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Memorandum

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	Nick Colella, MOECC		
	Ben Greenhouse, Jericho Wind, LP		
	Nancy O'Neill, Jericho Wind, LP		
	Al Wiley, Jericho Wind, LP		
	Jennifer Tuck, Jericho Wind, LP		
CC	Jake Murray, AECOM		
Subject	Jericho Wind Energy Centre – Modification to turbine foundation construction		
From	Marc Rose, AECOM		
Date	October 3, 2014	Project Number	60301207

Jericho Wind, LP (Jericho) is constructing a wind energy project in the Municipality of Lambton Shores and the Township of Warwick, in Lambton County, Ontario and in the Municipality of North Middlesex, in Middlesex County, Ontario. The project is referred to as the Jericho Wind Energy Centre (the "Project").

This memo has been prepared to document a proposed change to the method of constructing the foundation for Turbine 7 in the Project. Specifically, Jericho is proposing modifications to approved turbine foundation construction methods described in the Construction Plan Report (February, 2013) and the Project Description Report (February, 2013) to allow for the installation of pile foundations at Turbine 7 due to soil conditions. No changes to the Project Location, as mapped in the approved REA, are required in order to accommodate this modification. **Figure 1** illustrates the existing Project Location.

Table 1 documents the edits to the initial REA Reports and associated Revision Reports resulting from the modifications described above. The table includes text from the original REA submission (February, 2013) and the REA revision reports (October, 2013), and edits to the text (underlined text represents additions and strikethrough text represents deletions).

Table 1 Edits to the Initial REA Reports

Section / Page in REA Report	Combined REA Report and Revision Report text	Revised Text (Underlined text represents additions and ~~strikethrough text~~ represents deletions.)
Project Description Report		
Section 2.1.1 / page 5	The wind turbine technology proposed for this Project is the GE 1.6-100 Wind Turbine. The turbines are 3-bladed, upwind, horizontal-axis wind turbines that are state of the art technology. The turbines have a 100 m rotor diameter with a swept area of 7,854 m2; each blade is connected to the main shaft via the hub. The turbine is mounted on an 80 m tubular steel tower which contains an internal ladder provided for maintenance access. The turbine will be constructed on a foundation that is approximately 400 m2. The foundation consists of poured concrete and steel rebar to provide added strength.	The wind turbine technology proposed for this Project is the GE 1.6-100 Wind Turbine. The turbines are 3-bladed, upwind, horizontal-axis wind turbines that are state of the art technology. The turbines have a 100 m rotor diameter with a swept area of 7,854 m2; each blade is connected to the main shaft via the hub. The turbine is mounted on an 80 m tubular steel tower which contains an internal ladder provided for maintenance access. The turbine will be constructed on a foundation that is approximately 400 m2. The foundation consists of poured concrete and steel rebar to provide added strength. Where required due to soil conditions, pile type foundations will be installed.
Section 2.2.2.6 / page 12	A backhoe will be used to excavate an area approximately 3 m deep x 20 m x 20 m with the material being stockpiled for future backfilling. Stockpiled material will have topsoil and subsoil separated out and surplus excavated material will be removed from the site for disposal in an approved manner. The foundation, with an approximate footprint of 400 m2, will be constructed of poured concrete and reinforced with steel rebar to provide strength. The construction timeframe for turbine foundations is approximately three to four days, excluding curing time. After construction the foundation will be backfilled and the surface will be landscaped for drainage. The only surface evidence of the foundation will be a small protrusion of concrete to which the tower is attached; as such, land can be cultivated to within a few metres