



WIND FARM WATERBODY RAPID ASSESSMENT FORM

Stantec

Station # CL-CR4
 Watercourse Name 1
 Photos 3069-3070
 Date SEPT 19, 2012
 Weather conditions in previous 24 hrs Rain, 15°C
 GPS Coordinates (Zone) 17T E 0613993 N 4767722 Datum NAD83
 Descriptive Location Confession Road 4 - 300 West of Minor Rd

Project Name Niagara Wind
 Project # 160960269
 Field Staff Trevor & Hamish
 Time 14:20

Water Quality

Dissolved Oxygen (mg/L) dry pH dry Conductivity (µS/cm) dry
 Water Temperature (°C) dry Air Temperature (°C) 17°C
 Time *in situ* measurements taken dry

Watercourse Dimensions & Morphology

Mean Watercourse Width dry (m) Maximum Pool Depth dry (cm)
 Mean Bankfull Width < 1m (m) Mean Water Depth dry (cm)
dry % Riffle dry % Pool dry % Run dry % Flat
 Evidence of eroding banks, Comments on bank stability stable feature

Substrate (% cover)

Bedrock dry Cobble dry Sand 100% (Soil) Silt dry Muck dry
 Boulder dry Gravel dry Clay dry Marl dry Detritus dry

In-water Cover

Cover Types Present (circle): Undercut Banks dry Deep Pool dry Watercress dry Aquatic Veg dry
 Overhanging Vegetation dry Woody Debris dry Boulder dry Other Grass sward / agricultural weed

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) Agricultural field (mowed) 19m off South

Adjacent Land Use

Agricultural + rural residential

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) low - none

Migratory Obstructions (seasonal, permanent) low - no flow

Note any fish observations no

Waterbody Notes

Natural Watercourse N Trapezoidal Channel N Grassed Swale X (south of road) Buried Tile N
 Surficial Drainage (i.e. furrows) Yes Dugout Pond N Dominated by Aquatic Veg N Dry Y

Other Habitat Notes, Incidental Wildlife Observations, etc.

Surface drainage across agricultural field disturbed by ploughing - north of road, grassed on south side of road.
~ 300m culvert - CSP

Field Notes Authored by Hamish

Field Notes QA/QCed by ME



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # CL-CR4 Project Name Niagara Wind Farm
 Watercourse Name 2 Project # 1609
 Photos 8071 - 8074 Field Staff Hamish - Trevor
 Date 17 Sept 2012 Time 2:45 pm
 Weather conditions in previous 24 hrs Fine - Rain 15°C
 GPS Coordinates (Zone) 17T E 0619113 N 4767730 Datum NAD83
 Descriptive Location Concession Rd 4, 150 m West of minor Rd

Water Quality Dry
 Dissolved Oxygen (mg/L) pH Conductivity (µS/cm)
 Water Temperature (°C) Air Temperature (°C) 17°C
 Time *in situ* measurements taken

Watercourse Dimensions & Morphology

Mean Watercourse Width Dry (m) Maximum Pool Depth dry (cm)
 Mean Bankfull Width < 1 m (m) Mean Water Depth dry (cm)
 % Riffle % Pool % Run % Flat
 Evidence of eroding banks, Comments on bank stability Stable feature

Substrate (% cover)

 Bedrock Cobble Sand 100% (Soil) Silt Muck
 Boulder Gravel Clay Marl Detritus

in-water Cover

Cover Types Present (circle): Dry Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 60% shaded - grass cover - early successional / agricultural
 Adjacent Land Use Agricultural / Road side ditch / wild herbaceous meadow

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Note any fish observations no

Waterbody Notes

Natural Watercourse N Trapezoidal Channel N Grassed Swale Y Buried Tile N
 Surficial Drainage (i.e. furrows) N Dugout Pond N Dominated by Aquatic Veg N Dry Y

Other Habitat Notes, Incidental Wildlife Observations, etc.

Upstream (south side of road)
grassed ditch, surface drainage across grassy meadow
3000 ft x 50

Field Notes Authored by Hamish

Field Notes QA/QCed by MR



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # CL-CR 4 Project Name Niagara Wind Farm
 Watercourse Name 3 Project # 160960269
 Photos 3075 - 3080 Field Staff Trevor Hamish
 Date 19 Sept 2012 Time 2:55 pm
 Weather conditions in previous 24 hrs Fine - Rain 15°C
 GPS Coordinates (Zone) 17T E 0619353 N 4767739 Datum NAD83
 Descriptive Location Concession Rd 4 - 50 m East of Minor Rd

Water Quality Dry
 Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
 Water Temperature (°C) _____ Air Temperature (°C) 17°C
 Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width Dry (m) Maximum Pool Depth Dry (cm)
 Mean Bankfull Width < 1 m (m) Mean Water Depth Dry (cm)
 _____ % Riffle _____ % Pool _____ % Run _____ % Flat
 Evidence of eroding banks, Comments on bank stability stable feature

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 100% (Soil) Silt _____ Muck _____
 Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Dry Undercut Banks _____ Deep Pool _____ Watercress _____ Aquatic Veg _____
 Overhanging Vegetation _____ Woody Debris _____ Boulder _____ Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
70% - roadside grasses

Adjacent Land Use

Agricultural

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
no

Migratory Obstructions (seasonal, permanent)
no - low flow

Note any fish observations no

Waterbody Notes

Natural Watercourse N Trapezoidal Channel N Grassed Swale N Buried Tile N
 Surficial Drainage (i.e. furrows) Y Dugout Pond N Dominated by Aquatic Veg N Dry Y

Other Habitat Notes, Incidental Wildlife Observations, etc.

possibly equalization culvert
under road, drainage feature may flow south through ag field. No
defined channel observed. 100% vegetated with grasses & weeds
300 mm CSD

Field Notes Authored by Hamish

Field Notes QA/QCed by MZ



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WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # CL-CR4 Project Name Niagara Wind Farm
 Watercourse Name 4 Project # 160960269
 Photos 3081 - 3086 Field Staff Hamish + Trevor
 Date 17 Sept 2012 Time 3:05 pm
 Weather conditions in previous 24 hrs Fire - Rain - 15°C
 GPS Coordinates (Zone) 17T E 0619602 N 4767747 Datum NAD83
 Descriptive Location Concession Rd 4, 200 m East of Minor Rd

Water Quality

Dissolved Oxygen (mg/L) Dry pH 7.0 Conductivity (µS/cm) 170
 Water Temperature (°C) 17 Air Temperature (°C) 17
 Time *in situ* measurements taken

Watercourse Dimensions & Morphology

Mean Watercourse Width Dry (m) Maximum Pool Depth NA (cm)
 Mean Bankfull Width < 1 m (m) Mean Water Depth NA (cm)
 % Riffle % Pool % Run % Flat
 Evidence of eroding banks, Comments on bank stability Stable

Substrate (% cover)

Bedrock Cobble Sand 100 (Soil) Silt Muck
 Boulder Gravel Clay Marl Detritus

In-water Cover

Cover Types Present (circle): Dry Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 70% shaded - grasses + some aquatic grasses - cattails
 Adjacent Land Use Agricultural + agricultural residential + road side ditch + wood lot

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) No
 Migratory Obstructions (seasonal, permanent) no - low flow
 Note any fish observations no

Waterbody Notes

Natural Watercourse N Trapezoidal Channel N Grassed Swale Grassed roadside ditch Buried Tile N
 Surficial Drainage (i.e. furrows) N Dugout Pond N Dominated by Aquatic Veg N Dry Y

Other Habitat Notes, Incidental Wildlife Observations, etc. ~300 mm CSP

Field Notes Authored by Hamish Aubrey Field Notes QA/QCed by



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WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # CL-CR4 Project Name Niagara Wind Farm
 Watercourse Name 5 Project # 160960269
 Photos 3087-3091 Field Staff Trevor + Hamish
 Date 19 Sep 2012 Time 3:15 pm
 Weather conditions in previous 24 hrs Fire - Rain, 15°C
 GPS Coordinates (Zone) 17T E 0619854 N 4767760 Datum NAD83
 Descriptive Location Concession road 4 - 300 m east of Minor Rd

Water Quality

Dissolved Oxygen (mg/L) 0.0 pH 7.0 Conductivity (µS/cm) 170
 Water Temperature (°C) 17°C Air Temperature (°C) 17°C
 Time in situ measurements taken

Watercourse Dimensions & Morphology

Mean Watercourse Width Dry (m) Maximum Pool Depth NA (cm)
 Mean Bankfull Width (m) Mean Water Depth NA (cm)
 % Riffle % Pool % Run % Flat
 Evidence of eroding banks, Comments on bank stability Stable

Substrate (% cover)

Bedrock Cobble Sand Soil (100%) Silt Muck
 Boulder Gravel Clay Marl Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use 70% shaded - grassy cover
Agricultural

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Note any fish observations no - low
no

Waterbody Notes

Natural Watercourse N Trapezoidal Channel N Grassed Swale Y Buried Tile N
 Surficial Drainage (i.e. furrows) N Dugout Pond N Dominated by Aquatic Veg N Dry Y

Other Habitat Notes, Incidental Wildlife Observations, etc.

Defined channel associated
with culvert, approx 900 mm in size, some aquatic grasses
present but limited to roadside ditch.

Field Notes Authored by Hamish

Field Notes QA/QCed by



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WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # CL-CR4 Project Name Niagara Wind Farm
 Watercourse Name 6 Project # 160960269
 Photos 8092-8096 Field Staff Trevor & Hamish
 Date 19 Sept 2012 Time 3:25 pm
 Weather conditions in previous 24 hrs Fire - Rain 15°C
 GPS Coordinates (Zone) 17T E 0620212 N 4767775 Datum NAD83
 Descriptive Location Concession Road 4 - junction with Patterson Road

Water Quality

Dissolved Oxygen (mg/L) ✓ pH ✓ Conductivity (µS/cm) ✓
 Water Temperature (°C) ✓ Air Temperature (°C) 17°C
 Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width Dry (m) Maximum Pool Depth Dry (cm)
 Mean Bankfull Width ~1m (m) Mean Water Depth Dry (cm)
 _____ % Riffle _____ % Pool _____ % Run _____ % Flat
 Evidence of eroding banks, Comments on bank stability stable

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 100 (Soil) Silt _____ Muck _____
 Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use

70% shaded by grasses, some trees
Agricultural, roadside ditch

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent) no

Note any fish observations no - low flow

Waterbody Notes

Natural Watercourse N Trapezoidal Channel N Grassed Swale Y Buried Tile N
 Surficial Drainage (i.e. furrows) N Dugout Pond N Dominated by Aquatic Veg N Dry Y

Other Habitat Notes, Incidental Wildlife Observations, etc.

600 mm culvert - approx 155
Drainage feature crosses perpendicular to road. Drainage feature
present

Field Notes Authored by

Hamish Aubrey

Field Notes QA/QCed by

NA



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WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # CL-CR 4 Project Name Niagara Wind Farm
 Watercourse Name 7 Project # 160966269
 Photos 8097 - 2000 Field Staff Hamish + Trevor
 Date 19 Sept 2012 Time 3:35 pm
 Weather conditions in previous 24 hrs Fire - Rain, 15°C
 GPS Coordinates (Zone) 17T E 0620335 N 4767783 Datum NAD83
 Descriptive Location Concession Road 4, 50 m East of Paterson Rd

Water Quality Dry
 Dissolved Oxygen (mg/L) ✓ pH ✓ Conductivity (µS/cm) ✓
 Water Temperature (°C) ✓ Air Temperature (°C) 17°C
 Time *in situ* measurements taken ✓

Watercourse Dimensions & Morphology

Mean Watercourse Width Dry (m) Maximum Pool Depth Dry (cm)
 Mean Bankfull Width 21 m (m) Mean Water Depth Dry (cm)
 % Riffle ✓ % Pool ✓ % Run ✓ % Flat ✓
 Evidence of eroding banks, Comments on bank stability no

Substrate (% cover)

Bedrock ✓ Cobble ✓ Sand 100 (Soil) Silt ✓ Muck ✓
 Boulder ✓ Gravel ✓ Clay ✓ Marl ✓ Detritus ✓

In-water Cover

Cover Types Present (circle): Dry Undercut Banks ✓ Deep Pool ✓ Watercress ✓ Aquatic Veg ✓
 Overhanging Vegetation ✓ Woody Debris ✓ Boulder ✓ Other ✓

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

60% - grassed pasture + agricultural field
 Adjacent Land Use agriculture

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) Dry

Migratory Obstructions (seasonal, permanent) no

Note any fish observations no

Waterbody Notes

Natural Watercourse N Trapezoidal Channel N Grassed Swale Y Buried Tile N
 Surficial Drainage (i.e. furrows) N Dugout Pond N Dominated by Aquatic Veg N Dry Yes

Other Habitat Notes, Incidental Wildlife Observations, etc.

No defined channel, grassed swale on south side of road, ag field
& roadside drainage on north side
approx 300 m CSP

Field Notes Authored by Hamish

Field Notes QA/QCed by MR



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # CL-CR4 Project Name Niagara Wind Farm
 Watercourse Name 8 Project # 160960269
 Photos 8101-8104 Field Staff Trevor + Hamish
 Date 19 Sep 2012 Time 3:45 pm
 Weather conditions in previous 24 hrs Fine - Rain, 15°C
 GPS Coordinates (Zone) 17T E 0620519 N 4767795 Datum NAD83
 Descriptive Location Concession Road 4 - 150 m East of Patterson

Water Quality Dry
 Dissolved Oxygen (mg/L) pH Conductivity (µS/cm)
 Water Temperature (°C) Air Temperature (°C) 17°C
 Time *in situ* measurements taken

Watercourse Dimensions & Morphology

Mean Watercourse Width Dry (m) Maximum Pool Depth (cm)
 Mean Bankfull Width < 1 m (m) Mean Water Depth (cm)
 % Riffle % Pool % Run % Flat
 Evidence of eroding banks, Comments on bank stability stable feature

Substrate (% cover)

 Bedrock Cobble Sand 100 (Soil) Silt Muck
 Boulder Gravel Clay Marl Detritus

In-water Cover

Cover Types Present (circle): Dry Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
60% - grasses + some trees

Adjacent Land Use

Rural residential, agricultural, road

Fish Habitat Potential

low
 Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

low/no flow
 Note any fish observations None (Dry)

Waterbody Notes

Natural Watercourse Trapezoidal Channel N Grassed Swale Y Buried Tile N
 Surficial Drainage (i.e. furrows) N Dugout Pond N Dominated by Aquatic Veg N Dry Y

Other Habitat Notes, Incidental Wildlife Observations, etc. Poorly defined drainage feature - flow through ~300mm CSP culvert

Field Notes Authored by Trevor Chandler

Field Notes QA/QCed by MR



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # CL-CR 4 Project Name Niagara Wind Farm
 Watercourse Name 9 Project # 160968269
 Photos 3105 - 3108 Field Staff Trevor & Hamish
 Date 19 Sept 2012 Time 3:55 pm
 Weather conditions in previous 24 hrs Fine - Rain 15°C
 GPS Coordinates (Zone) 17T E 0620608 N 4767792 Datum NAD83
 Descriptive Location Concession Road 4 - 400 m East of Patterson

Water Quality Dry
 Dissolved Oxygen (mg/L) pH Conductivity (µS/cm)
 Water Temperature (°C) Air Temperature (°C) 17°C
 Time *in situ* measurements taken

Watercourse Dimensions & Morphology
 Mean Watercourse Width Dry (m) Maximum Pool Depth (cm)
 Mean Bankfull Width < 1 m (m) Mean Water Depth (cm)
 % Riffle % Pool % Run % Flat
 Evidence of eroding banks, Comments on bank stability

Substrate (% cover)
 Bedrock Cobble Sand 100 (Soil) Silt Muck
 Boulder Gravel Clay Marl Detritus

In-water Cover Dry
 Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other

Riparian Zone
 Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 30% - grasses are cut

Adjacent Land Use rural residential, agricultural, roadside ditch drainage

Fish Habitat Potential
 Critical Habitat (spawning or nursery areas, groundwater upwellings) no

Migratory Obstructions (seasonal, permanent) no - low

Note any fish observations no

Waterbody Notes
 Natural Watercourse N Trapezoidal Channel N Grassed Swale Y Buried Tile N
 Surficial Drainage (i.e. furrows) N Dugout Pond N Dominated by Aquatic Veg N Dry Y

Other Habitat Notes, Incidental Wildlife Observations, etc. Restored manicured grass lands / roadside drainage - small drainage channels. Small wetland south of road receives drainage.

Field Notes Authored by Hamish Aubrey Field Notes QA/QCed by WJZ



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WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # CL - CR4
 Watercourse Name 10
 Photos 3110 - 3112
 Date 19 Sept 2012

Project Name Niagara Wind Farm
 Project # 160960269
 Field Staff Trevor Hamish
 Time 4:15 pm

Weather conditions in previous 24 hrs Fine - Rain 15%
 GPS Coordinates (Zone) 17T E 062914 N 4767814 Datum NAD83
 Descriptive Location Concession Road 4 - 500 West of Hwy 20

Water Quality Dry
 Dissolved Oxygen (mg/L) --- pH --- Conductivity (µS/cm) ---
 Water Temperature (°C) --- Air Temperature (°C) 17°C
 Time *in situ* measurements taken ---

Watercourse Dimensions & Morphology

Mean Watercourse Width Dry (m) Maximum Pool Depth --- (cm)
 Mean Bankfull Width <1 m (m) Mean Water Depth --- (cm)
--- % Riffle --- % Pool --- % Run --- % Flat
 Evidence of eroding banks, Comments on bank stability Stable

Substrate (% cover)

Bedrock --- Cobble --- Sand 100 (Soil) Silt --- Muck ---
 Boulder --- Gravel --- Clay --- Marl --- Detritus ---

In-water Cover

Dry
 Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other ---

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
South side of road - grasses, north side - manicured cut grass
 Adjacent Land Use Rural residential, agricultural

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) no
 Migratory Obstructions (seasonal, permanent) no - low flow
 Note any fish observations no

Waterbody Notes

Natural Watercourse N Trapezoidal Channel N Grassed Swale Y Buried Tile N
 Surficial Drainage (i.e. furrows) N Dugout Pond N Dominated by Aquatic Veg N Dry Y

Other Habitat Notes, Incidental Wildlife Observations, etc. Roadside ditch (grasses)
& grassed swale. 300 mm approx

Field Notes Authored by Hamish

Field Notes QA/QCed by MZ



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WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # CL-CR4 Project Name Niagara Wind Farm
 Watercourse Name 11 Project # 160960269
 Photos 3113 - 3118 Field Staff Trevor Hamish
 Date 19 Sept 2012 Time 4:25 pm
 Weather conditions in previous 24 hrs Fire - Rain, 15°C
 GPS Coordinates (Zone) 17T E 0620973 N 4767844 Datum NAD83
 Descriptive Location Concession Rd 4 - 475 m east West of Hwy 20

Water Quality

Dissolved Oxygen (mg/L) Dry pH 7.5 Conductivity (µS/cm) 170
 Water Temperature (°C) 17°C Air Temperature (°C) 17°C
 Time in situ measurements taken

Watercourse Dimensions & Morphology

Mean Watercourse Width Dry (m) Maximum Pool Depth (cm)
 Mean Bankfull Width 1-2 m (m) Mean Water Depth (cm)
 % Riffle % Pool % Run % Flat
 Evidence of eroding banks, Comments on bank stability Stable - minor scour near culvert

Substrate (% cover)

Bedrock Cobble Sand 100 (Soil) Silt Muck
 Boulder Gravel Clay Marl Detritus

In-water Cover

Cover Types Present (circle): Dry Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
10-20% - some grasses / trees

Adjacent Land Use

Agricultural & rural residential

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) no

Migratory Obstructions (seasonal, permanent) no - low flow

Note any fish observations no

Waterbody Notes

Natural Watercourse N Trapezoidal Channel N Grassed Swale Y Buried Tile N
 Surficial Drainage (i.e. furrows) N Dugout Pond N Dominated by Aquatic Veg N Dry Y

Other Habitat Notes, Incidental Wildlife Observations, etc.

North side of road is grassed swale, south side of road is dug channel, straight ~ 900 mm CSP culvert

Field Notes Authored by

Hamish Aubrey

Field Notes QA/QCed by

MT



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # CL-CR4 Project Name Niagara Wind Farm
 Watercourse Name 12 Project # 160960269
 Photos 8/20 - 8/24 Field Staff Trevor + Hamish
 Date 19 Sept 2012 Time 4:40 pm
 Weather conditions in previous 24 hrs Fire - Rain 15°C
 GPS Coordinates (Zone) 17N E 0621210 N 4767828 Datum NAD83
 Descriptive Location Concession Rd 4 - 300 m west of Hwy 20

Water Quality

Dissolved Oxygen (mg/L) Dry pH 7.5 Conductivity (µS/cm) 170
 Water Temperature (°C) 17°C Air Temperature (°C) 17°C
 Time in situ measurements taken

Watercourse Dimensions & Morphology

Mean Watercourse Width Dry (m) Maximum Pool Depth (cm)
 Mean Bankfull Width (m) Mean Water Depth (cm)
 % Riffle % Pool % Run % Flat
 Evidence of eroding banks, Comments on bank stability Stable

Substrate (% cover)

Bedrock Cobble Sand 100 (Soil) Silt Muck
 Boulder Gravel Clay Marl Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
North side - 60-70% - agricultural grasses, south side 0% - dug out
 Adjacent Land Use Agricultural

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) no

Migratory Obstructions (seasonal, permanent) no-low flow

Note any fish observations no

Waterbody Notes

Natural Watercourse N Trapezoidal Channel X Grassed Swale N Buried Tile N
 Surficial Drainage (i.e. furrows) N Dugout Pond N Dominated by Aquatic Veg N Dry X

Other Habitat Notes, Incidental Wildlife Observations, etc. Minor small packets of standing water
~ 900 mm CSP culvert, south side of channel dug in ag field

Field Notes Authored by Hamish

Field Notes QA/QCed by MF



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WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # CL-CR4 Project Name Niagara Wind Farm
 Watercourse Name 13 Project # 160960269
 Photos 81 223 Field Staff Trevor + Hamish
 Date 19 Sept 2012 Time 4:50 pm
 Weather conditions in previous 24 hrs Fine - Rain 15°C
 GPS Coordinates (Zone) 17T E 0621786 N 4767353 Datum NAD83
 Descriptive Location Concession Road 4 - 50 m west of Hwy 20

Water Quality Dry
 Dissolved Oxygen (mg/L) ✓ pH ✓ Conductivity (µS/cm) ✓
 Water Temperature (°C) ✓ Air Temperature (°C) 17°C
 Time in situ measurements taken

Watercourse Dimensions & Morphology

Mean Watercourse Width Dry (m) Maximum Pool Depth (cm)
 Mean Bankfull Width < 1m (m) Mean Water Depth (cm)
 % Riffle % Pool % Run % Flat
 Evidence of eroding banks, Comments on bank stability no

Substrate (% cover)

Bedrock Cobble Sand (soil) 100% Silt Muck
 Boulder Gravel Clay Marl Detritus

In-water Cover

Dry
 Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
South side - 10% - grassed - North side - 80% - grasses / ag weeds
 Adjacent Land Use Agricultural, roading, rural residential

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) No
 Migratory Obstructions (seasonal, permanent) no - low flow
 Note any fish observations no

Waterbody Notes

Natural Watercourse N Trapezoidal Channel N Grassed Swale Y Buried Tile N
 Surficial Drainage (i.e. furrows) N Dugout Pond N Dominated by Aquatic Veg N Dry Y

Other Habitat Notes, Incidental Wildlife Observations, etc.

~ 450 mm CSP culvert South side = grass swale - mowed
North side of road = grasses - agricultural weeds
channel is ploughed on south side

Field Notes Authored by Hamish

Field Notes QA/QCed by M



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # CL-Youngs Project Name Niagara Wind Farm
 Watercourse Name 1 Project # 160960269
 Photos 8130 - 8134 Field Staff Trevor + Hamish
 Date 19 Sept Time 5:20 pm
 Weather conditions in previous 24 hrs Fine - Rain 15°C
 GPS Coordinates (Zone) 17T E 0619315 N 4774960 Datum NAD83
 Descriptive Location Youngs Rd St
Agricultural land, rural residential - 300 east of clayson rd.

Water Quality NA -
 Dissolved Oxygen (mg/L) ✓ pH ✓ Conductivity (µS/cm) ✓
 Water Temperature (°C) ✓ Air Temperature (°C) 17°C
 Time in situ measurements taken ✓

Watercourse Dimensions & Morphology
 Mean Watercourse Width 1-15 (m) Maximum Pool Depth 15 (cm)
 Mean Bankfull Width 3 (m) Mean Water Depth 10 (cm)
✓ % Riffle 100 % Pool ✓ % Run ✓ % Flat
 Evidence of eroding banks, Comments on bank stability stable

Substrate (% cover)
 Bedrock ✓ Cobble 10 Sand 80 Silt ✓ Muck ✓
 Boulder ✓ Gravel 10 Clay ✓ Marl 10% Detritus ✓

In-water Cover
 Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other ✓

Riparian Zone
 Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
30% shade - grasses

Adjacent Land Use Agricultural, roadside, rural residential

Fish Habitat Potential
 Critical Habitat (spawning or nursery areas, groundwater upwellings) no unlikely
 Migratory Obstructions (seasonal, permanent) no low flows
 Note any fish observations no

Waterbody Notes
 Natural Watercourse N Trapezoidal Channel Y Grassed Swale N Buried Tile N
 Surficial Drainage (i.e. furrows) N Dugout Pond N Dominated by Aquatic Veg Y Dry N

Other Habitat Notes, Incidental Wildlife Observations, etc. Not little to no flow.
small culvert observed, adjacent to road on southside, not on northside
then flows southwards. Roadside drainage
300m

Field Notes Authored by Hamish Field Notes QA/QCed by MF



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # CL-Fly Rd Project Name Niagara Area Wind Farm
 Watercourse Name Spring Creek Project # 160966267
 Photos 8156 8160 Field Staff Trevor & Hamish
 Date 19 Sept 2012 Time 6:30 pm
 Weather conditions in previous 24 hrs Fine - Rain 15°C
 GPS Coordinates (Zone) 17T E 0620039 N 4776898 Datum NAD83
 Descriptive Location Fly Rd - 400 m West of South Grimsley Rd 3

Water Quality NA - dry (mostly)
 Dissolved Oxygen (mg/L) pH Conductivity (µS/cm)
 Water Temperature (°C) Air Temperature (°C) 17°C
 Time in situ measurements taken

Watercourse Dimensions & Morphology
 Mean Watercourse Width 3 (m) Maximum Pool Depth 30 (cm)
 Mean Bankfull Width 6 (m) Mean Water Depth 10 (cm)
 % Riffle 100 % Pool % Run % Flat
 Evidence of eroding banks, Comments on bank stability Bank erosion south side of road, made amount

Substrate (% cover) under bridge
 Bedrock Cobble Sand 70 Silt Muck
 Boulder Gravel 30 Clay Marl Detritus

In-water Cover
 Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other

Riparian Zone
 Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
70% - trees & grasses

Adjacent Land Use Wooded area, rural residential

Fish Habitat Potential
 Critical Habitat (spawning or nursery areas, groundwater upwellings) none noted

Migratory Obstructions (seasonal, permanent) little to no flow

Note any fish observations yes - one small one

Waterbody Notes
 Natural Watercourse Maybe Trapezoidal Channel Y Grassed Swale N Buried Tile N
 Surficial Drainage (i.e. furrows) N Dugout Pond N Dominated by Aquatic Veg Y Dry N

Other Habitat Notes, Incidental Wildlife Observations, etc. White tailed deer
Box culvert - ~ 4 m wide

Field Notes Authored by Hamish

Field Notes QA/QCed by MD



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # CL-FLY rd 1 / B Project Name Niagara Wind
 Watercourse Name Trib to Spring Creek Project # 160950269
 Photos 8150-5 Field Staff Trevor Chandler, Hannah Albrecht
 Date Sept 19/12 Time 6:10
 Weather conditions in previous 24 hrs rain -15°C
 GPS Coordinates (Zone) 17T E 0868 N 4776663 Datum NAD83
 Descriptive Location FLY Rd - south Grimsby Rd junction

Water Quality

Dissolved Oxygen (mg/L) _____ pH Dry Conductivity (µS/cm) _____
 Water Temperature (°C) _____ Air Temperature (°C) 17°C
 Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
 Mean Bankfull Width 3-4 (m) Mean Water Depth _____ (cm)
 _____ % Riffle _____ % Pool _____ % Run _____ % Flat
 Evidence of eroding banks, Comments on bank stability stable

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 100% Silt _____ Muck _____
 Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
60% - pasture / roadside grasses - early

Adjacent Land Use

agricultural field / pasture / rural residential

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Note any fish observations none

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel ☒ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc.

pooled water in box culvert (box culvert is ~2m wide)

Field Notes Authored by T. Chandler

Field Notes QA/QCed by MDR



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # CL Fly rd 2 / C Project Name Niagara Wind
 Watercourse Name Trib to Spring Creek Project # 160950269
 Photos 8/60-65 Field Staff T. Chandler, Hannah Abr
 Date Sept 19/12 Time 6:40
 Weather conditions in previous 24 hrs 15°C, rain
 GPS Coordinates (Zone) 17E 0620461 N 4776782 Datum NAD83
 Descriptive Location Fly rd, 300m west of South Grumbled

Water Quality

Dissolved Oxygen (mg/L) DRY pH 7.0 Conductivity (µS/cm) 170
 Water Temperature (°C) 17°C Air Temperature (°C) 17°C
 Time *in situ* measurements taken

Watercourse Dimensions & Morphology

Mean Watercourse Width 1 (m) Maximum Pool Depth (cm)
 Mean Bankfull Width 3 (m) Mean Water Depth (cm)
 % Riffle % Pool % Run % Flat
 Evidence of eroding banks, Comments on bank stability stable

Substrate (% cover)

Bedrock Cobble Sand 70 Silt Muck
 Boulder Gravel 20 Clay Marl 10 Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
30-40% grasses, early

Adjacent Land Use

wooded lot, roadside ditch

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
none noted

Migratory Obstructions (seasonal, permanent)

Note any fish observations none

Waterbody Notes

Natural Watercourse Trapezoidal Channel ✓ Grassed Swale Buried Tile
 Surficial Drainage (i.e. furrows) Dugout Pond Dominated by Aquatic Veg Dry

Other Habitat Notes, Incidental Wildlife Observations, etc.

channel heavily dominated by grasses. Roadside drainage
culvert, water doesn't pass under road

Field Notes Authored by T. Chandler Field Notes QA/QCed by MP



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # C1 Fly Rd 3 / E Project Name Niagara Wind
 Watercourse Name Trill to Spring Creek Project # 16090269
 Photos 8/66-8/70 Field Staff T. Chandler Hamid Aubrey
 Date Sept 19/12 Time 6:55
 Weather conditions in previous 24 hrs Rain, 15°C
 GPS Coordinates (Zone) 17T E 0621010 N 4776610 Datum NAD83
 Descriptive Location Fly Road, 40 m east of South Grimsby Rd 3

Water Quality

Dissolved Oxygen (mg/L) dry pH 7 Conductivity (µS/cm) 1
 Water Temperature (°C) 17°C Air Temperature (°C) 17°C
 Time in situ measurements taken

Watercourse Dimensions & Morphology

Mean Watercourse Width (m) Maximum Pool Depth (cm)
 Mean Bankfull Width 3 (m) Mean Water Depth (cm)
 % Riffle % Pool % Run % Flat
 Evidence of eroding banks, Comments on bank stability stable

Substrate (% cover)

Bedrock Cobble Sand 100% Silt Muck
 Boulder Gravel Clay Marl Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Southside of road - 70% wetland grasses / Northside is 10% mowed gr
 Adjacent Land Use rural residential / lawns / roadside ditch

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) none noted
 Migratory Obstructions (seasonal, permanent) dry channel
 Note any fish observations none

Waterbody Notes

Natural Watercourse Trapezoidal Channel ✓ Grassed Swale Buried Tile
 Surficial Drainage (i.e. furrows) Dugout Pond Dominated by Aquatic Veg Dry ✓

Other Habitat Notes, Incidental Wildlife Observations, etc.

Box culvert, 1m, open bottom, straightened

Field Notes Authored by T. Chandler Field Notes QA/QCed by MZ



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # Walker Rd 1 / D Project Name Niagara Wind
 Watercourse Name Trib to Spring Creek Project # 160950269
 Photos 8171-75 Field Staff J. Chandler, Hamish Aubrey
 Date Sept 19/12 Time 7:05
 Weather conditions in previous 24 hrs rain, 15°C
 GPS Coordinates (Zone) 17T E 0621418 N 477775 Datum NAD83
 Descriptive Location Walker Rd, 20 m N of Philo Rd

Water Quality

Dissolved Oxygen (mg/L) 0.24 pH 7.0 Conductivity (µS/cm) 170
 Water Temperature (°C) 17°C Air Temperature (°C) 17°C
 Time in situ measurements taken

Watercourse Dimensions & Morphology

Mean Watercourse Width 1 (m) Maximum Pool Depth (cm)
 Mean Bankfull Width 3 (m) Mean Water Depth (cm)
 % Riffle % Pool % Run % Flat
 Evidence of eroding banks, Comments on bank stability Stable

Substrate (% cover)

Bedrock Cobble Sand 100% Silt Muck
 Boulder Gravel Clay Marl Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
70% grasses, early

Adjacent Land Use

Ag. fields, rural residential

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
none noted

Migratory Obstructions (seasonal, permanent)
dry channel

Note any fish observations none

Waterbody Notes

Natural Watercourse Trapezoidal Channel ✓ Grassed Swale Buried Tile
 Surficial Drainage (i.e. furrows) Dugout Pond Dominated by Aquatic Veg Dry ✓

Other Habitat Notes, Incidental Wildlife Observations, etc. 600mm CSP culvert, dry, straightened

Field Notes Authored by J. Chandler

Field Notes QA/QCed by



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # Walker Rd 2.1E Project Name Niagara Wind
 Watercourse Name Trib to Spring Creek Project # 16090269
 Photos 8/16-82 Field Staff T. Chandler, Hamish Aubrey
 Date Sept 19/12 Time 7:15
 Weather conditions in previous 24 hrs rain, 15°C
 GPS Coordinates (Zone) 11T E 0621412 N 4777973 Datum NAD83
 Descriptive Location Walker Road, 100 m N of Philip Rd

Water Quality

Dissolved Oxygen (mg/L) dry pH 7.5 Conductivity (µS/cm) 170
 Water Temperature (°C) 17°C Air Temperature (°C) 17°C
 Time *in situ* measurements taken

Watercourse Dimensions & Morphology

Mean Watercourse Width (m) Maximum Pool Depth (cm)
 Mean Bankfull Width 3 (m) Mean Water Depth (cm)
 % Riffle % Pool % Run % Flat
 Evidence of eroding banks, Comments on bank stability stable

Substrate (% cover)

Bedrock Cobble Sand 100% Silt Muck
 Boulder Gravel Clay Marl Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
70% grasses, early

Adjacent Land Use

agricultural fields, rural residential

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
none noted

Migratory Obstructions (seasonal, permanent)
dry channel

Note any fish observations none

Waterbody Notes

Natural Watercourse Trapezoidal Channel ✓ Grassed Swale Buried Tile
 Surficial Drainage (i.e. furrows) Dugout Pond Dominated by Aquatic Veg Dry ✓

Other Habitat Notes, Incidental Wildlife Observations, etc.

900mm csp culvert
some pooled water present

Field Notes Authored by T. Chandler

Field Notes QA/QCed by



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

R11T001-1 fig 20

Station # R11T001-1
 Watercourse Name
 Photos see log
 Date June 12 2012
 Weather conditions in previous 24 hrs rain
 GPS Coordinates (Zone) 17T E 623349 N 4765629 Datum
 Descriptive Location Vaughan Rd & SE-11

Project Name Niagara Wind
 Project # 160950269
 Field Staff KE + SK
 Time 4:25 pm

Water Quality

Dissolved Oxygen (mg/L) 10.41 pH 7.81 Conductivity (µS/cm) 1513
 Water Temperature (°C) 25.650 Air Temperature (°C) 30
 Time in situ measurements taken 4:25 pm

Watercourse Dimensions & Morphology

Mean Watercourse Width 1 (m) Maximum Pool Depth 10 (cm)
 Mean Bankfull Width 3 (m) Mean Water Depth 5 (cm)
 % Riffle 10.0 % Pool % Run % Flat
 Evidence of eroding banks, Comments on bank stability Stable & veg w/ RCG

Substrate (% cover)

Bedrock Cobble 20 Sand Silt Muck
 Boulder Gravel 80 Clay Marl Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg RCG
 Overhanging Vegetation Woody Debris Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 0%

Adjacent Land Use

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) none

Migratory Obstructions (seasonal, permanent) dry

Note any fish observations none

Waterbody Notes

Natural Watercourse Trapezoidal Channel ✓ Grassed Swale Buried Tile
 Surficial Drainage (i.e. furrows) Dugout Pond Dominated by Aquatic Veg Dry

Other Habitat Notes, Incidental Wildlife Observations, etc.

- incised drain

Field Notes Authored by KE

Field Notes QA/QCed by



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

NON
REA

Station # R11TD 02 Project Name NIAGARA WIND
 Watercourse Name 02-1 Project # 160950269
 Photos 8850 Field Staff T. Chandler M. Ellah
 Date June 7, 2012 Time 6:10 PM
 Weather conditions in previous 24 hrs Light thunder showers and sunny
 GPS Coordinates (Zone) 17T E 627172 N 4765995 Datum
 Descriptive Location _____

Water Quality DRY - TILED
 Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
 Water Temperature (°C) _____ Air Temperature (°C) 20
 Time *in situ* measurements taken N/A

Watercourse Dimensions & Morphology Low Depression - ploughed & planted w corn
 Mean Watercourse Width N/A (m) Maximum Pool Depth N/A (cm)
 Mean Bankfull Width N/A (m) Mean Water Depth N/A (cm)
N/A % Riffle N/A % Pool N/A % Run N/A % Flat
 Evidence of eroding banks, Comments on bank stability N/A

Substrate (% cover) DRY
 Bedrock _____ Cobble _____ Sand _____ Silt _____ Muck _____
 Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover
 Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone
 Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
OPEN 100%
 Adjacent Land Use
CORNFIELD

Fish Habitat Potential
 Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

NO WATER

Note any fish observations _____

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile ☒
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc. _____

Field Notes Authored by T. Chandler

Field Notes QA/QCed by WF



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

NON
REA

Station # BILTD 02
 Watercourse Name 02-2
 Photos 8851 8851 8851
 Date JUNE 7, 2017
 Weather conditions in previous 24 hrs Light thunder showers; Sunny
 GPS Coordinates (Zone) 17T E 627394 N 4765896 Datum
 Descriptive Location _____

Project Name NIAGARA WIND
 Project # 160950269
 Field Staff T. Chandler M. Ellah
 Time 6:35

Water Quality DRY - TILE DRAIN

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
 Water Temperature (°C) _____ Air Temperature (°C) 20
 Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology DRY

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
 Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)
 _____ % Riffle _____ % Pool _____ % Run _____ % Flat
 Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover) DRY

Bedrock _____ Cobble _____ Sand _____ Silt _____ Muck _____
 Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover DRY

Cover Types Present (circle): Undercut Banks _____ Deep Pool _____ Watercress _____ Aquatic Veg _____
 Overhanging Vegetation _____ Woody Debris _____ Boulder _____ Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
0%

Adjacent Land Use

CORNFIELD

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
0

Migratory Obstructions (seasonal, permanent)
NO FLOW

Note any fish observations 0

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile ✓
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ✓

Other Habitat Notes, Incidental Wildlife Observations, etc. _____

Field Notes Authored by T. Chandler

Field Notes QA/QCed by NP



WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

Stantec

Station # R11002

Project Name NIAGARA WIND

Watercourse Name 02-3

Project # 160950269

Photos 8852-56

Field Staff T. Chandler, M. Ellah

Date JUN 7, 2012

Time 6:30 PM

Weather conditions in previous 24 hrs —

GPS Coordinates (Zone) E 627501 N476 5973 Datum

Descriptive Location Along property line at east side of property.

Water Quality Too Shallow

Dissolved Oxygen (mg/L) — pH — Conductivity (µS/cm) —

Water Temperature (°C) — Air Temperature (°C) 20

Time *in situ* measurements taken —

Watercourse Dimensions & Morphology

Mean Watercourse Width 1 (m) Maximum Pool Depth 5 (cm)

Mean Bankfull Width 4 (m) Mean Water Depth 2 (cm)

— % Riffle 100 % Pool — % Run — % Flat

Evidence of eroding banks, Comments on bank stability stable

Substrate (% cover)

— Bedrock — Cobble 20 Sand 20 Silt 20 Muck

— Boulder — Gravel — Clay — Marl 60 Detritus

In-water Cover

Cover Types Present (circle): Overhanging Vegetation Woody Debris Undercut Banks Deep Pool Watercress Aquatic Veg

— Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

60% shrubs + aquatic vegetation

Adjacent Land Use

Agricultural fields (w crops planted)

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Low/no flow

Note any fish observations NONE

Waterbody Notes

Natural Watercourse No Trapezoidal Channel ✓ Grassed Swale — Buried Tile —

Surficial Drainage (i.e. furrows) No Dugout Pond — Dominated by Aquatic Veg ✓ Dry —

Other Habitat Notes, Incidental Wildlife Observations, etc. Sagittarium, sedges

Lesser duckweed

Field Notes Authored by T. Chandler

Field Notes QA/QCed by ME



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Non REA

Station # R11T003

Watercourse Name _____

Photos See Log

Date June 11 / 2012

Weather conditions in previous 24 hrs hot & Sunny

GPS Coordinates (Zone) 17T E 629942

Descriptive Location conc 1 approx 500m east of Bayle Rd.

Project Name Niagara Wind

Project # 1100950269

Field Staff KE JK

Time 4:11 pm

N 4764072 Datum NAD83

Water Quality

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____

Water Temperature (°C) _____ Air Temperature (°C) _____

Time in situ measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)

Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)

_____ % Riffle _____ % Pool _____ % Run _____ % Flat

Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble _____ Sand _____ Silt _____ Muck _____
Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Note any fish observations _____

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
Surficial Drainage (i.e. furrows) ☒ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc. Surficial Drainage or Temp wet areas that are ploughed.

Field Notes Authored by KE

Field Notes QA/QCed by Joe Keene



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

RETA

R11T004-1

F032

Station # R11T004-1
 Watercourse Name -
 Photos see log
 Date June 12 2012
 Weather conditions in previous 24 hrs fair overcast
 GPS Coordinates (Zone) 17T E 627606
 Descriptive Location conc. 4 @ Hodgkins Rd.

Project Name Niagara Wind
 Project # 160950269
 Field Staff RETA JK
 Time 9:16 AM

Water Quality
 Dissolved Oxygen (mg/L) 5.4 pH 7.43 Conductivity (µS/cm) 984
 Water Temperature (°C) 18.55 Air Temperature (°C) 23
 Time *in situ* measurements taken 9:20 AM

Watercourse Dimensions & Morphology
 Mean Watercourse Width 2 (m) Maximum Pool Depth - (cm)
 Mean Bankfull Width 4.5 (m) Mean Water Depth - (cm)
 % Riffle - % Pool - % Run - % Flat -
 Evidence of eroding banks, Comments on bank stability some erosion

Substrate (% cover)
 Bedrock - Cobble 20 Sand - Silt - Muck -
 Boulder - Gravel 80 Clay - Marl - Detritus -

In-water Cover
 Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other -

Riparian Zone
 Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 10%

Adjacent Land Use Ag - soybean

Fish Habitat Potential
 Critical Habitat (spawning or nursery areas, groundwater upwellings) none

Migratory Obstructions (seasonal, permanent) dry

Note any fish observations none

Waterbody Notes
 Natural Watercourse - Trapezoidal Channel ✓ Grassed Swale - Buried Tile -
 Surficial Drainage (i.e. furrows) - Dugout Pond - Dominated by Aquatic Veg ✓ Dry ✓

Other Habitat Notes, Incidental Wildlife Observations, etc.
trapezoidal ditch line dominated by aquatic veg
barber's note

Field Notes Authored by RE

Field Notes QA/QCed by Joe Du

1N

Hodgkins Rd

REA 2

REA-1

Conc. 4

11

REA-2

REA-6

loses definition
grassy swale
↓

Surficial
drainage

REA
3

Non REA-5

REA?
4

loses
definition
REA-3

Surficial
drainage

road



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

R11T004-2

Fig 32

Station # R11T004-2

Watercourse Name -

Photos see log

Date June 12 2012

Weather conditions in previous 24 hrs None overnight

GPS Coordinates (Zone) 17T E 625568

Descriptive Location conc. 4 @ Hodgkins Rd

Project Name Niagara Wind

Project # 160950269

Field Staff KE + JK

Time 9:25 AM

GPS Coordinates (Zone) 17T E 625568

Descriptive Location conc. 4 @ Hodgkins Rd

Water Quality

Dissolved Oxygen (mg/L) X pH dry Conductivity (µS/cm) -

Water Temperature (°C) - Air Temperature (°C) 23°C

Time *in situ* measurements taken -

Watercourse Dimensions & Morphology

Mean Watercourse Width 1.5 (m) Maximum Pool Depth dry (cm)

Mean Bankfull Width 3.5 (m) Mean Water Depth dry (cm)

% Riffle - % Pool - % Run - % Flat -

Evidence of eroding banks, Comments on bank stability stable & vlg

Substrate (% cover)

Bedrock - Cobble 10% Sand 10% Silt - Muck -

Boulder 10 Gravel 10-50 Clay - Marl - Detritus -

In-water Cover

Cover Types Present (circle): Undercut Banks - Deep Pool - Watercress - Aquatic Veg June 12

Overhanging Vegetation - Woody Debris - Boulder - Other -

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) <5%

Adjacent Land Use

307 field - Agricultural

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) -

Migratory Obstructions (seasonal, permanent) Dry

Note any fish observations Dry

Waterbody Notes

Natural Watercourse - Trapezoidal Channel ✓ Grassed Swale - Buried Tile -

Surficial Drainage (i.e. furrows) - Dugout Pond - Dominated by Aquatic Veg ✓ Dry ✓

Other Habitat Notes, Incidental Wildlife Observations, etc.

