Appendix I – Post-Construction Operation and Maintenance (O&M) <u>Manual</u>

Post-Construction Operation and Maintenance (O&M) Manual for Stormwater Management Facilities

for

FLAT CREEK SOLAR PROJECT

TOWN OF CANAJOHARIE AND ROOT MONTGOMERY COUNTY, NEW YORK

SPDES Permit #:

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1.0 Introduction

The stormwater management system for the Flat Creek Solar Project (Facility) consists of infiltration trenches, vegetated filter strips, and two detention basins with associated outlet control structures and overflow weirs. The following O&M Manual outlines the minimum requirements for maintaining the stormwater management facilities, as required in Section 3.5 of the New York State Stormwater Management Design Manual (SMDM).

1.1 Purpose of the Manual

This manual is intended to outline the requirements for proper maintenance and operation of the stormwater management facilities associated with Facility. Proper maintenance ensures the following:

- Stormwater facilities operate as they were designed;
- Stormwater facilities remain free of sediment, debris, and potential pollutants; and
- Stormwater facilities do not result in adverse downstream impacts to environmentally sensitive areas.

The Facility will be solely-owned, operated, and maintained by Flat Creek Solar LLC (the Owner). The Owner is responsible for ensuring that the stormwater management facilities installed on the Project Site are properly maintained and that they function as designed. In some cases, the maintenance responsibility may be assigned to others through special maintenance agreements. NYSDEC maintenance guidance and stormwater practice inspection checklists with stormwater management practice schematics for the Project Site are provided in Appendix A and B. Maintenance agreements associated with this Project shall be included in Appendix C of this Manual.

This Manual details the various stormwater facility components and the general operation and maintenance activities required for each component. Additional operation and maintenance information may be found in the SMDM) and the New York State Standards and Specifications for Erosion and Sediment Control.

2.0 Inspection and Maintenance Schedule

The stormwater management systems shall be inspected and maintained regularly to ensure proper site function. Inspection frequency may depend on the stormwater management systems and facilities present at the Project Site.

A Maintenance Inspection Form shall be completed during each inspection to document the Site conditions and required maintenance activities. Maintenance activities may include, but are not limited to, removal of sediment, trash, or debris; vegetation management; erosion repair; and revegetation of exposed soils. A blank sample Maintenance Inspection Form has been included in Appendix D. Completed Maintenance Inspection Forms shall be incorporated into Appendix E.

3.0 First Year Maintenance

The following maintenance activities are required during the first year following Project completion:



- Water vegetation once every three days for the first month, then provide a half inch of water per week during the first year.
- Fertilization may be needed in the fall after the first growing season to increase plant vigor.
 Fertilizer application and use should be in accordance with local, state, and federal laws and regulations.
- Keep the site free of vehicular and foot traffic and other weight loads.

4.0 General Site Maintenance

Site cover and associated structures should be inspected periodically for the first few months following construction and then on a bi-annual basis. Site inspections should also be performed following major weather events such as, but not limited to, major storm events, thunderstorms, and significant snow melt.

Items to inspect for include, but are not limited to:

- Differential settlement of embankments, cracking, or erosion.
- Lack of vegetative cover density.
- Sediment accumulation on the ground surface or within stormwater management practices or conveyance systems.
- Accumulation of debris, litter, or pollutants such as oil or grease on the ground surface or within stormwater management practices or conveyance systems.
- Damage to or weakness of stormwater management practices or conveyance systems.

4.1 Site Restoration

Areas within a Project Site that have undergone site restoration should be inspected periodically for the first six months and once after each storm event greater than a half-inch.

Items to inspect for include, but are not limited to:

- Checking embankments for subsidence, erosion, cracking, undesirable tree and shrub growth, and the presence of burrowing animals.
- Health and vigor of vegetation such as trees, shrubs, grass, and flowers.
- Accumulation of sediment or vegetative debris such as leaves and branches.

4.2 Tree Planting/Preservation

During the first three years, mulching, watering and protection of young trees is necessary. Inspection of trees should be performed every three months and within the one week of ice storms and high wind events, reaching speeds of 20 mph, until trees have reached maturity. As a minimum, inspection should include assessment of tree health, inspection for evidence of damage or disease, and determining the survival rate of damage and diseased trees. Trees shall be pruned and treated as necessary, and dead trees shall be replaced.

5.0 Winter Maintenance

Plowing and shoveling will be the primary method of snow removal for winter maintenance access across the Facility Site. Winter maintenances access within the array areas will be infrequent. Should de-icing materials be required for access during winter months, the Owner/Operator will



work with State agencies to determine which de-icing material may be used, specifically on pervious access roads and within agricultural lands.

To prevent impacts to stormwater management facilities, the following winter maintenance limitations, restrictions, and/or requirements are recommended:

- Remove snow and ice from catch basins, inlet and outlet structures, and away from culvert end sections.
- Snow plowed or removed should not be piled at inlets/outlets of stormwater management practices or structures.

6.0 Operation and Maintenance Procedures: Stormwater Management Facilities

6.1 Riparian Buffers and Filter Strips

Vegetated filter strips or undisturbed natural areas such as riparian buffers are utilized to treat and control stormwater runoff from areas of development. Vegetated filter strips are vegetated surfaces designed to treat sheet flow from adjacent areas and removed pollutants through filtration and infiltration.

General Inspection Requirements

The riparian buffers and/or filter strips shall be inspected annually for damage and debris. Damage may include, but is not limited to, exposed soils, erosion or channelization, and reduction in the buffer length. The buffer length shall be maintained at the design length to ensure effectiveness of the practice.

Erosion and Sedimentation

If sedimentation occurs, the sediment shall be removed with a hand shovel when greater than two inches of sediment is present. If erosion or channelization is experienced, upstream maintenance may be required to repair an underlying problem contributing to the damages.

Vegetation Management

Vegetation within filter strips shall be mowed to a minimum height of four inches with a minimum of four cuttings per year. Exposed soils within filter strips shall be reseeded and mulch, as needed.

Riparian buffers shall remain as undisturbed natural areas to ensure effectiveness of the practice.

Flow Spreaders and Level Spreaders

Flow spreaders or level spreaders installed in association with the riparian buffer or filter strip shall be maintained in accordance with Section 6.3 of this Manual.

6.2 Flow Spreaders/Level Spreader

A flow spreader/level spreader is a device used to distribute stormwater uniformly over the ground surface as sheet flow to prevent concentrated, erosive flows and promote infiltration.



General Inspection Requirements

Flow spreaders/level spreaders shall be inspected semi-annually and following major storm events for the first year. After the first year, the spreaders shall be inspected annually and after major storm events. The spreader shall be inspected for channelization, erosion, trash/debris, and sedimentation.

Erosion and Channelization

Channelization and erosion with the spreaders shall be repaired immediately. Channelization and erosion may occur within the upslope areas, around the weir, or in the stabilized outlet.

Sedimentation

Sediment shall be removed when it has accumulated to 10 to 20 percent of the design volume or channel capacity.

Trash and Debris

Trash and debris shall be removed as necessary and disposed of at an approved solid waste disposal facility.

Vegetated spreaders shall be mowed as necessary. Seed and mulch the disturbed areas as needed to maintain a vegetative cover.

6.3 Detention Ponds

Detention pond are designed to hold and slowly release stormwater through infiltration and/or a specially designed stormwater control structure.

General Inspection Requirements

The detention ponds shall be inspected at least once per year and after major storm events. The ponds shall be inspected for erosion, sedimentation, debris/trash, and vegetative debris. The stormwater control structure shall be inspected for sediment, debris/trash, and damage or deterioration.

Access and Vegetation Management

Access to the pond shall be inspected and maintained. Access should extend to the forebay, safety bench, riser, and outlet area.

Vegetation shall be managed around the pond and vegetative debris shall be removed as necessary to prevent accumulation in the pond.

Safety and Security Features

Safety and security features shall be inspected to ensure the features are functioning as designed. A warning sign shall be posted prohibiting swimming, wading, and skating, warning of possible contamination or pollution of the pond water and indicating the maximum pond depth.



Perimeter fencing shall be inspected for damage.

Trash and Debris

Trash and debris shall be removed from the pond and on trash racks immediately. The low flow orifice shall be inspection for clogging. Maintenance to the low flow orifice shall be completed as necessary.

Trash and debris shall be disposed of at an approved solid waste disposal facility.

Erosion and Sedimentation

Erosion may occur within the pond, forebay or the outlet area. Erosion shall be repaired immediately to prevent further damage to the pond.

Sediment shall be removed from the pond forebay every five to six years or when sediment has reach 50% of the forebay capacity. Sediment shall be disposed of at an approved solid waste disposal facility.

The pond dimensions and location shall not be altered in any way. Proper notification is required if the pond must be drained for maintenance purposes. Consultation with a licensed engineer may be necessary if erosion issues persist.

Pond Drain

The drain pipe shall be inspected to ensure it is functioning properly. Inspect the pipe for clogging and sediment deposition. The drain pipe should drain the pond to the design level within 24 hours.

6.4 Infiltration Facilities

Infiltration facilities dispose of stormwater by detaining the water and allowing it to infiltrate into the ground. Infiltration facilities may be designed to handle all or a portion of the runoff from a Project Site, or they may overflow and bypass larger storms to alternate systems.

General Inspection Requirements

Stormwater infiltration systems shall be inspected annually and after major storm events. The facility should be inspected following a storm event to ensure the system is functioning properly and maintaining the capacity to infiltrate the stormwater. A monitoring well may be utilized to inspect the functionality of the system. The system shall be inspected for sedimentation, debris/trash, and damage.

Access and Vegetation Management

Direct access to the infiltration facility shall be available at all times. Vegetation shall be managed to sustain the facility and allow for access. Seed and mulch bare soils are needed to maintain adequate soil cover.



Trash and Debris

Trash and debris shall be removed as needed.

Erosion and Sedimentation

Sediment shall be removed from the system when it accumulates to two inches, or when the system is not draining properly. The sediment shall be removed with a hand shovel and disposed of at an approved solid waste disposal facility. The infiltration facility shall be inspected annually for sediment deposition.

Inspect the system for displacement of aggregate material. Remove the displaced aggregate and repair the infiltration facility as needed to meet the design specifications.

System Functionality and Dewatering

The infiltration system shall fully dewater within 48 hours of a storm event. Damage to the infiltration system shall be repaired immediately following identification. The overflow from the infiltration system shall be inspected for damage and to ensure the system is operating correctly.

7.0 Operation and Maintenance Procedures: Stormwater Structures and Features

7.1 Storm Culverts and Drainage Pipes

Storm culverts and drainage pipes convey stormwater throughout the Project Site. The storm culverts and drainage pipes shall be inspected annually and after major storm events to assess for damage and obstructions. Storm culverts and drainage pipes may experience damage such as cracking, warping due to compaction, or corrosion. The culverts and piping shall be repaired or replaced when 25% or more of the structure has been compromised.

Sediment build-up and debris/trash shall be removed and disposed of at an approved soil waste disposal facility. Improper removal of sediment and debris/trash may result in flooding and adverse impacts to upstream areas. Use of a hand shovel is recommended for sediment removal.

Riprap outlet protection and stone aprons at the outlets of storm culverts and drainage pipes shall be inspected as detailed in Section 8.1 of this Manual. The inlets and outlets shall be assessed for erosive conditions. Repair to erosion shall be completed as needed.

Vegetation shall be maintained to prevent excess vegetative growth at the inlets and outlets of the culverts and piping.

8.0 Operation and Maintenance Procedures: Miscellaneous Items

8.1 End Sections

End sections are found at the end of pipes and typically include rock outlet protection such as riprap stone aprons. The purpose of riprap aprons placed at the end of pipes is to reduce the velocity, depth, and energy of stormwater, such that the flow will not erode downstream areas.

The end section(s) of pipes, including stone aprons, should be visually inspected for trash and sediment at least twice per year and after major storm events. If trash is observed, it should be



removed and disposed of properly. If excess sediment deposition is observed on the stone apron, measures should be taken to remove the sediment. Excessive sedimentation occurs when the stones on the bottom of the apron are no longer visible due to sediment deposition. It is recommended that accumulated sediments be removed with a hand shovel and disposed of offsite at an approved or otherwise authorized solid waste disposal facility.

8.2 Fences, Gates, and Signage

Fences have been installed around the perimeter of stormwater facilities in order to restrict entry to the facility, and to protecting the public and wildlife. Gates have been installed at various locations along the perimeter fencing to allow for maintenance access. Gates are to be secured shut with a lock except when maintenance operations are actively occurring.

Signage shall be installed at the appropriate stormwater management facilities, as detailed in the SMDM. The Owner/Operator shall erect or post, in the immediate vicinity of stormwater management practices, a conspicuous and legible sign of not less than 18 inches by 24 inches (or 10 inches by 12 inches for footprints smaller than 400 square feet) bearing the following information:

Stormwater Management Practice – (name of the practice)
Project Identification – (SPDES Permit number or similar)
Must Be Maintained in Accordance With the O&M Plan
DO NOT REMOVE OR ALTER

Inspect the fences, gates, and signage annually for areas needing repair or replacement. Repair or replace damaged or compromised components of the fences, gates, or signage as needed. Maintain the ground underneath the fences and gates as needed to allow safe entry and exit to the stormwater management facility and prevent further erosion impacts. Replace the signage if any information is missing or has been sun-bleached.

8.3 Access Roads, Gravel Parking Areas and Substation Yards

Access Roads

Access roads shall be maintained to allow for safe access to and from the Project Site. The access roads shall be inspected annually and after major storm events to assess for trash/debris, erosion, rilling, sedimentation, or gravel migration. Trash/debris shall be removed as needed and disposed of at an approved solid waste facility. Erosion, sedimentation, rilling, or gravel migration shall be repaired. Vegetation along the access roads shall be maintained as needed to allow for safe access to the Project Site.

Pervious Access Roads

Pervious access roads are to be installed after construction has finalized to prevent sediment tracking into the porous stone material or compaction of the road area. The pervious access road will require little on-going maintenance. The road areas shall be inspected annually and after major storm events to access for trash/debris, erosion, rilling, sedimentation, or gravel migration. Trash/debris shall be removed as needed and disposed of at an approved solid waste facility. Erosion, sedimentation, rilling, or gravel migration shall be repaired. Vegetation along the road areas shall be maintained as needed to allow for safe access to the Project Site.



Gravel Parking Areas

Gravel parking areas typically require little on-going maintenance, due to the limited use of heavy vehicles. The gravel parking areas shall be inspected annually and after major storm events to assess for trash/debris, erosion, rilling, sedimentation, or gravel migration. Trash/debris shall be removed as needed and disposed of at an approved solid waste facility. Erosion, sedimentation, rilling, or gravel migration shall be repaired. Vegetation along the parking areas shall be maintained as needed to allow for safe access to the Project Site.

Substation Yards

Substation yards shall be maintained to allow for safe operation at the Project Site. The substation yards shall be inspected annually and after major storm events to assess for trash/debris, erosion, rilling, sedimentation, or gravel migration. Trash/debris shall be removed as needed and disposed of at an approved solid waste facility. Erosion, sedimentation, rilling, or gravel migration shall be repaired. Vegetation around the substation yards shall be maintained as needed to allow for safe access to the Project Site.

9.0 Operation and Maintenance Procedures: Repair/Replacement Activities

Damage to on-site stormwater facilities and infrastructure may occur and repair or replacement may be necessary to ensure proper function. Components of the stormwater management practices, conveyance systems, or on-site structures which require repair or replacement should be addressed immediately following identification of deficiencies.

Repair of stormwater management facilities shall be completed as outlined in this Manual. Replacement of stormwater facilities or components of a facility may require assessment and design by a licensed engineer. The Owner/Operator shall read local, state, and federal regulations prior to replacement activities to ensure compliance.

10.0 Contact Information

Questions about the stormwater management systems and operation and maintenance procedures should be directed to the Owner/Operator.



Appendix A – NYSDEC Maintenance Guidance



MAINTENANCE GUIDANCE

Stormwater Management Practices

March 31, 2017



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Section 1. Introduction

1.1. Stormwater Management Practice (SMP) Groups

Stormwater management has become an important function for municipalities to address the quality of local water resources and to adhere to state standards. Increasingly, stormwater management practices (SMPs) are constructed as part of new development or redevelopment projects as retrofits to existing infrastructure and/or as part of local watershed restoration plan efforts.

While SMPs are proliferating, municipalities are charged with a certain level of implementation and oversight. Whether this is a new function for a municipality or an expansion of existing programs, it is important for these local programs to have some degree of guidance to successfully meet the challenge. One important area where guidance has been lacking is how to properly operate and maintain the wide range of SMPs that are constructed. This chapter was developed to address this need. It is widely understood that SMPs will not function properly to protect water resources without attention to operation and maintenance (O&M), and that O&M tasks and responsibilities must be identified and assumed by various stakeholders.

The chapter is structured around a hierarchy concept where O&M responsibilities are addressed by SMP owners/property managers, municipal staff, landscape contractors and professionals with knowledge in stormwater management (Qualified Professional). The hierarchy approach, explained in more detail below in Section 1.2, strives for a cost-efficient way to ensure long-term performance of SMPs.

The maintenance procedures described in this chapter are applied to ten separate SMP groups (**Table 1.1**). These same ten groups are used to separate maintenance inspection guidance, costs, and other guidance in the chapter.

Table 1.1 Practices Discussed in this Chapter, by Group			
SMP Group Practices Included			
Rainwater Harvesting	Rain BarrelCistern		
Rooftop Disconnection Sheetflow to Filter Strip Sheetflow to Riparian Buffers			
Swales	Vegetated SwaleWet Swale		
Tree Planting	Tree Planting		
Bioretention	 Bioretention Cell Dry Swale Rain Garden Stormwater Planters Tree Pits 		
Green Roofs • Green Roofs			
Permeable Pavements	Permeable Pavers Porous Asphalt/Concrete		
Ponds and Wetlands	Wet Pond Design OptionsStormwater Wetland Design Options		
Infiltration	Infiltration TrenchInfiltration BasinDry Well		
Sand and Organic Filters	Surface Sand FiltersUnderground Sand FiltersUnderground Organic Filters		

1.2. Maintenance Hierarchy

SMPs require inspections and maintenance to identify small problems before they become more serious and expensive to repair. For example, removing a small amount of sediment from a filtering medium or permeable pavement surface is much less expensive than replacing a surface that has already become clogged. However, it can be cost prohibitive for most communities or SMP owners to hire highly trained staff or contractors to inspect these practices or to carry out the actual maintenance tasks. This can be especially true with the advent of "micro-scale" Green Infrastructure practices, which may be distributed across many individual public and private properties, and where the absolute number of SMPs within a municipality may exceed local government inspection and maintenance capabilities.

Many SMP maintenance problems start out as fairly small, easily rectified issues as long as they are detected early enough through an inspection. For these issues, property

owners or managers can likely take care of the issue in an expedient and cost-effective manner.

However, at some point, property owners or managers will encounter an issue where diagnosing the problem and knowing the appropriate remedy will exceed their technical capabilities. At this point, an individual with training in SMP inspection, operation and maintenance, such as a municipal inspector or landscape contractor, may have to be called in for assistance.

Similarly, some problems escalate to the point where a Qualified Professional (i.e. professional engineer or landscape architect) is needed to bring the SMP back to a good functioning condition. The Qualified Professional may need to bring in other experts to assess problems with the SMP. For instance, they may call in a horticulturalist to assess problems with the planting plan.



Acknowledging this step-wise approach to SMP inspection and maintenance, the SMP Maintenance Hierarchy concept was developed. The concept uses a combination of skill levels (Figure 1.1) as explained in more detail below.

Level 1: Property Owners and Managers, Interns, etc.

This category includes property owners, property managers, or HOA representatives, for privately owned SMPs. For municipally owned SMPS, this could include municipal maintenance staff or interns, and volunteers. These individuals would typically have no or only very limited training in stormwater maintenance and inspection but can use available guidance to quickly identify and rectify common and simple issues with SMP performance. This level completes routine inspections and maintenance activities. For most SMPs, the majority of inspection and maintenance activities can be conducted at this skill level, thus Level 1 forms the base of the Maintenance Hierarchy pyramid. Many well-functioning SMPs can be adequately maintained for long periods of time using Level 1 capabilities.

Although many issues can be addressed at Level 1, these inspectors and maintainers need a relief valve when the SMP problems become harder to diagnose and/or the remedies require a higher level of resources and expertise. Such issues are referred to in this chapter as "kick-outs to Level 2." For instance, an SMP may have a minor amount of sediment that has accumulated at inlets or on the practice bottom. A Level 1 person may be able to take care of this with a flat shovel and wheel barrow. However, a Level 2 inspection would be triggered if the sediment is deep, widespread, keeps recurring, and/or requires more sophisticated equipment to remove.

Level 2: Trained Municipal Staff

This level of inspection and maintenance is conducted primarily by municipal employees or landscape contractors who have completed training on SMP, inspection, operation and maintenance. Level 2 inspections can take place in response to two circumstances:

1. As part of an ongoing, routine municipal inspection program whereby SMPs are visited on a rotating basis at a frequency established by the local program, or

2. In response to a "kick-out" from a Level 1 inspector based on a specific problem or problems.

Circumstance #2 obviously will require coordination and communication between the Level 1 and Level 2 inspectors, with documentation and background provided by the Level 1 inspector. This is an essential part of making the hierarchy approach successful. In the example above, the Level 2 inspector can better diagnose the sources of the sediment, whether the sediment is affecting performance of the SMP, and the specific tasks needed to remove the sediment and abate the source.

As with kick-outs from Level 1 to Level 2, the same can exist from Level 2 to Level 3. It may be that the Level 2 inspector encounters a problem where a Qualified Professional is needed to re-design certain components of the SMP, and a qualified contractor is needed to undertake a more serious repair. This is when Level 3 is activated.

Level 3: Qualified Professionals

Qualified professionals include professional engineers and landscape architects, who can revisit design issues associated with chronic or serious problems. For repair and maintenance of the SMPs at this level, individuals with specific skills and certifications, such as a certified plumber who has experience working with rainwater harvesting practices or a horticulturalist with knowledge on proper plantings may need to be called in by the Qualified Professional. Level 3 inspection or maintenance is triggered in response to specific problems identified during a Level 2 inspection.

Continuing with the example above, the Level 2 inspector identifies that the sediment is accumulating in the SMP because of the lack of pre-treatment or that the practice is not sized properly for its drainage area. The Level 2 inspector at this point should consult a Qualified Professional (Level 3) who can go back to the original or as-built plan and develop workable solutions.

Table 1.2 further describes how maintenance and inspection activities differ among the three levels of the SMP Maintenance Hierarchy.

Table 1.2 Maintenance/Inspection Hierarchy Levels				
	Level 1: Owners and Untrained Staff	Level 2: Trained Municipal Staff	Level 3: Qualified Professionals	
Qualifications/ Training of Inspectors	No special training, but person is provided educational materials	On-the-job training and/or short workshops Define adequate training or provide examples	Professional License such as a PE or RLA	
Frequency of Inspection	At least annually	Routine as determined by the local program OR as kick-out from Level 1 inspection	Only as needed from Level 2 inspection	
Inspection Guidance	Checklists are included for each practice group in Section 2 of this chapter and in Appendix A .	Guidance for the inspection is included in Section 3 , and checklists are included in Appendix B.	Section 4 includes guidance for diagnosing typical problems.	
Typical Maintenance Activities	Routine mowing. Trash removal. Plant care and upkeep. Mulching as needed. Removal of small amounts of sediment from pretreatment areas of the practice.	Removal of larger amounts of sediment. Structural damage repair. Minor regrading and scarification of soil surface to restore permeability.	Redesign an improperly functioning practice. Includes regrading of the contributing drainage area, replacing soil media and plantings (new planting plan), or modifying conveyance structures.	
Triggers for Inspection or Maintenance by this Level	Regular inspection (no trigger)	Level 1 Inspection Sheets (Section 2) describe triggers that warrant a Level 2 Inspection.	Level 2 Inspection Guidance (Section 3) describes triggers that warrant a Level 3 Inspection.	

1.3. Using the Remainder of this Chapter

This chapter provides guidance for maintaining SMPs, including inspection, maintenance activities, and maintenance planning. The chapter includes four sections as follows:

- **Section 2** outlines Level 1 inspection and maintenance procedures in the form of visual checklists. This includes guidance for inspection of each of the 10 SMP groups/categories included in this chapter, as well as specific kick-outs for Level 2.
- Section 3 provides guidance for Level 2 inspections as to observed conditions, remedies, and triggers for Level 3.
- **Section 4** is most relevant to Level 3 and includes diagnostic measures for specific problems, as well as guidance for performing repair activities.
- **Section 5** provides an overview of planning for maintenance, including techniques for estimating maintenance costs and elements of a maintenance plan.

Section 2. Level 1 Inspections

2.1. How to Use this Section

Section 2 provides guidance for Level 1 inspections of 10 groups of stormwater management practices (SMPs). See Section 1 of this chapter for an explanation of Level 1 in the Maintenance Hierarchy.

- Section 2.2 provides general guidance for Level 1 inspections.
- Sections 2.3 through 2.12 provide detailed Level 1 inspection guidance and inspection forms for each of the 10 practice categories:
 - 2.3 Rainwater Harvesting
 - 2.4 Disconnection and Sheetflow
 - o 2.5 Swales
 - 2.6 Tree Planting
 - o 2.7 Bioretention
 - 2.8 Green Roofs
 - 2.9 Permeable Pavement
 - o 2.10 Ponds and Wetlands
 - o 2.11 Infiltration
 - o 2.12 Sand and Organic Filters

2.2. General Guidance for Level 1 Inspections

Regardless of which practice you are inspecting, some key procedures and equipment are necessary. Read through this guidance before going on an inspection, and use the specific guidance in **Sections 2.3 through 2.12** for the particular practice type you are inspecting. The Level 1 Inspection can be completed with minimal previous training. Typical Level 1 inspectors may include a property owner or manager (for private SMPs) or perhaps an intern or maintenance or landscape crew members in the case of a publicly owned practice. Level 1 inspections are the most frequent inspections. They are designed to identify key maintenance issues before they become more serious and to help keep up with routine maintenance tasks.

When to Conduct a Level 1 Inspection

The Level 1 Inspection should be conducted at least annually for all practices and is often supplemented with additional visits after large storms, winter salting and sanding, or other seasonal changes. In addition, it is recommended that inspections take place more frequently during the first few years after installation of an SMP. Many issues can be identified and corrected during this early period so that they do not lead to larger problems in subsequent years. Plant establishment and health is one of these key issues. Once the SMP is stable and seems to be functioning properly, the inspections can become less frequent.

What to Take into the Field

The Level 1 Inspection is fairly simple, and it is assumed that very little measurement will be needed. However, the inspector should take pictures to document findings and should also keep a record of the inspections. The list of needs for the Level 1 Inspection includes the following:

- 1. Safety vest (if SMP is located in an area near traffic)
- 2. Notes or records from past inspections
- 3. Digital camera or phone
- 4. Clipboard and pencils (if using paper forms), or Tablet or smartphone if using digital forms
- 5. Bug spray (if needed)
- 6. Sun block (if needed)
- 7. Tape measure (optional, to measure pipe sizes and SMP dimensions)
- 8. Letter of permission to access property if the inspector is from an outside agency (e.g., summer intern working for the municipality)
- 9. Site Plan showing SMPs, Planting Plan (includes planting/seed mixes) and details
- 10. Engineers scale
- 11. Flagging/stakes and waterproof marker (to mark problem areas that need to be visited again)

Checklist and Follow-Up Actions

The Level 1 Inspection checklists included in **Sections 2.3 through 2.12** describe follow-up actions for each observed condition (See **Figure 2.2.1** for an example). A Level 1 Inspection Table is available for each component or key area of the particular SMP group. Use as follows:

- Check the box in the LEFT column if the problem is present at the site.
- Check the appropriate follow-up actions in the RIGHT column, or add your own as needed to fix the problem.
- DOCUMENT all your actions. Keep copies of the Level 1 inspection tables, plus notes, photos, or other
 documentation of corrective measures to fix problems. Record dates of actions and any follow-up inspections.
 This will be important for communicating with Level 2 inspectors and/or the local stormwater program.
- Activate a Level 2 Inspection (Section 3) as guided by the table (shown in blue cells): These blue cells identify
 conditions when a more detailed inspection will be needed to further diagnose problems. As the problem
 becomes more severe, it will be necessary to activate a Level 2 inspection. Consult the local stormwater program
 authority for the most appropriate Level 2 inspection option.

Problem (Check if Present) Seed and mulch areas of bare soil to get vegetation established. Fill in erosion areas with soil, compact, and seed straw to get vegetation established. If a rill or small channel is forming, try to redirect water flowing to this area by creating a small bern or adding topsoil to area by creating a small bern or adding topsoil to area by creating a small bern or adding topsoil to area by creating a small bern or adding topsoil to area by creating a small bern or adding topsoil to areas that are heavily compacted. Other: Kick-Out to Level 2 Inspection: Large areas of soil have been eroded, or larger channels are forming. May require rerouting of flow paths.

Figure 2.2.1. Example of a Level 1 Inspection Checklist, with Follow-Up Actions. Note "Kick-Out to Level 2" highlighted in gray.

2.3. Rainwater Harvesting – Level 1 Inspections

Components of Rainwater Harvesting

Key components to inspect for Rainwater Harvesting systems include the following:

- RWH 1. Conveyance System (gutters, downspouts, other pipes) and Filter
- RWH 2. Storage Tank
- RWH 3. Outlets

Note: The category of Rainwater Harvesting includes:

- Rain Barrel A small tank, usually between 50 and 100 gallons that can be installed directly next to a downspout. Multiple rain barrels can be connected in order to increase rainwater storage capacity. This is the most common form of rainwater harvesting on residential properties.
- Cistern A larger tank that can be installed above ground or below ground, depending on the structural capacity of the material.



Figure 2.3.1 Key Areas for Level 1 Inspection of Rainwater Harvesting Systems

Rainwater Harvesting Level 1 Inspection

The Level 1 Inspection focuses on the Conveyance System and Filter (RWH 1), Storage Tank (RWH 2), and Outlet (RWH 3). It is recommended that this inspection be conducted two to four times per year, especially in spring and late fall. If possible, inspect the system during or immediately after a storm in order to better see any active blockages, leaks, or other problems.

RWH 1. Conveyance System and Filter

Description: The conveyance system is all the components that collect and convey runoff from the roof toward the storage tank. This typically consists of gutters and downspouts, and sometimes additional drainage pipes. These components need to be kept clear of debris in order to avoid blockages and spilling of runoff out of the gutters. Every proper rainwater harvesting system also has one or more ways of filtering the water coming into the tanks from the conveyance system. These may include screens, first-flush diverters, and vortex filters.

Instruction: Inspect any gutters, downspouts, drainage pipes, and filters connected to the Rainwater Harvesting System. Consult **Table 2.3.1** below:



Figure 2.3.2 Inspecting the Conveyance System and a Vortex-style Filter

Table 2.3.1 RWH Conveyance System and Filter				
Problem (Check if Present)	Follow-Up Actions			
 Leaves, sticks, or other debris in gutters and downspouts 	□ Remove all debris by hand.□ Other:			
	 Clean out all debris and organic matter buildup by hand or by spraying with a hose. Other: 			
☐ Leaves, sticks, or other debris in filter(s)	Kick-Out to Level 2 Inspection: Filter (first-flush diverter or vortex filter outside the tank) does not seem to be operating, is completely clogged, or does not appear to be trapping any debris.			
 Loose or disconnected junctions between gutters, pipes, or filters 	 Secure any loose junctions or parts and make sure they are properly sealed to prevent leaks, Other: 			

RWH 2. Storage Tank

Description: Many different types and sizes of tanks can be used for rainwater harvesting. They can be situated underground, above ground, or even partially buried. The tank body has an inlet (and/or cover) and one or more outlet points for water to leave the tank. Advanced rainwater harvesting systems usually also have a pump and a filter inside or outside the tank to further clean the stored water and pump it to the point of use.

Instruction: When the tank is full, carefully inspect for any leaks or blockages. Next, drain the tank to inspect interior. For safety reason, visually inspect the inside of the tank without breaking the plane of the opening with any body parts, as this is a confined space that should only be entered by those with special training. Consult **Table 2.3.2** below.



Figure 2.3.3 Inspecting the Storage Tank

Table 2.3.2 RWH Storage Tank				
Problem (Check if Present)	Follow-Up Actions			
☐ Tank is above ground and not freeze proof.	 Winterize the tank by performing the following steps: Drain down water level in the tank before winter to avoid damage from freezing temperatures. Drain water from pipes and pumps. Disconnect conveyance pipes from the tank to enable roof runoff to bypass the tank during winter. 			
☐ Tank is full between rain events (harvested water is not being used).	☐ Drain down any remaining water in the tank before predicted rain events.			
Mosquito larvae or other insects present in the water	 Add mosquito dunks to water. Ensure that insect screens are installed on all openings and are properly sealed (inlet and outlets). Other: 			
	□ Remove as much as possible, by hand. □ Other:			
 Debris, algae, or organic matter accumulated in tank 	☐ Kick-Out to Level 2 Inspection: For large tanks that cannot easily be accessed for inspection and/or cleaning, defer to Level 2 Inspection.			
Tank does not appear to fill fully even during large rains, or water level drops quickly after filling.	☐ Kick-Out to Level 2 Inspection: Water is bypassing the tank and/or there are leaks in the tank wall. This will likely require special expertise to diagnose and fix.			
 Problems with pumps, filters, or other mechanical components 	☐ Kick-Out to Level 2 Inspection: This will likely require special expertise to diagnose and fix.			

RWH 3. Outlets

Description: An above-ground rainwater harvesting tank usually has at least two outlets—one at the top of the tank where water overflows when the tank is full, and one near the bottom of the tank for delivering the stored water by gravity feed. Many filters also have an outlet pipe to divert the first flush of roof runoff away from the tank. Any overflow outlet that spills onto the ground should have sufficient erosion control (e.g., rock or stone pad) to prevent erosion of the ground.

Instruction: Examine the outlet pipe(s) and the point at which it overflows onto the ground. Consult **Table 2.3.3** below.

Table 2.3.3 RWH Outlets				
Problem (Check if Present)		Follow-Up Actions		
	Slow flow from outlet caused by faulty or clogged valve	 If clogging seems to be the problem, ream out sediment from valve if this can be done from exterior. Other: 		
		☐ Kick-Out to Level 2 Inspection: Valve needs to be replaced or cannot be cleaned out from outside of tank.		
	Flow from outlet is backing up toward building foundation.	Add flexible pipe to end of outlet pipe to divert flow further away and downhill from building.		
	Erosion or drainage issues at outlet	 □ Add a gravel and/or stone pad to reduce the impact from the water flowing out of the outlet pipe during storms. □ Other: 		
		Kick-Out to Level 2 Inspection: Rills have formed, erosion or drainage problems are more severe or cannot be resolved, or there is discoloration or other unusual conditions around the outlet.		

2.4. Disconnection and Sheetflow

Components of Disconnection and Sheetflow

The intent of disconnection and sheetflow is for runoff from small areas of impervious cover to spread out evenly and dissipate in a grassy or vegetated area. It is a low-technology practice intended to reduce runoff at its source. Key components to inspect for Disconnection and Sheetflow include the following:

- D&S 1. Drainage Area
- D&S 2. Level Spreader/Energy Dissipator
- D&S 3. Treatment Area

Note: The category of

Disconnection and Sheetflow includes:



Figure 2.4.1 Key Areas for Level 1 Inspection of Disconnection and Sheetflow with filter strip shown.

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- Rooftop Disconnection Runoff from a small rooftop is directed to a relatively flat pervious area.
- Sheetflow to Filter Strip Runoff from a small parking lot, sidewalk, or other small impervious surface is directed to a relatively flat, uniformly graded grassy area.
- Sheetflow to Riparian Buffers Runoff from a small parking lot, sidewalk, or other small impervious surface is directed to a relatively flat, well-vegetated riparian area.

Disconnection and Sheetflow Level 1 Inspection

The Level 1 Inspection focuses on the Drainage Area (D&S 1), Level Spreader/Energy Dissipater (D&S 2), and Treatment Area (D&S 3). This inspection should be conducted twice per year, preferably in the spring and fall. If possible, inspect the practice during a storm in order to better see any active blockages, bypassing, or other problems.

D&S 1. Drainage Area

Description: The drainage area consists of rooftops and/or impervious surfaces such as parking lots, driveways, or sidewalks. Pervious areas such as lawns or forests may also be part of the drainage area.

Instruction: Visually inspect any surfaces in the drainage area. Consult **Table 2.4.1** below.

Table 2.4.1 D&S Drainage Area				
Problem (Check if Present)	Follow-Up Actions			
	 Changes in flow; more runoff; runoff bypassing the practice 	 For rooftop areas, make sure downspouts are still disconnected and conveying water into the treatment area. Look for and remove any "dams" of sediment and grass clippings that prevent water from entering the treatment area as sheet flow. Other: 		
		☐ Kick-Out to Level 2 Inspection: Changes to drainage area size or amount of runoff due to construction, tillage, etc.		
	 For parking lots in the drainage area—sediment, grass clippings, or other 	 For small, isolated amounts of debris, sweep up by hand and dispose properly so that it will not be exposed to runoff. Other: 		
	debris has accumulated at pavement edge.	Kick-Out to Level 2 Inspection: Sediment is widespread and cannot be removed by manual sweeping.		
	☐ For parking lots in the drainage area—dips or damage at pavement edge caused flow to concentrate.	☐ Kick-Out to Level 2 Inspection: This will likely require special expertise to diagnose and fix pavement edge.		

D&S 2. Level Spreader/Energy Dissipator

Description: Some disconnection and sheetflow practices have a structure in place to dissipate any concentrated runoff and turn it into sheet flow. This may consist of a stone or gravel spreader a concrete or wood level spreader, or other level and stable surface.

Instruction: Inspect the energy dissipator closely, during a rain event if possible. Consult the Table 2.4.2 below.

Table 2.4.2 D&S Level Spreader/Energy Dissipator				
Problem (Check if Present)			Foll	ow-Up Actions
		Debris and/or sediment accumulated behind or around the level spreader.		Remove debris and sediment by hand and ensure that the area behind the level spreader is relatively flat. Too much debris and sediment can cause runoff to bypass the level spreader structure. Other:
		Sinking, cracking,		For stone/gravel spreaders, add new material or rake out as needed to make it even. Other:
		sloughing, or other structural problem makes the energy dissipator no longer level.		Kick-Out to Level 2 Inspection: Structural issues that cannot be easily fixed by hand

D&S 3. Treatment Area

Description: After runoff is dissipated as sheet flow, it enters the treatment area—a relatively flat grassy or vegetated area.

Instruction: Examine where flow enters the treatment area as well as the whole flow path. Look for signs of concentrated flow. Consult the table below.

Table 2.4.3 D&S T	reatment Area		
Problem (Check if Present)	Follow-Up Actions		
☐ Trash and/or debris in the treatment area	☐ Collect trash/debris and dispose of properly.		
Grass filter strip has grown very tall, to the point that runoff cannot easily enter or is getting concentrated.	Mow filter strip twice a year or more frequently in a residential yard.		
□ Sparse vegetation or bare spots	 For grassy areas, add topsoil (as needed), grass seed mulch, and water during the growing season to reestablish consistent vegetation cover. Other: 		
	 For minor rills, fill in with soil, compact, and add seed and straw to establish vegetation. Other: 		
Rills or gullies are forming in treatment area where flow has become concentrated	Kick-Out to Level 2 Inspection: Rills are more than 2" to 3" deep and require more than just hand raking and re-seeding.		

2.5. Swales

Areas of Swales

- Key areas to inspect for swales include the following:
- SW 1. Drainage Area
- SW 2. Inlets
- SW 3. Swale Surface Area
- SW 4. Vegetation
- SW 5. Outlets

Note: The category of Swales includes:

- Vegetated Swale shallow channel densely planted with variety of grasses, shrubs, and/or trees (also called bioswale or drainage swale)
- Wet Swale a cross between a wetland and a swale, this linear system intercepts groundwater to maintain wetland vegetation

For the purposes of this chapter, the term "Swale" will be used to generally describe these practices.



Figure 2.5.1 Key Areas for Level 1 Inspection of Swales Credit

Swale Level 1 Inspection

The Level 1 Inspection focuses on the Drainage Area (SW1), Inlets (SW2), Swale Surface Area (SW3), Vegetation (SW4), and Outlets (SW5). This inspection should be conducted on a regular basis, with an early spring inspection to ensure that the practice has survived the winter, particularly if there has been a significant amount of snow. An inspection during the growing season or in the early fall is also recommended to check on the health of vegetation.

SW 1. Drainage Area

Description: The drainage area sends runoff to and is uphill from the swale. When it rains, water runs off and flows to and along the swale.

Instruction: Look for areas that are uphill from the swale. Consult **Table 2.5.1** below.

Table 2.5.1 SW Drainage Area					
Problem (Check if Present)	Follow-Up Actions				
Bare soil, erosion of the ground (rills washing out the dirt)	 Seed and mulch or sod areas of bare soil to establish vegetation. Fill in erosion areas with soil, compact, and add seed and straw to establish vegetation. If a rill or small channel is forming, try to redirect water flowing to this area by creating a small berm or adding topsoil to areas that are heavily compacted. Other: Kick-Out to Level 2 Inspection: Large areas of soil have been eroded, or larger channels are forming. May require rerouting of flow paths 				
Piles of grass clippings, mulch, dirt, salt, or other materials	 □ Remove or cover piles of grass clippings, mulch, dirt, etc. □ Other: 				
□ Open containers of oil, grease, paint, or other substances	Cover or properly dispose of materials; consult your local solid waste authority for guidance on materials that may be toxic or hazardous.				
	Kick-Out to Level 2 Inspection: Grass on edge of pavement continues to die off for unknown reasons. Swale edge may need to be replaced with other materials (e.g., stone diaphragm).				
	☐ Seed and mulch; add topsoil or compost if needed.☐ Other:				
☐ Grass dying at edge of road	□ Kick-Out to Level 2 Inspection: Grass on edge of pavement continues to die off for unknown reasons. Swale edge may need to be replaced with other materials (e.g., stone diaphragm).				

SW 2. Inlets

Description: The inlets to a swale are where water flows in. Depending on the design, water can flow in through:

- Ditch, pipe, or curb opening at top of swale: This is the most common approach, where water enters the swale at the top.
- Along the entire edge of the swale: If the swale is along a roadway or parking lot, water may enter along the long side of the swale through defined curb openings or simply by water flowing into the swale from the pavement edge (known as "sheetflow").

Instruction: Stand in the swale and look for all the places where water flows in. Consult **Table 2.5.2** below for possible problems.

Table 2.5.2 SW Inlets				
Problem (Check if Present)	Follow-Up Actions			
□ Inlets or the swale edge are collecting grit, grass clippings, or debris or have grass/weeds growing. Some water may not be getting into the swale. The objective is to have a clear pathway for water to flow into the swale.	 Use a flat shovel to remove grit and debris (especially at curb inlets or opening). Parking lots will generate fine grit that will accumulate at these spots. Pull out clumps of growing grass or weeds, and scoop out the soil or grit that the plants are growing in. Remove any grass clippings, leaves, sticks, and other debris that is collecting at inlets or along the edge of the swale where water is supposed to enter. For pipes and ditches, remove sediment and debris that is partially blocking the pipe or ditch opening where it enters the swale. Dispose of all material properly in an area where it will not re-enter the swale. Other: 			
Some or all of the inlets are eroding so that rills, gullies, and other erosion are present, or there is bare dirt that is washing into the swale.	 For small areas of erosion, smooth out the eroded part and apply rock or stone (e.g., river cobble) to prevent further erosion. Usually, filter fabric is placed under the rock or stone. In some cases, reseeding and applying an erosion control matting can be used to prevent further erosion. Some of these materials may be available at a garden center, but it may be best to consult a landscape contractor. Other: Level 2 Inspection: Erosion is occurring at most of the inlets or along much of the swale edge. The inlet design may have to be modified.			

SW 3. Swale Surface Area

Description: The swale surface area is the vegetated area where water flows during a storm and also the side slopes that slope down into the swale bottom. Depending on the design, the swale may also contain "check dams," which are small dams made out of earth, stone, wood, or other materials. The check dams slow down and temporarily pond water as it flows down the swale.

Instruction: Examine the entire swale surface and side slopes. Consult **Table 2.5.3** below for possible problems.

Table 2.5.3 SW Surface Area		
Problem (Check if Present)	Follow-Up Actions	
Minor areas of sediment, grit, trash, or other debris are accumulating in the swale.	 Use a shovel to scoop out minor areas of sediment or grit, especially in the spring after winter sanding materials may wash in and accumulate. Dispose of the material where it cannot re-enter the swale. If removing the material creates a hole or low area, fill with good topsoil and add seed and straw to re-vegetate. Remove trash, vegetative debris, and other undesirable materials. If the swale is densely vegetated, it may be difficult to do the maintenance; check for excessive ponding or other issues described in this section to see if the accumulated material is causing a problem. Other: 	
	 Kick-Out to Level 2 Inspection: Sediment has accumulated more than 3 inches deep and covers 25% or more of the swale surface. The source of sediment is unknown or cannot be controlled with simple measures. 	
	 Try filling the eroded areas with clean topsoil, and then seed and mulch to establish vegetation. If the problem recurs, you may have to use some type of matting, stone (e.g., river cobble), or other material to fill in eroded areas. If the erosion is on a side slope, fill with soil and cover with erosion-control matting or at least straw mulch after re-seeding. 	
	 Kick-Out to Level 2 Inspection: The problem persists or the erosion is more than 3 inches deep and seems to be an issue with how water enters and moves through the swale. Kick-Out to Level 2 Inspection: The problem does not seem to be caused by flowing water, but a collapse or sinking of the surface (e.g., "sinkhole") due to some underground problem. 	
□ Water does not flow evenly down the length of the swale, but ponds in certain areas for long periods of time (e.g., 72 hours after a storm). The swale does not seem to have "positive drainage." Check during or immediately after a rain storm.	 □ If the problem is minor (just small, isolated areas), try using a metal rake or other tools to create a more even flow path; remove excessive vegetative growth, sediment, or other debris that may be blocking the flow. □ Other: 	
	 Kick-Out to Level 2 Inspection: Water ponds in more than 25% of the swale for three days or more after a storm. The issue may be with the underlying soil or the grade of the swale. Water ponds behind check dams for three days or more after a storm. Check dams may be clogged or not functioning properly. 	

Table 2.5.3 SW Surface Area

Problem (Check if Present)

Check dams (if present): water is flowing around the edges of check dams, creating erosion or sinkholes on the uphill or downhill side, or the check dams are breaking apart or breaching.

Follow-Up Actions

- If the problem is isolated to just a few check dams, try simple repairs.
- ☐ It is very important for the center of each check dam (where most of the water flows) to be lower (by at least several inches) than the edges of the check dams where they meet the side slopes. Also, the check dams should be keyed into side slopes so water does not flow between the check dam and side slope.
- Use a level to check the right check-dam configuration, as noted above. Repair by moving around stone, filling and compacting soil, or adding new material so that water will be directed to the center of the check dam instead of the edges.
- □ Other

Kick-Out to Level 2 Inspection: Many check dams are impacted and/or the problem seems to be a design issue with height, spacing, shape, or materials used to construct them.

SW 4. Vegetation

Description: The health of vegetation within the swale is perhaps the most critical maintenance item for the property owner or responsible party. Many vegetated swales become overgrown, and "desirable" vegetation becomes choked out by weeds and invasive plants. It is important to know what the swale is supposed to look like and what plants seem to be thriving or doing poorly. Periodic maintenance of vegetation will prevent larger problems that are more difficult and costly to manage.

Instruction: Examine the swale vegetation. Consult **Table 2.5.4** below for possible problems.

Table 2.5.4 SW Vegetation **Problem (Check if Present) Follow-Up Actions** Mow or bush-hog the path. Other: Vegetation is too overgrown to access swale for maintenance activities If you can identify which plants are weeds or not intended to be part of the planting plan, eliminate these, preferably by hand pulling. If weeds are widespread, check with the local stormwater authority and/or Extension Office about proper use of herbicides for areas connected with the flow of water. Even vegetation that is intended to be present can become large, overgrown, block flow, and/or crowd out surrounding plants. Prune and thin accordingly. If weeds or invasive plants have overtaken the whole swale, bush-hog the entire area before seed heads form in the spring. It will be necessary to remove the root mat manually or with appropriate herbicides, as noted above. П Replant with species that are aesthetically pleasing and seem to be doing well in the swale. Other: П Kick-Out to Level 2 Inspection: You are unsure of the original planting Vegetation requires regular maintenance: design or the vegetation maintenance task is beyond your capabilities of pulling weeds, removing dead and diseased time, expertise, or resources. If you are unsure of the health of the plants, adding plants to fill in areas that are vegetation (e.g. salt damage, invasives, which plants are undesirable) or not well vegetated, etc. the appropriate season to conduct vegetation management, consult a landscape professional before undertaking any cutting, pruning, mowing, or brush hogging. The original plants are likely not suited for the actual conditions within the swale. If you are knowledgeable about plants, select and plant more appropriate vegetation (preferably native plants) so that almost the entire Vegetation is too thin, is not healthy, surface area will be covered by the end of the second growing season. and there are many spots that are not well vegetated. Kick-Out to Level 2 Inspection: For all but small practices (e.g., in residential yards), this task will likely require a landscape design professional or horticulturalist.

SW 5. Outlets

Description: These are where water leaves the swale when it fills up or where water reaches the downstream end of the swale. There may be a small stone apron or rock dam here or even an outlet grate.

Instruction: Examine outlets that release water out of the swale. Consult **Table 2.5.5** below for possible problems.

Table 2.5.5 SW Outlets		
Problem (Check if Present)	Follow-Up Actions	
 Outlet is obstructed with mulch, sediment, debris, trash, etc. 	Remove the debris and dispose of it where it cannot re-enter the swale.Other:	
	Kick-Out to Level 2 Inspection: Outlet is completely clogged or obstructed; there is too much material to remove by hand or with simple hand tools.	

2.6. Tree Planting

Tree Planting Actions for Maintenance

Key actions to take for tree planting maintenance include the following:

- TP1. Watering
- TP2. Mulch
- TP3. Pruning
- TP4. Disease or pests

Note: This is a simple, "non-structural" practice and, as such, maintenance tasks are similar to any landscape maintenance. Tree planting can involve individual trees or more, such as reforesting a riparian buffer.

For this type of practice, inspection is part of maintenance to check on the health of the trees.

Tree Planting Level 1 Inspection

The Level 1 Inspection goes hand in hand with active maintenance and includes watering (TP1), mulching (TP2), and Pruning (TP3). Watering should occur during the growing season. Mulching and pruning occurs once a year in the spring and early spring, respectively.



Figure 2.6.1. Key Areas for Inspection and Maintenance for Tree Planting

TP 1. Watering

Description: Proper water management is perhaps the most crucial maintenance activity to ensure survival of newly planted trees. Watering is essential during periods of drought, while over watering can be fatal. Watering options include regular or soaker hoses, sprinklers, buckets, drip irrigation, or installation of larger capacity watering tanks for irrigation systems. Consult the maintenance plan for instructions on the timing, volume, and method of watering that is appropriate for the specific species of trees.

Instruction: Inspect the trees to determine whether they need watering. Consult **Table 2.6.1** below.

Table 2.6.1 TP Watering		
Problem (Check if Present)	Follow-Up Actions	
Soil is not moist to the touch and/or it has not rained in a week, and leaves/needles are starting to appear wilted/dry.	 Water trees deeply and slowly near the base. Soaker hoses and drip irrigation work best for deep watering of trees and shrubs. Other: 	

TP 2. Mulch

Description: Mulching is a common method of weed control and moisture retention. Organic mulch should be spread over the soil surface and extend out to a radius of 5 feet or the tree drip line, whichever is less. Slowly decomposing organic mulches, such as shredded bark, compost, leaf mulch, or wood chips provide many added benefits for trees. Mulch that contains a combination of chips, leaves, bark and twigs is ideal for reforestation sites. Consult the maintenance plan for instructions on the timing, depth, and type of mulch application needed for the specific species of trees present.

Instruction: Mulch should be applied twice per year—in the late spring and during leaf fall. Consult the table below for possible problems. Check the depth of mulch regularly. Rake the old mulch to break up any matted layers and to refresh the appearance. Consult **Table 2.6.2** below.

Table 2.6.2 TP Mulch		
Problem (Check if Present)	Follow-Up Actions	
Mulch is too thin or thick (should be approximately 3" deep) or does not extend to tree canopy (or 5' radius if tree has a larger than 10' canopy reach).	 Add or remove mulch around tree canopy to maximum 5' radius but not within 3" of the bark. If mulch is against the stems or tree trunks, pull it back several inches to expose the base of the trunk and root crown. Other: 	

TP 3. Pruning

Description: Pruning is usually not needed for newly planted trees but may be beneficial for tree structure in older trees. If necessary, prune only dead, diseased, broken or crossing branches at planting. As the tree grows, lower branches may be pruned to provide clearance above the ground or to remove dead or damaged limbs that sprout from the trunk.

• Instruction: Examine the branches and tree shape. Consult Table 2.6.3 below for possible problems.

Table 2.6.3 TP Pruning		
Problem (Check if Present)	Follow-Up Actions	
 Presence of suckers, dead or diseased branches, branches that interfere with pedestrian traffic 	 Selective cutting Prune to make the tree more aesthetically pleasing and remove disease. Other: 	
	Kick-Out to Level 2 Inspection: Use an arborist or landscaper for more extensive pruning jobs.	

2.7. Bioretention

Areas of Bioretention

Key areas to inspect for Bioretention include the following:

- BR 1. Drainage Area
- BR 2. Inlets
- BR 3. Bioretention Ponding Area
- BR 4. Vegetation
- BR 5. Outlets

Note: The category of Bioretention includes:

- Bioretention cells areas of soil, mulch, and vegetation that treat runoff
- Dry swales long, linear bioretention cells, sometimes with check dams along a mildly sloping swale
- Rain gardens usually small-scale bioretention practices on residential or small commercial properties



Figure 2.7.1. Key Areas for Level 1 Inspection of Bioretention

- Stormwater planters usually in more urban settings, with soil and plants in a concrete box that receives roof runoff or perhaps other water from the site
- Tree pits also a more urban practice where the bioretention is confined within some sort of box (e.g., concrete) and places along road curbs or other areas to treat runoff

For the purposes of this chapter, the term "Bioretention cell" will be used to generally describe these practices.

Bioretention Level 1 Inspection

The Level 1 Inspection focuses on the Drainage Area (BR1), Inlets (BR2), Bioretention Ponding Area (BR3), Vegetation (BR4), and Outlets (BR5). This inspection should be conducted on a regular basis, with an early spring inspection to ensure that the practice has survived the winter, particularly if there has been a significant amount of snow. An inspection during the growing season or in the early fall is also recommended to check on the health of vegetation.

BR 1. Drainage Area

Description: The drainage area sends runoff to and is uphill from the Bioretention cell. When it rains, water runs off and flows to the Bioretention cell and ponds within the cell temporarily (usually for no more than 48 hours). Sometimes, the runoff will contain dirt, grit, grass clippings, oil, or other substances that SHOULD NOT be directed to the Bioretention area.

Instruction: Look for areas that are uphill from the Bioretention cell. Consult Table 2.7.1 below.

	Drainage Area			
Problem (Check if Present)		Follow-Up Actions		
-04/11/201	□ Bare soil, erosion of the ground (rills washing out the dirt)	 Seed and mulch areas of bare soil to establish vegetation. Fill in erosion areas with soil, compact, and seed and straw to establish vegetation. If a rill or small channel is forming, try to redirect water flowing to this area by creating a small berm or adding topsoil to areas that are heavily compacted. Other: Kick-Out to Level 2 Inspection: Large areas of soil have been eroded, or larger channels are forming. May require rerouting of flow paths. 		
	□ Piles of grass clippings, mulch, dirt, salt, or other materials	 □ Remove or cover piles of grass clippings, mulch, dirt, etc. □ Other: 		
	□ Open containers of oil, grease, paint, or other substances	 Cover or properly dispose of materials; consult your local solid waste authority for guidance on materials that may be toxic or hazardous. Other: 		

BR 2. Inlets

Description: The inlets to a Bioretention cell are where water flows into the cell. Depending on the design, water can flow in through:

- Curb cuts or openings in a parking lot or roadway
- Pipes or ditches that carry water into the Bioretention cell from the drainage area
- Flow directly over the land surface (known as "sheetflow"), sometimes across a strip of rock or stone



Curb cut – flow enter through defined place in curb



Curb cut



Gravel diaphragm – flow enters as sheetflow and is evenly distributed across length of practice



Grass filter strip: accepts sheet flow from the parking lot

Figure 2.7.2 Bioretention Cell Inlets

CSN, 2013

Instruction: Stand in the Bioretention cell itself and look for all the places where water flows in. Often there will be multiple points of inflow to the practice. Consult **Table 2.7.2** below for possible problems.

Table 2.7.2 BR Inlets					
Problem (Check if Present)	Follow-Up Actions				
	Use a flat shovel to remove grit and debris (especially at curb inlets or openings). Parking lots generate fine grit that will accumulate at these spots.				
	 Pull out clumps of growing grass or weeds and scoop out the soil or grit that the plants are growing in. 				
	 Remove any grass clippings, leaves, sticks, and other debris that is collecting at inlets. 				
	For pipes and ditches, remove sediment and debris that is partially blocking the pipe or ditch opening where it enters the Bioretention cell.				
	 Dispose of all material properly where it will not re-enter the Bioretention cell. 				
☐ Inlets collect grit and debris or grass/weeds.	□ Other:				
Some water may not be getting into the Bioretention cell. The objective is to have a clear pathway for water to flow into the cell.	☐ Kick-Out to Level 2 Inspection: Inlets are blocked to the extent that most of the water does not seem to be entering the Bioretention cell.				
	☐ For small areas of erosion, smooth out the eroded part and apply rock or stone (e.g., river cobble) to prevent further erosion. Usually, filter fabric is placed under the rock or stone.				
	In some cases, reseeding and applying erosion-control matting can be used to prevent further erosion. Some of these materials may be available at a garden center, but it may be best to consult a landscape contractor.				
F d W	□ Other:				
Some or all of the inlets are eroding so that rills, gullies, and other erosion is present, or there is bare dirt that is washing into the Bioretention cell.	□ Kick-Out to Level 2 Inspection: Erosion is occurring at most of the inlets, and it looks like there is too much water that is concentrating at these points. The inlet design may have to be modified.				

BR 3. Bioretention Ponding Area

Description: The ponding area fills up with water during a rainstorm. If you picture the Bioretention cell as a bathtub, there is the *bottom* (usually flat surface), *side slopes* (areas that slope down to the bottom from the surrounding ground), and *berms or structures that control the depth to which water ponds.*

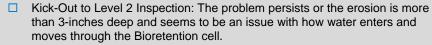
Instruction: Examine the entire Bioretention surface and side slopes. Consult the table below for possible problems.

Table 2.7.3 BR Ponding Area **Problem (Check if Present) Follow-Up Actions** Add new mulch to a total depth (including any existing mulch that is left) of 2 to 3 inches. The mulch should be shredded hardwood mulch that is less likely to float away during rainstorms. Avoid adding too much mulch so that inlets are obstructed or certain areas become higher than the rest of the Bioretention surface. П Other: Mulch (if used) needs to be replaced or replenished. The mulch layer had decomposed or is less than 1-inch thick. Use a shovel to scoop out minor areas of sediment or grit, especially in the spring after winter sanding materials may wash in and accumulate. Dispose of the material where it cannot re-enter the Bioretention cell. If removing the material creates a hole or low area, fill with soil mix that matches original mix and cover with mulch so that the Bioretention surface area is as flat as possible. Remove trash, vegetative debris, and other undesirable materials. Other: Kick-Out to Level 2 Inspection: Sediment has accumulated more than 2inches deep and covers 25% or more of the Bioretention surface. Kick-Out to Level 2 Inspection: The Bioretention cell is too densely vegetated to assess sediment accumulation or ponding: Minor areas of sediment, grit, trash, or other see BR-4, Vegetation. debris are accumulating on the bottom.



- There is erosion in the bottom or on the side slopes. Water seems to be carving out rills as it flows across the Bioretention surface or on the slopes, or sinkholes are forming in certain areas.
- Source: Stormwater Maintenance, LLC.

- ☐ Try filling the eroded areas with clean topsoil or sand, and cover with mulch.
- ☐ If the problem recurs, you may have to use stone (e.g., river cobble) to fill in problem areas.
- If the erosion is on a side slope, fill with clay that can be compacted and seed and mulch the area.
- □ Other:



☐ Kick-Out to Level 2 Inspection: The problem does not seem to be caused by flowing water, but a collapse or sinking of the surface (e.g., "sinkhole") due to some underground problem.



The bottom of the Bioretention cell is not flat, and the water pools at one end, along an edge, or in certain pockets. The whole bottom is not uniformly covered with water. See design plan to verify that Bioretention surface is intended to be flat. Check during or immediately after a rainstorm.

- If the problem is minor (just small, isolated areas are not covered with water), try raking the surface OR adding mulch to low spots to create a more level surface. You may need to remove and replace plantings in order to properly even off the surface.
- Check the surface with a string and bubble level to get the surface as flat as possible.
- Other:
- Kick-Out to Level 2 Inspection: Ponding water is isolated to less than half of the Bioretention surface area, and there seem to be elevation differences of more than a couple of inches across the surface.



- Water stands on the surface more than 72 hours after a rainstorm and /or wetland-type vegetation is present. The Bioretention cell does not appear to be draining properly.
- ☐ Kick-Out to Level 2 Inspection: This is generally a serious problem, and it will be necessary to activate a Level 2 Inspection.

BR 4. Vegetation

Description: The health of vegetation within the Bioretention cell is perhaps the most critical maintenance item for the property owner or responsible party. Many Bioretention cells become overgrown, and "desirable" vegetation becomes choked out by weeds and invasive plants. It is important to know what the Bioretention cell is supposed to look like and what plants seem to be thriving or doing poorly. Periodic maintenance of vegetation will prevent larger problems that are more difficult and costly to manage.

Instruction: Examine all Bioretention cell vegetation. Consult the table below for possible problems.

Table 2.7.4 BR Vegetation Problem (Check if Present) Follow-Up Actions If you can identify which plants are weeds or not intended to be part of the planting plan, eliminate these, preferably by hand pulling. If weeds are widespread, check with the local stormwater authority and/or Extension Office about proper use of herbicides for areas connected with the flow of water. Even vegetation that is intended to be present can become large, overgrown, and/or crowd out surrounding plants. Prune and thin accordingly. If weeds or invasive plants have overtaken the whole Bioretention cell, bush-hog the entire area before seedheads form in the spring. It will be necessary to remove the root mat manually or with appropriate herbicides, as noted above. Re-plant with species that are aesthetically pleasing and seem to be doing well in the Bioretention cell. Other: Kick-Out to Level 2 Inspection: You are unsure of the original planting design, or the vegetation maintenance task is beyond Vegetation requires regular maintenance—pulling your capabilities of time, expertise, or resources. If you are weeds, removing dead and diseased plants, replacing unsure of the health of the vegetation (e.g. salt damage, mulch around plants, adding plants to fill in areas that invasives, which plants are undesirable) or the appropriate are not well vegetated, etc. season to conduct vegetation management, consult a landscape professional before undertaking any cutting, pruning, mowing, or brush hogging. The original plants are likely not suited for the actual conditions within the Bioretention cell. If you are knowledgeable about plants, select and plant more appropriate vegetation (preferably native plants) so that almost the entire surface area will be covered by the end of the second growing season. Other: Kick-Out to Level 2 Inspection: For all but small practices (e.g., rain gardens), this task will likely require a landscape design professional or horticulturalist. Vegetation is too thin, is not healthy, and there are many spots that are not well vegetated.

BR 5. Outlets

Description: Outlets are where water leaves the Bioretention cell when there is too much ponded water. There are various ways that outlets are configured. They can be a yard drain type of structure in the Bioretention cell itself or a rock weir where water flows during large storms. Many Bioretention practices have an underdrain, which is like a French drain, that helps the Bioretention cell drain properly after storms. The underdrain pipe may "daylight" (come to the ground surface) at some point downhill from the Bioretention cell.

Instruction: Examine outlets that release water out of the Bioretention cell. Consult the table below for possible problems.

Table 2.7.5 BR Outlets				
Problem (Check if Present)	Follow-Up Actions			
□ Erosion at outlet	 Add stone to reduce the impact from the water flowing out of the outlet pipe or weir during storms. Other: 			
	☐ Kick-Out to Level 2 Inspection: Rills have formed and erosion problem becomes more severe.			
	 Remove the debris and dispose of it where it cannot re-enter the Bioretention cell. Other: 			
Outlet obstructed with mulch sediment	☐ Kick-Out to Level 2 Inspection: Outlet is completely clogged or obstructed; there is too much material to remove by hand or with simple hand tools.			
Outlet obstructed with mulch, sediment, debris, trash, etc.				

2.8. Green Roof

Areas of the Green Roof

Key areas to inspect for green roofs include the following:

GR 1. Vegetation and Surface

GR 2. Overflows and Drains

Note: Green Roofs consist of green infrastructure practices applied on rooftops, wherein stormwater is filtered through a vegetated planting bed. Green Roofs are a unique practice in that they are often covered by a professional ongoing maintenance contract, and their design is highly variable depending on the specific product. This section highlights some key inspection items.



Green Roof Level 1 Inspection

The Level 1 Inspection focuses on the Vegetation (GR1), Overflows and Drains (GR2), and the Surface and Soil Medium (GR3). This inspection should be conducted on a regular basis, with an early spring inspection to ensure that the practice has survived the winter, particularly if there has been a cold year.

On a routine basis, the Level 1 Inspector should also ensure that the vegetation is surviving any harsh roof conditions, particularly during dry periods.

GR 1. Vegetation and Surface

Description: The green roof vegetation usually consists of succulent plants, such as sedums, and should form a dense cover over the course of several growing seasons.

Instruction: Visually inspect the surface and vegetation of the practice. Consult **Table 2.8.1** below:

Table 2.8.1 GR Vegetation and Surface				
Problem (Check if Present)	Follow-Up Actions			
□ Wilting or nutrient-deprived vegetation; bare areas developing on the roof	 □ Water or irrigate. □ Prune or remove dead or dying vegetation. □ Other: 			
	☐ Kick-Out to Level 2 Inspection: Greater than 20% plant dieoff or wilting, even after rainy periods. May require new vegetation or indicate a problem with the soil medium.			
	□ Kick-Out to Level 2 Inspection: Yellowing vegetation may indicate a need for fertilizer, but do not fertilize unless explicitly included in the management plan or with a Level 2 Inspection.			
	☐ Kick-Out to Level 2 Inspection: Bare areas with no vegetation growing. These may become weed problems in the future.			
A PAN	Remove weeds by hand.			
	☐ Apply lime to kill moss. ☐ Other:			
□ Weeds or moss	□ Kick-Out to Level 2 Inspection: Weeds cover more than 25% of the surface, or the original planting plan has been compromised.			
□ Ponding between storm events	☐ Kick-Out to Level 2 Inspection: Surface ponding more than 24 hours after a storm event presents a hazard and needs to be addressed immediately.			

GR 2. Overflows and Drains

Description: Green roofs typically drain through a network of underdrains to outlet at roof drainage infrastructure. These drainage structures need to be inspected and cleaned periodically to ensure that the medium drains properly.

Instruction: Review the specific maintenance plan for this practice to determine where inspection ports are. Remove the cover and inspect the port.

	Table 2.8.2 GR Overflows and Drains					
Problem (Check if Present)			Follow-Up Actions			
 Inspection port for roof drainage (can be clogged with debris) 			Remove debris by hand or flush through with a hose. Other:			
			Kick-Out to Level 2 Inspection: Debris cannot be removed, or it appears that debris has accumulated in the underdrains.			
	Damage to other roof drainage structures (e.g., roof scuppers)		Call contractor or individual in charge of regular building maintenance. This is a building maintenance issue. Other:			

2.9. Permeable Pavement

Areas of Permeable Pavement

Key areas to inspect for permeable pavement include the following:

- PP1. Drainage Area
- PP2. Pavement Surface

Note: Permeable pavements include several materials, including porous asphalt materials, which appear similar to an asphalt parking lot, permeable concrete, and "interlocking concrete pavers," which are individual paving blocks. References to removing and replacing individual blocks of pavement refer only to this last category.

Permeable Pavement Level 1 Inspection

The Level 1 Inspection focuses on the

Drainage Area (PP1) and the Pavement Surface (PP2). This inspection should be conducted on a regular basis, with an early spring inspection to ensure that the practice has survived the winter, particularly if there has been a significant amount of snow.

On a routine basis, the Level 1 Inspector should also ensure that the pavement area and its drainage are properly managed. Some key activities to avoid include:

- 1. Applying sand during winter months
- Certain types of permeable pavement should not be plowed with steel-bladed plows.
- 3. Poor management of dumpsters
- 4. Storing or placing dirt, grit, mulch, sand, or other similar materials on or near the pavement surface



Figure 2.9.1. Key Areas for Level 1 Inspection of Permeable Pavement

PP 1. Drainage Area

Description: The drainage area sends runoff to the Permeable pavement area and is uphill from the Permeable pavement. When it rains, water runs off and flows to the Permeable pavement area, and it may pond there temporarily.

Instruction: Look for areas that are uphill from the Permeable pavement. Consult **Table 2.9.1** below:

Table 2.9.1 PP Drainage Area					
Problem (Check if Present)		Follow-Up Actions			
	□ Bare soil, erosion of the ground (rills washing out the dirt)	 Seed and straw areas of bare soil to establish vegetation. Fill in erosion areas with soil, compact, and seed and straw to establish vegetation. If a rill or small channel is forming, try to redirect water flowing to this area by creating a small berm or adding topsoil to areas that are heavily compacted. Other: 			
-04/1 201		 Kick-Out to Level 2 Inspection: Large areas of soil have been eroded, or larger channels are forming. May require rerouting of flow paths. 			
	□ Piles of grass clippings, mulch, dirt, salt, or other materials	 □ Remove or cover piles of grass clippings, mulch, dirt, etc. □ Other: 			
	□ Open containers of oil, grease, paint, or other substances	 Cover or properly dispose of materials; consult your local solid waste authority for guidance on materials that may be toxic or hazardous. Other: 			

PP 2. Permeable Pavement Surface

Description: The surface of the Permeable pavement should be relatively clean (not a lot of dirt and grit on the surface), free of cracks and broken pavement, and should NOT hold water after a rainstorm for more than a few hours.

Instruction: Examine the entire permeable pavement surface. Consult **Table 2.9.2** below for possible problems.

Table 2.9.2 PP Surface						
Problem (Check if Present)		14510 2.3.2 11 00	Follow-Up Actions			
		□ Dirt and grit accumulating on pavement surface		For small areas (e.g., driveways, patios), try a leaf blower or sweep the area to remove the dirt/grit from the Permeable pavement and properly dispose of the material. If dirt/grit remain in the joint areas between paver blocks, agitate with a rough brush and vacuum the surface with a wet/dry vac. Remove and replace clogged blocks in segmented pavers. For larger areas (e.g., parking lots, courtyards), hire a vacuum sweeper to restore the surface to a cleaner condition. Other: Kick-Out to Level 2 Inspection: Grit is widespread and cannot be removed by manual sweeping.		
		Grass and weeds are growing on the permeable pavement surface (applies only to pavement types that are not intended to be covered in vegetation).		If paver type is not intended to be covered in vegetation, remove the grass/weeds either mechanically (pulling, by hand or with a flame weeder) or with a herbicide approved for use in or near water (consult your local Extension Office for suggestions). Follow the actions listed above for removing dirt/grit from the pavement surface. Other: Kick-Out to Level 2 Inspection: Grass/weeds cover more than 25% of surface area.		
		Slumping, sinking, cracking, or breaking of the pavement surface (Source: CSN, 2013)		For small areas (e.g., patios, small driveway), it may be possible to remove the damaged pavers, check and fill in the underlying gravel, and replace with new materials. Other: Kick-Out to Level 2 Inspection: Problem affects more than a small, isolated area. Will typically require a qualified contractor to fix it. Problem recurs or occurs in multiple small locations.		
		Water stands on Permeable pavement for days after a rainstorm; the Permeable pavement is clogged and doesn't let water through. (Source: CSN, 2013)		Kick-Out to Level 2 Inspection: This is generally a serious problem, and it will be necessary to activate a Level 2 Inspection.		

2.10. Ponds and Wetlands

Areas of Ponds and Wetlands

Key areas to inspect for ponds and wetlands include the following:

- PO 1. Drainage area
- PO 2. Inlet pipes and swales
- PO 3. Pond area and embankments
- PO 4. Pond outlet

Note: This category includes the following practices:

- Wet ponds have a permanent pool of water and may be divided into various "cells"
- Stormwater wetlands have a variety of depth zones ranging from deep pools to shallow wetlands and are characterized by wetland vegetation

It is recommended strongly to have as-built drawings and copies of previous inspections at hand, if available. Aerial photos may be needed to help direct the inspector to the pond or wetland location if it is obscured by vegetation.

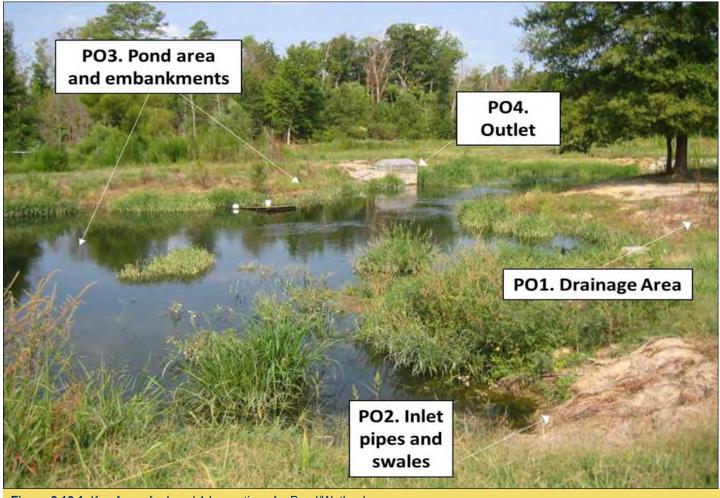


Figure 2.10.1. Key Areas for Level 1 Inspection of a Pond/Wetland

Pond and Wetland Level 1 Inspection

The Level 1 Inspection focuses on the drainage area (PW 1), inlet pipes or swales (PW 2), pond area and embankments (PW 3) and pond outlet structures and outfall (PW 4). This inspection should be conducted on a regular basis to ensure that a buildup of trash, vegetation, or sediment does not interfere with the pre-treatment, pond or wetland, and the outfall's normal flow or function. Pond embankments and dams should be regularly inspected for evidence of erosion, burrowing or tunneling animals, and large woody vegetation growing on the dam.

PW 1. Drainage Area

Description: The drainage area conveys runoff to and is uphill from the pond inlet. When it rains, water runs off through roof drains, yard drains, parking lots, roadways and underdrains to the ponds. Flow is through underground piping systems, overland via swales, or across the ground as sheetflow. Sometimes, the runoff will contain dirt, grit, grass clippings, leaves and woody debris that can collect in the drainage system. If left alone, blockages can occur and increase the chance of shallow flooding or standing water. Standing water in drainage systems foster mosquitos, pipe corrosion, and possible nuisance and odor conditions.

Instruction: Look for areas that are uphill from the pond. Consult **Table 2.10.1** below:

Table 2.10.1 PV	/ Drainage Area			
	Follow-Up Actions			
	 Seed and straw areas of bare soil to establish vegetation. Fill in eroded areas with soil, compact, seed and mulch with straw to establish vegetation. Other: 			
☐ Bare soil, erosion of the ground (rills washing out the dirt)	 Kick-Out to Level 2 Inspection: If a rill or small channel is forming, try to redirect water flowing to this area by creating a small berm or adding topsoil to areas that are heavily compacted. If large areas of soil have been eroded or larger channels are forming, this may require rerouting of flow paths or use of an erosion-control seed mat or blanket to reestablish acceptable ground cover or anchor sod where it is practical. 			
Piles of grass clippings, mulch, dirt, salt, or other materials	 Remove or cover piles of grass clippings, mulch, dirt, etc. Remove excessive vegetation or woody debris that can block drainage systems. Other: 			
Open containers of oil, grease, paint, or other substances exposed to rain in the drainage area	 Cover or properly dispose of materials; consult your local solid waste authority for guidance on materials that may be toxic or hazardous. Other: 			

PW 2. Pond Inlets

Description: Free, unobstructed flow from the drainage area to stormwater ponds is necessary to prevent shallow flooding and even structural damage from flooding. Pond inlets can consist of pipes, ditches, swales, or other means to convey stormwater to the pond or wetland.

Instruction: Look for all areas where water flows into the pond during storms. Note that there may be multiple points of inflow and types of structures (e.g., pipes, open ditches, etc.). Consult **Table 2.10.2** below:

Table 2.10.2 Pond Inlets				
Problem (Check if Present)			Foll	ow-Up Actions
				If the problem can be remedied with hand tools and done in a safe manner, remove vegetation, trash, woody debris, etc. from blocking inlet structures. Other:
		Inlets are buried, covered or filled with silt, debris, or trash, or blocked by excessive vegetation.		Kick-Out to Level 2 or 3 Inspection: If the amount of material is too large to handle OR there are ANY safety concerns about working in standing water, soft sediment, etc., the work will likely have to be performed by a qualified contractor.
		Inlets are broken, and, with pieces of pipe or concrete falling into the pond, there is erosion around the inlet, there is open space under the pipe, or there is erosion where the inlet meets the pond		Kick-Out to Level 2 Inspection: These types of structural or erosion problems are more serious and will require a qualified contractor to repair.

PW 3. Pond Area and Embankments

Description: The pond area and embankment can consist of the following elements:

- Pre-treatment cell or small holding area where water first flows into the pond from the various inlets. These are
 commonly referred to as "forebays" and will be demarcated from the main pond area by small dams made of
 earth or rock. The purpose of forebays is to capture some of the sediment and pollutants before they reach the
 deep pool, making maintenance easier over time. Not all ponds will have forebays.
- The pond surface can be open water or a combination of open water and areas with wetland vegetation. Sometimes there is a shallow bench around the perimeter of a pond, known as an "aquatic bench."
- The "side slopes" are areas around the perimeter of the pond where the surrounding land slopes down to the pond surface.
- Most ponds will have a "riser structure," where the water exits a pond during storms. This can be a concrete or
 metal pipe that is open at the top, often with some type of trash rack. Some ponds also have an "emergency
 spillway," which is an open, rock-lined channel that carries water from large storms safely across the
 embankment.
- The dam or embankment holds water in the pond and is constructed of compacted soil, such as clay. There is often a pipe through the embankment that carries water from the riser structure safely through the embankment to the downstream channel.

The pond's pre-treatment areas or forebays should not be choked with vegetation or full of sediment. Removal of excessive vegetation and sediment and selective replanting are often annual maintenance activities.

Likewise, the pond's deep pool should not to be choked with vegetation or filled with sediment. Vegetation and sediment bars can restrict flow and cause short circuiting that reduces capture of sediment. Pond volume is to be maintained at the original design capacity and free of sediment bars or debris piles. Sometimes ponds are over-maintained and have no vegetation. Algae and turbidity (muddy water) are common problems in many ponds.

Instruction: Examine both interior and exterior pond banks as well as the pond body. Observe from the inlet pipes to the outfall structure and emergency overflow.

Table 2.10.3 PW Pond Area and Embankments				
Problem (Check if Present)			Follow-Up Actions	
		The pretreatment area(s) or forebay(s) are filled with sediment, trash,		If the problem can be remedied with hand tools and done in a safe manner, use a flat shovel or other equipment to remove small amounts of sediment. Remove trash and excessive vegetation from forebays if this can be done in a safe manner. Other:
	sediment, trash, vegetation, or other debris.		Kick-Out to Level 2 Inspection: Large amounts of sediment or debris will have to be removed by a qualified contractor. ANY condition that poses a safety concern for working in standing water or soft sediments should be referred to a Level 2 Inspection or qualified contractor.	

Table 2.10.3 PW Pond Area and Embankments						
Problem (Check if Present)		Follow-Up Actions				
	☐ The pond area itself has accumulated sediment, trash, debris, or excessive vegetation that is	 Level 1 includes handling only small amounts of material that can be removed by hand, or with rakes or other hand tools. Do not attempt any repair that poses a safety issue. Other: 				
	choking the flow of the water, OR the pond area is covered with algae or aquatic plants.	 Kick-Out to Level 2 Inspection: Most cases will call for a Level 2 Inspection and/or a qualified contractor. You are not sure what type and amount of vegetation is supposed to be in the pond. The algae or aquatic plants should be identified so that proper control techniques can be applied 				
	☐ The side slopes of the pond are unstable, eroding,	 If there are only minor areas, try filling in small rills or gullies with topsoil, compacting, and seeding and mulching all bare dirt areas with an appropriate seed. Alternatively, try using herbaceous plugs to get vegetation established i tricky areas, such as steep slopes. Other: 				
	and have areas of bare dirt.	□ Kick-Out to Level 2 Inspection: Erosion and many bare dirt areas on steep side slopes will require a Level 2 Inspection and repair by a qualified contractor.				
	☐ The riser structure is clogged with trash, debris, sediment, vegetation, etc., OR	 If you can safely access the riser on foot or with a small boat, clear minor amounts of debris and remove it from the pond area for safe disposal. Other: 				
	is open, unlocked, or has a steep drop and poses a safety concern. The pond level may have dropped below its "normal" level.	 Kick-Out to Level 2 Inspection: The riser cannot be accessed safely, the amount of debris is substantial, or the riser seems to be completely clogged and the water level has risen too high. There are safety issues with the riser and concerabout access to pipes, drops, or any other life safety concern. 				

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☐ The riser is leaning, broken, settling or slumping, corroded, eroded or any other structural problem.

Table 2.10.3 PW Pond Area and Embankments				
Problem (Check if Present)		Follow-Up Actions		
	□ The dam/embankment is slumping, sinking, settling, eroding, or has medium or large trees growing on it.		If there are small isolated areas, try to fix them by adding clean material (clay and topsoil) and seeding and mulching. Periodically mow embankments to enable inspection of the banks and to minimize establishment of woody vegetation. Remove any woody vegetation that has already established on embankments. Other: Kick-Out to Level 2 Inspection: Most of these	
88/11/2809	g.c.m.g		situations will require a Level 2 Inspection or evaluation and repair by a qualified contractor. Seepage through the dam or problems with the pipe through the dam can be a serious issue that should be addressed to avoid possible dam failure.	
				Clear light debris and vegetation. Other:
		The emergency spillway or outfall (if it exists) has erosion, settlement, or loss of material. Rock-lined spillways have excessive debris or vegetation.		Kick-Out to Level 2 Inspection: Displacement of rock lining, excessive vegetation and erosion/settlement may warrant review and decision by Level 2 Inspector to check against original plan. Any uncertainty about the integrity of the emergency spillway should be referred to a Level 2 Inspector. Erosion or settlement such that design has been compromised should be reviewed by an engineer.

PW 4. Pond Outlet

Description: The pond's outlet enables the ponded water to discharge to downstream drainage systems or stream channels. The outlet is often at the base of the dam/embankment on the downstream side. Inspection of this point can help prevent flooding of the pond and upstream drainage systems and prevent pond failure at a weak point of a pond's containment system.

Instruction: Examine the outlet of the pipe on the downstream side of the dam/embankment where it empties into a stream, channel, or drainage system. Consult the table below for possible problems.

Table 2.10.4 PW Pond Outlet Problem (Check if Present) Follow-Up Actions If there is a minor blockage, remove the debris or vegetation to allow free flow of water. Remove any accumulated trash at the outlet. П Outlet: Kick-Out to Level 2 Inspection: If the area at the outlet cannot be easily accessed or if the blockage is substantial, a Level 2 Inspection is warranted. Erosion at and downstream of the outfall should be evaluated by a qualified professional. Any structural problems, such as broken pipes, structures falling into the stream, or holes or tunnels around the outfall pipe, should be evaluated by a Level 2 Inspector and will require repair by a qualified contractor. The pond outlet is clogged with sediment, trash, The pool of water at the outlet pipe is discolored, has an debris, vegetation, or is eroding, caving in, slumping, odor, or has excessive algae or vegetative growth. or falling apart.

2.11. Infiltration

Areas of Infiltration

Key areas to inspect for Infiltration include the following:

- IN 1. Drainage Area
- IN 2. Inlets
- IN 3. Infiltration Area
- IN 4. Outlets

Note: The category of Infiltration includes:

- Infiltration Trench Long, narrow infiltration practice, usually with small gravel at the surface and a reservoir of larger gravel or stone beneath
- Infiltration Basin Larger practice, usually covered with grass and highly permeable soil beneath



Figure 2.11.1 Key Areas for Level 1 Inspection of Infiltration Practice

Dry Well – Small pit filled with stone or gravel, or precast concrete chamber surrounded by stone that receives and stores runoff to enable it to infiltrate into the underlying ground.

Infiltration Level 1 Inspection

The Level 1 Inspection focuses on the Drainage Area (IN1), Inlets (IN2), Infiltration Area (IN3), and Outlets (IN4). The purpose of an infiltration practice is to temporarily store collected runoff so that it can percolate into the underlying soil. Using this practice is dependent on having a good on-site soil that is capable of infiltrating the amount of runoff generated by the drainage area. The Level 1 Inspection should be conducted at least twice a year, especially in early spring, to ensure that the practice has survived the winter, particularly if there has been a significant amount of snow.

IN 1. Drainage Area

Description: The drainage area conveys runoff to and is uphill from the Infiltration cell. When it rains, water runs off and flows to the Infiltration cell and soaks into its underlying layers.

Instruction: Look for both pervious and impervious areas that are uphill from the Infiltration cell. Consult **Table 11.1.1** below.

Table 11.1.1 IN Drainage Area		
Problem (Check if Present)		Follow-Up Actions
-04/11/20/1	□ Bare soil, erosion of the ground (rills washing out the dirt)	 Seed and straw areas of bare soil to establish vegetation. Fill in erosion areas with soil, compact, and seed and straw to get vegetation established. If a rill or small channel is forming, try to redirect water flowing to this area by creating a small berm or adding topsoil to areas that are heavily compacted. Other: Kick-Out to Level 2 Inspection: Large areas of soil have been eroded, or larger channels are forming. May require rerouting of flow paths.
For Dry Wells: Leaves, sticks, or other debris in gutters and downspouts		□ Remove all debris by hand. □ Other:
	□ Piles of grass clippings, mulch, dirt, salt, or other materials	 □ Remove or cover piles of grass clippings, mulch, dirt, etc. □ Other:
	□ Open containers of oil, grease, paint, or other substances	 Cover or properly dispose of materials; consult your local solid waste authority for guidance on materials that may be toxic or hazardous. Other:

IN 2. Inlets

Description: The inlets to an Infiltration practice are where water flows into the cell. Depending on the design, inlets can be:

- Curb cuts or openings in a parking lot or roadway
- Downspouts that deliver runoff directly from a rooftop to the Infiltration practice
- Pipes or ditches_that carry water into the Infiltration practice from the drainage area
- Flow directly over the land surface (known as "sheetflow"), sometimes across a strip of rock or stone

Instruction: Look for all the places where water flows into the Infiltration practice. Consult **Table 11.1.2** below for possible problems

possible problems.	
Tak	ple 11.1.2 IN Inlets
Problem (Check if Present)	Follow-Up Actions
	☐ Use a flat shovel to remove grit and debris (especially at curb inlets or openings). Parking lots generate fine grit that will accumulate at these spots.
	 Pull out clumps of growing grass or weeds and scoop out the soil or grit that the plants are growing in.
	 Remove any grass clippings, leaves, sticks, and other debris that is collecting at inlets.
	 For pipes and ditches, remove sediment and debris that is partially blocking the pipe or ditch opening where it enters the Infiltration practice.
	 Dispose of all material properly in an area where it will not re-enter the practice.
	□ Other:
 Inlets are collecting grit and debris or grass/weeds are growing. Some water may not be getting into the Infiltration practice. 	 Kick-Out to Level 2 Inspection: Inlets are blocked to the extent that most of the water does not seem to be entering the Infiltration practice.
□ Some or all of the inlets are eroding so that rills, gullies, and other erosion is present, or there is bare dirt that is washing into the Infiltration practice.	 For small areas of erosion, smooth out the eroded part and apply rock or stone (e.g., river cobble) to prevent further erosion. Usually, filter fabric is placed under the rock or stone. In some cases, reseeding and applying erosion-control matting can be used to prevent further erosion. Some of these materials may be available at a garden center, but it may be best to consult a landscape contractor. Other:
	Kick-Out to Level 2 Inspection: Erosion is occurring at most of the inlets and it looks like there is too much water that is concentrating at these points. The inlet design may have to be modified.

IN 3. Infiltration Area

Description: The infiltration area is the area that collects water and allows it to seep into the underlying soil. Some infiltration areas also have a vertical perforated pipe called an *observation well*, which is used to view the water level in the infiltration practice after a storm. If the infiltration practice is working properly, the water in the observation well should be completely drained down within 2 to 3 days of a storm. Depending on the design, the infiltration area can be covered with grass, gravel, or stone.

Instruction: Examine the surface of the infiltration area and the observation well. Consult **Table 11.1.3** below for possible problems. Note: The following Problem and Follow-Up Actions apply to infiltration practice pretreatment areas also.

Table 11.1.3 IN Infiltration Area Problem (Check if Present) Follow-Up Actions Mow infiltration area at least twice per year. П Other: For grass-covered Infiltration practices: grass has grown very tall, (Photo credit: Stormwater Maintenance, LLC) Add topsoil (as needed), grass seed, straw, and water during the growing season to re-establish consistent grass coverage. Other: Kick-Out to Level 2 Inspection: Sparse vegetation cover can be a sign that the infiltration area is not infiltrating at the proper rate and water is standing too long after a storm. The surface may be saturated or squishy, and the conditions do not enable grass to grow. This situation should be evaluated by a Level 2 Inspection and likely corrected by a qualified contractor. For grass-covered Infiltration practices: sparse vegetation cover or bare spots Use a shovel to scoop out minor areas of sediment or grit, especially in the spring after winter sanding materials may wash in and accumulate. Dispose of the material where it cannot re-enter the Infiltration practice. If removing the material creates a hole or low area, rake the surface smooth and level. Minor areas of sediment, grit, trash, or other debris Remove trash, debris, and other undesirable materials. are accumulating on the surface. Other: П Kick-Out to Level 2 Inspection: Sediment has accumulated more than 2-inches deep and covers 25% or more of the surface of the Infiltration area.

Table 11.1.3 IN Infiltration Area		
Problem (Check if Present)	Follow-Up Actions	
	 For minor areas of erosion, try filling the eroded areas with clean topsoil, sand, or stone (whatever the existing cover is). If the problem recurs, you may have to use larger stone (e.g., river cobble) to fill in problem areas. Other: 	
☐ There is erosion on the surface; water seems to be carving out rills as it flows across the surface of the Infiltration area or sinkholes are forming in certain areas.	 Kick-Out to Level 2 Inspection: The problem persists or the erosion is more than 3-inches deep and seems to be an issue with how water enters and moves through the infiltration area. Kick-Out to Level 2 Inspection: The problem does not seem to be caused by flowing water but a collapse or sinking of the surface (e.g., "sinkhole") due to some underground problem. 	
□ Observation well is damaged or cap is missing	☐ Kick-Out to Level 2 Inspection: Requires replacing pipes or caps.	
□ Water still visible in the observation well more than 72 hours after a rain storm. The Infiltration practice does not appear to be draining properly.	□ Kick-Out to Level 2 Inspection: This is generally a serious problem, and it will be necessary to activate a Level 2 Inspection.	

IN 4. Outlets

Description: Outlets are where water exits the surface of the infiltration area during larger storms when the underground infiltration reservoir fills up and the excess water needs somewhere to go. Note that not all infiltration practices will have an identifiable outlet if the design is for all the water to infiltrate into the ground. Outlets may be a berm, stone weir, or pipe.

Instruction: Locate and inspect all outlets. Consult **Table 2.11.4** below for possible problems.

Table 2.11.4 IN Outlets		
Problem (Check if Present)	Follow-Up Actions	
Outlet obstructed with sediment, debris, trash, etc.	 Remove the debris and dispose of it where it cannot re-enter the infiltration area. Other: 	
	☐ Kick-Out to Level 2 Inspection: Outlet is completely obstructed; there is too much material to remove by hand or with simple hand tools.	
☐ Rills or gullies are forming at outlet.	 For minor rills, fill in with soil, compact, and seed and straw to establish vegetation. Other: 	
	☐ Kick-Out to Level 2 Inspection: Rills are more than 2" to 3" deep and require more than just hand raking and re-seeding.	

2.12. Sand and Organic Filters

Components of Sand and Organic Filters

Key areas to inspect for these types of practices include the following:

- SF 1. Drainage Area
- SF 2. Inlets and Pre-treatment
- SF 3. Filter Area

Note: The category of Sand and Organic Filters includes:

- Surface Sand Filters Surface sand filters (Figure 2.12.1) have a sand layer and often an underdrain layer beneath. Water comes in on the surface.
- Underground Sand Filters Sand filters can also be in an underground vault or concrete trench in a parking lot or near a building. These are typically accessed through manholes or heavy grates.
- Underground Organic Filters These are similar to underground sand filters but may also contain canisters of peat or other organic media that helps filter pollutants from runoff. These types of underground structures will be difficult for Level 1 Inspectors to inspect because they involve pulling off heavy manhole covers or grates. The Level 1 Inspection will focus on any evidence of clogging as observed from the surface.





Figure 2.12.1. Key Areas for Level 1 Inspection of Sand and Organic Filters



Figure 2.12.2. Examples of underground filters: Left –Perimeter sand filter in a concrete box (photo shows the filter with the grate top off as the filter is being maintained). The right-hand side is a sedimentation chamber filled with water and the left-hand side is the sand filter chamber. Right –Underground vault filter with special organic filter media inside cartridges.

Sand and Organic Filter Level 1 Inspection

The Level 1 Inspection for Sand and Organic Filters focuses on the Drainage Area (SF1), Inlets (SF2), and Filter Area (SF3). The purpose of a filter practice is to temporarily store collected runoff and have it percolate through a filter media, such as sand, that filters pollutants before the water continues downstream. Most filters have an underdrain system (perforated pipe in a gravel layer) to let the water out of the filter once the filtration takes place. The Level 1 Inspection should be conducted at least annually, especially in early spring, to ensure that the practice has survived the winter, particularly if there has been a significant amount of snow.

SF 1. Drainage Area

Description: The drainage area conveys runoff to and is uphill from the filter.

Instruction: Look for both pervious and impervious areas that are uphill from the filter. Consult **Table 2.12.1** below.

Instruction: Look for both pervious and impervious areas that are uphill from the filter. Consult Table 2.12.1 below.		
Table 2.12.1 SF Drainage Area		
Problem (Check if Present)	Foll	ow-Up Actions
		Seed and straw areas of bare soil to get vegetation established. Fill in erosion areas with soil, compact, and seed and straw to establish vegetation. If a rill or small channel is forming, try to redirect water flowing to this area by creating a small berm or adding topsoil to areas that are heavily compacted. Other:
□ Bare soil, erosion of the ground (rills washing out the dirt)		Kick-Out to Level 2 Inspection: Large areas of soil have been eroded, or larger channels are forming. May require rerouting of flow paths.
Piles of grass clippings, mulch, dirt, salt, or other materials	0 0	Remove or cover piles of grass clippings, mulch, dirt, etc. Other:
Open containers of oil, grease, paint, or other substances		Cover or properly dispose of materials; consult your local solid waste authority for guidance on materials that may be toxic or hazardous. Other:

SF 2. Inlets

Description: The inlets to a filter are where water flows into the filter. Depending on the design, inlets can be:

- Curb cuts or inlets in a parking lot or roadway
- Downspouts that deliver runoff directly from a rooftop to the filter
- Pipes or ditches that carry water into the filter from the drainage area
- Flow directly over the land surface (known as "sheetflow")

Above-ground filters can have any of the above. Underground filters most likely have curb inlets or flow directly into a grate that is part of the filter itself (see left-hand side of perimeter sand filter shown in **Figure 2.12.3**).



Figure 2.12.3. Key Areas for Level 1 Inspection of Sand and Organic Filters

Instruction: Look for all the places where water flows into the filter practice. Consult **Table 2.12.2** below for possible problems.

Table 2.12.2 SF Inlets		
Problem (Check if Present)		Follow-Up Actions
	□ Inlets are collecting grit and debris or grass/weeds growing. Some water may not be getting into the filter practice.	 Use a flat shovel to remove grit and debris (especially at curb inlets or openings). Parking lots generate fine grit that accumulates at these spots. Pull out clumps of growing grass or weeds and scoop out the soil or grit that the plants are growing in. Remove any grass clippings, leaves, sticks, and other debris that is collecting at inlets. For pipes and ditches, remove sediment and debris that is partially blocking the pipe or ditch opening where it enters the Filter practice. Dispose of all material properly in an area where it will not re-enter the practice. Other:
	□ Some or all of the inlets are	 Kick-Out to Level 2 Inspection: Inlets are blocked to the extent that most of the water does not seem to be entering the filter practice. For small areas of erosion, smooth out the eroded part and apply rock or stone (e.g., river cobble) to prevent further erosion. Usually, filter fabric is placed under the rock or stone. In some cases, reseeding and applying erosion-control
101 33.48 PM	eroding so that rills, gullies, and other erosion are present, or there is dirt washing into the filter practice.	matting can be used to prevent further erosion. Some of these materials may be available at a garden center, but it may be best to consult a landscape contractor. Other: Kick-Out to Level 2 Inspection: Erosion is occurring at most of the inlets and it looks like there is too much water concentrating at these points. The inlet design may have to be modified.

Table 2.12.2 SF Inlets		
Problem (Check if Present)		Follow-Up Actions
	□ For an underground filter, water is ponding and doesn't seem to be getting through the filter.	□ Kick-Out to Level 2 Inspection: This is generally a more serious problem and should be referred for a Level 2 Inspection because it will require opening up the filter vault to check for clogging.

SF 3. Filter Area (for Surface Sand Filters)

Description: The Filter Area is the area that collects water and allows it to seep into the filter media. Some filters also have a vertical perforated pipe that is the cleanout for the underdrain pipe.

Instruction: Examine the surface of the filter and the observation well, if present. Consult **Table 2.12.3** below for possible problems.

Table 2.12.3 SF Filter Area (for Surface Sand Filters)			
Problem (Check if Present)	Follow-Up Actions		
	 Vegetation growing in the filter bed should be removed either manually or with a water-safe herbicide (e.g., glysophate without surfactants). Other: 		
□ Filter has grass and vegetation growing on more than 25% of the filter bed, threatening to clog the filter.	☐ Kick-Out to Level 2 Inspection: The filter seems clogged, or vegetation and weeds have proliferated past the point where the Level 1 person can manage it.		
 Minor amounts of sediment, grit, trash, or other debris are accumulating on the surface. 	 Use a shovel to scoop out minor amounts of sediment or grit, especially in the spring after winter sanding materials wash in and accumulate. Dispose of the material where it cannot re-enter the filter. If removing the material creates a hole or low area, rake the surface smooth and level. Remove trash, debris, and other undesirable materials. Other: 		
	□ Kick-Out to Level 2 Inspection: Sediment (other than sand) has accumulated more than 2-inches deep and covers 25% or more of the surface of the filter area.		

Table 2.12.3 SF Filter Area (for Surface Sand Filters)

Problem (Check if Present)

There is erosion on the surface; water seems to be carving out rills as it flows across the filter surface, or sinkholes are forming in certain areas.

Follow-Up Actions

- ☐ For minor areas of erosion, try filling the eroded areas with clean, coarse construction sand.
- Other:
- ☐ Kick-Out to Level 2 Inspection: The problem persists or the erosion is more than 3-inches deep and seems to be an issue with how water enters and moves through the filter area.
- ☐ Kick-Out to Level 2 Inspection: The problem does not seem to be caused by flowing water but by a collapse or sinking of the surface (e.g., "sinkhole") due to some underground problem.



■ Water is still visible on the surface and/or the standpipe (if present) more than 72 hours after a rainstorm. The filter practice drains very slowly or is completely clogged. Kick-Out to Level 2 Inspection: This is generally a serious problem, and it will be necessary to activate a Level 2 Inspection.

Section 3. Level 2 and 3 Inspections

3.1. How to Use this Section

This section provides guidance for Level 2 and 3 inspections for 10 groups of stormwater management practices (SMPs). See Section 1 of this chapter for an explanation of the Maintenance Hierarchy approach.

- Section 3.2 provides general guidance for Level 2 and 3 inspections.
- Sections 3.3 through 3.12 provide detailed Level 2 and 3 inspection guidance for each of the 10 practice categories:
 - 3.3 Rainwater Harvesting
 - 3.4 Disconnection and Sheetflow
 - o 3.5 Swales
 - 3.6 Tree Planting
 - o 3.7 Bioretention
 - o 3.8 Green Roofs
 - 3.9 Permeable Pavement
 - 3.10 Ponds and Wetlands
 - o 3.11 Infiltration
 - 3.12 Sand and Organic Filters
- Each section has tables containing guidance for Level 2 inspectors on specific SMP conditions and possible repairs for those problems (in left column), as well as lists of conditions that would likely trigger a Level 3 evaluation or maintenance action (right column). In addition, Appendix B contains detailed checklists for Level 2 inspectors to use in the field during their inspections.
- **Section 3.13** provides a brief overview for Level 3 inspections and how these fit into the overall hierarchy. However, most of the content for Level 3 maintenance actions is contained in **Section 4.**

3.2. General Guidance for Level 2 and 3 Inspections

The Level 2 inspection will typically be performed by a municipal employee or landscape contractor with some training in stormwater operations and maintenance. Regardless of which type of practice is being inspected, some key procedures and equipment are necessary. Read through this guidance before going on an inspection, and use the specific guidance in **Sections 3.3 through 3.12** for the practice you are inspecting. While much of the equipment and general procedures are somewhat similar to Level 1 inspections, additional information is provided for Level 2 inspectors below.

When to Conduct a Level 2 Inspection

The Level 2 Inspection is needed for two reasons. First, routine inspections to comply with local stormwater regulations typically require a Level 2 inspector. In addition, a Level 2 inspection may be triggered to address or diagnose problems identified during a Level 1 inspection. In this situation, the Level 2 inspector should confer with the Level 1 inspector about problems they have identified and then conduct a follow-up inspection that focuses more on diagnosing the causes of the problems and possible solutions. The checklists in **Appendix B** and other resources cited in **Sections 3.3 through 3.12** can be used as tools.

The frequency of this type of inspection may be defined by the municipality. As with Level 1 inspections, the frequency may change with the age of the SMP, with higher frequencies the first couple of years after installation. Well-established and well-maintained practices may only need to be inspected every few years.

Notifying the Responsible Party

Consult the plan file and maintenance agreement to ascertain the responsible party. Confirm that there is right of access through the local code, signed maintenance agreement, or other means. Contact the responsible party at least three business days in advance of the proposed inspection. If the responsible party cannot be found or contacted, make a reasonable effort through file research to contact a property representative, and document these efforts in writing. If the inspection is in response to a Level 1 inspection and referral to your agency, try to speak with the person who conducted the Level 1 inspection and get any documentation they may have. For publicly owned and managed SMPs, the responsible party will likely be the municipality or other regulated MS4.

What to Take in the Field

Level 2 inspections may require more measurement and, as a result, need some additional materials. In addition, the Level 2 inspection may involve gaining access to private property. Consequently, additional identification is needed for these inspections. A list of recommended items to take in the field is provided in **Table 2.2.1**.

Table 3.2.1 What to Take in the Field for a Level 2 Inspection

- Safety equipment: safety vest, steel-toe shoes, traffic cones if working near traffic, etc.
- Approved plan and as-built (record drawing) if available
- · Records of previous inspections if available
- Engineering scale
- Hand level and pocket rod if needed to measure relative elevations
- Digital camera
- Several copies of SMP checklist if paper forms are used (Appendix B)
- Clipboard and pencils if paper forms are used
- Dry erase white board and marker (optional) to include in photos to keep track of SMP tracking # in municipal database (see Figure 3.2 as example)
- Letter on municipal letterhead granting access and/or agency photo badge
- Pipe wrench to open underdrain clean-out caps
- Flashlight to look into underdrain cleanouts and/or manholes
- Manhole puller
- Soil probe or auger
- 100' measuring tape
- Shovel
- Bug spray

Conducting the Inspection

In general, the inspection should follow a consistent, logical approach, such as outlined below.

- Conduct a quick tour of the practice to identify any obvious issues and important components: inlets (number, location), surface area, overflow structures, berms or impoundments, outfalls, downstream conveyance channels or receiving waters. Check these components against the design plan or as-built drawing (if available).
- Starting at the outlet or low point, use the checklists provided in Appendix B to evaluate the practice. The inspection will proceed from the outlet or outfall to the stormwater treatment area, berms, side slopes, inlets, and drainage area. Make sure to fill in key information on the inspection form, such as SMP identifier number, site name, inspector name, date, and weather conditions.



Figure 3.2. A white board and digital camera can be handy to note SMP tracking #, date of inspection, and other forms of documentation. Note that an inspector may alternatively tag photographs, particularly if they are recorded on a smartphone or Tablet.

- Take photos of important components or maintenance concerns, and mark photo locations and direction on a sketch.
- Review the inspection form before leaving the site to make sure that all necessary information has been collected.

Follow-Up Actions

Immediate follow-up actions include entering the inspection information in the appropriate database or hard copy file, downloading and labeling photos, and providing other necessary documentation.

Another possible follow-up action would be to activate a Level 3 inspection in certain situations. The Level 2 inspector will have to make a judgement call as to whether observed problems warrant a Level 3 investigation, and will also have to coordinate with the responsible party to pursue such an investigation. The Level 2 guidance in this chapter summarizes follow-up actions associated with various observations of SMP condition. Note that these tables are divided into "Level 2" and "Triggers for Level 3" follow-up actions, with Level 2 actions in *blue* cells and Level 3 in *green* cells. Consult **Section 4** of this chapter for more guidance on how to diagnose and correct some of the maintenance items included in these tables.

Another follow-up action involves communicating problems and corrective measures to the responsible party (private or public). This may involve instructing the responsible party to undertake a Level 3 inspection or to provide a timeframe for correcting simpler issues that do not require Level 3 involvement. Many local programs have existing procedures for sending letters or activating a compliance procedure. These procedures include verifying that repairs and corrections are completed by the responsible party.

Level 3 Inspection Guidance

The Level 3 inspection is typically conducted by a Qualified Professional such as a professional engineer or Landscape Architect. It is assumed that the Level 3 inspector is knowledgeable in stormwater management, as well as engineering and construction practices. The Level 3 inspector will not typically be completing a full practice inspection. This inspection is conducted only in response to problems identified during the Level 2 inspection, is more diagnostic in nature, assumes a greater degree of initial knowledge, and may require more extensive intervention.

The Level 3 inspection is also more results based in that it will lead to a specific repair to address the issue that triggered the inspection. **Section 4** identifies 12 problems typically addressed in a Level 3 inspection and discusses measures to diagnose the cause of the problem, as well as repairs needed to address it. It should be noted that the problems addressed in each **Section 4** subsection can occur in a variety of SMPs (e.g., erosion is a common issue in almost every type of SMP). As a result, each subsection identifies the SMPs where the problem most commonly occurs and, in some cases, an SMP-specific diagnosis procedure.

3.3. Rainwater Harvesting – Level 2 Inspections and Triggers for Level 3

The most likely triggers for a Level 3 Inspection for Rainwater Harvesting practices are:

- Structural or mechanical problems (e.g., malfunction of the first-flush diverter or vortex filter)
- Accumulation of debris in the tank that cannot be easily removed by hand
- Severe erosion at the outlet

Table 3.3.1 Level 2 Inspection – RAINWATER HARVESTING			
Recommended Repairs	Triggers for Level 3 Inspection		
Observed Condition: Tank is not filling properly or water level drops quickly			
Condition 1: Tank is not filling properly Look for signs of water bypassing the tank. Inspect the conveyance system and filters to make sure that all parts are properly connected and not leaking. Observe the system during a rainstorm to make sure that water is not backing up and spilling out of the gutters or getting excessively diverted by the filter. Adjust angles and placement of filter as needed. Condition 2: Water level drops quickly after filling Requires diagnosis and resolution of problem: Leaking valve or spigot? Crack in tank wall?	 Gutters, pipes, and/or filter appear to be undersized or not properly designed. Structural or mechanical problem requires special expertise in rainwater harvesting systems. 		
Observed Condition: Tank is sinking, leaning, or at risk of collapse			
Condition 1: Foundation is not stable This repair may need specialized equipment and skill, depending on the size and type of tank. For smaller tanks (like rain barrels), drain and disconnect the tank to move it aside. Compact the underlying soil and create a solid, level base for the tank with concrete blocks or gravel. Seek professional help for larger tanks. Condition 2: Other structural problem Seek professional help.	Tanks cannot be easily adjusted or fixed by hand.		
Observed Condition: Severe erosion at outlet			
Condition 1: Erosion gets worse even after re-seeding or adding stone There are several potential solutions to this continued erosion. Add geotextile fabric below the stone to protect the soil. Dig out a pit at the outfall and fill with gravel or stone to absorb the velocity of the water spilling out the tank. If the outlet flows onto a steep slope, consider extending the pipe length to a flatter area. Some of these actions may require help from a contractor.	 Erosion control cannot easily be installed by hand. Erosion recurs after previous repairs. Downstream drainage concerns 		

3.4. Disconnection & Sheet Flow – Level 2 Inspections and Triggers for Level 3

The most likely triggers for a Level 3 Inspection for Disconnection and Sheetflow practices are:

- Significant damage to level spreader/energy dissipator
- Major erosion

Table 3.4.1 Level 2 Inspection – DISCONNECTION AND SHEETFLOW			
Recommended Repairs	Triggers for Level 3 Inspection		
Observed Condition: Significant sediment on pavement that drains to disconnection area (e.g., grass strip)			
Condition 1: Sediment on parking lot is widespread Enlist a mechanical sweeper or vacuum sweeper to remove sediment across entire pavement surface. Pay special attention to downhill edges of pavement where more sediment may have accumulated.	Sediment accumulation is so serious that it cannot be sufficiently removed with mechanical sweeper. May indicate a high sediment load from uphill in the drainage area that needs to be mitigated.		
Observed Condition: Pavement edge deteriorating			
Condition 1: Dips or damage at pavement edge causing runoff to concentrate Determine whether the damaged edge is causing significant enough concentration of runoff to warrant repair or regrading of the pavement.	 Edge must be patched or re-paved to make secure and level. Parking lot not draining properly to the energy dissipator and treatment area. 		
Observed Condition: Level spreader/energy dissipator			
Condition 1: Level spreader sinking or uneven If basic equipment can be used, prop up and secure any section of level spreader that is sinking. Regrade soil all around level spreader and add stone as necessary to prevent erosion and bypassing. Condition 2: Level spreader is broken These repairs can be simple for small, residential-scale practices, such as at a downspout. Ensure the level spreader is level across, keyed in to soil at the edges, and made of durable material that can withstand the flow of water running across it. Larger or more complicated level spreaders (e.g., concrete) will likely require specialized skill and equipment.	 Level spreader requires specialized equipment, regrading, or large amount of material to make level again. Level spreader needs to be re-designed and replaced. 		
Observed Condition: Erosion in treatment area			
Condition 1: Rills from concentrated flow Inspect energy dissipator to see whether it needs to be improved to better spread out incoming flow. Regrade flow path to ensure that it is relatively flat (if minor). If major re-grading is needed, the treatment area may need to be redesigned and fixed with specialized equipment.	 Major rills and gullies Treatment area needs to be re-designed and major grading needed. 		

3.5. Swales – Level 2 Inspections and Triggers for Level 3

The most likely triggers for a Level 3 Inspection for Swales are:

- Standing water, swale not draining properly (not applicable to wet swales)
- Severe erosion around or under check dams
- Large area of vegetation overrun with weeds and/or invasive species

If longer than 100 feet, develop a new planting plan and have it professionally reviewed.

Severe erosion at outlet that requires redesign

original planting plan.

Table 3.5.1 Level 2 Inspection: SWALE **Recommended Repairs Triggers for Level 3 Inspection** Observed Condition: Water Stands on Surface for More than 72 Hours after Storm Condition 1: Small pockets of standing water Use a soil probe or auger to examine the soil profile. If isolated areas have accumulated grit, fines, or vegetative debris or have compacted soil, try scraping off top 3 to 6 inches Soil is overly compacted or clogged and of soil and replacing with clean material. Also check to see that surface is level and water problem is not evident from Level 2 is not ponding selectively in certain areas. inspection. · Level 2 inspection identifies problem, but Condition 2: Standing water is widespread or covers entire surface it cannot be resolved easily or is associated with the original design of the Requires diagnosis and resolution of problem: practice (e.g., not enough slope down Bad or compacted soil through the swale). Filter fabric on the swale bottom Too much sediment/grit washing in from drainage area? Too much ponding depth? Longitudinal slope is too flat? Observed Condition: Vegetation is predominantly weeds and invasive species Vegetation deviates significantly from original planting plan; swale has been neglected and suffered from deferred For a small area, weed and dig up invasive plants. Replant with natives or plants from maintenance.

Owner/responsible party does not know

 For large area, hire a professional to develop a grading plan and develop a

how to maintain the practice.

planting plan.

Erosion (rills, gullies) is more than 12-inches deep at inlets or the swale bottom or more than 3-inches deep on side slopes. Flow paths from the drainage area are higher than expected, such that the swale needs to be redesigned to handle higher flow rates and velocities. Observed Condition: Significant sediment accumulation, indicating an uncontrolled source of sediment

Condition 1: Isolated areas of sediment accumulation, generally less than 3-inches deep Sediment source may be from a one-time or isolated event. Remove accumulated sediment and top 2 to 3 inches of swale soil media; replace with clean material. Check drainage area for any ongoing sources of sediment.

Condition 2: Majority of the surface is caked with "hard pan" (thin layer of clogging material) or accumulated sediment that is 3-inches deep or more

This can be caused by improper construction sequence (drainage area not fully stabilized prior to installation of the swale) or another chronic source of sediment in the drainage area. Augering several holes down along the swale can indicate how severe the problem is; often the damage is confined to the first several inches of soil. Removing and replacing this top layer (or to the depth where sediment incursion is seen in auger holes) can be adequate, as long the problem does not recur.

- More than 2 inches of accumulated sediment cover 25% or more of the swale surface area.
- "Hard pan" of thin, crusty layer covers majority of swale surface area and seems to be impeding flow of water along the swale.
- New sources of sediment seem to be accumulating with each significant rainfall event.

3.6. Tree Planting – Level 2 Inspections and Triggers for Level 3

A Level 2 Tree Planting inspection should be conducted periodically during the growing season by the Cooperative Extension or an arborist.

Table 3.6.1 Level 2 Inspection: TREE PLANTING	
Recommended Repairs	Triggers for Level 3 Inspection
Observed Condition: Appearance of fungus or pest damage	
Condition 1: Fungus, discoloration, browning leaves or holes in leaves Check with arborist or other tree professional about the best way to proceed. This requires a Level 3 inspection. Condition 2: Burrowing insects, holes Check with arborist or other tree professional about the best way to proceed. This requires a Level 3 inspection.	Any concerns about how to address infestation or disease

3.7. Bioretention – Level 2 Inspections and Triggers for Level 3

The most likely triggers for a Level 3 Inspection for Bioretention are:

- Standing water, clogged media
- Vegetation management
- Bioretention does not conform to original design plan in surface area or storage.
- Severe erosion of filter bed, inlets, or around outlets
- Significant sediment accumulation, indicating an uncontrolled source of sediment

Table 3.7.1 Level 2 Inspection: BIORETENTION NOTE: Key Source for this Information (CSN, 2013)		
Recommended Repairs	Triggers for Level 3 Inspection	
Observed Condition: Water Stands on Surface for More than 72 Hours after Storm		
Condition 1: Small pockets of standing water Use a soil probe or auger to examine the soil profile. If isolated areas have accumulated grit, fines, or vegetative debris or have bad soil media, try scraping off top 3 inches of media and replacing with clean material. Also check to see that surface is level and water is not ponding selectively in certain areas. Condition 2: Standing water is widespread or covers entire surface Requires diagnosis and resolution of problem: Clogged underdrain? Filter fabric between soil media and underdrain stone?	 Soil media is clogged and problem is not evident from Level 2 inspection. Level 2 inspection identifies problem, but it cannot be resolved easily or is associated with the original design of the practice. 	
Need to install underdrain if not present?Too much sediment/grit washing in from drainage area?		
Too much ponding depth?		
Improper soil media?		

Observed Condition: Vegetation is sparse or out of control

Condition 1: Original design planting plan seems good but has not been maintained, so there are many invasives and/or dead plants

Will require some horticultural experience to restore vegetation to intended condition by weeding, pruning, removing plants, and adding new plants.

Condition 2: Original design planting plan is unknown or cannot be actualized

A landscape architect or horticulturalist will be needed to redo the planting plan. Will likely require analysis of soil pH, moisture, organic content, sun/shade, and other conditions to make sure plants match conditions. Plan should include invasive plant management and maintenance plan to include mulching, watering, disease intervention, periodic thinning/pruning, etc.

- Vegetation deviates significantly from original planting plan; Bioretention has been neglected and suffered from deferred maintenance.
- Owner/responsible party does not know how to maintain the practice.

Observed Condition: Bioretention does not conform to original design plan in surface area or storage

Condition 1: Level 2 Inspection reveals that practice is too small based on design dimension, does not have adequate storage (e.g., ponding depth) based on the plan, and/or does not treat the drainage area runoff as indicated on the plan

Small areas of deviation can be corrected by the property owner or responsible party, but it is likely that a Qualified Professional will have to revisit the design and attempt a redesign that meets original objectives or that can be resubmitted to the municipality for approval.

 More than a 25% departure from the approved plan in surface area, storage, or drainage area; sometimes less than this threshold at the discretion of the Level 2 inspector.

Observed Condition: Severe erosion of filter bed, inlets, or around outlets

Condition 1: Erosion at inlets

The lining (e.g., grass, matting, stone, rock) may not be adequate for the actual flow velocities coming through the inlets. First line of defense is to try a more non-erosive lining and/or to extend the lining further down to where inlet slopes meet the Bioretention surface. If problem persists, analysis by a Qualified Professional is warranted.

Condition 2: Erosion of Bioretention filter bed

This is often caused by "preferential flow paths" through and along the Bioretention surface. The source of flow should be analyzed and methods employed to dissipate energy and disperse the flow (e.g., check dams, rock splash pads).

Condition 3: Erosion on side slopes

Again, the issue is likely linked with unanticipated flow paths down the side slopes (probably overland flow that concentrates as it hits the edge of the slope). For small or isolated areas, try filling, compacting, and re-establishing healthy ground cover vegetation. If the problem is more widespread, further analysis is required to determine how to redirect the flow.

- Erosion (rills, gullies) is more than 12 inches deep at inlets or the filter bed or more than 3 inches deep on side slopes.
- If the issue is not caused by moving water but some sort of subsurface defect. This may manifest as a sinkhole or linear depression and be associated with problems with the underdrain stone or pipe or underlying soil.

Observed Condition: Significant sediment accumulation, indicating an uncontrolled source of sediment

Condition 1: Isolated areas of sediment accumulation, generally less than 3-inches deep

Sediment source may be from a one-time or isolated event. Remove accumulated sediment and top 2 to 3 inches of Bioretention soil media; replace with clean material. Check drainage area for any ongoing sources of sediment.

Condition 2: Majority of the surface is caked with "hard pan" (thin layer of clogging material) or accumulated sediment that is 3-inches deep or more

This can be caused by an improper construction sequence (drainage area not fully stabilized prior to installation of Bioretention soil media) or another chronic source of sediment in the drainage area. Augering several holes down through the media can indicate how severe the problem is; often the damage is confined to the first several inches of soil media. Removing and replacing this top layer (or to the depth where sediment incursion is seen in auger holes) can be adequate, as long as the problem does not recur.

- More than 2 inches of accumulated sediment cover 25% or more of the Bioretention surface area.
- "Hard pan" of thin, crusty layer covers majority of Bioretention surface area and seems to be impeding flow of water down through the soil media.
- New sources of sediment seem to be accumulating with each significant rainfall event.

3.8. Green Roof – Level 2 Inspections and Triggers for Level 3

The most likely triggers for a Level 3 Inspection for Green Roofs are:

- Standing water
- Vegetation management
- Structural damage

Table 3.8.1 Level 2	Inspection: GREEN ROOF	
Recommended Repairs and Required Skills	Triggers for Level 3 Inspection	
Observed Condition: Unhealthy or Dying Vegetation		
	 More than 25% die off Plants are unhealthy for a prolonged period of time or need to be replanted repeatedly, indicating that a new planting plan may be necessary, or the planting medium is not functioning properly. pH or other media constituents are not conducive to plant growth, and the media needs to be amended (e.g., lime, fertilizer). This should be handled by a green roof vendor or green roof plant specialist. 	
Observed Condition: Ponding Between Storm Events or De	bris Accumulation	
Condition 1: Further inspection shows debris is clogging the outflow drainpipe Remove debris by hand and revisit within 24 hours to see whether this action fixed the problem. Condition 2: Debris has backed up to include the underdrain Attempt to remove by hand or flush out with a hose.	Ponding continues even after debris has been removed. This may indicate a problem with either the media or the underdrain system.	
Observed Condition: Structural Damage to Overflows		
Condition: If the damage is minor, repair damage directly, per original design drawings	Most instances of structural damage will need to be referred to the designer or a qualified green roof vendor.	
Observed Condition: Roof is Leaking or indication that the membrane has a leak		
Condition: Roof is leaking	Any leaks in the membrane trigger a Level 3 inspection or an inspection by the original installer or designer.	

3.9. Permeable Pavement – Level 2 Inspections and Triggers for Level 3

The most likely triggers for a Level 3 Inspection for Permeable Pavement are:

- Ponding or
- Highly clogged pavement

Table 3.9.1 Level 2 Inspection: PERMEABLE PAVEMENT		
Recommended Repairs and Required Skills	Triggers for Level 3 Inspection	
Observed Condition: Bare Soil or Erosion in the Drainage Area		
Large rills or gullies are forming in the drainage area. An attempt to regrade the drainage area has been unsuccessful Fixing the problem would require major regrading (i.e., redirecting more than a 100-square-foot area. It is not clear why the problem is occurring.		

Observed Condition: Dirt or Grit Accumulating, or Grass Growing on Pavement Surface

Condition 1: Grit beginning to form but is isolated to a small area or does not fill the joints between paver blocks

Try to agitate and sweep by hand, or hire a contractor with a vacuum sweeper. Also investigate the drainage area for potential sediment sources. If no obvious sources are found, discuss winter sanding and salting operations with the property owner to identify whether this could be the source.

Condition 2: Grit is forming and cannot be removed with agitation and hand sweeping

Hire a vendor with a regenerative air vacuum sweeper, maximum power 2,500 rpm; avoid sweepers that use water.

- More than 2 inches of sand/dirt/grit are on some of the pavement surface.
- More than 25% of the pavement surface is covered with sand/dirt/grit to the extent that joints between paver blocks are filled
- Regenerative air sweeper cannot remove grit.

Observed Condition: Structural Damage

Condition 1: Portions of porous asphalt or permeable pavers are damaged, and the cause is known to be at the surface.

If the damage is from a single event such as heavy equipment or heavy fallen objects, or the surface has been damaged by wear over time, hire a contractor experienced in permeable pavement installation to repair the damaged areas.

Condition 2: Damage to other structures, such as drainage infrastructure

If possible, repair or replace damaged items, or hire a contractor with permeable pavement experience if the damaged infrastructure is within the pavement surface.

- More than 25% of the surface needs to be repaired or replaced.
- It appears that the underlying material has "caved in," indicating an underlying water conveyance or soil stabilization issue.
- Problem is repaired but recurs within less than five years.

Table 3.9.1 Level 2 Inspection: PERMEABLE PAVEMENT

Recommended Repairs and Required Skills

Triggers for Level 3 Inspection

Observed Condition: Ponding on the Pavement Surface

Condition 1: Underdrains (if present) may be clogged

Check to see whether underdrains are clogged by inspecting cleanouts (if present) or catch basins and looking for debris. If underdrains appear clogged, it may be necessary to hire a router service to ream out the underdrains.

Condition 2: At time of Level 2 inspection, water is not ponded, and there is no obvious clogging of the surface.

Conduct a flood test to determine whether the ponding is an ongoing problem.

- Water stands on the pavement surface more than 72 hours after a storm, and the problem cannot be resolved by unclogging underdrains.
- More than 25% of the pavement surface is covered with sand/dirt/grit to the extent that joints between paver blocks are filled.



Figure 3.9.1. Winter salting, sanding, plowing, and snow storage can cause problems for permeable pavement surfaces, which will trigger a Level 3 investigation.



Figure 3.9.2. A Level 3 investigation is warranted if more than 25% of the permeable pavement surface appears to be clogged, or joints are filled in, or, as shown in the photo, vegetation is growing.

3.10. Ponds & Wetlands – Level 2 Inspections and Triggers for Level 3

The most likely triggers for a Level 3 Inspection for Ponds and Wetlands are:

- Severe erosion
- Excessive algae or aquatic plants
- Settlement and pipe corrosion
- Major sediment buildup

Table 3.10.1 Level Inspection: PONDS and WETLANDS

Recommended Repairs and Required Skills

Triggers for Level 3 Inspection

Observed Condition: Bare Soil or Erosion in the Drainage Area

Condition 1: Extensive problem spots, but no channels or rills forming

Reseed problem areas. If problem persists or grass does not take, consider hiring a landscape contractor.

Condition 2: Problem is extensive, and rills/channels are beginning to form

May be necessary to divert or redirect water that is causing the erosion problem. If it appears that simple regrading—such as installing a berm or leveling a low spot—will fix the problem, make repairs and ensure that the problem is repaired after the next storm.

- Large rills or gullies are forming in the drainage area.
- An attempt to regrade the drainage area has been unsuccessful.
- Fixing the problem would require major regrading (i.e., redirecting more than a 100-square-foot area.
- It is not clear why the problem is occurring.

Observed Condition: Manholes or Inlet Pipe Buried or Covered with Vegetation

Condition 1: Nearest manhole and inlet pipe not found

Consult as-built drawings to get to closest suspected location and use metal detector to search for metal manhole cover. If unsuccessful, identify nearest drain inlets and approximate pipe direction to locate next manhole.

Condition 2: Manhole located and inspected

Never enter a manhole, except by following confinedspace entry protocols.

If outlet pipe is not visible or greater than 25% full of sediment/debris or trash, it will typically require a qualified contractor to flush, clean and clear blockages.

Condition 3: Inlet pipe not found at pond

Clear vegetation and brush that may be covering the inlet pipe. Buried inlet pipes may be found through use of a metal probe.

Condition 4: Inlet pipe buried in sediment or blocked by vegetation

Once located, the pipe path can be cleared of vegetation with brush hook or other brush tools. Light digging may clear sediment from the end of the pipe.