of the turbine. Any wood-waste generated will be removed from the site and recycled unless the landowner otherwise directs. Spent welding roads will be disposed of as hazardous waste by a licensed contractor. Typical construction equipment, on a per turbine basis, will include: • Excavator for removing material; • Flatbed trucks (four to six) for delivery of rebar, turbine mounting assembly and forms; • Truck mounted crane or rough terrain forklift for unloading and placement of rebar and forms; • Concrete trucks for delivery of concrete (30-40 loads); • Construction trucks (three to four vehicles with multiple visits); and, • Dozer, loader and trucks to backfill and compact foundation and remove surplus excavated materials.	A backhoe will be used to excavate an area approximately 3 m deep x 20 m x 20 m with the material being stockpiled for future backfilling. Stockpiled material will have topsoil and subsoil separated out and surplus excavated material will be removed from the site for disposal in an approved manner. The foundation, with an approximate footprint of 400 m2, will be constructed of poured concrete and reinforced with steel rebar to provide strength. Where required due to soil conditions, steel H piles will be installed using a crane with a diesel hammer. After the steel H piles are installed to the depth of the bedrock or suitably stable soil, a concrete pile cap will be installed and a seal slab will be poured to allow for the installation and construction of the structural re-bar cage. Concrete will be poured within and around the re-bar cage to form the foundation. When the concrete has cured the foundation excavation will be backfilled and completed. The construction timeframe for turbine foundations is approximately three to four days, excluding curing time. After construction the foundation will be backfilled and the surface will be landscaped for drainage. The only surface evidence of the foundation will be a small protrusion of concrete to which the tower is attached; as such, land can be cultivated to within a few metres of the turbine. Any wood-waste generated will be removed from the site and recycled unless the landowner otherwise directs. Spent welding ~~roads~~ rods will be disposed of as hazardous waste by a licensed contractor. Typical construction equipment, on a per turbine basis, will include: • Excavator for removing material; • Flatbed trucks (four to six) for delivery of rebar, turbine mounting assembly and forms; • Truck mounted crane or rough terrain forklift for unloading and placement of rebar and forms; • Concrete trucks for delivery of concrete (30-40 loads); • Construction trucks (three to four vehicles with multiple visits); ~~and,~~ • Dozer, loader and trucks to backfill and compact foundation and remove surplus excavated materials~~.~~, and; • Pile driver or pile boring machinery where required.
Table 3-7 / page 58		**Potential Effect** Reduction in groundwater quality due to pile installation for turbine foundations if required. **Performance Objectives** • Minimize reduction in groundwater quality. **Mitigation Strategy** • Where required, maintain sheet piling and gasket seals as clean as possible prior to and during installation to limit potential contamination to surrounding groundwater. • Use best management practices to install piles as straight as possible with limited vibration to reduce voids between sheet piling and adjacent ground. **Residual Effects** • Reduction in groundwater quality minimized through application of mitigation measures. **Monitoring Plan and Contingency Measures** • **Contingency Measures:** • If voids occur between the piling and adjacent ground due to vibration and/or jarring (i.e., through contact with rocks or differential soil types) during installation, use suitable sealant (e.g., bentonite grout) in the void space to prevent the downward migration of water from the surface.
Table 3-10 / page 60	**Potential Effect** Increased noise due to construction activity.	**Potential Effect** Increased noise due to construction activity (including installation of pile turbine foundations if required).