Defined channel, dug ditch w aquatic veg

Field Notes Authored by KE/JK

Field Notes QA/QCed by Joe Shaw



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA
R11T004-3
F132

Station # R11T004-3
Watercourse Name _____
Photos see log
Date June 12 2012
Weather conditions in previous 24 hrs rain
GPS Coordinates (Zone) 17T E 627611 N 4767868 Datum _____
Descriptive Location conc. 4 @ Hodgkins Rd, approx 400 m south of conc. 4

Project Name Niagara Wind
Project # 160950269
Field Staff EE + JK
Time 9am

Water Quality

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (μ S/cm) dry
Water Temperature ($^{\circ}$ C) _____ Air Temperature ($^{\circ}$ C) _____
Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width 1 (m) Maximum Pool Depth X (cm) dry
Mean Bankfull Width 2 (m) Mean Water Depth X (cm)
% Riffle _____ % Pool _____ % Run _____ % Flat _____
Evidence of eroding banks, Comments on bank stability veg + stable

Substrate (% cover)

Bedrock _____ Cobble 20 20 Sand _____ Silt _____ Muck _____
Boulder _____ Gravel 80 80 Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg water plantain
Overhanging Vegetation Woody Debris Boulder Other _____ PCG
typha

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 0%

Adjacent Land Use

Ag, corn, soy & hay.

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) _____

Migratory Obstructions (seasonal, permanent) dry

Note any fish observations n/a

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel ✓ Grassed Swale _____ Buried Tile _____
Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg ✓ Dry ✓

Other Habitat Notes, Incidental Wildlife Observations, etc.

- S. agnicola E. lodes shells + burrowing crayfish (Falkenberry Lake)

Field Notes Authored by Katie Eschley

Field Notes QA/QCed by Joe Moore



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA 3241.
R11T004-4
F32

Station # R11T004-4
Watercourse Name _____
Photos see log
Date June 12 2012

Project Name Niagara Wind
Project # 160950269
Field Staff KE + JK
Time 9:55 Am

Weather conditions in previous 24 hrs rain
GPS Coordinates (Zone) 17 E 627484 N 4767693 Datum _____
Descriptive Location SW corner of Crown prop by Rail Road tracks - south of Corc. 4 approx 600m

Water Quality

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
Water Temperature (°C) _____ Air Temperature (°C) _____
Time in situ measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)
_____ % Riffle _____ % Pool _____ % Run _____ % Flat
Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble _____ Sand _____ Silt _____ Muck
Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
40% willows, shrubs
Adjacent Land Use Ag

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) _____
Migratory Obstructions (seasonal, permanent) _____
Note any fish observations connectivity?
none

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg ☒ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc.

low lying wet area dominated by cattails, willows
waterbody in
wet area in the middle, unsure about connectivity to
ups or d/s reaches, surficial drainage feeds into it

Field Notes Authored by KE

Field Notes QA/QCed by KE



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Non RE+
R11T004-
Fig 32 5

Station # R11T004-5
Watercourse Name _____
Photos _____
Date June 12 2012
Weather conditions in previous 24 hrs rain
GPS Coordinates (Zone) _____ E _____ N _____ Datum _____
Descriptive Location conc. 4 100 m east of Hodgkins Rd
& 400 m south in field

Project Name Niagara Wind
Project # 160950269
Field Staff KE & JIK
Time 10:40

Water Quality

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (μ S/cm) _____
Water Temperature ($^{\circ}$ C) _____ Air Temperature ($^{\circ}$ C) _____
Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)
_____ % Riffle _____ % Pool _____ % Run _____ % Flat
Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble _____ Sand _____ Silt _____ Muck _____
Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Note any fish observations _____

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale ☒ Buried Tile _____
Surficial Drainage (i.e. furrows) ☒ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc.

grassed swale w/ no channel definition, dominated
by RCG, but farmer could plough through,
leaves for surficial drainage

Field Notes Authored by KE

Field Notes QA/QCed by J. Now



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

K11T004-6

F432

Station # R11T004-6
Watercourse Name _____
Photos see log
Date June 12 2012

Project Name Niagara Wind
Project # 160950269
Field Staff KE + JK
Time 10:29 am

Weather conditions in previous 24 hrs rain
GPS Coordinates (Zone) 17T E 627698 N 4768121 Datum _____
Descriptive Location conc. 4 approx 100 m east of Hodgkin Rd

Water Quality

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (μ S/cm) _____
Water Temperature ($^{\circ}$ C) _____ Air Temperature ($^{\circ}$ C) _____
Time in situ measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width 0.5 (m) Maximum Pool Depth _____ (cm) dry
Mean Bankfull Width 1 (m) Mean Water Depth _____ (cm)
% Riffle _____ % Pool _____ % Run _____ % Flat _____
Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble 20 Sand _____ Silt _____ Muck _____
Boulder _____ Gravel 80 Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
0%

Adjacent Land Use

soy & hay

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
none

Migratory Obstructions (seasonal, permanent)
dry

Note any fish observations
none

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc.

- some channel definition on near road for approx. 50 m
3 & then becomes low lying swale w/ no definition

Field Notes Authored by KE

Field Notes QA/QCed by John H.



WIND FARM WATERBODY RAPID ASSESSMENT FORM

PEA 3/27/12

Stantec

Station # R11T005-1

Watercourse Name UNKNOWN

Photos 131-143

Date Apr 19/12

Weather conditions in previous 24 hrs 12°C, overcast

GPS Coordinates (Zone) 17T E 0621299

Descriptive Location N 4747673 Datum NAD83

Project Name Niagara Wind

Project # 160950269

Field Staff KC, MF

Time 4:25

Water Quality

Dissolved Oxygen (mg/L) no water pH no water Conductivity (µS/cm) no water

Water Temperature (°C) no water Air Temperature (°C) 20°C

Time in situ measurements taken no water

Watercourse Dimensions & Morphology

Mean Watercourse Width 1 (m) Maximum Pool Depth 20 (cm)

Mean Bankfull Width 3 (m) Mean Water Depth 16 (cm)

% Riffle no water % Pool no water % Run no water % Flat no water

Evidence of eroding banks, Comments on bank stability stable

Substrate (% cover)

Bedrock no water Cobble no water Sand 50 Silt 50 Muck no water
Boulder no water Gravel no water Clay no water Marl no water Detritus no water

In-water Cover

Cover Types Present (circle): Undercut Banks no water Deep Pool no water Watercress no water Aquatic Veg retail
Overhanging Vegetation no water Woody Debris no water Boulder no water Other no water

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) <5% grasses, early

Adjacent Land Use ag. land

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) no water

Migratory Obstructions (seasonal, permanent) seasonal

Note any fish observations no water

Waterbody Notes

Natural Watercourse ✓ Trapezoidal Channel ✓ Grassed Swale no water Buried Tile no water

Surficial Drainage (i.e. furrows) no water Dugout Pond no water Dominated by Aquatic Veg no water Dry no water

Other Habitat Notes, Incidental Wildlife Observations, etc. no water

Field Notes Authored by KC

Field Notes QA/QCed by MF

bush lot

RT1100S-3
REA

non
REA

RT1100S-1
REA

RT1100S-2

ag. field.

ag field

20m

farm
path

non REA.

↑
N

bush lot

non participant

Rymer Road





WIND FARM WATERBODY RAPID ASSESSMENT FORM

Nan
REA

Stantec

Station # RT11005-2 Project Name Niagara Wind
 Watercourse Name Unknown Project # 160450269
 Photos 118-124 Field Staff KC, MF
 Date Apr 19/12 Time 4:30
 Weather conditions in previous 24 hrs 12°C, overcast
 GPS Coordinates (Zone) 17T E N Datum NAD83
 Descriptive Location 400m north of Rymer, 400m west of Dickhaut Rd

Water Quality

~~-no water~~
 Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
 Water Temperature (°C) _____ Air Temperature (°C) _____
 Time in situ measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
 Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)
 _____ % Riffle _____ % Pool _____ % Run _____ % Flat
 Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble _____ Sand _____ Silt _____ Muck _____
 Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use

< 50%, grasses, early
ag land

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Note any fish observations

Swale

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale ☒ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc. _____

Field Notes Authored by KC

Field Notes QA/QCed by MF

Refer TO
RIIT00S-3 or

RIIT00S-1

for Drawing of
grassy wale



WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

Stantec

Station # RIIT005-3
 Watercourse Name unknown
 Photos 125-130
 Date Apr 19/12
 Weather conditions in previous 24 hrs 12°C, overcast
 GPS Coordinates (Zone) 17T E 0621291
 Descriptive Location 500m north of Rymer Road, 400m west of Dickhaut Road

Project Name Niagara Wind
 Project # 160950269
 Field Staff KC, MF
 Time 4:32

Water Quality

Dissolved Oxygen (mg/L) 7.24 mg/L pH 8.37 Conductivity (µS/cm) 963 µS/cm
 Water Temperature (°C) 19.04°C Air Temperature (°C) 20°C
 Time in situ measurements taken 4:35

Watercourse Dimensions & Morphology

Mean Watercourse Width 1.5 (m) Maximum Pool Depth 60 (cm)
 Mean Bankfull Width 6 (m) Mean Water Depth 40 (cm)
 % Riffle _____ % Pool 100 % Run _____ % Flat _____
 Evidence of eroding banks, Comments on bank stability stable - lots of vegetation

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 20 Silt 40 Muck _____
 Boulder _____ Gravel 40 Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg cattails
 Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) < 50%, grasses, early
 Adjacent Land Use ag. land

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) spawning, nursery, foraging

Migratory Obstructions (seasonal, permanent) intermittent

Note any fish observations school of cyprinidae

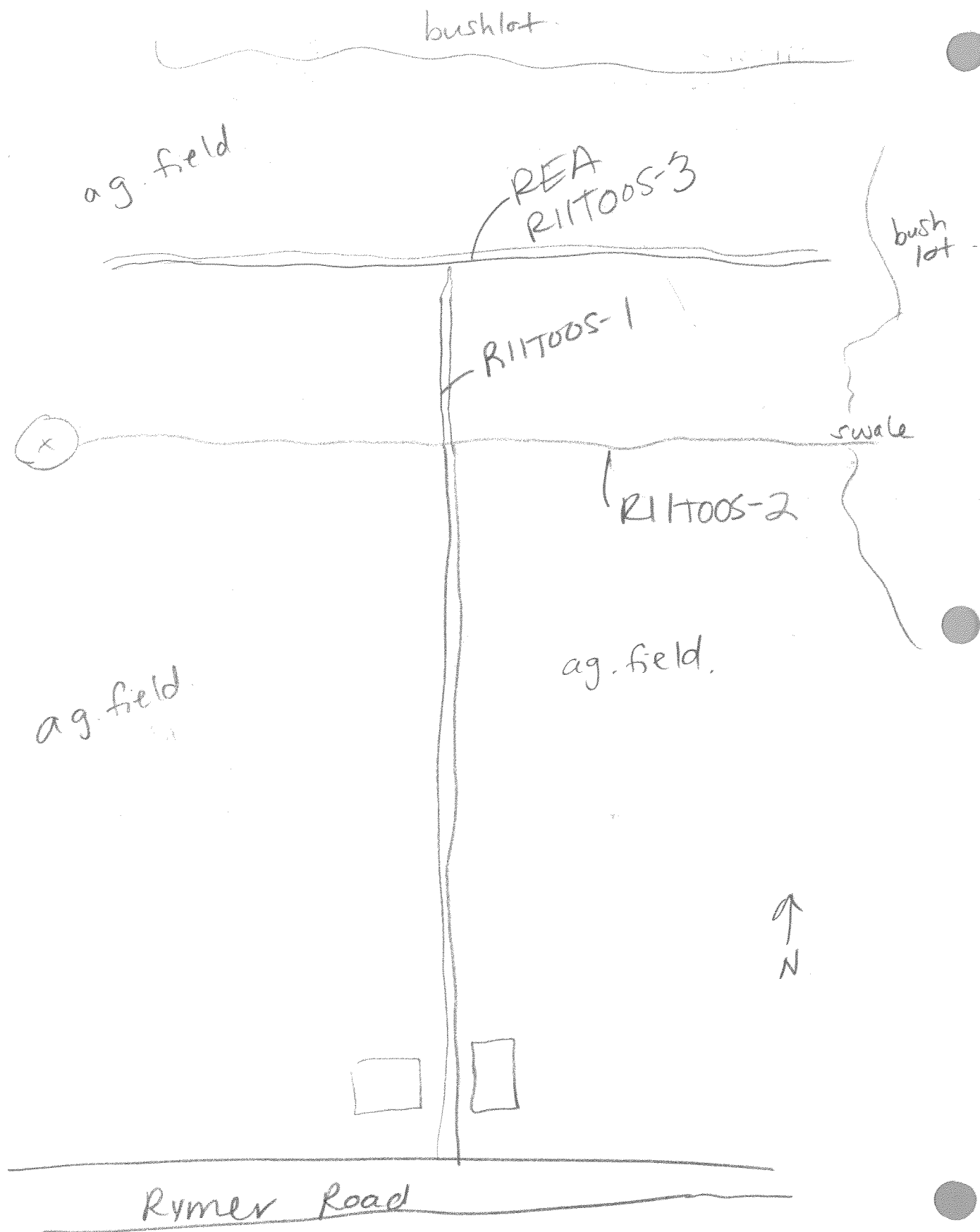
Waterbody Notes

Natural Watercourse ☒ Trapezoidal Channel ☒ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc. frogs - chorus

Field Notes Authored by KC

Field Notes QA/QCed by MF





Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Non REA

Station # BTH006

Project Name Niagara Wind

Watercourse Name unknown

Project # 160950629

Photos 24-28

Field Staff K. Clayton, M. Farella

Date April 4, 2012

Time 10:40 am

Weather conditions in previous 24 hrs cloudy, 10°C

GPS Coordinates (Zone) 17T E 0623042 N 4767420 Datum NAD83

Descriptive Location 800m north of Regional Rd 20, approx 1.2 km east of Regional Rd 27

Water Quality - not enough water

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____

Water Temperature (°C) _____ Air Temperature (°C) _____

Time in situ measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width 0.40 (m) Maximum Pool Depth 5 (cm)

Mean Bankfull Width 0.50 (m) Mean Water Depth 5 (cm)

_____ % Riffle _____ % Pool 100 % Run _____ % Flat

Evidence of eroding banks, Comments on bank stability

dugout channel furrow m.p.

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 50 Silt _____ Muck _____
Boulder _____ Gravel 50 Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other algae

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

0%

Adjacent Land Use

agricultural field

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

seasonal - farmer dugout channel furrow m.p.

Note any fish observations _____

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel ☒ Grassed Swale _____ Buried Tile _____

Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc. Chorus frog - full chorus, wild turkeys, white tail deer

Field Notes Authored by K. Clayton

Field Notes QA/QCed by MF

R11T006

Woodlot

N
↑

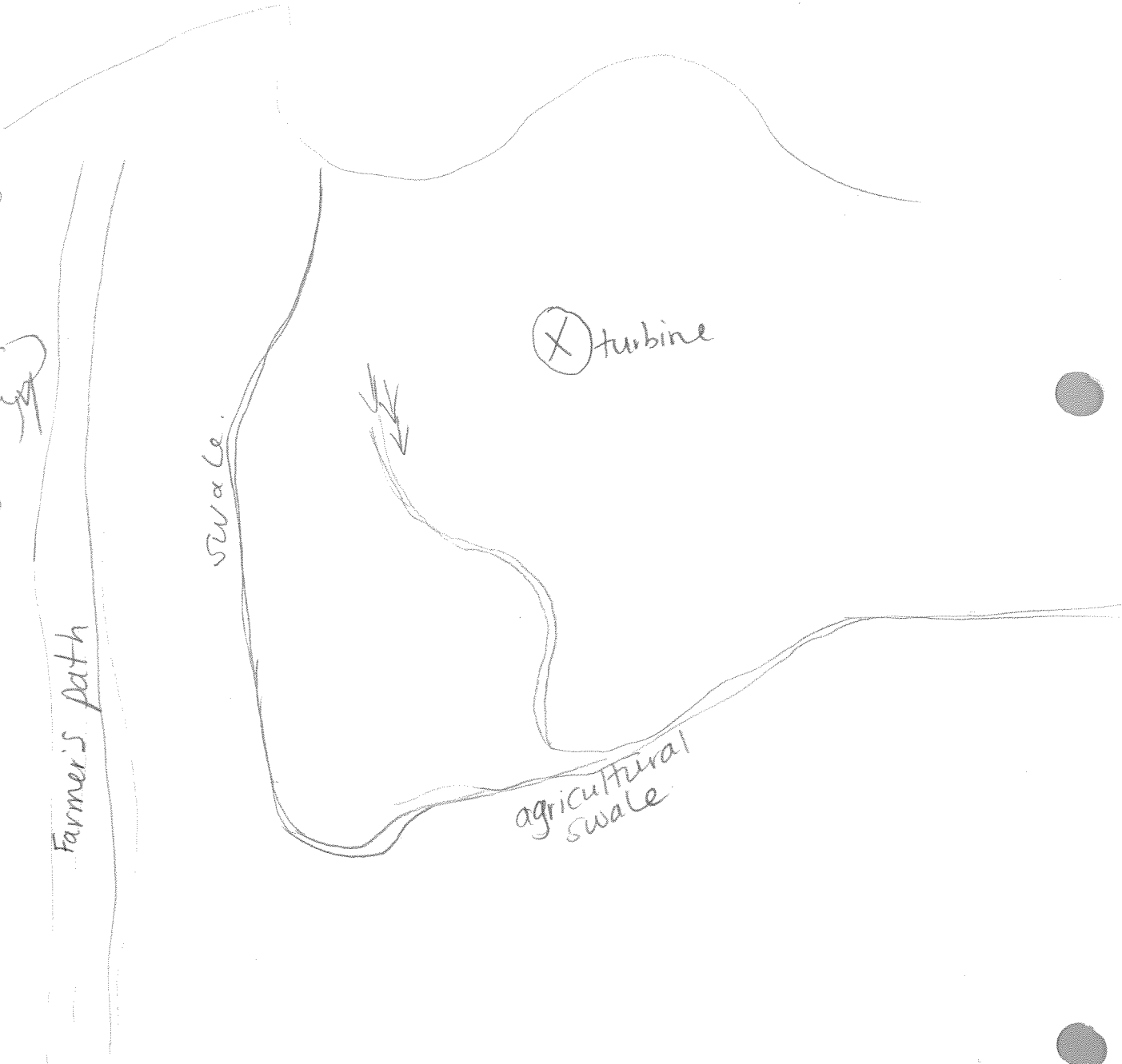
Chorus
Frogs
Cattails
Scrub
Scrub

Farmer's path

swale

(X) turbine

agricultural
swale





Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

tile 31

NAR
REA

Station # RUT007
Watercourse Name unknown
Photos —
Date June 13/12
Weather conditions in previous 24 hrs not sunny
GPS Coordinates (Zone) 17T E 0618612 N 4704261 Datum NAD83
Descriptive Location 2.1 km N of Elcho Road, 2.300m West of Erick Road

Project Name Niagara Wind
Project # 160950269
Field Staff K. Clayton, M. Fairlie
Time 3:30 pm

Water Quality

Dissolved Oxygen (mg/L) — pH — Conductivity (µS/cm) —
Water Temperature (°C) — Air Temperature (°C) 25
Time *in situ* measurements taken —

Watercourse Dimensions & Morphology

Mean Watercourse Width — (m) Maximum Pool Depth — (cm)
Mean Bankfull Width — (m) Mean Water Depth — (cm)
— % Riffle — % Pool — % Run — % Flat
Evidence of eroding banks, Comments on bank stability —

Substrate (% cover)

Bedrock — Cobble — Sand — Silt — Muck
Boulder — Gravel — Clay — Marl — Detritus —

In-water Cover

Cover Types Present (circle): Overhanging Vegetation Undercut Banks — Deep Pool — Watercress — Aquatic Veg —
Woody Debris — Boulder — Other —

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 75% grasses, early

Adjacent Land Use

reed canary grass, farmland

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) —

Migratory Obstructions (seasonal, permanent) dry channel m.p.

Note any fish observations —

Waterbody Notes

Natural Watercourse — Trapezoidal Channel — Grassed Swale — Buried Tile —
Surficial Drainage (i.e. furrows) ✓ Dugout Pond — Dominated by Aquatic Veg — Dry ✓

Other Habitat Notes, Incidental Wildlife Observations, etc. —

Field Notes Authored by K. Clayton

Field Notes QA/QCed by —

R117007-1

dry
channel
• surrounded by
reed canary grass
• no channel
definition



Say beans

Krick Road

Elcho Road



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

NON
REA

~~FILED~~

Station # R110T08
Watercourse Name 08-1A
Photos 8895-96; 8899, 8900-02
Date JUNE 8, 2012
Weather conditions in previous 24 hrs Sunny w cloudy periods
GPS Coordinates (Zone) 17T E 6145128 N 4765440 Datum
Descriptive Location

Project Name NIAGARA WIND
Project # 160950269
Field Staff T CHANDLER M ELLAH
Time 3:00 PM

Water Quality

DRY
Dissolved Oxygen (mg/L) pH Conductivity (µS/cm)
Water Temperature (°C) Air Temperature (°C) 25
Time *in situ* measurements taken

Watercourse Dimensions & Morphology

DRY
Mean Watercourse Width (m) Maximum Pool Depth (cm)
Mean Bankfull Width (m) Mean Water Depth (cm)
 % Riffle % Pool % Run % Flat
Evidence of eroding banks, Comments on bank stability

Substrate (% cover)

 Bedrock Cobble Sand Silt Muck
 Boulder Gravel Clay Marl Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use

AGRICULTURAL FIELD- CROPPED

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

NO FLOW

Note any fish observations

Waterbody Notes

Natural Watercourse Trapezoidal Channel Grassed Swale Buried Tile
Surficial Drainage (i.e. furrows) Dugout Pond Dominated by Aquatic Veg Dry

Other Habitat Notes, Incidental Wildlife Observations, etc.

Field Notes Authored by T. CHANDLER

Field Notes QA/QCed by ME



WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

Stantec

Station # R11T008
 Watercourse Name 08-1B
 Photos 8903-09, 8910
 Date JUNE 8 2002
 Weather conditions in previous 24 hrs Sunny w cloudy periods
 GPS Coordinates (Zone) 17T E 614618 N 4764676 Datum
 Descriptive Location _____

Project Name NIAGARA WIND
 Project # 160950269
 Field Staff TCHANDLER MELIAH
 Time 3:40

Water Quality

Dissolved Oxygen (mg/L) 7.73 pH 8.34 Conductivity (μ S/cm) 565
 Water Temperature ($^{\circ}$ C) 28.0 Air Temperature ($^{\circ}$ C) 25
 Time in situ measurements taken 3:50

Watercourse Dimensions & Morphology

Mean Watercourse Width 2 (m) Maximum Pool Depth 30 (cm)
 Mean Bankfull Width 3 (m) Mean Water Depth 5 (cm)
 % Riffle 100 % Pool _____ % Run _____ % Flat _____
 Evidence of eroding banks, Comments on bank stability stable

Substrate (% cover)

Bedrock _____ Cobble _____ Sand _____ Silt 100 Muck _____
 Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

60% grasses & aquatic vegetation, and trees (mature)

Adjacent Land Use

Agricultural Field (to west) Woodlot to east and south
+ north

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

potential spawning or nursery habitat

Migratory Obstructions (seasonal, permanent)

Low/no flow

Note any fish observations NONE

Waterbody Notes

Natural Watercourse Likely dug Trapezoidal Channel ☒ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc. Green frogs, aquatic
invertebrates, tree frogs

Field Notes Authored by T. CHANDLER

Field Notes QA/QCed by MF



WIND FARM WATERBODY RAPID ASSESSMENT FORM Non-REA

Stantec

Station # R11T008 Project Name NIAGARA WIND
 Watercourse Name 08-2 Project # 160950269
 Photos 8897-98 Field Staff T CHANDLER M ELLAN
 Date JUNE 8 2012 Time 3:20 PM
 Weather conditions in previous 24 hrs Sunny & cloudy periods
 GPS Coordinates (Zone) 17T E 614503 N 4765222 Datum
 Descriptive Location _____

Water Quality

Dissolved Oxygen (mg/L) 2.11 pH 7.51 Conductivity (µS/cm) 2459
 Water Temperature (°C) 19.91 Air Temperature (°C) 25
 Time in situ measurements taken 3:20 PM

Watercourse Dimensions & Morphology

SMALL POND - 1.5m x 5m
 Mean Watercourse Width POND (m) Maximum Pool Depth 30 (cm)
 Mean Bankfull Width N/A (m) Mean Water Depth 10 (cm)
 % Riffle 100 % Pool _____ % Run _____ % Flat _____
 Evidence of eroding banks, Comments on bank stability N/A

Substrate (% cover)

Bedrock _____ Cobble _____ Sand _____ Silt 100 Muck _____
 Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other Duckweed

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
100% - Duckweed

Adjacent Land Use

AGRICULTURAL FIELD

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

MAY DRY OUT

Note any fish observations NO

Waterbody Notes

SMALL POND AREA
 Natural Watercourse / Trapezoidal Channel / Grassed Swale / Buried Tile /
 Surficial Drainage (i.e. furrows) / Dugout Pond / Dominated by Aquatic Veg / Dry /

Other Habitat Notes, Incidental Wildlife Observations, etc.

LEOPARD & GREEN FROG
Lesser Duckweed - no outlet

Field Notes Authored by T. CHANDLER

Field Notes QA/QCed by NR



WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

Stantec

Station # R11T008 Project Name NIAGARA WIND
 Watercourse Name 08-3A Project # 160950269
 Photos 8912-25 Field Staff T. CHANDLER & M. ELLIOT
 Date JUNE 8, 2012 Time 4:10
 Weather conditions in previous 24 hrs Sunny w/ cloudy periods
 GPS Coordinates (Zone) 17T E 614339 N 4765160 Datum
 Descriptive Location _____

Water Quality ISOLATED WETLAND - MUDDY AROUND MARGINS
 Dissolved Oxygen (mg/L) NA pH NA Conductivity (µS/cm) NA
 Water Temperature (°C) NA Air Temperature (°C) 25
 Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology ~ 80 x 100 m
 Mean Watercourse Width NA (m) Maximum Pool Depth NA (cm)
 Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)
 _____ % Riffle _____ % Pool _____ % Run _____ % Flat
 Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)
 _____ Bedrock _____ Cobble _____ Sand _____ Silt 100 Muck
 _____ Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus

In-water Cover
 Cover Types Present (circle): Overhanging Vegetation Aquatic Veg
~~Undercut Banks~~ ~~Deep Pool~~ ~~Watercress~~
Woody Debris Boulder Other _____

Riparian Zone
 Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
30 Aquatic vegetation
 Adjacent Land Use
Wooded area (west) Ploughed agricultural field (to east)

Fish Habitat Potential
 Critical Habitat (spawning or nursery areas, groundwater upwellings)
 Migratory Obstructions (seasonal, permanent)
Low/no water
 Note any fish observations none

Waterbody Notes
 Natural Watercourse NA Trapezoidal Channel NA Grassed Swale NA Buried Tile NA
 Surficial Drainage (i.e. furrows) NA Dugout Pond NA Dominated by Aquatic Veg NA Dry NA

Other Habitat Notes, Incidental Wildlife Observations, etc. Cattails, sagittaria, bullrush,
Sedges,

Field Notes Authored by T. CHANDLER Field Notes QA/QCed by ME



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

RE A

Station # R1108
 Watercourse Name 08-3B
 Photos 8911
 Date June 28, 2012
 Weather conditions in previous 24 hrs Sunny w cloudy Periods
 GPS Coordinates (Zone) 17T E 614427 N 4765038 Datum
 Descriptive Location _____

Project Name Niagara Wind
 Project # 160950269
 Field Staff TCHANDLER, MELLER
 Time 4:00

Water Quality

DRY
 Dissolved Oxygen (mg/L) N/A pH N/A Conductivity (µS/cm) N/A
 Water Temperature (°C) N/A Air Temperature (°C) 23
 Time in situ measurements taken N/A

Watercourse Dimensions & Morphology

Mean Watercourse Width DRY (m) Maximum Pool Depth N/A (cm)
 Mean Bankfull Width 2 (m) Mean Water Depth N/A (cm)
 _____ % Riffle _____ % Pool _____ % Run _____ % Flat
 Evidence of eroding banks, Comments on bank stability recently dug, stable

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 70 Silt _____ Muck _____
 Boulder _____ Gravel 30 Clay _____ Marl _____ Detritus _____

In-water Cover

DRY
 Cover (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
20%

Adjacent Land Use

wooded area (west) ploughed agricultural field - to east

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

no flow

Note any fish observations _____

none

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel ☒ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc.

terrestrial veg on dry out channel, dug to drain wetland @ 08-3A - upstream

Field Notes Authored by T. CHANDLER

Field Notes QA/QCed by MF



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Non-
REA ^{mp.}
- wetland / pore
water

Station # R11T008
 Watercourse Name 08-4
 Photos 8926-27
 Date June 8, 2012
 Weather conditions in previous 24 hrs Sunny w/ cloudy periods
 GPS Coordinates (Zone) 17T E 614 445 N 4765266 Datum
 Descriptive Location _____

Water Quality DRY (recently)

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (μ S/cm) _____
 Water Temperature ($^{\circ}$ C) _____ Air Temperature ($^{\circ}$ C) 25
 Time in situ measurements taken _____

Watercourse Dimensions & Morphology ~100m x 10m

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
 Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)
 _____ % Riffle _____ % Pool _____ % Run _____ % Flat
 Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble _____ Sand _____ Silt 100 Muck
 Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus

In-water Cover DRY

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
10% Aquatic vegetation

Adjacent Land Use

Plowed agricultural field

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

low no water

Note any fish observations

no

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc.

low lying area in ag field w/ cattails, vegetation

Field Notes Authored by T. CHANDLER

Field Notes QA/QCed by MF



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Non REA

RIIT010+37

Fig 38

Station # RIIT010+37
 Watercourse Name _____
 Photos see log
 Date June 13 2012
 Weather conditions in previous 24 hrs rain + sun
 GPS Coordinates (Zone) 17T E 622150
 Descriptive Location conc. 6 C side road 42

Project Name Niagara Wind
 Project # 160950269
 Field Staff KE + JK
 Time 4:30pm

Water Quality

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (μ S/cm) _____
 Water Temperature ($^{\circ}$ C) _____ Air Temperature ($^{\circ}$ C) _____
 Time in situ measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
 Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)
 _____ % Riffle _____ % Pool _____ % Run _____ % Flat
 Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble _____ Sand _____ Silt _____ Muck _____
 Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) _____

Adjacent Land Use

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) _____

Migratory Obstructions (seasonal, permanent) _____

Note any fish observations _____

Waterbody Notes

Natural Watercourse 16 Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) ✓ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ✓

Other Habitat Notes, Incidental Wildlife Observations, etc.

no water features
isolated farm ponds

Field Notes Authored by KE

Field Notes QA/QCed by Joe Blane



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

R11T012-1

Fig 12

Station # R11T012-1
 Watercourse Name _____
 Photos see log
 Date June 13 2012

Project Name Niagara Wind
 Project # 160950269
 Field Staff KE + JK
 Time 9:07 AM

Weather conditions in previous 24 hrs rain
 GPS Coordinates (Zone) 17 E 621155 N 4756323 Datum _____
 Descriptive Location Plot 3, 1100 m west of Townline/Dunnville Waterford Rd. approximately 1 km west of Highway 3 - in field

Water Quality

Dissolved Oxygen (mg/L) _____ pH too little water (noist) Conductivity (µS/cm) _____
 Water Temperature (°C) _____ Air Temperature (°C) _____
 Time in situ measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width 2 (m) Maximum Pool Depth _____ (cm)
 Mean Bankfull Width 5 (m) Mean Water Depth _____ (cm)
 _____ % Riffle _____ % Pool _____ % Run _____ % Flat
 Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 20 Silt _____ Muck _____
 Boulder _____ Gravel 20 Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
5% man maple + willow

Adjacent Land Use

Ag - soy + hay

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
none

Migratory Obstructions (seasonal, permanent)
dry

Note any fish observations
none

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel ☒ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg ☒ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc.

- trapezoidal channel, moist, aquatic veg

Field Notes Authored by KE

Field Notes QA/QCed by Jane Pearson



WIND FARM WATERBODY RAPID ASSESSMENT FORM

Non
REA

Stantec

Station # 811T013-1

Watercourse Name unknown

Photos 46-50

Date Apr 4/12

Weather conditions in previous 24 hrs 10°C cloudy

GPS Coordinates (Zone) 17T E 0621405

Descriptive Location approx 500 N of Hwy 3 approx 1.2 km West of

Project Name 160950269

Project # Niagara Wind

Field Staff K. Clayton, M. Failla

Time 14:20

Datum NAD83

Dunville - Wainfleet Townline.

Water Quality

Agricultural Swale
Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____

Water Temperature (°C) _____ Air Temperature (°C) _____

Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)
_____ % Riffle _____ % Pool _____ % Run _____ % Flat

Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble _____ Sand _____ Silt _____ Muck _____
Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use _____

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Note any fish observations _____

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc. _____

Field Notes Authored by K. Clayton

Field Notes QA/QCed by M. Failla



WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

Stantec

Station # R11T013-2 Project Name Niagara Wind
 Watercourse Name unknown Project # 160950269
 Photos 51-59 Field Staff K.C. M.F.
 Date Apr 4/12 Time 14:30
 Weather conditions in previous 24 hrs 10°C, cloudy
 GPS Coordinates (Zone) 17T E 0621279 N 4755999 Datum NAD83
 Descriptive Location approx 600m North of Hwy 3, 1.2 km west of Dunville - Wainfleet turnline

Water Quality

Dissolved Oxygen (mg/L) 14.20 mg/L pH 8.72 Conductivity (µS/cm) 843
 Water Temperature (°C) 11.22°C Air Temperature (°C) 12°C
 Time in situ measurements taken 14:35

Watercourse Dimensions & Morphology

Mean Watercourse Width 1.5 (m) Maximum Pool Depth ~0.75 (cm)
 Mean Bankfull Width 4 (m) Mean Water Depth 0.50 (cm)
 % Riffle _____ % Pool 100 % Run _____ % Flat _____
 Evidence of eroding banks, Comments on bank stability banks are covered in grass - very stable

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 50 Silt _____ Muck _____
 Boulder _____ Gravel 50 Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress _____ Aquatic Veg _____
 Overhanging Vegetation _____ Woody Debris _____ Boulder _____ Other grasses, algae, duckweed

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 59% grasses, algae, early
 Adjacent Land Use farmland

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) spawning & nursery, foraging
 Migratory Obstructions (seasonal, permanent) permanent
 Note any fish observations _____

Waterbody Notes

Natural Watercourse ☒ Trapezoidal Channel ☒ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc.

frog jumping into water

Field Notes Authored by K. Clayton

Field Notes QA/QCed by M. Faiella

KIIT013-2

ag. field

Riparian
REA WATER BODY KIIT013-2

ag. field

agricultural swale
↳ non REA

KIIT013-1

ag. field.

live
scrub

greenhouses

Hwy 3

↑
N



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

R11TO13-3

Fig 12

Station # R11TO13-3
 Watercourse Name _____
 Photos see log
 Date June 13 2012
 Weather conditions in previous 24 hrs rain
 GPS Coordinates (Zone) 17 E 622196 N 4755274 Datum _____
 Descriptive Location Approximately 700 m west of Townline Dunsmuir Windfarm Rd., 300 m south of highway 3

Project Name Niagara Wind
 Project # 160950269
 Field Staff KE + JK
 Time 10:34 AM

Water Quality

Dissolved Oxygen (mg/L) 9.04 pH 7.82 Conductivity (µS/cm) 573
 Water Temperature (°C) 18.59 Air Temperature (°C) 20°
 Time in situ measurements taken 10:35 am

Watercourse Dimensions & Morphology

Mean Watercourse Width 4 (m) Maximum Pool Depth 40 (cm)
 Mean Bankfull Width 7 (m) Mean Water Depth 30 (cm)
 % Riffle 100 % Pool _____ % Run _____ % Flat _____
 Evidence of eroding banks, Comments on bank stability steep, stable, veg

Substrate (% cover)

Bedrock _____ Cobble 100 Sand _____ Silt _____ Muck _____
 Boulder _____ Gravel 40 Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
40% silver maple, lots sumac, willows, RCG
 Adjacent Land Use Ag - soy

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
none

Migratory Obstructions (seasonal, permanent)
none - probably permanent

Note any fish observations
none

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel ☒ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg ☒ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc.

Green Frog heard (at least 3)
- channel covered in Lemna minor
- could not access within 120 m, so moved 3 km away
where we had access & assessed

Field Notes Authored by KE

Field Notes QA/QCed by JK



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

? RFA-2

R/11013-2

F12

Station # R/11013-2+4
 Watercourse Name unknown
 Photos see below
 Date June 13, 2012

Project Name Niagara Wind
 Project # 160950269
 Field Staff KE + JK
 Time 10:20

Weather conditions in previous 24 hrs rain
 GPS Coordinates (Zone) 17 E 1021554 N 4755566 Datum
 Descriptive Location July 3, 1100m west of Townline/Danville/Windlet Rd., approximately 200m N of highway 3

Water Quality too little water to sample
 Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
 Water Temperature (°C) _____ Air Temperature (°C) _____
 Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology
 Mean Watercourse Width 1 (m) Maximum Pool Depth 2 (cm)
 Mean Bankfull Width 2 (m) Mean Water Depth 1 (cm)
 % Riffle 100 % Pool _____ % Run _____ % Flat _____
 Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)
 Bedrock _____ Cobble 29 Sand _____ Silt _____ Muck _____
 Boulder _____ Gravel 50 Clay _____ Marl _____ Detritus _____

In-water Cover
 Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg RCG phrag
 Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone
 Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 0%

Adjacent Land Use
Ag - soy + corn

Fish Habitat Potential
 Critical Habitat (spawning or nursery areas, groundwater upwellings) none
 Migratory Obstructions (seasonal, permanent) seasonally dry
 Note any fish observations none

Waterbody Notes
 Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale ☒ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg ☒ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc.
grassed ag swale dominated by aquatic veg
minimal water probably result of yesterday's rain
not directly connected to either adjacent pond

Field Notes Authored by KE

Field Notes QA/QCed by JK



WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

Stantec

Station # R11T014, R11T015, R11T044, R11T043
 Watercourse Name unknown
 Photos 100-106
 Date April 5/12
 Weather conditions in previous 24 hrs 12°C Sunny
 GPS Coordinates (Zone) 17T E 0624423 N 4748666 Datum NAD83
 Descriptive Location ~1km south of Canal Bank Road, 2 km east of Bird Road

Water Quality

Dissolved Oxygen (mg/L) 11.21 mg/L pH 9.12 Conductivity (µS/cm) 263 µS/cm
 Water Temperature (°C) 6.27°C Air Temperature (°C) 3°C
 Time in situ measurements taken 10:40 am

Watercourse Dimensions & Morphology

Mean Watercourse Width 0.75 (m) Maximum Pool Depth standing water (cm) no flow
 Mean Bankfull Width 4m (m) Mean Water Depth 100 (cm)
 % Riffle 0 % Pool 100 % Run 0 % Flat 0

Evidence of eroding banks, Comments on bank stability

banks are fully vegetated w/ grasses & crops
↳ banks could be less stable after plowed

Substrate (% cover)

Bedrock 0 Cobble 0 Sand 40 Silt 10 Muck 0
 Boulder 0 Gravel 50 Clay 0 Marl 0 Detritus 0

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg Canadian anemone cattails
Overhanging Vegetation Woody Debris Boulder Other 0

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

<5% cattails, early

Adjacent Land Use

farmland - ag. field

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

spawning, nursery, foraging

Migratory Obstructions (seasonal, permanent)

intermittent (says landowner)

Note any fish observations

Waterbody Notes

Natural Watercourse ☒ Trapezoidal Channel ☒ Grassed Swale ☐ Buried Tile ☐
 Surficial Drainage (i.e. furrows) ☐ Dugout Pond ☐ Dominated by Aquatic Veg ☒ Dry ☐

Other Habitat Notes, Incidental Wildlife Observations, etc.

Field Notes Authored by K. Clayton

Field Notes QA/QCed by M. Faiella

R11T014, 15, 44 & 43



Canal Bank Road

* Railbed taken out by road - can access through Seitz's property *

Bird Road

Seitz's farm

back path

Bush lot

ag. field

ag. field

REA waterbody

Bush lot

(X) = turbine

+++ = railbed





WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

Stantec

Station # R11016-1

Watercourse Name Unknown

Photos 83-92

Date April 19/20

Weather conditions in previous 24 hrs cool sunny

GPS Coordinates (Zone) 17T E 0623656

Descriptive Location 10m south of Canal Bank Road, 2 km east

Project Name Niagara Wind

Project # 160950269

Field Staff KC & MF

Time 12:30

Datum NAD83

Water Quality

Dissolved Oxygen (mg/L) 12.77 pH 8.75 Conductivity (µS/cm) 462

Water Temperature (°C) 15.80 Air Temperature (°C) 12°C

Time in situ measurements taken 12:39 pm

Watercourse Dimensions & Morphology

Mean Watercourse Width 2 (m) Maximum Pool Depth _____ (cm)

Mean Bankfull Width 6 (m) Mean Water Depth _____ (cm)

% Riffle _____ % Pool _____ % Run _____ % Flat _____

Evidence of eroding banks, Comments on bank stability unstable banks

Substrate (% cover)

*very turbid!
Bedrock _____ Cobble _____ Sand 20 Silt 60 Muck _____
Boulder _____ Gravel 20 Clay _____ Marl 20 Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation _____ Woody Debris _____ Boulder _____ Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use 57% grass, early ag. field

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent) permanent

Note any fish observations _____

Waterbody Notes

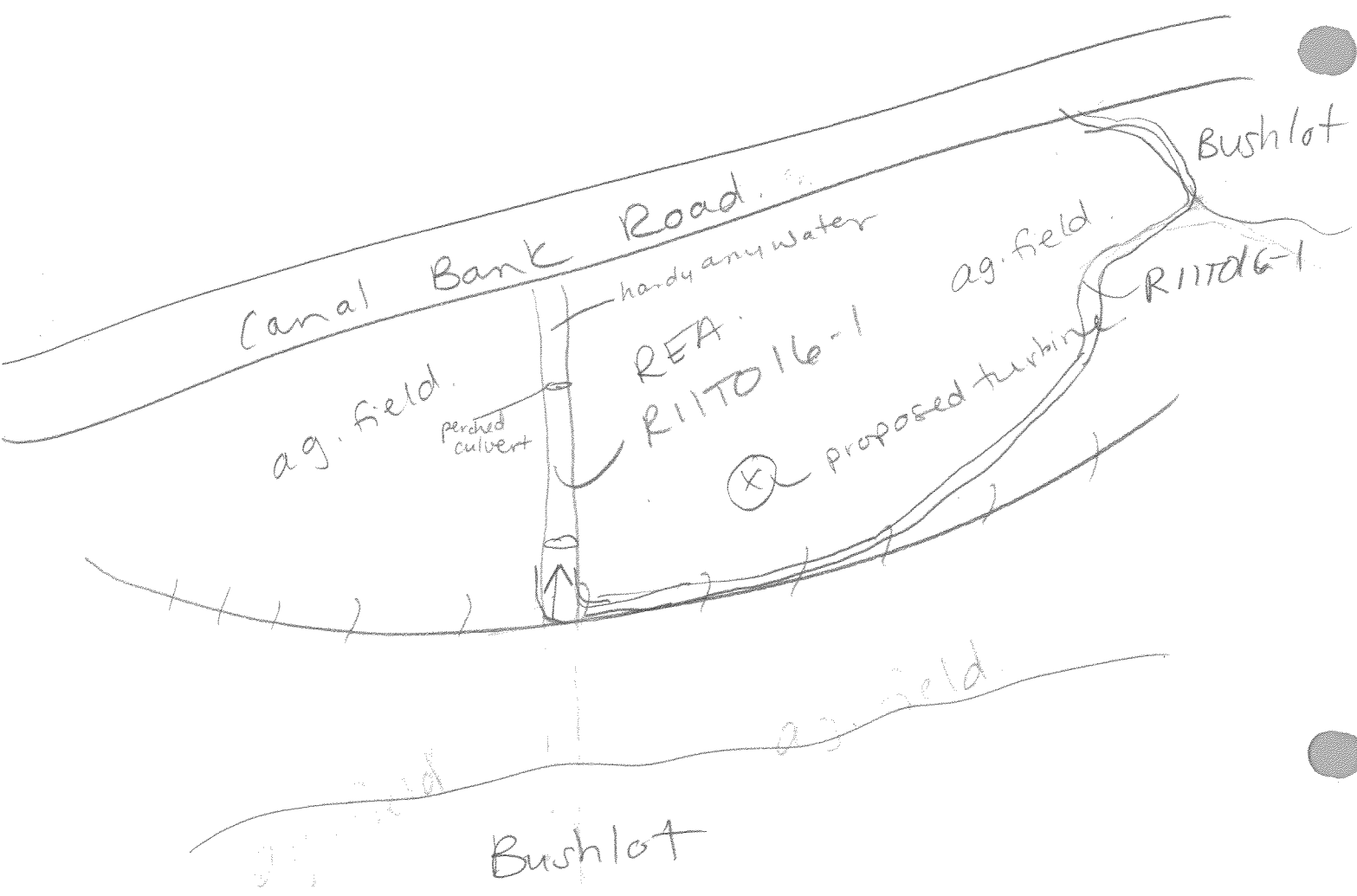
Natural Watercourse _____ Trapezoidal Channel ☒ Grassed Swale _____ Buried Tile _____

Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc. _____

Field Notes Authored by KC

Field Notes QA/QCed by MF



⊗ proposed turbine



WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

Stantec

Station # B11T017 & B11T047 Project Name Niagara Wind
 Watercourse Name unknown Project # 160950692
 Photos 69-89 Field Staff K.C. M.F.
 Date Apr 4/12 Time 16:30
 Weather conditions in previous 24 hrs 10°C Cloudy
 GPS Coordinates (Zone) 17T E 06227921 N 4748529 Datum NAD83
 Descriptive Location 1km East of Bird Rd & 1km south of Canal Bank Road

Water Quality

Dissolved Oxygen (mg/L) 14.74 mg/L pH 9.03 Conductivity (μ S/cm) 510 μ S/cm
 Water Temperature ($^{\circ}$ C) 15.77 $^{\circ}$ C Air Temperature ($^{\circ}$ C) 12 $^{\circ}$ C
 Time in situ measurements taken 17:00

Watercourse Dimensions & Morphology

Mean Watercourse Width 1.5 (m) Maximum Pool Depth 0.60 (cm)
 Mean Bankfull Width 3 (m) Mean Water Depth 0.50 (cm)
 % Riffle 100 % Pool 0 % Run 100 % Flat 0
 Evidence of eroding banks, Comments on bank stability stable banks, some erosion from adjacent land use

Substrate (% cover)

Bedrock 0 Cobble 0 Sand 50 Silt 10 Muck 0
 Boulder 0 Gravel 40 Clay 0 Marl 0 Detritus 0

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other algae
 10/5/12

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
<5%, grasses, early

Adjacent Land Use

farm land

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
spawning, nursery, foraging

Migratory Obstructions (seasonal, permanent)

seasonal / int.