- To locate buried manholes and lost storm lines, it is sometimes necessary to hire a pipeline inspection contractor with televising equipment or ground-penetrating radar and enter at the closest upstream access point.
- Locating a buried inlet pipe may require wading in the edge of the pond and using a metal probe and brush axe to find and expose the pipe.
- If other than light digging is necessary to remove accumulated sediment, a contractor with heavy equipment may be required.

Table 3.10.1 Level Inspection: PONDS and WETLANDS

Recommended Repairs and Required Skills

Triggers for Level 3 Inspection

Observed Condition: Pipe or Headwall Settlement, Erosion, Corrosion or Failure

Condition 1: Pipe or headwall settlement or failure

Severe sinkholes, settlement or corrosion should be kicked out to Level 3 Inspection.

Condition 2: Flow not confined to pipe and visible outside pipe wall

With flashlight, observe the inside of the pipe and note its condition. Take photographs. Look for sinkholes developing that indicate pipe failure beneath the surface. Kick out to Level 3 inspection.

- Where blockages are visible, a decision is needed on whether to clear them or leave in place. If a third of the pipe is full of sediment, it should be removed by a contractor with pipecleaning equipment.
- Corrosion of inlet pipes that allows flow around the pipe exterior is a structural concern because it can lead to settlement, sinkholes and undermining pond embankment.
 Evidence of this type of failure may require specialized pipeinspection equipment and investigation by an engineer.

Observed Condition: Pond Conditions

Condition 1: Pond pre-treatment zone is full of sediment or not constructed as shown on as-built drawings.

Condition 2: Excessive buildup of sediment or overgrowth

If the pre-treatment area or pond pool is overgrown or filled with sediment so that the original design is compromised, corrective measures are required. If plants have died, then replanting is necessary. If none of the original design exists due to alteration or sediment, kick out to Level 3 inspection.

- It may require inspection by an engineer to determine next steps for clearing, replanting or reconstruction.
- Erosion or settlement such that design has been compromised should be reviewed by an engineer. Recurring erosion may require redesign and/or regrading to direct flow away from eroding area.
- If sediment has filled more than 50% of the pond's capacity, dredging is likely needed and should be evaluated by a qualified contractor.
- Removal or control of excessive algae or aquatic plants can be assessed by a qualified pond maintenance company.

3.11. Infiltration – Level 2 Inspections and Triggers for Level 3

The most likely triggers for a Level 3 Inspection for Infiltration practices are:

- Standing water, clogged media
- Severe erosion of infiltration area, inlets, or around outlets
- Significant sediment accumulation, indicating an uncontrolled source of sediment

Table 3.11.1 Level Inspection: INFILTRATION

Recommended Repairs

Triggers for Level 3 Inspection

Observed Condition: Water Stands on Surface for More than 72 Hours after Storm

Condition 1: Small pockets of standing water

For infiltration basins with soil, use a soil probe or auger to examine the soil profile. For gravel infiltration trenches or basins, use a shovel to dig into the gravel layer where the problem is occurring. If isolated areas have accumulated grit, fine silt, or vegetative debris or have bad soil or clogged gravel, try removing and replacing with clean material. If the practice is supposed to have grass cover, it will likely be necessary to replant once the problem is resolved.

Condition 2: Standing water is widespread or covers entire surface

Look in the observation well (if it exists) and use a tape measure to estimate the depth of water standing in the soil or gravel. Requires diagnosis and resolution of problem:

- Too much sediment/grit washing in from drainage area?
- Too much ponding depth?
- Improper infiltration media?
- Underlying soil not suitable for infiltration?

As above, the resolution will likely require replanting and re-establishment of good grass cover if this is part of the design.

- Infiltration media is clogged and problem cannot be diagnosed from Level 2 inspection.
- Level 2 inspection identifies problem, but it cannot be resolved easily or it is associated with the original design of the practice.

Observed Condition: Severe erosion of infiltration bed, inlets, or around outlets

Condition 1: Erosion at inlets

The lining (e.g., grass, matting, stone, rock) may not be adequate for the actual flow velocities coming through the inlets. First line of defense is to try a less erosive lining and/or extending the lining further down to where inlet slopes meet the infiltration surface. If problem persists, analysis by a Qualified Professional is warranted.

Condition 2: Erosion of infiltration bed

This is often caused by "preferential flow paths" along the surface. The source of flow should be analyzed and methods employed to dissipate energy and disperse the flow (e.g., check dams, rock splash pads).

- Erosion (rills, gullies) is more than 12 inches deep
- The issue is not caused by moving water but some sort of subsurface defect, which may manifest as a sinkhole or linear depression and be associated with problems with the underlying stone or soil.

Observed Condition: Significant sediment accumulation, indicating an uncontrolled source of sediment

Condition 1: Isolated areas of sediment accumulation, generally less than 3-inches deep

Sediment source may be from a one-time or isolated event. For practices with soil cover, remove accumulated sediment and top 2 to 3 inches of soil; replace with clean material. Check drainage area for any ongoing sources of sediment.

Condition 2: Majority of the surface is caked with "hard pan" (thin layer of clogging material) or accumulated sediment that is 3-inches deep or more

This can be caused by an improper construction sequence (drainage area not fully stabilized prior to installation of infiltration practice) or another chronic source of sediment in the drainage area. For infiltration basins with soil, augering several holes down through the media can indicate how severe the problem is; often the damage is confined to the first several inches of soil media. Removing and replacing this top layer (or to the depth where sediment incursion is seen in auger holes) can be adequate, as long the problem does not recur.

- Trenches or dry wells with stone or gravel at surface may need to be cleaned out with a vacuum truck because the process of removing the top layer of stone may cause fine silt to drop further down.
- More than 2 inches of accumulated sediment cover 25% or more of the infiltration surface area.
- "Hard pan" of thin, crusty layer covers majority of Infiltration surface area and seems to be impeding flow of water down through the soil media.
- New sources of sediment seem to be accumulating with each significant rainfall event.

3.12. Sand and Organic Filters – Level 2 Inspections and Triggers for Level 3

The most likely triggers for a Level 3 Inspection for Sand and Organic Filters are:

- Standing water, clogged filter media
- Need to pump out sedimentation chamber
- Response to fuel or other spills that make it into the filter

Table 3.12.1 Level 2 Inspection: SAND AND ORGANIC FILTERS

Recommended Repairs

Triggers for Level 3 Inspection

Observed Condition: Water Stands on Surface for More than 72 Hours after Storm

Condition 1: Small pockets of standing water

Use a soil probe or auger to examine the sand or filter profile. If isolated areas have accumulated grit, fine silt, vegetative debris, oily sludge or bad sand media, try scraping off top 3 inches of media and replacing with clean, coarse construction sand.

Condition 2: Standing water is widespread or covers entire surface

Look in the underdrain cleanout (if present) and use a tape measure to estimate the depth of water standing in the sand layer. Requires diagnosis and resolution of problem:

- Clogged underdrain
- Filter fabric between the sand layer and underdrain gravel OR on top of the sand filter layer (usually held in place by a thin layer of gravel)
- Too much sediment/grit/vegetative debris/oily sludge washing in from drainage area
- Too much ponding depth
- Improper sand media

- Sand or organic media is clogged, but problem was not evident from Level 2 inspection.
- Level 2 inspection identifies problem, but it cannot be resolved easily or is associated with the original design of the practice.
- The problem seems to be filter fabric placement, but this is specified in the original design.
- The entire filter media layer or filter cartridges need to be replaced.
- The problem is associated with improper configuration of underdrain pipes or outlet structures.

Observed Condition: Severe erosion of filter bed, inlets, or around outlets

- Erosion (rills, gullies) is more than 12 inches deep.
- The issue is not caused by moving water but some sort of subsurface defect, which may manifest as a sinkhole or linear depression and be associated with problems with the underlying stone or soil.

Observed Condition: Significant sediment accumulation, indicating an uncontrolled source of sediment

Condition 1: Isolated areas of sediment accumulation, generally less than 3-inches deep

Sediment source may be from a one-time or isolated event. Remove accumulated sediment and top 2 to 3 inches of sand or filter media; replace with clean material. Check drainage area for any ongoing sources of sediment.

Condition 2: Majority of the surface is caked with "hard pan" (thin layer of clogging material) or accumulated sediment that is 3-inches deep or more

This can be caused by an improper construction sequence (drainage area not fully stabilized prior to installation of filter practice) or another chronic source of sediment in the drainage area. Augering several holes down through the sand media can indicate how severe the problem is; often the damage is confined to the first several inches of media. Removing and replacing this top layer (or to the depth where sediment incursion is seen in auger holes) can be adequate, as long the problem does not recur.

- More than 2 inches of accumulated sediment cover 25% or more of the filter surface area.
- "Hard pan" of thin, crusty layer covers majority of filter surface area that seems to be impeding flow of water down through the filter media.
- New sources of sediment seem to be accumulating with each significant rainfall event.

Observed Condition: Underground vault system has standing water and oily sludge floating on top, or other issues that indicate clogging, malfunction, or need for maintenance

Condition: Compare observation to the design or as-built plans to see whether existing conditions match the plan details.

 This condition will almost always warrant conferring with the manufacturer or vendor and/or using the Level 3 inspection process to further diagnose the problem.

Section 4. Diagnostics and Maintenance Measures

4.1. About this Section

Section 4 summarizes the most common problems found in SMPs, as well as typical maintenance or repair solutions. The guidance provided in this section has some similarities to **Section 3** but differs in the following ways:

- 1. The primary audience for Section 4 is the Level 3 inspector, often a professional engineer, or landscape architect tasked with diagnosing and repairing SMPs that are not working properly. However, the information in Section 4 may also be quite useful for a Level 2 inspector seeking to diagnose a particular problem.
- 2. The maintenance measures described in this section are more detailed and focus on repairs to specific problems rather than on routine maintenance such as weeding or minor sediment removal.
- 3. Because the problems described in this section can be applied to several different practices, this section is organized by the type of problem rather than the practice type.

Problems addressed during Level 3 inspection/maintenance are summarized in **Table 4.1**. This list is not exhaustive but does address the most common issues in the SMPs that require some advanced knowledge and skill to inspect and fix. Each problem category is discussed in a separate sub-section.

Table 4.1: Common Inspection/Maintenance Issues for Level 3		
Sub-Section/Category	Description	
4.2 Contributing Drainage Area – Pollutant Sources	Sediment or pollution sources in the Drainage Area	
4.3 Physical Obstructions	Physical obstructions to maintenance access, overflow, or emergency spillway	
4.4 Erosion	Erosion on side slopes, practice bottom, at inlet or outlets. Rills and gullies forming where there should be sheetflow	
4.5 Departures from Design Dimensions	Practice dimensions have been altered, either due to filling with sediment, redesign or filling in, or improper implementation.	
4.6 Improper Flow Pathways	Flow is shortcircuiting the practice, or drainage pathways have been otherwise modified.	
4.7 Sediment Buildup	Sediment has accumulated in a pool, practice bottom, pre-treatment area, or vault.	
4.8 Clogging	The soil media or other components are clogged, and there may be standing water for longer than intended.	
4.9 Vegetation	Excessive, inadequate, and/or unhealthy vegetation to support a practice	
4.10 Embankment and Overflow Condition	Issues with an embankment or overflow weir or channel	
4.11 Structural Damage	SMP infrastructure, such as concrete or metal elements, have been damaged.	
4.12 Pool Stability	Permanent pool of water is at the improper elevation.	
4.13 Pool Quality	Permanent pool of water suffers from poor quality due to algal growth or other issues.	

4.2. Contributing Drainage Area - Pollutant Sources

Issue applies most commonly to: Sheetflow/Disconnection, Swales, Bioretention, Permeable Pavement, Ponds/Wetlands, Infiltration, and Sand/Organic Filters.

Problem #1: Bare soil washing into SMP from drainage area

General Approach for All Practices:

- Identify the specific source(s) of sediment in the drainage area by tracking sediment flow during a rainfall or looking for a track of sediment staining during dry weather.
- For an active sedimentation event, attempt to filter incoming runoff if conditions allow (e.g., enough space upstream of the practice for temporary ponding). Consider installing a silt fence, silt socks (at curb inlets), staked straw bales, or other filtering material at the inlets of the SMP. This will keep at least some of the sediment from getting into the practice.
- Runoff from active construction should not enter the SMP; divert to a temporary and approved sediment control practice.
- For areas of bare soil not due to active construction (bottom photo), prep the soil and re-seed/plant with grass species or other thick ground cover appropriate for the region. May also need starter fertilizer, topsoil, and/or compost.
- For steep slopes with bare soil, consider also installing erosion-control matting to hold soil, seed, and straw in place until the vegetation becomes well established.
- For fill and topsoil stockpiles in the drainage area, provide temporary or permanent cover as soon as possible. Alternatively, surround the base of the stockpile with silt fence, or equivalent, to prevent the transport of sediment-laden runoff.





Helpful Skills:

- · Erosion and sediment control knowledge and skills
- Landscaping knowledge to understand appropriate ground cover species for re-vegetating bare areas

Equipment Typically Used for Fixing Sediment Sources:

- · Silt fencing and other sediment barriers
- · Erosion-control matting and/or straw
- Rakes and shovels
- · Light excavation or grading equipment for larger jobs
- Equipment to deliver topsoil or compost as needed
- Plants and/or seed mix, plus a way to move and store plant stock without damaging it or drying it out
- Starter fertilizer, topsoil, and/or compost

Problem #2: Other pollution sources in the drainage area

General Approach for All Practices:

- Pollutants may include: road salt, oils, fuels, food grease, wash water, paints and solvents, trash, and many others.
- Identify the source(s) of pollution.
- For pollutants spilled on the ground, remove by hand or use absorbents to soak up wet material. Absorbents and other waste materials shall be disposed of properly.
- For materials stored outside, move them to a covered area or build/add cover over the materials. Provide secondary containment, if possible.
- Make sure all waste containers have lids and fix any leaks (see poor practices in photo at right).
- For sites prone to frequent oil leaks and staining (e.g., vehicle maintenance yards), consider installing an oil/water separator to pre-treat runoff that enters the SMP.
- For routine dumping of wash water, grease, paints, or other pollutants, enforce behavior change and explain good housekeeping practices.
- Develop a pollution prevention plan for the site to ensure that hazardous materials and other potential pollutants are not stored where they are exposed to rainfall.
- For areas that receive a heavy salt and/or sand load during the winter, consider diverting upslope runoff, especially for practices such as permeable pavement.
 Some monitoring of winter road or parking lot clearing activities may also be warranted.



Helpful Skills:

- Knowledge of good housekeeping and pollution prevention practices
- Good communication with employees and managers at site (e.g., for correcting bad site operations)

Equipment Typically Used for Correcting Other Pollutant Sources:

- Tarps to cover stockpiles
- Absorbents to soak up spills
- Secondary containment barriers that will hold back any liquids or solids that may leak out of their primary container
- Storage barns, sheds, pole barns and other permanent cover for potential pollutants

4.3. Physical Obstructions

Issue Applies Most Commonly To: Rainwater Harvesting, Sheetflow/Disconnection, Swales, Bioretention, Green Roofs, Ponds/Wetlands, Infiltration, and Sand/Organic Filters

Problem #1: Maintenance access is obstructed

Ground-Level SMPs:

- Where a path for vehicles and construction equipment to access the practice
 was established during construction but is now overgrown, remove woody
 vegetation and any other tall vegetation. This path should be bush hogged
 once or twice a year.
- If the SMP needs a large quantity of trash and/or sediment removed in areas
 where access is limited due to steep grades, overgrown vegetation, etc., it
 will be necessary to establish safe vehicular access by clearing and possibly
 re-grading the area. It is advisable to have a maintained, all-weather surface
 to critical parts of the SMP.
- It is most important to provide access nearest to parts of the practice where sediment and trash tend to accumulate the most: forebay and riser structure.
- For an SMP blocked by fences (photo at right), install a gate that is wide enough for vehicles to enter for any current or future maintenance.
- Sometimes access is blocked by unauthorized structures, such as sheds, property fences, retaining walls, etc. Confer with the local stormwater authority on the presence of any maintenance easements and means to gain access to the practice.
- The solutions above should also provide for safe foot access for routine inspection and maintenance.



Rainwater Harvesting:

Ensure that no structures are covering the filter or the tank's access/inspection port.

Green Roofs

- Ensure that individuals can safely reach the roof with tools in hand (e.g., buckets, pruners, hoses). If the roof cannot be accessed via a walk-through door, this may require installing a wide ladder or fire escape-style stairs on the inside or outside of the building.
- If there is a concern of getting too close to the roof's edge while doing maintenance, install a railing around the edge for safety.
 Alternatively, for sloped roofs, workers may need to use harnesses during maintenance activities.

Helpful Skills:

- · Use of motorized landscaping equipment
- Chainsaw skills
- Use of grading equipment for larger jobs
- Note: OSHA safety requirements and certifications may apply to green roof maintenance.

Equipment Typically Used to Regain Proper Access:

- Mower, trimmer
- For very overgrown areas, chainsaw and/or bush hog
- For areas that need to be regraded, excavator, skid steer, or other grading equipment

Problem #2: Flow is obstructed in or out of the practice

General Approach for All Practices:

- Obstruction of overflow or emergency spillway structures is most often due to buildup of debris, such as trees, sticks, trash. It is very important to keep these structures clear of such blockages in order to avoid flooding or a dam breach (avoid conditions caused by beaver activity - top photo).
- Where debris cannot easily be cleared by hand, special equipment and skills may be needed. An obstructed riser structure in a wet pond may need to be accessed by boat (bottom photo). In cases where large sticks, tree branches, trash, or other debris obstruct the overflow or spillway, they may need to be cut up by chainsaw. Large debris will usually need to be hauled away with a truck.





Helpful Skills:

- Chainsaw skills
- Muscle strength to haul large debris
- Boating capabilities

Equipment Typically Used to Clear Obstructions:

- · Gloves, shovels, pruners, rakes, and other hand tools
- · Waders for wetlands
- · Chainsaw for large sticks and branches
- Cable puller (come-along) to remove large branches that cannot be pulled out by hand
- Boat and personal floatation device for riser structures in wet ponds
- Truck to haul away debris

4.4. Erosion

Issue Applies Most Commonly To: Sheetflow/Disconnection, Swales, Bioretention, and Ponds/Wetlands

Problem: Erosion on practice surface, inlets, and/or outlets

General Approach for All Practices:

- See Section 4.10 Embankment and Overflow Condition for how to repair erosion on side-slope embankments.
- Rill and gully erosion occurs when runoff flow is concentrated. Deep rills and gully erosion on the practice surface (top photo) will require the surface to be regraded to make uniform again. Use the lightest equipment possible in order to minimize soil compaction during excavation.
- After excavation, reseed/plant the area with ground cover that is appropriate for the moisture conditions of the practice. Amend or enhance soil as needed according to a soil test; soil may need more organic material to support plants.
- To prevent further erosion on the surface of the practice, ensure that flow from the inlets can spread out adequately and has enhanced energy dissipation features. This may require installing or enhancing a stone apron outlet protection that flares out and down to the level of the practice to slow and spread out the flow. Other options include check dams, energy dissipation devices, or an armored low-flow channel. A stilling basin (bottom photo) can also dissipate flow as it comes out of an inlet or outlet pipe. Apply similar treatments to any outlets that are experiencing erosion.
- Any sloped soils that are disturbed during excavation will likely need erosioncontrol matting to hold it in place while vegetation becomes established.





Helpful Skills:

- · Landscaping/Gardening
- Consult with Cooperative Extension Office or independent laboratory for soil testing
- Skills with excavation equipment
- · Knowledge of sediment and erosion control practices and resources appropriate for the area

Equipment Typically Used for Fixing Erosion:

- · Rakes, shovels, wheelbarrows, and other "landscaping" equipment
- Light excavation or grading equipment for larger jobs
- Equipment to deliver, unload, and move stone and other materials around
- · Plants and/or seed mix, plus a way to move and store plant stock without damaging it or drying it out

4.5. Departure from Design Dimensions

Issue Applies Most Commonly To: Swales, Bioretention, Ponds/Wetlands, Infiltration, and Sand/Organic Filters

Problem: Practice dimensions have been altered

General Approach for All Practices:

- Once constructed, the dimensions of an SMP may become altered from the original design for a variety of reasons. These reasons can include:
- The SMP was not constructed to the proper dimensions at initial installation.
- Sediment accumulation in the SMP reduces the intended storage volume of the practice (top photo).
- Redevelopment or regrading of the site encroaches into the footprint of the SMP.
- Dumping of leaves, trash, or other debris into the SMP reduces the intended storage volume of the practice.
- If it appears that the dimensions of an SMP have been altered, proceed as follows:
- Consult the original design or as-built plans and sizing computations for the SMP to identify the intended dimensions and storage volume of the practice. Measure the length, width, and depth of the practice to estimate the current storage volume. Calculate the difference in volume to determine whether it is significant enough to warrant restoring the practice to its original dimensions. If the loss in volume is greater than about 10%, this likely warrants action.
- If the SMP's original storage volume cannot practically be restored because of current site conditions, an additional SMP may need to be built elsewhere on the site in order to regain adequate storage and treatment volume for the site.
- For problems of dumping by individuals on or near the site, install "No Dumping" or similar signage to inform people that this is not an appropriate place to dispose of debris. Any debris that has already been dumped should be removed from the practice either by hand or with equipment.





Helpful Skills:

- Basic surveying
- Understanding stormwater design plans and sizing computations
- Stormwater management design
- Skills with excavation equipment and erosion and sediment control

Equipment Typically Used to Investigate and Fix Dimensions:

- Simple level or survey equipment, tape measure, and other tools to measure SMP dimensions
- Light excavation or grading equipment for larger jobs
- Rakes, shovels, wheelbarrows, and other "landscaping" equipment for small jobs
- Soil stabilization materials

4.6. Improper Flow Paths

Issue Applies Most Commonly To: Rainwater Harvesting, Sheetflow/Disconnection, Swales, Bioretention, Infiltration, and Sand/Organic Filters

Problem #1: Flow intended to go into a practice is diverted by debris or grit buildup or capacity issues at inlets

Bioretention, Swales, Infiltration, Sand/Organic Filters:





- Grit, sediment, leaves, and other debris builds up at curb inlets or other inlets, sometimes to the point where flow is diverted completely around the practice (photos above). This is a common issue for practices that rely on curb cuts or other small inlet structures to get water into the practice for treatment. A minor amount of debris may be OK and not affect the ability of water to enter the practice. However, be aware of conditions where flow that is supposed to be treated is diverted to a downgradient storm drain or other structures in such a way that the stormwater treatment is entirely or partially bypassed.
- In many cases, correcting the problem may simply involve removing debris or unclogging the inlet.
- However, this problem can be chronic if the inlet design is susceptible to clogging.
 This can occur if the slope from the inlet into the practice is flat and/or there are controllable sources of sediment and debris in the drainage area.
- For chronic problems, consider redesigning inlets to be more clog proof. One solution is to build in a 2 to 3-inch drop from the curb inlet onto a gravel or stone diaphragm along the edge of the practice (see example in photo are right).
- Inlets that are undersized for the flow coming to them should be enlarged and armored with an appropriate erosion-resistant lining.



Rainwater Harvesting:

- Water intended to be collected in rainwater harvesting systems is sometimes not delivered to the tank or cistern if the system of gutters, downspouts, pipes, etc. is not sized properly or if the first-flush diverter or vortex filter is not functioning correctly and diverting too much water away from the tank.
- As with inlets, this may simply be a matter of routine cleaning of gutters, downspouts, vortex filters, etc.
- It may also be a design or capacity issue, in which case, installing larger gutters or a more robust piping system may be in order.



Source: Rainwater Management Solutions 1 Example of enhancing the gutter and piping system leading to a rainwater harvesting system

Helpful Skills:

- Basic surveying
- Typical landscaping skills using materials such as soil, rock/stone, edging material, mulch, etc.
- · Light construction of gutters, downspouts, piping
- Some knowledge of first-flush diverter and vortex filter products

Problem #2: Flow is not uniformly accessing the entire treatment area

Bioretention, Swales, Infiltration, Disconnection and Sheetflow, Sand/Organic Filters:

Improper flow path issues in this category include:

Water forming channels or rills through the treatment bed of bioretention, swales, infiltration, or surface sand filters, and thus not spreading out across the treatment area surface

- Water ponding only at one end of the treatment area because the surface is not level
- Water piping through weak spots to an outlet or underdrain, such as where soil media meets a concrete structure
- See Section 4.4, Erosion for issues of channeling or erosion on the treatment surface.
- For uneven treatment area and preferential ponding, assess the severity of the problem. Compare the relative elevations of the "high" part of the treatment area (the area where water does NOT seem to pond) and any overflow structure or weir where high water flows will leave the practice. If there is still some freeboard (such that the overflow structure is higher than ALL of the treatment bed surface), then there will still be some ponding for larger rainfall events. Try some minor raking or moving soil media and mulch around to even out the filter bed.
- However, the problem is more serious if parts of the treatment area are higher than the overflow structure. These areas will never be valuable for treatment purposes. The treatment area is supposed to fill up like a bathtub, so some regrading is needed to level out the treatment area.
- If water is piping or shortcircuiting through the soil or sand media, forming sinkholes or otherwise bypassing the intended treatment mechanism, it will be necessary to repair these spots. Around concrete or metal overflow structures, use soil material right around the structure that can be compacted (bioretention soil media tends to be light, sandy, and fluffy and won't compact very well). Another option is to "ramp up" the soil layer to the lip of the structure so that there won't be a hydraulic jump at this potentially weak point. See the figure below.

These three issues are illustrated below:



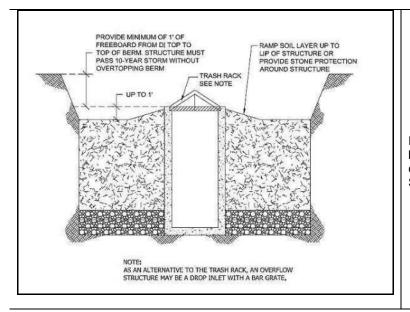
Water from the inlet at top of photo is channeling through the bioretention area.



Water is preferentially ponding only at one end of the bioretention because the surface is not flat.



Water is "piping" down to the underdrain at the weak spot where the soil media meets the concrete overflow structure.



Ramp up soil layer to the lip of the structure to address this being a weak interface where water can work down and create bypassing. (Source: Virginia 2013 Stormwater BMP Specifications, Specification #9, Bioretention, Figure 9.13.)

Impervious Disconnection:

The most likely flow path issues with Impervious Disconnection are: (1) owners intentionally diverting downspouts away from pervious area and onto impervious area (left photo below), and (2) slight grading issues diverting the water away from the intended pervious receiving area (right photo below).





Both issues are fairly straightforward to address but involve communicating and working with property owners to explain the purpose of disconnection and how to properly maintain it. The second issue may involve some minor regrading or building low-profile berms to get water to flow to the intended disconnection area.

Helpful Skills:

- Rudimentary surveying
- Typical landscaping skills—using materials such as soil, rock/stone, edging material, mulch, etc.

Equipment Typically Used for Inspecting and Fixing Flow Paths

- Surveying equipment (i.e. Site level or total station) to get relative elevations among different parts of treatment area, inlets, overflow structures, etc.
- Small, simple tools—flat shovels, wheelbarrows, rakes, other common landscape/gardening tools
- Large, more complicated equipment—small excavators to move material around or do regrading. Always work from the side of the practice and NOT within the practice itself.

4.7. Sediment Buildup

Issue Applies Most Commonly To: Swales, Bioretention, Permeable Pavement, Ponds/Wetlands, Infiltration, and Sand/Organic Filters

Problem: Sediment accumulation more than 2 inches thick covering 25% or more of the practice surface area

Bioretention, Swales:

- Determine the source(s) of sediment. The most likely sources are: (1) premature installation of the practice during the construction process and discharge of construction site sediment loads; (2) erosion in the contributing drainage area *after* construction is complete; and (3) erosion along the practice side slope or within the practice itself. If it is an ongoing source, it must be abated (see Sections 4.2, Contributing Drainage Area, and 4.4, Erosion).
- Use a soil auger to auger holes in various places across the Bioretention or Swale surface area, especially in areas where sediment is accumulating. Determine how deep the sediment is penetrating into the soil media layer. Usually, it will be the top 2 to 3 inches that are most affected. Note that for swales *without* an engineered soil media, the sediment layer will likely be confined to the surface.
- Remove the "fouled" soil media to the affected depth (using flat shovels or small excavators and working from the side) and replace with clean material from an approved vendor (bioretention soil media or equivalent). If no vendors are available in your area, use the soil media specifications from the **Design Manual** to replicate the right mix of sand, topsoil, and composted organic material.
- Check to ensure that the practice is filtering at the proper rate after the next several storm events.

Infiltration:

- For infiltration practices excavated to a suitable infiltrating soil layer (e.g., not stone reservoir layer), use the same procedures as for Bioretention/Swales above.
- For infiltration trenches and basins that have a stone reservoir layer, use similar procedures, but use a shovel to dig into the stone layer to ascertain how deep the sediment incursion is into the stone. Remove down to this layer and replace with clean material.
- If the infiltration practice is clogged, see Section 4.8: Clogging.
- As with Bioretention, check for controllable sources of sediment in the Drainage Area (Section 4.2).

Permeable Pavement:

- NOTE: Routine sweeping with a regenerative air vacuum (maximum power 2,500 rpm) is important to avoid more costly repairs that result from deferred maintenance. It is best to sweep the pavement surface in the early spring after winter sanding/salting materials or snow piles have led to sediment or winter slag accumulation. Also, if the area is surrounded by tree canopy, fall cleanup is essential, as vegetative debris tends to get pulverized by vehicle traffic and ground into the pavement surface.
- Observe the pavement surface during a storm event to see whether the sediment is clogging the pavement (i.e., standing water on the surface after the storm stops). If so, see Section 4.8: Clogging.
- Remove several of the paver blocks in different parts of the structure to ascertain how deep the sediment is penetrating into the bedding and reservoir layers. Most of the time, sediment incursion will be limited to the top 1 or 2 inches of the pavement bedding layer (for permeable interlocking concrete pavers and concrete grid pavers).
- Based on the above observations, it may be worthwhile to quantify
 the infiltration rate using ASTM C-1701/1701M. This is most useful
 in conducting the test in the same place within the pavement
 surface through the course of several years to document reduction
 in infiltration rates. Repair or restorative sweeping is warranted
 when infiltration rates drop below around 10 inches per hour.
 NOTE: As stated above, this can likely be avoided if routine annual
 sweeping is conducted.
- If sediment covers more than 25% of the surface, is deeper than 2 inches, or vegetation is starting to grow where sediment has accumulated, consult a street-sweeping vendor about restorative sweeping. In this case, it will be necessary to use a higher RPM sweeper or vacuum sweeper to suck out more of the bedding pea gravel that has been fouled, then replace with clean material.



Infiltration test using ASTM C-1701



Pulling grass and weeds from the joints can damage parking surface if roots are firmly established in the bedding layer.

- Vegetation growing in the pavement joints should be removed either manually or with a water-safe herbicide (e.g., glysophate without surfactants). It is important to not let weeds proliferate in the pavement surface because pulling them out by the roots may damage the pavement structure. (Note: The application of herbicides to control invasive or undesirable vegetation within wetlands or other waters of the U.S. may require an Aquatic Pesticide Permit from the NYS DEC)
- Check the pavement surface after a storm event to ensure that it is draining properly.

The North Carolina State University (NCSU) Stormwater Engineering Group has an informative Urban Waterways publication, *Maintaining Permeable Pavements* (2011):

http://www.bae.ncsu.edu/stormwater/pubs.htm



Routine, air-vacuum sweeping in the early spring and fall is the best approach for permeable pavement maintenance (Photo source: Toronto and Region Conservation)

Ponds and Wetlands:

- Sedimentation is an inevitable process in ponds and wetlands. NOTE that upstream erosion, especially along stream channels or ditches
 leading to the practice will accelerate the sedimentation process and lead to more frequent and costly sediment removal operations.
 Whenever possible, it is important to mitigate any upstream erosion issues.
- Forebays and/or pre-treatment areas should be cleaned out when they reach 50% of their design capacity. Once cleanout is complete, it will be worthwhile to install a graduated rod into the forebay with a clear marking of future sediment clean-out levels.
- The main body of a pond or wetland may need to be dredged on an infrequent basis or when sediment has replaced 50% of the design capacity. There are many dredging methods available. Excavators with long arms can handle most small or moderate-sized ponds. Other methods may be necessary for larger facilities. Dredging can be a complicated operation involving dewatering, storage of wet sediment, and possibly hauling to on-site or off-site disposal or reuse areas. Consult a qualified contractor to explore available methods and costs for the particular application. Once again, installation of a graduated rod can help mark future clean-out levels. Note: The dredging of accumulated sediment within regulated wetlands, ponds or at outlet structure may require permits from NYS DEC and/or USACE. In addition, removed sediment should be properly disposed of in a regulated solid waste management facility or in an upland area that is at least 100 feet from regulated wetlands or streams. Sediment managed in upland disposal areas shall be graded, seeded and mulched.

Sand/Organic Filters:

- See the section above on Bioretention/Swales as some of the procedures will be similar, especially for above-ground filters. It is important to determine whether the drainage area is generating a controllable source of sediment that can be abated.
- Underground trench or vault filters will require routine maintenance to: (1) remove accumulated sediment, trash, and floatables from the sedimentation chamber, usually with a vac truck; and (2) remove sediment, grit, and sludge from the top layer of the filter media and replace with clean material. NOTE: Depending on the configuration of the underground filter, confined-space procedures may apply. For a normally operating practice, these maintenance tasks should be conducted every two to three years. If the filter is treating a stormwater hotspot or a particularly dirty drainage area (e.g., vehicle maintenance, washing, repair), the frequency may increase to annually or more often, as dictated by Level 2 inspections. Also, in these cases, it may be warranted to test the material to ensure proper disposal.
- Some proprietary filters require replacement of special cartridges or filter material. Consult the vendor or manufacturer for special maintenance procedures.



Routine cleaning of a perimeter or "Delaware" sand filter. This can be done from the surface, but deeper, vault-type filters will require confined-space entry procedures.

Helpful Skills:

- Most common contracting skills
- Excavation, dewatering, and sediment disposal in some cases
- Knowledge of maintenance equipment, such as vac trucks, street sweepers, etc.
- Knowledge of preferred conditions for bioretention soil media
- · Soil testing in some cases where sediment is being removed from stormwater hotspots

Equipment Typically Used for Sediment Removal Activities:

- Small, simple tools—flat shovels, wheelbarrows, rakes, other common tools
- Larger jobs—small or large excavators, loaders, dewatering equipment (pumps, dirt bags, etc.), trucks to haul material to on-site or off-site disposal or reuse areas, erosion and sediment-control supplies.

4.8. Clogging

Issue Applies Most Commonly To: Bioretention, Permeable Pavement, Infiltration, and Sand/Organic Filters

Problem: Filter media clogged; water standing on practice surface for 48 to 72 hours or longer after a storm

Bioretention:



Standing water on the bioretention surface 48 to 72 hours after a storm event is a sure indication of clogging (top photo). Clogging of bioretention practices can be tricky to diagnose as there are several probable causes:

- a. Clogged underdrain
- b. Filter fabric between soil media and underdrain stone
- c. Too much sediment/grit washing in from drainage area
- d. Too much ponding depth
- e. Improper soil media

The following procedure can be used to work through diagnosing the most common causes, beginning with the simplest and easiest to fix and progressing through more complex remedies:

 Look for a thin, crusty layer of sediment that covers some or all of the soil media. It is often grayish in color. This thin layer can sometimes be enough

to cause slow drainage. Scrape this crust off and ascertain sources of sediment in the drainage area (see Section 4.2, Contributing Drainage Area). Often, this problem can be caused by the bioretention soil media being installed too early in the construction process, but other chronic sediment sources should also be checked.

- 2. Open the underdrain cleanout and pour water in to verify that the underdrains are functioning and not clogged or otherwise in need of repair. The purpose of this check is to see whether there is standing water all the way down through the soil. If there is standing water on the surface, but not in the underdrain, then there is clogging somewhere in the soil layer. If the underdrain and cleanout have standing water and there is not water coming out the other end (outlet) of the underdrain pipe, then the underdrain is clogged and will need to be rooted out.
- 3. Use a soil auger to auger several holes down through the soil media to the underdrain layer (if present) or underlying soil. Check to see whether there is a layer of filter fabric at the bottom of the soil layer. The auger will pierce through any filter fabric that is present, and pieces of fabric in the auger bucket should be removed. Notice if the fabric is "blinded" or clogged with sediment. This is a common issue with older bioretention practices. If the practice has a clogged the filter fabric layer, go to step #6, install wick drain.



Filter fabric, where present, is a likely source of clogging.

4. While checking for filter fabric in auger holes, also note whether there is a layer of saturated soil media or bad soil media (e.g., too much clay content) that may be on top of a good media layer. This will be fairly obvious as the top 3 or 4 inches will be mucky and saturated, with dry and sandy media below. If this is the case, it will be necessary to remove the bad material and replace with good, clean bioretention soil media in accordance with the design specifications. Till or incorporate the good material into the underlying existing soil media to establish a good contact.

- 5. If the entire profile of soil media is bad, has too much clay content, or does not appear to meet the specifications for soil media, it will be worthwhile to test the soil and compare against the recommended specifications (e.g., clay content, particle sizes, etc.). If the soil does NOT meet specifications, see steps #6 and #9 below.
- 6. If the problem appears to be filter fabric or bad soil media (steps #3 or #5 above), there is a critical decision to be made. It is an expensive proposition to dig up the entire facility to either remove the filter fabric or replace the entire soil layer. If the clogging problem is not severe in nature, an intermediate (and much cheaper) option may be to install wick drains. Using a 6-inch auger bucket, auger numerous vertical holes around the practice surface area, making sure to auger all the way down to the underdrain stone or underlying soil (if there is no underdrain). Hammer 6-inch perforated PVC or other type of pipe into these holes. Perforations should be about 3/8-inch diameter. Fill the pipes with clean underdrain gravel (#57 stone) mixed in with coarse construction sand. These drains will serve to wick fines from the surrounding soil media and will provide alternative drainage.



Check after the next several storm events to see whether the wick drains improve drainage.

Adding sand to a wick drain. The vertical perforated PVC pipe has already been placed in the auger hole.

- 7. Sometimes the cause of saturated soil media is springs or some type of baseflow coming into the practice. This is a more difficult problem as bioretention is not supposed to receive this type of constant flow. It will be necessary to identify and reroute springs or baseflow or perhaps replace the bioretention practice with a different type of practice.
- 8. Another possible source of poor drainage or clogging is that there can be too much water on top of the soil media when the bioretention practice fills up. Most specifications call for a maximum ponding depth of 12 inches, but sometimes the ponding depth can be 18 or even 24 inches. While this increases the amount of head pushing water down through the

soil media, it can also lead to compaction or too much sediment building up. If the bioretention practice has a ponding depth greater than 12 inches, consider configuring the outlet or large storm overflow to reduce the ponding depth to 12 inches or less. Check with the local stormwater authority to ensure that doing this will not compromise the required treatment volume of the practice.

- 9. If clogging is too severe to be fixed with wick drains or other remedies listed above, it may be necessary to rebuild the bioretention practice by digging up the existing soil, taking out any filter fabric that is between the soil media and underdrain stone, and rebuilding and replanting according to the design specifications.
- 10. Whatever the chosen remedy, check to ensure that the practice is filtering at the proper rate after the next several storm events.

The Chesapeake Stormwater Network (CSN) has produced an excellent reference guide for inspecting and diagnosing Bioretention issues, *Technical Bulletin #10, Bioretention Illustrated.* This tool can be used as an additional reference and can be downloaded using this link: http://chesapeakestormwater.net/category/publications/

Infiltration:

- Clogging of infiltration practices can be simple to resolve or fatal:
- On the *simple* side, clogging (or poor drainage) may arise from sediment, vegetative debris, parking lot grit, or other debris clogging the top few inches of soil or stone.
- With luck, the practice will have an observation well (vertical perforated PVC pipe with cap that extends through the stone reservoir in an infiltration trench or basin). Check the observation well three days after a storm event of ½-inch or more. If water is standing in the observation well to the surface, then the whole profile may be clogged (see below under *fatal*). If the observation well has only a few inches or no water and there is still water standing on the surface, then surface clogging is a likely culprit.
- For infiltration practices in soil (no stone reservoir), auger several holes around the infiltration surface area. If saturated soil seems to be on top of good, clean, dry soil, then surface clogging seems likely.
- For infiltration trenches and basins with a gravel reservoir, dig several holes around the surface to determine, again, whether there seems to be a layer of gravel clogged with sediment, leaves, vegetative debris, parking lot grit, etc. If possible, dig down to where the gravel meets the underlying soil to see whether a layer of filter fabric is present (which may be common with older practices). If this is the case, blinding of the filter fabric may be a cause of the clogging.
- For surface clogging, remove the affected material down to the level where the soil or gravel seems clean, and replace with clean material. If filter fabric seems to be a problem, it will be necessary to dig up the gravel, remove the filter fabric, and rebuild the reservoir layer in accordance with the current design specifications. In either case, check after a storm event to ensure that this has resolved the issue.
- On the *fatal* side, the underlying soil may not be suitable for infiltration, either due to soil characteristics, compaction during construction, or other causes. Check the original design package to see whether any soil testing was done at the time. It may be worthwhile to auger down to the infiltration interface layer (e.g., where stone reservoir meets the underlying soil and then another several inches below this interface), and take several soil samples for lab analysis to compare to current soil specifications (see information below about infiltration soil analysis).

- It may be that a geotechnical analysis would reveal that there is a good infiltration soil layer, but it is lower than the existing interface.
 This would still require a complete rebuild and excavation down to the suitable soil layer. Restoring porosity at the designed elevation would require replacing soil above this suitable layer and avoiding compaction.
- Another option would be to convert the practice to a bioretention practice with an underdrain. Check with the local stormwater authority to see whether this would require any site plan or stormwater plan amendments or other permits.
- Many updated state stormwater manuals and specifications include protocols for infiltration soil testing and analysis that reference various ASTM standards. For example, see: Virginia 2013 BMP Standards & Specifications, Specification #8: Infiltration, Appendix 8-A. Infiltration and Soil Testing at: http://www.deg.virginia.gov/fileshare/wps/2013 DRAFT BMP Specs/

Permeable Pavement:

- AS NOTED IN SECTION 4.7 sediment buildup, routine sweeping with a regenerative air vacuum (maximum power 2,500 rpm) is important to avoid more costly repairs that result from deferred maintenance. Preventative maintenance is the best and most cost-effective way to prevent clogging in the first place.
- If there is standing water on the pavement surface 48 to 72 hours after a storm event of ½-inch or more, then the pavement surface is clogged.
- Check the design plan or as-built plan to see whether the permeable pavement design includes an underdrain. There may also be underdrain cleanouts at the edge of the permeable pavement.
- If there is an underdrain, the first thing to check is whether the underdrain is clogged, crushed, or broken. Check to see whether there is standing water in the underdrain cleanout 48 to 72 hours after a storm event. If the underdrain is dry, pour water into the underdrain with a hose and see whether it comes out the other end. If the underdrain is clogged, snake it out, as this is the first and easiest thing to try.
- If the underdrain is working, then clogging may be due to: (1) clogged surface or bedding layer; or (2) underlying soil is not suitable for infiltration for designs with no underdrain. First, refer to the guidance in Section 4.7 – Sediment Buildup, and then proceed as follows:
- IF THERE IS NO UNDERDRAIN AND THE DESIGN IS BASED ON SOIL INFILTRATION UNDER THE PAVEMENT, it will be worthwhile to check the soil because unclogging the surface layer will likely not fix the problem. Check the original design package for any soil infiltration testing. It is likely worthwhile to remove the entire pavement section in several places down to the soil layer and to do a geotechnical investigation of the soil profile. See: ASTM C-1701/1701M and/or Virginia 2013 BMP Standards & Specifications, Specification #8: Infiltration, Appendix 8-A, Infiltration and Soil Testing for examples of soil infiltration protocols (URL above).
- If the soil is not suitable for an infiltration design, it will probably be necessary to rebuild the pavement using an underdrain design or possibly adding subsurface drainage along the perimeter of the parking area.
- IF THERE IS AN UNDERDRAIN OR THE SOIL IS SUITABLE FOR INFILTRATION, the best approach to try to unclog the pavement is restorative sweeping with a vacuum sweeper. Regenerative air sweepers may not have enough suction to relieve the clogging.
- If vacuum sweeping is not successful, it may be necessary to rebuild any layers
 fouled with sediment and fines. It is likely that this will be confined to the bedding
 layer and gravel used in the paver stone joints, but some clogging can possibly
 move down into the underlying stone reservoir layer.
- The North Carolina State University (NCSU) Stormwater Engineering Group has an informative Urban Waterways publication, Maintaining Permeable Pavements (2011): http://www.bae.ncsu.edu/stormwater/pubs.htm



Water standing on the parking surface 48 to 72 hours after a storm is an indication of clogging. Snow piles at the edge of the photo point to possible clogging from winter sanding or plowing.

Sand/Organic Filters:

- See the section above on Bioretention/Swales as some of the procedures will be similar, especially for above-ground filters.
- Also see Section 4.7 Sediment Buildup for guidance on routine maintenance of the sedimentation and filter chambers.
- As with Bioretention, there can be various causes for clogged filters:
- Filter fabric layer under the filter media that has blinded or clogged
- Clogging of the surface of the filter layer or filter cartridges
- · Bad filter media (e.g., sand or organic media)
- "Plumbing" issues with configuration of overflow and underdrain pipes
- Fortunately, filters are usually confined within concrete vaults or manholes, so diagnosing and rectifying clogging problems should be more straightforward. Check the original design or as-built plans. Some of the following guidance may also be helpful:
- For proprietary cartridge or special filter media structures, consult the vendor or manufacturer for recommended solutions.
- See Section 4.7 for guidance on removing the top layer of filter media and replacing with clean material, as well as vacuuming out any sedimentation chambers.
- If it is suspected that overflow or outlet pipes are not configured correctly, check against the design plans and also standard drawings from the manufacturer.
- Chronic clogging problems are likely due to excessively dirty drainage areas, including uncontrolled sources of sediment, oil and grease washoff, vegetative debris from surrounding trees or shrubs, or other sources. It will be important to check and resolve any controllable sources of clogging in the drainage area (see Section 4.2 Contributing Drainage Area).



Standing water on the parking lot is evidence that this perimeter sand filter (under the sidewalk) is clogged.

Helpful Skills:

- Soil infiltration analysis techniques as per ASTM and/or current BMP design specifications
- · Excavation, dewatering, and sediment disposal in some cases
- Knowledge of maintenance equipment, such as vac trucks, street sweepers, etc.
- Knowledge of preferred conditions for bioretention, sand/organic filter media, or standard permeable pavement types and bedding layers
- · General practice of trying easier or less expensive strategies before jumping right to wholesale reconstruction of a practice

Equipment Typically Used for Unclogging Activities:

- Soil infiltration testing or geotechnical equipment
- Small or large excavators, loaders, dewatering equipment (pumps, dirt bags, etc.), trucks to haul material to on-site or off-site disposal or reuse areas, erosion and sediment control supplies
- Pavement demolition and repair equipment
- · Mulch, plants, filter media, and other materials needed to rebuild practices

4.9. Vegetation

Issue Applies Most Commonly To: Swales, Tree Planting, Bioretention, Green Roofs, and Ponds/Wetlands

Problem #1: Not enough vegetation; vegetation is unhealthy

Bioretention, Swales, Tree Planting:

- Test soil/media to ensure proper conditions exist for plant survival.
- Check water drawdown after a storm to make sure that wet/saturated conditions are not the cause of plant failure. If this IS an issue, see Section 4.8 – Clogging.
- Amend or enhance soil as needed; soil may need more organic material to support plants, but do NOT use uncomposted organic material or animal waste, as it will likely export undesirable nutrients to the stormwater system.
- If plants have continued to die, consider a different species or entire planting palette or revised
 planting plan (photo to right shows the need for a whole new planting plan). Also consider using
 an appropriate bioretention or swale native seed mix to supplement use of plugs or other nursery
 stock.
- Consult a horticulturalist or plant nursery if there is evidence of disease or pests.
- Replant and add mulch or ground cover as needed.



Ponds and Wetlands:

- See Section 4.13 Pool Quality for general guidance on pond and wetland vegetation maintenance, as well as the following.
- For emergent vegetation, determine whether water depths are too deep or shallow for survival (i.e., depths are different from design depths, or original design included improper vegetation).
- If a small amount of supplemental vegetation is needed, plant wetland plugs per nursery guidance.
- For large-scale plantings, drain the permanent pool and plant during the early spring.

Green Roof:

- Consult with a green roof plant vendor about possible causes of plant failure. Lack of watering during initial establishment could be the main culprit.
- Work with a qualified vendor to develop and install a new planting plan.
- Speak with building facilities maintenance personnel to ensure they understand need for watering and caring for new plants after they are installed.

Helpful Skills:

- Landscaping/gardening
- Consult with Cooperative Extension Office or independent laboratory for soil testing
- If original planting plan is deemed inadequate, consult a landscape architect or horticulturalist to determine whether a revised planting plan is needed.
- Knowledge of native plant and/or wetland plant nurseries in general region

Problem #2: Too much vegetation, overgrown (with invasive species), not maintained

General Approach for All Practices:

- Determine which invasive plants are present. For a list of regulated and prohibited invasive plants in New York State, see New York State Prohibited and Regulated Plants (NYS DEC, NYS Agriculture and Markets, 2014) at:
 http://www.dec.ny.gov/docs/lands forests pdf/isprohibitedplants2.pdf. Invasive plants shall be properly disposed of in a manner that renders them non-living and non-viable to prevent the establishment, introduction or spread of disposed species.
- Review whether the original planting plan relied on these plants; for example, some wetland plans may rely on "aggressive colonizers" such as cat tails.
- For more detailed information regarding appropriate control measures for each species, consult the Cornell Cooperative Extension Invasive Species Program at the following link: http://ccetompkins.org/environment/invasive-nuisance-species/invasive-plants. If invasives have taken over the facility, wholesale removal and replanting with desirable species may be necessary.
- If (non-invasive) plants are overgrown, (example in photo to right), remove, thin, or trim back excessive vegetation.
- If an entire new planting plan is deemed necessary, use SMP-Specific Guidance in the remainder of this manual, along with landscaping goals for the site location, to devise a plan that allows for adequate growth over a long period of time. A simple, clear planting design (example in photo below) with a long-term plan has the best chance of being maintained through time. Maintenance crews need to know which plants are part of the design versus weeds and how the practice should look from year to year.
- Develop a plan to ensure proper weeding, pruning, trimming, and replanting to maintain the plan over time.
- See Section 4.13 Pool Quality for general guidance on pond and wetland vegetation maintenance, as well as the following.





Helpful Skills:

- Knowledge of exotic and invasive species is needed. Consult a local Cooperative Extension Office.
- Specific measures may include mechanical hand pulling, regrading (requires construction equipment), or herbicide/pesticide
 application safe for aquatic environments.
- Landscape architect
- Knowledge of wetland plants (for ponds/wetlands)
- Knowledge of SMP design (to understand hydrologic regime for plant selection)

Equipment Typically Used for Vegetation Maintenance Activities

- · Soil auger to diagnose issues of soil drainage that may affect vegetation health
- Rakes, shovels, wheelbarrows, and other "landscaping" equipment
- Light excavation or grading equipment for larger jobs
- · Equipment to deliver, unload, and move soil media, mulch, and other materials
- Plants and/or seed mix, plus a way to move and store plant stock without damaging it or drying it out
- Planting bars, soil drills, etc.
- For planting in standing water (e.g., ponds, wetlands), pumps or pump-around systems and dirt bags or other ways to temporarily dewater planting area

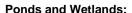
4.10. Embankment and Overflow Condition

Issue Applies Most Commonly To: Swales, Bioretention, and especially Ponds/Wetlands

Problem #1: Rill and channel erosion and bare dirt areas of embankments

Bioretention, Swales:

- Erosion and areas of bare dirt indicate two basic issues: 1) soils and moisture levels are not suitable for the plants or turf used; and 2) vegetation cannot take hold because of concentrated flow, physical wear, or poor soil conditions.
 Address these issues first with a soil/media test to ensure proper conditions exist for plant survival.
- High salt content from winter deicing of pavement is a common culprit of poor soil conditions for roadside plants. If this is the case, restore area with plant species that can tolerate salt levels, or replace edge plants with a stone diaphragm to intercept runoff from road.
- Amend or enhance soil as needed; soil may need more organic material to support dense ground cover.
- For concentrated flow and physical wear, redirect concentrated flow so that it disperses in mulched and vegetated areas. Stake in mulch and replant with vigorous plants recommended through the soils test.
- If plants have continued to die, consider a different species or entire planting
 palette or a revised planting plan (see Section 4.9 Vegetation and photo to
 right). Also consider using an appropriate bioretention or swale native seed mix
 to supplement use of plugs or other nursery stock.
- Consult a horticulturalist or plant nursery if there is evidence of disease or pests.
- · Replant and add mulch or ground cover as needed.



- Where erosion has deposited soil within the pond or wetland water line, remove this material and reshape the slope.
- If a small amount of supplemental vegetation is needed, plant wetland plugs per nursery guidance.
- To address rill and channel erosion, first obtain a soil sample test to get soil amendment recommendations. Undercut the eroded sections and replace with clean amended soil, based on the soil test, and reseed as appropriate for the season.
- It may be necessary to stake in seed blankets or erosion-resistant lining (e.g., erosion-control matting or even rock in extreme situations) to stabilize eroded areas. Again, choose seed types appropriate for the season.
- Based on soil test guidance, reseed bare areas to prevent further erosion.
- For persistent problems, reroute the flow to more stable receiving areas using berms, diversions, etc.

Helpful Skills:

- Landscaping/gardening
- Consult with Cooperative Extension Office or independent laboratory for soil testing.
- If original planting plan is deemed inadequate, consult a landscape architect or horticulturalist to determine whether a
 revised planting plan is needed.
- · Knowledge of sediment and erosion control practices and resources appropriate for the area





Problem #2: Settlement, loss of armoring material, erosion of emergency overflow

General Approach for All Practices:

- Settlement, loss of armoring material, erosion and accumulated debris can affect the dimension, water velocity or capacity of the
 emergency overflow such that embankment failure could occur in flood events (photos below).
- Inspect for exposure of soil or geotextile base material in the overflow and rearmor areas of exposure.
- In cases of settlement, a qualified engineer should be sought to assess its capacity and impact on pond capacity.
- Erosion of spillways should be repaired and revegetated as described for embankments.



Helpful Skills:

- Knowledge of sediment and erosion control practices for the area
- · Completion of self-guided training on dam safety through Association of State Dam Safety Officials: http://www.damsafety.org

Problem #3: Impounding structure (embankment or dam) integrity issues due to tunneling or digging animals, woody vegetation or seepage

Ponds/Wetlands:

- Impounding structure stability is a serious concern, especially where trees have become established on the slopes, or there's
 evidence of animal burrows or seepage.
- The best approach for trees on the crest, slopes, and adjacent to an impounding structure or embankment is to cut them down before they reach significant size. If large trees have been cut down but their root systems not removed, carefully monitor the area around the remaining stumps for signs of seepage.
- Exercise judgement for trees on the surrounding side slopes that are NOT impounding structures (not designed to hold back water in the pool). Sometimes a forested edge can enhance the appeal of a pond, but access for maintenance must also be available, and some trees can drop debris into ponds, leading to quality issues.
- Animal burrows can be dangerous to the structural integrity of the embankment because they weaken it and can create pathways for seepage. Professional exterminators may be needed to trap and remove animal pests.
- Seepage as water flow or boiling sand on the lower portion of the exterior slope or toe area of an impounding structure should be brought to the attention of a qualified engineer.
- Leakage around conveyance structures such as barrel pipes or spillways should be monitored for increase since the last inspection. A qualified engineer is needed to resolve issues of piping or seepage along the barrel pipe through a dam.
- Turbidity or cloudiness in seepage should also be brought to the attention of a qualified engineer.

Helpful Skills:

Completion of self-guided training on dam safety through the Association of State Dam Safety Officials: http://www.damsafety.org

Equipment Typically Used for Embankment and Overflow Maintenance Activities

- Excavation or grading equipment for larger jobs
- Equipment to deliver, unload, and move soil media, mulch, and other materials
- Plants and/or seed mix, seed blanket and erosion control materials
- · Rod and level for settlement measurements
- Clear glass bottle for seepage visual test

4.11. Structural Damage

Issue Applies Most Commonly To: Any Practice

Problem: Structural damage to pipes, headwalls, standpipes, inlet/outlet structures, grates, curbs, and other structural components

- Structural components are necessary for water to flow into and out of stormwater practices as intended. This is a broad category that involves components composed of concrete, metal, plastic, and other materials. Some common examples include:
- Deteriorated or broken curbs that allow water to bypass a practice
- Slumping or sinkholes where soil meets a concrete drop inlet or outlet structure
- · Broken or collapsed inlets
- Connections in an inlet or manhole structure that are not parged and are leaky
- Collapsed or crushed pipes (especially corrugated metal)
- Missing or broken steps or other safety features in a manhole or riser structure
- · Root penetration and clogging of underdrain or other pipes
- Broken check dams
- There are too many particular instances to mention here, but the general idea is to inspect and repair any structural components that are affecting the performance of a practice or leading to a potential health or safety issue.

Helpful Skills:

- · General contracting skills—concrete work, metal, proper joint sealing
- Routing out clogged pipes
- Perhaps CCTV experience to look for broken or clogged pipes

Equipment Typically Used for Fixing Erosion:

- General contracting
- CCTV

4.12. Pool Stability

Issue Applies Most Commonly To: Ponds/Wetlands

Problem: Flooded or dry pond - outlet issues

General Approach for Ponds and Wetlands:

- Note high-water marks on structures or pond banks and compare with outlet structure weir.
- If the outlet weir is submerged, investigate downstream for plugs such as beaver dams, woody debris or sediment bars. Refer to Section 4.3 – Physical Obstructions for removal of obstructions.
- If the pond is retaining more water than it is supposed to and there is no flow from the outlet with no visible blockages in the outlet pipe, look for obstructions above the weir or outlet pipe. Woody debris, vegetation and silt can plug outfall weirs or blind rock outfall protection. Removal of such blockages tends to be a hand exercise. A jet/vacuum truck or other heavy equipment may be needed to clear excessive or precarious blockages (photo on right).
- If the pond is too low and not holding water in the designated pool, the outlet structure should be closely inspected to see whether it has settled from the original construction or there is leakage through joints or cracks. Finding no deficiencies with the structure, investigate the pond embankment as described in **Section 4.10** for evidence of seepage.
- If there is no evidence of seepage and the outlet structure has no apparent structural defects, an engineer should be consulted to review the pond design and determine the proper outlet elevation.





Helpful Skills:

- The ability to navigate uneven surfaces, to follow ditch banks and to sight drainage obstructions is implicit with this task.
- Ability to use a level to sight adequate elevation fall is helpful.

Equipment Typically Used for Pool Stability Evaluations

- · Bright flashlight for pipe inspection
- Manhole hook for manhole cover access
- Brush hook to clear debris and walking surfaces
- Rod and level to check elevation differentials

4.13. Pool Quality

Issue Applies Most Commonly To: Ponds/Wetlands

Problem #1: Littoral shelves and pond edge: not enough vegetation; vegetation is unhealthy; invasive plants have taken over

Ponds and Wetlands:

- If there is not enough vegetation or no vegetation, determine whether maintenance practices have killed the plants. If so, work with the owner to educate those responsible for pond maintenance on correct methods. Consult plans for original planting and replant.
- For emergent vegetation, determine whether water depths are too deep or shallow for survival (i.e., depths are different from design depths, or original design included improper vegetation).
- If a small amount of supplemental vegetation is needed, plant wetland plugs per nursery guidance.
- For large-scale plantings, drain the permanent pool and plant during the early spring. If ponds are overgrown so that less than 25% of the surface area is visible, the pond water level should be lowered to enable selective plant removal.
- Invasive plants, such as phragmites or common reed, should be removed with their roots. Be sure to restore areas that have been disturbed with replacement vegetation because root removal exposes soil to erosion. Invasive plants shall be properly disposed of in a manner that renders them non-living and non-viable to prevent the establishment, introduction or spread of disposed species.
- Native plants selected based on environmental conditions have the greatest chance for survival.
- Consult a horticulturalist or plant nursery if there is evidence of disease or pests.

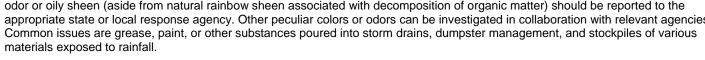
Helpful Skills:

- Landscaping/gardening
- If original planting plan is deemed inadequate, consult a landscape architect or horticulturalist to determine whether a revised planting plan is needed.
- Knowledge of native plants and/or wetland plant nurseries in general region
- Familiarity with New York invasive terrestrial and wetland plants and their control: http://nyis.info/

Problem #2: Pond color, scum, odor, algae and plant overgrowth

- Ponds that have algae covering more than 20% of the surface should have maintenance to remove it. Raking or mechanical harvesting of filamentous algae offers short-term control, but feasible long-term strategies should be considered.
- Pond maintenance companies should be relied on to identify the algae and appropriately control them. Pond specialists can control the algae growth in ponds, but its growth and reproduction are dependent on nutrients. When nutrients are in abundance, so will be the algae or vegetation.
- Plants can be used in shallow shelfs at inlets to take up nutrients, but they must be maintained and cuttings removed to take nutrients out of the pond system.
- If (non-invasive) plants are overgrown, remove or trim back excessive vegetation. Remove cuttings and trimmings. Do not allow vegetative debris to remain in the pond.
- Pond clarity and color can be impacted by excessive sediment discharge or flow shortcircuiting. For issues of clarity and color, follow the recommendations in Section 4.7 - Sediment Buildup.
- If invasive aquatic plants are identified, follow DEC guidelines for reporting and controlling invasives (see Section 4.9 Vegetation).
- Some color, odor, and pond quality issues can be caused by leaks, spills, and other releases in the drainage area. Any petroleum odor or oily sheen (aside from natural rainbow sheen associated with decomposition of organic matter) should be reported to the appropriate state or local response agency. Other peculiar colors or odors can be investigated in collaboration with relevant agencies. Common issues are grease, paint, or other substances poured into storm drains, dumpster management, and stockpiles of various





Helpful Skills:

- Ability to recognize invasive aquatic plants
- Specific measures may include mechanical hand pulling, regrading (requires construction equipment), or herbicide/pesticide application safe for aquatic environments.
- Knowledge of wetland plants and common types of algae and aquatic weeds
- Knowledge of types of pond maintenance practices

Equipment Typically Used for Pool Quality Investigations

- · High-top rubber boots
- Canoes or small boats
- Brush hook to clear vegetation and access pond bank
- · Secchi disk to check and compare pond color and clarity
- Large-mouth bottle to collect algae and water quality samples
- Various materials to control aquatic weeds and algae

Section 5. Planning for Stormwater Maintenance

Often, stormwater practices fall into disrepair because there is no plan in place for ensuring that they are maintained over time. As a result, maintenance can become reactive in nature, resulting in high costs for repairing damaged practices or practices becoming ineffective over time. This section outlines some key elements of stormwater maintenance planning, including:

- 1. Program models for stormwater maintenance
- 2. Inspection and maintenance checklists
- 3. Planning for the costs of stormwater maintenance
- 4. Identifying the need for infrequent maintenance items

5.1. Program Models for Stormwater Maintenance

The Maintenance Hierarchy concept (See Section 1) is discussed throughout this chapter, but the individuals who will conduct the Level 1, Level 2 and Level 3 inspections and maintenance will vary depending on how the local program is administered. While this chapter does not focus on program elements, it is important to note that the local program requirements will influence who performs ongoing maintenance. This will play an important role in how to develop a comprehensive maintenance plan.

Although there are many options for implementing a stormwater plan, they can be described by three broad categories, including: 1) Private Maintenance; 2) Local Program; and 3) Hybrid Approach. Understanding the program in the local community will influence the best techniques for developing the maintenance plan (**Table 5.1**).

Option 1: Private Maintenance

In this option, maintenance is the responsibility of the private land owner. In regulated MS4s, however, the land owner will periodically report to the local government. In this model, it is important to ensure that the maintenance plan is very easy to understand and includes pictures of key practice elements. If possible, include a list of contractors who will be able to perform maintenance items and how much these will cost. Finally, materials should point homeowners to resources so that they can learn more about the practices on their property. DEC's Maintenance Photo Library and Training Materials webpage (link) can be useful tools for this purpose.

Option 2: Local Government Maintenance

In this option, the local government takes over maintenance responsibility for all stormwater practices. While it is still important to develop a clear and simple plan, the designer can assume some level of training or supervision for the individuals conducting inspections and maintenance. For publicly maintained practices, it is helpful to find out what resources the local government has in place for developing the plan. These resources may be in the form of existing reporting and tracking procedures, which can be modified for the specific practice, or equipment such as vacuum sweepers. Maintenance access should be made available to local government staff through official easements.

Option 3: Hybrid Approach

In the hybrid approach to stormwater maintenance, larger practices or practices on public land are maintained by the local government, and smaller practices on private property are maintained by the owner. There are other hybrid models, however. For example, the local government may take responsibility for inspections but leave the owner responsible for maintenance items identified during the inspection.

Table 5.1 Maintenance Considerations for Three Program Options			
Program Option	Inspection/Maintenance Performed By:	Key Considerations for the Designer	
Option 1: Private	Level 1: Property owner or HOA Level 2: Private Contractor Level 3: Certified Contractor	Make the plan very simple and graphic intensive. Include a list of contractors if applicable. Provide links to educational materials.	
Option 2: Local Program	Level 1: Interns or Untrained Staff Level 2: Trained Local Staff Level 3: City/Town Engineer or other individual hired by the city or town	Learn about the resources the local program has at its disposal. If government staff are being trained, develop a maintenance plan that is consistent with their knowledge and understanding. Be aware of equipment and materials on hand in this community.	
Option 3: Hybrid Approach	Inspection is typically divided, where larger practices or those on private property are maintained by the public entity.	Understand how this maintenance is divided, and develop a plan that is consistent with this arrangement.	

Special Considerations for Green Infrastructure Practices

Because many of the Green Infrastructure practices included in this manual, such as Tree Planting, Rain Gardens and Sheetflow and Level Spreaders, are implemented at a very small scale, they present a unique challenge in terms of stormwater maintenance. These practices are more likely to be located on private property. As a result, the designer needs to consider the *Private Maintenance* model. Maintenance plans for these small practices should be as simple as possible, and the designer should ensure that maintenance can be completed with readily available materials.

5.2. Inspection and Maintenance Checklists and Documentation

The checklists included in this chapter are specific to the maintenance hierarchy. The maintenance plan should include inspection checklists for all three hierarchies. In addition, these checklists should be modified to identify the specific practice elements included in each design. The materials developed as a part of the maintenance plan should be provided to the practice owner and local government. (See **Table 5.2**)

Table 5.2. Customizing Checklists and Guidance			
Hierarchy	y Checklist/Checklist Guidance Tips for Customizing		
Level 1	Section 2 includes both the checklists and guidance.	Add photographs of the practice (once installed), and include a simple aerial photograph of the site to locate the practice. Include key local government contacts and contractors along with the checklist.	
Level 2	Section 3 includes guidance on how to respond to the Level 1 Inspection and/or activate a Level 3 investigation. Appendix B includes routine inspection checklists for the Level 2 Inspector.	Modify to remove elements that are not in this particular practice.	
Level 3	Guidance is included in Sections 3 and 4 .	Typically, this will not need to be modified.	

5.3. Budgeting for Maintenance

A maintenance plan should include a budget for annual maintenance. In the Public Maintenance model, a single entity (the local government) will be responsible for maintenance of many practices, so the cost of maintenance for an individual practice may not be as important as estimating the average cost of maintenance across all practices. For privately maintained practices, on the other hand, it is very helpful to develop a cost estimate that is as accurate as possible for the specific location. As a result, two options for estimating costs are presented here, including:

- Option 1: Average or Unit Costs
 Generalized cost data are used to estimate an annual cost. This option may be used for a municipality or other institution that manages a large number of practices.
- Option 2: Detailed Individual Practice Budget
 Annual costs are estimated using more detailed practice information, as well as more detailed estimates of labor and materials costs.

Option 1: Average or Unit Costs

In this option, annual maintenance costs are estimated on a per-acre basis or based on a percentage of the construction costs. These prices typically range from about 1% to 4% of the construction costs (King and Hagan, 2011; **Table 5.3**).

Table 5.3 Typical Maintenance Costs (Source: King and Hagan, 2011; Adjusted to 2015 Costs)			
Practice	Annual Maintenance Cost (% of Construction)	Annual Maintenance Cost (\$/cubic foot of the water quality volume– WQV—treated)	
Buffers	4%	\$0.25-\$0.35	
Tree Planting	4%	\$0.35	
Ponds and Wetlands	4%	\$0.22-\$0.35	
Infiltration Trench/ Basin	2%	\$0.25	
Filtering Practices	4%	\$0.41-\$0.47	
Bioretention	4%	\$0.44	
Swales	3%	\$0.18-\$0.26	
Permeable Pavement 1% \$0.64-\$0.89			

While the costs in **Table 5.3** may be a reasonable starting point, it is important to note that the actual data will vary greatly, depending on labor rates and materials costs. For example, the hourly "Open Shop" labor rate for rough grading is approximately \$27/hour in Elmira and \$38/hour in New York City (Means, 2015). In addition, costs for labor, materials and equipment will vary depending on the maintenance arrangement (**Table 5.4**).

Table 5.4 Variability in Maintenance Costs Based on Maintenance Arrangement			
Maintenance Arrangement	Labor	Materials	Equipment
Public Maintenance (Municipality)	Level 1: Intern Wage Level 2: Staff Salary Level 3: Professional Staff or Contractor	Low: Materials bought in bulk.	Low: Typically owned by Public Works or similar department.
Private Maintenance (Homeowner)	Level 1: Homeowner (Free) or Contractor Level 2: Private Landscaper or Contractor Level 3: Professional Contractor	High: Materials purchased in small quantities.	High: Specialized equipment needs to be rented if needed.
Private Maintenance (Commercial or HOA)	Level 1: Free (with HOA volunteers) or Contracted Labor Rate Level 2: Private Landscaper or Contractor Level 3: Professional Contractor	Varies: Materials may be bought in bulk or on a small scale, depending on the size of the private entity.	High: Specialized equipment needs to be rented if needed.

Option 2: Site-Based Costs

Because both the unit costs of labor and materials and the average annual costs of maintenance can be so highly variable, more detailed data will be needed to estimate costs at a particular site. One approach for estimating these costs is to generate a list of routine maintenance items, along with associated unit costs for labor, materials and equipment. This approach requires the user to enter basic design data for the practice, as well as information regarding local labor rates and other general costs. In the bioretention example below, unit costs are used to estimate routine maintenance costs, including inspections and regular maintenance.

Example Annual Cost Estimation: Bioretention

An example cost estimation for a bioretention cell follows below. The cost estimation tool used in the Maintenance Chapter will be automated. This example demonstrates how the unit cost and typical frequency data will be used to estimate average annual maintenance costs. In it, we are estimating annual maintenance costs for a bioretention practice with characteristics summarized in **Table 5.5**. **Table 5.6** then summarizes activities, their frequency and extent, and associated labor costs.

Using the assumptions for this practice, the annual costs for routine maintenance would be \$1,828 (\$1.15/cubic foot of Water Quality Volume) in the first year and \$1,468 (\$0.90/cf WQv) in subsequent years. This value is much higher than the \$0.44/cf estimated using general cost data (**Table 5.3**). However, significant cost savings could be realized by using volunteer or intern-level labor for Level 1 inspections and routine maintenance.

Table 5.5. Assumptions for Bioretention Cost Example			
Practice Design		Unit Costs	
Water Quality Volume (cf)	1,600	Level 1 Labor (\$/hr)	\$15
Forebay Volume (cf)	400	Level 2 Labor (\$/hr)	\$35
Total Practice Area (sf)	2,000	Mulch (\$/cy)	\$10
Filter Area (sf)	1,000	Plants (\$/plant)	\$1
Ponding Area (sf)	1,500	Trash Tipping Fee	\$25
Slope Area (sf)	500	Seed/Mulch for a small area	\$10
Turf Area (sf)	No Turf	Average Cost for a PVC Replacement Part (Planning Level)	\$100
Inlets (#)	1		

Maintenance Guidance 96

	Frequency						Materials and	Annual Costs		
Task	Task (x/year, Typical Extent Extent Hours (Unit) Hours, Decimal)	Hours/yr	Hours/yr Level	Equipment	Labor	Materials and Equipment	Total			
Level 1 Inspection - 1 to 5- acre drainage	1	Practice	1	1 per inspection	1	1		\$15		\$15
Level 2 Inspection - 1 to 5- acre drainage	0.2	Practice	1	2 per inspection	0.4	2		\$14		\$14
Watering - grass and plants: Year 1	16	Weekly for first growing season, over filter surface area	1,000	0.5 per 400 sf area	24	1	Assume minimal cost for water	\$360		\$360
Trash and Debris Removal	4	Ponding area	1,500	1 per 400 sf practice surface area	15	1	Assume \$25 Tipping Fee for Each Trip	\$225	\$100	\$325
Weeding	2	Assume 50% of practice area	1,000	4 per 400 sf practice surface area	20	1	-	\$300		\$300
Mulching	1	Ponding area	1,500	4 per 400 sf area	15	1	Bark mulch; assume 15 cy/application	\$225	\$150	\$375
Sediment Removal (minor)	1	Assume one small area per inlet	1	1 per small area	1	1		\$15		\$15
Erosion Repair (minor)	1	Inlets; assume 25 sf/practice	25	1 per 25 sf	1	1	Seed, mulch and topsoil	\$15	\$10	\$25
Erosion Repair (minor)	1	10% of slope area	50	1 per 25 sf	2	1	Seed, mulch and topsoil	\$30	\$20	\$40
Minor Regrading	0.5	1 spot per 400 sf of practice area	5	1 per repair	2.5	2	Assume done by hand	\$88		\$88
Planting (plants)	0.2	Assume 50% of practice area	1,000	8 per200 sf	8	1	Assume 500 plants/planting	\$120	\$100	\$220
Minor PVC or Metal Repairs (observation well cap, PVC riser, grates)	0.2	1 per practice	1	1 per repair	0.2	2	Assume about a \$100 piece of equipment	\$7	\$20	\$27
Sediment Removal (small forebay)	0.2	per forebay	1	2 per forebay	0.4	2	Assume removal by hand	\$14		\$14
			•				Total Costs - Year 1	\$1,428	\$400	\$1,828

Total Costs - Subsequent Years

\$1,068

\$400

\$1,468

Maintenance Guidance 97

5.4. Planning for "Non-Routine" Maintenance

If the guidance provided in this chapter is followed and practices are designed properly, the routine maintenance (and budget guidance in **Section 5.3**) should be sufficient to keep a practice functioning indefinitely, but planning is needed for infrequent maintenance items. In the initial maintenance plan, identify a few of the most likely infrequent items. If initial routine inspections start to identify a more serious problem, develop a plan and budget for performing the repairs. To be more conservative, another option is to provide a contingency budget to plan for non-routine repairs over the life of the practice.

Note: Maintenance and repairs that rise to a Level 3 inspection may require permits from the NYS DEC and/or US Army Corps of Engineers if they are undertaken within or adjacent to regulated wetlands or other waters of the U.S.

Maintenance Guidance 98





Appendix B - NYSDEC	Stormwater Practic	ce Inspection	Checklists

Stormwater Pond/Wetland Operation, Maintenance and Management Inspection Checklist

Project		
Site Status:	:	
Date:		
Time:		
Inspector:		
1		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
Embankment and emergency spillway (Annual, After	r Major Storms)	•
Vegetation and ground cover adequate		
2. Embankment erosion		
3. Animal burrows		
4. Unauthorized planting		
5. Cracking, bulging, or sliding of dam		
a. Upstream face		
b. Downstream face		
c. At or beyond toe		
downstream		
upstream		
d. Emergency spillway		
6.Pond, toe & chimney drains clear and functioning		
7.Seeps/leaks on downstream face		
8.Slope protection or riprap failure		
9. Vertical/horizontal alignment of top of dam "As-Built"		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
10. Emergency spillway clear of obstructions and debris		
11. Other (specify)		
2. Riser and principal spillway (Annual)		·
Type: Reinforced concrete Corrugated pipe Masonry 1. Low flow orifice obstructed		
Low flow trash rack. a. Debris removal necessary		
b. Corrosion control		
Weir trash rack maintenance a. Debris removal necessary		
b. corrosion control		
4. Excessive sediment accumulation insider riser		
Concrete/masonry condition riser and barrels a. cracks or displacement		
b. Minor spalling (<1")		
c. Major spalling (rebars exposed)		
d. Joint failures		
e. Water tightness		
6. Metal pipe condition		
7. Control valve a. Operational/exercised		
b. Chained and locked		
Pond drain valve a. Operational/exercised		
b. Chained and locked		
9. Outfall channels functioning		
10. Other (specify)		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
3. Permanent Pool (Wet Ponds) (monthly)	
Undesirable vegetative growth		
2. Floating or floatable debris removal required		
3. Visible pollution		
4. Shoreline problem		
5. Other (specify)		
4. Sediment Forebays		
1.Sedimentation noted		
2. Sediment cleanout when depth < 50% design depth		
5. Dry Pond Areas		
Vegetation adequate		
2. Undesirable vegetative growth		
3. Undesirable woody vegetation		
4. Low flow channels clear of obstructions		
5. Standing water or wet spots		
6. Sediment and / or trash accumulation		
7. Other (specify)		
6. Condition of Outfalls (Annual, After Major Storms)		
1. Riprap failures		
2. Slope erosion		
3. Storm drain pipes		
4.Endwalls / Headwalls		
5. Other (specify)		
7. Other (Monthly)		
Encroachment on pond, wetland or easement area		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
2. Complaints from residents		
3.Aesthetics a. Grass growing required		
b. Graffiti removal needed		
c. Other (specify)		
4. Conditions of maintenance access routes.		
5. Signs of hydrocarbon build-up		
6. Any public hazards (specify)		
8. Wetland Vegetation (Annual)	•	
 Vegetation healthy and growing Wetland maintaining 50% surface area coverage of wetland plants after the second growing season. (If unsatisfactory, reinforcement plantings needed) 		
Dominant wetland plants: Survival of desired wetland plant species Distribution according to landscaping plan?		
3. Evidence of invasive species		
4. Maintenance of adequate water depths for desired wetland plant species		
5. Harvesting of emergent plantings needed		
6. Have sediment accumulations reduced pool volume significantly or are plants "choked" with sediment	555	
7. Eutrophication level of the wetland.		
8. Other (specify)		
Comments:		

Actions to be Taken:		
		 _

Project:

Infiltration Trench Operation, Maintenance, and Management Inspection Checklist

Location: Site Status:		
Date:		
Time:		
Inspector:		
Maintenance Item	SATISFACTORY / UNSATISFACTORY	COMMENTS
1. Debris Cleanout (Mor	nthly)	
Trench surface clear of debris		
Inflow pipes clear of debris		
Overflow spillway clear of debris		
Inlet area clear of debris		
2. Sediment Traps or Forebays	(Annual)	
Obviously trapping sediment		
Greater than 50% of storage volun remaining	ne	
3. Dewatering (Monthly)		
Trench dewaters between storms		
4. Sediment Cleanout of Trench	(Annual)	
No evidence of sedimentation in trench		
Sediment accumulation doesn't ye require cleanout	t	
5. Inlets (Annual)		

Maintenance Item	SATISFACTORY / UNSATISFACTORY	COMMENTS
Good condition		
No evidence of erosion		
6. Outlet/Overflow Spillway (Annua	ıl)	
Good condition, no need for repair		
No evidence of erosion		
7. Aggregate Repairs (Annual)		
Surface of aggregate clean		
Top layer of stone does not need replacement		
Trench does not need rehabilitation		
Comments:		
Actions to be Taken:		

Infiltration Stormwater Management Practices Level 1 Inspection Checklist SMP ID# **SMP Owner** Private Public **SMP Location** (Address; Latitude & Longitude) Latitude Longitude Party Responsible for System Type Type of Site Maintenance Above Ground Same as SMP Owner Seasonal Commercial Below Ground Industrial □ Other Continuous Use Other Residential ☐ State **Inspection Date Inspection Time** Inspector **Date of Last** Inspection **IN Drainage Area** Look for both pervious and impervious areas that are uphill from the Infiltration cell. **Problem (Check if Present) Follow-Up Actions** Seed and straw areas of bare soil to establish vegetation.

IN Drainage Area

Look for both pervious and impervious areas that are uphill from the Infiltration cell.

Problem (Check if Present)		Follow-Up Actions		
-04/11/2011		☐ Kick-Out to Level 2 Inspection: Large areas of soil have been eroded, or larger channels are forming. May require rerouting of flow paths.		
 For Dry Wells: Leaves, sticks, or other debris in gutters and downspouts 		□ Remove all debris by hand.□ Other:		
	□ Piles of grass clippings, mulch, dirt, salt, or other materials	 □ Remove or cover piles of grass clippings, mulch, dirt, etc. □ Other: 		
	□ Open containers of oil, grease, paint, or other substances	 Cover or properly dispose of materials; consult your local solid waste authority for guidance on materials that may be toxic or hazardous. Other: 		



IN Inlets

Look for all the places where water flows into the Infiltration practice.

Problem (Check if Present)

Follow-Up Actions



- Use a flat shovel to remove grit and debris (especially at curb inlets or openings). Parking lots generate fine grit that will accumulate at these spots.
- Pull out clumps of growing grass or weeds and scoop out the soil or grit that the plants are growing in.
- Remove any grass clippings, leaves, sticks, and other debris that is collecting at inlets.
- For pipes and ditches, remove sediment and debris that is partially blocking the pipe or ditch opening where it enters the Infiltration practice.
- □ Dispose of all material properly in an area where it will not re-enter the practice.
- □ Other:
- Inlets are collecting grit and debris or grass/weeds are growing. Some water may not be getting into the Infiltration practice.
- Kick-Out to Level 2 Inspection: Inlets are blocked to the extent that most of the water does not seem to be entering the Infiltration practice.

- □ Some or all of the inlets are eroding so that rills, gullies, and other erosion is present, or there is bare dirt that is washing into the Infiltration practice.
- ☐ For small areas of erosion, smooth out the eroded part and apply rock or stone (e.g., river cobble) to prevent further erosion. Usually, filter fabric is placed under the rock or stone.
- In some cases, reseeding and applying erosion-control matting can be used to prevent further erosion. Some of these materials may be available at a garden center, but it may be best to consult a landscape contractor.
- Other:

☐ Kick-Out to Level 2 Inspection: Erosion is occurring at most of the inlets and it looks like there is too much water that is concentrating at these points. The inlet design may have to be modified.

IN Infiltration Area

Examine the surface of the infiltration area and the observation well. Note: The following Problem and Follow-Up Actions apply to infiltration practice pretreatment areas also.

Problem (Check if Present)	Follow-Up Actions	
□ For grass-covered Infiltration practices: grass has	 ☐ Mow infiltration area at least twice per year. ☐ Other: 	
grown very tall, Photo credit: Stormwater Maintenance, LLC		
Prioto credit. Stormwater infainteriance, ELC	 □ Add topsoil (as needed), grass seed, straw, and water during the growing season to re-establish consistent grass coverage. □ Other: 	
□ For grass-covered Infiltration practices: sparse vegetation cover or bare spots	□ Kick-Out to Level 2 Inspection: Sparse vegetation cover can be a sign that the infiltration area is not infiltrating at the proper rate and water is standing too long after a storm. The surface may be saturated or squishy, and the conditions do not enable grass to grow. This situation should be evaluated by a Level 2 Inspection and likely corrected by a qualified contractor.	
Minor areas of sediment, grit, trash, or other debris are accumulating on the surface.	 Use a shovel to scoop out minor areas of sediment or grit, especially in the spring after winter sanding materials may wash in and accumulate. Dispose of the material where it cannot re-enter the Infiltration practice. If removing the material creates a hole or low area, rake the surface smooth and level. Remove trash, debris, and other undesirable materials. Other: 	
	□ Kick-Out to Level 2 Inspection: Sediment has accumulated more than 2-inches deep and covers 25% or more of the surface of the Infiltration area.	



IN Infiltration Area

Examine the surface of the infiltration area and the observation well. Note: The following Problem and Follow-Up Actions apply to infiltration practice pretreatment areas also.

Problem (Check if Present)	Follow-Up Actions		
	 For minor areas of erosion, try filling the eroded areas with clean topsoil, sand, or stone (whatever the existing cover is). If the problem recurs, you may have to use larger stone (e.g., river cobble) to fill in problem areas. Other: 		
There is erosion on the surface; water seems to be carving out rills as it flows across the surface of the Infiltration area or sinkholes are forming in certain areas.	 Kick-Out to Level 2 Inspection: The problem persists or the erosion is more than 3-inches deep and seems to be an issue with how water enters and moves through the infiltration area. Kick-Out to Level 2 Inspection: The problem does not seem to be caused by flowing water but a collapse or sinking of the surface (e.g., "sinkhole") due to some underground problem. 		
□ Observation well is damaged or cap is missing	☐ Kick-Out to Level 2 Inspection: Requires replacing pipes or caps.		

IN Infiltration Area

Examine the surface of the infiltration area and the observation well. Note: The following Problem and Follow-Up Actions apply to infiltration practice pretreatment areas also.

Problem (Check if Present) Follow-Up Actions | Kick-Out to Level 2 Inspection: This is generally a serious problem, and it will be necessary to activate a Level 2 Inspection. | Water still visible in the observation well more than 72 hours after a rain storm. The Infiltration practice does not appear to be draining properly.

IN Outlets				
Locate and inspect all outlets.				
Problem (Check if Present)	Follow-Up Actions			
	 □ Remove the debris and dispose of it where it cannot re-enter the infiltration area. □ Other: 			
Outlet obstructed with sediment, debris, trash, etc.	☐ Kick-Out to Level 2 Inspection: Outlet is completely obstructed; there is too much material to remove by hand or with simple hand tools.			
	 □ For minor rills, fill in with soil, compact, and seed and straw to establish vegetation. □ Other: 			
☐ Rills or gullies are forming at outlet.	☐ Kick-Out to Level 2 Inspection: Rills are more than 2" to 3" deep and require more than just hand raking and re-seeding.			



Additional Notes:	
Inspector: Date:	
mapector	
Complete the following if follow-up/corrective actions were identified during	g this inspection:
Certified Completion of Follow-Up Actions:	
"I hereby certify that the follow-up/corrective actions identified in the performed on (DATE) have been completed and armaintenance deficiencies have been adequately corrected."	
Inspector/Operator: Date: _	



Infiltration Stormwater Management Practices Level 2 Inspection Checklist Private SMP ID# **SMP Owner** Public **SMP Location** (Address; Latitude & Longitude) Latitude Longitude Party Responsible for System Type Type of Site Maintenance Above Ground Commercial □ Same as SMP Owner Seasonal ■ Below Ground Industrial □ Other Continuous Use Residential □ Other □ State **Inspection Date Inspection Time** Inspector **Date of Last** Inspection



Level 2 Inspection: INFILTRATION Triggers for Level 3 Inspection Recommended Repairs Observed Condition: Water Stands on Surface for More than 72 Hours after Storm Condition 1: Small pockets of standing water For infiltration basins with soil, use a soil probe or auger to examine the soil profile. For gravel infiltration trenches or basins, use a shovel to dig into the gravel layer where the problem is occurring. If isolated areas have accumulated grit, fine silt, or vegetative debris or have bad soil or clogged gravel, try removing and replacing with clean material. If the practice is supposed to have grass cover, it will likely be necessary to replant once the Infiltration media is clogged and problem problem is resolved. cannot be diagnosed from Level 2 inspection. Level 2 inspection identifies problem, but it cannot be resolved easily or it is associated ☐ Condition 2: Standing water is widespread or covers entire surface with the original design of the practice. Look in the observation well (if it exists) and use a tape measure to estimate the depth of water standing in the soil or gravel. Requires diagnosis and resolution of problem: Level 3 Inspection necessary Too much sediment/grit washing in from drainage area? Too much ponding depth? Improper infiltration media? Underlying soil not suitable for infiltration? As above, the resolution will likely require replanting and re-establishment of good grass cover if this is part of the design. Observed Condition: Severe erosion of infiltration bed, inlets, or around outlets Condition 1: Frosion at inlets The lining (e.g., grass, matting, stone, rock) may not be adequate for the Erosion (rills, gullies) is more than 12 inches actual flow velocities coming through the inlets. First line of defense is to try a less erosive lining and/or extending the lining further down to where inlet The issue is not caused by moving water but slopes meet the infiltration surface. If problem persists, analysis by a Qualified some sort of subsurface defect, which may Professional is warranted. manifest as a sinkhole or linear depression and be associated with problems with the underlying stone or soil. Condition 2: Erosion of infiltration bed This is often caused by "preferential flow paths" along the surface. The source of flow should be analyzed and methods employed to dissipate energy and Level 3 Inspection necessary disperse the flow (e.g., check dams, rock splash pads).



Notes:	
Inspector:	Date:
Complete the following if follow-up/corrective acti	ions were identified during this inspection:
0.45.10	
Certified Completion of Follow-Up Actions:	
"I hereby certify that the follow-up/correcting performed on (DATE) have	
maintenance deficiencies have been adec	
Inspector/Operator:	Date:



Permeable Pavement Stormwater Management Practices Level 1 Inspection Checklist SMP ID# **SMP Owner** Private Public **SMP Location** (Address; Latitude & Longitude) Latitude Longitude Party Responsible for Type of Site **System Type** Maintenance ☐ Above Ground Commercial ☐ Same as SMP Owner Seasonal Continuous Use ■ Below Ground Industrial Other Residential □ Other ☐ State **Inspection Date Inspection Time** Inspector

PP Drainage Area			
Look for areas that are uphill from the Permeable pavement.			
Problem (Check if Present)		Follow-Up Actions	
2-04/11/20/1	□ Bare soil, erosion of the ground (rills washing out the dirt)	 Seed and straw areas of bare soil to establish vegetation. Fill in erosion areas with soil, compact, and seed and straw to establish vegetation. If a rill or small channel is forming, try to redirect water flowing to this area by creating a small berm or adding topsoil to areas that are heavily compacted. Other: 	

Date of Last Inspection



PP Drainage Area

Look for areas that are uphill from the Permeable pavement.

Problem (Check if Present)	·	Follow-Up Actions
-04/11/2011		□ Kick-Out to Level 2 Inspection: Large areas of soil have been eroded, or larger channels are forming. May require rerouting of flow paths.
	□ Piles of grass clippings, mulch, dirt, salt, or other materials	 □ Remove or cover piles of grass clippings, mulch, dirt, etc. □ Other:
	□ Open containers of oil, grease, paint, or other substances	 Cover or properly dispose of materials; consult your local solid waste authority for guidance on materials that may be toxic or hazardous. Other:



PP Surface

Examine the entire permeable pavement surface.

Problem (Check if Present)		Follow-Up Actions	
		Dirt and grit accumulating on pavement surface	 For small areas (e.g., driveways, patios), try a leaf blower or sweep the area to remove the dirt/grit from the Permeable pavement and properly dispose of the material. If dirt/grit remain in the joint areas between paver blocks, agitate with a rough brush and vacuum the surface with a wet/dry vac. Remove and replace clogged blocks in segmented pavers. For larger areas (e.g., parking lots, courtyards), hire a vacuum sweeper to restore the surface to a cleaner condition. Other: Kick-Out to Level 2 Inspection: Grit is widespread and cannot be removed by manual sweeping.
		Grass and weeds are growing on the permeable pavement surface (applies only to pavement types that are not intended to be covered in vegetation).	 □ If paver type is not intended to be covered in vegetation, remove the grass/weeds either mechanically (pulling, by hand or with a flame weeder) or with a herbicide approved for use in or near water (consult your local Extension Office for suggestions). □ Follow the actions listed above for removing dirt/grit from the pavement surface. □ Other: □ Kick-Out to Level 2 Inspection: Grass/weeds cover more than 25% of surface area.
		Slumping, sinking, cracking, or breaking of the pavement surface (Source: CSN, 2013)	 For small areas (e.g., patios, small driveway), it may be possible to remove the damaged pavers, check and fill in the underlying gravel, and replace with new materials. Other: Kick-Out to Level 2 Inspection: Problem affects more than a small, isolated area. Will typically require a qualified contractor to fix it. Problem recurs or occurs in multiple small locations.
		Water stands on Permeable pavement for days after a rainstorm; the Permeable pavement is clogged and doesn't let water through. (Source: CSN, 2013)	Kick-Out to Level 2 Inspection: This is generally a serious problem, and it will be necessary to activate a Level 2 Inspection.



Additional Notes:	
Inspector:	Date:
Complete the following if follow-up/corrective actions were	identified during this inspection:
Certified Completion of Follow-Up Actions:	
"I hereby certify that the follow-up/corrective actions	
performed on (DATE) have been conmaintenance deficiencies have been adequately co	mpleted and any required prected."
Inspector/Operator:	Date:



Permeable Pavement Stormwater Management Practices Level 2 Inspection Checklist Private SMP ID# **SMP Owner** Public **SMP Location** (Address; Latitude & Longitude) Latitude Longitude Party Responsible for System Type Type of Site Maintenance Above Ground Commercial □ Same as SMP Owner Seasonal ■ Below Ground □ Other Continuous Use Industrial Residential Other □ State **Inspection Date Inspection Time** Inspector **Date of Last** Inspection



Level 2 Inspection: PERMEABLE PAVEMENT Recommended Repairs and Required Skills Triggers for Level 3 Inspection Observed Condition: Bare Soil or Erosion in the Drainage Area Condition 1: Extensive problem spots, but no channels or rills forming Large rills or gullies are forming in the drainage area. Reseed problem areas. If problem persists or grass does not An attempt to regrade the drainage area has been take, consider hiring a landscape contractor. unsuccessful Fixing the problem would require major regrading (i.e., redirecting more than a 100-square-foot area. Condition 2: Problem is extensive, and rills/channels are beginning to form It is not clear why the problem is occurring. May be necessary to divert or redirect water that is causing the erosion problem. If it appears that simple regradingsuch as installing a berm or leveling a low spot-will fix the Level 3 inspection necessary problem, make repairs and check to ensure that the problem is repaired after the next storm. Observed Condition: Dirt or Grit Accumulating, or Grass Growing on Pavement Surface Condition 1: Grit beginning to form but is isolated to a small area or does not fill the joints between paver blocks More than 2 inches of sand/dirt/grit are on some of the pavement surface. Try to agitate and sweep by hand, or hire a contractor with a vacuum sweeper. Also investigate the drainage area for More than 25% of the pavement surface is covered with potential sediment sources. If no obvious sources are found, sand/dirt/grit to the extent that joints between paver blocks are discuss winter sanding and salting operations with the filled. property owner to identify whether this could be the source. · Regenerative air sweeper cannot remove grit. Condition 2: Grit is forming and cannot be removed with agitation and hand sweeping Level 3 inspection necessary Hire a vendor with a regenerative air vacuum sweeper, maximum power 2,500 rpm; avoid sweepers that use water.



Level 2 Inspection: PERMEABLE PAVEMENT Recommended Repairs and Required Skills Triggers for Level 3 Inspection Observed Condition: Structural Damage ☐ Condition 1: Portions of porous asphalt or permeable pavers are damaged, and the cause is known to be at the surface. If the damage is from a single event such as heavy More than 25% of the surface needs to be repaired or replaced. equipment or heavy fallen objects, or the surface has been It appears that the underlying material has "caved in," indicating damaged by wear over time, hire a contractor experienced in an underlying water conveyance or soil stabilization issue. permeable pavement installation to repair the damaged areas. Problem is repaired but recurs within less than five years. Condition 2: Damage to other structures, such as drainage infrastructure Level 3 inspection necessary If possible, repair or replace damaged items, or hire a contractor with permeable pavement experience if the damaged infrastructure is within the pavement surface. Observed Condition: Ponding on the Pavement Surface Condition 1: Underdrains (if present) may be clogged Water stands on the pavement surface more than 72 hours Check to see whether underdrains are clogged by inspecting after a storm, and the problem cannot be resolved by cleanouts (if present) or catch basins and looking for debris. unclogging underdrains. If underdrains appear clogged, it may be necessary to hire a More than 25% of the pavement surface is covered with router service to ream out the underdrains. sand/dirt/grit to the extent that joints between paver blocks are filled. Condition 2: At time of Level 2 inspection, water is not ponded, and there is no obvious clogging of the surface. Level 3 inspection necessary Conduct a flood test to determine whether the ponding is an ongoing problem.



Notes:	
Inspector:	Date:
Complete the following if follow-up/corrective actions were ide	antified during this inspection:
Complete the following if follow-up/corrective actions were fue	and this inspection.
Certified Completion of Follow-Up Actions:	
"I hereby certify that the follow-up/corrective actions id	
performed on (DATE) have been complemaintenance deficiencies have been adequately corre	leted and any required cted."
Inspector/Operator:	Date:



Pond and Wetland Stormwater Management Practices Level 1 Inspection Checklist SMP ID# **SMP Owner** Private Public **SMP Location** (Address; Latitude & Longitude) Latitude Longitude Party Responsible for **System Type** Type of Site Maintenance ☐ Above Ground Commercial ☐ Same as SMP Owner Seasonal Continuous Use ■ Below Ground Industrial Other Residential Other ☐ State **Inspection Date Inspection Time** Inspector **Date of Last** Inspection

PW Drainage Area			
Look for areas that are uphill from the pond.			
Problem (Check if Present)	Follow-Up Actions		
□ Bare soil, erosion of the ground (rills washing out the dirt)	 Seed and straw areas of bare soil to establish vegetation. Fill in eroded areas with soil, compact, seed and mulch with straw to establish vegetation. Other: 		

☐ Bare soil, erosion of the ground (rills washing out the dirt)		forming a small heavily If large forming erosion	at to Level 2 Inspection: If a rill or small channel is, try to redirect water flowing to this area by creating berm or adding topsoil to areas that are compacted. areas of soil have been eroded or larger channels are, this may require rerouting of flow paths or use of an econtrol seed mat or blanket to reestablish acceptable cover or anchor sod where it is practical.
Piles of grass clippings, mulcl dirt, salt, or other materials	n, 🗆	Remove	e or cover piles of grass clippings, mulch, dirt, etc. e excessive vegetation or woody debris that can block e systems.
Open container of oil, grease, paint, or other substances exposed to rain in the drainage area		solid wa	or properly dispose of materials; consult your local aste authority for guidance on materials that may be hazardous.
Pond Inlets			
Look for all areas where water flows into the pond during storms. Note that there may be multiple points of inflow and types of structures (e.g., pipes, open ditches, etc.).			may be multiple points of inflow and types of
Problem (Check if Present)			Follow-Up Actions

☐ If the problem can be remedied with hand tools and done in a safe manner, remove vegetation, trash, woody debris, etc. from blocking inlet structures. Other: Inlets are buried, covered or filled with silt, debris, or trash, or blocked by excessive vegetation. Kick-Out to Level 2 or 3 Inspection: If the amount of material is too large to handle OR there are ANY safety concerns about working in standing water, soft sediment, etc., the work will likely have to be performed by a qualified contractor.

Pond Inlets

Look for all areas where water flows into the pond during storms. Note that there may be multiple points of inflow and types of structures (e.g., pipes, open ditches, etc.).

Problem (Check if Present)		Follow-Up Actions
	□ Inlets are buried, covered or filled w silt, debris, or tras blocked by excess vegetation.	sh, or there are ANY safety concerns about working
	Inlets are broken, with pieces of pipe concrete falling in pond, there is ero around the inlet, the open space under pipe, or there is end where the inlet me the pond	e or to the sion here is r the rosion Color of the to the sion here is r the rosion Color of the to the serious and will require a qualified contractor to repair.

PW Pond Area and Embankments

Examine both interior and exterior pond banks as well as the pond body. Observe from the inlet pipes to the outfall structure and emergency overflow.

Problem (Check if Present)		Follow-Up Actions	
	☐ The pretreatment area(s) or forebay(s) are filled with sediment, trash, vegetation, or other debris.	 If the problem can be remedied with hand tools and done in a safe manner, use a flat shovel or other equipment to remove small amounts of sediment. Remove trash and excessive vegetation from forebays if this can be done in a safe manner. Other: 	



PW Pond Area and Embankments

Examine both interior and exterior pond banks as well as the pond body. Observe from the inlet pipes to the outfall structure and emergency overflow.

Problem (Check if Present)		Follow-Up Actions		
all.	☐ The pretreatment area(s) or forebay(s) are filled with sediment, trash, vegetation, or other debris.	□ Kick-Out to Level 2 Inspection: Large amounts of sediment or debris will have to be removed by a qualified contractor. ANY condition that poses a safety concern for working in standing water or soft sediments should be referred to a Level 2 Inspection or qualified contractor.		
	The pond area itself has accumulated sediment, trash, debris, or excessive vegetation that is choking the flow of the water, OR the pond area is covered with algae or aquatic plants.	 Level 1 includes handling only small amounts of material that can be removed by hand, or with rakes or other hand tools. Do not attempt any repair that poses a safety issue. Other: Kick-Out to Level 2 Inspection: Most cases will call for a Level 2 Inspection and/or a qualified contractor. You are not sure what type and amount of vegetation is supposed to be in the pond. The algae or aquatic plants should be identified so that proper control techniques can be applied. 		
	☐ The side slopes of the pond are unstable, eroding, and have areas of bare dirt.	 □ If there are only minor areas, try filling in small rills or gullies with topsoil, compacting, and seeding and mulching all bare dirt areas with an appropriate seed. Alternatively, try using herbaceous plugs to get vegetation established in tricky areas, such as steep slopes. □ Other: □ Kick-Out to Level 2 Inspection: Erosion and many bare dirt areas on steep side slopes will require a Level 2 Inspection and repair by a qualified contractor. 		



PW Pond Area and Embankments

Examine both interior and exterior pond banks as well as the pond body. Observe from the inlet pipes to the outfall structure and emergency overflow.

Problem (Check if Present)		Follow-Up Actions	
	☐ The riser structure is clogged with trash, debris, sediment,	 If you can safely access the riser on foot or with a small boat, clear minor amounts of debris and remove it from the pond area for safe disposal. Other: 	
	vegetation, etc., OR is open, unlocked, or has a steep drop and poses a safety concern. The pond level may have dropped below its "normal" level.	 Kick-Out to Level 2 Inspection: The riser cannot be accessed safely, the amount of debris is substantial, or the riser seems to be completely clogged and the water level has risen too high. There are safety issues with the riser and concern about access to pipes, drops, or any other life safety concern. The riser is leaning, broken, settling or slumping, corroded, eroded or any other structural problem. 	
9811/2809	☐ The dam/embankment is slumping, sinking, settling, eroding, or has medium or large trees growing on it.	 If there are small isolated areas, try to fix them by adding clean material (clay and topsoil) and seeding and mulching. Periodically mow embankments to enable inspection of the banks and to minimize establishment of woody vegetation. Remove any woody vegetation that has already established on embankments. Other: Kick-Out to Level 2 Inspection: Most of these situations will require a Level 2 Inspection or evaluation and repair by a qualified contractor. Seepage through the dam or problems with the pipe through the dam can be a serious issue that should be addressed to avoid possible dam failure. 	

PW Pond Area and Embankments

Examine both interior and exterior pond banks as well as the pond body. Observe from the inlet pipes to the outfall structure and emergency overflow.

Problem (Check if Present)		Follow-Up Actions		
		The emergency spillway or outfall (if it exists) has		Clear light debris and vegetation. Other:
	li li	Erosion, settlement, or loss of material. Rock-lined spillways have excessive debris or vegetation.		Kick-Out to Level 2 Inspection: Displacement of rock lining, excessive vegetation and erosion/settlement may warrant review and decision by Level 2 Inspector to check against original plan.
				Any uncertainty about the integrity of the emergency spillway should be referred to a Level 2 Inspector.
				Erosion or settlement such that design has been compromised should be reviewed by an engineer.

PW Pond Outlet

Examine the outlet of the pipe on the downstream side of the dam/embankment where it empties into a stream, channel, or drainage system.

Problem (Check if Present)



☐ The pond outlet is clogged with sediment, trash, debris, vegetation, or is eroding, caving in, slumping, or falling apart.

Follow-Up Actions

- If there is a minor blockage, remove the debris or vegetation to allow free flow of water.
- Remove any accumulated trash at the outlet.
- Outlet:
- ☐ Kick-Out to Level 2 Inspection:
- ☐ If the area at the outlet cannot be easily accessed or if the blockage is substantial, a Level 2 Inspection is warranted.
- Erosion at and downstream of the outfall should be evaluated by a qualified professional.
- Any structural problems, such as broken pipes, structures falling into the stream, or holes or tunnels around the outfall pipe, should be evaluated by a Level 2 Inspector and will require repair by a qualified contractor.
- ☐ The pool of water at the outlet pipe is discolored, has an odor, or has excessive algae or vegetative growth.



dditional Notes:
Inspector: Date:
Inspector: Date:
Complete the following if follow-up/corrective actions were identified during this inspection:
Certified Completion of Follow-Up Actions:
"I hereby certify that the follow-up/corrective actions identified in the inspection performed on (DATE) have been completed and any required maintenance deficiencies have been adequately corrected."
Inspector/Operator: Date:



Pond and Wetland Stormwater Management Practices Level 2 Inspection Checklist Private SMP ID# **SMP Owner** Public **SMP Location** (Address; Latitude & Longitude) Latitude Longitude Party Responsible for System Type Type of Site Maintenance Above Ground Commercial □ Same as SMP Owner Seasonal ■ Below Ground □ Other Continuous Use Industrial Residential Other □ State **Inspection Date Inspection Time** Inspector **Date of Last** Inspection



Level 2 Inspection:	PONDS and WETLANDS
Recommended Repairs and Required Skills	Triggers for Level 3 Inspection
Observed Condition: Bare Soil or Erosion in the Drainage	
Condition 1: Extensive problem spots, but no channels or rills forming Reseed problem areas. If problem persists or grass does not take, consider hiring a landscape contractor. Condition 2: Problem is extensive, and rills/channels are beginning to form May be necessary to divert or redirect water that is causing the erosion problem. If it appears that simple regrading—such as installing a berm or leveling a low spot—will fix the problem, make repairs and ensure that the problem is repaired after the next storm.	 Large rills or gullies are forming in the drainage area. An attempt to regrade the drainage area has been unsuccessful. Fixing the problem would require major regrading (i.e., redirecting more than a 100-square-foot area. It is not clear why the problem is occurring. Level 3 inspection necessary
Observed Condition: Manholes or Inlet Pipe Buried or Co	overed with Vegetation
 Condition 1: Nearest manhole and inlet pipe not found Consult as-built drawings to get to closest suspected location and use metal detector to search for metal manhole cover. If unsuccessful, identify nearest drain inlets and approximate pipe direction to locate next manhole. 	
☐ Condition 2: Manhole located and inspected Never enter a manhole, except by following confined-space entry protocols. If outlet pipe is not visible or greater than 25% full of sediment/debris or trash, it will typically require a qualified contractor to flush, clean and clear blockages.	 To locate buried manholes and lost storm lines, it is sometimes necessary to hire a pipeline inspection contractor with televising equipment or ground-penetrating radar and enter at the closest upstream access point. Locating a buried inlet pipe may require wading in the edge of the pond and using a metal probe and brush axe to find and expose the pipe. If other than light digging is necessary to remove accumulated
 Condition 3: Inlet pipe not found at pond Clear vegetation and brush that may be covering the inlet pipe. Buried inlet pipes may be found through use of a metal probe. Condition 4: Inlet pipe buried in sediment or blocked 	sediment, a contractor with heavy equipment may be required. Level 3 inspection necessary
by vegetation Once located, the pipe path can be cleared of vegetation with brush hook or other brush tools. Light digging may clear sediment from the end of the pipe.	



Level 2 Inspection:	PONDS and WETLANDS						
Recommended Repairs and Required Skills	Triggers for Level 3 Inspection						
Observed Condition: Pipe or Headwall Settlement, Erosid	n, Corrosion or Failure						
☐ Condition 1: Pipe or headwall settlement or failure Severe sinkholes, settlement or corrosion should be kicked out to Level 3 Inspection.	Where blockages are visible, a decision is needed on whether to clear them or leave in place. If a third of the pipe is full of sediment, it should be removed by a contractor with pipecleaning equipment.						
☐ Condition 2: Flow not confined to pipe and visible outside pipe wall With flashlight, observe the inside of the pipe and note its condition. Take photographs. Look for sinkholes developing that indicate pipe failure beneath the surface. Kick out to Level 3 inspection.	 Corrosion of inlet pipes that allows flow around the pipe exterior is a structural concern because it can lead to settlement, sinkholes and undermining pond embankment. Evidence of this type of failure may require specialized pipe-inspection equipment and investigation by an engineer. Level 3 inspection necessary 						
Observed Condition: Pond Conditions							
 Condition 1: Pond pre-treatment zone is full of sediment or not constructed as shown on as-built drawings. 	 It may require inspection by an engineer to determine next steps for clearing, replanting or reconstruction. Erosion or settlement such that design has been compromised should be reviewed by an engineer. Recurring erosion may require redesign and/or regrading to direct flow away from 						
Condition 2: Excessive buildup of sediment or overgrowth If the pre-treatment area or pond pool is overgrown or filled with sediment so that the original design is compromised, corrective measures are required. If plants have died, then replanting is necessary. If none of the original design exists due to alteration or sediment, kick out to Level 3 inspection.	 eroding area. If sediment has filled more than 50% of the pond's capacity, dredging is likely needed and should be evaluated by a qualified contractor. Removal or control of excessive algae or aquatic plants can be assessed by a qualified pond maintenance company. 						
	☐ Level 3 inspection necessary						



Notes:	
L	
	D /
Inspector:	Date:
Complete the following if follow-up/corrective actions were identif	fied during this inspection:
Certified Completion of Follow-Up Actions:	
"I hereby certify that the follow-up/corrective actions ident performed on (DATE) have been complete	
maintenance deficiencies have been adequately correcte	d."
Inspector/Operator:	Date:



Appendix C – Maintenance Agreements



Appendix D – Blank Maintenance Inspection Form

Post-Construction Operation and Maintenance Manual: Maintenance Inspection Form

Project Name:	
Inspection Date:	
Inspection Time:	
Inspector's Name:	

Inspection Item	Inspection Frequency	Maintenance Required?	Comments
	,	Swale(s)	
Free of trash, debris, and pollutants?	Monthly		
Erosion and/or sedimentation observed?	Annually		
Spillway is stable and is free of erosion or sedimentation?	Annually		
Channel dewaters between storm events?	Monthly		
Blockage of flow present in the swale, culverts or underdrains?	Monthly		
Vegetation is healthy and sufficient ground cover is observed?	Monthly		
Vegetation is mowed to a minimum height of 8 inches?	Monthly		
	Riparian Bu	ffers and Filter St	trips
Free of trash, debris, and pollutants?	Annually		
Erosion and/or sedimentation observed?	Annually		
Vegetation is healthy and sufficient ground cover is observed?	Annually		
Vegetation is mowed to a minimum height of 4 inches (minimum of 4 cuttings per year)?	Quarterly		
Buffer length has not been reduced?	Annually		
		ders/Level Spread	ders
Free of trash, debris, and pollutants?	Annually		
Erosion and/or sedimentation observed?	Annually		
Channelization around the weir is observed?	Annually		
Rock outlet protection is displaced?	Annually		
Vegetation is healthy and sufficient ground cover is observed?	Annually		
Vegetation is mowed to a minimum height of 8 inches?	Annually		
	Det	ention Ponds	
Free of trash, debris, and pollutants?	Annually		
Erosion and sedimentation not observed?	Annually		
Stormwater control structure is free of sediment, debris/trash, and no damage was observed?	Annually		

Inspection Item	Inspection Frequency	Maintenance Required?	Comments								
Vegetation is healthy and sufficient ground cover is observed?	Annually	-									
Vegetation is mowed to a minimum height of 8 inches?	Annually										
Sediment has reached 50% of the forebay capacity?	Annually										
Security features around the pond are in good condition?	Annually										
Infiltration Facilities											
Facility is functioning properly?	Annually										
Free of trash, debris, and pollutants?	Monthly										
System is draining properly?	Monthly										
Sediment accumulation has reached 2 inches or greater?	Annually										
Vegetation is healthy and sufficient ground cover is observed?	Annually										
Vegetation is mowed to a minimum height of 8 inches?	Annually										
Overflow area is in good condition?	Annually										
	Storm Culver	ts and Drainage I	Pipes								
Free of trash, debris, and pollutants?	Annually										
Culvert/pipe is free of obstructions and functioning properly?	Annually										
Vegetation at the inlet and outlet is properly maintained?	Annually										
Culvert/pipe is not damaged (cracked, warped, corroded, etc.)?	Annually										
25% or more of the culvert/pipe structure has been compromised?	Annually										
	En	d Sections									
Free of trash, debris, and pollutants?	Semi-Annually										
Erosion and/or sedimentation is observed?	Semi-Annually										
Rocks at the outlet have not been displaced or are insufficient?	Semi-Annually										
Vegetation is impeding the flow of stormwater from the structure?	Semi-Annually										
	Fences, G	ates, and Signag	je								
Fencing and gates are in working order and are not damaged?	Annually										
Signage is legible and displayed clearly?	Annually	-									
Vegetation is maintained to not impede gated access or block signage?	Annually										
	Acc	cess Roads									
Road surface is free of riling?	Annually										

Inspection Item	Inspection	Maintenance	Comments
	Frequency	Required?	
Geo-web/grid is not exposed?	Annually		
Gravel cover is sufficient, and the road has	Annually		
maintained the proper grade?			
Erosion and/or sedimentation observed?	Annually		
Free of trash, debris, and pollutants?	Annually		
Vegetation is healthy and sufficient ground cover is observed?	Annually		
Vegetation is mowed to a minimum height of 4 inches?	Annually		
	Perviou	s Access Roads	
Road surface is free of riling?	Annually		
Geo-web/grid is not exposed?	Annually		
Gravel cover is sufficient, and the road has	Annually		
maintained the proper grade?	Annually		
Erosion and/or sedimentation observed?	Annually		
Free of trash, debris, and pollutants?	Annually		
Vegetation is healthy and sufficient ground cover is observed?	Annually		
Vegetation is mowed to a minimum height of 4 inches?	Annually		
	Grave	l Parking Areas	
Road surface is free of riling?	Annually		
Geo-web/grid is not exposed?	Annually		
Gravel cover is sufficient, and the road has maintained the proper grade?	Annually		
Erosion and/or sedimentation observed?	Annually		
Free of trash, debris, and pollutants?	Annually		
Vegetation is healthy and sufficient ground cover is observed?	Annually		
Vegetation is mowed to a minimum height of 4 inches?	Annually		
monos:	Gravel	Substation Yard	
Surface is free of riling?	Annually		
Gravel cover is sufficient, and has maintained the			
proper grade?	Annually		
Erosion and/or sedimentation observed?	Annually		
Free of trash, debris, and pollutants?	Annually		
Vegetation is healthy and sufficient ground cover is observed?	Annually		
Vegetation is mowed to a minimum height of 4 inches?	Annually		



Appendix E – Completed Maintenance Inspection Forms

Appendix J - Stormwater Design Calculations

- Water Quality Volume (WQv) and Runoff Reduction Volume (RRv) Calculations Culvert Sizing Calculation -
- NYSDEC Solar Panel Construction Stormwater Permitting/SWPPP Guidance -
- Maryland Department of the Environment (MDEP) Stormwater Design Guidance Solar Panel Installation -
 - NYSDEC Limited-Use Pervious Access Road Approval -

Note: Documents provided in this Appendix are preliminary and will be amended and finalized for the Final SWPPP prior to construction.

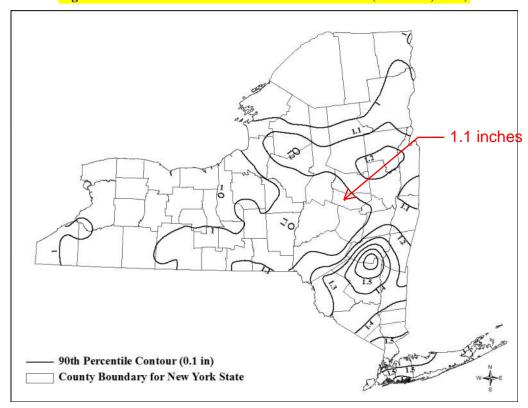
Appendix J – Water Quality Volume (WQv) and Runoff Reduction Volume (RRv) Calculations

New York State Stormwater Management Design Manual

Chapter 4: Unified Stormwater Sizing Criteria

Section 4.2 Water Quality Volume (WQv)

Figure 4.1: 90th Percentile Rainfall in New York State (NYSDEC, 2013)



Basis of Design for Water Quality

As a basis for design, the following assumptions may be made:

Measuring Impervious Cover: the measured area of a site plan that does not have permanent vegetative or permeable cover shall be considered total impervious cover. Impervious cover is defined as all impermeable surfaces and includes: paved and gravel road surfaces, paved and gravel parking lots, paved driveways, building structures, paved sidewalks, and miscellaneous impermeable structures such as patios, pools, and sheds. Where site size makes direct measurement of impervious cover impractical, the land use/impervious cover relationships presented in Table 4.2 can be used to initially estimate impervious cover. In site specific planning impervious cover must be calculated based the specific proposed impervious cover.