Table 1 Edits to the Initial REA Reports

Section / Page in REA Report	Combined REA Report and Revision Report text	Revised Text (Underlined text represents additions and ~~strikethrough text~~ represents deletions.)
	Mitigation Measures • Ensure that construction equipment is kept in good condition and does not exceed noise emissions as specified in MOE publication NPC-115. • Operate construction vehicles in accordance with municipal by-laws. • Implement speed limit on unpaved roads. **Residual Effects** • Increased noise minimized through application of mitigation measures. • High likelihood of effect occurring; however, increase noise levels associated with construction is short-term and magnitude of such effects will be limited. **Monitoring Plan and Contingency Measures** • Track all complaints and conduct follow-up monitoring (see Complaints Resolution Process in Emergency Response and Communications Plan). • **Contingency Measures:** o Repair faulty equipment resulting in increased noise levels in a timely fashion.	**Mitigation Measures** • Ensure that construction equipment is kept in good condition and does not exceed noise emissions as specified in MOE publication NPC-115. • Operate construction vehicles in accordance with municipal by-laws. • Implement speed limit on unpaved roads. • Where required, schedule piling to occur during daylight hours whenever possible. **Residual Effects** • Increased noise minimized through application of mitigation measures. • High likelihood of effect occurring; however, increase noise levels associated with construction is short-term and magnitude of such effects will be limited. • No effects from the construction of pile type turbine foundations are anticipated based on the required minimum distances to nearby receptors. **Monitoring Plan and Contingency Measures** • Track all complaints and conduct follow-up monitoring (see Complaints Resolution Process in Emergency Response and Communications Plan). • **Contingency Measures:** o Repair faulty equipment resulting in increased noise levels in a timely fashion. o Investigate the use of quieter piling methodologies (i.e. the use of a shroud around the pile and hammer) if there are noise complaints associated with piling.
Construction Plan Report		
Section 2.2.6 / page 12	A backhoe will be used to excavate an area approximately 3 m deep x 20 m x 20 m with the material being stockpiled for future backfilling. Stockpiled material will have topsoil and subsoil separated out and surplus excavated material will be removed from the site for disposal in an approved manner. The foundation, with an approximate footprint of 400 m2, will be constructed of poured concrete and reinforced with steel rebar to provide strength. The construction timeframe for turbine foundations is approximately three to four days, excluding curing time. After construction the foundation will be backfilled and the surface will be landscaped for drainage. The only surface evidence of the foundation will be a small protrusion of concrete to which the tower is attached; as such, land can be cultivated to within a few metres of the turbine. Any wood-waste generated will be removed from the site and recycled unless the landowner otherwise directs. Spent welding roads will be disposed of as hazardous waste by a licensed contractor. Typical construction equipment, on a per turbine basis, will include: • Excavator for removing material; • Flatbed trucks (four to six) for delivery of rebar, turbine mounting assembly and forms; • Truck mounted crane or rough terrain forklift for unloading and placement of rebar and forms; • Concrete trucks for delivery of concrete (30-40 loads); • Construction trucks (three to four vehicles with multiple visits); and, • Dozer, loader and trucks to backfill and compact foundation and remove surplus excavated materials.	A backhoe will be used to excavate an area approximately 3 m deep x 20 m x 20 m with the material being stockpiled for future backfilling. Stockpiled material will have topsoil and subsoil separated out and surplus excavated material will be removed from the site for disposal in an approved manner. The foundation, with an approximate footprint of 400 m2, will be constructed of poured concrete and reinforced with steel rebar to provide strength. Where required due to soil conditions, steel H piles will be installed using a crane with a diesel hammer. After the steel H piles are installed to the depth of the bedrock or suitably stable soil, a concrete pile cap will be installed and a seal slab will be poured to allow for the installation and construction of the structural re-bar cage. Concrete will be poured within and around the re-bar cage to form the foundation. When the concrete has cured the foundation excavation will be backfilled and completed. The construction timeframe for turbine foundations is approximately three to four days, excluding curing time. After construction the foundation will be backfilled and the surface will be landscaped for drainage. The only surface evidence of the foundation will be a small protrusion of concrete to which the tower is attached; as such, land can be cultivated to within a few metres of the turbine. Any wood-waste generated will be removed from the site and recycled unless the landowner otherwise directs. Spent welding ~~roads~~ rods will be disposed of as hazardous waste by a licensed contractor. Typical construction equipment, on a per turbine basis, will include: • Excavator for removing material; • Flatbed trucks (four to six) for delivery of rebar, turbine mounting assembly and forms; • Truck mounted crane or rough terrain forklift for unloading and placement of rebar and forms; • Concrete trucks for delivery of concrete (30-40 loads); • Construction trucks (three to four vehicles with multiple visits); ~~and,~~ • Dozer, loader and trucks to backfill and compact foundation and remove surplus excavated materials~~.~~; and; • Pile driver or pile boring machinery where required.
Table 3-6 / page 49		**Potential Effect** Reduction in groundwater quality due to pile installation for turbine foundations if required. **Performance Objectives** • Minimize reduction in groundwater quality. **Mitigation Strategy** • Where required, maintain sheet piling and gasket seals as clean as possible prior to and during installation to limit potential

Table 1 Edits to the Initial REA Reports

Section / Page in REA Report	Combined REA Report and Revision Report text	Revised Text (Underlined text represents additions and ~~strikethrough text~~ represents deletions.)
		contamination to surrounding groundwater. • Use best management practices to install piles as straight as possible with limited vibration to reduce voids between sheet piling and adjacent ground. **Residual Effects** • Reduction in groundwater quality minimized through application of mitigation measures. **Monitoring Plan and Contingency Measures** • **Contingency Measures:** • If voids occur between the piling and adjacent ground due to vibration and/or jarring (i.e., through contact with rocks or differential soil types) during installation, use suitable sealant (e.g., bentonite grout) in the void space to prevent the downward migration of water from the surface.