Note any fish observations

Waterbody Notes

Natural Watercourse ☒ Trapezoidal Channel ☒ Grassed Swale ☐ Buried Tile ☐
 Surficial Drainage (i.e. furrows) ☐ Dugout Pond ☐ Dominated by Aquatic Veg ☐ Dry ☐

Other Habitat Notes, Incidental Wildlife Observations, etc.

frogs - leopard, chorus
frogs

Field Notes Authored by

K. clayton

Field Notes QA/QCed by

M. Faiella

woodlot
disturbed
area - placed
∴ no connection
to channel

agricultural
field

phragmites
stand

ag field

lots of vegetation

pool / standing
water

~~main~~ ~~main~~ ~~main~~ Bird Road



WIND FARM WATERBODY RAPID ASSESSMENT FORM

REAS

Stantec

Station # R11T018 Project Name Niagara Wind
 Watercourse Name 18-1 Project # 180950269
 Photos 8837-38 Field Staff T Chandler M Ellah
 Date June 7, 2012 Time 4:25
 Weather conditions in previous 24 hrs Thunder showers in afternoon otherwise sunny
 GPS Coordinates (Zone) 17T E 629950 N 4766663 Datum
 Descriptive Location At proposed access Road crossing

Water Quality

Dissolved Oxygen (mg/L) 1 pH 7 Conductivity (μ S/cm) 1
 Water Temperature ($^{\circ}$ C) 1 Air Temperature ($^{\circ}$ C) 20
 Time in situ measurements taken N/A

Watercourse Dimensions & Morphology

Mean Watercourse Width DRY (m) Maximum Pool Depth N/A (cm)
 Mean Bankfull Width 2 (m) Mean Water Depth N/A (cm)
0 % Riffle 0 % Pool 0 % Run 0 % Flat
 Evidence of eroding banks, Comments on bank stability NONE

Substrate (% cover)

Bedrock 100 Cobble 0 Sand 0 Silt 0 Muck 0
 Boulder 0 Gravel 0 Clay 0 Marl 0 Detritus 0

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

80% grass/shrub

Adjacent Land Use

Agricultural Field

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Low/no flow

Note any fish observations

None

Waterbody Notes

Natural Watercourse 0 Trapezoidal Channel X Grassed Swale 0 Buried Tile 0
 Surficial Drainage (i.e. furrows) 0 Dugout Pond 0 Dominated by Aquatic Veg 0 Dry X

Other Habitat Notes, Incidental Wildlife Observations, etc.

Straightened drainage feature with well-defined bed & banks; cattails, sedges present but not common.

Field Notes Authored by T. Chandler

Field Notes QA/QCed by ME



WIND FARM WATERBODY RAPID ASSESSMENT FORM

Non-
REA mp.

Stantec

Station # R11TD18 Project Name: Niagara Wind
 Watercourse Name 18-2 Project #: 160950269
 Photos 8839-44 Field Staff T Chandler M Ellah
 Date June 7, 2012 Time 4:40
 Weather conditions in previous 24 hrs. Light thunderstorms & sun
 GPS Coordinates (Zone) 17T E 629 834 N 476 6486 Datum
 Descriptive Location _____

Water Quality DRY
 Dissolved Oxygen (mg/L) N/A pH N/A Conductivity (µS/cm) N/A
 Water Temperature (°C) N/A Air Temperature (°C) 20
 Time in situ measurements taken N/A

Watercourse Dimensions & Morphology Gravel wet area 15x30m
 Mean Watercourse Width N/A (m) Maximum Pool Depth N/A (cm)
 Mean Bankfull Width N/A (m) Mean Water Depth N/A (cm)
0 % Riffle 0 % Pool 0 % Run 0 % Flat
 Evidence of eroding banks, Comments on bank stability Stable

Substrate (% cover)
 Bedrock / Cobble / Sand 100 Silt / Muck
 Boulder / Gravel / Clay / Marl / Detritus

In-water Cover DRY
 Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other /

Riparian Zone
 Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Bullrush - no water
 Adjacent Land Use
Cornfield (planted)

Fish Habitat Potential
 Critical Habitat (spawning or nursery areas, groundwater upwellings)
 Migratory Obstructions (seasonal, permanent)
DRY
 Note any fish observations NONE

Waterbody Notes Small depression with veg - not ploughed. - not dug.
 Natural Watercourse / Trapezoidal Channel / Grassed Swale / Buried Tile /
 Surficial Drainage (i.e. furrows) / Dugout Pond / Dominated by Aquatic Veg / Dry /

Other Habitat Notes, Incidental Wildlife Observations, etc. leopard frog.

Field Notes Authored by T. Chandler

Field Notes QA/QCed by MP



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

NOT A
REA

Station # R11T018 Project Name NIAGARA WIND
 Watercourse Name 18-3 Project # 160950269
 Photos 8845-46 Field Staff T. Chandler, M. Ellah
 Date June 7, 2012 Time 4:55
 Weather conditions in previous 24 hrs Light thunder showers / sun
 GPS Coordinates (Zone) 17T E 629 837 N 4766384 Datum
 Descriptive Location Near RR Tracks

Water Quality

DRY
 Dissolved Oxygen (mg/L) / pH / Conductivity (µS/cm) /
 Water Temperature (°C) / Air Temperature (°C) 22
 Time in situ measurements taken DRY

Watercourse Dimensions & Morphology

Mean Watercourse Width DRY (m) Maximum Pool Depth NIA (cm)
 Mean Bankfull Width NIA (m) Mean Water Depth NIA (cm)
 % Riffle / % Pool / % Run / % Flat /
 Evidence of eroding banks, Comments on bank stability minor rill feature
(ploughed over)

Substrate (% cover)

Bedrock / Cobble / Sand 100 Silt / Muck /
 Boulder / Gravel / Clay / Marl / Detritus /

In-water Cover

DRY
 Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other /

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

0% - corn field
 Adjacent Land Use Cornfield

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Low/no flow

Note any fish observations /

Waterbody Notes

DRY DRAINAGE FEATURE IN FIELD
 Natural Watercourse / Trapezoidal Channel / Grassed Swale / Buried Tile /
 Surficial Drainage (i.e. furrows) / Dugout Pond / Dominated by Aquatic Veg / Dry /

Other Habitat Notes, Incidental Wildlife Observations, etc. /

Field Notes Authored by T. Chandler

Field Notes QA/QCed by WTE



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

 RBA
 R11T0194-
 Fy 55

 Station # R11T0194-1
 Watercourse Name _____
 Photos See log
 Date June 13 2012
 Weather conditions in previous 24 hrs rain
 GPS Coordinates (Zone) 17 T E 620311 N 4755174 Datum
 Descriptive Location East of Hutchinson Road, approximately 600m North of Highway 3

 Project Name Niagara Wind
 Project # 160950269
 Field Staff KE + JK
 Time 10:50 AM

Water Quality

 Dissolved Oxygen (mg/L) 7.14 pH 7.76 Conductivity ($\mu\text{S/cm}$) 1520
 Water Temperature ($^{\circ}\text{C}$) 16.94 Air Temperature ($^{\circ}\text{C}$) 25
 Time in situ measurements taken 10:55

Watercourse Dimensions & Morphology

 Mean Watercourse Width 4 (m) Maximum Pool Depth 40 (cm)
 Mean Bankfull Width 7 (m) Mean Water Depth 40 (cm)
 % Riffle 100 % Pool _____ % Run _____ % Flat _____
 Evidence of eroding banks, Comments on bank stability stable + veg

Substrate (% cover)

 Bedrock _____ Cobble 20 Sand _____ Silt _____ Muck _____
 Boulder _____ Gravel 80 Clay _____ Marl _____ Detritus _____

In-water Cover

 Cover Types Present (circle): Undercut Banks Deep Pool Watercress sedges, turtle, rock, water, plantain, algae, lily pads
 Overhanging Vegetation Woody Debris Boulder Other _____ Aquatic Veg _____

Riparian Zone

 Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 40% - elm, Ash

Adjacent Land Use

AS - lawn

Fish Habitat Potential

 Critical Habitat (spawning or nursery areas, groundwater upwellings) none

 Migratory Obstructions (seasonal, permanent) none - permanent

 Note any fish observations observed - bait Ash prob. Brook stickle back

Waterbody Notes

 Natural Watercourse _____ Trapezoidal Channel ☒ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg ☒ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc.

- deep trapezoidal channel algae & aquatic veg

 Field Notes Authored by KE

 Field Notes QA/QCed by JR/MR



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

~~Not m.p.~~
REA
Tile

Station # R11T020-1
Watercourse Name unknown
Photos 735-740
Date June 12/12

Project Name Niagara Wind
Project # 160950269
Field Staff K. Clayton, M. Faiella
Time 10:01

Weather conditions in previous 24 hrs Rain, hot, humid
GPS Coordinates (Zone) 17T E 0620271 N 4749143 Datum NAD83
Descriptive Location off of Inman Road (Aarts property),
600m north of Canal Bank Road

Water Quality

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
Water Temperature (°C) _____ Air Temperature (°C) 21
Time in situ measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
Mean Bankfull Width 2 (m) Mean Water Depth _____ (cm)
% Riffle _____ % Pool _____ % Run _____ % Flat _____
Evidence of eroding banks, Comments on bank stability stable - vegetated

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 50 Silt _____ Muck _____
Boulder _____ Gravel 50 Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
100% scrub-vegetation small trees, early

Adjacent Land Use

farmland

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) _____

Migratory Obstructions (seasonal, permanent) _____

Note any fish observations no water

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel ☒ Grassed Swale _____ Buried Tile _____
Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg ☒ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc. _____

Field Notes Authored by K. Clayton

Field Notes QA/QCed by MT



ag. field.

ag. field.

Proposed
access Road

dry
channel

Non BEA?
RIITD 20-1

tailails
& Riparian
veg.

Inman Road

N →



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Tile 52

REA

Station # R11T024-1 Project Name Niagara Wind
 Watercourse Name unknown Project # 160950269
 Photos See photo log Field Staff K. Clayton, M. Fairella
 Date June 12/12 Time 3:35 PM
 Weather conditions in previous 24 hrs Rain, hot humid
 GPS Coordinates (Zone) 17T E 0627835 N 4749765 Datum NAD83
 Descriptive Location 650m east of Buckett Road, on non-public Road

Water Quality

Dissolved Oxygen (mg/L) 7.37 pH 7.59 Conductivity (μ S/cm) 248
 Water Temperature ($^{\circ}$ C) 19.35 Air Temperature ($^{\circ}$ C) 27^{\circ}
 Time in situ measurements taken 3:42

Watercourse Dimensions & Morphology

Mean Watercourse Width 3 (m) Maximum Pool Depth 0.50 (cm)
 Mean Bankfull Width 6 (m) Mean Water Depth _____ (cm)
 _____ % Riffle _____ % Pool 100 % Run _____ % Flat
 Evidence of eroding banks, Comments on bank stability stable - vegetated

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 40 Silt 10 Muck _____
 Boulder _____ Gravel 50 Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
45% grasses, small trees, early

Adjacent Land Use

farmland

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
spawning, foraging, nursery

Migratory Obstructions (seasonal, permanent)
permanent

Note any fish observations _____

Waterbody Notes

Natural Watercourse ☒ Trapezoidal Channel ☒ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc. _____

Field Notes Authored by K. Clayton

Field Notes QA/QCed by MR

Bushlot →

(X)
RIIT024

ag. field

✓ proposed
access rd.

Bushlot

REA
RIIT024-1

REA
RIIT024-1
lots of
duckweed

unassumed Road

REA
RIIT024-1

ag. field

Concess 1
really
thick
with
cattail

Burkett
Road

Lakeshore

↑
N



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Non
REA

Station # R11T027

Project Name Niagara Wind

No feature

Watercourse Name unknown

Project # 160950269

Photos 29-33 (D, N, E, S, W)

Field Staff K. Clayton, M. Faiella

Date Apr 4/12

Time 12:35 pm

Weather conditions in previous 24 hrs Cloudy 10°C

GPS Coordinates (Zone) 17T E 0622533

N 4768838

Datum NAD83

Descriptive Location 50m West of Comfort Rd, 600m east of Regional Rd

20, 50m west of 'Choice one' access Road

Water Quality

~~No water or features~~

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____

Water Temperature (°C) _____ Air Temperature (°C) _____

Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)

Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)

_____ % Riffle _____ % Pool _____ % Run _____ % Flat

Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble _____ Sand _____ Silt _____ Muck _____
Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use _____

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent) _____

Note any fish observations _____

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc. Chorus Frogs in Bush lot

Field Notes Authored by K. Clayton

Field Notes QA/QCed by M. Faiella



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

MP.
entrm
Apr 9th
KE
Not REA7

Station # R11T028 Project Name Niagara Wind
 Watercourse Name unknown Project # 160958269
 Photos 34-45 Field Staff K. Clayton, M. Faiella
 Date Apr 4/12 Time 12:40 pm
 Weather conditions in previous 24 hrs cloudy, 10°C
 GPS Coordinates (Zone) 17T E 0622517 N 4769098 Datum NAD83
 Descriptive Location _____

Water Quality

No water
 Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
 Water Temperature (°C) _____ Air Temperature (°C) _____
 Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width 1 (m) Maximum Pool Depth 2 (cm)
 Mean Bankfull Width 1.2 (m) Mean Water Depth 2 (cm)
 _____ % Riffle _____ % Pool 100 % Run _____ % Flat
 Evidence of eroding banks, Comments on bank stability little erosion, poor stability, exposed soil

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 50 Silt _____ Muck _____
 Boulder _____ Gravel 50 Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other Terrestrial plants

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 0%

Adjacent Land Use

agricultural land

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) _____

Migratory Obstructions (seasonal, permanent) _____

Note any fish observations Seasonal

Waterbody Notes

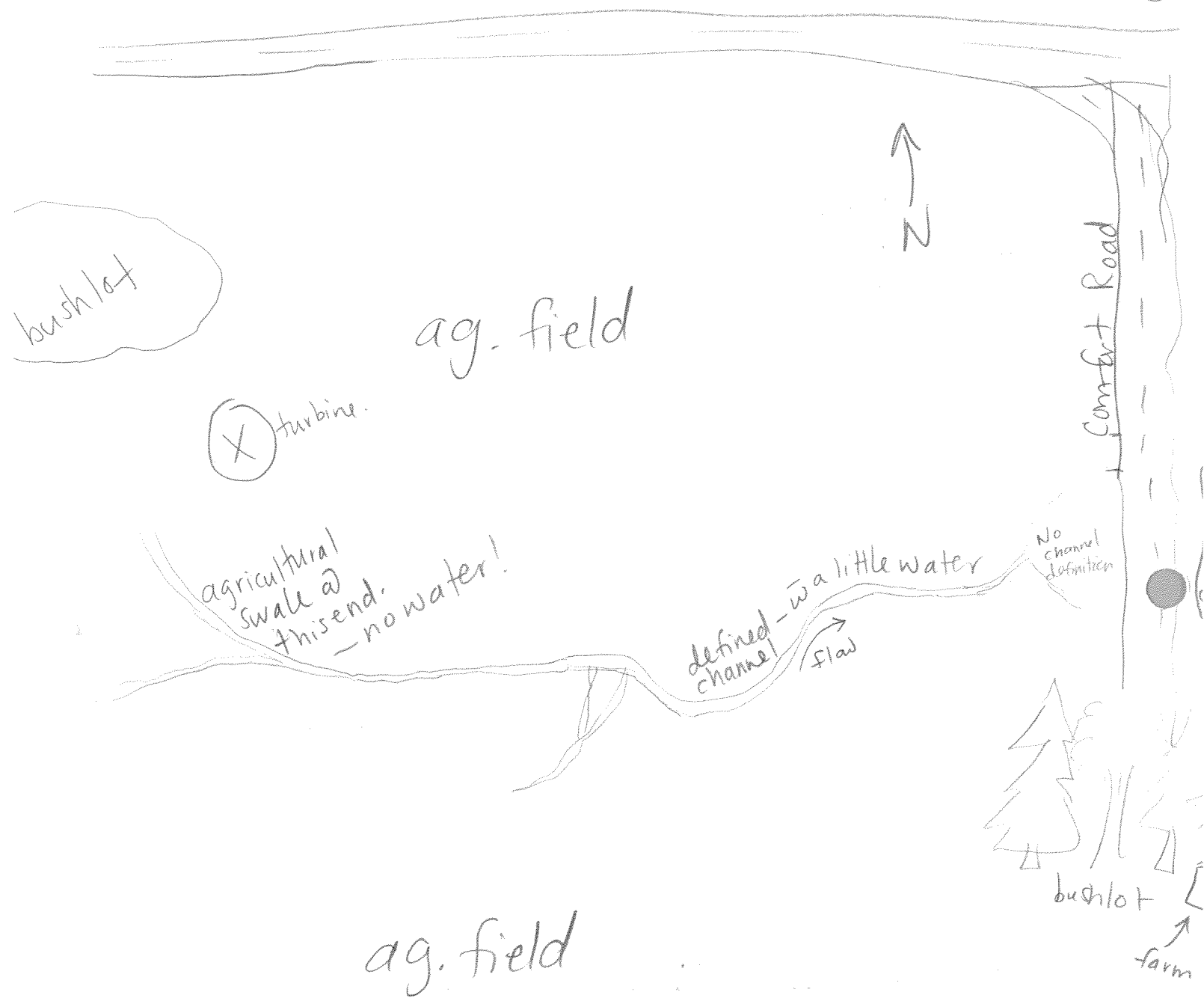
Natural Watercourse ☒ Trapezoidal Channel ☒ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc.

Field Notes Authored by K. Clayton

Field Notes QA/QCed by M. Faiella

R11T028





WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

Stantec

Station # R11TD29
 Watercourse Name 29-1
 Photos 8865-69
 Date June 8, 2012
 Weather conditions in previous 24 hrs Sunny w/ cloudy periods. mk
 GPS Coordinates (Zone) 17T E 628602 N 4763603 Datum
 Descriptive Location _____

Water Quality DRY BUT SOIL WET

Dissolved Oxygen (mg/L) N/A pH N/A Conductivity (µS/cm) N/A
 Water Temperature (°C) N/A Air Temperature (°C) 25
 Time in situ measurements taken N/A

Watercourse Dimensions & Morphology

Mean Watercourse Width DRY (m) Maximum Pool Depth N/A (cm)
 Mean Bankfull Width 2.5 (m) Mean Water Depth 0 (cm)
N/A % Riffle N/A % Pool N/A % Run N/A % Flat
 Evidence of eroding banks, Comments on bank stability base of banks
minor scour along

Substrate (% cover)

Bedrock 1 Cobble 19 Sand 60 Silt 1 Muck 1
 Boulder 1 Gravel 20 Clay 1 Marl 1 Detritus 1

In-water Cover DRY-

Cover Types Present (circle): Undercut Banks Deep Pool Watercress minor
 Overhanging Vegetation Woody Debris Boulder Other Aquatic Veg

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
30% grass, early

Adjacent Land Use

Agricultural field - cropped

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)
Low/no flow

Note any fish observations
None

Waterbody Notes

Natural Watercourse ✓ Trapezoidal Channel ✓ Grassed Swale ✓ Buried Tile ✓
 Surficial Drainage (i.e. furrows) ✓ Dugout Pond ✓ Dominated by Aquatic Veg ✓ Dry ✓

Other Habitat Notes, Incidental Wildlife Observations, etc. Few sagittarium

Straightened waterway.

Field Notes Authored by T. CHANDLER Field Notes QA/QCed by W



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Non
REA

Station # R117029
 Watercourse Name 29-2
 Photos 8870-71
 Date JUNE 8, 2012
 Weather conditions in previous 24 hrs cloudy periods, Sunny
 GPS Coordinates (Zone) 17T E 628309 N 4763066 Datum
 Descriptive Location _____

Project Name NIAGARA WIND
 Project # 160950269
 Field Staff T. CHANDLER M. ELLAH
 Time 11:15 AM

Water Quality DRY
 Dissolved Oxygen (mg/L) N/A pH N/A Conductivity (μ S/cm) N/A
 Water Temperature ($^{\circ}$ C) N/A Air Temperature ($^{\circ}$ C) 25
 Time in situ measurements taken N/A

Watercourse Dimensions & Morphology
 Mean Watercourse Width DRY (m) Maximum Pool Depth N/A (cm)
 Mean Bankfull Width N/A (m) Mean Water Depth N/A (cm)
 % Riffle 0 % Pool 0 % Run 0 % Flat 0
 Evidence of eroding banks, Comments on bank stability Large rill feature
disturbed by ploughing

Substrate (% cover)
 Bedrock 0 Cobble 0 Sand 0 Silt 0 Muck 0
 Boulder 0 Gravel 0 Clay 0 Marl 0 Detritus 0

In-water Cover DRY
 Cover Types (percent) (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other 0

Riparian Zone
 Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
0%

Adjacent Land Use
Agricultural Field - soybeans

Fish Habitat Potential
 Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

No Flow
 Note any fish observations None

Waterbody Notes
 Natural Watercourse 0 Trapezoidal Channel 0 Grassed Swale 0 Buried Tile 0
 Surficial Drainage (i.e. furrows) 0 Dugout Pond 0 Dominated by Aquatic Veg 0 Dry 1

Other Habitat Notes, Incidental Wildlife Observations, etc.

Field Notes Authored by T. CHANDLER

Field Notes QA/QCed by ME



WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

Stantec

Station # RUTO29
 Watercourse Name #29-3
 Photos 8872-76
 Date JUNE 8, 2012
 Weather conditions in previous 24 hrs Sunny with cloudy periods
 GPS Coordinates (Zone) 17T E 628560 N 4762922 Datum
 Descriptive Location _____

Project Name NIAGARA WIND
 Project # 160950269
 Field Staff T. CHANDLER, M. ELLAH
 Time 11:35

Water Quality

Dissolved Oxygen (mg/L) 6.30 pH 7.95 Conductivity (μS/cm) 1608
 Water Temperature (°C) 15.17 Air Temperature (°C) 25
 Time in situ measurements taken 11:40

Watercourse Dimensions & Morphology

Mean Watercourse Width 3 (m) Maximum Pool Depth 40 (cm)
 Mean Bankfull Width 6 (m) Mean Water Depth 5 (cm)
30 % Riffle 50 % Pool 10 % Run 10 % Flat
 Evidence of eroding banks, Comments on bank stability MINOR BASAL SCOUR; SOME TREES WITH BENT TRUNKS

Substrate (% cover)

Bedrock _____ Cobble 40 Sand 20 Silt _____ Muck _____
 Boulder 35 Gravel _____ Clay 10 Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool ~~Watercress~~ ~~Aquatic Veg~~
Overhanging Vegetation Woody Debris ~~Boulder~~ ~~Other~~

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

95% - Mature trees

Adjacent Land Use

Woodlot - mature

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Spawning & nursery potential

Migratory Obstructions (seasonal, permanent)

low/no flow

Note any fish observations None observed

Waterbody Notes

Natural Watercourse ☒ Trapezoidal Channel ☒ Grassed Swale ☒ Buried Tile ☒
 Surficial Drainage (i.e. furrows) ☒ Dugout Pond ☒ Dominated by Aquatic Veg ☒ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc.

Green Frog
Naturally sinuous channel with well defined valley
Flow observed (<16/5)

Field Notes Authored by T. CHANDLER

Field Notes QA/QCed by NR



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

NOT RE

R117031
1-4, 97
2nd, 97
Fig 35

Station # R117031 1-4, 73
Watercourse Name see log
Photos see log
Date June 11 2012
Weather conditions in previous 24 hrs hot & sunny
GPS Coordinates (Zone) 17 E 625089 N 476507 Datum
Descriptive Location Vaughan Rd 600m west of Hwys Rd

Project Name Niagara Wind
Project # 160950269
Field Staff KE JK
Time 5 pm

Water Quality

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (μ S/cm) _____
Water Temperature ($^{\circ}$ C) _____ Air Temperature ($^{\circ}$ C) _____
Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)
_____ % Riffle _____ % Pool _____ % Run _____ % Flat
Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble _____ Sand _____ Silt _____ Muck _____
Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Note any fish observations _____

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
Surficial Drainage (i.e. furrows) ☒ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc.

-surficial drainage through soy field

Field Notes Authored by KE

Field Notes QA/QCed by Joe Koe



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA
R11T031
-8
fig 35

Station # R11T031-8
Watercourse Name _____
Photos See log
Date June 11 2012
Weather conditions in previous 24 hrs hot & sunny
GPS Coordinates (Zone) 17 E 625104 N 4765094 Datum
Descriptive Location Vaughan Rd, 600 m west of Maslip Rd

Project Name Niagara Wind
Project # 160950269
Field Staff KE + JK
Time 4:57 pm

Water Quality

Dissolved Oxygen (mg/L) dry one pool w/ too much algae to
pH do Conductivity (µS/cm) reading
Water Temperature (°C) _____ Air Temperature (°C) _____
Time in situ measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width 1.5 (m) Maximum Pool Depth 20 (cm)
Mean Bankfull Width 3.5 (m) Mean Water Depth 0 (cm)
% Riffle 100 % Pool _____ % Run _____ % Flat _____
Evidence of eroding banks, Comments on bank stability stable & veg

Substrate (% cover)

Bedrock _____ Cobble _____ Sand _____ Silt _____ Muck _____
Boulder _____ Gravel 100 Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
20

Adjacent Land Use

soy + pig barn

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
none

Migratory Obstructions (seasonal, permanent)
dry

Note any fish observations
none

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel ☒ Grassed Swale _____ Buried Tile _____
Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc.

- channel that is mainly dry w/ a few small pools
- filled w/ algae
- some aquatic veg
- green frogs
* some reaches more channelized than others

Field Notes Authored by KE

Field Notes QA/QCed by puller



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

not REA
R11T031
-10
Fg 35

Station # R11T031-10

Watercourse Name _____

Photos see log

Date June 11 2012

Weather conditions in previous 24 hrs hot + sunny

GPS Coordinates (Zone) 17T E 625024

Descriptive Location Vaughan 600m west of Hesp

Project Name Niagara Wind

Project # 160950269

Field Staff KE + JK

Time 5:20pm

Datum _____

Water Quality

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____

Water Temperature (°C) _____ Air Temperature (°C) _____

Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)
_____ % Riffle _____ % Pool _____ % Run _____ % Flat

Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble _____ Sand _____ Silt _____ Muck _____
Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use _____

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Note any fish observations _____

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
Surficial Drainage (i.e. furrows) ☒ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc.

South of Vaughan Rd this mapped watercourse
is just surficial drainage through a corn
field - no defined channel

Field Notes Authored by KE

Field Notes QA/QCed by J. K.



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

R11 T031-11

F035

Station # R11 T031-11
 Watercourse Name
 Photos see log
 Date June 11 2012
 Weather conditions in previous 24 hrs suny clt
 GPS Coordinates (Zone) 17T E 625024 N 4765209 Datum
 Descriptive Location Vaughan Rd 650m west of Healey Rd

Project Name Niagara Wind
 Project # 160950269
 Field Staff KE + JK
 Time 5:30pm

Water Quality

Dissolved Oxygen (mg/L) 12.48 pH 8.10 Conductivity (µS/cm) 210
 Water Temperature (°C) 25.77 Air Temperature (°C) 28
 Time in situ measurements taken 5:30pm

Watercourse Dimensions & Morphology

Mean Watercourse Width 0.5 (m) Maximum Pool Depth 10 (cm)
 Mean Bankfull Width 1.5 (m) Mean Water Depth 5 (cm)
 % Riffle 100 % Pool % Run % Flat
 Evidence of eroding banks, Comments on bank stability slightly eroded, but veg.

Substrate (% cover)

Bedrock Cobble 40 Sand Silt Muck
 Boulder Gravel 60 Clay Marl Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 10%

Adjacent Land Use

Ag - corn

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent) seasonal

Note any fish observations none

Waterbody Notes

Natural Watercourse Trapezoidal Channel ✓ Grassed Swale Buried Tile
 Surficial Drainage (i.e. furrows) Dugout Pond Dominated by Aquatic Veg Dry

Other Habitat Notes, Incidental Wildlife Observations, etc.

within Vaughan Rd allowance, south side, small section is channelized b/w culvert + field w/ clear standing water - is a WB.

Field Notes Authored by KE

Field Notes QA/QCed by J. Allen



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Non-REA 37P

R11T031
12

Fig 35

Station # R11T031-12 Project Name Niagara Wind
 Watercourse Name _____ Project # 160950269
 Photos see log Field Staff KE + JK
 Date June 11 2012 Time 5:45 pm
 Weather conditions in previous 24 hrs sunny & hot
 GPS Coordinates (Zone) 17N E 1625217 N 4765216 Datum _____
 Descriptive Location Vaughan Rd 550m west of Measlip Rd

Water Quality

~~Dissolved Oxygen (mg/L) _____~~ pH _____ Conductivity (µS/cm) _____
~~Water Temperature (°C) _____~~ Air Temperature (°C) 25.0
 Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width 1 (m) Maximum Pool Depth dry (cm)
 Mean Bankfull Width 1.5 (m) Mean Water Depth _____ (cm)
dry % Riffle _____ % Pool _____ % Run _____ % Flat _____
 Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble 40 Sand _____ Silt _____ Muck _____
 Boulder _____ Gravel 60 Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
15%

Adjacent Land Use

Ag + rural residential

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
none

Migratory Obstructions (seasonal, permanent)
dry

Note any fish observations
none

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ✓

Other Habitat Notes, Incidental Wildlife Observations, etc.

- typha + RCG, culvert over access road.
- seasonally wet
- minimal channel definition (ill-defined) M.P.

Field Notes Authored by KE

Field Notes QA/QCed by JK



WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

Stantec

Station # RIIT032 Project Name Niagara Wind
 Watercourse Name Unknown Project # 160950269
 Photos 8-23 Field Staff KC, MF
 Date April 4, 2012 Time 9:20 am
 Weather conditions in previous 24 hrs Cloudy, 10°C on Apr 3rd
 GPS Coordinates (Zone) 17T E 0624862 N 4764452 Datum NAD83
 Descriptive Location ~800m North of Elcho Rd + ~1.4km NE of Culver Rd.

Water Quality

Dissolved Oxygen (mg/L) 13.51 mg/L pH 9.36 Conductivity (µS/cm) 1603
 Water Temperature (°C) 5.05°C Air Temperature (°C) 10°C
 Time in situ measurements taken 9:35 am

Watercourse Dimensions & Morphology

Mean Watercourse Width 2.0 (m) Maximum Pool Depth 20 (cm)
 Mean Bankfull Width 3.0 (m) Mean Water Depth 15 (cm)
 % Riffle 30 % Pool 70 % Run 70 % Flat
 Evidence of eroding banks, Comments on bank stability Undercut, minor slumping exposed soil.

Substrate (% cover)

Bedrock Cobble Sand 50 Silt Muck
 Boulder Gravel 50 Clay Marl Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
5%, mainly overhanging riparian grasses.
 Adjacent Land Use agriculture.

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
Foraging, nursery

Migratory Obstructions (seasonal, permanent)
Non REA section d/s is diffuse, lack of definition may cause obstruction

Note any fish observations None

Waterbody Notes

Natural Watercourse ☒ Trapezoidal Channel Grassed Swale Buried Tile
 Surficial Drainage (i.e. furrows) Dugout Pond Dominated by Aquatic Veg ☒ Dry

Other Habitat Notes, Incidental Wildlife Observations, etc.

many bird species.

Field Notes Authored by MF

Field Notes QA/QCed by MF

⊗ = turbine location
|| = seed canopy grass

ELCHO RD

diffuse

NOU REA

Ag field

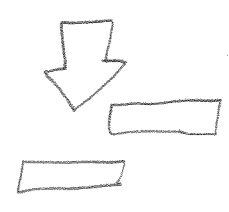
Ag field (with wheat)

W →

woodlot

woodlot

woodlot





WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

Stantec

Station # R11T033 Project Name NIAGARA WIND
 Watercourse Name 33-1 Project # 160950269
 Photos 9857-61, 8862 deleted 8863-64 Field Staff T. Chandler & M. Ellah
 Date June 7, 2012 Time 6:55 PM
 Weather conditions in previous 24 hrs Light thunder showers and sunny
 GPS Coordinates (Zone) 17N E 626876 N 4765898 Datum
 Descriptive Location _____

Water Quality

Dissolved Oxygen (mg/L) 7.41 pH 8.55 Conductivity (µS/cm) 2258
 Water Temperature (°C) 19.45 Air Temperature (°C) 20
 Time in situ measurements taken 7:00 PM

Watercourse Dimensions & Morphology

Mean Watercourse Width 1.5 (m) Maximum Pool Depth 15 (cm)
 Mean Bankfull Width 4 (m) Mean Water Depth 3-4 (cm)
0 % Riffle 70 % Pool 30 % Run 0 % Flat
 Evidence of eroding banks, Comments on bank stability MINOR BANK SCOUR

Substrate (% cover)

1 Bedrock 4 Cobble 10 Sand 60 Silt 1 Muck
1 Boulder 5 Gravel 20 Clay 1 Marl 1 Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other
minor

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

80% Grasses, minortree - early

Adjacent Land Use

Ploughed Agricultural field w crops planted

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

potential spawning & nursery areas

Migratory Obstructions (seasonal, permanent)

low/no flow

Note any fish observations None

Waterbody Notes

Natural Watercourse ✓? may have been straightened Trapezoidal Channel ✓? Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc. green frog

No flow - water ponded. Watercourse flows along Gee Road along its downstream section.

Field Notes Authored by T. Chandler

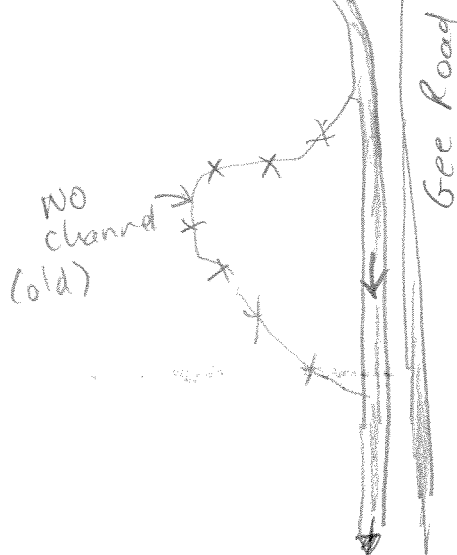
Field Notes QA/QCed by MP

ROTO33
33-1

PROPERTY LINE

↑
N

Watercourse has been
realigned along Gee Rd.



□ FARM
HOUSE



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

NOT REA

R11T034
SE 12

Station # R11T034
Watercourse Name See log
Photos See log
Date June 11

Project Name Niagara Wind
Project # 160950269
Field Staff KEFK
Time 2:40 pm

F1345

Weather conditions in previous 24 hrs sunny clear
GPS Coordinates (Zone) 17 E 626494 N 4763909 Datum
Descriptive Location Elcho Rd, approx 500m west of
See Rd

Water Quality

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
Water Temperature (°C) _____ Air Temperature (°C) _____
Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)
_____ % Riffle _____ % Pool _____ % Run _____ % Flat
Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble _____ Sand _____ Silt _____ Muck _____
Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Note any fish observations _____

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
Surficial Drainage (i.e. furrows) ☒ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc.

-ploughed field corn + soybean
-no RWB, just surficial drainage

Field Notes Authored by RE

Field Notes QA/QCed by for KFK



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

NOT REA
R11T035H

Station # R11T035H Project Name Niagara Wind
 Watercourse Name See log Project # 160950269
 Photos See log Field Staff KE & JK
 Date June 11 2012 Time 1:50 pm
 Weather conditions in previous 24 hrs Sunny & hot
 GPS Coordinates (Zone) 17T E 627169 N 4764532 Datum
 Descriptive Location Grass Rd South of Vaughan

Water Quality

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (μ S/cm) _____
 Water Temperature ($^{\circ}$ C) _____ Air Temperature ($^{\circ}$ C) _____
 Time in situ measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
 Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)
 _____ % Riffle _____ % Pool _____ % Run _____ % Flat
 Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble _____ Sand _____ Silt _____ Muck _____
 Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Note any fish observations _____

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) ☒ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc.

no waterbodies, only surficial drainage that has been
ploughed

Field Notes Authored by KE

Field Notes QA/QCed by JK/Koe



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Tile 25

REA

D/S in bushland

Not REA
outside of bushland

m.p.

Station # R11T036-1 Project Name Niagara Wind
 Watercourse Name unknown - Beaver Creek Project # 160950269
 Photos see photo log Field Staff K. Clayton, M. Farella
 Date June 13/12 Time 2:20pm
 Weather conditions in previous 24 hrs Hot & humid
 GPS Coordinates (Zone) 17 E 0621694 N 476.3476 Datum NAD 83
 Descriptive Location ~200m south of Elcho Road, off old Road,
west of Janssens property

Water Quality

Dissolved Oxygen (mg/L) 6.01 pH 8.19 Conductivity (µS/cm) 384
 Water Temperature (°C) 17.70 Air Temperature (°C) 21°C
 Time in situ measurements taken 2:35

Watercourse Dimensions & Morphology

Mean Watercourse Width 5 (m) Maximum Pool Depth 0.60 (cm)
 Mean Bankfull Width 7 (m) Mean Water Depth 0.40 (cm)
 % Riffle _____ % Pool 100 % Run _____ % Flat _____
 Evidence of eroding banks, Comments on bank stability fairly stable banks -
vegetated w/ grasses

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 40 Silt 50 Muck _____
 Boulder _____ Gravel 10 Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool _____ Watercress _____ Aquatic Veg _____
Overhanging Vegetation Woody Debris Boulder _____ Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
15% trees & grasses, (D/S) mature (U/S) early
 Adjacent Land Use farmland

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
spawning, nursery, foraging
 Migratory Obstructions (seasonal, permanent)
permanent
 Note any fish observations _____

Waterbody Notes

Natural Watercourse ☒ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc. very turbid

Field Notes Authored by K. Clayton

Field Notes QA/QCed by NIF



N
1.



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Tile 28

REAR
Non m.f.

Station # RIIT038-1
Watercourse Name unknown
Photos see photo log
Date June 13/12
Weather conditions in previous 24 hrs hot 27°
GPS Coordinates (Zone) 17T E 0620900
Descriptive Location North of Silver St

Project Name Niagara Wind
Project # 160950269
Field Staff K. Clayton, M. Faiella
Time 11:30

Datum NAD83

Water Quality - no water

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
Water Temperature (°C) _____ Air Temperature (°C) 20°C
Time in situ measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width 1m (m) Maximum Pool Depth _____ (cm)
Mean Bankfull Width 2 (m) Mean Water Depth _____ (cm)
% Riffle _____ % Pool _____ % Run _____ % Flat _____
Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 50 Silt 50 Muck _____
Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Note any fish observations no water

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
Surficial Drainage (i.e. furrows) ☒ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc.

lots of reed canary grass

Field Notes Authored by K. Clayton

Field Notes QA/QCed by MF

lot

Bush lot

Bush

say
beans.

RIIT038-2

RIIT038-1

RIIT038-1

pooled H₂O

(continues
onto houses
property)

willows

↓
N

Silver Street



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Non
REA
tile 28

Station # R11T038-2 Project Name Niagara Wind
 Watercourse Name unknown Project # 160950269
 Photos See photo log Field Staff K. Clayton & M. Faiella
 Date June 13/12 Time 12:20
 Weather conditions in previous 24 hrs Hot & humid
 GPS Coordinates (Zone) 17T E 062750 N 476950 Datum NAD83
 Descriptive Location ~700m South of Silver Street

Water Quality

no water
 Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (μ S/cm) _____
 Water Temperature ($^{\circ}$ C) _____ Air Temperature ($^{\circ}$ C) _____
 Time in situ measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width 1.5 (m) Maximum Pool Depth _____ (cm)
 Mean Bankfull Width 2 (m) Mean Water Depth _____ (cm)
 _____ % Riffle _____ % Pool _____ % Run _____ % Flat
 Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 50 Silt 50 Muck
 Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
45% grasses, early

Adjacent Land Use

soy beans

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Note any fish observations

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) ☒ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc.

Coyote to chicken

Field Notes Authored by K. Clayton

Field Notes QA/QCed by MF

See map
on R11TO38-1



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Non
REA

Station # R117039
Watercourse Name unknown
Photos 708-714
Date June 11/12

Project Name Niagara Wind
Project # 160958269
Field Staff K. Clayton, M. Farilla
Time 13:00

Weather conditions in previous 24 hrs no rain, cloudy, light breeze hot, 30°
GPS Coordinates (Zone) 17T E N Datum NAD83
Descriptive Location South of Vaughn Road, West of Port Davidson Road

Water Quality

Dissolved Oxygen (mg/L) Dry pH / Conductivity (µS/cm) /
Water Temperature (°C) / Air Temperature (°C) /
Time *in situ* measurements taken /

Watercourse Dimensions & Morphology

Mean Watercourse Width / (m) Maximum Pool Depth / (cm)
Mean Bankfull Width 1 (m) Mean Water Depth / (cm)
/ % Riffle / % Pool / % Run / % Flat
Evidence of eroding banks, Comments on bank stability /

Substrate (% cover)

Bedrock / Cobble / Sand / Silt 50 Muck /
Boulder / Gravel 50 Clay / Marl / Detritus /

In-water Cover

Cover Types Present (circle): Undercut Banks / Deep Pool / Watercress / Aquatic Veg /
Overhanging Vegetation / Woody Debris / Boulder / Other /

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 0%

Adjacent Land Use

farmland

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) /

Migratory Obstructions (seasonal, permanent) /

Note any fish observations /

Waterbody Notes

Natural Watercourse / Trapezoidal Channel / Grassed Swale / Buried Tile /
Surficial Drainage (i.e. furrows) / Dugout Pond / Dominated by Aquatic Veg / Dry /

Other Habitat Notes, Incidental Wildlife Observations, etc.

completely dry, surficial drainage, plowed through - non REA

Field Notes Authored by K. Clayton

Field Notes QA/QCed by MF



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Non REA

RIIT041-

Fig 22

Station # RIIT041-1

Watercourse Name _____

Photos see log

Date June 13 2012

Weather conditions in previous 24 hrs rain

GPS Coordinates (Zone) 17 E 621127

N 4756992 Datum

Descriptive Location Spore A Road approx 200m SW of tracks
+ 700m east into field

Project Name Niagara Wind

Project # 160950269

Field Staff KE + JK

Time 9:31 am

Water Quality

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (μ S/cm) _____

Water Temperature ($^{\circ}$ C) _____ Air Temperature ($^{\circ}$ C) _____

Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)

Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)

_____ % Riffle _____ % Pool _____ % Run _____ % Flat

Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock	Cobble	Sand	Silt	Muck
Boulder	Gravel	Clay	Marl	Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use _____

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Note any fish observations _____

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
Surficial Drainage (i.e. furrows) ☒ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc.

surficial drainage through corn field

Field Notes Authored by KE

Field Notes QA/QCed by JK



WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

Stantec

41-2

Station # R11T073
 Watercourse Name Unknown
 Photos 60-68
 Date Apr 4/12
 Weather conditions in previous 24 hrs 10°C, cloudy
 GPS Coordinates (Zone) 17T E 0619971
 Descriptive Location E of Gore Rd A

Project Name Niagara Wind
 Project # 160950629
 Field Staff K. Clayton, M. Faiella
 Time 15:15

Water Quality

Dissolved Oxygen (mg/L) 10.47 mg/L pH 8.84 Conductivity (µS/cm) 758 µS/cm
 Water Temperature (°C) 11.63°C Air Temperature (°C) 12°C
 Time in situ measurements taken 15:16

Watercourse Dimensions & Morphology

Mean Watercourse Width 0.4 (m) Maximum Pool Depth 0.20 (cm)
 Mean Bankfull Width 3 (m) Mean Water Depth 0.10 (cm)
 % Riffle 100 % Pool 0 % Run 0 % Flat 0
 Evidence of eroding banks, Comments on bank stability fairly stable - covered in vegetation

Substrate (% cover)

Bedrock 0 Cobble 0 Sand 60 Silt 10 Muck 0
 Boulder 0 Gravel 40 Clay 0 Marl 0 Detritus 0

In-water Cover

Cover Types Present (circle):
 Overhanging Vegetation 0 Undercut Banks 0 Deep Pool 0 Watercress 0 Aquatic Veg 0
 Woody Debris 0 Boulder 0 Other 0

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 5%

Adjacent Land Use Farmland

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) spawning, nursery, foraging

Migratory Obstructions (seasonal, permanent) intermittent

Note any fish observations small fish - cyprinidae sp.