PROJECT: Cordelio Calculated By: RLD

Flat Creek Solar

Date: Checked By: 8/8/2024 PGT

Proj. No.: 435979

Time of Concentration Summary

Revised:

Time of Concentration Equations:

1. Where $T_t := \frac{0.007 \cdot (N \cdot L)^{0.8}}{P_2^{0.5} \cdot S^{0.4}}$ from SCS TR-55. For Sheet Flow (300 feet or less)

2. Where V:=20.3282√S from the SCS Upland Method Channel Flow Chart For Shallow Concentrated Flow (Paved surfaces)

3. Where 'T $_{t}$:= $\frac{L}{3600 \cdot V}$ from the SCS Upland Method *Channel Flow Chart* Travel time equation

4. Where v :=16.1345√s from the SCS Upland Method Channel Flow Chart For Shallow Concentrated Flow (Unpaved surfaces)

5. Where: v = 9 VS from the SCS Upland Method Channel Flow Chart For Shallow Concentrated Flow (Cultivated)

6. Where: v = 7 VS from the SCS Upland Method Channel Flow Chart For Shallow Concentrated Flow (Short Grass Pasture)

7. Where: v = 5 VS from the SCS Upland Method Channel Flow Chart For Shallow Concentrated Flow (Woodland)

8. Where $v := 12 \cdot \sqrt{s}$ from the SCS Upland Method Channel Flow Chant For Channel Flow - Waterways and Swamps, No Channels

9. Where $V:=15-\sqrt{S}$ from the SCS Upland Method Channel Flow Chart For Channel Flow - Grassed Waterways and Roadside Ditches

10. Where $\mathbf{v} := 21 \cdot \sqrt{s}$ from the SCS Upland Method Channel Flow Chart For Channel Flow - Small Tributary & Swamp w/Channels

11. Where $V := 35 \cdot \sqrt{S}$ from the SCS Upland Method Channel Flow Chart For Channel Flow - Large Tributary

13. Where $V := \frac{1.49 \cdot R^{.667} \cdot \sqrt{S}}{N}$ For Channel Flow - Culvert Flow

14. Where $P_2 = 2$ -Year, 24 Hour Rainfall (in) (Montgomery County, NY: $P_2 = 2.39$ inches)

Mannings Roughness Coefficients Table

Surface Description	n - value
Smooth surfaces	0.011
Crush Stone/Substation Yards	0.025
Fallow	0.050
Cultivated: Residue<=20%	0.060
Cultivated: Residue>=20%	0.170
Grass: Short	0.150
Grass: Dense	0.240
Grass: Bermuda	0.410
Range	0.130
Woods: Light underbrush	0.400
Woods: Dense underbrush	0.800

PROJECT:	Cordelio								Calculat Date:	-	RLD 8/8/24
TRC Proj. No.: Subcatchment:	435979 1S - Pre								Checked		PGT
Time of Concenti		terminat	ion Wor	ksheet :	SCS Me	thods			Reviseu		
Time of Concent	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
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Slope, ft/ft											
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T _t , hr											0.0000
Unpaved											
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
Tt, hr											0.0000
Cultivated											
Length, ft											
Slope, ft/ft											
Velocity⁴, ft/sec Tt³, hr											0.0000
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Snort Grass Pastur Length, ft	6	784									
Slope, ft/ft		0.014									
Velocity ⁴ , ft/sec		0.8283									
T _t , hr		0.263									0.2629
Woodland											
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Slope, ft/ft			0								
Velocity ⁵ , ft/sec											
T _t , hr											0.0000
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Velocity ⁶ , ft/sec			U								
T _t , hr											0.0000
Grassed Waterway	s/Roadsid	e Ditches									
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Slope, ft/ft											
Velocity ⁷ , ft/sec											
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Lengtn, π Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Culvert											
Diameter, ft											
Area, ft ²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
Velocity ¹¹ , ft/sec											
Length, L, ft T _t , hr											0.0000
15.111										Шпр	0.0000
										HR	0.866
										Min	51.98

Subcatchment 19-Post	PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Sept	Subcatchment:		t									FGI
Sept		ration De	terminat	ion Worl	ksheet.	SCS Me	thods					
SHEET FLOW	-							Seg 7	Seg 8	Seg 9	Seg 10	
Largeth, file	SHEET FLOW			, i	Ť							
2.3	Manning's No.	0.240										
Sicker, Min	Length, ft											
### 0.445 #### 0.445 ###################################												
SHALLOW CONCENTRATED FLOW												0.4455
Paved			FLOW									0.4455
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17.	Slope, ft/ft											
Unpayed	Velocity ² , ft/sec											
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Grassed Waterways/Roadside Ditches	Velocity ⁶ , ft/sec											
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Slope, ft/ft Swamp w/Channels Slope, ft/ft Slope, ft/ft O.04 Wellocity ⁸ , ft/sec Vellocity ⁸ , ft/s	Grassed Waterway	/s/Roadsid	e Ditches									
Velocity ⁷ , ft/sec	Length, ft											
T ₁ , hr												
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Velocity ⁸ , ft/sec T ₁ , hr 1.50 1.579 1.50 1.579 1.50	Slope, ft/ft											
Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.866	Velocity ⁸ , ft/sec											
Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.866	T _t , hr			0.158								0.1579
Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr	Large Tributary											
Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.866												
Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.866												
Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft T _b , hr HR 0.866												0 0000
Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft T _b , hr HR 0.866	Culvert											0.0000
Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft T₁, hr HR 0.866	Diameter, ft											
Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.866	Area, ft ²											
Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.866	Wetted Perimeter, ft											
Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.866	Hydraulic Radius, R, ft											
Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.866	Slope, ft/ft											
Length, L, ft T _L , hr 0.0000 HR 0.866	Manning's No.											
HR 0.866												
HR 0.866												0.000
	P "							<u> </u>			lhr	

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Subcatchment:	435979 3S - Pre								Revised		PGI
Time of Concent		terminat	ion Wor	ksheet,	SCS Me	thods				_	
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
SHEET FLOW											
Manning's No.	0.240										
Length, ft	100										
P2 , in	2.39										
Slope, ft/ft T _t ¹ˌhr	0.050 0.191										0.1908
SHALLOW CONCE		FLOW									0.1906
Paved											
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Unpaved											
_ength, ft											
Slope, ft/ft											
Velocity ² , ft/sec Γ ³ , hr											0.0000
Cultivated											0.0000
_ength, ft											
Lengtn, it Slope, ft/ft											
Velocity ⁴ , ft/sec											
Γ _t , hr											0.0000
Short Grass Pastur	е										
_ength, ft		241	445								
Slope, ft/ft		0.05	0.017								
Velocity⁴, ft/sec		1.5652	0.9127								
Γ ³ , hr		0.043	0.135								0.1782
Woodland											
Length, ft				50							
Slope, ft/ft				0.03							
Velocity ⁵ , ft/sec T _t ³ , hr				0.8660							0.0400
CHANNEL FLOW				0.016							0.0160
Waterways & Swan	nns. No Ch	nannels									
Length, ft	ipo, ito oi										
Slope, ft/ft											
Velocity ⁶ , ft/sec											
T _t , hr											0.0000
Grassed Waterway	s/Roadsid	e Ditches									
Length, ft											
Slope, ft/ft											
Velocity ⁷ , ft/sec											
Γ _t , hr		No a se se a la									0.0000
Small Tributary & S ength, ft	wamp w/C	inanneis									
_engtn, π Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Large Tributary											
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
Γ _t , hr											0.0000
Diameter, ft											
Diameter, ft Area, ft ²											
Diameter, ft Area, ft ² Wetted Perimeter, ft									1	1	
Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft											
Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft											
Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No.											
Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. /elocity ¹¹ , ft/sec											
Diameter, ft vrea, ft ² Vetted Perimeter, ft dydraulic Radius, R, ft Slope, ft/ft Janning's No. Velocity ¹¹ , ft/sec ength, L, ft											0.0000
Diameter, ft Area, ft ² Vetted Perimeter, ft Hydraulic Radius, R, ft Blope, ft/ft Janning's No.										HR	0.0000 0.385

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Subcatchment:	3S - POS	ST							Revised		101
Time of Concent	ration De	terminat	ion Wor	ksheet, :	SCS Me	thods					
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
SHEET FLOW											
Manning's No.	0.240										
Length, ft	100										
P2 , in	2.39										
Slope, ft/ft T _t ¹,hr	0.050 0.191										0.1908
SHALLOW CONCE		FLOW									0.1300
Paved											
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Unpaved				I .			I .				
Length, ft											
Slope, ft/ft Velocity ² , ft/sec											
Velocity ² , ft/sec T _t ³ , hr											0.0000
Cultivated											0.0000
Length, ft											
Slope, ft/ft											
Velocity ⁴ , ft/sec											
T _t , hr											0.0000
Short Grass Pastur	·e										
Length, ft		241	445								
Slope, ft/ft		0.05	0.017								
Velocity ⁴ , ft/sec		1.5652	0.9127								
T _t , hr		0.043	0.135								0.1782
Woodland											
Length, ft				50							
Slope, ft/ft Velocity ⁵ , ft/sec				0.03 0.8660							
T _t , hr				0.8660							0.0160
CHANNEL FLOW				0.010							0.0100
Waterways & Swan	nps, No Cl	hannels									
Length, ft											
Slope, ft/ft											
Velocity ⁶ , ft/sec											
T _t , hr											0.0000
Grassed Waterway	s/Roadsid	le Ditches		ı			ı				
Length, ft											
Slope, ft/ft Velocity ⁷ , ft/sec											
T _t , hr											0.0000
Small Tributary & S	wamn w/C	Channels									0.0000
Length, ft	uiiip w/C	u									
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr		<u></u>									0.0000
Large Tributary											
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Culvert											
Diameter, ft Area, ft ²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
Velocity ¹¹ , ft/sec											
Length, L, ft											
											0.0000
Length, L, ft										HR	0.0000 0.385

PROJECT:	Cordelio								Calculate	ed By:	RLD								
	Flat Cre	ek Solar							Date:		8/8/24								
TRC Proj. No.:	435979								Checked		PGT								
Subcatchment:	4S - Pre				20011				Revised:										
Time of Concenti																			
OLIEFT EL OW	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	Seg 11	Seg 12	Seg 13	Seg 14	Seg 15	Seg 16	Seg 17	Seg 18	
SHEET FLOW	0.040										1 1					<u> </u>			
Manning's No. Length, ft	0.240 100																		
P2 , in	2.39																		
Slope, ft/ft	0.006																		
T _t 1, hr	0.445																		0.4455
SHALLOW CONCE	NTRATED	FLOW																	
Paved							,												
Length, ft																			
Slope, ft/ft																			
Velocity ² , ft/sec T, ³ hr																			0.0000
Unpaved																			0.0000
Length, ft																			
Slope, ft/ft																			
Velocity ² , ft/sec																			
T _t , hr																			0.0000
Cultivated																			
Length, ft																			
Slope, ft/ft																			
Velocity ⁴ , ft/sec T _t ³ , hr																			
																			0.0000
Short Grass Pastur	re .	077																	
Length, ft Slope, ft/ft		277 0.015																	
Velocity ⁴ , ft/sec		0.8573																	
T _t hr		0.090																	0.0897
Woodland																			
Length, ft																			
Slope, ft/ft																			
Velocity ⁵ , ft/sec																			
T _t , hr																			0.0000
CHANNEL FLOW	N- O																		
Waterways & Swan	nps, No C	nanneis																	
Length, ft Slope, ft/ft																			
Velocity ⁶ , ft/sec																			
T _t , hr																			0.0000
Grassed Waterway	s/Roadsid	e Ditches																	
Length, ft			778											593					
Slope, ft/ft			0.024											0.027					
Velocity ⁷ , ft/sec			2.324											2.465					
T _t , hr			0.093											0.067					0.1598
Small Tributary & S	Swamp w/	Channels			744	101		005		007		507				2005			
Length, ft					741 0.079	401		605		627		527				2925			
Slope, ft/ft Velocity ⁸ , ft/sec					5.902	0.032 3.757		0.042 4.304		0.045 4.455		0.04 4.200				0.01 2.100			
T _i , hr					0.035	0.030		0.039		0.039		0.035				0.387			0.5644
Large Tributary																			
Length, ft																			
Slope, ft/ft																			
Velocity ⁸ , ft/sec																			
T _t , hr																			0.0000
Culvert																			
Diameter, ft				2			2		2		2		1		2.5		1		
Area, ft ²				3.14			3.14		3.14		3.14		0.785		4.90625				
Wetted Perimeter, ft				6.28			6.28		6.28		6.28		3.14		7.85				
Hydraulic Radius, R, ft Slope, ft/ft				0.5 0.005			0.5 0.056		0.5 0.014		0.5 0.075		0.25 0.025		0.625 0.025		I		
Siope, π/π Manning's No.				0.005			0.056		0.014		0.075		0.025		0.025				
Velocity ¹¹ , ft/sec				2.6542648			8.8828692		4.4414346		10.279924		3.7380254		6.887605				
Length, L, ft				40			18		36		40		40		40		1		
T _t , hr				0.00419			0.00056		0.00225		0.00108		0.00297		0.00161				0.0127
										HR									1.272

Section Color Co	PROJECT:	Cordelic								Calculate	ed By:	RLD								
Substact Number 1962 Post Pos			ek Solar																	
Time of Concentration Determination Workshorter, SCS More Soy So	TRC Proj. No.:											PGT								
Market FLOW				ion Mor	kahaat (SCS Mo	thodo			Reviseu:										
SHEET FLOW	Time of Concent							0 7	C== 0	C 0	C== 40	C== 44	C== 40	C== 42	C== 44	C== 45	C 4C	C== 47	0 40	
Manager Mana	SHEET FLOW	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg /	Seg o	Seg 9	Seg 10	Seg 11	Seg 12	Seg 13	Seg 14	Seg 15	Seg 16	Seg 17	Seg 16	
Image: 10 20 20 20 20 20 20 20		0.240																		
Part	Length, ft																			
See, Bill G. G. G. G. G. G. G.	P2, in																			
SHALLOW CONCENTRATED FLOW	Slope, ft/ft																			
Parent																				0.4455
Compared		NTRATED	FLOW																	
Sizes Bit																				
The																				
Long	T _t ³ hr																			0.0000
Sizes 11	Unpaved																			
Marchan Marc	Length, ft																			
Company Comp	Slope, ft/ft																			
Cultivated																				
Lamph, 11 Skope, 18 Nord, 17, 19 Nord, 17, 19 Nord, 18 No																				U.0000
Size Branch Bra																				
Marchay March Marchay Marcha																				
Short Grass Pasture	Velocity ⁴ , ft/sec																			
Short Grass Pasture Implify II	T _t , hr																			0.0000
Size, N. M. 0.015 0.090	Short Grass Pastur	re																		
MacCaling MacC	Length, ft																			
Modelland	Slope, ft/ft																			
Modeland	Velocity ⁴ , ft/sec																			
Length, ft Stoke Length			0.090																	0.0897
Sispe, Biff																				
### CHANNEL FLOW ####################################																				
TIL PRINCE FLOW Waterways & Swamps, No Channels Largen In Robert																				
Waterways & Swamps, No Channels	T _t ³ hr																			0.0000
Length, ft Stope, ft ft Velocity ⁶ , ft/see T, To ft Carssed Waterways/Roadside Ditches Length, ft Stope, ft ft Velocity ⁶ , ft/see T, To ft Dispose ft ft D	CHANNEL FLOW																			
Slope, If It		nps, No Cl	nannels																	
Velocity 1/16/16/2 Velocity 1/16/2 Velocity																				
Compared Waterways/Roadside Ditches																				
Crassed Waterways/Roadside Ditches	T.3 hr																			0.0000
Length, ft 778 0.024 0.025 0.025 0.025 0.027 0.025 0.0011 0.0127 0.0012	* 1	s/Roadsid	o Ditches																	0.0000
Slope, ft/ft		Sirtouusiu	Ditolics												593					
Small Tributary & Swamp w/Channels	Slope, ft/ft																			
Small Tributary & Swamp w/Channels	Velocity ⁷ , ft/sec																			
Length, ft	T _t , hr			0.093											0.067					0.1598
Slope, fl/ft		Swamp w/0	Channels																	
Velocity fifsec	Length, ft																			
T, hr																				
Large Tributary Length, ft Slope, ft/ft Velocity ² , ft/sec Fi, ft Diameter, ft Area, ft Are	T _n , hr																			0.5644
Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₅ , ftr Culvert Diameter, ft 2 2 2 2 1 2.5 Area, ft ² 3.14 3.14 3.14 3.14 0.785 4.90625 Wetted Perimeter, ft 6.28 6.28 6.28 6.28 3.14 7.85 Hydraulic Radius, R, ft 0.5 0.5 0.5 0.5 0.25 0.625 Slope, ft/ft 0.005 0.066 0.014 0.075 0.025 0.025 Melaning's No. 0.025 0.025 0.025 Melaning's No. 0.025 0.025 0.025 0.025 Melaning's No. 0.026 0.026 0.025 0.025 Melaning's No. 0.026 0.026 0.026 0.025 0.025 Melaning's No. 0.026 0.026 0.025 0.025 Melaning's No. 0.006 0.014 0.075 0.025 0.025 Melaning's No. 0.0016 0.0025 0.025 0.025 0.025 Melaning's No. 0.0026 0.026 0.025 0.025 0.025 Melaning's No. 0.0026 0.026 0.025 0.025 0.025 Melaning's No. 0.0026 0.0026 0.0026 0.0026 0.0026 0.0026 0.0026 0.0026 0.0026 0.0026 0.0026 0.0026 0.0026 0.0026 0.0026 0.0026 0.0026 0.0026 0.0027 0.00161 0.0027		1				2.300	2.300		2.300		2.300		2.300				2.307			2.3044
Slope, fift	Length, ft																			
Ti, hr	Slope, ft/ft																			
Culvert 2 2 2 2 1 2.5 Vexted Perimeter, ft Modes In Manual Pulphrane 2 2 2 2 1 2.5 Wetted Perimeter, ft Metted Perimeter, ft Modes In Manual Pulphrane 6.28 6.28 6.28 6.28 6.28 3.14 7.85 Hydraulic Radius, R, ft Modes In Manual Pulphrane 0.5 0.05 0.025	Velocity ⁸ , ft/sec																			
Diameter, ft	T _t , hr																			0.0000
Area, ft 2 Area, ft 3.14 3.14 3.14 3.14 3.14 3.14 3.14 3.14 3.14 3.14 3.14 3.14 3.14 3.14 3.14 3.14 7.85 4.90625 8.81 8.826862 8.82 8.826862 8.842648 8.8826862 8.842648 8.8826862 8.842648 8.8826862 8.842648 8.8826862 8.842648 8.8426862 8.8426																				
Wetted Perimeter, ft 6.28 6.28 6.28 6.28 3.14 7.85 Hydraulic Radius, R, ft 0.5 0.5 0.5 0.5 0.25 0.625 Slope, ft/ft 0.005 0.056 0.014 0.075 0.025 0.025 Manning's No. 0.025 0.025 0.025 0.025 0.025 Velocity ¹ / ₁ ft/sec 2.6542648 8.8828692 4.4414346 10.279924 3.7380254 6.887605 Length, L, ft 40 18 36 40 40 40 T ₁ , hr 0.00419 0.00056 0.00225 0.00108 0.00297 0.00161 0.0127												1 1						1		
Hydraulic Radius, R, ft 0.5 0.5 0.5 0.5 0.25 0.625 0.55 0.5 0.25 0.625 0																				
Slope, ft/ft																				
Manning's No. 0.025 0.02																		I		
Velocity ¹¹ , ff/sec 2 654268 8.8828802 4.4414346 10.279924 3.7380254 6.887605 Length L, ft 40 18 36 40 40 40 F _s hr 0.00419 0.00255 0.00108 0.00297 0.00161 0.0127	Manning's No.																			
Length, L, ft 40 18 36 40 40 40 T _L , hr 0.00419 0.00056 0.00225 0.00108 0.00297 0.00161 0.0127	Velocity ¹¹ , ft/sec																			
	Length, L, ft				40			18		36		40		40		40				
HR 1.272	T _t , hr				0.00419			0.00056				0.00108		0.00297		0.00161				0.0127
											HR									1.272

Subcatchment: SS - Pre	PROJECT:	Cordelio Flat Cree								Calculat Date:	-	RLD 8/8/24
Sept	TRC Proj. No.: Subcatchment:	435979 5S - Pre										PGT
Sept			terminat	ion Wor	ksheet.	SCS Me	thods			TCVISCU		
### SHEET FLOW ### Annexing No. 0.240 ### 100 2 ### 100 2 ### 100 2 ### 100 2 ### 100 37	Time of Consonia							Seg 7	Seg 8	Seg 9	Seg 10	
angli, 1, 100 2.39 3.370	SHEET FLOW	- 3 -	- J -									
2, in	Manning's No.	0.240										
Signey, NR	Length, ft											
All Companies All Companie												
### SHALLOW CONCENTRATED FLOW ### Ward ### angular #### Angular #### Angular #### Angular #### Angular ###################################												
Pare			EL OW									0.3270
angth, ft spoke, ftf secocity, financ ft, ft spoke, ftf		NIKAIED	FLOW									
Unpaved	Velocity ² , ft/sec											
angth, ft Solote, Trit Solote,	Γ _t , hr											0.0000
angth, ft Solote, Trit Solote,	Unpaved											
	_ength, ft											
Company Comp	Slope, ft/ft											
Company Comp	Velocity ² , ft/sec											
Angels												0.0000
Siope, NT Siop	Cultivated											
	_ength, ft											
1,												
Short Grass Pasture												0.000
According Acco												0.0000
		re	0.40									
10												
Noodland												0.2157
ength, ft Slope, ft/ft Slope, ft/ft Materways & Swamps, No Channels ength, ft Slope, ft/ft Materways & Swamps, No Channels ength, ft Slope, ft/ft Materways/Roadside Ditches ength, ft Noac, ft/ft Noac, ft/ft Materways/Roadside Ditches ength, ft Noac, ft/ft Noac, ft/ft Noac, ft/ft Noac, ft/ft Noac, ft/ft Materways/Roadside Ditches ength, ft Noac, ft/ft Noac, ft/ft/ft/ft/ft/ft/ft/ft/ft/ft/ft/ft/ft/f			0.210									0.2137
Slope, ft/ft Slop												
1,												
## CHANNEL FLOW **Naterways & Swamps, No Channels	Γ _t , hr											0.0000
Length, ft Slope, ft/ft Slope,	CHANNEL FLOW								_			
Slope, ft/ft Slop		nps, No Ch	nannels						_	_		
// In the control of	Length, ft											
1, hr 0.0000 0.	Slope, ft/ft											
Crassed Waterways/Roadside Ditches												
Singe, fit												0.0000
Siope, ft/ft		s/Roadsid	e Ditches		0.40							
//elocity7, ft/sec												
Small Tributary & Swamp w/Channels												
Small Tributary & Swamp w/Channels												0.0208
Length, ft Slope, ft/ft		Swamn w/C	hannele	0.020	0.010							0.0290
Slope, ft/ft //elocity ⁸ , ft/sec		waiip w/C										
//elocity ⁸ , ft/sec	Slope, ft/ft											
Title	Velocity ⁸ , ft/sec											
Length, ft Slope, ft/ft Slope,	T _t , hr											0.0000
Length, ft Slope, ft/ft Slope,	Large Tributary											
//elocity ⁸ , ft/sec	ength, ft											
Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft Ti, hr HR 0.572	Slope, ft/ft											
Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft Fi, hr HR 0.572	/elocity ⁸ , ft/sec											
Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft Γ, hr HR 0.572												0.0000
Vetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Anning's No. (elocity¹¹, ft/sec Length, L, ft -,, hr HR 0.0000												
Vetted Perimeter, ft dydraulic Radius, R, ft Slope, ft/ft Anning's No. /elocity ¹¹ , ft/sec .ength, L, ft 'i, hr HR 0.572												
Hydraulic Radius, R, ft Slope, ft/ft Manning's No. /elocity ¹¹ , ft/sec .ength, L, ft	•											
Slope, ft/ft Manning's No. /elocity ¹¹ , ft/sec .ength, L, ft r, hr HR 0.572												
Manning's No. /elocity ¹¹ , ft/sec .ength, L, ft r, hr HR 0.572	•											
/elocity ¹¹ , ft/sec .ength, L, ft r _r , hr												
ength, L, ft -, hr 0.0000 HR 0.572												
П, hr 0.0000 HR 0.572												
HR 0.572												0.0000
	v.							L			IHR	
											II .	

PROJECT:	Cordelic Flat Cre										Calculat Date:	ed By:	RLD 8/8/24
TRC Proj. No.: Subcatchment:	435979 5S - POS										Checked		PGT
Time of Concent	ration De	terminat	ion Wor	ksheet,	SCS Me	thods							
SHEET FLOW	Seg 1			Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
Manning's No.	0.240	0.011	0.240										
Length, ft	34	23	43										
P2 , in	2.39	2.39	2.39										
Slope, ft/ft	0.003	0.009	0.023										
Tt1 hr SHALLOW CONCE	0.248	0.010	0.132										0.3904
Paved	NIKAIED	FLOW											
Length, ft													
Slope, ft/ft													
Velocity ² , ft/sec													
T _t , hr													0.0000
Unpaved			I	I		T		l		I	1		
Length, ft Slope, ft/ft													
Velocity ² , ft/sec													
T _t , hr													0.0000
Cultivated													
Length, ft													
Slope, ft/ft													
Velocity⁴, ft/sec													
Tt ³ , hr Short Grass Pastur													0.0000
Length, ft	re			842									
Slope, ft/ft				0.024									
Velocity ⁴ , ft/sec				1.0844									
T _t , hr				0.216									0.2157
Woodland													
Length, ft													
Slope, ft/ft													
Velocity ⁵ , ft/sec T _t ³ , hr													0.0000
CHANNEL FLOW													0.0000
Waterways & Swan	nps, No Cl	hannels											
Length, ft													
Slope, ft/ft													
Velocity ⁶ , ft/sec T _t ³ , hr													
	o/Doodoid	la Ditabas											0.0000
Grassed Waterway Length, ft	S/Roausio	ie Ditches			311	242							
Slope, ft/ft					0.087	0.19							
Velocity ⁷ , ft/sec					4.424	6.538							
T _t , hr					0.020	0.010							0.0298
Small Tributary & S	Swamp w/0	Channels											
Length, ft													
Slope, ft/ft Velocity ⁸ , ft/sec													
T _t , hr													0.0000
Large Tributary													
Length, ft													
Slope, ft/ft													
Velocity ⁸ , ft/sec													0.000
T _t , hr Culvert													0.0000
Diameter, ft													
Area, ft ²													
Wetted Perimeter, ft													
Hydraulic Radius, R, ft													
Slope, ft/ft													
Manning's No.													
Velocity ¹¹ , ft/sec													
Length, L, ft T _t , hr													0.0000
· · · · ·		1	<u> </u>								1	HR	0.636
												II	
												Min	38.15

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Subcatchment:	435979 6S - Pre								Revised		PGI
Time of Concentr		terminat	ion Wor	ksheet,	SCS Me	thods				-	
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
SHEET FLOW											
Manning's No.	0.240										
Length, ft	100										
P2 , in	2.39										
Slope, ft/ft T _t ¹ˌhr	0.005 0.479										0.4792
SHALLOW CONCE		FLOW									0.4792
Paved											
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Unpaved											
_ength, ft											
Slope, ft/ft											
Velocity ² , ft/sec T _t ³, hr											0.0000
Cultivated											0.0000
_ength, ft											
Slope, ft/ft											
Velocity ⁴ , ft/sec											
T _t , hr											0.0000
Short Grass Pastur	·e										
Length, ft		256	341								
Slope, ft/ft		0.02	0.103								
Velocity ⁴ , ft/sec		0.9899	2.2466								
T _t , hr		0.072	0.042								0.1140
Woodland				0.15							
Length, ft				316							
Slope, ft/ft Velocity ⁵ , ft/sec				0.187 2.1622							
T _t , hr				0.041							0.0406
CHANNEL FLOW				0.011							0.0100
Waterways & Swan	nps, No Cl	nannels									
Length, ft											
Slope, ft/ft											
Velocity ⁶ , ft/sec											
T _t , hr											0.0000
Grassed Waterway	s/Roadsid	e Ditches	:	I			I	l	T		
Length, ft					137						
Slope, ft/ft Velocity ⁷ , ft/sec					0.007 1.255						
T _t , hr					0.030						0.0303
Small Tributary & S	wamp w/C	Channels			2.000						3.3330
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Large Tributary											
_ength, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec T _t , hr											0.0000
Culvert											0.0000
Diameter, ft											
Area, ft ²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
Velocity ¹¹ , ft/sec											
_ength, L, ft											
Γ _t , hr											0.0000
		· <u></u>					·	· <u></u>		HR	0.664
										Min	

Subcatchment S-1-POST	PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Sep 1 Sep 2 Sep 3 Sep 4 Sep 5 Sep 6 Sep 7 Sep 8 Sep 10	Subcatchment:		ST									101
SHEET FLOW	Time of Concentr	ration De	terminat	ion Wor	ksheet,	SCS Me	thods					
Maintings No. 0.240		Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
Leargh, ft. 100 2.29 3.41 3.4792		_							1			
P2												
Sep. No. 0.000 0.4792 SHALLOW CONCENTRATED FLOW 0.4792 SHALLOW CONCENTRATED FLOW 0.4792 SHALLOW CONCENTRATED FLOW 0.0000 Shallow Control of the state of t												
17,												
SHALLOW CONCENTRATED FLOW												0.4702
Paved			FLOW									0.4732
Length, ft Stope, ftm Velocidy, ft, flee Tr, fth Cuttivated Length, ft Nee Length												
Slope, lift												
17. hr	Slope, ft/ft											
Unpaved Length. ft Slope, bit ft Workorky* (Nec Ti*, br Cutivated Anogh, ft Note of the State of	Velocity ² , ft/sec											
Length, ft Slope, thft Velocity*, 18eec T*, 1hr Cultivated Length, ft Slope, thft Velocity*, 19ee T*, 256 Short Grass Pasture Length, ft Slope, thft O.02 O.000 Short Grass Pasture Length, ft Slope, thft O.02 O.013 Velocity*, 19ee T*, 1hr O.072 O.042 Woodland Length, ft Slope, thft O.02 O.042 Woodland Length, ft Slope, thft O.047 Velocity*, 19eec O.041 CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, thft O.0000 Grassed Waterways & Swamps, No Channels Length, ft Slope, thft Velocity*, 19eec Length, ft Slope, thft O.0000 Grassed Waterways/Roadside Ditches Length, ft Slope, thft Velocity*, 19eec Length, ft Slope, thft O.0000 Grassed Waterways & Swamp w/Channels Length, ft Slope, thft Velocity*, 19eec T*, 1hr O.0000 Grassed Waterways & Swamp w/Channels Length, ft Slope, thft Velocity*, 19eec T*, 1hr O.0000 Cultwet Dommeter, ft Area, ft Hydraulic Radius, R, ft Slope, thft Velocity*, 19eec Length, R, The O.0000 Cultwet Dommeter, ft Area, ft Hydraulic Radius, R, ft Slope, thft Velocity*, 19eec Length, L, II T*, 1hr O.0000 LHR O.0000												0.0000
Slope, Infl Webcody*, Time Ti, hr	Unpaved											
Velocity Name Velocity	Length, ft											
Ti, br 0,0000 Cutivated Length, R 0,0000 Short Grass Pasture 0,0000 Length, R 0,02												
Cultivated Length, ft Slope, fift O.02 0.103 Velocity*, fisce 17, fir 0.02 0.103 Velocity*, fisce 18, first Slope, fift O.02 0.103 Velocity*, fisce 0.09890 2.24866 Velocity*, fisce 0.0990 V												0.0000
Length, ft Skope, ft/ft Velocity*, ft/ftsec T, T, Th Velocity*, ft/ftsec Length, ft Skope, ft/ft OLO2 OL103 Velocity*, ft/ftsec OL02 OL104 Velocity*, ft/ftsec OL02 OL104 Velocity*, ft/ftsec OL02 OL04 OL1140 OL0406 CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Skope, ft/ft Velocity*, ft/ftsec T, Th OL007 OL007 Small Tributary & Swamp w/Channels Length, ft Skope, ft/ft Velocity*, ft/ftsec T, Th OL0000 Crassed Waterways/Roadside Ditches Length, ft Skope, ft/ft Velocity*, ft/ftsec T, Th OL0000 Crassed Waterways/Roadside Ditches Length, ft Skope, ft/ft Velocity*, ft/ftsec T, Th OL0000 Crassed Waterways/Roadside Ditches Length, ft Skope, ft/ft Velocity*, ft/ftsec T, Th OL0000 Crassed Waterways/Roadside Ditches Length, ft Skope, ft/ft Velocity*, ft/ftsec T, Th OL0000 Crassed Waterways/Roadside Ditches Length, ft Skope, ft/ft Velocity*, ft/ftsec T, Th OL0000 Large Tributary Length, ft Skope, ft/ft Wetted Perimeter, ft Fydraulic Radius, R, ft Skope, ft/ft Wetted Perimeter, ft Fydraulic Radius, R, ft Skope, ft/ft Mennings No. Velocity*, ft/ftsec Length, L, ft T, T, Tr DL0000 DEFINE TYPE TYPE TYPE TYPE TYPE TYPE TYPE TYP												0.0000
Slope, Int Welcolory*, Type												
No.0000 No.00000 No.000000 No.000000 No.000000 No.0000000 No.000000000000000000000000000000000000												
17, hr	Velocity ⁴ , ft/sec											
Short Grass Pasture	T _t , hr											0.0000
Length, ft Siope, ft/ft Velocity*, ft/sec Tr, hr O, 072 O, 040 Siope, ft/ft O, 072 O, 040 Siope, ft/ft Velocity*, ft/sec Tr, hr O, 073 O, 040 Siope, ft/ft Velocity*, ft/sec Tr, hr O, 074 O, 040 Siope, ft/ft Velocity*, ft/sec Tr, hr O, 0406 Siope, ft/ft Velocity*, ft/sec Length, ft Tr, hr O, 0406 Siope, ft/ft Velocity*, ft/sec Length, ft Siope, ft/ft Velocity*, ft/sec Length, ft Tr, hr O, 0406 Siope, ft/ft Velocity*, ft/sec Length, ft Tr, hr O, 0406 Siope, ft/ft Velocity*, ft/sec Length, ft Tr, hr O, 0406 Siope, ft/ft Velocity*, ft/sec Length, ft Tr, hr O, 0406 Siope, ft/ft Velocity*, ft/sec Length, ft Tr, hr O, 0406 Siope, ft/ft Velocity*, ft/sec Length, ft Tr, hr O, 0406 Siope, ft/ft Velocity*, ft/sec Length, ft Tr, hr O, 0406 Siope, ft/ft Velocity*, ft/sec Length, ft Tr, hr O, 0406 Siope, ft/ft Velocity*, ft/sec Length, ft Tr, hr O, 0406 Siope, ft/ft Velocity*, ft/sec Length, ft Tr, hr O, 0406 Siope, ft/ft Velocity*, ft/sec Length, ft Tr, hr O, 0406 Siope, ft/ft Velocity*, ft/sec Length, ft Tr, hr O, 0406 Siope, ft/ft Velocity*, ft/sec Length, ft Tr, hr O, 0406 Siope, ft/ft Velocity*, ft/sec Length, ft Tr, hr O, 0406 Siope, ft/ft Velocity*, ft/sec Length, ft Tr, hr O, 0406 Siope, ft/ft Velocity*, ft/sec Length, ft Tr		·e										
Slope, fift	Length, ft		256	341								
1,	Slope, ft/ft		0.02	0.103								
Woodland 316	Velocity⁴, ft/sec		0.9899	2.2466								
Length, ft	Tt, hr		0.072	0.042								0.1140
Slope, ft/ft Slop	Woodland	_										
Velocity ² , ft/sec	Length, ft											
Ti, hr 0.0406 CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity', ft/sec Ti, hr 0.030 Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity', ft/sec Ti, hr 0.0000 Carsed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity', ft/sec Length, ft Slope, ft/ft Velocity', ft/sec Length, ft Slope, ft/ft Velocity', ft/sec Ti, hr 0.0000 Culvert Diameter, ft Area, ft' Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity', ft/sec Length, L, ft Ti, hr 0.0000 HR 0.0000												
### CHANNEL FLOW Waterways & Swamps, No Channels												0.0400
Waterways & Swamps, No Channels					0.041							0.0406
Length, ft Slope, ft/ft Velocity*, ft/sec Ti*, hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity*, ft/sec Ti*, hr 137 Slope, ft/ft 0,007 Velocity*, ft/sec 1,255 0,030 Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity*, ft/sec Ti*, hr 0,0000 Large Tributary Length, ft Slope, ft/ft Velocity*, ft/sec Ti*, hr 0,0000 Culvert Diameter, ft Hydraulc Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulc Radius, R, ft Slope, ft/ft Manning's No. Velocity*, ft/sec Length, L, ft Ti*, hr 0,0000 HRR 0,0000 HRR 0,0000 HRR 0,0000 HRR 0,0000		nns No Cl	hannels									
Slope, fl/ft Slop		103, 140 01	laminois									
Velocity ⁹ , ft/sec T ₁ ⁸ , hr	Slope, ft/ft											
Slope, ft/ft	Velocity ⁶ , ft/sec											
Length, ft	T _t , hr											0.0000
Slope, ft/ft	Grassed Waterway	s/Roadsid	le Ditches	}								
Velocity ⁷ , ft/sec	Length, ft					137						
Tr. hr	Slope, ft/ft											
Small Tributary & Swamp w/Channels												
Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T _b , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁹ , ft/sec T _b , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T _b , hr HR 0.0000						0.030						0.0303
Slope, ft/ft		wamp w/0	nannels									
Velocity®, ft/sec 0.0000 Large Tributary 0.0000 Length, ft Slope, ft/ft Velocity®, ft/sec 0.0000 T _v , hr 0.0000 Culvert 0.0000 Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft Length, L, ft 0.0000 HR 0.664												
T _t , hr												
Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec Tt ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft Tt ₁ , hr HR 0.664	T _t , hr											0.0000
Length, ft Slope, ft/ft Velocity, ft/sec T _t , hr												2.3000
Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr	Length, ft											
Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.664	Slope, ft/ft											
Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft T _b , hr HR 0.664	Velocity ⁸ , ft/sec											
Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft T _i , hr HR 0.664	T _t , hr											0.0000
Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft T _t , hr HR 0.664	Culvert											
Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T,, hr HR 0.664	Diameter, ft											
Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft Ti, hr HR 0.664												
Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.664												
Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.664	•											
Velocity ¹¹ , ft/sec Length, L, ft T _t , hr HR 0.664												
Length, L, ft T _b hr HR												
HR 0.664												
HR 0.664	Lengin, L, ii T _t , hr											0.0000
			1			1			I.	1	IHR	
											II .	

Subcatchment: 7s - Pre	PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat	-	RLD 8/8/24 PGT
Time of Concentration Determination Worksheet, SCS Methods	Subcatchment:											PGI
Sept			terminat	ion Wor	ksheet,	SCS Me	thods				_	
Maning's No.								Seg 7	Seg 8	Seg 9	Seg 10	
A	SHEET FLOW											
22 in	Manning's No.											
Signey, Riff 0.019												
### ALLOW CONCENTRATED FLOW Paved												
### SHALLOW CONCENTRATED FLOW Paved angin, ft Silope, ft ft selocity, fireac ft, fir Dispaved angin, ft Silope, ft ft Silope, f												0.2000
Passed			FLOW									0.2809
Longste, Rt. Marked Mark		HILAILD	1 2011									
Dispayed	Slope, ft/ft											
Unpaved Compile Comp	Velocity ² , ft/sec											
.ength, ft Noticoticy ² , Nesce (**) 1												0.0000
Sicken Min	Unpaved											
Part												
Company Comp												
Cultivated Company C												0.0000
												0.0000
Slope, If If												
17, hr	Velocity⁴, ft/sec											
Short Grass Pasture	Γ _t , hr											0.0000
August A	•	re										
Siops, fift			449	512								
1,	Slope, ft/ft											
Noodland	Velocity⁴, ft/sec		1.3824	1.0383								
Length, ft Slope, ft/ft Slope,	Γ _t , hr		0.090	0.137								0.2272
Slope, ft/ft	Woodland											
Action A	Length, ft											
1,	Slope, ft/ft											
### CHANNEL FLOW **Naterways & Swamps, No Channels												
Waterways & Swamps, No Channels					0.339	0.061		0.069				0.4680
Length, ft Slope, ft/ft Slope,		nns No Ch	nannels									
Siope, ft/ft Siop		iipo, ito oi										
// In the first of	Slope, ft/ft											
Crassed Waterways/Roadside Ditches	Velocity ⁶ , ft/sec											
Length, ft Slope, ft/ft Slope,	$\Gamma_{t,}^{3}$ hr											0.0000
Siope, ft/ft Small Tributary & Swamp w/Channels Siope, ft/ft	Grassed Waterway	s/Roadsid	e Ditches									
//elocity*, ft/sec ft, hr Small Tributary & Swamp w/Channels	Length, ft											
Fig. No.	Slope, ft/ft											
Small Tributary & Swamp w/Channels												
Slope, ft/ft												0.0000
Slope, ft/ft		wamp w/C	nannels				2212		744			
// velocity ⁸ , ft/sec 3.697 4.304 0.2947												
Ti, hr												
Large Tributary Length, ft Slope, ft/ft //elocitys, ft/sec Ti, hr Culvert Diameter, ft Area, ft² Netted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. //elocitys, ft/sec Length, L, ft Ti, hr HR 1.271												0 2947
Length, ft Slope, ft/ft (/elocity ⁶ , ft/sec Γ ₁ , hr 0.0000 Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. (/elocity ¹¹ , ft/sec Length, L, ft Γ ₁ , hr HR 1.271							0.270		0.040			U.2041
Slope, ft/ft //elocity ⁸ , ft/sec r, hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Vanning's No. //elocity ¹¹ , ft/sec Length, L, ft r, hr HR 1.271												
//elocity ⁸ , ft/sec	Slope, ft/ft											
Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft Fi, hr HR 1.271	Velocity ⁸ , ft/sec											
Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft F ₁ , hr HR 1.271	Γ _t , hr											0.0000
Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. /elocity ¹¹ , ft/sec .ength, L, ft Ti, hr HR 1.271	Culvert											
Vetted Perimeter, ft dydraulic Radius, R, ft Slope, ft/ft Manning's No. /elocity ¹¹ , ft/sec ength, L, ft j, hr HR 1.271												
Hydraulic Radius, R, ft Slope, ft/ft Manning's No. /elocity ¹¹ , ft/sec .ength, L, ft												
Slope, ft/ft Manning's No. /elocity ¹¹ , ft/sec .ength, L, ft r, hr HR 1.271												
Manning's No. /elocity ¹¹ , ft/sec .ength, L, ft [r, hr	•											
/elocity ¹¹ , ft/sec .ength, L, ft r _s , hr	•											
Length, L, ft [1, hr												
1, hr 0.0000 HR 1.271												
HR 1.271												0.0000
	•		I.		1	<u> </u>		<u> </u>	<u> </u>		IHR	
											II .	

Subcatchment: 75 - POST	PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Sept	Subcatchment:		ST									101
Sept	Time of Concenti	ration De	terminat	ion Wor	ksheet,	SCS Me	thods					
Manning's No. 0,240								Seg 7	Seg 8	Seg 9	Seg 10	
A					1				1			
72. in												
Signer, No.												
September Sept												
### SHALLOW CONCENTRATED FLOW Paved												0.2800
Paved Soros, thit			FLOW									0.2009
Slope, If Iff	Length, ft											
Dispayed	Slope, ft/ft											
Unpayed	Velocity ² , ft/sec											
.ength, ft Slope, fth Velocity*, 1/8 ver (**) **Ti** **Ti*												0.0000
Sicpe, Infr	Unpaved							_			_	
Velocity	Length, ft											
Country Coun	Slope, ft/ft											
Cultivated ength, it is is in the content of the co												0.0000
Langth, ft Slope, ft/ft Velocity*, ft/sec T\$\times\$ not Grass Pasture Length, ft Length,												0.0000
Slope, NR												
12	Velocity ⁴ , ft/sec											
Short Grass Pasture	T _t , hr											0.0000
Add		re										
Slope, fift	Length, ft		449	512								
No No No No No No No No	Slope, ft/ft		0.039	0.022								
Moodland	Velocity⁴, ft/sec		1.3824	1.0383								
Sicipe, ft/ft	Tt, hr		0.090	0.137								0.2272
Sicepe, fift	Woodland											
\text{Velocity}^2, ft/sec	Length, ft											
1, hr												
### CHANNEL FLOW Waterways & Swamps, No Channels												
Waterways & Swamps, No Channels					0.339	0.061		0.069				0.4680
Length, ft Slope, ft/ft Velocity', ft/sec Ti, hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity', ft/sec Ti, hr Siope, ft/ft Velocity', ft/sec Ti, hr Culvert Diameter, ft Avea, ft? Veted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Welocity', ft/sec Length, ft Slope, ft/ft Velocity', ft/sec Length, ft Ti, hr Ti O.0000 HR 1.271		nns No Cl	nannols									
Slope, ft/ft Slope, ft/ft/ft Slope, ft/ft/ft Slope, ft/ft/ft Slope, ft/ft/ft Slope, ft/ft/ft Slop		iips, ito oi	laillieis									
Grassed Waterways/Roadside Ditches	Velocity ⁶ , ft/sec											
Length, ft Slope, ft/ft Slope,	T _t , hr											0.0000
Slope, ft/ft Swamp w/Channels Siope, ft/ft Slope, ft/ft	Grassed Waterway	s/Roadsid	e Ditches							'		
Velocity ⁷ , ft/sec	Length, ft											
T ₁ , hr	Slope, ft/ft											
Small Tributary & Swamp w/Channels 3312 711												
Length, ft												0.0000
Slope, ft/ft 0.031 0.042 0.045 0.2947		swamp w/0	Channels				00:-					
Velocity ⁸ , ft/sec T ₁ , hr 3.697 0.249 0.046 0.2947 Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹ , ft/sec Length, L, ft T ₁ , hr HR 1.271												
T ₁ , hr												
Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 1.271												0.2047
Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 1.271							5.∠+3		0.040			0.2071
Slope, ft/ft Velocity®, ft/sec Tr, hr												
Velocity ⁸ , ft/sec 0.0000 Culvert 0.0000 Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Hx Manning's No. Velocity¹¹¹, ft/sec Length, L, ft 0.0000 T₁, hr HR 1.271	Slope, ft/ft											
Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 1.271	Velocity ⁸ , ft/sec											
Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft T ₁ , hr HR 1.271	T _t , hr											0.0000
Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft Ti, hr HR 1.271	Culvert											
Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 1.271	Diameter, ft											
-Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft Ti, hr HR 1.271	Area, ft ²											
Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 1.271	Wetted Perimeter, ft											
Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr	Hydraulic Radius, R, ft											
Velociy ¹¹ , ft/sec Length, L, ft Τ _b hr HR 1.271	•											
Length, L, ft Γ ₁ , hr HR 1.271												
Π _τ hr 0.0000 HR 1.271												
HR 1.271												0.0000
	•										lhr	
											II .	

Subcathment Ss - Pre	PROJECT:	Cordelio								Calculat Date:	-	RLD 8/8/24
Sept	TRC Proj. No.: Subcatchment:	435979 8S - Pre										PGT
SHEET FLOW Meaning's NO. 1.00 1.2 in 1.00 1.2 in 2.30 Short, Miles Control of the Control o			terminat	ion Wor	ksheet :	SCS Me	thods			. 10 71300		
Mannings No. 0.240								Seg 7	Seg 8	Seg 9	Seg 10	
Largish	SHEET FLOW											
22 in 2.39	Manning's No.											
Slope, RM												
SALLOW CONCENTRATED FLOW												
### Shall DW CONCENTRATED FLOW												0.2045
Paved			FLOW									0.2045
Length, ft Slope, bit Valocidy*, fixes Ti*, fr Slope, bit Valocidy*, fixes Length, fi Slope, fit Valocidy*,												
Stope, thin Workcolly*, Work Wo												
17, m	Slope, ft/ft											
Unpaved	Velocity ² , ft/sec											
Length, ft Slope, thit Velocity', 1/ Neve T', 1/ hr Cultivated Length, ft Slope, thit Velocity', 1/ See T', 1/ hr Slope, thit Velocity', 1/ See T', 1/ hr O,0000 Short Grass Pasture Length, ft Slope, thit O,021 Velocity', 1/ Neve T', 1/ hr O,0000 CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, thit Velocity', 1/ Neve T', 1/ hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, thit Velocity', 1/ Neve T', 1/ hr O,0000 Grassed Waterways/Roadside Ditches Length, ft Slope, thit O,032 O,065 Slope, thit Velocity', 1/ See Length, ft Slope, thit O,032 O,065 Slope, thit Velocity', 1/ See Length, ft Slope, thit O,0000 Large Tributary Length, ft Slope, thit Velocity', 1/ Neve T', hr O,0000 Culvert Dolumente, ft Avea, ft' Hydraulic Radius, R, ft Slope, thit Welsted Perinder, ft Hydraulic Radius, R, ft Slope, 1/ New Welsted Perinder, ft Hydraulic Radius, R, ft Slope, 1/ New Length, ft Hydraulic Radius, R, ft Slope, 1/ New Length, ft New Length, ft Hydraulic Radius, R, ft Slope, 1/ New Length, ft New Length, ft Hydraulic Radius, R, ft Slope, 1/ New Length, ft New Length, ft Hydraulic Radius, R, ft Slope, 1/ New Length, ft New Length, ft Hydraulic Radius, R, ft Slope, 1/ New Length, ft Hydraulic Radius, R, ft Slope, 1/ New Length, ft Hydraulic Radius, R, ft Slope, 1/ New Length, ft Hydraulic Radius, R, ft Slope, 1/ New Length, ft Hydraulic Radius, R, ft Slope, 1/ New Length, ft Hydraulic Radius, R, ft Slope, 1/ New Length, ft Hydraulic Radius, R, ft Slope, 1/ New Length, ft Hydraulic Radius, R, ft Slope, 1/ New Length, ft Hydraulic Radius, R, ft Slope, 1/ New Length, ft Hydraulic Radius, R, ft Slope, 1/ New Length, ft Hydraulic Radius, R, ft Slope, 1/ New Length, ft Length												0.0000
Slope, Inft			1		ı			ı	1		1	
Velocity New Velo												
Ti, hr												
Cultivated Lunghi, ft Slope, fth O.0000 Short Grass Pasture Lunghi, ft Slope, fth O.021 Velocity*, ftsec 1, 10144 Tr, fth O.021 Velocity*, ftsec 1, 10144 Tr, fth O.0000 Slope, fth O.0000 Slope, fth O.0000 Slope, fth Slope, fth Slope Slope, fth Slope, fth Slope Slope, fth Slope, fth Slope Slop												0.0000
Length, ft Stope, ft ff tributary & Swamp wiChannels												0.0000
Slope, Int Wester												
Velocity', these	Slope, ft/ft											
Short Grass Pasture	Velocity ⁴ , ft/sec											
Length, ft Sispe, ft/ft Velocity', ft/sec 1,0144 17, hr 0,000 Woodland Length, ft Sispe, ft/ft Velocity', ft/sec 1, hr Veloci	T _t , hr											0.0000
Slope, ft/ft	Short Grass Pastu	re										
Velocity filsec	Length, ft		364									
T, hr	Slope, ft/ft											
Woodland Length, ft Slope, ft/ft Waterways & Swamps, No Channels Length, ft Slope, ft/ft Waterways & Swamps, No Channels Length, ft Slope, ft/ft Waterways & Swamps, No Channels Length, ft Slope, ft/ft Waterways & Swamps, No Channels Waterways/Roadside Ditches Waterways/Roadsi												
Length, ft Slope, ft/ft Velocity ² , ft/sec T ₁ ² hr O.0000 O			0.100									0.0997
Slope, ft/ft Slop												
Velocity ² , ft/sec T ₁ ² hr D. D. D. D. D. D. D. D												
Ti, hr 0.0000 CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity, ft/sec Ti, hr 0.032 0.065 Velocity, ft/sec Ti, hr 0.032 0.083 Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity, ft/sec Ti, hr 0.0000 Carsed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity, ft/sec Ti, hr 0.0000 Carsed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity, ft/sec Ti, hr 0.0000 Carsed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity, ft/sec Ti, hr 0.0000 Culvert Diameter, ft Area, ft Area, ft Area, ft Area, ft Area, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹ , ft/sec Length, L, ft Ti, hr 0.0000 HR 0.492												
### CHANNEL FLOW Waterways & Swamps, No Channels												0.0000
Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T- ⁶ , hr 0.0000	CHANNEL FLOW											
Slope, ft/ft Slop	Waterways & Swan	nps, No Cl	nannels									
Velocity ⁸ , ft/sec T ₁ ⁸ , tr	Length, ft											
Company												
Comparison Com												0.0000
Length, ft 1017 1137		o/Doodoid	o Ditoboo									0.0000
Slope, ft/ft		s/Roausiu	e Ditches		1127							
Velocity ⁷ , ft/sec												
Tr. hr	Velocity ⁷ , ft/sec											
Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.0000	T _t , hr											0.1879
Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.0000	Small Tributary & S	Swamp w/C	Channels									
Velocity ⁸ , ft/sec 0.0000 Large Tributary 0.0000 Length, ft Slope, ft/ft Velocity ⁸ , ft/sec 0.0000 T _v , hr 0.0000 Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft Length, L, ft 0.0000 HR 0.492	Length, ft											
T _t , hr	Slope, ft/ft											
Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.492												
Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.492												0.0000
Slope, ft/ft Velocity®, ft/sec T ₁ , hr												
Velocity ⁸ , ft/sec 0.0000 Culvert 0.0000 Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft 0.0000 T ₁ , hr HR 0.492												
Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft T _i , hr HR 0.492												
Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft T _b , hr HR 0.492	T _t , hr											0.0000
Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft T _i , hr HR 0.492	Culvert											
Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.492	Diameter, ft											
Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.492	Area, ft²											
Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.492	Wetted Perimeter, ft											
Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.492	Hydraulic Radius, R, ft											
Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.492	Slope, ft/ft											
Length, L, ft T _i , hr HR												
T _t , hr 0.0000 HR 0.492												
HR 0.492												0,0000
	-0				<u> </u>			<u> </u>			HP	
											II .	

Subcatchment: 8 Time of Concentrat SHEET FLOW Manning's No. Length, ft P2, in Slope, ft/ft T,¹, hr SHALLOW CONCENT Paved Length, ft Slope, ft/ft Velocity², ft/sec T,³, hr Cultivated Length, ft Slope, ft/ft Velocity², ft/sec T,³, hr Cultivated Length, ft Slope, ft/ft Velocity², ft/sec T,³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T,³, hr Woodland Length, ft Slope, ft/ft Velocity⁵, ft/sec	0.240 100 2.39 0.042 0.205	terminati Seg 2	seg 3	ksheet, Seg 4	SCS Me	thods Seg 6	Seg 7	Seg 8	Checked Revised Seg 9		0.2045 0.0000
SHEET FLOW Manning's No. Length, ft P2, in Slope, ft/ft T ₁ , hr SHALLOW CONCENT Paved Length, ft Slope, ft/ft Velocity ² , ft/sec T ₁ , hr Unpaved Length, ft Slope, ft/ft Velocity ² , ft/sec T ₁ , hr Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec	0.240 100 2.39 0.042 0.205	Seg 2					Seg 7	Seg 8	Seg 9	Seg 10	
SHEET FLOW Manning's No. Length, ft P2 , in Slope, ft/ft T,' , hr SHALLOW CONCENT Paved Length, ft Slope, ft/ft Velocity', ft/sec T,' , hr Cultivated Length, ft Slope, ft/ft Velocity', ft/sec T,' , hr Cultivated Length, ft Slope, ft/ft Velocity', ft/sec T,' , hr Shope, ft/ft Velocity', ft/sec T,' , hr Shope, ft/ft Velocity', ft/sec T,' , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity', ft/sec T,' , hr Woodland Length, ft Slope, ft/ft Velocity', ft/sec	0.240 100 2.39 0.042 0.205	Seg 2					Seg 7	Seg 8	Seg 9	Seg 10	
Manning's No. Length, ft P2, in Slope, fl/ft Tt, hr SHALLOW CONCENT Paved Length, ft Slope, fl/ft Velocity ² , fl/sec Tt, hr Cultivated Length, ft Slope, fl/ft Velocity ⁴ , fl/sec Tt, hr Cultivated Length, ft Slope, fl/ft Velocity ⁴ , fl/sec Tt, hr Cultivated Length, ft Slope, fl/ft Velocity ⁴ , fl/sec Tt, hr Short Grass Pasture Length, ft Slope, fl/ft Velocity ⁴ , fl/sec Tt, hr Woodland Length, ft Slope, fl/ft Velocity ⁵ , fl/sec	100 2.39 0.042 0.205	FLOW									
Length, ft P2 , in Slope, ft/ft T, ¹ , hr SHALLOW CONCENT Paved Length, ft Slope, ft/ft Velocity ² , ft/sec T, ³ , hr Unpaved Length, ft Slope, ft/ft Velocity ² , ft/sec T, ³ , hr Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T, ⁵ , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T, ⁵ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec	100 2.39 0.042 0.205	FLOW									
P2 , in Slope, ft/ft T,* hr SHALLOW CONCENT Paved Length, ft Slope, ft/ft Velocity*, ft/sec T,* hr Unpaved Length, ft Slope, ft/ft Velocity*, ft/sec T,* hr Cultivated Length, ft Slope, ft/ft Velocity*, ft/sec T,* hr Cultivated Length, ft Slope, ft/ft Velocity*, ft/sec T,* hr Short Grass Pasture Length, ft Slope, ft/ft Velocity*, ft/sec T,* hr Woodland Length, ft Slope, ft/ft Velocity*, ft/sec	2.39 0.042 0.205	FLOW									
Slope, ft/ft Tt ¹ , hr SHALLOW CONCENT Paved Length, ft Slope, ft/ft Velocity², ft/sec Tt³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec Tt³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec Tt³, hr Welocity⁴, ft/sec Tt³, hr Welocity⁴, ft/sec Tt³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec Tt³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec	0.042 0.205	FLOW									
T _t ¹ , hr SHALLOW CONCENT Paved Length, ft Slope, ft/ft Velocity ² , ft/sec T _t ² , hr Unpaved Length, ft Slope, ft/ft Velocity ² , ft/sec T _t ³ , hr Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T _t ³ , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T _t ³ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec	0.205	FLOW									
SHALLOW CONCENT Paved Length, ft Slope, ft/ft Velocity², ft/sec Tt³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec Tt³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec Tt³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec Tt³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec Tt³, hr Woodland Length, ft Slope, ft/ft Velocity⁵, ft/sec		FLOW									
Paved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec	RATED	FLOW									0.0000
Length, ft Slope, ft/ft Velocity², ft/sec Tt³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec Tt³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec Tt³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec Tt³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec											0.0000
Slope, ft/ft Velocity², ft/sec Tt³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec Tt³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec Tt³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec Tt³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec											0.0000
Velocity², ft/sec T₁³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec											0.0000
T,³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T,³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T,³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T,³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec											0.0000
Unpaved Length, ft Slope, ft/ft Velocity ² , ft/sec T ₁ , shr Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ , shr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ , shr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec											0.0000
Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec											
Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec											
Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec											
T ₁ *, hr Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ *, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ *, hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec											
Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ ³ , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ ³ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec											0.0000
Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ ³ , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ ³ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec											0.0000
Slope, ft/ft Velocity ⁴ , ft/sec T ₁ ³ , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ ³ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec											
Velocity ⁴ , ft/sec T _i ³ , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T _i ³ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec											
T _i *, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity*, ft/sec T _i *, hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec											
Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T _i ³ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec											0.0000
Length, ft Slope, ft/ft Velocity ³ , ft/sec T ₁ ³ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec											3.3000
Slope, ft/ft Velocity ⁴ , ft/sec T _t ³ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec		364									
Velocity ⁴ , ft/sec T _t ³ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec		0.021									
Tr³, hr Woodland Length, ft Slope, ft/ft Velocity⁵, ft/sec		1.0144									
Length, ft Slope, ft/ft Velocity ⁵ , ft/sec		0.100									0.0997
Length, ft Slope, ft/ft Velocity ⁵ , ft/sec											
Slope, ft/ft Velocity ⁵ , ft/sec T ₁ ³ , hr											
T _t , hr											
											0.0000
CHANNEL FLOW											
Waterways & Swamps	s, No Ch	nannels									
Length, ft											
Slope, ft/ft											
Velocity ⁶ , ft/sec											
T _t , hr											0.0000
Grassed Waterways/R	Roadsid	e Ditches									
Length, ft			1017	1137							
Slope, ft/ft			0.032	0.065							
Velocity ⁷ , ft/sec T _t , hr			2.683	3.824							0.4070
		\h = = l =	0.105	0.083							0.1879
Small Tributary & Swa	amp w/C	iianneis									
Length, ft Slope, ft/ft											
Slope, π/π Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Large Tributary											3.3000
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Culvert											
Diameter, ft											
Area, ft ²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
Velocity ¹¹ , ft/sec											
Length, L, ft											
T _t , hr											0.0000
										HR	0.492
										Min	29.52

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	d By:	RLD 8/8/24 PGT
Subcatchment:	9S - Pre				20011				Revised	:	
Time of Concentr											
SHEET FLOW	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
Manning's No.	0.240									1	
Length, ft	100										
P2, in	2.39										
Slope, ft/ft	0.001										
T _t 1 hr	0.912										0.9122
SHALLOW CONCE		FLOW									0.0122
Paved											
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Unpaved											
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Cultivated											
Length, ft											
Slope, ft/ft											
Velocity ⁴ , ft/sec											
T _t , hr											0.0000
Short Grass Pasture	е										
Length, ft											
Slope, ft/ft Velocity ⁴ , ft/sec											
T _t , hr											0.0000
											0.0000
Woodland		540									
Length, ft Slope, ft/ft		540 0.010									
Velocity ⁵ , ft/sec		0.5000									
T _t , hr		0.300									0.3000
CHANNEL FLOW											
Waterways & Swam	ps, No Cl	hannels									
Length, ft											
Slope, ft/ft											
Velocity ⁶ , ft/sec											
T _t , hr											0.0000
Grassed Waterways	/Roadsid	le Ditches									
Length, ft											
Slope, ft/ft											
Velocity ⁷ , ft/sec											
T _t , hr											0.0000
Small Tributary & S	wamp w/0	nannels									
Length, ft											
Slope, ft/ft Velocity ⁸ , ft/sec											
T _t , hr											0.0000
											0.0000
Large Tributary Length, ft			572								
Slope, ft/ft			0.001								
Velocity ⁸ , ft/sec			1.107								
T _t , hr			0.144								0.1436
Culvert											
Diameter, ft											
Area, ft ²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
Velocity ¹¹ , ft/sec											
Length, L, ft											
T _t , hr											0.0000
·										HR	1.356
										Min	81.34
										Į-	

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Subcatchment:	9S - POS	ST							Revised		101
Time of Concent	ration De	terminat	ion Worl	ksheet,	SCS Me	thods					
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
SHEET FLOW											
Manning's No.	0.240										
Length, ft	100										
P2, in	2.39										
Slope, ft/ft	0.001										
T _t , hr	0.912	EL OW									0.9122
SHALLOW CONCE	NIRAIED	FLOW									
Paved										<u> </u>	
Length, ft Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Unpaved											0.0000
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Cultivated											
Length, ft											
Slope, ft/ft											
Velocity ⁴ , ft/sec											
Tt, hr											0.0000
Short Grass Pastu	re										
Length, ft											
Slope, ft/ft											
Velocity ⁴ , ft/sec											
Tt, hr											0.0000
Woodland											
Length, ft		540									
Slope, ft/ft		0.010									
Velocity ⁵ , ft/sec T _t , hr		0.5000									0.2000
CHANNEL FLOW		0.300									0.3000
Waterways & Swar	nne No Ch	nannole									
Length, ft	lips, No Ci	laillieis									
Slope, ft/ft											
Velocity ⁶ , ft/sec											
T _t , hr											0.0000
Grassed Waterway	/s/Roadsid	e Ditches					ı				
Length, ft											
Slope, ft/ft											
Velocity ⁷ , ft/sec											
T _t , hr											0.0000
Small Tributary & S	Swamp w/C	Channels									
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec T _t , hr											0.0000
											0.0000
Large Tributary Length, ft			572								
Slope, ft/ft			0.001								
Velocity ⁸ , ft/sec			1.107								
T _t , hr			0.144								0.1436
Culvert											
Diameter, ft											
Area, ft ²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
Velocity ¹¹ , ft/sec											
Length, L, ft											_
T _t , hr										Ü	0.0000
											4.050
										HR Min	1.356

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Subcatchment:	10S - Pre	9							Revised		101
Time of Concentr	ation De	terminat	ion Wor	ksheet,	SCS Me	thods					
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
SHEET FLOW				1							
Manning's No.	0.240										
Length, ft P2,in	100 2.39										
P2 , In Slope, ft/ft	0.001										
T _t , hr	0.912										0.9122
SHALLOW CONCE		FLOW									****
Paved											
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Unpaved											
Length, ft Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Cultivated											
Length, ft											
Slope, ft/ft											
Velocity ⁴ , ft/sec											
T _t , hr											0.0000
Short Grass Pastur	е										
_ength, ft		388		165							
Slope, ft/ft Velocity ⁴ , ft/sec		0.003 0.3834		0.012 0.7668							
T _t , hr		0.3034		0.060							0.3409
Woodland		0.20		0.000							
Length, ft			33								
Slope, ft/ft			0.061								
Velocity ⁵ , ft/sec			1.2349								
T _t , hr			0.007								0.0074
CHANNEL FLOW	na Na Ch										
Waterways & Swam Length, ft	ips, No Ci	lailleis									
Slope, ft/ft											
Velocity ⁶ , ft/sec											
T _t , hr											0.0000
Grassed Waterways	s/Roadsid	e Ditches									
Length, ft											
Slope, ft/ft											
Velocity ⁷ , ft/sec											
T _t , hr		`hannala									0.0000
Small Tributary & S Length, ft	waifip W/C	manneis			310	920	295				
Slope, ft/ft					0.006	0.008	0.026				
Velocity ⁸ , ft/sec					1.627	1.878	3.386				
T _t , hr					0.053	0.136	0.024				0.2132
Large Tributary											
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec T _t , hr											0.0000
ւ _ն ու Culvert											0.0000
Culvert Diameter, ft											
Diameter, it Area, ft²											
Netted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
Velocity ¹¹ , ft/sec											
Length, L, ft											
「 _t , hr										U	0.0000
										HR	1.474
										Min	

Subcatchment: 105 - POST	PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Sept	Subcatchment:		ST									101
SHEET FLOW	Time of Concenti	ration De	terminat	ion Wor	ksheet,	SCS Me	thods					
Maning's No.								Seg 7	Seg 8	Seg 9	Seg 10	
A												
2.3												
Signet Mile												
### 0.012 0.9122 0.9122 ### PANALLOW CONCENTRATED FLOW ### PANALOW CONCENTRATED FLOW CONCENTRA												
### DATE OF TRAINING TO THE PROPERTY OF THE PR												0.0122
Passed			FLOW									0.9122
Longste, Rill Microsoft, Flaseo (1) Impaved Microsoft, Flaseo (2) Longsted Microsoft, Flaseo (3) Longsted Microsoft, Flaseo (4) Reso (5) Reso (5) Reso (6) Reso (7) Reso (8) Longsted Microsoft, Flaseo (9) Longsted Microsoft, Flaseo (1) Reso (1) Res												
Sices Intheriodicy Fire												
Dispayed	Slope, ft/ft											
Unpaved	Velocity ² , ft/sec											
.ength, ft Noticoticy ² , Notice (**) **The **Th												0.0000
Sicken Min	Unpaved										_	
Part	Length, ft											
Cultivated Cul												
Cultivated angth, it copy, this c												0.0000
												0.0000
Slope, If If												
1,	Velocity ⁴ , ft/sec											
Short Grass Pasture	T _t , hr											0.0000
Angels		re										
Siops, fift			388		165							
No	Slope, ft/ft		0.003		0.012							
Noodland	Velocity ⁴ , ft/sec		0.3834		0.7668							
Length, ft 33 0.061 0.061 0.0074 0.007	T _t , hr		0.281		0.060							0.3409
Slope, ft/ft	Woodland											
	Length, ft											
1,												
### CHANNEL FLOW **Naterways & Swamps, No Channels												0.0074
Waterways & Swamps, No Channels				0.007								0.0074
Length, ft Slope, ft/ft Slope,		nne No Ch	nannole									
Siope, ft/ft Siop		iips, ito oi	laillieis									
// In the control of												
Crassed Waterways/Roadside Ditches	Velocity ⁶ , ft/sec											
Length, ft Slope, ft/ft Slope,	T _t , hr											0.0000
Siope, ft/ft Small Tributary & Swamp w/Channels Siope, ft/ft	Grassed Waterway	s/Roadsid	e Ditches							'		
//elocity ⁷ , ft/sec fi, hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft 0.006 0.008 0.026 All Colority ⁸ , ft/sec 1.627 1.878 3.386 Fi, hr Diameter, ft Colority ⁸ , ft/sec 0.0000 Culvert Culvert Colority ⁸ , ft/sec Colority ⁸ ,	Length, ft											
Tight Tibutary & Swamp w/Channels	Slope, ft/ft											
Small Tributary & Swamp w/Channels 310 920 295												
Slope, ft/ft												0.0000
Slope, ft/ft		swamp w/C	Channels				855	0.5-				
// Indexity												
Tip												
Large Tributary Length, ft Slope, ft/ft //elocitys, ft/sec Ti, hr Culvert Diameter, ft Area, ft² Netted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. //elocitys, ft/sec Length, L, ft Ti, hr HR 1.474												0 2132
Length, ft Slope, ft/ft (/elocityst), ft/sec (I ₁ , hr						3.000	5.150	J.027				0.2102
Slope, ft/ft	Length, ft											
//elocity ⁸ , ft/sec	Slope, ft/ft											
Culvert 0.0000 Culvert 0.0000 Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Hydraulic Radius, R, ft HR Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft 0.0000 In, hr IHR 1.474	Velocity ⁸ , ft/sec											
Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft F ₁ , hr HR 1.474	Γ _t , hr											0.0000
Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft Fi, hr HR 1.474	Culvert											
Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. /elocity ¹¹ , ft/sec ength, L, ft r, hr HR 1.474	Diameter, ft											
Hydraulic Radius, R, ft Slope, ft/ft Manning's No. /elocity ¹¹ , ft/sec .ength, L, ft r, hr HR 1.474												
Slope, ft/ft Manning's No. /elocity ¹¹ , ft/sec .ength, L, ft r, hr HR 1.474												
Manning's No. /elocity ¹¹ , ft/sec .ength, L, ft f _r , hr HR 1.474	•											
/elocity ¹¹ , ft/sec _ength, L, ft r _s , hr												
Length, L, ft F _L , hr HR 1.474												
1, hr 0.0000 HR 1.474												
HR 1.474												0.0000
					<u> </u>		IHR					
											II .	

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checker	-	RLD 8/8/24 PGT
Subcatchment:	11S - Pre	9							Revised		101
Time of Concent	ration De	terminat	ion Wor	ksheet,	SCS Me	thods					
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
SHEET FLOW		1		1			1	1			
Manning's No.	0.240										
Length, ft	100										
P2 , in	2.39										
Slope, ft/ft T _t ¹, hr	0.012 0.338										0.3376
SHALLOW CONCE		FLOW									0.5570
Paved											
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Unpaved		I .		I .			I .	I .			
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec T _t ³ , hr											0.0000
Cultivated											0.0000
Length, ft											
Slope, ft/ft											
Velocity ⁴ , ft/sec											
T _t ³ , hr											0.0000
Short Grass Pastu	re										
Length, ft		521	418								
Slope, ft/ft		0.011	0.008								
Velocity ⁴ , ft/sec		0.7342	0.6261								
T _t , hr		0.197	0.185								0.3826
Woodland											
Length, ft											
Slope, ft/ft Velocity ⁵ , ft/sec											
T _t , hr											0.0000
CHANNEL FLOW											0.0000
Waterways & Swar	nps, No Cł	nannels									
Length, ft											
Slope, ft/ft											
Velocity ⁶ , ft/sec											
T _t , hr											0.0000
Grassed Waterway	s/Roadsid	e Ditches	:	I		T	I	I			
Length, ft Slope, ft/ft											
Velocity ⁷ , ft/sec											
T _t , hr											0.0000
Small Tributary & S	Swamp w/C	hannels									2.3000
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Large Tributary											
Length, ft											
Slope, ft/ft Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Culvert											0.0000
Diameter, ft											
Area, ft ²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
Velocity ¹¹ , ft/sec											
Length, L, ft											0.5
T _t , hr										lius	0.0000
										HR	0.720
										Min	43.21

PROJECT: TRC Proj. No.:	Cordelio Flat Cre 435979	ek Solar							Calculat Date: Checked	d By:	RLD 8/8/24 PGT
Subcatchment:	11S - PC								Revised	:	
Time of Concentra											
CHEET ELOW	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
SHEET FLOW	0.040										
Manning's No. Length, ft	0.240 100										
P2, in	2.39										
Slope, ft/ft	0.012										
T _t , hr	0.338										0.3376
SHALLOW CONCEN	TRATED	FLOW									
Paved											
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											0.0000
T _t , hr											0.0000
Unpaved	<u> </u>										
Length, ft Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Cultivated											2.3000
Length, ft											
Slope, ft/ft											
Velocity ⁴ , ft/sec											
T _t ³, hr											0.0000
Short Grass Pasture	9										
Length, ft		521	418								
Slope, ft/ft		0.011	0.008								
Velocity ⁴ , ft/sec		0.7342	0.6261								
T _t , hr		0.197	0.185								0.3826
Woodland	T.										
Length, ft											
Slope, ft/ft Velocity ⁵ , ft/sec											
T _t ³ hr											0.0000
CHANNEL FLOW											0.0000
Waterways & Swam	ps, No Cl	hannels									
Length, ft											
Slope, ft/ft											
Velocity ⁶ , ft/sec											
T _t , hr											0.0000
Grassed Waterways	/Roadsid	le Ditches		ı			_	ı		1	
Length, ft											
Slope, ft/ft											
Velocity ⁷ , ft/sec T _t , hr											0.0000
Small Tributary & Sv	wamp w//	Channolo									0.0000
Length, ft	ranip w/C	J.Iaiiiiei5									
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Large Tributary											
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Culvert											
Diameter, ft											
Area, ft ² Wetted Perimeter, ft											
Wetted Perimeter, ft Hydraulic Radius, R, ft											
Hydraulic Radius, R, π Slope, ft/ft											
Manning's No.											
Velocity ¹¹ , ft/sec											
Length, L, ft											
T _t , hr											0.0000
										HR	0.720
										Min	43.21
										<u> </u>	TV.E (

Subcatchment 125 - Pre	PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Sept	Subcatchment:	12S - Pre										
SHEET FLOW	Time of Concenti											
Manning's No.	CHEET ELOW	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
A		0.800										
2, sn												
STALLOW CONCENTRATED FLOW	P2, in											
### SHALLOW CONCENTRATED FLOW Paved	Slope, ft/ft	0.047										
Pave	T _t , hr											0.5123
		NTRATED	FLOW									
Slope, If If Welcholy*, New County Count									I	T.	1	
Dispayed												
Unpaved												0.0000
.ength, ft Slope, ftff Velocity*, Velocit Velocity*, Velocit Velocity*, Velocit Velocity*, Velocity												
Sicpe, Infr	Length, ft											
Country Coun	Slope, ft/ft											
Cultivated	Velocity ² , ft/sec											
.angth, ft Slope, ft/ft Velocity*, ft/sec 7; Nort Grass Pasture .ength, ft Slope, ft/ft O007 Velocity*, ft/stee 0.0007 Velocity*, ft/stee 0.0000 Velocity*, ft/stee 0.00000 Velocity*, ft/stee 0.0000 Ve	T _t , hr											0.0000
Slope, NR	Cultivated											
	Length, ft											
1687 1688 1688												
Short Grass Pasture												0.0000
.ength, ft Slope, fift		~										0.0000
Slope, fift				1687								
Velocity , fifsec 0.5857 0.800 0.8001												
Woodland	Velocity ⁴ , ft/sec											
Sicipe, ft/ft	T _t , hr			0.800								0.8001
Slope, fift	Woodland											
Velocity ² , ft/sec 0.3873 0.431 0.4310	Length, ft											
1, hr	Slope, ft/ft											
CHANNEL FLOW Waterways & Swamps, No Channelsength, ft Slope, fift //elocity ² , fisecit, hr Sope, fift //elocity ² , fisecit, hr Sope, fift //elocity ² , fisecit, hr Could be summed to see the s												0.4040
Waterways & Swamps, No Channels			0.431									0.4310
Length, ft Slope, ft/ft Velocity', ft/sec Ti, hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity', ft/sec Ti, hr Culvert Diameter, ft Avea, ft? Veted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Welcotity', ft/sec Length, ft Slope, ft/ft Velocity', ft/sec Length, ft Ti, hr T		nps. No Ch	nannels									
Slope, ft/ft Slope, ft/ft/ft Slope, ft/ft/ft/ft/ft/ft/ft/ft/ft/ft/ft/ft/ft/f	Length, ft	, , , , , ,										
Company Comp	Slope, ft/ft											
Grassed Waterways/Roadside Ditches	Velocity ⁶ , ft/sec											
Length, ft Slope, ft/ft Velocity'', ft/sec T _i , hr												0.0000
Slope, ft/ft		s/Roadsid	e Ditches					ı	ı			
Velocity ⁷ , ft/sec Γ ₁ , hr Small Tributary & Swamp w/Channels												
T ₁ , hr												
Small Tributary & Swamp w/Channels												0.0000
Length, ft Slope, ft/ft Velocity ⁸ , ft/sec Tributary Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec Tri, hr O.0000 Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Welocity ¹ , ft/sec Length, L, ft Tr, hr O.0000 HR O.0000 HR O.0000		wamp w/C	Channels									3.3000
Slope, ft/ft Velocity®, ft/sec Velocity®	Length, ft											
T ₁ , hr	Slope, ft/ft											
Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 1.743	Velocity ⁸ , ft/sec											
Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 1.743	T _t , hr											0.0000
Slope, ft/ft Velocity®, ft/sec Tr, hr												
Velocity ⁸ , ft/sec Γ₁, hr 0.0000 Culvert Vetted Perimeter, ft Hydraulic Radius, R, ft HR Slope, ft/ft Velocity ¹¹ , ft/sec Length, L, ft 0.0000 HR 1.743												
Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 1.743												
Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft T _i , hr 0.0000 HR 1.743	T _t , hr											0.0000
Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft T ₁ , hr HR 1.743	Culvert											
Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft Ti, hr HR 1.743	Diameter, ft											
Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 1.743	Area, ft ²											
Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 1.743	Wetted Perimeter, ft											
Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr	Hydraulic Radius, R, ft											
Velocity ¹¹ , ft/sec Length, L, ft Τ _L hr HR 1.743	Slope, ft/ft											
Length, L, ft Γ ₁ , hr HR 1.743												
1, hr 0.0000 HR 1.743												
HR 1.743												0.0000
	w :										IHR	
											II .	

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Subcatchment:	12S - PC	_							Revised		
Time of Concent	ration De	terminat	ion Worl	ksheet, 🤅	SCS Me	thods					
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
SHEET FLOW											
Manning's No.	0.800										
Length, ft P2, in	100 2.39										
Slope, ft/ft	0.047										
T _t , hr	0.512										0.5123
SHALLOW CONCE		FLOW									
Paved											
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Unpaved				I	I		I	I			
Length, ft											
Slope, ft/ft Velocity ² , ft/sec											
T _t , hr											0.0000
Cultivated											0.0000
Length, ft											
Slope, ft/ft											
Velocity ⁴ , ft/sec											
T _t , hr											0.0000
Short Grass Pastu	re										
Length, ft			1687								
Slope, ft/ft			0.007								
Velocity ⁴ , ft/sec			0.5857								
T _t , hr			0.800								0.8001
Woodland											
Length, ft		601									
Slope, ft/ft Velocity ⁵ , ft/sec		0.006 0.3873									
T _t , hr		0.3673									0.4310
CHANNEL FLOW		0.101									0.1010
Waterways & Swar	nps, No Ch	nannels									
Length, ft											
Slope, ft/ft											
Velocity ⁶ , ft/sec											
Tt, hr											0.0000
Grassed Waterway	s/Roadsid	e Ditches					ı				
Length, ft											
Slope, ft/ft Velocity ⁷ , ft/sec											
T _t , hr											0.0000
Small Tributary & S	wamn w/C	hannole									0.0000
Length, ft	uiiip w/C										
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Large Tributary											
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Culvert											
Diameter, ft Area, ft ²											
Area, π⁻ Wetted Perimeter, ft											
wetted Perimeter, it Hydraulic Radius, R, ft											
Hydraulic Radius, R, π Slope, ft/ft											
Manning's No.											
Velocity ¹¹ , ft/sec											
Velocity ¹¹ , ft/sec Length, L, ft											
											0.0000
Length, L, ft										HR	0.0000 1.743

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Subcatchment:	13S - Pre	•							Revised		101
Time of Concentr	ration De	terminat	ion Worl	ksheet, :	SCS Me	thods					
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
SHEET FLOW											
Manning's No.	0.240										
Length, ft	100										
P2 , in Slope, ft/ft	2.39 0.023										
Siope, ivit T _t , hr	0.023										0.2602
SHALLOW CONCE		FLOW									0.2002
Paved											
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Unpaved							I .	I .			
_ength, ft											
Slope, ft/ft Velocity ² , ft/sec											
velocity , it/sec T _t , hr											0.0000
Cultivated											0.0000
_ength, ft											
Slope, ft/ft											
Velocity ⁴ , ft/sec											
T _t , hr											0.0000
Short Grass Pastur	re										
_ength, ft		1838									
Slope, ft/ft		0.008									
Velocity ⁴ , ft/sec		0.6261									
Γ ³ , hr		0.815									0.8155
Woodland											
Length, ft			418								
Slope, ft/ft Velocity ⁵ , ft/sec			0.005								
T _t , hr			0.3536 0.328								0.3284
CHANNEL FLOW			0.320								0.3204
Waterways & Swan	nps. No Ch	nannels									
Length, ft											
Slope, ft/ft											
Velocity ⁶ , ft/sec											
T _t , hr											0.0000
Grassed Waterway	s/Roadsid	e Ditches									
Length, ft											
Slope, ft/ft											
Velocity ⁷ , ft/sec T _t , hr											0.0000
	twomp w/C	hannala									0.0000
Small Tributary & S ₋ength, ft	waiiip w/C	, iailieis									
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Large Tributary											
_ength, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
Γ _t , hr											0.0000
Culvert											
Diameter, ft											
Area, ft ²											
Hydraulic Radius, R, ft											
Hydraulic Radius, R, ft Slope, ft/ft											
Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec											
Hydraulic Radius, R, ft Slope, ft/ft Manning's No. /elocity ¹¹ , ft/sec											
hydraulic Radius, R, ft Slope, ft/ft Manning's No. /elocity ¹¹ , ft/sec .ength, L, ft											0.0000
Hydraulic Radius, R, ft Slope, ft/ft Manning's No.										HR	0.0000

PROJECT: TRC Proj. No.: Subcatchment:	Cordelio Flat Cree 435979 13S - PC	ek Solar									Calculat Date: Checked Revised	d By:	RLD 8/8/24 PGT
Time of Concentr			tion Wor	ksheet	SCS Me	thods					1/641960		
Time of Concerns	Seg 1	Seg 2	1011 1101	itorioot,	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
SHEET FLOW							Ť						
Manning's No.	0.240												
Length, ft	100												
P2 , in	2.39												
Slope, ft/ft T _t ¹, hr	0.023 0.260												0.2602
SHALLOW CONCE		FLOW											0.2002
Paved													
Length, ft													
Slope, ft/ft													
Velocity ² , ft/sec													
T _t , hr													0.0000
Unpaved		1	1		1			ı	1		1	1	
Length, ft			21		21								
Slope, ft/ft			0.019		0.014								
Velocity ² , ft/sec T _t ³, hr			2.223987 0.003		1.90906 0.003								0.0057
Cultivated			0.003		0.003								0.0037
Length, ft													
Slope, ft/ft													
Velocity ⁴ , ft/sec													
T _t , hr													0.0000
Short Grass Pastur	е												
Length, ft		99		251		1446							
Slope, ft/ft		0.015	ı	0.009		0.007							
Velocity ⁴ , ft/sec		0.8573		0.6641		0.5857							
T _t , hr		0.032		0.105		0.686							0.8229
Woodland							440						
Length, ft Slope, ft/ft							418 0.005						
Velocity ⁵ , ft/sec							0.3536						
T _t , hr							0.328						0.3284
CHANNEL FLOW	<u> </u>												
Waterways & Swam	nps, No Cl	nannels											
Length, ft													
Slope, ft/ft													
Velocity ⁶ , ft/sec T _t ³ , hr													0.0000
	- /D - -	a Ditabas											0.0000
Grassed Waterways Length, ft	sirvaasia	e Ditches											
Slope, ft/ft													
Velocity ⁷ , ft/sec													
T _t , hr													0.0000
Small Tributary & S	wamp w/0	Channels											
Length, ft													
Slope, ft/ft													
Velocity ⁸ , ft/sec													
T _t , hr													0.0000
Large Tributary													
Length, ft Slope, ft/ft													
Velocity ⁸ , ft/sec													
T _t , hr													0.0000
Culvert	1												
Diameter, ft													
Area, ft ²													
Wetted Perimeter, ft													
Hydraulic Radius, R, ft													
Slope, ft/ft													
Manning's No.													
Velocity ¹¹ , ft/sec													
Length, L, ft T _t , hr													0.0000
P *								l .				HR	1.417
												II	
												Min	85.03

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Subcatchment:	14S - Pre	е							Revised		FGI
Time of Concent	ration De	terminat	ion Worl	ksheet,	SCS Me	thods					
-	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
SHEET FLOW	Ť			Ť			Ť			Ť	
Manning's No.	0.240										
Length, ft	100										
P2, in	2.39										
Slope, ft/ft	0.015										
Tt ¹ , hr	0.309										0.3088
SHALLOW CONCE	NTRATED	FLOW									
Paved									I		
Length, ft											
Slope, ft/ft Velocity ² , ft/sec											
T _t , hr											0.0000
											0.0000
Unpaved											
Length, ft Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Cultivated											0.0000
Length, ft											
Slope, ft/ft											
Velocity ⁴ , ft/sec											
T _t , hr											0.0000
Short Grass Pastu	re										
Length, ft		835									
Slope, ft/ft		0.012									
Velocity ⁴ , ft/sec		0.7668									
T _t , hr		0.302									0.3025
Woodland											
Length, ft											
Slope, ft/ft											
Velocity ⁵ , ft/sec											
T _t , hr											0.0000
CHANNEL FLOW											
Waterways & Swar	nps, No Cl	nannels					ı				
Length, ft											
Slope, ft/ft											
Velocity ⁶ , ft/sec T _t ³ , hr											0.0000
	/D - : -	- Ditabaa									0.0000
Grassed Waterway	/s/Roadsid	e Ditches									
Length, ft Slope, ft/ft											
Velocity ⁷ , ft/sec											
T _t , hr											0.0000
Small Tributary & S	Swamn w/C	Channels									
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Large Tributary											
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Culvert											
Diameter, ft											
Area, ft ²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
Velocity ¹¹ , ft/sec											
Length, L, ft											
T L.	1	1									0.0000
T _t , hr										i	
T _t , hr										HR	0.611

Slope, firft				Calculat Date: Checker	-	RLD 8/8/24 PGT
Seg 1				Revised	l:	
SHEET FLOW						
Manning's No. 0.240	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
Length, ft						
P2						
T ₁						
SHALLOW CONCENTRATED FLOW Paved Length, ft Slope, ft/ft Velocity ⁶ , ft/sec Ti ² , hr Unpaved Length, ft Slope, ft/ft Velocity ⁶ , ft/sec Ti ² , hr Cultivated Length, ft Slope, ft/ft Velocity ⁶ , ft/sec Ti ² , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁶ , ft/sec Ti ² , hr Outs Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁶ , ft/sec Ti ² , hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec Ti ² , hr CHANNEL FLOW Stependys & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec Ti ³ , hr Crassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁷ , ft/sec Ti, hr Crassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁶ , ft/sec Ti, hr Crassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁶ , ft/sec Ti, hr Carge Tributary Length, ft Slope, ft/ft Velocity ⁶ , ft/sec Ti, hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ⁶ , ft/sec Length, ft Slope, ft/ft Manning's No. Velocity ⁷ , ft/sec Length, ft Slope, ft/ft Manning's No. Velocity ⁷ , ft/sec Length, ft Slope, ft/ft Manning's No. Velocity ⁷ , ft/sec Length, ft Slope, ft/ft Manning's No. Velocity ⁷ , ft/sec Length, ft						
Length, ft Stope, ft/ft Velocity ² , ft/sec T ₁ ² , hr						0.3088
Length, ft Slope, ft/ft Velocity ² , ft/sec T _i ² , hr Unpaved Length, ft Slope, ft/ft Velocity ² , ft/sec T _i ² , hr Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T _i ² , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T _i ² , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T _i ² , hr O.019 O.01 Velocity ⁴ , ft/sec T _i ² , hr O.037 Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T _i ² , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T _i ² , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T _i ² , hr Culter Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T _i , hr Carge Tributary Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T _i , hr Culter Uength, ft Slope, ft/ft Velocity ⁶ , ft/sec T _i , hr Culter Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ⁶ , ft/sec Length, ft Slope, ft/ft Manning's No. Velocity ⁷ , ft/sec Length, ft Slope, ft/ft Manning's No. Velocity ⁷ , ft/sec Length, ft						
Slope, ft/ft		ı	1	1		
Velocity ² , ft/sec T ₁ ² , hr						
Unpaved Length, ft 20						0.0000
Length, ft Slope, ft/ft Velocity, ft/sec T _i , hr Cultivated Length, ft Slope, ft/ft Velocity, ft/sec T _i , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity, ft/sec T _i , hr O.019 O.01 Velocity, ft/sec T _i , hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity, ft/sec T _i , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity, ft/sec T _i , hr Channels Length, ft Slope, ft/ft Velocity, ft/sec T _i , hr Channels Length, ft Slope, ft/ft Velocity, ft/sec T _i , hr Channels Length, ft Slope, ft/ft Velocity, ft/sec T _i , hr Channels Length, ft Slope, ft/ft Velocity, ft/sec T _i , hr Channels Length, ft Slope, ft/ft Velocity, ft/sec T _i , hr Culter Culter Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹ , ft/sec Length, ft, ft/sec Length, ft, ft/sec Length, ft Slope, ft/ft Manning's No. Velocity ¹ , ft/sec Length, ft, ft/sec Length, ft, ft/sec Length, ft Slope, ft/ft Manning's No. Velocity ¹ , ft/sec Length, ft, ft/sec Length, ft, ft						0.0000
Slope, ft/ft Velocity ² , ft/sec T ₁ , hr Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ , hr Short Grass Pasture Length, ft Slope, ft/ft 0,019 0,01 Velocity ⁶ , ft/sec T ₁ , hr 0,037 Woodland Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ , hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ , hr CHANNEL FLOW Waterways & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ , hr Crassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ , hr Carge Tributary Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ⁶ , ft/sec Length, ft, ft/sec Length, ft, ft/sec Length, ft, ft/sec Length, ft Slope, ft/ft Manning's No. Velocity ⁷ , ft/sec Length, ft, ft						
Velocity ² , ft/sec T, ² , hr Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T, ³ hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T, ³ hr Woodland Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T, ³ hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T, ³ hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T, ³ hr Critical Control of the second of						
Ti ³ , hr 0.003 Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec Ti ³ , hr Short Grass Pasture Length, ft Slope, ft/ft O.019 O.01 Velocity ⁴ , ft/sec Ti ³ , hr O.037 Woodland Length, ft Slope, ft/ft Velocity ⁶ , ft/sec Ti ³ , hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec Ti ³ , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁶ , ft/sec Ti, hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec Ti, hr Culyelocity ⁷ , ft/sec Ti, hr						
Cultivated Length, ft Slope, ft/ft Velocity ³ , ft/sec Tr ³ , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ³ , ft/sec Tr ³ , hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ³ , ft/sec Tr ³ , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ³ , ft/sec Tr ³ , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ³ , ft/sec Tr ³ , hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ³ , ft/sec Tr ³ , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ³ , ft/sec Tr, hr Caupall Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ³ , ft/sec Tr, hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ³ , ft/sec Length, L, ft						0.0028
Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T; ³ , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T; ³ , hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T; ³ , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T; ³ , hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T; ³ , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T;, hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T;, hr CHANNEL FLOW Waterways & Swamp W/Channels Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T;, hr CHANNEL FLOW Waterways & Swamp W/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T;, hr Cuivert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹ , ft/sec Length, L, ft						
Slope, ft/ft						
Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Velocity ⁹ , ft/sec T ₁ , ft/sec T ₁ , ft/sec T ₂ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Velocity ⁹ , ft/sec T ₁ , ft/sec T ₂ , ft/ft Velocity ⁹ , ft/sec T ₃ , hr Culvert Diameter, ft Area, ft, ft/sec T ₄ , ft/sec T ₇ , ft/sec T ₇ , ft/sec T ₈ , ft/ft Velocity ⁹ , ft/ft/sec T ₈ , ft/ft Velocity ⁹ , ft/ft/sec Length, L, ft						
Short Grass Pasture Length, ft Slope, ft/ft O.019 O.01 Velocity ⁴ , ft/sec T ₁ , a hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ , a hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ , a hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Mydraulic Radius, R, ft Mydraulic Radius, R,						
Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ , shr Voodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ , shr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ , shr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , shr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , shr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , shr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Welocity ¹ , ft/sec Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , shr						0.0000
Slope, ft/ft Velocity ⁴ , ft/sec T ₁ ³ , hr Velocity ⁴ , ft/sec T ₁ ³ , hr Velocity ⁵ , ft/sec T ₁ ³ , hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ ³ , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Chylia Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Cuivert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹ , ft/sec Length, L, ft						
Velocity ⁴ , ft/sec T ₁ ³ , hr 0.037 Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ ³ , hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ ³ , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹ , ft/sec Length, L, ft						
T ₁ , hr 0.037 0.273 Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ , hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ , hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Slope, ft/ft Velocity ¹ , ft/sec Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Slope, ft/ft Nonning's No. Velocity ¹¹ , ft/sec Length, L, ft						
Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ , nr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ , nr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , nr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , nr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft						
Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ , and CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ , and Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹ , ft/sec Length, L, ft						0.3095
Slope, ft/ft Velocity ⁵ , ft/sec T, ³ , hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T, ³ , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, 1, ft						
Velocity ⁵ , ft/sec T ₁ ³ , hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ ³ , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft						
T,³, hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity³, ft/sec T,³, hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity³, ft/sec T₁, hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity³, ft/sec T₁, hr Large Tributary Length, ft Slope, ft/ft Velocity³, ft/sec T₁, hr Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft						
CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ ⁸ , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft						0.0000
Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ , hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Manual Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹ , ft/sec Length, L, ft						
Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T _i , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T _i , hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T _i , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T _i , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹ , ft/sec Length, L, ft						
Velocity ⁶ , ft/sec T ₁ ³ , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft						
T ₁ , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft						
Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft						
Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft						0.0000
Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft		I				
Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft						
T ₁ , hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft						
Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft						0.0000
Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T _t , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T _t , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft						0.0000
Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft						
Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft						
T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft						
Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft						0.0000
Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft						
Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft						
T _t , hr Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft						
Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, f/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft						
Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft						0.0000
Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹ , ft/sec Length, L, ft						
Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft						
Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft						
Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft						
Manning's No. Velocity ¹¹ , ft/sec Length, L, ft						
Velocity ¹¹ , ft/sec Length, L, ft						
Length, L, ft						
						0.0000
	1	I.		1	HR	0.621
					Min	37.26

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Subcatchment:	15S - Pre	е							Revised		
Time of Concent	ration De	terminat	ion Worl	ksheet,	SCS Me	thods					
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
SHEET FLOW											
Manning's No.	0.240										
Length, ft	100										
P2, in	2.39										
Slope, ft/ft	0.022										
T _t ¹ , hr	0.265	E1 014/									0.2649
SHALLOW CONCE	NTRATED	FLOW									
Paved		T							I		
Length, ft											
Slope, ft/ft Velocity ² , ft/sec											
T _t , hr											0.0000
											0.0000
Unpaved											
Length, ft Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Cultivated											0.0000
Length, ft											
Slope, ft/ft											
Velocity ⁴ , ft/sec											
T _t , hr											0.0000
Short Grass Pastu	re										
Length, ft		387	220								
Slope, ft/ft		0.021	0.004								
Velocity ⁴ , ft/sec		1.0144	0.4427								
T _t , hr		0.106	0.138								0.2440
Woodland											
Length, ft											
Slope, ft/ft											
Velocity⁵, ft/sec											
T _t , hr											0.0000
CHANNEL FLOW											
Waterways & Swar	nps, No Cl	nannels					ı				
Length, ft											
Slope, ft/ft											
Velocity ⁶ , ft/sec T _t ³ , hr											0.0000
	/D -:-	- Ditabaa									0.0000
Grassed Waterway	/s/Roadsid	e Ditches	i								
Length, ft Slope, ft/ft											
Velocity ⁷ , ft/sec											
T _t , hr											0.0000
Small Tributary & S	Swamn w/C	Channels									2.0000
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Large Tributary											
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr										<u></u>	0.0000
Culvert											
Diameter, ft											
Area, ft ²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
Velocity ¹¹ , ft/sec											
Length, L, ft											
										ii	0.0000
Length, L, ft										HR	0.0000

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Subcatchment:	15S - PC	ST							Revised		101
Time of Concent	ration De	terminat	ion Worl	ksheet, :	SCS Me	thods					
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
SHEET FLOW											
Manning's No.	0.240										
Length, ft	100										
P2 , in	2.39										
Slope, ft/ft T _t ¹, hr	0.022 0.265										0.2649
SHALLOW CONCE		FLOW									0.2043
Paved											
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
Tt, hr											0.0000
Unpaved				ı			ı				
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec T _t ³ , hr											0.0000
Cultivated											0.0000
Length, ft											
Slope, ft/ft											
Velocity ⁴ , ft/sec											
T _t ³ , hr											0.0000
Short Grass Pastu	re										
Length, ft		387	220								
Slope, ft/ft		0.021	0.004								
Velocity ⁴ , ft/sec		1.0144	0.4427								
T _t , hr		0.106	0.138								0.2440
Woodland											
Length, ft											
Slope, ft/ft Velocity ⁵ , ft/sec											
T _t , hr											0.0000
CHANNEL FLOW											0.0000
Waterways & Swar	nps, No Ch	nannels									
Length, ft											
Slope, ft/ft											
Velocity ⁶ , ft/sec											
T _t , hr											0.0000
Grassed Waterway	s/Roadsid	e Ditches	i	l			l		I		
Length, ft											
Slope, ft/ft Velocity ⁷ , ft/sec											
T _t , hr											0.0000
Small Tributary & S	wamp w/C	Channels									2.5550
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Large Tributary											
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec T _t , hr											0.0000
Culvert											0.0000
Diameter, ft											
Area, ft ²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
Velocity ¹¹ , ft/sec											
Length, L, ft											
T _t , hr											0.0000
										HR	0.509
										Min	

Sept	PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979	ek Solar							Calculat Date: Checked	d By:	RLD 8/8/24 PGT
Sept	Subcatchment:									Revised	:	
SHEET FLOW In	Time of Concent											
Maning's No.	SHEET ELOW	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
Lampth file		0.410										
2.3												
Sicker, Min												
SHALLOW CONCENTRATED FLOW												
Pave	T _t hr											0.4508
Length, ft Slope, bitt Velocity ² , Name City, 1 American City, 2 American City, 1 American City, 2 American	SHALLOW CONCE	NTRATED	FLOW									
Sicpo, thit Welviority*, Word Welviority	Paved											
Unpayed Unpa	Length, ft											
17, hr												
Unpaved												0.0000
Length, ft Sloop, ft/ft Velocity ² , 1/8sec Ti, 1/8 Cutivated Length, ft Sloop, strift Velocity ² , 1/8sec Ti, 1/8 Sloop, strift Velocity ² , 1/8sec Ti, 1/8 Sloop, strift Velocity ² , 1/8sec Length, ft No Loop Length, ft Sloop, strift Velocity ² , 1/8sec Length, ft No Loop Length, ft No Length, ft No Loop Length, ft No Length, f												0.0000
Slope, thm												
Velocity Nisec Cultivated												
Ti, Ihr 0,0000 Cutivated cangin, it 1,0000 Sicre, third 0,0000 Sic												
Cultivated Length, ft Siope, ft/ft Vesc (Fr) ft Vesc (Fr)	T _t , hr											0.0000
Length, ft Nelocipy*, ft/sec \text{information} Note Grass Pasture Length, ft 0.009 0.009 Velocipy*, ft/sec 0.0281 0.6841 \text{information} Tip* 1 0.063 0.433 Woodland Length, ft 0.083 0.433 Woodland Length, ft 0.083 0.433 Woodland Length, ft 0.083 0.433 Waterways & Swamps, No Channels Length, ft 0.0000 CHANNEL FLOW Waterways & Swamps, No Channels Length, ft 0.0000 Since, ftff Velocipy*, ft/sec Length, ft 0.0000 Small Tributary & Swamp w/Channels Length, ft 0.0000 Small Tributary & Swamp w/Channels Length, ft 0.0000 Large fributary Length, ft 0.0000 Culcy ft/sec 0.0000 Culcy ft/sec 0.0000 Large fributary Length, ft 0.0000 Large fributary Length, ft 0.0000 Large fributary Length, ft 0.0000 Length, L, ft	Cultivated											
Siope, It Welcolary*, Risec	Length, ft											
1,	Slope, ft/ft											
Short Grass Pasture ength, ft	Velocity ⁴ , ft/sec											
Length, ft Silope, ft/ft 0,008 0,009 0,008 0,009 0,008 0,009 0,0251 0,0631 0,0433 0,0433 0,0433 0,04959 Woodland Length, ft Slope, ft/ft Welocity ² , ft/sec 0,0000 CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Welocity ² , ft/sec 7, hr Welocity ² , ft/sec 7, hr Slope, ft/ft Welocity ² , ft/sec 7, hr Slope, ft/ft Welocity ² , ft/sec 7, hr Slope, ft/ft Welocity ² , ft/sec 8, hr Slope, ft/ft Welocity ² , ft/sec 8, hr Slope, ft/ft Welocity ² , ft/sec 9, hr Weled Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Welocity ² , ft/sec Length, L, ft T, hr												0.0000
Slope, fift	Short Grass Pastur	re										
Wolcolify, fit/sec	Length, ft		142	1035								
No.	Slope, ft/ft											
Woodland Length, ft Slope, ft/ft Welcotip ² / ₁ , ft/sec Channels												
Length, ft Silope, ft/ft Wickcolary ² , ft/sec Ti ² , hr Waterways & Swamps, No Channels Length, ft Silope, ft/ft Velocity ² , ft/sec Ti ² , hr O.0000 Cassed Waterways/Roadside Ditches Length, ft Silope, ft/ft Velocity ² , ft/sec Ti ₂ , hr O.0000 Small Tributary & Swamp w/Channels Length, ft Silope, ft/ft O.017 Velocity ² , ft/sec Ti ₃ , hr O.0339 Large Tributary Length, ft Silope, ft/ft Velocity ² , ft/sec Ti ₄ , hr O.0000 Culvert Diameter; ft Avea, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Silope, ft/ft Manning's No. Velocity ³ , ft/sec Length, ft Manning's No. Velocity ³ , ft/sec Length, ft Manning's No. Velocity ³ , ft/sec Length, ft Tydraulic Radius, R, ft Silope, ft/ft Manning's No. Velocity ³ , ft/sec Length, ft Tydraulic Radius, R, ft Silope, ft/ft Manning's No. Velocity ³ , ft/sec Length, ft Tydraulic Radius, R, ft Silope, ft/ft Manning's No. Velocity ³ , ft/sec Length, ft Tydraulic Radius, R, ft Silope, ft/ft Manning's No. Velocity ³ , ft/sec Length, ft Tydraulic Radius, R, ft Silope, ft/ft Manning's No. Velocity ³ , ft/sec Length, ft Tydraulic Radius, R, ft Silope, ft/ft Manning's No. Velocity ³ , ft/sec Length, ft Tydraulic Radius, R, ft Silope, ft/ft Manning's No. Velocity ³ , ft/sec Length, ft Tydraulic Radius, R, ft Silope, ft/ft Manning's No. Velocity ³ , ft/sec			0.063	0.433								0.4959
Slope, fift												
\text{Velocity}^{\chick}, \text{tissec} \ \(\text{Ti}^{\chick}, \text{tissec} \) \ \(\text{CHANNEL FLOW} \) \text{Waterways & Swamps, No Channels} \) \text{Length, ft} \) \text{Slope, fifth} \) \text{Velocity}^{\chick}, \text{fisec} \) \text{Ti}^{\chick}, \text{tisec} \) \text{Usectory}^{\chick}, \text{tisec} \) \text{Velocity}^{\chick}, \text{tisec} \) \text{Ti}, \text{hr} \) \text{0.0000} \) \text{Small Tributary & Swamp w/Channels} \) \text{Length, ft} \) \text{Slope, fifth} \) \text{0.017} \) \text{Velocity}^{\chick}, \text{tisec} \) \text{Ti}, \text{hr} \) \text{0.0339} \) \text{Large Tributary} \) \text{Length, ft} \) \text{Slope, fifth} \) \text{Velocity}^{\chick}, \text{tisec} \) \text{Ti}, \text{hr} \) \text{Ulomert} \) \text{Diameter, ft} \) \text{Velocity}^{\chick}, \text{tisec} \) \text{Ti}, \text{hr} \) \text{Velocity}^{\chick}, \text{tisec} \) \text{Ti}, \text{tisec} \) \text{Velocity}^{\chick}, \text{tisec} \) \text{Velocity}^{\chick}, \text{tisec} \) \text{Velocity}^{\chick}, \text{tisec} \) \text{Velocity}^{\chick}, \text{tisec} \) \text{Ti}, \text{tisec} \) \text{Ti},												
Time												
CHANNEL FLOW Waterways & Swamps, No Channels												0.0000
Waterways & Swamps, No Channels												
Length, ft Slope, ft/ft Velocity ² , ft/sec T ² , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ² , ft/sec Velocity ² , ft/sec Velocity ² , ft/sec Wetted Perimeter, ft Hydraulc Radius, R, ft Slope, ft/ft Manning's No. Velocity ³ , ft/sec Length, t, ft T, hr O.0000 HR O.0000		nps, No Cl	nannels									
Velocity®, fitsec Ti,* hr	Length, ft											
Company	Slope, ft/ft											
Grassed Waterways/Roadside Ditches												
Length, ft Slope, ft/ft Slope,												0.0000
Slope, ft/ft Welcotry ⁷ , ft/sec Welcotry ⁷ , ft/sec Welcotry ⁷ , ft/sec Welcotry ⁸ , ft/sec Welco		s/Roadsid	e Ditches	•	I	I			_	1		
Velocity ⁷ , ft/sec												
Tt, hr												
Small Tributary & Swamp w/Channels 334 0.017												0.0000
Length, ft		Swamn w/C	hannole									0.0000
Slope, ft/ft		w/C			334							
Velocity ⁸ , ft/sec 2.738 T ₁ , hr 0.0339 Large Tributary	Slope, ft/ft											
Tt, hr	Velocity ⁸ , ft/sec											
Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.981	T _t , hr											0.0339
Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr	Large Tributary											
Velocity ⁸ , ft/sec 0.0000 Culvert 0.0000 Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft 0.0000 HR 0.981	Length, ft											
Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft T _b , hr HR 0.981	Slope, ft/ft											
Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft T _b , hr HR 0.981												
Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft T _i , hr HR 0.981												0.0000
Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft T _i , hr HR 0.981												
Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.981												
Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.981												
Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.981												
Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.981												
Velocity ¹¹ , ft/sec Length, L, ft T _b , hr HR 0.981												
Length, L, ft T _b hr HR	Velocity ¹¹ , ft/sec											
T _L hr 0.0000 HR 0.981												
HR 0.981	T _t , hr											0.0000
		•								•	HR	
											II .	

Second S	PROJECT:	Cordelio								Calculat Date:	-	RLD 8/8/24
Interest Concentration Determination Worksheet, SCS Methods	TRC Proj. No.:	435979 165 - PC	ST									PGT
### Sept Seg 2 Seg 3 Seg 4 Seg 5 Seg 6 Seg 7 Seg 8 Seg 9 Seg 10 ### Sept Seg 1 Seg 2 Seg 3 Seg 4 Seg 5 Seg 6 Seg 7 Seg 8 Seg 9 Seg 10 ### Sept Seg 1 Seg 2 Seg 3 Seg 4 Seg 5 Seg 6 Seg 7 Seg 8 Seg 9 Seg 10 ### Sept Seg 1 Seg 2 Seg 3 Seg 4 Seg 5 Seg 6 Seg 7 Seg 8 Seg 9 Seg 10 ### Sept Seg 1 Seg 2 Seg 3 Seg 4 Seg 5 Seg 6 Seg 7 Seg 8 Seg 9 Seg 10 ### Sept Seg 1 Seg 2 Seg 3 Seg 4 Seg 5 Seg 6 Seg 7 Seg 8 Seg 9 Seg 10 ### Sept Seg 1 Seg 2 Seg 3 Seg 4 Seg 5 Seg 6 Seg 7 Seg 8 Seg 9 Seg 10 ### Sept Seg 1 Seg 2 Seg 3 Seg 4 Seg 5 Seg 6 Seg 7 Seg 8 Seg 9 Seg 10 ### Sept Seg 1 Seg 2 Seg 3 Seg 4 Seg 5 Seg 6 Seg 7 Seg 8 Seg 9 Seg 10 ### Sept Seg 1				ion Wor	ksheet :	SCS Me	thods			Iteviseu	•	
### HEEF FLOW	Time of Concerta							Seg 7	Sea 8	Seg 9	Sea 10	
Part	SHEET FLOW	3.3.					9-					
2, in 2.39 pope, fift 0.451	//anning's No.	0.410										
Description	ength, ft											
The HALLOW CONCENTRATED FLOW	² 2, in											
### ### ### ### #### #################	Slope, ft/ft											
Part			EL OW									0.4508
		NIKAIED	FLOW									
Depart D												
Part	/elocity ² , ft/sec											
	t, hr											0.0000
Dept. ##	Inpaved											
Decompt	ength, ft											
The	lope, ft/ft											
Subtivated Surget Subtivated Subtiva	/elocity ² , ft/sec											
angth, ft ploce, ft/ft ploce, f												0.0000
Company												
Comparison Com												
The content of the												
Not Grass Pasture 142												0.0000
angth, ft		'A										0.0000
Image: Part			142	1035								
Noodland night, ft pope, ft/ft elocity ² , ft/sec	/elocity ⁴ , ft/sec											
angth, ft ope, first o	Γ ³ , hr		0.063	0.433								0.4959
Lope, ft/ft elocity*, ft/sec -, hr	Voodland											
	ength, ft											
### 0.0000 #############################	Slope, ft/ft											
HANNEL FLOW Vaterways & Swamps, No Channels nagth, ft lope, ft/ft elocity*, ft/sec , hr 0,0000 Frassed Waterways/Roadside Ditches nagth, ft lope, ft/ft elocity*, ft/sec , hr 0,0000 Frassed Waterways/Roadside Ditches nagth, ft lope, ft/ft elocity*, ft/sec , hr 0,0000 Frassed Waterways/Roadside Ditches nagth, ft lope, ft/ft elocity*, ft/sec , hr 0,0000 Frassed Waterways/Roadside Ditches nagth, ft lope, ft/ft elocity*, ft/sec , hr 0,0000 Frassed Waterways/Roadside Ditches nagth, ft lope, ft/ft elocity*, ft/sec , hr 0,0000 Frassed Waterways/Roadside Ditches nagth, ft lope, ft/ft lope, ft/ft lope, ft/ft lope, ft/ft lameter, ft												
Vaterways & Swamps, No Channels ongth, ft ope, ft/ft elocity*, ft/sec 3, hr ope, ft/ft elocity*, ft/sec ongth, ft ope, ft/ft lope, ft/ft l												0.0000
angth, ft ope, ft/ft elecity ⁶ , ft/sec 3, hr 0,0000 elecity ⁶ , ft/sec 4, hr 0,0000 elecity ⁶ , ft/sec 4, hr 0,0000 elecity ⁶ , ft/sec 4, hr 0,0000 elecity ⁶ , ft/sec 5, hr 0,0000 elecity ⁶ , ft/sec 6, hr 0,0000 elecity ⁶ , ft/sec 7, hr 0,0000 elecity ⁶ , ft/sec 7, hr 0,0000 elecity ⁶ , ft/sec 8, hr 0,0000 elecity ⁶ , ft/sec 9, hr 0,0000 elecity ⁶		ne No Cl	hannole									
Cope, ft/ft		ips, No Ci	lalilleis									
elocity ⁶ , ft/sec 3, hr elocity ⁶ , ft/sec y,												
3, hr 0,0000 irassed Waterways/Roadside Ditches ength, ft lope, ft/ft elocity ⁷ , ft/sec ength, ft lope, ft/ft lo	/elocity ⁶ , ft/sec											
angth, ft lope, ft/ft lope, ft	Γ ³ , hr											0.0000
angth, ft lope, ft/ft lope, ft	Grassed Waterway	s/Roadsid	e Ditches									
elocity ² , ft/sec , hr mail Tributary & Swamp w/Channels ope, ft/ft	_ength, ft											
Annual Tributary & Swamp w/Channels	Slope, ft/ft											
Second S	/elocity ⁷ , ft/sec											
angth, ft lope, ft/ft lope, ft	t, hr											0.0000
Dope, ft/ft	Small Tributary & S	wamp w/0	Channels									
Policity 1, ft 1												
arge Tributary ength, ft lope, ft/ft elocity ⁸ , ft/sec , hr lulvert lameter, ft rea, ft² /etted Perimeter, ft dydraulic Radius, R, ft lope, ft/ft lanning's No. elocity ⁸ , ft/sec ength, L, ft , hr HR 0.0000												
arge Tributary ength, ft lope, ft/ft elocity ⁸ , ft/sec , hr culvert iameter, ft rea, ft ² /etted Perimeter, ft ydraulic Radius, R, ft lope, ft/ft anning's No. elocity ¹ , ft/sec ength, L, ft , hr HR 0.0000	/elocity*, tt/sec 「 _t , hr											0 0330
ength, ft lope, ft/ft lope, ft/ft elocity ⁸ , ft/sec , hr culvert lameter, ft rea, ft //etted Perimeter, ft ydraulic Radius, R, ft lope, ft/ft lanning's No. elocity ¹ , ft/sec ength, L, ft , hr HR 0.0000					0.034							0.0339
lope, ft/ft elocity ⁸ , ft/sec , hr												
Selocity ⁸ , ft/sec	Slope, ft/ft											
Output O	'elocity ⁸ , ft/sec											
iameter, ft rea, ft² /etted Perimeter, ft ydraulic Radius, R, ft lope, ft/ft anning's No. elocity ¹¹ , ft/sec ength, L, ft , hr 0.0000	t, hr											0.0000
rea, ft ² /etted Perimeter, ft ydraulic Radius, R, ft lope, ft/ft lanning's No. elocity ¹¹ , ft/sec ength, L, ft , hr 0.0000	ulvert											
/etted Perimeter, ft ydraulic Radius, R, ft lope, ft/ft lanning's No. elocity ¹¹ , ft/sec ength, L, ft , hr HR 0.981	iameter, ft											
ydraulic Radius, R, ft lope, ft/ft lanning's No. elocity ¹¹ , ft/sec ength, L, ft , hr	rea, ft ²											
ope, ft/ft lanning's No. elocity ¹¹ , ft/sec ength, L, ft , hr HR 0.0000	etted Perimeter, ft											
lanning's No. elocity ¹¹ , ft/sec ength, L, ft , hr	ydraulic Radius, R, ft											
elocity ¹¹ , ft/sec ength, L, ft , hr												
ength, L, ft , hr 0.0000 HR 0.981	anning's No.											
, hr 0.0000 HR 0.981												
HR 0.981												0.0000
	,	1			<u> </u>						IHR	
											II	

PROJECT:	Cordelio Flat Cree 435979								Calculat	-	RLD 8/8/24
TRC Proj. No.: Subcatchment:	435979 16SA - P)ro							Checked		PGT
Time of Concent			ion Worl	ksheet.	SCS Me	thods			Revised		
Time of Concome	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
SHEET FLOW											
Manning's No.	0.240										
Length, ft	100										
P2, in	2.39										
Slope, ft/ft	0.027										
Tt ¹ , hr SHALLOW CONCE	0.244	ELOW/									0.2441
Paved	NIKAIED	FLOW									
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Unpaved											
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											_
T _t , hr											0.0000
Cultivated											
Length, ft Slope, ft/ft											
Velocity ⁴ , ft/sec											
T _t , hr											0.0000
Short Grass Pastu	re										3.3000
Length, ft		964									
Slope, ft/ft		0.014									
Velocity⁴, ft/sec		0.8283									
Tt, hr		0.323									0.3233
Woodland											
Length, ft											
Slope, ft/ft											
Velocity ⁵ , ft/sec T _t ³ , hr											0.0000
CHANNEL FLOW											0.0000
Waterways & Swan	nns. No Cl	hannels									
Length, ft	iipo, ito oi										
Slope, ft/ft											
Velocity ⁶ , ft/sec											
T _t , hr											0.0000
Grassed Waterway	s/Roadsid	le Ditches									
Length, ft											
Slope, ft/ft											
Velocity ⁷ , ft/sec											
T _t , hr		Nh a man a la									0.0000
Small Tributary & S Length, ft	wamp w/C	ilalineis	702								
Slope, ft/ft			0.009								
Velocity ⁸ , ft/sec			1.992								
T _t , hr			0.098								0.0979
Large Tributary											
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Culvert											
Diameter, ft Area, ft ²											
Area, π- Wetted Perimeter, ft											
Hydraulic Radius P #											
Slope, ft/ft		1									
Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec											
Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft											
Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec											0.0000
Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft										HR	0.0000 0.665

Subcatinnent: 165A - POST	PROJECT:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Sept	Subcatchment:		OST									FGI
Sept	Time of Concent	ration De	terminat	ion Worl	ksheet,	SCS Me	thods					
Mannings No. 0.240								Seg 7	Seg 8	Seg 9	Seg 10	
Length, ft								_				
P.	Manning's No.											
Sept.												
17-												
### SAMALDW CONCENTRATED FLOW Pawed Length, ft Stope, ft ft Velocity', flance Ti, ft Cultivated Length, ft Stope, ft ft Velocity', flance Ti', ft Cultivated Length, ft Stope, ft ft Velocity', flance Ti', ft Cultivated Length, ft Stope, ft ft Velocity', flance Ti', ft Cultivated Length, ft Stope, ft ft Velocity', flance Ti', ft Cultivated Length, ft Stope, ft ft Velocity', flance Ti', ft Cultivated Length, ft Stope, ft ft Velocity', flance Ti', ft Cultivated Length, ft Stope, ft ft Velocity', flance Ti', ft Cultivated Length, ft Stope, ft ft Velocity', flance Ti', ft Cultivated Length, ft Stope, ft ft Velocity', flance Ti', ft Cultivated Length, ft Stope, ft ft Velocity', flance Ti', ft Cultivated Length, ft Stope, ft ft Velocity', flance Ti', ft Cultivated Length, ft Stope, ft ft Velocity', flance Ti', ft Cultivated Length, ft Stope, ft ft Velocity', flance Ti', ft Cultivated Length, ft Stope, ft ft Velocity', flance Ti', ft Cultivated Length, ft Stope, ft ft Velocity', flance Ti', ft Cultivated Length, ft Stope, ft ft Velocity', flance Ti', ft Cultivated Length, ft Stope, ft ft Velocity', flance Ti', ft Ti',												0.2444
Paved Langth, ft Slope, ft ft Velocity, ft Pace 7, ft br			FLOW									0.2441
Length, ft Stope, that Velocidy, fivese Ti, fiv Cultivated Length, ft Stope, that Velocidy, fivese Ti, fiv Cultivated Length, ft Stope, that Velocidy, fivese Ti, fiv Cultivated Length, ft Stope, that Velocidy, fivese O, 2233 Ti, fiv O, 323 O, 3233 O, 323												
Slope, lift												
Unique U	Slope, ft/ft											
Unpayed Length # Slope, Ith Slope, Ith Slope, Ith Wolcocky, 15ec Colored	Velocity ² , ft/sec											
Length, ft Sloope, thit Velocity*, 1 Nese T*, 1 hr Cultivated Length, ft Sloope, thit Velocity*, 1 Nese T*, 2 hr Short Grass Pasture Length, ft Sloope, thit Outled Velocity*, 1 Nese T*, 1 hr Outled Velocity*, 1 Nese T*, 1 hr Outled Velocity*, 1 Nese T*, 1 hr Outled Velocity*, 1 Nese Length, ft Sloope, thit Velocity*, 1 Nese Length, ft Sloope, 1 Nese Length, ft Slo	Tt, hr											0.0000
Slope, Inft Webcody*, Place Cultivated	Unpaved											
Velocity Name	Length, ft											
0,0000 0	Slope, ft/ft											
Cultivated Length, it Slope, thir issue Velocidy, Visec Velocity, Visec Veloci												0.000
Length, ft Slope, ft/ft Velocity ² , ft/store T ² , ft / ft/store Length, ft Slope, ft/ft Velocity ² , ft/store Length, ft Slope, ft/ft Velocity ² , ft/store Use of the store												0.0000
Slope, tht Wedcody, five:												
Velocity Nee												
0,0000 0												
Short Grass Pasture	T _t , hr											0.0000
Length, ft Velocity*, ft/Sec		re										
Slope, fift	Length, ft		964									
No.	Slope, ft/ft		0.014									
Woodland Length, ft Slope, ft/ft Waterways & Swamps, No Channels Length, ft Slope, ft/ft Waterways & Swamps, No Channels Length, ft Slope, ft/ft Waterways & Swamps, No Channels Length, ft Slope, ft/ft Waterways & Swamps, No Channels Length, ft Slope, ft/ft Waterways/Roadside Ditches Length, ft Slope, ft/ft Waterways/Roadside Ditches Length, ft Slope, ft/ft Waterways/Roadside Ditches Length, ft To 2 Slope, ft/ft Waterways/Roadside Ditches Length, ft To 3 Large Tributary Length, ft Slope, ft/ft Waterways/Roadside Ditches Length, ft To 3 Large Tributary Length, ft Slope, ft/ft Waterways/Roadside Ditches Length, ft To 3 Large Tributary Length, ft Large Tributary Large Tributa	Velocity⁴, ft/sec		0.8283									
Length, ft Slope, ft/ft Slope, ft/ft Velocity ² , ft/sec T ₁ ² hr Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ² , ft/sec T ₁ , hr O,0000 Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ² , ft/sec T ₁ , hr O,0000 Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft O,009 Velocity ² , ft/sec T ₁ , hr O,0000 Large Tributary Length, ft Slope, ft/ft Velocity ² , ft/sec T ₁ , hr O,0000 Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, ft, ft Slope, ft/ft Manning's No. Velocity ³ , ft/sec Length, ft Slope, ft/ft Manning's No. Velocity ³ , ft/sec Length, ft Slope, ft/ft Manning's No. Velocity ³ , ft/sec Length, ft Slope, ft/ft Manning's No. Velocity ³ , ft/sec Length, ft T ₁ , ft/ft/suce Length, ft T ₂ , ft/ft/suce Length, ft T ₃ , ft/ft/suce Length, ft T ₄ , ft/ft/suce Length, ft T ₅ , ft/ft D,0000 HR D,0000	Tt, hr		0.323									0.3233
Slope, ft/ft Slop	Woodland											
Velocity ¹ , filsec Ti, hr	Length, ft											
Time												
CHANNEL FLOW												
Waterways & Swamps, No Channels												0.0000
Length, ft Slope, ft/ft Welcottyf', ft/sec T,'', hr		mne No Ch	nannole									
Slope, fl/ft Slop		iips, No Ci	laillieis									
Velocity ⁹ , ft/sec T ₁ ² , hr												
Grassed Waterways/Roadside Ditches	Velocity ⁶ , ft/sec											
Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr 702 Slope, ft/ft Velocity ⁸ , ft/sec T ₂ , hr 1, 992 T ₃ , hr 1, 992 T ₄ , hr 1, 992 T ₅ , hr 1, 992 T ₆ , hr 1, 992 T ₇ , hr 1, 0,0000 0,0	T _t ³ , hr											0.0000
Slope, ft/ft Velocity ⁷ , ft/sec Velocity ⁸ , ft/sec Veloc	Grassed Waterway	/s/Roadsid	e Ditches							'	<u>'</u>	
Velocity ⁷ , ft/sec	Length, ft											
Tt, hr	Slope, ft/ft											
Small Tributary & Swamp w/Channels												
Length, ft 702												0.0000
Slope, ft/ft		Swamp w/C	nannels	700								
Velocity ⁸ , ft/sec												
T _t , hr												
Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T, hr Culvert Diameter, ft Area, ft ² Wetled Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T, hr HR 0.665												0.0979
Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.665				5.000								0.0010
Slope, ft/ft Velocity ⁸ , ft/sec T, hr												
Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.665	Slope, ft/ft											
Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹¹, ft/sec Length, L, ft T,, hr HR 0.665	Velocity ⁸ , ft/sec											
Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft T ₁ , hr HR 0.665	T _t , hr											0.0000
Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft T₀, hr HR 0.665	Culvert											
Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.665	Diameter, ft											
Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.665												
Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.665	Wetted Perimeter, ft											
Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T _i , hr HR 0.665	•											
Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.665												
Length, L, ft T _t , hr 0.0000	Manning's No.											
HR 0.665												
HR 0.665												0 0000
	•				<u> </u>			I.	<u> </u>		IHR	
											ll .	

Subcatchment: 175 - Pro Section	PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Sept	Subcatchment:		е									101
Sept	Time of Concent	ration De	terminat	ion Wor	ksheet,	SCS Me	thods					
Mannings No. 0.400 0.240								Seg 7	Seg 8	Seg 9	Seg 10	
Leargh, ft. 50 50 50 50 50 50 50 5	SHEET FLOW											
P.	Manning's No.											
Sept.												
17,												
### SAMALOW CONCENTRATED FLOW Pawed Length, ft Stope, ft ft Velocity', felore Ti, ft Unipswed Length, ft Stope, ft ft Stope, ft ft Velocity', felore Ti', ft Unipswed Length, ft Stope, ft ft Velocity', felore Ti', ft Unipswed Length, ft Stope, ft ft Velocity', felore Ti', ft Unipswed Length, ft Stope, ft ft Velocity', felore Ti', ft Unipswed Length, ft Stope, ft ft Velocity', felore Ti', ft Unipswed Length, ft Stope, ft ft Velocity', felore Ti', ft Unipswed Length, ft Stope, ft ft Velocity', felore Ti', ft Unipswed Length, ft Stope, ft ft Velocity', felore Ti', ft Unipswed Length, ft Stope, ft ft Velocity', felore Ti', ft Unipswed Length, ft Stope, ft ft Velocity', felore Ti', ft Unipswed Length, ft Stope, ft ft Velocity', felore Ti', ft Unipswed Length, ft Stope, ft ft Velocity', felore Ti', ft Unipswed Length, ft Stope, ft ft Velocity', felore Ti', ft Unipswed Length, ft Stope, ft ft Velocity', felore Ti', ft Unipswed Length, ft Stope, ft ft Velocity', felore Ti', ft Unipswed Length, ft Stope, ft ft Velocity', felore Ti', ft Unipswed Length, ft Stope, ft ft Velocity', felore Ti', ft Unipswed Length, ft Stope, ft ft Velocity', felore Ti', ft Unipswed Length, ft Stope, ft ft Velocity', felore Ti', ft Unipswed Length, ft Velocity', filter Length, ft Velocity', filter Length, ft Velore Ti', ft Unipswed Length, ft Ti',												0.3845
Paved												0.0040
Length, ft Stope, ft ft Velocidy, ft feece Tr, ft Tr Stope, ft ft Velocidy, ft feece Tr, ft Tr Stope, ft ft Velocidy, ft feece Tr, ft Tr Stope, ft ft Velocidy, ft feece Tr, ft Tr Stope, ft ft Velocidy, ft feece Tr, ft Tr, ft Tr Stope, ft ft Velocidy, ft feece Tr, ft Tr, ft Tr Stope, ft ft Velocidy, ft feece Tr, ft Tr, ft Tr Tr Stope, ft ft Velocidy, ft feece Tr, ft Tr, ft Tr	Paved											
Unpayed Unpa	Length, ft											
17. hr	Slope, ft/ft											
Unpaved Length. If Slope, Inft Woodorty* (Visce Ti, 1hr Cutivated Length. If Slope, Inft Woodorty*, (Visce Ti, 1hr Cutivated Length. If Slope, Inft Length. If S												
Length, ft Sloope, thit Velocity ² , 1/8ce T ² , 1/hr Cultivated Length, ft Sloope, thit Velocity ² , 1/8ce T ² , 1/hr Short Grass Pasture Length, ft Sloope, thit Outside Control of the												0.0000
Slope, Infl Webcody*, Place T*, Infl Develope*, Rese Length, R.					T.				T.			
Velocity Name Velocity												
Ti, br 0,0000 Cultivated Length, R 0,0000 Short Grass Pasture Length, R 0,000 Length, R 0,000 Short Grass Pasture Length, R 0,000 Shore, MPT 0,000 Woodland Length, R 0,544 0,563 Shope, MT Woodland Length, R 0,000 Shope, MT Woodland Length, R Shope, MT												
Cultivated Length, ft Slope, Affine Velocidy, Visece Ti, Th												0.0000
Length, ft Slope, ft/ft Velocity*, ft/ftsec T, T, Tr												0.0000
Slope, Int Welcolary*, 1 Nee	Length, ft											
17, hr	Slope, ft/ft											
Short Grass Pasture	Velocity ⁴ , ft/sec											
Length, ft Silope, ft/ft Velocity*, ft/sec 1, 2/12 d, 0,7000 1, 1,1064 Woodland Length, ft Slope, ft/ft Velocity*, ft/sec 1,2/12 d, 0,7600 1,2/12 d, 0,7600 1,1064 Woodland Length, ft Slope, ft/ft Velocity*, ft/sec 1,7 hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity*, ft/sec 1,7 hr Double Fributary Length, ft Slope, ft/ft Velocity*, ft/sec 1,7 hr Double Fributary Length, ft No.0000 Well Readus, R, ft Slope, ft/ft Velocity*, ft/sec Univert Diameter, ft Velocity*, ft/sec Univert Velocity*, ft/sec Length, ft No.0000 Well Readus, R, ft Slope, ft/ft Velocity*, ft/sec Length, L, ft T, hr	Tt, hr											0.0000
Slope, fift		re										
	Length, ft											
1,1064 1												
Woodland Length, ft Slope, ft/ft Waterways & Swamps, No Channels Length, ft Slope, ft/ft Waterways & Swamps, No Channels Length, ft Slope, ft/ft Waterways & Swamps, No Channels Length, ft Slope, ft/ft Waterways & Swamps, No Channels Length, ft Slope, ft/ft Waterways/Roadside Ditches Length, ft												
Length, ft Slope, ft/ft Velocity ² , ft/sec T ₁ ² hr Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ² , ft/sec T ₁ ² , hr O,0000 Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ² , ft/sec T ₁ , hr O,0000 Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft O,017 Velocity ² , ft/sec T ₁ , hr O,086 O,0857 Large Tributary Length, ft Slope, ft/ft Velocity ² , ft/sec T ₁ , hr O,0000 Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ² , ft/sec Length, ft Nanning's No. Velocity ² , ft/sec Length, ft Manning's No. Velocity ² , ft/sec Length, ft Manning's No. Velocity ² , ft/sec Length, ft T ₁ , hr O,0000 Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ² , ft/sec Length, ft T ₂ , hr O,0000 HR O,0000				0.544	0.563							1.1064
Slope, ft/ft Slop												
Velocity ² , ft/sec T ₁ , hr												
Ti, hr 0.0000 CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ² , ft/sec Ti, hr 0.0000 Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ³ , ft/sec Length, ft Slope, ft/ft Velocity ⁴ , ft/sec Length, ft Slope, ft/ft Slope, ft/ft Velocity ⁴ , ft/sec Length, ft Slope, ft/ft Slope, ft/ft Slope, ft/ft Slope, ft/ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹ , ft/sec Length, L, ft Ti, hr O.0000 HR 0.0000												
### CHANNEL FLOW Waterways & Swamps, No Channels	T _t ³ , hr											0.0000
Length, ft Slope, ft/ft Welcotity*, ft/sec T-, thr	CHANNEL FLOW											
Slope, fl/ft Slop	Waterways & Swar	nps, No Cl	nannels									
Velocity ⁹ , ft/sec T ₁ ² , hr	Length, ft											
Company												
Grassed Waterways/Roadside Ditches												
Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Slope, ft/ft Velocity ⁸ , ft/sec T ₂ , hr Slope, ft/ft Velocity ⁸ , ft/sec T ₃ , hr Slope, ft/ft Velocity ⁸ , ft/sec T ₄ , hr Slope, ft/ft Velocity ⁸ , ft/sec T ₅ , hr Slope, ft/ft Velocity ⁸ , ft/sec T ₆ , hr Slope, ft/ft Velocity ⁸ , ft/sec T ₇ , hr Slope, ft/ft Velocity ⁸ , ft/sec T ₈ , ft/sec Slope, ft/ft Velocity ⁸ , ft/sec Usert Usert Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ⁹ , ft/sec Length, L, ft T ₆ , hr O.0000 HR 1.577		ro/Doodoid	o Ditoboo									0.0000
Slope, ft/ft Swamp w/Channels Slope, ft/ft		/s/Roausiu	e Ditches									
Velocity ⁷ , ft/sec 0,0000	1 -											
Tt, hr												
Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T _b , hr Velocity ⁸ , ft/sec T _b , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁹ , ft/sec T _b , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T _b , hr HR 1.577	T _t , hr											0.0000
Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T _b , hr Velocity ⁸ , ft/sec T _b , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁹ , ft/sec T _b , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T _b , hr HR 1.577	Small Tributary & S	Swamp w/0	Channels									
Velocity ⁸ , ft/sec	Length, ft					845						
T ₁ , hr	Slope, ft/ft											
Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 1.577												
Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T _t , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T _t , hr HR 1.577						0.086						0.0857
Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr												
Velocity ⁸ , ft/sec T ₁ , hr												
Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft T ₁ , hr HR 1.577												
Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft T _b , hr IHR 1.577	T _t , hr											0.0000
Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft T _i , hr HR 1.577	Culvert											
Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft T _t , hr HR 1.577	Diameter, ft											
Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T,, hr HR 1.577	Area, ft²											
Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr MRR 1.577	Wetted Perimeter, ft											
Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR	Hydraulic Radius, R, ft											
Velocity ¹¹ , ft/sec Length, L, ft T _t , hr 0.0000	Slope, ft/ft											
Length, L, ft T _b hr 1.577												
T _t , hr 0.0000 HR 1.577												
HR 1.577												0.0000
	P "		<u> </u>								IHR	
											II .	