Table 3-8 / page 51	**Potential Effect**
	Increased noise due to construction activity.
	
	Mitigation Measures
	• Ensure that construction equipment is kept in good condition and does not exceed noise emissions as specified in MOE publication NPC-115.
	• Operate construction vehicles in accordance with municipal by-laws.
	• Implement speed limit on unpaved roads.
	
	Residual Effects
	• Increased noise minimized through application of mitigation measures.
	• High likelihood of effect occurring; however, increase noise levels associated with construction is short-term and magnitude of such effects will be limited.
	
	Monitoring Plan and Contingency Measures
	• Track all complaints and conduct follow-up monitoring (see Complaints Resolution Process in Emergency Response and Communications Plan).
	• **Contingency Measures:**
	  ○ Repair faulty equipment resulting in increased noise levels in a timely fashion.
		Potential Effect
		Increased noise due to construction activity (including installation of pile turbine foundations if required).
		
		Mitigation Measures
		• Ensure that construction equipment is kept in good condition and does not exceed noise emissions as specified in MOE publication NPC-115.
		• Operate construction vehicles in accordance with municipal by-laws.
		• Implement speed limit on unpaved roads.
		• Where required, schedule piling to occur during daylight hours whenever possible.
		
		Residual Effects
		• Increased noise minimized through application of mitigation measures.
		• High likelihood of effect occurring; however, increase noise levels associated with construction is short-term and magnitude of such effects will be limited.
		• No effects from the construction of pile type turbine foundations are anticipated based on the required minimum distances to nearby receptors.
		
		Monitoring Plan and Contingency Measures
		• Track all complaints and conduct follow-up monitoring (see Complaints Resolution Process in Emergency Response and Communications Plan).
		• **Contingency Measures:**
		  ○ Repair faulty equipment resulting in increased noise levels in a timely fashion.
		  ○ Investigate the use of quieter piling methodologies (i.e. the use of a shroud around the pile and hammer) if there are noise complaints associated with piling.

Design and Operations Report		
There are no edits to the Design and Operations Report resulting from the modifications described in this memo.		
Water Assessment and Water Body Report		
There are no edits to the Water Assessment and Water Body Report resulting from the modifications described in this memo.		
Decommissioning Plan Report		
There are no edits to the Decommissioning Plan Report resulting from the modifications described in this memo.		
Wind Turbine Specification Report		
There are no edits to the Wind Turbine Specification Report resulting from the modifications described in this memo.		

The Project modification described in this memo does not change the overall conclusion of the Project Description Report (February, 2013) and associated Revision to the Project Description Report (October, 2013) which state that **"this project can be constructed, installed and operated without any significant adverse residual effects to the environment. Post-construction monitoring related to effects on wildlife, including birds and bats, will be undertaken to confirm this conclusion".**

MR:JM:mm
Attach. Figure 1 – Existing Project Location

Lake Huron

Kettle Point 44

Lambton Shores

Warwick

North Middlesex

Middlesex Centre

Adelaide Metcalfe

Refer to Parkhill Interconnect Project Appendix from Original REA Submission

Legend

Project Location
- GE Turbine
- Permanent Meterological Tower
- Access Road
- Collection Line
- Crane Path
- Transmission Line
- Substation & Laydown Area
- Disturbance Areas
- Existing 500kV Transmission Line

Parkhill Interconnect Infrastructure (See Addendum)
- Parkhill Transformer Substation and Point of Interconnection
- Proposed Transmission line from Bornish Switchyard to Parkhill TS
- Bornish Switchyard

- Wind Energy Centre Study Area
- Transmission Line Study Area
- 120m Area of Investigation
- Municipal Division
- Freeway
- Expressway / Highway
- Major Road
- Local Road
- Ramp
- Railway

Natural Feature
- Watercourse (ABCA, SCRCA)
- Watercourse (MNR)
- Waterbody
- Cartographic Wetland
- Wooded Area

N W E S

Kilometers
0 0.75 1.5 3

1:50,000
UTM Zone 17N, NAD 83

Jericho Wind Energy Centre

Project Location

July 2014
Project 60155032

AECOM

Figure 1

Map Document: (\\GIS\Newtera\GIS\Spatial\MXDs\Report\MXDs\NHA_Mapping\Jericho\60155032_Jericho_REA_Addendum_ProjectLoc_20140715.mxd)