Waterbody Notes

Natural Watercourse ✓ Trapezoidal Channel ✓ Grassed Swale 0 Buried Tile 0
 Surficial Drainage (i.e. furrows) 0 Dugout Pond 0 Dominated by Aquatic Veg 0 Dry 0

Other Habitat Notes, Incidental Wildlife Observations, etc. frogs, small cyprinidae

Field Notes Authored by K. Clayton

Field Notes QA/QCed by M. Faiella

R11T073





WIND FARM WATERBODY RAPID ASSESSMENT FORM

Stantec

-agricultural
swale

Non
REA

Station # R11T042-1

Watercourse Name unknown

Photos 90-94

Date Apr 5/12

Weather conditions in previous 24 hrs Sunny 12°C

GPS Coordinates (Zone) 17T E 0619947

Descriptive Location 1.2 km south of Hwy 3, ~ 1.4 km west of

Project Name Niagara Wind

Project # 1100950269

Field Staff K. Clayton, M. Faiella

Time 9:00 am

N 4753627 Datum NAD 83

Water Quality - no water - ag. swale

Dissolved Oxygen (mg/L) _____

pH _____ Conductivity (µS/cm) _____

Water Temperature (°C) _____

Air Temperature (°C) _____

Time in situ measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m)

Mean Bankfull Width _____ (m)

Maximum Pool Depth _____ (cm)

Mean Water Depth _____ (cm)

_____ % Riffle

_____ % Pool

_____ % Run

_____ % Flat

Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

_____ Bedrock

_____ Cobble

_____ Sand

_____ Silt

_____ Muck

_____ Boulder

_____ Gravel

_____ Clay

_____ Marl

_____ Detritus

In-water Cover

Cover Types Present (circle):

Overhanging Vegetation

Woody Debris

Undercut Banks

Boulder

Deep Pool

Other _____

Watercress

Aquatic Veg

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use

- ag. land

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Note any fish observations

Waterbody Notes

Natural Watercourse

Trapezoidal Channel

Grassed Swale

Buried Tile

Surficial Drainage (i.e. furrows)

Dugout Pond

Dominated by Aquatic Veg

Dry

Other Habitat Notes, Incidental Wildlife Observations, etc.

lots of Red wing
black birds calling

Field Notes Authored by K. Clayton

Field Notes QA/QCed by M. Faiella



WIND FARM WATERBODY RAPID ASSESSMENT FORM

Stantec

REA

Station # RIT042-2

Watercourse Name unknown

Photos 95-99

Date Apr 5/12

Weather conditions in previous 24 hrs Cool, 12°C

GPS Coordinates (Zone) 17T E 0619857

Descriptive Location 1 km south of Hwy 3, ~1.4 km west of Hutchison Rd.

Project Name Niagara Wind

Project # 160950369

Field Staff K.C. M.F.

Time 9:10

N 4753762 Datum NAD83

Water Quality

Dissolved Oxygen (mg/L) 11.85 mg/L pH 8.61 Conductivity (μ S/cm) 716 μ S/cm

Water Temperature ($^{\circ}$ C) 5.79 $^{\circ}$ C Air Temperature ($^{\circ}$ C) 3 $^{\circ}$ C

Time in situ measurements taken 9:20 am

Watercourse Dimensions & Morphology

Mean Watercourse Width 2 (m)

Mean Bankfull Width 6 (m)

% Riffle 100 % Pool 0

Evidence of eroding banks, Comments on bank stability stable banks - lots of riparian vegetation

Maximum Pool Depth standing H₂O 0.40 (cm)

Mean Water Depth 0.60 (cm)

% Run 100 % Flat 0

Substrate (% cover)

Bedrock 0 Cobble 0 Sand 50 Silt 10 Muck 0
Boulder 0 Gravel 40 Clay 0 Marl 0 Detritus 0

In-water Cover

Cover Types Present (circle):

Overhanging Vegetation

Undercut Banks

Woody Debris

Boulder

Deep Pool

Other

Watercress

Aquatic Veg

Duckweed
milfoil
horsetail
etc

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 20% grasses, early

Adjacent Land Use farmland - also lots of Redwing Dogwood & poplars

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) spawning, nursery, foraging

Migratory Obstructions (seasonal, permanent) permanent

Note any fish observations

Waterbody Notes

Natural Watercourse ✓ Trapezoidal Channel ✓ Grassed Swale 0 Buried Tile 0
Surficial Drainage (i.e. furrows) 0 Dugout Pond 0 Dominated by Aquatic Veg ✓ Dry 0

Other Habitat Notes, Incidental Wildlife Observations, etc. Redwing blackbirds

Field Notes Authored by K. Dayton

Field Notes QA/QCed by M. Faralla

R11T042-2.

Bush lot

Bush lot

⊗ Turbine

agricultural
swale R11T042-1

REA
water
cOURSE.

R11T042-2

ag. field

ag. field.

back
path

buses

Farris

Hwy 3

N
↓

Hutchison Rd.



WIND FARM WATERBODY RAPID ASSESSMENT FORM

Stantec

Station # RIT042-3 & 042-4

Watercourse Name unknown

Photos 34-41

Date Apr 19/12

Weather conditions in previous 24 hrs 12°C, overcast

GPS Coordinates (Zone) 17T E 0619984

Descriptive Location 600m South of Hwy 3, 1km East of Crown Road

Project Name Niagara Wind

Project # 160950269

Field Staff K. Clayton, M. Faiella

Time 9:25

RIT042-3

Non
REA

By your car
drive through
terrestrial
veg
channel
is not
well def

RIT042-4

↳ RET

*not win
120m
bunker

Water Quality

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____

Water Temperature (°C) _____ Air Temperature (°C) _____

Time *in situ* measurements taken _____

- standing water

Watercourse Dimensions & Morphology

Mean Watercourse Width 0.5m (m) Maximum Pool Depth 0.30 (cm)

Mean Bankfull Width 1.5m (m) Mean Water Depth 0.25 (cm)

_____ % Riffle _____ % Pool 100 % Run _____ % Flat

Evidence of eroding banks, Comments on bank stability _____

fairly shallow banks, - stable w vegetation

standing water

Substrate (% cover)

Bedrock _____ Cobble _____ Sand _____ Silt 50 Muck _____
Boulder _____ Gravel _____ Clay _____ Marl 50 Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg

Overhanging Vegetation Woody Debris Boulder Other _____

some
cattails

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

<5% grasses, cane & willow saplings

Adjacent Land Use _____

ag. field

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

seasonal

Note any fish observations _____

Waterbody Notes

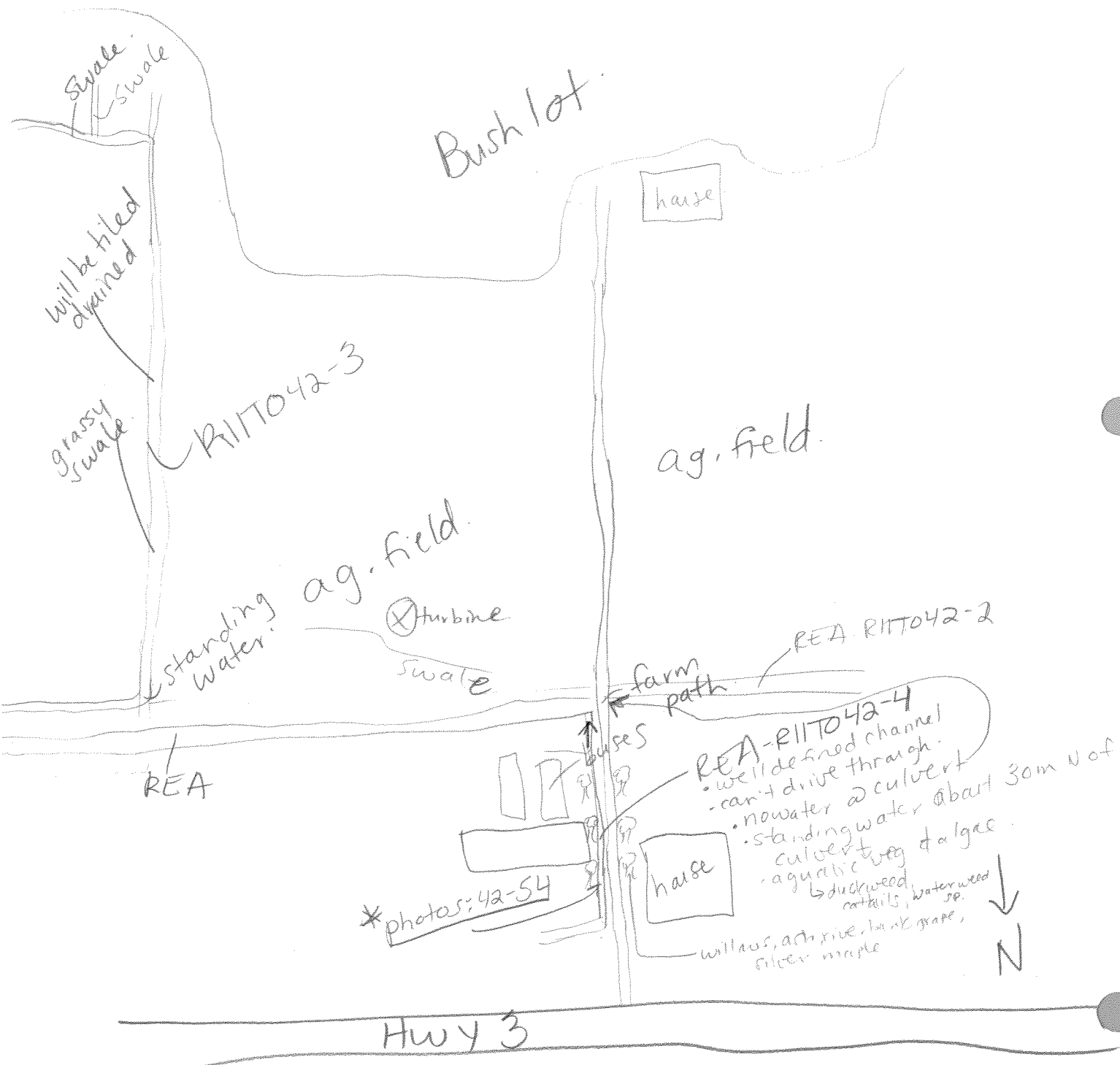
Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale ✓ Buried Tile _____

Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc. _____

Field Notes Authored by K. Clayton

Field Notes QA/QCed by M. Faiella



Bush lot.

house

ag. field.

ag. field.

⊗ turbine
swale

REA R11T042-2

farm path

REA-R11T042-4
• well defined channel
• can't drive through
• no water @ culvert
• standing water about 30m N of culvert
• aquatic veg
↳ duckweed, cattails, waterweed

house

*photos: 42-54

willow, ash, rice, hack grape, silver maple

↓
N

Hwy 3



WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

Stantec

Station # R11T044 Project Name Niagara Wind
 Watercourse Name unknown Project # 160950269
 Photos 93-101 Field Staff KC & MF
 Date Apr 19/12 Time 12:40pm
 Weather conditions in previous 24 hrs 12°C, overcast
 GPS Coordinates (Zone) 17T E 0624474 N 4748433 Datum NAD83
 Descriptive Location 2 km South of Canal Bank Rd, 1 km East of Bird Rd

Water Quality

Dissolved Oxygen (mg/L) 7.92 mg/L pH 8.96 Conductivity (μ S/cm) 300 μ S/cm
 Water Temperature ($^{\circ}$ C) 13.85 $^{\circ}$ C Air Temperature ($^{\circ}$ C) 12 $^{\circ}$ C
 Time in situ measurements taken 12:45

Watercourse Dimensions & Morphology

Mean Watercourse Width 3 (m) Maximum Pool Depth 60 (cm)
 Mean Bankfull Width 6 (m) Mean Water Depth 50 (cm)
 % Riffle _____ % Pool 100 % Run _____ % Flat _____
 Evidence of eroding banks, Comments on bank stability fairly stable banks

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 30 Silt 30 Muck _____
 Boulder _____ Gravel 20 Clay _____ Marl 20 Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg *• duckweed*
 Overhanging Vegetation Woody Debris Boulder Other _____ *• coon tail*
• cattail

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

80% Ash, willow, mature
 Adjacent Land Use farmland & bush lot

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Spawning, nursery, foraging
 Migratory Obstructions (seasonal, permanent)

Note any fish observations huge school of shiners

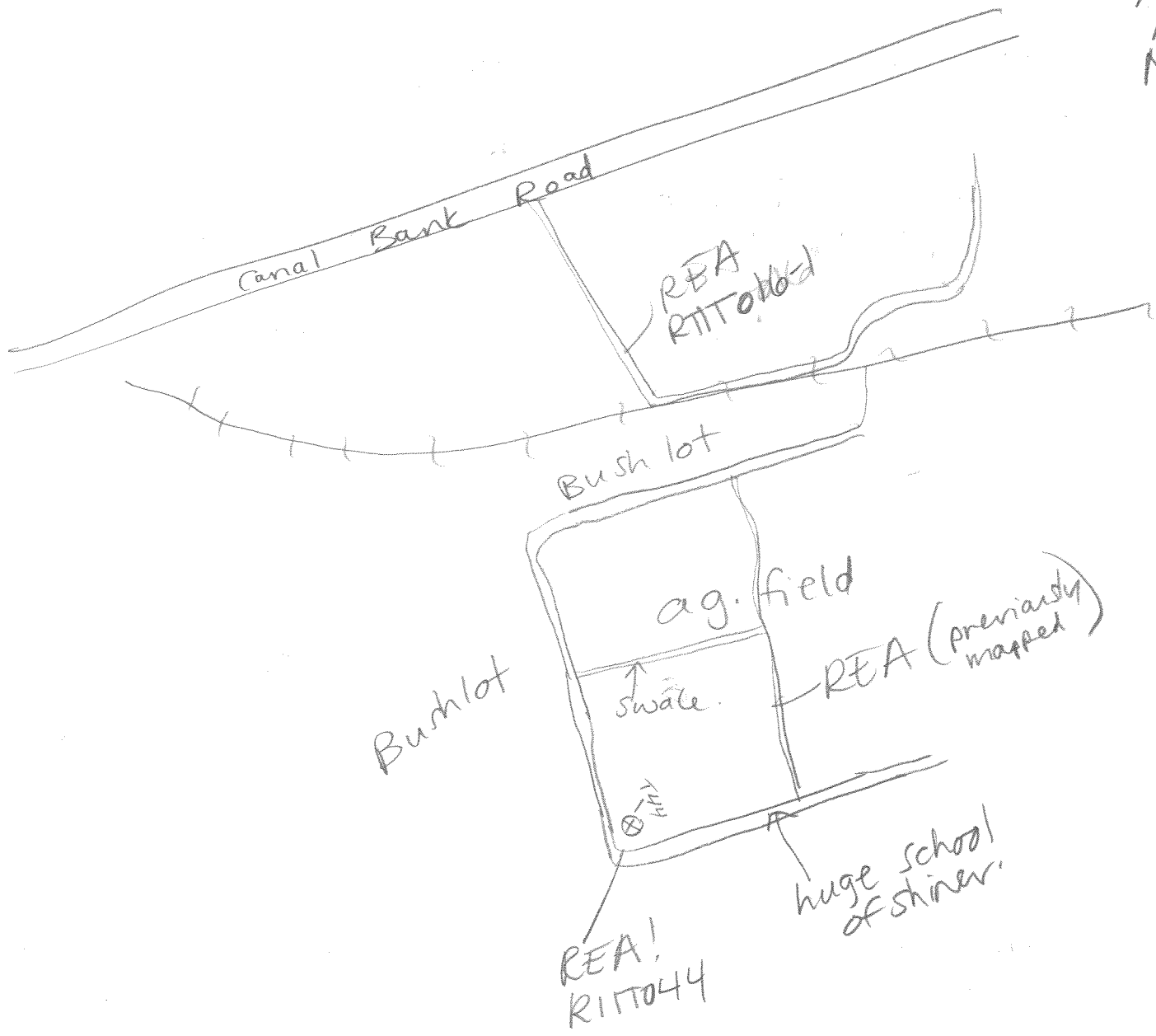
Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel ☒ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc. hundreds of shiners
Leopard frog

Field Notes Authored by KC

Field Notes QA/QCed by MF





WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

Stantec

Station # R11T045-1

Project Name Niagara Wind

Watercourse Name unknown

Project # 160950269

Photos 66-70

Field Staff KE & MF

Date Apr 19/12

Time 11:43

Weather conditions in previous 24 hrs 12°C overcast

GPS Coordinates (Zone) 17T E 2622842 N 4748406 Datum NAD83

Descriptive Location 600m south of Canal Bank Rd, 500m east of Bird Road

Water Quality

Dissolved Oxygen (mg/L) 9.15 pH 9.09 Conductivity (µS/cm) 220

Water Temperature (°C) 11.06 Air Temperature (°C) 12°C

Time in situ measurements taken 11:45

Watercourse Dimensions & Morphology

Mean Watercourse Width 1.5 (m) Maximum Pool Depth 0.40 (cm)

Mean Bankfull Width 6m (m) Mean Water Depth 0.30 (cm)

% Riffle 100 % Pool 0 % Run 0 % Flat 0

Evidence of eroding banks, Comments on bank stability stable w/ vegetation

Substrate (% cover)

Bedrock 0 Cobble 0 Sand 30 Silt 50 Muck 0
Boulder 0 Gravel 0 Clay 0 Marl 20 Detritus 0

In-water Cover

Cover Types Present (circle): Overhanging Vegetation Woody Debris Aquatic Veg algae
Undercut Banks 0 Deep Pool 0 Watercress 0 Boulder 0 Other 0

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

57% terrestrial shrubs, early

Adjacent Land Use farmland - ag. field

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

spawning, nursery

Migratory Obstructions (seasonal, permanent)

permanent

Note any fish observations

Waterbody Notes

Natural Watercourse ✓ Trapezoidal Channel 0 Grassed Swale 0 Buried Tile 0

Surficial Drainage (i.e. furrows) 0 Dugout Pond 0 Dominated by Aquatic Veg 0 Dry 0

Other Habitat Notes, Incidental Wildlife Observations, etc. heard chorus frogs

Field Notes Authored by K. Clayton

Field Notes QA/QCed by M. Faiella

Canal Bank Rd



Railway bed

Bush lot

Set's farm

REA (previously mapped)

Bulldozed area

Bush lot

REA waterbody
R111045-1



WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

Stantec

Station # R11T045-2 Project Name Niagara Wind
 Watercourse Name unknown Project # 160950269
 Photos 71-76 Field Staff KC & MF
 Date Apr 19 / 12 Time 11:55
 Weather conditions in previous 24 hrs 12°C, overcast
 GPS Coordinates (Zone) 17T E 0622729 N 4748832 Datum NAD 83
 Descriptive Location 500m south of Canal Bank Rd., 500m east of Bird Road.

Water Quality

Dissolved Oxygen (mg/L) standing water pH 7.2 Conductivity (μ S/cm) 150
 Water Temperature ($^{\circ}$ C) 12 Air Temperature ($^{\circ}$ C) 11
 Time in situ measurements taken 11:55

Watercourse Dimensions & Morphology

Mean Watercourse Width 2m (m) Maximum Pool Depth 20 (cm)
 Mean Bankfull Width 4m (m) Mean Water Depth 15 (cm)
 % Riffle 100 % Pool 0 % Run 100 % Flat 0
 Evidence of eroding banks, Comments on bank stability Stable banks

Substrate (% cover)

Bedrock 0 Cobble 0 Sand 20 Silt 60 Muck 0
 Boulder 0 Gravel 0 Clay 20 Marl 20 Detritus 0

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other reed, canary, cattails, algae, phragmites

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 50%, grasses, reeds

Adjacent Land Use farm land

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) spawning, nursery

Migratory Obstructions (seasonal, permanent) seasonal

Note any fish observations —

Waterbody Notes

Natural Watercourse — Trapezoidal Channel ✓ Grassed Swale — Buried Tile —
 Surficial Drainage (i.e. furrows) — Dugout Pond — Dominated by Aquatic Veg ✓ Dry —

Other Habitat Notes, Incidental Wildlife Observations, etc. —

Field Notes Authored by K. Clayton

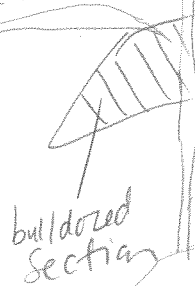
Field Notes QA/QCed by M. Faiella

Canal Bank Rd

Rail bed



REA (Previously mapped)



bulldozed section

REA RIIT04S-2
• standing water
• can't drive through it.
• dominated by aquatic veg.

Bushlot



WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

Stantec

Station # P11045-3 Project Name Niagara Wind
 Watercourse Name unknown Project # 160950269
 Photos 17-82 Field Staff KE & MF
 Date Apr 19/12 Time 12:08
 Weather conditions in previous 24 hrs 12°C overcast
 GPS Coordinates (Zone) 17N E 0623107 N 4749128 Datum NAD83
 Descriptive Location 400m South of Canal Bank Rd

Water Quality

- standing water
 Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
 Water Temperature (°C) _____ Air Temperature (°C) _____
 Time in situ measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width 1.5 (m) Maximum Pool Depth 20 (cm)
 Mean Bankfull Width 2m (m) Mean Water Depth 15 (cm)
 _____ % Riffle _____ % Pool 100 % Run _____ % Flat
 Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 40 Silt 40 Muck _____
 Boulder _____ Gravel _____ Clay _____ Marl 20 Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
25%, cattails, early

Adjacent Land Use

ag. field

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
spawning, nursery

Migratory Obstructions (seasonal, permanent)
intermittent or permanent

Note any fish observations _____

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel ✓ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc. frogs

Field Notes Authored by K. Clayton

Field Notes QA/QCed by M. Faiella

Canal Bank Road

↑
N

R11T045-2

Bush lot

REA
R11T045-3

ag. field

Proposed
turbine (X)

Bush lot.

swale.



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA
Tile #51

Station # R11T049-1 Project Name Niagara Wind
 Watercourse Name Unknown Project # 160950269
 Photos See photo log Field Staff K. Clayton, M. Faircliff
 Date June 12/18 Time 4:45 pm
 Weather conditions in previous 24 hrs Rain, hot & humid
 GPS Coordinates (Zone) 17T E 0626974 N 4748779 Datum NAD83
 Descriptive Location ~1 km north of Lakeshore Road, ~300m north of old Railbed

Water Quality

- no water
 Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
 Water Temperature (°C) _____ Air Temperature (°C) 27°C
 Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
 Mean Bankfull Width 6 (m) Mean Water Depth _____ (cm)
 _____ % Riffle _____ % Pool _____ % Run _____ % Flat
 Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 50 Silt 40 Muck _____
 Boulder _____ Gravel _____ Clay _____ Marl 10 Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other Sedges (Carex sp.)

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Note any fish observations _____

Waterbody Notes

Natural Watercourse ☒ Trapezoidal Channel ☒ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc. _____

Field Notes Authored by K. Clayton

Field Notes QA/QCed by MP

- would be great habitat if there was water (ie. in spring)
- lots of woody debris, shaded channel.

minor Road.

old Rail bed.



RIIT049

RIIT049-1

RIIT023

corn field.

mature riparian area.

agr. field.

Veldhuizer property



path

N
↑

old Road

Lake shore Road.



WIND FARM WATERBODY RAPID ASSESSMENT FORM

NON
REA
DUG POND

Stantec

Station # R11T052-1
Watercourse Name 52-1
Photos 8885
Date JUNE 8, 2017
Weather conditions in previous 24 hrs Sunny & cloudy periods.
GPS Coordinates (Zone) 17T E 614259
Descriptive Location _____

Project Name NIAGARA WIND
Project # 160950269
Field Staff T. CHANDLER M. ELLAH
Time 2:00 PM

Water Quality

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
Water Temperature (°C) _____ Air Temperature (°C) _____
Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)
_____ % Riffle _____ % Pool _____ % Run _____ % Flat
Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble _____ Sand _____ Silt _____ Muck _____
Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use _____

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Note any fish observations NONE

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
Surficial Drainage (i.e. furrows) _____ Dugout Pond ☒ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc. _____

Field Notes Authored by T. CHANDLER

Field Notes QA/QCed by WE



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

NON
REA

~~FILED~~

Station # B11T052
 Watercourse Name 52-2
 Photos 8886-88
 Date JUNE 8 2017
 Weather conditions in previous 24 hrs _____
 GPS Coordinates (Zone) 17T E 614161 N 4766482 Datum _____
 Descriptive Location _____

Project Name NIAGARA WIND
 Project # 160950269
 Field Staff TCHANDLER, M. ELLAH
 Time 2:05

Water Quality

DRY
 Dissolved Oxygen (mg/L) N/A pH N/A Conductivity (µS/cm) N/A
 Water Temperature (°C) N/A Air Temperature (°C) 25
 Time *in situ* measurements taken N/A

Watercourse Dimensions & Morphology

LOW AREA IN PLOUGHED FIELD
 Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
 Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)
 _____ % Riffle _____ % Pool _____ % Run _____ % Flat
 Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble _____ Sand _____ Silt _____ Muck _____
 Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

Water Cover

DRY
 Cover Types Present (circle): Undercut Banks _____ Deep Pool _____ Watercress _____ Aquatic Veg _____
 Overhanging Vegetation _____ Woody Debris _____ Boulder _____ Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

0% - SOY BEAN

Adjacent Land Use

AGRICULTURAL FIELD

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

NO FLOW

Note any fish observations _____

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile ☒
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc. _____

Field Notes Authored by TCHANDLER

Field Notes QA/QCed by MP



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

NON
REA
FILED

Station # R11T052

Project Name NIAGARA WIND

Watercourse Name 52-3

Project # 160950269

Photos 8889

Field Staff TCHANDLER M ELLAH

Date JUNE 8 2012

Time 2:25

Weather conditions in previous 24 hrs

GPS Coordinates (Zone) 17T E 614366 N 4766321 Datum

Descriptive Location

Water Quality

Dissolved Oxygen (mg/L) DRY - TILED pH DRY - TILED Conductivity (μS/cm) DRY - TILED

Water Temperature (°C) DRY - TILED Air Temperature (°C) DRY - TILED

Time *in situ* measurements taken DRY - TILED

Watercourse Dimensions & Morphology

Mean Watercourse Width DRY - TILED (m) Maximum Pool Depth DRY - TILED (cm)

Mean Bankfull Width DRY - TILED (m) Mean Water Depth DRY - TILED (cm)

DRY - TILED % Riffle DRY - TILED % Pool DRY - TILED % Run DRY - TILED % Flat

Evidence of eroding banks, Comments on bank stability DRY - TILED

Substrate (% cover)

DRY - TILED Bedrock DRY - TILED Cobble DRY - TILED Sand DRY - TILED Silt DRY - TILED Muck DRY - TILED
DRY - TILED Boulder DRY - TILED Gravel DRY - TILED Clay DRY - TILED Marl DRY - TILED Detritus

In-water Cover

Cover Types Present (circle): DRY - TILED Undercut Banks DRY - TILED Deep Pool DRY - TILED Watercress DRY - TILED Aquatic Veg DRY - TILED
Overhanging Vegetation DRY - TILED Woody Debris DRY - TILED Boulder DRY - TILED Other DRY - TILED

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use

PLOUGHED ARI FIELD

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Note any fish observations

Waterbody Notes

Natural Watercourse DRY - TILED Trapezoidal Channel DRY - TILED Grassed Swale DRY - TILED Buried Tile DRY - TILED ✓

Surficial Drainage (i.e. furrows) DRY - TILED Dugout Pond DRY - TILED Dominated by Aquatic Veg DRY - TILED Dry DRY - TILED

Other Habitat Notes, Incidental Wildlife Observations, etc.

Field Notes Authored by TCHANDLER Field Notes QA/QCed by NR



WIND FARM WATERBODY RAPID ASSESSMENT FORM

NON
REA

Stantec

~~TILED~~

Station # R11T052
Watercourse Name 52-4
Photos 8890
Date JUNE 8, 2012
Weather conditions in previous 24 hrs _____
GPS Coordinates (Zone) 17T E 614423 N 4766319 Datum _____
Descriptive Location _____

Project Name NIAGARA WIND
Project # 160950269
Field Staff T. CHANDLER M. ELLIOT
Time 2:20 PM

Water Quality

DRY - TILED

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
Water Temperature (°C) _____ Air Temperature (°C) _____
Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)
_____ % Riffle _____ % Pool _____ % Run _____ % Flat
Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble _____ Sand _____ Silt _____ Muck _____
Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In Water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) _____

Adjacent Land Use

PROHIBITED AGRIC. FIELD

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) _____

Migratory Obstructions (seasonal, permanent) _____

NO FLOW
Note any fish observations _____

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile ☒
Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc. 0

Field Notes Authored by T. CHANDLER

Field Notes QA/QCed by ME



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

NON
REA
~~TILED~~

Station # R11TD 52

Watercourse Name 52-S

Photos 8891-92

Date JUNE 8, 2012

Weather conditions in previous 24 hrs Cloudy periods, Sun

GPS Coordinates (Zone) 17T E 614295

Descriptive Location _____

Project Name NIAGARA WIND

Project # 160950269

Field Staff T CHANDLER M ELLAH

Time 2:30 PM

Water Quality DRY - TILED

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____

Water Temperature (°C) _____ Air Temperature (°C) 25

Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology DRY

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)

Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)

_____ % Riffle _____ % Pool _____ % Run _____ % Flat

Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble _____ Sand _____ Silt _____ Muck _____
Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): _____ Undercut Banks _____ Deep Pool _____ Watercress _____ Aquatic Veg _____
Overhanging Vegetation _____ Woody Debris _____ Boulder _____ Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use

PLOUGGED AGRICULTURAL FIELD

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

NO FLOW

Note any fish observations _____

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile ☒

Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc.

Field Notes Authored by T CHANDLER Field Notes QA/QCed by MP



WIND FARM WATERBODY RAPID ASSESSMENT FORM

NON
REA

Stantec

~~TILED~~

Station # RI1052
Watercourse Name 52-6
Photos 8893-94
Date JUNE 8, 2012
Weather conditions in previous 24 hrs Sunny w cloudy periods
GPS Coordinates (Zone) 17T E 614492
Descriptive Location _____

Project Name NIAGARA WIND
Project # 160950769
Field Staff T CHANDLER M ELLAH
Time 2:45
Datum _____

Water Quality

DRY - TILED
Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
Water Temperature (°C) _____ Air Temperature (°C) 25
Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)
_____ % Riffle _____ % Pool _____ % Run _____ % Flat
Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

_____ Bedrock _____ Cobble _____ Sand _____ Silt _____ Muck
_____ Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus

Water Cover

DRY
Cover Types Present (circle): _____ Undercut Banks _____ Deep Pool _____ Watercress _____ Aquatic Veg
Overhanging Vegetation _____ Woody Debris _____ Boulder _____ Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) _____

Adjacent Land Use

CORN FIELD

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) _____

Migratory Obstructions (seasonal, permanent) _____

NO FLOW

Note any fish observations _____

Waterbody Notes

DRY
Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile ☒
Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc. Ø

Field Notes Authored by T. CHANDLER

Field Notes QA/QCed by MB



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Tile # 29

Non REAS

Station # RUT054
 Watercourse Name unknown
 Photos _____
 Date June 13/12
 Weather conditions in previous 24 hrs hot & humid
 GPS Coordinates (Zone) 17H E N Datum NAD83
 Descriptive Location ~ 2 m from Vaughn Road

Project Name Niagara Wind
 Project # 160950269
 Field Staff K. Clayton, M. Faiella
 Time _____

Water Quality

- no water
 Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (μ S/cm) _____
 Water Temperature ($^{\circ}$ C) _____ Air Temperature ($^{\circ}$ C) _____
 Time in situ measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
 Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)
 _____ % Riffle _____ % Pool _____ % Run _____ % Flat
 Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble _____ Sand _____ Silt _____ Muck _____
 Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Note any fish observations _____

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc.

** heard bald eagle calling in bushlet across the road from Vitucci's farm
observed red-tailed hawk flying over corn field

Field Notes Authored by K. Clayton

Field Notes QA/QCed by ME



WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

Stantec

Station # R11 TOSS Project Name Niagara Wind
 Watercourse Name unknown Project # 160950269
 Photos 116-122 Field Staff K. Clayton, M. Faiella
 Date Apr 5/12 Time 12:20 pm
 Weather conditions in previous 24 hrs 12°C, sunny
 GPS Coordinates (Zone) 17T E 0623818 N 4764372 Datum NAD 83
 Descriptive Location ~600m north of Elcho Road ~1 km east of Regional Rd 27

Water Quality

Dissolved Oxygen (mg/L) 12.04 pH 8.75 Conductivity (µS/cm) 345
 Water Temperature (°C) 6°C Air Temperature (°C) 5°C
 Time in situ measurements taken 12:31

Watercourse Dimensions & Morphology

Mean Watercourse Width 0.60 (m) Maximum Pool Depth 0.20 (cm)
 Mean Bankfull Width 2 (m) Mean Water Depth 0.15 (cm)
 % Riffle _____ % Pool 100 % Run _____ % Flat _____
 Evidence of eroding banks, Comments on bank stability banks are stable from Riparian vegetation

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 40 Silt _____ Muck _____
 Boulder _____ Gravel 60 Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

5% grasses, early

Adjacent Land Use

farmland

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

spawning, nursery, foraging

Migratory Obstructions (seasonal, permanent)

Note any fish observations

Waterbody Notes

Natural Watercourse ☒ Trapezoidal Channel ☒ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc.

Red wing blackbirds
Red tailed Hawk

Field Notes Authored by K.C.

Field Notes QA/QCed by M.F.

RITTOSS 1



eg. 10/10/07



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

NOT
A REA

Station # R11T056H

Watercourse Name 56H-1

Photos 8847-49

Date June 7, 2012

Weather conditions in previous 24 hrs Hot, sunny

GPS Coordinates (Zone) 17T E 626273

Descriptive Location _____

Project Name NIAGARA WIND

Project # 160950269

Field Staff J. Chandler M. Ellah

Time 5:30

N 4769267 Datum _____

Water Quality

Dissolved Oxygen (mg/L) DAY N/A pH N/A Conductivity (μS/cm) N/A

Water Temperature (°C) N/A Air Temperature (°C) 20

Time in situ measurements taken N/A

Watercourse Dimensions & Morphology

Mean Watercourse Width N/A (m) Maximum Pool Depth N/A (cm)

Mean Bankfull Width N/A (m) Mean Water Depth N/A (cm)

0 % Riffle 0 % Pool 0 % Run 0 % Flat

Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

DRY
Bedrock _____ Cobble _____ Sand _____ Silt _____ Muck _____
Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover:

DRY
Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

scrub
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use

Agricultural field - planted w crops.

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

No flow

Note any fish observations No

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale ✓ Buried Tile _____

Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ✓

Other Habitat Notes, Incidental Wildlife Observations, etc.

No Access to drainage feature except along Fifteen Road.

Field Notes Authored by J. Chandler

Field Notes QA/QCed by NA



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Not REA
RIIT057
Tile 46
F346

Station # RIIT057
Watercourse Name _____
Photos see log
Date JUNE 12 2012
Weather conditions in previous 24 hrs Rain
GPS Coordinates (Zone) 17 E 625140 N 4768603 Datum
Descriptive Location Brook Rd just south of Rail Tracks

Project Name Niagara Wind
Project # 160950269
Field Staff KE + JK
Time 2:44pm

Water Quality

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (μ S/cm) _____
Water Temperature ($^{\circ}$ C) _____ Air Temperature ($^{\circ}$ C) _____
Time in situ measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)
_____ % Riffle _____ % Pool _____ % Run _____ % Flat
Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble _____ Sand _____ Silt _____ Muck _____
Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Note any fish observations _____

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
Surficial Drainage (i.e. furrows) ☒ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc.

- no watercourse or water body, just surficial drainage
- ATV trail at back of second property near turbine

Field Notes Authored by KE

Field Notes QA/QCed by Joe Kene



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

RCA
RIIT0584

F333

Station # RIIT0584-1

Watercourse Name -

Photos See log

Date June 12 2012

Weather conditions in previous 24 hrs rain

GPS Coordinates (Zone) E 628432

N 4767522 Datum

Descriptive Location conc 4 blue crown + Roudene Rd

approx 800m south in field

Water Quality

Dissolved Oxygen (mg/L) mostly dry or too little water to sample

pH -

Conductivity (µS/cm) -

Water Temperature (°C) -

Air Temperature (°C) -

Time *in situ* measurements taken -

Watercourse Dimensions & Morphology

Mean Watercourse Width 0.5 (m)

Maximum Pool Depth - (cm)

Mean Bankfull Width - (m)

Mean Water Depth - (cm)

- % Riffle

- % Pool

- % Run

- % Flat

Evidence of eroding banks, Comments on bank stability -

Substrate (% cover)

Bedrock -

Cobble 20

Sand -

Silt -

Muck -

Boulder -

Gravel 80

Clay -

Marl -

Detritus -

In-water Cover

Cover Types Present (circle):

Undercut Banks -

Deep Pool -

Watercress -

Aquatic Veg

Overhanging Vegetation

Woody Debris -

Boulder -

Other -

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

10% shrub near bush lot

Adjacent Land Use

corn, soy, hay

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

none

Migratory Obstructions (seasonal, permanent)

dry

Note any fish observations

none

Waterbody Notes

Natural Watercourse -

shallow
Trapezoidal Channel ☒

Grassed Swale -

Buried Tile -

Surficial Drainage (i.e. furrows) -

Dugout Pond -

Dominated by Aquatic Veg ☒

Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc.

- shallow degraded channel filled with grasses + juncus

- some carex sp + can. bluejoint

- noted burrowing crayfish burrows

Field Notes Authored by KE

Field Notes QA/QCed by geller

→ OVER

- shallow, narrow defined channel along back edge of field
- 100s definition definition + ploughed through in adjacent field
- BOBOLINK observed in hay field
~ 10-20



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

NON
REA outside
woodl.
REA inside

Station # R11T059
Watercourse Name S9-2
Photos 8828-29
Date JUNE 7, 2012
Weather conditions in previous 24 hrs _____
GPS Coordinates (Zone) 17N E 629920 N 4767524 Datum _____
Descriptive Location _____

Project Name NIAGARA WIND
Project # 160930269
Field Staff T. Chandler M. ELLAN
Time 2:25 PM

Water Quality

Dissolved Oxygen (mg/L) DRY pH DRY Conductivity (µS/cm) DRY
Water Temperature (°C) DRY Air Temperature (°C) 25
Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width NO WATER (m) Maximum Pool Depth NA (cm)
Mean Bankfull Width ~2 (m) Mean Water Depth NA (cm)
0 % Riffle 0 % Pool 0 % Run 0 % Flat
Evidence of eroding banks, Comments on bank stability Poorly defined swale w/
at woodlot - defined channel in woodlot

Substrate (% cover)

NA
Bedrock _____ Cobble _____ Sand _____ Silt _____ Muck _____
Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover

NO WATER
Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
NO watercourse w/ woodlot; 100% shaded in woodlot
Adjacent Land Use Hay field w/ woodlot; woodlot

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) _____

Migratory Obstructions (seasonal, permanent) dry / no flow

Note any fish observations NO FISH

Waterbody Notes

Natural Watercourse DRY Trapezoidal Channel _____ Grassed Swale DRY Buried Tile _____
Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry DRY

Other Habitat Notes, Incidental Wildlife Observations, etc. Baboblinks in area.

Field Notes Authored by T. Chandler

Field Notes QA/QCed by MB



WIND FARM WATERBODY RAPID ASSESSMENT FORM

NOT ME
REA

Stantec

Station # R11T059
Watercourse Name 59-3
Photos 8833 8830
Date June 7, 2012

Project Name NIAGARA WIND
Project # 160950269
Field Staff T. Chandler M. Ellah
Time 2:45

Weather conditions in previous 24 hrs Rain
GPS Coordinates (Zone) 17T E 629280 N 476 7449 Datum
Descriptive Location _____

Water Quality

Isolated pool at d/s end of CSP culvert @ Rosedene Rd.
Dissolved Oxygen (mg/L) 1.74 pH 7.79 Conductivity (µS/cm) 4380
Water Temperature (°C) 21.66 Air Temperature (°C) 27
Time *in situ* measurements taken 2:45 PM

Watercourse Dimensions & Morphology

DRY - u/s Road.
Mean Watercourse Width dry (m) Maximum Pool Depth N/A (cm)
Mean Bankfull Width 2-3 (m) Mean Water Depth _____ (cm)
0 % Riffle 0 % Pool 0 % Run 0 % Flat
Evidence of eroding banks, Comments on bank stability stable

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 100 Silt _____ Muck _____
Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

dry/low flow - perched culvert at Rosedene Rd. ~10cm
Note any fish observations NONE

Waterbody Notes

Intermittent waterbody along roadside ditch.
Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

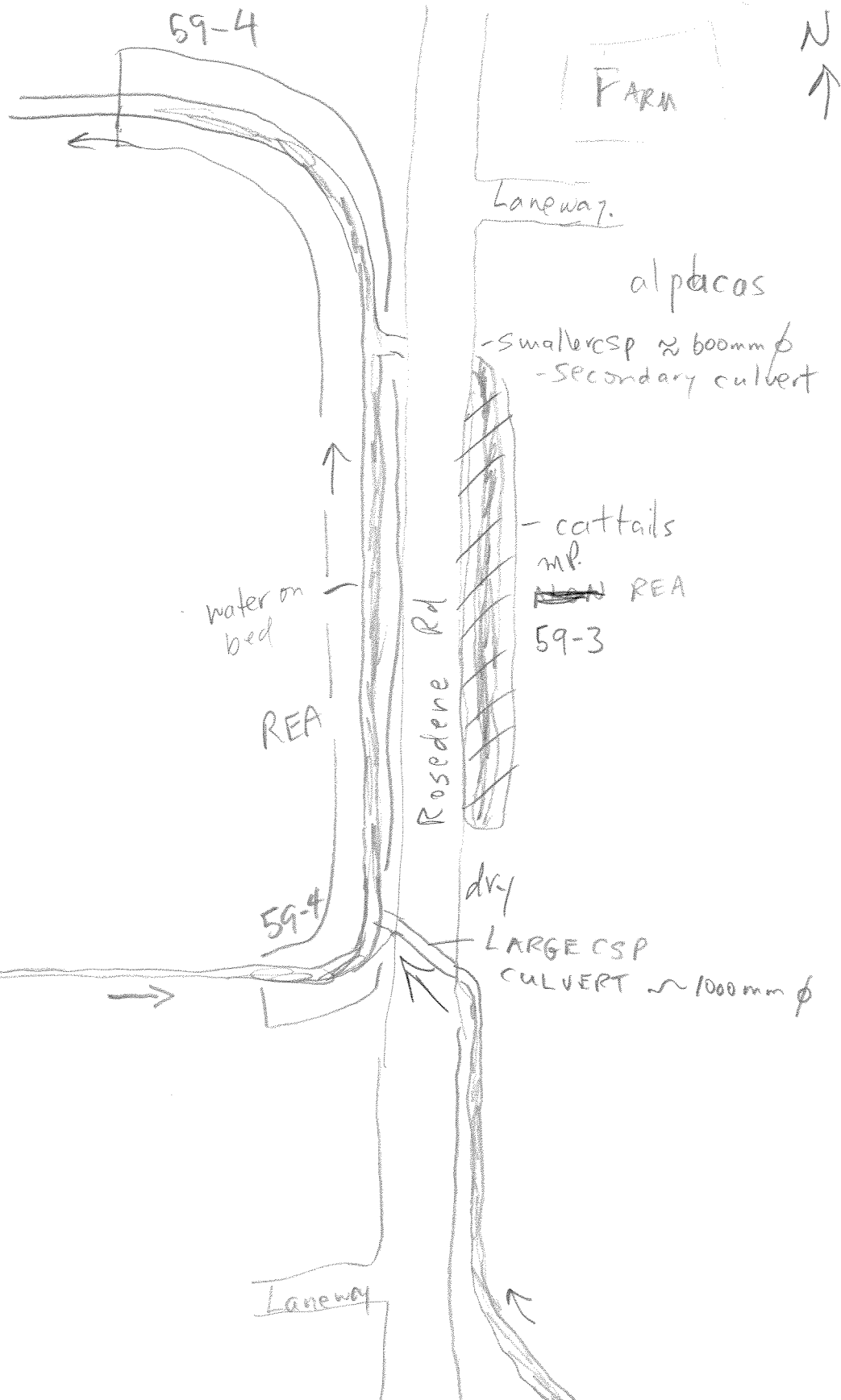
Other Habitat Notes, Incidental Wildlife Observations, etc.

Field Notes Authored by M. Ellah

Field Notes QA/QCed by MP

R11T059

59-3





WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

Stantec

Station # RIOT59 Project Name: NIAGARA WIND
 Watercourse Name 59-4 Project #: 160950269
 Photos 8831-32, 34, 35, 36 Field Staff T. Chandler, M. Ellah
 Date JUNE 7, 2012 Time 2:55
 Weather conditions in previous 24 hrs. Thundershowers previous evening, then sunny
 GPS Coordinates (Zone) 17T E 629274 N 4767433 Datum
 Descriptive Location

Water Quality

Dissolved Oxygen (mg/L) 8.00 pH 8.17 Conductivity (µS/cm) 4062
 Water Temperature (°C) 27.15 Air Temperature (°C)
 Time *in situ* measurements taken 3:00 PM

Watercourse Dimensions & Morphology

- Vegetation-dominated morphology.
 Mean Watercourse Width 1.5 (m) Maximum Pool Depth 20 (cm)
 Mean Bankfull Width 2.5 (m) Mean Water Depth 5 (cm)
0 % Riffle 100 % Pool 0 % Run 0 % Flat
 Evidence of eroding banks, Comments on bank stability Evidence of minor basal scour.