PROJECT: TRC Proj. No.:	Cordelic Flat Cre 435979	ek Solar											Calculat Date: Checked	d By:	RLD 8/8/24 PGT
Subcatchment:	17S - PC		tion Ma	ulcabaat	CCC M	a + la a d a							Revised	:	
Time of Concent				rksneet,	SUS IVI	etnoas		04	0	00	07	00	00	0 10	
SHEET FLOW	Seg 1	Seg 2	Seg 3					Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
Manning's No.	0.400	0.240													
Length, ft	50	50													
P2, in	2.39	2.39													
Slope, ft/ft	0.030	0.014													
T _t , hr	0.202	0.182													0.3845
SHALLOW CONCE															0.00.00
Paved															
ength, ft															
Slope, ft/ft															
Velocity ² , ft/sec															
Γ _t , hr															0.0000
Unpaved															
Length, ft				20		27									
Slope, ft/ft				0.02		0.011									
Velocity ² , ft/sec				2.281763		1.692201									
T _t , hr				0.002		0.004									0.0069
Cultivated															
Length, ft															
Slope, ft/ft															
Velocity ⁴ , ft/sec															
T _t , hr															0.0000
Short Grass Pastu	re														
Length, ft			625		1407		293	1418							
Slope, ft/ft			0.005		0.046		0.009	0.01							
Velocity ⁴ , ft/sec			0.4950		1.5013		0.6641	0.7000							
T _t , hr			0.351		0.260		0.123	0.563							1.2963
Woodland															
Length, ft															
Slope, ft/ft															
Velocity ⁵ , ft/sec															
T _t , hr															0.0000
CHANNEL FLOW															
Waterways & Swar	mps, No Cl	hannels													
Length, ft															
Slope, ft/ft															
Velocity ⁶ , ft/sec															
T _t , hr															0.0000
Grassed Waterway	s/Roadsid	e Ditches													
Length, ft															
Slope, ft/ft															
Velocity ⁷ , ft/sec															
T _t , hr															0.0000
Small Tributary & S	Swamp w/	Channels													
Length, ft									845						
Slope, ft/ft									0.017						
Velocity ⁸ , ft/sec									2.738						
T _t , hr									0.086						0.0857
Large Tributary															
Length, ft															
Slope, ft/ft															
Velocity ⁸ , ft/sec															
T _t , hr															0.0000
Culvert															
Diameter, ft															
Area, ft ²															
Wetted Perimeter, ft															
Hydraulic Radius, R, ft															
Slope, ft/ft															
Manning's No.															
Velocity ¹¹ , ft/sec															
Length, L, ft															
Γ _t , hr															0.0000
														HR	1.773
														Min	106.41
														<u> </u>	100.41

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checker	-	RLD 8/8/24 PGT
Subcatchment:	18S - Pre	9							Revised		101
Time of Concent	ration De	terminat	ion Wor	ksheet,	SCS Me	thods					
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
SHEET FLOW	0.400										
Manning's No. Length, ft	0.400 100										
P2, in	2.39										
Slope, ft/ft	0.015										
T _t , hr	0.465										0.4646
SHALLOW CONCE	NTRATED	FLOW									
Paved											
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec T _t , hr											0.0000
Unpaved											0.0000
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr			<u></u>		<u></u>			<u>L_</u>	<u>L</u>		0.0000
Cultivated											
Length, ft											
Slope, ft/ft											
Velocity ⁴ , ft/sec											
T _t , hr											0.0000
Short Grass Pastu	re										
Length, ft Slope, ft/ft											
Velocity ⁴ , ft/sec											
T _t hr											0.0000
Woodland											
Length, ft		205	2144								
Slope, ft/ft		0.010	0.092								
Velocity⁵, ft/sec		0.5000	1.5166								
T _t , hr		0.114	0.393								0.5066
CHANNEL FLOW Waterways & Swan	nno No Ci	annolo									
Length, ft	lips, No Ci	lailleis									
Slope, ft/ft											
Velocity ⁶ , ft/sec											
T _t , hr											0.0000
Grassed Waterway	s/Roadsid	e Ditches									
Length, ft				1440							
Slope, ft/ft				0.038							
Velocity ⁷ , ft/sec				2.924							0.4000
T _t , hr	Sugar will	hannala		0.137							0.1368
Small Tributary & S Length, ft	owamp w/C	manneis									
Lengin, it Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Large Tributary											
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											0.000
T _t , hr											0.0000
Culvert Diameter, ft											
Diameter, it Area, ft²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
Velocity ¹¹ , ft/sec											
Length, L, ft											
T _t , hr										U	0.0000
										HR	1.108
										Min	66.48

SHEET FLOW					Calculat Date: Checked	-	RLD 8/8/24 PGT
Seg 1 Seg 2 SHEET FLOW					Revised		101
SHEET FLOW Manning's No. 0.400 Length, ft 100 P2, in 2.39 Slope, ft/ft 0.015 T,¹, hr 0.465 SHALLOW CONCENTRATED FLOW Paved Length, ft Slope, ft/ft Velocity², ft/sec T,³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T,³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T,³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec T,³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec T,³, hr Grassed Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity⁴, ft/sec T,³, hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity⁴, ft/sec T,³, hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity⁴, ft/sec T,¹, hr Channels Length, ft Slope, ft/ft Velocity⁴, ft/sec T,², hr Chapth, ft Slope, ft/ft Velocity⁴, ft/sec T,², hr Chipth Velocity⁴, ft/sec T,², hr	Worksheet.						
SHEET FLOW Manning's No. 0.400 Length, ft 100 P2 , in 2.39 Slope, ft/ft 0.015 T,¹, hr 0.465 SHALLOW CONCENTRATED FLOW Paved Length, ft Slope, ft/ft Velocity², ft/sec T,², hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T,², hr Cultivated Length, ft Slope, ft/ft Velocity², ft/sec T,², hr Wolodland Length, ft Slope, ft/ft Velocity², ft/sec T,², hr Woodland Length, ft Slope, ft/ft Velocity², ft/sec T,², hr GHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity³, ft/sec T,², hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity³, ft/sec T,², hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity³, ft/sec T,², hr Channels Length, ft Slope, ft/ft Velocity³, ft/sec T,², hr Channels Length, ft Slope, ft/ft Velocity³, ft/sec T,², hr Channels Length, ft Slope, ft/ft Velocity³, ft/sec T,², hr Chare, ft/ft Velocity³, ft/sec T,², hr Chare, ft/ft Velocity³, ft/sec T,², hr Culvert Diumeter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft	Seg 3 Seg 4	s	Seg 7	Seg 8	Seg 9	Seg 10	
Length, ft P2 , in P3 , in P4 , in P5 , in P5 , in P6 , in P6 , in P6 , in P7 , in P8			Ť			Ť	
Slope, ft/ft T,' hr ShALLOW CONCENTRATED FLOW Paved Length, ft Slope, ft/ft Velocity', ft/sec T,' hr Cultivated Length, ft Slope, ft/ft Velocity', ft/sec T,' hr Short Grass Pasture Length, ft Slope, ft/ft Velocity', ft/sec T,' hr Short Grass Pasture Length, ft Slope, ft/ft Velocity', ft/sec T,' hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity', ft/sec T,' hr CHANNEL FLOW Materways & Swamps, No Channels Length, ft Slope, ft/ft Velocity', ft/sec T,' hr Criph ft Slope, ft/ft Velocity', ft/sec T,' hr Channels Length, ft Slope, ft/ft Velocity', ft/sec T,' hr Chanter Swamp w/Channels Length, ft Slope, ft/ft Velocity', ft/sec T,' hr Cultert Diameter, ft Area, ft' Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Velocity', ft/sec T, hr Culvert Diameter, ft Area, ft' Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Velocity', ft/sec Length, ft Slope, ft/ft Velocity', ft/sec T, hr Culvert Diameter, ft Area, ft' Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Velocity', ft/sec Length, L, ft							
Slope, ft/ft T,¹, hr SHALLOW CONCENTRATED FLOW Paved Length, ft Slope, ft/ft Velocity², ft/sec T,³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T,³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T,³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T,³, hr Woodland Length, ft Slope, ft/ft Velocity⁵, ft/sec T,³, hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity⁶, ft/sec T,³, hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity⁶, ft/sec T,³, hr Crassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity⁶, ft/sec T, hr Carassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity⁶, ft/sec T, hr Cultivert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slopen, ft/ft Velocity⁶, ft/sec T, thr Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slopen, ft/ft Velocity¹, ft/sec Length, ft Slopen, ft/ft Velocity⁶, ft/sec T, thr Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slopen, ft/ft Velocity¹, ft/sec Length, L, ft							
SHALLOW CONCENTRATED FLOW Paved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity³, ft/sec T₁, hr Large Tributary Length, ft Slope, ft/ft Velocity³, ft/sec T₁, hr Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slopen, ft/ft Velocity³, ft/sec T₁, hr Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slopen, ft/ft Velocity³, ft/sec T₁, hr Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slopen, ft/ft Velocity¹, ft/sec Length, L, ft							
SHALLOW CONCENTRATED FLOW Paved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁, hr Chanl Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity³, ft/sec T₁, hr Chanl Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity³, ft/sec T₁, hr Chanl Tributary Length, ft Slope, ft/ft Velocity³, ft/sec T₁, hr Chanl Tributary Length, ft Slope, ft/ft Velocity³, ft/sec T₁, hr Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slopen, ft/ft Velocity¹, ft/sec Length, L, ft							
Paved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁, hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity³, ft/sec T₁, hr CHangth, ft Slope, ft/ft Velocity³, ft/sec T₁, hr Changth, ft Slope, ft/ft Velocity³, ft/sec T₁, hr Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Area, ft² Area, f							0.4646
Length, ft Slope, ft/ft Velocity², ft/sec T₁³ hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁, hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity³, ft/sec T₁, hr CHANNEL FLOW CHANEL FLOW CHANNEL FLOW CHANNEL FLOW CHANNEL FLOW CHANNEL FLOW CHANNEL FLOW CHANNEL F							
Slope, ft/ft Velocity ² , ft/sec T ₁ , hr Unpaved Length, ft Slope, ft/ft Velocity ² , ft/sec T ₁ , hr Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ , hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Velocity ¹ , ft/sec Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Velocity ¹ , ft/sec Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr							
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Ti, hr 0.114 CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec Ti, hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁷ , ft/sec Ti, hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec Ti, hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec Ti, hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Welcoity ¹ , ft/sec Length, L, ft	0.092						
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Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Whoraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft							
Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹ , ft/sec Length, L, ft	1440						
T ₁ , hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft	0.038						
Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T _i , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T _i , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft	2.924						
Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft	0.137						0.1368
Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft							
Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft							
T _t , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T _t , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft							
Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft							
Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T,, hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft							0.0000
Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft							
Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft							
Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft							
Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft							0.0000
Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft							0.0000
Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft							
Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft							
Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft							
Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft							
Manning's No. Velocity ¹¹ , ft/sec Length, L, ft							
Velocity ¹¹ , ft/sec Length, L, ft							
Length, L, ft							
							0.0000
						HR	1.108
						Min	66.48

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979	ek Solar							Calculate:	d By:	RLD 8/8/24 PGT
Subcatchment:	19S - Pro		ion M	liak - 1	000.14	the a -l			Revised	:	
Time of Concent											
SHEET FLOW	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
Manning's No.	0.400										
Length, ft	100										
P2 , in	2.39										
Slope, ft/ft	0.010										
T _t , hr	0.546										0.5464
SHALLOW CONCE	NTRATED	FLOW									
Paved					ı						
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec T _t ³, hr											0.0000
Unpaved											0.0000
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Cultivated											
Length, ft											
Slope, ft/ft											
Velocity⁴, ft/sec											
T _t , hr											0.0000
Short Grass Pastui	re										
Length, ft			706	109	244						
Slope, ft/ft			0.072	0.005	0.041						
Velocity ⁴ , ft/sec			1.8783	0.4950	1.4174						
T _t , hr			0.104	0.061	0.048						0.2134
Woodland		4045									
Length, ft Slope, ft/ft		1915									
Velocity ⁵ , ft/sec		0.089 1.4916									
T _t , hr		0.357									0.3566
CHANNEL FLOW		0.007									0.0000
Waterways & Swan	nps, No Cl	nannels									
Length, ft											
Slope, ft/ft											
Velocity ⁶ , ft/sec											
T _t , hr											0.0000
Grassed Waterway	s/Roadsid	e Ditches	3	ı	I		I		1		
Length, ft											
Slope, ft/ft Velocity ⁷ , ft/sec											
T _t , hr											0.0000
Small Tributary & S	Swamn w/C	hannels									0.0000
Length, ft	unp w/C					706	923				
Slope, ft/ft						0.006	0.012				
Velocity ⁸ , ft/sec						1.627	2.300				
T _t , hr						0.121	0.111				0.2320
Large Tributary											
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Culvert											
Diameter, ft											
Area, ft ²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft Slope, ft/ft											
Siope, π/π Manning's No.											
Velocity ¹¹ , ft/sec											
Length, L, ft											
T _t , hr											0.0000
	1			1	1			1		HR	1.348
										Min	80.91
										Train 11	00.31

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Subcatchment:	19S - PC				20014				Revised	:	
Time of Concentr							C 7	Co 0	S 0	C== 40	
SHEET FLOW	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
Manning's No.	0.400										
_ength, ft	100										
P2, in	2.39										
Slope, ft/ft	0.010										
t, hr	0.546										0.5464
SHALLOW CONCE	NTRATED	FLOW									
Paved ength, ft	<u> </u>										
Slope, ft/ft											
/elocity ² , ft/sec											
t, hr											0.0000
Jnpaved											
ength, ft											
Slope, ft/ft											
/elocity ² , ft/sec											
t, hr											0.0000
Cultivated											
ength, ft											
Slope, ft/ft /elocity ⁴ , ft/sec											
/elocity*, ft/sec -³ _, hr											0.0000
Short Grass Pastur	<u> </u>										0.0000
ength, ft	G		706	109	244						
Slope, ft/ft			0.072	0.005	0.041						
/elocity ⁴ , ft/sec			1.8783	0.4950	1.4174						
t, hr			0.104	0.061	0.048						0.2134
Noodland											
ength, ft		1915									
Slope, ft/ft		0.089									
/elocity ⁵ , ft/sec		1.4916									
Γ ³ , hr		0.357									0.3566
CHANNEL FLOW	N. OI										
Naterways & Swam	ps, No Cr	nanneis									
_ength, ft Slope, ft/ft											
/elocity ⁶ , ft/sec											
$\Gamma_{t,}^{3}$ hr											0.0000
Grassed Waterways	/Roadsid	e Ditches									
ength, ft											
Slope, ft/ft											
/elocity ⁷ , ft/sec											
լ, hr											0.0000
Small Tributary & S	wamp w/C	Channels									
ength, ft						706	923				
Slope, ft/ft /elocity ⁸ , ft/sec						0.006	0.012				
/eiocity*, π/sec Γ _t , hr						1.627 0.121	2.300 0.111				0.2320
_arge Tributary						0.121	0.111				0.2320
ength, ft											
Slope, ft/ft											
/elocity ⁸ , ft/sec											
t, hr											0.0000
Culvert											
Diameter, ft											
rea, ft ²											
Vetted Perimeter, ft											
lydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No. /elocity ¹¹ , ft/sec											
reiocity , it/sec ∟ength, L, ft											
	1										
											0.0000
engin, L, ii -, hr										HR	0.0000

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Subcatchment:	20S - Pre	9							Revised		101
Time of Concenti	ration De	terminat	ion Worl	ksheet,	SCS Me	thods					
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
SHEET FLOW											
Manning's No.	0.240										
Length, ft	100										
P2 , in	2.39										
Slope, ft/ft T _t ¹ˌhr	0.017 0.294										0.2937
SHALLOW CONCE		FLOW									0.2937
Paved	MINAILD	1 LOW									
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Unpaved											
_ength, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
Γ ³ , hr											0.0000
Cultivated											
_ength, ft Slope, ft/ft											
Siope, π/π Velocity ⁴ , ft/sec											
Velocity , it/sec Γ _t , hr											0.0000
Short Grass Pastur	re										0.0000
_ength, ft		1739									
Slope, ft/ft		0.006									
Velocity ⁴ , ft/sec		0.5422									
Γ _t , hr		0.891									0.8909
Woodland											
Length, ft											
Slope, ft/ft											
Velocity ⁵ , ft/sec											
T _t , hr											0.0000
CHANNEL FLOW Waterways & Swan	nno No Ci	annolo									
Length, ft	lips, No Ci	lailleis									
Slope, ft/ft											
Velocity ⁶ , ft/sec											
Γ _t , hr											0.0000
Grassed Waterway	s/Roadsid	e Ditches									
Length, ft											
Slope, ft/ft											
Velocity ⁷ , ft/sec											
Γ _t , hr											0.0000
Small Tributary & S	Swamp w/C	Channels									
_ength, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec T _t , hr											0.0000
Large Tributary											0.0000
Large Tributary Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
Γ _t , hr											0.0000
Culvert											
Diameter, ft											
Area, ft²											
Vetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
Velocity ¹¹ , ft/sec											
ւength, L, ft Г _t , hr											0.0000
0 - "							1	1		HR	
										II	1.185
										Min	71.07

PROJECT: TRC Proj. No.: Subcatchment:	Cordelic Flat Cre 435979 20S - PC	ek Solar									Calculate: Date: Checkee	d By:	RLD 8/8/24 PGT
Time of Concent			tion Wor	ksheet,	SCS Me	thods							
SHEET FLOW	Seg 1	Seg 2	Seg 3	Seg 4			Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
Manning's No.	0.240						0.240						
Length, ft	100						100						
P2, in	2.39						2.39						
Slope, ft/ft	0.017						0.003						
T _t ,hr	0.294						0.588						0.8815
SHALLOW CONCE Paved	NTRATED	FLOW											
Length, ft													
Slope, ft/ft													
Velocity ² , ft/sec													
T _t , hr													0.0000
Unpaved			00		00					I			
Length, ft Slope, ft/ft			20 0.01		22 0.009								
Velocity ² , ft/sec			1.61345		1.530653								
T _t , hr			0.003		0.004								0.0074
Cultivated													
Length, ft													
Slope, ft/ft Velocity ⁴ , ft/sec													
T _t , hr													0.0000
Short Grass Pastu	re												
Length, ft		391		981		129		94					
Slope, ft/ft		0.008		0.006		0.001		0.002					
Velocity ⁴ , ft/sec		0.6261		0.5422		0.2214		0.3130					0.0040
T _t , hr		0.173		0.503		0.162		0.083					0.9213
Woodland													
Length, ft Slope, ft/ft													
Velocity ⁵ , ft/sec													
T _t hr													0.0000
CHANNEL FLOW													
Waterways & Swar	mps, No C	hannels											
Length, ft													
Slope, ft/ft													
Velocity ⁶ , ft/sec													0.0000
T _t , hr		la Dit-la											0.0000
Grassed Waterway	/s/Koadsid	ie Ditche	S										
Length, ft Slope, ft/ft													
Velocity ⁷ , ft/sec													
T _t , hr													0.0000
Small Tributary &	Swamp w/	Channels											
Length, ft													
Slope, ft/ft													
Velocity ⁸ , ft/sec													
T _t , hr													0.0000
Large Tributary													
Length, ft													
Slope, ft/ft Velocity ⁸ , ft/sec													
T _t , hr													0.0000
Culvert													2.0000
Diameter, ft													
Area, ft ²													
Wetted Perimeter, ft													
Hydraulic Radius, R, ft													
Slope, ft/ft													
Manning's No.													
Velocity ¹¹ , ft/sec													
Length, L, ft T _t , hr													0.0000
1 t, 1 H												llup	0.0000
												HR	1.810
												Min	108.61

PROJECT: TRC Proj. No.: Subcatchment:	Cordelio Flat Creel 435979 PRE 21S	k Solar					Calculat Date: Checked Revised	l By:	RLD 8/8/24 PGT
Time of Concentrati		nination	Worksh	eet. SCS	S Method	S			
Timo or concontida	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	
SHEET FLOW									
Manning's No.	0.24								
Length, ft	100								
P2 , in	2.40								
Slope, ft/ft	0.041								
T _t , hr	0.206								0.2061
SHALLOW CONCENTE Paved	RAIEDFLO	ν							
Length, ft									
Slope, ft/ft									
Velocity ² , ft/sec									
T^3_{t},hr									0.0000
Unpaved									
Length, ft									
Slope, ft/ft									
Velocity ² , ft/sec									
T _t , hr									0.0000
Cultivated									
Length, ft									
Slope, ft/ft									
Velocity ⁴ , ft/sec									
T _t , hr Short Grass Pasture									0.0000
		004							
Length, ft Slope, ft/ft		821 0.01							
Velocity ⁴ , ft/sec		0.7000							
T _t , hr		0.7000							0.3258
Woodland		0.020							0.0200
Length, ft									
Slope, ft/ft									
Velocity ⁵ , ft/sec									
T _t , hr									0.0000
CHANNEL FLOW									
Waterways & Swamps	, No Chanr	nels						I	
Length, ft									
Slope, ft/ft Velocity ⁶ , ft/sec									
T _t , hr									0.0000
Grassed Waterways/R	nadeide Di	tchos							0.0000
Length, ft	oausiue Di	tories							
Slope, ft/ft									
Velocity ⁷ , ft/sec									
T _t , hr									0.0000
Small Tributary & Swa	mp w/Chai	nnels							
Length, ft									
Slope, ft/ft									
Velocity ⁸ , ft/sec									
T _t , hr									0.0000
Large Tributary									
Length, ft									
Slope, ft/ft									
Velocity ⁸ , ft/sec									0.0000
T _t , hr									0.0000
Culvert Diameter, ft									
Diameter, π Area, ft ²									
Wetted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, ft/ft									
Manning's No.									
Velocity ¹² , ft/sec									
Length, L, ft									
T _t , hr						<u>L_</u>			0.0000
								ШΒ	0.500
								HR	0.532
								Min	31.91

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979	k Solar					Calculat Date: Checked		RLD 8/8/24 PGT
Subcatchment:	POST 218	5					Revised		
Time of Concentrat	ion Deterr	mination	Worksh	eet, SCS	6 Method	S			
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	
SHEET FLOW	0.04								
Manning's No. Length, ft	0.24 100								
P2, in	2.40								
Slope, ft/ft	0.041								
T _t ¹ ,hr	0.206								0.2061
SHALLOW CONCENT	RATED FLO	ÓW							
Paved								ı	
Length, ft									
Slope, ft/ft Velocity ² , ft/sec									
T _t , hr									0.0000
Unpaved									0.0000
Length, ft									
Slope, ft/ft									
Velocity ² , ft/sec									
T _t , hr									0.0000
Cultivated									
Length, ft									
Slope, ft/ft Velocity⁴, ft/sec									
T _t , hr									0.0000
Short Grass Pasture									0.0000
Length, ft		821							
Slope, ft/ft		0.01							
Velocity ⁴ , ft/sec		0.7000							
T _t , hr		0.326							0.3258
Woodland									
Length, ft									
Slope, ft/ft Velocity ⁵ , ft/sec									
T _t , hr									0.0000
CHANNEL FLOW									0.0000
Waterways & Swamps	, No Chani	nels							
Length, ft									
Slope, ft/ft									
Velocity ⁶ , ft/sec									0.0000
Tt, hr Grassed Waterways/R	loadaida Di	itahaa							0.0000
Length, ft	oausiue Di	itties							
Slope, ft/ft									
Velocity ⁷ , ft/sec									
T _t , hr									0.0000
Small Tributary & Swa	mp w/Cha	nnels							
Length, ft									
Slope, ft/ft									
Velocity ⁸ , ft/sec									
T _t , hr									0.0000
Large Tributary									
Length, ft Slope, ft/ft									
Velocity ⁸ , ft/sec									
T _t , hr									0.0000
Culvert									
Diameter, ft									
Area, ft ²									
Wetted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, ft/ft									
Manning's No. Velocity ¹² , ft/sec									
Length, L, ft									
T _t , hr									0.0000
	1		I.			1	ı	l	
								HR	0.532
								Min	31.91

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979	k Solar					Calculat Date: Checked		RLD 8/8/24 PGT
Subcatchment:	PRE 22S						Revised		1 01
Time of Concentrat	ion Deterr	mination	Worksh	eet, SCS	S Method	S			
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	
SHEET FLOW									
Manning's No.	0.24								
Length, ft P2,in	100 2.40								
Slope, ft/ft	0.005								
T _t , hr	0.478								0.4782
SHALLOW CONCENT		ow							
Paved									
Length, ft									
Slope, ft/ft									
Velocity ² , ft/sec T _t ³ _, hr									0.0000
Unpaved									0.0000
Length, ft									
Slope, ft/ft									
Velocity ² , ft/sec									
T _t , hr									0.0000
Cultivated									
Length, ft									
Slope, ft/ft									
Velocity⁴, ft/sec Tt³ _, hr									
									0.0000
Short Grass Pasture Length, ft		1072							
Slope, ft/ft		0.013							
Velocity ⁴ , ft/sec		0.7981							
T _t , hr		0.373							0.3731
Woodland									
Length, ft			83						
Slope, ft/ft			0.133						
Velocity ⁵ , ft/sec			1.8235						
T _t , hr			0.013						0.0126
CHANNEL FLOW	No Chan	nolo							
Waterways & Swamps Length, ft	s, NO Chain	ileis							
Slope, ft/ft									
Velocity ⁶ , ft/sec									
T _t , hr									0.0000
Grassed Waterways/R	oadside D	itches					-		
Length, ft									
Slope, ft/ft									
Velocity ⁷ , ft/sec									
T _t , hr									0.0000
Small Tributary & Swa	mp w/Cha	nnels		401					
Length, ft Slope, ft/ft				184 0.011					
Velocity ⁸ , ft/sec				2.202					
T _t , hr				0.023					0.0232
Large Tributary				0.023					0.0232
Length, ft						<u> </u>			
Slope, ft/ft									
Velocity ⁸ , ft/sec									
T _t , hr									0.0000
Culvert									
Diameter, ft									
Area, ft ²									
Wetted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, ft/ft Manning's No.									
vianning's No. Velocity ¹² , ft/sec									
Length, L, ft									
Γ _t , hr									0.0000
	1		ı			1	ı	l	
								HR	0.887
								Min	53.23

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979	k Solar					Calculat Date: Checked		RLD 8/8/24 PGT
Subcatchment:	POST 228						Revised	: -	
Time of Concentrati	on Deterr	nination	Worksh	eet, SCS	6 Method	S			
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	
SHEET FLOW									
Manning's No.	0.24								
Length, ft	100								
P2, in	2.40								
Slope, ft/ft T _t ¹, hr	0.005 0.478								0.4782
SHALLOW CONCENTE)W							0.4762
Paved	VAILDIL	/VV							
Length, ft									
Slope, ft/ft									
Velocity ² , ft/sec									
T _t , hr									0.0000
Unpaved									
Length, ft									
Slope, ft/ft									
Velocity ² , ft/sec									
T _t , hr									0.0000
Cultivated									
Length, ft									
Slope, ft/ft									
Velocity⁴, ft/sec									
T _t , hr									0.0000
Short Grass Pasture									
Length, ft		1072							
Slope, ft/ft Velocity ⁴ , ft/sec		0.013							
Velocity , firsec T _t , hr		0.7981 0.373							0.3731
Woodland		0.575							0.3731
Length, ft			83						
Slope, ft/ft			0.133						
Velocity ⁵ , ft/sec			1.8235						
T _t , hr			0.013						0.0126
CHANNEL FLOW									
Waterways & Swamps	, No Chani	nels							
Length, ft									
Slope, ft/ft									
Velocity ⁶ , ft/sec									
T _t ³ , hr									0.0000
Grassed Waterways/R	oadside Di	tches	ı			1		1	
Length, ft									
Slope, ft/ft									
Velocity ⁷ , ft/sec									0.0000
T _t , hr									0.0000
Small Tributary & Swa	mp w/Cha	nneis		404					
Length, ft Slope, ft/ft				184					
Siope, π/π Velocity ⁸ , ft/sec				0.011 2.202					
T _t , hr									0.0000
				0.023					0.0232
Large Tributary									
Length, ft									
Slope, ft/ft Velocity ⁸ , ft/sec									
T _t , hr									0.0000
Culvert									2.3000
Diameter, ft									
Area, ft ²									
Netted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, ft/ft									
Manning's No.									
/elocity ¹² , ft/sec									
ength, L, ft									
t, hr									0.0000
								HR	0.887
								Min	53.23

PROJECT: TRC Proj. No.: Subcatchment:	Cordelio Flat Creel 435979 PRE 23S	k Solar					Calculat Date: Checked Revised	d By:	RLD 8/8/24 PGT
Time of Concentrati		nination	Worksh	eet. SCS	S Method	S			
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	
SHEET FLOW									
Manning's No.	0.4								
Length, ft	100								
P2 , in	2.40								
Slope, ft/ft	0.042								
T _t , hr	0.307								0.3071
SHALLOW CONCENTE	RATED FLO	DW							
Paved	1					T.	I		
Length, ft									
Slope, ft/ft Velocity², ft/sec									
T _t , hr									0.0000
Unpaved									0.0000
Length, ft									
Slope, ft/ft									
Velocity ² , ft/sec									
T _t , hr									0.0000
Cultivated									
Length, ft									
Slope, ft/ft									
Velocity ⁴ , ft/sec									
T _t , hr									0.0000
Short Grass Pasture									
Length, ft									
Slope, ft/ft									
Velocity ⁴ , ft/sec									
T _t , hr									0.0000
Woodland									
Length, ft		1941	806						
Slope, ft/ft		0.085	0.058						
Velocity ⁵ , ft/sec T _t ³ _, hr		1.4577	1.2042 0.186						0.5550
CHANNEL FLOW		0.370	0.100						0.5558
Waterways & Swamps	No Chanr	nels							
Length, ft	, ito onam								
Slope, ft/ft									
Velocity ⁶ , ft/sec									
T _t ³ , hr									0.0000
Grassed Waterways/R	oadside Di	tches							
Length, ft								770	
Slope, ft/ft								0.012	
Velocity ⁷ , ft/sec								1.643	
T _t , hr								0.130	0.1302
Small Tributary & Swa	mp w/Chai	nnels							
Length, ft				1740	1229	1895	650		
Slope, ft/ft Velocity ⁸ , ft/sec				0.014	0.055	0.025	0.018		
				2.485	4.925	3.320	2.817		
T _t , hr				0.195	0.069	0.159	0.064		0.4865
Large Tributary									
Length, ft									
Slope, ft/ft Velocity ⁸ , ft/sec									
Velocity', π/sec T _t , hr									0.0000
Culvert									0.0000
Diameter, ft									
Area, ft ²									
Netted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, ft/ft									
Manning's No.									
Velocity ¹² , ft/sec									
_ength, L, ft									
Γ _t , hr									0.0000
								HR	1.480
									1.400
								Min	88.77

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979 POST 235						Calculate:	d By:	RLD 8/8/24 PGT
Subcatchment:			Morkob	act CC	C Mathad	_	Revised	:	
Time of Concentration							07	00	
SHEET FLOW	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	
Manning's No.	0.4								
Length, ft	100								
P2 , in	2.40								
Slope, ft/ft	0.042								
T _t ,hr	0.307								0.3071
SHALLOW CONCENTR		ow .							
Paved									
Length, ft									
Slope, ft/ft									
Velocity ² , ft/sec									
T _t , hr									0.0000
Unpaved									
Length, ft									
Slope, ft/ft									
Velocity ² , ft/sec									
T _t , hr									0.0000
Cultivated									
Length, ft									
Slope, ft/ft									
Velocity ⁴ , ft/sec									
Tt ³ , hr									0.0000
Short Grass Pasture									
Length, ft									
Slope, ft/ft									
Velocity⁴, ft/sec									
T _t , hr									0.0000
Woodland	ı								
Length, ft		1941	806						
Slope, ft/ft		0.085	0.058						
Velocity ⁵ , ft/sec		1.4577	1.2042						
T _t , hr		0.370	0.186						0.5558
CHANNEL FLOW	No Chan								
Waterways & Swamps	, No Chani	neis							
Length, ft									
Slope, ft/ft Velocity ⁶ , ft/sec									
Velocity , fi/sec T _t ³ , hr									0.0000
	andaida Di	4-6							0.0000
Grassed Waterways/Ro	Dadside Di	tcnes						770	
Length, ft								770	
Slope, ft/ft Velocity ⁷ , ft/sec								0.012	
T _t , hr								1.643	0.1202
	mm w/Oh -	nnals						0.130	0.1302
Small Tributary & Swa	mp w/Cha	ineis		4740	4000	1005	050		
Length, ft				1740	1229	1895	650		
Slope, ft/ft Velocity ⁸ , ft/sec				0.014	0.055	0.025	0.018		
				2.485	4.925	3.320	2.817		
T _t , hr				0.195	0.069	0.159	0.064		0.4865
Large Tributary									
Length, ft									
Slope, ft/ft									
Velocity ⁸ , ft/sec									
T _t , hr									0.0000
Culvert									
Diameter, ft									
Area, ft ²									
Wetted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, ft/ft									
Manning's No.									
Velocity ¹² , ft/sec									
Length, L, ft									
Γ _t , hr									0.0000
	·		·	·				HR	1.480
								Min	88.77

PROJECT: TRC Proj. No.:	Cordelio Flat Creel 435979	k Solar					Calculat Date: Checked		RLD 8/8/24 PGT
Subcatchment:	PRE 24S						Revised		
Time of Concentrat	icPRE 24S								
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	
SHEET FLOW									
Manning's No.	0.24								
Length, ft	100								
P2, in	2.40								
Slope, ft/ft	0.025								0.0510
T _t 1,hr SHALLOW CONCENT	0.251	NW.							0.2512
Paved	KAIEDFLO	JVV							
Length, ft									
Slope, ft/ft									
Velocity ² , ft/sec									
T _t , hr									0.0000
Unpaved									
Length, ft									
Slope, ft/ft									
Velocity ² , ft/sec									
T _t , hr									0.0000
Cultivated									
Length, ft									
Slope, ft/ft									
Velocity ⁴ , ft/sec									
T _t , hr									0.0000
Short Grass Pasture									
Length, ft		830							
Slope, ft/ft		0.02							
Velocity ⁴ , ft/sec T _t ³ , hr		0.9899							0.0000
		0.233							0.2329
Woodland	1								
Length, ft Slope, ft/ft									
Velocity ⁵ , ft/sec									
T _t , hr									0.0000
CHANNEL FLOW									0.0000
Waterways & Swamps	s. No Chani	nels							
Length, ft									
Slope, ft/ft									
Velocity ⁶ , ft/sec									
T _t , hr									0.0000
Grassed Waterways/R	loadside Di	tches							
Length, ft			270						
Slope, ft/ft			0.021						
Velocity ⁷ , ft/sec			2.174						
T _t , hr			0.035						0.0345
Small Tributary & Swa	mp w/Cha	nnels							
Length, ft									
Slope, ft/ft									
Velocity ⁸ , ft/sec									
T _t , hr									0.0000
Large Tributary			1					1	
Length, ft									
Slope, ft/ft									
Velocity ⁸ , ft/sec T _t , hr									0.0000
									0.0000
Culvert									
Diameter, ft Area, ft ²									
Netted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, ft/ft									
Manning's No.									
/elocity ¹² , ft/sec									
ength, L, ft									
Γ _t , hr									0.0000
t, III									
t III								l	
6 III								HR	0.519

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979	k Solar					Calculat Date: Checked		RLD 8/8/24 PGT
Subcatchment:	POST 249	3					Revised		
Time of Concentrati	PRE 24S								
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	
SHEET FLOW									
Manning's No.	0.24								
Length, ft	100								
P2, in	2.40								
Slope, ft/ft	0.025								0.0540
T _t 1,hr SHALLOW CONCENTI	0.251)W							0.2512
Paved	MAIED FLO	JVV							
Length, ft									
Slope, ft/ft									
Velocity ² , ft/sec									
T _t , hr									0.0000
Unpaved									
ength, ft									
Slope, ft/ft									
Velocity ² , ft/sec									
T _t , hr									0.0000
Cultivated									
Length, ft									
Slope, ft/ft									
Velocity ⁴ , ft/sec									
T _t , hr									0.0000
Short Grass Pasture									
Length, ft		830							
Slope, ft/ft		0.02							
Velocity ⁴ , ft/sec		0.9899							
T _t , hr		0.233							0.2329
Woodland									
Length, ft									
Slope, ft/ft									
Velocity ⁵ , ft/sec									0.0000
T _t 3, hr CHANNEL FLOW									0.0000
Waterways & Swamps	No Chan	nole							
Length, ft	, NO Onam	11013							
Slope, ft/ft									
Velocity ⁶ , ft/sec									
T _t , hr									0.0000
Grassed Waterways/R	oadside Di	itches							
Length, ft			270						
Slope, ft/ft			0.021						
Velocity ⁷ , ft/sec			2.174						
T _t , hr			0.035						0.0345
Small Tributary & Swa	mp w/Cha	nnels							
Length, ft									
Slope, ft/ft									
Velocity ⁸ , ft/sec									
T _t , hr									0.0000
Large Tributary									
Length, ft									
Slope, ft/ft									
Velocity ⁸ , ft/sec									
T _t , hr									0.0000
Culvert									
Diameter, ft									
Area, ft ²									
Netted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, ft/ft									
Manning's No.									
/elocity ¹² , ft/sec									
ength, L, ft									
t, hr									0.0000
								HR	0.519
								Min	31.11

PROJECT:	Cordelio Flat Cree 435979	k Solar					Calculat Date: Checked		RLD 8/8/24 PGT
Subcatchment:	PRE 25S						Revised		_
Time of Concentrat	ion Deterr	mination	Worksh	eet, SC	S Method	S			
OUEET EL OW	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	
SHEET FLOW	0.04								
Manning's No. Length, ft	0.24 100								
P2, in	2.40								
Slope, ft/ft	0.019								
T _t ,hr	0.280								0.2803
SHALLOW CONCENT	RATED FLO)W							
Paved		1							
Length, ft									
Slope, ft/ft Velocity ² , ft/sec									
T _t , hr									0.0000
Unpaved									
Length, ft									
Slope, ft/ft									
Velocity ² , ft/sec									
T _t , hr									0.0000
Cultivated									
Length, ft Slope, ft/ft									
Velocity ⁴ , ft/sec									
T _t , hr									0.0000
Short Grass Pasture									
Length, ft			640						
Slope, ft/ft			0.03						
Velocity ⁴ , ft/sec			1.2124						
T _t , hr			0.147						0.1466
Woodland		4004							
Length, ft Slope, ft/ft		1281 0.051							
Velocity ⁵ , ft/sec		1.1292							
T _t , hr		0.315							0.3151
CHANNEL FLOW									
Waterways & Swamps	, No Chan	nels							
Length, ft									
Slope, ft/ft Velocity ⁶ , ft/sec									
Velocity , it/sec T _t , hr									0.0000
Grassed Waterways/R	oadside D	itches							0.0000
Length, ft	- Caaciac B	101100							
Slope, ft/ft									
Velocity ⁷ , ft/sec									
T _t , hr									0.0000
Small Tributary & Swa	mp w/Cha	nnels							
Length, ft				4093	482	682			
Slope, ft/ft Velocity ⁸ , ft/sec				0.036	0.007 1.757	0.013			
Velocity , fi/sec T _t , hr				3.984		2.394			0.4467
Large Tributary				0.285	0.076	0.079			0.4407
Large Iributary Length, ft									
Slope, ft/ft									
Velocity ⁸ , ft/sec									
T _t , hr									0.0000
Culvert									
Diameter, ft									
Area, ft ²									
Wetted Perimeter, ft									
Hydraulic Radius, R, ft Slope, ft/ft									
Siope, π/π Manning's No.									
Velocity ¹² , ft/sec									
Length, L, ft									
Γ _t , hr									0.0000
								HR	1 100
									1.183
								Min	70.97

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979	k Solar					Calculat Date: Checked		RLD 8/8/24 PGT
Subcatchment:	POST 25	3					Revised		
Time of Concentrati	on Deterr	mination	Worksh	eet, SCS	S Method	S			
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	
SHEET FLOW									
Manning's No.	0.24								
Length, ft	100								
P2, in	2.40 0.019								
Slope, ft/ft T _t ¹ _, hr	0.019								0.2803
SHALLOW CONCENTE		ow.							0.2003
Paved									
Length, ft									
Slope, ft/ft									
Velocity ² , ft/sec									
Γ ³ , hr									0.0000
Unpaved		_						_	
ength, ft									
Slope, ft/ft									
Velocity ² , ft/sec T _t ³, hr									0.0000
									0.0000
Cultivated									
Length, ft Slope, ft/ft									
Velocity ⁴ , ft/sec									
T _t , hr									0.0000
Short Grass Pasture									3.3330
Length, ft			640						
Slope, ft/ft			0.03						
Velocity ⁴ , ft/sec			1.2124						
T _t , hr			0.147						0.1466
Woodland									
Length, ft		1281							
Slope, ft/ft		0.051							
Velocity ⁵ , ft/sec		1.1292							
T _t , hr		0.315							0.3151
CHANNEL FLOW Waterways & Swamps	No Chan	nole							
Length, ft	, NO Chain	11613							
Slope, ft/ft									
Velocity ⁶ , ft/sec									
T _t ³ , hr									0.0000
Grassed Waterways/R	oadside D	itches							
Length, ft									
Slope, ft/ft									
Velocity ⁷ , ft/sec									
T _t , hr									0.0000
Small Tributary & Swa	mp w/Cha	nnels							
Length, ft				4093	482	682			
Slope, ft/ft				0.036	0.007	0.013			
Velocity ⁸ , ft/sec				3.984	1.757	2.394			
T _t , hr				0.285	0.076	0.079			0.4407
Large Tributary									
Length, ft									
Slope, ft/ft Velocity ⁸ , ft/sec									
velocity , livsec T _t , hr									0.0000
Culvert									0.0000
Diameter, ft									
Area, ft ²									
Wetted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, ft/ft									
Manning's No.									
/elocity ¹² , ft/sec									
ength, L, ft									
t, hr									0.0000
					•			HR	1 102
									1.183
								Min	70.97

Sept	PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979	k Solar					Calculat Date: Checked		RLD 8/8/24 PGT
Seg 1 Seg 2 Seg 3 Seg 4 Seg 5 Seg 6 Seg 7 Seg 8	Subcatchment:									FGI
Seg 1 Seg 2 Seg 3 Seg 4 Seg 5 Seg 6 Seg 7 Seg 8			nination	Worksh	eet, SCS	S Method	S		-	
### HEET FLOW Image: No.								Seg 7	Seg 8	
	SHEET FLOW									
2, in	Manning's No.	0.24								
Description	Length, ft									
hr 0.308	P2, in									
### ALLOW CONCENTRATED FLOW awayd angh, ft pope, ftff p										
			214/							0.3081
Impared		AIEDFL	JVV							
	•									
Impaced might, if tope, this electory, fixed electory, e	Velocity ² , ft/sec									
angth, ft pope, ft/ft pope, ft/ft/ft/ft pope, ft/ft/ft pope, ft/ft/ft/ft/ft/ft/ft/ft/ft/ft	T _t , hr									0.0000
	Unpaved								•	
	Length, ft									
The	Slope, ft/ft									
Sultivated Sength, ft Cope, the Co										
										0.0000
Independent										
	Length, ft									
The content of the										
thort Grass Pasture night, ft										0.0000
angth, ft 720										0.0000
Dep. ft/ft				720						
	Slope, ft/ft									
Voodland night, ft tope, fifft elocity ² , ft/sec 3. HANNEL FLOW Vaterways & Swamps, No Channels enight, ft pope, ft/ft elocity ² , ft/sec 3. The 0.0000 Frassed Waterways/Roadside Ditches enight, ft pope, ft/ft elocity ² , ft/sec 1.643 1.647 1.648 1.649 1.649 1.649 1.649 1.649 1.649 1.640 1.640 1.640 1.641 1.641 1.642 1.643 1.643 1.643 1.643 1.644 1.644 1.645 1.645 1.645 1.646 1.646 1.647 1.648 1.6	Velocity ⁴ , ft/sec									
angth, ft ope, ft/ft o	T _t , hr			0.319						0.3194
loope, ft/ft elocity ⁵ , ft/sec	Woodland									
elocity ³ , ft/sec , hr HANNEL FLOW Vaterways & Swamps, No Channels angth, ft pope, ft/ft elocity ⁶ , ft/sec in hr 0.0000 variassed Waterways/Roadside Ditches ength, ft pope, ft/ft pope, ft/ft pope, ft/ft pope, ft/ft pope, ft/ft elocity ⁶ , ft/sec hr 0.0000 variastributary & Swamp w/Channels ength, ft pope, ft/ft elocity ⁶ , ft/sec hr 0.0000 variastributary & Swamp w/Channels ength, ft pope, ft/ft elocity ⁶ , ft/sec hr 0.0000 variastributary ength, ft pope, ft/ft elocity ⁶ , ft/sec hr 0.0000 valuvert immeler, ft rea, ft ² reted Perimeter, ft variatic Radius, R, ft pope, ft/ft elocity ⁷ , ft/sec ength, L, ft pope, ft/ft elocity ⁷ , ft/sec ength, L, ft pope, ft/ft elocity ⁷ , ft/sec ength, L, ft pope, ft/ft elocity ⁷ , ft/sec ength, L, ft pope, ft/ft elocity ⁷ , ft/sec ength, L, ft pope, ft/ft elocity ⁷ , ft/sec ength, L, ft pope, ft/ft elocity ⁷ , ft/sec ength, L, ft p, ftr	Length, ft									
### Description of the control of th	Slope, ft/ft									
HANNEL FLOW Vaterways & Swamps, No Channels angth, ft lope, ft/ft	Velocity ⁵ , ft/sec									
Vaterways & Swamps, No Channels ength, ft elocity ⁶ , ft/sec ength, ft ope, ft/ft elocity ⁶ , ft/sec ength, ft ope, ft/ft ope, ft/ft ope, ft/ft ope, ft/ft ope, ft/ft elocity ⁶ , ft/sec hr ondidate ondi	T _t , hr									0.0000
ength, ft ope, ft/ft o	Waterwaye & Swampe	No Chan	nolo							
		NO Cham	1612							
slocity ⁶ , ft/sec - hr - hr - sassed Waterways/Roadside Ditches ength, ft - lope, ft/ft - lope, ft/	Slope, ft/ft									
irassed Waterways/Roadside Ditches ength, ft	Velocity ⁶ , ft/sec									
ength, ft	T _t , hr									0.0000
ength, ft	Grassed Waterways/Ro	oadside Di	itches							
elocity ⁷ , ft/sec	Length, ft									
imall Tributary & Swamp w/Channels angth, ft lope, ft/ft lamater, ft rea, ft² //etted Perimeter, ft lope, ft/ft lamning's No. lelocity², ft/sec ength, , ft ength; ft lope, ft/ft lamning's No. lelocity², ft/sec ength, , ft ength; ft ength; ft ength; ft ength; ft/ft ength; ft/ft/ft/ft/ft/ft/ft/ft/ft/ft/ft/ft/ft/f	Slope, ft/ft		0.012							
Inmall Tributary & Swamp w/Channels ength, ft lope, ft/ft elocity ⁸ , ft/sec , hr O.0000 arge Tributary ength, ft lope, ft/ft elocity ⁸ , ft/sec , hr O.0000 Divert Inmeter, ft rea, ft // letted Perimeter, ft ydraulic Radius, R, ft lope, ft/ft lannings No. elocity ⁹ , ft/sec elocity ¹ , ft/sec	Velocity ⁷ , ft/sec									
ength, ft lope, ft/ft elocity ⁸ , ft/sec , hr arge Tributary ength, ft lope, ft/ft elocity ⁸ , ft/sec , hr 0.0000 culvert iameter, ft rea, ft ² fetted Perimeter, ft ydraulic Radius, R, ft lope, ft/ft lanning's No. elocity ¹ , ft/sec ength, L, ft , hr 0.0000 HR 0.717	T _t , hr									0.0891
lope, ft/ft elocity ⁸ , ft/sec , , hr	•	mp w/Cha	nnels							
elocity ⁸ , ft/sec , hr arge Tributary ength, ft lope, ft/ft elocity ⁸ , ft/sec , hr diameter, ft rea, ft ² /etted Perimeter, ft ydraulic Radius, R, ft lope, ft/ft lanning's No. elocity ⁸ , ft/sec ength, L, ft , hr HR 0.717	Length, ft									
hr										
arge Tributary ength, ft lope, ft/ft elocity ⁸ , ft/sec ,, hr 0.0000 Culvert iameter, ft rea, ft ² //etted Perimeter, ft ydraulic Radius, R, ft lope, ft/ft lanning's No. elocity ¹² , ft/sec ength, L, ft ,, hr HR 0.717										0.000
ength, ft lope, ft/ft elocity ⁸ , ft/sec , hr divert iameter, ft rea, ft² /etted Perimeter, ft ydraulic Radius, R, ft lope, ft/ft lanning's No. elocity ¹ , ft/sec ength, L, ft , hr HR 0.717										0.0000
lope, ft/ft elocity ⁸ , ft/sec , , hr										
Delocity®, ft/sec Delocity®, ft/sec Delocity®, ft/sec Delocity®, ft/sec Delocity®, ft/sec Delocity®	-									
tulvert iameter, ft rea, ft² /etted Perimeter, ft ydraulic Radius, R, ft lope, ft/ft lanning's No. elocity ¹² , ft/sec ength, L, ft , hr HR 0.717										
Culvert iameter, ft rea, ft² /etted Perimeter, ft ydraulic Radius, R, ft lope, ft/ft lanning's No. elocity ¹² , ft/sec ength, L, ft , hr HR 0.717	T _t , hr									0.0000
iameter, ft rea, ft² /etted Perimeter, ft ydraulic Radius, R, ft lope, ft/ft lanning's No. elocity ¹² , ft/sec ength, L, ft , hr HR 0.717	Culvert									
/etted Perimeter, ft ydraulic Radius, R, ft lope, ft/ft lanning's No. elocity ¹² , ft/sec ength, L, ft , hr 0.0000 HR 0.717	Diameter, ft									
ydraulic Radius, R, ft lope, ft/ft lanning's No. elocity ¹² , ft/sec ength, L, ft , hr HR 0.717	Area, ft ²									
lope, ft/ft	Wetted Perimeter, ft									
lanning's No. elocity ¹² , ft/sec ength, L, ft , hr 0.0000	Hydraulic Radius, R, ft									
elocity ¹² , ft/sec ength, L, ft , hr 0.0000	Slope, ft/ft									
ength, L, ft , hr 0.0000 HR 0.717	Manning's No.									
hr 0.0000 HR 0.717										
HR 0.717										0.0000
	15.11								i	0.0000
Min									HR	0.717
									Min	43.00

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979						Calculat Date: Checked	l By:	RLD 8/8/24 PGT
Subcatchment:	POST 26						Revised	<u> </u>	
Time of Concentrati				eet, SCS	S Method	S			
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	
SHEET FLOW									
Manning's No.	0.24								
Length, ft	100								
P2, in	2.40								
Slope, ft/ft	0.015								
T _t ,hr	0.308								0.3081
SHALLOW CONCENTE	RATED FLO	ow							
Paved			I			1		ı	
Length, ft									
Slope, ft/ft									
Velocity ² , ft/sec									
T _t , hr									0.0000
Unpaved			ı						
Length, ft									
Slope, ft/ft									
Velocity ² , ft/sec									
T _t , hr									0.0000
Cultivated									
Length, ft									
Slope, ft/ft									
Velocity ⁴ , ft/sec									
T _t , hr									0.0000
Short Grass Pasture									
Length, ft			720						
Slope, ft/ft			0.008						
Velocity ⁴ , ft/sec			0.6261						
T _t , hr			0.319						0.3194
Woodland									
Length, ft									
Slope, ft/ft									
Velocity ⁵ , ft/sec									
T _t , hr									0.0000
CHANNEL FLOW									0.0000
Waterways & Swamps	No Chan	nels							
Length, ft	, ito onam	11013							
Slope, ft/ft									
Velocity ⁶ , ft/sec									
T _t , hr									0.0000
	andaida D	4-6							0.0000
Grassed Waterways/R	oadside D		l						
Length, ft		527							
Slope, ft/ft		0.012							
Velocity ⁷ , ft/sec		1.643							2 222 :
T _t , hr		0.089							0.0891
Small Tributary & Swa	mp w/Cha	nnels							
Length, ft									
Slope, ft/ft									
Velocity ⁸ , ft/sec									
T _t , hr									0.0000
Large Tributary									
Length, ft									
Slope, ft/ft									
Velocity ⁸ , ft/sec									
T _t , hr									0.0000
Culvert									
Diameter, ft									
Area, ft ²									
Wetted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, ft/ft									
Manning's No.									
Velocity ¹² , ft/sec									
Length, L, ft									
T _t , hr								<u> </u>	0.0000
<u> </u>								HR	0.717
									U./ 1/
								Min	43.00

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979	k Solar					Calculat Date: Checked		RLD 8/8/24 PGT
Subcatchment:	PRE 27S						Revised		
Time of Concentrati	on Deterr	nination	Worksh	eet, SCS	6 Method	S			
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	
SHEET FLOW									
Manning's No.	0.24								
Length, ft	100								
P2,in Slope, ft/ft	2.40 0.05								
Siope, ivit T _t , hr	0.03								0.1904
SHALLOW CONCENT)W							0.1304
Paved									
Length, ft									
Slope, ft/ft									
Velocity ² , ft/sec									
T _t , hr									0.0000
Unpaved						1			
Length, ft									
Slope, ft/ft Velocity ² , ft/sec									
T _t , hr									0.0000
Cultivated									0.0000
Length, ft									
Slope, ft/ft									
Velocity ⁴ , ft/sec									
T _t , hr									0.0000
Short Grass Pasture									
Length, ft		973		152	824				
Slope, ft/ft		0.097		0.033	0.023				
Velocity ⁴ , ft/sec		2.1801		1.2716	1.0616				0.0700
T _t , hr		0.124		0.033	0.216				0.3728
Woodland Length, ft			E40						
Slope, ft/ft			548 0.082						
Velocity ⁵ , ft/sec			1.4318						
T _t , hr			0.106						0.1063
CHANNEL FLOW									
Waterways & Swamps	, No Chani	nels							
Length, ft									
Slope, ft/ft									
Velocity ⁶ , ft/sec									
T _t , hr	d-1-d- D1	4 - 1							0.0000
Grassed Waterways/R Length, ft	oadside Di	tcnes				F40			
Lengtn, π Slope, ft/ft						510 0.008			
Velocity ⁷ , ft/sec						1.342			
T _t , hr						0.106			0.1056
Small Tributary & Swa	mp w/Cha	nnels							
Length, ft									
Slope, ft/ft									
Velocity ⁸ , ft/sec									
T _t , hr									0.0000
Large Tributary									
Length, ft									
Slope, ft/ft									
Velocity ⁸ , ft/sec									
T _t , hr									0.0000
Culvert									
Diameter, ft Area, ft ²									
Area, แ Wetted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, ft/ft									
Manning's No.									
/elocity ¹² , ft/sec									
ength, L, ft									
Γ _t , hr	<u> </u>								0.0000
		_				_		пр	0.775
								HR	0.775

Subcatchment: POST 278	LD 5/24 GT
Seg 1	
SHEET FLOW	
Mannings No.	
Length, ft	
P2	
Slope, fift	
17.1 br	
Paved	904
Length, ft Stope, first Velocity*, ft/sec T*, in r V	
Slope, fift Velocity*, fixer	
Velocity/, fissec	
17-1 hr	
Unpaved Length, ft	000
Length, ft Stope, ft/ft Velocity ² , ft/sec 7, hr 0,05 Stope, ft/ft Velocity ² , ft/sec 1, 6, 10, 10, 10, 10, 10, 10, 10, 10, 10, 10	500
Slope, fift	
Velocity', firsec 3.6077839 0.002 0.000 0.00	
Ti,* hr	
Cultivated Length, ft Slope, fifth Velocity', fusec T', 'hr Short Grass Pasture Length, ft Slope, fifth Velocity', fusec T', 'hr O.098 O.033 O.023 Velocity', fusec T', 'hr O.082 Slope, fifth O.082 Slope, fifth O.082 Slope, fifth O.082 Velocity', fusec T', 'hr O.098 Grassed Waterways & Swamps, No Channels Length, ft Slope, fifth Velocity', fusec T', 'hr O.008 Grassed Waterways/Roadside Ditches Length, ft Slope, fufth Velocity', fusec T', 'hr O.008 Slope, fufth Velocity', fusec T', 'hr O.008 Small Tributary & Swamp w/Channels Length, ft Slope, fufth Velocity', fusec T', 'hr O.006 Crassed Waterways/Roadside Ditches Length, ft Slope, fufth Velocity', fusec T', 'hr O.007 Crassed Waterways/Roadside Ditches Length, ft Slope, fufth Velocity', fusec T', 'hr O.007 Crassed Waterways/Roadside Ditches Length, ft Slope, fufth Velocity', fusec T', 'hr O.007 Crassed Waterways/Roadside Ditches Length, ft Slope, fufth Velocity', fusec T', 'hr O.007 Crassed Waterways/Roadside Ditches Length, ft Slope, fufth Velocity', fusec T', 'hr O.007 Crassed Waterways/Roadside Ditches Length, ft Slope, fufth Velocity', fusec T', 'hr O.007 Crassed Waterways/Roadside Ditches Length, ft Slope, fufth Velocity', fusec T', 'hr O.007 Crassed Waterways/Roadside Ditches Length, ft Slope, fufth Velocity', fusec T', 'hr O.007 Crassed Waterways/Roadside Ditches Length, ft Slope, fufth Velocity', fusec T', 'hr O.007 Crassed Waterways/Roadside Ditches Length, ft Slope, fufth Velocity', fusec T', 'hr O.007 Crassed Waterways/Roadside Ditches Length, ft Slope, fufth Velocity', fusec T', 'hr O.007 Crassed Waterways/Roadside Ditches Length, ft Slope, fufth Velocity', fusec T', 'hr O.007 Crassed Waterways/Roadside Ditches Length, ft Slope, fufth Velocity', fusec T', 'hr O.007 Crassed Waterways/Roadside Ditches Length, ft Slope, fufth Velocity', fusec T', 'hr O.007 Crassed Waterways/Roadside Ditches Length, ft Slope, fufth Velocity', fusec T', 'hr O.008 Crassed Water	015
Slope, ft/ft	
Velocity*, flysec T;* hr Shope, flyth Shope	
Ti, hr	
Short Grass Pasture	
Length, ft 952 152 824 Slope, ft/ft 0.098 0.033 0.023 Velocity*, ft/sec 2.1913 1.2716 1.0616 T;*, ftr 0.121 0.033 0.216 0.36	000
Slope, ft/ft	
Velocity ⁴ , ft/sec	
T ₁ ² , hr	
Woodland Length, ft S48 Slope, ft/ft 0.082 Slope, ft/ft 0.068 Slope, ft/ft Slope, ft/ft/ft Slope, ft/ft Slope, ft/ft Slope, ft/ft Slope, ft/ft Slope, ft/ft Slope, ft/ft	605
Length, ft	555
Slope, ft/ft	
Velocity ⁶ , ft/sec	
CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Stope, ft/ft Velocity ⁶ , ft/sec T ₁ , hr Grassed Waterways/Roadside Ditches Length, ft Stope, ft/ft Velocity ⁷ , ft/sec T ₀ , hr Small Tributary & Swamp w/Channels Length, ft Stope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Clarge Tributary Length, ft Stope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Cutert Diameter, ft Area, ft ² Wetted Perimeter, ft	
Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁹ , ft/sec T ₁ ³ , hr Carassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁹ , ft/sec T ₁ , hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁹ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft	063
Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ ³ , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Usinger, ft Slope, ft/ft Velocity ⁹ , ft/sec T ₁ , hr Culvert Usinger, ft Slope, ft/ft Velocity ⁹ , ft/sec T ₁ , hr Culvert Usinger, ft Area, ft ² Wetted Perimeter, ft	
Slope, ft/ft	
Velocity ⁶ , ft/sec 0.00 Grassed Waterways/Roadside Ditches 510 Slope, ft/ft 0.008 Velocity ⁷ , ft/sec 1.342 T ₁ , hr 0.106 0.10 Small Tributary & Swamp w/Channels 1.342 0.106 0.10 Length, ft Slope, ft/ft 9.00 <td></td>	
T,³, hr	
Crassed Waterways/Roadside Ditches	000
Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft	500
Slope, ft/ft	
Velocity ⁷ , ft/sec 1.342 T ₁ , hr 0.106 Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec 7 ₁ , hr Large Tributary Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Wetted Perimeter, ft	
T ₁ , hr 0.106 0.106 Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr 0.00 Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr 0.00 Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft	
Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft	056
Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft	
Velocity ⁸ , ft/sec 0.00 Large Tributary 0.00 Length, ft Slope, ft/ft Velocity ⁸ , ft/sec 0.00 T ₁ , hr 0.00 Culvert 0.00 Diameter, ft Area, ft ² Wetted Perimeter, ft 0.00	
T _b hr 0.00 Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T _b hr 0.00 Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft	
Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T _b hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft	
Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft	000
Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft	
Velocity ⁸ , ft/sec 0.00 T ₁ , hr 0.00 Culvert 0.00 Diameter, ft Area, ft² Wetted Perimeter, ft 0.00	
T ₁ , hr 0.00 Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft	
Culvert Diameter, ft Area, ft² Wetted Perimeter, ft	
Diameter, ft Area, ft ² Wetted Perimeter, ft	ນບບ
Area, ft ² Wetted Perimeter, ft	
Wetted Perimeter, ft	
· 3	
Slope, ft/ft	
Manning's No.	
Velocity ¹² , ft/sec	
Length, L, ft	
T _b hr 0.00	000
HR 0.7	772
	13
Min 46.	.40

Illino of Concentration Determination Worksheet, SCS Methods	PROJECT: TRC Proj. No.: Subcatchment:	Cordelio Flat Creel 435979 PRE 28S	k Solar					Calculat Date: Checked Revised	l By:	RLD 8/8/24 PGT
Seg 1 Seg 2 Seg 3 Seg 4 Seg 5 Seg 6 Seg 7 Seg 8 Seg 8 Seg 7 Seg 8 Seg 8 Seg 7 Seg 8 Seg			nination	Worksh	eet, SCS	S Method:	S			
### HEET FLOW Incomplete 100	Time or Comcontration							Seg 7	Sea 8	
Interning No. 0,24	SHEET FLOW									
2. in	Manning's No.	0.24								
Inpare I	Length, ft	100								
The CONCENTRATED FLOW	P2 , in	2.40								
HALLOW CONCENTRATED FLOW avaved angth, ft plops, ftff elocity', firece ', ftr	Slope, ft/ft									
										0.3263
		AIEDFLC	VV							
International Content										
The	Velocity ² , ft/sec									
Description	T _t , hr									0.0000
Image: Part	Unpaved									
	Length, ft									
Cultivated Cul	Slope, ft/ft									
Description										
Image: Comparison of the com										0.0000
Indeptor										
	-									
The										
Short Grass Pasture ength, ft	T _t , hr									0.0000
ength, ft	Short Grass Pasture									
Injury I	Length, ft		163							
Voodland ength, ft lope, ft/ft electry*, ft/sec pop, ft/ft ft/sec pop, ft/ft electry*, ft/sec pop, ft/ft ft/sec pop,	Slope, ft/ft									
Voodland ength, ft loope, ft/ft elocity ² , ft/sec 3, than Vaterways & Swamps, No Channels ength, ft loope, ft/ft elocity ² , ft/sec 3, than Vaterways & Swamps, No Channels ength, ft loope, ft/ft elocity ² , ft/sec 1, than Vaterways/Roadside Ditches ength, ft loope, ft/ft elocity ² , ft/sec 2, than Vaterways/Roadside Ditches ength, ft loope, ft/ft elocity ² , ft/sec 2, than Vaterways/Roadside Ditches ength, ft loope, ft/ft elocity ² , ft/sec 3, 883 0, 1831 O.1831 Intributary & Swamp w/Channels ength, ft loope, ft/ft elocity ² , ft/sec 4, than Vaterways/Ft/sec 5, than Vaterways/Ft/sec 6, than Vaterways/Ft/sec 7, than Vaterways/Ft/sec 8, than Vaterways/Ft/sec 9,	Velocity ⁴ , ft/sec		1.1921							
ength, ft lope, ft/ft lope, ft	T _t , hr		0.038							0.0380
lope, ft/ft elocity*, ft/sec pt, hr Doce, ft/ft Doce,										
elocity ² , ft/sec 2, hr HANNEL FLOW Vaterways & Swamps, No Channels ength, ft loope, ft/ft elocity ² , ft/sec 2, hr 1, hr 1	Length, ft									
### Description of the control of th										
## Provided to the control of the co										0.0000
Naterways & Swamps, No Channels ength, ft loope, ft/ft elocity ⁶ , ft/sec ength, ft loope, ft/ft none, ft/ft/ft none, ft/ft/ft none, ft/ft/ft none, ft/ft/ft none, ft/ft/ft/ft none, ft/ft/ft none, ft/ft/ft none, ft/ft/ft/ft none, ft/ft/ft none, ft/ft/ft/ft/ft none, ft/ft/ft/ft/ft/ft none, ft/ft										0.0000
ength, ft lope, fift l		No Chanr	nels							
Iope, ft/ft	Length, ft	TTO CITALIT								
3°, hr 0.0000 Crassed Waterways/Roadside Ditches ength, ft 0.067 elocity", ft/sec 3.883 ength, ft 10pe, ft/ft 10p	Slope, ft/ft									
Crassed Waterways/Roadside Ditches	Velocity ⁶ , ft/sec									
ength, ft 2559 0.067 electity ⁷ , ft/sec 3.883 0.183 0.1831 0	T _t , hr									0.0000
		adside Di	tches							
	Length, ft									
h hr	Slope, ft/ft									
Small Tributary & Swamp w/Channels ength, ft lope, ft/ft elocity ⁸ , ft/sec to, hr O.0000 Aarge Tributary ength, ft lope, ft/ft lope, ft/ft felocity ⁸ , ft/sec to, hr O.0000 Culvert iameter, ft rea, ft ² /velted Perimeter, ft lydraulic Radius, R, ft lope, ft/ft lanning's No. lelocity ⁹ , ft/sec ength, L, ft to, hr O.0000 HR O.0000										0.4004
ength, ft lope, ft/ft lelocity ⁸ , ft/sec ,, hr		/Ch		0.183						0.1831
lope, ft/ft elocity ⁸ , ft/sec , , hr		np w/Char	ineis							
Pelocity®, ft/sec	-									
0.0000 0	Velocity ⁸ , ft/sec									
ength, ft lope, ft/ft lope, ft/ft lelocity ⁸ , ft/sec ,, hr Culvert iameter, ft rea, ft ² //etted Perimeter, ft lope, ft/ft lanning's No. elocity ¹ , ft/sec ength, L, ft ,, hr HR 0.547	T _t , hr									0.0000
ength, ft lope, ft/ft elocity ⁸ , ft/sec ₁ , hr Culvert iameter, ft rea, ft ² //etted Perimeter, ft lope, ft/ft lanning's No. felocity ¹² , ft/sec ength, L, ft ₁ , hr HR 0.547										0.0000
lope, ft/ft (elocity ⁸ , ft/sec ,, hr 0.0000 Culvert iameter, ft rea, ft ² Vetted Perimeter, ft lydraulic Radius, R, ft lope, ft/ft tanning's No. elocity ¹² , ft/sec ength, L, ft ,, hr HR 0.547										
Pelocity ⁸ , ft/sec i, hr 0.0000 Culvert Diameter, ft rea, ft ² Vetted Perimeter, ft Vydraulic Radius, R, ft Idope, ft/ft Idanning's No. Idelocity ¹² , ft/sec Identity ¹² , ft/sec Identity ¹² , ft/sec Identity ¹³ , hr Identity ¹⁴ Identity ¹⁵ Identity ¹⁵ Identity ¹⁶ Identity ¹⁶ Identity ¹⁷ Identity ¹⁷ Identity ¹⁸ Ide	Slope, ft/ft									
Dulvert Diameter, ft rea, ft² Vetted Perimeter, ft lydraulic Radius, R, ft loope, ft/ft lanning's No. lelocity ¹² , ft/sec length, L, ft length, len	Velocity ⁸ , ft/sec									
plameter, ft rea, ft² Vetted Perimeter, ft lydraulic Radius, R, ft lope, ft/ft lanning's No. elocity¹², ft/sec ength, L, ft i, hr HR 0.547	T _t , hr									0.0000
rea, ft² Vetted Perimeter, ft tydraulic Radius, R, ft lope, ft/ft flanning's No. elelocity1², ft/sec ength, L, ft ,, hr HR 0.547	Culvert									
Vetted Perimeter, ft Indextruction of the state of the st	Diameter, ft									
Aydraulic Radius, R, ft Ilope, ft/ft Itanning's No. Ielocity ¹² , ft/sec Iength, L, ft In the second	Area, ft ²									
lope, ft/ft flanning's No. felocity ¹² , ft/sec ength, L, ft t, hr HR 0.547	Wetted Perimeter, ft									
tlanning's No. felocity ¹² , ft/sec ength, L, ft hr 0.0000 HR 0.547	Hydraulic Radius, R, ft									
elocity ¹² , ft/sec ength, L, ft 0.0000 HR 0.547	Slope, ft/ft									
ength, L, ft i, hr 0.0000 HR 0.547										
hr 0.0000 HR 0.547										
HR 0.547										0.0000
										0.0000
Min									HR	0.547
11W111 37 84									Min	32.84

PROJECT: TRC Proj. No.: Subcatchment:	Cordelio Flat Creel 435979 POST 285						Calculat Date: Checked Revised	l By:	RLD 8/8/24 PGT
Time of Concentrati			Worksh	eet SCS	Method	s .	11011000		
Time of Concential	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	
SHEET FLOW	ocg i	OUG I	oug o	OUG T	oug u	- Cog C	ocg /	OUG U	
Manning's No.	0.24								
Length, ft	100								
P2, in	2.40								
Slope, ft/ft	0.013								
T _t , hr	0.326								0.3263
SHALLOW CONCENTE	RATED FLO	<u>w</u>							
Paved							T	I	
Length, ft									
Slope, ft/ft Velocity², ft/sec									
T _t , hr									0.0000
Unpaved									0.0000
Length, ft									
Slope, ft/ft									
Velocity ² , ft/sec									
T _t , hr									0.0000
Cultivated									
Length, ft									
Slope, ft/ft									
Velocity ⁴ , ft/sec									0.5
T _t , hr									0.0000
Short Grass Pasture		460							
Length, ft Slope, ft/ft		163 0.029							
Velocity ⁴ , ft/sec		1.1921							
T _t , hr		0.038							0.0380
Woodland									
Length, ft									
Slope, ft/ft									
Velocity ⁵ , ft/sec									
T _t , hr									0.0000
CHANNEL FLOW									
Waterways & Swamps Length, ft	, No Chanr	neis							
Slope, ft/ft									
Velocity ⁶ , ft/sec									
T _t , hr									0.0000
Grassed Waterways/R	oadside Di	tches							
Length, ft			2559						
Slope, ft/ft			0.067						
Velocity ⁷ , ft/sec			3.883						
T _t , hr			0.183						0.1831
Small Tributary & Swa	mp w/Chai	nnels							
Length, ft									
Slope, ft/ft Velocity ⁸ , ft/sec									
T _t , hr									0.0000
									0.0000
Large Tributary Length, ft									
Lengtn, π Slope, ft/ft									
Velocity ⁸ , ft/sec									
T _t , hr									0.0000
Culvert									
Diameter, ft									
Area, ft ²									
Wetted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, ft/ft									
Manning's No.									
Velocity ¹² , ft/sec Length, L, ft									
Lengtn, L, tt T _t , hr									0.0000
								Ī	
								HR	0.547
								Min	

PROJECT: TRC Proj. No.: Subcatchment:	Cordelio Flat Creel 435979 PRE 29S	Solar					Calculat Date: Checked Revised	l By:	RLD 8/8/24 PGT
Time of Concentration		nination	Worksh	eet, SC	S Method	S			
-	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	
SHEET FLOW									
Manning's No.	0.24								
Length, ft	100								
P2, in	2.40								
Slope, ft/ft T _t ¹, hr	0.065								0.4744
SHALLOW CONCENTR	0.171	NW .							0.1714
Paved	AILDIL	/ * *							
Length, ft									
Slope, ft/ft									
Velocity ² , ft/sec									
T _t , hr									0.0000
Unpaved						_	_	_	
Length, ft									
Slope, ft/ft Velocity ² , ft/sec									
Velocity , ft/sec T _t , hr									0.0000
Cultivated									0.0000
Length, ft									
Slope, ft/ft									
Velocity ⁴ , ft/sec									
T _t , hr									0.0000
Short Grass Pasture									
Length, ft		63		612					
Slope, ft/ft		0.095		0.057					
Velocity ⁴ , ft/sec T _t ³ , hr		2.1575		1.6712					0.4000
Woodland		0.008		0.102					0.1098
Length, ft			31		31				
Slope, ft/ft			0.129		0.61				
Velocity ⁵ , ft/sec			1.7958		3.9051				
T _t , hr			0.005		0.002				0.0070
CHANNEL FLOW									
Waterways & Swamps,	No Chann	nels							
Length, ft									
Slope, ft/ft									
Velocity ⁶ , ft/sec T _t ³ , hr									0.0000
Grassed Waterways/Ro	adaida Di	tohoo							0.0000
Length, ft	Dausiue Di	iches				900			
Slope, ft/ft						0.02			
Velocity ⁷ , ft/sec						2.121			
T _t , hr						0.118			0.1179
Small Tributary & Swar	np w/Chai	nels							
Length, ft									
Slope, ft/ft									
Velocity ⁸ , ft/sec									
T _t , hr									0.0000
Large Tributary									
Length, ft									
Slope, ft/ft Velocity ⁸ , ft/sec									
Velocity, tt/sec T _t , hr									0.0000
Culvert									0.0000
Diameter, ft									
Area, ft ²									
Wetted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, ft/ft									
Manning's No.									
Velocity ¹² , ft/sec									
Length, L, ft									0.0000
Γ _t , hr								1	0.0000
								HR	0.406
								Min	24.36
								1.41111	44.30

PROJECT: TRC Proj. No.: Subcatchment:	Cordelio Flat Cree 435979 POST 293						Calculat Date: Checked Revised	l By:	RLD 8/8/24 PGT
Time of Concentration			Morkeh	ant SC	S Method	c	Reviseu		
Time of Concential	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	
SHEET FLOW	Jeg i	Jeg z	Jeg 3	Jeg 4	Jeg J	Jeg 0	Jeg /	Jeg 0	
Manning's No.	0.24								
Length, ft	100								
P2, in	2.40								
Slope, ft/ft	0.065								
T _t ,hr	0.171								0.1714
SHALLOW CONCENTE	RATED FLO	ow							
Paved									
Length, ft Slope, ft/ft									
Velocity ² , ft/sec									
T _t , hr									0.0000
Unpaved									0.0000
Length, ft									
Slope, ft/ft									
Velocity ² , ft/sec									
Tt, hr									0.0000
Cultivated									
Length, ft									
Slope, ft/ft									
Velocity ⁴ , ft/sec									
T _t , hr									0.0000
Short Grass Pasture									
Length, ft		63		612					
Slope, ft/ft		0.095		0.057					
Velocity⁴, ft/sec		2.1575		1.6712					
T _t , hr		0.008		0.102					0.1098
Woodland			0.4		04				
Length, ft Slope, ft/ft			31		31				
Velocity ⁵ , ft/sec			0.129 1.7958		0.61 3.9051				
T _t , hr			0.005		0.002				0.0070
CHANNEL FLOW									
Waterways & Swamps	, No Chan	nels							
Length, ft									
Slope, ft/ft									
Velocity ⁶ , ft/sec									
Tt, hr									0.0000
Grassed Waterways/R	oadside D	itches							
Length, ft						900			
Slope, ft/ft						0.02			
Velocity ⁷ , ft/sec T _t , hr						2.121			0.1170
	mn w/Cha	nnolo				0.118			0.1179
Small Tributary & Swa Length, ft	inp w/cna	illeis							
Slope, ft/ft									
Velocity ⁸ , ft/sec									
T _t , hr									0.0000
Large Tributary									0.0000
Length, ft									
Slope, ft/ft									
Velocity ⁸ , ft/sec									
T _t , hr									0.0000
Culvert									
Diameter, ft									
Area, ft ²									
Wetted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, ft/ft									
Manning's No.									
Velocity ¹² , ft/sec									
Length, L, ft									
T _t , hr									0.0000
								HR	0.406
								Min	24.36

PROJECT: TRC Proj. No.:	Cordelio Flat Creel 435979	k Solar					Calculat Date: Checked		RLD 8/8/24 PGT
Subcatchment:	PRE 30S						Revised		
Time of Concentration	on Deterr	nination	Worksh	eet, SCS	Method:	S			
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	
SHEET FLOW									
Manning's No.	0.24								
Length, ft	100								
P2, in	2.40								
Slope, ft/ft T _t ¹, hr	0.006 0.445								0.4445
SHALLOW CONCENTE)W							0.4443
Paved	CAILD I L	,,,							
Length, ft									
Slope, ft/ft									
Velocity ² , ft/sec									
T _t , hr									0.0000
Unpaved									
Length, ft									
Slope, ft/ft									
Velocity ² , ft/sec									0.0005
T _t , hr									0.0000
Cultivated									
Length, ft									
Slope, ft/ft Velocity ⁴ , ft/sec									
T _t , hr									0.0000
Short Grass Pasture									0.0000
Length, ft		1152							
Slope, ft/ft		0.070							
Velocity ⁴ , ft/sec		1.8520							
T _t , hr		0.173							0.1728
Woodland	<u>'</u>								
Length, ft									
Slope, ft/ft									
Velocity ⁵ , ft/sec									
T _t , hr									0.0000
CHANNEL FLOW Waterways & Swamps	No Chan	nolo							
Length, ft	, NO CHAIL	1612							
Slope, ft/ft									
Velocity ⁶ , ft/sec									
T _t ³ , hr									0.0000
Grassed Waterways/Ro	oadside Di	itches							
Length, ft			175						
Slope, ft/ft			0.023						
Velocity ⁷ , ft/sec			2.275						
T _t , hr			0.021						0.0214
Small Tributary & Swa	mp w/Chai	nnels							
Length, ft									
Slope, ft/ft Velocity ⁸ , ft/sec									
									0.0000
T _t , hr									0.0000
Large Tributary									
Length, ft Slope, ft/ft									
Velocity ⁸ , ft/sec									
T _t , hr									0.0000
Culvert									
Diameter, ft									
Area, ft ²									
Wetted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, ft/ft									
Manning's No.									
Velocity ¹² , ft/sec									
_ength, L, ft									
Γ _t , hr									0.0000
								HR	0.639
								Min	38.32

### State	PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979	k Solar					Calculat Date: Checked	l By:	RLD 8/8/24 PGT
Seg 1 Seg 2 Seg 3 Seg 4 Seg 5 Seg 6 Seg 7 Seg 8		Post 30S	! 4!	\ \ \ / -	1 000	N M - 411	-	Revised	<u> </u>	
SHEET FLOW Menning's No.	Time of Concentration									
Mannings No. 0.24	SHEET EI OW	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	
Length, ft. 70, 17, 17 71 71 71 71 71 71 71 71 71 71 71 71 7		0.24								
P2	-									
Stope. Inft										
### SPANCE Company Com	Slope, ft/ft									
Paved	T _t ,hr									0.4445
Length, ft Stope, ft/ft Velocity*, ft/ftee T*, ft 0,0000 Cultivated Length, ft Stope, ft/ft Velocity*, ft/ftee T*, ft 0,0000 Stope, ft/ft Velocity*, ft/ftee T*, ft 0,070 Velocity*, ft/ftee T*, ft 0,070 Velocity*, ft/ftee T*, ft 0,070 Velocity*, ft/ftee T*, ft 0,0000 CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Stope, ft/ft Velocity*, ft/ftee T*, ft 0,0000 CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Stope, ft/ft Velocity*, ft/ftee T*, ft 0,0000 CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Stope, ft/ft Velocity*, ft/ftee T*, ft 0,0000 Crassed Waterways/Roadside Ditches Length, ft Stope, ft/ft Velocity*, ft/ftee T*, ft 0,0000 Cultivate Dimeter, ft Area, ft Velocity*, ft/ftee T*, ft Stope, ft/ft Memoring* No. Velocity*, ft/ftee T*, ft Stope, ft/ft Memoring* No. Velocity*, ft/ftee Length, ft T*,		ATED FLO	DW .							
Slope, It Wedoorly, Tibec Tibe							1		_	
Valoady, Nese Valoady, Nes	-									
Unpared Unpa										
Unpaved Length, ft Slope, fift Velocity', Visce C T', i'r Cultivated Length, ft Slope, fift Velocity', Visce C T', i'r O,0000										0.0000
Length, ft Silope, ft/ft Velocity ² , ft/ftee Cultivated Length, ft Silope, ft/ft Velocity ² , ft/ftee Cultivated Length, ft Silope, ft/ft Velocity ² , ft/ftee Cultivated Length, ft Silope, ft/ft Velocity ² , ft/ftee Cultivated Length, ft Silope, ft/ft O.070 Velocity ² , ft/ftee Cultivated Cultiv										0.0000
Slope, fift Webcolty*, fiber										
Velocity Marker Velocity Velocity Marker Velocity Marker Velocity Velocity Marker Velocity Velocity Marker Velocity Velocit										
Cultivated Cul	Velocity ² , ft/sec									
Cultivated Length, ft Slope, ft/ft Velocity ² , ft/ftee City, ft/ftee Ci	T _t , hr									0.0000
Length, ft Slope, ft/ft Velocity*, ft/sec Ti,* Int O.070 Velocity*, ft/sec Ti,* Int O.070 Velocity*, ft/sec Ti,* Int O.0000 CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity*, ft/sec Ti,* Int O.0000 CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity*, ft/sec Ti,* Int O.0000 CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity*, ft/sec Ti,* Int O.0000 CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity*, ft/sec Ti,* Int O.0000 CHANNEL FLOW Waterways & Swamps, No Channels Length, ft O.0000 CHANNEL FLOW Waterways & Swamps, No Channels Length, ft O.0000 CHANNEL FLOW Waterways & Swamps, No Channels Length, ft O.0000 CHANNEL FLOW Velocity*, ft/sec Ti,* Int O.0000 Culvert Diameter, ft Area, ft* Weted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Weted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Weted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Weted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Ti, Int Ti,	Cultivated									·
Slope, ft/ft Slop	Length, ft									
Short Grass Pasture Length, ft Slope, ft/ft Velocity ² , ft/sec T ₁ ² , br Velocity ² , ft/sec T ₂ ² , br Velocity ² , ft/sec T ₃ ² , br Velocity ² , ft/sec T ₄ ² , br Velocity ² , ft/sec T ₄ ² , br Velocity ² , ft/sec T ₄ ² , br Velocity ² , ft/sec T ₄ ² , br Velocity ² , ft/sec T ₄ ² , br Velocity ² , ft/sec T ₄ ² , br Velocity ² , ft/sec T ₅ ² , br Velocity ² , ft/sec T ₆ , br Velocity ² , ft/sec T ₇ , br Velocity ² , ft/sec Velocity ² , ft/sec Velocity ² , ft/sec T ₇ , br Velocity ² , ft/sec Velocity ² , ft/	Slope, ft/ft									
Short Grass Pasture	Velocity ⁴ , ft/sec									
Length, ft Silope, fuff Velocity ¹ , fusec 1,8520 17, hr 0,070 Woodland Length, ft Silope, fuff Velocity ² , fusec 1, hr 10,000 CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Silope, fuft Velocity ² , fusec 1, hr 175 Silope, fuft Velocity ² , fusec 1, hr 175 Silope, fuft Velocity ² , fusec 1, hr 175 Silope, fuft Velocity ² , fusec 1, hr 175 Silope, fuft Velocity ² , fusec 1, hr 175 Silope, fuft Velocity ² , fusec 1, hr 175 Silope, fuft Velocity ² , fusec 1, hr 175 Silope, fuft Velocity ² , fusec 1, hr 175 Silope, fuft Velocity ² , fusec 1, hr 175 Silope, fuft Velocity ² , fusec 1, hr 175 Silope, fuft Velocity ² , fusec 1, hr 175 Silope, fuft Velocity ² , fusec 1, hr 175 Silope, fuft Velocity ² , fusec 1, hr 175 Silope, fuft Velocity ² , fusec 1, hr 175 Silope, fuft Velocity ² , fusec 1, hr 175 Silope, fuft Velocity ² , fusec 1, hr 175 Nonon 175										0.0000
Slope, fl/ft	Short Grass Pasture									
Nelocity*, fisec	Length, ft		1152							
1, hr	Slope, ft/ft		0.070							
Woodland Length, ft Slope, ft/ft Welcotty ² , ft/sec T ₁ ² , hr										
Length, ft Slope, ft/ft Velocity*, ft/sec T,* hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity*, ft/sec Length, ft Slope, ft/ft Velocity*, ft/sec T, hr Clare Tributary Length, ft Slope, ft/ft Velocity*, ft/sec T, hr Culvert Diameter, ft Area, ft* Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Velocity*, ft/sec Length, ft Slope, ft/ft Velocity*, ft/sec T, hr O.0000 Culvert Diameter, ft Area, ft* Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Welocity*, ft/sec Length, ft Slope, ft/ft Velocity*, ft/sec Length, ft T, hr T, hr			0.173							0.1728
Slope, ft/ft										
Velocity ⁵ , ft/sec 1, hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec 1, hr Chocked Waterways/Roadside Ditches Length, ft Slope, ft/ft 0.0000 Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft 0.023 Velocity ⁶ , ft/sec 1, hr 0.021 Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T _b , hr 0.0000 Large Tributary Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T _b , hr 0.0000 Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wenden Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wenden Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wenden										
Ti, hr 0.0000 CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec Ti, hr 0.023 Velocity ⁷ , ft/sec Ti, hr 0.023 Velocity ⁷ , ft/sec Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec Ti, hr 0.0000 Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec Ti, hr 0.0000 Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec Ti, hr 0.0000 Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec Ti, hr 0.0000 Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec Ti, hr 0.0000 Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec Ti, hr 0.0000 Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec Length, ft Slope, ft/ft Velocity ⁸ , ft/sec Length, ft Slope, ft/ft Manning's No. Velocity ⁹ , ft/sec Length, ft ft/sec Length, ft ft/sec Length, ft ft/sec										
CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr O.0000 Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr O.023 Velocity ⁷ , ft/sec T ₂ , hr O.021 Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₂ , hr Under Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₃ , hr O.0000 Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ⁸ , ft/sec Length, L, ft T ₃ , hr O.0000										0.0000
Waterways & Swamps										312020
Slope, ft/ft		No Chani	nels							
Velocity ⁸ , ft/sec T ₁ , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft 0.023 Velocity ⁸ , ft/sec 2.275 T ₁ , hr 0.021 Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culocity ⁸ , ft/sec T ₂ , hr O.0000 Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ⁹ , ft/sec Length, L, ft T ₁ , hr O.0000	Length, ft									
Comparison	Slope, ft/ft									
Company										
Length, ft Slope, ft/ft Slope, ft/ft Slope, ft/ft Velocity ⁷ , ft/sec T _t , hr O.021 Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T _t , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹² , ft/sec Length, L, ft T _t , hr O.0000										0.0000
Slope, ft/ft		adside Di	itches				l l			
Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr 0.0000 Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr 0.0000 Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹² , ft/sec Length, L, ft T ₁ , hr 0.0000	-									
Diameter Company Com										
Small Tributary & Swamp w/Channels										0.0214
Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T _t , hr 0.0000 Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T _b , hr 0.0000 Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹² , ft/sec Length, L, ft T _b , hr		nn w/Cha	nnels	0.021						3.3214
Slope, ft/ft Velocity ⁸ , ft/sec										
Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹² , ft/sec Length, L, ft T ₁ , hr 0.0000	Slope, ft/ft									
T ₁ , hr 0.0000 Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr 0.0000 Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹² , ft/sec Length, L, ft T ₁ , hr 0.0000	Velocity ⁸ , ft/sec									
Large Tributary Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹² , ft/sec Length, L, ft T ₁ , hr 0.0000										0.0000
Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T _t , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹² , ft/sec Length, L, ft T _t , hr										2.3000
Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr 0.0000										
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Slope, ft/ft									
Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity'², ft/sec Length, L, ft T _b , hr 0.0000	Velocity ⁸ , ft/sec									
Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity'², ft/sec Length, L, ft T _I , hr	T _t , hr							<u> </u>		0.0000
Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹² , ft/sec Length, L, ft T _I , hr	Culvert									
Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹² , ft/sec Length, L, ft T _t , hr	Diameter, ft									
Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹² , ft/sec Length, L, ft T _t , hr 0.0000	Area, ft ²									
Slope, ft/ft Manning's No. Velocity ¹² , ft/sec Length, L, ft T ₁ , hr 0.0000	Wetted Perimeter, ft									
Manning's No. Velocity ¹² , ft/sec Length, L, ft T ₁ , hr 0.0000	Hydraulic Radius, R, ft									
Velocity ¹² , ft/sec Length, L, ft T ₁ , hr 0.0000	•									
Length, L, ft T _I , hr 0.0000										
T _b hr 0.0000										
The state of the s	Length, L, ft T., hr									0.0000
HR 0.639	16.10									0.0000
									HR	0.639
Min 38.32									Min	20.22

PROJECT: TRC Proj. No.: Subcatchment:	Cordelio Flat Creel 435979 PRE 31S	(Solar					Calculat Date: Checked Revised	l By:	RLD 8/8/24 PGT
Time of Concentration		nination	Worksh	eet. SCS	S Method	S			
-	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	
SHEET FLOW									
Manning's No.	0.24								
Length, ft	100								
P2, in	2.40								
Slope, ft/ft	0.003								
T _t , hr	0.587								0.5866
SHALLOW CONCENTE	RATED FLO)W							<u> </u>
Paved									
Length, ft Slope, ft/ft									
Velocity ² , ft/sec									
T _t , hr									0.0000
Unpaved									0.0000
Length, ft									
Slope, ft/ft									
Velocity ² , ft/sec									
T _t , hr									0.0000
Cultivated									
Length, ft									
Slope, ft/ft									
Velocity ⁴ , ft/sec									
T _t , hr									0.0000
Short Grass Pasture									
Length, ft		219		591.5					
Slope, ft/ft		0.007		0.044					
Velocity ⁴ , ft/sec		0.5857		1.4683					0.0450
T _t , hr		0.104		0.112					0.2158
Woodland			050						
Length, ft Slope, ft/ft			252 0.01						
Velocity ⁵ , ft/sec			0.5000						
T _t , hr			0.3000						0.1400
CHANNEL FLOW			0.110						0.1100
Waterways & Swamps	. No Chanr	nels							
Length, ft					722				
Slope, ft/ft					0.057				
Velocity ⁶ , ft/sec					2.865				
T _t ³ , hr					0.070				0.0700
Grassed Waterways/Ro	oadside Di	tches							
Length, ft									
Slope, ft/ft									
Velocity ⁷ , ft/sec									0.0000
T _t , hr	(0)								0.0000
Small Tributary & Swa	mp w/Chai	ineis							
Length, ft Slope, ft/ft									
Velocity ⁸ , ft/sec									
T _t , hr									0.0000
Large Tributary									0.0000
Large I ributary Length, ft									
Slope, ft/ft									
Velocity ⁸ , ft/sec									
T _t , hr									0.0000
Culvert									
Diameter, ft									
Area, ft ²									
Wetted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, ft/ft									
Manning's No.									
Velocity ¹² , ft/sec									
Length, L, ft									
Γ _t , hr									0.0000
		·		·		·		HR	1.012
								Min	60.74

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979	k Solar					Calculate:	l By:	RLD 8/8/24 PGT
Subcatchment: Time of Concentration	Post 31S	mination	Markah	ant SC	Mothod	0	Revised	:	
Time of Concentiation	Seg 1	Seg 2	Seg 3			Seg 6	Soc 7	Seg 8	
SHEET FLOW	Seg i	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Sey o	
Manning's No.	0.24								
Length, ft	100								
P2, in	2.40								
Slope, ft/ft	0.003								
T _t , hr	0.587								0.5866
SHALLOW CONCENTE	RATED FLO	ow							
Paved		I	l	I I		T.		I	
Length, ft									
Slope, ft/ft Velocity ² , ft/sec									
T _t , hr									0.0000
Unpaved									0.0000
Length, ft									
Slope, ft/ft									
Velocity ² , ft/sec									
T _t , hr									0.0000
Cultivated									
Length, ft									
Slope, ft/ft									
Velocity ⁴ , ft/sec									
T _t , hr									0.0000
Short Grass Pasture									
Length, ft		219		591.5					
Slope, ft/ft		0.007		0.044					
Velocity ⁴ , ft/sec T _t ³ , hr		0.5857		1.4683					0.0450
Woodland		0.104		0.112					0.2158
Length, ft			252						
Slope, ft/ft			0.01						
Velocity ⁵ , ft/sec			0.5000						
T _t , hr			0.140						0.1400
CHANNEL FLOW									
Waterways & Swamps	, No Chan	nels							
Length, ft					722				
Slope, ft/ft					0.057				
Velocity ⁶ , ft/sec					2.865				
T _t , hr					0.070				0.0700
Grassed Waterways/Ro	oadside D	itcnes				l			
Length, ft Slope, ft/ft									
Velocity ⁷ , ft/sec									
T _t , hr									0.0000
Small Tributary & Swa	mp w/Cha	nnels							0.000
Length, ft									
Slope, ft/ft									
Velocity ⁸ , ft/sec									
T _t , hr									0.0000
Large Tributary									2.3000
Length, ft									
Slope, ft/ft									
Velocity ⁸ , ft/sec									
T _t , hr									0.0000
Culvert									
Diameter, ft									
Area, ft ²									
Wetted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, ft/ft									
Manning's No.									
Velocity ¹² , ft/sec									
Length, L, ft									0.0000
T _t , hr									0.0000
								HR	1.012
								Mir	60.74
								Min	60.74

PROJECT: TRC Proj. No.:	Cordelio Flat Creel 435979	k Solar					Calculat Date: Checked		RLD 8/8/24 PGT
Subcatchment:	PRE 32S						Revised	:	
Time of Concentration	on Deterr	nination	Worksh	eet, SC	S Method	s			
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	
SHEET FLOW									
Manning's No.	0.24								
Length, ft	100								
P2, in	2.40								
Slope, ft/ft	0.02								
T _t , hr	0.275								0.2746
SHALLOW CONCENTR	ATED FLC)W							
Paved									
Length, ft									
Slope, ft/ft Velocity ² , ft/sec									
T _t , hr									0.0000
									0.0000
Unpaved Length, ft									
Slope, ft/ft Velocity ² , ft/sec									
T _t , hr									0.0000
Cultivated									0.0000
Length, ft									
Slope, ft/ft									
Velocity ⁴ , ft/sec									
T _t , hr									0.0000
Short Grass Pasture									0.0000
Length, ft		0.40	2083						
Slope, ft/ft		848 0.1	0.009						
Velocity ⁴ , ft/sec		2.2136	0.6641						
T _t , hr		0.106	0.871						0.9777
Woodland		0.100	0.071						0.5111
Length, ft									
Slope, ft/ft									
Velocity ⁵ , ft/sec									
T _t , hr									0.0000
CHANNEL FLOW									0.0000
Waterways & Swamps,	No Chanr	nels							
Length, ft									
Slope, ft/ft									
Velocity ⁶ , ft/sec									
T _t , hr									0.0000
Grassed Waterways/Ro	oadside Di	tches							
Length, ft									
Slope, ft/ft									
Velocity ⁷ , ft/sec									
T _t , hr									0.0000
Small Tributary & Swar	np w/Chai	nnels							
Length, ft									
Slope, ft/ft									
Velocity ⁸ , ft/sec									
T _t , hr									0.0000
Large Tributary									
Length, ft									
Slope, ft/ft									
Velocity ⁸ , ft/sec									
T _t , hr									0.0000
Culvert									
Diameter, ft									
Area, ft²									
Wetted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, ft/ft									
Manning's No.									
Velocity ¹² , ft/sec									
Length, L, ft									
T _t , hr									0.0000
								LID	
								HR	1.252
								Min	75.14

PROJECT: TRC Proj. No.: Subcatchment:	Cordelio Flat Creel 435979 POST 328									Calculat Date: Checked Revised	I Ву:	RLD 8/8/24 PGT
Time of Concentra	tion Deterr	mination	Worksh	eet, SC	S Metho	ds						
	Seg 1	Seg 2			Seg 3			Seg 4	Seg 5	Seg 7	Seg 8	
SHEET FLOW												
Manning's No.	0.24											
Length, ft	100											
P2, in	2.40											
Slope, ft/ft	0.02											0.0740
T _t 1,hr SHALLOW CONCENT	0.275	214/										0.2746
Paved	KAIED FLO	JVV										
Length, ft												
Slope, ft/ft												
Velocity ² , ft/sec												
T _t , hr												0.0000
Unpaved												
_ength, ft			21			25						
Slope, ft/ft			0.105			0.016						
Velocity ² , ft/sec			5.228176			2.040871						
Γ _t , hr			0.001			0.003						0.0045
Cultivated												
Length, ft												
Slope, ft/ft												
Velocity ⁴ , ft/sec												
T _t , hr												0.0000
Short Grass Pasture												
Length, ft		604		222	630		1429					
Slope, ft/ft Velocity ⁴ , ft/sec		0.08		0.153	0.007		0.009					
Velocity , fi/sec T _t , hr		1.9799 0.085		2.7381 0.023	0.5857 0.299		0.6641 0.598					1.0038
Woodland		0.063		0.023	0.299		0.096					1.0036
Length, ft												
Slope, ft/ft												
Velocity ⁵ , ft/sec												
T _t , hr												0.0000
CHANNEL FLOW												
Waterways & Swamp	s, No Chani	nels										
Length, ft												
Slope, ft/ft												
Velocity ⁶ , ft/sec												
T _t , hr												0.0000
Grassed Waterways/I	Roadside Di	itches										
Length, ft												
Slope, ft/ft												
Velocity ⁷ , ft/sec												0.000
T _t , hr												0.0000
Small Tributary & Sw	amp w/Chai	nnels			l			<u> </u>	<u> </u>	<u> </u>	<u> </u>	
Length, ft												
Slope, ft/ft Velocity ⁸ , ft/sec												
T _t , hr												0.0000
												0.0000
Large Tributary Length, ft												
Length, ft Slope, ft/ft												
Siope, π/π Velocity ⁸ , ft/sec												
T _t , hr												0.0000
Culvert												5.0000
Diameter, ft												
Area, ft ²												
Wetted Perimeter, ft												
Hydraulic Radius, R, ft												
Slope, ft/ft												
Manning's No.												
Velocity ¹² , ft/sec												
_ength, L, ft												
	1											0.0000
Γ _t , hr												
t, hr									I		пр	4.000
t _h hr		<u> </u>									HR Min	1.283

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979	k Solar					Calculat Date: Checked		RLD 8/8/24 PGT
Subcatchment:	PRE 33S						Revised		101
Time of Concentrati		mination	Worksh	eet. SCS	Method:	S			
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	
SHEET FLOW									
Manning's No.	0.4								
Length, ft	100								
P2 , in	2.40								
Slope, ft/ft	0.034								
T _t , hr	0.334								0.3342
SHALLOW CONCENT	RATED FLO	ow							
Paved		I							
Length, ft Slope, ft/ft									
Velocity ² , ft/sec									
T _t , hr									0.0000
Unpaved									0.0000
Length, ft									
Slope, ft/ft									
Velocity ² , ft/sec									
T _t , hr									0.0000
Cultivated									2.3000
Length, ft									
Slope, ft/ft									
Velocity ⁴ , ft/sec									
T _t , hr									0.0000
Short Grass Pasture									
Length, ft			1157						
Slope, ft/ft			0.046						
Velocity ⁴ , ft/sec			1.5013						
T _t , hr			0.214						0.2141
Woodland									
Length, ft		932		60					
Slope, ft/ft		0.016		0.312					
Velocity ⁵ , ft/sec		0.6325		2.7928					
T _t , hr		0.409		0.006					0.4153
CHANNEL FLOW									
Waterways & Swamps	, No Chani	nels	I			1		I	
Length, ft									
Slope, ft/ft Velocity ⁶ , ft/sec									
Velocity*, π/sec T _t *, hr									0.0000
	andaida Di	4-6							0.0000
Grassed Waterways/R	oadside Di	tcnes							
Length, ft Slope, ft/ft									
Velocity ⁷ , ft/sec									
T _t , hr									0.0000
Small Tributary & Swa	mn w/Cha	nnels							3.3000
Length, ft	p w/ona				141				
Slope, ft/ft					0.023				
Velocity ⁸ , ft/sec					3.185				
T _t , hr					0.012				0.0123
Large Tributary					0.012				0.0123
Large Tributary Length, ft									
Slope, ft/ft									
Velocity ⁸ , ft/sec									
T _t , hr									0.0000
Culvert									
Diameter, ft									
Area, ft ²									
Wetted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, ft/ft									
Manning's No.									
Velocity ¹² , ft/sec									
ength, L, ft									
t, hr									0.0000
								HR	0.076
									0.976
								Min	58.55

PROJECT: TRC Proj. No.: Subcatchment:	Cordelio Flat Cree 435979 Post 33S	k Solar							Calculat Date: Checked Revised	d By:	RLD 8/8/24 PGT
Time of Concentra		mination	Worksh	neet, SC	S Metho	ods					
	Seg 1	Seg 2	Seg 3	,		Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	
SHEET FLOW											
Manning's No.	0.4										
Length, ft	100										
P2, in	2.40										
Slope, ft/ft	0.034										
T _t , hr	0.334										0.3342
SHALLOW CONCENT	RATED FLO	ow									l
Paved							I				
Length, ft Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Unpaved											0.0000
Length, ft				34							
Slope, ft/ft				0.085							
Velocity ² , ft/sec				4.703975							
T _t , hr				0.002							0.0020
Cultivated											
Length, ft											
Slope, ft/ft											
Velocity ⁴ , ft/sec											
T _t , hr											0.0000
Short Grass Pasture											
Length, ft			808		315						
Slope, ft/ft			0.042		0.054						
Velocity⁴, ft/sec			1.4346		1.6267						
T _t , hr			0.156		0.054						0.2102
Woodland											
Length, ft		932				60					
Slope, ft/ft		0.016				0.312					
Velocity ⁵ , ft/sec		0.6325				2.7928					
T _t , hr		0.409				0.006					0.4153
CHANNEL FLOW											
Waterways & Swamp	s, No Chan	nels									
Length, ft											
Slope, ft/ft											
Velocity ⁶ , ft/sec											
T _t , hr											0.0000
Grassed Waterways/l	Roadside D	itches									
Length, ft											
Slope, ft/ft											
Velocity ⁷ , ft/sec											
T _t , hr											0.0000
Small Tributary & Sw	amp w/Cha	nnels									
Length, ft							141				
Slope, ft/ft Velocity ⁸ , ft/sec							0.023				
-							3.185				
T _t , hr							0.012				0.0123
Large Tributary											
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											2 222
T _t , hr											0.0000
Culvert											
Diameter, ft Area, ft ²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft Slope, ft/ft											
Slope, ft/ft Manning's No.											
Velocity ¹² , ft/sec											
Velocity , π/sec Length, L, ft											
Lengtn, L, π T _t , hr											0.0000
v "			<u> </u>				<u> </u>				0.0000
										HR	0.974
										Min	58.45
										<u> </u>	JU.4J

PROJECT: TRC Proj. No.: Subcatchment:	Cordelio Flat Creel 435979 PRE 34S	k Solar					Calculat Date: Checked Revised	l By:	RLD 8/8/24 PGT
Time of Concentration		nination	Worksh	eet SCS	S Method	9	Revised		
Time of Concentration	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	
SHEET FLOW	ocg i	OUG 2	OUG U	OUg 4	- Cog C	- Cog C	oug i	OUG U	
Manning's No.	0.4								
Length, ft	100								
P2 , in	2.40								
Slope, ft/ft	0.032								
T _t , hr	0.342								0.3424
SHALLOW CONCENTR	RATED FLO)W							
Paved									
Length, ft									
Slope, ft/ft									
Velocity ² , ft/sec									0.0000
T _t , hr									0.0000
Unpaved	I	I	I					I	
Length, ft									
Slope, ft/ft Velocity ² , ft/sec									
T _t , hr									0.0000
Cultivated									0.0000
Cultivated Length, ft									
Length, ft Slope, ft/ft									
Velocity ⁴ , ft/sec									
T _t , hr									0.0000
Short Grass Pasture									0.0000
Length, ft			1058						
Slope, ft/ft			0.019						
Velocity ⁴ , ft/sec			0.9649						
T _t , hr			0.305						0.3046
Woodland									
Length, ft		130							
Slope, ft/ft		0.022							
Velocity ⁵ , ft/sec		0.7416							
T _t , hr		0.049							0.0487
CHANNEL FLOW									
Waterways & Swamps,	No Chanr	nels							
Length, ft									
Slope, ft/ft									
Velocity ⁶ , ft/sec									
T _t ³ , hr									0.0000
Grassed Waterways/Ro	oadside Di	tches							
Length, ft									
Slope, ft/ft									
Velocity ⁷ , ft/sec									
T _t , hr									0.0000
Small Tributary & Swar	mp w/Chai	nnels							
Length, ft				155					
Slope, ft/ft				0.181					
Velocity ⁸ , ft/sec				8.934					
T _t , hr				0.005					0.0048
Large Tributary									
Length, ft									
Slope, ft/ft									
Velocity ⁸ , ft/sec									
T _t , hr									0.0000
Culvert									
Diameter, ft									
Area, ft ²									
Wetted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, ft/ft									
Manning's No. √elocity ¹² , ft/sec									
ւength, L, ft Г _t , hr									0.0000
i [i iii								1	0.0000
								HR	0.701
								Min	40.00
								[IAIIII	42.03

Sep	TRC Proj. No.:	Cordelio Flat Creel 435979 POST 345						Calculat Date: Checked Revised	l By:	RLD 8/8/24 PGT
Seg 1 Seg 2 Seg 3 Seg 4 Seg 5 Seg 6 Seg 7 Seg 8				Morkeh	aat SCS	2 Mathad	c	Reviseu		
SHEET FLOW Manning's No.	Time of Concentiation							Soc 7	Soc 9	
Mainting's No. 0.4	SHEET FLOW	Sey i	Seg 2	Seg s	Sey 4	Sey 5	Seg 6	Seg /	Sey o	
Langth, ft. 100 22, in 240 Stope, If fth 0.032 ShalLOW CONCENTRATED FLOW Paved Length, ft. Stope, If fth Webcoty*, Vision T**, Th		0.4								
P2	-									
Slope, Inft										
### ### ### ### ### ### ### ### ### ##										
Paved Pave										0.3424
Paved)W							
Length, ft. Stope, ft.ff Velocity*, ft.fee Longth, ft. Stope, ft.ff Stope, ft.ff Stope, ft.ff Velocity*, ft.fee Longth, ft. Stope, ft.ff Velocity*, ft.f										
Slope, If IT Wedoorly, Tive										
Webcatty										
Unpaved Length, ft Slope, ftf Waterways Wate										
Length, ft Silope, ft/ft Velocity ² , ft/ft/sec Cultivated Length, ft Silope, ft/ft Velocity ² , ft/ft/sec Cultivated Length, ft Silope, ft/ft Velocity ² , ft/ft/sec Cultivated Length, ft Silope, ft/ft Velocity ² , ft/ft/sec Cultivated Length, ft Silope, ft/ft Cultivated Length, ft Silope, ft/ft Cultivated Length, ft Cultivated Length, ft Silope, ft/ft Cultivated Length, ft Silope, ft/ft Cultivated Culti	T _t , hr									0.0000
Length, ft Silope, ft/ft Velocity ² , ft/ft/sec Cultivated Length, ft Silope, ft/ft Velocity ² , ft/ft/sec Cultivated Length, ft Silope, ft/ft Velocity ² , ft/ft/sec Cultivated Length, ft Silope, ft/ft Velocity ² , ft/ft/sec Cultivated Length, ft Silope, ft/ft Cultivated Length, ft Silope, ft/ft Cultivated Length, ft Cultivated Length, ft Silope, ft/ft Cultivated Length, ft Silope, ft/ft Cultivated Culti	Unpaved									
Slope, fift Webcolty*, fiber										
Ti, hr	Slope, ft/ft									
Ti, hr	Velocity ² , ft/sec									
Cultivated Length, ft Shope, ft/ft Velocity ² , ft/sec Ti ² , in Length, ft Slope, ft/ft Velocity ² , ft/sec Ti ² , in Length, ft Slope, ft/ft O.0000 Short Grass Pasture Length, ft Slope, ft/ft O.002 Woodland Length, ft O.002 Woodland Slope, ft/ft O.002 Velocity ² , ft/sec Ti ² , in O.0487 CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ² , ft/sec Ti ² , in O.0000 Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ² , ft/sec Ti ² , in O.0000 Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ² , ft/sec Ti ² , in O.0000 Grassed Tributary & Swamp W/Channels Length, ft Slope, ft/ft Velocity ² , ft/sec Ti ² , in O.0000 Channels Length, ft Slope, ft/ft Metad Perimeter, ft Prydraulic Radius, R, ft Slope, ft/ft Metad Perimeter, ft Prydraulic Radius, R, ft Slope, ft/ft Metad Perimeter, ft Prydraulic Radius, R, ft Slope, ft/ft Metad Perimeter, ft Prydraulic Radius, R, ft Slope, ft/ft Metad Perimeter, ft Prydraulic Radius, R, ft Slope, ft/ft Metad Perimeter, ft Prydraulic Radius, R, ft Slope, ft/ft Metad Perimeter, ft Prydraulic Radius, R, ft Slope, ft/ft Metad Perimeter, ft Prydraulic Radius, R, ft Slope, ft/ft Metad Perimeter, ft Prydraulic Radius, R, ft Slope, ft/ft Metad Perimeter, ft Prydraulic Radius, R, ft Slope, ft/ft Metad Perimeter, ft Prydraulic Radius, R, ft Slope, ft/ft Metad Perimeter, ft Prydraulic Radius, R, ft Slope, ft/ft Metad Perimeter, ft Prydraulic Radius, R, ft Slope, ft/ft Metad Perimeter, ft Prydraulic Radius, R, ft Slope, ft/ft Metad Perimeter, ft Prydraulic Radius, R, ft Slope, ft/ft Metad Perimeter, ft Prydraulic Radius, R	T _t , hr									0.0000
Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ² , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ² , hr O.0000 Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁶ , ft/sec O.09649 T ² , hr O.305 Woodland Length, ft Slope, ft/ft O.022 Velocity ⁶ , ft/sec C.7416 T ² , hr O.049 CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ² , hr O.0000 Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ² , hr O.0000 Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ² , hr O.0000 Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T, hr O.0000 Cmarsed Tributary Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T, hr O.0000 Cmarsed Tributary Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T, hr O.0000 Culvert Diameter, ft Ares, ft ² Weted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Weted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Weted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Weted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Weted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Weted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft T, hr										
Slope, ft/ft										
1,	-									
Short Grass Pasture										
Length, ft	T _t , hr									0.0000
Length, ft										
Slope, fl/ft	Length, ft			1058						
Ti, hr				0.019						
Woodland	Velocity ⁴ , ft/sec			0.9649						
Length, ft	T _t , hr			0.305						0.3046
Slope, ft/ft	Woodland									
Velocity ³ , ft/sec 0.049 0.0487 CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ ² , hr 0.0000 Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ ² , hr 0.0000 Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ , hr 0.151 Velocity ⁶ , ft/sec T ₁ , hr 0.0000 Cmark of the third of third of	Length, ft		130							
T; hr 0.049 0.0487 CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity', ft/sec Ti, hr 0.0000 Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft 0.181 Velocity', ft/sec Ti, hr 0.0000 Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft 0.181 Velocity', ft/sec Ti, hr 0.005 0.0048 Large Tributary Length, ft Slope, ft/ft Velocity', ft/sec Ti, hr 0.005 0.0000 Culvert Diameter, ft Area, ft' Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity'', ft/sec Length, L, ft Light, Light, L, ft Light, L	Slope, ft/ft		0.022							
CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Velocity ⁷ , ft/sec T ₁ , hr Velocity ⁷ , ft/sec T ₂ , hr Velocity ⁷ , ft/sec T ₃ , hr Velocity ⁷ , ft/sec T ₄ , hr Velocity ⁸ , ft/sec Length, ft Slope, ft/ft Velocity ⁸ , ft/sec Velocity ⁸ , ft/sec Length, ft Slope, ft/ft Velocity ⁸ , ft/sec Length, ft Slope, ft/ft Velocity ⁸ , ft/sec Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₄ , hr Velocity ⁸ , ft/sec T ₅ , hr Velocity ⁸ , ft/sec Velocity ⁹ , ft/sec			0.7416							
Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec Ti ² , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁶ , ft/sec Ti, hr O.0000 Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec Ti, hr O.005 Large Tributary Length, ft Slope, ft/ft Velocity ⁶ , ft/sec Ti, hr O.0000 Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ⁶ , ft/sec Length, L, ft Ti, hr O.0000	T _t , hr		0.049							0.0487
Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr O.0000 Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr O.0000 Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec B. 9.34 T ₁ , hr O.0005 Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr O.0000 Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹² , ft/sec Length, L, ft T ₁ , hr O.0000	CHANNEL FLOW									
Slope, ft/ft	Waterways & Swamps,	No Chanr	nels							
Velocity ⁸ , ft/sec 0.0000 Grassed Waterways/Roadside Ditches Length, ft Length, ft 0.0000 Small Tributary & Swamp w/Channels 0.0000 Length, ft 0.181 Velocity ⁸ , ft/sec 0.181 T ₁ , hr 0.005 Large Tributary 0.0048 Large Tributary Velocity ⁸ , ft/sec T ₁ , hr 0.0000 Culvert O.0000 Culvert O.0000 Metted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Slope, ft/ft Manning's No. Velocity ⁸ , ft/sec Length, L, ft 0.0000	Length, ft									
T ₁ , hr										
Grassed Waterways/Roadside Ditches										
Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Length, ft Slope, ft/ft Velocity ⁸ , ft/sec Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹² , ft/sec Length, L, ft T ₁ , hr										0.0000
Slope, ft/ft	Grassed Waterways/Ro	adside Di	tches							
Velocity*, ft/sec T ₁ , hr Small Tributary & Swamp w/Channels										
T _t , hr 0.0000 Small Tributary & Swamp w/Channels 155 Length, ft 0.181 Slope, fl/ft 0.181 Velocity ⁸ , ft/sec 8.934 T _t , hr 0.005 Large Tributary Length, ft Slope, fl/ft Slope, fl/ft Velocity ⁸ , ft/sec 0.0000 Culvert 0.0000 Culvert Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, fl/ft Manning's No. Velocity ¹² , ft/sec Length, L, ft T _t , hr 0.0000 0.0000	1 / 1									
Small Tributary & Swamp w/Channels 155										
Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ , hr 0.005 Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹² , ft/sec Length, L, ft T ₁ , hr 0.0000										0.0000
Slope, ft/ft	Small Tributary & Swan	np w/Chai	nnels							
Velocity ⁸ , ft/sec 8.934 T _r , hr 0.005 Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec 0.0000 T _r , hr 0.0000 Culvert Oliameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹² , ft/sec Length, L, ft T _r , hr 0.0000 0.0000	-									
T ₁ , hr 0.005 0.0048 Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr 0.0000 Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹² , ft/sec Length, L, ft T ₁ , hr 0.0000										
Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹² , ft/sec Length, L, ft T ₁ , hr 0.0000					8.934					
Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹² , ft/sec Length, L, ft T ₁ , hr	T _t , hr				0.005					0.0048
Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T _t , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹² , ft/sec Length, L, ft T _t , hr O.0000	Large Tributary									
Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr 0.0000										
Velocity ⁸ , ft/sec T _t , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹² , ft/sec Length, L, ft T _t , hr										
Culvert 0.0000 Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹², ft/sec Length, L, ft T _b , hr O.0000										
Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹², ft/sec Length, L, ft Tı, hr	T _t , hr									0.0000
Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹², ft/sec Length, L, ft T₁, hr	Culvert									
Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹² , ft/sec Length, L, ft T _t , hr 0.0000										
Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹² , ft/sec Length, L, ft T _t , hr 0.0000	Area, ft ²									
Slope, ft/ft Manning's No. Velocity ¹² , ft/sec Length, L, ft T _t , hr 0.0000	Wetted Perimeter, ft									
Slope, ft/ft Manning's No. Velocity ¹² , ft/sec Length, L, ft T _t , hr 0.0000	Hydraulic Radius, R, ft									
Manning's No. Velocity ¹² , ft/sec Length, L, ft T, hr 0.0000	·									
Velocity ¹² , ft/sec Length, L, ft T _i , hr 0.0000	Manning's No.									
Length, L, ft T ₁ , hr 0.0000										
T _b hr 0.0000										
										0.0000
∥HR 0.701	l									
II .									IHK	0.701
Min 42.03									Min	42.03

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979	k Solar					Calculat Date: Checked		RLD 8/8/24 PGT
Subcatchment:	PRE 35S						Revised	:	
Time of Concentration	on Deterr	mination	Worksh	eet, SCS	S Methods	S			
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	
SHEET FLOW									
Manning's No.	0.011								
Length, ft	100								
P2, in	2.40								
Slope, ft/ft	0.005								
T _t , hr	0.041	211							0.0406
SHALLOW CONCENTE	RATED FLO	ow							
Paved									
Length, ft		755							
Slope, ft/ft Velocity², ft/sec		0.059							
Velocity , livsec T _t , hr		4.937703							0.0405
		0.042							0.0425
Unpaved									
Length, ft									
Slope, ft/ft Velocity ² , ft/sec									
Velocity ⁻ , ft/sec T _t , hr									0.0000
									0.0000
Cultivated									
Length, ft									
Slope, ft/ft									
Velocity ⁴ , ft/sec T _t ³, hr									0.0000
									0.0000
Short Grass Pasture				44					
Length, ft				1445					
Slope, ft/ft				0.038					
Velocity ⁴ , ft/sec T _t ³, hr				1.3646					0.2042
Woodland				0.294					0.2942
Length, ft									
Slope, ft/ft Velocity ⁵ , ft/sec									
Velocity , fivsec T _t , hr									0.0000
CHANNEL FLOW									0.0000
Waterways & Swamps	No Chan	nole							
Length, ft	, ito onam	1013	438						
Slope, ft/ft			0.059						
Velocity ⁶ , ft/sec			2.915						
T _t , hr			0.042						0.0417
Grassed Waterways/R	nadside D	itches							
Length, ft									
Slope, ft/ft									
Velocity ⁷ , ft/sec									
T _t , hr									0.0000
Small Tributary & Swa	mp w/Cha	nnels							
Length, ft					351				
Slope, ft/ft					0.08				
Velocity ⁸ , ft/sec					5.940				
T _t , hr					0.016				0.0164
Large Tributary					0.010				0.0104
Large Tributary Length, ft									
Lengtn, π Slope, ft/ft									
Velocity ⁸ , ft/sec									
T _t , hr									0.0000
Culvert									0.0000
Diameter, ft									
Area, ft ²									
Wetted Perimeter, ft									
Hydraulic Radius, R, ft									
Slope, ft/ft									
Manning's No.									
/elocity ¹² , ft/sec									
Length, L, ft									
Lengin, L, II F _t , hr									0.0000
· · · ·									0.0000
								HR	0.435
								Min	26.42
								IAIIII	26.12

PROJECT: TRC Proj. No.: Subcatchment:	Cordelio Flat Cree 435979 POST 353								Calculate: Date: Checker	d By:	RLD 8/8/24 PGT
Time of Concentration			Worksh	eet, SC	S Metho	ds					
CLIEFT FLOW	Seg 1	Seg 2	Seg 3	Seg 4			Seg 5	Seg 6	Seg 7	Seg 8	
SHEET FLOW Manning's No.	0.011										
Length, ft	100										
P2, in	2.40										
Slope, ft/ft	0.005										
T _t , hr	0.041										0.0406
SHALLOW CONCENTE	RATED FLO	OW									
Paved									1	1	
Length, ft Slope, ft/ft		755 0.059									
Velocity ² , ft/sec		4.937703									
T _t , hr		0.042									0.0425
Unpaved											
Length, ft					22						
Slope, ft/ft					0.05						
Velocity ² , ft/sec					3.607784						
T _t , hr					0.002						0.0017
Cultivated											
Length, ft											
Slope, ft/ft Velocity⁴, ft/sec											
Velocity*, ft/sec T _t , hr											0.0000
Short Grass Pasture											0.0000
Length, ft				414		1009					
Slope, ft/ft				0.058		0.029					
Velocity ⁴ , ft/sec				1.6858		1.1921					
T _t , hr				0.068		0.235					0.3033
Woodland											
Length, ft											
Slope, ft/ft											
Velocity ⁵ , ft/sec											
T _t , hr											0.0000
CHANNEL FLOW Waterways & Swamps	No Chan	nole									
Length, ft	, NO Chair	11613	438						<u> </u>		
Slope, ft/ft			0.059								
Velocity ⁶ , ft/sec			2.915								
Tt, hr			0.042								0.0417
Grassed Waterways/Re	oadside D	itches			•						
Length, ft											
Slope, ft/ft											
Velocity ⁷ , ft/sec											
T _t , hr											0.0000
Small Tributary & Swa	mp w/Cha	nnels					251				
Length, ft							351				
Slope, ft/ft Velocity ⁸ , ft/sec							0.08 5.940				
T _t , hr											0.0464
							0.016				0.0164
Large Tributary Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Culvert											
Diameter, ft											
Area, ft ²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No. Velocity ¹² , ft/sec											
Velocity , ft/sec Length, L, ft											
Length, L, ft T _t , hr											0.0000
v "				1			<u> </u>	<u> </u>	1	Ì	
										HR	0.446
										Min	26.78
										Į.	•

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked		RLD 8/8/24 PGT
Subcatchment:	36S - Pre		as \//as	leab a a t	CCC Ma	the ede			Revised	: -	
Time of Concent	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
SHEET FLOW	Jeg i	Jeg z	Seg S	Jeg 4	Seg 5	Seg 0	Jeg /	Jeg o	Jeg s	Seg 10	
Manning's No.	0.240										
Length, ft	100										
P2, in	2.39										
Slope, ft/ft	0.032										
T _t 1, hr	0.228										0.2280
SHALLOW CONCE	NTRATED	FLOW									
Paved											
Length, ft Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Unpaved											0.0000
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Cultivated											
Length, ft											
Slope, ft/ft											
Velocity ⁴ , ft/sec											
T _t , hr											0.0000
Short Grass Pastu	re										
Length, ft		372	0	0							
Slope, ft/ft		0.052	0	0							
Velocity ⁴ , ft/sec		1.5962									
T _t , hr		0.065									0.0647
Woodland											
Length, ft		0	105	0							
Slope, ft/ft Velocity ⁵ , ft/sec		0.000	0.061	0							
T _t , hr			1.2349 0.024								0.0236
CHANNEL FLOW			0.024								0.0230
Waterways & Swar	nns. No Cl	nannels									
Length, ft	.,		0	2019	709	456					
Slope, ft/ft			0	0.053	0.037	0.09					
Velocity ⁶ , ft/sec				2.763	2.308	3.600					
T _t , hr				0.203	0.085	0.035					0.3235
Grassed Waterway	/s/Roadsid	e Ditches									
Length, ft											
Slope, ft/ft											
Velocity ⁷ , ft/sec											
T _t , hr											0.0000
Small Tributary & S	Swamp w/C	nannels									
Length, ft											
Slope, ft/ft Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Large Tributary											0.0000
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Culvert											
Diameter, ft											
Area, ft ²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
Velocity ¹¹ , ft/sec											
Length, L, ft											0.005
T _t , hr										llue.	0.0000
										HR	0.640
										ll .	

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Subcatchment:	36S - PC	ST							Revised		
Time of Concent	ration De	terminat	ion Wor	ksheet,	SCS Me	thods					
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
SHEET FLOW											
Manning's No.	0.240										
Length, ft P2, in	100										
Slope, ft/ft	2.39 0.032										
T _t , hr	0.032										0.2280
SHALLOW CONCE		FLOW									0.2200
Paved											
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Unpaved				,			,	,	_		
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec T _t ³ , hr											0.000
											0.0000
Cultivated Length, ft											
Slope, ft/ft											
Velocity ⁴ , ft/sec											
T _t , hr											0.0000
Short Grass Pastur	re										
Length, ft		372	0	0							
Slope, ft/ft		0.052	0	0							
Velocity ⁴ , ft/sec		1.5962									
Tt, hr		0.065									0.0647
Woodland											
Length, ft		0	105	0							
Slope, ft/ft		0.000	0.061	0							
Velocity ⁵ , ft/sec T _t ³ , hr			1.2349								0.0000
CHANNEL FLOW			0.024								0.0236
Waterways & Swan	nns. No Cl	nannels									
Length, ft			0	2019	709	456					
Slope, ft/ft			0	0.053	0.037	0.09					
Velocity ⁶ , ft/sec				2.763	2.308	3.600					
T _t , hr				0.203	0.085	0.035					0.3235
Grassed Waterway	s/Roadsid	e Ditches									
Length, ft											
Slope, ft/ft											
Velocity ⁷ , ft/sec											
T _t , hr		No a se se a la									0.0000
Small Tributary & S Length, ft	owamp w/C	manneis									
Length, it Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Large Tributary											
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
											0.0000
Culvert											
Culvert Diameter, ft											
Culvert Diameter, ft Area, ft ²											
Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft											
Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft											
Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft											
Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No.											
Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft											
Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec											0.0000
Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft										HR	0.0000

Subcatchment: 378 - Pro	PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
### Sept Sep S	Subcatchment:		е									101
SHEET FLOW	Time of Concenti	ration De	terminat	ion Wor	ksheet,	SCS Me	thods					
Committed No. Committed No		Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
	SHEET FLOW											
2,												
Signet												
All Companies All Companie												
### O												0.2800
Pare			FLOW									0.2009
angth, ft felocity*, filesec ***********************************	Paved											
	Length, ft											
Dispayed	Slope, ft/ft											
Impaved	Velocity ² , ft/sec											
angth, fi filection, filesce file filescent fi												0.0000
	Unpaved										_	
Price Pric	Length, ft											
Collibrated												
Dutivated												0.0000
angth, ft lispop, ftff lelocity*, ft/sec 7, for Short Grass Pasture ength, ft logo, ftff												0.0000
Short Grass Pasture 169												
1876 1876	Velocity ⁴ , ft/sec											
Short Grass Pasture	T _t , hr											0.0000
ength, ft 169		·e										
			169	0	1878							
10	Slope, ft/ft											
Noodland	Velocity⁴, ft/sec		2.4550		1.7570							
ength, ft 0 366 0 0 0.000 0.103 0 0.00	Tt ³ , hr		0.019		0.297							0.3160
Nope, ft/ft Nope	Woodland											
	Length, ft											
1,			0.000		0							
CHANNEL FLOW Naterways & Swamps, No Channels ength, ft 0 Slope, ft/ft 0 Channels ength, ft Slope, ft/ft (elocity ² , ft/sec i, hr Small Tributary & Swamp w/Channels ength, ft Slope, ft/ft (elocity ² , ft/sec i, hr In the state of the state												
Naterways & Swamps, No Channels				0.063								0.0634
Company Comp		ne No Ch	nannole									
Slope, ft/ft Slop		ips, 140 Ci	laillieis	0								
// filesotity ⁰ , fit/sec												
Grassed Waterways/Roadside Ditches ength, ft Slope, ft/ft (Flocity)*, ft/sec ;, hr Credity*, ft/sec	Velocity ⁶ , ft/sec			Ů								
Length, ft Slope, ft/ft Slope,	T _t , hr											0.0000
Siope, ft/ft Siop	Grassed Waterway	s/Roadsid	e Ditches						<u> </u>	'		
/elocity ⁷ , ft/sec ,, hr Small Tributary & Swamp w/Channels ength, ft Slope, ft/ft /elocity ⁸ , ft/sec ,, hr O.0000 arge Tributary ength, ft Slope, ft/ft /elocity ⁸ , ft/sec ,, hr O.0000 Cuivert Vested Perimeter, ft dydraulic Radius, R, ft Slope, ft/ft Alanning's No. /elocity ⁸ , ft/sec ength, L, ft ,, hr O.0000 HR O.0000	Length, ft											
Small Tributary & Swamp w/Channels	Slope, ft/ft											
Small Tributary & Swamp w/Channels												
Page												0.0000
Slope, ft/ft Pelocity ⁸ , ft/sec Peloc		wamp w/C	Channels									
/elocity ⁸ , ft/sec												
Large Tributary Length, ft Slope, ft/ft State Stat												0.0000
Slope, ft/ft State Slope, ft/ft Slope, ft/f												0.0000
Slope, ft/ft //elocity ⁸ , ft/sec												
/elocity ⁸ , ft/sec 7, hr 0.0000 Culvert Diameter, ft vrea, ft ² Vetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Alanning's No. /elocity ¹¹ , ft/sec ength, L, ft 7, hr HR 0.0000	Slope, ft/ft											
Culvert Diameter, ft trea, ft² Vetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Alanning's No. Velocity¹¹, ft/sec energth, L, ft ft, hr	Velocity ⁸ , ft/sec											
Diameter, ft Varea, ft 2 Vetted Perimeter, ft Aldydraulic Radius, R, ft Sloop, ft/ft Alanning's No. Velocity ¹¹ , ft/sec Length, L, ft	T _t , hr											0.0000
Area, ft ² Vetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Anning's No. (elocity ¹¹ , ft/sec Length, L, ft	Culvert											
Vetted Perimeter, ft dydraulic Radius, R, ft Slope, ft/ft Manning's No. /elocity ¹¹ , ft/sec .ength, L, ft ', hr HR 0.660	Diameter, ft											
Aydraulic Radius, R, ft Slope, ft/ft Anning's No. /elocity ¹¹ , ft/sec ength, L, ft j, hr HR 0.660	Area, ft ²											
Slope, ft/ft ### ### #### #######################												
Manning's No. /elocity ¹¹ , ft/sec .ength, L, ft	Hydraulic Radius, R, ft											
/elocity ¹¹ , ft/sec .ength, L, ft ₇ , hr												
ength, L, ft -, hr 0.0000 HR 0.660												
HR 0.660												
HR 0.660												0.0000
	•		I.		1			1	<u> </u>		IHR	
											II .	

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Subcatchment:	37S - Po								Revised		
Time of Concent	ration De	terminat	ion Wor	ksheet,	SCS Me	thods					
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
SHEET FLOW		1		_				l			
Manning's No.	0.240 100										
Length, ft P2, in	2.39										
Slope, ft/ft	0.019										
T _t , hr	0.281										0.2809
SHALLOW CONCE		FLOW									
Paved											
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
Tt, hr											0.0000
Unpaved		1		1			ı	ı	_		
Length, ft				0	22						
Slope, ft/ft				0	0.078						
Velocity ² , ft/sec T _t ³ , hr					4.506121						0.004
					0.0014						0.0014
Cultivated Length, ft											
Slope, ft/ft											
Velocity ⁴ , ft/sec											
T _t , hr											0.0000
Short Grass Pastui	re										0.0000
Length, ft		169	0	173	0	1683					
Slope, ft/ft		0.123	0	0.09	0	0.061					
Velocity ⁴ , ft/sec		2.4550		2.1000	_	1.7289					
T _t , hr		0.019		0.023		0.270					0.3124
Woodland											
Length, ft		0	366	0							
Slope, ft/ft		0.000	0.103	0							
Velocity ⁵ , ft/sec			1.6047								
T _t , hr			0.063								0.0634
CHANNEL FLOW	N. OI										
Waterways & Swan	nps, No Ci	nanneis	0	I							
Length, ft Slope, ft/ft			0								
Velocity ⁶ , ft/sec			U								
T _t , hr											0.0000
Grassed Waterway	s/Roadsid	e Ditches									0.0000
Length, ft											
Slope, ft/ft											
Velocity ⁷ , ft/sec											
T _t , hr											0.0000
Small Tributary & S	Swamp w/0	Channels									
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Large Tributary											
Length, ft Slope, ft/ft											
Slope, π/π Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Culvert											3.3000
Diameter, ft											
Area, ft ²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
Velocity ¹¹ , ft/sec											
Length, L, ft											
T _t , hr											0.0000
										HR	0.658
										Min	0.036

Subcatchment: 3i Time of Concentrati SHEET FLOW Manning's No. Length, ft P2, in Slope, ft/ft T ₁ ¹ , hr SHALLOW CONCENTI Paved Length, ft Slope, ft/ft Velocity ² , ft/sec T ₁ ³ , hr Unpaved Length, ft Slope, ft/ft Velocity ² , ft/sec T ₁ ³ , hr Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ ³ , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ ³ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ ³ , hr CHANNEL FLOW Waterways & Swamps Length, ft	0.240 100 2.39 0.020 0.275	erminati Seg 2	Seg 3 43 0.031 1.2325	ksheet, Seg 4	SCS Me Seg 5	thods Seg 6	Seg 7	Seg 8	Seg 9		0.2752 0.0000
SHEET FLOW Manning's No. Length, ft P2 , in Slope, ft/ft T ₁ ¹ , hr SHALLOW CONCENTI Paved Length, ft Slope, ft/ft Velocity ² , ft/sec T ₁ ³ , hr Unpaved Length, ft Slope, ft/ft Velocity ² , ft/sec T ₁ ³ , hr Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ ³ , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ ³ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ ³ , hr Cultivated Cength, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ ³ , hr Channel	0.240 100 2.39 0.020 0.275	FLOW	Seg 3 43 0.031				Seg 7	Seg 8	Seg 9	Seg 10	0.0000
SHEET FLOW Manning's No. Length, ft P2 , in Slope, ft/ft T ₁ *, hr SHALLOW CONCENTI Paved Length, ft Slope, ft/ft Velocity², ft/sec T ₁ *, hr Cultivated Length, ft Slope, ft/ft Velocity², ft/sec T ₁ *, hr Cultivated Length, ft Slope, ft/ft Velocity², ft/sec T ₁ *, hr Welocity⁴, ft/sec T ₁ *, hr Shope, ft/ft Velocity⁴, ft/sec T ₁ *, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec T ₁ *, hr Woodland Length, ft Slope, ft/ft Velocity⁵, ft/sec T ₁ *, hr CHANNEL FLOW Waterways & Swamps Length, ft	0.240 100 2.39 0.020 0.275	FLOW	43 0.031	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	0.0000
Manning's No. Length, ft P2 , in Slope, ft/ft Tt, 1 hr SHALLOW CONCENTI Paved Length, ft Slope, ft/ft Velocity², ft/sec Tt, 3 hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec Tt, 5 hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec Tt, 5 hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec Tt, 5 hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec Tt, 5 hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec Tt, 5 hr Woodland Length, ft Slope, ft/ft Velocity⁵, ft/sec Tt, 5 hr Woodland Length, ft Slope, ft/ft Velocity⁵, ft/sec CHANNEL FLOW Waterways & Swamps Length, ft	100 2.39 0.020 0.275	0	0.031								0.0000
Length, ft P2 , in Slope, ft/ft T _t 1, hr SHALLOW CONCENTI Paved Length, ft Slope, ft/ft Velocity², ft/sec T _t 3, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T _t 3, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T _t 3, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T _t 3, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec T _t 3, hr CHANNEL FLOW Waterways & Swamps Length, ft	100 2.39 0.020 0.275	0	0.031								0.0000
P2 , in Slope, ft/ft T,¹ hr SHALLOW CONCENTI Paved Length, ft Slope, ft/ft Velocity², ft/sec T,³ hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T,³ hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T,³ hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T,³ hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec T,³ hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec T,³ hr CHANNEL FLOW Waterways & Swamps Length, ft	2.39 0.020 0.275	0	0.031								0.0000
Slope, ft/ft T ₁ ¹, hr SHALLOW CONCENT! Paved Length, ft Slope, ft/ft Velocity², ft/sec T ₁ ³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T ₁ ³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T ₁ ³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T ₁ ³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec T ₁ ³, hr Channel Channel CHANNEL FLOW Waterways & Swamps Length, ft	0.020 0.275	0	0.031								0.0000
T.¹. hr SHALLOW CONCENTI Paved Length, ft Slope, ft/ft Velocity², ft/sec T.³. hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T.³. hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T,³. hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T,³. hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec T,³. hr Cultivated Candidate Candidate Control Grass Pasture Control Grass P	0.275	0	0.031								0.0000
SHALLOW CONCENTI Paved Length, ft Slope, ft/ft Velocity², ft/sec T,³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T,³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T,³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T,³, hr Woodland Length, ft Slope, ft/ft Velocity⁵, ft/sec T,³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T,³, hr Channel	RATED	0	0.031								
Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Cultivated Company Comp			0.031								
Slope, ft/ft Velocity², ft/sec T₁³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Channel FLOW Waterways & Swamps Length, ft			0.031								
Velocity², ft/sec T₁³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Cultivated Coltivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Coltivated Coltivated Coltivated Coltivated Coltivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Coltivated			0.031								
T _i *, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T _i *, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T _i *, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T _i *, hr Woodland Length, ft Slope, ft/ft Velocity⁵, ft/sec T _i *, hr Channel Flow Waterways & Swamps Length, ft			0.031								
Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Channel CHANNEL FLOW Waterways & Swamps Length, ft			0.031								
Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr Channel FLOW Waterways & Swamps Length, ft			0.031								0.0000
Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Channel Flow Waterways & Swamps Length, ft			0.031								0.0000
Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr CHANNEL FLOW Waterways & Swamps Length, ft			0.031								0.0000
T ₁ , hr Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ , hr CHANNEL FLOW Waterways & Swamps Length, ft			0.031								0.0000
Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ , hr CHANNEL FLOW Waterways & Swamps Length, ft			0.031								0.0000
Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ ³ , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ ³ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ ³ , hr CHANNEL FLOW Waterways & Swamps Length, ft			0.031								
Slope, ft/ft Velocity ⁴ , ft/sec T ₁ ³ , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ ³ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ ³ , hr CHANNEL FLOW Waterways & Swamps Length, ft			0.031								
Velocity ⁴ , ft/sec T ₁ , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ , hr CHANNEL FLOW Waterways & Swamps Length, ft			0.031								
T,*, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity*, ft/sec T,*, hr Woodland Length, ft Slope, ft/ft Velocity5, ft/sec T,*, hr CHANNEL FLOW Waterways & Swamps Length, ft			0.031								
Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T, ³ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T, ³ , hr CHANNEL FLOW Waterways & Swamps Length, ft			0.031								0.0000
Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ , hr CHANNEL FLOW Waterways & Swamps Length, ft			0.031								
Slope, ft/ft Velocity ⁴ , ft/sec Tt ³ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec Tt ³ , hr CHANNEL FLOW Waterways & Swamps Length, ft			0.031								
Velocity ⁴ , ft/sec T ₁ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ , hr CHANNEL FLOW Waterways & Swamps Length, ft											
Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T _t ³ , hr CHANNEL FLOW Waterways & Swamps Length, ft											
Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T _t ³ , hr CHANNEL FLOW Waterways & Swamps Length, ft			0.010								0.0097
Slope, ft/ft Velocity ⁵ , ft/sec T _t ³ , hr CHANNEL FLOW Waterways & Swamps Length, ft											
Velocity ⁵ , ft/sec T _t ³ , hr CHANNEL FLOW Waterways & Swamps Length, ft		125	0	811							
T _t , hr CHANNEL FLOW Waterways & Swamps Length, ft		0.046	0	0.02							
CHANNEL FLOW Waterways & Swamps Length, ft		1.0724		0.7071							
Waterways & Swamps Length, ft		0.032		0.319							0.3510
Length, ft	N Ob										
-	s, No Cn	anneis	0								
Slope, ft/ft			0								
Velocity ⁶ , ft/sec			U								
T _t , hr											0.0000
Grassed Waterways/R	Roadside	Ditches									0.0000
Length, ft											
Slope, ft/ft											
Velocity ⁷ , ft/sec											
T _t , hr											0.0000
Small Tributary & Swa	amp w/C	hannels									
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Large Tributary											
Length, ft											
Slope, ft/ft Velocity ⁸ , ft/sec											
Velocity', π/sec T _t , hr											0.0000
Culvert											0.0000
Diameter, ft											
Area, ft ²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
Velocity ¹¹ , ft/sec											
Length, L, ft											
T _t , hr											0.0000
										HR	0.636
										Min	38.15

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979	ek Solar							Calculat Date: Checked	d By:	RLD 8/8/24 PGT
Subcatchment:	38S - Po		ian \//an	leabaat :	CCC Ma	the ende			Revised	:	
Time of Concentra							07	22	00	0 10	
SHEET FLOW	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
Manning's No.	0.240										
Length, ft	100										
P2 , in	2.39										
Slope, ft/ft	0.020										
T _t , hr	0.275										0.2752
SHALLOW CONCEN	NTRATED	FLOW									
Paved											
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											0.0000
T _t , hr											0.0000
Unpaved	1										
Length, ft Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Cultivated											3.3000
Length, ft											
Slope, ft/ft											
Velocity ⁴ , ft/sec											
T _t , hr											0.0000
Short Grass Pasture	9										
Length, ft		0	106								
Slope, ft/ft		0	0.041								
Velocity⁴, ft/sec			1.4174								
T _t , hr			0.021								0.0208
Woodland											
Length, ft		92	0	781							
Slope, ft/ft		0.041	0	0.019							
Velocity ⁵ , ft/sec		1.0124		0.6892							
T _t , hr		0.025		0.315							0.3400
CHANNEL FLOW Waterways & Swam	no No Ci	hannala									
Length, ft	ps, No Ci	lallileis	0								
Slope, ft/ft			0								
Velocity ⁶ , ft/sec			0								
T _t , hr											0.0000
Grassed Waterways	/Roadsid	le Ditches									
Length, ft											
Slope, ft/ft											
Velocity ⁷ , ft/sec											
T _t , hr											0.0000
Small Tributary & Sv	wamp w/0	Channels									
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											2 2225
T _t , hr											0.0000
Large Tributary											
Length, ft Slope, ft/ft											
Slope, π/π Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Culvert											
Diameter, ft											
Area, ft ²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
Velocity ¹¹ , ft/sec											
Length, L, ft											
T _t , hr		<u> </u>							<u> </u>		0.0000
										HR	0.636
										Min	38.16
										U	

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Subcatchment:	39S - Pre	9							Revised		101
Time of Concent	ration De	terminati	ion Worl	ksheet,	SCS Me	thods					
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
SHEET FLOW											
Manning's No.	0.240										
Length, ft	100										
P2, in	2.39										
Slope, ft/ft T _t ¹, hr	0.011 0.350										0.3496
SHALLOW CONCE		FLOW									0.3490
Paved	MINAILD	1 LOW									
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Unpaved											
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Cultivated											
Length, ft											
Slope, ft/ft Velocity ⁴ , ft/sec											
T _t , hr											0.0000
Short Grass Pastu	'Α										0.0000
Length, ft	_	1194									
Slope, ft/ft		0.01									
Velocity ⁴ , ft/sec		0.7000									
T _t , hr		0.474									0.4738
Woodland											
Length, ft			0								
Slope, ft/ft			0								
Velocity ⁵ , ft/sec											
T _t , hr											0.0000
CHANNEL FLOW	N. 01										
Waterways & Swan	nps, No Cr	nanneis	755								
Length, ft Slope, ft/ft			755 0.044								
Velocity ⁶ , ft/sec			2.517								
T _t , hr			0.083								0.0833
Grassed Waterway	s/Roadsid	e Ditches									0.0000
Length, ft											
Slope, ft/ft											
Velocity ⁷ , ft/sec											
T _t , hr											0.0000
Small Tributary & S	wamp w/C	Channels									
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Large Tributary											
Length, ft Slope, ft/ft											
Slope, ft/ft Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Culvert											2.0000
Diameter, ft											
Area, ft ²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
Velocity ¹¹ , ft/sec											
Length, L, ft											
T _t , hr											0.0000
										HR Min	0.907

Subcatchment 395 - Post	PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Sept	Subcatchment:		st									101
SHEET FLOW	Time of Concent	ration De	terminat	ion Wor	ksheet, :	SCS Me	thods					
Manning's No. 0.240 mapple file 100 2.2 in 2.39 in 2.39 in in 2.39 in in in in in in in i		Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
A					1			1	1			
72, in 2.39 3000, htt 0.011 1, in 0.330 SHALLOW CONCENTRATED FLOW Paved Amengin in 0.011 Stope, in in clearly flower of in in 1000 Continuated origin, it 0.0000 Continuated origin, it 0.00000 Continuated origin, it 0.000000 Continuated origin, it 0.0000000000000000000000000000000000												
Signe, NM												
1												
### SHALLOW CONCENTRATED FLOW Paved												0.3496
Pave			FLOW									0.0490
		TTTTO TT LD										
Slope, If Iff Welcotory, New Comments	Length, ft											
Unique U	Slope, ft/ft											
Unpaved	Velocity ² , ft/sec											
.ength, ft Slope, ftff Velocity*, Velocit C**, Th Coultivated .ength, ft Slope, ftff Velocity*, Velocit C**, Th Coultivated .ength, ft Slope, ftff Velocity*, Velocit C**, Th Coultivated .ength, ft Slope, ftff O Velocity*, Velocit C**, Th O Coultivated .ength, ft O Slope, ftff O Velocity*, Velocit C**, Th O Coultivated .ength, ft O Slope, ftff O Velocity*, Velocit C**, Th O Coultivate .ength, ft O Slope, ftff O O CHANNEL FLOW Waterways & Swamps, No Channels .ength, ft Slope, ftff O Velocity*, Velocit C**, Th O O Statistic Coultivate .ength, ft Slope, ftff Velocity*, Velocit C**, Th O O Coultivate .ength, ft Slope, ftff Velocity*, Velocit C**, Th O O Coultivate .ength, ft Slope, ftff Velocity*, Velocit C**, Th O O O Coultivate .ength, ft Slope, ftff Velocity*, Velocit C**, Th O O O Coultivate .ength, ft Slope, ftff Velocity*, Velocit C**, Th O O O Coultivate .ength, ft Slope, ftff Velocity*, Velocit C**, Th O O O O Coultivate .ength, ft Slope, ftff Velocity*, Velocit C**, Th O O O O Coultivate .ength, ft Slope, ftff Velocity*, Velocit C**, Th O O O O O O O O O O O O O O O O O O O												0.0000
Sicpe, Infr	Unpaved									,		
Velocity Velocity	Length, ft											
0,0000 0,00000 0,0000 0,0000 0,0000 0,0000 0,0000 0,0000 0,00000 0,0000 0,0000 0,0000 0,0000 0,0000 0,0000 0,0000 0,0000 0,0000 0,0000 0,0000 0,0000 0,0000 0,0000 0,0000 0,0000 0,0000 0,00000 0,00000 0,00000 0,0000 0,0000 0,0000 0,0000 0,0000 0,0000 0,0000 0,000	Slope, ft/ft											
Cultivated												0.0000
Angelia Ange												0.0000
Siope, NR												
194	Velocity ⁴ , ft/sec											
Short Grass Pasture	T _t , hr											0.0000
Length, ft 1194		re										
Slope, fift	Length, ft		1194									
No. No.	Slope, ft/ft		0.01									
Woodland	Velocity⁴, ft/sec		0.7000									
Sicipe, ft/ft	Tt, hr		0.474									0.4738
Slope, fift	Woodland											
Velocity ² , ft/sec T ₁	Length, ft											
1, hr	Slope, ft/ft			0								
### CHANNEL FLOW Waterways & Swamps, No Channels												
Waterways & Swamps, No Channels												0.0000
Length, ft Slope, ft/ft 0.044 4 (elocity)*, ft/sec 2.517 7.3 hr 0.083 0.0833 Grassed Waterways/Roadside Ditches		nne No Cl	nannole									
Slope, ft/ft		iips, ito oi	laillieis	755								
Grassed Waterways/Roadside Ditches	Velocity ⁶ , ft/sec											
Length, ft Slope, ft/ft Velocity'', ft/sec T _i , hr	T _t , hr			0.083								0.0833
Slope, ft/ft	Grassed Waterway	s/Roadsid	e Ditches						<u> </u>	'		
Velocity ⁷ , ft/sec Γ ₁ , hr Small Tributary & Swamp w/Channelsength, ft Slope, ft/ft Velocity ⁸ , ft/sec Γ ₁ , hr Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Vetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹ , ft/sec	Length, ft											
T ₁ , hr	Slope, ft/ft											
Small Tributary & Swamp w/Channels												
Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T _{ri} , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T _{ri} , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T _{ri} , hr HR 0.0000												0.0000
Slope, ft/ft Velocity®, ft/sec Velocity®		swamp w/0	Channels									
Velocity ⁸ , ft/sec 0.0000 Large Tributary 0.0000 Length, ft Slope, ft/ft Slope, ft/ft 0.0000 Velocity ⁸ , ft/sec 0.0000 T ₁ , hr 0.0000 Culvert 0.0000 Culvert 0.0000 Wetted Perimeter, ft 0.0000 Hydraulic Radius, R, ft 0.0000 Slope, ft/ft 0.0000 Manning's No. 0.0000 Velocity ¹¹ , ft/sec 0.0000 Length, L, ft 0.0000 T ₁ , hr 0.0000												
T ₁ , hr												
Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.0000	T _t , hr											0.0000
Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.0000												0.0000
Slope, ft/ft Velocity®, ft/sec Tr, hr	Length, ft											
Velocity ⁸ , ft/sec 0.0000 Culvert 0.0000 Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Hx Manning's No. Velocity¹¹¹, ft/sec Length, L, ft 0.0000 T₁, hr HR 0.0000	Slope, ft/ft											
Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft T _i , hr HR 0.9000	Velocity ⁸ , ft/sec											
Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft T ₁ , hr HR 0.907	T _t , hr											0.0000
Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft Ti, hr HR 0.0000	Culvert											
Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft Ti, hr HR 0.907	Diameter, ft											
Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft Ti, hr HR 0.907												
Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.907												
Manning's No. Velocity ¹¹ , ft/sec Length, L, ft T ₁ , hr HR 0.907	•											
Velocity ¹¹ , ft/sec Length, L, ft Τ _L hr HR 0.9007												
Length, L, ft Γ, hr 0.0000 HR 0.907												
T _t , hr 0.0000 HR 0.907												
HR 0.907	Lengin, L, ii T _t , hr											0.0000
		1			I.			I.	I.	1	IHR	
											II .	

Subcatchment: 409 - Pre	PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
### Sept	Subcatchment:		•									101
SHEET FLOW	Time of Concentr	ration De	terminat	ion Worl	ksheet, :	SCS Me	thods					
Manings No.		Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
2.3 in 2.3 in 2.3 in 2.2 in 2												
Signet												
All Companies All Companie												
### Description of the Control of th												0.2871
Park			FLOW									0.2071
angth, ft relocatify, filesec	Paved											
Sipop. Rth	Length, ft											
Dispace Disp	Slope, ft/ft											
Impaved	Velocity ² , ft/sec											
angth, fi filection, filesce filection, filesce filescent, filesce fil	T _t , hr											0.0000
Indicators Ind	Unpaved											
Price Pric	Length, ft											
Color Colo	Slope, ft/ft											
Dutivated												
angth, ft lispos, ftff lociocity*, ft/sec 7, for Short Grass Pasture ength, ft lociocity*, ft/sec lociocity*												0.0000
Short Grass Pasture												
1												
Short Grass Pasture												0.0000
ength, ft 1426 0,015 0,015 0,0573 0,462 0,0573 0,462 0,0573 0,462 0,000diand 0,000di		·o										0.0000
		6	1/126									
1,												
Noodland												0.4620
ength, ft lope, ft/ft lope, ft/ft/ft/ft lope, ft/ft/ft lope, ft/ft lope, ft/ft/ft/ft/ft lope, ft/ft/ft/ft/ft/ft/ft lope, ft/ft			0.402									0.4020
Nope, ft/ft Nope Note Nope Note Nope Note Nope				0								
## DHANNEL FLOW **Naterways & Swamps, No Channels ength, ft	Velocity ⁵ , ft/sec											
Naterways & Swamps, No Channels	T _t hr											0.0000
Company Comp	CHANNEL FLOW											
Slope, ft/ft Slop		nps, No Ch	nannels		ı			ı				
Company Comp												
### Company of the Co												
Length, ft Slope, ft/ft Slope,		<u> </u>	- · ·									0.0000
Siope, ft/ft Siop		s/Roadsid	e Ditches	i					I			
/elocity ⁷ , ft/sec ,, hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft (/elocity ⁸ , ft/sec ,, hr 0.0000 Singer Tributary Length, ft Slope, ft/ft (/elocity ⁸ , ft/sec ,, hr 0.0000 Sulvert Vetted Perimeter, ft dydraulic Radius, R, ft Slope, ft/ft (/elocity ⁸ , ft/sec ength, L, ft ft, hr Manning's No. (/elocity ⁸ , ft/sec ength, L, ft ft, hr Manning's No. (/elocity ⁸ , ft/sec ength, L, ft ft, hr MR 0.0000 HR 0.0000												
Small Tributary & Swamp w/Channels												
Small Tributary & Swamp w/Channels												0.0000
State Stat		wamn w/C	hannels									2.0000
Slope, ft/ft	_ength, ft			354								
// velocity ⁸ , ft/sec	Slope, ft/ft											
To, hr 0.040 0.0396 -arge Tributary -ength, ft Slope, ft/ft Slope, ft/ft/ft Slope, ft/ft/ft Slope, ft/ft/ft Slope, ft/ft/ft Slope, ft/ft/ft/ft Slop	Velocity ⁸ , ft/sec											
Slope, ft/ft State Slope, ft/ft Slope, ft/f	T _t , hr			0.040								0.0396
Slope, ft/ft //elocity ⁸ , ft/sec	Large Tributary											
/elocity ⁸ , ft/sec 7, hr 0.0000 Culvert Diameter, ft vrea, ft ² Vetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Alanning's No. /elocity ¹¹ , ft/sec ength, L, ft 7, hr HR 0.0000	_ength, ft											
Culvert Diameter, ft trea, ft2 Vetted Perimeter, ft dydraulic Radius, R, ft Slope, ft/ft Alanning's No. Velocity11, ft/sec energth, L, ft ft, hr	Slope, ft/ft											
Culvert Diameter, ft Area, ft² Vetted Perimeter, ft Adydraulic Radius, R, ft Slope, ft/ft Anning's No. (elocity¹¹, ft/sec Length, L, ft ¬, hr HR 0.789												
Diameter, ft vrea, ft² Vetted Perimeter, ft dydraulic Radius, R, ft Slope, ft/ft Janning's No. (elocity¹¹, ft/sec ength, L, ft -, hr HR 0.789												0.0000
Vetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Anning's No. (elocity¹¹, ft/sec Length, L, ft -,, hr HR 0.789												
Vetted Perimeter, ft dydraulic Radius, R, ft Slope, ft/ft Manning's No. /elocity ¹¹ , ft/sec ength, L, ft j, hr HR 0.789												
Aydraulic Radius, R, ft Slope, ft/ft Anning's No. /elocity ¹¹ , ft/sec ength, L, ft j, hr HR 0.789												
Slope, ft/ft ### ### #### #######################												
Manning's No. /elocity ¹¹ , ft/sec ength, L, ft 'i, hr HR 0.789	•											
/elocity ¹¹ , ft/sec .ength, L, ft ₇ , hr												
ength, L, ft -, hr 0.0000 HR 0.789												
HR 0.789												
HR 0.789												0 0000
	-										lhr	
											II .	

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Subcatchment:	40S - Po	st							Revised		PGI
Time of Concent			ion Worl	ksheet,	SCS Me	thods					
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
SHEET FLOW											
Manning's No.	0.240										
Length, ft	100										
P2 , in	2.39										
Slope, ft/ft T _t ¹, hr	0.018 0.287										0.2871
SHALLOW CONCE		FLOW									0.2071
Paved	MINAILD	1 2011									
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
Tt, hr											0.0000
Unpaved											
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec T _t ³ , hr											0.0000
Cultivated											0.0000
Length, ft											
Slope, ft/ft											
Velocity ⁴ , ft/sec											
T _t , hr											0.0000
Short Grass Pastur	re										
Length, ft		1426									
Slope, ft/ft		0.015									
Velocity ⁴ , ft/sec		0.8573									
T _t , hr		0.462									0.4620
Woodland											
Length, ft			0								
Slope, ft/ft Velocity ⁵ , ft/sec			0								
T _t , hr											0.0000
CHANNEL FLOW											0.0000
Waterways & Swan	nps. No Ch	nannels									
Length, ft	, , , , , ,										
Slope, ft/ft											
Velocity ⁶ , ft/sec											
Tt ³ , hr											0.0000
Grassed Waterway	s/Roadsid	e Ditches									
Length, ft											
Slope, ft/ft											
Velocity ⁷ , ft/sec T _t , hr											0.0000
Small Tributary & S	wamn w/C	hannele									0.0000
Length, ft	uiip w/C		354								
Slope, ft/ft			0.014								
Velocity ⁸ , ft/sec			2.485								
T _t , hr			0.040								0.0396
Large Tributary											
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											_
T _t , hr											0.0000
Culvert											
Diameter, ft Area, ft ²											
Area, π Wetted Perimeter, ft											
Wetted Perimeter, it Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
Velocity ¹¹ , ft/sec											
Length, L, ft		1									0.0000
Lengtn, L, π T _t , hr											0.0000
										HR	0.789

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checker	-	RLD 8/8/24 PGT
Subcatchment:	41S - Pre								Revised		
Time of Concent											
SHEET FLOW	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
Manning's No.	0.240										
Length, ft	100										
P2, in	2.39										
Slope, ft/ft	0.007										
T _t , hr	0.419										0.4188
SHALLOW CONCE	NTRATED	FLOW									
Paved											
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec T _t , hr											0.0000
											0.0000
Unpaved Length, ft		<u> </u>		<u> </u>			<u> </u>	<u> </u>			
Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Cultivated											
Length, ft											
Slope, ft/ft											
Velocity⁴, ft/sec											
T _t , hr											0.0000
Short Grass Pastur	re										
Length, ft		700									
Slope, ft/ft Velocity ⁴ , ft/sec		0.014									
T _t , hr		0.8283 0.235									0.2348
Woodland		0.233									0.2340
Length, ft			226								
Slope, ft/ft			0.034								
Velocity ⁵ , ft/sec			0.9220								
T _t ³ , hr			0.068								0.0681
CHANNEL FLOW											
Waterways & Swar	nps, No Ch	nannels									
Length, ft			0	218							
Slope, ft/ft			0	0.009							
Velocity ⁶ , ft/sec T _t ³ , hr				1.138							0.0522
	o/Doodoid	a Ditabas		0.053							0.0532
Grassed Waterway Length, ft	s/Roausiu	e Ditches									
Slope, ft/ft											
Velocity ⁷ , ft/sec											
T _t , hr											0.0000
Small Tributary & S	Swamp w/C	hannels									
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Large Tributary											
Length, ft											
Slope, ft/ft Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Culvert											1.5000
Diameter, ft											
Area, ft ²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
Velocity ¹¹ , ft/sec											
Length, L, ft T _t , hr											0.0000
15.11										Шпр	0.0000
										HR	0.775
										Min	46.49

PROJECT: TRC Proj. No.:	Cordelic Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Subcatchment:	41S - Po								Revised	:	
Time of Concent							0 - 7	0	00	0 - 10	
SHEET FLOW	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
Manning's No.	0.240										
Length, ft	100										
P2 , in	2.39										
Slope, ft/ft	0.007										
T _t 1, hr	0.419	=1 614/									0.4188
SHALLOW CONCE	NTRATED	FLOW									
Paved Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Unpaved											
Length, ft			20								
Slope, ft/ft			0.019								
Velocity ² , ft/sec			2.223987								
T _t , hr			0.002								0.0025
Cultivated											
Length, ft Slope, ft/ft											
Slope, π/π Velocity⁴, ft/sec											
T _t , hr											0.0000
Short Grass Pastur	re										0.0000
Length, ft		504		178							
Slope, ft/ft		0.014		0.014							
Velocity⁴, ft/sec		0.8283		0.8283							
Tt ³ , hr		0.169		0.060							0.2287
Woodland											
Length, ft					226						
Slope, ft/ft Velocity ⁵ , ft/sec					0.034						
T _t , hr					0.9220 0.068						0.0681
CHANNEL FLOW					0.000						0.0001
Waterways & Swan	nps. No Cl	nannels									
Length, ft			0	0		218					
Slope, ft/ft			0	0		0.009					
Velocity ⁶ , ft/sec						1.138					
T _t , hr						0.053					0.0532
Grassed Waterway	s/Roadsid	le Ditches	3		I			ı	1		
Length, ft											
Slope, ft/ft Velocity ⁷ , ft/sec											
T _t , hr											0.0000
Small Tributary & S	Swamn w/C	Channels									0.0000
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Large Tributary											
Length, ft											
Slope, ft/ft Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Culvert											0.0000
Diameter, ft											
Area, ft ²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
Velocity ¹¹ , ft/sec											
Length, L, ft T _t , hr											0.0000
15 m										HR	0.0000
										II .	0.771
										Min	46.28

TRC Proj. No.:							Calculat Date: Checked	-	RLD 8/8/24 PGT
Seg 1 Seg 2							Revised		
### SHEET FLOW Manning's No.								2 12	
Manning's No. 0.240 Length, ft 100 P2, in 2.39 Slope, fl/ft 0.003 Tt, hr 0.588 SHALLOW CONCENTRATED FLOW Paved Length, ft Slope, fl/ft Velocity ² , fl/sec Tt, hr Cultivated Length, ft Slope, fl/ft Velocity ⁴ , fl/sec Tt, hr Short Grass Pasture Length, ft Slope, fl/ft Velocity ⁵ , fl/sec Tt, hr 0.018 Short Grass Pasture Length, ft Slope, fl/ft Velocity ⁵ , fl/sec Tt, hr 0.099 Woodland Length, ft Slope, fl/ft Velocity ⁵ , fl/sec Tt, hr 0.099 Woodland Length, ft Slope, fl/ft Velocity ⁵ , fl/sec Tt, hr 0.099 Wowderways & Swamps, No Channels Length, ft Slope, fl/ft Velocity ⁶ , fl/sec Tt, hr 0.0099 CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, fl/ft Velocity ⁶ , fl/sec Tt, hr 0.0099 Slope, fl/ft Velocity ⁶ , fl/sec Tt, hr 0.0099 CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, fl/ft Velocity ⁶ , fl/sec Tt, hr 0.0099 CHANNEL FLOW Waterways & Swamp W/Channels Length, ft Slope, fl/ft Velocity ⁷ , fl/sec Tt, hr 0.0099 Culturet Diameter, ft Culvert Diameter Cul	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
Slope, ft/ft ShALLOW CONCENTRATED FLOW Paved Length, ft Slope, ft/ft Slope, ft/f									
Slope, ft/ft O.003 Ti ¹ , hr O.588 SHALLOW CONCENTRATED FLOW Paved Length, ft Slope, ft/ft Velocity ² , ft/sec Ti ² , hr Unpaved Length, ft Slope, ft/ft Velocity ² , ft/sec Ti ² , hr Cultivated Length, ft Slope, ft/ft Velocity ³ , ft/sec Ti ² , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec Ti ² , hr O.018 Velocity ⁴ , ft/sec Ti ² , hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁵ , ft/sec Ti ³ , hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁵ , ft/sec Ti ³ , hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁵ , ft/sec Ti, hr CHANNEL FLOW Waterways & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁵ , ft/sec Ti, hr Cultert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Area, ft ² Wetted Perimeter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Area, ft ² Wetted Perimeter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Area, ft ² Wetted Perimeter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Hydraulic Radius R, ft Slope, ft/ft									
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Slope, ft/ft //elocity ² , ft/sec r ₁ , hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft //elocity ⁶ , ft/sec r ₁ , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft //elocity ⁷ , ft/sec r ₁ , hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft //elocity ⁸ , ft/sec r ₁ , hr Large Tributary Length, ft Slope, ft/ft //elocity ⁸ , ft/sec r ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft //elocity ¹¹ , ft/sec Length, ft Slope, ft/ft //elocity ¹² , ft/sec //elocity ¹³ , ft/sec //elocity ¹⁴ , ft/sec //elocity ¹⁵ , ft/sec //elocity ¹⁵ , ft/sec Length, L, ft									
//elocity ⁶ , ft/sec Ti ³ , hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft //elocity ⁶ , ft/sec Ti ³ , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft //elocity ⁷ , ft/sec Ti, hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft //elocity ⁸ , ft/sec Ti, hr Large Tributary Large Tributary Large Tributary Large Tributary Logione ft/ft Metted Perimeter, ft Area, ft ² Wetted Perimeter, ft Area, ft ²	1133								
Ti, hr CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec Ti, hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁷ , ft/sec Ti, hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec Ti, hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec Ti, hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wanning's No. Velocity ¹ , ft/sec Length, L, ft	0.041								
CHANNEL FLOW Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ ⁷ , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹ , ft/sec Length, L, ft	1.0124 0.311								0.3109
Waterways & Swamps, No Channels Length, ft Slope, ft/ft Velocity ⁶ , ft/sec Ti ⁻³ , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁷ , ft/sec Ti ₁ , hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec Ti ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec Ti ₂ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Wenning's No. Velocity ¹¹ , ft/sec Length, L, ft	0.511								0.5109
Slope, ft/ft Velocity ⁶ , ft/sec Tt ³ , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁷ , ft/sec Tt, hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec Tt, hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec Tt, hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, t, ft									
Velocity ⁶ , ft/sec T ₁ ³ , hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, l, ft	0	1841	1761	235					
Tt, hr Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁷ , ft/sec Tt, hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec Tt, hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec Tt, hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, l, ft	0	0.023	0.021	0.015					
Grassed Waterways/Roadside Ditches Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, f, ft		1.820	1.739	1.470					0.0007
Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T _t , hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T _t , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T _t , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹ , ft/sec Length, I, ft		0.281	0.281	0.044					0.6067
Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Velocity ¹ , ft/sec Length, L, ft									
Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft									
Small Tributary & Swamp w/Channels Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹ , ft/sec Length, L, ft									
Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹ , ft/sec Length, L, ft									0.0000
Slope, ft/ft //elocity ⁸ , ft/sec r, hr Large Tributary Length, ft Slope, ft/ft //elocity ⁸ , ft/sec r, hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. //elocity ¹¹ , ft/sec Length, L, ft									
Velocity ⁸ , ft/sec T ₁ , hr Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹ , ft/sec Length, L, ft									
Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T,, hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Menning's No. Velocity ¹¹ , ft/sec Length, L, ft									
Large Tributary Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft									0.0000
Length, ft Slope, ft/ft Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft									
Velocity ⁸ , ft/sec T ₁ , hr Culvert Diameter, ft Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft									
Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft									
Culvert Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft									
Diameter, ft Area, ft² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity¹¹, ft/sec Length, L, ft									0.0000
vea, ft² Vetted Perimeter, ft tydraulic Radius, R, ft slope, ft/ft Anning's No. (elocity ¹¹ , ft/sec ength, L, ft									
Vetted Perimeter, ft dydraulic Radius, R, ft Slope, ft/ft Anning's No. /elocity ¹¹ , ft/sec .ength, L, ft									
Hydraulic Radius, R, ft Slope, ft/ft Manning's No. /elocity ¹¹ , ft/sec .ength, L, ft									
Manning's No. /elocity ¹¹ , ft/sec .ength, L, ft									
/elocity ¹¹ , ft/sec .ength, L, ft									
ength, L, ft									
									0.0000
p			<u> </u>					HR	1.604
								Min	96.27

PROJECT: TRC Proj. No.: Subcatchment:	Cordelic Flat Cree 435979 42S - Po	ek Solar							Calculat Date: Checked Revised	d By:	RLD 8/8/24 PGT
Time of Concent			ion Mor	kehoot	SCS Ma	thodo			Revisea	:	
Time of Concent	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
SHEET FLOW	Seg i	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg /	Sey o	Seg 9	Seg 10	
Manning's No.	0.240										
Length, ft	100										
P2, in	2.39										
Slope, ft/ft	0.003										
T _t , hr	0.588										0.5878
SHALLOW CONCE		FLOW									
Paved											
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Unpaved											
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Cultivated											
Length, ft											
Slope, ft/ft											
Velocity⁴, ft/sec											
T _t , hr											0.0000
Short Grass Pastui	re										
Length, ft		335	1133								
Slope, ft/ft		0.018	0.041								
Velocity⁴, ft/sec		0.9391	1.4174								
T _t , hr		0.099	0.222								0.3211
Woodland											
Length, ft			0								
Slope, ft/ft			0								
Velocity ⁵ , ft/sec											
Tt, hr											0.0000
CHANNEL FLOW											
Waterways & Swan	nps, No Cl	nannels		ı	l		ı	ı			
Length, ft			0	1841	1761	235					
Slope, ft/ft			0	0.023	0.021	0.015					
Velocity ⁶ , ft/sec				1.820	1.739	1.470					
T _t , hr				0.281	0.281	0.044					0.6067
Grassed Waterway	s/Roadsid	e Ditches	1	ı	ı		ı	ı			
Length, ft											
Slope, ft/ft											
Velocity ⁷ , ft/sec											
T _t , hr											0.0000
Small Tributary & S	swamp w/0	Channels									
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Large Tributary											
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											2 222-
T _t , hr											0.0000
Culvert											
Diameter, ft											
Area, ft ²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No. Velocity ¹¹ , ft/sec											
Length, L, ft											0.0000
T _t , hr										lup	0.0000
										HR	1.516
										Min	90.94

TRC Proj. No.: Subcatchment: Time of Concentr	435979	ek Solar							Calculat Date: Checked	-	RLD 8/8/24 PGT
Time of Concentr	43S - Pre								Revised		
CHEET ELOW	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
SHEET FLOW Manning's No.	0.240										
Length, ft	100										
P2, in	2.39										
Slope, ft/ft	0.009										
T _t hr	0.379										0.3788
SHALLOW CONCE	NTRATED	FLOW									
Paved											
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Unpaved											
Length, ft											
Slope, ft/ft Velocity ² , ft/sec											
T _t , hr											0.0000
Cultivated											3.5556
Length, ft											
Slope, ft/ft											
Velocity ⁴ , ft/sec											
Tt, hr											0.0000
Short Grass Pastur	'e										
Length, ft		171	104	1366	225						
Slope, ft/ft		0.013	0.143	0.031	0.027						
Velocity ⁴ , ft/sec		0.7981	2.6471	1.2325	1.1502						
T _t , hr		0.060	0.011	0.308	0.054						0.4326
Woodland			_								
Length, ft			0								
Slope, ft/ft Velocity ⁵ , ft/sec			0								
T _t , hr											0.0000
CHANNEL FLOW											0.0000
Waterways & Swam	nps, No Ch	nannels									
Length, ft			0	0	0	0					
Slope, ft/ft			0	0	0	0					
Velocity ⁶ , ft/sec											
Tt, hr											0.0000
Grassed Waterways	s/Roadsid	e Ditches									
Length, ft											
Slope, ft/ft											
Velocity ⁷ , ft/sec T _t , hr											0.0000
Small Tributary & S	wamp w/C	hannolo									0.0000
Length, ft	wainp w/C	, iailiels									
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Large Tributary											
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Culvert											
Diameter, ft											
Area, ft ²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope ft/ft											
Slope, ft/ft Manning's No											
Manning's No.											
Manning's No. Velocity ¹¹ , ft/sec											
Manning's No. Velocity ¹¹ , ft/sec Length, L, ft											0.0000
Manning's No.										HR	0.0000 0.811

PROJECT: TRC Proj. No.:	Cordelic Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Subcatchment:	43S - Po								Revised		
Time of Concent	ration De	terminat	ion Worl	ksheet,	SCS Me	thods					
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
SHEET FLOW											
Manning's No.	0.240										
Length, ft	100										
P2, in Slope, ft/ft	2.39 0.009										
T _t , hr	0.009										0.3788
SHALLOW CONCE		FLOW									0.0700
Paved											
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Unpaved		_								_	
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Cultivated Length, ft											
Slope, ft/ft											
Velocity ⁴ , ft/sec											
T _t , hr											0.0000
Short Grass Pastu	re										0.0000
Length, ft		171	104	1366	225						
Slope, ft/ft		0.013	0.143	0.031	0.027						
Velocity ⁴ , ft/sec		0.7981	2.6471	1.2325	1.1502						
Tt, hr		0.060	0.011	0.308	0.054						0.4326
Woodland											
Length, ft			0								
Slope, ft/ft			0								
Velocity ⁵ , ft/sec											
T _t , hr											0.0000
CHANNEL FLOW	mna Na Ci	hannala									
Waterways & Swar Length, ft	nps, No Ci	ianneis	0	0	0	0					
Slope, ft/ft			0	0	0	0					
Velocity ⁶ , ft/sec			U	0	0	U					
T _t hr											0.0000
Grassed Waterway	/s/Roadsid	le Ditches							l .		
Length, ft											
Slope, ft/ft											
Velocity ⁷ , ft/sec											
T _t , hr											0.0000
Small Tributary & S	Swamp w/0	Channels									
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec T _t , hr											0.0000
Large Tributary											0.0000
Large Tributary Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Culvert											
Diameter, ft											
Area, ft²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
Velocity ¹¹ , ft/sec											
Length, L, ft											
T _t , hr										liue.	0.0000
										HR	0.811
										Min	

	0.240 100 2.39 0.014 0.317	terminati Seg 2	seg 3	ksheet, seg 4	SCS Me Seg 5	sthods Seg 6	Seg 7	Seg 8	Checkec Revised Seg 9		PGT 0.3174
SHEET FLOW Manning's No. Length, ft P2 , in Slope, ft/ft Tt ¹ , hr SHALLOW CONCEN Paved Length, ft Slope, ft/ft Velocity ² , ft/sec Tt ³ , hr Unpaved Length, ft Slope, ft/ft Velocity ² , ft/sec Tt ³ , hr Cultivated Length, ft Slope, ft/ft Velocity ² , ft/sec Tt ³ , hr Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec Tt ³ , hr Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec Tt ³ , hr Short Grass Pasture	0.240 100 2.39 0.014 0.317	Seg 2					Seg 7	Seg 8	Seg 9	Seg 10	0.3174
SHEET FLOW Manning's No. Length, ft P2 , in Slope, ft/ft Tt ¹ , hr SHALLOW CONCEN Paved Length, ft Slope, ft/ft Velocity ² , ft/sec Tt ³ , hr Unpaved Length, ft Slope, ft/ft Velocity ² , ft/sec Tt ³ , hr Cultivated Length, ft Slope, ft/ft Velocity ² , ft/sec Tt ³ , hr Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec Tt ³ , hr Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec Tt ³ , hr Short Grass Pasture	0.240 100 2.39 0.014 0.317	Seg 2					Seg 7	Seg 8	Seg 9	Seg 10	0.3174
Manning's No. Length, ft P2, in Slope, ft/ft Tt ¹ , hr SHALLOW CONCEN' Paved Length, ft Slope, ft/ft Velocity ² , ft/sec Tt ³ , hr Unpaved Length, ft Slope, ft/ft Velocity ² , ft/sec Tt ³ , hr Cultivated Length, ft Slope, ft/ft Velocity ³ , ft/sec Tt ³ , hr Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec Tt ³ , hr Short Grass Pasture	100 2.39 0.014 0.317 TRATED	FLOW									0.3174
Length, ft P2 , in Slope, ft/ft Tt ¹ , hr SHALLOW CONCEN' Paved Length, ft Slope, ft/ft Velocity ² , ft/sec Tt ³ , hr Unpaved Length, ft Slope, ft/ft Velocity ² , ft/sec Tt ³ , hr Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec Tt ³ , hr Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec Tt ³ , hr Short Grass Pasture	100 2.39 0.014 0.317 TRATED	FLOW									0.3174
P2 , in Slope, ft/ft T,¹, hr SHALLOW CONCEN' Paved Length, ft Slope, ft/ft Velocity², ft/sec T,², hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T,², hr Cultivated Length, ft Slope, ft/ft Velocity², ft/sec T,², hr Cultivated Length, ft Slope, ft/ft Velocity², ft/sec T,², hr Short Grass Pasture	2.39 0.014 0.317 TRATED	FLOW									0.3174
Slope, ft/ft Tt ¹ , hr SHALLOW CONCEN' Paved Length, ft Slope, ft/ft Velocity ² , ft/sec Tt ³ , hr Unpaved Length, ft Slope, ft/ft Velocity ² , ft/sec Tt ³ , hr Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec Tt ³ , hr Short Grass Pasture	0.014 0.317 TRATED	FLOW									0.3174
T ₁ ¹ , hr SHALLOW CONCEN Paved Length, ft Slope, ft/ft Velocity², ft/sec T ₁ ³ , hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T ₁ ³ , hr Cultivated Length, ft Slope, ft/ft Velocity², ft/sec T ₁ ³ , hr Shope, ft/ft Velocity⁴, ft/sec T ₁ ³ , hr Short Grass Pasture	0.317 TRATED	FLOW									0.3174
SHALLOW CONCEN' Paved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Shope, ft/ft Velocity⁴, ft/sec T₁³, hr	TRATED	FLOW									0.3174
Paved Length, ft Slope, ft/ft Velocity², ft/sec Tt³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec Tt³, hr Cultivated Length, ft Slope, ft/ft Velocity², ft/sec Tt³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec Tt³, hr Short Grass Pasture		FLOW									
Length, ft Slope, ft/ft Velocity², ft/sec T₁², hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture											
Slope, ft/ft Velocity², ft/sec Tt³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec Tt³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec Tt³, hr Shope, ft/ft Velocity⁴, ft/sec Tt³, hr											
Velocity², ft/sec T₁³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture											
Tt ³ , hr Unpaved Length, ft Slope, ft/ft Velocity ² , ft/sec Tt ³ , hr Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec Tt ³ , hr Short Grass Pasture											
Unpaved Length, ft Slope, ft/ft Velocity², ft/sec Tt³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec Tt³, hr Short Grass Pasture											
Length, ft Slope, ft/ft Velocity², ft/sec Tt³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec Tt³, hr Short Grass Pasture											0.0000
Slope, ft/ft Velocity², ft/sec Tt³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec Tt³, hr Short Grass Pasture											
Velocity², ft/sec Tt³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec Tt³, hr Short Grass Pasture											
T _t , hr Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T _t , hr Short Grass Pasture											
Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec Tt ³ , hr Short Grass Pasture											
Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T _t ³ , hr Short Grass Pasture											0.0000
Slope, ft/ft Velocity ⁴ , ft/sec T _t ³ , hr Short Grass Pasture											
Velocity ⁴ , ft/sec T _t , hr Short Grass Pasture											
T ³ , hr Short Grass Pasture											
Short Grass Pasture											0.0000
											0.0000
Lenath, ft		4									
		477	0	0	0						
Slope, ft/ft Velocity ⁴ , ft/sec		0.056	0	0	0						
T _t , hr		1.6565 0.080									0.0800
		0.080									0.0800
Woodland											
Length, ft			0								
Slope, ft/ft Velocity ⁵ , ft/sec			0								
T _t , hr											0.0000
CHANNEL FLOW											0.0000
Waterways & Swamp	s No Ch	nannels									
Length, ft	, 110 G		4083	0	0	0					
Slope, ft/ft			0.006	0	0	0					
Velocity ⁶ , ft/sec			0.930		ľ						
T _t , hr			1.220								1.2202
Grassed Waterways/	Roadsid	e Ditches									
Length, ft											
Slope, ft/ft											
Velocity ⁷ , ft/sec											
T _t , hr											0.0000
Small Tributary & Sw	amp w/C	hannels									
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Large Tributary											
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Culvert											
Diameter, ft											
Area, ft ²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
Velocity ¹¹ , ft/sec											
Length, L, ft											
T _t , hr											0.0000
										HR	1.618
										Min	97.05

Time of Concentration Se SHEET FLOW Manning's No.	240 00 .39 014	terminati Seg 2	Seg 3	ksheet, Seg 4	SCS Me Seg 5	thods Seg 6	Seg 7	Seg 8	Seg 9		0.3174 0.0000 0.0000
SHEET FLOW Manning's No. 0.2 Length, ft 10 P2, in 2. Slope, ft/ft 0.0 T, 1 nr 0.3 SHALLOW CONCENTRA Paved Length, ft Slope, ft/ft Velocity', ft/sec T, 2 nr Unpaved Length, ft Slope, ft/ft Velocity', ft/sec T, 3 hr Cultivated Length, ft Slope, ft/ft Velocity', ft/sec T, 3 hr Short Grass Pasture Length, ft Slope, ft/ft Velocity', ft/sec T, 3 hr Woodland Length, ft Slope, ft/ft Velocity', ft/sec T, 3 hr Woodland Length, ft Slope, ft/ft Velocity', ft/sec T, 3 hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity', ft/sec T, 3 hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity', ft/sec T, 5 hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity', ft/sec T, br Grassed Waterways/Roa Length, ft Slope, ft/ft Slope, ft/ft Slope, ft/ft Slope, ft/ft	240 00 .39 014 317	FLOW 477 0.056 1.6565	Seg 3	Seg 4	Seg 5		Seg 7	Seg 8	Seg 9	Seg 10	0.0000
SHEET FLOW Manning's No. 0.2 Length, ft 11 P2 , in 2. Silope, ft/ft 0.3 SHALLOW CONCENTRA Paved Length, ft Silope, ft/ft Velocity², ft/sec T₁³, hr Unpaved Length, ft Silope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Silope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Silope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Silope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Silope, ft/ft Velocity⁴, ft/sec T₁³, hr Grassed Waterways/Roa Length, ft Silope, ft/ft Velocity⁴, ft/sec T₁², hr CHANNEL FLOW Waterways & Swamps, N Length, ft Silope, ft/ft Velocity³, ft/sec T₁², hr Grassed Waterways/Roa Length, ft Silope, ft/ft	240 00 .39 014 317	477 0.056 1.6565	0	0		Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	0.0000
Manning's No. Length, ft P2, in Slope, fl/ft O.C SHALLOW CONCENTRA Paved Length, ft Slope, fl/ft Velocity ² , fl/sec T _t ³ , hr Cultivated Length, ft Slope, fl/ft Velocity ⁴ , fl/sec T _t ³ , hr Cultivated Length, ft Slope, fl/ft Velocity ⁴ , fl/sec T _t ³ , hr Cultivated Length, ft Slope, fl/ft Velocity ⁴ , fl/sec T _t ³ , hr Changth, ft Slope, fl/ft Velocity ⁵ , fl/sec T _t ³ , hr Changth, ft Slope, fl/ft Velocity ⁵ , fl/sec T _t ³ , hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, fl/ft Velocity ⁵ , fl/sec T _t ³ , hr CHANNEL FLOW Grassed Waterways/Roa Length, ft Slope, fl/ft Velocity ⁷ , fl/sec T _t ³ , hr CHANNEL FLOW Soppe, fl/ft Velocity ⁷ , fl/sec T _t ³ , hr CHANNEL FLOW Soppe, fl/ft Velocity ⁷ , fl/sec T _t ³ , hr CHANNEL FLOW Soppe, fl/ft Velocity ⁷ , fl/sec T _t ³ , hr CHANNEL FLOW Soppe, fl/ft Velocity ⁷ , fl/sec T _t ³ , hr CHANNEL FLOW Soppe, fl/ft Velocity ⁷ , fl/sec T _t ³ , hr CHANNEL FLOW Soppe, fl/ft Velocity ⁷ , fl/sec T _t ³ , hr CHANNEL FLOW Soppe, fl/ft Slope, fl/ft	00 .39 014 317	477 0.056 1.6565			0						0.0000
Length, ft P2 , in P3 , in P3 , in P4 , in P5 , in P5 , in P6 , in P6 , in P6 , in P7 , in P7 , in P8	00 .39 014 317	477 0.056 1.6565			0						0.0000
P2 , in 2. Slope, ft/ft 0.3 Shallow Concentra Paved Length, ft Slope, ft/ft Velocity², ft/sec T₁², hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T₁², hr Cultivated Length, ft Slope, ft/ft Velocity², ft/sec T₁², hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁², hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁², hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁², hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁², hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr CHANNEL FLOW Sope, ft/ft Velocity⁴, ft/sec T₁³, hr Sope, ft/ft Slope, ft/ft	.39 014 317	477 0.056 1.6565			0						0.0000
Slope, ft/ft 0.0 SHALLOW CONCENTRA Paved Length, ft Slope, ft/ft Velocity², ft/sec T₁², hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T₁², hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁², hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁², hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁², hr CHANNEL FLOW Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁², hr CHANNEL FLOW Slope, ft/ft Velocity⁴, ft/sec T₁², hr CHANNEL FLOW Slope, ft/ft Velocity⁴, ft/sec T₁², hr CHANNEL FLOW Slope, ft/ft Velocity⁴, ft/sec T₁², hr Sopall Tributary & Swamp Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁, hr Small Tributary & Swamp Length, ft Slope, ft/ft	014 317	477 0.056 1.6565			0						0.0000
Tt hr 0.3 SHALLOW CONCENTRA Paved Length, ft Slope, ft/ft Velocity², ft/sec Tt³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec Tt³, hr Cultivated Length, ft Slope, ft/ft Velocity², ft/sec Tt³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec Tt³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec Tt³, hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity⁴, ft/sec Tt³, hr CHANNEL FLOW Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity³, ft/sec Tt³, hr Sope, ft/ft Velocity³, ft/sec Slope, ft/ft Velocity³, ft/sec Slope, ft/ft	317	477 0.056 1.6565			0						0.0000
SHALLOW CONCENTRA Paved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity¹, ft/sec T₁³, hr Grassed Waterways/Roa Length, ft Slope, ft/ft		477 0.056 1.6565			0						0.0000
Paved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity³, ft/sec T₁³, hr CHANNEL FLOW Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity³, ft/sec T₁³, hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity³, ft/sec T₁³, hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity³, ft/sec T₁, hr Small Tributary & Swamp Length, ft Slope, ft/ft	NIED .	477 0.056 1.6565			0						0.0000
Length, ft Slope, ft/ft Velocity ² , ft/sec T _t ³ , hr Unpaved Length, ft Slope, ft/ft Velocity ² , ft/sec T _t ³ , hr Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T _t ³ , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T _t ³ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T _t ³ , hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T _t ³ , hr CHANNEL FLOW Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T _t ³ , hr Grassed Waterways/Roa Length, ft Slope, ft/ft		0.056 1.6565			0						0.0000
Slope, ft/ft Velocity², ft/sec T₁³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr CHANNEL FLOW Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr Grassed Waterways/Roa Length, ft Slope, ft/ft Slope, ft/ft Slope, ft/ft Slope, ft/ft		0.056 1.6565			0						0.0000
Velocity², ft/sec T₁³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr CHANNEL FLOW Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr Sope, ft/ft Velocity⁵, ft/sec T₁¸, hr Sope, ft/ft Velocityð, ft/sec		0.056 1.6565			0						0.0000
Tr³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec Tr³, hr Cultivated Length, ft Slope, ft/ft Velocity³, ft/sec Tr³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec Tr³, hr Woodland Length, ft Slope, ft/ft Velocity², ft/sec Tr³, hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity³, ft/sec Tr³, hr CHANNEL FLOW Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity³, ft/sec Tr³, hr Grassed Waterways/Roa Length, ft Slope, ft/ft Slope, ft/ft Slope, ft/ft Slope, ft/ft Slope, ft/ft		0.056 1.6565			0						0.0000
Unpaved Length, ft Slope, ft/ft Velocity², ft/sec Tt³ hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec Tt³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec Tt³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec Tt³, hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity⁶, ft/sec Tt³, hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity⁶, ft/sec Tt³, hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity⁶, ft/sec Tt₀, hr Small Tributary & Swamp Length, ft Slope, ft/ft		0.056 1.6565			0						0.0000
Length, ft Slope, ft/ft Velocity², ft/sec Tt³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec Tt³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec Tt³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec Tt³, hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity⁴, ft/sec Tt³, hr CHANNEL FLOW Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity⁴, ft/sec Tt³, hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity¹, ft/sec Tt₀, hr Small Tributary & Swamp Length, ft Slope, ft/ft		0.056 1.6565			0						
Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr CHANNEL FLOW Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity¹, ft/sec T₁ъ, hr Small Tributary & Swamp Length, ft Slope, ft/ft		0.056 1.6565			0						
Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr CHANNEL FLOW Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity³, ft/sec T₁³, hr Grassed Waterways/Roa Length, ft Slope, ft/ft Slope, ft/ft Velocity³, ft/sec T₀, hr Small Tributary & Swamp Length, ft Slope, ft/ft		0.056 1.6565			0						
T ₁ *, hr Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ *, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ *, hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ *, hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ *, hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ *, hr Grassed Waterways/Roa Length, ft Slope, ft/ft Slope, ft/ft Slope, ft/ft Slope, ft/ft Slope, ft/ft		0.056 1.6565			0						
Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ , shr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ , shr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ , shr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ , shr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ , hr Grassed Waterways/Roa Length, ft Slope, ft/ft Slope, ft/ft Small Tributary & Swamp Length, ft Slope, ft/ft		0.056 1.6565			0						
Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ , shr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ , shr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ , shr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ , shr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , shr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , shr Small Tributary & Swamp		0.056 1.6565			0						0.0000
Slope, ft/ft Velocity ⁴ , ft/sec Tt ³ , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec Tt ³ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec Tt ³ , hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity ⁶ , ft/sec Tt ³ , hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity ⁷ , ft/sec Tt, hr Small Tributary & Swamp Length, ft Slope, ft/ft		0.056 1.6565			0						0.0000
Velocity ⁴ , ft/sec T ₁ ³ , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ ³ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ ³ , hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ ³ , hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp Length, ft Slope, ft/ft		0.056 1.6565			0						0.0000
Short Grass Pasture Length, ft Slope, ft/ft Velocity ³ , ft/sec T ₁ , 3 hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ , 3 hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ , 3 hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp Length, ft Slope, ft/ft		0.056 1.6565			0						0.0000
Short Grass Pasture Length, ft Slope, ft/ft Velocity ³ , ft/sec T ₁ , 3 hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ , 3 hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ , 3 hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp Length, ft Slope, ft/ft		0.056 1.6565			0						
Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ ³ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ ³ , hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ ³ , hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp Length, ft Slope, ft/ft		0.056 1.6565			0						
Slope, ft/ft Velocity ⁴ , ft/sec T _t ³ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T _t ³ , hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T _t ³ , hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T _t , hr Small Tributary & Swamp Length, ft Slope, ft/ft		0.056 1.6565									
T,*, hr Woodland Length, ft Slope, ft/ft Velocity*, ft/sec T,*, hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity*, ft/sec T,*, hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity*, ft/sec T,*, hr Small Tributary & Swamp Length, ft Slope, ft/ft		1.6565			0						
Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ , hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ , hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp		0.080									
Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ ³ , hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ ³ , hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp		000									0.0800
Velocity ⁵ , ft/sec T ₁ ³ , hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ ³ , hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp Length, ft Slope, ft/ft											
Slope, ft/ft Velocity ⁵ , ft/sec T, ³ , hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T, ³ , hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T,, hr Small Tributary & Swamp Length, ft Slope, ft/ft Velocity ⁸ , ft/sec			0								
T ₁ , hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ , hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp Length, ft Slope, ft/ft			0								
CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ ³ , hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp Length, ft Slope, ft/ft											
Waterways & Swamps, N Length, ft Slope, ft/ft Velocity ⁶ , ft/sec T ₁ ³ , hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp Length, ft Slope, ft/ft											0.0000
Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ ³ , hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp Length, ft Slope, ft/ft											
Slope, ft/ft Velocity ⁶ , ft/sec T, ³ , hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T,, hr Small Tributary & Swamp Length, ft Slope, ft/ft	lo Ch	annels		ı							
Velocity ⁶ , ft/sec T _t ³ , hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T _t , hr Small Tributary & Swamp Length, ft Slope, ft/ft			4083	0	0	0					
T _t , hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T _t , hr Small Tributary & Swamp Length, ft Slope, ft/ft			0.006	0	0	0					
Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp Length, ft Slope, ft/ft			0.930								4.0000
Length, ft Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp Length, ft Slope, ft/ft	.1 - 1 - 1	. D'1.1	1.220								1.2202
Slope, ft/ft Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp Length, ft Slope, ft/ft	asiae	e Ditches									
Velocity ⁷ , ft/sec T ₁ , hr Small Tributary & Swamp Length, ft Slope, ft/ft											
T _t , hr Small Tributary & Swamp Length, ft Slope, ft/ft											
Small Tributary & Swamp Length, ft Slope, ft/ft											0.0000
Length, ft Slope, ft/ft	n w/C	hannole									0.0000
Slope, ft/ft	y w/C	manners									
Velocity", ft/sec											
T _t , hr											0.0000
Large Tributary											0.0000
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Culvert											
Diameter, ft											
Area, ft ²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
Velocity ¹¹ , ft/sec											
Length, L, ft											
T _t , hr											0.0000
										HR	1.618
										Min	97.05

PROJECT: TRC Proj. No.:	Cordelic Flat Cre 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Subcatchment:	44SA - F	-							Revised		
Time of Concent											
SHEET FLOW	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
Manning's No.	0.240										
Length, ft	100										
P2, in	2.39										
Slope, ft/ft	0.083										
T _t , hr	0.156										0.1558
SHALLOW CONCE	NTRATED	FLOW									
Paved											
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Unpaved		1	44								
Length, ft Slope, ft/ft			11 0.027								
Slope, π/π Velocity², ft/sec			2.651169								
T _t , hr			0.001								0.0012
Cultivated			3.001								5.55.2
Length, ft											
Slope, ft/ft											
Velocity ⁴ , ft/sec											
T _t , hr		<u></u>									0.0000
Short Grass Pastui	re										
Length, ft		735	0	293	0						
Slope, ft/ft		0.061	0	0.015	0						
Velocity ⁴ , ft/sec		1.7289		0.8573							
T _t , hr		0.118		0.095							0.2130
Woodland											
Length, ft Slope, ft/ft			0								
Velocity ⁵ , ft/sec			U								
T _t , hr											0.0000
CHANNEL FLOW											
Waterways & Swan	nps, No Cl	hannels									
Length, ft				0	0	0					
Slope, ft/ft				0	0	0					
Velocity ⁶ , ft/sec											
T _t , hr	<u> </u>										0.0000
Grassed Waterway	s/Roadsid	le Ditches	\$		l	<u> </u>					
Length, ft Slope, ft/ft											
Slope, π/π Velocity ⁷ , ft/sec											
T _t , hr											0.0000
Small Tributary & S	Swamp w/C	Channels									0.0000
Length, ft					743						
Slope, ft/ft					0.032						
Velocity ⁸ , ft/sec					3.757						
T _t , hr					0.055						0.0549
Large Tributary											
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											0.5
T _t , hr											0.0000
Culvert											
Diameter, ft Area, ft ²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft Slope. ft/ft											
Slope, ft/ft		1									
Manning's No. Velocity ¹¹ , ft/sec Length, L, ft											
Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec											0.0000
Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft										HR	0.0000 0.425

PROJECT: TRC Proj. No.:	Cordelic Flat Cre 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Subcatchment:	44SA - F								Revised		
Time of Concent											
SHEET FLOW	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
Manning's No.	0.240										
Length, ft	100										
P2, in	2.39										
Slope, ft/ft	0.083										
T _t , hr	0.156										0.1558
SHALLOW CONCE	NTRATED	FLOW									
Paved											
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Unpaved			44								
Length, ft			11								
Slope, ft/ft Velocity ² , ft/sec			0.027 2.651169								
T _t , hr			0.001								0.0012
Cultivated			3.001								5.55.2
Length, ft											
Slope, ft/ft											
Velocity ⁴ , ft/sec											
T _t , hr										<u> </u>	0.0000
Short Grass Pastu	re										
Length, ft		735	0	293	0						
Slope, ft/ft		0.061	0	0.015	0						
Velocity⁴, ft/sec		1.7289		0.8573							
T _t , hr		0.118		0.095							0.2130
Woodland											
Length, ft Slope, ft/ft			0								
Velocity ⁵ , ft/sec			U								
T _t , hr											0.0000
CHANNEL FLOW											
Waterways & Swan	nps, No Cl	hannels									
Length, ft				0	0	0					
Slope, ft/ft				0	0	0					
Velocity ⁶ , ft/sec											
T _t , hr	<u> </u>										0.0000
Grassed Waterway	s/Roadsid	e Ditches	\$		l	 		l	l l		
Length, ft Slope, ft/ft											
Slope, π/π Velocity ⁷ , ft/sec											
T _t , hr											0.0000
Small Tributary & S	Swamp w/C	Channele									0.0000
Length, ft					743						
Slope, ft/ft					0.032						
Velocity ⁸ , ft/sec					3.757						
T _t , hr					0.055						0.0549
Large Tributary											
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											0.5
T _t , hr											0.0000
Culvert Diameter, ft											
Area, ft²		1									
Area, ft ² Wetted Perimeter, ft											
Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft											
Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft											
Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft											
Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No.											
Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec											0.0000
Area, ft ² Wetted Perimeter, ft Hydraulic Radius, R, ft Slope, ft/ft Manning's No. Velocity ¹¹ , ft/sec Length, L, ft										HR	0.0000 0.425

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Subcatchment:	45S - Pre	•							Revised		FGI
Time of Concenti	ration De	terminat	ion Wor	ksheet,	SCS Me	thods					
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
SHEET FLOW											
Manning's No.	0.240										
Length, ft	100										
P2 , in	2.39										
Slope, ft/ft T _t ¹ˌhr	0.012 0.338										0.3376
SHALLOW CONCE		FLOW									0.3376
Paved	MINAILD	1 2011									
_ength, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
Γ _t , hr											0.0000
Unpaved											
_ength, ft											
Slope, ft/ft											
/elocity ² , ft/sec											
T _t , hr											0.0000
Cultivated											
_ength, ft Slope, ft/ft											
Slope, π/π Velocity ⁴ , ft/sec											
Velocity , it/sec Γ _t , hr											0.0000
Short Grass Pastur	re										0.0000
_ength, ft		115									
Slope, ft/ft		0.052									
Velocity ⁴ , ft/sec		1.5962									
Γ _t , hr		0.020									0.0200
Woodland											
Length, ft			0								
Slope, ft/ft			0								
Velocity ⁵ , ft/sec											
T _t , hr											0.0000
CHANNEL FLOW Waterways & Swan	nno No Ch	annolo									
Length, ft	lips, No Ci	lailleis	762								
Slope, ft/ft			0.019								
Velocity ⁶ , ft/sec			1.654								
Γ _t , hr			0.128								0.1280
Grassed Waterway	s/Roadsid	e Ditches									
_ength, ft											
Slope, ft/ft											
Velocity ⁷ , ft/sec											
Γ _t , hr											0.0000
Small Tributary & S	Swamp w/C	Channels									
_ength, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec T _t , hr											0.0000
Large Tributary											0.0000
_ength, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
Γ _t , hr											0.0000
Culvert											
Diameter, ft											
Area, ft²											
Vetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
Velocity ¹¹ , ft/sec											
ength, L, ft _t , hr											0.0000
0 - "							1	1		HR	
										II .	0.486
										Min	29.13

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Subcatchment:	45S - Po								Revised		
Time of Concent											
SHEET FLOW	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
Manning's No.	0.240										
Length, ft	100										
P2, in	2.39										
Slope, ft/ft	0.006										
T _t , hr	0.445										0.4455
SHALLOW CONCE	NTRATED	FLOW									
Paved											
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec T _t ³ , hr											0.0000
											0.0000
Unpaved Length, ft			20					<u> </u>			
Slope, ft/ft			0.01								
Velocity ² , ft/sec			1.61345								
T _t , hr			0.003								0.0034
Cultivated											
Length, ft											
Slope, ft/ft											
Velocity ⁴ , ft/sec											
Tt ³ , hr											0.0000
Short Grass Pastu	re										
Length, ft		14		80							
Slope, ft/ft		0.015		0.07							
Velocity ⁴ , ft/sec		0.8573		1.8520							
T _t , hr		0.005		0.012							0.0165
Woodland											
Length, ft			0								
Slope, ft/ft Velocity ⁵ , ft/sec			0								
T _t , hr											0.0000
CHANNEL FLOW											0.0000
Waterways & Swan	nps, No Cl	nannels									
Length, ft	İ		0		762						
Slope, ft/ft			0		0.019						
Velocity ⁶ , ft/sec					1.654						
Tt ³ , hr					0.128						0.1280
Grassed Waterway	s/Roadsid	e Ditches	;					ı			
Length, ft											
Slope, ft/ft											
Velocity ⁷ , ft/sec T _t , hr											0.0000
Small Tributary & S	Swamp w/C	hannolo									0.0000
Length, ft	waiiip w/C	JilaillieiS									
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Large Tributary	<u> </u>										
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Culvert											
Diameter, ft											
Area, ft ²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft Manning's No											
Manning's No. Velocity ¹¹ , ft/sec											
velocity , tt/sec Length, L, ft											
Lengtn, L, π T _t , hr											0.0000
				<u> </u>	<u> </u>			<u> </u>		HR	0.593
										II .	
										Min	35.60

Subcatchment: 46 Time of Concentration SHEET FLOW Manning's No. Length, ft P2, in Slope, ft/ft Ti, hr SHALLOW CONCENTF Paved Length, ft Slope, ft/ft Velocity², ft/sec Ti³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec Ti³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec Ti³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec Ti³, hr Channel Length, ft Slope, ft/ft Velocity⁴, ft/sec Ti³, hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity⁵, ft/sec Ti³, hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity⁵, ft/sec	0.240 100 2.39 0.005 0.479	terminati Seg 2	Seg 3	ksheet, seg 4	SCS Me Seg 5	thods Seg 6	Seg 7	Seg 8	Seg 9		0.4792 0.0000
Time of Concentration SHEET FLOW Manning's No. Length, ft P2, in Slope, ft/ft T,¹, hr SHALLOW CONCENTF Paved Length, ft Slope, ft/ft Velocity², ft/sec T,³, hr Cultivated Length, ft Slope, ft/ft Velocity², ft/sec T,³, hr Cultivated Length, ft Slope, ft/ft Velocity², ft/sec T,³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T,³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec T,³, hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity⁵, ft/sec T,³ hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity⁵, ft/sec	0.240 100 2.39 0.005 0.479	Seg 2 FLOW 1200 0.016 0.8854					Seg 7	Seg 8			0.0000
SHEET FLOW Manning's No. Length, ft P2, in Slope, ft/ft T ₁ ¹ , hr SHALLOW CONCENTF Paved Length, ft Slope, ft/ft Velocity ² , ft/sec T ₁ ³ , hr Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ ³ , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ ³ , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ ³ , hr Channel Channel Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ ³ , hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ ³ , hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity ⁶ , ft/sec	0.240 100 2.39 0.005 0.479	FLOW 1200 0.016 0.8854					Seg 7	Seg 8	Seg 9	Seg 10	0.0000
SHEET FLOW Manning's No. Length, ft P2 , in Slope, ft/ft T,¹, hr SHALLOW CONCENTF Paved Length, ft Slope, ft/ft Velocity², ft/sec T,³, hr Cultivated Length, ft Slope, ft/ft Velocity², ft/sec T,³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T,³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T,³, hr Channel Cength, ft Slope, ft/ft Velocity⁴, ft/sec T,³, hr Channel Length, ft Slope, ft/ft Velocity⁴, ft/sec T,³, hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity⁶, ft/sec	0.240 100 2.39 0.005 0.479	1200 0.016 0.8854									0.0000
Length, ft P2 , in Slope, ft/ft T,¹ hr SHALLOW CONCENTF Paved Length, ft Slope, ft/ft Velocity², ft/sec T,³ hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T,³ hr Cultivated Length, ft Slope, ft/ft Velocity², ft/sec T,³ hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T,³ hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T,³ hr Channel Length, ft Slope, ft/ft Velocity⁴, ft/sec T,³ hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity⁵, ft/sec T,¹ hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity⁵, ft/sec	100 2.39 0.005 0.479	1200 0.016 0.8854									0.0000
P2 , in Slope, ft/ft T,¹ , hr SHALLOW CONCENTF Paved Length, ft Slope, ft/ft Velocity², ft/sec T,³ , hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T,³ , hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T,³ , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T,³ , hr Woodland Length, ft Slope, ft/ft Velocity⁵, ft/sec T,³ , hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity⁵, ft/sec T,³ , hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity⁵, ft/sec	2.39 0.005 0.479	1200 0.016 0.8854									0.0000
Slope, ft/ft T ₁ ¹ , hr SHALLOW CONCENTF Paved Length, ft Slope, ft/ft Velocity ² , ft/sec T ₁ ³ , hr Unpaved Length, ft Slope, ft/ft Velocity ² , ft/sec T ₁ ³ , hr Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ ³ , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ ³ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ ³ , hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity ⁵ , ft/sec	0.005 0.479	1200 0.016 0.8854									0.0000
T.¹. hr SHALLOW CONCENTE Paved Length, ft Slope, ft/ft Velocity², ft/sec T.³. hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T.³. hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T.³. hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T.³. hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec T.³. hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity⁵, ft/sec T.³. hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity⁵, ft/sec	0.479	1200 0.016 0.8854									0.0000
SHALLOW CONCENTF Paved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr		1200 0.016 0.8854									0.0000
Paved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity⁵, ft/sec	KATED	1200 0.016 0.8854									
Length, ft Slope, ft/ft Velocity², ft/sec T₁³ hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity⁵, ft/sec		0.016 0.8854									
Slope, ft/ft Velocity², ft/sec T₁³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity⁵, ft/sec		0.016 0.8854									
Velocity², ft/sec T₁³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Channel Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Channel Cha		0.016 0.8854									
T, ³ , hr Unpaved Length, ft Slope, ft/ft Velocity ² , ft/sec T, ³ , hr Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T, ³ , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T, ³ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T, ³ , hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity ⁶ , ft/sec		0.016 0.8854									
Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity⁵, ft/sec		0.016 0.8854									
Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity⁵, ft/sec		0.016 0.8854									0.0000
Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity⁵, ft/sec		0.016 0.8854									0.0000
Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity⁵, ft/sec		0.016 0.8854									0.0000
T ₁ s, hr Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ s, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ s, hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ s, hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity ⁵ , ft/sec		0.016 0.8854									0.0000
Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ , hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity ⁵ , ft/sec		0.016 0.8854									
Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ , hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity ⁶ , ft/sec		0.016 0.8854									
Velocity ⁴ , ft/sec T ₁ , hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ , hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity ⁶ , ft/sec		0.016 0.8854									
Tr. hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec Tr. hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec Tr. hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity ⁶ , ft/sec		0.016 0.8854									
Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ ³ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ ³ , hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity ⁶ , ft/sec		0.016 0.8854									
Length, ft Slope, ft/ft Velocity ⁴ , ft/sec T ₁ , shr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ , hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity ⁶ , ft/sec		0.016 0.8854									0.0000
Slope, ft/ft Velocity ⁴ , ft/sec T ₁ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ , hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity ⁶ , ft/sec		0.016 0.8854									
Velocity ⁴ , ft/sec T ₁ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ , hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity ⁶ , ft/sec		0.8854									
T ₁ , hr Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ , hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity ⁶ , ft/sec											
Woodland Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T; hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity ⁶ , ft/sec		0.376									
Length, ft Slope, ft/ft Velocity ⁵ , ft/sec T ₁ , hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity ⁶ , ft/sec											0.3765
Slope, ft/ft Velocity ⁵ , ft/sec T ₁ , hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity ⁶ , ft/sec											
Velocity ⁵ , ft/sec T _i ³ , hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity ⁶ , ft/sec			0								
T _i *, hr CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity ⁶ , ft/sec			0								
CHANNEL FLOW Waterways & Swamps, Length, ft Slope, ft/ft Velocity ⁶ , ft/sec											0.0000
Waterways & Swamps, Length, ft Slope, ft/ft Velocity ⁶ , ft/sec											0.0000
Length, ft Slope, ft/ft Velocity ⁶ , ft/sec	No Ch	annole									
Slope, ft/ft Velocity ⁶ , ft/sec	, 140 01	ainicis	0								
Velocity ⁶ , ft/sec			0								
			Ü								
T _t , hr											0.0000
Grassed Waterways/Re	oadsid	e Ditches									
Length, ft											
Slope, ft/ft											
Velocity ⁷ , ft/sec											
T _t , hr											0.0000
Small Tributary & Swar	mp w/C	hannels									
Length, ft			744								
Slope, ft/ft			0.057								
Velocity ⁸ , ft/sec			5.014								0.04/-
T _t , hr			0.041								0.0412
Large Tributary											
Length, ft Slope, ft/ft											
Slope, π/π Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Culvert											0.0000
Diameter, ft											
Area, ft ²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
Velocity 11, ft/sec											
Length, L, ft											
T _t , hr											0.0000
										HR	0.897
										Min	53.81

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979	ek Solar							Calculat Date: Checked	d By:	RLD 8/8/24 PGT
Subcatchment:	46S - Po				20011	4 1			Revised	:	
Time of Concent											
SHEET FLOW	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
Manning's No.	0.240										
Length, ft	100										
P2, in	2.39										
Slope, ft/ft	0.005										
T _t , hr	0.479	51.014									0.4792
SHALLOW CONCE	NTRATED	FLOW									
Paved Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Unpaved											
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
T _t , hr											0.0000
Cultivated											
Length, ft Slope, ft/ft											
Velocity ⁴ , ft/sec											
T _t , hr											0.0000
Short Grass Pastur	re										
Length, ft		1200									
Slope, ft/ft		0.016									
Velocity ⁴ , ft/sec		0.8854									
T _t , hr		0.376									0.3765
Woodland											
Length, ft			0								
Slope, ft/ft Velocity ⁵ , ft/sec			0								
T _t , hr											0.0000
CHANNEL FLOW											0.0000
Waterways & Swan	nps, No Cl	nannels									
Length, ft			0								
Slope, ft/ft			0								
Velocity ⁶ , ft/sec											
T _t , hr		51/ 1									0.0000
Grassed Waterway	s/Roadsid	e Ditches									
Length, ft Slope, ft/ft											
Velocity ⁷ , ft/sec											
T _t , hr											0.0000
Small Tributary & S	Swamp w/0	Channels									
Length, ft			744								
Slope, ft/ft			0.057								
Velocity ⁸ , ft/sec			5.014								
T _t , hr			0.041								0.0412
Large Tributary Length, ft											
Length, ft Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Culvert											
Diameter, ft											
Area, ft ²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
Velocity ¹¹ , ft/sec											
Length, L, ft T _t , hr											0.0000
v ···				<u> </u>	<u> </u>		<u> </u>	<u> </u>		HR	0.897
										II .	
										Min	53.81

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Subcatchment:	47S - Pre	•							Revised		FGI
Time of Concent	ration De	terminat	ion Worl	ksheet, \$	SCS Me	thods					
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
SHEET FLOW											
Manning's No.	0.240										
Length, ft	100										
P2 , in	2.39										
Slope, ft/ft T _t ¹ˌhr	0.060 0.177										0.4770
SHALLOW CONCE		FLOW									0.1773
Paved	MINAILD	1 LOW									
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
Γ _t , hr											0.0000
Unpaved											
_ength, ft											
Slope, ft/ft											
Velocity ² , ft/sec											2.22-
T _t , hr											0.0000
Cultivated											
_ength, ft Slope, ft/ft											
Siope, π/π Velocity ⁴ , ft/sec											
Velocity , it/sec Γ _t , hr											0.0000
Short Grass Pastui	re										2.2200
_ength, ft		2662									
Slope, ft/ft		0.025									
Velocity ⁴ , ft/sec		1.1068									
Γ _t , hr		0.668					<u></u>				0.6681
Woodland											
Length, ft											
Slope, ft/ft											
Velocity ⁵ , ft/sec											
T _t , hr											0.0000
CHANNEL FLOW Waterways & Swan	nno No Ch	annolo									
Length, ft	lips, No Ci	lailleis									
Slope, ft/ft											
Velocity ⁶ , ft/sec											
Γ _t , hr											0.0000
Grassed Waterway	s/Roadsid	e Ditches									
Length, ft			288		146						
Slope, ft/ft			0.005		0.031						
Velocity ⁷ , ft/sec			1.061		2.641						
Γ _t , hr			0.075		0.015						0.0908
Small Tributary & S	Swamp w/C	Channels									
_ength, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec T _t , hr											0.0000
Large Tributary											0.0000
Large Tributary Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
Γ _t , hr											0.0000
Culvert											
Diameter, ft				2							
Area, ft ²				3.14							
Wetted Perimeter, ft				6.28							
Hydraulic Radius, R, ft				0.5							
Slope, ft/ft				0.005							
Manning's No.				0.025							
/elocity ¹¹ , ft/sec				2.654265							
_ength, L, ft				56							0.00=0
t, hr				0.00586						IIIID	0.0059
										HR	0.942
										Min	56.52

PROJECT:	Cordelio								Calculat Date:	-	RLD 8/8/24
TRC Proj. No.: Subcatchment:	435979 47S - Po	et							Checked		PGT
Time of Concentr			ion Worl	ksheet S	SCS Me	thods			TCVISCU		
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
SHEET FLOW											
Manning's No.	0.240										
ength, ft	100										
P2 , in	2.39										
Slope, ft/ft - _t 1 _, hr	0.054 0.185										0.1850
SHALLOW CONCE		FLOW									0.1650
Paved											
ength, ft											
Slope, ft/ft											
/elocity ² , ft/sec											
t, hr											0.0000
Jnpaved							I	T	T.		
ength, ft Slope, ft/ft											
ыоре, π/π /elocity ² , ft/sec											
t, hr											0.0000
Cultivated											
ength, ft											
Slope, ft/ft											
/elocity ⁴ , ft/sec											
T ³ , hr											0.0000
Short Grass Pastur	е										
ength, ft		2683									
Slope, ft/ft /elocity ⁴ , ft/sec		0.027 1.1502									
Γ _t , hr		0.648									0.6479
		,									2.2.7.0
ength, ft			0								
Slope, ft/ft			0								
/elocity ⁵ , ft/sec											
Γ _t , hr											0.0000
CHANNEL FLOW Waterways & Swan	nne No Cl	hannolo									
vvaterways & Swari ₋ength, ft	ואט טויו, פעוי	ameis	0								
Slope, ft/ft			0								
/elocity ⁶ , ft/sec											
Γ ³ , hr											0.0000
Grassed Waterway	s/Roadsid	le Ditches									
_ength, ft			288		146						
Slope, ft/ft			0.005		0.031						
/elocity ⁷ , ft/sec Γ _t , hr			1.061 0.075		2.641						0.0908
Small Tributary & S	wamn w/	Channele	0.075		0.015						0.0908
ength, ft	waiiip w/C	Juanners									
Slope, ft/ft											
/elocity ⁸ , ft/sec											
լ, hr											0.0000
₋arge Tributary											
ength, ft											
Slope, ft/ft											
/elocity ⁸ , ft/sec _t , hr											0.0000
Culvert											0.0000
iameter, ft				2							
rea, ft ²				3.14							
/etted Perimeter, ft				6.28							
lydraulic Radius, R, ft				0.5							
lope, ft/ft				0.005							
lanning's No.				0.025							
elocity ¹¹ , ft/sec				2.654265							
ength, L, ft , hr				56							0.0050
, 111				0.00586						llup	0.0059
										HR	0.930
										Min	55.77

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Subcatchment:	48S - Po	st							Revised		101
Time of Concent	ration De	terminat	ion Wor	ksheet, :	SCS Me	thods					
	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
SHEET FLOW		1						1			
Manning's No.											
Length, ft P2, in											
Slope, ft/ft											
T _t , hr											0.0000
SHALLOW CONCE	NTRATED	FLOW									
Paved											
Length, ft											
Slope, ft/ft Velocity ² , ft/sec											
T _t , hr											0.0000
Unpaved											0.0000
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
Tt, hr											0.0000
Cultivated											
Length, ft											
Slope, ft/ft											
Velocity ⁴ , ft/sec T _t ³ , hr											0.0000
Short Grass Pastu	re										0.0000
Length, ft											
Slope, ft/ft											
Velocity⁴, ft/sec											
Tt, hr											0.0000
Woodland											
Length, ft			0								
Slope, ft/ft Velocity ⁵ , ft/sec			0								
T _t , hr											0.0000
CHANNEL FLOW											
Waterways & Swar	nps, No Cl	nannels									
Length, ft			0								
Slope, ft/ft			0								
Velocity ⁶ , ft/sec T _t ³ , hr											0.0000
Grassed Waterway	e/Doadeid	o Ditchos									0.0000
Length, ft	5/NOausiu	e Ditches									
Slope, ft/ft											
Velocity ⁷ , ft/sec											
T _t , hr											0.0000
Small Tributary & S	Swamp w/C	channels									
Length, ft											
Slope, ft/ft Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Large Tributary											
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T _t , hr											0.0000
Culvert Diameter, ft											
Diameter, π Area, ft²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
Velocity ¹¹ , ft/sec											
Length, L, ft T _t , hr											0.0000
т, ш										HR	0.0000
										II .	0.000
										Min	6.00

PROJECT: TRC Proj. No.:	Cordelio Flat Cree 435979								Calculat Date: Checked	-	RLD 8/8/24 PGT
Subcatchment:	49S - Po								Revised		101
Time of Concent											
SHEET FLOW	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
Manning's No.	0.240										
_ength, ft	100										
P2, in	2.39										
Slope, ft/ft	0.068										
t, hr	0.169										0.1687
SHALLOW CONCE	NTRATED	FLOW									
Paved											
.ength, ft Slope, ft/ft											
/elocity ² , ft/sec											
t, hr											0.0000
Jnpaved											
ength, ft											
Slope, ft/ft											
/elocity ² , ft/sec											
Γ ³ , hr											0.0000
Cultivated											
ength, ft											
Slope, ft/ft /elocity⁴, ft/sec											
/eiocity ⁻ , π/sec Γ _t , hr											0.0000
Short Grass Pastu	ro										0.0000
ength, ft		725									
Slope, ft/ft		0.036									
/elocity ⁴ , ft/sec		1.3282									
t, hr		0.152									0.1516
Noodland											
ength, ft			0								
Slope, ft/ft			0								
Velocity ⁵ , ft/sec											
T ³ , hr CHANNEL FLOW											0.0000
Waterways & Swar	nns No Ch	nannole									
ength, ft	npo, no or		0								
Slope, ft/ft			0								
Velocity ⁶ , ft/sec											
Γ _t , hr											0.0000
Grassed Waterway	s/Roadsid	e Ditches									
_ength, ft											
Slope, ft/ft											
√elocity ⁷ , ft/sec Γ _t , hr											0.0000
	Swamn w/C	hannolo									0.0000
Small Tributary & S .ength, ft	waiiip w/C	manners									
Slope, ft/ft											
Velocity ⁸ , ft/sec											
Γ _t , hr									L		0.0000
Large Tributary		<u>'</u>									
ength, ft											
Slope, ft/ft											
/elocity ⁸ , ft/sec											
Γ _t , hr											0.0000
Culvert											
Diameter, ft Area, ft²											
ง ea, เเ Vetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
/elocity ¹¹ , ft/sec											
ength, L, ft											
t, hr											0.0000
										HR	0.320
										Min	

Time of Concentration Se SHEET FLOW Manning's No. Length, ft P2 , in Slope, ft/ft T,' , hr SHALLOW CONCENTRA Paved Length, ft Slope, ft/ft Velocity', ft/sec T,' , hr Cultivated Length, ft Slope, ft/ft Velocity', ft/sec T,' , hr Cultivated Length, ft Slope, ft/ft Velocity', ft/sec T,' , hr Woodland Length, ft Slope, ft/ft Velocity', ft/sec T,' , hr Woodland Length, ft Slope, ft/ft Velocity', ft/sec T,' , hr Woodland Length, ft Slope, ft/ft Velocity', ft/sec T,' , hr Woodland Length, ft Slope, ft/ft Velocity', ft/sec T,' , hr GHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity', ft/sec T,' , hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity', ft/sec T,' , hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity', ft/sec	- Post n Determ g 1 Se	eg 2 Seg		SCS Med Seg 5	thods Seg 6	Seg 7	Seg 8	Checkec Revised Seg 9		0.0000 0.0000
Se SHEET FLOW Manning's No. Length, ft P2 , in Slope, ft/ft T,¹, hr SHALLOW CONCENTRA Paved Length, ft Slope, ft/ft Velocity², ft/sec T,², hr Cultivated Length, ft Slope, ft/ft Velocity², ft/sec T,², hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T,², hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T,², hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T,², hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec T,², hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity⁶, ft/sec T,², hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity⁶, ft/sec T,², hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity⁶, ft/sec T,², hr	g 1 Se	eg 2 Seg				Seg 7	Seg 8	Seg 9	Seg 10	
SHEET FLOW Manning's No. Length, ft P2 , in Slope, ft/ft T,', hr SHALLOW CONCENTRA Paved Length, ft Slope, ft/ft Velocity², ft/sec T,², hr Cultivated Length, ft Slope, ft/ft Velocity², ft/sec T,², hr Cultivated Length, ft Slope, ft/ft Velocity², ft/sec T,², hr Woodland Length, ft Slope, ft/ft Velocity², ft/sec T,², hr Channel Slope, ft/ft Velocity², ft/sec T,², hr Channel Slope, ft/ft Velocity², ft/sec T,², hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity², ft/sec T,², hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity², ft/sec T,², hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity², ft/sec T,², hr			3 Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10	
Manning's No. Length, ft P2, in Slope, ft/ft Tt, hr SHALLOW CONCENTRA Paved Length, ft Slope, ft/ft Velocity, ft/sec Tt, hr Shope, ft/ft Velocity, ft/sec Tt, hr Cultivated Length, ft Slope, ft/ft Velocity, ft/sec Tt, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity, ft/sec Tt, hr Channel Length, ft Slope, ft/ft Velocity, ft/sec Tt, hr Channel Length, ft Slope, ft/ft Velocity, ft/sec Tt, hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity, ft/sec Tt, hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity, ft/sec Tt, hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity, ft/sec Tt, hr	TED FLO	DW								
Length, ft P2 , in Slope, ft/ft Tt, 1 hr SHALLOW CONCENTRA Paved Length, ft Slope, ft/ft Velocity ² , ft/sec Tt, 3 hr Cultivated Length, ft Slope, ft/ft Velocity ⁴ , ft/sec Tt, 3 hr Short Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec Tt, 3 hr Channel Grass Pasture Length, ft Slope, ft/ft Velocity ⁴ , ft/sec Tt, 3 hr Channel Grass Pasture Length, ft Slope, ft/ft Velocity ⁵ , ft/sec Tt, 3 hr Channel Grass Pasture Length, ft Slope, ft/ft Velocity ⁵ , ft/sec Tt, 3 hr Channel FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity ⁶ , ft/sec Tt, 1 hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity ⁷ , ft/sec Tt, 1 hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity ⁷ , ft/sec Tt, 1 hr	TED FLC	DW								
P2 , in Slope, ft/ft T,' hr SHALLOW CONCENTRA Paved Length, ft Slope, ft/ft Velocity', ft/sec T,' hr Cultivated Length, ft Slope, ft/ft Velocity', ft/sec T,' hr Cultivated Length, ft Slope, ft/ft Velocity', ft/sec T,' hr Short Grass Pasture Length, ft Slope, ft/ft Velocity', ft/sec T,' hr Woodland Length, ft Slope, ft/ft Velocity', ft/sec T,' hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity', ft/sec T,' hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity', ft/sec T,' hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity', ft/sec T,' hr	TED FLC	DW								
Slope, ft/ft T₁¹, hr SHALLOW CONCENTRA Paved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr CHANNEL FLOW Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity⁵, ft/sec T₁³, hr Grassed Waterways/Roa	TED FLC	DW								
T.¹, Inr SHALLOW CONCENTRA Paved Length, ft Slope, ft/ft Velocity², ft/sec T.³, Inr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T.³, Inr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T.³, Inr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T.³, Inr Woodland Length, ft Slope, ft/ft Velocity⁵, ft/sec T.³, Inr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity⁶, ft/sec T.³, Inr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity⁶, ft/sec T.³, Inr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity⁶, ft/sec T.³, Inr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity⁶, ft/sec T.³, Inr	TED FLC	DW								
SHALLOW CONCENTRA Paved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr CHANNEL FLOW Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr	TED FLC	DW								0.0000
Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Unpaved Length, ft Slope, ft/ft Velocity², ft/sec T₁³, hr Cultivated Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Short Grass Pasture Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Woodland Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr CHANNEL FLOW Waterways & Swamps, N Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr Grassed Waterways/Roa Length, ft Slope, ft/ft Velocity⁴, ft/sec T₁³, hr										0.0000
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Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area. A3: 3.860 sa-ft 0.089 ac 3,860 Gravel Drive Area, A1: sq-ft 0 Meadow Area, A2: sq-ft 0.089 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.002 ac-ft WQv = 70.8 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-3 Calculate Storage Volume, Vol (cu-ft)

Length, L: 193 ft Vol = L * W * D * n Vol = 154.4 cu-ft Width, W: 2 ft Depth, D: 1 ft

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area. A3: 10,961 sa-ft 0.252 ac Gravel Drive Area, A1: 10,961 sq-ft 0 Meadow Area, A2: sq-ft 0.252 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.005 ac-ft WQv = 201.0 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-4 Calculate Storage Volume, Vol (cu-ft)

Length, L: 551 ft Vol = L * W * D * n Vol = 440.8 cu-ft Width, W: 2 ft Depth, D: 1 ft

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area. A3: 4.230 sa-ft 0.097 ac 4,230 Gravel Drive Area, A1: sq-ft 0 Meadow Area, A2: sq-ft 0.097 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.002 ac-ft WQv = 77.6 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-5 Calculate Storage Volume, Vol (cu-ft)

 Length, L:
 200
 ft
 Vol = L * W * D * n
 Vol = 160.0
 cu-ft

 Width, W:
 2
 ft
 ft

 Depth, D:
 1
 ft

 Porosity, n:
 0.4

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area. A3: 4.762 sa-ft 0.109 ac 4,762 Gravel Drive Area, A1: sq-ft 0 Meadow Area, A2: sq-ft 0.109 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.002 ac-ft WQv = 87.3 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-6 Calculate Storage Volume, Vol (cu-ft)

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area. A3: 3.700 sa-ft 0.085 ac 3,700 Gravel Drive Area, A1: sq-ft 0 Meadow Area, A2: sq-ft 0.085 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.002 ac-ft WQv = 67.8 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-7 Calculate Storage Volume, Vol (cu-ft)

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area. A3: 11,000 lsa-ft 0.253 ac 11,000 Gravel Drive Area, A1: sq-ft 0 Meadow Area, A2: sq-ft 0.253 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.005 ac-ft WQv = 201.7 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-8 Calculate Storage Volume, Vol (cu-ft)

Length, L: 538 ft Vol = L * W * D * n Vol = 430.4 cu-ft
Width, W: 2 ft
Depth, D: 1 ft

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area. A3: 22.129 lsa-ft 0.508 ac Gravel Drive Area, A1: 22,129 sq-ft 0 Meadow Area, A2: sq-ft 0.508 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200 Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.009 ac-ft WQv = 405.7 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-9 Calculate Storage Volume, Vol (cu-ft)

Length, L: 634 ft Vol = L * W * D * n Vol = 507.2 cu-ft

Width, W: 2 ft

Depth, D: 1 ft

Porosity, n: 0.4

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area. A3: 17.578 lsa-ft 0.404 ac 17,578 Gravel Drive Area, A1: sq-ft 0 Meadow Area, A2: sq-ft 0.404 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.007 ac-ft WQv = 322.3 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-10 Calculate Storage Volume, Vol (cu-ft)

Length, L: 803 ft Vol = L * W * D * n Vol = 642.4 cu-ft Width, W: 2 ft Depth, D: 1 ft

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area. A3: 15.295 sa-ft 0.351 ac 15,295 Gravel Drive Area, A1: sq-ft 0 Meadow Area, A2: sq-ft 0.351 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.006 ac-ft WQv = 280.4 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-11 Calculate Storage Volume, Vol (cu-ft)

Length, L: 675 ft Vol = L * W * D * n Vol = 540.0 cu-ft
Width, W: 2 ft
Depth, D: 1 ft

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area. A3: 8.879 sa-ft 0.204 ac 8,879 Gravel Drive Area, A1: sq-ft 0 Meadow Area, A2: sq-ft 0.204 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200 Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.004 ac-ft WQv = 162.8 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-12 Calculate Storage Volume, Vol (cu-ft)

Length, L: 438 ft Vol = L * W * D * n Vol = 350.4 cu-ft

Width, W: 2 ft

Depth, D: 1 ft

Porosity, n: 0.4

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area, A3: 1.607 sa-ft 0.037 ac Gravel Drive Area, A1: 1,607 sq-ft 0 Meadow Area, A2: sq-ft 0.037 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

64.0

cu-ft

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.001 ac-ft WQv = 29.5 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-13 Calculate Storage Volume, Vol (cu-ft)

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area, A3: 20.000 lsa-ft 0.459 ac 20,000 Gravel Drive Area, A1: sq-ft 0 Meadow Area, A2: sq-ft 0.459 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.008 ac-ft WQv = 366.7 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-14 Calculate Storage Volume, Vol (cu-ft)

Length, L: 1000 ft Vol = L * W * D * n Vol = 800.0 cu-ft Width, W: 2 ft Depth, D: 1 ft

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area, A3: 18.300 lsa-ft 0.420 ac 18,300 Gravel Drive Area, A1: sq-ft 0 Meadow Area, A2: sq-ft 0.420 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200 Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.008 ac-ft WQv = 335.5 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-15 Calculate Storage Volume, Vol (cu-ft)

Length, L: 915 ft Vol = L * W * D * n Vol = 732.0 cu-ft

Width, W: 2 ft

Depth, D: 1 ft

Porosity, n: 0.4

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area, A3: 7.427 sa-ft 0.171 ac Gravel Drive Area, A1: 7,427 sq-ft 0 Meadow Area, A2: sq-ft 0.171 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.003 ac-ft WQv = 136.2 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-16 Calculate Storage Volume, Vol (cu-ft)

Length, L: 371 ft Vol = L * W * D * n Vol = 296.8 cu-ft Width, W: 2 ft Depth, D: 1 ft

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area, A3: 6.159 sa-ft 0.141 ac Gravel Drive Area, A1: 6,159 sq-ft 0 Meadow Area, A2: sq-ft 0.141 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.003 ac-ft WQv = 112.9 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-17 Calculate Storage Volume, Vol (cu-ft)

Length, L: 308 ft Vol = L * W * D * n Vol = 246.4 cu-ft
Width, W: 2 ft
Depth, D: 1 ft

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area, A3: 7.149 sa-ft 0.164 ac 7,149 Gravel Drive Area, A1: sq-ft 0 Meadow Area, A2: sq-ft 0.164 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.003 ac-ft WQv = 131.1 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-18 Calculate Storage Volume, Vol (cu-ft)

Length, L: 357 ft Vol = L * W * D * n Vol = 285.6 cu-ft
Width, W: 2 ft
Depth, D: 1 ft

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area, A3: 4.874 sa-ft 0.112 ac Gravel Drive Area, A1: 4,874 sq-ft 0 Meadow Area, A2: sq-ft 0.112 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.002 ac-ft WQv = 89.4 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-19 Calculate Storage Volume, Vol (cu-ft)

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area, A3: 8.748 sa-ft 0.201 ac 8,748 Gravel Drive Area, A1: sq-ft 0 Meadow Area, A2: sq-ft 0.201 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.004 ac-ft WQv = 160.4 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-20 Calculate Storage Volume, Vol (cu-ft)

Length, L: 437 ft Vol = L * W * D * n Vol = 349.6 cu-ft
Width, W: 2 ft
Depth, D: 1 ft

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area, A3: 1.817 sa-ft 0.042 ac Gravel Drive Area, A1: 1,817 sq-ft 0 Meadow Area, A2: sq-ft 0.042 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.001 ac-ft WQv = 33.3 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-21 Calculate Storage Volume, Vol (cu-ft)

Length, L: 90 ft Vol = L * W * D * n Vol = 72.0 cu-ft

Width, W: 2 ft

Depth, D: 1 ft

Porosity, n: 0.4

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area, A3: 6.200 sa-ft 0.142 ac 6,200 Gravel Drive Area, A1: sq-ft 0 Meadow Area, A2: sq-ft 0.142 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.003 ac-ft WQv = 113.7 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-22 Calculate Storage Volume, Vol (cu-ft)

Length, L: 310 ft Vol = L * W * D * n Vol = 248.0 cu-ft Width, W: 2 ft Depth, D: 1 ft

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area, A3: 5.280 sa-ft 0.121 ac 5,280 Gravel Drive Area, A1: sq-ft 0 Meadow Area, A2: sq-ft 0.121 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200 Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.002 ac-ft WQv = 96.8 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-23 Calculate Storage Volume, Vol (cu-ft)

Length, L: 259 ft Vol = L * W * D * n Vol = 207.2 cu-ft Width, W: 2 ft Depth, D: 1 ft

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area, A3: 10,796 lsa-ft 0.248 ac 10,796 Gravel Drive Area, A1: sq-ft 0 Meadow Area, A2: sq-ft 0.248 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.005 ac-ft WQv = 197.9 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-24 Calculate Storage Volume, Vol (cu-ft)

Length, L: 540 ft Vol = L * W * D * n Vol = 432.0 cu-ft Width, W: 2 ft Depth, D: 1 ft

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area, A3: 12.000 lsa-ft 0.275 ac 12,000 Gravel Drive Area, A1: sq-ft 0 Meadow Area, A2: sq-ft 0.275 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200 Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.005 ac-ft WQv = 220.0 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-25 Calculate Storage Volume, Vol (cu-ft)

Length, L: 580 ft Vol = L * W * D * n Vol = 464.0 cu-ft

Width, W: 2 ft

Depth, D: 1 ft

Porosity, n: 0.4

Client: Cordelio Calculated By: RLD **Project Name:** Flat Creek Solar **Checked By: PGT Project Number:** 435979 Date: 8/8/24

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area, A3: 9.143 sa-ft 0.210 ac Gravel Drive Area, A1: 9,143 sq-ft 0 Meadow Area, A2: sq-ft 0.210 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) =0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12WQv =0.004 ac-ft WQv = 167.6 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-26 Calculate Storage Volume, Vol (cu-ft)

450 Vol = L * W * D * n Length, L: ft Vol = 360.0 cu-ft Width, W: 2 ft 1 ft Depth, D: 0.4

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area, A3: 2.050 sa-ft 0.047 ac 2,050 Gravel Drive Area, A1: sq-ft 0 Meadow Area, A2: sq-ft 0.047 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200 Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.001 ac-ft WQv = 37.6 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-27 Calculate Storage Volume, Vol (cu-ft)

Length, L: 106 ft Vol = L * W * D * n Vol = 84.8 cu-ft
Width, W: 2 ft
Depth, D: 1 ft

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area, A3: 15,360 lsa-ft 0.353 ac 15,360 Gravel Drive Area, A1: sq-ft 0 Meadow Area, A2: sq-ft 0.353 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.006 ac-ft WQv = 281.6 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-28 Calculate Storage Volume, Vol (cu-ft)

Length, L: 768 ft Vol = L * W * D * n Vol = 614.4 cu-ft Width, W: 2 ft Depth, D: 1 ft

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area, A3: 35.324 sa-ft 0.811 ac 35,324 Gravel Drive Area, A1: sq-ft 0 Meadow Area, A2: sq-ft 0.811 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200 Min. Rv = 0.2

.....

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.015 ac-ft WQv = 647.6 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-29 Calculate Storage Volume, Vol (cu-ft)

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area, A3: 17,135 lsa-ft 0.393 ac Gravel Drive Area, A1: 17,135 sq-ft 0 Meadow Area, A2: sq-ft 0.393 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.007 ac-ft WQv = 314.1 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-30 Calculate Storage Volume, Vol (cu-ft)

Length, L: 790 ft Vol = L * W * D * n Vol = 632.0 cu-ft
Width, W: 2 ft
Depth, D: 1 ft

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area, A3: 3.726 sa-ft 0.086 ac 3,726 Gravel Drive Area, A1: sq-ft 0 Meadow Area, A2: sq-ft 0.086 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Calculate Water Quality Volume, WQv (ac-ft)

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200 Min. Rv = 0.2

WQv = (P * Rv * A)/12 WQv = 0.002 ac-ft WQv = 68.3 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-31 Calculate Storage Volume, Vol (cu-ft)

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area, A3: 8.115 sa-ft 0.186 ac Gravel Drive Area, A1: 8,115 sq-ft 0 Meadow Area, A2: sq-ft 0.186 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.003 ac-ft WQv = 148.8 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-32 Calculate Storage Volume, Vol (cu-ft)

Length, L: 406 ft Vol = L * W * D * n Vol = 324.8 cu-ft Width, W: 2 ft Depth, D: 1 ft

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area, A3: 14.570 lsa-ft 0.334 ac Gravel Drive Area, A1: 14,570 sq-ft 0 Meadow Area, A2: sq-ft 0.334 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.006 ac-ft WQv = 267.1 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-34 Calculate Storage Volume, Vol (cu-ft)

Length, L: 660 ft Vol = L * W * D * n Vol = 528.0 cu-ft
Width, W: 2 ft
Depth, D: 1 ft

Client: Cordelio Calculated By: RLD **Project Name:** Flat Creek Solar **Checked By: PGT Project Number:** 435979 Date: 8/8/24

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area, A3: 5.021 sa-ft 0.115 ac Gravel Drive Area, A1: 5,021 sq-ft 0 Meadow Area, A2: sq-ft 0.115 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) =0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12WQv = 0.002 ac-ft WQv = 92.1 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-35 Calculate Storage Volume, Vol (cu-ft)

251 Vol = L * W * D * n Length, L: ft Vol = 200.8 cu-ft Width, W: 2 ft 1 ft Depth, D: 0.4

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area, A3: 1.558 sa-ft 0.036 ac 1,558 Gravel Drive Area, A1: sq-ft 0 Meadow Area, A2: sq-ft 0.036 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.001 ac-ft WQv = 28.6 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-36 Calculate Storage Volume, Vol (cu-ft)

Length, L: 78 ft Vol = L * W * D * n Vol = 62.4 cu-ft Width, W: 2 ft Depth, D: 1 ft

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area, A3: 8.153 sa-ft 0.187 ac Gravel Drive Area, A1: 8,153 sq-ft 0 Meadow Area, A2: sq-ft 0.187 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200 Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.003 ac-ft WQv = 149.5 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-37 Calculate Storage Volume, Vol (cu-ft)

Length, L: 380 ft Vol = L * W * D * n Vol = 304.0 cu-ft Width, W: 2 ft Depth, D: 1 ft

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area, A3: 9.721 sa-ft 0.223 ac Gravel Drive Area, A1: 9,721 sq-ft 0 Meadow Area, A2: sq-ft 0.223 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200 Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.004 ac-ft WQv = 178.2 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-38 Calculate Storage Volume, Vol (cu-ft)

Length, L: 400 ft Vol = L * W * D * n Vol = 320.0 cu-ft
Width, W: 2 ft
Depth, D: 1 ft

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area, A3: 7.235 sa-ft 0.166 ac 7,235 Gravel Drive Area, A1: sq-ft 0 Meadow Area, A2: sq-ft 0.166 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.003 ac-ft WQv = 132.6 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-39 Calculate Storage Volume, Vol (cu-ft)

Length, L: 372 ft Vol = L * W * D * n Vol = 297.6 cu-ft

Width, W: 2 ft

Depth, D: 1 ft

Porosity, n: 0.4

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area, A3: 3.306 sa-ft 0.076 ac 3,306 Gravel Drive Area, A1: sq-ft 0 Meadow Area, A2: sq-ft 0.076 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.001 ac-ft WQv = 60.6 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-40 Calculate Storage Volume, Vol (cu-ft)

Length, L: 165 ft Vol = L * W * D * n Vol = 132.0 cu-ft
Width, W: 2 ft
Depth, D: 1 ft

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area, A3: 18.466 sa-ft 0.424 ac Gravel Drive Area, A1: 18,466 sq-ft 0 Meadow Area, A2: sq-ft 0.424 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.008 ac-ft WQv = 338.5 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-41 Calculate Storage Volume, Vol (cu-ft)

Length, L: 923 ft Vol = L * W * D * n Vol = 738.4 cu-ft Width, W: 2 ft Depth, D: 1 ft

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area, A3: 5.433 sa-ft 0.125 ac Gravel Drive Area, A1: 5,433 sq-ft 0 Meadow Area, A2: sq-ft 0.125 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.002 ac-ft WQv = 99.6 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-42 Calculate Storage Volume, Vol (cu-ft)

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area, A3: 1.810 sa-ft 0.042 ac Gravel Drive Area, A1: 1,810 sq-ft 0 Meadow Area, A2: sq-ft 0.042 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200 Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.001 ac-ft WQv = 33.2 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-43 Calculate Storage Volume, Vol (cu-ft)

Length, L: 92 ft Vol = L * W * D * n Vol = 73.6 cu-ft

Width, W: 2 ft

Depth, D: 1 ft

Porosity, n: 0.4

Client:CordelioCalculated By: RLDProject Name:Flat Creek SolarChecked By: PGTProject Number:435979Date:8/8/24

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area. A3: 2.853 sa-ft 0.065 ac 2,853 Gravel Drive Area, A1: sq-ft 0 Meadow Area, A2: sq-ft 0.065 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.001 ac-ft WQv = 52.3 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-44 Calculate Storage Volume, Vol (cu-ft)

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area. A3: 5.723 sa-ft 0.131 ac Gravel Drive Area, A1: 5,723 sq-ft 0 Meadow Area, A2: sq-ft 0.131 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.002 ac-ft WQv = 104.9 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-45 Calculate Storage Volume, Vol (cu-ft)

Length, L: 295 ft Vol = L * W * D * n Vol = 236.0 cu-ft Width, W: 2 ft Depth, D: 1 ft

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area. A3: 8.781 sa-ft 0.202 ac Gravel Drive Area, A1: 8,781 sq-ft 0 Meadow Area, A2: sq-ft 0.202 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.004 ac-ft WQv = 161.0 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-46 Calculate Storage Volume, Vol (cu-ft)

Length, L: 437 ft Vol = L * W * D * n Vol = 349.6 cu-ft Width, W: 2 ft Depth, D: 1 ft

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area. A3: 8.602 sa-ft 0.197 ac Gravel Drive Area, A1: 8,602 sq-ft 0 Meadow Area, A2: sq-ft 0.197 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.004 ac-ft WQv = 157.7 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-47 Calculate Storage Volume, Vol (cu-ft)

Length, L: 433 | ft | Vol = L * W * D * n | Vol = 346.4 | cu-ft |
Width, W: 2 | ft |
Depth, D: 1 | ft |
Porosity, n: 0.4

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area. A3: 1.425 sa-ft 0.033 ac 1,425 Gravel Drive Area, A1: sq-ft 0 Meadow Area, A2: sq-ft 0.033 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.001 ac-ft WQv = 26.1 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-48 Calculate Storage Volume, Vol (cu-ft)

Length, L: 73 ft Vol = L * W * D * n Vol = 58.4 cu-ft Width, W: 2 ft Depth, D: 1 ft

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area. A3: 7.313 sa-ft 0.168 ac Gravel Drive Area, A1: 7,313 sq-ft 0 Meadow Area, A2: sq-ft 0.168 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.003 ac-ft WQv = 134.1 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-49 Calculate Storage Volume, Vol (cu-ft)

Length, L: 370 ft Vol = L * W * D * n Vol = 296.0 cu-ft Width, W: 2 ft Depth, D: 1 ft

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area. A3: 5.025 sa-ft 0.115 ac 5,025 Gravel Drive Area, A1: sq-ft 0 Meadow Area, A2: sq-ft 0.115 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.002 ac-ft WQv = 92.1 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-50 Calculate Storage Volume, Vol (cu-ft)

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area. A3: 7.500 sa-ft 0.172 ac 7,500 Gravel Drive Area, A1: sq-ft 0 Meadow Area, A2: sq-ft 0.172 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.003 ac-ft WQv = 137.5 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-51 Calculate Storage Volume, Vol (cu-ft)

Length, L: 373 ft Vol = L * W * D * n Vol = 298.4 cu-ft
Width, W: 2 ft
Depth, D: 1 ft

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area. A3: 1,161 sa-ft 0.027 ac Gravel Drive Area, A1: 1,161 sq-ft 0 Meadow Area, A2: sq-ft 0.027 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.000 ac-ft WQv = 21.3 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-52 Calculate Storage Volume, Vol (cu-ft)

Client: Cordelio Calculated By: RLD **Project Name:** Flat Creek Solar **Checked By: PGT Project Number:** 435979 Date: 8/8/24

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area. A3: 1.510 sa-ft 0.035 ac Gravel Drive Area, A1: 1,510 sq-ft 0 Meadow Area, A2: sq-ft 0.035 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) =0.059 Rv = 0.200

in

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12WQv = 0.001 ac-ft WQv = 27.7 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-53 Calculate Storage Volume, Vol (cu-ft)

75 Vol = L * W * D * n Length, L: ft Vol = 60.0 cu-ft Width, W: 2 ft 1 ft Depth, D:

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area. A3: 17.283 sa-ft 0.397 ac 17,283 Gravel Drive Area, A1: sq-ft 0 Meadow Area, A2: sq-ft 0.397 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.007 ac-ft WQv = 316.9 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-54 Calculate Storage Volume, Vol (cu-ft)

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area. A3: 1.471 sa-ft 0.034 ac Gravel Drive Area, A1: 1,471 sq-ft 0 Meadow Area, A2: sq-ft 0.034 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200 Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.001 ac-ft WQv = 27.0 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

0.4

Porosity, n:

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-55 Calculate Storage Volume, Vol (cu-ft)

Length, L: 74 ft Vol = L * W * D * n Vol = 59.2 cu-ft Width, W: 2 ft Depth, D: 1 ft

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area. A3: 28.000 lsa-ft 0.643 ac 28,000 Gravel Drive Area, A1: sq-ft 0 Meadow Area, A2: sq-ft 0.643 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.012 ac-ft WQv = 513.3 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-56 Calculate Storage Volume, Vol (cu-ft)

Length, L: 933 ft Vol = L * W * D * n Vol = 746.4 cu-ft

Width, W: 2 ft

Depth, D: 1 ft

Porosity, n: 0.4

Water Quality Volume Calculations

NYS Stormwater Management Design Manual, Chapter 4, Section 2 - "The Water Quality Volume (WQv) is intended to improve water quality by capturing and treating runoff from small, frequentstorm events that tend to contain higher pollutant levels. The WQv is directly related to the amount of impervious cover created at a site."

Access Drives

Runoff from sections of the access drive will flow to roadside infiltration trenches. This BMP will provide the required water quality treatment by infiltration or evaporation.

Subcatchment Area. A3: 4.500 sa-ft 0.103 ac 4,500 Gravel Drive Area, A1: sq-ft 0 Meadow Area, A2: sq-ft 0.103 ac 0.000 ac Percent Impervious Cover, I 1.00 % 90% Rainfall depth, P: 1.10 in

From Figure 4.1 - NYS Stormwater Management Design Manual, January 2015

Calculate Volumetric Runoff Coefficient, Rv

Rv = 0.05 + (0.009 * I) = 0.059 Rv = 0.200

Min. Rv = 0.2

Calculate Water Quality Volume, WQv (ac-ft)

WQv = (P * Rv * A)/12 WQv = 0.002 ac-ft WQv = 82.5 cu-ft

Provided Water Quality Volume, WQv (cu-ft)

These calculations demonstrate that, as designed, the proposed infiltration trench(es) will provide adequate storage and treatment for the required Water Quality Volume.