Substrate (% cover)

Bedrock / Cobble 10 Sand 60 Silt / Muck /
 Boulder / Gravel 30 Clay / Marl / Detritus /

In-water Cover

Cover Types Present (circle): Undercut Banks minor Deep Pool minor Watercress / Aquatic Veg /
 Overhanging Vegetation / Woody Debris / Boulder / Other /

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use

70% grass, early
Road to east, pasture hayfield to west of drainage feature

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

potential spawning or nursery area

Migratory Obstructions (seasonal, permanent)

low/no flow

Note any fish observations None

Waterbody Notes

Natural Watercourse Trapezoidal Channel ✓? Grassed Swale Buried Tile
 Surficial Drainage (i.e. furrows) Dugout Pond Dominated by Aquatic Veg Dry

Other Habitat Notes, Incidental Wildlife Observations, etc.

Intermittent channel along roadside ditch. Lots of water, no evidence of flow. very slight flow evident.

Field Notes Authored by T. Chandler

Field Notes QA/QCed by mbz



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Tile 54 REA

Station # RIITOG1-1
 Watercourse Name Unknown
 Photos See photo log
 Date June 18/12
 Weather conditions in previous 24 hrs Rain, hot & humid
 GPS Coordinates (Zone) 17T E 0625279 N 4747894 Datum NAD83
 Descriptive Location ~800m north of Lake Shore Road

Project Name Niagara Wind
 Project # 160950269
 Field Staff K. Clayton, M. Faiella
 Time 2:50

Water Quality

Dissolved Oxygen (mg/L) 3.51 pH 7.66 Conductivity (µS/cm) 535
 Water Temperature (°C) 22.26 Air Temperature (°C) 27°C
 Time in situ measurements taken 3:02

Watercourse Dimensions & Morphology

Mean Watercourse Width 2 (m) Maximum Pool Depth 0.75 (cm) *in pool as field entrance*
 Mean Bankfull Width 3.5 (m) Mean Water Depth 0.40 (cm)
 % Riffle 10 % Pool 90 % Run 0 % Flat 0
 Evidence of eroding banks, Comments on bank stability Fairly stable - lots of vegetation

Substrate (% cover)

Bedrock 0 Cobble 0 Sand 40 Silt 10 Muck 0
 Boulder 0 Gravel 50 Clay 0 Marl 0 Detritus 0

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

100% grasses (reed canary grass, early farmland)
 Adjacent Land Use farmland

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

spawning, nursery, foraging
 Migratory Obstructions (seasonal, permanent)

permanent
 Note any fish observations -

Waterbody Notes

Natural Watercourse ✓ Trapezoidal Channel ✓ Grassed Swale 0 Buried Tile 0
 Surficial Drainage (i.e. furrows) 0 Dugout Pond 0 Dominated by Aquatic Veg ✓ Dry 0

Other Habitat Notes, Incidental Wildlife Observations, etc.

leopard frog

Field Notes Authored by K. Clayton

Field Notes QA/QCed by MF



ag field

ag field

EEA
RIIT061-1

channel opens
up into a little
pond/pool

some
mature
trees, but
mostly grass

lots of Riparian
veg.

ag. field/
corn

ag. field/
corn

path

Barrick's
yellow shed

Lakeshore Road



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Tile 5

REA

both are REAS

* notes for 211062 on ba

Station # R11T062-14-2
Watercourse Name unknown
Photos See photo log
Date June 12/12

Project Name Niagara Wind
Project # 160950269
Field Staff K. Clayton, M. Farella
Time 10:43

Weather conditions in previous 24 hrs Rain, hot & humid
GPS Coordinates (Zone) 17T E 0621903 N 4751418 Datum NAD83
Descriptive Location ~600m west of Hutchinson Road

Water Quality

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
Water Temperature (°C) _____ Air Temperature (°C) 21
Time in situ measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width 2 (m) Maximum Pool Depth 0.60 (cm)
Mean Bankfull Width 5 (m) Mean Water Depth 0.50 (cm)
% Riffle _____ % Pool 100 % Run _____ % Flat _____
Evidence of eroding banks, Comments on bank stability stable - vegetated

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 40 Silt 10 Muck _____
Boulder _____ Gravel 50 Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use 75% small trees & scrub, early farmland

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

spawning nursery, foraging
Migratory Obstructions (seasonal, permanent) _____

Note any fish observations _____

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel ☒ Grassed Swale _____ Buried Tile _____
Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc. _____

Field Notes Authored by K. Clayton

Field Notes QA/QCed by _____

bush lot.

x RIIT063

bush lot

x RIIT062
swale

REA
RIIT062-1

ag. field

ag. field

ag. field

Riparian
veg.

cattails.

* very little water in channel - too low
for YSI reading.
width = 2.5
bank fill = 4.5
100% shaded
dominated by
cattails.

Riparian
veg.

cattails

Small
trees.

REA
RIIT062-2

Hutchinson Road

17T 0622513 475621

N →



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

RETA
RIIT065-

Fig 6

Station # RIIT065-1
Watercourse Name
Photos see log
Date June 13 2012

Project Name Niagara Wind
Project # 160950269
Field Staff KE + JK
Time 12:12 pm

Weather conditions in previous 24 hrs rain & sun
GPS Coordinates (Zone) 17T E 623340 N 4754876 Datum
Descriptive Location along Townline Dunnville watercourse, just north of Jerry Dump Rd

Water Quality

Dissolved Oxygen (mg/L) 8.84 pH 8.30 Conductivity (µS/cm) 701
Water Temperature (°C) 18.41 Air Temperature (°C) 28°
Time in situ measurements taken 12:15 pm

Watercourse Dimensions & Morphology

Mean Watercourse Width 2.5 (m) Maximum Pool Depth 30 (cm)
Mean Bankfull Width 5 (m) Mean Water Depth 20 (cm)
% Riffle 100 % Pool % Run % Flat

Evidence of eroding banks, Comments on bank stability

steep, but stable + vegetated.

Substrate (% cover)

Bedrock	Cobble	Sand	Silt	Muck
Boulder	Gravel	Clay	Marl	Detritus

40 60

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg waterplantain
Overhanging Vegetation Woody Debris Boulder Other iris typha

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

30% cottonwood, ash, sumac, grape, phragmites, dogwood

Adjacent Land Use

Ag - corn & soy

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) none

Migratory Obstructions (seasonal, permanent) permanent

Note any fish observations none

Waterbody Notes

Natural Watercourse Trapezoidal Channel ✓ Grassed Swale Buried Tile
Surficial Drainage (i.e. furrows) Dugout Pond Dominated by Aquatic Veg ✓ Dry

Other Habitat Notes, Incidental Wildlife Observations, etc.

- incised channel flows east/west & connects to
incised channel along Townline that flows to
Jerry Dump Rd

Field Notes Authored by KE

Field Notes QA/QCed by Joe/Kee

Bush lot

Jenny Jump Rd

REA

corn

REA-1

soy

1/2

REA-1

REA-1

town line



WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

Stantec

Station # R11T072-1

Project Name Niagara Wind

Watercourse Name unknown

Project # 160950269

Photos 107-117

Field Staff KC MF

Date Apr 19/12

Time 3:16

Weather conditions in previous 24 hrs 12°C, overcast

GPS Coordinates (Zone) 17T E 0620444

N 4756980

Descriptive Location 500m east of Gore Rd, 600 North of

Hutchinson Road

Water Quality

Dissolved Oxygen (mg/L) 1.0

pH 7.0

Conductivity (µS/cm) 120

Water Temperature (°C) 12

Air Temperature (°C) 12

Time in situ measurements taken standing H₂O

Watercourse Dimensions & Morphology

Mean Watercourse Width 1.5 (m)

Maximum Pool Depth 20 (cm)

Mean Bankfull Width 4 (m)

Mean Water Depth 15 (cm)

% Riffle 100

% Pool 0

% Run 100

% Flat 0

Evidence of eroding banks, Comments on bank stability stable

Substrate (% cover)

Bedrock 0

Cobble 0

Sand 50

Silt 50

Muck 0

Boulder 0

Gravel 0

Clay 0

Marl 0

Detritus 0

In-water Cover

Cover Types Present (circle):

Undercut Banks 0

Deep Pool 0

Watercress 0

Aquatic Veg

Overhanging Vegetation 0

Woody Debris 0

Boulder 0

Other 0

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) <5%, grasses, early

Adjacent Land Use farmland

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) spawning, nursery area, foraging

Migratory Obstructions (seasonal, permanent) seasonal

Note any fish observations 0

Waterbody Notes

Natural Watercourse 0

Trapezoidal Channel ✓

Grassed Swale 0

Buried Tile 0

Surficial Drainage (i.e. furrows) 0

Dugout Pond 0

Dominated by Aquatic Veg 0

Dry 0

Other Habitat Notes, Incidental Wildlife Observations, etc. - frogs

Field Notes Authored by KC

Field Notes QA/QCed by MF

Bush lot

REA
R11T072-1

ag. field.

⊗ turbine

REA
R11T072-1

REA

haftstede
farm

GORE ROAD



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Non REA
R11T076
Fry20

Station # R11T076 Project Name Niagara Wind
 Watercourse Name Unknown Project # 160950269
 Photos — Field Staff KE + JK
 Date June 12 2017 Time 4:50
 Weather conditions in previous 24 hrs rain
 GPS Coordinates (Zone) 17 E 623502 N 4765881 Datum
 Descriptive Location north of Vaughan Rd.

Water Quality

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
 Water Temperature (°C) _____ Air Temperature (°C) _____
 Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
 Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)
 _____ % Riffle _____ % Pool _____ % Run _____ % Flat
 Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble _____ Sand _____ Silt _____ Muck _____
 Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Note any fish observations _____

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) ☒ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc.

- low lying wetland area w/ minimal surficial
 drainage into
 - no other water bodies

Field Notes Authored by KE

Field Notes QA/QCed by Jr. Rose



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA
R11T078M

Station # R11T078M-1
Watercourse Name -
Photos See log
Date June 12 2012
Weather conditions in previous 24 hrs rain
GPS Coordinates (Zone) 17T E 628928
Descriptive Location Vaughan Rd, 800m west of Doyle Rd. on South side.

Project Name Niagara Wind
Project # 1100950269
Field Staff KE + JK
Time 4 pm.

Fig 3

Water Quality

Dissolved Oxygen (mg/L) - pH - Conductivity (µS/cm) -
Water Temperature (°C) - Air Temperature (°C) -
Time *in situ* measurements taken -

Watercourse Dimensions & Morphology

Mean Watercourse Width 1.5 (m) Maximum Pool Depth - (cm) dry
Mean Bankfull Width 1.5 (m) Mean Water Depth - (cm)
- % Riffle - % Pool - % Run - % Flat
Evidence of eroding banks, Comments on bank stability -

Substrate (% cover)

Bedrock - Cobble 20 Sand - Silt - Muck -
Boulder - Gravel 80 Clay - Marl - Detritus -

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other -

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
0%

Adjacent Land Use

Ag bay

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
none

Migratory Obstructions (seasonal, permanent)
dry

Note any fish observations
none

Waterbody Notes

Natural Watercourse - Trapezoidal Channel ✓ Grassed Swale - Buried Tile -
Surficial Drainage (i.e. furrows) - Dugout Pond - Dominated by Aquatic Veg - Dry ✓

Other Habitat Notes, Incidental Wildlife Observations, etc.

- incised channel - dry

Field Notes Authored by KE

Field Notes QA/QCed by JK



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Non REA
R11T078H

Station # R11T078H-2
Watercourse Name _____
Photos see log
Date June 12 2012
Weather conditions in previous 24 hrs rain
GPS Coordinates (Zone) 7T E 628466 N 4765214 Datum _____
Descriptive Location Vaughan Rd 800m west of Bayle Rd

Project Name Niagara Wind
Project # 160950269
Field Staff KE + JIK
Time 3:50 pm

Fig 3

Water Quality

Dissolved Oxygen (mg/L) _____ pH dry Conductivity (µS/cm) _____
Water Temperature (°C) _____ Air Temperature (°C) _____
Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width 0.5 (m) Maximum Pool Depth dry (cm)
Mean Bankfull Width 0.75 (m) Mean Water Depth dry (cm)
_____ % Riffle _____ % Pool _____ % Run _____ % Flat
Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble 20 Sand _____ Silt _____ Muck _____
Boulder _____ Gravel 80 Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
0%

Adjacent Land Use

Ag hay +

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
none

Migratory Obstructions (seasonal, permanent)
dry

Note any fish observations
none

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc.

- very shallow, narrow defined channel veg w/ RCG on banks
- farmer could plough (does at one point for access) but probably leaves for surficial drainage

Field Notes Authored by KE

Field Notes QA/QCed by Joe Hare



WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

Stantec

Station # R11T079
 Watercourse Name 79-1
 Photos 8807-09
 Date June 7, 2012
 Weather conditions in previous 24 hrs _____
 GPS Coordinates (Zone) 17T E 630771 N 4772424 Datum _____
 Descriptive Location _____

Project Name Niagara Wind
 Project # 160950269
 Field Staff T. Chandler M. Elleh
 Time 10:55 AM

Water Quality

Dissolved Oxygen (mg/L) 4.40 pH 8.30 Conductivity (µS/cm) 766
 Water Temperature (°C) 16.22 Air Temperature (°C) 25
 Time *in situ* measurements taken 11:05 AM

Watercourse Dimensions & Morphology

Mean Watercourse Width 4 (m) Maximum Pool Depth 100 (cm)
 Mean Bankfull Width 8 (m) Mean Water Depth 50 (cm)
0 % Riffle 100 % Pool 0 % Run 0 % Flat
 Evidence of eroding banks, Comments on bank stability minor scour (basal) along outside of meander - not excessive

Substrate (% cover)

0 Bedrock 20 Cobble 10 Sand 15 Silt 1 Muck
30 Boulder 10 Gravel 15 Clay 1 Marl 1 Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
50% shaded, grasses, early successional
 Adjacent Land Use
Scrubland, mostly open/grass with few trees

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
Spawning & nursery area

Migratory Obstructions (seasonal, permanent)
Low flow (possible) - no water movement observed.

Note any fish observations Non observed

Waterbody Notes

Natural Watercourse ☒ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc.

Walnuts close by, Green frog, tadpoles, red bellied wood pecker, yellow warbler.

Field Notes Authored by T. Chandler

Field Notes QA/QCed by ME



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

Station # B11T079 Project Name NIAGARA wind
 Watercourse Name 79-2A Project # 160950269
 Photos 8810-8817, 8818 Field Staff T. Chandler, M. Ellah
 Date JUNE 7, 2012 Time 11:35
 Weather conditions in previous 24 hrs Thundershowers late yesterday
 GPS Coordinates (Zone) 17 T E 630210 N 4771506 Datum
 Descriptive Location _____

Water Quality MOSTLY DRY - SMALL PONDED AREAS

Dissolved Oxygen (mg/L) 7.22 pH 9.34 Conductivity (μ S/cm) 1413
 Water Temperature ($^{\circ}$ C) 27.34 Air Temperature ($^{\circ}$ C) 25
 Time *in situ* measurements taken 11:35

Watercourse Dimensions & Morphology - 30% Pool - 70% DRY

Mean Watercourse Width 1.0 (m) Maximum Pool Depth 10 (cm)
 Mean Bankfull Width 2.0 (m) Mean Water Depth 2 (where ponded) (cm)
0 % Riffle 30 % Pool 0 % Run 0 % Flat

Evidence of eroding banks, Comments on bank stability Well defined channel w evidence
of recent bank scour - banks ~0.5m high - NOT PLOUGHED
Vertical incision occurring along channel - exposed drain pipe.

Substrate (% cover)

Bedrock	<u>2</u>	Cobble	<u>20</u>	Sand	<u>50</u>	Silt	<u>/</u>	Muck
Boulder	<u>8</u>	Gravel	<u>20</u>	Clay	<u>/</u>	Marl	<u>/</u>	Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

5% shaded - early successional - grasses

Adjacent Land Use

Agricultural field

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Low/no flow

Note any fish observations None

Waterbody Notes

Natural Watercourse ☒ Trapezoidal Channel ☐ Grassed Swale ☐ Buried Tile ☐
 Surficial Drainage (i.e. furrows) ☐ Dugout Pond ☐ Dominated by Aquatic Veg ☐ Dry ☐

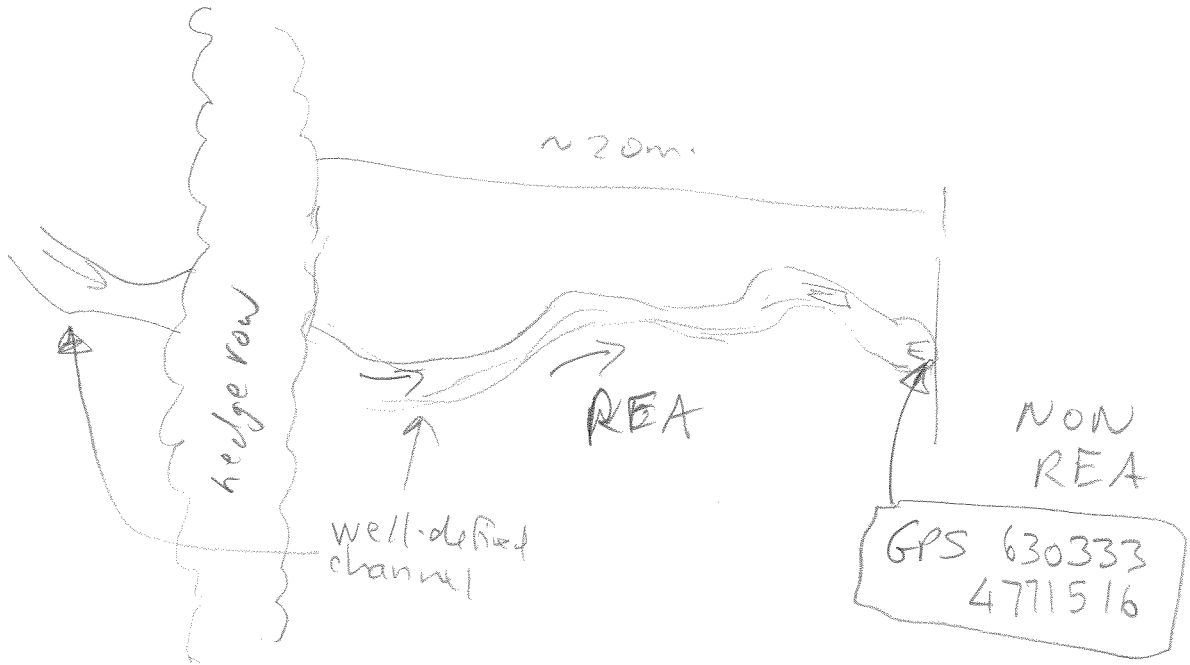
Other Habitat Notes, Incidental Wildlife Observations, etc. None

- Tile system failing - exposed, broken tiles.

Field Notes Authored by T. Chandler

Field Notes QA/QCed by NT

R11 TO 79
79-2A.





Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

NON
REA

Station # R11079
Watercourse Name 79-2B
Photos 8819
Date JUNE 7, 2012
Weather conditions in previous 24 hrs Thursday Thundershowers in area yesterday evening
GPS Coordinates (Zone) 12T E 630431 N 4771591 Datum
Descriptive Location

Project Name NIAGARA WIND
Project # 160950769
Field Staff T. Chandler, M. Ellah
Time 12:05

Water Quality NO WATER - DRY

Dissolved Oxygen (mg/L) pH Conductivity (μS/cm)
Water Temperature (°C) Air Temperature (°C) 25
Time *in situ* measurements taken

Watercourse Dimensions & Morphology

NO CHANNEL - Poorly defined swale
Mean Watercourse Width (m) Maximum Pool Depth (cm) - Tiled.
Mean Bankfull Width (m) Mean Water Depth (cm)
 % Riffle % Pool % Run % Flat
Evidence of eroding banks, Comments on bank stability

Substrate (% cover)

Bedrock Cobble Sand Silt Muck
 Boulder Gravel Clay Marl Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use

Agricultural Field

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Note any fish observations

Waterbody Notes

Natural Watercourse Trapezoidal Channel Grassed Swale Buried Tile ✓
Surficial Drainage (i.e. furrows) Dugout Pond Dominated by Aquatic Veg Dry ✓

Other Habitat Notes, Incidental Wildlife Observations, etc. Flycatchers.

Field Notes Authored by T. Chandler

Field Notes QA/QCed by MP



WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

Stantec

Station # R117079
 Watercourse Name 79-2C
 Photos 8820, 8822, 8823
 Date JUNE 7, 2012
 Weather conditions in previous 24 hrs Thunder storms previous evening
 GPS Coordinates (Zone) 17N E 630436
 Descriptive Location _____

Project Name NIAGARA WIND
 Project # 160950269
 Field Staff T Chandler M ELLAH
 Time 12:15 pm
 Datum _____

Water Quality

Dissolved Oxygen (mg/L) 6.05 pH 8.15 Conductivity (µS/cm) 967
 Water Temperature (°C) 19.35 Air Temperature (°C) 25
 Time *in situ* measurements taken 12:25

Watercourse Dimensions & Morphology

Mean Watercourse Width 1.0 (m) Maximum Pool Depth 20 (cm)
 Mean Bankfull Width 2.5 (m) Mean Water Depth 2 (cm)
 _____ % Riffle _____ % Pool _____ % Run _____ % Flat
 Evidence of eroding banks, Comments on bank stability minor undercut
minor basal scour

Substrate (% cover)

Bedrock _____ Cobble 20 Sand 80 Silt _____ Muck _____
 Boulder _____ Gravel 20 Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
90% - grasses etc, trees etc

Adjacent Land Use

Scrubland then ploughed agricultural field farther west - wooded area to east.

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
spawning/nursery potential

Migratory Obstructions (seasonal, permanent)
Low/no flow

Note any fish observations None

Waterbody Notes

Natural Watercourse ☒ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

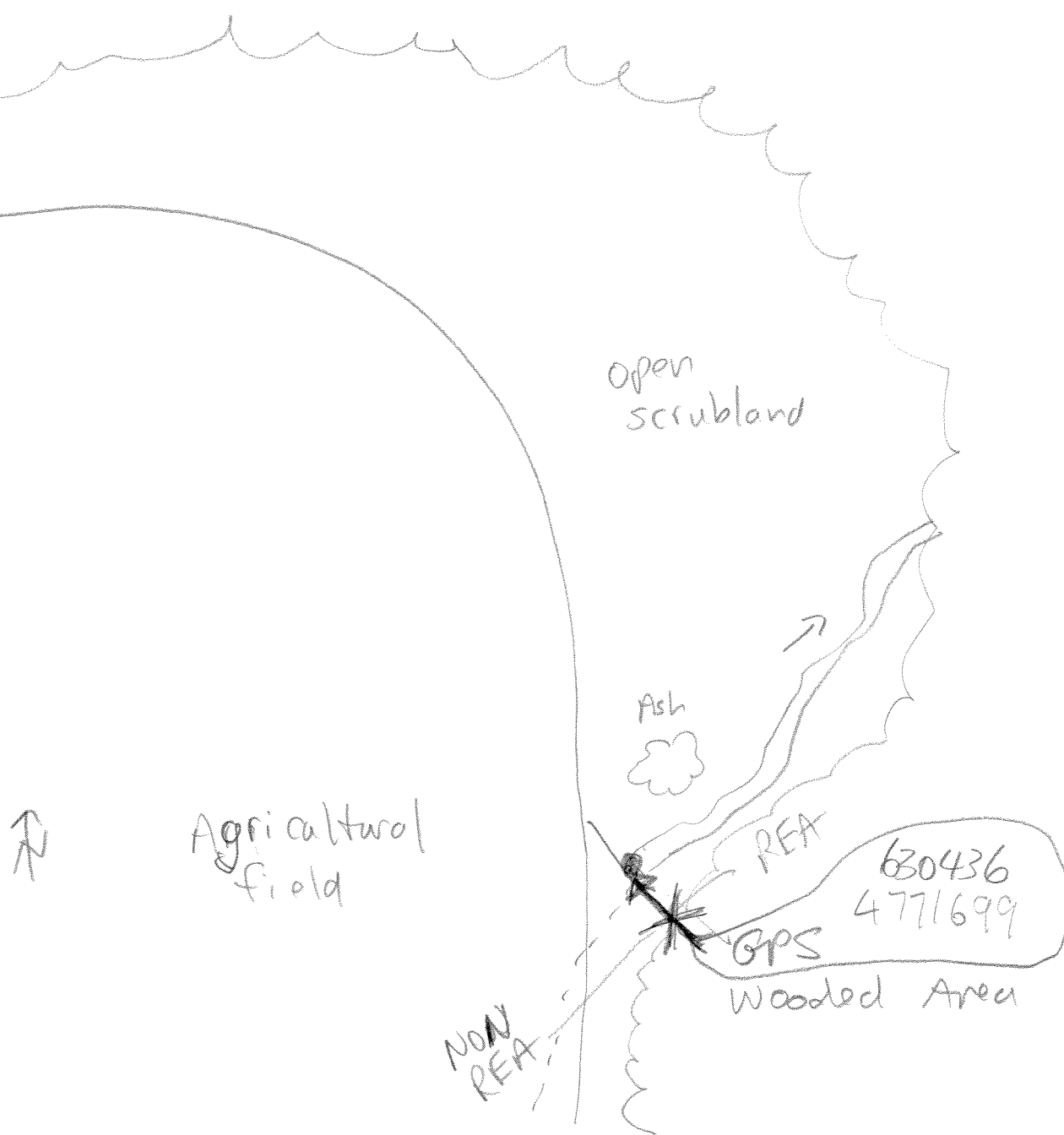
Other Habitat Notes, Incidental Wildlife Observations, etc.

green frog, slagbark hickory
- green frog heard in wooded area d/sy agricultural field.

Field Notes Authored by T. Chandler

Field Notes QA/QCed by JP

RN7079
79-2c





Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

tile 58

WB

Station # R11081a Project Name Niagara Wind
 Watercourse Name unknown trib. Project # 160950269
 Photos See photos Field Staff K. Clayton, M. Faiella
 Date June 11/12 Time 4:04 pm
 Weather conditions in previous 24 hrs Sunny & hot
 GPS Coordinates (Zone) 17T E 0616324 N 4767607 Datum NAD 83
 Descriptive Location off of concession 4 ~ 300m east of Jarlin Road & 600m west of McCollum Road

Water Quality

Dissolved Oxygen (mg/L) — pH — Conductivity (µS/cm) —
 Water Temperature (°C) — Air Temperature (°C) —
 Time in situ measurements taken —

- no water

Watercourse Dimensions & Morphology

Mean Watercourse Width — (m) Maximum Pool Depth — (cm)
 Mean Bankfull Width 2 (m) Mean Water Depth — (cm)
— % Riffle — % Pool — % Run — % Flat
 Evidence of eroding banks, Comments on bank stability —

Substrate (% cover)

Bedrock — Cobble 20 Sand 70 Silt 10 Muck —
 Boulder — Gravel — Clay — Marl — Detritus —

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other —

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use

95%, cattails & grasses, early successional
farm field - hay

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Note any fish observations

potential spawning
Seasonal

Waterbody Notes

Natural Watercourse ✓ Trapezoidal Channel ✓ m.p. Grassed Swale — Buried Tile —
 Surficial Drainage (i.e. furrows) — Dugout Pond — Dominated by Aquatic Veg — Dry —

Other Habitat Notes, Incidental Wildlife Observations, etc. —

Field Notes Authored by K. Clayton

Field Notes QA/QCed by Mark Pomroy

—N

McCullum Road

concession 4

Hay field

RHT08/a
REA
dry
channel



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

Station # R11T082 Project Name Niagara Wind
 Watercourse Name Unknown Project # 160950269
 Photos 108-115 Field Staff K.C. M.F.
 Date Apr 5/12 Time 11:25 am
 Weather conditions in previous 24 hrs 12°C, Sunny
 GPS Coordinates (Zone) 17T E 0618492 N 4754806 Datum Nad83
 Descriptive Location ~800m north of Hwy 3, ~800m east of Crown Rd

Water Quality

Dissolved Oxygen (mg/L) 11.2 mg/L pH 8.90 Conductivity (µS/cm) 320
 Water Temperature (°C) 6.20°C Air Temperature (°C) 3°C
 Time in situ measurements taken 11:40 am

Watercourse Dimensions & Morphology

Mean Watercourse Width 2m (m) Maximum Pool Depth 0.80 (cm) standing water
 Mean Bankfull Width 7 (m) Mean Water Depth 0.60 (cm)
 % Riffle _____ % Pool 100 % Run _____ % Flat _____
 Evidence of eroding banks, Comments on bank stability stable banks from Riparian veg.

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 40 Silt 10 Muck _____
 Boulder _____ Gravel 50 Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg duckweed
Overhanging Vegetation Woody Debris Boulder Other algae pondweeds
milfoil

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use shrubs/grasses, early agricultural field

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) spawning, nursery,aging

Migratory Obstructions (seasonal, permanent) permanent

Note any fish observations _____

Waterbody Notes

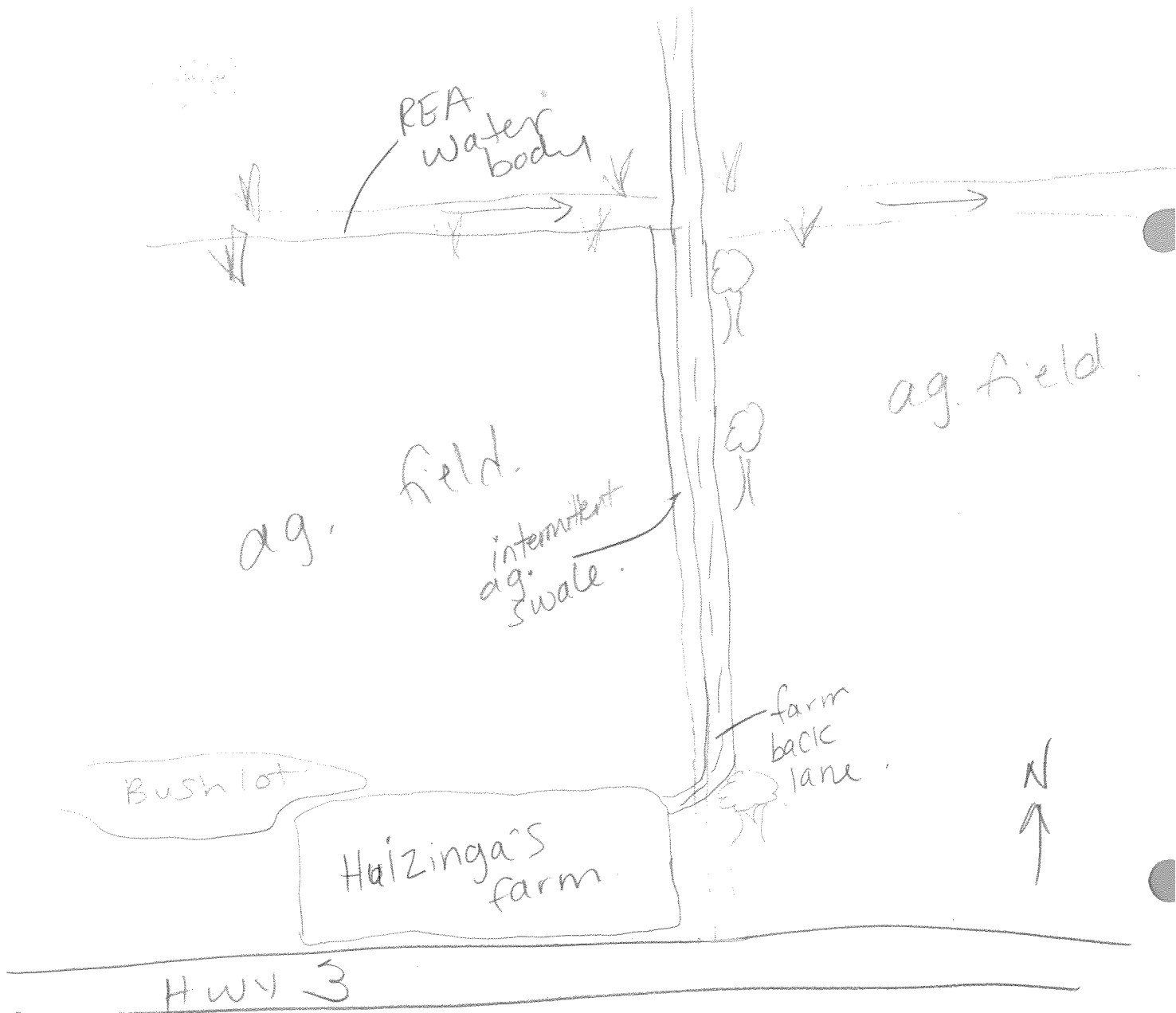
Natural Watercourse ☒ Trapezoidal Channel ☒ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg ☒ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc. Chorus frogs

Field Notes Authored by K. Clayton

Field Notes QA/QCed by M. Farella

R1170.82





Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

* REA?
L 110m n of culv is REA

Station # R11T082-2
Watercourse Name unknown
Photos 01-16
Date April 19/12
Weather conditions in previous 24 hrs overcast - 12°C
GPS Coordinates (Zone) 17T E 0618379
Descriptive Location 500m N of 3 Hwy, 1km west of Hutchison Rd.

Project Name Niagara Wind
Project # 160950269
Field Staff KC, MF
Time 8:15am
Datum NAD83

Water Quality

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
Water Temperature (°C) _____ Air Temperature (°C) _____
Time in situ measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width 1.5 (m) Maximum Pool Depth _____ (cm)
Mean Bankfull Width 5 (m) Mean Water Depth _____ (cm)
% Riffle _____ % Pool _____ % Run _____ % Flat _____
Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 50 Silt 50 Muck _____
Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use

< 5% shrubby veg & grasses, early agricultural field

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Note any fish observations

potentially spawning in early spring
seasonal/intermittent

Waterbody Notes

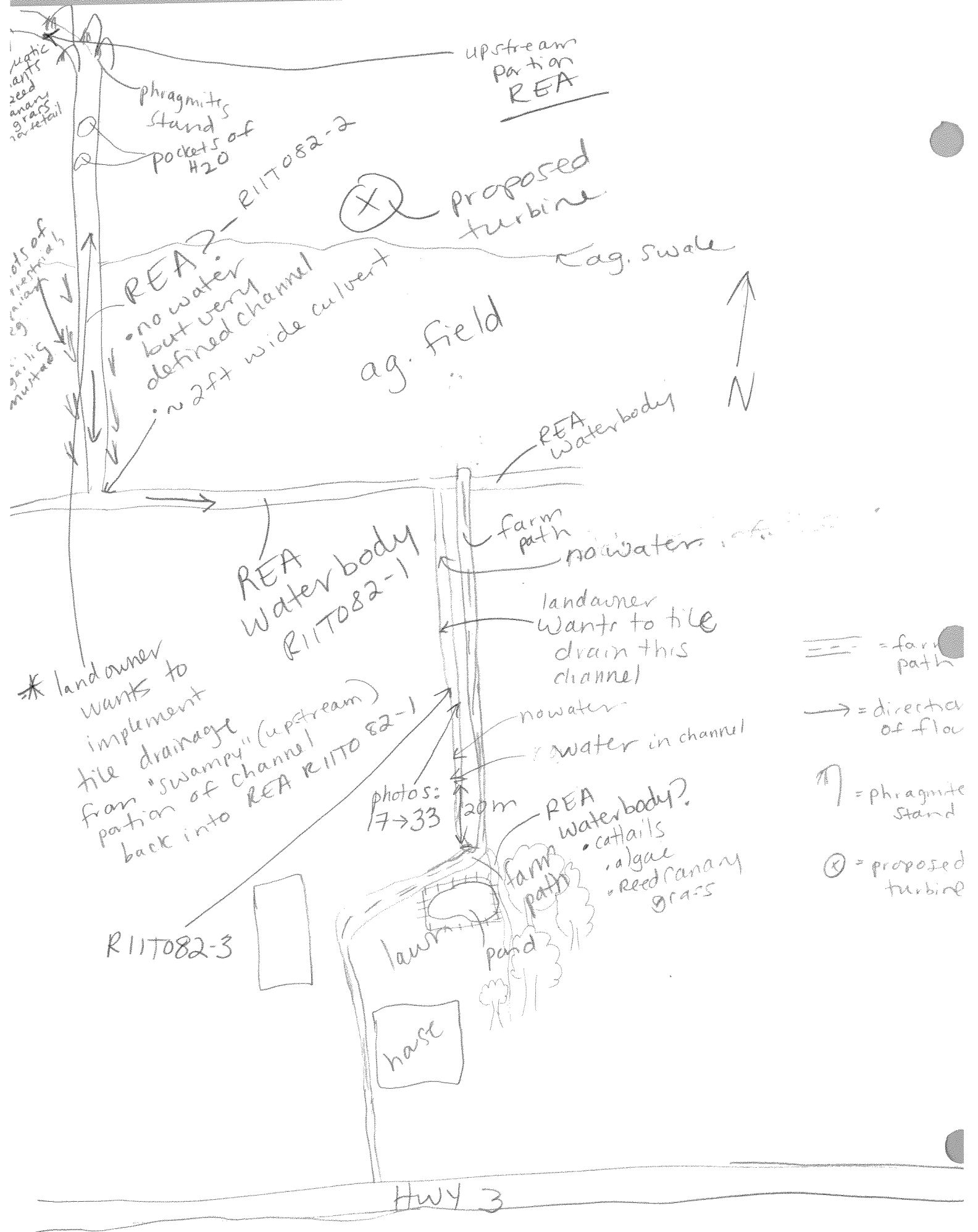
Natural Watercourse ☒ Trapezoidal Channel ☒ Grassed Swale _____ Buried Tile _____
Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc.

red wing Black birds,
leopard frogs (in upstream portion)

Field Notes Authored by K. Clayton

Field Notes QA/QCed by M. Faiella





WIND FARM WATERBODY RAPID ASSESSMENT FORM

Stantec

NON
REA

Station # R11T083
Watercourse Name 83-1,2,3
Photos 8761-72+73
Date June 6, 2012

Project Name: Niagara
Project #: 160950269
Field Staff Mitch Ellah, Trevor Chandler
Time 1:40 PM

Weather conditions in previous 24 hrs. Sunny cloud
GPS Coordinates (Zone) 171 E 615843 N 4770614 Datum
Descriptive Location 500-1000 m due south of the southern terminus of Woods Road.

Water Quality NO WATER
Dissolved Oxygen (mg/L) 0 pH N/A Conductivity (µS/cm) 0
Water Temperature (°C) 0 Air Temperature (°C) 0
Time in situ measurements taken 0

Watercourse Dimensions & Morphology

Mean Watercourse Width 1.5 (m) Maximum Pool Depth N/A (cm)
Mean Bankfull Width N/A (m) Mean Water Depth N/A (cm)
N/A % Riffle N/A % Pool N/A % Run N/A % Flat
Evidence of eroding banks, Comments on bank stability Some channel development in areas not recently ploughed. Channel v. poorly defined in ploughed field.

Substrate (% cover)

<u>0</u> Bedrock	<u>0</u> Cobble	<u>20</u> Sand	<u>55</u> Silt	<u>0</u> Muck
<u>0</u> Boulder	<u>5</u> Gravel	<u>20</u> Clay	<u>0</u> Marl	<u>0</u> Detritus

In-water Cover

N/A
Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other 0

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
ploughed field w winter wheat

Adjacent Land Use

Agricultural field (cropped)

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

low/no flow

Note any fish observations N/A - no water

Waterbody Notes

N/A DRY
Natural Watercourse 0 Trapezoidal Channel 0 Grassed Swale 0 Buried Tile 0
Surficial Drainage (i.e. furrows) 0 Dugout Pond 0 Dominated by Aquatic Veg 0 Dry 0

Other Habitat Notes, Incidental Wildlife Observations, etc.

beds/banks ploughed through.

Field Notes Authored by Trevor Chandler Field Notes QA/QCed by MS



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

Station # R11T084-1 & 84-2 Project Name Niagara Wind
 Watercourse Name unknown Project # 160950269
 Photos 55-65 Field Staff KC & MF
 Date April 19/12 Time 11:00
 Weather conditions in previous 24 hrs 12°C overcast
 GPS Coordinates (Zone) 17T E 0622705 N 4753525 Datum NAD83
 Descriptive Location 600m south of Jenny jump Rd,

Water Quality

Dissolved Oxygen (mg/L) -standing water pH 7.5 Conductivity (µS/cm) 1200
 Water Temperature (°C) 12.0 Air Temperature (°C) 11.0
 Time in situ measurements taken 11:00

Watercourse Dimensions & Morphology

Mean Watercourse Width 1.5 (m) Maximum Pool Depth 15 (cm)
 Mean Bankfull Width 5m (m) Mean Water Depth 5-10 (cm)
 % Riffle 100 % Pool 0 % Run 100 % Flat 0
 Evidence of eroding banks, Comments on bank stability standing H2O

Substrate (% cover)

Bedrock 0 Cobble 0 Sand 50 Silt 50 Muck 0
 Boulder 0 Gravel 0 Clay 0 Marl 0 Detritus 0

In-water Cover

Cover Types Present (circle): Undercut Banks 0 Deep Pool 0 Watercress 0 Aquatic Veg 0
 Overhanging Vegetation 0 Woody Debris 0 Boulder 0 Other 0

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 25% grasses & mature trees

Adjacent Land Use

farmland

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) spawning nursery

Migratory Obstructions (seasonal, permanent) seasonal / intermittent

Note any fish observations 0

Waterbody Notes

Natural Watercourse ✓ Trapezoidal Channel 0 Grassed Swale 0 Buried Tile 0
 Surficial Drainage (i.e. furrows) 0 Dugout Pond 0 Dominated by Aquatic Veg 0 Dry 0

Other Habitat Notes, Incidental Wildlife Observations, etc. 0

Field Notes Authored by K. Clayton

Field Notes QA/QCed by M. Faiella

Jenny Jump Rd.



Hutchinson Rd.

tree line

house

Kelly Residence

farm path



agg. field

Riparian Area

REA



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Non
REA

Station # R11T085-1

Watercourse Name unknown swale

Photos 700, 701

Date June 11/12

Weather conditions in previous 24 hrs Sunny, hot

GPS Coordinates (Zone) 17T E 0619222

Descriptive Location South of Sixteen Rd, on Minor Road

Project Name Niagara Wind

Project # 160950269

Field Staff K. Clayton Marc Faiella

Time 2:35pm

N 4769671 Datum

Water Quality

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____

Water Temperature (°C) _____ Air Temperature (°C) _____

Time in situ measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)

Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)

_____ % Riffle _____ % Pool _____ % Run _____ % Flat

Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble _____ Sand _____ Silt _____ Muck _____
Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use _____

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Note any fish observations _____

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____

Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc. _____

Field Notes Authored by KC

Field Notes QA/QCed by WVF



WIND FARM WATERBODY RAPID ASSESSMENT FORM

Stantec

REA:
non
RE

Station # R11 T088 T088-1B
Watercourse Name T088-1B
Photos 8774-76
Date June 6, 2017

Project Name: Niagara Wind.
Project #: 160950269
Field Staff Trevor Chandler, Mitch Ellah
Time 12:00 PM (NOON)

Weather conditions in previous 24 hrs. Sun + cloudy

GPS Coordinates (Zone) 17N E 615860

N 4771425

Datum

Descriptive Location

At Southern terminus of Woods Rd.
DIS ME - WB U/S of terminus - non-WB

Water Quality NO WATER - GRASSED WATERWAY

Dissolved Oxygen (mg/L) 0

pH 0

Conductivity (µS/cm) 0

Water Temperature (°C) 0

Air Temperature (°C) 0

Time in situ measurements taken 0

Watercourse Dimensions & Morphology - Morphology vegetation controlled.

Mean Watercourse Width 0.5 (m)

Maximum Pool Depth _____ (cm)

Mean Bankfull Width N/A (m)

Mean Water Depth _____ (cm)

N/A % Riffle

N/A % Pool

N/A % Run

N/A % Flat

Evidence of eroding banks, Comments on bank stability

NO

Substrate (% cover)

Grass lined

Bedrock

Cobble

Sand

Silt

Muck

Boulder

Gravel

Clay

Marl

Detritus

In-water Cover

N/A

Cover Types Present (circle):

Undercut Banks

Deep Pool

Watercress

Aquatic Veg

Overhanging Vegetation

Woody Debris

Boulder

Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

grass-lined

Adjacent Land Use

Agricultural Fields (cropped)

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

low/no flow

Note any fish observations

None

Waterbody Notes

N/A.

Natural Watercourse _____ Trapezoidal Channel _____

Grassed Swale ☒

Buried Tile _____

Surficial Drainage (i.e. furrows) _____ Dugout Pond _____

Dominated by Aquatic Veg _____

Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc. None

Field Notes Authored by Trevor Chandler

Field Notes QA/QCed by ME



WIND FARM WATERBODY RAPID ASSESSMENT FORM

Stantec

MP
BEA, C
non R

Station # R11T088
Watercourse Name T088-1A
Photos 8777-79
Date June 6, 2012

Project Name: Niagara Wind
Project #: 160950269
Field Staff Trevor Chandler, Mitch Ellah
Time 12:30

Weather conditions in previous 24 hrs. Sunny + clouds -
GPS Coordinates (Zone) 17T E 615670 N 4771150 Datum
Descriptive Location 200 M South of Farm at S end of Woods Road
at concrete box culvert (ruins) - 0.5 km S, 0.5 km W of S.M.P.

Water Quality - taken outside study area/project loc'n

Dissolved Oxygen (mg/L) 3.51 pH 7.81 Conductivity (μ S/cm) 1753
Water Temperature ($^{\circ}$ C) 16.75 Air Temperature ($^{\circ}$ C) 20
Time in situ measurements taken 12:40

Watercourse Dimensions & Morphology

Mean Watercourse Width 1.0 (m) Maximum Pool Depth 50 (cm)
Mean Bankfull Width 2.0 (m) Mean Water Depth 5 (cm)
0 % Riffle 20 % Pool 0 % Run 0 % Flat

Evidence of eroding banks, Comments on bank stability

Morphology poorly defined. Deeper pools immed. up & d/s of concrete culvert where watercourse enters Devries property. 20% pool - the rest is dry.

Substrate (% cover)

0 Bedrock 5 Cobble 30 Sand 40 Silt 0 Muck
5 Boulder 10 Gravel 10 Clay 0 Marl 0 Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other concrete slabs

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

20% shade, grasses & cattails

Adjacent Land Use

Agricultural fields

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

low/no flow

Note any fish observations None observed.