Infiltration Trench TR-57 Calculate Storage Volume, Vol (cu-ft)

Client:CordelioProject Name:Flat Creek SolarProject Number:435979

Water Quality BMP Table

Vegetated Filter Strip ID	Width (ft)	Sheet No.	Veg
VFS-1	50	C-102-02	
VFS-2	75	C-102-02	
VFS-5	50	C-102-02	
VFS-6	75	C-102-02	
VFS-7	60	C-102-03	
VFS-8	50,75	C-102-03	
VFS-10	50	C-102-10	
VFS-11	75,60	C-102-11	
VFS-12	60	C-102-06	
VFS-13	50	C-102-06	
VFS-14	90	C-102-06	
VFS-16	60,75	C-102-03,04	
VFS-18	50,100,86,58	C-102-08	
VFS-19	60	C-102-16	
VFS-20	86,75,50	C-102-17	
VFS-21	100	C-102-16	
VFS-22	75	C-102-16	
VFS-23	75	C-102-17	
VFS-24	50	C-102-17	
VFS-26	60	C-102-11	
VFS-27	60,50	C-102-12,19	
VFS-28	60	C-102-12	
VFS-29	60	C-102-12	
VFS-32	58,86	C-102-13	
VFS-33	60	C-102-13	
VFS-34	60	C-102-14	
VFS-35	60	C-102-14	
VFS-36	60	C-102-13	
VFS-38	60	C-102-26	
VFS-39	60	C-102-22,27	
VFS-41	60	C-102-26	
VFS-42	60	C-102-27	
VFS-43	60	C-102-27	
VFS-44	60	C-102-27	
VFS-46	60	C-102-27	
VFS-47	60	C-102-27	
VFS-48	60	C-102-27	
VFS-49	60	C-102-32	
VFS-50	60	C-102-24	
VFS-52	60	C-102-32	
VFS-53	60	C-102-32	
VFS-54	58	C-102-38	
VFS-55	60	C-102-37	
VFS-56	60,90	C-102-37	
VFS-57	60,90	C-102-37,38	
VFS-59	60	C-102-38,39	
VFS-60	60	C-102-38	
VFS-61	58	C-102-38,46	
VFS-62	86,90,115	C-102-38,45	
VFS-63	115	C-102-36,43	
VFS-64	60,86	C-102-39,46,47	
VFS-65	90	C-102-44	

VEGETATED	D FILTER STRIPS		
Vegetated Filter Strip ID	Width (ft)	Sheet No.	
VFS-66	60	C-102-44	
VFS-67	60,90	C-102-43	
VFS-68	60	C-102-43,44	
VFS-69	60	C-102-43,44	
VFS-70	60	C-102-43	
VFS-71	60	C-102-44	
VFS-72	60	C-102-44,53	
VFS-73	60,90	C-102-43	
VFS-74	60,75	C-102-55	
VFS-75	75	C-102-55	
VFS-76	50	C-102-54	
VFS-77	60	C-102-54	
VFS-78	60	C-102-54	
VFS-79	75	C-102-54	
VFS-80	58,60	C-102-54	
VFS-81	60	C-102-51	
VFS-81 VFS-82	60	C-102-51 C-102-57	
VFS-83	60,90	C-102-57	
VFS-85	60		
	60	C-102-57 C-102-58	
VFS-86			
VFS-87	58,60,86	C-102-50,56	
VFS-89	60	C-102-50	
VFS-90	58,60	C-102-41,50	
VFS-92	60	C-102-49	
VFS-93	60	C-102-49	
VFS-94	60	C-102-49	
VFS-95	60	C-102-49	
VFS-96	60	C-102-48	
VFS-97	60	C-102-29	
VFS-99	60	C-102-50	
VFS-100	60	C-102-49	
VFS-101	50	C-102-03	
VFS-102	50	C-102-02	
VFS-103	50	C-102-03	
VFS-104	90	C-102-06	
VFS-106	60	C-102-06	
VFS-107	58	C-102-08	
VFS-108	60	C-102-08	
VFS-109	60	C-102-17	
VFS-110	58	C-102-16	
VFS-111	75	C-102-16	
VFS-112	50	C-102-17	
VFS-113	60	C-102-11	
VFS-114	60	C-102-11	
VFS-115	60	C-102-12	
VFS-116	60	C-102-12	
VFS-117	60	C-102-14	
VFS-118	58	C-102-13	
VFS-119	60	C-102-13	
VFS-120	60	C-102-32	
VFS-121	60	C-102-32	
VFS-122	60	C-102-24	
VI J'IZZ	1 30	U 102-24	

VEGETATED FILTER STRIPS

VEGETATED FILTER STRIPS							
Vegetated Filter Strip ID	Width (ft)	Sheet No.					
VFS-123	60	C-102-24					
VFS-124	60	C-102-24					
VFS-125	60	C-102-23					
VFS-126	60	C-102-22					
VFS-127	60	C-102-27					
VFS-128	60	C-102-27					
VFS-129	60	C-102-27					
VFS-130	60	C-102-27					
VFS-131	60	C-102-38					
VFS-132	60	C-102-37					
VFS-133	60	C-102-32					
VFS-134	60	C-102-32					
VFS-135	58	C-102-46					
VFS-136	60	C-102-39					
VFS-137	58	C-102-38					
VFS-138	75	C-102-38					
VFS-139	60	C-102-37					
VFS-140	60	C-102-46					
VFS-142	90	C-102-45					
VFS-143	86	C-102-45					
VFS-144	90	C-102-44					
VFS-145	60	C-102-43					
VFS-146	60	C-102-44	-				
VFS-147	60	C-102-44	<u> </u>				
VFS-148	60	C-102-43					
VFS-149	60	C-102-54					
VFS-150	60	C-102-54	<u> </u>				
VFS-151	60	C-102-53	<u> </u>				
VFS-151	60	C-102-33	-				
	60	C-102-44 C-102-43	├				
VFS-153 VFS-154			<u> </u>				
	50	C-102-60	<u> </u>				
VFS-155	75	C-102-55					
VFS-156	58	C-102-55	-				
VFS-157	50	C-102-59	-				
VFS-158	50	C-102-54	-				
VFS-159	60	C-102-50	├				
VFS-160	60	C-102-50	├				
VFS-161	60	C-102-41					
VFS-162	60	C-102-50					
VFS-163	58	C-102-56					
VFS-164	60	C-102-56	-				
VFS-165	60	C-102-58					
VFS-166	60	C-102-57					
VFS-167	60	C-102-57	L				
VFS-168	60	C-102-51	<u> </u>				
VFS-169	90	C-102-45	l L				
VFS-170	60	C-102-46	l L				
VFS-171	60	C-102-32					
VFS-172	86	C-102-46	j F				
VFS-173	60	C-102-24					
VFS-174	60	C-102-20					

INFILTRATION TRENCHES							
Infiltration Trench ID	Length (ft)	Sheet No.					
TR-3	193	C-102-03					
TR-4	551	C-102-03					
TR-5	200	C-102-03					
TR-6	241	C-102-06					
TR-7	184	C-102-06					
TR-8	538	C-102-06					
TR-9	634	C-102-08					
TR-10	803	C-102-16					
TR-11	675	C-102-16					
TR-12	438	C-102-16					
TR-13	80	C-102-16					
TR-14	1000	C-102-13					
TR-15	915	C-102-20					
TR-16	371	C-102-13					
TR-17	308	C-102-13					
TR-18	357	C-102-14					
TR-19	244	C-102-14					
TR-20	437	C-102-13					
TR-21	106	C-102-27					
TR-22	310	C-102-22					
TR-23	259	C-102-27					
TR-24	540	C-102-27					
TR-26	450	C-102-32					
TR-27	106	C-102-24					
TR-28	768	C-102-24					
TR-29	1766	C-102-37					
TR-30	790	C-102-37					
TR-31	186	C-102-38					
TR-32	406	C-102-46					
TR-34	660	C-102-44					
TR-35	251	C-102-44					
TR-36	78	C-102-55					
TR-37	380	C-102-55					
TR-38	400	C-102-55					
TR-39	372	C-102-54,55					
TR-40	165	C-102-54					
TR-41	923	C-102-54					
TR-42	264	C-102-54,55					
TR-43	92	C-102-51					
TR-44	143	C-102-51					
TR-45	295	C-102-57					
TR-46	437	C-102-58					
TR-47	433	C-102-50					
TR-48	73	C-102-50					
TR-49	370	C-102-49					
TR-50	251	C-102-49					
TR-51	373	C-102-11					
TR-53	75	C-102-32					
TR-54	853	C-102-23					
TR-55	74	C-102-29					
TR-56	933	C-102-29					
TR-57	225	C-102-49					

Client: Cordelio
Project Name: Flat Creek Solar
Project Number: 435979

Water Quality BMP Summary

VFS = Vegetated Filter Strip
TR = Infiltration Trench
SS = Substation

ALIGNMENT RD-01	BEGIN STA. 0+00	END STA. END	SLOPE 0% - 8%	HSG B	WIDTH (FT) 50	BMP VFS-1	NOTE
RD-02	0+55	2+00	8% - 12%	В	75	VFS-2	
RD-05	0+00	0+30	00/ 00/		50	Stream Crossing	
	0+30 END	1+65 END	0% - 8% 8% - 12%	B B	50 75	VFS-5 VFS-6	
RD-07	0+00	0+40				Stream Crossing	
	0+40	3+10	0% - 8%	D	60	VFS-7	
	3+10	5+10			2	TR-3	
	5+10	7+50	0% - 8%	В	50	VFS-8	
	7+50	9+25	8% - 12%	В	75	VFS-8	
	9+25	14+75			2	TR-4	
	14+75	21+60	0% - 8%	В	50	VFS-10	
	21+60	27+45	8% - 12%	В	75	VFS-11	
	27+45	28+30	0% - 8%	D	60	VFS-11	
	28+30	30+50				TR-5	
	30+50	31+15				Stream Crossing	
	31+15	33+60	0% - 8%	D	60	VFS-12	
	33+60	36+00				TR-6	
	36+00	43+75	0% - 8%	В	50	VFS-13	
RD-114	0+00	1+70			2	TR-7	
	1+70	7+00			2	TR-8	
	7+00	END	12% - 15%	D	90	VFS-14	
RD-08	0+00	7+00	0% - 8%	D	60	VFS-16	
	7+00	9+40	8% - 12%	В	75	VFS-16	
RD-14	0+00	2+00	0% - 8%	В	50	VFS-18	
	2+00	4+30	12% - 15%	В	100	VFS-18	
	4+30	6+75	0% - 8%	В	50	VFS-18	
	6+75	13+15	8% - 12%	С	86	VFS-18	

	13+15 15+60	15+60 END	0% - 8%	С	58 2	VFS-18 TR-9
RD-19	0	0+40				Stream Crossing
	0+40	4+45	0% - 8%	D	60	VFS-19
	4+45	12+50			2	TR-10
	12+50	12+80				Stream Crossing
	12+80	19+60			2	TR-11
	19+60	21+70	8% - 12%	С	86	VFS-20
	21+70	22+50	8% - 12%	В	75	VFS-20
	22+50	END	0% - 8%	В	50	VFS-20
RD-21	0+00	3+45	12% - 15%	В	100	VFS-21
	3+45	7+90		_	2	TR-12
	7+90	8+10			_	Stream Crossing
	8+10	8+90			2	TR-13
	END	END	8% - 12%	В	75	VFS-22
RD-18	0+00	0+35				Stream Crossing
	0+35	2+30	8% - 12%	В	75	VFS-23
	END	END	0% - 8%	В	50	VFS-24
RD-24	0+00	3+80			2	TR-51
RD-26	0+00	0+40				Stream Crossing
	0+40	END	0% - 8%	D	60	VFS-26
RD-28	0+00	0+40				Stream Crossing
ND 20	0+40	6+90	0% - 8%	D	60	VFS-27
	6+90	9+40	0% - 8%	В	50	VFS-27
	9+40	11+10	0% - 8%	D	60	VFS-28
	11+10	11+40				Stream Crossing
	11+40	14+00	0% - 8%	D	60	VFS-29
					_	
RD-105	0+00	9+30			2	TR-15
	9+30 10+30	19+30			2	TR-14
	19+30 19+50	19+50			2	Stream Crossing TR-16
	19+50 23+20	23+20 25+10	0% - 8%	С	2 58	VFS-32
	25+20 25+10	25+10 26+35	0% - 8% 8% - 12%	С	38 86	VFS-32 VFS-32
	26+55	30+50	0% - 12%	D	60	VFS-32 VFS-33
	20∓33	30+30	0/0 - 0/0	D	00	VI 3-33

	30+50 33+60	33+60 33+85			2	TR-17 Stream Crossing
	33+85	37+45			2	TR-18
	37+45	42+35	0% - 8%	D	60	VFS-34
	42+35	44+80		_	2	TR-19
	44+80	END	0% - 8%	D	60	VFS-35
RD-32	1+00	5+35			2	TR-20
	5+35	7+80	0% - 8%	D	60	VFS-36
			201 201	_		
RD-34	0+00	3+00	0% - 8%	D	60	VFS-38
	3+00	3+90			2	TR-21
	3+90	19+20	0% - 8%	D	60	VFS-39
	19+20	22+20			2	TR-22
RD-36	0+00	0+30				Stream Crossing
	0+30	2+00	0% - 8%	D	60	VFS-41
	2+00	3+90			2	TR-23
	3+90	6+55	0% - 8%	D	60	VFS-42
	6+55	8+80	0% - 8%	D	60	VFS-43
	8+80	9+30				Stream Crossing
	9+30	12+90	0% - 8%	D	60	VFS-44
	12+50	17+90			2	TR-24
RD-107	0+00	3+75	0% - 8%	D	60	VFS-46
	3+75	4+10				Stream Crossing
	4+10	8+35	0% - 8%	D	60	VFS-47
	8+35	END	0% - 8%	D	60	VFS-48
RD-39	0+00	5+10	0% - 8%	D	60	VFS-49
	5+10	5+95			2	TR-53
	5+95	6+35				Stream Crossing
	6+35	END				TR-26
RD-58	0+00	1+00			2	TR-27
	1+00	8+15	0% - 8%	D	60	VFS-50
	8+15	END			2	TR-28
DD 46	0.00	2.05	00/ 00/	5	60	VEC 52
RD-46	0+00	2+85	0% - 8%	D	60	VFS-52
	2+85	3+10	00/ 00/	-	60	Stream Crossing
	3+10	END	0% - 8%	D	60	VFS-53

DD 40	0.00	0.40				Chungan Cungging
RD-48	0+00	0+40	00/ 00/	6	F0	Stream Crossing
	0+40	8+35	0% - 8%	С	58	VFS-54
	8+35	26+00			2	TR-29
	26+00	34+00			2	TR-30
	34+00	END	0% - 8%	D	60	VFS-55
RD-50	0+00	5+70	0% - 8%	D	60	VFS-56
ND-30	5+70	7+25	8% - 12%	D	90	VFS-56
	7+25		0% - 12%		60	
		12+60		D		VFS-56
	11+60	14+75	8% - 12%	D	90	VFS-57
	14+75	16+40	0% - 8%	D	60	VFS-57
	16+40	18+25			2	TR-31
RD-60	0+00	0+30				Stream Crossing
	0+30	7+25	0% - 8%	D	60	VFS-59
	7+25	END	0% - 8%	D	60	VFS-60
	7.23	LIND	070 070	D	00	V13 00
RD-64	0+00	0+40				Stream Crossing
	0+40	3+90	0% - 8%	С	58	VFS-61
	3+90	8+00			2	TR-32
	8+00	12+70	8% - 12%	С	86	VFS-62
	12+70	17+10	12% - 15%	С	115	VFS-62
	17+10	18+50	8% - 12%	С	86	VFS-62
	18+50	21+50	8% - 12%	D	90	VFS-62
	21+50	23+60	8% - 12%	D	90	VFS-169
	23+60	24+60	12% - 15%	С	115	VFS-63
RD-62	0+00	0+45				Stream Crossing
ND-02	0+00		00/ 00/	_	60	
		1+50	0% - 8%	D	60	VFS-64
	1+50	10+00	8% - 12%	С	86	VFS-64
	11+70	END	0% - 8%	D	60	VFS-170
RD-83	0+00	0+30				Stream Crossing
	0+30	END	8% - 12%	D	90	VFS-65
RD-84	0+00	1+50	0% - 8%	D	60	VFS-66
ND 07	1+50	8+20	J/0 J/0	U	2	TR-34
	8+20	15+45	0% - 8%	D	60	VFS-67
	15+45	20+00	8% - 12%	D	90	VFS-67
RD-77	0+00	0+30				Stream Crossing

	0+30	7+40	0% - 8%	D	60	VFS-68
	7+40	END	0% - 8%	D	60	VFS-69
	7 1 40	LIND	070 070	D	00	V1 3 03
DD 444	0.00	6 75	00/ 00/	_	60	\ /FC 70
RD-111	0+00	6+75	0% - 8%	D	60	VFS-70
	7+20	9+00	0% - 8%	D	60	VFS-69
	9+00	11+50			2	TR-35
	11+50	12+70	0% - 8%	D	60	VFS-71
	12+70	13+00				Stream Crossing
	13+00	END	0% - 8%	D	60	VFS-72
	15+00	END	070 - 670	D	00	VF3-72
RD-78	0+00	2+00	8% - 12%	D	90	VFS-73
112 70	2+00	6+80	0% - 8%	D	60	VFS-73
	7+25	END	8% - 12%	D	90	VFS-68
RD-68	0+00	2+30	8% - 12%	В	75	VFS-74
ND 00	2+30	10+50	0% - 8%	D	60	VFS-74
	10+50	16+75	8% - 12%	В	75	VFS-74
	17+15	END	8% - 12%	В	75	VFS-75
RD-73	0+95	1+75			2	TR-36
ND-73						
	1+75	5+70			2	TR-37
	5+70	6+40				Stream Crossing
	6+40	10+00			2	TR-38
	10+00	13+90			2	TR-39
	13+90	19+60	0% - 8%	В	50	VFS-76
	19+60	21+25			2	TR-40
			00/ 00/	D		
	21+25	30+00	0% - 8%	D	60	VFS-77
	30+00	39+25			2	TR-41
	39+25	END	0% - 8%	D	60	VFS-78
RD-75	0+60	1+00				Stream Crossing
	1+00	3+70			2	TR-42
	3+70	4+60	8% - 12%	В	- 75	VFS-79
	3170	4100	870 - 1270	ь	73	V13-73
RD-87	0+00	0+30				Stream Crossing
	0+30	2+30	0% - 8%	С	58	VFS-80
	2+30	4+30	0% - 8%	D	60	VFS-80
	4+30	6+20	0% - 8%	C	58	VFS-80
			U/0 - 070	C		
	6+20	7+10			2	TR-43
	7+10	8+50			2	TR-44
	8+50	14+75	0% - 8%	D	60	VFS-81
	14+75	17+75			2	TR-45

	17+75	28+50				Existing Road
	28+50	33+50	0% - 8%	D	60	VFS-82
	33+50	34+75	070 070	D	00	Pond
	34+75	37+00	0% - 8%	D	60	VFS-83
	37+00	38+75	8% - 12%	D	90	VFS-83
	38+75	44+50	0% - 8%	D	60	VFS-83
	38173	44130	070 - 870	D	00	VI 3-63
RD-90	0+00	END	0% - 8%	D	60	VFS-85
RD-88	0+00	5+45				Existing Road
	5+45	5+75				Stream Crossing
	5+75	10+15			2	TR-46
	10+15	END	0% - 8%	D	60	VFS-86
RD-93	0+00	0+25				Stream Crossing
ND-33	0+25	0+23 4+80	0% - 8%	D	60	VFS-87
	4+80	8+00	0% - 8%	C	58	VFS-87
	8+00	9+55	0% - 8% 8% - 12%	C	36 86	VFS-87
	9+55	END	0% - 8%	D	60	VFS-87
	9+33	END	070 - 870	D	00	VF3-07
RD-95	0+00	2+20			2	TR-57
	2+20	6+00	0% - 8%	D	60	VFS-100
	6+00	12+90	0% - 8%	D	60	VFS-99
	12+90	13+40			2	TR-48
	13+40	13+70				Stream Crossing
	13+70	18+00			2	TR-47
	18+00	27+90	0% - 8%	D	60	VFS-89
	27+90	28+30				Stream Crossing
	28+30	33+05	0% - 8%	D	60	VFS-90
	33+05	33+75	0% - 8%	С	58	VFS-90
	33+75	END	0% - 8%	D	60	VFS-90
DD 00	000	2.70			2	TD 40
RD-99	0+00	3+70	00/ 00/	5	2	TR-49
	3+60	5+70	0% - 8%	D	60	VFS-92
	5+70	8+20	00/ 00/	5	2	TR-50
	8+20	12+40	0% - 8%	D	60	VFS-93
	11+45	15+00	0% - 8%	D	60	VFS-94
RD-100	0+00	END	0% - 8%	D	60	VFS-95
RD-118	0+00	0+20				Stream Crossing

	0+20 9+50 10+20	8+70 10+20 END	0% - 8%	D	2 2 60	TR-54 TR-55 VFS-97	SS
RD-120	0+00 0+30	0+30 END			2	Stream Crossing TR-56	
RD-127	0+00	END	0% - 8%	D	60	VFS-173	
INVERTERS							
A1-1			0% - 8%	В	50	VFS-2	
A1-2			0% - 8%	В	50	VFS-102	
A1-3			0% - 8%	В	50	VFS-103	
A1-4			8% - 12%	D	90	VFS-104	
A1-5			0% - 8%	D	60	VFS-106	
A2-1			0% - 8%	В	50	VFS-101	
A2-2			0% - 8%	D	60	VFS-16	
A2-3			0% - 8%	D	60	VFS-16	
B1-1			0% - 8%	С	58	VFS-107	
B1-2			0% - 8%	D	60	VFS-108	
C1-1			0% - 8%	D	60	VFS-109	
C1-2			0% - 8%	С	58	VFS-110	
C1-3			8% - 12%	В	75 	VFS-111	
C1-4			0% - 8%	В	50	VFS-112	
D1-1			0% - 8%	D	60	VFS-113	
D1-2 D2-1			0% - 8% 0% - 8%	D D	60 60	VFS-114	
D2-1 D2-2			0% - 8% 0% - 8%	D	60	VFS-115 VFS-116	
D2-2 D2-3			0% - 8%	D	60	VFS-174	
D2-4			0% - 8%	D	60	VFS-117	
D2-5			0% - 8%	C	58	VFS-118	
D2-6			0% - 8%	D	60	VFS-119	
E1-1			0% - 8%	D	60	VFS-120	
E1-2			0% - 8%	D	60	VFS-121	
E1-3			0% - 8%	D	60	VFS-122	
E1-4			0% - 8%	D	60	VFS-123	
E1-5			0% - 8%	D	60	VFS-124	
E1-6			0% - 8%	D	60	VFS-125	
E2-1			0% - 8%	D	60	VFS-131	
E2-2			8% - 12%	D	90	VFS-57	
E2-3			0% - 8%	D	60	VFS-132	
E2-4			0% - 8%	D	60	VFS-133	
E2-5			0% - 8%	D	60	VFS-171	
E2-6			0% - 8%	D	60	VFS-134	
E3-1			0% - 8%	D	60	VFS-126	

E3-2	0% - 8%	D	60	VFS-127
E3-3	0% - 8%	D	60	VFS-128
E3-4	0% - 8%	D	60	VFS-129
E3-5	0% - 8%	D	60	VFS-130
E4-1	0% - 8%	С	58	VFS-135
E4-2	0% - 8%	D	60	VFS-136
E4-3	0% - 8%	С	58	VFS-137
E4-4	8% - 12%	В	75	VFS-138
E4-5	0% - 8%	D	60	VFS-139
E5-1	8% - 12%	С	86	VFS-172
E5-2	0% - 8%	С	58	VFS-64
E5-3	0% - 8%	D	60	VFS-140
E5-4	8% - 12%	D	90	VFS-142
E5-5	8% - 12%	С	86	VFS-143
E6-1	8% - 12%	D	90	VFS-144
E6-2	0% - 8%	D	60	VFS-145
E6-3	0% - 8%	D	60	VFS-146
E6-4	0% - 8%	D	60	VFS-147
E6-5	0% - 8%	D	60	VFS-148
E6-6	12% - 15%	D	120	VFS-67
E7-1	0% - 8%	D	60	VFS-149
E7-2	0% - 8%	D	60	VFS-150
E7-3	0% - 8%	D	60	VFS-151
E7-4	0% - 8%	D	60	VFS-152
E7-5	0% - 8%	D	60	VFS-153
E8-1	0% - 8%	В	50	VFS-154
E8-2	8% - 12%	В	75	VFS-155
E8-3	0% - 8%	С	58	VFS-156
E8-4	0% - 8%	В	50	VFS-157
E8-5	0% - 8%	В	50	VFS-158
G1-1	0% - 8%	D	60	VFS-96
G1-2	0% - 8%	D	60	VFS-95
G1-3	0% - 8%	D	60	VFS-159
G1-4	0% - 8%	D	60	VFS-160
G2-1	0% - 8%	D	60	VFS-161
G2-2	0% - 8%	D	60	VFS-162
G2-3	0% - 8%	С	58	VFS-163
G2-4	0% - 8%	D	60	VFS-164
G2-5	0% - 8%	D	60	VFS-83
G2-6	8% - 12%	D	90	VFS-83
G3-1	0% - 8%	D	60	VFS-165
G3-2	0% - 8%	D	60	VFS-166
G3-3	0% - 8%	D	60	VFS-167
G3-4	0% - 8%	D	60	VFS-168
				_

Client:CordelioProject Name:Flat Creek SolarProject Number:435979

Culvert Summary

Culvert	MATERIAL	DIA (INCHES)	LENGTH (FEET)	SLOPE (%)	INVERT IN	INVERT OUT	COMMENTS
SD01	HDPE	15	36	3.26	718.96	717.78	NEW
SD02	HDPE	18	50	2.89	522.45	521.05	NEW
SD03	HDPE	12	52	4.91	536.78	534.22	REPLACE
SD05	HDPE	12	34	1.17	608.60	608.20	REPLACE
SD06	HDPE	36	56	0.50	579.30	579.00	REPLACE
SD07	HDPE	15	61	4.65	563.89	561.05	REPLACE
SD08	HDPE	15	63	6.55	649.31	645.15	REPLACE
SD09	HDPE	18	56	2.84	712.86	714.46	NEW
SD10	HDPE	24	45	1.58	704.64	703.93	NEW
SD11	HDPE	24	43	4.05	790.48	788.72	NEW
SD12	HDPE	12	36	0.08	735.21	735.18	NEW
SD13	HDPE	18	34	2.56	773.53	771.81	NEW
SD14	HDPE	18	49	3.40	882.04	880.88	NEW
SD15	HDPE	36	40	4.42	754.57	752.42	NEW
SD16	HDPE	18	31	4.28	894.24	892.54	NEW
SD17	HDPE	18	41	4.99	891.51	889.95	REPLACE
SD18	HDPE	18		6.65	878.73	875.98	NEW
	3 SIDED BOX						
SD19	CULVERT	24' X 8'	25	0.50	760.00	759.88	NEW
SD20	HDPE	18	49	6.80	782.50	779.14	REPLACE
SD21	HDPE	18	55	7.67	818.73	814.51	REPLACE
SD22	HDPE	12	40	4.07	838.25	836.61	NEW
SD23	HDPE	12	37	4.51	839.28	837.60	NEW
SD24	HDPE	18	58	7.80	795.76	791.25	REPLACE
SD25	HDPE	24	60	3.27	894.67	892.69	REPLACE
SD26	HDPE	24	90	2.02	908.28	906.45	REPLACE
SD27	HDPE	24	93	3.16	928.52	925.59	NEW
SD28	HDPE	15	62	4.06	842.04	839.52	REPLACE
SD29	HDPE	36	81	3.40	815.58	812.82	REPLACE
SD30	HDPE	36	43	1.15	798.64	798.15	REPLACE
SD31	HDPE	24	42	7.12	804.00	801.00	REPLACE
SD32	HDPE	24	38	0.59	796.15	795.92	NEW
SD33	HDPE	24	38	0.59	796.15	795.92	NEW
	HDPE	15	58	0.17	732.97	732.88	REPLACE

Appendix J – Culvert Sizing Calculations

Client:CordelioProject Name:Flat Creek SolarProject Number:435979

Culvert Summary

Culvert	MATERIAL	DIA (INCHES)	LENGTH (FEET)	SLOPE (%)	INVERT IN	INVERT OUT	COMMENTS
SD01	HDPE	15	36	3.26	718.96	717.78	NEW
SD02	HDPE	18	50	2.89	522.45	521.05	NEW
SD03	HDPE	12	52	4.91	536.78	534.22	REPLACE
SD05	HDPE	12	34	1.17	608.60	608.20	REPLACE
SD06	HDPE	36	56	0.50	579.30	579.00	REPLACE
SD07	HDPE	15	61	4.65	563.89	561.05	REPLACE
SD08	HDPE	15	63	6.55	649.31	645.15	REPLACE
SD09	HDPE	18	56	2.84	712.86	714.46	NEW
SD10	HDPE	24	45	1.58	704.64	703.93	NEW
SD11	HDPE	24	43	4.05	790.48	788.72	NEW
SD12	HDPE	12	36	0.08	735.21	735.18	NEW
SD13	HDPE	18	34	2.56	773.53	771.81	NEW
SD14	HDPE	18	49	3.40	882.04	880.88	NEW
SD15	HDPE	36	40	4.42	754.57	752.42	NEW
SD16	HDPE	18	31	4.28	894.24	892.54	NEW
SD17	HDPE	18	41	4.99	891.51	889.95	REPLACE
SD18	HDPE	18		6.65	878.73	875.98	NEW
	3 SIDED BOX						
SD19	CULVERT	24' X 8'	25	0.50	760.00	759.88	NEW
SD20	HDPE	18	49	6.80	782.50	779.14	REPLACE
SD21	HDPE	18	55	7.67	818.73	814.51	REPLACE
SD22	HDPE	12	40	4.07	838.25	836.61	NEW
SD23	HDPE	12	37	4.51	839.28	837.60	NEW
SD24	HDPE	18	58	7.80	795.76	791.25	REPLACE
SD25	HDPE	24	60	3.27	894.67	892.69	REPLACE
SD26	HDPE	24	90	2.02	908.28	906.45	REPLACE
SD27	HDPE	24	93	3.16	928.52	925.59	NEW
SD28	HDPE	15	62	4.06	842.04	839.52	REPLACE
SD29	HDPE	36	81	3.40	815.58	812.82	REPLACE
SD30	HDPE	36	43	1.15	798.64	798.15	REPLACE
SD31	HDPE	24	42	7.12	804.00	801.00	REPLACE
SD32	HDPE	24	38	0.59	796.15	795.92	NEW
SD33	HDPE	24	38	0.59	796.15	795.92	NEW
SD34	HDPE	15	58	0.17	732.97	732.88	REPLACE
		1					1

Appendix J – NYSDEC Solar Panel Construction Stormwater
Permitting/SWPPP Guidance

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Water, Bureau of Water Permits 625 Broadway, Albany, New York 12233-3505 P: (518) 402-8111 | F: (518) 402-9029 www.dec.ny.gov

MEMORANDUM

TO:

FROM:

Robert Wither, Chief, South Permit Section

SUBJECT: Solar Panel Construction Stormwater Permitting/SWPPP Guidance

DATE:

April 6, 2018

Issue

The Department is seeing an increase in the number of solar panel construction projects across New York State. This has resulted in an increase in the number of questions on Construction General Permit (CGP) and Stormwater Pollution Prevention Plan (SWPPP) requirements from design professionals because the current CGP (GP-0-15-002) does not include a specific reference to the SWPPP requirements for solar panel projects in Tables 1 and 2 of Appendix B. To address this issue, the Division of Water (DOW) has developed the following guidance on CGP/SWPPP requirements for the different types of solar panel projects.

Scenario 1

The DOW considers solar panel projects designed and constructed in accordance with the following criteria to be a "Land clearing and grading for the purposes of creating vegetated open space (i.e. recreational parks, lawns, meadows, fields)" type project as listed in Table 1, Appendix B of the CGP. Therefore, the SWPPP for this type of project will typically just need to address erosion and sediment controls.

- 1. Solar panels are constructed on post or rack systems and elevated off the ground surface,
- 2. The panels are spaced apart so that rain water can flow off the down gradient side of the panel and continue as sheet flow across the ground surface*,
- 3. For solar panels constructed on slopes, the individual rows of solar panels are generally installed along the contour so rain water sheet flows down slope*,
- 4. The ground surface below the panels consist of a well-established vegetative cover (see "Final Stabilization" definition in Appendix A of the CGP),
- 5. The project does not include the construction of any traditional impervious areas (i.e. buildings, substation pads, gravel access roads or parking areas, etc.),
- 6. Construction of the solar panels will not alter the hydrology from pre-to post development conditions (see Appendix A of the CGP, for definition of "Alter the hydrology..."). Note: The design professional shall perform the necessary site assessment/hydrology analysis to make this determination.



Scenario 2

If the design and construction of the solar panels meets all the criteria above, except for item 6, the project will fall under the "All other construction activities that include the construction or reconstruction of impervious area or alter the hydrology from pre-to post development conditions, and are not listed in Table 1" project type as listed in Table 2, Appendix B of the CGP. Therefore, the SWPPP for this type of project must address post-construction stormwater practices designed in accordance with the sizing criteria in Chapter 4 of the NYS Stormwater Management Design Manual, dated January 2015 (Note: Chapter 10 for projects in NYC EOH Watershed). The Water Quality Volume (WQv)/Runoff Reduction Volume (RRv) sizing criteria can be addressed by designing and constructing the solar panels in accordance with the criteria in items 1 – 4 above, however, the quantity control sizing criteria (Cpv, Qp and Qf) from Chapter 4 (or 10) of the Design Manual must still be addressed, unless one of the waiver criteria from Chapter 4 can be applied. **See notes below for additional criteria.

** Notes

- Item 1: For solar panel projects where the panels are mounted directly to the ground (i.e. no space below panel to allow for infiltration of runoff), the SWPPP must address post-construction stormwater management controls designed in accordance with the sizing criteria in Chapter 4 of the NYS Stormwater Management Design Manual, dated January 2015 (Note: Chapter 10 for projects in NYC EOH Watershed).
- Item 5: For solar panel projects that include the construction of traditional impervious areas (i.e. buildings, substation pads, gravel access roads or parking areas, etc.), the SWPPP must address post-construction stormwater management controls for those areas of the project. This applies to both Scenario 1 and 2 above.

cc: Carol Lamb-Lafay, BWP Dave Gasper, BWP

^{*}Refer to Maryland's "Stormwater Design Guidance- Solar Panel Installations" attached for guidance on panel installation.

^{**}See notes below for additional criteria.

Appendix J – Maryland Department of the Environment (MDEP)

Stormwater Design Guidance – Solar Panel Installation



Maryland Department of the Environment

Stormwater Design Guidance – Solar Panel Installations

Revisions to Maryland's stormwater management regulations in 2010 require that environmental site design (ESD) be used to the maximum extent practicable (MEP) to mimic natural hydrology, reduce runoff to reflect forested wooded conditions, and minimize the impact of land development on water resources. This applies to any residential, commercial, industrial, or institutional development where more than 5,000 square feet of land area is disturbed. Consequently, stormwater management must be addressed even when permeable features like solar panel installations exceed 5,000 square feet of land disturbance.

Depending on local soil conditions and proposed imperviousness, the amount of rainfall that stormwater requirements are based on varies from 1.0 to 2.6 inches. However, addressing stormwater management does not mean that structural or micro-scale practices must be constructed to capture and treat large volumes of runoff. Using nonstructural techniques like disconnecting impervious cover reduces runoff by promoting overland filtering and infiltration. Commonly used with smaller or narrower impervious areas like driveways or open roads, the Disconnection of Non-Rooftop Runoff technique (see pp. 5.61 to 5.65 of the **2000 Maryland Stormwater Design Manual**¹) is a low cost alternative for treating runoff in situations like rows of solar panels.

When non-rooftop disconnection is used to treat runoff, the following factors should be considered:

- The vegetated area receiving runoff must be equal to or greater in length than the disconnected surface (e.g., width of the row of solar panels)
- Runoff must sheet flow onto and across vegetated areas to maintain the disconnection
- Disconnections should be located on gradual slopes (≤ 5%) to maintain sheetflow. Level spreaders, terraces, or berms may be used to maintain sheetflow conditions if the average slope is steeper than 5%. However, installations on slopes greater than 10% will require an engineered plan that ensures adequate treatment and the safe and non-erosive conveyance of runoff to the property line or downstream stormwater management practice.
- Disconnecting impervious surfaces works best in undisturbed soils. To minimize disturbance and compaction, construction vehicles and equipment should avoid areas used for disconnection during installation of the solar panels.
- Groundcover vegetation must be maintained in good condition in those areas receiving disconnected runoff. Typically this maintenance is no different than other lawn or landscaped areas. However, areas receiving runoff should be protected (e.g., planting shrubs or trees along the perimeter) from future compaction.

Depending on the layout and number of panels installed, the disconnection of non-rooftop runoff technique may address some or all of the stormwater management requirements for an individual project. Where the imperviousness is high or there is other infrastructure (e.g., access roads, transformers), additional runoff may need to be treated. In these situations, other ESD techniques or micro-scale practices may be needed to provide stormwater management for these features.

Example 1 – Using Non-Rooftop Disconnection Where the Average Slope ≤ 5%

Several rows of solar panels will be installed in an existing meadow. The soils within the meadow are hydrologic soil group (HSG) B and the average slope does not exceed 5%. Each row of panels is 10 feet wide and the distance between rows is 20 feet. The rows of solar panels will be installed according to Figure 1 below. In this scenario, the disconnection length is the same as the distance between rows (20 feet) and is greater than the width of each row (10 feet). Therefore, each row of panels is adequately disconnected and the runoff from 1.0 inch of rainfall is treated.

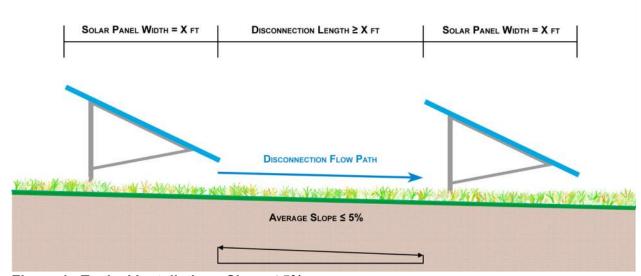


Figure 1. Typical Installation - Slope ≤ 5%

Example 2 – Using Non-Rooftop Disconnection Where the Average Slope ≥ 5% but ≤ 10%

Several rows of solar panels will be installed in an existing meadow. The soils within the meadow are hydrologic soil group (HSG) B and the average slope is greater than 5% but less than 10%. Each row of panels is 10 feet wide and the distance between rows is 20 feet. The rows of solar panels will be installed as shown in Figure 2 below. The disconnection length is the same as the distance between rows (20 feet) and is greater than the width of each row (10 feet). However, in this example, a level spreader (typically 1 to 2-foot wide and 1 foot deep) has been located at the drip edge of each row of panels to dissipate energy and maintain sheetflow.

Discussion

To meet State and local stormwater management requirements, ESD must be used to the MEP to reduce runoff to reflect forested conditions. While all reasonable options for implementing ESD must be investigated, minimally, the runoff from 1 inch of rainfall must be treated. In each of the examples above, there may be additional opportunities to implement ESD techniques or practices and reduce runoff that should be explored. However, simply disconnecting the runoff from the solar panel arrays captures and treats the runoff from 1.0 inch of rainfall. Where imperviousness is low and soil conditions less optimal (e.g., HSG C or D), this may be sufficient to completely address stormwater management requirements. In more dense applications or in sandy soils, additional stormwater management may be required.

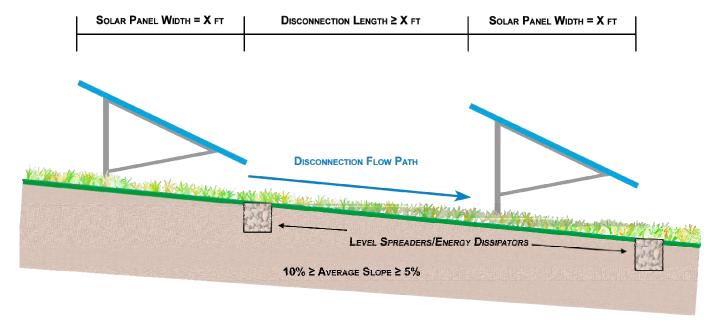


Figure 2. Typical Installation – Slope ≥ 5% but ≤ 10%

Conclusion

The primary purpose of Maryland's stormwater management program is to mimic natural hydrologic runoff characteristics and minimize the impact of land development on water resources. Any land development project that exceeds 5,000 square feet of disturbance, including solar panel projects, must address stormwater management. However, for solar panels, stormwater management may be provided in a cost-effective manner by disconnecting each row of panels and directing runoff over the vegetated areas between the individual rows.

Resources

¹ 2000 Maryland Stormwater Design Manual, Volumes I and II, MDE, October 2000 (http://www.mde.state.md.us/programs/Water/StormwaterManagementProgram/MarylandStormwaterDesignManual/Pages/Programs/WaterPrograms/SedimentandStormwater/stormwater_design/index.aspx)



From: Gasper, David J (DEC)

Sent: Wednesday, May 22, 2019 9:33 AM

To: Adewole, Adedayo J (DEC) <adedayo.adewole@dec.ny.gov>; Banerjee, Dilip K (DEC) <dilip.banerjee@dec.ny.gov>; Barrie, Mary O (DEC) <mary.barrie@dec.ny.gov>; Blum, Tara M (DEC) <tara.blum@dec.ny.gov>; Boyer, Brian C (DEC) <bri>brian.boyer@dec.ny.gov>; Hourigan, Brian (DEC) <bri>brian.hourigan@dec.ny.gov>; Browne, Natalie S (DEC) <natalie.browne@dec.ny.gov>; Buetow, Carrie C (DEC) <carrie.buetow@dec.ny.gov>; Capowski, Robert M (DEC) <robert.capowski@dec.ny.gov>; Carroll, Alyssa D (DEC) <Alyssa.Carroll@dec.ny.gov>; Chiappetta, Christina M (DEC) <Christina.Chiappetta@dec.ny.gov>; Cioffi, Toni (DEC) <toni.cioffi@dec.ny.gov>; Coriale, Richard R (DEC) <ri><richard.coriale@dec.ny.gov>; Cruden, Erica B (DEC) <erica.cruden@dec.ny.gov>; Czajkowski, Katherine M (DEC) <katherine.czajkowski@dec.ny.gov>; DeAngelis, Armand T</ri> (DEC) <armand.deangelis@dec.ny.gov>; DiGiulio, Tim (DEC) <tim.digiulio@dec.ny.gov>; Dunlap, Fred (DEC) <fred.dunlap@dec.ny.gov>; Fichter, Adria A (DEC) <adria.fichter@dec.ny.gov>; Fung, Hua J (DEC) <hua.fung@dec.ny.gov>; Gasper, David J (DEC) <david.gasper@dec.ny.gov>; Haas, Cathy (DEC) <cathy.haas@dec.ny.gov>; Hock, John P (DEC) < John. Hock@dec.ny.gov>; Shear, Holly (DEC) < holly.shear@dec.ny.gov>; Hourigan, Brian (DEC) < brian.hourigan@dec.ny.gov>; Howard, Sean M (DEC) <Sean.Howard@dec.ny.gov>; Jangbari, Pradeep (DEC) pradeep.jangbari@dec.ny.gov>; Johnson, Abigail B (DEC) <Abigail.Johnson@dec.ny.gov>; Kazmierski, Matthew J (DEC) <matthew.kazmierski@dec.ny.gov>; Kim, Eric J (DEC) <Eric.Kim@dec.ny.gov>; Konsella, Jeffrey A (DEC) <jeffrey.konsella@dec.ny.gov>; Lamb-Lafay, Carol (DEC) <carol.lamb-lafay@dec.ny.gov>; Leung, Anthony (DEC) <anthony.leung@dec.ny.gov>; Lints, William J (DEC) <william.lints@dec.ny.gov>; Luce, Andrew (DEC) <andrew.luce@dec.ny.gov>; Malcolm, James E (DEC) <james.malcolm@dec.ny.gov>; Manning, Karis I (DEC) <karis.manning@dec.ny.gov>; McCague, Steven J (DEC) <steven.mccague@dec.ny.gov>; McCullough, Jeffrey B (DEC) <jeffrey.mccullough@dec.ny.gov>; Mcgrath, Kathleen E (DEC) <kathleen.mcgrath@dec.ny.gov>; Melancon, Julie E (DEC) <julie.melancon@dec.ny.gov>; Millar, Lance C (DEC) <lance.millar@dec.ny.gov>; Mitchell, Derek X (DEC) <derek.mitchell@dec.ny.gov>; Mitchell, Rebecca X (DEC) <Rebecca.Mitchell@dec.ny.gov>; Murakami, Tatsuhiko V (DEC) <tatsuhiko.murakami@dec.ny.gov>; Murray, William P (DEC) <william.murray@dec.ny.gov>; Browne, Natalie S (DEC) <natalie.browne@dec.ny.gov>; Porciello, Ryan J (DEC) <Ryan.Porciello@dec.ny.gov>; Pratt, David (DEC) <david.pratt@dec.ny.gov>; Reuther, Julie A (DEC) <Julie.Reuther@dec.ny.gov>; Elburn, Robert H (DEC) <robert.elburn@dec.ny.gov>; Scannell, Luke W (DEC) <luke.scannell@dec.ny.gov>; Zacharias, Sebastian (DEC) <sebastian.zacharias@dec.nv.gov>; Sen, Shyamal Kumar (DEC) <shyamal.sen@dec.nv.gov>; Shear, Holly (DEC) <holly.shear@dec.nv.gov>; Sievers, Chad M (DEC) <chad.sievers@dec.ny.gov>; Smith, Kathryn G (DEC) <kathryn.smith@dec.ny.gov>; Smythe, William (DEC) <william.smythe@dec.ny.gov>; Spadaro, Vincent J (DEC) <vincent.spadaro@dec.ny.gov>; Starr, Bonnie L (DEC) <Bonnie.Starr@dec.ny.gov>; Streeter, Meredith (DEC) <meredith.streeter@dec.ny.gov>; Streeter, Robert (DEC) <<u>robert.streeter@dec.ny.gov</u>>; Sullivan, Ethan R (DEC) <<u>Ethan.Sullivan@dec.ny.gov</u>>; Tamargo, Jonathan R (DEC) <<u>Jonathan.Tamargo@dec.ny.gov</u>>; Thompson, Sevon O (DEC) <sevon.thompson@dec.ny.gov>; Thorsland, Derek T (DEC) <derek.thorsland@dec.ny.gov>; Venne, Tamara (DEC) <tamara.venne@dec.ny.gov>; Vigneault, Thomas M (DEC) <thomas.vigneault@dec.nv.gov>; Waite, Thomas M (DEC) <thomas.waite@dec.nv.gov>; Waldron, Ryan P (DEC) <ryan.waldron@dec.nv.gov>; Smythe, William (DEC) <william.smythe@dec.nv.gov>; Wither, Robert (DEC) <robert.wither@dec.nv.gov>; Zacharias, Sebastian (DEC) <sebastian.zacharias@dec.nv.gov> Subject: Acceptance of TRC's Limited Use Pervious Access Road Detail

FYI - The Department has accepted TRC's "Limited Use, Pervious Access Road Detail" with an "Issued As Final" date of 05/20/19 (see attached). This detail replaces the 10/30/18 version the Department accepted on November 13, 2018.

TRC has given us permission to release the final detail to solar array project owners, design professionals and MS4 officials. Please let me know if you have any questions.

David Gasper, PE

Professional Engineer 1, Division of Water

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www.dec.ny.gov | **1** |

GENERAL NOTES:

- 1. USE OF THIS DETAIL/CRITERION IS LIMITED TO ACCESS ROADS USED ON AN OCCASIONAL BASIS ONLY (I.E. PROVIDE ACCESS FOR MOWING, EQUIPMENT REPAIR OR MAINTENANCE, ETC.).
- 2. LIMITED USE PERVIOUS ACCESS ROAD IS LIMITED TO LOW IMPACT IRREGULAR MAINTENANCE ACCESS ASSOCIATED WITH RENEWABLE ENERGY PROJECTS IN NEW YORK STATE.
- 3. REMOVE STUMPS, ROCKS AND DEBRIS AS NECESSARY. FILL VOIDS TO MATCH EXISTING NATIVE SOILS AND COMPACTION LEVEL.
- 4. REMOVED TOPSOIL MAY BE SPREAD IN ADJACENT AREAS AS DIRECTED BY THE PROJECT ENGINEER. COMPACT TO THE DEGREE OF THE NATIVE INSITU SOIL. DO NOT PLACE IN AN AREA THAT IMPEDES STORMWATER DRAINAGE.
- 5. GRADE ROADWAY, WHERE NECESSARY, TO NATIVE SOIL AND DESIRED ELEVATION. MINOR GRADING FOR CROSS SLOPE CUT AND FILL MAY BE REQUIRED.
- 6. REMOVE REFUSE SOILS AS DIRECTED BY THE PROJECT ENGINEER. DO NOT PLACE IN AN AREA THAT IMPEDES STORMWATER DRAINAGE.
- 7. ROADWAY WIDTH TO BE DETERMINED BY CLIENT.
- 8. THE LIMITED USE PERVIOUS ACCESS ROAD CROSS SLOPE SHALL BE 2% IN MOST CASES AND SHOULD NOT EXCEED 6%. THE LONGITUDINAL SLOPE OF THE ACCESS DRIVE SHOULD NOT EXCEED 15%.
- 9. LIMITED USE PERVIOUS ACCESS ROAD IS NOT INTENDED TO BE UTILIZED FOR CONSTRUCTION WHICH MAY SUBJECT THE ACCESS TO SEDIMENT TRACKING. THIS SPECIFICATION IS TO BE DEVELOPED FOR POST—CONSTRUCTION USE. SOIL RESTORATION PRACTICES MAY BE APPLICABLE TO RESTORE CONSTRUCTION RELATED COMPACTION TO PRE—EXISTING CONDITIONS AND SHOULD BE VERIFIED BY SOIL PENETROMETER READINGS. THE PENETROMETER READINGS SHALL BE COMPARED TO THE RESPECTIVE RECORDED READINGS TAKEN PRIOR TO CONSTRUCTION, EVERY 100 LINEAR FEET ALONG THE PROPOSED ROADWAY.
- 10. TO ENSURE THAT SOIL IS NOT TRACKED ONTO THE LIMITED USE PERVIOUS ACCESS ROAD, IT SHALL NOT BE USED BY CONSTRUCTION VEHICLES TRANSPORTING SOIL, FILL MATERIAL, ETC. IF THE LIMITED USE PERVIOUS ACCESS IS COMPLETED DURING THE INITIAL PHASES OF CONSTRUCTION, A STANDARD NEW YORK STATE STABILIZED CONSTRUCTION ACCESS SHALL BE CONSTRUCTED AND UTILIZED TO REMOVE SEDIMENT FROM CONSTRUCTION VEHICLES AND EQUIPMENT PRIOR TO ENTERING THE LIMITED USE PERVIOUS ACCESS ROAD FROM ANY LOCATION ON, OR OFF SITE. MAINTENANCE OF THE PERVIOUS ACCESS ROAD WILL BE REQUIRED IF SEDIMENT IS OBSERVED WITHIN THE CLEAN STONE.
- 11. THE LIMITED USE PERVIOUS ACCESS ROAD SHALL NOT BE CONSTRUCTED OR USED UNTIL ALL AREAS SUBJECT TO RUNOFF ONTO THE PERVIOUS ACCESS HAVE ACHIEVED FINAL STABILIZATION.
- 12. PROJECTS SHOULD AVOID INSTALLATION OF THE LIMITED USE PERVIOUS ACCESS ROAD IN POORLY DRAINED AREAS, HOWEVER IF NO ALTERNATIVE LOCATION IS AVAILABLE, THE PROJECT SHALL UTILIZE WOVEN GEOTEXTILE MATERIAL AS DETAILED IN FOLLOWING NOTES.
- 13. THE DRAINAGE DITCH IS OFFERED IN THE DETAIL FOR CIRCUMSTANCES WHEN CONCENTRATED FLOW COULD NOT BE AVOIDED. THE INTENTION OF THIS DESIGN IS TO MINIMIZE ALTERATIONS TO HYDROLOGY, HOWEVER WHEN DEALING WITH 5%—15% GRADES NOT PARALLEL TO THE CONTOUR, A ROADSIDE DITCH MAY BE REQUIRED. THE NYS STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROLS FOR GRASSED WATERWAYS AND VEGETATED WATERWAYS ARE APPLICABLE FOR SIZING AND STABILIZATION. DIMENSIONS FOR THE GRASSED WATERWAY SPECIFICATION WOULD BE DESIGNED FOR PROJECT SPECIFIC HYDROLOGIC RUNOFF CALCULATIONS, AND A SEPARATE DETAIL FOR THE SPECIFIC GRASSED WATERWAY WOULD BE INCLUDED IN THIS PRACTICE. RUNOFF DISCHARGES WILL BE SUBJECT TO THE OUTLET REQUIREMENTS OF THE REFERENCED STANDARD. INCREASED POST—DEVELOPMENT RUNOFF FROM THE ASSOCIATED ROADSIDE DITCH MAY REQUIRE ADDITIONAL PRACTICES TO ATTENUATE RUNOFF TO PRE—DEVELOPMENT CONDITIONS.
- 14. IF A ROADSIDE DITCH IS NOT UTILIZED TO CAPTURE RUNOFF FROM THE ACCESS ROAD, THE PERVIOUS ACCESS ROAD WILL HAVE A WELL-ESTABLISHED PERENNIAL VEGETATIVE COVER, WHICH SHALL CONSIST OF UNIFORM VEGETATION (I.E. BUFFER), 20 FEET WIDE AND PARALLEL TO THE DOWN GRADIENT SIDE OF THE ACCESS ROAD. POST-CONSTRUCTION OPERATION AND MAINTENANCE PRACTICES WILL MAINTAIN THIS VEGETATIVE COVER TO ENSURE FINAL STABILIZATION FOR THE LIFE OF THE ACCESS ROAD.
- 15. THE DESIGN PROFESSIONAL MUST ACCOUNT FOR THE LIMITED USE PERVIOUS ACCESS ROAD IN THEIR SITE ASSESSMENT/HYDROLOGY ANALYSIS. IF THE HYDROLOGY ANALYSIS SHOWS THAT THE HYDROLOGY HAS BEEN ALTERED FROM PRE— TO POST—DEVELOPMENT CONDITIONS (SEE APPENDIX A OF GP—0—15—002 FOR THE DEFINITION OF "ALTER THE HYDROLOGY..."), THE DESIGN MUST INCLUDE THE NECESSARY DETENTION/RETENTION PRACTICES TO ATTENUATE THE RATES (10 AND 100 YEAR EVENTS) TO PRE—DEVELOPMENT CONDITIONS.

GEOGRID MATERIAL NOTES:

- 1. THE GEOGRID, OR COMPARABLE PRODUCT, IS INTENDED FOR USE FOR ALL CONDITIONS, IN ORDER TO ASSIST IN MATERIAL SEPARATION FROM NATIVE SOILS AND PRESERVE ACCESS LOADS.
- 2. GRAVEL FILL MATERIAL SHALL CONSIST OF 1-4" CLEAN, DURABLE, SHARP-ANGLED CRUSHED STONE OF UNIFORM QUALITY, MEETING THE SPECIFICATIONS OF NYSDOT ITEM 703-02, SIZE DESIGNATION 3-5 OF TABLE 703-4. STONE MAY BE PLACED IN FRONT OF, AND SPREAD WITH, A TRACKED VEHICLE. GRAVEL SHALL NOT BE COMPACTED.
- 3. GEOGRID SHALL BE MIRAFI BXG110 OR APPROVED EQUAL. GEOGRID SHALL BE DESIGNED BASED ON EXISTING SOIL CONDITIONS AND PROPOSED HAUL ROAD SLOPES.
- 4. IF MORE THAN ONE ROLL WIDTH IS REQUIRED, ROLLS SHOULD OVERLAP A MINIMUM OF SIX
- 5. REFER TO MANUFACTURER'S SPECIFICATION FOR PROPER TYING AND CONNECTIONS.
- 6. LIMITED USE PERVIOUS ACCESS ROAD SHALL BE TOP DRESSED AS REQUIRED WITH ONLY 1-4" CRUSHED STONE MEETING NYSDOT ITEM 703-02 SPECIFICATIONS.

BASIS OF DESIGN: TENCATE MIRAFI BXG110 GEOGRIDS; 365 SOUTH HOLLAND DRIVE, PENDERGRASS, GA;800-685-9990 OR 706-693-2226; WWW.MIRAFI.COM

GEOWEB MATERIAL NOTES:

- 1. THE GEOWEB, OR COMPARABLE PRODUCT, IS SUGGESTED FOR USE ON ROAD PROFILES EXCEEDING 10%. THE GEOWEB PRODUCT IS INTENDED TO LIMIT SHIFTING STONE MATERIAL
- 2. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
- 3. WHERE REQUIRED, A NATIVE SOIL WEDGE SHALL BE PLACED TO ACCOMMODATE ROAD CROSS SLOPE OF 2%. NATIVE SOIL SHALL BE COMPACTED TO MATCH EXISTING SOIL CONDITIONS.
- 4. GRAVEL FILL MATERIAL SHALL CONSIST OF 1-4" CLEAN, DURABLE, SHARP-ANGLED CRUSHED STONE OF UNIFORM QUALITY, MEETING THE SPECIFICATIONS OF NYSDOT ITEM 703-02, SIZE DESIGNATION 3-5 OF TABLE 703-4. STONE MAY BE PLACED IN FRONT OF, AND SPREAD WITH, A TRACKED VEHICLE. GRAVEL SHALL NOT BE COMPACTED.
- 5. GEOWEB SYSTEM SHALL BE PRESTO GEOSYSTEM GEOWEB OR APPROVED EQUAL. GEOWEB SHALL BE DESIGNED BASED ON EXISTING SOIL CONDITIONS AND PROPOSED HAUL ROAD SLOPES.
- 6. LIMITED USE PERVIOUS ACCESS ROAD SHALL BE TOP DRESSED AS REQUIRED WITH ONLY 1-4" CRUSHED STONE, SIZE 3A, MEETING NYSDOT ITEM 703-02 SPECIFICATIONS.
- 7. THE TOP EDGES OF ADJACENT CELL WALLS SHALL BE FLUSH WHEN CONNECTING. ALIGN THE I—SLOTS FOR INTERLEAF AND END TO END CONNECTIONS. THE GEOWEB PANELS SHALL BE CONNECTED WITH ATRA KEYS AT EACH INTERLEAD AND END TO END CONNECTIONS. REFER TO MANUFACTURER'S SPECIFICATION FOR PROPER INSTALLATION, TYING AND CONNECTIONS.

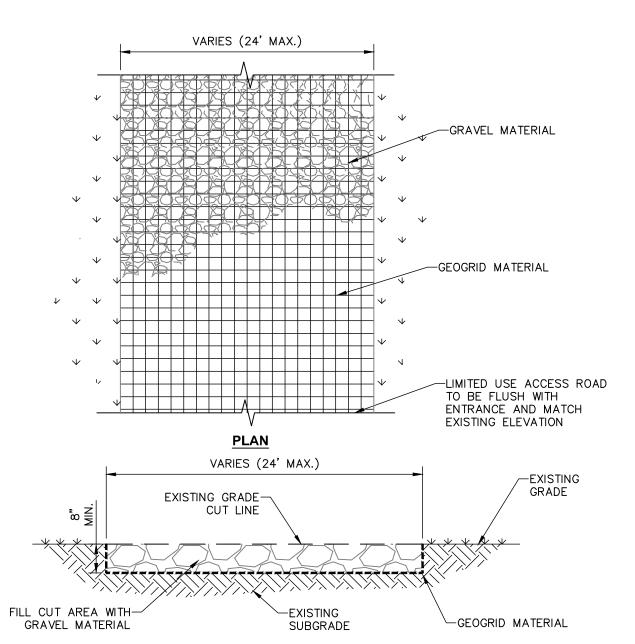
BASIS OF DESIGN:
PRESTO GEOSYSTEMS GEOWEB; 670 NORTH PERKINS STREET, APPLETON, WI;
800-548-3424 OR 920-738-1222; INFO@PRESTOGEO.COM;
WWW.PRESTOGEO.COM

WOVEN GEOTEXTILE MATERIAL NOTES:

SCIENTIST, OR GEOTECHNICAL DATA.

- 1. SPECIFIED GEOTEXTILE WILL ONLY BE UTILIZED IN PLACID SOILS. PLACID SOILS CONSIST OF POORLY DRAINED SOILS COMPOSED OF FINELY TEXTURED PARTICLES AND ARE PRONE TO RUTTING. PLACID SOILS ARE TYPICALLY PRESENT IN LOW-LYING AREAS WITH HYDROLOGIC SOILS GROUP (HSG) OF C OR D, OR AS SPCIFIED FROM AN ENVIRONMENTAL SCIENTIST, SOIL
- 2. THE CONCERN FOR POTENTIAL REDUCTION OF NATIVE INFILTRATION RATES DUE TO THE GEOTEXTILE MATERIAL WOULD NOT BE A SIGNIFICANT CONCERN IN POORLY DRAINED SOILS WHERE SEGREGATION OF PERVIOUS STONE AND NATIVE MATERIALS IS CRUCIAL FOR LONG TERM OPERATION AND MAINTENANCE.

BASIS OF DESIGN: TENCATE MIRAFI RSI-SERIES WOVEN GEOSYNTHETICS; 365 SOUTH HOLLAND DRIVE, PENDERGRASS, GA;800-685-9990 OR 706-693-2226; WWW.MIRAFI.COM

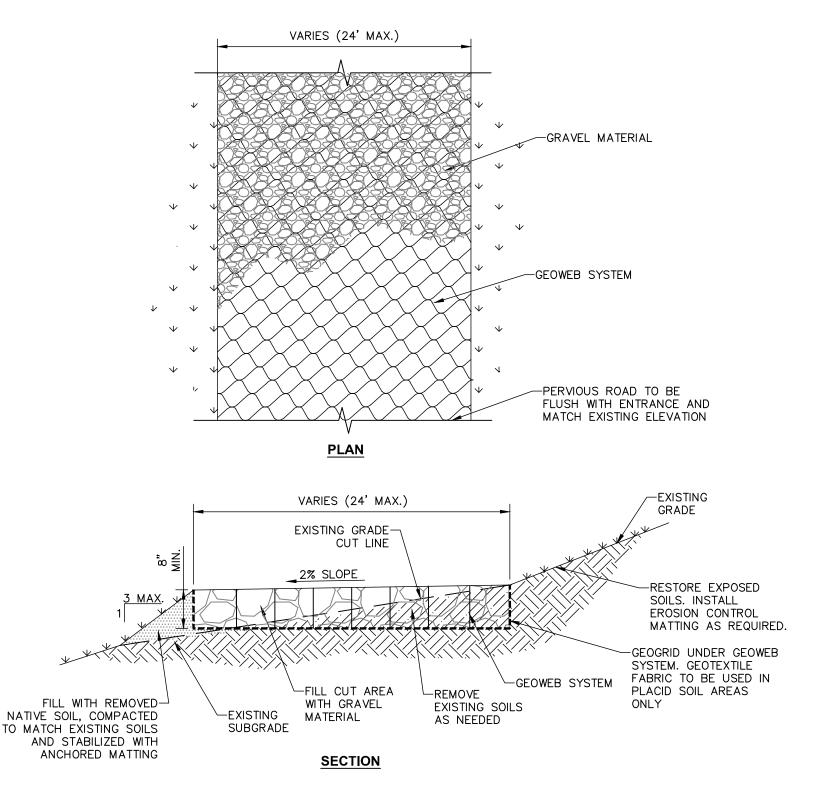


EXISTING GRADE-EXISTING-CUT LINE VARIES (24' MAX.) GRADE FILL CUT AREA WITH-GRAVEL MATERIAL 2% SLOPE -RESTORE EXPOSED SOILS. INSTALL **EROSION CONTROL** MATTING AS REQUIRED. REMOVE EXISTING-SOILS AS NEEDED FILL WITH REMOVED--INSTALL CHECK DAMS OR NATIVE SOIL, COMPACTED -GEOGRID UNDER ANCHORED STABILIZATION TO MATCH EXISTING SOILS SUBGRADE GEOWEB-GEOWEB SYSTEM. MATERIAL IN DRAINAGE AND STABILIZED WITH SYSTEM GEOTEXTILE FABRIC TO CHANNEL ANCHORED MATTING BE USED IN PLACID SOIL AREAS ONLY

1. THE ROADSIDE DITCH SHALL BE DESIGNED IN ACCORDANCE WITH THE NEW YORK STATE STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROLS FOR GRASSED AND VEGETATED WATERWAYS. ADDITIONAL DETAILS WILL BE PROVIDED SPECIFIC TO THE SITE DESIGN.

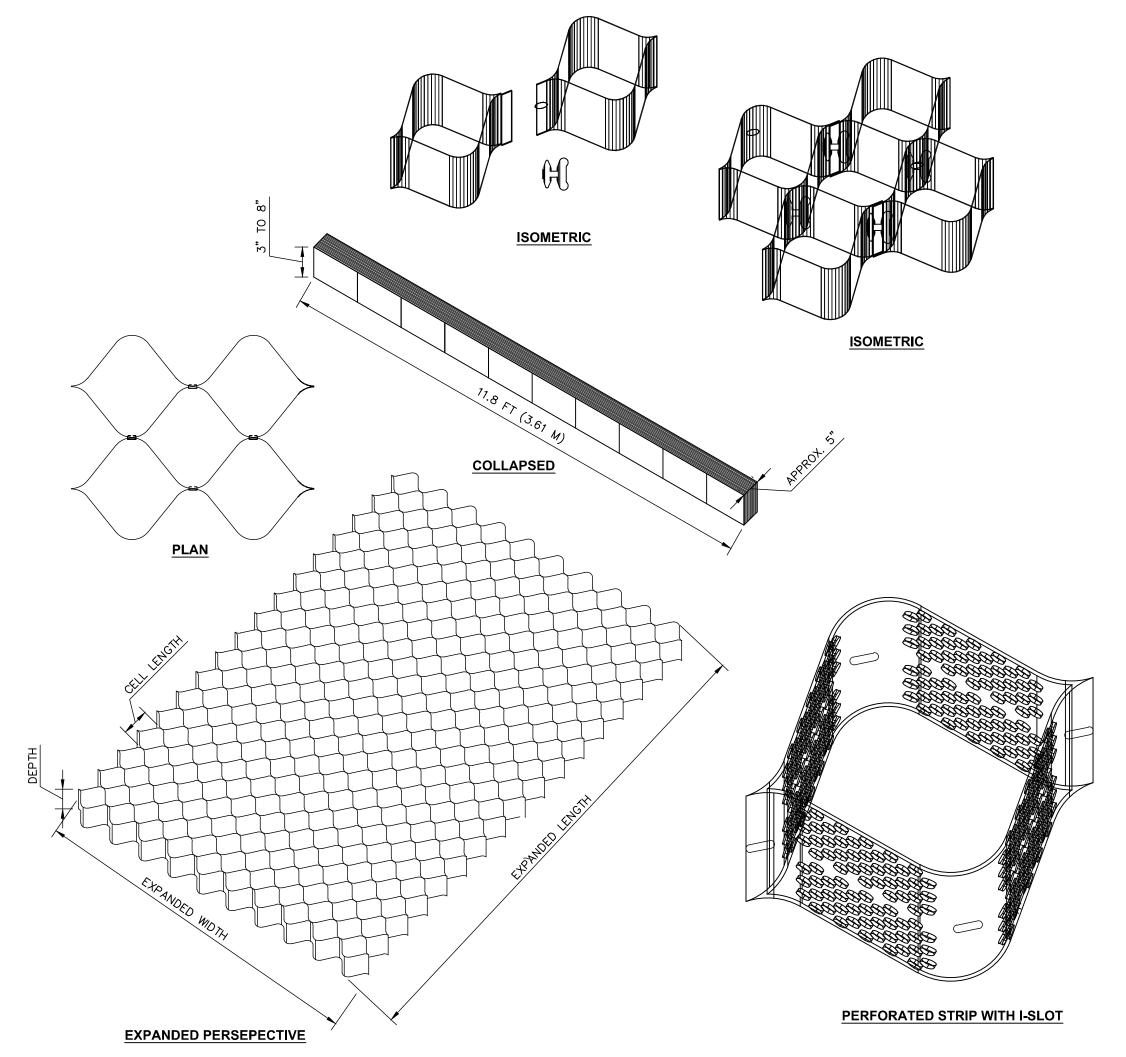
LIMITED USE PERVIOUS ACCESS ROAD - 10% AND GREATER SLOPES WITH DITCH
SCALE: N.T.S.





LIMITED USE PERVIOUS ACCESS ROAD - 10% AND GREATER SLOPES

SCALE: N.T.S.



GEOWEB SYSTEM
SCALE: N.T.S.

		i
1	ISSUED AS FINAL	05/20/2019
NO.	REVISION	DATE

TRC Engineers, Inc. 215 Greenfield Parkway Liverpool, NY 13088

www.trccompanies.com

DRAWING TITLE:

LIMITED USE PERVIOUS ACCESS ROAD DETAIL

SCALE: N.T.S.

DATE: 05/17/2019

DRAWN BY: CAK

CHECKED BY: SML

PROJECT:

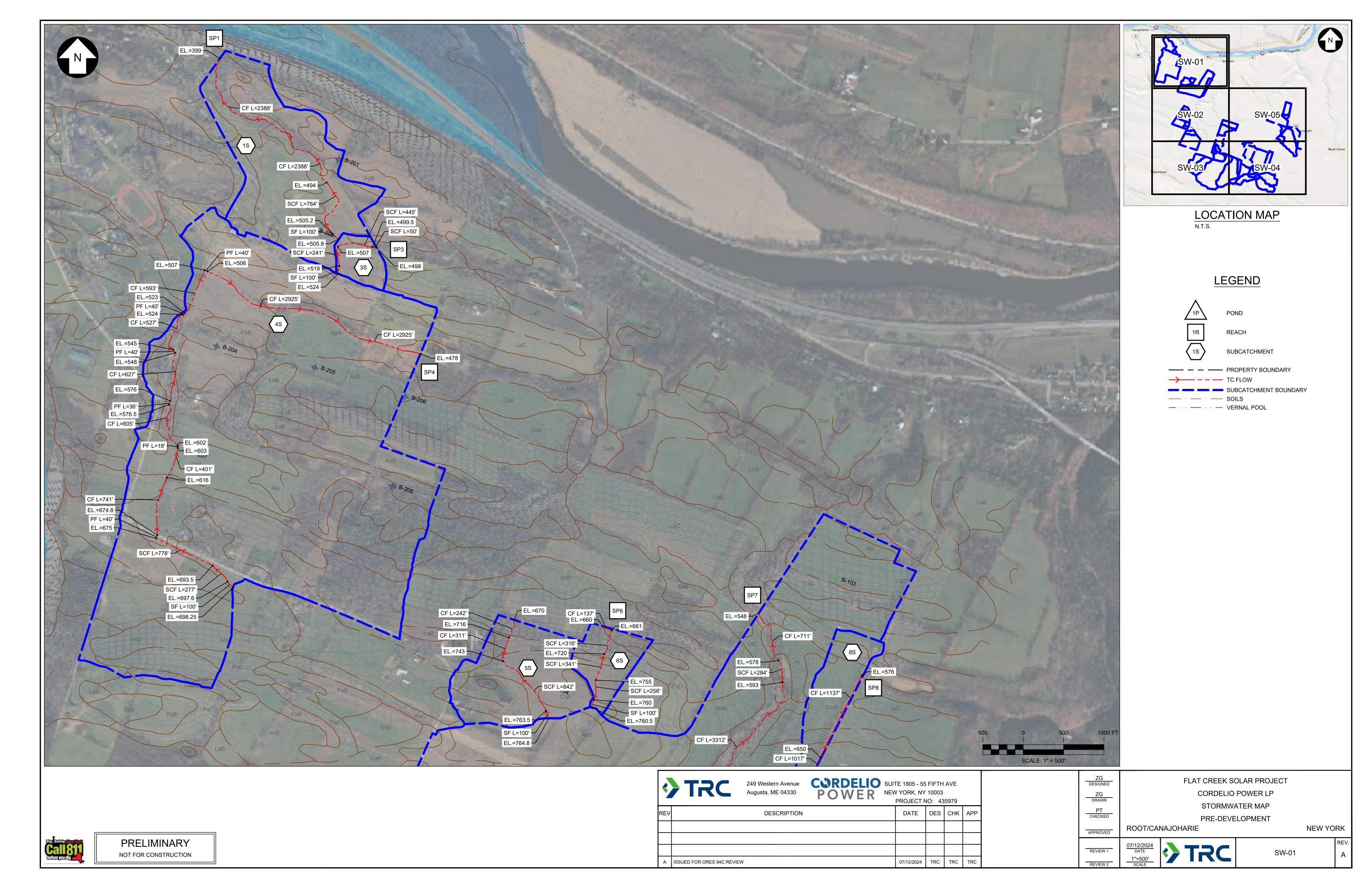
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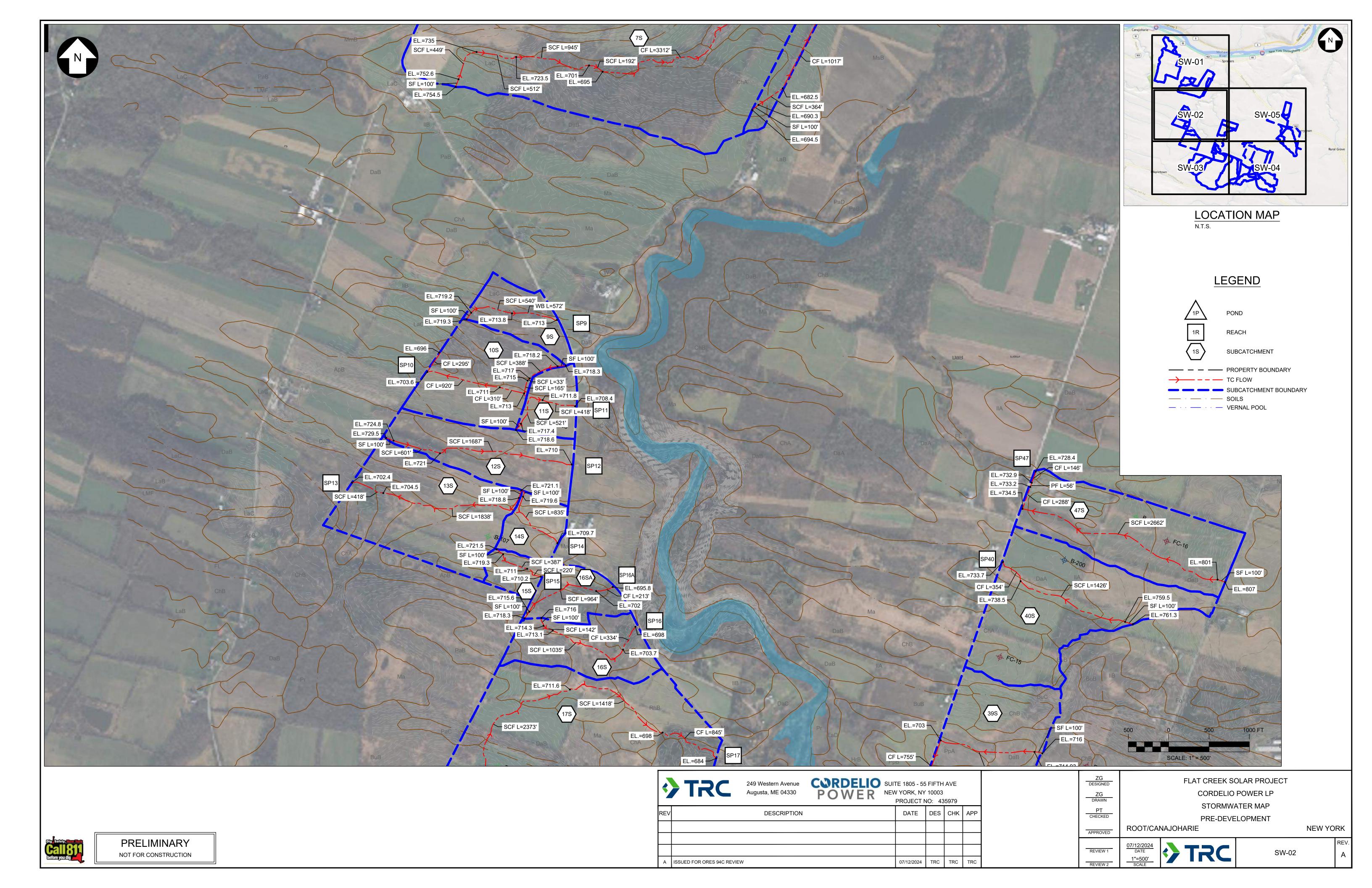
Appendix K – Pre-Development Modeling

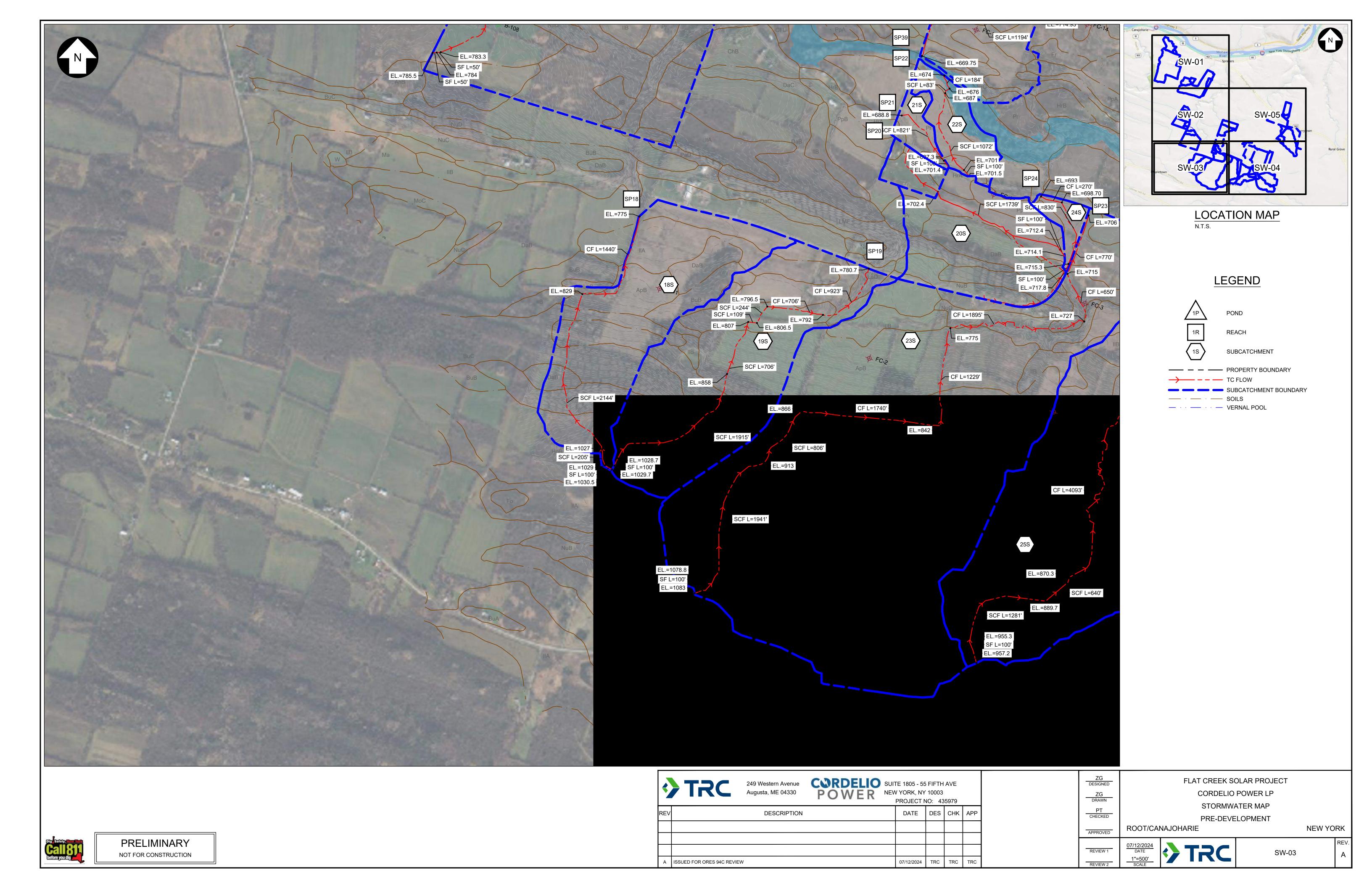
- Pre-Development Subcatchment Map -
- Pre-Development HydroCAD Model -

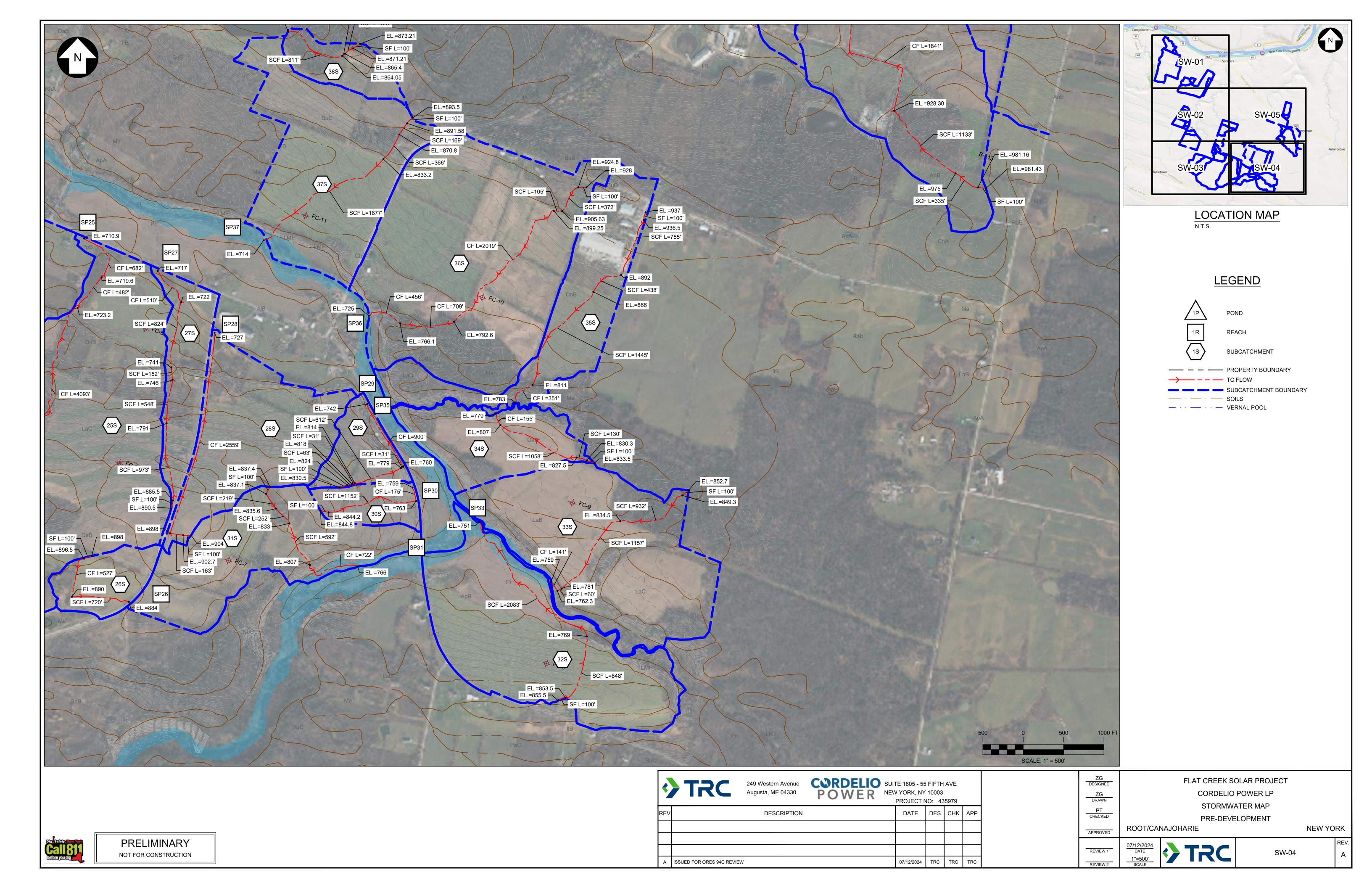
Note: Documents provided in this Appendix are preliminary and will be amended and finalized for the Final SWPPP prior to construction.

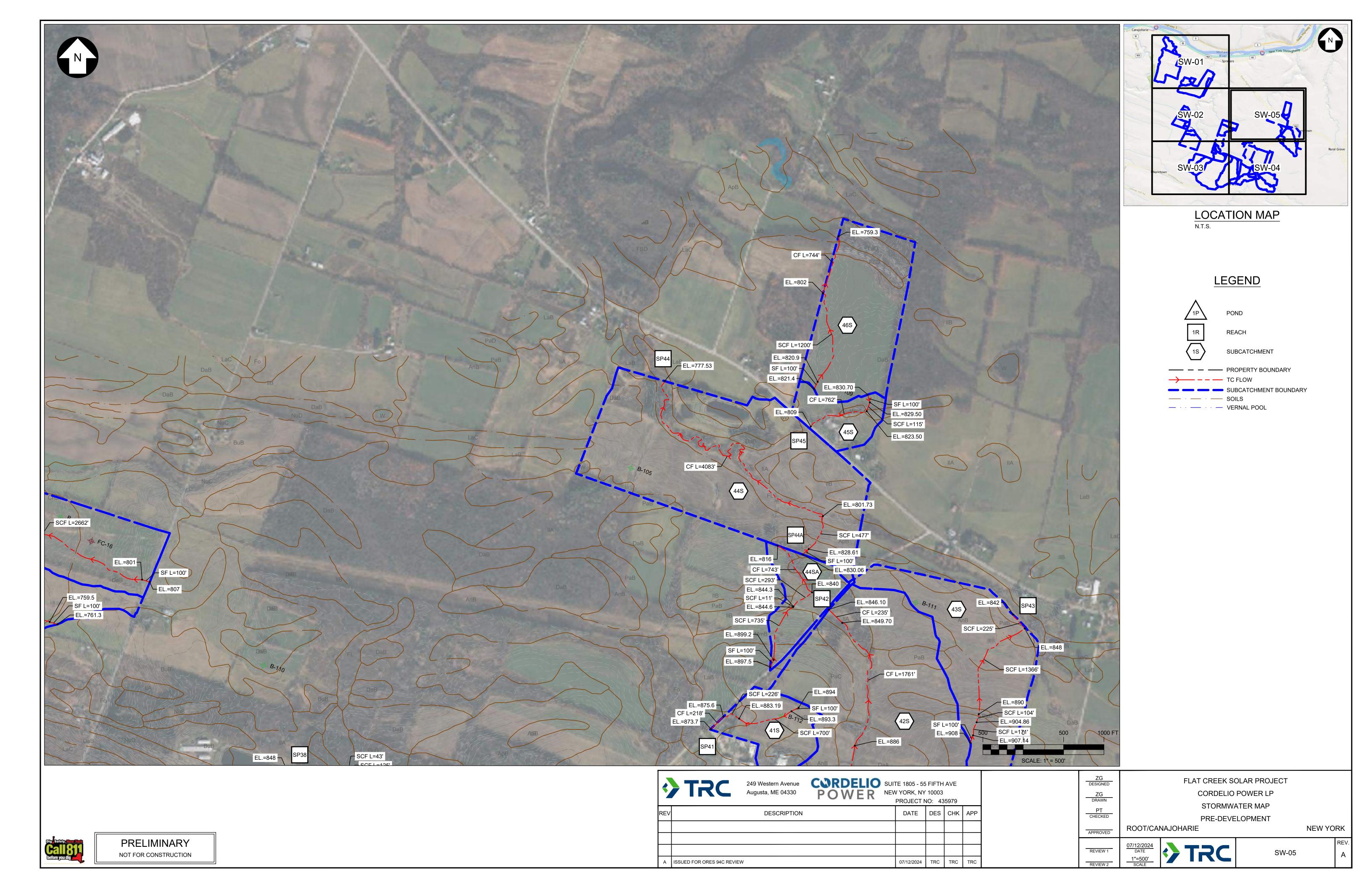
Appendix K – Pre-Development Subcatchment Map



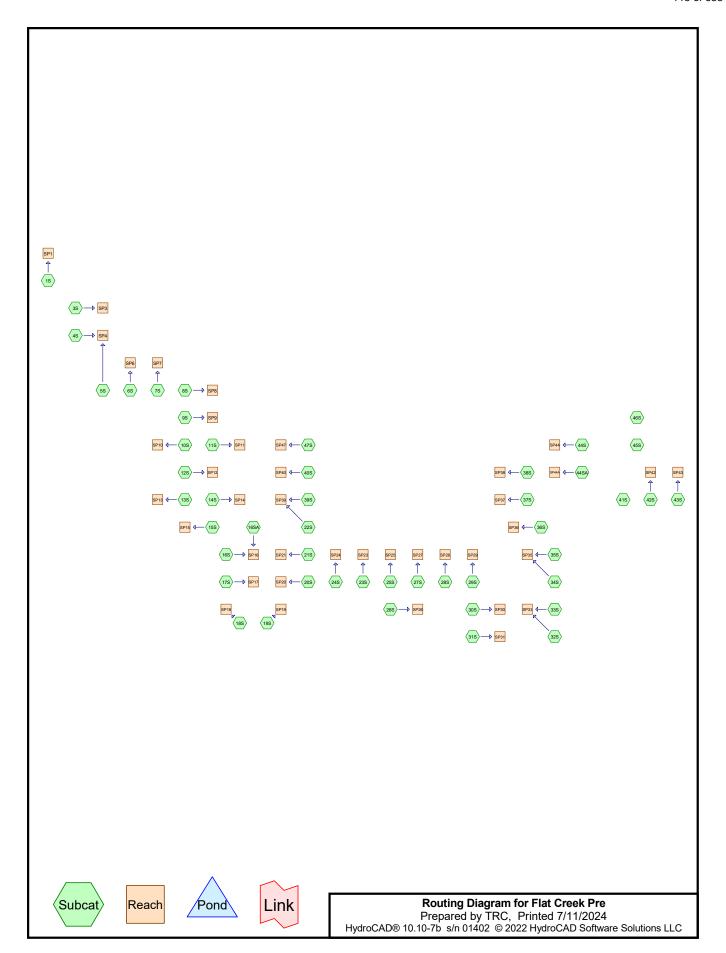








Appendix K – Pre-Development HydroCAD Model



Prepared by TRC
HydroCAD® 10.10-7b s/n 01402 © 2022 HydroCAD Software Solutions LLC

Printed 7/11/2024

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Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-yr	Type II 24-hr		Default	24.00	1	2.04	2
2	10-yr	Type II 24-hr		Default	24.00	1	3.42	2
3	25-yr	Type II 24-hr		Default	24.00	1	4.07	2
4	100-yr	Type II 24-hr		Default	24.00	1	5.07	2

Area Listing (all nodes)

Area	CN	Description
(acres)		(subcatchment-numbers)
0.768	61	>75% Grass cover, Good, HSG B (41S)
0.155	74	>75% Grass cover, Good, HSG C (41S)
0.284	30	Brush, Good, HSG A (21S, 39S)
4.083	48	Brush, Good, HSG B (1S, 4S, 5S, 7S, 9S, 10S, 13S, 14S, 15S, 16SA, 19S, 25S,
		27S, 28S, 29S, 32S, 34S, 36S, 37S, 44SA)
8.589	65	Brush, Good, HSG C (6S, 7S, 8S, 17S, 21S, 22S, 23S, 27S, 28S, 29S, 32S, 42S)
75.859	73	Brush, Good, HSG D (1S, 3S, 4S, 5S, 6S, 7S, 9S, 10S, 11S, 12S, 13S, 14S, 15S, 16S, 16SA, 17S, 18S, 19S, 20S, 22S, 23S, 24S, 25S, 27S, 28S, 31S, 32S, 33S, 34S, 35S, 36S, 37S, 39S, 40S, 42S, 44S, 44SA, 45S, 46S, 47S)
3.005	96	Gravel (4S, 5S, 7S, 8S, 29S, 39S, 41S, 44S, 44SA, 45S, 47S)
4.976	96	Gravel surface, HSG A (19S, 20S, 27S, 32S, 37S, 42S)
3.124	96	Gravel surface, HSG D (23S, 25S, 35S, 36S)
7.571	98	Impervious (7S, 12S, 14S, 15S, 16S, 16SA, 17S, 18S, 19S, 20S, 37S, 41S, 43S, 44S, 44SA, 45S, 47S)
8.790	98	Impervious Pavement (1S, 4S, 5S, 8S, 9S, 26S, 29S, 39S, 40S)
1.302	98	Impervious Roof (4S, 5S, 8S, 29S)
2.220	98	Impervious Surface (28S, 30S, 31S, 32S)
11.500	30	Meadow, non-grazed, HSG A (20S, 21S, 22S, 23S, 27S, 39S)
385.599	58	Meadow, non-grazed, HSG B (1S, 3S, 4S, 5S, 7S, 8S, 9S, 10S, 12S, 13S, 14S, 15S, 16SA, 18S, 19S, 20S, 25S, 27S, 28S, 29S, 31S, 32S, 33S, 34S, 35S, 36S, 37S, 41S, 44S, 44SA)
313.074	71	Meadow, non-grazed, HSG C (4S, 5S, 6S, 7S, 16S, 17S, 18S, 19S, 20S, 21S, 22S, 23S, 25S, 26S, 27S, 28S, 29S, 30S, 31S, 32S, 35S, 36S, 39S, 41S, 42S, 43S, 44SA)
1,881.769	78	Meadow, non-grazed, HSG D (1S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S, 12S, 13S, 14S, 15S, 16S, 16SA, 17S, 18S, 19S, 20S, 21S, 22S, 23S, 24S, 25S, 26S, 27S, 28S, 29S, 30S, 31S, 32S, 33S, 34S, 35S, 36S, 37S, 38S, 39S, 40S, 41S, 42S, 43S, 44SA, 45S, 46S, 47S)
0.410	98	Paved parking, HSG D (11S)
1.856	98	Paved roads w/curbs & sewers, HSG A (21S, 22S, 27S)
10.727	98	Paved roads w/curbs & sewers, HSG D (23S, 24S, 25S, 35S, 36S)
7.148	98	Water (4S, 5S, 9S, 26S, 37S, 44S, 44SA, 45S)
1.438	98	Water Surface, HSG A (17S, 18S, 20S, 42S)
2.690	30	Woods, Good, HSG A (21S, 22S, 27S, 39S)
124.384	55	Woods, Good, HSG B (1S, 3S, 4S, 5S, 7S, 8S, 9S, 10S, 13S, 15S, 18S, 19S, 20S, 25S, 27S, 28S, 29S, 31S, 32S, 33S, 34S, 35S, 36S, 37S, 41S, 44S, 44SA, 46S)
87.844	70	Woods, Good, HSG C (4S, 5S, 6S, 7S, 16S, 17S, 18S, 19S, 20S, 22S, 23S, 27S, 28S, 29S, 30S, 31S, 32S, 35S, 36S, 37S, 39S, 41S, 42S, 43S, 44S, 44SA)
539.268	77	Woods, Good, HSG D (1S, 3S, 4S, 5S, 6S, 7S, 8S, 10S, 12S, 13S, 14S, 15S, 16S, 16SA, 17S, 18S, 19S, 20S, 22S, 23S, 24S, 25S, 26S, 27S, 28S, 29S, 31S, 32S, 33S, 34S, 35S, 36S, 37S, 38S, 39S, 40S, 42S, 43S, 44S, 44SA, 45S, 46S, 47S)

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Area Listing (all nodes) (continued)

3,488.434	74	TOTAL AREA
(acres)		(subcatchment-numbers)
Area	CN	Description

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Soil Listing (all nodes)

Area	Soil	Subcatchment
(acres)	Group	Numbers
22.744	HSG A	17S, 18S, 19S, 20S, 21S, 22S, 23S, 27S, 32S, 37S, 39S, 42S
514.835	HSG B	1S, 3S, 4S, 5S, 7S, 8S, 9S, 10S, 12S, 13S, 14S, 15S, 16SA, 18S, 19S, 20S,
		25S, 27S, 28S, 29S, 31S, 32S, 33S, 34S, 35S, 36S, 37S, 41S, 44S, 44SA, 46S
409.661	HSG C	4S, 5S, 6S, 7S, 8S, 16S, 17S, 18S, 19S, 20S, 21S, 22S, 23S, 25S, 26S, 27S,
		28S, 29S, 30S, 31S, 32S, 35S, 36S, 37S, 39S, 41S, 42S, 43S, 44S, 44SA
2,511.158	HSG D	1S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S, 12S, 13S, 14S, 15S, 16S, 16SA, 17S,
		18S, 19S, 20S, 21S, 22S, 23S, 24S, 25S, 26S, 27S, 28S, 29S, 30S, 31S, 32S,
		33S, 34S, 35S, 36S, 37S, 38S, 39S, 40S, 41S, 42S, 43S, 44S, 44SA, 45S, 46S,
		47S
30.036	Other	1S, 4S, 5S, 7S, 8S, 9S, 12S, 14S, 15S, 16S, 16SA, 17S, 18S, 19S, 20S, 26S,
		28S, 29S, 30S, 31S, 32S, 37S, 39S, 40S, 41S, 43S, 44S, 44SA, 45S, 47S
3,488.434		TOTAL AREA

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Ground Covers (all nodes)

Ground Covers (all nodes)									
HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers		
0.000	0.768	0.155	0.000	0.000	0.923	>75% Grass cover, Good	41		
							S		
0.284	4.083	8.589	75.859	0.000	88.816	Brush, Good	1S,		
							3S,		
							4S,		
							EC		
							5S,		
							6S,		
							00,		
							7S,		
							,		
							8S,		
							9S,		
							10		
							S,		
							11		
							S,		
							12		
							S,		
							13		
							S,		
							14		
							S,		
							15		
							S,		
							16		
							S, 16		
							SA,		
							OA,		
							17		
							S,		
							18		
							S,		
							19		
							S,		
							20		
							S,		
							21		

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HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	3.005	3.005	Gravel	4S,
							•
							5 S,
							7 S,
							8S,
							29
							S,
							39
							S,
							41
							S,
							44
							S,
							44
							SA,
							,
							45
							S,
							47
							S
4.976	0.000	0.000	3.124	0.000	8.100	Gravel surface	19
							S,
							20
							S,
							23
							S,
							S,
							S,
							S,
							S,
							36
							S,
							S,
							42
							S
4.310	0.000	0.000	J. 124	0.000	0.100	Clavel Sullace	S, 20 S,

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9S,

			0.00	001010 (0			,	
HS	G-A I	HSG-B	HSG-C F	HSG-D	Other	Total	Ground	Subcatchment
(ac	res) ((acres)	(acres) ((acres) (acres)	(acres)	Cover	Numbers
0.	.000	0.000	0.000	0.000	7.571	7.571	Impervious	7S,
							·	
								12
								S,
								14
								S,
								15
								S,
								16
								S,
								16
								SA,
								47
								17
								S,
								18
								S, 19
								S,
								20
								S,
								37
								S,
								41
								S,
								43
								S,
								44
								S,
								44
								SA,
								45
								S,
								47
0	000	0.000	0.000	0.000	0.700	0.700		S
0.	.000	0.000	0.000	0.000	8.790	8.790	Impervious Pavement	1 S,
								4S,
								5S,
								8S,

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				•	-, (,	
HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	1.302	1.302	Impervious Roof	4S,
							5S,
							8S,
							29
							S
0.000	0.000	0.000	0.000	2.220	2.220	Impervious Surface	28
							S,
							30
							S,
							31
							S,
							32 S
44 500	005 500	040.074	4 004 700	0.000	0.504.040	N4 1	
11.500	385.599	313.074	1,881.769	0.000	2,591.942	Meadow, non-grazed	1S,
							3S,
							4S,
							5S,
							6S,
							7S,
							8S,
							9S,
							10
							S,
							11
							S,
							12
							S,
							13
							S,
							14
							S,
							15
							S,
							3, 16
							10

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HSG-A	HSG-B	HSG-C	HSG-D	Other	Total	Ground	Subcatchment
 (acres)	(acres)	(acres)	(acres)	(acres)	(acres)	Cover	Numbers
0.000	0.000	0.000	0.410	0.000	0.410	Paved parking	11
							S
1.856	0.000	0.000	10.727	0.000	12.583	Paved roads w/curbs & sewers	
							S,
							22
							S,
							23
							S,
							24
							S,
							25
							S,
							27
							S,
							35
							S,
							36
							S
0.000	0.000	0.000	0.000	7.148	7.148	Water	4S,
							50
							5S,
							00
							9S,
							26
							S,
							37
							S,
							44
							S,
							44
							SA,
							,
							45
							S
1.438	0.000	0.000	0.000	0.000	1.438	Water Surface	17
							S,
							18
							S,
							20
							S,
							42
							S

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23 S, 24

		0.00	ilia Govers	(an nodes	, (Joinina	, ou,	
HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
2.690	124.384	87.844	539.268	0.000	754.186	Woods, Good	1S,
							3 S,
							4 S,
							5S,
							6S,
							7 S,
							8S,
							9S,
							10 S, 12 S, 13 S, 14 S, 15 S, 16 S,
							SA, 17 S, 18 S, 19 S, 20 S, 21 S, 22 S,
							0,

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22.744	514.835	409.661	2.511.158	30.036	3.488.434	TOTAL AREA	
(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	Cover	Numbers
HSG-A	HSG-B	HSG-C	HSG-D	Other	Total	Ground	Subcatchment

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Pipe Listing (all nodes)

_	Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
	1	4S	0.00	0.00	40.0	0.0050	0.025	0.0	24.0	0.0
	2	4S	0.00	0.00	18.0	0.0560	0.025	0.0	24.0	0.0
	3	4S	0.00	0.00	36.0	0.0140	0.025	0.0	24.0	0.0
	4	4S	0.00	0.00	40.0	0.0750	0.025	0.0	24.0	0.0
	5	4S	0.00	0.00	40.0	0.0250	0.025	0.0	12.0	0.0
	6	4S	0.00	0.00	40.0	0.0250	0.025	0.0	30.0	0.0

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Subcatchment 1S:

Subcatchment 12S:

Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

Runoff Area=3,020,873 sf 2.29% Impervious Runoff Depth=0.15" Flow Length=3,272' Tc=52.0 min CN=65 Runoff=2.37 cfs 0.844 af

Runoff Area=1,437,516 sf 0.62% Impervious Runoff Depth=0.51"

Flow Length=2,388' Tc=104.6 min CN=78 Runoff=4.99 cfs 1.394 af

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Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 3S: Runoff Area=324,754 sf 0.00% Impervious Runoff Depth=0.13" Flow Length=836' Tc=23.1 min CN=64 Runoff=0.27 cfs 0.080 af Runoff Area=16,260,538 sf 1.60% Impervious Runoff Depth=0.26" Subcatchment 4S: Flow Length=7,788' Tc=76.3 min CN=70 Runoff=26.54 cfs 7.959 af Runoff Area=1,679,234 sf 4.90% Impervious Runoff Depth=0.34" Subcatchment 5S: Flow Length=1,495' Tc=34.3 min CN=73 Runoff=7.29 cfs 1.087 af Runoff Area=598,623 sf 0.00% Impervious Runoff Depth=0.31" **Subcatchment 6S:** Flow Length=1,150' Tc=39.7 min CN=72 Runoff=2.03 cfs 0.354 af Subcatchment 7S: Runoff Area=10,734,763 sf 0.11% Impervious Runoff Depth=0.26" Flow Length=6,505' Tc=76.1 min CN=70 Runoff=17.50 cfs 5.254 af **Subcatchment 8S:** Runoff Area=1,124,521 sf 2.07% Impervious Runoff Depth=0.28" Flow Length=2,618' Tc=29.5 min CN=71 Runoff=4.04 cfs 0.606 af Runoff Area=698,860 sf 9.80% Impervious Runoff Depth=0.43" Subcatchment 9S: Flow Length=1,212' Tc=81.2 min CN=76 Runoff=2.35 cfs 0.581 af Subcatchment 10S: Runoff Area=1,561,270 sf 0.00% Impervious Runoff Depth=0.43" Flow Length=2,211' Tc=88.4 min CN=76 Runoff=4.95 cfs 1.298 af **Subcatchment 11S:** Runoff Area=521,344 sf 3.42% Impervious Runoff Depth=0.55" Flow Length=1,039' Tc=43.1 min CN=79 Runoff=3.85 cfs 0.545 af

Subcatchment 13S:Runoff Area=2,395,812 sf 0.00% Impervious Runoff Depth=0.37"
Flow Length=2,356' Tc=84.2 min CN=74 Runoff=6.23 cfs 1.690 af

Subcatchment 14S:

Runoff Area=516,650 sf 1.75% Impervious Runoff Depth=0.43"
Flow Length=935' Tc=36.6 min CN=76 Runoff=3.12 cfs 0.429 af

Subcatchment 15S:Runoff Area=329,223 sf 1.24% Impervious Runoff Depth=0.17"
Flow Length=707' Tc=30.6 min CN=66 Runoff=0.43 cfs 0.104 af

Subcatchment 16S: Runoff Area=1,134,608 sf 1.12% Impervious Runoff Depth=0.51" Flow Length=1,611' Tc=58.8 min CN=78 Runoff=6.02 cfs 1.100 af

Subcatchment 16SA: Runoff Area=657,258 sf 1.69% Impervious Runoff Depth=0.43"

Tc=39.9 min CN=76 Runoff=3.73 cfs 0.546 af

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Subcatchment 17S:	Runoff Area=6,847,928 sf 0.59

Subcatchment 18S:

Subcatchment 19S:

Subcatchment 20S:

Type II 24-hr 1-yr Rainfall=2.04"

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Runoff Area=6,847,928 sf 0.59% Impervious Runoff Depth=0.47" Flow Length=4,736' Tc=94.5 min CN=77 Runoff=22.97 cfs 6.155 af

Runoff Area=4,001,602 sf 0.41% Impervious Runoff Depth=0.47" Flow Length=3,889' Tc=66.4 min CN=77 Runoff=17.46 cfs 3.597 af

Runoff Area=5,028,770 sf 0.59% Impervious Runoff Depth=0.43" Flow Length=4,703' Tc=80.9 min CN=76 Runoff=17.12 cfs 4.179 af

Runoff Area=2,479,797 sf 2.23% Impervious Runoff Depth=0.37"

Tc=71.1 min CN=74 Runoff=7.34 cfs 1.749 af

Subcatchment 21S: Runoff Area=332,609 sf 6.38% Impervious Runoff Depth=0.23" Flow Length=921' Tc=31.9 min CN=69 Runoff=0.80 cfs 0.147 af

Subcatchment 22S: Runoff Area=785,644 sf 0.79% Impervious Runoff Depth=0.23" Flow Length=1,439' Tc=53.3 min CN=69 Runoff=1.36 cfs 0.348 af

Subcatchment 23S:Runoff Area=17,302,399 sf 0.42% Impervious Runoff Depth=0.43"
Flow Length=9,131' Tc=88.7 min CN=76 Runoff=55.11 cfs 14.379 af

Subcatchment 24S:Runoff Area=260,905 sf 6.43% Impervious Runoff Depth=0.55"
Flow Length=1,200' Tc=31.2 min CN=79 Runoff=2.43 cfs 0.273 af

Subcatchment 25S:

Runoff Area=10,643,407 sf 0.28% Impervious Runoff Depth=0.40"

Flow Length=7,278' Tc=71.0 min CN=75 Runoff=35.47 cfs 8.159 af

Subcatchment 26S:Runoff Area=823,994 sf 2.72% Impervious Runoff Depth=0.51"
Flow Length=1,347' Tc=43.1 min CN=78 Runoff=5.50 cfs 0.799 af

Subcatchment 27S:

Runoff Area=1,317,635 sf 4.05% Impervious Runoff Depth=0.28"
Flow Length=3,107' Tc=46.4 min CN=71 Runoff=3.47 cfs 0.710 af

Subcatchment 28S:Runoff Area=2,868,130 sf 1.43% Impervious Runoff Depth=0.34"
Flow Length=2,822' Tc=32.9 min CN=73 Runoff=12.82 cfs 1.856 af

Subcatchment 29S:Runoff Area=776,122 sf 2.65% Impervious Runoff Depth=0.37"
Flow Length=1,737' Tc=24.4 min CN=74 Runoff=4.92 cfs 0.547 af

Subcatchment 30S: Runoff Area=618,450 sf 1.49% Impervious Runoff Depth=0.31" Flow Length=1,427' Tc=38.4 min CN=72 Runoff=2.15 cfs 0.366 af

Subcatchment 31S: Runoff Area=2,981,588 sf 0.44% Impervious Runoff Depth=0.37" Flow Length=1,885' Tc=60.7 min CN=74 Runoff=9.88 cfs 2.103 af

Subcatchment 32S: Runoff Area=4,274,758 sf 0.78% Impervious Runoff Depth=0.13" Flow Length=3,031' Tc=75.2 min CN=64 Runoff=2.23 cfs 1.047 af

Subcatchment 33S:

Runoff Area=4,477,391 sf 0.00% Impervious Runoff Depth=0.21"
Flow Length=2,390' Tc=58.6 min CN=68 Runoff=6.14 cfs 1.782 af

Type II 24-hr 1-yr Rainfall=2.04"

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Subcatchment 34S: Runoff Area=1,658,827 sf 0.00% Impervious Runoff Depth=0.28"

Flow Length=1,443' Tc=42.0 min CN=71 Runoff=4.66 cfs 0.894 af

Subcatchment 35S: Runoff Area=2,634,778 sf 10.71% Impervious Runoff Depth=0.43"

Flow Length=3,089' Tc=26.1 min CN=76 Runoff=20.26 cfs 2.190 af

Subcatchment 36S: Runoff Area=6,697,461 sf 0.98% Impervious Runoff Depth=0.47"

Tc=38.4 min CN=77 Runoff=43.74 cfs 6.020 af

Subcatchment 37S: Runoff Area=3,957,824 sf 0.96% Impervious Runoff Depth=0.47"

Tc=39.6 min CN=77 Runoff=25.26 cfs 3.557 af

Subcatchment 38S: Runoff Area=734,553 sf 0.00% Impervious Runoff Depth=0.47"

Tc=38.1 min CN=77 Runoff=4.83 cfs 0.660 af

Subcatchment 39S: Runoff Area=2,495,408 sf 0.69% Impervious Runoff Depth=0.34"

Tc=54.4 min CN=73 Runoff=7.84 cfs 1.615 af

Subcatchment 40S: Runoff Area=2,878,096 sf 0.94% Impervious Runoff Depth=0.51"

Tc=47.3 min CN=78 Runoff=17.96 cfs 2.792 af

Subcatchment 41S: Runoff Area=1,003,158 sf 1.68% Impervious Runoff Depth=0.31"

Tc=46.5 min CN=72 Runoff=3.07 cfs 0.594 af

Subcatchment 42S: Runoff Area=7,512,433 sf 0.28% Impervious Runoff Depth=0.47"

Tc=96.3 min CN=77 Runoff=24.88 cfs 6.752 af

Subcatchment 43S: Runoff Area=2,645,848 sf 0.11% Impervious Runoff Depth=0.47"

Tc=48.7 min CN=77 Runoff=14.50 cfs 2.378 af

Subcatchment 44S: Runoff Area=5,126,184 sf 3.21% Impervious Runoff Depth=0.51"

Tc=97.1 min CN=78 Runoff=18.78 cfs 4.972 af

Subcatchment 44SA: Runoff Area=785,481 sf 3.78% Impervious Runoff Depth=0.51"

Tc=25.5 min CN=78 Runoff=7.63 cfs 0.762 af

Subcatchment 45S: Runoff Area=581,958 sf 9.77% Impervious Runoff Depth=0.59"

Tc=29.1 min CN=80 Runoff=6.26 cfs 0.654 af

Subcatchment 46S: Runoff Area=2,133,969 sf 0.00% Impervious Runoff Depth=0.40"

Tc=53.8 min CN=75 Runoff=8.67 cfs 1.636 af

Subcatchment 47S: Runoff Area=2,293,218 sf 1.04% Impervious Runoff Depth=0.51"

Tc=56.5 min CN=78 Runoff=12.52 cfs 2.224 af

Total Runoff Area = 3,488.434 ac Runoff Volume = 109.766 af Average Runoff Depth = 0.38" 98.81% Pervious = 3,446.971 ac 1.19% Impervious = 41.462 ac

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Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

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Summary for Subcatchment 1S:

Runoff = 2.37 cfs @ 12.82 hrs, Volume= 0.844 af, Depth= 0.15" Routed to Reach SP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 1-yr Rainfall=2.04"

	Area (sf) CN Description			escription					
		94,531	77 V	Voods, Go	od, HSG D				
	196,024 55 Woods, Good, HSG B				od, HSG B				
	9,804 48 Brush, Good, HSG B				d, HSG B				
		8,870		Brush, Goo	,				
*	* 69,062 98 Impervious Pavement								
	1,853,031 58 Meadow, non-grazed, H								
789,551 78 Meadow, non-grazed, HSG D				HSG D					
	3,020,873 65 Weighted Average								
	2,9	51,811	97.71% Pervious Area						
	69,062		2	29% Impe	ervious Area	a			
	Тс	Length	Slope	Velocity	Capacity	Description			
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	26.7	100	0.0060	0.06		Sheet Flow,			
						Grass: Dense n= 0.240 P2= 2.40"			
	15.8	784	0.0140	0.83		Shallow Concentrated Flow,			
						Short Grass Pasture Kv= 7.0 fps			
_	9.5	2,388		4.20		Direct Entry, Small Tributary & Swamp w/ Channels			
	52.0	3,272	Total						

Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

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Summary for Subcatchment 3S:

Runoff = 0.27 cfs @ 12.33 hrs, Volume= 0.080 af, Depth= 0.13" Routed to Reach SP3 :

_	Aı	rea (sf)	CN	Description					
		1,021	55	55 Woods, Good, HSG B					
	2	23,581	58	Meadow, no	on-grazed,	HSG B			
		1,749		Brush, Goo	,				
		969		Woods, Go					
_		97,434	78	Meadow, no	on-grazed,	HSG D			
		24,754		Weighted A	•				
	3	24,754		100.00% Pe	ervious Are	ea			
	_								
	Tc	Length	Slope		Capacity	Description			
_	(min)	(feet)	(ft/ft)		(cfs)				
	11.4	100	0.0500	0.15		Sheet Flow,			
						Grass: Dense n= 0.240 P2= 2.40"			
	2.6	241	0.0500	1.57		Shallow Concentrated Flow,			
						Short Grass Pasture Kv= 7.0 fps			
	8.1	445	0.0170	0.91		Shallow Concentrated Flow,			
						Short Grass Pasture Kv= 7.0 fps			
	1.0	50	0.0300	0.87		Shallow Concentrated Flow,			
_						Woodland Kv= 5.0 fps			
	23.1	836	Total						

Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

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Summary for Subcatchment 4S:

[47] Hint: Peak is 319% of capacity of segment #4[47] Hint: Peak is 191% of capacity of segment #9[47] Hint: Peak is 906% of capacity of segment #13

Runoff = 26.54 cfs @ 13.06 hrs, Volume= 7.959 af, Depth= 0.26" Routed to Reach SP4 :

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	Area (sf)	CN	Description
	5,031	48	Brush, Good, HSG B
*	29,184	98	Impervious Pavement
*	9,824	98	Impervious Roof
	708,087	58	Meadow, non-grazed, HSG B
	34,201	55	Woods, Good, HSG B
	34,999	73	Brush, Good, HSG D
	320,256	77	Woods, Good, HSG D
	1,271	70	Woods, Good, HSG C
	170,830	71	Meadow, non-grazed, HSG C
*	2,590	96	Gravel
*	29,099	98	Impervious Pavement
*	287	98	Impervious Roof
	3,181,257	78	Meadow, non-grazed, HSG D
	9,634	48	Brush, Good, HSG B
	868,528	55	Woods, Good, HSG B
*	30,257	98	Impervious Pavement
*	10,455	98	Impervious Roof
*	4,215	96	Gravel
	2,040,672	58	Meadow, non-grazed, HSG B
	38,512	78	Meadow, non-grazed, HSG D
	55,419	77	Woods, Good, HSG D
	334,887	78	Meadow, non-grazed, HSG D
	26,398	73	Brush, Good, HSG D
*	20,636	98	Impervious Pavement
	885,711	77	Woods, Good, HSG D
*	4,759	96	Gravel
	2,163,012	78	Meadow, non-grazed, HSG D
*	10,062	98	Impervious Roof
*	13,878	98	Impervious Pavement
*	13,754	96	Gravel
*	15,803	98	Water
	777,230	55	Woods, Good, HSG B
	16,892	48	Brush, Good, HSG B
	1,287,972	58	Meadow, non-grazed, HSG B
*	72,761	98	Impervious Pavement
*	14,040	98	Impervious Roof
•	1,010	96	Gravel
	91,670	77 70	Woods, Good, HSG D
	16,841	73	Brush, Good, HSG D
	1,693,872	78	Meadow, non-grazed, HSG D
*	55,622	55	Woods, Good, HSG B
^	4,369	98	Impervious Pavement
	643,096	58	Meadow, non-grazed, HSG B
	41,645	70	Woods, Good, HSG C
	470,010	71	Meadow, non-grazed, HSG C
	16,260,538	70	Weighted Average
	15,999,883		98.40% Pervious Area
	260,655		1.60% Impervious Area

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	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	26.7	100	0.0060	0.06	, ,	Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.40"
	5.4	277	0.0150	0.86		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
	5.6	778	0.0240	2.32		Shallow Concentrated Flow,
						Grassed Waterway Kv= 15.0 fps
	0.3	40	0.0050	2.65	8.32	
						24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50'
	0.4	711		F 00		n= 0.025 Corrugated metal
	2.1 1.8	741 401		5.90 3.76		Direct Entry, Small Tributary & Swamp w/ Channels Direct Entry, Small Tributary & Swamp w/Channels
	0.0	18	0.0560	3.76 8.86	27.84	
	0.0	10	0.0300	0.00	27.04	24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50'
						n= 0.025 Corrugated metal
	2.3	605		4.30		Direct Entry, Small Tributary & Swamp w/ Channels
	0.1		0.0140	4.43	13.92	
						24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50'
						n= 0.025 Corrugated metal
	2.3	627		4.46		Direct Entry, Small Tributary & Swamp w/ Channels
	0.1	40	0.0750	10.25	32.22	
						24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50'
						n= 0.025 Corrugated metal
	2.1	527		4.20		Direct Entry, Small Tributary & Swamp w/ Channels
	0.2	40	0.0250	3.73	2.93	
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'
	4.0	E02		0.47		n= 0.025 Corrugated metal
	4.0 0.1	593 40	0.0250	2.47 6.87	33.72	Direct Entry, Roadside Ditch Pipe Channel,
	0.1	40	0.0230	0.07	33.12	30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63'
						n= 0.025 Corrugated metal
	23.2	2,925		2.10		Direct Entry, Small Tributary & Swamp w/ Channels
_	76.3	7,788	Total			2.001 2
	7 0.0	1,100	iotai			

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Summary for Subcatchment 5S:

Runoff = 7.29 cfs @ 12.38 hrs, Volume= 1.087 af, Depth= 0.34" Routed to Reach SP4 :

	Aı	rea (sf)	CN [Description		
*		11,333	96 (Gravel		
	1	36,520	70 V	Voods, Go	od, HSG C	
*		438	98 I	mpervious	Pavement	
*		6,831	98 I	mpervious	Roof	
*		7,136	98 \	Vater		
	9	15,909	71 N	∕leadow, no	on-grazed,	HSG C
		57,613		Voods, Go	od, HSG B	
*		1,117	98 I	mpervious	Pavement	
		3,366		Brush, Goo	d, HSG B	
*		813		Gravel		
		60,234		∕leadow, no	on-grazed,	HSG B
*		66,794		Vater		
_		6,417		Brush, Goo	d, HSG D	
*		3,263		Gravel		
		517			od, HSG D	
		99,842			on-grazed,	
_		01,091			on-grazed,	HSG D
	,	79,234		Veighted A	•	
	,	96,918	95.10% Pervious Area			
		82,316	2	1.90% Impe	ervious Area	a
	Тс	Length	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	Description
_	19.6	100	0.0130	0.09	(0.0)	Sheet Flow,
	13.0	100	0.0130	0.09		Grass: Dense n= 0.240 P2= 2.40"
	12.9	842	0.0240	1.08		Shallow Concentrated Flow,
	12.0	072	J.UZ-70	1.00		Short Grass Pasture Kv= 7.0 fps
	1.2	311		4.42		Direct Entry, Grassed Waterway
	0.6	242		6.54		Direct Entry, Grassed Waterway
	34.3	1,495	Total	2.31		

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Summary for Subcatchment 6S:

Runoff = 2.03 cfs @ 12.47 hrs, Volume= 0.354 af, Depth= 0.31" Routed to Reach SP6 :

Are	ea (sf)	CN E	escription					
2	23,122	70 V	70 Woods, Good, HSG C					
3	31,419	65 E	Brush, Goo	d, HSG C				
43	37,478	71 N	leadow, no	on-grazed, l	HSG C			
1	11,524	73 E	Brush, Goo	d, HSG D				
	2,524	77 V	Voods, Go	od, HSG D				
5	55,990	78 N	/leadow, no	on-grazed,	HSG D			
	1,516	70 V	Voods, Go	od, HSG C				
	2,812	77 V	Voods, Go	od, HSG D				
2	20,186			on-grazed, l				
1	12,052	71 N	<u>lleadow, no</u>	on-grazed,	HSG C			
59	98,623	72 V	Veighted A	verage				
59	98,623	100.00% Pervious Area						
Тс	Length	Slope		Capacity	Description			
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
28.7	100	0.0050	0.06		Sheet Flow,			
					Grass: Dense n= 0.240 P2= 2.40"			
4.3	256	0.0200	0.99		Shallow Concentrated Flow,			
					Short Grass Pasture Kv= 7.0 fps			
2.5	341	0.1030	2.25		Shallow Concentrated Flow,			
					Short Grass Pasture Kv= 7.0 fps			
2.4	316	0.1870	2.16		Shallow Concentrated Flow,			
					Woodland Kv= 5.0 fps			
1.8	137		1.26		Direct Entry, Grassed Waterway			
39.7	1,150	Total						

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Summary for Subcatchment 7S:

Runoff = 17.50 cfs @ 13.07 hrs, Volume= 5.254 af, Depth= 0.26" Routed to Reach SP7 :

	Α	rea (sf)	CN D	escription		
	2,822,055 58 Meadow, non-grazed, H					HSG B
	23,489 48 Brush, Good, HSG B					
	640,040 55 Woods, Good, HSG B					
	2,2	69,487			on-grazed,	HSG C
	2,183 65 Brush, Good, HSG C					
	137,505 70 Woods, Good, HSG C					
		42,616			on-grazed,	HSG D
		53,119		rush, Goo		
*	,	29,743			od, HSG D	
*		11,894		mpervious		
_	40.7	2,632		Gravel		
	,	34,763		Veighted A	•	
	,	22,869	_		vious Area	
	11,894 0.11% Impervious Area				ervious Area	a
	Тс	Length	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	Boompaon
_	16.8	100	0.0190	0.10	(3.3)	Sheet Flow,
	10.0	100	0.0100	0.10		Grass: Dense n= 0.240 P2= 2.40"
	5.4	449	0.0390	1.38		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
	8.2	512	0.0220	1.04		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
	20.3	945	0.0240	0.77		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
	3.6	192	0.0310	0.88		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
	14.9	3,312		3.70		Direct Entry, Small Tributary & Swamp w/ Channels
	4.1	284	0.0530	1.15		Shallow Concentrated Flow,
	2.0	714		4.20		Woodland Kv= 5.0 fps
_	2.8	711		4.30		Direct Entry, Small Tributary & Swamp w/ Channels
	76.1	6,505	Total			

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Summary for Subcatchment 8S:

Runoff = 4.04 cfs @ 12.32 hrs, Volume= 0.606 af, Depth= 0.28" Routed to Reach SP8 :

	Α	rea (sf)	CN I	Description						
		0	55 \	Woods, Go	od, HSG B					
*		1,030	98	mpervious	Pavement					
		27,402	58	Meadow, non-grazed, HSG B						
		15,462		Voods, Good, HSG D						
*		6,130	98	mpervious	Pavement					
	2	200,339	78 I	Meadow, no	on-grazed, l	HSG D				
		25,785		Woods, Go						
*		1,580	96	Gravel	•					
*		5,152	98	mpervious	Pavement					
	1	91,169	58 I	Meadow, no	on-grazed, l	HSG B				
*		7,435		mpervious						
		9,470	77	Woods, Go	od, HSG D					
	4	23,047	78 I	Meadow, no	on-grazed, l	HSG D				
		12,817	65 l	Brush, Goo	d, HSG C					
*		2,902		mpervious	Pavement					
*		3,771	96	Gravel						
*		670		mpervious	Roof					
_	1	90,360	58 I	Meadow, no	on-grazed, l	HSG B				
	1,1	24,521	71	Weighted A	verage					
	1,1	01,202	9	97.93% Per	vious Area					
		23,319	:	2.07% Impe	ervious Area	a				
	Тс	Length	Slope		Capacity	Description				
	(min)	(feet)	(ft/ft)		(cfs)					
	12.2	100	0.0420	0.14		Sheet Flow,				
						Grass: Dense n= 0.240 P2= 2.40"				
	6.0	364	0.0210	1.01		Shallow Concentrated Flow,				
						Short Grass Pasture Kv= 7.0 fps				
	6.3	1,017		2.68		Direct Entry, Roadside Ditch				
_	5.0	1,137		3.82		Direct Entry, Roadside Ditch				
	29.5	2,618	Total							

Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

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Summary for Subcatchment 9S:

Runoff = 2.35 cfs @ 13.04 hrs, Volume= 0.581 af, Depth= 0.43"

Routed to Reach SP9:

	Α	rea (sf)	CN I	Description					
*		46,629	98	Water					
*		6,554			Pavement				
	4	24,080	78 I	Meadow, no	on-grazed,	HSG D			
		2,058			od, HSG B				
		7,321		Brush, Goo	d, HSG B				
*		10,739		Vater					
*		1,356		•	Pavement				
	1	10,953			on-grazed,	HSG B			
*		3,190		•	Pavement				
		19,729		Brush, Goo	•				
		66,251			on-grazed,	HSG D			
	698,860 76 Weighted Average				-				
		30,392			rvious Area				
		68,468	,	9.80% Impe	ervious Area	a			
	То	Longth	Clana	Volocity	Conneity	Description			
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description			
	(min)				(CIS)	Oh oot Flour			
	54.6	100	0.0010	0.03		Sheet Flow,			
	10.0	E40	0.0100	0.50		Grass: Dense n= 0.240 P2= 2.40"			
	18.0	540	0.0100	0.50		Shallow Concentrated Flow,			
	9.6	570		1 11		Woodland Kv= 5.0 fps Direct Entry Small Tributary & Swamp w/Channels			
_	8.6	572	T . 4 . 1	1.11		Direct Entry, Small Tributary & Swamp w/Channels			
	81.2	1,212	Total						

Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

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Summary for Subcatchment 10S:

Runoff = 4.95 cfs @ 13.11 hrs, Volume= 1.298 af, Depth= 0.43" Routed to Reach SP10 :

A	rea (sf)	CN D	escription		
	35,373	55 V	Voods, Go	od, HSG B	
	4,798	48 B	rush, Goo	d, HSG B	
	92,207	58 N	1eadow, no	on-grazed,	HSG B
	87,496	73 B	rush, Goo	d, HSG D	
	13,364	77 V	Voods, Go	od, HSG D	
1,3	28,032	78 N	leadow, no	on-grazed,	HSG D
1,5	61,270	76 V	Veighted A	verage	
1,5	61,270	1	00.00% Pe	ervious Are	a
Tc	Length	Slope	•	Capacity	Description
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)	
54.6	100	0.0010	0.03		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.40"
16.9	388	0.0030	0.38		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
0.4	33	0.0610	1.23		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
3.6	165	0.0120	0.77		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
3.2	310		1.63		Direct Entry, Small Tributary & Swamp w/ Channels
8.2	920		1.88		Direct Entry, Small Tributary & Swamp w/ Channels
1.5	295		3.39		Direct Entry, Small Tributary & Swamp w/Channels
88.4	2,211	Total			

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Summary for Subcatchment 11S:

Runoff = 3.85 cfs @ 12.46 hrs, Volume= 0.545 af, Depth= 0.55" Routed to Reach SP11 :

	Aı	rea (sf)	CN [Description		
		17,843	98 F	Paved park	ing, HSG D	
	5	01,616	78 N	/leadow, no	on-grazed,	HSG D
	1,885 73 Brush, Good, HSG D					
	5	21,344	79 V	Veighted A	verage	
		03,501	-		vious Area	
		17,843	3	3.42% Impe	ervious Area	a
	_	1	01	17.1	0	Describe the co
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	20.2	100	0.0120	0.08		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.40"
	11.8	521	0.0110	0.73		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
	11.1	418	0.0080	0.63		Shallow Concentrated Flow,
_						Short Grass Pasture Kv= 7.0 fps
	43.1	1.039	Total			

Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

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Summary for Subcatchment 12S:

Runoff = 4.99 cfs @ 13.36 hrs, Volume= 1.394 af, Depth= 0.51" Routed to Reach SP12 :

	Α	rea (sf)	CN D	escription		
*		8,897	98 Ir	npervious		
		8,690			on-grazed,	
	1,3	13,095		,	on-grazed,	HSG D
	5,821 73 Brush, Good, HSG D				,	
		01,013	77 V	∕oods, Go	od, HSG D	
		37,516		Veighted A		
	1,4	28,619	_		vious Area	
	8,897 0.62% Impervious Area					a
	Тс	Longth	Slope	Volocity	Capacity	Description
	(min)	Length (feet)	(ft/ft)	Velocity (ft/sec)	(cfs)	Description
	30.7	100	0.0470	0.05	(013)	Sheet Flow,
	30.7	100	0.0470	0.03		Woods: Dense underbrush n= 0.800 P2= 2.40"
						110003. Delise dilucibidsii 11-0.000 1 2-2.40
	25.9	601	0.0060	ი ვი		Shallow Concentrated Flow
	25.9	601	0.0060	0.39		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
						Woodland Kv= 5.0 fps
	25.9 48.0	601 1,687	0.0060	0.39		· · · · · · · · · · · · · · · · · · ·

Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

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Summary for Subcatchment 13S:

Runoff = 6.23 cfs @ 13.09 hrs, Volume= 1.690 af, Depth= 0.37" Routed to Reach SP13 :

A	rea (sf)	CN D	escription		
2	79,893	58 M	leadow, no	on-grazed, l	HSG B
1,5	58,214	78 N	leadow, no	on-grazed, l	HSG D
	424	48 B	rush, Goo	d, HSG B	
	77,097	73 B	rush, Goo	d, HSG D	
1	42,209	55 V	Voods, Go	od, HSG B	
3	37,975	77 V	√oods, Go	od, HSG D	
2,3	95,812	74 V	Veighted A	verage	
2,3	95,812	1	00.00% Pe	ervious Are	a
Tc	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
15.6	100	0.0230	0.11		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.40"
48.9	1,838	0.0080	0.63		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
19.7	418	0.0050	0.35		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
84.2	2,356	Total			

Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

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Summary for Subcatchment 14S:

Runoff = 3.12 cfs @ 12.39 hrs, Volume= 0.429 af, Depth= 0.43" Routed to Reach SP14 :

	Aı	rea (sf)	CN [Description		
*		9,018	98 I	mpervious		
		70,714	58 N	∕leadow, no	on-grazed,	HSG B
	4	28,883	78 N	∕leadow, no	on-grazed,	HSG D
	744 48 Brush, Good, HSG B					
	189 73 Brush, Good, HSG D					
	7,102 77 Woods, Good, HSG D					
	5	16,650	76 V	Veighted A	verage	
507,632 98.25% Pervious Area					vious Area	
		9,018	1	.75% Impe	ervious Area	a
	Тс	Length	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	18.5	100	0.0150	0.09		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.40"
	18.1	835	0.0120	0.77		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
	36.6	935	Total	·		

Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

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Summary for Subcatchment 15S:

Runoff = 0.43 cfs @ 12.41 hrs, Volume= 0.104 af, Depth= 0.17" Routed to Reach SP15 :

A	rea (sf)	CN E	Description		
*	4,081	98 I	mpervious		
1	81,283	58 N	/leadow, no	on-grazed,	HSG B
1	26,101	78 N	/leadow, no	on-grazed,	HSG D
	6,560	48 E	Brush, Goo	d, HSG B	
	2,092	73 E	Brush, Goo	d, HSG D	
	5,023		•	od, HSG B	
	4,083	77 V	Voods, Go	od, HSG D	
3	29,223		Veighted A	•	
325,142 98.76% Pervious Area					
	4,081	1	.24% Impe	ervious Area	a
_		٥.			
Tc	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
15.9	100	0.0220	0.11		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.40"
6.4	387	0.0210	1.01		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
8.3	220	0.0040	0.44		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
30.6	707	Total			

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Summary for Subcatchment 16S:

Runoff = 6.02 cfs @ 12.69 hrs, Volume= 1.100 af, Depth= 0.51" Routed to Reach SP16 :

_	Α	rea (sf)	CN D	escription		
*		12,714	98 Ir	npervious		
		25,066	71 N	leadow, no	on-grazed,	HSG C
	9	38,415	78 N	leadow, no	on-grazed,	HSG D
		3,358		rush, Goo	,	
		863	70 V	Voods, Go	od, HSG C	
_	1	54,192	77 V	Voods, Go	od, HSG D	
	1,1	34,608		Veighted A		
	1,1	21,894	_		vious Area	
		12,714	1	.12% Impe	ervious Area	a
	-		01		0 "	
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	27.0	100	0.0170	0.06		Sheet Flow,
						Grass: Bermuda n= 0.410 P2= 2.40"
	3.8	142	0.0080	0.63		Shallow Concentrated Flow,
	00.0	4 005		0.00		Short Grass Pasture Kv= 7.0 fps
	26.0	1,035	0.0090	0.66		Shallow Concentrated Flow,
	0.0	004		0.74		Short Grass Pasture Kv= 7.0 fps
_	2.0	334		2.74		Direct Entry, Small Tributary & Swamp w/ Channels
	58.8	1,611	Total			

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Summary for Subcatchment 16SA:

Runoff = 3.73 cfs @ 12.43 hrs, Volume= 0.546 af, Depth= 0.43" Routed to Reach SP16 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 1-yr Rainfall=2.04"

	Area (sf)	CN	Description					
*	11,093	98	Impervious					
	70,093	58	Meadow, non-grazed, HSG B					
	359,929	78	Meadow, non-grazed, HSG D					
	259	48	Brush, Good, HSG B					
	14,806	73	Brush, Good, HSG D					
	0	70	Woods, Good, HSG C					
	201,078	77	Woods, Good, HSG D					
	657,258	76	Weighted Average					
	646,165		98.31% Pervious Area					
	11,093		1.69% Impervious Area					
	Tc Length	Slo						
(min) (feet)	(ft/	/ft) (ft/sec) (cfs)					

39.9

Direct Entry, SEE SPREADSHEET

Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

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Summary for Subcatchment 17S:

Runoff = 22.97 cfs @ 13.17 hrs, Volume= 6.155 af, Depth= 0.47" Routed to Reach SP17 :

_	A	rea (sf)	CN E	escription		
		22,601	98 V	Vater Surfa	ace, HSG A	1
*		17,632	98 Ir	mpervious		
252,955 71 Meadow, non-grazed, H						HSG C
4,937,352 78 Meadow, non-grazed, HS						HSG D
		16,810		Brush, Goo		
	1	30,011	73 B	Brush, Goo	d, HSG D	
	1	11,819		,	od, HSG C	
_	1,3	58,748	77 V	Voods, Go	od, HSG D	
	6,8	47,928	77 V	Veighted A	verage	
	6,807,695 99.41% Pervious Area					
	40,233 0.59% Impervious Area					a
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	12.1	50	0.0300	0.07		Sheet Flow,
						Woods: Light underbrush n= 0.400 P2= 2.40"
	10.9	50	0.0140	0.08		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.40"
	32.6	2,373	0.0300	1.21		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
	33.8	1,418	0.0100	0.70		Shallow Concentrated Flow,
	- 4	0.45		0.74		Short Grass Pasture Kv= 7.0 fps
_	5.1	845		2.74		Direct Entry, Small Tributary & Swamp w/Channels
	94.5	4.736	Total			

Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

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Summary for Subcatchment 18S:

Runoff = 17.46 cfs @ 12.79 hrs, Volume= 3.597 af, Depth= 0.47" Routed to Reach SP18 :

	Area (sf)	CN [Description		
	2,953	98 V	Vater Surfa	ace, HSG A	1
*	13,432	98 I	mpervious		
	5,975	58 N	∕leadow, no	on-grazed,	HSG B
	29,944	71 N	∕leadow, no	on-grazed,	HSG C
2	2,207,221			on-grazed,	HSG D
	157,865		Brush, Goo		
	23,440		•	od, HSG B	
321,869 70 Woods, Good, HSG C					
1,238,903 77 Woods, Good, HSG D					
4,001,602 77 Weighted Average					
3	3,985,217			vious Area	
	16,385 0.41% Impervious Area				a
				_	
	c Length	Slope	•		Description
(mir	, , ,	(ft/ft)	(ft/sec)	(cfs)	
27.	8 100	0.0150	0.06		Sheet Flow,
					Woods: Light underbrush n= 0.400 P2= 2.40"
6.	8 205	0.0100	0.50		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
23.	6 2,144	0.0920	1.52		Shallow Concentrated Flow,
_					Woodland Kv= 5.0 fps
8.	,		2.92		Direct Entry, Ditch
66.	4 3,889	Total			

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Summary for Subcatchment 19S:

Runoff = 17.12 cfs @ 13.04 hrs, Volume= 4.179 af, Depth= 0.43" Routed to Reach SP19 :

_	Aı	rea (sf)	CN D	escription		
*		29,609	98 Ir	npervious		
		21,503	96 G	ravel surfa	ace, HSG A	1
	84,734 58 Meadow, non-grazed, H					HSG B
	89,335 71 Meadow, non-grazed, H					HSG C
	2,422,408 78 Meadow, non-grazed, H					HSG D
		10,082		rush, Goo		
		74,495		rush, Goo	,	
		16,971			od, HSG B	
		81,805			od, HSG C	
_	1,5	97,828	77 V	/oods, Go	od, HSG D	
	,	28,770		Veighted A	-	
	,	99,161	_	•	vious Area	
		29,609	0	.59% Impe	ervious Area	a
	_					
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	32.7	100	0.0100	0.05		Sheet Flow,
	0.4.4	4 0 4 5		4.40		Woods: Light underbrush n= 0.400 P2= 2.40"
	21.4	1,915	0.0890	1.49		Shallow Concentrated Flow,
	0.0	700	0.0700	4.00		Woodland Kv= 5.0 fps
	6.3	706	0.0720	1.88		Shallow Concentrated Flow,
	0.7	400	0.0050	0.40		Short Grass Pasture Kv= 7.0 fps
	3.7	109	0.0050	0.49		Shallow Concentrated Flow,
	2.9	244	0.0410	1.42		Short Grass Pasture Kv= 7.0 fps
	2.9	244	0.0410	1.42		Shallow Concentrated Flow,
	7.2	706		1.63		Short Grass Pasture Kv= 7.0 fps Direct Entry, Small Tributary & Swamp w/ Channels
	6.7	923		2.30		Direct Entry, Small Tributary & Swamps w/ Channels
_			Total	2.00		Direct Entry, Official Tributary & Owamps W/ Officialities
	80.9	4,703	Total			

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Summary for Subcatchment 20S:

Runoff = 7.34 cfs @ 12.91 hrs, Volume= 1.749 af, Depth= 0.37" Routed to Reach SP20 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 1-yr Rainfall=2.04"

16,368 98 Water Surface, HSG A * 38,886 98 Impervious 503 96 Gravel surface, HSG A 99,447 30 Meadow, non-grazed, HSG A	
503 96 Gravel surface, HSG A	
, ,	
99.447 30 Meadow non-grazed HSG A	
33,447 00 Mcadow, Horr-grazed, Floor	
58,596 58 Meadow, non-grazed, HSG B	
130,201 71 Meadow, non-grazed, HSG C	
1,680,681 78 Meadow, non-grazed, HSG D	
21,162 73 Brush, Good, HSG D	
131,716 55 Woods, Good, HSG B	
6,015 70 Woods, Good, HSG C	
296,222 77 Woods, Good, HSG D	
2,479,797 74 Weighted Average	
2,424,543 97.77% Pervious Area	
55,254 2.23% Impervious Area	
Tc Length Slope Velocity Capacity Description	
(min) (feet) (ft/ft) (ft/sec) (cfs)	

71.1 **Direct Entry, SEE SPREDSHEET**

Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

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Summary for Subcatchment 21S:

Runoff = 0.80 cfs @ 12.38 hrs, Volume= 0.147 af, Depth= 0.23" Routed to Reach SP21 :

A	rea (sf)	CN [Description		
28,890 30 Meadow, non-grazed, H					HSG A
2	262,110	71 N	/leadow, no	on-grazed,	HSG C
12,438 78 Meadow, non-grazed					HSG D
	683	30 E	Brush, Goo	d, HSG A	
	5,947	65 E	Brush, Goo	d, HSG C	
	1,322	30 \	Voods, Go	od, HSG A	
	21,219	98 F	Paved road	ls w/curbs 8	R sewers, HSG A
3	332,609 69 Weighted Average				
3	311,390			rvious Area	
	21,219 6.38% Impervious Area			ervious Area	a
Tc	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
12.4	100	0.0410	0.13		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.40"
19.5	821	0.0100	0.70		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
31.9	921	Total			·

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Summary for Subcatchment 22S:

Runoff = 1.36 cfs @ 12.73 hrs, Volume= 0.348 af, Depth= 0.23" Routed to Reach SP39 :

	Area (sf)	CN [Description		
87,197 30 Meadow, non-grazed, H					HSG A
418,867 71 Meadow, non-grazed, H					HSG C
	134,602	78 I	Meadow, no	on-grazed,	HSG D
	814	65 E	Brush, Goo	d, HSG C	
	7,253	73 E	Brush, Goo	d, HSG D	
	843		,	od, HSG A	
	3,389		,	od, HSG C	
	126,479		,	od, HSG D	
6,200 98 Paved roads w/curbs &					& sewers, HSG A
785,644 69 Weighted Average					
	779,444		-	rvious Area	
	6,200 0.79% Impervious Area				a
-		01		O ::	
Tc	•	Slope	,	. ,	Description
<u>(min)</u>		(ft/ft)	(ft/sec)	(cfs)	
28.7	100	0.0050	0.06		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.40"
22.4	1,072	0.0130	0.80		Shallow Concentrated Flow,
0.0	00	0.4000	4.00		Short Grass Pasture Kv= 7.0 fps
8.0	83	0.1330	1.82		Shallow Concentrated Flow,
4 4	404		0.00		Woodland Kv= 5.0 fps
1.4			2.20		Direct Entry, Small Tributary & Swamp w/ Channels
53.3	1,439	Total			

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Summary for Subcatchment 23S:

Runoff = 55.11 cfs @ 13.12 hrs, Volume= 14.379 af, Depth= 0.43" Routed to Reach SP23 :

	Ar	rea (sf)	CN D	escription						
	;	33,228	30 N	leadow, no	on-grazed, l	HSG A				
	494,460 71 Meadow, non-grazed, H					HSG C				
	7,3	49,351			on-grazed, l	HSG D				
		99,742		rush, Goo						
1,788,044				3 Brush, Good, HSG D						
	,	93,479			od, HSG C					
		45,558		,	od, HSG D					
		73,510				& sewers, HSG D				
		25,027			ace, HSG D)				
		02,399		Veighted A						
1		28,889	_		vious Area					
		73,510	0	.42% Impe	ervious Area	a				
-	т.	Longth	Clana	\/alaaitu	Canacity	Description				
(mi	Tc	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description				
					(CIS)	Oh oot Flour				
18	3.4	100	0.0420	0.09		Sheet Flow,				
20	2.2	1,941	0.0850	1.46		Woods: Light underbrush n= 0.400 P2= 2.40" Shallow Concentrated Flow,				
22	2.2	1,941	0.0650	1.40		Woodland Kv= 5.0 fps				
11	1.2	806	0.0580	1.20		Shallow Concentrated Flow,				
		000	0.0000	1.20		Woodland Kv= 5.0 fps				
11	1.6	1,740		2.49		Direct Entry, Small Tributary & Swamp w/ Channels				
	1.2	1,229		4.93		Direct Entry, Small Tributary & Swamp w/ Channels				
	9.5	1,895		3.32		Direct Entry, Small Tributary & Swamp w/ Channels				
	3.8	650		2.82		Direct Entry, Small Tributary & Swamp w/ Channels				
	7.8	770		1.64		Direct Entry, Roadside Ditch				
	3.7	9,131	Total							

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Summary for Subcatchment 24S:

Runoff = 2.43 cfs @ 12.29 hrs, Volume= 0.273 af, Depth= 0.55" Routed to Reach SP24 :

_	Aı	rea (sf)	CN D	escription		
	2	26,229	78 N	leadow, no	on-grazed,	HSG D
7,721 73 Brush, Good, HSG D					d, HSG D	
10,176 77 Woods, Good, HSG D				Voods, Go	od, HSG D	
		16,779	98 F	Paved road	s w/curbs 8	R sewers, HSG D
260,905 79 Weighted Average					verage	
	2	44,126	9	3.57% Per	vious Area	
		16,779	6	.43% Impe	ervious Area	a
	_					
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	15.1	100	0.0250	0.11		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.40"
	14.0	830	0.0200	0.99		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
_	2.1	270		2.17		Direct Entry, Small Tributary & Swamp w/ Channels
	31.2	1.200	Total			

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Summary for Subcatchment 25S:

Runoff = 35.47 cfs @ 12.88 hrs, Volume= 8.159 af, Depth= 0.40" Routed to Reach SP25 :

Ar	ea (sf)	CN D	escription					
8	16,850	58 M	leadow, no	on-grazed,	HSG B			
9	55,101	71 N	1eadow, no	on-grazed,	HSG C			
5,10	04,595	78 N	1eadow, no	on-grazed,	HSG D			
•	18,372	48 B	rush, Goo	d, HSG B				
26	65,288	73 B	rush, Goo	d, HSG D				
18	89,511			od, HSG B				
3,24	44,843	77 V	Voods, Go	od, HSG D				
2	29,278	98 P	aved road	s w/curbs 8	& sewers, HSG D			
	19,569	96 G	Gravel surfa	ace, HSG [)			
10,64	43,407	75 V	Veighted A	verage				
10,6	14,129	9	9.72% Per	vious Area				
2	29,278	0	0.28% Impervious Area					
Тс	Length	Slope	Velocity	Capacity	Description			
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
16.8	100	0.0190	0.10		Sheet Flow,			
					Grass: Dense n= 0.240 P2= 2.40"			
18.9	1,281	0.0510	1.13		Shallow Concentrated Flow,			
					Woodland Kv= 5.0 fps			
8.8	640	0.0300	1.21		Shallow Concentrated Flow,			
					Short Grass Pasture Kv= 7.0 fps			
17.1	4,093		3.98		Direct Entry, Small Tributary & Swamp w/ Channels			
4.6	482		1.76		Direct Entry, Small Tributary & Swamp w/ Channels			
4.8	682		2.39		Direct Entry, Small Tributary & Swamp w/ Channels			
71.0	7,278	Total						

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Summary for Subcatchment 26S:

Runoff = 5.50 cfs @ 12.46 hrs, Volume= 0.799 af, Depth= 0.51" Routed to Reach SP26 :

	Α	rea (sf)	CN E	Description					
		75,400	77 V	Voods, Go					
*		4,254	98 V	Vater					
		50,954	71 N	/leadow, no	on-grazed,	HSG C			
*		18,174	98 li	mpervious	Pavement				
_	6	75,212	78 N	/leadow, no	on-grazed,	HSG D			
	8	23,994		Veighted A					
	801,566			97.28% Pervious Area					
	22,428			2.72% Impervious Area					
	_		01			5			
	Tc	Length	Slope	Velocity	Capacity	Description			
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	18.5	100	0.0150	0.09		Sheet Flow,			
						Grass: Dense n= 0.240 P2= 2.40"			
	5.4	527		1.64		Direct Entry, Ditch			
	19.2	720	0.0080	0.63		Shallow Concentrated Flow,			
						Short Grass Pasture Kv= 7.0 fps			
	43.1	1,347	Total						

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Summary for Subcatchment 27S:

Runoff = 3.47 cfs @ 12.57 hrs, Volume= 0.710 af, Depth= 0.28" Routed to Reach SP27 :

A	rea (sf)	CN D	escription		
1	02,395	30 N	leadow, no	on-grazed,	HSG A
	70,249			on-grazed,	
3	56,229			on-grazed,	
5	94,316	78 N	leadow, no	on-grazed,	HSG D
	15,001	48 E	Brush, Goo	d, HSG B	
	136	65 E	Brush, Goo	d, HSG C	
	35,121	73 E	Brush, Goo	d, HSG D	
	1,761	30 V	Voods, Go	od, HSG A	
	10,015	55 V	Voods, Go	od, HSG B	
	44,190	70 V	Voods, Go	od, HSG C	
	27,054			od, HSG D	
	53,425	98 F	aved road	s w/curbs &	& sewers, HSG A
	7,743	96 G	Gravel surfa	ace, HSG <i>I</i>	4
1,3	17,635	71 V	Veighted A	verage	
1,2	64,210	9	5.95% Per	vious Area	l
	53,425	4	.05% Impe	ervious Are	a
_					-
Tc	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
11.4	100	0.0500	0.15		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.40"
7.4	973	0.0970	2.18		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
6.4	548	0.0820	1.43		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
2.0	152	0.0330	1.27		Shallow Concentrated Flow,
40.0	004	0.0000	4.00		Short Grass Pasture Kv= 7.0 fps
12.9	824	0.0230	1.06		Shallow Concentrated Flow,
6.3	510		1.34		Short Grass Pasture Kv= 7.0 fps Direct Entry, Small Tributary & Swamp w/ Channels
46.4		Total	1.54		Direct Lifting, official tributary & Swamp w/ officialities
40.4	3,107	าบเลเ			

Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

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Summary for Subcatchment 28S:

Runoff = 12.82 cfs @ 12.35 hrs, Volume= 1.856 af, Depth= 0.34" Routed to Reach SP28 :

	rea (sf)	CN [Description		
•	148,045	58 N	/leadow, no	on-grazed,	HSG B
1,3	391,071	71 N	∕leadow, no	on-grazed,	HSG C
1,	142,501	78 N	∕leadow, no	on-grazed,	HSG D
	16,837	48 E	Brush, Goo	d, HSG B	
	158	65 E	Brush, Goo	d, HSG C	
	36,741		Brush, Goo	•	
	39,665		,	od, HSG B	
	794		,	od, HSG C	
	51,395		,	od, HSG D	
*	40,923	98 I	mpervious	Surface	
2,8	2,868,130 73 Weighted Average				
2,8	327,207	ξ	98.57% Pei	rvious Area	
	40,923	1	⊺.43% Impe	ervious Are	a
_				_	
Тс	-	Slope	Velocity	Capacity	Description
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)	
19.6	100	0.0130	0.09		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.40"
2.3	163	0.0290	1.19		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
11.0	2,559		3.88		Direct Entry, Roadside Ditch
32.9	2,822	Total			

Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

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Summary for Subcatchment 29S:

Runoff = 4.92 cfs @ 12.22 hrs, Volume= 0.547 af, Depth= 0.37" Routed to Reach SP29 :

	Α	rea (sf)	CN [Description		
		34,206	70 V	Voods, Go	od, HSG C	
*		7,569			Pavement	
*		4,117	98 I	mpervious	Roof	
*		5,127	96 (Gravel		
	2	47,913	71 N	/leadow, no	on-grazed,	HSG C
		11,168	55 V	Voods, Go	od, HSG B	
		740	65 E	Brush, Goo	d, HSG C	
		9,072	48 E	Brush, Goo	d, HSG B	
*		428	98 I	mpervious	Roof	
		56,539			on-grazed,	HSG B
*		8,416			Pavement	
		16,068		•	od, HSG D	
	3	74,759	78 N	∕leadow, no	on-grazed,	HSG D
		76,122		Veighted A		
		55,592			vious Area	
		20,530	2	2.65% Impe	ervious Are	a
	Тс	Length	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	10.3	100	0.0650	0.16		Sheet Flow,
			0.000	00		Grass: Dense n= 0.240 P2= 2.40"
	0.5	63	0.0950	2.16		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
	0.3	31	0.1290	1.80		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
	6.1	612	0.0570	1.67		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
	0.1	31	0.6100	3.91		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
	7.1	900		2.12		Direct Entry, Roadside Ditch
	24.4	1,737	Total			

Flat Creek Pre

Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

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Summary for Subcatchment 30S:

Runoff = 2.15 cfs @ 12.44 hrs, Volume= 0.366 af, Depth= 0.31" Routed to Reach SP30 :

	Aı	rea (sf)	CN [Description							
	5	11,468	71 N	71 Meadow, non-grazed, HSG C							
		80,980	78 N	Meadow, no	on-grazed,	HSG D					
		16,758	70 V	Voods, Go	od, HSG C						
*		9,244	98 I	mpervious	Surface						
	6	18,450	72 V	Veighted A	verage						
	6	09,206	ç	98.51% Per	vious Area						
		9,244	1	.49% Impe	ervious Area	a					
	Tc	Length	Slope	Velocity	Capacity	Description					
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)						
	26.7	100	0.0060	0.06		Sheet Flow,					
						Grass: Dense n= 0.240 P2= 2.40"					
	10.4	1,152	0.0700	1.85		Shallow Concentrated Flow,					
						Short Grass Pasture Kv= 7.0 fps					
_	1.3	175		2.28		Direct Entry, Roadside Ditch					
	38.4	1.427	Total								

Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

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Summary for Subcatchment 31S:

Runoff = 9.88 cfs @ 12.76 hrs, Volume= 2.103 af, Depth= 0.37" Routed to Reach SP31 :

_	Α	rea (sf)	CN D	escription					
		66,905	58 N	leadow, no	on-grazed,	HSG B			
	1,1	85,943	71 N	leadow, no	on-grazed,	HSG C			
	1,3	98,406		Meadow, non-grazed, HSG D					
		1,947		rush, Goo	,				
		84,560		,	od, HSG B				
		17,524		,	od, HSG C				
*		13,262		,	od, HSG D				
_		13,041		npervious					
	,	81,588		/eighted A					
	,	68,547	_		vious Area				
		13,041	0	.44% Impe	ervious Are	a			
	Тс	Length	Slope	Velocity	Capacity	Description			
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	35.2	100	0.0030	0.05		Sheet Flow,			
						Grass: Dense n= 0.240 P2= 2.40"			
	6.2	219	0.0070	0.59		Shallow Concentrated Flow,			
						Short Grass Pasture Kv= 7.0 fps			
	8.4	252	0.0100	0.50		Shallow Concentrated Flow,			
						Woodland Kv= 5.0 fps			
	6.7	592	0.0440	1.47		Shallow Concentrated Flow,			
	4.0	700		0.07		Short Grass Pasture Kv= 7.0 fps			
_	4.2	722		2.87		Direct Entry, Small Tributary & Swamp w/ Channels			
	60.7	1,885	Total						

Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

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Summary for Subcatchment 32S:

Runoff = 2.23 cfs @ 13.29 hrs, Volume= 1.047 af, Depth= 0.13" Routed to Reach SP33 :

A	rea (sf)	CN E	Description					
2,5	541,060	58 N	/leadow, no	on-grazed,	HSG B			
7	16,554	71 N	/leadow, no	on-grazed,	HSG C			
5	17,326	78 N	/leadow, no	on-grazed,	HSG D			
	869	48 E	Brush, Good, HSG B					
	3,094	65 E	Brush, Goo	d, HSG C				
	4,465	73 E	Brush, Goo	d, HSG D				
2	200,046			od, HSG B				
	46,472			od, HSG C				
	208,119		•	od, HSG D				
*	33,483		mpervious					
	3,270	96 (Gravel surfa	ace, HSG <i>P</i>	4			
	274,758		Weighted Average					
	241,275		99.22% Pervious Area					
	33,483	C).78% Impe	ervious Are	a			
_		01			B			
Tc	Length	Slope	Velocity	Capacity	Description			
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
16.5	100	0.0200	0.10		Sheet Flow,			
					Grass: Dense n= 0.240 P2= 2.40"			
6.4	848	0.1000	2.21		Shallow Concentrated Flow,			
					Short Grass Pasture Kv= 7.0 fps			
52.3	2,083	0.0090	0.66		Shallow Concentrated Flow,			
					Short Grass Pasture Kv= 7.0 fps			
75.2	3,031	Total						

Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

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Summary for Subcatchment 33S:

Runoff = 6.14 cfs @ 12.83 hrs, Volume= 1.782 af, Depth= 0.21" Routed to Reach SP33 :

A	rea (sf)	CN E	Description		
1,7	22,412	58 N	/leadow, no	on-grazed,	HSG B
1,5	42,409	78 N	/leadow, no	on-grazed,	HSG D
	1,381	73 E	Brush, Goo	d, HSG D	
3	84,753	55 V	Voods, Go	od, HSG B	
8	326,436	77 V	Voods, Go	od, HSG D	
4,4	77,391	68 V	Veighted A	verage	
4,4	77,391	1	00.00% Pe	ervious Are	a
Tc	Length	Slope	Velocity	Capacity	Description
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)	
20.1	100	0.0340	0.08		Sheet Flow,
					Woods: Light underbrush n= 0.400 P2= 2.40"
24.6	932	0.0160	0.63		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
12.8	1,157	0.0460	1.50		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
0.4	60	0.3120	2.79		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
0.7	141		3.19		Direct Entry, Small Tributary & Swamp w/ Channels
58.6	2,390	Total			

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Summary for Subcatchment 34S:

Runoff = 4.66 cfs @ 12.51 hrs, Volume= 0.894 af, Depth= 0.28" Routed to Reach SP35 :

A	rea (sf)	CN D	escription				
	20,254	58 N	leadow, no	on-grazed,	HSG B		
9	37,330	78 M	leadow, no	on-grazed,	HSG D		
	16,371	48 B	rush, Goo	d, HSG B			
	35,437		Brush, Good, HSG D				
	29,230		Woods, Good, HSG B				
2	20,205	77 V	Voods, Go	od, HSG D			
,	58,827		Veighted A	•			
1,6	58,827	1	00.00% Pe	ervious Are	a		
_							
Tc	Length	Slope	Velocity	Capacity	Description		
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)			
20.5	100	0.0320	0.08		Sheet Flow,		
					Woods: Light underbrush n= 0.400 P2= 2.40"		
2.9	130	0.0220	0.74		Shallow Concentrated Flow,		
					Woodland Kv= 5.0 fps		
18.3	1,058	0.0190	0.96		Shallow Concentrated Flow,		
					Short Grass Pasture Kv= 7.0 fps		
0.3	155		8.93		Direct Entry, Small tributary & Swamp w/channels		
42.0	1,443	Total					

Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

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Summary for Subcatchment 35S:

Runoff = 20.26 cfs @ 12.24 hrs, Volume= 2.190 af, Depth= 0.43" Routed to Reach SP35 :

_	Aı	ea (sf)	CN E	escription				
32,311 58 Meadow, non-grazed, HS						HSG B		
		36,347	71 N	∕leadow, no	on-grazed, l	HSG C		
	1,4	45,641			on-grazed, l	HSG D		
		26,860	73 E	Brush, Goo	d, HSG D			
		50,341		,	od, HSG B			
		79,608			od, HSG C			
		04,736		•	od, HSG D			
		82,102				& sewers, HSG D		
_		76,832	96 G	Gravel surfa	ace, HSG D)		
	2,6	34,778		Veighted A				
	2,3	52,676	8	89.29% Pervious Area				
	2	82,102	1	10.71% Impervious Area				
	_							
	Tc	Length	Slope	Velocity	Capacity	Description		
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)			
	2.4	100	0.0050	0.68		Sheet Flow,		
						Smooth surfaces n= 0.011 P2= 2.40"		
	2.6	755	0.0590	4.93		Shallow Concentrated Flow,		
						Paved Kv= 20.3 fps		
	2.5	438		2.91		Direct Entry,		
	17.6	1,445	0.0380	1.36		Shallow Concentrated Flow,		
						Short Grass Pasture Kv= 7.0 fps		
_	1.0	351		5.94		Direct Entry, Small Tributary & Swamp w/ Channels		
	26.1	3.089	Total					

Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

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Summary for Subcatchment 36S:

Runoff = 43.74 cfs @ 12.40 hrs, Volume= 6.020 af, Depth= 0.47" Routed to Reach SP36 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 1-yr Rainfall=2.04"

_	Area (s	sf) CN	l [Description				
	52,18	34 58	3 N	/leadow, no	on-grazed,	HSG B		
	69	95 71	l 1	/leadow, no	on-grazed,	HSG C		
	5,121,40)5 78	3 N	/leadow, no	on-grazed,	HSG D		
	1,14	15 48	3 E	Brush, Goo				
	33,87	70 73	3 E	Brush, Goo	d, HSG D			
	278,87	76 55	5 V	Voods, Go	od, HSG B			
	346,11	17 70	70 Woods, Good, HSG C					
	782,90)2 77	77 Woods, Good, HSG D					
	65,61	16 98	3 F	Paved road	s w/curbs &	R sewers, HSG D		
_	14,65	51 96	6	Gravel surfa	ace, HSG [)		
	6,697,46	31 77	7 V	Veighted A	verage			
	6,631,84	1 5	9	9.02% Pei	vious Area			
	65,61	16	C	.98% Impe	ervious Area	a		
	Tc Len	gth SI	ope	Velocity	Capacity	Description		
_	(min) (fe	et) (ft/ft)	(ft/sec)	(cfs)			
	20.4					Direct Entry, SEE SDDEADUSEET		

38.4

Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

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Summary for Subcatchment 37S:

Runoff = 25.26 cfs @ 12.42 hrs, Volume= 3.557 af, Depth= 0.47" Routed to Reach SP37 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 1-yr Rainfall=2.04"

	Area (sf)	CN	Description
*	30,667	98	Impervious
	13,321	96	Gravel surface, HSG A
*	7,485	98	Water
	57,778	58	Meadow, non-grazed, HSG B
	3,215,975	78	Meadow, non-grazed, HSG D
	805	48	Brush, Good, HSG B
	915	73	Brush, Good, HSG D
	76,106	55	Woods, Good, HSG B
	148,513	70	Woods, Good, HSG C
_	406,259	77	Woods, Good, HSG D
	3,957,824	77	Weighted Average
	3,919,672		99.04% Pervious Area
	38,152		0.96% Impervious Area
	-	01	V I '' O '' D ''
	Tc Length	Slop	
_	(min) (feet)	(ft/	
	20.0		Dina at Finting OFF ODDE A DOUGET

39.6

Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

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Summary for Subcatchment 38S:

Runoff = 4.83 cfs @ 12.40 hrs, Volume= 0.660 af, Depth= 0.47" Routed to Reach SP38 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 1-yr Rainfall=2.04"

_	Area	a (sf)	CN				
	355	5,232	78	Meadow, no	on-grazed,	HSG D	
	379	9,321	77	Woods, Go	od, HSG D		
734,553 77 Weighted Average				Weighted A	verage		
734,553				100.00% Pe	ervious Are	а	
	Tc L	.ength	Slope	e Velocity	Capacity	Description	
_	(min)	(feet)	(ft/ft) (ft/sec)	(cfs)		
	00.4					D:	OFF ODDE A DOLLEFT

38.1

Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

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Summary for Subcatchment 39S:

Runoff = 7.84 cfs @ 12.67 hrs, Volume= 1.615 af, Depth= 0.34" Routed to Reach SP39 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 1-yr Rainfall=2.04"

	Area (sf)	CN	Description		
	113,238	30	Woods, Good	I, HSG A	
*	17,184	98	Impervious Pa	avement	
	149,774	30	Meadow, non-	-grazed, I	HSG A
	11,690	30	Brush, Good,	HSG A	
	30,170	70	Woods, Good	I, HSG C	
	7,231	71	Meadow, non-	-grazed, I	HSG C
	194,104	77	Woods, Good	I, HSG D	
	70,193	73	Brush, Good,	HSG D	
*	2,287	96	Gravel		
_	1,899,537	78	Meadow, non-	-grazed, l	HSG D
	2,495,408	73	Weighted Ave	erage	
	2,478,224		99.31% Pervi	ous Area	1
	17,184		0.69% Imperv	ious Area	a
	Tc Length	Slop	oe Velocity (Capacity	Description
	(min) (feet)	(ft/	ft) (ft/sec)	(cfs)	
	E 4 . 4				Direct Fater OFF ODDE A DOLLET

54.4

Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

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Summary for Subcatchment 40S:

Runoff = 17.96 cfs @ 12.53 hrs, Volume= 2.792 af, Depth= 0.51" Routed to Reach SP40 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 1-yr Rainfall=2.04"

	Aı	rea (sf)	CN	Description			
*		26,987	98	Impervious	Pavement		
	1	71,417	77	Woods, Go	od, HSG D		
		20,992	73	Brush, Goo	d, HSG D		
	2,6	58,700	78	Meadow, no	on-grazed,	HSG D	
	2,8	78,096	78	Weighted A	verage		
	2,8	51,109		99.06% Per	vious Area		
		26,987		0.94% Impe	ervious Area	a	
	Тс	Length	Slop	e Velocity	Capacity	Description	
	(min)	(feet)	(ft/ft	,	(cfs)	Description	
_		(ieet)	(11/11)	(10/360)	(013)		
	17 2					Divoct Enter	

47.3

Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

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Summary for Subcatchment 41S:

Runoff = 3.07 cfs @ 12.57 hrs, Volume= 0.594 af, Depth= 0.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 1-yr Rainfall=2.04"

	Area (sf)	CN	Description
*	16,863	98	Impervious
*	44,367	96	Gravel
	50,657	58	Meadow, non-grazed, HSG B
	654,398	71	Meadow, non-grazed, HSG C
	153,128	78	Meadow, non-grazed, HSG D
	12,946	55	Woods, Good, HSG B
	30,598	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
	33,461	61	>75% Grass cover, Good, HSG B
	6,740	74	>75% Grass cover, Good, HSG C
	1,003,158	72	Weighted Average
	986,295		98.32% Pervious Area
	16,863		1.68% Impervious Area
	Tc Length	Slop	pe Velocity Capacity Description
(r	min) (feet)	(ft/	ft) (ft/sec) (cfs)
	40 F		Discret Fator OFF ODDE ADOLLET

46.5

Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

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Summary for Subcatchment 42S:

24.88 cfs @ 13.20 hrs, Volume= 6.752 af, Depth= 0.47" Runoff Routed to Reach SP42:

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 1-yr Rainfall=2.04"

Aı	rea (sf)	CN	Description			
	20,734	98	Water Surfa	ace, HSG A	1	
1	70,414	96	Gravel surfa	ace, HSG A	4	
9	56,587	71	Meadow, no	on-grazed,	HSG C	
5,2	27,848	78	Meadow, no	on-grazed,	HSG D	
	287	65	Brush, Goo	d, HSG C		
	56,930	73	Brush, Goo	d, HSG D		
	32,944	70	Woods, Go	od, HSG C		
1,0	46,689	77	Woods, Go	od, HSG D		
7,5	12,433	77	Weighted A	verage		
7,4	91,699		99.72% Pei	vious Area		
	20,734		0.28% Impe	ervious Area	a	
Tc	Length	Slop	e Velocity	Capacity	Description	
(min)	(feet)	(ft/f	t) (ft/sec)	(cfs)		
96.3					Direct Entry, SEE SPREADSHEET	

Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

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Summary for Subcatchment 43S:

Runoff = 14.50 cfs @ 12.55 hrs, Volume= 2.378 af, Depth= 0.47" Routed to Reach SP43 :

	Ar	ea (sf)	CN	Description		
*		2,810	98	Impervious		
	4	40,724	71	Meadow, n	on-grazed,	HSG C
	2,1	72,158	78	Meadow, n	on-grazed,	HSG D
		11,726	70	Woods, Go	od, HSG C	
		18,430	77	Woods, Go	od, HSG D	
	2,64	45,848	77	Weighted A	verage	
	2,64	43,038		99.89% Pe	rvious Area	
		2,810		0.11% Impe	ervious Are	a
	Tc	Length	Slop	•	Capacity	Description
(r	nin)	(feet)	(ft/f	t) (ft/sec)	(cfs)	
4	48.7					Direct Entry, SEE SPREADSHEET

Type II 24-hr 1-yr Rainfall=2.04"

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Summary for Subcatchment 44S:

18.78 cfs @ 13.26 hrs, Volume= 4.972 af, Depth= 0.51" Runoff Routed to Reach SP44:

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 1-yr Rainfall=2.04"

	Area (sf)	CN	Description
*	136,522	98	Water
*	27,820	98	Impervious
*	4,835	96	Gravel
	146,073	58	Meadow, non-grazed, HSG B
	90,051	71	Meadow, non-grazed, HSG C
	4,232,980	78	Meadow, non-grazed, HSG D
	82,986	73	Brush, Good, HSG D
	6,012	55	Woods, Good, HSG B
	3,850	70	Woods, Good, HSG C
	395,055	77	Woods, Good, HSG D
	5,126,184	78	Weighted Average
	4,961,842		96.79% Pervious Area
	164,342		3.21% Impervious Area
	Tc Length	Slop	pe Velocity Capacity Description
(min) (feet)	(ft/	ft) (ft/sec) (cfs)
	07.4		D: 4 F 4 OFF ORDEADOUEFT

97.1

Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

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Summary for Subcatchment 44SA:

Runoff = 7.63 cfs @ 12.22 hrs, Volume= 0.762 af, Depth= 0.51" Routed to Reach SP44A :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 1-yr Rainfall=2.04"

	Area (sf)	CN	Description
*	8,459	98	Water
*	21,218	98	Impervious
*	12,958	96	Gravel
	4,574	58	Meadow, non-grazed, HSG B
	57,514	71	Meadow, non-grazed, HSG C
	588,570	78	Meadow, non-grazed, HSG D
	988	48	Brush, Good, HSG B
	17,587	73	Brush, Good, HSG D
	2,222	55	Woods, Good, HSG B
	22,179	70	Woods, Good, HSG C
	49,212	77	Woods, Good, HSG D
	785,481	78	Weighted Average
	755,804		96.22% Pervious Area
	29,677		3.78% Impervious Area
	Tc Length	Slop	pe Velocity Capacity Description
(min) (feet)	(ft/f	ft) (ft/sec) (cfs)
	0E E		Direct Entry SEE SDDEADSUEET

25.5

Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

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Summary for Subcatchment 45S:

Runoff = 6.26 cfs @ 12.26 hrs, Volume= 0.654 af, Depth= 0.59" Routed to nonexistent node SP46

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 1-yr Rainfall=2.04"

_	Area (sf)	CN	Description						
*	49,323	98	Impervious						
	33,429	77	Woods, Go	od, HSG D					
	12,134	73	Brush, Goo	d, HSG D					
*	720	96	Gravel						
	478,790	78	Meadow, no	dow, non-grazed, HSG D					
*	7,562	98	Water						
	581,958	80	Weighted Average						
	525,073		90.23% Pervious Area						
	56,885		9.77% Impe	rvious Are	a				
	Tc Length	Slo	,	Capacity	Description				
_	(min) (feet)	(ft/	ft) (ft/sec)	(cfs)					
	00.4				Discort Forting OFF ODDE ADOLLET				

29.1

Type II 24-hr 1-yr Rainfall=2.04"

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Summary for Subcatchment 46S:

Runoff 8.67 cfs @ 12.64 hrs, Volume= 1.636 af, Depth= 0.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 1-yr Rainfall=2.04"

Tc Len (min) (fe	gth S eet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description		
Tc Len	gth S	Slope	Velocity	Capacity	Description		
2,133,96	69	1	00.00% Pe	ervious Area	а		
2,133,969 75 Weighted Average				verage			
27,326 73 Brush, Good, HSG D							
					HSG D		
229,88	82 5		,	,			
367,923 77 Woods, Good, HSG D				od, HSG D			
Area (s	Area (sf) CN Description						
	367,92 229,83 1,508,83 27,33 2,133,90	367,923 7 229,882 5 1,508,838 7 27,326 7	367,923 77 V 229,882 55 V 1,508,838 78 M 27,326 73 B 2,133,969 75 V	367,923 77 Woods, Goo 229,882 55 Woods, Goo 1,508,838 78 Meadow, no 27,326 73 Brush, Goo 2,133,969 75 Weighted A	367,923 77 Woods, Good, HSG D 229,882 55 Woods, Good, HSG B 1,508,838 78 Meadow, non-grazed, 27,326 73 Brush, Good, HSG D 2,133,969 75 Weighted Average	367,923 77 Woods, Good, HSG D 229,882 55 Woods, Good, HSG B 1,508,838 78 Meadow, non-grazed, HSG D 27,326 73 Brush, Good, HSG D 2,133,969 75 Weighted Average	367,923 77 Woods, Good, HSG D 229,882 55 Woods, Good, HSG B 1,508,838 78 Meadow, non-grazed, HSG D 27,326 73 Brush, Good, HSG D 2,133,969 75 Weighted Average 2,133,969 100.00% Pervious Area

53.8

Type II 24-hr 1-yr Rainfall=2.04" Printed 7/11/2024

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Summary for Subcatchment 47S:

Runoff = 12.52 cfs @ 12.65 hrs, Volume= 2.224 af, Depth= 0.51" Routed to Reach SP47 :

	Area (s	f) CN		escription					
*	23,84	6 98	Ir	Impervious					
*	10,90	0 96	G	ravel					
	2,186,70	3 78	Ν	1eadow, no	on-grazed, l	HSG D			
	15,31	0 73	В	rush, Goo	d, HSG D				
	56,45	9 77	٧	Voods, Go	od, HSG D				
	2,293,21	8 78	٧	Veighted A	verage				
	2,269,37	2	9	8.96% Per	vious Area				
	23,84	-6	1	.04% Impe	ervious Area	a			
	Tc Lenç	gth Slo	ope	Velocity	Capacity	Description			
	(min) (fe	et) (f	t/ft)	(ft/sec)	(cfs)				
	56.5					Direct Entry, SEE SPREADSHEET			

Type II 24-hr 10-yr Rainfall=3.42" Printed 7/11/2024

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Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Runoff Area=3,020,873 sf 2.29% Impervious Runoff Depth=0.71"

Flow Length=3,272' Tc=52.0 min CN=65 Runoff=22.85 cfs 4.106 af

Subcatchment 3S: Runoff Area=324,754 sf 0.00% Impervious Runoff Depth=0.67"

Flow Length=836' Tc=23.1 min CN=64 Runoff=4.00 cfs 0.413 af

Subcatchment 4S: Runoff Area=16,260,538 sf 1.60% Impervious Runoff Depth=0.96"

Flow Length=7,788' Tc=76.3 min CN=70 Runoff=140.28 cfs 29.834 af

Subcatchment 5S: Runoff Area=1,679,234 sf 4.90% Impervious Runoff Depth=1.13"

Flow Length=1,495' Tc=34.3 min CN=73 Runoff=32.00 cfs 3.618 af

Subcatchment 6S: Runoff Area=598,623 sf 0.00% Impervious Runoff Depth=1.07"

Flow Length=1,150' Tc=39.7 min CN=72 Runoff=9.64 cfs 1.224 af

Subcatchment 7S: Runoff Area=10,734,763 sf 0.11% Impervious Runoff Depth=0.96"

Flow Length=6,505' Tc=76.1 min CN=70 Runoff=93.03 cfs 19.696 af

Subcatchment 8S: Runoff Area=1,124,521 sf 2.07% Impervious Runoff Depth=1.01"

Flow Length=2,618' Tc=29.5 min CN=71 Runoff=20.86 cfs 2.180 af

Subcatchment 9S: Runoff Area=698,860 sf 9.80% Impervious Runoff Depth=1.31"

Flow Length=1,212' Tc=81.2 min CN=76 Runoff=8.47 cfs 1.748 af

Subcatchment 10S: Runoff Area=1,561,270 sf 0.00% Impervious Runoff Depth=1.31"

Flow Length=2,211' Tc=88.4 min CN=76 Runoff=17.83 cfs 3.906 af

Subcatchment 115: Runoff Area=521,344 sf 3.42% Impervious Runoff Depth=1.50"

Flow Length=1,039' Tc=43.1 min CN=79 Runoff=11.92 cfs 1.500 af

Subcatchment 12S: Runoff Area=1,437,516 sf 0.62% Impervious Runoff Depth=1.44"

Flow Length=2,388' Tc=104.6 min CN=78 Runoff=16.04 cfs 3.951 af

Subcatchment 13S: Runoff Area=2,395,812 sf 0.00% Impervious Runoff Depth=1.19"

Flow Length=2,356' Tc=84.2 min CN=74 Runoff=25.18 cfs 5.431 af

Subcatchment 14S: Runoff Area=516,650 sf 1.75% Impervious Runoff Depth=1.31"

Flow Length=935' Tc=36.6 min CN=76 Runoff=11.25 cfs 1.292 af

Subcatchment 15S: Runoff Area=329,223 sf 1.24% Impervious Runoff Depth=0.76"

Flow Length=707' Tc=30.6 min CN=66 Runoff=4.01 cfs 0.477 af

Subcatchment 16S: Runoff Area=1,134,608 sf 1.12% Impervious Runoff Depth=1.44"

Flow Length=1,611' Tc=58.8 min CN=78 Runoff=19.62 cfs 3.119 af

Subcatchment 16SA: Runoff Area=657,258 sf 1.69% Impervious Runoff Depth=1.31"

Tc=39.9 min CN=76 Runoff=13.47 cfs 1.644 af

	.02 6.
Flat Creek Pre Prepared by TRC HydroCAD® 10.10-7b s/n 01402 © 20	Type II 24-hr 10-yr Rainfall=3.42" Printed 7/11/2024 D22 HydroCAD Software Solutions LLC Page 68
Subcatchment 17S:	Runoff Area=6,847,928 sf 0.59% Impervious Runoff Depth=1.37" Flow Length=4,736' Tc=94.5 min CN=77 Runoff=78.53 cfs 17.966 af
Subcatchment 18S:	Runoff Area=4,001,602 sf 0.41% Impervious Runoff Depth=1.37" Flow Length=3,889' Tc=66.4 min CN=77 Runoff=59.93 cfs 10.498 af
Subcatchment 19S:	Runoff Area=5,028,770 sf 0.59% Impervious Runoff Depth=1.31" Flow Length=4,703' Tc=80.9 min CN=76 Runoff=61.10 cfs 12.579 af
Subcatchment 20S:	Runoff Area=2,479,797 sf 2.23% Impervious Runoff Depth=1.19" Tc=71.1 min CN=74 Runoff=29.55 cfs 5.622 af
Subcatchment 21S:	Runoff Area=332,609 sf 6.38% Impervious Runoff Depth=0.91" Flow Length=921' Tc=31.9 min CN=69 Runoff=5.05 cfs 0.577 af
Subcatchment 22S:	Runoff Area=785,644 sf 0.79% Impervious Runoff Depth=0.91" Flow Length=1,439' Tc=53.3 min CN=69 Runoff=8.22 cfs 1.362 af
Subcatchment 23S:	Runoff Area=17,302,399 sf 0.42% Impervious Runoff Depth=1.31" Flow Length=9,131' Tc=88.7 min CN=76 Runoff=196.79 cfs 43.282 af
Subcatchment 24S:	Runoff Area=260,905 sf 6.43% Impervious Runoff Depth=1.50" Flow Length=1,200' Tc=31.2 min CN=79 Runoff=7.47 cfs 0.751 af
Subcatchment 25S:	Runoff Area=10,643,407 sf 0.28% Impervious Runoff Depth=1.25" Flow Length=7,278' Tc=71.0 min CN=75 Runoff=135.13 cfs 25.360 af
Subcatchment 26S:	Runoff Area=823,994 sf 2.72% Impervious Runoff Depth=1.44" Flow Length=1,347' Tc=43.1 min CN=78 Runoff=17.88 cfs 2.265 af
Subcatchment 27S:	Runoff Area=1,317,635 sf 4.05% Impervious Runoff Depth=1.01" Flow Length=3,107' Tc=46.4 min CN=71 Runoff=17.67 cfs 2.554 af
Subcatchment 28S:	Runoff Area=2,868,130 sf 1.43% Impervious Runoff Depth=1.13" Flow Length=2,822' Tc=32.9 min CN=73 Runoff=56.32 cfs 6.179 af

Subcatchment 29S:

Runoff Area=776,122 sf 2.65% Impervious Runoff Depth=1.19"
Flow Length=1,737' Tc=24.4 min CN=74 Runoff=19.81 cfs 1.760 af

Subcatchment 30S: Runoff Area=618,450 sf 1.49% Impervious Runoff Depth=1.07" Flow Length=1,427' Tc=38.4 min CN=72 Runoff=10.18 cfs 1.265 af

Subcatchment 31S:Runoff Area=2,981,588 sf 0.44% Impervious Runoff Depth=1.19"
Flow Length=1,885' Tc=60.7 min CN=74 Runoff=39.94 cfs 6.759 af

Subcatchment 32S:Runoff Area=4,274,758 sf 0.78% Impervious Runoff Depth=0.67"

Flow Length=3,031' Tc=75.2 min CN=64 Runoff=22.66 cfs 5.439 af

Subcatchment 33S:Runoff Area=4,477,391 sf 0.00% Impervious Runoff Depth=0.86"
Flow Length=2,390' Tc=58.6 min CN=68 Runoff=40.42 cfs 7.326 af

Type II 24-hr 10-yr Rainfall=3.42"

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Subcatchment 34S: Runoff Area=1,658,827 sf 0.00% Impervious Runoff Depth=1.01"

Flow Length=1,443' Tc=42.0 min CN=71 Runoff=23.92 cfs 3.215 af

Subcatchment 35S: Runoff Area=2,634,778 sf 10.71% Impervious Runoff Depth=1.31"

Flow Length=3,089' Tc=26.1 min CN=76 Runoff=72.29 cfs 6.591 af

Subcatchment 36S: Runoff Area=6,697,461 sf 0.98% Impervious Runoff Depth=1.37"

Tc=38.4 min CN=77 Runoff=149.27 cfs 17.571 af

Subcatchment 37S: Runoff Area=3,957,824 sf 0.96% Impervious Runoff Depth=1.37"

Tc=39.6 min CN=77 Runoff=86.22 cfs 10.383 af

Subcatchment 38S: Runoff Area=734,553 sf 0.00% Impervious Runoff Depth=1.37"

Tc=38.1 min CN=77 Runoff=16.44 cfs 1.927 af

Subcatchment 39S: Runoff Area=2,495,408 sf 0.69% Impervious Runoff Depth=1.13"

Tc=54.4 min CN=73 Runoff=34.06 cfs 5.376 af

Subcatchment 40S: Runoff Area=2,878,096 sf 0.94% Impervious Runoff Depth=1.44"

Tc=47.3 min CN=78 Runoff=58.44 cfs 7.911 af

Subcatchment 41S: Runoff Area=1,003,158 sf 1.68% Impervious Runoff Depth=1.07"

Tc=46.5 min CN=72 Runoff=14.38 cfs 2.051 af

Subcatchment 42S: Runoff Area=7,512,433 sf 0.28% Impervious Runoff Depth=1.37"

Tc=96.3 min CN=77 Runoff=85.06 cfs 19.709 af

Subcatchment 43S: Runoff Area=2,645,848 sf 0.11% Impervious Runoff Depth=1.37"

Tc=48.7 min CN=77 Runoff=49.77 cfs 6.941 af

Subcatchment 44S: Runoff Area=5,126,184 sf 3.21% Impervious Runoff Depth=1.44"

Tc=97.1 min CN=78 Runoff=60.50 cfs 14.091 af

Subcatchment 44SA: Runoff Area=785,481 sf 3.78% Impervious Runoff Depth=1.44"

Tc=25.5 min CN=78 Runoff=24.34 cfs 2.159 af

Subcatchment 45S: Runoff Area=581,958 sf 9.77% Impervious Runoff Depth=1.57"

Tc=29.1 min CN=80 Runoff=18.30 cfs 1.751 af

Subcatchment 46S: Runoff Area=2,133,969 sf 0.00% Impervious Runoff Depth=1.25"

Tc=53.8 min CN=75 Runoff=33.26 cfs 5.085 af

Subcatchment 47S: Runoff Area=2,293,218 sf 1.04% Impervious Runoff Depth=1.44"

Tc=56.5 min CN=78 Runoff=40.83 cfs 6.304 af

Total Runoff Area = 3,488.434 ac Runoff Volume = 346.749 af Average Runoff Depth = 1.19" 98.81% Pervious = 3,446.971 ac 1.19% Impervious = 41.462 ac

Type II 24-hr 10-yr Rainfall=3.42" Printed 7/11/2024

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Summary for Subcatchment 1S:

Runoff = 22.85 cfs @ 12.61 hrs, Volume= 4.106 af, Depth= 0.71" Routed to Reach SP1 :

_	Α	rea (sf)	CN [Description		
		94,531	77 V	Voods, Go	od, HSG D	
	196,024 55 Woods, Good, HSG B					
		9,804	48 E	Brush, Goo	d, HSG B	
		8,870	73 E	Brush, Goo	d, HSG D	
*		69,062	98 I	mpervious	Pavement	
	1,853,031 58 Meadow, non-grazed, H					
789,551 78 Meadow, non-grazed, H					on-grazed,	HSG D
	3,0	20,873	65 V	Veighted A	verage	
	2,9	51,811	S	7.71% Per	vious Area	
		69,062	2	2.29% Impe	ervious Area	a
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	26.7	100	0.0060	0.06		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.40"
	15.8	784	0.0140	0.83		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
_	9.5	2,388		4.20		Direct Entry, Small Tributary & Swamp w/ Channels
	52 N	3 272	Total			

Type II 24-hr 10-yr Rainfall=3.42" Printed 7/11/2024

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Summary for Subcatchment 3S:

Runoff = 4.00 cfs @ 12.20 hrs, Volume= 0.413 af, Depth= 0.67" Routed to Reach SP3 :

A	rea (sf)	CN [Description		
	1,021	55 \	Woods, Go	od, HSG B	
2	23,581	58 N	Meadow, no	on-grazed,	HSG B
	1,749	73 E	Brush, Goo	d, HSG D	
	969	77 \	Woods, Go	od, HSG D	
	97,434	78 N	∕leadow, no	on-grazed,	HSG D
3	24,754	64 \	Veighted A	verage	
3	24,754	1	100.00% Pe	ervious Are	a
Tc	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
11.4	100	0.0500	0.15		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.40"
2.6	241	0.0500	1.57		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
8.1	445	0.0170	0.91		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
1.0	50	0.0300	0.87		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
23.1	836	Total			

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Summary for Subcatchment 4S:

- [47] Hint: Peak is 1686% of capacity of segment #4
- [47] Hint: Peak is 504% of capacity of segment #7
- [47] Hint: Peak is 1008% of capacity of segment #9
- [47] Hint: Peak is 435% of capacity of segment #11
- [47] Hint: Peak is 4789% of capacity of segment #13
- [47] Hint: Peak is 416% of capacity of segment #15

Runoff = 140.28 cfs @ 12.93 hrs, Volume= 29.834 af, Depth= 0.96" Routed to Reach SP4 :

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	Area (sf)	CN	Description
	5,031	48	Brush, Good, HSG B
*	29,184	98	Impervious Pavement
*	9,824	98	Impervious Roof
	708,087	58	Meadow, non-grazed, HSG B
	34,201	55	Woods, Good, HSG B
	34,999	73	Brush, Good, HSG D
	320,256	77	Woods, Good, HSG D
	1,271	70	Woods, Good, HSG C
	170,830	71	Meadow, non-grazed, HSG C
*	2,590	96	Gravel
*	29,099	98	Impervious Pavement
*	287	98	Impervious Roof
	3,181,257	78	Meadow, non-grazed, HSG D
	9,634	48	Brush, Good, HSG B
	868,528	55	Woods, Good, HSG B
*	30,257	98	Impervious Pavement
*	10,455	98	Impervious Roof
*	4,215	96	Gravel
	2,040,672	58	Meadow, non-grazed, HSG B
	38,512	78	Meadow, non-grazed, HSG D
	55,419	77	Woods, Good, HSG D
	334,887	78	Meadow, non-grazed, HSG D
	26,398	73	Brush, Good, HSG D
*	20,636	98	Impervious Pavement
	885,711	77	Woods, Good, HSG D
*	4,759	96	Gravel
	2,163,012	78	Meadow, non-grazed, HSG D
*	10,062	98	Impervious Roof
*	13,878	98	Impervious Pavement
*	13,754	96	Gravel
*	15,803	98	Water
	777,230	55	Woods, Good, HSG B
	16,892	48	Brush, Good, HSG B
	1,287,972	58	Meadow, non-grazed, HSG B
*	72,761	98	Impervious Pavement
*	14,040	98	Impervious Roof
*	1,010	96	Gravel
	91,670	77	Woods, Good, HSG D
	16,841	73	Brush, Good, HSG D
	1,693,872	78	Meadow, non-grazed, HSG D
	55,622	55	Woods, Good, HSG B
*	4,369	98	Impervious Pavement
	643,096	58	Meadow, non-grazed, HSG B
	41,645	70	Woods, Good, HSG C
	470,010	71	Meadow, non-grazed, HSG C
	16,260,538	70	Weighted Average
	15,999,883		98.40% Pervious Area
	260,655		1.60% Impervious Area

Type II 24-hr 10-yr Rainfall=3.42" Printed 7/11/2024

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00.7 400 0.0000 0.00 0 lass4 F lass	
26.7 100 0.0060 0.06 Sheet Flow,	
Grass: Dense n= 0.240 P2= 2.40"	
5.4 277 0.0150 0.86 Shallow Concentrated Flow,	
Short Grass Pasture Kv= 7.0 fps	
5.6 778 0.0240 2.32 Shallow Concentrated Flow,	
Grassed Waterway Kv= 15.0 fps 0.3 40 0.0050 2.65 8.32 Pipe Channel,	
0.3 40 0.0050 2.65 8.32 Pipe Channel , 24.0" Round Area= 3.1 sf Perim= 6.3' r=	- 0 50'
n= 0.025 Corrugated metal	- 0.50
2.1 741 5.90 Direct Entry, Small Tributary & Swamp w	w/ Channole
1.8 401 3.76 Direct Entry, Small Tributary & Swamp w	
0.0 18 0.0560 8.86 27.84 Pipe Channel ,	W G Harmons
24.0" Round Area= 3.1 sf Perim= 6.3' r=	= 0.50'
n= 0.025 Corrugated metal	
2.3 605 4.30 Direct Entry, Small Tributary & Swamp w	v/ Channels
0.1 36 0.0140 4.43 13.92 Pipe Channel ,	
24.0" Round Area= 3.1 sf Perim= 6.3' r=	= 0.50'
n= 0.025 Corrugated metal	
2.3 627 4.46 Direct Entry, Small Tributary & Swamp w	v/ Channels
0.1 40 0.0750 10.25 32.22 Pipe Channel ,	
24.0" Round Area= 3.1 sf Perim= 6.3' r=	= 0.50'
n= 0.025 Corrugated metal	
2.1 527 4.20 Direct Entry, Small Tributary & Swamp w 0.2 40 0.0250 3.73 2.93 Pipe Channel,	w/ Channels
0.2 40 0.0250 3.73 2.93 Pipe Channel , 12.0" Round Area= 0.8 sf Perim= 3.1' r=	- 0.25'
n= 0.025 Corrugated metal	- 0.23
4.0 593 2.47 Direct Entry, Roadside Ditch	
0.1 40 0.0250 6.87 33.72 Pipe Channel ,	
30.0" Round Area= 4.9 sf Perim= 7.9' r=	= 0.63'
n= 0.025 Corrugated metal	0.00
23.2 2,925 2.10 Direct Entry, Small Tributary & Swamp w	v/ Channels
76.3 7,788 Total	

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Summary for Subcatchment 5S:

Runoff = 32.00 cfs @ 12.32 hrs, Volume= 3.618 af, Depth= 1.13" Routed to Reach SP4 :

	Aı	rea (sf)	CN [Description		
*		11,333	96 (Gravel		
	1	36,520	70 V	Voods, Go	od, HSG C	
*		438	98 I	mpervious	Pavement	
*		6,831	98 I	mpervious	Roof	
*		7,136	98 \	Vater		
	9	15,909	71 N	∕leadow, no	on-grazed,	HSG C
		57,613		Voods, Go	od, HSG B	
*		1,117	98 I	mpervious	Pavement	
		3,366		Brush, Goo	d, HSG B	
*		813		Gravel		
		60,234		∕leadow, no	on-grazed,	HSG B
*		66,794		Vater		
_		6,417		Brush, Goo	d, HSG D	
*		3,263		Gravel		
		517			od, HSG D	
		99,842			on-grazed,	
_		01,091			on-grazed,	HSG D
	,	79,234		Veighted A	•	
	,	96,918			vious Area	
		82,316	2	1.90% Impe	ervious Area	a
	Тс	Length	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	Description
_	19.6	100	0.0130	0.09	(0.0)	Sheet Flow,
	13.0	100	0.0130	0.09		Grass: Dense n= 0.240 P2= 2.40"
	12.9	842	0.0240	1.08		Shallow Concentrated Flow,
	12.0	072	J.UZ-70	1.00		Short Grass Pasture Kv= 7.0 fps
	1.2	311		4.42		Direct Entry, Grassed Waterway
	0.6	242		6.54		Direct Entry, Grassed Waterway
	34.3	1,495	Total	2.31		

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Summary for Subcatchment 6S:

Runoff = 9.64 cfs @ 12.40 hrs, Volume= 1.224 af, Depth= 1.07" Routed to Reach SP6 :

Are	ea (sf)	CN E	Description		
2	23,122	70 V	Voods, Go	od, HSG C	
3	31,419	65 E	Brush, Goo	d, HSG C	
43	37,478	71 N	/leadow, no	on-grazed,	HSG C
1	1,524	73 E	Brush, Goo	d, HSG D	
	2,524	77 V	Voods, Go	od, HSG D	
5	55,990	78 N	/leadow, no	on-grazed,	HSG D
	1,516	70 V	Voods, Go	od, HSG C	
	2,812	77 V	Voods, Go	od, HSG D	
2	20,186	78 N	/leadow, no	on-grazed,	HSG D
1	2,052	71 N	/leadow, no	on-grazed,	HSG C
59	8,623	72 V	Veighted A	verage	
59	8,623	1	00.00% Pe	ervious Are	a
Tc	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
28.7	100	0.0050	0.06		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.40"
4.3	256	0.0200	0.99		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
2.5	341	0.1030	2.25		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
2.4	316	0.1870	2.16		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
1.8	137		1.26		Direct Entry, Grassed Waterway
39.7	1,150	Total			

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Summary for Subcatchment 7S:

Runoff = 93.03 cfs @ 12.93 hrs, Volume= 19.696 af, Depth= 0.96" Routed to Reach SP7 :

_	Α	rea (sf)	CN [Description		
	2,8	22,055	58 N	Лeadow, no	on-grazed,	HSG B
		23,489		Brush, Goo	,	
		40,040		Voods, Go	,	
	2,2	69,487		∕leadow, no		HSG C
		2,183		Brush, Goo	,	
		37,505		Voods, Go		
	,	42,616		Meadow, no		HSG D
		53,119		Brush, Goo	,	
*		29,743		Woods, Go	od, HSG D	
•		11,894		mpervious		
_		2,632		Gravel		
	,	34,763		Weighted A		
		22,869	-	99.89% Per		
		11,894	().11% Impe	ervious Are	a
	Тс	Length	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	·
	16.8	100	0.0190	0.10		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.40"
	5.4	449	0.0390	1.38		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
	8.2	512	0.0220	1.04		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
	20.3	945	0.0240	0.77		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
	3.6	192	0.0310	0.88		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
	14.9	3,312	0.0500	3.70		Direct Entry, Small Tributary & Swamp w/ Channels
	4.1	284	0.0530	1.15		Shallow Concentrated Flow,
	2.8	711		4.30		Woodland Kv= 5.0 fps Direct Entry, Small Tributary & Swamp w/ Channels
_	76.1	6,505	Total	4.50		Direct Entry, Small Tributary & Swamp w/ Chamileis
	<i>i</i> 0. I	0,305	าบเลเ			

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Summary for Subcatchment 8S:

Runoff = 20.86 cfs @ 12.26 hrs, Volume= 2.180 af, Depth= 1.01" Routed to Reach SP8 :

	Α	rea (sf)	CN I	Description		
		0	55	Woods, Go	od, HSG B	
*		1,030	98	mpervious	Pavement	
		27,402	58 I	Meadow, no	on-grazed, l	HSG B
		15,462	77 '	Woods, Go	od, HSG D	
*		6,130	98	mpervious	Pavement	
	2	200,339	78 I	Meadow, no	on-grazed, l	HSG D
		25,785		Woods, Go	od, HSG B	
*		1,580		Gravel		
*		5,152		mpervious		
	1	91,169		Meadow, no		HSG B
*		7,435		mpervious		
		9,470		Woods, Go		
	4	23,047		Meadow, no		HSG D
		12,817		Brush, Goo	,	
*		2,902		mpervious	Pavement	
*		3,771		Gravel .	5	
*	4	670		mpervious		1100 B
_		90,360		Meadow, no		HSG B
		24,521		Weighted A	•	
		01,202		97.93% Per		
		23,319		2.07% Impe	ervious Area	a
	Тс	Length	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	•	(cfs)	2 coonpain
	12.2	100	0.0420		· /	Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.40"
	6.0	364	0.0210	1.01		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
	6.3	1,017		2.68		Direct Entry, Roadside Ditch
	5.0	1,137		3.82		Direct Entry, Roadside Ditch
-	29.5	2,618	Total			

Type II 24-hr 10-yr Rainfall=3.42" Printed 7/11/2024

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Summary for Subcatchment 9S:

Runoff = 8.47 cfs @ 12.92 hrs, Volume= 1.748 af, Depth= 1.31" Routed to Reach SP9 :

	Α	rea (sf)	CN I	Description					
*		46,629	98 \	Water					
*		6,554	98 I	mpervious	Pavement				
	4	24,080			on-grazed,				
		2,058			od, HSG B				
		7,321		Brush, Goo	d, HSG B				
*		10,739		<i></i> Vater					
*		1,356		•	Pavement				
	1	10,953			on-grazed,	HSG B			
*		3,190			Pavement				
		19,729		Brush, Goo					
_		66,251		•	on-grazed,	HSG D			
		98,860		Weighted Average					
		30,392	-		rvious Area				
		68,468	(9.80% Impe	ervious Area	a			
	То	Longth	Clana	Volocity	Canacity	Description			
	Tc	Length	Slope (ft/ft)	Velocity (ft/sec)	Capacity	Description			
_	(min)	(feet)			(cfs)	Oh a at Flavo			
	54.6	100	0.0010	0.03		Sheet Flow,			
	40.0	E40	0.0400	0.50		Grass: Dense n= 0.240 P2= 2.40"			
	18.0	540	0.0100	0.50		Shallow Concentrated Flow,			
	9.6	570		1 11		Woodland Kv= 5.0 fps Direct Entry Small Tributory & Swamp w/Channels			
_	8.6	572	.	1.11		Direct Entry, Small Tributary & Swamp w/Channels			
	81.2	1,212	Total						

Type II 24-hr 10-yr Rainfall=3.42" Printed 7/11/2024

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Summary for Subcatchment 10S:

Runoff = 17.83 cfs @ 13.05 hrs, Volume= 3.906 af, Depth= 1.31" Routed to Reach SP10 :

A	rea (sf)	CN D	escription		
	35,373	55 V	Voods, Go	od, HSG B	
	4,798	48 B	rush, Goo	d, HSG B	
	92,207	58 N	1eadow, no	on-grazed,	HSG B
	87,496	73 B	rush, Goo	d, HSG D	
	13,364	77 V	Voods, Go	od, HSG D	
1,3	28,032	78 N	leadow, no	on-grazed,	HSG D
1,5	61,270	76 V	Veighted A	verage	
1,5	61,270	1	00.00% Pe	ervious Are	a
Tc	Length	Slope	•	Capacity	Description
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)	
54.6	100	0.0010	0.03		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.40"
16.9	388	0.0030	0.38		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
0.4	33	0.0610	1.23		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
3.6	165	0.0120	0.77		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
3.2	310		1.63		Direct Entry, Small Tributary & Swamp w/ Channels
8.2	920		1.88		Direct Entry, Small Tributary & Swamp w/ Channels
1.5	295		3.39		Direct Entry, Small Tributary & Swamp w/Channels
88.4	2,211	Total			

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Summary for Subcatchment 11S:

Runoff = 11.92 cfs @ 12.42 hrs, Volume= 1.500 af, Depth= 1.50" Routed to Reach SP11 :

_	Α	rea (sf)	CN E	escription		
_	17,843 98 Paved parking, HSG D					
	5	01,616	78 N	leadow, no	on-grazed,	HSG D
_		1,885	73 E	Brush, Goo	d, HSG D	
	5	21,344	79 V	Veighted A	verage	
	5	03,501	9	6.58% Per	vious Area	
		17,843	3	.42% Impe	ervious Area	a
	_					
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	20.2	100	0.0120	0.08		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.40"
	11.8	521	0.0110	0.73		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
	11.1	418	0.0080	0.63		Shallow Concentrated Flow,
_						Short Grass Pasture Kv= 7.0 fps
	43.1	1.039	Total			

Type II 24-hr 10-yr Rainfall=3.42" Printed 7/11/2024

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Summary for Subcatchment 12S:

Runoff = 16.04 cfs @ 13.26 hrs, Volume= 3.951 af, Depth= 1.44" Routed to Reach SP12 :

	Aı	rea (sf)	CN E	escription		
*		8,897	98 Ir	mpervious		
		8,690	58 N	leadow, no	on-grazed,	HSG B
	1,3	13,095	78 N	leadow, no	on-grazed,	HSG D
		5,821		Brush, Goo	•	
	1	01,013	77 V	Voods, Go	od, HSG D	
	1,4	37,516	78 V	Veighted A	verage	
	1,4	28,619	9	9.38% Per	vious Area	
	8,897 0.62% lm		.62% Impe	ervious Area	a	
	_					
,	Tc	Length	Slope	Velocity	Capacity	Description
	min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	30.7	100	0.0470	0.05		Sheet Flow,
						Woods: Dense underbrush n= 0.800 P2= 2.40"
	25.9	601	0.0060	0.39		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
	48.0	1,687	0.0070	0.59		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
1	04.6	2,388	Total			

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Summary for Subcatchment 13S:

Runoff = 25.18 cfs @ 13.00 hrs, Volume= 5.431 af, Depth= 1.19" Routed to Reach SP13 :

Area (sf) CN	Description	1				
279,893	3 58	Meadow, n	on-grazed,	HSG B			
1,558,214	78	Meadow, n	Meadow, non-grazed, HSG D				
424	48	Brush, Goo	d, HSG B				
77,09	7 73	Brush, Goo	Brush, Good, HSG D				
142,209	55	Woods, Go	Woods, Good, HSG B				
337,97	77	Woods, Go	od, HSG D				
2,395,812	2 74	Weighted A	Average				
2,395,812	2	100.00% P	100.00% Pervious Area				
Tc Leng	th Slo	pe Velocity	Capacity	Description			
(min) (fee	t) (ft/	ft) (ft/sec)	(cfs)	·			
15.6 10	0.02	30 0.11		Sheet Flow,			
				Grass: Dense n= 0.240 P2= 2.40"			
48.9 1,83	8 0.00	80 0.63		Shallow Concentrated Flow,			
				Short Grass Pasture Kv= 7.0 fps			
19.7 4°	8 0.00	50 0.35		Shallow Concentrated Flow,			
				Woodland Kv= 5.0 fps			
84.2 2,35	6 Tota	I					

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Summary for Subcatchment 14S:

Runoff = 11.25 cfs @ 12.34 hrs, Volume= 1.292 af, Depth= 1.31" Routed to Reach SP14 :

_	A	rea (sf)	CN [Description		
*		9,018	98 I	mpervious		
		70,714	58 N	∕leadow, no	on-grazed, l	HSG B
	4	28,883	78 N	∕leadow, no	on-grazed,	HSG D
		744	48 E	Brush, Goo	d, HSG B	
		189	73 E	Brush, Goo	d, HSG D	
		7,102	77 \	Voods, Go	od, HSG D	
	5	16,650	76 \	Veighted A	verage	
	5	07,632	Ś	8.25% Per	rvious Area	
		9,018	•	.75% Impe	ervious Area	a
	_				_	
	Тс	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	18.5	100	0.0150	0.09		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.40"
	18.1	835	0.0120	0.77		Shallow Concentrated Flow,
_						Short Grass Pasture Kv= 7.0 fps
	36.6	935	Total			

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Summary for Subcatchment 15S:

Runoff = 4.01 cfs @ 12.30 hrs, Volume= 0.477 af, Depth= 0.76" Routed to Reach SP15 :

Aı	rea (sf)	CN [Description		
*	4,081	98 I	mpervious		
1	81,283	58 N	∕leadow, no	on-grazed,	HSG B
1	26,101	78 N	/leadow, no	on-grazed,	HSG D
	6,560		Brush, Goo	,	
	2,092	73 E	Brush, Goo	d, HSG D	
	5,023		,	od, HSG B	
	4,083	77 V	<u>Voods, Go</u>	od, HSG D	
3	29,223		Veighted A	•	
3	25,142	g	8.76% Per	vious Area	
	4,081	1	.24% Impe	ervious Area	a
_					
Tc	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
15.9	100	0.0220	0.11		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.40"
6.4	387	0.0210	1.01		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
8.3	220	0.0040	0.44		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
30.6	707	Total			

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Summary for Subcatchment 16S:

Runoff = 19.62 cfs @ 12.62 hrs, Volume= 3.119 af, Depth= 1.44" Routed to Reach SP16 :

/	Area (sf)	CN E	escription		
*	12,714	98 lı	mpervious		
	25,066			on-grazed,	
	938,415			on-grazed,	HSG D
	3,358		rush, Goo	,	
	863			od, HSG C	
	154,192	77 V	Voods, Go	od, HSG D	
	134,608		Veighted A	•	
1,	121,894	_		vious Area	
	12,714 1.12% Impervious Area				a
То	Longth	Clana	\/alaaitr	Consoitu	Description
Tc (min)	•	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
				(013)	Shoot Flour
27.0	100	0.0170	0.06		Sheet Flow, Grass: Bermuda n= 0.410 P2= 2.40"
3.8	142	0.0080	0.63		Shallow Concentrated Flow,
5.0	142	0.0000	0.03		Short Grass Pasture Kv= 7.0 fps
26.0	1,035	0.0090	0.66		Shallow Concentrated Flow,
20.0	1,000	0.0000	0.00		Short Grass Pasture Kv= 7.0 fps
2.0	334		2.74		Direct Entry, Small Tributary & Swamp w/ Channels
58.8	1,611	Total			

Type II 24-hr 10-yr Rainfall=3.42"

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Summary for Subcatchment 16SA:

Runoff = 13.47 cfs @ 12.38 hrs, Volume= 1.644 af, Depth= 1.31" Routed to Reach SP16 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 10-yr Rainfall=3.42"

	Area (sf)	CN	Description
*	11,093	98	Impervious
	70,093	58	Meadow, non-grazed, HSG B
	359,929	78	Meadow, non-grazed, HSG D
	259	48	Brush, Good, HSG B
	14,806	73	Brush, Good, HSG D
	0	70	Woods, Good, HSG C
	201,078	77	Woods, Good, HSG D
	657,258	76	Weighted Average
	646,165		98.31% Pervious Area
	11,093		1.69% Impervious Area
	Tc Length	Slo	
(min) (feet)	(ft/	/ft) (ft/sec) (cfs)

39.9

Type II 24-hr 10-yr Rainfall=3.42" Printed 7/11/2024

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Summary for Subcatchment 17S:

Runoff = 78.53 cfs @ 13.12 hrs, Volume= 17.966 af, Depth= 1.37" Routed to Reach SP17 :

_	A	rea (sf)	CN E	escription		
		22,601	98 V	Vater Surfa	ace, HSG A	1
*		17,632	98 Ir	mpervious		
	2	52,955	71 N	leadow, no	on-grazed,	HSG C
	4,9	37,352	78 N	∕leadow, no	on-grazed,	HSG D
		16,810		Brush, Goo		
	1	30,011	73 B	Brush, Goo	d, HSG D	
	1	11,819		,	od, HSG C	
_	1,3	58,748	77 V	Voods, Go	od, HSG D	
	6,8	47,928	77 V	Veighted A	verage	
	6,8	07,695	9	9.41% Per	vious Area	
		40,233	0	.59% Impe	ervious Area	a
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	12.1	50	0.0300	0.07		Sheet Flow,
						Woods: Light underbrush n= 0.400 P2= 2.40"
	10.9	50	0.0140	0.08		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.40"
	32.6	2,373	0.0300	1.21		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
	33.8	1,418	0.0100	0.70		Shallow Concentrated Flow,
	- 4	0.45		0 7 1		Short Grass Pasture Kv= 7.0 fps
_	5.1	845		2.74		Direct Entry, Small Tributary & Swamp w/Channels
	94.5	4.736	Total			

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Summary for Subcatchment 18S:

Runoff = 59.93 cfs @ 12.74 hrs, Volume= 10.498 af, Depth= 1.37" Routed to Reach SP18 :

	Α	rea (sf)	CN E	Description				
		2,953	98 V	Water Surface, HSG A				
*		13,432	98 lı	mpervious				
		5,975	58 N	∕leadow, no	on-grazed,	HSG B		
		29,944	71 N	/leadow, no	on-grazed,	HSG C		
	2,2	07,221	78 N	/leadow, no	on-grazed,	HSG D		
	1	57,865	73 E	Brush, Goo	d, HSG D			
		23,440	55 V	Voods, Go	od, HSG B			
	3	21,869	70 V	Voods, Go	od, HSG C			
	1,2	38,903	77 V	Voods, Go	od, HSG D			
	4,001,602 77 Weighted Average							
	, ,				vious Area			
	16,385		C	.41% Impe	ervious Area	a		
		,		•				
	Tc	Length	Slope	Velocity	Capacity	Description		
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	·		
_	27.8	100	0.0150	0.06	, ,	Sheet Flow,		
						Woods: Light underbrush n= 0.400 P2= 2.40"		
	6.8	205	0.0100	0.50		Shallow Concentrated Flow,		
						Woodland Kv= 5.0 fps		
	23.6	2,144	0.0920	1.52		Shallow Concentrated Flow,		
	_3.0	_,				Woodland Kv= 5.0 fps		
	8.2	1,440		2.92		Direct Entry, Ditch		
_	66.4	3,889	Total			•		

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Summary for Subcatchment 19S:

Runoff = 61.10 cfs @ 12.95 hrs, Volume= 12.579 af, Depth= 1.31" Routed to Reach SP19 :

_	Aı	rea (sf)	CN D	escription		
*		29,609	98 Ir	npervious		
	21,503 96 Gravel surface, HSG A					1
		84,734	58 M	leadow, no	on-grazed,	HSG B
		89,335	71 N	leadow, no	on-grazed,	HSG C
	2,4	22,408	78 N	leadow, no	on-grazed, l	HSG D
		10,082		rush, Goo		
		74,495		rush, Goo	,	
		16,971			od, HSG B	
		81,805			od, HSG C	
_	1,5	97,828	77 V	/oods, Go	od, HSG D	
	,	28,770		Veighted A	-	
	,	99,161	_	•	vious Area	
		29,609	0	.59% Impe	ervious Area	a
	_		-			
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	32.7	100	0.0100	0.05		Sheet Flow,
	0.4.4	4 0 4 5		4.40		Woods: Light underbrush n= 0.400 P2= 2.40"
	21.4	1,915	0.0890	1.49		Shallow Concentrated Flow,
	0.0	700	0.0700	4.00		Woodland Kv= 5.0 fps
	6.3	706	0.0720	1.88		Shallow Concentrated Flow,
	0.7	400	0.0050	0.40		Short Grass Pasture Kv= 7.0 fps
	3.7	109	0.0050	0.49		Shallow Concentrated Flow,
	2.9	244	0.0410	1.42		Short Grass Pasture Kv= 7.0 fps
	2.9	244	0.0410	1.42		Shallow Concentrated Flow,
	7.2	706		1.63		Short Grass Pasture Kv= 7.0 fps Direct Entry, Small Tributary & Swamp w/ Channels
	6.7	923		2.30		Direct Entry, Small Tributary & Swamps w/ Channels
_			Total	2.00		Direct Entry, Official Tributary & Owamps W/ Officialities
	80.9	4,703	Total			

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Summary for Subcatchment 20S:

Runoff = 29.55 cfs @ 12.83 hrs, Volume= 5.622 af, Depth= 1.19" Routed to Reach SP20 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 10-yr Rainfall=3.42"

	Area (sf)	CN	Description						
	16,368	98	Water Surface, HSG A						
*	38,886	98	Impervious						
	503	96	Gravel surface, HSG A						
	99,447	30	Meadow, non-grazed, HSG A						
	58,596	58	Meadow, non-grazed, HSG B						
	130,201	71	Meadow, non-grazed, HSG C						
	1,680,681	78	Meadow, non-grazed, HSG D						
	21,162	73	Brush, Good, HSG D						
	131,716	55	Woods, Good, HSG B						
	6,015	70	Woods, Good, HSG C						
	296,222	77	Woods, Good, HSG D						
	2,479,797	74	Weighted Average						
	2,424,543		97.77% Pervious Area						
	55,254		2.23% Impervious Area						
	Tc Length	Slop	pe Velocity Capacity Description						
(min) (feet)	(ft/	ft) (ft/sec) (cfs)						
	74.4		Direct Fator OFF ODDEDOUEFT						

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Summary for Subcatchment 21S:

Runoff = 5.05 cfs @ 12.30 hrs, Volume= 0.577 af, Depth= 0.91" Routed to Reach SP21 :

	Α	rea (sf)	CN	Description						
28,890 30 Meadow, non-grazed, H						HSG A				
	2	262,110	71	Meadow, no	on-grazed,	HSG C				
		12,438	78	Meadow, no	on-grazed,	HSG D				
		683	30	Brush, Goo	d, HSG A					
		5,947	65	Brush, Goo	d, HSG C					
		1,322	30	Woods, Go	od, HSG A					
		21,219	98	Paved road	ls w/curbs 8	R sewers, HSG A				
	3	32,609	69	Neighted A	verage					
	3	311,390	9	93.62% Pervious Area						
		21,219	(6.38% Impe	ervious Area	a				
	Тс	Length	Slope	Velocity	Capacity	Description				
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
	12.4	100	0.0410	0.13		Sheet Flow,				
						Grass: Dense n= 0.240 P2= 2.40"				
	19.5	821	0.0100	0.70		Shallow Concentrated Flow,				
						Short Grass Pasture Kv= 7.0 fps				
	31.9	921	Total			·				

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Summary for Subcatchment 22S:

Runoff = 8.22 cfs @ 12.60 hrs, Volume= 1.362 af, Depth= 0.91" Routed to Reach SP39 :

A	rea (sf)	CN D	escription		
	87,197	30 N	leadow, no	on-grazed,	HSG A
4	18,867	71 N	leadow, no	on-grazed,	HSG C
1	34,602	78 N	leadow, no	on-grazed,	HSG D
	814	65 E	rush, Goo	d, HSG C	
	7,253		rush, Goo	,	
	843		,	od, HSG A	
	3,389		,	od, HSG C	
1	26,479		,	od, HSG D	
-	6,200	98 F	aved road	s w/curbs &	& sewers, HSG A
	85,644		Veighted A	•	
7	79,444	_	-	vious Area	
	6,200	0	.79% Impe	ervious Are	a
_					
Tc	Length	Slope	Velocity	Capacity	Description
(min)_	(feet)	(ft/ft)	(ft/sec)	(cfs)	
28.7	100	0.0050	0.06		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.40"
22.4	1,072	0.0130	0.80		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
8.0	83	0.1330	1.82		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
1.4	184		2.20		Direct Entry, Small Tributary & Swamp w/ Channels
53.3	1,439	Total			

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Summary for Subcatchment 23S:

Runoff = 196.79 cfs @ 13.08 hrs, Volume= 43.282 af, Depth= 1.31" Routed to Reach SP23 :

	Ar	rea (sf)	CN D	escription					
	33,228 30 Meadow, non-grazed, H					HSG A			
	494,460 71 Meadow, non-grazed, H					HSG C			
	7,3	49,351			on-grazed, l	HSG D			
		99,742		rush, Goo					
	,	88,044		rush, Goo	•				
	,	93,479							
		45,558		, ,					
		73,510				& sewers, HSG D			
		25,027			ace, HSG D)			
		02,399		Veighted A					
1		28,889	_		vious Area				
		73,510	0	.42% Impe	ervious Area	a			
-	т.	Longth	Clana	\/alaaitu	Canacity	Description			
(mi	Tc	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description			
					(CIS)	Oh oot Flour			
18	3.4	100	0.0420	0.09		Sheet Flow,			
20	2.2	1,941	0.0850	1.46		Woods: Light underbrush n= 0.400 P2= 2.40" Shallow Concentrated Flow,			
22	2.2	1,941	0.0650	1.40		Woodland Kv= 5.0 fps			
11	1.2	806	0.0580	1.20		Shallow Concentrated Flow,			
		000	0.0000	1.20		Woodland Kv= 5.0 fps			
11	1.6	1,740		2.49		Direct Entry, Small Tributary & Swamp w/ Channels			
	1.2	1,229		4.93		Direct Entry, Small Tributary & Swamp w/ Channels			
	9.5	1,895		3.32		Direct Entry, Small Tributary & Swamp w/ Channels			
	3.8	650		2.82		Direct Entry, Small Tributary & Swamp w/ Channels			
	7.8	770		1.64		Direct Entry, Roadside Ditch			
	3.7	9,131	Total						

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Summary for Subcatchment 24S:

Runoff = 7.47 cfs @ 12.27 hrs, Volume= 0.751 af, Depth= 1.50" Routed to Reach SP24 :

_	Aı	rea (sf)	CN D	escription		
	226,229 78 Meadow, non-grazed, F				on-grazed,	HSG D
		7,721	73 E	Brush, Goo	d, HSG D	
		10,176	77 V	Voods, Go	od, HSG D	
		16,779	98 F	Paved road	s w/curbs 8	R sewers, HSG D
	2	60,905	79 V	Veighted A	verage	
	2	44,126	9	3.57% Per	vious Area	
		16,779	6	.43% Impe	ervious Area	а
	_					
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	15.1	100	0.0250	0.11		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.40"
	14.0	830	0.0200	0.99		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
_	2.1	270		2.17		Direct Entry, Small Tributary & Swamp w/ Channels
	31.2	1.200	Total			

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Summary for Subcatchment 25S:

Runoff = 135.13 cfs @ 12.83 hrs, Volume= 25.360 af, Depth= 1.25" Routed to Reach SP25 :

A	rea (sf)	CN D	escription		
8	16,850	58 M	leadow, no	on-grazed,	HSG B
9	55,101	71 N	leadow, no	on-grazed,	HSG C
5,1	04,595	78 M	leadow, no	on-grazed,	HSG D
	18,372	48 B	rush, Goo	d, HSG B	
2	65,288	73 B	rush, Goo	d, HSG D	
1	89,511	55 V	loods, Go	od, HSG B	
3,2	44,843	77 V	loods, Go	od, HSG D	
	29,278	98 P	aved road	s w/curbs 8	R sewers, HSG D
	19,569	96 G	ravel surfa	ace, HSG D)
10,6	43,407	75 V	/eighted A	verage	
10,6	14,129	9	9.72% Per	vious Area	
	29,278	0	.28% Impe	ervious Area	a
Tc	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
16.8	100	0.0190	0.10		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.40"
18.9	1,281	0.0510	1.13		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
8.8	640	0.0300	1.21		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
17.1	4,093		3.98		Direct Entry, Small Tributary & Swamp w/ Channels
4.6	482		1.76		Direct Entry, Small Tributary & Swamp w/ Channels
4.8	682		2.39		Direct Entry, Small Tributary & Swamp w/ Channels
71.0	7,278	Total			

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Summary for Subcatchment 26S:

Runoff = 17.88 cfs @ 12.42 hrs, Volume= 2.265 af, Depth= 1.44" Routed to Reach SP26 :

_	Α	rea (sf)	CN E	Description		
		75,400	77 V	Voods, Go	od, HSG D	
*		4,254	98 V	Vater		
		50,954	71 N	/leadow, no	on-grazed,	HSG C
*		18,174			Pavement	
_	6	75,212	78 N	/leadow, no	on-grazed,	HSG D
	823,994 78 Weighted Average					
		01,566	_		vious Area	
		22,428	2	2.72% Impe	ervious Are	a
	т.	1	01	17.1	0	December 6 and
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	18.5	100	0.0150	0.09		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.40"
	5.4	527		1.64		Direct Entry, Ditch
	19.2	720	0.0080	0.63		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
	43.1	1,347	Total	•	•	

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Summary for Subcatchment 27S:

Runoff = 17.67 cfs @ 12.49 hrs, Volume= 2.554 af, Depth= 1.01" Routed to Reach SP27 :

A	rea (sf)	CN D	escription		
1	02,395	30 N	leadow, no	on-grazed,	HSG A
	70,249	58 N	leadow, no	on-grazed,	HSG B
3	56,229	71 N	leadow, no	on-grazed,	HSG C
5	94,316			on-grazed,	HSG D
	15,001		rush, Goo	d, HSG B	
	136		Brush, Goo	•	
	35,121		rush, Goo	•	
	1,761			od, HSG A	
	10,015		,	od, HSG B	
	44,190			od, HSG C	
	27,054			od, HSG D	
	53,425				& sewers, HSG A
	7,743			ace, HSG <i>P</i>	1
	17,635		Veighted A		
,	64,210	_		vious Area	
	53,425	4	.05% Impe	ervious Area	a
То	Longth	Slope	Volocity	Conneity	Description
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
				(015)	Chast Flour
11.4	100	0.0500	0.15		Sheet Flow,
7.1	072	0.0070	2.40		Grass: Dense n= 0.240 P2= 2.40"
7.4	973	0.0970	2.18		Shallow Concentrated Flow,
6.4	548	0.0820	1.43		Short Grass Pasture Kv= 7.0 fps Shallow Concentrated Flow,
0.4	340	0.0620	1.43		Woodland Kv= 5.0 fps
2.0	152	0.0330	1.27		Shallow Concentrated Flow,
2.0	132	0.0550	1.21		Short Grass Pasture Kv= 7.0 fps
12.9	824	0.0230	1.06		Shallow Concentrated Flow,
12.3	024	0.0200	1.00		Short Grass Pasture Kv= 7.0 fps
6.3	510		1.34		Direct Entry, Small Tributary & Swamp w/ Channels
46.4	3,107	Total			

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Summary for Subcatchment 28S:

Runoff = 56.32 cfs @ 12.30 hrs, Volume= 6.179 af, Depth= 1.13" Routed to Reach SP28 :

	Area (sf)	CN I	Description		
	148,045	58 I	Meadow, no	on-grazed,	HSG B
	1,391,071	71 I	Meadow, no	on-grazed,	HSG C
	1,142,501	78 I	Meadow, no	on-grazed,	HSG D
	16,837	48 I	Brush, Goo	d, HSG B	
	158	65 I	Brush, Goo	d, HSG C	
	36,741		Brush, Goo	,	
	39,665			od, HSG B	
	794			od, HSG C	
	51,395		•	od, HSG D	
*	40,923	98	mpervious	Surface	
:	2,868,130		Neighted A		
2	2,827,207	(98.57% Pei	rvious Area	
	40,923		1.43% Impe	ervious Are	a
_					
	c Length	Slope		Capacity	Description
(mir		(ft/ft)	(ft/sec)	(cfs)	
19.	6 100	0.0130	0.09		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.40"
2.	3 163	0.0290	1.19		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
11.	0 2,559		3.88		Direct Entry, Roadside Ditch
32.	9 2,822	Total			

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Summary for Subcatchment 29S:

Runoff = 19.81 cfs @ 12.19 hrs, Volume= 1.760 af, Depth= 1.19" Routed to Reach SP29 :

	Α	rea (sf)	CN E	escription		
		34,206	70 V	Voods, Go	od, HSG C	
*		7,569	98 lı	mpervious	Pavement	
*		4,117	98 lı	mpervious	Roof	
*		5,127	96	- Gravel		
	2	47,913	71 N	/leadow, no	on-grazed,	HSG C
		11,168	55 V	Voods, Go	od, HSG B	
		740	65 E	Brush, Goo	d, HSG C	
		9,072	48 E	Brush, Goo	d, HSG B	
*		428	98 lı	mpervious	Roof	
		56,539	58 N	/leadow, no	on-grazed,	HSG B
*		8,416	98 li	mpervious	Pavement	
		16,068			od, HSG D	
_	3	74,759	78 N	/leadow, no	on-grazed,	HSG D
	776,122 74 Weighted Average					
	755,592 97.35% Pervious Area					
		20,530	2	2.65% Impe	ervious Are	a
	Тс	Length	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	Description
_	10.3	100	0.0650	0.16	(013)	Sheet Flow,
	10.0	100	0.0000	0.10		Grass: Dense n= 0.240 P2= 2.40"
	0.5	63	0.0950	2.16		Shallow Concentrated Flow,
	0.0		0.0000	2		Short Grass Pasture Kv= 7.0 fps
	0.3	31	0.1290	1.80		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
	6.1	612	0.0570	1.67		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
	0.1	31	0.6100	3.91		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
_	7.1	900		2.12		Direct Entry, Roadside Ditch
	24.4	1,737	Total			

Type II 24-hr 10-yr Rainfall=3.42" Printed 7/11/2024

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Summary for Subcatchment 30S:

Runoff = 10.18 cfs @ 12.38 hrs, Volume= 1.265 af, Depth= 1.07" Routed to Reach SP30 :

	Aı	rea (sf)	CN E	Description							
	5	11,468	71 N	71 Meadow, non-grazed, HSG C							
		80,980	78 N	/leadow, no	on-grazed,	HSG D					
		16,758	70 V	Voods, Go	od, HSG C						
*		9,244	98 lı	mpervious	Surface						
	6	18,450	72 V	Veighted A	verage						
	6	09,206	9	8.51% Per	vious Area						
	9,244 1.49% Impervious Area				ervious Area	a					
				•							
	Tc	Length	Slope	Velocity	Capacity	Description					
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)						
	26.7	100	0.0060	0.06		Sheet Flow,					
						Grass: Dense n= 0.240 P2= 2.40"					
	10.4	1,152	0.0700	1.85		Shallow Concentrated Flow,					
						Short Grass Pasture Kv= 7.0 fps					
	1.3	175		2.28		Direct Entry, Roadside Ditch					
	38.4	1,427	Total	·	·						

Type II 24-hr 10-yr Rainfall=3.42" Printed 7/11/2024

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Summary for Subcatchment 31S:

Runoff = 39.94 cfs @ 12.67 hrs, Volume= 6.759 af, Depth= 1.19" Routed to Reach SP31 :

	Α	rea (sf)	CN D	escription		
	66,905 58 Meadow, non-grazed, H					HSG B
	1,1	85,943	71 N	leadow, no	on-grazed,	HSG C
	1,3	98,406	78 N	leadow, no	on-grazed,	HSG D
		1,947	73 B	rush, Goo	d, HSG D	
		84,560		,	od, HSG B	
		17,524		,	od, HSG C	
		13,262		,	od, HSG D	
*		13,041		npervious		
	2,9	81,588		√eighted A		
	2,9	68,547	_		vious Area	
		13,041	0	.44% Impe	ervious Area	a
	Τ.	1	01	V/-1!6	0	December 1999
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	35.2	100	0.0030	0.05		Sheet Flow,
	0.0	0.40	0.0070	0.50		Grass: Dense n= 0.240 P2= 2.40"
	6.2	219	0.0070	0.59		Shallow Concentrated Flow,
	0.4	050	0.0400	0.50		Short Grass Pasture Kv= 7.0 fps
	8.4 252 0.0100		0.50		Shallow Concentrated Flow,	
	6.7	592	0.0440	1.47		Woodland Kv= 5.0 fps
	0.7	392	0.0440	1.47		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
	4.2	722		2.87		Direct Entry, Small Tributary & Swamp w/ Channels
_			Total	2.01		Direct Littiy, Omail Tributary & Swarip W Chainleis
	60.7	1,885	Total			

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Summary for Subcatchment 32S:

Runoff = 22.66 cfs @ 12.96 hrs, Volume= 5.439 af, Depth= 0.67" Routed to Reach SP33 :

_	Α	rea (sf)	CN D	escription		
	2,541,060 58 Meadow, non-grazed, H					HSG B
	7	16,554	71 N	leadow, no	on-grazed,	HSG C
	5	17,326			on-grazed,	HSG D
		869		Brush, Goo	•	
		3,094		Brush, Goo	•	
		4,465		Brush, Goo	•	
		00,046		,	od, HSG B	
		46,472			od, HSG C	
		08,119			od, HSG D	
*		33,483		mpervious		
_		3,270		Gravel surf	ace, HSG A	1
		74,758		Veighted A		
	,	41,275	_	-	rvious Area	
		33,483	0	.78% Impe	ervious Area	a
	_		01		0 "	D
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	16.5 100 0.0200 0.10			Sheet Flow,		
				Grass: Dense n= 0.240 P2= 2.40"		
	6.4 848 0.1000		2.21		Shallow Concentrated Flow,	
	50.0	0.000	0.0000	0.00		Short Grass Pasture Kv= 7.0 fps
	52.3	2,083	0.0090	0.66		Shallow Concentrated Flow,
_						Short Grass Pasture Kv= 7.0 fps
	75.2	3.031	Total			

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Summary for Subcatchment 33S:

Runoff = 40.42 cfs @ 12.69 hrs, Volume= 7.326 af, Depth= 0.86" Routed to Reach SP33 :

A	rea (sf)	CN [Description		
1,7	722,412	58 N	Лeadow, no	on-grazed,	HSG B
1,5	542,409	78 N	Meadow, no	on-grazed,	HSG D
	1,381	73 E	Brush, Goo	d, HSG D	
	384,753		,	od, HSG B	
8	326,436	77 \	Voods, Go	od, HSG D	
4,4	177,391		Veighted A		
4,4	177,391	1	100.00% Pe	ervious Are	a
_					
Tc	Length	Slope	Velocity	Capacity	Description
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)	
20.1	100	0.0340	0.08		Sheet Flow,
					Woods: Light underbrush n= 0.400 P2= 2.40"
24.6	932	0.0160	0.63		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
12.8	1,157	0.0460	1.50		Shallow Concentrated Flow,
0.4	00	0.0400	0.70		Short Grass Pasture Kv= 7.0 fps
0.4	60	0.3120	2.79		Shallow Concentrated Flow,
0.7	4.44		0.40		Woodland Kv= 5.0 fps
0.7	141		3.19		Direct Entry, Small Tributary & Swamp w/ Channels
58.6	2,390	Total			

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Summary for Subcatchment 34S:

Runoff = 23.92 cfs @ 12.43 hrs, Volume= 3.215 af, Depth= 1.01" Routed to Reach SP35 :

_	Α	rea (sf)	CN E	escription		
20,254 58 Meadow, non-grazed, HS					on-grazed,	HSG B
	9	37,330	78 N	leadow, no	on-grazed,	HSG D
		16,371	48 E	Brush, Goo	d, HSG B	
		35,437	73 E	Brush, Goo	d, HSG D	
	4	29,230	55 V	Voods, Go	od, HSG B	
_	2	20,205	77 V	Voods, Go	od, HSG D	
	1,6	58,827	71 V	Veighted A	verage	
	1,6	58,827	1	00.00% Pe	ervious Are	a
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	20.5	100	0.0320	0.08		Sheet Flow,
						Woods: Light underbrush n= 0.400 P2= 2.40"
	2.9	130	0.0220	0.74		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
	18.3	1,058	0.0190	0.96		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
_	0.3	155		8.93		Direct Entry, Small tributary & Swamp w/channels
	42.0	1.443	Total			

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Summary for Subcatchment 35S:

Runoff = 72.29 cfs @ 12.21 hrs, Volume= 6.591 af, Depth= 1.31" Routed to Reach SP35 :

Area (sf)	CN	Description		
32,311	58	Meadow, no	on-grazed,	HSG B
36,347	71	Meadow, no	on-grazed,	HSG C
1,445,641	78	Meadow, no	on-grazed,	HSG D
26,860	73	Brush, Goo	d, HSG D	
450,341		Woods, Go		
79,608		Woods, Go	•	
204,736		Woods, Go	,	
282,102				& sewers, HSG D
76,832		Gravel surfa)
2,634,778		Weighted A	•	
2,352,676		89.29% Per		
282,102		10.71% Imp	ervious Ar	ea
To Longth	Slope	Volocity	Congoity	Description
Tc Length (min) (feet)	Slope (ft/ft)	•	Capacity (cfs)	Description
			(615)	Chaot Flaur
2.4 100	0.0050	0.68		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.40"
2.6 755	0.0590	4.93		Shallow Concentrated Flow,
2.0 755	0.0590	4.93		Paved Kv= 20.3 fps
2.5 438		2.91		Direct Entry,
17.6 1,445				Shallow Concentrated Flow,
17.0 1,440	3.0000	1.50		Short Grass Pasture Kv= 7.0 fps
1.0 351		5.94		Direct Entry, Small Tributary & Swamp w/ Channels
26.1 3,089	Total			

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Summary for Subcatchment 36S:

Runoff = 149.27 cfs @ 12.36 hrs, Volume= 17.571 af, Depth= 1.37" Routed to Reach SP36 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 10-yr Rainfall=3.42"

Area (sf)	CN	Description				
52,184	58	Meadow, non-grazed, HSG B				
695	71	Meadow, non-grazed, HSG C				
5,121,405	78	Meadow, non-grazed, HSG D				
1,145	48	Brush, Good, HSG B				
33,870	73	Brush, Good, HSG D				
278,876	55	Woods, Good, HSG B				
346,117	70	Woods, Good, HSG C				
782,902	77	Woods, Good, HSG D				
65,616	98	Paved roads w/curbs & sewers, HSG D				
14,651	96	Gravel surface, HSG D				
6,697,461	77	Weighted Average				
6,631,845		99.02% Pervious Area				
65,616	0.98% Impervious Area					
Tc Length	Slop	pe Velocity Capacity Description				
(min) (feet)	(ft/	(ft) (ft/sec) (cfs)				
38.4		Direct Entry SEE SDDEADUSEET				

38.4

Type II 24-hr 10-yr Rainfall=3.42" Printed 7/11/2024

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Summary for Subcatchment 37S:

Runoff = 86.22 cfs @ 12.38 hrs, Volume= 10.383 af, Depth= 1.37" Routed to Reach SP37 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 10-yr Rainfall=3.42"

	Area (sf)	CN	Description					
*	30,667	98	Impervious					
	13,321	96	Gravel surface, HSG A					
*	7,485	98	Water					
	57,778	58	Meadow, non-grazed, HSG B					
	3,215,975	78	Meadow, non-grazed, HSG D					
	805	48	Brush, Good, HSG B					
	915	73	Brush, Good, HSG D					
	76,106	55	Woods, Good, HSG B					
	148,513	70	Woods, Good, HSG C					
_	406,259	77	Woods, Good, HSG D					
	3,957,824	77	Weighted Average					
	3,919,672		99.04% Pervious Area					
	38,152		0.96% Impervious Area					
	-	01	V I '' O '' D ''					
	Tc Length	Slop						
_	(min) (feet)	(ft/						
	20.0		Dina at Finting OFF ODDE A DOUGET					

39.6

Type II 24-hr 10-yr Rainfall=3.42" Printed 7/11/2024

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Summary for Subcatchment 38S:

Runoff = 16.44 cfs @ 12.36 hrs, Volume= 1.927 af, Depth= 1.37" Routed to Reach SP38 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 10-yr Rainfall=3.42"

Ar	rea (sf)	CN	Description					
3	55,232	78	8 Meadow, non-grazed, HSG D					
3	79,321	i						
7	34,553	77 Weighted Average						
7	34,553		100.00% Pervious Area					
Tc	Length	Slope	e Velocity	Capacity	/ Description			
(min)	(feet)	(ft/ft	(ft/sec)	(cfs)				
00.4		•			Discret Forting OFF ODDEADOUEFT			

38.1

Type II 24-hr 10-yr Rainfall=3.42" Printed 7/11/2024

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Summary for Subcatchment 39S:

Runoff = 34.06 cfs @ 12.59 hrs, Volume= 5.376 af, Depth= 1.13" Routed to Reach SP39 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 10-yr Rainfall=3.42"

	Area (sf)	CN	Description						
	113,238	30	Woods, Good	Woods, Good, HSG A					
*	17,184	98	Impervious Pa	avement					
	149,774	30	Meadow, non-	-grazed, I	HSG A				
	11,690	30	Brush, Good,	HSG A					
	30,170	70	Woods, Good	I, HSG C					
	7,231	71	Meadow, non-	-grazed, I	HSG C				
	194,104	77	Woods, Good	I, HSG D					
	70,193	73	Brush, Good,	HSG D					
*	2,287	96	Gravel						
_	1,899,537	78	Meadow, non-	-grazed, l	HSG D				
	2,495,408	73	Weighted Ave	erage					
	2,478,224		99.31% Pervi	ous Area	1				
	17,184		0.69% Impervious Area						
	Tc Length	Slop	oe Velocity (Capacity	Description				
	(min) (feet)	(ft/	ft) (ft/sec)	(cfs)					
	E 4 . 4				Direct Fater OFF ODDE A DOLLET				

54.4

Type II 24-hr 10-yr Rainfall=3.42" Printed 7/11/2024

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Summary for Subcatchment 40S:

Runoff = 58.44 cfs @ 12.47 hrs, Volume= 7.911 af, Depth= 1.44" Routed to Reach SP40 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 10-yr Rainfall=3.42"

	Ar	ea (sf)	CN	Description								
*	2	26,987	98	Impervious	Pavement							
	17	71,417	77	Woods, Go								
		20,992	73	Brush, Goo								
	2,6	58,700	78	Meadow, no	Meadow, non-grazed, HSG D							
	2,87	78,096	78	78 Weighted Average								
	2,8	51,109		99.06% Per	vious Area	a						
	2	26,987		0.94% Impe	ervious Area	ea						
	_		٥.									
	Tc	Length	Slope	,	Capacity	Description						
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)							
	17.2					Direct Entry, SEE SDDEADSHEET						

Type II 24-hr 10-yr Rainfall=3.42" Printed 7/11/2024

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Summary for Subcatchment 41S:

Runoff = 14.38 cfs @ 12.48 hrs, Volume= 2.051 af, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 10-yr Rainfall=3.42"

	Area (sf)	CN	Description
*	16,863	98	Impervious
*	44,367	96	Gravel
	50,657	58	Meadow, non-grazed, HSG B
	654,398	71	Meadow, non-grazed, HSG C
	153,128	78	Meadow, non-grazed, HSG D
	12,946	55	Woods, Good, HSG B
	30,598	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
	33,461	61	>75% Grass cover, Good, HSG B
	6,740	74	>75% Grass cover, Good, HSG C
	1,003,158	72	Weighted Average
	986,295		98.32% Pervious Area
	16,863		1.68% Impervious Area
	Tc Length	Slop	pe Velocity Capacity Description
(r	min) (feet)	(ft/	ft) (ft/sec) (cfs)
	40 F		Discot Fator OFF ODDEADOUFFT

46.5

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Summary for Subcatchment 42S:

85.06 cfs @ 13.15 hrs, Volume= 19.709 af, Depth= 1.37" Runoff Routed to Reach SP42:

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 10-yr Rainfall=3.42"

A	rea (sf)	CN	Description					
	20,734	98	Water Surface, HSG A					
1	70,414	96	Gravel surfa	ace, HSG A	A			
9	56,587	71	Meadow, no	on-grazed,	HSG C			
5,2	27,848	78	Meadow, no	on-grazed,	HSG D			
	287	65	Brush, Goo	d, HSG C				
	56,930	73	Brush, Goo	d, HSG D				
	32,944	70	Woods, Go	od, HSG C				
1,0	46,689	77	Woods, Go	od, HSG D				
7,5	12,433	77	Weighted A	verage				
7,4	91,699		99.72% Per	vious Area	1			
	20,734		0.28% Impe	ervious Area	a			
			·					
Tc	Length	Slope	,	Capacity	Description			
(min)	(feet)	(ft/ft) (ft/sec)	(cfs)				
96.3					Direct Entry, SEE SPREADSHEET			

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Summary for Subcatchment 43S:

Runoff = 49.77 cfs @ 12.50 hrs, Volume= 6.941 af, Depth= 1.37" Routed to Reach SP43 :

	Aı	rea (sf)	CN	Description				
*		2,810	98	Impervious				
	4	40,724	71	Meadow, no	on-grazed,	HSG C		
2,172,158 78 Meadow, non-grazed, H						HSG D		
11,726 70 Woods, Good, HSG C								
		18,430	77	Woods, Go	od, HSG D			
2,645,848 77 Weighted Average								
2,643,038 99.89% Pervious Area					vious Area			
2,810			0.11% Impervious Area					
	Tc	Length	Slop	e Velocity	Capacity	Description		
(min)	(feet)	(ft/f	t) (ft/sec)	(cfs)			
	48.7					Direct Entry, SEE SPREADSHEET		

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Summary for Subcatchment 44S:

Runoff = 60.50 cfs @ 13.15 hrs, Volume= 14.091 af, Depth= 1.44" Routed to Reach SP44 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 10-yr Rainfall=3.42"

	Area (sf)	CN	Description							
*	136,522	98	Water							
*	27,820	98	Impervious							
*	4,835	96	Gravel Same Same Same Same Same Same Same Same							
	146,073	58	Meadow, non-grazed, HSG B							
	90,051	71	Meadow, non-grazed, HSG C							
	4,232,980	78	Meadow, non-grazed, HSG D							
	82,986	73	Brush, Good, HSG D							
	6,012	55	Woods, Good, HSG B							
	3,850	70	Woods, Good, HSG C							
	395,055	77	Woods, Good, HSG D							
	5,126,184	78	Weighted Average							
	4,961,842		96.79% Pervious Area							
	164,342		3.21% Impervious Area							
	Tc Length	Slop	pe Velocity Capacity Description							
	(min) (feet)	(ft/	/ft) (ft/sec) (cfs)							
	07.4		Direct Fator, OFF ORDEADOUFFT							

97.1

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Summary for Subcatchment 44SA:

24.34 cfs @ 12.20 hrs, Volume= 2.159 af, Depth= 1.44" Runoff Routed to Reach SP44A:

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 10-yr Rainfall=3.42"

	Area (sf)	CN	Description								
*	8,459	98	Water	Water							
*	21,218	98	Impervious	Impervious							
*	12,958	96	Gravel	Gravel Sravel							
	4,574	58	Meadow, no	n-grazed,	HSG B						
	57,514	71	Meadow, no	n-grazed,	HSG C						
	588,570	78	Meadow, no	n-grazed,	HSG D						
	988	48	Brush, Good	d, HSG B							
	17,587	73	Brush, Good	d, HSG D							
	2,222	55	Woods, Go	od, HSG B							
	22,179	70	Woods, Go	od, HSG C							
	49,212	77	Woods, Go	od, HSG D							
	785,481	78	Weighted A	verage							
	755,804		96.22% Per	vious Area							
	29,677		3.78% Impe	rvious Are	a						
	Tc Length	Slop	•	Capacity	Description						
(m	nin) (feet)	(ft/	ft) (ft/sec)	(cfs)							
2	5.5				Direct Entry, SEE SPREADSHEET						

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Summary for Subcatchment 45S:

Runoff = 18.30 cfs @ 12.24 hrs, Volume= 1.751 af, Depth= 1.57" Routed to nonexistent node SP46

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 10-yr Rainfall=3.42"

_	Area (sf)	CN	Description	Description							
*	49,323	98	Impervious	Impervious							
	33,429	77	Woods, Go	Woods, Good, HSG D							
	12,134	73	Brush, Goo	Brush, Good, HSG D							
*	720	96	Gravel								
	478,790	78	Meadow, no	Meadow, non-grazed, HSG D							
*	7,562	98	Water								
	581,958	80	Weighted A	verage							
525,073 90.23% Pervious Area											
	56,885		9.77% Impe	ervious Area	a						
	Tc Length	Slo	,	Capacity	Description						
_	(min) (feet)	(ft/	ft) (ft/sec)	(cfs)							
	00.4				Discort Forting OFF ODDE ADOLLET						

29.1

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Summary for Subcatchment 46S:

Runoff = 33.26 cfs @ 12.58 hrs, Volume= 5.085 af, Depth= 1.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 10-yr Rainfall=3.42"

	50.0					D: 1 = 1	OFF ODDE A DOLLEFT			
_	(min) (fe	eet)	(ft/ft)	(ft/sec)	(cfs)					
	Tc Len	gth	Slope	Velocity	Capacity	Description				
	2,133,9	69	1	100.00% Pervious Area						
	2,133,969		75 \	Weighted Average						
	27,32	26	73 E	Brush, Good, HSG D						
	1,508,8	38	78 N	Meadow, non-grazed, HSG D						
	229,88	82		,	Voods, Good, HSG B					
367,923 77 Woods, Good, HS										
	Area (s	sf) (CN [Description						

53.8

Type II 24-hr 10-yr Rainfall=3.42" Printed 7/11/2024

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Summary for Subcatchment 47S:

Runoff = 40.83 cfs @ 12.60 hrs, Volume= 6.304 af, Depth= 1.44" Routed to Reach SP47 :

	Area (sf) Cl	<u>N D</u>	escription						
*	23,8	46 9	8 Ir	Impervious						
*	10,9	00 9	6 G	Gravel						
	2,186,7	03 7	8 M	leadow, no	n-grazed, l	HSG D				
	15,3	10 7	3 B	rush, Goo	d, HSG D					
	56,4	59 7	7 V	Voods, Go	od, HSG D					
	2,293,2	18 7	8 V	Veighted A	verage					
2,269,372 98.96% Pervious Are					vious Area					
23,846			1.04% Impervious Area							
	Tc Ler	igth S	Slope	Velocity	Capacity	Description				
	(min) (fe	eet)	(ft/ft)	(ft/sec)	(cfs)					
	56.5					Direct Entry, SEE SPREADSHEET				

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Runoff Area=3,020,873 sf 2.29% Impervious Runoff Depth=1.07"

Flow Length=3,272' Tc=52.0 min CN=65 Runoff=37.81 cfs 6.180 af

Subcatchment 3S: Runoff Area=324,754 sf 0.00% Impervious Runoff Depth=1.01"

Flow Length=836' Tc=23.1 min CN=64 Runoff=6.72 cfs 0.629 af

Subcatchment 4S: Runoff Area=16,260,538 sf 1.60% Impervious Runoff Depth=1.38"

Flow Length=7,788' Tc=76.3 min CN=70 Runoff=211.69 cfs 42.822 af

Subcatchment 5S: Runoff Area=1,679,234 sf 4.90% Impervious Runoff Depth=1.58"

Flow Length=1,495' Tc=34.3 min CN=73 Runoff=46.35 cfs 5.069 af

Subcatchment 6S: Runoff Area=598,623 sf 0.00% Impervious Runoff Depth=1.51"

Flow Length=1,150' Tc=39.7 min CN=72 Runoff=14.15 cfs 1.729 af

Subcatchment 7S: Runoff Area=10,734,763 sf 0.11% Impervious Runoff Depth=1.38"

Flow Length=6,505' Tc=76.1 min CN=70 Runoff=140.36 cfs 28.270 af

Subcatchment 8S: Runoff Area=1,124,521 sf 2.07% Impervious Runoff Depth=1.44"

Flow Length=2,618' Tc=29.5 min CN=71 Runoff=30.95 cfs 3.103 af

Subcatchment 9S: Runoff Area=698,860 sf 9.80% Impervious Runoff Depth=1.79"

Flow Length=1,212' Tc=81.2 min CN=76 Runoff=11.91 cfs 2.396 af

Subcatchment 10S: Runoff Area=1,561,270 sf 0.00% Impervious Runoff Depth=1.79"

Flow Length=2,211' Tc=88.4 min CN=76 Runoff=25.04 cfs 5.353 af

Subcatchment 115: Runoff Area=521,344 sf 3.42% Impervious Runoff Depth=2.02"

Flow Length=1,039' Tc=43.1 min CN=79 Runoff=16.24 cfs 2.015 af

Subcatchment 12S: Runoff Area=1,437,516 sf 0.62% Impervious Runoff Depth=1.94"

Flow Length=2,388' Tc=104.6 min CN=78 Runoff=22.09 cfs 5.343 af

Subcatchment 13S: Runoff Area=2,395,812 sf 0.00% Impervious Runoff Depth=1.65"

Flow Length=2,356' Tc=84.2 min CN=74 Runoff=36.15 cfs 7.553 af

Subcatchment 14S: Runoff Area=516,650 sf 1.75% Impervious Runoff Depth=1.79"

Flow Length=935' Tc=36.6 min CN=76 Runoff=15.76 cfs 1.772 af

Subcatchment 15S: Runoff Area=329,223 sf 1.24% Impervious Runoff Depth=1.13"

Flow Length=707' Tc=30.6 min CN=66 Runoff=6.48 cfs 0.710 af

Subcatchment 16S: Runoff Area=1,134,608 sf 1.12% Impervious Runoff Depth=1.94"

Flow Length=1,611' Tc=58.8 min CN=78 Runoff=27.01 cfs 4.217 af

Subcatchment 16SA: Runoff Area=657,258 sf 1.69% Impervious Runoff Depth=1.79"

Tc=39.9 min CN=76 Runoff=18.88 cfs 2.254 af

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Subcatchment 17S: Runoff Area=6,847,928 sf 0.59% Impervious Runoff Depth=1.87" Flow Length=4,736' Tc=94.5 min CN=77 Runoff=109.25 cfs 24.456 af

Runoff Area=4,001,602 sf 0.41% Impervious Runoff Depth=1.87" **Subcatchment 18S:** Flow Length=3,889' Tc=66.4 min CN=77 Runoff=83.28 cfs 14.291 af

Subcatchment 19S: Runoff Area=5,028,770 sf 0.59% Impervious Runoff Depth=1.79" Flow Length=4,703' Tc=80.9 min CN=76 Runoff=85.81 cfs 17.243 af

Subcatchment 20S: Runoff Area=2,479,797 sf 2.23% Impervious Runoff Depth=1.65" Tc=71.1 min CN=74 Runoff=42.38 cfs 7.818 af

Runoff Area=332,609 sf 6.38% Impervious Runoff Depth=1.31"

Subcatchment 21S: Flow Length=921' Tc=31.9 min CN=69 Runoff=7.73 cfs 0.835 af

Subcatchment 22S: Runoff Area=785,644 sf 0.79% Impervious Runoff Depth=1.31" Flow Length=1,439' Tc=53.3 min CN=69 Runoff=12.63 cfs 1.972 af

Runoff Area=17,302,399 sf 0.42% Impervious Runoff Depth=1.79" Subcatchment 23S: Flow Length=9,131' Tc=88.7 min CN=76 Runoff=275.76 cfs 59.327 af

Subcatchment 24S: Runoff Area=260,905 sf 6.43% Impervious Runoff Depth=2.02" Flow Length=1,200' Tc=31.2 min CN=79 Runoff=10.15 cfs 1.008 af

Subcatchment 25S: Runoff Area=10,643,407 sf 0.28% Impervious Runoff Depth=1.72" Flow Length=7,278' Tc=71.0 min CN=75 Runoff=191.48 cfs 35.009 af

Runoff Area=823,994 sf 2.72% Impervious Runoff Depth=1.94" Subcatchment 26S: Flow Length=1,347' Tc=43.1 min CN=78 Runoff=24.59 cfs 3.063 af

Subcatchment 27S: Runoff Area=1,317,635 sf 4.05% Impervious Runoff Depth=1.44" Flow Length=3,107' Tc=46.4 min CN=71 Runoff=26.33 cfs 3.636 af

Subcatchment 28S: Runoff Area=2,868,130 sf 1.43% Impervious Runoff Depth=1.58" Flow Length=2,822' Tc=32.9 min CN=73 Runoff=81.51 cfs 8.658 af

Runoff Area=776,122 sf 2.65% Impervious Runoff Depth=1.65" Subcatchment 29S: Flow Length=1,737' Tc=24.4 min CN=74 Runoff=28.23 cfs 2.447 af

Subcatchment 30S: Runoff Area=618,450 sf 1.49% Impervious Runoff Depth=1.51" Flow Length=1,427' Tc=38.4 min CN=72 Runoff=14.96 cfs 1.786 af

Subcatchment 31S: Runoff Area=2,981,588 sf 0.44% Impervious Runoff Depth=1.65" Flow Length=1,885' Tc=60.7 min CN=74 Runoff=57.32 cfs 9.399 af

Subcatchment 32S: Runoff Area=4,274,758 sf 0.78% Impervious Runoff Depth=1.01" Flow Length=3,031' Tc=75.2 min CN=64 Runoff=37.87 cfs 8.276 af

Subcatchment 33S: Runoff Area=4,477,391 sf 0.00% Impervious Runoff Depth=1.25" Flow Length=2,390' Tc=58.6 min CN=68 Runoff=62.99 cfs 10.703 af

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Subcatchment 34S: Runoff Area=1,658,827 sf 0.00% Impervious Runoff Depth=1.44"

Flow Length=1,443' Tc=42.0 min CN=71 Runoff=35.60 cfs 4.577 af

Subcatchment 35S: Runoff Area=2,634,778 sf 10.71% Impervious Runoff Depth=1.79"

Flow Length=3,089' Tc=26.1 min CN=76 Runoff=100.95 cfs 9.034 af

Subcatchment 36S: Runoff Area=6,697,461 sf 0.98% Impervious Runoff Depth=1.87"

Tc=38.4 min CN=77 Runoff=207.05 cfs 23.919 af

Subcatchment 37S: Runoff Area=3,957,824 sf 0.96% Impervious Runoff Depth=1.87"

Tc=39.6 min CN=77 Runoff=119.85 cfs 14.135 af

Subcatchment 38S: Runoff Area=734,553 sf 0.00% Impervious Runoff Depth=1.87"

Tc=38.1 min CN=77 Runoff=22.81 cfs 2.623 af

Subcatchment 39S: Runoff Area=2,495,408 sf 0.69% Impervious Runoff Depth=1.58"

Tc=54.4 min CN=73 Runoff=49.45 cfs 7.533 af

Subcatchment 40S: Runoff Area=2,878,096 sf 0.94% Impervious Runoff Depth=1.94"

Tc=47.3 min CN=78 Runoff=80.40 cfs 10.697 af

Subcatchment 41S: Runoff Area=1,003,158 sf 1.68% Impervious Runoff Depth=1.51"

Tc=46.5 min CN=72 Runoff=21.19 cfs 2.897 af

Subcatchment 42S: Runoff Area=7,512,433 sf 0.28% Impervious Runoff Depth=1.87"

Tc=96.3 min CN=77 Runoff=118.29 cfs 26.830 af

Subcatchment 43S: Runoff Area=2,645,848 sf 0.11% Impervious Runoff Depth=1.87"

Tc=48.7 min CN=77 Runoff=69.11 cfs 9.449 af

Subcatchment 44S: Runoff Area=5,126,184 sf 3.21% Impervious Runoff Depth=1.94"

Tc=97.1 min CN=78 Runoff=83.34 cfs 19.053 af

Subcatchment 44SA: Runoff Area=785,481 sf 3.78% Impervious Runoff Depth=1.94"

Tc=25.5 min CN=78 Runoff=33.33 cfs 2.919 af

Subcatchment 45S: Runoff Area=581,958 sf 9.77% Impervious Runoff Depth=2.10"

Tc=29.1 min CN=80 Runoff=24.65 cfs 2.338 af

Subcatchment 46S: Runoff Area=2,133,969 sf 0.00% Impervious Runoff Depth=1.72"

Tc=53.8 min CN=75 Runoff=47.12 cfs 7.019 af

Subcatchment 47S: Runoff Area=2,293,218 sf 1.04% Impervious Runoff Depth=1.94"

Tc=56.5 min CN=78 Runoff=56.18 cfs 8.523 af

Total Runoff Area = 3,488.434 ac Runoff Volume = 480.887 af Average Runoff Depth = 1.65" 98.81% Pervious = 3,446.971 ac 1.19% Impervious = 41.462 ac

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 1S:

Runoff = 37.81 cfs @ 12.57 hrs, Volume= 6.180 af, Depth= 1.07" Routed to Reach SP1 :

Area (sf) CN Description										
94,531 77 Woods, Good, HSG D										
	196,024		55 V	Woods, Good, HSG B						
	9,804		48 E	Brush, Good, HSG B						
		8,870	73 E	Brush, Goo	d, HSG D					
*		69,062	98 lı	mpervious	Pavement					
	1,8	53,031		,	on-grazed,					
	7	89,551	78 N	∕leadow, no	on-grazed,	HSG D				
	3,0	20,873	65 V	Veighted A	verage					
	2,9	51,811	9	97.71% Pervious Area						
		69,062	2.29% Impervious Area							
	_									
,	Tc	Length	Slope	Velocity	Capacity	Description				
	min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
	26.7	100	0.0060	0.06		Sheet Flow,				
						Grass: Dense n= 0.240 P2= 2.40"				
	15.8	784	0.0140	0.83		Shallow Concentrated Flow,				
						Short Grass Pasture Kv= 7.0 fps				
	9.5	2,388		4.20		Direct Entry, Small Tributary & Swamp w/ Channels				
	52.0	3,272	Total							

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 3S:

Runoff = 6.72 cfs @ 12.19 hrs, Volume= 0.629 af, Depth= 1.01" Routed to Reach SP3 :

A	rea (sf)	CN [Description		
	1,021	55 \	Voods, Go	od, HSG B	
2	223,581	58 N	Meadow, no	on-grazed,	HSG B
	1,749	73 E	Brush, Goo	d, HSG D	
	969	77 \	Woods, Go	od, HSG D	
	97,434	78 N	<mark>Л</mark> еаdow, no	on-grazed,	HSG D
3	324,754	64 \	Weighted A	verage	
3	324,754	1	100.00% Pe	ervious Are	a
Tc	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
11.4	100	0.0500	0.15		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.40"
2.6	241	0.0500	1.57		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
8.1	445	0.0170	0.91		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
1.0	50	0.0300	0.87		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
23.1	836	Total			

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 4S:

- [47] Hint: Peak is 2545% of capacity of segment #4
- [47] Hint: Peak is 760% of capacity of segment #7
- [47] Hint: Peak is 1521% of capacity of segment #9
- [47] Hint: Peak is 657% of capacity of segment #11
- [47] Hint: Peak is 7227% of capacity of segment #13
- [47] Hint: Peak is 628% of capacity of segment #15

Runoff = 211.69 cfs @ 12.91 hrs, Volume= 42.822 af, Depth= 1.38" Routed to Reach SP4 :

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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	Area (sf)	CN	Description
	5,031	48	Brush, Good, HSG B
*	29,184	98	Impervious Pavement
*	9,824	98	Impervious Roof
	708,087	58	Meadow, non-grazed, HSG B
	34,201	55	Woods, Good, HSG B
	34,999	73	Brush, Good, HSG D
	320,256	77	Woods, Good, HSG D
	1,271	70	Woods, Good, HSG C
	170,830	71	Meadow, non-grazed, HSG C
*	2,590	96	Gravel
*	29,099	98	Impervious Pavement
*	287	98	Impervious Roof
	3,181,257	78	Meadow, non-grazed, HSG D
	9,634	48	Brush, Good, HSG B
	868,528	55	Woods, Good, HSG B
*	30,257	98	Impervious Pavement
*	10,455	98	Impervious Roof
*	4,215	96	Gravel
	2,040,672	58	Meadow, non-grazed, HSG B
	38,512	78	Meadow, non-grazed, HSG D
	55,419	77	Woods, Good, HSG D
	334,887	78	Meadow, non-grazed, HSG D
	26,398	73	Brush, Good, HSG D
*	20,636	98	Impervious Pavement
	885,711	77	Woods, Good, HSG D
*	4,759	96	Gravel
	2,163,012	78	Meadow, non-grazed, HSG D
*	10,062	98	Impervious Roof
*	13,878	98	Impervious Pavement
*	13,754	96	Gravel
*	15,803	98	Water
	777,230	55	Woods, Good, HSG B
	16,892	48	Brush, Good, HSG B
	1,287,972	58	Meadow, non-grazed, HSG B
*	72,761	98	Impervious Pavement
*	14,040	98	Impervious Roof
*	1,010	96	Gravel
	91,670	77	Woods, Good, HSG D
	16,841	73	Brush, Good, HSG D
	1,693,872	78	Meadow, non-grazed, HSG D
	55,622	55	Woods, Good, HSG B
*	4,369	98	Impervious Pavement
	643,096	58	Meadow, non-grazed, HSG B
	41,645	70	Woods, Good, HSG C
	470,010	71	Meadow, non-grazed, HSG C
	16,260,538	70	Weighted Average
	15,999,883	. 0	98.40% Pervious Area
	260,655		1.60% Impervious Area
	200,000		1.55 /s Impervious / trou