Waterbody Notes

Natural Watercourse ☒ Trapezoidal Channel ☐ Grassed Swale ☐ Buried Tile ☐
Surficial Drainage (i.e. furrows) ☐ Dugout Pond ☐ Dominated by Aquatic Veg ☐ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc.

WB only occurs to west of study area. Many frogs observed.

Field Notes Authored by Trevor Chandler

Field Notes QA/QCed by MP



WIND FARM WATERBODY RAPID ASSESSMENT FORM

Stantec

NON
REA
REA

Station # B117D88
Watercourse Name 88-2
Photos 8780-8781
Date June 6, 2012

Project Name: Niagara Wind
Project #: 160950269
Field Staff Trevor Chandler, Mitch Ellah
Time 12:50

Weather conditions in previous 24 hrs. sun + cloud,
GPS Coordinates (Zone) 17T E 615867 N 4771469 Datum
Descriptive Location 30 m north of southern terminus of Woods Rd.

Water Quality NO WATER

Dissolved Oxygen (mg/L) 0 pH 0 Conductivity (µS/cm) 0
Water Temperature (°C) 0 Air Temperature (°C) 0
Time in situ measurements taken 0

Watercourse Dimensions & Morphology DRY

Mean Watercourse Width 0 (m) Maximum Pool Depth 0 (cm)
Mean Bankfull Width 0 (m) Mean Water Depth 0 (cm)
0 % Riffle 0 % Pool 0 % Run 0 % Flat
Evidence of eroding banks, Comments on bank stability flat sinuous swale
through fields - ploughed over - some channel definition.

Substrate (% cover)

0 Bedrock 0 Cobble 20 Sand 80 Silt 0 Muck
0 Boulder 0 Gravel 0 Clay 0 Marl 0 Detritus

In-water Cover N/A

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other 0

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Crops, winter wheat

Adjacent Land Use

Agricultural Field

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
N/A

Migratory Obstructions (seasonal, permanent)
low/no flow

Note any fish observations None

Waterbody Notes Not a water body U/S.

Natural Watercourse 0 Trapezoidal Channel 0 Grassed Swale 0 Buried Tile 0
Surficial Drainage (i.e. furrows) 0 Dugout Pond 0 Dominated by Aquatic Veg 0 Dry 0

Other Habitat Notes, Incidental Wildlife Observations, etc.

Field Notes Authored by T. Chandler

Field Notes QA/QCed by NPZ



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

RE

R11T08

Fig 10

Station # R11T089-1

Watercourse Name

Photos See log

Date June 13 2012

Weather conditions in previous 24 hrs rain + sun

GPS Coordinates (Zone) 17 E 623260

Descriptive Location Booker Rd, 1 km west of Townline

Project Name Niagara Wind

Project # 160950269

Field Staff KE + JK

Time 2:20 pm

Datum

Water Quality

Dissolved Oxygen (mg/L) 14.82 pH 8.34 Conductivity (µS/cm) 540

Water Temperature (°C) 24.5 Air Temperature (°C) 28

Time *in situ* measurements taken 2:25 pm

Watercourse Dimensions & Morphology

Mean Watercourse Width 1.5 (m) Maximum Pool Depth 20 (cm)

Mean Bankfull Width 3 (m) Mean Water Depth 30 (cm)

% Riffle 100 % Pool % Run % Flat

Evidence of eroding banks, Comments on bank stability steep, but stable & veg

Substrate (% cover)

Bedrock Cobble Sand 20 Silt Muck
Boulder Gravel 80 Clay Marl Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg lemnisc

Overhanging Vegetation RCG Woody Debris Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 80% elm, Ash, etc (brush lot to west)

Adjacent Land Use Ag - wheat, soy, corn

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) none

Migratory Obstructions (seasonal, permanent) permanent

Note any fish observations none

Waterbody Notes

Natural Watercourse Trapezoidal Channel ✓ Grassed Swale Buried Tile

Surficial Drainage (i.e. furrows) Dugout Pond Dominated by Aquatic Veg Dry

Other Habitat Notes, Incidental Wildlife Observations, etc.

deep, incised channel w/ water + lemnisc

Field Notes Authored by KE

Field Notes QA/QCed by JK



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

RIIT089-

F510

Station # RIIT089-2
 Watercourse Name _____
 Photos see log
 Date June 13 2012
 Weather conditions in previous 24 hrs _____
 GPS Coordinates (Zone) 17 E 624167 N 4753064 Datum
 Descriptive Location Brooke Rd, 400m west of townline

Project Name Niagara Wind
 Project # 160950269
 Field Staff KE + JK
 Time 2:38 pm

Water Quality

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
 Water Temperature (°C) _____ Air Temperature (°C) _____
 Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width 1 (m) Maximum Pool Depth X (cm) dry
 Mean Bankfull Width 2 (m) Mean Water Depth X (cm)
 % Riffle _____ % Pool _____ % Run _____ % Flat _____
 Evidence of eroding banks, Comments on bank stability steep, stable + veg

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 20 Silt _____ Muck _____
 Boulder _____ Gravel 80 Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg RC
 Overhanging Vegetation RCG Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
30% elm, Ash etc along

Adjacent Land Use

Ag - corn, soy

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
none

Migratory Obstructions (seasonal, permanent)
permanent

Note any fish observations
none

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel ✓ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg ✓ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc.

incised channel, moist & dominated w/ aquatic veg

Field Notes Authored by KE

Field Notes QA/QCed by Joe K

REA -1

Colic

FARM

Booker Rd

REA-2



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

RI1T089-

F810

Station # RI1T089-3
 Watercourse Name _____
 Photos sat
 Date June 13 2012
 Weather conditions in previous 24 hrs rain + sun
 GPS Coordinates (Zone) 17T E 623124 N 4753082 Datum
 Descriptive Location hedge row / Dunnville Westfield Rd, North of Pooler Rd (parallel to it) 9150m north of Pooler

Project Name Niagara Wind
 Project # 160950269
 Field Staff KE + JK
 Time 3:10 pm

Water Quality

Dissolved Oxygen (mg/L) _____ pH dry Conductivity (µS/cm) _____
 Water Temperature (°C) _____ Air Temperature (°C) _____
 Time in situ measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm) dry
 Mean Bankfull Width 2 (m) Mean Water Depth _____ (cm)
 _____ % Riffle _____ % Pool _____ % Run _____ % Flat
 Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 20 Silt _____ Muck _____
 Boulder _____ Gravel 80 Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
hedgerow - elm, RCG, maple, Ash

Adjacent Land Use

soy, wheat

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
none

Migratory Obstructions (seasonal, permanent)
dry

Note any fish observations
none

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel shallow Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ✓

Other Habitat Notes, Incidental Wildlife Observations, etc.

- shallow channel in hedgerow w/ defoliated bed + bank
- most likely seasonal drainage to RBA-1 + 2

Field Notes Authored by KE

Field Notes QA/QCed by JK



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA-

Station # RIIT091 Project Name Niagara Wind
 Watercourse Name unknown Project # 160950629
 Photos 102-106 Field Staff KC & MF
 Date Apr 19 / 12 Time 3:02
 Weather conditions in previous 24 hrs 12°C, overcast
 GPS Coordinates (Zone) 17T E 0620509 N 4756692 Datum NAD 83
 Descriptive Location 500m east of Gore Rd, 600m N of Hutchins

Water Quality -standing water
 Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
 Water Temperature (°C) _____ Air Temperature (°C) _____
 Time in situ measurements taken _____

Watercourse Dimensions & Morphology
 Mean Watercourse Width 1.5 (m) Maximum Pool Depth 50 (cm)
 Mean Bankfull Width 3 (m) Mean Water Depth 30 (cm)
 _____ % Riffle _____ % Pool 100 % Run _____ % Flat
 Evidence of eroding banks, Comments on bank stability fairly stable due to vegetation

Substrate (% cover)
 Bedrock _____ Cobble _____ Sand 30 Silt 30 Muck _____
 Boulder _____ Gravel 30 Clay _____ Marl 10 Detritus _____

In-water Cover
 Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other algae

Riparian Zone
 Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
< 10%, grasses, early
 Adjacent Land Use agricultural field

Fish Habitat Potential
 Critical Habitat (spawning or nursery areas, groundwater upwellings)
Spawning, nursery, foraging
 Migratory Obstructions (seasonal, permanent)
seasonal
 Note any fish observations _____

Waterbody Notes
 Natural Watercourse _____ Trapezoidal Channel ☒ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc.

Field Notes Authored by KC Field Notes QA/QCed by MF



ag. field.

ag. field.

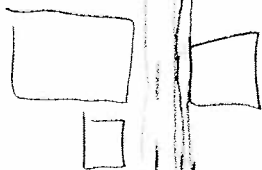
pooled
H₂O

dry for
~150m

farm
path

REA
RIITO91

contains
water
very channelized
algae.



GORE Road.



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

NON
REA

Station # B11T093H Project Name Niagara Wind
 Watercourse Name 93-1a Project # 160950269
 Photos 8796-98 No photo 8745 Field Staff T. Chandler, M. Ellah
 Date June 6, 2012 Time 9:40 PM
 Weather conditions in previous 24 hrs _____
 GPS Coordinates (Zone) 17T E 618372 N 4767446 Datum _____
 Descriptive Location _____

Water Quality NO WATER

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
 Water Temperature (°C) _____ Air Temperature (°C) _____
 Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
 Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)
 _____ % Riffle _____ % Pool _____ % Run _____ % Flat
 Evidence of eroding banks, Comments on bank stability poorly defined swale
in ploughed field

Substrate (% cover)

Bedrock _____ Cobble 20 Sand 60 Silt 1 Muck _____
 Boulder _____ Gravel _____ Clay 20 Marl _____ Detritus _____

In-water Cover NO WATER

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Agricultural field

Adjacent Land Use _____

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) _____

Migratory Obstructions (seasonal, permanent) _____

No Flow

Note any fish observations NONE

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry X

Other Habitat Notes, Incidental Wildlife Observations, etc. Field recently ploughed

Planted w soy beans.

Field Notes Authored by T. Chandler

Field Notes QA/QCed by WR



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

Station # R11T093H
 Watercourse Name 93-1b
 Photos 8799-8801
 Date June 6, 2012
 Weather conditions in previous 24 hrs _____
 GPS Coordinates (Zone) 17N E 618502 N 4767151 Datum _____
 Descriptive Location _____

Project Name Niagara Wind
 Project # 160950269
 Field Staff T. Chandler, M. Ellah
 Time 4:50 PM

Water Quality

Dissolved Oxygen (mg/L) 7.13 pH 9.29 Conductivity (µS/cm) 794
 Water Temperature (°C) 31.20 Air Temperature (°C) 20°C
 Time in situ measurements taken 4:50pm

Watercourse Dimensions & Morphology

Mean Watercourse Width 15 (m) Maximum Pool Depth 50 (cm)
 Mean Bankfull Width N/A (m) Mean Water Depth 20 (cm)
 _____ % Riffle 100 % Pool _____ % Run _____ % Flat
 Evidence of eroding banks, Comments on bank stability stable
Area of ponded water along

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 80 Silt _____ Muck _____
 Boulder _____ Gravel 20 Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other Algae

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
40% shaded (by algae)
 Adjacent Land Use Agricultural field

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

ponded area - May dry up
 Note any fish observations None

Waterbody Notes

Natural Watercourse ☒ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc. dragonfly's, common yellowthroat
low area with ponded water, Gray tree frogs.

Field Notes Authored by T. Chandler

Field Notes QA/QCed by MP



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

Station # R1T093H
 Watercourse Name q3-2
 Photos 8802-06
 Date June 6, 2012
 Weather conditions in previous 24 hrs Sun + cloud
 GPS Coordinates (Zone) 17T E 618263 N 4767030 Datum
 Descriptive Location _____

Project Name Niagara Wind
 Project # 160950289
 Field Staff T. Chandler M. Ellah
 Time 5:00 PM

Water Quality Too SHALLOW

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (μ S/cm) _____
 Water Temperature ($^{\circ}$ C) _____ Air Temperature ($^{\circ}$ C) 25
 Time in situ measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width 4 (m) Maximum Pool Depth _____ (cm)
 Mean Bankfull Width 8 (m) Mean Water Depth _____ (cm)
 _____ % Riffle _____ % Pool _____ % Run _____ % Flat
 Evidence of eroding banks, Comments on bank stability Stable - veg dominated

Substrate (% cover)

Bedrock _____ Cobble _____ Sand _____ Silt 100 Muck _____
 Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
70% sedges, shrub

Adjacent Land Use

Agricultural fields - Soy bean & winter wheat

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Dry/low flow

Note any fish observations None

Waterbody Notes

Natural Watercourse ☒ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg ☒ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc. Green frogs

Wooded area d/s. - watercourse not ploughed up stream (wgt)
in wheat field

Field Notes Authored by T. Chandler

Field Notes QA/QCed by MP



WIND FARM

WATERBODY RAPID ASSESSMENT FORM

REA

Stantec

Station # R11094
 Watercourse Name 94-1
 Photos 8790-91
 Date June 6, 2012
 Weather conditions in previous 24 hrs. Sunny & cloud.
 GPS Coordinates (Zone) 17T E 618420 N 4768015 Datum
 Descriptive Location Along Scott Road (Allowance)

Project Name: Niagara Wind
 Project #: 160950269
 Field Staff T. Chandler M. Ellah
 Time 3:20

Water Quality NO WATER

Dissolved Oxygen (mg/L) / pH / Conductivity (μ S/cm) /
 Water Temperature ($^{\circ}$ C) / Air Temperature ($^{\circ}$ C) /
 Time *in situ* measurements taken /

Watercourse Dimensions & Morphology

Mean Watercourse Width / (m) Maximum Pool Depth / (cm)
 Mean Bankfull Width 2 (m) Mean Water Depth / (cm)
/ % Riffle / % Pool / % Run / % Flat
 Evidence of eroding banks, Comments on bank stability Minor scour around trees & roots and where disturbed by ATV crossings

Substrate (% cover)

/ Bedrock 5 Cobble 20 Sand 70 Silt / Muck /
/ Boulder 5 Gravel / Clay / Marl / Detritus /

In-water Cover N/A

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other /

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
90% - grasses (trees at Scott Rd. crossing)
 Adjacent Land Use Agricultural fields

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

low/no flow

Note any fish observations None

Waterbody Notes

Natural Watercourse ✓ Trapezoidal Channel / Grassed Swale / Buried Tile /
 Surficial Drainage (i.e. furrows) / Dugout Pond / Dominated by Aquatic Veg / Dry /

Other Habitat Notes, Incidental Wildlife Observations, etc. Wooded area at Scott Rd. Shagbark hickory.

Field Notes Authored by T. Chandler

Field Notes QA/QCed by WP



WIND FARM WATERBODY RAPID ASSESSMENT FORM

Stantec

NON
REA

Station # R11094
 Watercourse Name 94-2
 Photos 892-94
 Date June 6, 2012
 Weather conditions in previous 24 hrs. Sunny, cloudy
 GPS Coordinates (Zone) 17T E 618459 N 4768466 Datum
 Descriptive Location _____

Project Name: Niagara Wind
 Project #: 160950269
 Field Staff T. Chandler M. Ellah
 Time 3:40

Water Quality NO WATER
 Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
 Water Temperature (°C) _____ Air Temperature (°C) _____
 Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology NIA
 Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
 Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)
 _____ % Riffle _____ % Pool _____ % Run _____ % Flat
 Evidence of eroding banks, Comments on bank stability NONE

Substrate (% cover)
 _____ Bedrock _____ Cobble _____ Sand 100 Silt _____ Muck _____
 _____ Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover NO WATER
 Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone
 Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
0% shaded
 Adjacent Land Use Agricultural Field

Fish Habitat Potential
 Critical Habitat (spawning or nursery areas, groundwater upwellings)

 Migratory Obstructions (seasonal, permanent)
Dry
 Note any fish observations None

Waterbody Notes
 Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ✓

Other Habitat Notes, Incidental Wildlife Observations, etc. Depression in plowed
field. Recently driven through - Dimensions: 10 x 10 m.

Field Notes Authored by T. Chandler Field Notes QA/QCed by MS



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Non REA

Tile 13

ag Swale
↳ (on Hardy prop)

Station # R11T095-1
Watercourse Name unknown
Photos 801-810
Date June 13/12
Weather conditions in previous 24 hrs hot & humid
GPS Coordinates (Zone) 17T E 0622684 N 4760950 Datum NAD83
Descriptive Location 650m south of Creek Rd 7.5 km west of side Road 42

Project Name Niagara Wind
Project # 160950269
Field Staff K. Clayton, M. Fawcett
Time 9:30

Water Quality

Dissolved Oxygen (mg/L) - no water pH - Conductivity (µS/cm) -
Water Temperature (°C) - Air Temperature (°C) 17°C
Time in situ measurements taken -

Watercourse Dimensions & Morphology

Mean Watercourse Width - (m) Maximum Pool Depth - (cm)
Mean Bankfull Width - (m) Mean Water Depth - (cm)
% Riffle - % Pool - % Run - % Flat -
Evidence of eroding banks, Comments on bank stability -

Substrate (% cover)

- soil - filled
Bedrock - Cobble - Sand - Silt - Muck
Boulder - Gravel - Clay - Marl - Detritus -

In-water Cover

Cover Types Present (circle): - Undercut Banks - Deep Pool - Watercress - Aquatic Veg -
Overhanging Vegetation - Woody Debris - Boulder - Other -

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) -

Adjacent Land Use

farmland

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) -

Migratory Obstructions (seasonal, permanent) -

Note any fish observations no water

Waterbody Notes

Natural Watercourse - Trapezoidal Channel - Grassed Swale - Buried Tile -
Surficial Drainage (i.e. furrows) ✓ Dugout Pond - Dominated by Aquatic Veg - Dry ✓

Other Habitat Notes, Incidental Wildlife Observations, etc.

Field Notes Authored by HC

Field Notes QA/QCed by MA

Bushlo

hedge row

swale

agricultural
swale

hedge row

Non
REA

Barn

hardy
residents

grassed
hedge row

Creek Road

N
↓

Tile #15

W.P. REA



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # R11T096-1
Watercourse Name unknown
Photos 754-762
Date June 12/12
Weather conditions in previous 24 hrs Rain, hot, humid
GPS Coordinates (Zone) 17T E 0620885
Descriptive Location 100m from Bird Lead

Project Name Niagara Wind
Project # 160950269
Field Staff K. Clayton, M. Farella
Time 11:45

Water Quality

- no water
Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (μ S/cm) _____
Water Temperature ($^{\circ}$ C) _____ Air Temperature ($^{\circ}$ C) 21
Time in situ measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)
% Riffle _____ % Pool _____ % Run _____ % Flat _____
Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble _____ Sand _____ Silt 100 Muck _____
Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Overhanging Vegetation Undercut Banks _____ Deep Pool _____ Watercress _____ Aquatic Veg _____
Woody Debris _____ Boulder _____ Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
45% trees, mature

Adjacent Land Use

pasture

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) _____

Migratory Obstructions (seasonal, permanent) _____

Note any fish observations Seasonal

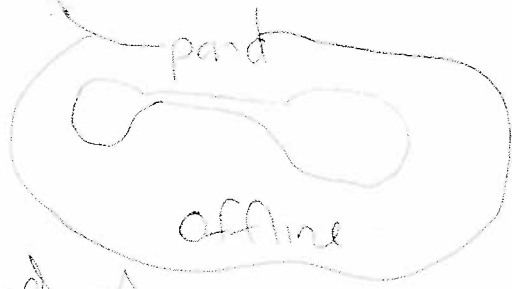
Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel ☒ Grassed Swale _____ Buried Tile _____
Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc. _____

Field Notes Authored by K. Clayton

Field Notes QA/QCed by MEF



reed
carr
grass

Unaquatic
veg

no water
surrounded
by native
trees
probably lots
of water in
spring of year

farmland.

RIT096-1

pasture



Bird Road

← N



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Non
REA

Station # RUT097
Watercourse Name 97-1
Photos 8782
Date June 6, 2012
Weather conditions in previous 24 hrs Sunny + cloudy
GPS Coordinates (Zone) 17N E 617224 N 4765666 Datum
Descriptive Location 600m south of Silver Street and 600m west of Port Davidson Rd.

Project Name Niagara Wind
Project # 160950269
Field Staff T. Chandler M. Ellah
Time 1:30 PM

Water Quality NO WATER

Dissolved Oxygen (mg/L) 2 pH 8 Conductivity (µS/cm) 2
Water Temperature (°C) 2 Air Temperature (°C) 2
Time in situ measurements taken 2

Watercourse Dimensions & Morphology

Mean Watercourse Width N/A (m) Maximum Pool Depth 2 (cm)
Mean Bankfull Width N/A (m) Mean Water Depth 2 (cm)
2 % Riffle 2 % Pool 2 % Run 2 % Flat
Evidence of eroding banks, Comments on bank stability swale in ploughed field

Substrate (% cover)

2 Bedrock 2 Cobble 2 Sand 20 Silt 80 Muck
2 Boulder 2 Gravel 2 Clay 2 Marl 2 Detritus

In-water Cover N/A

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other 2

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
open field
Adjacent Land Use plough agricultural field

Fish Habitat Potential N/A

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

no flow

Note any fish observations No

Waterbody Notes

Natural Watercourse 2 Trapezoidal Channel 2 Grassed Swale 2 Buried Tile 2
Surficial Drainage (i.e. furrows) 2 Dugout Pond 2 Dominated by Aquatic Veg 2 Dry 2

Other Habitat Notes, Incidental Wildlife Observations, etc. None

Field Notes Authored by T. Chandler

Field Notes QA/QCed by MTZ



WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

Stantec

Station # R11T097
 Watercourse Name 97-2
 Photos 8783-85
 Date June 6, 2012
 Weather conditions in previous 24 hrs. Sunny & cloudy
 GPS Coordinates (Zone) 17T E 617231 N 4766234 Datum
 Descriptive Location At Silver Street, 500m west of Port Davidson Rd

Project Name: Niagara Wind
 Project #: 160950269
 Field Staff T. Chandler M. Ellan
 Time 2:00 PM

Water Quality

Dissolved Oxygen (mg/L) 6.18 pH 8.38 Conductivity (µS/cm) 2630
 Water Temperature (°C) 14.27 Air Temperature (°C) 20
 Time in situ measurements taken 2:10 PM

Watercourse Dimensions & Morphology

Mean Watercourse Width 1.0 (m) Maximum Pool Depth 0 (cm)
 Mean Bankfull Width 1.5 (m) Mean Water Depth 0 (cm)
0 % Riffle 10 % Pool 90 % Run 0 % Flat
 Evidence of eroding banks, Comments on bank stability Morphology Vegetation dominated - good channel development w water

Substrate (% cover)

Bedrock 10 Cobble 20 Sand 30 Silt 0 Muck
10 Boulder 10 Gravel 20 Clay 0 Marl 0 Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress 0 Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other rip rap at Silver St Xing.

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
50, grass cover.
 Adjacent Land Use grassed area (manicured lawn) but mainly scrubland

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
 Migratory Obstructions (seasonal, permanent)
low/no flow
 Note any fish observations none seen

Waterbody Notes

Natural Watercourse ✓ Trapezoidal Channel ✓ Grassed Swale ✓ Buried Tile ✓
 Surficial Drainage (i.e. furrows) ✓ Dugout Pond ✓ Dominated by Aquatic Veg ✓ Dry ✓

Other Habitat Notes, Incidental Wildlife Observations, etc.

Large grassed buffer on either side of channel, wooded area to north of Silver Street

Field Notes Authored by TCHANDLER

Field Notes QA/QCed by ME



WIND FARM WATERBODY RAPID ASSESSMENT FORM

Non
REA

Stantec

Station # R11T097
Watercourse Name 97-3
Photos 8786-88, +89
Date June 6, 2012

Project Name: Niagara Wind
Project #: 160950269
Field Staff T. Chandler M. Ellal
Time 2:20 PM

Weather conditions in previous 24 hrs. Sun & Cloud.
GPS Coordinates (Zone) 17T E 617166 N 4765985 Datum
Descriptive Location Pond ~ 20x40m + dry swale that drains to west.
800m west of Port Davidson Rd. 100-300m south of Silver Street.

Water Quality

Dissolved Oxygen (mg/L) 5.20 pH 8.18 Conductivity (µS/cm) 1073
Water Temperature (°C) 26.83 Air Temperature (°C) 20°C
Time in situ measurements taken 2:35 pm

Watercourse Dimensions & Morphology

Mean Watercourse Width (m) Maximum Pool Depth (cm)
Mean Bankfull Width (m) Mean Water Depth (cm)
 % Riffle % Pool % Run % Flat
Evidence of eroding banks, Comments on bank stability pond feature w swale
draining to west. Swale is ploughed regularly

Substrate (% cover)

Bedrock Cobble Sand Silt 100 Muck
Boulder Gravel Clay Marl Detritus

In-water Cover

Cover Types Present (circle): none Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
0% shaded
Adjacent Land Use
pasture

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)
pond may dry out in summer. Water turbid.

Note any fish observations None seen. Pond seems natural

Waterbody Notes

Natural Watercourse Trapezoidal Channel Grassed Swale Buried Tile
Surficial Drainage (i.e. furrows) Dugout Pond Dominated by Aquatic Veg Dry

Other Habitat Notes, Incidental Wildlife Observations, etc.

Mallard ducks in pond
Cattle & horses have access to pond. No evidence of excavation
(e.g. soil piles)
no water outleting the pond

Field Notes Authored by T. Chandler

Field Notes QA/QCed by WSE



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

RI1T098-1
4 NBS
REA
Pg 2

Station # RI1T098-1
Watercourse Name see log
Photos see log
Date June 13 2012
Weather conditions in previous 24 hrs rain
GPS Coordinates (Zone) 17T E 617 672
Descriptive Location Runy 3 Dlw crown + Marshagan

Project Name Niagara Wind
Project # 160950269
Field Staff KE + JK
Time 11:15 AM

N 4753587 Datum
GPS Coordinates (Zone) 17T E 617 672

Water Quality

Dissolved Oxygen (mg/L) dry
Water Temperature (°C) dry
Time in situ measurements taken dry

Watercourse Dimensions & Morphology

Mean Watercourse Width 1 (m)
Mean Bankfull Width 3 (m)
Maximum Pool Depth dry (cm)
Mean Water Depth dry (cm)
% Riffle dry % Pool dry % Run dry % Flat dry
Evidence of eroding banks, Comments on bank stability dry

Substrate (% cover)

Bedrock 40 Cobble 40 Sand 40 Silt 40 Muck 40
Boulder 40 Gravel 40 Clay 40 Marl 40 Detritus 40

In-water Cover

Cover Types Present (circle): phrag Undercut Banks phrag Deep Pool phrag Watercress phrag
Overhanging Vegetation phrag Woody Debris phrag Boulder phrag Other phrag

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 30% trees + phrag

Adjacent Land Use

rural residential + corn fields

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) none

Migratory Obstructions (seasonal, permanent) dry

Note any fish observations none

Waterbody Notes

Natural Watercourse check Trapezoidal Channel check Grassed Swale check Buried Tile check
Surficial Drainage (i.e. furrows) check Dugout Pond check Dominated by Aquatic Veg check Dry check

Other Habitat Notes, Incidental Wildlife Observations, etc.

shallow channel w/ defined bed + banks +
dominated by phrag
behind house to west of access road it takes definit
+ becomes a grass swale that is named then conne
w/ #3

Field Notes Authored by KE

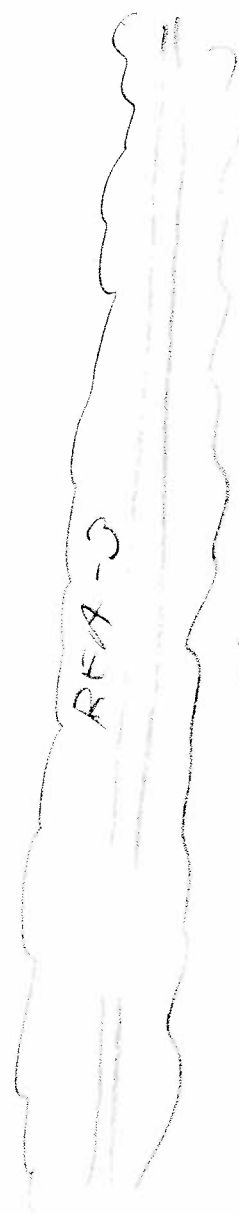
Field Notes QA/QCed by KE

Surficial
Drainage

REA-2
surficial drainage

CORN

2/



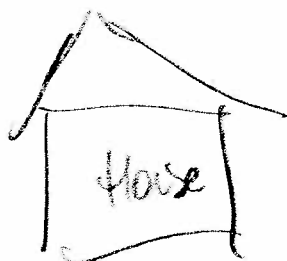
Hedgerow

REA-1

grassed swale

no
access

proposed
access
road





Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

NON
REA

R11T098-2

F12

Station # R11T098-2
Watercourse Name _____
Photos see log
Date June 13 2012
Weather conditions in previous 24 hrs rain
GPS Coordinates (Zone) 17 E 817746 N 4753438 Datum
Descriptive Location Hwy 3 blw Crown & Marshagan
approx 300 m south

Project Name Niagara Wind
Project # 160950269
Field Staff KE & JK
Time 11:10 AM

Water Quality
Dissolved Oxygen (mg/L) _____
Water Temperature (°C) _____
Time in situ measurements taken _____
pH dry Conductivity (µS/cm) _____
Air Temperature (°C) _____

Watercourse Dimensions & Morphology
Mean Watercourse Width _____ (m)
Mean Bankfull Width _____ (m)
Maximum Pool Depth _____ (cm)
Mean Water Depth _____ (cm)
% Riffle _____ % Pool _____ % Run _____ % Flat _____
Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)
Bedrock _____ Cobble _____ Sand _____ Silt _____ Muck _____
Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover
Cover Types Present (circle):
Overhanging Vegetation _____ Undercut Banks _____ Deep Pool _____ Watercress _____ Aquatic Veg _____
Woody Debris _____ Boulder _____ Other _____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) _____

Adjacent Land Use _____

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings) _____

Migratory Obstructions (seasonal, permanent) _____

Note any fish observations _____

Waterbody Notes
Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
Surficial Drainage (i.e. furrows) ☒ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc. _____

surficial drainage
entire field plowed & planted w/ corn

Field Notes Authored by KE

Field Notes QA/QCed by JK



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA
R11T098-
F152

Station # R11T098-3
Watercourse Name _____
Photos see log
Date June 13 2012
Weather conditions in previous 24 hrs rain
GPS Coordinates (Zone) 17 E 617663 N 4753360 Datum
Descriptive Location Hwy 3 blw crown Rd + Marshagan Rd

Project Name Niagara Wind
Project # 160950269
Field Staff KE + JK
Time 11:30 AM

Water Quality
Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (μ S/cm) _____
Water Temperature ($^{\circ}$ C) _____ Air Temperature ($^{\circ}$ C) _____
Time in situ measurements taken _____

Watercourse Dimensions & Morphology
Mean Watercourse Width 1.5 (m) Maximum Pool Depth _____ (cm) dry
Mean Bankfull Width 4 (m) Mean Water Depth _____ (cm)
% Riffle _____ % Pool _____ % Run _____ % Flat _____
Evidence of eroding banks, Comments on bank stability stable w/ some vegetation

Substrate (% cover)
Bedrock _____ Cobble 40 Sand _____ Silt _____ Muck _____
Boulder _____ Gravel 40 Clay _____ Marl 20 Detritus _____

In-water Cover
Cover Types Present (circle): Undercut Banks _____ Deep Pool _____ Watercress _____ Aquatic Veg _____
Overhanging Vegetation _____ Woody Debris _____ Boulder _____ Other _____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
80% - elm, cottonwood, grape

Adjacent Land Use
Ag - corn

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
none

Migratory Obstructions (seasonal, permanent)
dry

Note any fish observations
none

Waterbody Notes
Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc.
- somewhat shallow channel w/ deep bed + bank
in a hedgerow, possibly dug years ago but has
materialized

Field Notes Authored by KE

Field Notes QA/QCed by Joe Kew



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # RIIT099-1 Project Name Niagara Wind
Watercourse Name unknown trib. Project # 160950269
Photos See photo log Field Staff K. Clayton, M. Farrella
Date June 12/12 Time 9:30
Weather conditions in previous 24 hrs Rain - hot & humid
GPS Coordinates (Zone) 17T E 0619087 N 4749101 Datum NAD83
Descriptive Location west of Inman Road (~1 km)

Water Quality
Dissolved Oxygen (mg/L) 3.70 pH 7.72 Conductivity (μ S/cm) 589
Water Temperature ($^{\circ}$ C) 20.08 Air Temperature ($^{\circ}$ C) 21
Time in situ measurements taken 9:35

Watercourse Dimensions & Morphology
Mean Watercourse Width 2.5 (m) Maximum Pool Depth 0.5 (cm)
Mean Bankfull Width 6 (m) Mean Water Depth 0.4 (cm)
% Riffle 100 % Pool 100 % Run 100 % Flat 100
Evidence of eroding banks, Comments on bank stability Staple vegetation

Substrate (% cover)
Bedrock 0 Cobble 50 Sand 40 Silt 10 Muck 0
Boulder 0 Gravel 50 Clay 0 Marl 0 Detritus 0

In-water Cover
Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other algae

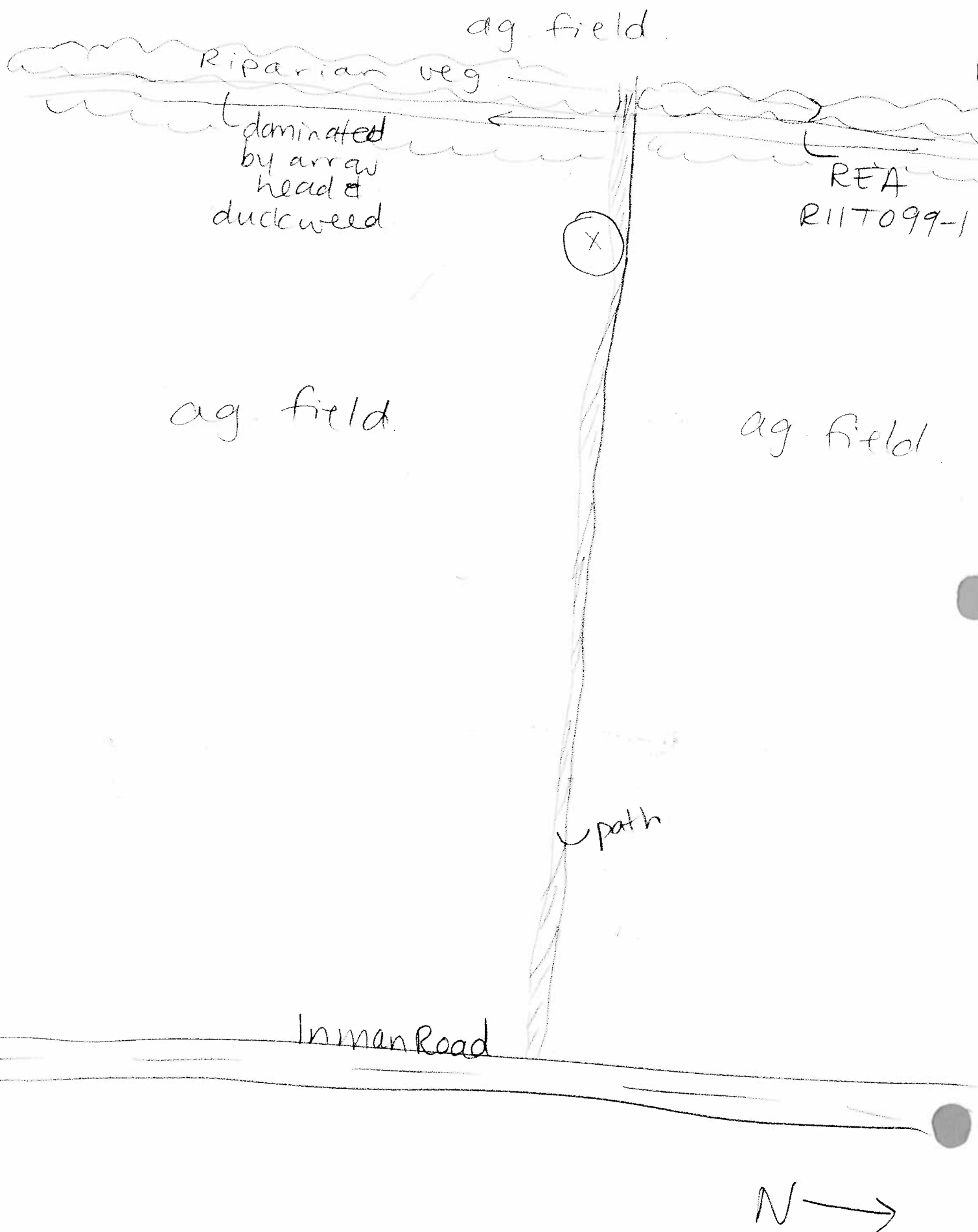
Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 85% - Sumac & grasses, early successional
Adjacent Land Use agricultural field

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings) spawning, nursery, foraging
Migratory Obstructions (seasonal, permanent) 0
Note any fish observations Brook stickleback

Waterbody Notes
Natural Watercourse ☒ Trapezoidal Channel ☐ Grassed Swale ☐ Buried Tile ☐
Surficial Drainage (i.e. furrows) ☐ Dugout Pond ☐ Dominated by Aquatic Veg ☒ Dry ☐

Other Habitat Notes, Incidental Wildlife Observations, etc.

Field Notes Authored by K. Clayton Field Notes QA/QCed by MR
W:\resource\Internal Info and Teams\Aquatic Resources\Field Sheets\Stantec\Form 02 Wind Farm Waterbody Rapid Assessment Form.doc



Tile REA



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # R11T099-2 Project Name Niagara Wind
 Watercourse Name unknown Project # 160950269
 Photos 727-734 Field Staff K. Clayton, M. Farella
 Date June 12/12 Time 9:47
 Weather conditions in previous 24 hrs Rain, hot & humid
 GPS Coordinates (Zone) 17T E 0620096 N 4749360 Datum NAD83
 Descriptive Location off of Inman Road

Water Quality

Dissolved Oxygen (mg/L) 5.90 pH 7.71 Conductivity (µS/cm) 870
 Water Temperature (°C) 18.08 Air Temperature (°C) 21
 Time in situ measurements taken 9:50

Watercourse Dimensions & Morphology

Mean Watercourse Width 2.5 (m) Maximum Pool Depth 0.50 (cm)
 Mean Bankfull Width 6 (m) Mean Water Depth 0.40 (cm)
 % Riffle _____ % Pool 100 % Run _____ % Flat _____
 Evidence of eroding banks, Comments on bank stability stable - vegetated

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 40 Silt 10 Muck _____
 Boulder _____ Gravel 50 Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Overhanging Vegetation Undercut Banks Deep Pool Watercress Aquatic Veg
Woody Debris Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
95% grasses & small trees, early

Adjacent Land Use

farmland

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
spawning, nursery, foraging

Migratory Obstructions (seasonal, permanent)

Note any fish observations

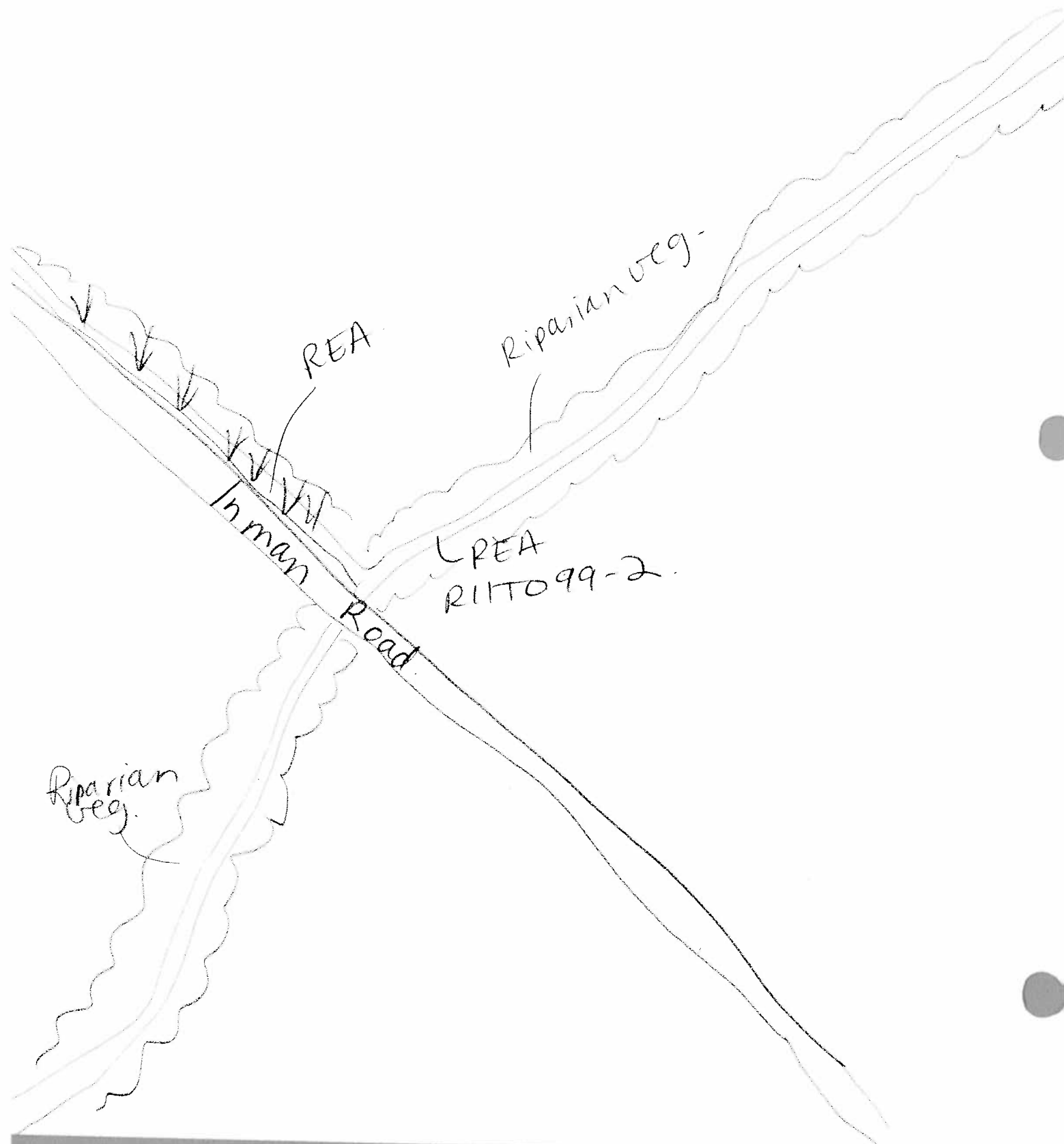
Waterbody Notes

Natural Watercourse ☒ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg ☒ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc.

Field Notes Authored by K. Clayton Field Notes QA/QCed by MF

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RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project Niagara Wind Project # 160950269
 Station # 13-6 Field Staff K. March M. Farella
 Photos Taken - Date Oct 22/12
 GPS Coordinates 17T 0625873 4750847 Time 11:35
 Descriptive Location South of Canal bank Rd, East of Dunnville / Wainfleet Road

Water Quality

Dissolved Oxygen (mg/L) not enough for YOI pH - Conductivity (µS/cm) -
 Water Temperature (°C) - Air Temperature (°C) 10°C
 Weather conditions in previous 24 hrs Sunny, 15°C

Watercourse Dimensions & Morphology

Mean Watercourse Width 1.5 (m) Maximum Pool Depth - (cm)
 Mean Bankfull Width 3 (m) Mean Water Depth 15 (cm)
- % Riffle - % Pool - % Run - % Flat
 Evidence of eroding banks, Comments on bank stability stable

Substrate – Upstream (% cover)

5 Bedrock 40 Silt - Boulder 50 Clay - Cobble
5 Muck - Gravel - Marl - Sand 15 Detritus

Substrate – Downstream (% cover)

- Bedrock - Silt - Boulder - Clay - Cobble
- Muck - Gravel - Marl - Sand - Detritus

In-water Cover

Cover Types Present (circle): Overhanging Vegetation Undercut Banks Deep Pool Vascular Plants
- Woody Debris Boulder Other Typha

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Upstream meadow, poplar, typha, grasses
 Downstream -

Adjacent Land Use

Upstream ag land, canal, road, forest
 Downstream -

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Upstream -
 Downstream -

Migratory Obstructions (seasonal, permanent)

Upstream dry
 Downstream -

Note any fish observations none observed

Other Habitat Notes, Incidental Wildlife Observations, etc. Trapezoidal

channel dominated by Typha
intermittent flow



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # 3-4
 Watercourse Name unnamed tributary
 Photos 331-336
 Date Oct 22/12
 Weather conditions in previous 24 hrs Sunny - 15°C
 GPS Coordinates (Zone) 17T E 0615310
 Descriptive Location off of Coistar Gainsborough Townline, South of Vaughan Road
 Project Name Niagara Wind
 Project # 160980269
 Field Staff K. Mason, M. Fairella
 Time 10:36
 Datum NAD83

Water Quality

Dissolved Oxygen (mg/L) 11.24 pH 7.99 Conductivity (µS/cm) 1185
 Water Temperature (°C) 8.38 Air Temperature (°C) 15°C
 Time in situ measurements taken 10:40

Watercourse Dimensions & Morphology

Mean Watercourse Width 2 (m) Maximum Pool Depth 60 (cm)
 Mean Bankfull Width 4 (m) Mean Water Depth 40 (cm) standing water
 % Riffle — % Pool — % Run — % Flat —
 Evidence of eroding banks, Comments on bank stability all graded - stable

Substrate (% cover)

Bedrock 5 Cobble — Sand 80 Silt 5 Muck —
 Boulder — Gravel — Clay — Marl 10 Detritus —

In-water Cover

Overhanging Vegetation — Woody Debris — Boulder — Deep Pool — Watercress — Aquatic veg — Typha — RCG —
 Other algae

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 15% grasses, early

Adjacent Land Use

residential, road, ag. field

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) potential for ayonhio

Migratory Obstructions (seasonal, permanent) Thick vegetation

Note any fish observations none observed

Waterbody Notes

Natural Watercourse ☒ Trapezoidal Channel ☐ Grassed Swale ☐ Buried Tile ☐
 Surficial Drainage (i.e. furrows) ☐ Dugout Pond ☐ Dominated by Aquatic Veg ☒ Dry ☐

Other Habitat Notes, Incidental Wildlife Observations, etc. Riparian area comprised of Typha, grasses, willows
channel of culvert is very wide (~7m wide) however narrower 5m from culvert to 22m wide

Field Notes Authored by K. Mason

Field Notes QA/QCed by MR



WIND FARM WATERBODY RAPID ASSESSMENT FORM

Stantec

Station # 4-2
 Watercourse Name unnamed tributary
 Photos 337-342
 Date Oct 22/12
 Weather conditions in previous 24 hrs Sunny, 15°C
 GPS Coordinates (Zone) 17T E 0618971 N 4764056 Datum NAD83
 Descriptive Location off of Krick Road, N of Elcho Road, south of Vaughan Rd.