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00.7 400 0.0000 0.00 0 lass4 F lass	
26.7 100 0.0060 0.06 Sheet Flow,	
Grass: Dense n= 0.240 P2= 2.40"	
5.4 277 0.0150 0.86 Shallow Concentrated Flow,	
Short Grass Pasture Kv= 7.0 fps	
5.6 778 0.0240 2.32 Shallow Concentrated Flow,	
Grassed Waterway Kv= 15.0 fps 0.3 40 0.0050 2.65 8.32 Pipe Channel,	
0.3 40 0.0050 2.65 8.32 Pipe Channel , 24.0" Round Area= 3.1 sf Perim= 6.3' r=	- 0 50'
n= 0.025 Corrugated metal	- 0.50
2.1 741 5.90 Direct Entry, Small Tributary & Swamp w	w/ Channole
1.8 401 3.76 Direct Entry, Small Tributary & Swamp w	
0.0 18 0.0560 8.86 27.84 Pipe Channel ,	W G Harmon
24.0" Round Area= 3.1 sf Perim= 6.3' r=	= 0.50'
n= 0.025 Corrugated metal	
2.3 605 4.30 Direct Entry, Small Tributary & Swamp w	v/ Channels
0.1 36 0.0140 4.43 13.92 Pipe Channel ,	
24.0" Round Area= 3.1 sf Perim= 6.3' r=	= 0.50'
n= 0.025 Corrugated metal	
2.3 627 4.46 Direct Entry, Small Tributary & Swamp w	v/ Channels
0.1 40 0.0750 10.25 32.22 Pipe Channel ,	
24.0" Round Area= 3.1 sf Perim= 6.3' r=	= 0.50'
n= 0.025 Corrugated metal	
2.1 527 4.20 Direct Entry, Small Tributary & Swamp w 0.2 40 0.0250 3.73 2.93 Pipe Channel,	w/ Channels
0.2 40 0.0250 3.73 2.93 Pipe Channel , 12.0" Round Area= 0.8 sf Perim= 3.1' r=	- 0.25'
n= 0.025 Corrugated metal	- 0.25
4.0 593 2.47 Direct Entry, Roadside Ditch	
0.1 40 0.0250 6.87 33.72 Pipe Channel ,	
30.0" Round Area= 4.9 sf Perim= 7.9' r=	= 0.63'
n= 0.025 Corrugated metal	0.00
23.2 2,925 2.10 Direct Entry, Small Tributary & Swamp w	v/ Channels
76.3 7,788 Total	

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 5S:

Runoff = 46.35 cfs @ 12.31 hrs, Volume= 5.069 af, Depth= 1.58" Routed to Reach SP4 :

	Aı	rea (sf)	CN [Description		
*		11,333	96 (Gravel		
	1	36,520	70 V	Voods, Go	od, HSG C	
*		438	98 I	mpervious	Pavement	
*		6,831	98 I	mpervious	Roof	
*		7,136	98 \	Vater		
	9	15,909	71 N	∕leadow, no	on-grazed,	HSG C
		57,613		Voods, Go	od, HSG B	
*		1,117	98 I	mpervious	Pavement	
		3,366		Brush, Goo	d, HSG B	
*		813		Gravel		
		60,234		∕leadow, no	on-grazed,	HSG B
*		66,794		Vater		
_		6,417		Brush, Goo	d, HSG D	
*		3,263		Gravel		
		517			od, HSG D	
		99,842			on-grazed,	
_		01,091			on-grazed,	HSG D
	,	79,234		Veighted A	•	
	,	96,918			vious Area	
		82,316	2	1.90% Impe	ervious Area	a
	Тс	Length	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	Description
_	19.6	100	0.0130	0.09	(0.0)	Sheet Flow,
	13.0	100	0.0130	0.09		Grass: Dense n= 0.240 P2= 2.40"
	12.9	842	0.0240	1.08		Shallow Concentrated Flow,
	12.0	072	J.UZ-70	1.00		Short Grass Pasture Kv= 7.0 fps
	1.2	311		4.42		Direct Entry, Grassed Waterway
	0.6	242		6.54		Direct Entry, Grassed Waterway
	34.3	1,495	Total	2.31		

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 6S:

Runoff = 14.15 cfs @ 12.39 hrs, Volume= 1.729 af, Depth= 1.51" Routed to Reach SP6 :

Are	ea (sf)	CN E	escription		
2	23,122	70 V	Voods, Go	od, HSG C	
3	31,419	65 E	Brush, Goo	d, HSG C	
43	37,478	71 N	leadow, no	on-grazed, l	HSG C
1	11,524	73 E	Brush, Goo	d, HSG D	
	2,524	77 V	Voods, Go	od, HSG D	
5	55,990	78 N	/leadow, no	on-grazed,	HSG D
	1,516	70 V	Voods, Go	od, HSG C	
	2,812	77 V	Voods, Go	od, HSG D	
2	20,186			on-grazed, l	
1	12,052	71 N	<u>lleadow, no</u>	on-grazed,	HSG C
59	98,623	72 V	Veighted A	verage	
59	98,623	1	00.00% Pe	ervious Are	a
Тс	Length	Slope		Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
28.7	100	0.0050	0.06		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.40"
4.3	256	0.0200	0.99		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
2.5	341	0.1030	2.25		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
2.4	316	0.1870	2.16		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
1.8	137		1.26		Direct Entry, Grassed Waterway
39.7	1,150	Total			

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Summary for Subcatchment 7S:

Runoff = 140.36 cfs @ 12.90 hrs, Volume= 28.270 af, Depth= 1.38" Routed to Reach SP7 :

	Α	rea (sf)	CN D	escription		
	2,8	22,055	58 N	leadow, no	on-grazed,	HSG B
		23,489	48 B	Brush, Goo	d, HSG B	
		40,040		,	od, HSG B	
	2,2	69,487			on-grazed,	HSG C
		2,183		Brush, Goo	,	
		37,505		,	od, HSG C	
	,	42,616			on-grazed,	HSG D
		53,119		Brush, Goo		
*	,	29,743			od, HSG D	
*		11,894		mpervious		
_		2,632		Gravel		
	,	34,763		Veighted A	•	
	,	22,869	_		vious Area	
		11,894	Ü	.11% Impe	ervious Are	a
	Тс	Length	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	Description
_	16.8	100	0.0190	0.10	(010)	Sheet Flow,
	10.0	100	0.0130	0.10		Grass: Dense n= 0.240 P2= 2.40"
	5.4	449	0.0390	1.38		Shallow Concentrated Flow,
	0		0.0000			Short Grass Pasture Kv= 7.0 fps
	8.2	512	0.0220	1.04		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
	20.3	945	0.0240	0.77		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
	3.6	192	0.0310	0.88		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
	14.9	3,312		3.70		Direct Entry, Small Tributary & Swamp w/ Channels
	4.1	284	0.0530	1.15		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
_	2.8	711		4.30		Direct Entry, Small Tributary & Swamp w/ Channels
	76.1	6,505	Total			

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 8S:

Runoff = 30.95 cfs @ 12.26 hrs, Volume= 3.103 af, Depth= 1.44" Routed to Reach SP8 :

	Α	rea (sf)	CN	Description		
		0	55	Woods, Go	od, HSG B	
*		1,030	98	mpervious	Pavement	
		27,402	58	Meadow, no	on-grazed, l	HSG B
		15,462	77	Woods, Go	od, HSG D	
*		6,130	98	mpervious	Pavement	
	2	200,339	78	Meadow, no	on-grazed, l	HSG D
		25,785	55	Woods, Go	od, HSG B	
*		1,580	96	Gravel		
*		5,152	98	mpervious	Pavement	
	1	91,169	58	Meadow, no	on-grazed, l	HSG B
*		7,435	98	mpervious	Pavement	
		9,470	77	Woods, Go	od, HSG D	
	4	23,047			on-grazed, I	HSG D
		12,817		Brush, Goo		
*		2,902		mpervious	Pavement	
*		3,771		Gravel		
*		670		mpervious		
	1	90,360		Meadow, no	on-grazed, l	HSG B
	,	24,521		Weighted A		
		01,202			vious Area	
		23,319	:	2.07% Impe	ervious Area	a
	_	1 41.	01	17.1	0	December Reco
	Tc	Length	Slope		Capacity	Description
_	(min)	(feet)	(ft/ft)		(cfs)	
	12.2	100	0.0420	0.14		Sheet Flow,
		201	0.0040	4.04		Grass: Dense n= 0.240 P2= 2.40"
	6.0	364	0.0210	1.01		Shallow Concentrated Flow,
	0.0	4 0 4 7		0.00		Short Grass Pasture Kv= 7.0 fps
	6.3	1,017		2.68		Direct Entry, Roadside Ditch
	5.0	1,137		3.82		Direct Entry, Roadside Ditch
	29.5	2,618	Total			

Flat Creek Pre

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 9S:

Runoff = 11.91 cfs @ 12.91 hrs, Volume= 2.396 af, Depth= 1.79" Routed to Reach SP9 :

	Α	rea (sf)	CN I	Description				
*		46,629	98	Vater				
*		6,554			Pavement			
	4	24,080	78 I	Meadow, no	on-grazed,	HSG D		
		2,058			od, HSG B			
		7,321		Brush, Goo	d, HSG B			
*		10,739		Nater				
*		1,356		•	Pavement			
	1	10,953			on-grazed,	HSG B		
*		3,190		•	Pavement			
		19,729		Brush, Goo	•			
	66,251 78 Meadow, non-grazed, H					HSG D		
		98,860		Neighted A	-			
		30,392			rvious Area			
		68,468	,	9.80% Impe	ervious Area	a		
	То	Longth	Clana	Volocity	Conneity	Description		
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description		
	(min)				(CIS)	Oh oot Flour		
	54.6	100	0.0010	0.03		Sheet Flow,		
	10.0	E40	0.0100	0.50		Grass: Dense n= 0.240 P2= 2.40"		
	18.0	540	0.0100	0.50		Shallow Concentrated Flow,		
	9.6	570		1 11		Woodland Kv= 5.0 fps Direct Entry Small Tributary & Swamp w/Channels		
_	8.6	572	T . 4 . 1	1.11		Direct Entry, Small Tributary & Swamp w/Channels		
	81.2	1,212	Total					

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 10S:

Runoff = 25.04 cfs @ 13.04 hrs, Volume= 5.353 af, Depth= 1.79" Routed to Reach SP10 :

A	rea (sf)	CN D	escription		
	35,373	55 V	Voods, Go	od, HSG B	
	4,798	48 B	rush, Goo	d, HSG B	
	92,207	58 N	leadow, no	on-grazed,	HSG B
	87,496		rush, Goo		
	13,364	77 V	Voods, Go	od, HSG D	
1,3	28,032	78 N	leadow, no	on-grazed,	HSG D
1,5	61,270	76 V	Veighted A	verage	
1,5	61,270	1	00.00% Pe	ervious Are	a
Tc	Length	Slope		Capacity	Description
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)	
54.6	100	0.0010	0.03		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.40"
16.9	388	0.0030	0.38		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
0.4	33	0.0610	1.23		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
3.6	165	0.0120	0.77		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
3.2	310		1.63		Direct Entry, Small Tributary & Swamp w/ Channels
8.2	920		1.88		Direct Entry, Small Tributary & Swamp w/ Channels
1.5	295		3.39		Direct Entry, Small Tributary & Swamp w/Channels
88.4	2,211	Total			

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 11S:

Runoff = 16.24 cfs @ 12.41 hrs, Volume= 2.015 af, Depth= 2.02" Routed to Reach SP11 :

_	Α	rea (sf)	CN D	N Description						
_		17,843	98 F	aved park	ing, HSG D					
	5	01,616	78 N	leadow, no	on-grazed,	HSG D				
_		1,885	73 E	rush, Goo	d, HSG D					
	5	21,344	79 V	Veighted A	verage					
	5	03,501	9	6.58% Per	vious Area					
		17,843	3	.42% Impe	ervious Area	a				
	_									
	Tc	Length	Slope	Velocity	Capacity	Description				
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
	20.2	100	0.0120	0.08		Sheet Flow,				
						Grass: Dense n= 0.240 P2= 2.40"				
	11.8	521	0.0110	0.73		Shallow Concentrated Flow,				
						Short Grass Pasture Kv= 7.0 fps				
	11.1	418	0.0080	0.63		Shallow Concentrated Flow,				
_						Short Grass Pasture Kv= 7.0 fps	_			
	43.1	1.039	Total							

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 12S:

Runoff = 22.09 cfs @ 13.24 hrs, Volume= 5.343 af, Depth= 1.94" Routed to Reach SP12 :

_	Α	rea (sf)	CN D	escription		
*		8,897	98 Ir	npervious		
		8,690	58 M	leadow, no	on-grazed,	HSG B
	1,3	13,095	78 N	leadow, no	on-grazed,	HSG D
		5,821	73 B	rush, Goo	d, HSG D	
_	1	01,013	77 V	loods, Go	od, HSG D	
	1,4	37,516	78 V	Veighted A	verage	
	1,4	28,619	9	9.38% Per	vious Area	
	8,897 0.62% Impervious Area					а
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	30.7	100	0.0470	0.05		Sheet Flow,
						Woods: Dense underbrush n= 0.800 P2= 2.40"
	25.9	601	0.0060	0.39		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
	48.0	1,687	0.0070	0.59		Shallow Concentrated Flow,
_						Short Grass Pasture Kv= 7.0 fps
	104.6	2,388	Total			

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 13S:

Runoff = 36.15 cfs @ 12.99 hrs, Volume= 7.553 af, Depth= 1.65" Routed to Reach SP13 :

	Aı	rea (sf)	CN [Description		
	2	79,893	58 N	/leadow, no	on-grazed,	HSG B
	1,5	58,214	78 N	<i>l</i> leadow, no	on-grazed,	HSG D
		424		Brush, Goo	,	
		77,097		Brush, Goo	,	
		42,209			od, HSG B	
_	3	37,975	77 \	<u>Voods, Go</u>	od, HSG D	
	,	95,812		Veighted A		
	2,3	95,812	1	00.00% Pe	ervious Are	a
	_		01			
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	15.6	100	0.0230	0.11		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.40"
	48.9	1,838	0.0080	0.63		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
	19.7	418	0.0050	0.35		Shallow Concentrated Flow,
_						Woodland Kv= 5.0 fps
	84.2	2,356	Total			

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 14S:

Runoff = 15.76 cfs @ 12.34 hrs, Volume= 1.772 af, Depth= 1.79" Routed to Reach SP14 :

	Aı	rea (sf)	CN [Description		
*		9,018	98 I	mpervious		
		70,714	58 N	∕leadow, no	on-grazed,	HSG B
	4	28,883	78 N	∕leadow, no	on-grazed,	HSG D
		744	48 E	Brush, Goo	d, HSG B	
		189	73 E	Brush, Goo	d, HSG D	
		7,102	77 \	Voods, Go	od, HSG D	
	5	16,650	76 V	Veighted A	verage	
	5	07,632	ç	8.25% Per	vious Area	
		9,018	1	.75% Impe	ervious Area	a
	Тс	Length	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	18.5	100	0.0150	0.09		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.40"
	18.1	835	0.0120	0.77		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
	36.6	935	Total	·		

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 15S:

Runoff = 6.48 cfs @ 12.28 hrs, Volume= 0.710 af, Depth= 1.13" Routed to Reach SP15 :

Aı	rea (sf)	CN [Description		
*	4,081	98 I	mpervious		
1	81,283	58 N	/leadow, no	on-grazed,	HSG B
1	26,101	78 N	/leadow, no	on-grazed,	HSG D
	6,560		Brush, Goo	,	
	2,092	73 E	Brush, Goo	d, HSG D	
	5,023		,	od, HSG B	
	4,083	77 V	<u>Voods, Go</u>	od, HSG D	
3	29,223		Veighted A	•	
3	25,142	g	8.76% Per	vious Area	
	4,081	1	.24% Impe	ervious Area	a
_					
Tc	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
15.9	100	0.0220	0.11		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.40"
6.4	387	0.0210	1.01		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
8.3	220	0.0040	0.44		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
30.6	707	Total			

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 16S:

Runoff = 27.01 cfs @ 12.62 hrs, Volume= 4.217 af, Depth= 1.94" Routed to Reach SP16 :

	Α	rea (sf)	CN D	escription		
*		12,714	98 Ir	mpervious		
		25,066			on-grazed,	
	9	38,415	78 N	leadow, no	on-grazed,	HSG D
		3,358		Brush, Goo	,	
		863		•	od, HSG C	
_	1	54,192	77 V	Voods, Go	od, HSG D	
	1,1	34,608		Veighted A		
	,	21,894	9	8.88% Per	vious Area	
	12,714		1.12% Impervious Area			a
			01	17.1	0	December
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	27.0	100	0.0170	0.06		Sheet Flow,
		4.40		0.00		Grass: Bermuda n= 0.410 P2= 2.40"
	3.8	142	0.0080	0.63		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
	000		0 0000	0.00		Ob all and O are a seturate at Flance
	26.0	1,035	0.0090	0.66		Shallow Concentrated Flow,
		,	0.0090			Short Grass Pasture Kv= 7.0 fps
_	26.0 2.0 58.8	1,035 334 1,611	0.0090 Total	0.66 2.74		•

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 16SA:

Runoff = 18.88 cfs @ 12.38 hrs, Volume= 2.254 af, Depth= 1.79" Routed to Reach SP16 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 25-yr Rainfall=4.07"

	Area (sf)	CN	Description
*	11,093	98	Impervious
	70,093	58	Meadow, non-grazed, HSG B
	359,929	78	Meadow, non-grazed, HSG D
	259	48	Brush, Good, HSG B
	14,806	73	Brush, Good, HSG D
	0	70	Woods, Good, HSG C
	201,078	77	Woods, Good, HSG D
	657,258	76	Weighted Average
	646,165		98.31% Pervious Area
	11,093		1.69% Impervious Area
	Tc Length	Slo	
(min) (feet)	(ft/	/ft) (ft/sec) (cfs)

39.9

Direct Entry, SEE SPREADSHEET

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 17S:

Runoff = 109.25 cfs @ 13.10 hrs, Volume= 24.456 af, Depth= 1.87" Routed to Reach SP17 :

_	Aı	rea (sf)	CN D	escription		
		22,601	98 V	Vater Surfa	ace, HSG A	1
*		17,632	98 Ir	mpervious		
		52,955			on-grazed, l	
		37,352			on-grazed, l	HSG D
		16,810		rush, Goo	,	
		30,011		rush, Goo	•	
		11,819		,	od, HSG C	
_		58,748		Voods, Go	od, HSG D	
		47,928		Veighted A		
	,	07,695	_	-	vious Area	
		40,233	0	.59% Impe	ervious Area	a
	т.	1 41-	Ol	\	0	Description
	Tc	Length	Slope	Velocity		Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	12.1	50	0.0300	0.07		Sheet Flow,
	40.0	50	0.0440	0.00		Woods: Light underbrush n= 0.400 P2= 2.40"
	10.9	50	0.0140	0.08		Sheet Flow,
	20.6	0.070	0.0000	4.04		Grass: Dense n= 0.240 P2= 2.40"
	32.6	2,373	0.0300	1.21		Shallow Concentrated Flow,
	22.0	1 /10	0.0100	0.70		Short Grass Pasture Kv= 7.0 fps
	33.8	1,418	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
	5.1	845		2.74		Direct Entry, Small Tributary & Swamp w/Channels
-	94.5	4.736	Total	2.14		Direct Entry, Official Tributary & Swamp Wionamiers
	94.0	4.730	าบเสเ			

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 18S:

Runoff = 83.28 cfs @ 12.73 hrs, Volume= 14.291 af, Depth= 1.87" Routed to Reach SP18 :

	Area (sf)	CN [Description				
	2,953	98 V	Vater Surfa	ace, HSG A	1		
*	13,432	98 I	mpervious				
	5,975	58 N	∕leadow, no	on-grazed,	HSG B		
	29,944	71 N	∕leadow, no	on-grazed,	HSG C		
2	2,207,221			on-grazed,	HSG D		
	157,865		Brush, Goo				
	23,440		•	od, HSG B			
321,869 70 Woods, Good, HSG C							
1	1,238,903 77 Woods, Good, HSG D						
4	4,001,602 77 Weighted Average						
3	3,985,217		99.59% Pervious Area				
	16,385	().41% Impe	ervious Area	a		
				_			
	c Length	Slope	•		Description		
(mir		(ft/ft)	(ft/sec)	(cfs)			
27.	8 100	0.0150	0.06		Sheet Flow,		
					Woods: Light underbrush n= 0.400 P2= 2.40"		
6.	8 205	0.0100	0.50		Shallow Concentrated Flow,		
					Woodland Kv= 5.0 fps		
23.	6 2,144	0.0920	1.52		Shallow Concentrated Flow,		
_					Woodland Kv= 5.0 fps		
8.	,		2.92		Direct Entry, Ditch		
66.	4 3,889	Total					

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 19S:

Runoff = 85.81 cfs @ 12.93 hrs, Volume= 17.243 af, Depth= 1.79" Routed to Reach SP19 :

A	rea (sf)	CN D	escription		
*	29,609	98 Ir	npervious		
	21,503	96 G	Gravel surfa	ace, HSG A	1
	84,734			on-grazed,	
	89,335			on-grazed,	
2,4	122,408			on-grazed,	HSG D
	10,082		rush, Goo	,	
	74,495		rush, Goo		
	16,971		,	od, HSG B	
	81,805		,	od, HSG C	
	597,828			od, HSG D	
	028,770		Veighted A		
4,9	999,161	-		vious Area	
	29,609	0	.59% Impe	ervious Area	a
То	Longth	Clana	\/alaaitı/	Consoitu	Description
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
				(615)	Chaot Flour
32.7	100	0.0100	0.05		Sheet Flow,
21.4	1,915	0.0890	1.49		Woods: Light underbrush n= 0.400 P2= 2.40" Shallow Concentrated Flow ,
۷1. 4	1,913	0.0090	1.43		Woodland Kv= 5.0 fps
6.3	706	0.0720	1.88		Shallow Concentrated Flow,
0.0	700	0.0120	1.00		Short Grass Pasture Kv= 7.0 fps
3.7	109	0.0050	0.49		Shallow Concentrated Flow,
0		0.0000	0.10		Short Grass Pasture Kv= 7.0 fps
2.9	244	0.0410	1.42		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
7.2	706		1.63		Direct Entry, Small Tributary & Swamp w/ Channels
6.7	923		2.30		Direct Entry, Small Tributary & Swamps w/ Channels
80.9	4,703	Total			

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 20S:

Runoff = 42.38 cfs @ 12.81 hrs, Volume= 7.818 af, Depth= 1.65" Routed to Reach SP20 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 25-yr Rainfall=4.07"

	Area (sf)	CN	Description						
	16,368	98	Water Surface, HSG A						
*	38,886	98	Impervious						
	503	96	Gravel surface, HSG A						
	99,447	30	Meadow, non-grazed, HSG A						
	58,596	58	Meadow, non-grazed, HSG B						
	130,201	71	Meadow, non-grazed, HSG C						
	1,680,681	78	Meadow, non-grazed, HSG D						
	21,162	73	Brush, Good, HSG D						
	131,716	55	Woods, Good, HSG B						
	6,015	70	Woods, Good, HSG C						
	296,222	77	Woods, Good, HSG D						
	2,479,797	74	Weighted Average						
	2,424,543		97.77% Pervious Area						
	55,254		2.23% Impervious Area						
	Tc Length	Slop	pe Velocity Capacity Description						
	(min) (feet)	(ft/	ft) (ft/sec) (cfs)						
	74.4		D: (E (OFF ODDEDOUEET						

1.1 Direct Entry,

71.1

Direct Entry, SEE SPREDSHEET

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 21S:

Runoff = 7.73 cfs @ 12.29 hrs, Volume= 0.835 af, Depth= 1.31" Routed to Reach SP21 :

 Α	rea (sf)	CN	Description						
	28,890	30	Meadow, no	on-grazed,	HSG A				
2	262,110	71	Meadow, no	on-grazed,	HSG C				
	12,438	78	Meadow, no	on-grazed,	HSG D				
	683	30	Brush, Goo	d, HSG A					
	5,947	65	Brush, Goo	d, HSG C					
1,322 30 Woods, Good, HSG A			Woods, Go	od, HSG A					
 21,219 98 Paved roads w/curbs &					R sewers, HSG A				
3	32,609	69	Neighted A	verage					
3	311,390	9	93.62% Pervious Area						
	21,219	(6.38% Impe	ervious Area	a				
Тс	Length	Slope	Velocity	Capacity	Description				
 (min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
12.4	100	0.0410	0.13		Sheet Flow,				
					Grass: Dense n= 0.240 P2= 2.40"				
19.5	821	0.0100	0.70		Shallow Concentrated Flow,				
					Short Grass Pasture Kv= 7.0 fps				
31.9	921	Total			·				

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 22S:

Runoff = 12.63 cfs @ 12.58 hrs, Volume= 1.972 af, Depth= 1.31" Routed to Reach SP39 :

	rea (sf)	CN I	Description				
	87,197	30 [Meadow, no	on-grazed, l	HSG A		
4	418,867	71	Meadow, no	on-grazed, l	HSG C		
	134,602	78 I	Meadow, no	on-grazed, l	HSG D		
	814	65 I	Brush, Goo	d, HSG C			
	7,253		Brush, Goo	•			
	843		,	od, HSG A			
	3,389		,	od, HSG C			
,	126,479		,	od, HSG D			
	6,200		Paved road	s w/curbs &	k sewers, HSG A		
	785,644		Neighted A				
•	779,444		-	rvious Area			
	6,200	().79% Impe	ervious Area	a		
_		-			—		
Tc	-	Slope	•		Description		
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)			
28.7	100	0.0050	0.06		Sheet Flow,		
					Grass: Dense n= 0.240 P2= 2.40"		
22.4	1,072	0.0130	0.80		Shallow Concentrated Flow,		
					Short Grass Pasture Kv= 7.0 fps		
0.8	83	0.1330	1.82		Shallow Concentrated Flow,		
					Woodland Kv= 5.0 fps		
1.4	184		2.20		Direct Entry, Small Tributary & Swamp w/ Channels		
53.3	1,439	Total					

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Summary for Subcatchment 23S:

Runoff = 275.76 cfs @ 13.05 hrs, Volume= 59.327 af, Depth= 1.79" Routed to Reach SP23 :

A	rea (sf)	CN D	escription		
	33,228	30 N	leadow, no	on-grazed, l	HSG A
	194,460			on-grazed,	
,	349,351			on-grazed, l	HSG D
	299,742		rush, Goo		
,	788,044		rush, Goo		
	193,479			od, HSG C	
5,7	745,558		,	od, HSG D	
	73,510				& sewers, HSG D
	25,027			ace, HSG D)
,	302,399		Veighted A		
17,2	228,889	_		vious Area	
	73,510	0	.42% Impe	ervious Area	a
т.	ما السميد ا	Clana	\/alaaitr	Conneitu	Description
Tc	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	Object Floor
18.4	100	0.0420	0.09		Sheet Flow,
22.2	1 0 1 1	0.0050	1 16		Woods: Light underbrush n= 0.400 P2= 2.40"
22.2	1,941	0.0850	1.46		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
11.2	806	0.0580	1.20		Shallow Concentrated Flow,
11.2	000	0.0300	1.20		Woodland Kv= 5.0 fps
11.6	1,740		2.49		Direct Entry, Small Tributary & Swamp w/ Channels
4.2	1,229		4.93		Direct Entry, Small Tributary & Swamp w/ Channels
9.5	1,895		3.32		Direct Entry, Small Tributary & Swamp w/ Channels
3.8	650		2.82		Direct Entry, Small Tributary & Swamp w/ Channels
7.8	770		1.64		Direct Entry, Roadside Ditch
88.7	9,131	Total			

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Summary for Subcatchment 24S:

Runoff = 10.15 cfs @ 12.26 hrs, Volume= 1.008 af, Depth= 2.02" Routed to Reach SP24 :

_	Α	rea (sf)	CN E	Description		
	2	26,229	78 N	/leadow, no	on-grazed,	HSG D
		7,721	73 E	Brush, Goo	d, HSG D	
		10,176	77 V	Voods, Go	od, HSG D	
_		16,779	98 F	Paved road	s w/curbs &	R sewers, HSG D
	2	60,905	79 V	Veighted A	verage	
	2	44,126	9	3.57% Per	vious Area	
		16,779	6	.43% Impe	ervious Area	a
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	15.1	100	0.0250	0.11		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.40"
	14.0	830	0.0200	0.99		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
_	2.1	270		2.17		Direct Entry, Small Tributary & Swamp w/ Channels
	31.2	1,200	Total			

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Summary for Subcatchment 25S:

Runoff = 191.48 cfs @ 12.80 hrs, Volume= 35.009 af, Depth= 1.72" Routed to Reach SP25 :

Ar	rea (sf)	CN D	escription		
8	16,850	58 N	leadow, no	on-grazed,	HSG B
9	55,101	71 N	leadow, no	on-grazed,	HSG C
5,1	04,595	78 N	leadow, no	on-grazed,	HSG D
	18,372	48 B	rush, Goo	d, HSG B	
2	65,288	73 B	rush, Goo	d, HSG D	
1	89,511	55 V	Voods, Go	od, HSG B	
	44,843		,	od, HSG D	
	29,278				& sewers, HSG D
	19,569	96 G	Gravel surfa	ace, HSG [)
10,6	43,407	75 V	Veighted A	verage	
10,6	14,129	9	9.72% Per	vious Area	
	29,278	0	.28% Impe	ervious Are	a
_					
Tc	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
16.8	100	0.0190	0.10		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.40"
18.9	1,281	0.0510	1.13		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
8.8	640	0.0300	1.21		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
17.1	4,093		3.98		Direct Entry, Small Tributary & Swamp w/ Channels
4.6	482		1.76		Direct Entry, Small Tributary & Swamp w/ Channels
4.8	682		2.39		Direct Entry, Small Tributary & Swamp w/ Channels
71.0	7,278	Total			

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Summary for Subcatchment 26S:

Runoff = 24.59 cfs @ 12.41 hrs, Volume= 3.063 af, Depth= 1.94" Routed to Reach SP26 :

_	Α	rea (sf)	CN D	escription		
		75,400	77 V	Voods, Go	od, HSG D	
*	:	4,254	98 V	Vater		
		50,954	71 N	leadow, no	on-grazed,	HSG C
*		18,174		•	Pavement	
_	6	75,212	78 N	<u>leadow, no</u>	on-grazed,	HSG D
	823,994 78 Weighted Average					
	801,566 97.28% Pervious Area					
		22,428 2.72% Impervious Are			ervious Are	a
	Тс	Length	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	Description
	18.5	100	0.0150	0.09		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.40"
	5.4	527		1.64		Direct Entry, Ditch
	19.2	720	0.0080	0.63		Shallow Concentrated Flow,
	10.2					
_	10.2					Short Grass Pasture Kv= 7.0 fps

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Summary for Subcatchment 27S:

Runoff = 26.33 cfs @ 12.48 hrs, Volume= 3.636 af, Depth= 1.44" Routed to Reach SP27 :

A	rea (sf)	CN [Description		
1	02,395	30 N	/leadow, no	on-grazed,	HSG A
	70,249	58 N	/leadow, no	on-grazed,	HSG B
3	56,229	71 N	/leadow, no	on-grazed,	HSG C
5	94,316	78 N	/leadow, no	on-grazed,	HSG D
	15,001	48 E	Brush, Goo	d, HSG B	
	136	65 E	Brush, Goo	d, HSG C	
	35,121	73 E	Brush, Goo	d, HSG D	
	1,761		Voods, Go	od, HSG A	
	10,015		Voods, Go	od, HSG B	
	44,190		•	od, HSG C	
	27,054			od, HSG D	
	53,425				& sewers, HSG A
	7,743		Gravel surfa	ace, HSG <i>P</i>	1
1,3	17,635		Veighted A		
,	64,210			rvious Area	
	53,425	4	I.05% Impe	ervious Are	a
_		01		. "	B
Tc	Length	Slope	Velocity	Capacity	Description
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)	
11.4	100	0.0500	0.15		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.40"
7.4	973	0.0970	2.18		Shallow Concentrated Flow,
2.4	5.40		4 40		Short Grass Pasture Kv= 7.0 fps
6.4	548	0.0820	1.43		Shallow Concentrated Flow,
0.0	450	0.0000	4.07		Woodland Kv= 5.0 fps
2.0	152	0.0330	1.27		Shallow Concentrated Flow,
40.0	004	0.0000	4.00		Short Grass Pasture Kv= 7.0 fps
12.9	824	0.0230	1.06		Shallow Concentrated Flow,
6.3	510		1.34		Short Grass Pasture Kv= 7.0 fps Direct Entry, Small Tributary & Swamp w/ Channels
46.4	3,107	Total	1.04		Direct Entry, email moutary & ewamp w/ emailles
40.4	3, 107	าบเลเ			

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Summary for Subcatchment 28S:

Runoff = 81.51 cfs @ 12.29 hrs, Volume= 8.658 af, Depth= 1.58" Routed to Reach SP28 :

	rea (sf)	CN I	Description		
•	148,045	58 I	Meadow, no	on-grazed,	HSG B
1,3	391,071	71 I	Meadow, no	on-grazed,	HSG C
1,	142,501	78 I	Meadow, no	on-grazed,	HSG D
	16,837		Brush, Goo	d, HSG B	
	158		Brush, Goo	d, HSG C	
	36,741		Brush, Goo	•	
	39,665			od, HSG B	
	794			od, HSG C	
	51,395		,	od, HSG D	
*	40,923	98 I	mpervious	Surface	
2,8	368,130	73 \	Weighted A	verage	
2,8	327,207	(98.57% Per	rvious Area	
	40,923	•	1.43% Impe	ervious Are	a
_		-			—
Tc	Length	Slope		Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
19.6	100	0.0130	0.09		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.40"
2.3	163	0.0290	1.19		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
11.0	2,559		3.88		Direct Entry, Roadside Ditch
32.9	2,822	Total			

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Summary for Subcatchment 29S:

Runoff = 28.23 cfs @ 12.19 hrs, Volume= 2.447 af, Depth= 1.65" Routed to Reach SP29 :

	A	rea (sf)	CN [Description		
		34,206	70 ١	Voods, Go	od, HSG C	
*		7,569			Pavement	
*		4,117	98 I	mpervious	Roof	
*		5,127	96 (Gravel		
	2	47,913	71 N	Meadow, no	on-grazed,	HSG C
		11,168	55 \	Woods, Go	od, HSG B	
		740	65 E	Brush, Goo	d, HSG C	
		9,072		Brush, Goo		
*		428		mpervious		
		56,539			on-grazed,	HSG B
*		8,416		mpervious		
		16,068			od, HSG D	
_		74,759			on-grazed,	HSG D
		76,122		Veighted A		
		55,592			vious Area	
		20,530	Ź	2.65% Impe	ervious Are	a
	Тс	Length	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	10.3	100	0.0650	0.16		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.40"
	0.5	63	0.0950	2.16		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
	0.3	31	0.1290	1.80		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
	6.1	612	0.0570	1.67		Shallow Concentrated Flow,
		o :	0.0465	0.64		Short Grass Pasture Kv= 7.0 fps
	0.1	31	0.6100	3.91		Shallow Concentrated Flow,
	7 1	000		0.40		Woodland Kv= 5.0 fps
_	7.1	900	T.4.1	2.12		Direct Entry, Roadside Ditch
	24.4	1,737	Total			

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Summary for Subcatchment 30S:

Runoff = 14.96 cfs @ 12.37 hrs, Volume= 1.786 af, Depth= 1.51" Routed to Reach SP30 :

	Aı	rea (sf)	CN [Description		
	5	11,468	71 N	∕leadow, no	on-grazed,	HSG C
		80,980	78 N	Meadow, no	on-grazed,	HSG D
		16,758	70 \	Voods, Go	od, HSG C	
*		9,244	98 I	mpervious	Surface	
618,450 72 Weighted Average						
	609,206 98.51% Pervious Area					
		9,244	1	.49% Impe	ervious Area	a
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	26.7	100	0.0060	0.06		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.40"
	10.4	1,152	0.0700	1.85		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
_	1.3	175		2.28		Direct Entry, Roadside Ditch
	38.4	1.427	Total			

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Summary for Subcatchment 31S:

Runoff = 57.32 cfs @ 12.66 hrs, Volume= 9.399 af, Depth= 1.65" Routed to Reach SP31 :

_	Α	rea (sf)	CN D	escription						
	66,905 58 Meadow, non-grazed, H					HSG B				
	1,1	85,943	71 M	Meadow, non-grazed, HSG C						
	1,3	98,406		Meadow, non-grazed, HSG D						
		1,947		rush, Goo	•					
		84,560		,	od, HSG B					
		17,524		,	od, HSG C					
*		13,262		,	od, HSG D					
_		13,041		npervious						
	,	81,588		Veighted A						
	,	68,547	_		vious Area					
		13,041	U	.44% Impe	ervious Are	a				
	Тс	Length	Slope	Velocity	Capacity	Description				
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	'				
	35.2	100	0.0030	0.05		Sheet Flow,				
						Grass: Dense n= 0.240 P2= 2.40"				
	6.2	219	0.0070	0.59		Shallow Concentrated Flow,				
						Short Grass Pasture Kv= 7.0 fps				
	8.4	252	0.0100	0.50		Shallow Concentrated Flow,				
						Woodland Kv= 5.0 fps				
	6.7	592	0.0440	1.47		Shallow Concentrated Flow,				
	4.0	700		0.07		Short Grass Pasture Kv= 7.0 fps				
_	4.2	722		2.87		Direct Entry, Small Tributary & Swamp w/ Channels				
	60.7	1,885	Total							

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Summary for Subcatchment 32S:

Runoff = 37.87 cfs @ 12.94 hrs, Volume= 8.276 af, Depth= 1.01" Routed to Reach SP33 :

A	rea (sf)	CN	Description						
2,5	541,060	58	Meadow, non-grazed, HSG B						
7	716,554	71	Meadow, non-grazed, HSG C						
5	517,326	78	Meadow, non-grazed, HSG D						
	869	48	Brush, Goo	d, HSG B					
	3,094		Brush, Goo						
	4,465		Brush, Good, HSG D						
2	200,046		,	od, HSG B					
	46,472		•	od, HSG C					
	208,119			od, HSG D					
*	33,483		mpervious						
-	3,270		Gravel surfa	ace, HSG <i>P</i>	1				
	274,758		Weighted A						
4,2	241,275			rvious Area					
	33,483	(0.78% Impe	ervious Area	a				
То	Longth	Slope	Volocity	Canacity	Description				
Tc (min)	Length (feet)	Slope (ft/ft)	•	Capacity (cfs)	Description				
				(015)	Chast Flour				
16.5	100	0.0200	0.10		Sheet Flow,				
6.4	848	0.4000	2.24		Grass: Dense n= 0.240 P2= 2.40"				
6.4	040	0.1000	2.21		Shallow Concentrated Flow,				
50. 0	2,083	0.0090	0.66		Short Grass Pasture Kv= 7.0 fps Shallow Concentrated Flow,				
52.3	2,003	0.0090	0.00		Short Grass Pasture Kv= 7.0 fps				
75.0	2.024	Tatal			Short Grass Pasture RV-1.0 1ps				
75.2	3,031	Total							

Flat Creek Pre

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 33S:

Runoff = 62.99 cfs @ 12.66 hrs, Volume= 10.703 af, Depth= 1.25" Routed to Reach SP33 :

A	rea (sf)	CN [Description		
1,7	722,412	58 Meadow, non-grazed,			HSG B
1,5	542,409	78 N	Meadow, no	on-grazed,	HSG D
	1,381	73 E	Brush, Goo	d, HSG D	
	384,753		,	od, HSG B	
8	326,436	77 \	Voods, Go	od, HSG D	
4,4	177,391		Veighted A		
4,4	177,391	1	100.00% Pe	ervious Are	a
_					
Tc	Length	Slope	Velocity	Capacity	Description
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)	
20.1	100	0.0340	0.08		Sheet Flow,
					Woods: Light underbrush n= 0.400 P2= 2.40"
24.6	932	0.0160	0.63		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
12.8	1,157	0.0460	1.50		Shallow Concentrated Flow,
0.4	00	0.0400	0.70		Short Grass Pasture Kv= 7.0 fps
0.4	60	0.3120	2.79		Shallow Concentrated Flow,
0.7	4.44		0.40		Woodland Kv= 5.0 fps
0.7	141		3.19		Direct Entry, Small Tributary & Swamp w/ Channels
58.6	2,390	Total			

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Summary for Subcatchment 34S:

Runoff = 35.60 cfs @ 12.42 hrs, Volume= 4.577 af, Depth= 1.44" Routed to Reach SP35 :

_	Α	rea (sf)	CN E	escription				
20,254 58 Meadow, non-grazed, H					on-grazed,	HSG B		
	9	37,330	78 N	leadow, no	on-grazed,	HSG D		
		16,371	48 E	Brush, Goo	d, HSG B			
		35,437	73 E	Brush, Good, HSG D				
	4	29,230	55 V	Woods, Good, HSG B				
_	2	20,205	77 V	Voods, Go	od, HSG D			
	1,6	58,827	71 V	Veighted A	verage			
	1,6	58,827	1	00.00% Pe	ervious Are	a		
	Tc	Length	Slope	Velocity	Capacity	Description		
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)			
	20.5	100	0.0320	0.08		Sheet Flow,		
						Woods: Light underbrush n= 0.400 P2= 2.40"		
	2.9	130	0.0220	0.74		Shallow Concentrated Flow,		
						Woodland Kv= 5.0 fps		
	18.3	1,058	0.0190	0.96		Shallow Concentrated Flow,		
						Short Grass Pasture Kv= 7.0 fps		
_	0.3	155		8.93		Direct Entry, Small tributary & Swamp w/channels		
	42.0	1.443	Total					

Flat Creek Pre

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 35S:

Runoff = 100.95 cfs @ 12.21 hrs, Volume= 9.034 af, Depth= 1.79" Routed to Reach SP35 :

_	Aı	ea (sf)	CN E	escription		
32,311 58 Meadow, non-grazed, HS					on-grazed,	HSG B
		36,347	71 N	/leadow, no	on-grazed,	HSG C
	1,4	45,641	78 N	/leadow, no	on-grazed,	HSG D
		26,860	73 E	Brush, Goo	d, HSG D	
		50,341		•	od, HSG B	
		79,608			od, HSG C	
		04,736		,	od, HSG D	
		82,102				& sewers, HSG D
_		76,832	96 G	Gravel surfa	ace, HSG D)
		34,778		Veighted A		
		52,676			vious Area	
	2	82,102	1	0.71% lmp	ervious Are	ea
	_					
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	2.4	100	0.0050	0.68		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.40"
	2.6	755	0.0590	4.93		Shallow Concentrated Flow,
						Paved Kv= 20.3 fps
	2.5	438		2.91		Direct Entry,
	17.6	1,445	0.0380	1.36		Shallow Concentrated Flow,
	4.0	054		5.04		Short Grass Pasture Kv= 7.0 fps
-	1.0	351		5.94		Direct Entry, Small Tributary & Swamp w/ Channels
	26.1	3.089	Total			

Type II 24-hr 25-yr Rainfall=4.07"
Printed 7/11/2024

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Summary for Subcatchment 36S:

Runoff = 207.05 cfs @ 12.36 hrs, Volume= 23.919 af, Depth= 1.87" Routed to Reach SP36 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 25-yr Rainfall=4.07"

_	Area (sf)	CN	Description							
	52,184	58	Meadow, no	Meadow, non-grazed, HSG B						
	695	71	Meadow, no	on-grazed,	HSG C					
	5,121,405	78	Meadow, no	on-grazed,	HSG D					
	1,145	48	Brush, Goo	d, HSG B						
	33,870	73	Brush, Goo	d, HSG D						
	278,876	55	Woods, Go	od, HSG B						
	346,117	70	Woods, Go	od, HSG C						
	782,902	77	Woods, Go	od, HSG D						
	65,616	98	Paved road	s w/curbs 8	k sewers, HSG D					
_	14,651	96	Gravel surfa	ace, HSG D)					
	6,697,461	77	Weighted A	verage						
	6,631,845	99.02% Pervious Area								
	65,616	65,616 0.98% Impervious Area								
	Tc Length	n Slo _l	pe Velocity	Capacity	Description					
_	(min) (feet)) (ft/	ft) (ft/sec)	(cfs)						
	20.4				Direct France OFF ODDE ADJOFFT					

38.4

Direct Entry, SEE SPREADHSEET

Flat Creek Pre

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 37S:

Runoff = 119.85 cfs @ 12.37 hrs, Volume= 14.135 af, Depth= 1.87" Routed to Reach SP37 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 25-yr Rainfall=4.07"

	Area (sf)	CN	Description
*	30,667	98	Impervious
	13,321	96	Gravel surface, HSG A
*	7,485	98	Water
	57,778	58	Meadow, non-grazed, HSG B
	3,215,975	78	Meadow, non-grazed, HSG D
	805	48	Brush, Good, HSG B
	915	73	Brush, Good, HSG D
	76,106	55	Woods, Good, HSG B
	148,513	70	Woods, Good, HSG C
	406,259	77	Woods, Good, HSG D
	3,957,824	77	Weighted Average
	3,919,672		99.04% Pervious Area
	38,152		0.96% Impervious Area
	Tc Length	Slop	pe Velocity Capacity Description
(min) (feet)	(ft/1	ft) (ft/sec) (cfs)
	00.0		D: 4 F 4 OFF ODDEADOUEFT

39.6

Direct Entry, SEE SPREADSHEET

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 38S:

Runoff = 22.81 cfs @ 12.35 hrs, Volume= 2.623 af, Depth= 1.87" Routed to Reach SP38 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 25-yr Rainfall=4.07"

	Ar	rea (sf)	CN	Description				
355,232 78 Meado					on-grazed,	, HSG D		
379,321 77 Woods, Good, HSG D								
734,553 77 Weighted Average					verage			
	7	34,553		100.00% Pervious Area				
	Tc	Length	Slope	e Velocity	Capacity	/ Description		
	(min)	(feet)	(ft/ft	(ft/sec)	(cfs)			
	00.4		•			Discret Forting OFF ODDEADOUEFT		

38.1

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 39S:

Runoff = 49.45 cfs @ 12.58 hrs, Volume= 7.533 af, Depth= 1.58" Routed to Reach SP39 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 25-yr Rainfall=4.07"

	Area (sf)	CN	Description						
	113,238	30	Woods, Good	I, HSG A					
*	17,184	98	98 Impervious Pavement						
	149,774	30	Meadow, non-	-grazed, I	HSG A				
	11,690	30	Brush, Good,	HSG A					
	30,170	70	Woods, Good	I, HSG C					
	7,231	71	Meadow, non-	-grazed, I	HSG C				
	194,104	77	Woods, Good	I, HSG D					
	70,193	73	Brush, Good,	HSG D					
*	2,287	96	Gravel						
_	1,899,537	78	Meadow, non-	-grazed, l	HSG D				
	2,495,408	73	Weighted Ave	erage					
	2,478,224		99.31% Pervi	ous Area	1				
	17,184		0.69% Imperv	ious Area	a				
	Tc Length	Slop	oe Velocity (Capacity	Description				
	(min) (feet)	(ft/	ft) (ft/sec)	(cfs)					
	E 4 . 4				Direct Fater OFF ODDE A DOLLET				

54.4

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 40S:

Runoff = 80.40 cfs @ 12.47 hrs, Volume= 10.697 af, Depth= 1.94" Routed to Reach SP40 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 25-yr Rainfall=4.07"

	Area (sf)	CN	Description				
* 26,987 98 Impervious Pavement							
	171,417	77	Woods, Go	od, HSG D			
	20,992	73	Brush, Goo	d, HSG D			
	2,658,700	78	Meadow, no	on-grazed,	HSG D		
	2,878,096	78	Weighted A	verage			_
	2,851,109		99.06% Per	rvious Area			
	26,987		0.94% Impe	ervious Area	а		
	Tc Lengtl	h Slo _l	oe Velocity	Capacity	Description		
_	(min) (feet	t) (ft/	ft) (ft/sec)	(cfs)			
	17.2				Direct Entry	SEE SUDEAUSHEET	

47.3

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 41S:

Runoff = 21.19 cfs @ 12.47 hrs, Volume= 2.897 af, Depth= 1.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 25-yr Rainfall=4.07"

	Area (sf)	CN	Description
*	16,863	98	Impervious
*	44,367	96	Gravel
	50,657	58	Meadow, non-grazed, HSG B
	654,398	71	Meadow, non-grazed, HSG C
	153,128	78	Meadow, non-grazed, HSG D
	12,946	55	Woods, Good, HSG B
	30,598	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
	33,461	61	>75% Grass cover, Good, HSG B
	6,740	74	>75% Grass cover, Good, HSG C
	1,003,158	72	Weighted Average
	986,295		98.32% Pervious Area
	16,863		1.68% Impervious Area
	Tc Length	Slop	pe Velocity Capacity Description
(r	min) (feet)	(ft/	ft) (ft/sec) (cfs)
	40 F		Discot Fator OFF ODDEADOUFFT

46.5

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 42S:

118.29 cfs @ 13.14 hrs, Volume= 26.830 af, Depth= 1.87" Runoff Routed to Reach SP42:

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 25-yr Rainfall=4.07"

A	rea (sf)	CN	Description		
	20,734	98	Water Surfa	ace, HSG A	4
1	70,414	96	Gravel surfa	ace, HSG A	A
9	56,587	71	Meadow, no	on-grazed,	HSG C
5,2	27,848	78	Meadow, no	on-grazed,	HSG D
	287	65	Brush, Goo	d, HSG C	
	56,930	73	Brush, Goo	d, HSG D	
	32,944	70	Woods, Go	od, HSG C	
1,0	46,689	77	Woods, Go	od, HSG D	
7,5	12,433	77	Weighted A	verage	
7,4	91,699		99.72% Per	vious Area	1
	20,734		0.28% Impe	ervious Area	a
Tc	Length	Slope	,	Capacity	Description
(min)	(feet)	(ft/ft) (ft/sec)	(cfs)	
96.3					Direct Entry, SEE SPREADSHEET

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 43S:

Runoff = 69.11 cfs @ 12.49 hrs, Volume= 9.449 af, Depth= 1.87" Routed to Reach SP43 :

	Area (sf) Cl	<u>N D</u>	escription					
*	2,8	310 9	8 Ir	npervious					
	440,7	'24 7	1 M	leadow, no	on-grazed, l	HSG C			
	2,172,1	58 7	8 M	Meadow, non-grazed, HSG D					
	11,7	26 7	0 V	loods, Go	od, HSG C				
	18,4	30 7	7 V	loods, Go	od, HSG D				
	2,645,8	348 7	7 V	/eighted A	verage				
	2,643,0	38	9	9.89% Per	vious Area				
	2,8	310	0	.11% Impe	rvious Area	a			
	Tc Ler	ngth S	Slope	Velocity	Capacity	Description			
(min) (f	eet)	(ft/ft)	(ft/sec)	(cfs)				
	48.7					Direct Entry, SEE SPREADSHEET			

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 44S:

Runoff = 83.34 cfs @ 13.13 hrs, Volume= 19.053 af, Depth= 1.94" Routed to Reach SP44 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 25-yr Rainfall=4.07"

	Area (sf)	CN	Description
*	136,522	98	Water
*	27,820	98	Impervious
*	4,835	96	Gravel
	146,073	58	Meadow, non-grazed, HSG B
	90,051	71	Meadow, non-grazed, HSG C
	4,232,980	78	Meadow, non-grazed, HSG D
	82,986	73	Brush, Good, HSG D
	6,012	55	Woods, Good, HSG B
	3,850	70	Woods, Good, HSG C
	395,055	77	Woods, Good, HSG D
	5,126,184	78	Weighted Average
	4,961,842		96.79% Pervious Area
	164,342		3.21% Impervious Area
	Tc Length	Slop	pe Velocity Capacity Description
	(min) (feet)	(ft/	ft) (ft/sec) (cfs)
	07.4		D' (E (OFF ODDE ADOLLET

97.1

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 44SA:

33.33 cfs @ 12.20 hrs, Volume= 2.919 af, Depth= 1.94" Runoff Routed to Reach SP44A:

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 25-yr Rainfall=4.07"

	Area (sf)	CN	Description						
*	8,459	98	Water						
*	21,218	98	Impervious	mpervious					
*	12,958	96	Gravel	ravel					
	4,574	58	Meadow, no	on-grazed,	HSG B				
	57,514	71	Meadow, no	on-grazed,	HSG C				
	588,570	78	Meadow, no	on-grazed,	HSG D				
	988	48	Brush, Goo	d, HSG B					
	17,587	73	Brush, Goo	d, HSG D					
	2,222	55	Woods, Go	od, HSG B					
	22,179	70	Woods, Go	od, HSG C					
	49,212	77	Woods, Go	od, HSG D					
	785,481	78	Weighted A	verage					
	755,804		96.22% Per	vious Area					
	29,677		3.78% Impe	ervious Are	a				
	Tc Length	Slop	,	Capacity	Description				
(m	in) (feet)	(ft/	ft) (ft/sec)	(cfs)					
2	5.5				Direct Entry, SEE SPREADSHEET				

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 45S:

Runoff = 24.65 cfs @ 12.24 hrs, Volume= 2.338 af, Depth= 2.10" Routed to nonexistent node SP46

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 25-yr Rainfall=4.07"

	Area (sf)	CN	Description						
*	49,323	98	Impervious	Impervious					
	33,429	77	Woods, Go	Woods, Good, HSG D					
	12,134	73	Brush, Goo	Brush, Good, HSG D					
*	720	96	Gravel						
	478,790	78	Meadow, no	on-grazed,	HSG D				
*	7,562	98	Water						
	581,958	80	Weighted A	verage					
	525,073		90.23% Per	vious Area					
	56,885		9.77% Impe	ervious Area	a				
	Tc Length	Slo	,	Capacity	Description				
	(min) (feet)	(ft/	ft) (ft/sec)	(cfs)					
	00.4				Discoul Endon	OFF ORDEADOUEET			

29.1

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 46S:

Runoff = 47.12 cfs @ 12.57 hrs, Volume= 7.019 af, Depth= 1.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 25-yr Rainfall=4.07"

_	-0 0					Discrete Forting OFF ODDE ADOLLET
(n	nin)	(feet)	(ft/f	t) (ft/sec)	(cfs)	
	10	Length		,		Describinon
	Тс	Longth	Slop	e Velocity	Capacity	Description
	2,100,000 100.00701 GIVIOUS 711CC			100100701	o	-
	2 13	3,969		100.00% P	ervious Are	a
	2,13	3,969	75	Weighted A	Average	
		27,326	<u>73</u>	Brush, Goo		
	•	•			,	
	1.50	8,838	78	Meadow, no	on-grazed.	HSG D
229,882 55 Woods, Good, HSG B					od, HSG B	
					,	
367,923 77 Woods, Good, HSG D					od HSG D	
	Area (sf) CN Description					
A (. f) ON D						

53.8

Type II 24-hr 25-yr Rainfall=4.07" Printed 7/11/2024

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Summary for Subcatchment 47S:

Runoff = 56.18 cfs @ 12.59 hrs, Volume= 8.523 af, Depth= 1.94" Routed to Reach SP47 :

	Area (sf)	CN	Description		
*	23,846	98	Impervious		
*	10,900	96	Gravel		
	2,186,703	78	Meadow, no	on-grazed,	HSG D
	15,310	73	Brush, Goo	d, HSG D	
	56,459	77	Woods, Go	od, HSG D	
	2,293,218	78	Weighted A	verage	
	2,269,372		98.96% Pei	vious Area	
	23,846		1.04% Impe	ervious Area	a
	Tc Lengtl			Capacity	Description
(min) (feet	t) (ft/	ft) (ft/sec)	(cfs)	
	56.5				Direct Entry, SEE SPREADSHEET

Type II 24-hr 100-yr Rainfall=5.07"

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Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Runoff Area=3,020,873 sf 2.29% Impervious Runoff Depth=1.70"

Flow Length=3,272' Tc=52.0 min CN=65 Runoff=64.68 cfs 9.826 af

Subcatchment 3S: Runoff Area=324,754 sf 0.00% Impervious Runoff Depth=1.63"

Flow Length=836' Tc=23.1 min CN=64 Runoff=11.58 cfs 1.010 af

Subcatchment 4S: Runoff Area=16,260,538 sf 1.60% Impervious Runoff Depth=2.09"

Flow Length=7,788' Tc=76.3 min CN=70 Runoff=334.30 cfs 64.964 af

Subcatchment 5S: Runoff Area=1,679,234 sf 4.90% Impervious Runoff Depth=2.34"

Flow Length=1,495' Tc=34.3 min CN=73 Runoff=70.28 cfs 7.503 af

Subcatchment 6S: Runoff Area=598,623 sf 0.00% Impervious Runoff Depth=2.25"

Flow Length=1,150' Tc=39.7 min CN=72 Runoff=21.72 cfs 2.579 af

Subcatchment 7S: Runoff Area=10,734,763 sf 0.11% Impervious Runoff Depth=2.09"

Flow Length=6,505' Tc=76.1 min CN=70 Runoff=221.62 cfs 42.888 af

Subcatchment 8S: Runoff Area=1,124,521 sf 2.07% Impervious Runoff Depth=2.17"

Flow Length=2,618' Tc=29.5 min CN=71 Runoff=47.97 cfs 4.667 af

Subcatchment 9S: Runoff Area=698,860 sf 9.80% Impervious Runoff Depth=2.59"

Flow Length=1,212' Tc=81.2 min CN=76 Runoff=17.57 cfs 3.467 af

Subcatchment 10S: Runoff Area=1,561,270 sf 0.00% Impervious Runoff Depth=2.59"

Flow Length=2,211' Tc=88.4 min CN=76 Runoff=36.88 cfs 7.746 af

Subcatchment 11S: Runoff Area=521,344 sf 3.42% Impervious Runoff Depth=2.86"

Flow Length=1,039' Tc=43.1 min CN=79 Runoff=23.21 cfs 2.854 af

Subcatchment 12S: Runoff Area=1,437,516 sf 0.62% Impervious Runoff Depth=2.77"

Flow Length=2,388' Tc=104.6 min CN=78 Runoff=31.94 cfs 7.621 af

Subcatchment 13S: Runoff Area=2,395,812 sf 0.00% Impervious Runoff Depth=2.42"

Flow Length=2,356' Tc=84.2 min CN=74 Runoff=54.39 cfs 11.093 af

Subcatchment 14S: Runoff Area=516,650 sf 1.75% Impervious Runoff Depth=2.59"

Flow Length=935' Tc=36.6 min CN=76 Runoff=23.15 cfs 2.563 af

Subcatchment 15S: Runoff Area=329,223 sf 1.24% Impervious Runoff Depth=1.78"

Flow Length=707' Tc=30.6 min CN=66 Runoff=10.85 cfs 1.118 af

Subcatchment 16S: Runoff Area=1,134,608 sf 1.12% Impervious Runoff Depth=2.77"

Flow Length=1,611' Tc=58.8 min CN=78 Runoff=39.01 cfs 6.015 af

Subcatchment 16SA: Runoff Area=657,258 sf 1.69% Impervious Runoff Depth=2.59"

Tc=39.9 min CN=76 Runoff=27.80 cfs 3.261 af

	200 0
Flat Creek Pre	Type II 24-hr 100-yr Rainfall=5.07"
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Subcatchment 17S:	Runoff Area=6,847,928 sf 0.59% Impervious Runoff Depth=2.68" Flow Length=4,736' Tc=94.5 min CN=77 Runoff=159.48 cfs 35.131 af
Subcatchment 18S:	Runoff Area=4,001,602 sf 0.41% Impervious Runoff Depth=2.68" Flow Length=3,889' Tc=66.4 min CN=77 Runoff=121.31 cfs 20.529 af
Subcatchment 19S:	Runoff Area=5,028,770 sf 0.59% Impervious Runoff Depth=2.59" Flow Length=4,703' Tc=80.9 min CN=76 Runoff=126.47 cfs 24.949 af
	Them being an 1,700 to colo mini on the Transaction 120.11 old billion at
Subcatchment 20S:	Runoff Area=2,479,797 sf 2.23% Impervious Runoff Depth=2.42" Tc=71.1 min CN=74 Runoff=63.77 cfs 11.482 af
Subcatchment 21S:	Runoff Area=332,609 sf 6.38% Impervious Runoff Depth=2.01" Flow Length=921' Tc=31.9 min CN=69 Runoff=12.32 cfs 1.278 af
Subcatchment 22S:	Runoff Area=785,644 sf 0.79% Impervious Runoff Depth=2.01" Flow Length=1,439' Tc=53.3 min CN=69 Runoff=20.19 cfs 3.019 af
Subcatchment 23S:	Runoff Area=17,302,399 sf 0.42% Impervious Runoff Depth=2.59" Flow Length=9,131' Tc=88.7 min CN=76 Runoff=406.51 cfs 85.840 af
Subcatchment 24S:	Runoff Area=260,905 sf 6.43% Impervious Runoff Depth=2.86" Flow Length=1,200' Tc=31.2 min CN=79 Runoff=14.48 cfs 1.429 af
Subcatchment 25S:	Runoff Area=10,643,407 sf 0.28% Impervious Runoff Depth=2.51" Flow Length=7,278' Tc=71.0 min CN=75 Runoff=284.98 cfs 51.029 af
Subcatchment 26S:	Runoff Area=823,994 sf 2.72% Impervious Runoff Depth=2.77" Flow Length=1,347' Tc=43.1 min CN=78 Runoff=35.47 cfs 4.368 af
Subcatchment 27S:	Runoff Area=1,317,635 sf 4.05% Impervious Runoff Depth=2.17" Flow Length=3,107' Tc=46.4 min CN=71 Runoff=41.02 cfs 5.469 af
Subcatchment 28S:	Runoff Area=2,868,130 sf 1.43% Impervious Runoff Depth=2.34" Flow Length=2,822' Tc=32.9 min CN=73 Runoff=123.53 cfs 12.815 af

Subcatchment 29S:

Runoff Area=776,122 sf 2.65% Impervious Runoff Depth=2.42"
Flow Length=1,737' Tc=24.4 min CN=74 Runoff=42.16 cfs 3.593 af

Subcatchment 30S: Runoff Area=618,450 sf 1.49% Impervious Runoff Depth=2.25" Flow Length=1,427' Tc=38.4 min CN=72 Runoff=22.97 cfs 2.664 af

Subcatchment 31S:Runoff Area=2,981,588 sf 0.44% Impervious Runoff Depth=2.42"

Flow Length=1,885' Tc=60.7 min CN=74 Runoff=86.25 cfs 13.805 af

Subcatchment 32S: Runoff Area=4,274,758 sf 0.78% Impervious Runoff Depth=1.63" Flow Length=3,031' Tc=75.2 min CN=64 Runoff=65.60 cfs 13.299 af

Subcatchment 33S:Runoff Area=4,477,391 sf 0.00% Impervious Runoff Depth=1.93"

Flow Length=2,390' Tc=58.6 min CN=68 Runoff=102.33 cfs 16.528 af

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Subcatchment 34S:

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Runoff Area=1,658,827 sf 0.00% Impervious Runoff Depth=2.17"

Flow Length=1,443' Tc=42.0 min CN=71 Runoff=55.38 cfs 6.885 af

Subcatchment 35S: Runoff Area=2,634,778 sf 10.71% Impervious Runoff Depth=2.59"

Flow Length=3,089' Tc=26.1 min CN=76 Runoff=147.83 cfs 13.072 af

Subcatchment 36S: Runoff Area=6,697,461 sf 0.98% Impervious Runoff Depth=2.68"

Tc=38.4 min CN=77 Runoff=301.27 cfs 34.359 af

Subcatchment 37S: Runoff Area=3,957,824 sf 0.96% Impervious Runoff Depth=2.68"

Tc=39.6 min CN=77 Runoff=174.46 cfs 20.304 af

Subcatchment 38S: Runoff Area=734,553 sf 0.00% Impervious Runoff Depth=2.68"

Tc=38.1 min CN=77 Runoff=33.18 cfs 3.768 af

Subcatchment 39S: Runoff Area=2,495,408 sf 0.69% Impervious Runoff Depth=2.34"

Tc=54.4 min CN=73 Runoff=75.20 cfs 11.149 af

Subcatchment 40S: Runoff Area=2,878,096 sf 0.94% Impervious Runoff Depth=2.77"

Tc=47.3 min CN=78 Runoff=116.03 cfs 15.258 af

Subcatchment 41S: Runoff Area=1,003,158 sf 1.68% Impervious Runoff Depth=2.25"

Tc=46.5 min CN=72 Runoff=32.59 cfs 4.322 af

Subcatchment 42S: Runoff Area=7,512,433 sf 0.28% Impervious Runoff Depth=2.68"

Tc=96.3 min CN=77 Runoff=172.59 cfs 38.540 af

Subcatchment 43S: Runoff Area=2,645,848 sf 0.11% Impervious Runoff Depth=2.68"

Tc=48.7 min CN=77 Runoff=100.68 cfs 13.574 af

Subcatchment 44S: Runoff Area=5,126,184 sf 3.21% Impervious Runoff Depth=2.77"

Tc=97.1 min CN=78 Runoff=120.52 cfs 27.177 af

Subcatchment 44SA: Runoff Area=785,481 sf 3.78% Impervious Runoff Depth=2.77"

Tc=25.5 min CN=78 Runoff=47.87 cfs 4.164 af

Subcatchment 45S: Runoff Area=581,958 sf 9.77% Impervious Runoff Depth=2.95"

Tc=29.1 min CN=80 Runoff=34.82 cfs 3.289 af

Subcatchment 46S: Runoff Area=2,133,969 sf 0.00% Impervious Runoff Depth=2.51"

Tc=53.8 min CN=75 Runoff=70.08 cfs 10.231 af

Subcatchment 47S: Runoff Area=2,293,218 sf 1.04% Impervious Runoff Depth=2.77"

Tc=56.5 min CN=78 Runoff=81.11 cfs 12.158 af

Total Runoff Area = 3,488.434 ac Runoff Volume = 704.653 af Average Runoff Depth = 2.42" 98.81% Pervious = 3,446.971 ac 1.19% Impervious = 41.462 ac

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Summary for Subcatchment 1S:

Runoff = 64.68 cfs @ 12.56 hrs, Volume= 9.826 af, Depth= 1.70" Routed to Reach SP1 :

	Α	rea (sf)	CN E	Description		
		94,531	77 V	Voods, Go	od, HSG D	
	1	96,024	55 V	Voods, Go	od, HSG B	
		9,804	48 E	Brush, Goo	d, HSG B	
		8,870	73 E	Brush, Goo	d, HSG D	
*		69,062 98 Impervious Pavement				
	1,8	53,031		,	on-grazed,	
	7	89,551	78 N	∕leadow, no	on-grazed,	HSG D
	3,0	20,873	65 V	Veighted A	verage	
	2,9	51,811	9	7.71% Per	vious Area	
		69,062	2	29% Impe	ervious Area	a
	_					
,	Tc	Length	Slope	Velocity	Capacity	Description
	min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	26.7	100	0.0060	0.06		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.40"
	15.8	784	0.0140	0.83		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
	9.5	2,388		4.20		Direct Entry, Small Tributary & Swamp w/ Channels
	52.0	3,272	Total			

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Summary for Subcatchment 3S:

Runoff = 11.58 cfs @ 12.18 hrs, Volume= 1.010 af, Depth= 1.63" Routed to Reach SP3 :

_	Α	rea (sf)	CN	Description		
		1,021	55	Woods, Go	od, HSG B	
	2	23,581	58	Meadow, no	on-grazed,	HSG B
		1,749	73	Brush, Goo	d, HSG D	
		969	77	Woods, Go	od, HSG D	
_		97,434	78	Meadow, no	on-grazed,	HSG D
	3	24,754	64	Weighted A	verage	
	3	24,754		100.00% Pe	ervious Are	ea
	Tc	Length	Slope	•	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	11.4	100	0.0500	0.15		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.40"
	2.6	241	0.0500	1.57		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
	8.1	445	0.0170	0.91		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
	1.0	50	0.0300	0.87		Shallow Concentrated Flow,
_						Woodland Kv= 5.0 fps
	23.1	836	Total			

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Summary for Subcatchment 4S:

[47] Hint: Peak is 4019% of capacity of segment #4

[47] Hint: Peak is 1201% of capacity of segment #7

[47] Hint: Peak is 2402% of capacity of segment #9

[47] Hint: Peak is 1038% of capacity of segment #11

[47] Hint: Peak is 11412% of capacity of segment #13

[47] Hint: Peak is 991% of capacity of segment #15

334.30 cfs @ 12.87 hrs, Volume= Runoff

64.964 af, Depth= 2.09"

Routed to Reach SP4:

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	Area (sf)	CN	Description
	5,031	48	Brush, Good, HSG B
*	29,184	98	Impervious Pavement
*	9,824	98	Impervious Roof
	708,087	58	Meadow, non-grazed, HSG B
	34,201	55	Woods, Good, HSG B
	34,999	73	Brush, Good, HSG D
	320,256	77	Woods, Good, HSG D
	1,271	70	Woods, Good, HSG C
	170,830	71	Meadow, non-grazed, HSG C
*	2,590	96	Gravel
*	29,099	98	Impervious Pavement
*	287	98	Impervious Roof
	3,181,257	78	Meadow, non-grazed, HSG D
	9,634	48	Brush, Good, HSG B
	868,528	55	Woods, Good, HSG B
*	30,257	98	Impervious Pavement
*	10,455	98	Impervious Roof
*	4,215	96	Gravel
	2,040,672	58	Meadow, non-grazed, HSG B
	38,512	78	Meadow, non-grazed, HSG D
	55,419	77	Woods, Good, HSG D
	334,887	78	Meadow, non-grazed, HSG D
	26,398	73	Brush, Good, HSG D
*	20,636	98	Impervious Pavement
	885,711	77	Woods, Good, HSG D
*	4,759	96	Gravel
	2,163,012	78	Meadow, non-grazed, HSG D
*	10,062	98	Impervious Roof
*	13,878	98	Impervious Pavement
*	13,754	96	Gravel
*	15,803	98	Water
	777,230	55	Woods, Good, HSG B
	16,892	48	Brush, Good, HSG B
	1,287,972	58	Meadow, non-grazed, HSG B
*	72,761	98	Impervious Pavement
*	14,040	98	Impervious Roof
*	1,010	96	Gravel
	91,670	77	Woods, Good, HSG D
	16,841	73	Brush, Good, HSG D
	1,693,872	78	Meadow, non-grazed, HSG D
	55,622	55	Woods, Good, HSG B
*	4,369	98	Impervious Pavement
	643,096	58	Meadow, non-grazed, HSG B
	41,645	70	Woods, Good, HSG C
	470,010	71	Meadow, non-grazed, HSG C
	16,260,538	70	Weighted Average
	15,999,883		98.40% Pervious Area
	260,655		1.60% Impervious Area

Type II 24-hr 100-yr Rainfall=5.07" Printed 7/11/2024

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00.7 400 0.0000 0.00 0 lass4 F lass	
26.7 100 0.0060 0.06 Sheet Flow,	
Grass: Dense n= 0.240 P2= 2.40"	
5.4 277 0.0150 0.86 Shallow Concentrated Flow,	
Short Grass Pasture Kv= 7.0 fps	
5.6 778 0.0240 2.32 Shallow Concentrated Flow,	
Grassed Waterway Kv= 15.0 fps 0.3 40 0.0050 2.65 8.32 Pipe Channel,	
0.3 40 0.0050 2.65 8.32 Pipe Channel , 24.0" Round Area= 3.1 sf Perim= 6.3' r=	- 0 50'
n= 0.025 Corrugated metal	- 0.50
2.1 741 5.90 Direct Entry, Small Tributary & Swamp w	w/ Channole
1.8 401 3.76 Direct Entry, Small Tributary & Swamp w	
0.0 18 0.0560 8.86 27.84 Pipe Channel ,	W G Harmons
24.0" Round Area= 3.1 sf Perim= 6.3' r=	= 0.50'
n= 0.025 Corrugated metal	
2.3 605 4.30 Direct Entry, Small Tributary & Swamp w	v/ Channels
0.1 36 0.0140 4.43 13.92 Pipe Channel ,	
24.0" Round Area= 3.1 sf Perim= 6.3' r=	= 0.50'
n= 0.025 Corrugated metal	
2.3 627 4.46 Direct Entry, Small Tributary & Swamp w	v/ Channels
0.1 40 0.0750 10.25 32.22 Pipe Channel ,	
24.0" Round Area= 3.1 sf Perim= 6.3' r=	= 0.50'
n= 0.025 Corrugated metal	
2.1 527 4.20 Direct Entry, Small Tributary & Swamp w 0.2 40 0.0250 3.73 2.93 Pipe Channel,	w/ Channels
0.2 40 0.0250 3.73 2.93 Pipe Channel , 12.0" Round Area= 0.8 sf Perim= 3.1' r=	- 0.25'
n= 0.025 Corrugated metal	- 0.25
4.0 593 2.47 Direct Entry, Roadside Ditch	
0.1 40 0.0250 6.87 33.72 Pipe Channel ,	
30.0" Round Area= 4.9 sf Perim= 7.9' r=	= 0.63'
n= 0.025 Corrugated metal	0.00
23.2 2,925 2.10 Direct Entry, Small Tributary & Swamp w	v/ Channels
76.3 7,788 Total	

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Summary for Subcatchment 5S:

Runoff = 70.28 cfs @ 12.30 hrs, Volume= 7.503 af, Depth= 2.34" Routed to Reach SP4 :

	Α	rea (sf)	CN I	Description		
*		11,333	96	Gravel		
	1	36,520	70 Y	Noods, Go	od, HSG C	
*		438		mpervious		
*		6,831	98	mpervious	Roof	
*		7,136	98	Vater		
	9	15,909	71 I	Meadow, no	on-grazed, l	HSG C
		57,613	55	Noods, Go	od, HSG B	
*		1,117	98	mpervious	Pavement	
		3,366		Brush, Goo	d, HSG B	
*		813		Gravel		
		60,234		Meadow, no	on-grazed,	HSG B
*		66,794		Nater		
		6,417		Brush, Goo	d, HSG D	
*		3,263		Gravel		
		517		,	od, HSG D	UOO D
		99,842			on-grazed, l	
		01,091			on-grazed,	HSG D
	,	79,234		Neighted A	•	
	,	96,918			vious Area	
		82,316	4	1.90% impe	ervious Area	a
	Тс	Length	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	Description
	19.6	100	0.0130		(0.0)	Sheet Flow,
	13.0	100	0.0130	0.09		Grass: Dense n= 0.240 P2= 2.40"
	12.9	842	0.0240	1.08		Shallow Concentrated Flow,
	0	0.2	3.52 10	1.50		Short Grass Pasture Kv= 7.0 fps
	1.2	311		4.42		Direct Entry, Grassed Waterway
	0.6	242		6.54		Direct Entry, Grassed Waterway
	34.3	1,495	Total			

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Summary for Subcatchment 6S:

Runoff = 21.72 cfs @ 12.38 hrs, Volume= 2.579 af, Depth= 2.25" Routed to Reach SP6 :

Aı	rea (sf)	CN [Description		
	23,122	70 V	Voods, Go	od, HSG C	
	31,419	65 E	Brush, Goo	d, HSG C	
4	37,478	71 N	/leadow, no	on-grazed,	HSG C
	11,524	73 E	Brush, Goo	d, HSG D	
	2,524	77 \	Voods, Go	od, HSG D	
	55,990			on-grazed,	
	1,516	70 V	Voods, Go	od, HSG C	
	2,812	77 \	Voods, Go	od, HSG D	
	20,186	78 N	/leadow, no	on-grazed,	HSG D
	12,052	71 N	/leadow, no	on-grazed,	HSG C
5	98,623	72 \	Veighted A	verage	
	98,623			ervious Are	a
Тс	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
28.7	100	0.0050	0.06		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.40"
4.3	256	0.0200	0.99		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
2.5	341	0.1030	2.25		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
2.4	316	0.1870	2.16		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
1.8	137		1.26		Direct Entry, Grassed Waterway
39.7	1,150	Total			

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Summary for Subcatchment 7S:

Runoff = 221.62 cfs @ 12.87 hrs, Volume= 42.888 af, Depth= 2.09" Routed to Reach SP7 :

	Α	rea (sf)	CN D	escription		
	2,8	22,055	58 N	leadow, no	on-grazed,	HSG B
		23,489	48 B	Brush, Goo	d, HSG B	
		40,040		,	od, HSG B	
	2,2	69,487			on-grazed,	HSG C
		2,183		Brush, Goo	,	
		37,505		,	od, HSG C	
	,	42,616			on-grazed,	HSG D
		53,119		Brush, Goo		
*	,	29,743			od, HSG D	
*		11,894		mpervious		
_		2,632		Gravel		
	,	34,763		Veighted A	•	
	,	22,869	_		vious Area	
		11,894	Ü	.11% Impe	ervious Are	a
	Тс	Length	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	Description
_	16.8	100	0.0190	0.10	(010)	Sheet Flow,
	10.0	100	0.0130	0.10		Grass: Dense n= 0.240 P2= 2.40"
	5.4	449	0.0390	1.38		Shallow Concentrated Flow,
	0		0.0000			Short Grass Pasture Kv= 7.0 fps
	8.2	512	0.0220	1.04		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
	20.3	945	0.0240	0.77		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
	3.6	192	0.0310	0.88		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
	14.9	3,312		3.70		Direct Entry, Small Tributary & Swamp w/ Channels
	4.1	284	0.0530	1.15		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
_	2.8	711		4.30		Direct Entry, Small Tributary & Swamp w/ Channels
	76.1	6,505	Total			

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Summary for Subcatchment 8S:

Runoff = 47.97 cfs @ 12.25 hrs, Volume= 4.667 af, Depth= 2.17" Routed to Reach SP8 :

	Α	rea (sf)	CN [Description		
_		0			od, HSG B	
*		1,030		,	Pavement	
		27,402			on-grazed, l	HSG B
		15,462			od, HSG D	
*		6,130			Pavement	
	2	200,339			on-grazed, l	HSG D
		25,785			od, HSG B	
*		1,580	96 (Gravel	,	
*		5,152	98 I	mpervious	Pavement	
	1	91,169	58 N	леadow, no	on-grazed, l	HSG B
*		7,435	98 I	mpervious	Pavement	
		9,470	77 \	Woods, Go	od, HSG D	
	4	23,047	78 N	Meadow, no	on-grazed, l	HSG D
		12,817		Brush, Goo	•	
*		2,902			Pavement	
*		3,771		Gravel		
*		670		mpervious		
_	1	90,360			on-grazed, l	HSG B
		24,521		Weighted A		
	,	01,202	_		rvious Area	
		23,319	2	2.07% Impe	ervious Area	3
	_					
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	12.2	100	0.0420	0.14		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.40"
	6.0	364	0.0210	1.01		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
	6.3	1,017		2.68		Direct Entry, Roadside Ditch
_	5.0	1,137		3.82		Direct Entry, Roadside Ditch
	29.5	2,618	Total			

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Summary for Subcatchment 9S:

Runoff = 17.57 cfs @ 12.91 hrs, Volume= 3.467 af, Depth= 2.59" Routed to Reach SP9 :

	Α	rea (sf)	CN I	Description		
*		46,629	98	Nater		
*		6,554			Pavement	
	4	24,080	78 I	Meadow, no	on-grazed,	HSG D
		2,058			od, HSG B	
		7,321		Brush, Goo	d, HSG B	
*		10,739		Nater		
*		1,356		•	Pavement	
	1	10,953			on-grazed,	HSG B
*		3,190		•	Pavement	
		19,729		Brush, Goo	•	
		66,251			on-grazed,	HSG D
		98,860		Neighted A	-	
		30,392			rvious Area	
		68,468	,	9.80% Impe	ervious Area	a
	То	Longth	Clana	Volocity	Conneity	Description
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	(min)				(CIS)	Oh oot Flour
	54.6	100	0.0010	0.03		Sheet Flow,
	10.0	E40	0.0100	0.50		Grass: Dense n= 0.240 P2= 2.40"
	18.0	540	0.0100	0.50		Shallow Concentrated Flow,
	9.6	570		1 11		Woodland Kv= 5.0 fps Direct Entry Small Tributary & Swamp w/Channels
_	8.6	572	T . 4 . 1	1.11		Direct Entry, Small Tributary & Swamp w/Channels
	81.2	1,212	Total			

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Summary for Subcatchment 10S:

Runoff = 36.88 cfs @ 13.03 hrs, Volume= 7.746 af, Depth= 2.59" Routed to Reach SP10 :

A	rea (sf)	CN D	escription		
	35,373	55 V	Voods, Go	od, HSG B	
	4,798	48 B	rush, Goo	d, HSG B	
	92,207	58 N	leadow, no	on-grazed,	HSG B
	87,496		rush, Goo		
	13,364	77 V	Voods, Go	od, HSG D	
1,3	28,032	78 N	leadow, no	on-grazed,	HSG D
1,5	61,270	76 V	Veighted A	verage	
1,5	61,270	1	00.00% Pe	ervious Are	a
Tc	Length	Slope		Capacity	Description
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)	
54.6	100	0.0010	0.03		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.40"
16.9	388	0.0030	0.38		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
0.4	33	0.0610	1.23		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
3.6	165	0.0120	0.77		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
3.2	310		1.63		Direct Entry, Small Tributary & Swamp w/ Channels
8.2	920		1.88		Direct Entry, Small Tributary & Swamp w/ Channels
1.5	295		3.39		Direct Entry, Small Tributary & Swamp w/Channels
88.4	2,211	Total			

Type II 24-hr 100-yr Rainfall=5.07" Printed 7/11/2024

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Summary for Subcatchment 11S:

Runoff = 23.21 cfs @ 12.41 hrs, Volume= 2.854 af, Depth= 2.86" Routed to Reach SP11 :

_	Α	rea (sf)	CN D	escription			
		17,843	98 F	aved park	ing, HSG D		
	5	01,616	78 N	leadow, no	on-grazed,	HSG D	
_		1,885	73 E	rush, Goo	d, HSG D		
	5	21,344	79 V	Veighted A	verage		
	5	03,501	-		vious Area		
		17,843	3	.42% Impe	ervious Area	a	
	_		01		0 :	D 18	
	Tc	Length	Slope	Velocity	Capacity	Description	
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)		
	20.2	100	0.0120	0.08		Sheet Flow,	
						Grass: Dense n= 0.240 P2= 2.40"	
	11.8	521	0.0110	0.73		Shallow Concentrated Flow,	
						Short Grass Pasture Kv= 7.0 fps	
	11.1	418	0.0080	0.63		Shallow Concentrated Flow,	
_						Short Grass Pasture Kv= 7.0 fps	
	43.1	1,039	Total				

Type II 24-hr 100-yr Rainfall=5.07" Printed 7/11/2024

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Summary for Subcatchment 12S:

Runoff = 31.94 cfs @ 13.23 hrs, Volume= 7.621 af, Depth= 2.77" Routed to Reach SP12 :

	Α	rea (sf)	CN D	escription		
*		8,897	98 Ir	npervious		
		8,690			on-grazed,	
	1,3	13,095		,	on-grazed,	HSG D
		5,821		rush, Goo	,	
		01,013	77 V	∕oods, Go	od, HSG D	
		37,516		Veighted A		
	1,4	28,619	_		vious Area	
		8,897	0	.62% Impe	ervious Area	a
	Тс	Longth	Slope	Volocity	Capacity	Description
	(min)	Length (feet)	(ft/ft)	Velocity (ft/sec)	(cfs)	Description
	30.7	100	0.0470	0.05	(013)	Sheet Flow,
	30.7	100	0.0470	0.03		Woods: Dense underbrush n= 0.800 P2= 2.40"
						770003. Delise underbrush 11- 0.000 1 2- 2.40
	25.9	601	0.0060	0.39		Shallow Concentrated Flow
	25.9	601	0.0060	0.39		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
						Woodland Kv= 5.0 fps
	25.9 48.0	601 1,687	0.0060	0.39		· · · · · · · · · · · · · · · · · · ·

Type II 24-hr 100-yr Rainfall=5.07" Printed 7/11/2024

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Summary for Subcatchment 13S:

Runoff = 54.39 cfs @ 12.98 hrs, Volume= 11.093 af, Depth= 2.42" Routed to Reach SP13 :

Area (sf) CN	Description	1					
279,893	279,893 58		Meadow, non-grazed, HSG B					
1,558,214	78	Meadow, n	Meadow, non-grazed, HSG D					
424	48	Brush, Goo	d, HSG B					
77,09	7 73	Brush, Goo	d, HSG D					
142,209	55	Woods, Go	od, HSG B					
337,97	5 77	Woods, Go	od, HSG D					
2,395,812	2 74	Weighted A	Average					
2,395,812	2	100.00% P	ervious Are	ea				
Tc Leng	th Slo	pe Velocity	Capacity	Description				
(min) (fee	t) (ft/	ft) (ft/sec)	(cfs)	·				
15.6 10	0.02	30 0.11		Sheet Flow,				
				Grass: Dense n= 0.240 P2= 2.40"				
48.9 1,83	8 0.00	80 0.63		Shallow Concentrated Flow,				
				Short Grass Pasture Kv= 7.0 fps				
19.7 4°	8 0.00	50 0.35		Shallow Concentrated Flow,				
				Woodland Kv= 5.0 fps				
84.2 2,35	6 Tota	I						

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Summary for Subcatchment 14S:

Runoff = 23.15 cfs @ 12.33 hrs, Volume= 2.563 af, Depth= 2.59" Routed to Reach SP14 :

_	A	rea (sf)	CN [Description					
*		9,018	98 I	mpervious					
		70,714	58 N	∕leadow, no	on-grazed, l	HSG B			
	4	28,883	78 N	∕leadow, no	on-grazed,	HSG D			
		744	48 E	Brush, Goo	d, HSG B				
		189	73 E	Brush, Goo	d, HSG D				
		7,102	77 \	Voods, Go	od, HSG D				
	516,650 76 Weighted Av				verage				
	507,632			98.25% Pervious Area					
		9,018	•	1.75% Impervious Area					
	_				_				
	Тс	Length	Slope	Velocity	Capacity	Description			
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	18.5	100	0.0150	0.09		Sheet Flow,			
						Grass: Dense n= 0.240 P2= 2.40"			
	18.1	835	0.0120	0.77		Shallow Concentrated Flow,			
_						Short Grass Pasture Kv= 7.0 fps			
	36.6	935	Total						

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Summary for Subcatchment 15S:

Runoff = 10.85 cfs @ 12.27 hrs, Volume= 1.118 af, Depth= 1.78" Routed to Reach SP15 :

A	rea (sf)	CN E	Description		
*	4,081	98 lı	mpervious		
1	81,283	58 N	/leadow, no	on-grazed, l	HSG B
1	26,101	78 N	/leadow, no	on-grazed,	HSG D
	6,560		Brush, Goo	•	
	2,092		Brush, Goo	•	
	5,023		•	od, HSG B	
	4,083	77 V	<u>Voods, Go</u>	od, HSG D	
3	29,223		Veighted A	•	
3	25,142	9	8.76% Per	vious Area	
	4,081	1	.24% Impe	ervious Area	a
_					
Tc	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
15.9	100	0.0220	0.11		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.40"
6.4	387	0.0210	1.01		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
8.3	220	0.0040	0.44		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
30.6	707	Total			

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Summary for Subcatchment 16S:

Runoff = 39.01 cfs @ 12.61 hrs, Volume= 6.015 af, Depth= 2.77" Routed to Reach SP16 :

	Α	rea (sf)	CN D	escription		
*		12,714	98 Ir	npervious		
		25,066	71 N	leadow, no	on-grazed,	HSG C
	9	38,415	78 N	leadow, no	on-grazed,	HSG D
		3,358		rush, Goo	•	
		863	70 V	Voods, Go	od, HSG C	
	1	54,192	77 V	Voods, Go	od, HSG D	
	1,1	34,608		Veighted A		
	1,1	21,894	_		vious Area	
		12,714	1.12% Impervious Area			
	_		0.1			
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	27.0	100	0.0170	0.06		Sheet Flow,
						Grass: Bermuda n= 0.410 P2= 2.40"
	3.8	142	0.0080	0.63		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
	26.0	1,035	0.0090	0.66		Shallow Concentrated Flow,
		004		0 74		Short Grass Pasture Kv= 7.0 fps
_	2.0	334		2.74		Direct Entry, Small Tributary & Swamp w/ Channels
	58.8	1,611	Total			

Type II 24-hr 100-yr Rainfall=5.07"

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Summary for Subcatchment 16SA:

Runoff = 27.80 cfs @ 12.37 hrs, Volume= 3.261 af, Depth= 2.59" Routed to Reach SP16 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 100-yr Rainfall=5.07"

	Area (sf)	CN	Description		
*	11,093	98	Impervious		
	70,093	58	Meadow, non-g	grazed, F	HSG B
	359,929	78	Meadow, non-	grazed, F	HSG D
	259	48	Brush, Good, F	HSG B	
	14,806	73	Brush, Good, F	HSG D	
	0	70	Woods, Good,	HSG C	
	201,078	77	Woods, Good,	HSG D	
	657,258	76	Weighted Aver	rage	
	646,165		98.31% Pervio	us Area	
11,093 1.69% Impervious Area					l
	Tc Length	Slo	,	apacity	Description
<u>(r</u>	min) (feet)	(ft/	ft) (ft/sec)	(cfs)	
,	20.0				Direct Foto, OFF ODDEADOUEFT

39.9

Type II 24-hr 100-yr Rainfall=5.07" Printed 7/11/2024

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Summary for Subcatchment 17S:

Runoff = 159.48 cfs @ 13.09 hrs, Volume= 35.131 af, Depth= 2.68" Routed to Reach SP17 :

	Aı	rea (sf)	CN D	escription					
		22,601	98 V	Vater Surfa	ace, HSG A	1			
*		17,632	98 Ir	npervious					
	2	52,955	71 N	Meadow, non-grazed, HSG C					
	•	37,352		Meadow, non-grazed, HSG D					
		16,810		Brush, Good, HSG C					
		30,011		rush, Goo	,				
		11,819		,	od, HSG C				
		58,748			od, HSG D				
	•	47,928		Veighted A					
	•	07,695			vious Area				
		40,233	0	.59% Impe	rvious Area	a			
	Тс	Length	Slope	Velocity	Capacity	Description			
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	Description			
_	12.1	50	0.0300	0.07	(===)	Sheet Flow,			
	. –	00	0.0000	0.01		Woods: Light underbrush n= 0.400 P2= 2.40"			
	10.9	50	0.0140	0.08		Sheet Flow,			
						Grass: Dense n= 0.240 P2= 2.40"			
	32.6	2,373	0.0300	1.21		Shallow Concentrated Flow,			
		•				Short Grass Pasture Kv= 7.0 fps			
	33.8	1,418	0.0100	0.70		Shallow Concentrated Flow,			
						Short Grass Pasture Kv= 7.0 fps			
_	5.1	845		2.74		Direct Entry, Small Tributary & Swamp w/Channels			
	94.5	4,736	Total						

Type II 24-hr 100-yr Rainfall=5.07" Printed 7/11/2024

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Summary for Subcatchment 18S:

Runoff = 121.31 cfs @ 12.72 hrs, Volume= 20.529 af, Depth= 2.68" Routed to Reach SP18 :

	Area (sf)	CN	Description					
	2,953	98	Water Surfa	ace, HSG A	1			
*	13,432	98	mpervious					
	5,975		Meadow, no					
	29,944		Meadow, no					
2	2,207,221		Meadow, no		HSG D			
	157,865			Brush, Good, HSG D				
	23,440		Woods, Go	•				
	321,869		Woods, Go	•				
	1,238,903		Woods, Go	,				
	4,001,602							
;	3,985,217	99.59% Pervious Area						
	16,385		0.41% Impe	ervious Are	a			
-	'a lanath	Clana	Valacity	Conneity	Description			
ı mir)	ີc Length າ) (feet)	Slope (ft/ft)	•	Capacity (cfs)	Description			
				(CIS)	Oh a at Flann			
27.	8 100	0.0150	0.06		Sheet Flow,			
6.	0 205	0.0100	0.50		Woods: Light underbrush n= 0.400 P2= 2.40" Shallow Concentrated Flow ,			
0.	8 205	0.0100	0.50		Woodland Kv= 5.0 fps			
23.	6 2,144	0.0920	1.52		Shallow Concentrated Flow,			
۷٥.	0 2,144	0.0320	1.02		Woodland Kv= 5.0 fps			
8.	2 1,440		2.92		Direct Entry, Ditch			
66.		Total						

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Summary for Subcatchment 19S:

Runoff = 126.47 cfs @ 12.90 hrs, Volume= 24.949 af, Depth= 2.59" Routed to Reach SP19 :

A	rea (sf)	CN D	escription					
*	29,609	98 Ir	mpervious					
	21,503 96 Gravel surface, HSG A			ace, HSG A	1			
	84,734		58 Meadow, non-grazed, HSG B					
	89,335		Meadow, non-grazed, HSG C					
2,4	122,408			on-grazed,	HSG D			
	10,082		rush, Goo	,				
	74,495		rush, Goo					
	16,971		,	od, HSG B				
	81,805		,	od, HSG C				
	597,828		-	od, HSG D				
	028,770		Veighted A					
4,9	999,161	-	•	vious Area				
	29,609	0	.59% Impe	ervious Area	a			
То	Longth	Clana	\/alaaitı/	Consoitu	Description			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description			
				(615)	Chaot Flour			
32.7	100	0.0100	0.05		Sheet Flow,			
21.4	1,915	0.0890	1.49		Woods: Light underbrush n= 0.400 P2= 2.40" Shallow Concentrated Flow ,			
۷1. 4	1,913	0.0090	1.48		Woodland Kv= 5.0 fps			
6.3	706	0.0720	1.88		Shallow Concentrated Flow,			
0.0	700	0.0120	1.00		Short Grass Pasture Kv= 7.0 fps			
3.7	109	0.0050	0.49		Shallow Concentrated Flow,			
0		0.0000	0.10		Short Grass Pasture Kv= 7.0 fps			
2.9	244	0.0410	1.42		Shallow Concentrated Flow,			
					Short Grass Pasture Kv= 7.0 fps			
7.2	706		1.63		Direct Entry, Small Tributary & Swamp w/ Channels			
6.7	923		2.30		Direct Entry, Small Tributary & Swamps w/ Channels			
80.9	4,703	Total						

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Summary for Subcatchment 20S:

Runoff = 63.77 cfs @ 12.78 hrs, Volume= 11.482 af, Depth= 2.42" Routed to Reach SP20 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 100-yr Rainfall=5.07"

	Area (sf)	CN	Description							
	16,368	98	Water Surface, HSG A							
*	38,886	98	Impervious							
	503	96	Gravel surface, HSG A							
	99,447	30	Meadow, non-grazed, HSG A							
	58,596	58	Meadow, non-grazed, HSG B							
	130,201	71	Meadow, non-grazed, HSG C							
	1,680,681	78	Meadow, non-grazed, HSG D							
	21,162	73	Brush, Good, HSG D							
	131,716	55	Woods, Good, HSG B							
	6,015	70	Woods, Good, HSG C							
	296,222	77	Woods, Good, HSG D							
	2,479,797	74	Weighted Average							
	2,424,543		97.77% Pervious Area							
	55,254		2.23% Impervious Area							
	Tc Length	Slop	pe Velocity Capacity Description							
(min) (feet)	(ft/	ft) (ft/sec) (cfs)							
	74.4		Direct Fator OFF ODDEDOUEFT							

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Summary for Subcatchment 21S:

Runoff = 12.32 cfs @ 12.28 hrs, Volume= 1.278 af, Depth= 2.01" Routed to Reach SP21 :

A	rea (sf)	CN E	Description				
	28,890	30 N	/leadow, no	on-grazed,	HSG A		
2	262,110	71 N	/leadow, no	on-grazed,	HSG C		
	12,438	78 N	/leadow, no	on-grazed,	HSG D		
	683	30 E	Brush, Goo	d, HSG A			
	5,947	65 E	Brush, Goo	d, HSG C			
	1,322	30 V	Voods, Go	od, HSG A			
	21,219	98 F	Paved road	s w/curbs &	& sewers, HSG A		
3	32,609	69 Weighted Average					
3	311,390	g	3.62% Pei	rvious Area			
	21,219		6.38% Impervious Area				
Tc	Length	Slope	Velocity	Capacity	Description		
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)			
12.4	100	0.0410	0.13		Sheet Flow,		
					Grass: Dense n= 0.240 P2= 2.40"		
19.5	821	0.0100	0.70		Shallow Concentrated Flow,		
					Short Grass Pasture Kv= 7.0 fps		
31.9	921	Total					

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Summary for Subcatchment 22S:

Runoff = 20.19 cfs @ 12.56 hrs, Volume= 3.019 af, Depth= 2.01" Routed to Reach SP39 :

A	rea (sf)	CN D	escription		
	87,197	30 N	leadow, no	on-grazed,	HSG A
4	18,867	71 N	leadow, no	on-grazed,	HSG C
1	34,602	78 N	leadow, no	on-grazed,	HSG D
	814	65 E	rush, Goo	d, HSG C	
	7,253		rush, Goo	,	
	843		,	od, HSG A	
	3,389		,	od, HSG C	
1	26,479		,	od, HSG D	
-	6,200	98 F	aved road	s w/curbs &	& sewers, HSG A
	85,644		Veighted A	•	
7	79,444	_	-	vious Area	
	6,200	0	.79% Impe	ervious Are	a
_					
Tc	Length	Slope	Velocity	Capacity	Description
(min)_	(feet)	(ft/ft)	(ft/sec)	(cfs)	
28.7	100	0.0050	0.06		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.40"
22.4	1,072	0.0130	0.80		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
8.0	83	0.1330	1.82		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
1.4	184		2.20		Direct Entry, Small Tributary & Swamp w/ Channels
53.3	1,439	Total			

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Summary for Subcatchment 23S:

Runoff = 406.51 cfs @ 13.02 hrs, Volume= 85.840 af, Depth= 2.59" Routed to Reach SP23 :

	Ar	rea (sf)	CN D	escription		
	;	33,228	30 N	leadow, no	on-grazed, l	HSG A
	494,460 71 Meadow, non-grazed, H					HSG C
	7,3	49,351			on-grazed, l	HSG D
		99,742		rush, Goo		
	,	88,044		rush, Goo	•	
	,	93,479			od, HSG C	
		45,558		,	od, HSG D	
		73,510				& sewers, HSG D
		25,027			ace, HSG D)
		02,399		Veighted A		
1		28,889	_		vious Area	
		73,510	0	.42% Impe	ervious Area	a
-	т.	Longth	Clana	\/alaaitu	Canacity	Description
(mi	Tc	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
					(CIS)	Oh oot Flour
18	3.4	100	0.0420	0.09		Sheet Flow,
20	2.2	1,941	0.0850	1.46		Woods: Light underbrush n= 0.400 P2= 2.40" Shallow Concentrated Flow,
22	2.2	1,941	0.0650	1.40		Woodland Kv= 5.0 fps
11	1.2	806	0.0580	1.20		Shallow Concentrated Flow,
		000	0.0000	1.20		Woodland Kv= 5.0 fps
11	1.6	1,740		2.49		Direct Entry, Small Tributary & Swamp w/ Channels
	1.2	1,229		4.93		Direct Entry, Small Tributary & Swamp w/ Channels
	9.5	1,895		3.32		Direct Entry, Small Tributary & Swamp w/ Channels
	3.8	650		2.82		Direct Entry, Small Tributary & Swamp w/ Channels
	7.8	770		1.64		Direct Entry, Roadside Ditch
	3.7	9,131	Total			

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Summary for Subcatchment 24S:

Runoff = 14.48 cfs @ 12.26 hrs, Volume= 1.429 af, Depth= 2.86" Routed to Reach SP24 :

_	Α	rea (sf)	CN E	Description		
	2	26,229	78 N	/leadow, no	on-grazed,	HSG D
		7,721	73 E	Brush, Goo	d, HSG D	
		10,176	77 V	Voods, Go	od, HSG D	
_		16,779	98 F	Paved road	s w/curbs &	R sewers, HSG D
	2	60,905	79 V	Veighted A	verage	
	2	44,126	9	3.57% Per	vious Area	
		16,779	6	.43% Impe	ervious Area	a
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	15.1	100	0.0250	0.11		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.40"
	14.0	830	0.0200	0.99		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
_	2.1	270		2.17		Direct Entry, Small Tributary & Swamp w/ Channels
	31.2	1,200	Total			

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Summary for Subcatchment 25S:

Runoff = 284.98 cfs @ 12.78 hrs, Volume= 51.029 af, Depth= 2.51" Routed to Reach SP25 :

Ar	ea (sf)	CN D	escription		
8	16,850	58 M	leadow, no	on-grazed,	HSG B
9	55,101	71 N	1eadow, no	on-grazed,	HSG C
5,10	04,595	78 N	1eadow, no	on-grazed,	HSG D
•	18,372	48 B	rush, Goo	d, HSG B	
26	65,288	73 B	rush, Goo	d, HSG D	
18	89,511			od, HSG B	
3,24	44,843	77 V	Voods, Go	od, HSG D	
2	29,278	98 P	aved road	s w/curbs 8	& sewers, HSG D
	19,569	96 G	Gravel surfa	ace, HSG [)
10,64	43,407	75 V	Veighted A	verage	
10,6	14,129	9	9.72% Per	vious Area	
2	29,278	0	.28% Impe	ervious Area	a
Тс	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
16.8	100	0.0190	0.10		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.40"
18.9	1,281	0.0510	1.13		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
8.8	640	0.0300	1.21		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
17.1	4,093		3.98		Direct Entry, Small Tributary & Swamp w/ Channels
4.6	482		1.76		Direct Entry, Small Tributary & Swamp w/ Channels
4.8	682		2.39		Direct Entry, Small Tributary & Swamp w/ Channels
71.0	7,278	Total			

Type II 24-hr 100-yr Rainfall=5.07" Printed 7/11/2024

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Summary for Subcatchment 26S:

Runoff = 35.47 cfs @ 12.41 hrs, Volume= 4.368 af, Depth= 2.77" Routed to Reach SP26 :

	Α	rea (sf)	CN E	Description					
		75,400	77 V	Voods, Go	od, HSG D				
*		4,254	98 V	Water					
		50,954	71 N	Meadow, non-grazed, HSG C					
*		18,174	98 li	98 Impervious Pavement					
_	6	75,212	78 N	/leadow, no	on-grazed,	HSG D			
	8	23,994	78 V	Veighted A	verage				
	801,566			7.28% Per	vious Area				
	22,428			2.72% Impervious Area					
	_		٥.			-			
	Tc	Length	Slope	Velocity	Capacity	Description			
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	18.5	100	0.0150	0.09		Sheet Flow,			
						Grass: Dense n= 0.240 P2= 2.40"			
	5.4	527		1.64		Direct Entry, Ditch			
	19.2	720	0.0080	0.63		Shallow Concentrated Flow,			
						Short Grass Pasture Kv= 7.0 fps			
	43.1	1,347	Total						

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Summary for Subcatchment 27S:

Runoff = 41.02 cfs @ 12.46 hrs, Volume= 5.469 af, Depth= 2.17" Routed to Reach SP27 :

Ar	ea (sf)	CN E	Description		
10	02,395	30 N	/leadow, no	on-grazed,	HSG A
-	70,249	58 N	/leadow, no	on-grazed,	HSG B
	56,229	71 N	/leadow, no	on-grazed,	HSG C
59	94,316			on-grazed,	HSG D
•	15,001		Brush, Goo	•	
	136		Brush, Goo	•	
;	35,121		Brush, Goo	,	
	1,761		,	od, HSG A	
	10,015			od, HSG B	
	44,190		,	od, HSG C	
	27,054		,	od, HSG D	
;	53,425				R sewers, HSG A
	7,743			ace, HSG A	4
	17,635		Veighted A		
,	54,210	_		rvious Area	
;	53,425	4	.05% Impe	ervious Area	a
Тс	Longth	Slope	Velocity	Conneity	Description
(min)	Length (feet)	Slope (ft/ft)	(ft/sec)	Capacity (cfs)	Description
				(015)	Chast Flour
11.4	100	0.0500	0.15		Sheet Flow, Grass: Dense n= 0.240 P2= 2.40"
7.4	973	0.0970	2.18		
7.4	913	0.0970	2.10		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.4	548	0.0820	1.43		Shallow Concentrated Flow,
0.4	340	0.0020	1.43		Woodland Kv= 5.0 fps
2.0	152	0.0330	1.27		Shallow Concentrated Flow,
2.0	102	0.0550	1.21		Short Grass Pasture Kv= 7.0 fps
12.9	824	0.0230	1.06		Shallow Concentrated Flow,
12.0	024	3.0200	1.00		Short Grass Pasture Kv= 7.0 fps
6.3	510		1.34		Direct Entry, Small Tributary & Swamp w/ Channels
46.4	3,107	Total			

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Summary for Subcatchment 28S:

Runoff = 123.53 cfs @ 12.29 hrs, Volume= 12.815 af, Depth= 2.34" Routed to Reach SP28 :

	Α	rea (sf)	CN [Description					
	1	48,045	58 N	/leadow, no	on-grazed,	HSG B			
	1,3	91,071	71 N	∕leadow, no	on-grazed,	HSG C			
	1,1	42,501	78 N	/leadow, no	on-grazed,	HSG D			
		16,837	48 E	Brush, Goo	d, HSG B				
	158 65 Brush, Good, HSG C								
	36,741 73 Brush, Good, HSG D								
		39,665	55 V	Voods, Go	od, HSG B				
		794	70 V	Voods, Go	od, HSG C				
	51,395 77 Woods, Good, HSG D								
*		40,923	98 I	mpervious	Surface				
	2,868,130 73		73 V	Veighted A	verage				
	2,827,207		ç	98.57% Pervious Area					
		40,923	1	.43% Impe	ervious Area	a			
	Тс	Length	Slope	Velocity	Capacity	Description			
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	19.6	100	0.0130	0.09		Sheet Flow,			
						Grass: Dense n= 0.240 P2= 2.40"			
	2.3	163	0.0290	1.19		Shallow Concentrated Flow,			
						Short Grass Pasture Kv= 7.0 fps			
_	11.0	2,559		3.88		Direct Entry, Roadside Ditch			
	32.9	2,822	Total						

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Summary for Subcatchment 29S:

Runoff = 42.16 cfs @ 12.18 hrs, Volume= 3.593 af, Depth= 2.42" Routed to Reach SP29 :

	Α	rea (sf)	CN D	escription		
		34,206	70 V	Voods, Go	od, HSG C	
*		7,569	98 Ir	npervious	Pavement	
*		4,117	98 Ir	npervious	Roof	
*		5,127	96 G	Gravel		
	2	47,913	71 N	leadow, no	on-grazed,	HSG C
		11,168	55 V	Voods, Go	od, HSG B	
		740	65 E	rush, Goo	d, HSG C	
		9,072	48 E	rush, Goo	d, HSG B	
*		428		mpervious		
		56,539			on-grazed,	HSG B
*		8,416			Pavement	
		16,068			od, HSG D	
_	3	74,759	78 N	<u>leadow, no</u>	on-grazed,	HSG D
		76,122		Veighted A		
		755,592 97.35% Pervious Area				
		20,530	2	.65% Impe	ervious Are	a
	Тс	Length	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	•
	10.3	100	0.0650	0.16	, ,	Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.40"
	0.5	63	0.0950	2.16		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
	0.3	31	0.1290	1.80		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
	6.1	612	0.0570	1.67		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
	0.1	31	0.6100	3.91		Shallow Concentrated Flow,
	7 1	000		2.12		Woodland Kv= 5.0 fps
_	7.1	900	T.4.1	2.12		Direct Entry, Roadside Ditch
	24.4	1,737	Total			

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Summary for Subcatchment 30S:

Runoff = 22.97 cfs @ 12.36 hrs, Volume= 2.664 af, Depth= 2.25" Routed to Reach SP30 :

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Summary for Subcatchment 31S:

Runoff = 86.25 cfs @ 12.64 hrs, Volume= 13.805 af, Depth= 2.42" Routed to Reach SP31 :

	Aı	rea (sf)	CN D	escription		
		66,905	58 M	leadow, no	on-grazed,	HSG B
	1,185,943 71 Meadow, non-grazed, H					HSG C
	1,398,406 78 Meadow, non-grazed, H					HSG D
	1,947 73 Brush, Good, HSG D					
	84,560 55 Woods, Good, HSG B					
		17,524		,	od, HSG C	
*		13,262			od, HSG D	
_		13,041		npervious		
	,	81,588		Veighted A		
	,	68,547	_		vious Area	
		13,041	0	.44% Impe	ervious Area	a
	Тс	Length	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	2 desiripaten
	35.2	100	0.000			·
		100	0.0030	0.05		Sheet Flow,
		100		0.05		Sheet Flow, Grass: Dense n= 0.240 P2= 2.40"
	6.2	219	0.0030	0.05 0.59		Grass: Dense n= 0.240 P2= 2.40" Shallow Concentrated Flow,
		219	0.0070	0.59		Grass: Dense n= 0.240 P2= 2.40" Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
	6.2 8.4					Grass: Dense n= 0.240 P2= 2.40" Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps Shallow Concentrated Flow,
	8.4	219 252	0.0070 0.0100	0.59 0.50		Grass: Dense n= 0.240 P2= 2.40" Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps Shallow Concentrated Flow, Woodland Kv= 5.0 fps
		219	0.0070	0.59		Grass: Dense n= 0.240 P2= 2.40" Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps Shallow Concentrated Flow, Woodland Kv= 5.0 fps Shallow Concentrated Flow,
	8.4 6.7	219 252 592	0.0070 0.0100	0.59 0.50 1.47		Grass: Dense n= 0.240 P2= 2.40" Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps Shallow Concentrated Flow, Woodland Kv= 5.0 fps Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
	8.4	219 252	0.0070 0.0100	0.59 0.50		Grass: Dense n= 0.240 P2= 2.40" Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps Shallow Concentrated Flow, Woodland Kv= 5.0 fps Shallow Concentrated Flow,

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Summary for Subcatchment 32S:

Runoff = 65.60 cfs @ 12.90 hrs, Volume= 13.299 af, Depth= 1.63" Routed to Reach SP33 :

A	rea (sf)	CN	Description					
2,5	41,060	58	Meadow, no	on-grazed,	HSG B			
7	16,554	71	Meadow, no	on-grazed,	HSG C			
5	17,326	78	Meadow, no	on-grazed,	HSG D			
	869	48	Brush, Goo	d, HSG B				
	3,094	65	Brush, Goo	d, HSG C				
	4,465	73	Brush, Goo	d, HSG D				
2	200,046	55	Woods, Go	od, HSG B				
	46,472	70	Woods, Go	od, HSG C				
2	208,119	77	Woods, Go	od, HSG D				
*	33,483		Impervious					
	3,270 96 Gravel surface, HSG A			ace, HSG A	4			
4,2	4,274,758 64		Weighted Average					
4,2	41,275	,	99.22% Pervious Area					
	33,483	(0.78% Impe	ervious Area	a			
Tc	Length	Slope	•		Description			
<u>(min)</u>	(feet)	(ft/ft)		(cfs)				
16.5	100	0.0200	0.10		Sheet Flow,			
					Grass: Dense n= 0.240 P2= 2.40"			
6.4	848	0.1000	2.21		Shallow Concentrated Flow,			
					Short Grass Pasture Kv= 7.0 fps			
52.3	2,083	0.0090	0.66		Shallow Concentrated Flow,			
					Short Grass Pasture Kv= 7.0 fps			
75.2	3,031	Total						

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Summary for Subcatchment 33S:

Runoff = 102.33 cfs @ 12.64 hrs, Volume= 16.528 af, Depth= 1.93" Routed to Reach SP33 :

	Α	rea (sf)	CN D	escription		
Ī	1,7	22,412	58 N	leadow, no	on-grazed,	HSG B
	1,5	42,409	78 N	leadow, no	on-grazed, l	HSG D
		1,381	73 E	Brush, Goo	d, HSG D	
	3	84,753	55 V	Voods, Go	od, HSG B	
_	8	26,436	77 V	Voods, Go	od, HSG D	
	4,4	77,391	68 V	Veighted A	verage	
	4,4	77,391	1	00.00% Pe	ervious Are	a
	_					
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	20.1	100	0.0340	0.08		Sheet Flow,
						Woods: Light underbrush n= 0.400 P2= 2.40"
	24.6	932	0.0160	0.63		Shallow Concentrated Flow,
	40.0		0.0400	4.50		Woodland Kv= 5.0 fps
	12.8	1,157	0.0460	1.50		Shallow Concentrated Flow,
	0.4	60	0.2420	2.70		Short Grass Pasture Kv= 7.0 fps
	0.4	60	0.3120	2.79		Shallow Concentrated Flow,
	0.7	141		3.19		Woodland Kv= 5.0 fps Direct Entry, Small Tributary & Swamp w/ Channels
-			T ()	3.19		Direct Littly, Small Hibutary & Swamp w/ Chamles
	58.6	2.390	Total			

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Summary for Subcatchment 34S:

Runoff = 55.38 cfs @ 12.41 hrs, Volume= 6.885 af, Depth= 2.17" Routed to Reach SP35 :

A	rea (sf)	CN D	escription				
	20,254	58 N	leadow, no	on-grazed,	HSG B		
9	37,330	78 M	leadow, no	on-grazed,	HSG D		
	16,371	48 B	rush, Goo	d, HSG B			
35,437 73			Brush, Good, HSG D				
	29,230		•	od, HSG B			
2	20,205	77 V	Voods, Go	od, HSG D			
,	58,827		Veighted A	•			
1,6	58,827	1	00.00% Pe	ervious Are	a		
_							
Tc	Length	Slope	Velocity	Capacity	Description		
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)			
20.5	100	0.0320	0.08		Sheet Flow,		
					Woods: Light underbrush n= 0.400 P2= 2.40"		
2.9	130	0.0220	0.74		Shallow Concentrated Flow,		
					Woodland Kv= 5.0 fps		
18.3	1,058	0.0190	0.96		Shallow Concentrated Flow,		
					Short Grass Pasture Kv= 7.0 fps		
0.3	155		8.93		Direct Entry, Small tributary & Swamp w/channels		
42.0	1,443	Total					

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Summary for Subcatchment 35S:

Runoff = 147.83 cfs @ 12.20 hrs, Volume= 13.072 af, Depth= 2.59" Routed to Reach SP35 :

Area (s	f) CN	Description	l			
32,31	1 58	Meadow, n	Meadow, non-grazed, HSG B			
36,34	7 71	Meadow, n	on-grazed,	HSG C		
1,445,64	1 78	Meadow, n	on-grazed,	HSG D		
26,86	0 73	Brush, Goo	d, HSG D			
450,34		Woods, Go				
79,60		Woods, Go				
204,73		Woods, Go				
282,10				& sewers, HSG D		
76,83		Gravel surf)		
2,634,77		Weighted A				
2,352,67		89.29% Pe				
282,10	2	10.71% lm _l	pervious Ar	ea		
Tc Lenç	th Slo	ne Velocity	Capacity	Description		
(min) (fe		ft) (ft/sec)	(cfs)	Description		
	0.00	, , ,	(013)	Sheet Flow,		
2. 4 1	0.00	0.00		Smooth surfaces n= 0.011 P2= 2.40"		
2.6 7	55 0.05	90 4.93		Shallow Concentrated Flow,		
2.0 7	0.00	30 4.33		Paved Kv= 20.3 fps		
2.5 4	38	2.91		Direct Entry,		
17.6 1,4				Shallow Concentrated Flow,		
	0.00			Short Grass Pasture Kv= 7.0 fps		
1.0 3	51	5.94		Direct Entry, Small Tributary & Swamp w/ Channels		
26.1 3,0	39 Tota	l				

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Summary for Subcatchment 36S:

Runoff = 301.27 cfs @ 12.35 hrs, Volume= 34.359 af, Depth= 2.68" Routed to Reach SP36 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 100-yr Rainfall=5.07"

	Area (sf)	CN	Description	
52,184 58 Meadow, non-grazed, HSG B				
	695	71	Meadow, non-grazed, HSG C	
	5,121,405	78	Meadow, non-grazed, HSG D	
	1,145	48	Brush, Good, HSG B	
	33,870	73	Brush, Good, HSG D	
	278,876	55	Woods, Good, HSG B	
	346,117	70	Woods, Good, HSG C	
	782,902	77	Woods, Good, HSG D	
	65,616	98	Paved roads w/curbs & sewers, HSG D	
	14,651	96	Gravel surface, HSG D	
	6,697,461	77	Weighted Average	
	6,631,845		99.02% Pervious Area	
	65,616		0.98% Impervious Area	
	Tc Length	Slop	e Velocity Capacity Description	
(n	nin) (feet)	(ft/f	t) (ft/sec) (cfs)	
2	0.4		Direct Fater OFF ODDEADLOFFT	

38.4

Type II 24-hr 100-yr Rainfall=5.07" Printed 7/11/2024

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Summary for Subcatchment 37S:

Runoff = 174.46 cfs @ 12.36 hrs, Volume= 20.304 af, Depth= 2.68" Routed to Reach SP37 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 100-yr Rainfall=5.07"

	Araa (af)	CNI	Description
	Area (sf)	CN	Description
*	30,667	98	Impervious
	13,321	96	Gravel surface, HSG A
*	7,485	98	Water
	57,778	58	Meadow, non-grazed, HSG B
	3,215,975	78	Meadow, non-grazed, HSG D
	805	48	Brush, Good, HSG B
	915	73	Brush, Good, HSG D
	76,106	55	Woods, Good, HSG B
	148,513	70	Woods, Good, HSG C
	406,259	77	Woods, Good, HSG D
	3,957,824	77	Weighted Average
	3,919,672		99.04% Pervious Area
	38,152		0.96% Impervious Area
	,		•
	Tc Length	Slop	pe Velocity Capacity Description
(min) (feet)	(ft/	
	00.0		D' 4 E 4 OFF ODDEADOUEET

39.6

Type II 24-hr 100-yr Rainfall=5.07" Printed 7/11/2024

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Summary for Subcatchment 38S:

Runoff = 33.18 cfs @ 12.35 hrs, Volume= 3.768 af, Depth= 2.68" Routed to Reach SP38 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 100-yr Rainfall=5.07"

_	Area	a (sf)	CN	Description			
355,232			78	Meadow, non-grazed, HSG D			
	379	9,321	77	Woods, Go	od, HSG D		
-	734	1,553	77	Weighted A	verage		
	734	1,553		100.00% Pe	ervious Are	а	
	Tc L	.ength	Slope	e Velocity	Capacity	Description	
_	(min)	(feet)	(ft/ft) (ft/sec)	(cfs)		
	00.4					D:	OFF ODDE A DOLLEFT

38.1

Type II 24-hr 100-yr Rainfall=5.07" Printed 7/11/2024

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Summary for Subcatchment 39S:

Runoff = 75.20 cfs @ 12.56 hrs, Volume= 11.149 af, Depth= 2.34" Routed to Reach SP39 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 100-yr Rainfall=5.07"

	Area (sf)	CN	Description
	113,238	30	Woods, Good, HSG A
*	17,184	98	Impervious Pavement
	149,774	30	Meadow, non-grazed, HSG A
	11,690	30	Brush, Good, HSG A
	30,170	70	Woods, Good, HSG C
	7,231	71	Meadow, non-grazed, HSG C
	194,104	77	Woods, Good, HSG D
	70,193	73	Brush, Good, HSG D
*	2,287	96	Gravel
	1,899,537	78	Meadow, non-grazed, HSG D
·	2,495,408	73	Weighted Average
	2,478,224		99.31% Pervious Area
	17,184		0.69% Impervious Area
			·
	Tc Length	Slop	pe Velocity Capacity Description
	(min) (feet)	(ft/	ft) (ft/sec) (cfs)

54.4

Type II 24-hr 100-yr Rainfall=5.07" Printed 7/11/2024

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Summary for Subcatchment 40S:

Runoff = 116.03 cfs @ 12.46 hrs, Volume= 15.258 af, Depth= 2.77" Routed to Reach SP40 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 100-yr Rainfall=5.07"

	Aı	rea (sf)	CN	Description				
*		26,987	98	Impervious	Pavement			
	1	71,417	77	Woods, Go	od, HSG D			
		20,992	73	Brush, Good, HSG D				
	2,6	58,700	78	Meadow, no	on-grazed,	HSG D		
	2,8	78,096	78	Weighted A	verage			
	2,8	51,109		99.06% Per	vious Area			
		26,987		0.94% Impe	ervious Area	a		
	Тс	Length	Slop	e Velocity	Capacity	Description		
	(min)	(feet)	(ft/ft	,	(cfs)	Description		
_		(ieet)	(11/11)	(10/360)	(013)			
	17 2					Direct Enter		

47.3

Type II 24-hr 100-yr Rainfall=5.07" Printed 7/11/2024

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Summary for Subcatchment 41S:

Runoff = 32.59 cfs @ 12.46 hrs, Volume= 4.322 af, Depth= 2.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 100-yr Rainfall=5.07"

	Area (sf)	CN	Description
*	16,863	98	Impervious
*	44,367	96	Gravel
	50,657	58	Meadow, non-grazed, HSG B
	654,398	71	Meadow, non-grazed, HSG C
	153,128	78	Meadow, non-grazed, HSG D
	12,946	55	Woods, Good, HSG B
	30,598	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
	33,461	61	>75% Grass cover, Good, HSG B
_	6,740	74	>75% Grass cover, Good, HSG C
	1,003,158	72	Weighted Average
	986,295		98.32% Pervious Area
	16,863		1.68% Impervious Area
	Tc Lengtl	h Slo	pe Velocity Capacity Description
	(min) (feet	t) (ft/	/ft) (ft/sec) (cfs)
	10 E		Direct Firth, CEE CODE ADOLLET

46.5

Type II 24-hr 100-yr Rainfall=5.07" Printed 7/11/2024

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Summary for Subcatchment 42S:

172.59 cfs @ 13.13 hrs, Volume= 38.540 af, Depth= 2.68" Runoff Routed to Reach SP42:

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 100-yr Rainfall=5.07"

A	rea (sf)	CN	Description			
20,734 98 Water Surface, HSG A						
1	70,414	96	Gravel surfa	ace, HSG A	1	
g	56,587	71	Meadow, no	on-grazed,	HSG C	
5,2	27,848	78	Meadow, no	on-grazed,	HSG D	
	287	65	Brush, Goo	d, HSG C		
	56,930	73	Brush, Goo	d, HSG D		
	32,944	70	Woods, Go	od, HSG C		
1,0	46,689	77	Woods, Go	od, HSG D		
7,5	12,433	77	Weighted A	verage		
7,4	91,699		99.72% Per	vious Area		
	20,734		0.28% Impe	ervious Area	a	
Tc	Length	Slope		Capacity	Description	
(min)	(feet)	(ft/ft) (ft/sec)	(cfs)		
96.3					Direct Entry, SEE SPREADSHEET	

Type II 24-hr 100-yr Rainfall=5.07" Printed 7/11/2024

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Summary for Subcatchment 43S:

Runoff = 100.68 cfs @ 12.49 hrs, Volume= 13.574 af, Depth= 2.68" Routed to Reach SP43 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 100-yr Rainfall=5.07"

	Area (sf)	CN	Description	
*	2,810	98	Impervious	
	440,724	71	Meadow, non-grazed, HSG C	
	2,172,158	78	Meadow, non-grazed, HSG D	
	11,726	70	Woods, Good, HSG C	
	18,430	77	Woods, Good, HSG D	
	2,645,848	77	Weighted Average	
	2,643,038		99.89% Pervious Area	
	2,810		0.11% Impervious Area	
	Tc Length	Slo		
_	(min) (feet)	(ft/	/ft) (ft/sec) (cfs)	
	10.7		Direct Foto, CEE CODEADCHEET	

48.7

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Summary for Subcatchment 44S:

Runoff = 120.52 cfs @ 13.11 hrs, Volume= 27.177 af, Depth= 2.77" Routed to Reach SP44 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 100-yr Rainfall=5.07"

	Area (sf)	CN	Description
*	136,522	98	Water
*	27,820	98	Impervious
*	4,835	96	Gravel
	146,073	58	Meadow, non-grazed, HSG B
	90,051	71	Meadow, non-grazed, HSG C
	4,232,980	78	Meadow, non-grazed, HSG D
	82,986	73	Brush, Good, HSG D
	6,012	55	Woods, Good, HSG B
	3,850	70	Woods, Good, HSG C
_	395,055	77	Woods, Good, HSG D
	5,126,184	78	Weighted Average
	4,961,842		96.79% Pervious Area
	164,342		3.21% Impervious Area
	Tc Length	Slop	pe Velocity Capacity Description
_	(min) (feet)	(ft/	/ft) (ft/sec) (cfs)
	07.4		Direct Fator OFF ODDEADOUFFT

97.1

Type II 24-hr 100-yr Rainfall=5.07" Printed 7/11/2024

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Summary for Subcatchment 44SA:

Runoff = 47.87 cfs @ 12.19 hrs, Volume= 4.164 af, Depth= 2.77" Routed to Reach SP44A:

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 100-yr Rainfall=5.07"

	Area (sf)	CN	Description				
*	8,459	98	Water				
*	21,218	98	Impervious				
*	12,958	96	Gravel				
	4,574	58	Meadow, non-grazed, HSG B				
	57,514	71	Meadow, non-grazed, HSG C				
	588,570	78	Meadow, non-grazed, HSG D				
	988	48	Brush, Good, HSG B				
	17,587	73	Brush, Good, HSG D				
	2,222	55	Woods, Good, HSG B				
	22,179	70	Woods, Good, HSG C				
	49,212	77	Woods, Good, HSG D				
	785,481	78	Weighted Average				
755,804 96.22% Pervious Area							
	29,677	29,677 3.78% Impervious Area					
	Tc Length	Slop	pe Velocity Capacity Description				
(min) (feet)	(ft/f	ft) (ft/sec) (cfs)				
	0E E		Direct Entry SEE SDDEADSUEET				

25.5

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Summary for Subcatchment 45S:

Runoff = 34.82 cfs @ 12.23 hrs, Volume= 3.289 af, Depth= 2.95" Routed to nonexistent node SP46

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 100-yr Rainfall=5.07"

_	Area (sf)	CN	Description				
*	49,323	98	Impervious				
	33,429	77	Woods, Good, HSG D				
	12,134	73	Brush, Good, HSG D				
*	720	96	Gravel	Gravel			
	478,790	78	Meadow, no	Meadow, non-grazed, HSG D			
*	7,562	98	Water	Water			
581,958 80 Weighted Average							
525,073 90.23% Pervious Area							
56,885 9.77% Impervious Area				a			
	Tc Length	Slo		Capacity	Description		
_	(min) (feet)	(ft/	ft) (ft/sec)	(cfs)			
	00.4				Discort Forting OFF ODDE ADOLLET		

29.1

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Summary for Subcatchment 46S:

Runoff = 70.08 cfs @ 12.55 hrs, Volume= 10.231 af, Depth= 2.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs Type II 24-hr 100-yr Rainfall=5.07"

FO 0		Diverse Finders OFF ODDEADOUEFT				
(min) (feet)	(ft/	/ft) (ft/sec) (cfs)				
Tc Length	Slop					
To Longth	Slor	no Volocity Canacity Description				
2,100,000		100.00701 017100071100				
2,133,969		100.00% Pervious Area				
2,133,969	75	Weighted Average				
27,326	Brush, Good, HSG D					
1,508,838	78 73	Meadow, non-grazed, HSG D				
•						
229,882	55	Woods, Good, HSG B				
367,923	77	Woods, Good, HSG D				
	CIN	Description				
Area (sf)) CN Description					

53.8

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Summary for Subcatchment 47S:

Runoff = 81.11 cfs @ 12.59 hrs, Volume= 12.158 af, Depth= 2.77" Routed to Reach SP47 :

	Area (sf)	CN	Description				
*	23,846	98	Impervious				
*	10,900	96	Gravel				
	2,186,703	78	Meadow, non-grazed, HSG D				
	15,310	73	Brush, Good, HSG D				
	56,459	77	Woods, Good, HSG D				
2,293,218 78 Weighted Average			Weighted A	verage			
2,269,372 98.96% Pervious Are		rvious Area					
23,846			1.04% Impervious Area				
	Tc Lengtl			Capacity	Description		
	(min) (feet	t) (ft/	ft) (ft/sec)	(cfs)			
	56.5				Direct Entry, SEE SPREADSHEET		