Water Quality

Dissolved Oxygen (mg/L) 6.93 pH 8.38 Conductivity (µS/cm) 799
 Water Temperature (°C) 9.80 Air Temperature (°C) 15.00
 Time in situ measurements taken 11:00

Watercourse Dimensions & Morphology

Mean Watercourse Width 2.5 (m) Maximum Pool Depth 50 (cm)
 Mean Bankfull Width 4 (m) Mean Water Depth 45 (cm)
Standing Water % Riffle _____ % Pool _____ % Run _____ % Flat _____
 Evidence of eroding banks, Comments on bank stability all grassed - stable

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 80 Silt 10 Muck _____
 Boulder _____ Gravel 10 Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle):
 Overhanging Vegetation _____ Woody Debris _____ Undercut Banks _____ Deep Pool _____ Watercress _____
 Aquatic Veg duckweed, sedges, RCG

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
10% grassed, early

Adjacent Land Use

corn & bushlot, road

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Note any fish observations low water, none observed

Waterbody Notes

Natural Watercourse ☒ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc.

at culvert & narrows away from culvert. Turbid water once away from culvert channel is grassed & fairly dry, however channel is defined.

Field Notes Authored by K. Macan

Field Notes QA/QCed by MP



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # 4-3
 Watercourse Name unnamed Tributary
 Photos 343 - 348
 Date Oct 22/12
 Project Name Niagara Wind
 Project # 160950 26.9
 Field Staff K. Mason, M. Fairella
 Time 11:18
 Weather conditions in previous 24 hrs runny, 15°C
 GPS Coordinates (Zone) 17T E 0619208 N 4764925 Datum NAD83
 Descriptive Location off of Vaughan Road, east of Krick Road, west of 4-3 102012

Water Quality

Dissolved Oxygen (mg/L) 8.62 pH 8.22 Conductivity (µS/cm) 784
 Water Temperature (°C) 9.22 Air Temperature (°C) 15°C
 Time in situ measurements taken 11:22

Watercourse Dimensions & Morphology

Mean Watercourse Width 2.5 (m) Maximum Pool Depth 50 (cm) standing H₂O
 Mean Bankfull Width ~4 (m) Mean Water Depth 40 (cm)
 % Riffle _____ % Pool _____ % Run _____ % Flat _____
 Evidence of eroding banks, Comments on bank stability stable - all grassed

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 80 Silt 10 Muck _____
 Boulder _____ Gravel 10 Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks 2 culvert Deep Pool algal Watercress duckweed
 Overhanging Vegetation RCG Woody Debris _____ Boulder _____ Other _____ Aquatic Veg _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use

80% grasses, early ag. fields, road, rural residential

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent) none

Note any fish observations low water / thick vegetation
none observed

Waterbody Notes

Natural Watercourse ☒ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc.

includes online pond on DLS side of road. With all the grassed, channel banks are hard to define

Field Notes Authored by K. Mason

Field Notes QA/QCed by mf



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # 4-4 10/20/12 Project Name Niagara Wind
 Watercourse Name Unnamed Tributary Project # 160950269
 Photos 349-352 Field Staff K. Mason, M. Farrell
 Date Oct 20/12 Time 11:30
 Weather conditions in previous 24 hrs Sunny, 15°C
 GPS Coordinates (Zone) 17T E 0619735 N 4764957 Datum NAD83
 Descriptive Location off of Vaughan Rd, east of 4-2 10/20/12

Water Quality

Dissolved Oxygen (mg/L) not enough for YSI pH 7.5 Conductivity (µS/cm) 150
 Water Temperature (°C) 15°C Air Temperature (°C) 15°C
 Time in situ measurements taken 11:30

Watercourse Dimensions & Morphology

Mean Watercourse Width 5 (m) Maximum Pool Depth 20 (cm) standing water
 Mean Bankfull Width 7 (m) Mean Water Depth 15 (cm)
0 % Riffle 0 % Pool 0 % Run 0 % Flat
 Evidence of eroding banks, Comments on bank stability stable - vegetation

Substrate (% cover)

Bedrock 0 Cobble 0 Sand 80 Silt 10 Muck 0
 Boulder 0 Gravel 0 Clay 0 Marl 10 Detritus 0

In-water Cover

Cover Types Present (circle): Overhanging Vegetation Undercut Banks 0 Deep Pool 0 Watercress 0 Aquatic Veg RCG Typha
 Woody Debris 0 Boulder 0 Other 0

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 100% grasses & Typha, early

Adjacent Land Use

road, rural residential, corn, bush lot

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) none

Migratory Obstructions (seasonal, permanent)

Thick vegetation along water
 Note any fish observations none observed

Waterbody Notes

Natural Watercourse 0 Trapezoidal Channel 0 Grassed Swale 0 Buried Tile 0
 Surficial Drainage (i.e. furrows) ✓ Dugout Pond 0 Dominated by Aquatic Veg ✓ Dry 0

Other Habitat Notes, Incidental Wildlife Observations, etc. W/s side the drainage feature is ill defined, D/s you can see a Typha corridor, channel may be more defined downstream

Field Notes Authored by K. Mason

Field Notes QA/QCed by mf



WIND FARM WATERBODY RAPID ASSESSMENT FORM

Stantec

Station # 5.3 102012
 Watercourse Name unnamed Trib.
 Photos 353-357
 Date Oct 22/12
 Weather conditions in previous 24 hrs Sunny, 15°C
 GPS Coordinates (Zone) 17T E 0619028 N 4763161 Datum NAD83
 Descriptive Location off of Knick Road, South of Elcho Road

Water Quality

Dissolved Oxygen (mg/L) 9.19 pH 8.04 Conductivity (µS/cm) 1389
 Water Temperature (°C) 10.22 Air Temperature (°C) 15°C
 Time in situ measurements taken 11:50

Watercourse Dimensions & Morphology

Mean Watercourse Width 2 (m) Maximum Pool Depth 80 (cm)
 Mean Bankfull Width 3 (m) Mean Water Depth 30 (cm) standing H₂O
 % Riffle _____ % Pool _____ % Run _____ % Flat _____
 Evidence of eroding banks, Comments on bank stability stable - well vegetated

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 80 Silt 5 Muck _____
 Boulder _____ Gravel 10 Clay _____ Marl 5 Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks _____ Deep Pool _____ Watercress _____
 Overhanging Vegetation _____ Woody Debris _____ Boulder _____ Other _____
Puckweed
Typha
Aquatic Veg RCG

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
80% grasses, early

Adjacent Land Use

road, ag. field, pasture

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
potential cyprinid spawning

Migratory Obstructions (seasonal, permanent)
thick vegetation

Note any fish observations none observed

Waterbody Notes

Natural Watercourse ☒ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc. channel is wider @ culvert (~10m wide). Riparian includes grasses, willows, & scrubby vegetation. Water in channel is murky & covered w duckweed

Field Notes Authored by K. Mason

Field Notes QA/QCed by mlp



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # 6-2

Watercourse Name unnamed trib.

Photos 358-361

Date Oct 22/12

Weather conditions in previous 24 hrs sunny, 15°C

GPS Coordinates (Zone) 17T E 0619046

Descriptive Location N of Zumstein Road

Project Name Niagara Wind

Project # 160950269

Field Staff K. Mason, M. Farrell

Time 12:01

Datum NAD83

Water Quality

Dissolved Oxygen (mg/L) dry

pH dry Conductivity (µS/cm) dry

Water Temperature (°C) dry

Air Temperature (°C) 15

Time in situ measurements taken dry

Watercourse Dimensions & Morphology

Mean Watercourse Width dry (m)

Mean Bankfull Width 1.5 (m)

Maximum Pool Depth dry (cm)

Mean Water Depth dry (cm)

% Riffle dry

% Pool dry

% Run dry

% Flat dry

Evidence of eroding banks, Comments on bank stability dry

Substrate (% cover)

Bedrock dry

Cobble dry

Sand dry

Silt dry

Muck dry

Boulder dry

Gravel dry

Clay dry

Marl dry

Detritus dry

In-water Cover

Cover Types Present (circle):

Overhanging Vegetation 100% soil substrate

Woody Debris dry

Undercut Banks dry

Boulder dry

Deep Pool dry

Watercress dry

Aquatic Veg dry

Other dry

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 95%, grasses, early

Adjacent Land Use ag. fields, road

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) dry

Migratory Obstructions (seasonal, permanent) none

Note any fish observations dry - none

Waterbody Notes

Natural Watercourse dry Trapezoidal Channel dry

Grassed Swale dry

Buried Tile dry

Surficial Drainage (i.e. furrows) dry Dugout Pond dry

Dominated by Aquatic Veg dry

Dry dry

Other Habitat Notes, Incidental Wildlife Observations, etc.

very minor channel
definition - possibly more DLS
vis side is piped

Field Notes Authored by K. Mason

Field Notes QA/QCed by mf



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # 6-3
 Watercourse Name unnamed trib
 Photos 362-367
 Date Oct 22/12
 Weather conditions in previous 24 hrs Sunny, 15°C
 GPS Coordinates (Zone) 17T E 0619064 N 4761625 Datum Nad83
 Descriptive Location off of Krick Road, south of Zumstern
& of 6-1

Water Quality

Dissolved Oxygen (mg/L) 7.22 pH 8.16 Conductivity (µS/cm) 610
 Water Temperature (°C) 8.88 Air Temperature (°C) 17°C
 Time in situ measurements taken 12:15

Watercourse Dimensions & Morphology

Mean Watercourse Width 1.5 (m) Maximum Pool Depth 30 (cm)
 Mean Bankfull Width 8 (m) Mean Water Depth 20 (cm) standing water
 % Riffle — % Pool — % Run — % Flat —
 Evidence of eroding banks, Comments on bank stability stable - well vegetated

Substrate (% cover)

Bedrock — Cobble — Sand 80 Silt 10 Muck —
 Boulder — Gravel 10 Clay — Marl — Detritus —

In-water Cover

Cover Types Present (circle): Undercut Banks — Deep Pool — Watercress — RCG
Overhanging Vegetation Woody Debris — Boulder — Other — Aquatic veg
Typha

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
100% - grasses, early

Adjacent Land Use

ag. field, road

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
none

Migratory Obstructions (seasonal, permanent)
low water - thick vegetation

Note any fish observations
none observed

Waterbody Notes

Natural Watercourse ☒ Trapezoidal Channel — Grassed Swale — Buried Tile —
 Surficial Drainage (i.e. furrows) — Dugout Pond — Dominated by Aquatic Veg ☒ Dry —

Other Habitat Notes, Incidental Wildlife Observations, etc. channel is more defined away from culvert
water pooled at culvert. Riparian area includes grasses, Typha
dogwoods. Channel widens away from culvert & has
potential to flood 220m wide.

Field Notes Authored by K. Mason

Field Notes QA/QCed by M.P.



WIND FARM WATERBODY RAPID ASSESSMENT FORM

Stantec

Station # 8-2 Project Name Niagara Wind
 Watercourse Name unnamed tributary Project # 160950269
 Photos 368-372 Field Staff K. Mason, M. Farella
 Date Oct 22/12 Time 13:43
 Weather conditions in previous 24 hrs Sunny, 15°C
 GPS Coordinates (Zone) 17T E 0623116 N 4760425 Datum NAD83
 Descriptive Location off of side road 42, north of Concession 6

Water Quality

Dissolved Oxygen (mg/L) no water pH no water Conductivity (µS/cm) no water
 Water Temperature (°C) no water Air Temperature (°C) 18°C
 Time in situ measurements taken no water

Watercourse Dimensions & Morphology

Mean Watercourse Width 2 (m) Maximum Pool Depth moist (cm)
 Mean Bankfull Width 2 (m) Mean Water Depth moist (cm)
 % Riffle no water % Pool no water % Run no water % Flat no water
 Evidence of eroding banks, Comments on bank stability stable - all grassed & hard to define

Substrate (% cover)

Bedrock no water Cobble no water Sand no water Silt 100 Muck grasses
 Boulder no water Gravel no water Clay no water Marl no water Detritus no water

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
 Overhanging Vegetation no water Woody Debris no water Boulder no water Other no water

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 100%, terrestrial grasses, early

Adjacent Land Use

road, corn

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) none

Migratory Obstructions (seasonal, permanent) low water, thick vegetation

Note any fish observations none

Waterbody Notes

Natural Watercourse no water Trapezoidal Channel no water Grassed Swale checked Buried Tile no water
 Surficial Drainage (i.e. furrows) no water Dugout Pond no water Dominated by Aquatic Veg no water Dry no water

Other Habitat Notes, Incidental Wildlife Observations, etc.

slight channel definition in all terrestrial grasses in channel minimal water
Riparian area comprised of terrestrial grasses, dogwoods, trembling aspen etc.

Field Notes Authored by K. Mason

Field Notes QA/QCed by m.p.



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # 8-31
 Watercourse Name unnamed Tributary
 Photos 373-377
 Date Oct 22/12
 Weather conditions in previous 24 hrs Sunny, 15°C
 GPS Coordinates (Zone) 17T E 062234d N 4759602 Datum NAD83
 Descriptive Location off of Concession 6, west of Sideroad 42 east of Sideroad 44

Project Name Niagara Wind
 Project # 100950269
 Field Staff K. Mason, M. Faiella
 Time 13:56

Water Quality

Dissolved Oxygen (mg/L) _____ pH dry Conductivity (µS/cm) _____
 Water Temperature (°C) _____ Air Temperature (°C) 18°C
 Time in situ measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
 Mean Bankfull Width 2 (m) Mean Water Depth _____ (cm)
 _____ % Riffle _____ % Pool _____ % Run _____ % Flat
 Evidence of eroding banks, Comments on bank stability well vegetated

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 50 Silt 50 Muck _____
 Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Typha sedges
Overhanging Vegetation Woody Debris Boulder Other _____ Aquatic Veg

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 95% grasses & Typha, early

Adjacent Land Use road, scrubland, pasture

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) _____

Migratory Obstructions (seasonal, permanent) _____

Note any fish observations low water / thick vegetation
none

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel ☒ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc. Riparian area is comprised of dogwoods, grasses, Typha meadow species
channel runs along Concession 6

Field Notes Authored by K. Mason Field Notes QA/QCed by M.P.



WIND FARM WATERBODY RAPID ASSESSMENT FORM

Stantec

Station # 9-2

Watercourse Name unnamed Trib

Photos 380 - 384

Date Oct 22/12

Weather conditions in previous 24 hrs Sunny, 15°C

GPS Coordinates (Zone) 17T E 0622156

Descriptive Location off of Sid. road 44, South of conc. 16

Project Name Niagara Wind

Project # 160950269

Field Staff K. Mason H. Farilla

Time 14:16

Datum NAD83

Water Quality

Dissolved Oxygen (mg/L) _____

pH _____

Conductivity (µS/cm) _____

Water Temperature (°C) _____

Air Temperature (°C) 18°C

Time in situ measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m)

Maximum Pool Depth _____ (cm)

Mean Bankfull Width 5 (m)

Mean Water Depth _____ (cm)

% Riffle _____

% Pool _____

% Run _____

% Flat _____

Evidence of eroding banks, Comments on bank stability stable banks - well vegetated in grasses, Typha & meadow species.

Substrate (% cover)

Bedrock _____

Cobble _____

Sand _____

Silt _____

Muck _____

Boulder _____

Gravel _____

Clay _____

Marl _____

Detritus _____

In-water Cover

Cover Types Present (circle):

Undercut Banks _____

Deep Pool _____

Watercress _____

Aquatic veg Typha sedges

Overhanging Vegetation

Woody Debris _____

Boulder _____

Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 50%, Typha, early

Adjacent Land Use

pasture, road, ag field

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) _____

Migratory Obstructions (seasonal, permanent) _____

dry channel, thick vegetation

Note any fish observations none

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel ☒

Grassed Swale _____

Buried Tile _____

Surficial Drainage (i.e. furrows) _____ Dugout Pond _____

Dominated by Aquatic Veg _____

Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc. deeply incised channel - dry at the time of survey

Field Notes Authored by K. Mason

Field Notes QA/QCed by ml



WIND FARM WATERBODY RAPID ASSESSMENT FORM

Stantec

Station # 10-114 Project Name Niagara wind
 Watercourse Name unnamed tributary Project # 160950269
 Photos 385-390 Field Staff K. Mason, M. Faiella
 Date Oct 22/12 Time 14:25
 Weather conditions in previous 24 hrs Sunny, 15°C
 GPS Coordinates (Zone) 17T E 0622190 N 4757136 Datum NAD83
 Descriptive Location off of side road 44 south of 9-110201

Water Quality

Dissolved Oxygen (mg/L) 7.50 pH 7.66 Conductivity (µS/cm) 3470
 Water Temperature (°C) 11.35 Air Temperature (°C) 18°C
 Time in situ measurements taken 14:30

Watercourse Dimensions & Morphology

Mean Watercourse Width 1 (m) Maximum Pool Depth 1 (cm)
 Mean Bankfull Width 2 (m) Mean Water Depth 1 (cm)
 % Riffle 0 % Pool 0 % Run 100 % Flat 0
 Evidence of eroding banks, Comments on bank stability stable - well vegetated

Substrate (% cover)

Bedrock 0 Cobble 0 Sand 80 Silt 10 Muck 0
 Boulder 0 Gravel 0 Clay 0 Marl 10 Detritus 0

In-water Cover

Cover Types Present (circle): Undercut Banks 0 Deep Pool 0 Watercress 0
 Overhanging Vegetation 0 Woody Debris 0 Boulder 0 Other 0 Aquatic Veg

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 15% small trees, intermediate

Adjacent Land Use

agricultural fields, road

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) none

Migratory Obstructions (seasonal, permanent) none

Note any fish observations dry channel / thick vegetation

Waterbody Notes

Natural Watercourse 0 Trapezoidal Channel ✓ Grassed Swale 0 Buried Tile 0
 Surficial Drainage (i.e. furrows) 0 Dugout Pond 0 Dominated by Aquatic Veg 0 Dry ✓

Other Habitat Notes, Incidental Wildlife Observations, etc. standing water at culvert, however dry for the rest

Field Notes Authored by K. Mason

Field Notes QA/QCed by mf



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # 11-3

Watercourse Name unnamed tributary

Photos 394-398

Date Oct 22/12

Weather conditions in previous 24 hrs sunny, 15°C

GPS Coordinates (Zone) 17T E 0623924

Descriptive Location off of Welland Rd, south of

Project Name Niagara Wind

Project # 11-0950269

Field Staff K. Masan M. Farrelle

Time 14:50

Datum NAD83

concession 5, North of Hwy 3

Water Quality

Dissolved Oxygen (mg/L) _____

pH _____

Conductivity (µS/cm) _____

Water Temperature (°C) _____

Air Temperature (°C) 15°C

Time in situ measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m)

Maximum Pool Depth _____ (cm)

Mean Bankfull Width 2 (m)

Mean Water Depth _____ (cm)

% Riffle _____

% Pool _____

% Run _____

% Flat _____

Evidence of eroding banks, Comments on bank stability vegetated

stable banks - well

Substrate (% cover)

Bedrock _____

Cobble _____

Sand _____

Silt _____

Muck _____

Boulder _____

Gravel _____

Clay _____

Marl _____

Detritus _____

In-water Cover

Cover Types Present (circle):

Overhanging Vegetation

Undercut Banks _____

Woody Debris _____

Boulder _____

Deep Pool _____

Other _____

Watercress _____

Aquatic veg

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 85%

Adjacent Land Use ag. fields, road

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) _____

Migratory Obstructions (seasonal, permanent) _____

Note any fish observations none observed

Waterbody Notes

Natural Watercourse _____

Trapezoidal Channel ☒

Grassed Swale _____

Buried Tile _____

Surficial Drainage (i.e. furrows) _____

Dugout Pond _____

Dominated by Aquatic Veg _____

Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc. Waterbody on east side of

road, grassed swale on west

Field Notes Authored by K. Masan

Field Notes QA/QCed by MP



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # 12-2 Project Name Niagara Wind
 Watercourse Name unnamed Trib. Project # 160930269
 Photos 408-413 Field Staff K. Mason, M. Fairella
 Date Oct 23/12 Time 9:25
 Weather conditions in previous 24 hrs Sunny, 18°C
 GPS Coordinates (Zone) 17T E 0623228 N 4754513 Datum NAD83
 Descriptive Location off of Jenny Jump Road alongside corn field west of Tawline Road

Water Quality

Dissolved Oxygen (mg/L) 8.21 pH 8.88 Conductivity (µS/cm) 253
 Water Temperature (°C) 11.48 Air Temperature (°C) 10°C
 Time in situ measurements taken 9:35

Watercourse Dimensions & Morphology

Mean Watercourse Width 2 (m) Maximum Pool Depth 25 (cm)
 Mean Bankfull Width 6 (m) Mean Water Depth 20 (cm)
 % Riffle 100 % Pool 0 % Run 0 % Flat 0
 Evidence of eroding banks, Comments on bank stability some erosion & scouring

Substrate (% cover)

Bedrock 0 Cobble 0 Sand 40 Silt 10 Muck 0
 Boulder 0 Gravel 40 Clay 0 Marl 10 Detritus 0

In-water Cover

Cover Types Present (circle): Undercut Banks 0 Deep Pool 0 Watercress 0 Aquatic veg RCG Type
 Overhanging Vegetation 0 Woody Debris 0 Boulder 0 Other 0

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
20% grasses & meadow species, early

Adjacent Land Use

corn & unmaintained road

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
none

Migratory Obstructions (seasonal, permanent)
low water

Note any fish observations none observed

Waterbody Notes

Natural Watercourse 0 Trapezoidal Channel ✓ Grassed Swale 0 Buried Tile 0
 Surficial Drainage (i.e. furrows) 0 Dugout Pond 0 Dominated by Aquatic Veg 0 Dry 0

Other Habitat Notes, Incidental Wildlife Observations, etc. defined trapezoidal channel

Field Notes Authored by K. Mason

Field Notes QA/QCed by MF



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # 13-4 Project Name Niagara Wind
 Watercourse Name unnamed Project # 160930269
 Photos 414-419 Field Staff K. Mason, M. Faiella
 Date Oct 23/12 Time 9:45
 Weather conditions in previous 24 hrs Sunny, 18°C
 GPS Coordinates (Zone) 17T E 0624235 N 4753084 Datum NAD83
 Descriptive Location off of Booker Road, west of Dunnville
Wainfleet Township

Water Quality
 Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
 Water Temperature (°C) _____ Air Temperature (°C) 10°C
 Time in situ measurements taken _____

Watercourse Dimensions & Morphology
 Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
 Mean Bankfull Width 9 (m) Mean Water Depth _____ (cm)
 % Riffle _____ % Pool _____ % Run _____ % Flat _____
 Evidence of eroding banks, Comments on bank stability Sand scouring

Substrate (% cover)
 Bedrock _____ Cobble _____ Sand 80 Silt 10 Muck _____
 Boulder _____ Gravel _____ Clay _____ Marl 10 Detritus _____

In-water Cover
 Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone
 Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 100% RCG, early
 Adjacent Land Use ag field, road

Fish Habitat Potential
 Critical Habitat (spawning or nursery areas, groundwater upwellings) none
 Migratory Obstructions (seasonal, permanent) low water & thick vegetation
 Note any fish observations none observed

Waterbody Notes
 Natural Watercourse _____ Trapezoidal Channel ☒ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg ☒ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc. deeply defined channel
dominated by RCG
Riparian area consists of poplars, meadow sp., dogwood etc

Field Notes Authored by K. Mason Field Notes QA/QCed by M.P.



WIND FARM WATERBODY RAPID ASSESSMENT FORM

Stantec

Station # 13-5
 Watercourse Name unnamed
 Photos 420-423
 Date Oct 23/12

Project Name Niagara wind
 Project # 160950269
 Field Staff K. Mason, M. Faella
 Time 9:57

Weather conditions in previous 24 hrs Sunny, 18°C
 GPS Coordinates (Zone) 17T E 0623722 N 4752888 Datum NAD83
 Descriptive Location off of Booker Road west of 13-1 10/20/12
& Dunnville/Wainfleet townline

Water Quality

Dissolved Oxygen (mg/L) Dry pH Dry Conductivity (µS/cm) Dry
 Water Temperature (°C) Dry Air Temperature (°C) 10°C
 Time in situ measurements taken Dry

Watercourse Dimensions & Morphology

Mean Watercourse Width Dry (m) Maximum Pool Depth Dry (cm)
 Mean Bankfull Width 2.5 (m) Mean Water Depth Dry (cm)
 % Riffle Dry % Pool Dry % Run Dry % Flat Dry
 Evidence of eroding banks, Comments on bank stability stable banks - all vegetated

Substrate (% cover)

Bedrock Dry Cobble Dry Sand Dry Silt 100 Muck Dry
 Boulder Dry Gravel Dry Clay Dry Marl Dry Detritus Dry

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Phragmites
Overhanging Vegetation Woody Debris Boulder Other Aquatic veg

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
80% meadow sp & Phragmites, early

Adjacent Land Use

ag. field, road, bushlot

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
none

Migratory Obstructions (seasonal, permanent)
dry & thick vegetation

Note any fish observations none

Waterbody Notes

Natural Watercourse Dry Trapezoidal Channel ✓ Grassed Swale Dry Buried Tile Dry
 Surficial Drainage (i.e. furrows) Dry Dugout Pond Dry Dominated by Aquatic Veg Dry

Other Habitat Notes, Incidental Wildlife Observations, etc. defined channel dominated by Phragmites. Riparian area consists of Phragmites, w. Pine, meadow species etc.

Field Notes Authored by K. Mason

Field Notes QA/QCed by md.



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # 13-6
 Watercourse Name unnamed Trib
 Photos 424-427
 Date Oct 23/12
 Weather conditions in previous 24 hrs Sunny 18°C
 GPS Coordinates (Zone) 17T E 0622258 N 4752708 Datum NAD83
 Descriptive Location off of Booker Road, west of 13-2
& 13-1, running along bushlot (to the N)

Project Name Niagara Wind
 Project # 160950269
 Field Staff K. Mason, M. Faiella
 Time 10:07

Water Quality
 Dissolved Oxygen (mg/L) not enough for YSI pH not enough for YSI Conductivity (µS/cm) not enough for YSI
 Water Temperature (°C) not enough for YSI Air Temperature (°C) 10°C
 Time in situ measurements taken not enough for YSI

Watercourse Dimensions & Morphology

Mean Watercourse Width 1.5 (m) Maximum Pool Depth 15 (cm)
 Mean Bankfull Width 2 (m) Mean Water Depth 10 (cm) standing H2O
0 % Riffle 0 % Pool 0 % Run 0 % Flat
 Evidence of eroding banks, Comments on bank stability well vegetated

Substrate (% cover)

Bedrock 0 Cobble 0 Sand 80 Silt 10 Muck 0
 Boulder 0 Gravel 0 Clay 0 Marl 10 Detritus 0

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress RCC Typha
Overhanging Vegetation Woody Debris Boulder Other Aquatic Veg

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
75% meadow species & poplars, intermediate

Adjacent Land Use

road, ag. field, bushlot

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
none

Migratory Obstructions (seasonal, permanent)
low water

Note any fish observations none observed

Waterbody Notes

Natural Watercourse 0 Trapezoidal Channel ✓ Grassed Swale 0 Buried Tile 0
 Surficial Drainage (i.e. furrows) 0 Dugout Pond 0 Dominated by Aquatic Veg 0 Dry 0

Other Habitat Notes, Incidental Wildlife Observations, etc.

On south side of Booker Road, non-waterbody on North side
Riparian area consists of poplars, Dogwoods, grasses, meadow species etc.

Field Notes Authored by K. Mason

Field Notes QA/QCed by ML



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # 13-7

Watercourse Name unnamed trib

Photos 428-430

Date Oct 23/12

Weather conditions in previous 24 hrs Sunny, 18°C

GPS Coordinates (Zone) 17T E

Descriptive Location off of Dunnville/Wainfleet Tangle

Project Name Niagara Wind

Project # 160950269

Field Staff K. Maon, M. Faicella

Time 10:39

N 4752861 Datum Nad 83

South of Bookers Road

Water Quality

Dissolved Oxygen (mg/L) 8.50

pH 8.32 Conductivity (µS/cm) 1058

Water Temperature (°C) 11.69

Air Temperature (°C) 10°C

Time in situ measurements taken 10:41

Watercourse Dimensions & Morphology

Mean Watercourse Width 2 (m)

Maximum Pool Depth 25 (cm)

Mean Bankfull Width 6 (m)

Mean Water Depth 10 (cm)

% Riffle

% Pool

% Run

% Flat

Evidence of eroding banks, Comments on bank stability well vegetated - stable

Substrate (% cover)

Bedrock

Cobble

Sand

Silt

Muck

Boulder

Gravel

Clay

Marl

Detritus

In-water Cover

Cover Types Present (circle):

Overhanging Vegetation

Woody Debris

Undercut Banks

Boulder

Deep Pool

Other

Watercress

Aquatic Veg

Duckweed
RCG

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) <5%, meadow species & sumac, early

Adjacent Land Use

ag. land, road, rural residential

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) potential spawning for cyprinid sp.

Migratory Obstructions (seasonal, permanent) low water

Note any fish observations none observed

Waterbody Notes

Natural Watercourse Trapezoidal Channel ☒

Grassed Swale

Buried Tile

Surficial Drainage (i.e. furrows) Dugout Pond

Dominated by Aquatic Veg

Dry

Other Habitat Notes, Incidental Wildlife Observations, etc.

surrounded by meadow/riparian vegetation. lots of
duckweed

Field Notes Authored by K. Maon

Field Notes QA/QCed by m.f.



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # 13-8

Watercourse Name unnamed

Photos 431-435

Date Oct 23/12

Weather conditions in previous 24 hrs Sunny 18°C

GPS Coordinates (Zone) 17E 0624976

Descriptive Location off of Peth Road, west of Dunnville/
Wainfleet Township

Project Name Niagara Wind

Project # 160950269

Field Staff K. Mason, M. Favella

Time 10:50

Water Quality

Dissolved Oxygen (mg/L) 9.13

pH 8.74 Conductivity (µS/cm) 273-

Water Temperature (°C) 11.92

Air Temperature (°C) 10°C

Time in situ measurements taken 10:55

Watercourse Dimensions & Morphology

Mean Watercourse Width 2 (m)

Maximum Pool Depth 30 (cm)

Mean Bankfull Width 4 (m)

Mean Water Depth 20 (cm)

% Riffle % Pool

% Run % Flat

Evidence of eroding banks, Comments on bank stability stable banks - well vegetated

Substrate (% cover)

Bedrock Cobble Sand 70 Silt 10 Muck
Boulder Gravel 20 Clay Marl Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress
Overhanging Vegetation Woody Debris Boulder Other Aquatic Veg

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 60%

Adjacent Land Use meadow sp & pine, intermediate
road, ag field

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) none

Migratory Obstructions (seasonal, permanent)

Note any fish observations low water, thick grasses
none observed

Waterbody Notes

Natural Watercourse Trapezoidal Channel ✓ Grassed Swale Buried Tile
Surficial Drainage (i.e. furrows) Dugout Pond Dominated by Aquatic Veg Dry

Other Habitat Notes, Incidental Wildlife Observations, etc. Riparian area consist of
meadow sp, pine, Poplars, dogwood & willow sp.

Field Notes Authored by K. Mason

Field Notes QA/QCed by MP



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # 14-6

Watercourse Name unnamed

Photos 440-444

Date Oct 23/12

Weather conditions in previous 24 hrs Sunny, 18°C

GPS Coordinates (Zone) 17T E 0625305

Descriptive Location off of Dunnville / Wainfleet townline, south of 13-5102015 & Poth Road

Project Name Niagara Wind

Project # 12-000 160950269

Field Staff K. Mason, M. Failla

Time 11:16

N 4751761 Datum NAD83

Water Quality

Dissolved Oxygen (mg/L) _____

pH _____

Conductivity (µS/cm) _____

Water Temperature (°C) _____

Air Temperature (°C) 10°C

Time in situ measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width 2 (m)

Maximum Pool Depth 30 (cm)

Mean Bankfull Width 2.5 (m)

Mean Water Depth 25 (cm)

standing water

% Riffle _____

% Pool _____

% Run _____

% Flat _____

Evidence of eroding banks, Comments on bank stability Vegetated

stable banks - well

Substrate (% cover)

Bedrock _____

Cobble _____

Sand 40

Silt 20

Muck _____

Boulder _____

Gravel 30

Clay _____

Marl 10

Detritus _____

In-water Cover

Cover Types Present (circle):

Overhanging Vegetation

Undercut Banks _____
Woody Debris _____

Boulder _____

Deep Pool _____

Other _____

Watercress _____

Aquatic Veg

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 75% scrubland & grasses, early

Adjacent Land Use road, ag. field

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) none

Migratory Obstructions (seasonal, permanent) thick vegetation, low water

Note any fish observations none observed

Waterbody Notes

Natural Watercourse _____

Trapezoidal Channel ☒

Grassed Swale _____

Buried Tile _____

Surficial Drainage (i.e. furrows) _____

Dugout Pond _____

Dominated by Aquatic Veg _____

Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc. Water body on east side of Dunnville/Wainfleet townline, non-water body on west side.

Field Notes Authored by K. Mason

Field Notes QA/QCed by m.p.



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # 15-3

Watercourse Name unnamed

Photos 445-449

Date Oct 23/12

Weather conditions in previous 24 hrs Sunny, 18°C

GPS Coordinates (Zone) 17T E 0625873

Descriptive Location off of Dunnville/Wainfleet Twp line

Project Name Niagara Wind

Project # 160950269

Field Staff K. Mason, M. Fairlie

Time 11:32

Datum NAD83

N of intersection w/ Canal bank rd

Water Quality

Dissolved Oxygen (mg/L) 9.73 pH 8.38 Conductivity (µS/cm) 608

Water Temperature (°C) 12.77 Air Temperature (°C) 10°C

Time *in situ* measurements taken 11:33

Watercourse Dimensions & Morphology

Mean Watercourse Width 1.5 (m) Maximum Pool Depth 25 (cm)

Mean Bankfull Width 3 (m) Mean Water Depth 15 (cm) *standing H₂O*

% Riffle _____ % Pool _____ % Run _____ % Flat _____

Evidence of eroding banks, Comments on bank stability stable banks - well vegetated

Substrate (% cover)

Bedrock _____ Cobble _____ Sand 30

Boulder _____ Gravel 40 Clay _____ Silt 20 Muck _____

Marl 10 Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress *Typha*

Overhanging Vegetation Woody Debris Boulder Other _____ Aquatic Veg

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 95%, Typha, early

Adjacent Land Use canal, road, corn

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) none

Migratory Obstructions (seasonal, permanent) low water, thick vegetation

Note any fish observations _____

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel ☒ Grassed Swale _____ Buried Tile _____

Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg ☒ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc. Trapezoidal defined

channel dominated by cattails

Field Notes Authored by K. Mason

Field Notes QA/QCed by mf



WIND FARM WATERBODY RAPID ASSESSMENT FORM

Stantec

Station # 15-4
 Watercourse Name unnamed
 Photos 452-454
 Date Oct 23/12
 Weather conditions in previous 24 hrs Sunny, 18°C
 GPS Coordinates (Zone) 17T E 0625245 N 4750584 Datum NAD83
 Descriptive Location off of Canal Bank rd, west of Dunnville
Wainfleet Township

Project Name Niagara Wind
 Project # 160950269
 Field Staff K. Mason, M. Farrell
 Time 11:52

Water Quality
 Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
 Water Temperature (°C) _____ Air Temperature (°C) 10°C
 Time in situ measurements taken _____

Watercourse Dimensions & Morphology
 Mean Watercourse Width 2 (m) Maximum Pool Depth 20 (cm)
 Mean Bankfull Width 4.5 (m) Mean Water Depth 15 (cm)
 _____ % Riffle _____ % Pool _____ % Run 100 % Flat
 Evidence of eroding banks, Comments on bank stability stable banks -
all grassed

Substrate (% cover)
 Bedrock _____ Cobble _____ Sand 80 Silt 10 Muck _____
 Boulder _____ Gravel 10 Clay _____ Marl _____ Detritus _____

In-water Cover
 Cover Types Present (circle): Undercut Banks Deep Pool Watercress Typha
 Overhanging Vegetation Woody Debris Boulder Other _____ Aquatic veg

Riparian Zone
 Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
12% grasses & typha, early

Adjacent Land Use road, residential

Fish Habitat Potential
 Critical Habitat (spawning or nursery areas, groundwater upwellings)
none

Migratory Obstructions (seasonal, permanent)
low water
 Note any fish observations none observed

Waterbody Notes
 Natural Watercourse _____ Trapezoidal Channel ☒ Grassed Swale _____ Buried Tile _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc. mowed grass up to
channel edge, very defined channel

Field Notes Authored by K. Mason Field Notes QA/QCed by M.P.



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # 15-5 10 112
 Watercourse Name unnamed
 Photos 455-456
 Date Oct 23/12
 Weather conditions in previous 24 hrs Sunny 18°C
 GPS Coordinates (Zone) 17T E 0624439 N 4750255 Datum Nad83
 Descriptive Location off of Hutchinson Road, west of Canal Bank Rd & 15-2

Project Name Niagara Wind
 Project # 160950269
 Field Staff K. Moran, M. Faiella
 Time 12:03

Water Quality

Dissolved Oxygen (mg/L) pH Conductivity (µS/cm)
 Water Temperature (°C) Air Temperature (°C) 10°C
 Time in situ measurements taken

Watercourse Dimensions & Morphology

Mean Watercourse Width (m) Maximum Pool Depth (cm)
 Mean Bankfull Width 4 (m) Mean Water Depth (cm)
 % Riffle % Pool % Run % Flat
 Evidence of eroding banks, Comments on bank stability well vegetated

Substrate (% cover)

Bedrock Cobble Sand Silt Muck
 Boulder Gravel Clay Marl Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 15% forest, mature

Adjacent Land Use

ag. field, canal

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) none

Migratory Obstructions (seasonal, permanent) low water

Note any fish observations none

Waterbody Notes

Natural Watercourse Trapezoidal Channel ✓ Grassed Swale Buried Tile
 Surficial Drainage (i.e. furrows) Dugout Pond Dominated by Aquatic Veg Dry

Other Habitat Notes, Incidental Wildlife Observations, etc. Riparian area consists of mature trees & small shrubs
has a well defined channel

Field Notes Authored by K. Moran

Field Notes QA/QCed by m.f.



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Non REA

Station # 1-2

Watercourse Name unknown

Photos _____

Date June 22/12

Weather conditions in previous 24 hrs hot & humid ~32°C

GPS Coordinates (Zone) 17T E 0622161

Descriptive Location North of intersection of Greenlane & Mantachew Road

Project Name Niagara Wind

Project # 160950269

Field Staff R. Clayton, J. Keene

Time 11:10

Datum NAD83

Water Quality

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____

Water Temperature (°C) _____ Air Temperature (°C) 32°C

Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)

Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)

_____ % Riffle _____ % Pool _____ % Run _____ % Flat

Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

_____ Bedrock _____ Cobble _____ Sand _____ Silt _____ Muck

_____ Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus

In-water Cover

Cover Types Present (circle): _____ Undercut Banks _____ Deep Pool _____ Watercress _____ Aquatic Veg

Overhanging Vegetation _____ Woody Debris _____ Boulder _____ Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) scrubby vegetation

Adjacent Land Use Residential, farmland, road

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings) none

Migratory Obstructions (seasonal, permanent) dry

Note any fish observations none observed

Waterbody Notes

Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____ Seep _____

Surficial Drainage (i.e. furrows) ☒ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc. _____

Field Notes Authored by K. Clayton

Field Notes QA/QCed by JK



WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

Stantec

Station # 1-3 Project Name Niagara Wind
 Watercourse Name unknown Project # 100950269
 Photos _____ Field Staff J. Greene, K. Clayton
 Date June 22/13 Time 11:15
 Weather conditions in previous 24 hrs not humid ~32°C
 GPS Coordinates (Zone) 17T E 0622116 N 478192 Datum NAD83
 Descriptive Location near intersection of Greenlane & Mainview Road

Water Quality

Dissolved Oxygen (mg/L) 8.10 pH 8.70 Conductivity (µS/cm) 835
 Water Temperature (°C) 20.10 Air Temperature (°C) 32°C
 Time *in situ* measurements taken 11:16

Watercourse Dimensions & Morphology

Mean Watercourse Width 1 (m) Maximum Pool Depth 0.20 (cm)
 Mean Bankfull Width 2.5-3 (m) Mean Water Depth 0.15 (cm)
 _____ % Riffle _____ % Pool 100 % Run _____ % Flat
 Evidence of eroding banks, Comments on bank stability stable

Substrate (% cover)

Bedrock 50 Cobble _____ Sand 20 Silt _____ Muck _____
20 Boulder 10 Gravel _____ Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg Typha RCG
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

15% trees, grasses, intermediate
 Adjacent Land Use Road, ag. land

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

potential trout spawning

Migratory Obstructions (seasonal, permanent)

almost dry channel

Note any fish observations _____

Waterbody Notes

Natural Watercourse ☒ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____ Seep _____
 Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc. _____

Field Notes Authored by K. Clayton

Field Notes QA/QCed by JK



WIND FARM WATERBODY RAPID ASSESSMENT FORM

REA

Stantec

Station # 752

Watercourse Name unknown

Photos see photo log

Date June 20/12

Project Name Niagara Wind

Project # 160958269

Field Staff ME, MF

Time 10:05

Weather conditions in previous 24 hrs hot & humid

GPS Coordinates (Zone) 17T E 0623260 N 4752701 Datum NAD83

Descriptive Location On Booker Rd ~ 1km west of Townline Dunn/Whin

Water Quality

Dissolved Oxygen (mg/L) 5.56 pH 7.90 Conductivity (µS/cm) 498

Water Temperature (°C) 21.57 Air Temperature (°C) 29°C

Time *in situ* measurements taken 10:10

Watercourse Dimensions & Morphology

Mean Watercourse Width 1.75 (m) Maximum Pool Depth 20 (cm)

Mean Bankfull Width 30 (m) Mean Water Depth 15 (cm)

% Riffle 50 % Pool 50 % Run 50 % Flat

Evidence of eroding banks, Comments on bank stability none. well veget'd

Substrate (% cover)

Bedrock 40 Cobble 40 Sand 40 Silt 40 Muck

Boulder 20 Gravel 20 Clay 20 Marl 20 Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg

Overhanging Vegetation Woody Debris Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

20% mature / immature poplars, willow, shrubs.

Adjacent Land Use

ag. rd.

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

spawn, foraging, nursery

Migratory Obstructions (seasonal, permanent)

lack of water

Note any fish observations school of yoy of possible brook stickle back.

Waterbody Notes

Natural Watercourse ✓ Trapezoidal Channel ✓ Grassed Swale ✓ Buried Tile ✓

Surficial Drainage (i.e. furrows) ✓ Dugout Pond ✓ Dominated by Aquatic Veg ✓ Dry ✓

Other Habitat Notes, Incidental Wildlife Observations, etc. Song bird sp.

Field Notes Authored by ME

Field Notes QA/QCed by ME



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Station # 13-6
 Watercourse Name unnamed Trib
 Photos 424-427
 Date Oct 23/12
 Weather conditions in previous 24 hrs Sunny 18°C
 GPS Coordinates (Zone) 17T E 0622258 N 4752708 Datum NAD83
 Descriptive Location off of Booker Road, west of 13-2
#13-1, running along bushlot (to the N)

Project Name Niagara Wind
 Project # 160950269
 Field Staff K. Mason, M. Faiella
 Time 10:07

Water Quality
 Dissolved Oxygen (mg/L) not enough for YSI
 Water Temperature (°C) 18 pH 7.5 Conductivity (µS/cm) 100
 Time in situ measurements taken 10:07 Air Temperature (°C) 10°C

Watercourse Dimensions & Morphology
 Mean Watercourse Width 1.5 (m) Maximum Pool Depth 15 (cm)
 Mean Bankfull Width 2 (m) Mean Water Depth 10 (cm) standing H₂O
0 % Riffle 0 % Pool 0 % Run 0 % Flat
 Evidence of eroding banks, Comments on bank stability well vegetated

Substrate (% cover)
 Bedrock 0 Cobble 0 Sand 80 Silt 10 Muck 0
 Boulder 0 Gravel 0 Clay 0 Marl 10 Detritus 0

In-water Cover
 Cover Types Present (circle): Undercut Banks 0 Deep Pool 0 Watercress 0
Overhanging Vegetation Woody Debris 0 Boulder 0 Other 0 Aquatic veg PCG Typha

Riparian Zone
 Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional) 75%
 Adjacent Land Use meadow, species & poplars, intermediate
road, ag field, bushlot

Fish Habitat Potential
 Critical Habitat (spawning or nursery areas, groundwater upwellings) none
 Migratory Obstructions (seasonal, permanent) low water
 Note any fish observations none observed

Waterbody Notes
 Natural Watercourse 0 Trapezoidal Channel ✓ Grassed Swale 0 Buried Tile 0
 Surficial Drainage (i.e. furrows) 0 Dugout Pond 0 Dominated by Aquatic Veg 0 Dry 0

Other Habitat Notes, Incidental Wildlife Observations, etc. waterbody
Road, non-waterbody on North side of Booker
Riparian area consists of poplars, Dogwood, grasses, meadow
species etc.

Field Notes Authored by K. Mason Field Notes QA/QCed by MLP



Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

~~No longer in Proj. Locking~~

REA

X

Station # 16-3
Watercourse Name unknown
Photos _____
Date June 21/12

Project Name Niagara Wind
Project # 160958269
Field Staff J. Keene, Kelly Clayton
Time 9:54

Weather conditions in previous 24 hrs _____
GPS Coordinates (Zone) 17T E 617946 N 4769975 Datum Nad83
Descriptive Location off of Port Davidson Road, South of 16-2,
North of Sixteen Rd

Water Quality

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
Water Temperature (°C) _____ Air Temperature (°C) 30°C
Time *in situ* measurements taken _____

-no water

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
Mean Bankfull Width 3 (m) Mean Water Depth _____ (cm)
_____ % Riffle _____ % Pool _____ % Run _____ % Flat
Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)

Bedrock _____ Cobble 20 Sand 40 Silt _____ Muck _____
Boulder _____ Gravel 40 Clay _____ Marl _____ Detritus _____

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg RCG
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

100%, RCG, early
Adjacent Land Use residential, farmland

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Note any fish observations dry

Waterbody Notes

Natural Watercourse ☒ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg ☒ Dry ☒

Other Habitat Notes, Incidental Wildlife Observations, etc.

narrow channel full of
Reed Canary grass & a little typha - no water

Field Notes Authored by K. Clayton

Field Notes QA/QCed by ME

Appendix D

DFO Operational Statements



HIGH-PRESSURE DIRECTIONAL DRILLING

Fisheries and Oceans Canada Ontario Operational Statement

Version 3.0

For the purpose of this Operational Statement, the term High-Pressure Directional Drilling (HPDD) means trenchless methods of crossing a watercourse using pressurized mud systems. HPDD is used to install cables and pipelines for gas, telecommunications, fibre optics, power, sewer, oil and water lines underneath watercourses and roads. This method is preferable to open-cut and isolated crossings since the cable or pipeline is drilled underneath the watercourse with very little disturbance to the bed or banks. HPDD involves drilling a pilot bore hole underneath the watercourse towards a surface target, back-reaming the bore hole to the drill rig while pulling the pipe along through the hole. This process typically uses the freshwater gel mud system composed of a mixture of clean, freshwater as the base, bentonite (clay-based drilling lubricant) as the viscosifier and synthetic polymers.

The general order of preference for carrying out a cable or pipeline stream crossing in order to protect fish and fish habitat is: a) a punch or bore crossing (see *Punch & Bore Crossings* Operational Statement), b) HPDD crossing, c) dry open-cut crossing, and d) isolated open-cut crossing (see *Isolated or Dry Open-cut Stream Crossings* Operational Statement). This order must be balanced with practical considerations at the site.

One of the risks associated with HPDD is the escape of drilling mud into the environment as a result of a spill, tunnel collapse or the rupture of mud to the surface, commonly known as “frac-out”. A frac-out is caused when excessive drilling pressure results in drilling mud propagating toward the surface. The risk of a frac-out can be reduced through proper geotechnical assessment practices and drill planning and execution. The extent of a frac-out can be limited by careful monitoring and having appropriate equipment and response plans ready in the event that one occurs. HPDD can also result in excessive disturbance of riparian vegetation and sedimentation and erosion due to operation of equipment on the shoreline or fording to access the opposite bank.

Fisheries and Oceans Canada (DFO) is responsible for protecting fish and fish habitat across Canada. Under the *Fisheries Act* no one may carry out a work or undertaking that will cause the harmful alteration, disruption or destruction (HADD) of fish habitat unless it has been authorized by DFO. By following the conditions and measures set out below you will be in compliance with subsection 35(1) of the *Fisheries Act*.

The purpose of this Operational Statement is to describe the conditions under which it is applicable to your project and the measures to incorporate into your project in order to avoid negative impacts to fish habitat. You may proceed with your

high-pressure directional drill project without a DFO review when you meet the following conditions:

- the crossing technique will not damage the stream bed and thereby negatively impact fish or fish habitat,
- the crossing is not a wet open-cut crossing,
- you have an emergency frac-out response plan and a contingency crossing plan in place that outline the protocol to monitor, contain and clean-up a potential frac-out and an alternative method for carrying out the crossing, and
- you incorporate the *Measures to Protect Fish and Fish Habitat when High-Pressure Directional Drilling* listed below in this Operational Statement.

If you cannot meet all of the conditions listed above and cannot incorporate all of the measures listed below then your project may result in a violation of subsection 35(1) of the *Fisheries Act* and you could be subject to enforcement action. In this case, you should contact your Conservation Authority, or the DFO office in your area (see Ontario DFO office list) or Parks Canada if the project is located within its jurisdiction, including the Trent-Severn Waterway and the Rideau Canal, if you wish to obtain an opinion on the possible options you should consider to avoid contravention of the *Fisheries Act*.

You are required to respect all municipal, provincial or federal legislation that applies to the work being carried out in relation to this Operational Statement. The activities undertaken in this Operational Statement must also comply with the *Species at Risk Act* (www.sararegistry.gc.ca). If you have questions regarding this Operational Statement, please contact one of the agencies listed above.

We ask that you notify DFO, preferably 10 working days before starting your work by filling out and sending the Ontario Operational Statement notification form (www.dfo-mpo.gc.ca/regions/central/habitat/os-eo/prov-terr/index_e.htm) to the DFO office in your area. This information is requested in order to evaluate the effectiveness of the work carried out in relation to this Operational Statement.

Measures to Protect Fish and Fish Habitat when High-Pressure Directional Drilling

1. Use existing trails, roads or cut lines wherever possible, as access routes to avoid disturbance to the riparian vegetation.
2. Design the drill path to an appropriate depth below the watercourse to minimize the risk of frac-out and to a depth

to prevent the line from becoming exposed due to natural scouring of the stream bed. The drill entry and exit points are far enough from the banks of the watercourse to have minimal impact on these areas.

3. While this Operational Statement does not cover the clearing of riparian vegetation, the removal of select plants may be necessary to access the construction site. This removal should be kept to a minimum and within the road or utility right-of-way.
4. Machinery fording the watercourse to bring equipment required for construction to the opposite side is limited to a one-time event (over and back) and should occur only if an existing crossing at another location is not available or practical to use. A *Temporary Stream Crossing* Operational Statement is also available.
 - 4.1. If minor rutting is likely to occur, stream bank and bed protection methods (e.g., swamp mats, pads) should be used provided they do not constrict flows or block fish passage.
 - 4.2. Grading of the stream banks for the approaches should not occur.
 - 4.3. If the stream bed and banks are steep and highly erodible (e.g., dominated by organic materials and silts) and erosion and degradation are likely to occur as a result of equipment fording, then a temporary crossing structure or other practice should be used to protect these areas.
 - 4.4. Time the one-time fording to prevent disruption to sensitive fish life stages by adhering to appropriate fisheries timing windows (see the *Ontario In-Water Construction Timing Windows*).
 - 4.5. Fording should occur under low flow conditions and not when flows are elevated due to local rain events or seasonal flooding.
5. Operate machinery on land above the ordinary high water mark (see definition below) and in a manner that minimizes disturbance to the banks of the watercourse.
 - 5.1. Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks.
 - 5.2. Wash, refuel and service machinery and store fuel and other materials for the machinery away from the water to prevent any deleterious substance from entering the water.
 - 5.3. Keep an emergency spill kit on site in case of fluid leaks or spills from machinery.
 - 5.4. Restore banks to original condition if any disturbance occurs.
6. Construct a dugout/settling basin at the drilling exit site to contain drilling mud to prevent sediment and other deleterious substances from entering the watercourse. If this cannot be achieved, use silt fences or other effective sediment and erosion control measures to prevent drilling mud from entering the watercourse. Inspect these measures regularly during the course of construction and make all necessary repairs if any damage occurs.
 - 6.1. Dispose of excess drilling mud, cuttings and other waste materials at an adequately sized disposal

facility located away from the water to prevent it from entering the watercourse.

7. Monitor the watercourse to observe signs of surface migration (frac-out) of drilling mud during all phases of construction.

Emergency Frac-out Response and Contingency Planning

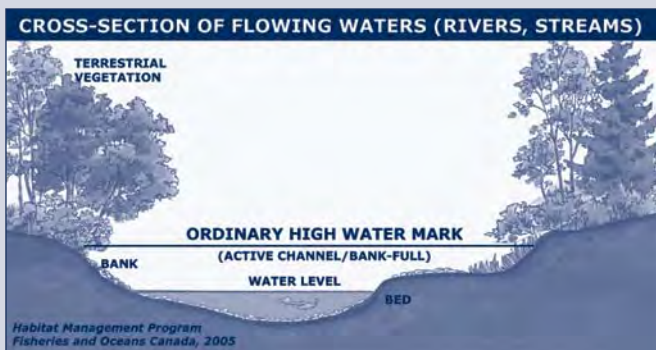
8. Keep all material and equipment needed to contain and clean up drilling mud releases on site and readily accessible in the event of a frac-out.
9. Implement the frac-out response plan that includes measures to stop work, contain the drilling mud and prevent its further migration into the watercourse and notify all applicable authorities, including the closest DFO office in the area (see Ontario DFO office list). Prioritize clean up activities relative to the risk of potential harm and dispose of the drilling mud in a manner that prevents re-entry into the watercourse.
10. Ensure clean up measures do not result in greater damage to the banks and watercourse than from leaving the drilling mud in place.
11. Implement the contingency crossing plan including measures to either re-drill at a more appropriate location or to isolate the watercourse to complete the crossing at the current location. See *Isolated or Dry Open-cut Stream Crossings* Operational Statement for carrying out an isolated trenched crossing.
12. Stabilize any waste materials removed from the work site to prevent them from entering the watercourse. This could include covering spoil piles with biodegradable mats or tarps or planting them with preferably native grass or shrubs.
13. Vegetate any disturbed areas by planting and seeding preferably with native trees, shrubs or grasses and cover such areas with mulch to prevent erosion and to help seeds germinate. If there is insufficient time remaining in the growing season, the site should be stabilized (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and vegetated the following spring.
 - 13.1. Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.

Definition:

Ordinary high water mark – The usual or average level to which a body of water rises at its highest point and remains for sufficient time so as to change the characteristics of the land. In flowing waters (rivers, streams) this refers to the “active channel/bank-full level” which is often the 1:2 year flood flow return level. In inland lakes, wetlands or marine environments it refers to those parts of the water body bed and banks that are frequently flooded by water so as to leave a mark on the land and where the natural vegetation changes from predominately aquatic vegetation to terrestrial

vegetation (excepting water tolerant species). For reservoirs this refers to normal high operating levels (Full Supply Level).

For the Great Lakes this refers to the 80th percentile elevation above chart datum as described in DFO's *Fish Habitat and Determining the High Water Mark on Lakes*.



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Aussi disponible en français

http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/modernizing-moderniser/epmp-pmpe/index_f.asp

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NOTIFICATION FORM

Fisheries and Oceans Canada
Ontario Operational Statement

Version 3.1

PROPONENT INFORMATION

NAME:	STREET ADDRESS:	
CITY/TOWN:	PROVINCE/TERRITORY:	POSTAL CODE:
TEL. NO. (RESIDENCE):	TEL. NO. (WORK):	
FAX NO:	EMAIL ADDRESS:	

CONTRACTOR INFORMATION (provide this information if a Contractor is working on behalf of the Proponent)

NAME:	STREET ADDRESS:	
CITY/TOWN:	PROVINCE/TERRITORY:	POSTAL CODE:
TEL. NO. (RESIDENCE):	TEL. NO. (WORK):	
FAX NO:	EMAIL ADDRESS:	

PROJECT INFORMATION

Select Operational Statements that are being used (check all applicable boxes):

- | | | |
|---|---|---|
| ☐ Beach Creation for Residential Use | ☐ Ice Bridges and Snow Fills | ☐ Public Beach Maintenance |
| ☐ Beaver Dam Removal | ☐ Isolated Pond Construction | ☐ Punch & Bore Crossings |
| ☐ Bridge Maintenance | ☐ Isolated or Dry Open-cut Stream Crossings | ☐ Routine Maintenance Dredging |
| ☐ Clear-Span Bridges | ☐ Maintenance of Riparian Vegetation in Existing Rights-of-Way | ☐ Submerged Log Salvage |
| ☐ Culvert Maintenance | ☐ Mineral Exploration Activities | ☐ Temporary Stream Crossing |
| ☐ Dock and Boathouse Construction | ☐ Moorings | ☐ Underwater Cables |
| ☐ High-Pressure Directional Drilling | ☐ Overhead Line Construction | |

Select the type of water body or watercourse at or near your project:

- | | | |
|---|---|----------------------------------|
| ☐ River, Stream, Creek | ☐ Marine (Ocean or Sea) | ☐ Estuary |
| ☐ Lake (8 hectares or greater) | ☐ Pond or wetland (pond is less than 8 hectares) | |

PROJECT LOCATION (S) (fill out this section if the project location is different from Proponent Information; append multiple project locations on an additional sheet if necessary)

Name of water body or watercourse	Coordinates of the Project (UTM co-ordinate or Degrees, Minutes, Seconds), if available Easting: _____ Northing: _____ Latitude: _____ Longitude: _____
Legal Description (Plan, Block, Lot, Concession, Township)	Directions to Access the Project Site (i.e., Route or highway number, etc.)
Proposed Start Date (YYYY/MM/DD):	Proposed Completion Date (YYYY/MM/DD):

We ask that you notify DFO, preferably 10 working days before starting your work, by filling out and sending in, by mail or by fax, this notification form to the DFO office in your area. This information is requested in order to evaluate the effectiveness of the work carried out in relation to the Operational Statement.

I, _____ (print name) certify that the information given on this form is, to the best of my knowledge, correct and complete.

Signature _____ Date _____

Note: If you cannot meet all of the conditions and cannot incorporate all of the measures in the Operational Statement then your project may result in a violation of subsection 35(1) of the *Fisheries Act* and you could be subject to enforcement action. In this case, you should contact your Conservation Authority, or the DFO office in your area (see Ontario DFO office list), or Parks Canada if the project is located within its jurisdiction, including the Trent-Severn Waterway and the Rideau Canal, if you wish to obtain more information on the possible options you should consider to avoid contravention of the *Fisheries Act*. For activities carried out under the *Crown Forest Sustainability Act*, the requirements of the applicable Operational Statements are addressed through an existing agreement and the Ontario Ministry of Natural Resources is the first point of contact.

Information about the above-noted proposed work or undertaking is collected by DFO under the authority of the *Fisheries Act* for the purpose of administering the fish habitat protection provisions of the *Fisheries Act*. Personal information will be protected under the provisions of the *Privacy Act* and will be stored in the Personal Information Bank DFO-SCI-605. Under the *Privacy Act*, individuals have a right to, and on request shall be given access to, any personal information about them contained in a personal information bank. Instructions for obtaining personal information are contained in the Government of Canada's Info Source publications available at www.infosource.gc.ca or in Government of Canada offices. Information other than "personal" information may be accessible or protected as required by the provisions of the *Access to Information Act*.

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**[http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/
modernizing-moderniser/epmp-pmpe/index_f.asp](http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/modernizing-moderniser/epmp-pmpe/index_f.asp)**



ISOLATED OR DRY OPEN-CUT STREAM CROSSINGS

Fisheries and Oceans Canada
Ontario Operational Statement

Version 1.0

For the purpose of this Operational Statement, the term “Isolated Crossing” means a temporary stream crossing technique that allows work (e.g., trenched pipeline or cable installation) to be carried out “in-the-dry” while diverting the natural flow around the site during construction. These types of open trenched crossings are isolated using flume or dam and pump techniques (see *Pipeline Associated Watercrossings*, 2005 at http://www.capp.ca/default.asp?V_DOC_ID=763&PubID=96717).

The term “Dry Open-cut Stream Crossing” means a temporary stream crossing work (e.g., trenched pipeline or cable installation) that is carried out during a period when the entire stream width is seasonally dry or is frozen to the bottom.

The risks to fish and fish habitat associated with isolated open cut stream crossings include the potential for direct damage to substrates, release of excessive sediments, loss of riparian habitat, stranding of fish in dewatered areas, impingement/entrainment of fish at pump intakes, and disruption of essential fish movement patterns. Similarly, dry open-cut stream crossings pose a risk to fish and fish habitat due to potential harmful alteration of substrates, loss of riparian habitat, and release of excessive sediment once stream flows resume.

The order of preference for carrying out a cable or pipeline stream crossing, in order to protect fish and fish habitat, is: a) punch or bore crossing (see *Punch & Bore Crossings* Operational Statement); b) high-pressure directional drill crossing (see *High-Pressure Directional Drilling* Operational Statement); c) dry open-cut crossing; and d) isolated open-cut crossing. This order must be balanced with practical considerations at the site.

Fisheries and Oceans Canada (DFO) is responsible for protecting fish and fish habitat across Canada. Under the *Fisheries Act* no one may carry out a work or undertaking that will cause the harmful alteration, disruption or destruction (HADD) of fish habitat unless it has been authorized by DFO. By following the conditions and measures set out below you will be in compliance with subsection 35(1) of the *Fisheries Act*.

The purpose of this Operational Statement is to describe the conditions under which it is applicable to your project and the measures to incorporate into your project in order to avoid negative impacts to fish habitat. You may proceed with your isolated or dry open-cut stream crossing project without a DFO review when you meet the following conditions:

- if working within the Thames River, Sydenham River, Ausable River, Grand River, or Maitland River, you have contacted your Conservation Authority or local DFO Office (see Ontario

DFO office list) to ensure that your project will not impact Schedule I mussel species at risk under the federal *Species at Risk Act* (SARA), before proceeding,

- for dry, open-cut crossings the watercourse is dry or frozen completely to the bottom at the site,
- for isolated crossings, the channel width of the watercourse at the crossing site is less than 5 meters from ordinary high water mark to ordinary high water mark (HWM) (see definition below),
- the isolated crossing does not involve the construction or use of an off-stream diversion channel, or the use of earthen dams,
- the isolated crossing ensures that all natural upstream flows are conveyed downstream during construction, with no change in quality or quantity,
- the site does not occur at a stream location involving known fish spawning habitat, particularly if it is dependent on groundwater upwelling,
- the use of explosives is not required to complete the crossing, and
- you incorporate the *Measures to Protect Fish and Fish Habitat when Carrying Out an Isolated or Dry Open-cut Stream Crossing* listed below.

If you cannot meet all of the conditions listed above and cannot incorporate all of the measures listed below then your project may result in a violation of subsection 35(1) of the *Fisheries Act* and you could be subject to enforcement action. In this case, you should contact your Conservation Authority, or the DFO office in your area (see Ontario DFO office list) or Parks Canada if the project is located within its jurisdiction, including the Trent-Severn Waterway and the Rideau Canal, if you wish to obtain an opinion on the possible options you should consider to avoid contravention of the *Fisheries Act*.

You are required to respect all municipal, provincial and federal legislation that applies to the work being carried out in relation to this Operational Statement. The activities undertaken in this Operational Statement must also comply with SARA (www.sararegistry.gc.ca). If you have questions regarding this Operational Statement, please contact one of the agencies listed above.

We ask that you notify DFO, preferably 10 working days before starting your work, by filling out and sending the Ontario Operational Statement notification form (www.dfo-mpo.gc.ca/regions/central/habitat/os-eo/prov-terr/index_e.htm) to the DFO office in your area. This information is requested in order to evaluate the effectiveness of the work carried out in relation to this Operational Statement.

Measures to Protect Fish and Fish Habitat when Carrying Out an Isolated or Dry Open-Cut Stream Crossing

1. Use existing trails, roads or cut lines wherever possible, as access routes to avoid disturbance to the riparian vegetation.
2. Locate crossings at straight sections of the stream, perpendicular to the banks, whenever possible. Avoid crossing on meander bends, braided streams, alluvial fans, active floodplains or any other area that is inherently unstable and may result in the erosion and scouring of the stream bed.
3. Complete the crossing in a manner that minimizes the duration of instream work.
4. Construction should be avoided during unusually wet, rainy or winter thaw conditions.
5. While this Operational Statement does not cover the clearing of riparian vegetation, the removal of select plants may be necessary to access the construction site. This removal should be kept to a minimum and within the utility right-of-way.
6. Machinery fording a flowing watercourse to bring equipment required for construction to the opposite side is limited to a one-time event (over and back) and is to occur only if an existing crossing at another location is not available or practical to use. Operational Statements are also available for *Ice Bridges and Snow Fills*, *Clear-Span Bridges*, and *Temporary Stream Crossing*.
 - 6.1. If minor rutting is likely to occur, stream bank and bed protection methods (e.g., swamp mats, pads) should be used provided they do not constrict flows or block fish passage.
 - 6.2. Grading of the stream banks for the approaches should not occur.
 - 6.3. If the stream bed and banks are steep and highly erodible (e.g., dominated by organic materials and silts) and erosion and degradation is likely to occur as a result of equipment fording, then a temporary crossing structure or other practice should be used to protect these areas.
 - 6.4. Time the one-time fording to prevent disruption to sensitive fish life stages by adhering to appropriate fisheries timing windows (see the *Ontario In-Water Construction Timing Windows*).
 - 6.5. Fording should occur under low flow conditions and not when flows are elevated due to local rain events or seasonal flooding.
7. Operate machinery in a manner that minimizes disturbance to the watercourse bed and banks.
 - 7.1. Protect entrances at machinery access points (e.g., using swamp mats) and establish single site entry and exit.
 - 7.2. Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks.

- 7.3. Wash, refuel and service machinery and store fuel and other materials for the machinery away from the water to prevent deleterious substances from entering the water.
- 7.4. Keep an emergency spill kit on site in case of fluid leaks or spills from machinery.

8. Install effective sediment and erosion control measures before starting work to prevent entry of sediment into the watercourse. Inspect them regularly during the course of construction and make all necessary repairs if any damage occurs.
9. Stabilize any waste materials removed from the work site, above the HWM, to prevent them from entering the watercourse. This could include covering spoil piles with biodegradable mats or tarps or planting them with grass or shrubs.
10. Vegetate any disturbed areas by planting and seeding preferably with native trees, shrubs or grasses and cover such areas with mulch to prevent soil erosion and to help seeds germinate. If there is insufficient time remaining in the growing season, the site should be stabilized (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and vegetated the following spring.
 - 10.1. Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.

Measures to Protect Fish and Fish Habitat when Carrying Out an Isolated Crossing

Temporary isolation is used to allow work “in-the-dry” while maintaining the natural downstream flow by installing dams up and downstream of the site and conveying all of the natural upstream flow into a flume, or pumping it around the isolated area. In addition to measures 1 to 10, the following measures should be carried out when conducting an isolated stream crossing:

11. Time isolated crossings to protect sensitive fish life stages by adhering to fisheries timing windows (see Measure 6.4).
12. Use dams made of non-earthen material, such as water-inflated portable dams, pea gravel bags, concrete blocks, steel or wood wall, clean rock, sheet pile or other appropriate designs, to separate the dewatered work site from flowing water.
 - 12.1. If granular material is used to build dams, use clean or washed material that is adequately sized (i.e., moderately sized rock and not sand or gravel) to withstand anticipated flows during the construction. If necessary, line the outside face of dams with heavy poly-plastic to make them impermeable to water. Material to build these dams should not be taken from below the HWM of any water body.
 - 12.2. Design dams to accommodate any expected high flows of the watercourse during the construction period.

13. Before dewatering, rescue any fish from within the isolated area and return them safely immediately downstream of the worksite.

13.1. You will require a permit from DFO to relocate any aquatic species that are listed as either endangered or threatened under SARA. Please contact your Conservation Authority or the DFO office in your area to determine if an aquatic species at risk is in the vicinity of your project and, if appropriate, use the DFO website at www.dfo-mpo.gc.ca/species-especes/permits/sarapermits_e.asp to apply for a permit.

14. Pump sediment laden dewatering discharge into a vegetated area or settling basin, and prevent sediment and other deleterious substances from entering any water body.
15. Remove accumulated sediment and excess spoil from the isolated area before removing dams.
16. Stabilize the **streambed** and restore the original channel shape, bottom gradient and substrate to pre-construction condition before removing dams.
17. Ensure **banks** are stabilized, restored to original shape, adequately protected from erosion and re-vegetated, preferably with native species.
18. If rock is used to stabilize banks, it should be clean, free of fine materials, and of sufficient size to resist displacement during peak flood events. The rock should be placed at the original stream bank grade to ensure there is no infilling or narrowing of the watercourse.
19. Gradually remove the downstream dam first, to equalize water levels inside and outside of the isolated area and to allow suspended sediments to settle.
20. During the final removal of dams, restore the original channel shape, bottom gradient and substrate at these locations.
21. **Pumped Diversion**
Pumped diversions are used to divert water around the isolated area to maintain natural downstream flows and prevent upstream ponding.

- 21.1. Ensure intakes are operated in a manner that prevents streambed disturbance and fish mortality. Guidelines to determine the appropriate mesh size for intake screens may be obtained from DFO (e.g., *Freshwater Intake End-of-Pipe Fish Screen Guideline* (1995), available at www.dfo-mpo.gc.ca/Library/223669.pdf).
- 21.2. Ensure the pumping system is sized to accommodate any expected high flows of the watercourse during the construction period. Pumps should be monitored at all times, and back-up pumps should be readily available on-site in case of pump failure.
- 21.3. Protect pump discharge area(s) to prevent erosion and the release of suspended sediments downstream, and remove this material when the works have been completed.

Measures to Protect Fish and Fish Habitat when Carrying Out a Dry Open-Cut Stream Crossing

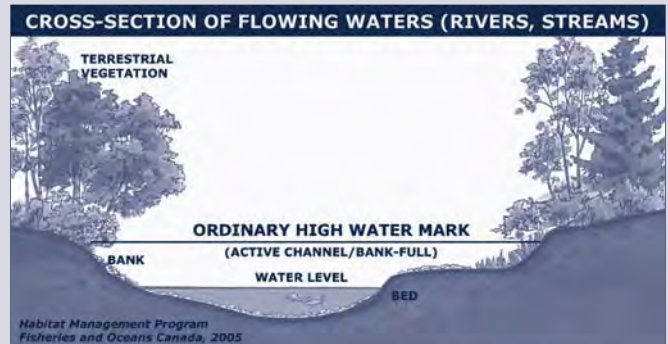
In addition to measures 1 to 10, the following measures should be carried out when conducting a dry open-cut stream crossing:

22. Stabilize the **streambed** and restore the original channel shape, bottom gradient and substrate to pre-construction condition.
23. Ensure **banks** are stabilized, restored to original shape, adequately protected from erosion and re-vegetated, preferably with native species.

Definition:

Ordinary high water mark (HWM) - The usual or average level to which a body of water rises at its highest point and remains for sufficient time so as to change the characteristics of the land. In flowing waters (rivers, streams) this refers to the "active channel/bank-full level" which is often the 1:2 year flood flow return level. In inland lakes, wetlands or marine environments it refers to those parts of the water body bed and banks that are frequently flooded by water so as to leave a mark on the land and where the natural vegetation changes from predominately aquatic vegetation to terrestrial vegetation (excepting water tolerant species). For reservoirs this refers to normal high operating levels (Full Supply Level).

For the Great Lakes this refers to the 80th percentile elevation above chart datum as described in DFO's Fish Habitat and Determining the High Water Mark on Lakes.



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OVERHEAD LINE CONSTRUCTION

Fisheries and Oceans Canada Ontario Operational Statement

Version 3.0

Overhead lines are constructed for electrical or telecommunication transmission across many watercourses that range in size from small streams and ponds to large rivers, lakes and reservoirs. This Operational Statement applies to selective removal of vegetation along the right-of-way to provide for installation and safe operation of overhead lines, and passage of equipment and materials across the water body.

Although fish habitat occurs throughout a water system, it is the riparian habitat that is most sensitive to overhead line construction. Riparian vegetation occurs adjacent to the watercourse and directly contributes to fish habitat by providing shade, cover, and spawning and food production areas. It is important to design and build your overhead line project to meet your needs while also protecting riparian areas. Potential impacts to fish and fish habitat include excessive loss of riparian vegetation, erosion and sedimentation resulting from bank disturbance and loss of plant root systems, rutting and compaction of stream substrate at crossing sites, and disruption of sensitive fish life stages.

Fisheries and Oceans Canada (DFO) is responsible for protecting fish and fish habitat across Canada. Under the *Fisheries Act* no one may carry out a work or undertaking that will cause the harmful alteration, disruption or destruction (HADD) of fish habitat unless it has been authorized by DFO. By following the conditions and measures set out below you will be in compliance with subsection 35(1) of the *Fisheries Act*.

The purpose of this Operational Statement is to describe the conditions under which it is applicable to your project and the measures to incorporate into your project in order to avoid negative impacts to fish habitat. You may proceed with your overhead line project without a DFO review when you meet the following conditions:

- it does not require the construction or placement of any temporary or permanent structures (e.g. islands, poles, crib works, etc.) below the ordinary high water mark (HWM) (see definition below), and
- you incorporate the *Measures to Protect Fish and Fish Habitat when Constructing Overhead Lines* listed below in this Operational Statement.

If you cannot meet all of the conditions listed above and cannot incorporate all of the measures listed below then your project may result in a violation of subsection 35(1) of the *Fisheries Act* and you could be subject to enforcement action. In this case,

you should contact your Conservation Authority, or the DFO office in your area (see Ontario DFO office list) or Parks Canada if the project is located within its jurisdiction, including the Trent-Severn Waterway and the Rideau Canal, if you wish to obtain an opinion on the possible options you should consider to avoid contravention of the *Fisheries Act*.

You are required to respect all municipal, provincial or federal legislation that applies to the work being carried out in relation to this Operational Statement. The activities undertaken in this Operational Statement must also comply with the *Species at Risk Act* (www.sararegistry.gc.ca). If you have questions regarding this Operational Statement, please contact one of the agencies listed above.

We ask that you notify DFO, preferably 10 working days before starting your work by filling out and sending the Ontario Operational Statement notification form (www.dfo-mpo.gc.ca/regions/central/habitat/os-eo/prov-terr/index_e.htm) to the DFO office in your area. This information is requested in order to evaluate the effectiveness of the work carried out in relation to this Operational Statement.

Measures to Protect Fish and Fish Habitat when Constructing Overhead Lines

1. Installing overhead lines under frozen conditions is preferable in all situations. On wet terrains (e.g., bogs), lines should be installed under frozen conditions, where possible, or using aerial methods (i.e., helicopter).
2. Design and construct approaches so that they are perpendicular to the watercourse wherever possible to minimize loss or disturbance to riparian vegetation.
3. Avoid building structures on meander bends, braided streams, alluvial fans, active floodplains or any other area that is inherently unstable and may result in erosion and scouring of the stream bed or overhead line structures.
 - 3.1. Wherever possible, locate all temporary or permanent structures, such as poles, sufficiently above the HWM to prevent erosion.
4. While this Operational Statement does not cover the clearing of riparian vegetation, the removal of select plants may be necessary to accommodate the overhead line. This removal

should be kept to a minimum and within the road or utility right-of-way.

5. Machinery fording the watercourse to bring equipment required for construction to the opposite side is limited to a one-time event (over and back) and should occur only if an existing crossing at another location is not available or practical to use. A *Temporary Stream Crossing Operational Statement* is also available.

- 5.1. If minor rutting is likely to occur, stream bank and bed protection methods (e.g., swamp mats, pads) should be used provided they do not constrict flows or block fish passage.
- 5.2. Grading of the stream banks for the approaches should not occur.
- 5.3. If the stream bed and banks are steep and highly erodible (e.g., dominated by organic materials and silts) and erosion and degradation is likely to occur as a result of equipment fording, then a temporary crossing structure or other practice should be used to protect these areas.
- 5.4. Time the one-time fording to prevent disruption to sensitive fish life stages by adhering to appropriate fisheries timing windows (see the *Ontario In-Water Construction Timing Windows*).
- 5.5. Fording should occur under low flow conditions and not when flows are elevated due to local rain events or seasonal flooding.

6. Operate machinery on land and in a manner that minimizes disturbance to the banks of the watercourse.

- 6.1. Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks.
- 6.2. Wash, refuel and service machinery and store fuel and other materials for the machinery away from the water to prevent any deleterious substance from entering the water.
- 6.3. Keep an emergency spill kit on site in case of fluid leaks or spills from machinery.
- 6.4. Restore banks to original condition if any disturbance occurs.

7. Install effective sediment and erosion control measures before starting work to prevent entry of sediment into the watercourse. Inspect them regularly during the course of construction and make all necessary repairs if any damage occurs.

- 7.1. Avoid work during wet, rainy conditions or use alternative techniques such as aerial methods (i.e., helicopter) to install overhead lines.

8. Stabilize any waste materials removed from the work site to prevent them from entering the watercourse. This could include covering spoil piles with biodegradable mats or tarps or planting them with grass or shrubs.

9. Vegetate any disturbed areas by planting and seeding preferably with native trees, shrubs or grasses and cover such areas with mulch to prevent erosion and to help seeds germinate. If there is insufficient time remaining in the growing season, the site should be stabilized (e.g.,

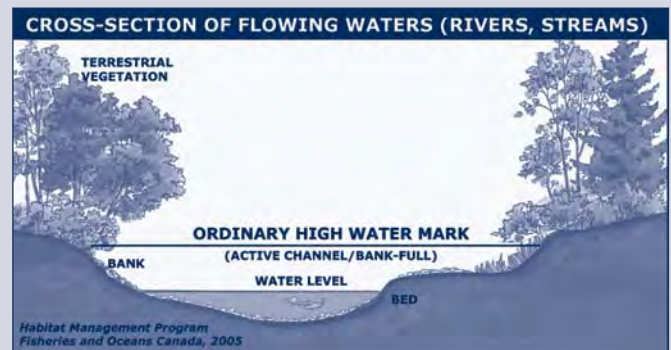
cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and vegetated the following spring.

- 9.1. Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.

Definition:

Ordinary high water mark (HWM) – The usual or average level to which a body of water rises at its highest point and remains for sufficient time so as to change the characteristics of the land. In flowing waters (rivers, streams) this refers to the “active channel/bank-full level” which is often the 1:2 year flood flow return level. In inland lakes, wetlands or marine environments it refers to those parts of the water body bed and banks that are frequently flooded by water so as to leave a mark on the land and where the natural vegetation changes from predominately aquatic vegetation to terrestrial vegetation (excepting water tolerant species). For reservoirs this refers to normal high operating levels (Full Supply Level).

For the Great Lakes this refers to the 80th percentile elevation above chart datum as described in DFO’s *Fish Habitat and Determining the High Water Mark on Lakes*.



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PUNCH & BORE CROSSINGS

Fisheries and Oceans Canada Ontario Operational Statement

Version 3.0

For the purpose of this Operational Statement, the term punch and bore refers to a trenchless crossing method which involves the excavation of a vertical bell hole or shallow depression on either side of the watercourse. Horizontal punching or boring between the two points, at an appropriate depth below the watercourse, completes the creation of a passage-way for the crossing. Punch and bore crossings allow cables and pipelines to be installed under watercourses without imparting any disturbance to the bed and banks. Punch and bore crossings differ from high-pressure directional drilled crossings, in that no pressurized mud systems are required, thereby avoiding the risk of sediment release due to frac-out.

Punch and bore crossings can negatively impact fish and fish habitat due to erosion and sedimentation from site disturbance and dewatering of bell holes or the collapse of the punch or bore hole under the stream. Disturbing riparian vegetation can reduce important shoreline cover, shade and food production areas. Machinery fording the stream can disturb bottom and bank substrates, disrupt sensitive fish life stages, and introduce deleterious substances if equipment is not properly maintained. Impacts can be reduced if an emergency response plan and clean-up materials are in place.

The general order of preference for carrying out a cable or pipeline stream crossing in order to protect fish and fish habitat is: a) a punch or bore crossing, b) high-pressure directional drill crossing (see *High-Pressure Directional Drilling Operational Statement*), c) dry open-cut crossing, and d) isolated open-cut crossing (see *Isolated or Dry Open-cut Stream Crossings Operational Statement*). This order must be balanced with practical considerations at the site.

Fisheries and Oceans Canada (DFO) is responsible for protecting fish and fish habitat across Canada. Under the *Fisheries Act* no one may carry out a work or undertaking that will cause the harmful alteration, disruption or destruction (HADD) of fish habitat unless it has been authorized by DFO. By following the conditions and measures set out below you will be in compliance with subsection 35(1) of the *Fisheries Act*.

The purpose of this Operational Statement is to describe the conditions under which it is applicable to your project and the measures to be incorporated into your project in order to avoid negative impacts to fish habitat. You may proceed with your punch or bore crossing project without a DFO review when you meet the following conditions:

- the crossing is not a wet open-cut crossing,

- the crossing technique will not damage the stream bed or bank and thereby negatively impact fish or fish habitat,
- the site does not occur at a stream location involving known fish spawning habitat, particularly if it is dependent on groundwater upwelling, and
- you incorporate the *Measures to Protect Fish and Fish Habitat when Conducting Punch and Bore Crossings*, listed below.

If you cannot meet all of the conditions listed above and cannot incorporate all of the measures listed below then your project may result in a violation of subsection 35(1) of the *Fisheries Act* and you could be subject to enforcement action. In this case, you should contact your Conservation Authority, or the DFO office in your area (see Ontario DFO office list) or Parks Canada if the project is located within its jurisdiction, including the Trent-Severn Waterway and the Rideau Canal, if you wish to obtain an opinion on the possible options you should consider to avoid contravention of the *Fisheries Act*.

You are required to respect all municipal, provincial or federal legislation that applies to the work being carried out in relation to this Operational Statement. The activities undertaken in this Operational Statement must also comply with the *Species at Risk Act* (www.sararegistry.gc.ca). If you have questions regarding this Operational Statement, please contact one of the agencies listed above.

We ask that you notify DFO, preferably 10 working days before starting your work by filling out and sending the Ontario Operational Statement notification form (www.dfo-mpo.gc.ca/regions/central/habitat/os-eo/prov-terr/index_e.htm) to the DFO office in your area. This information is requested in order to evaluate the effectiveness of the work carried out in relation to this Operational Statement.

Measures to Protect Fish and Fish Habitat when Conducting Punch and Bore Crossings

- A punch or bore crossing can be conducted at any time of the year provided there is not a high risk of failure and it does not require in-water activities such as machinery fording.
- Design the punch or bore path for an appropriate depth below the watercourse to prevent the pipeline or cable from becoming exposed due to natural scouring of the stream bed.

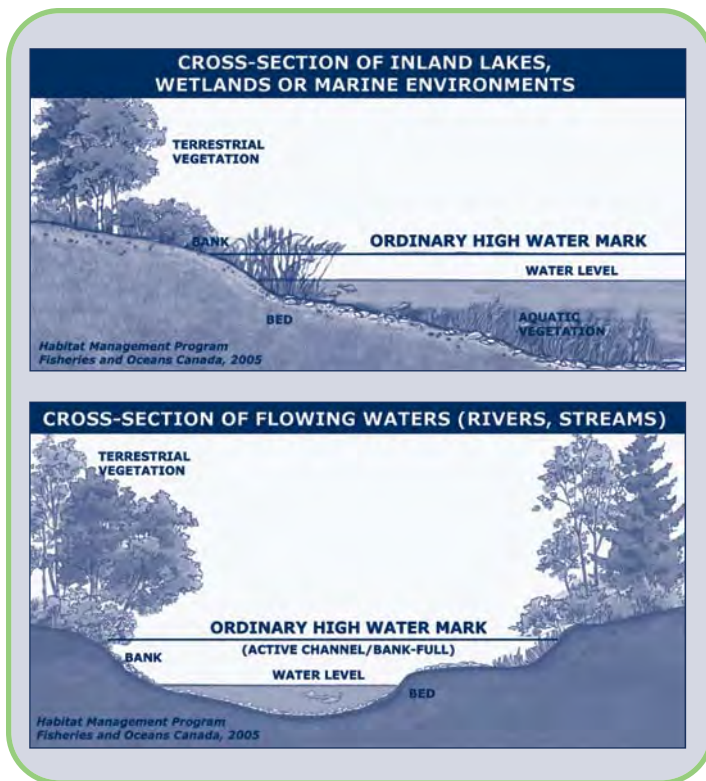
3. While this Operational Statement does not cover the clearing of riparian vegetation, the removal of select plants may be necessary to access the construction site and to excavate the bell holes. This removal is to be kept to a minimum and within the utility right-of-way.
4. Install effective sediment and erosion control measures before starting work to prevent entry of sediment into the water body. Inspect them regularly during the course of construction and make all necessary repairs if any damage occurs.
5. Machinery fording the watercourse to bring equipment required for construction to the opposite side is limited to a one-time event (over and back) and should occur only if an existing crossing at another location is not available or practical to use. A *Temporary Stream Crossing Operational Statement* is also available.
 - 5.1. If minor rutting is likely to occur, stream bank and bed protection methods (e.g., swamp mats, pads) should be used provided they do not constrict flows or block fish passage.
 - 5.2. Grading of the stream banks for the approaches should not occur.
 - 5.3. If the stream bed and banks are steep and highly erodible (e.g., dominated by organic materials and silts) and erosion and degradation are likely to occur as a result of equipment fording, then a temporary crossing structure or other practice should be used to protect these areas.
 - 5.4. Time the one-time fording to prevent disruption to sensitive fish life stages by adhering to appropriate fisheries timing windows (see the *Ontario In-Water Construction Timing Windows*).
 - 5.5. Fording should occur under low flow conditions and not when flows are elevated due to local rain events or seasonal flooding.
6. Operate machinery on land above the ordinary high water mark (HWM) (see definition below) and in a manner that minimizes disturbance to the banks of the watercourse.
 - 6.1. Machinery is to arrive on-site in a clean condition and is to be maintained free of fluid leaks.
 - 6.2. Wash, refuel and service machinery and store fuel and other materials for the machinery away from the water to prevent any deleterious substance from entering the water.
 - 6.3. Keep an emergency spill kit on site in case of fluid leaks or spills from machinery.
7. Excavate bell holes beyond the HWM, far enough away from any watercourse to allow containment of any sediment or deleterious substances above the HWM.
 - 7.1. When dewatering bell holes, remove suspended solids by diverting water into a vegetated area or settling basin, and prevent sediment and other deleterious substances from entering the watercourse.

- 7.2. Stabilize any waste materials removed from the work site (including bell holes) to prevent them from entering the watercourse. This could include covering spoil piles with biodegradable mats or tarps or planting them with grass or shrubs.
 - 7.3. After suitably backfilling and packing the bell holes, vegetate any disturbed areas (see Measure 11).
8. Monitor the watercourse to observe signs of malfunction during all phases of the work.
9. For the duration of the work, keep on-site and readily accessible, all material and equipment needed to contain and clean-up releases of sediment-laden water and other deleterious substances.
10. Develop a response plan that is to be implemented immediately in the event of a sediment release or spill of a deleterious substance. This plan is to include measures to:
 - a) stop work, contain sediment-laden water and other deleterious substances and prevent their further migration into the watercourse;
 - b) notify all applicable authorities in the area, including the closest DFO office;
 - c) promptly clean-up and appropriately dispose of the sediment-laden water and deleterious substances; and
 - d) ensure clean-up measures are suitably applied so as not to result in further alteration of the bed and/or banks of the watercourse.
11. Vegetate any disturbed areas by planting and seeding preferably with native trees, shrubs or grasses and cover such areas with mulch to prevent erosion and to help seeds germinate. If there is insufficient time remaining in the growing season, the site should be stabilized (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and vegetated the following spring.
 - 11.1. Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.

Definition:

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501 Towerhill Road, Unit 102
Peterborough, ON K9H 7S3
Telephone: (705) 750-0269
Fax: (705) 750-4016
Email: ReferralsPeterborough@DFO-MPO.GC.CA

Prescott

Fisheries and Oceans Canada
401 King Street West
Prescott, ON K0E 1T0
Telephone: (613) 925-2865
Fax: (613) 925-2245
Email: ReferralsPrescott@DFO-MPO.GC.CA

Northern Ontario District

Parry Sound

Fisheries and Oceans Canada
28 Waubeek Street
Parry Sound, ON P2A 1B9
Telephone: (705) 746-2196
Fax: (705) 746-4820
Email: ReferralsParrySound@DFO-MPO.GC.CA

Sudbury and Sault Ste. Marie

Fisheries and Oceans Canada
1500 Paris Street, Unit 11
Sudbury, ON P3E 3B8
Telephone: (705) 522-2816
Fax: (705) 522-6421
Email: ReferralsSudbury@DFO-MPO.GC.CA

Thunder Bay and Kenora

Fisheries and Oceans Canada
Thunder Bay Office
100 Main Street, Suite 425
Thunder Bay, ON P7B 6R9
Telephone: (807) 346-8118
Fax: (807) 346-8545
Email: ReferralsThunderBay@DFO-MPO.GC.CA

Aussi disponible en français

http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/modernizing-moderniser/epmp-pmpe/index_f.asp

Appendix E

Curricula vitae

Kathleen's experience is focused in aquatic biology, including stream, lake and wetland assessments, benthic macroinvertebrate identification and biomonitoring, and fisheries habitat studies. She has experience conducting environmental impact studies, environmental effects monitoring programs, baseline studies and watershed plans. Using ecosystem based approaches, typical multidisciplinary project involvement includes Class EAs and infrastructure siting/routing studies, evaluating alternative design concepts and developing mitigative solutions to minimize impacts to the natural environment.

Kathleen has acquired an understanding of federal and provincial legislation, policies and procedures for natural heritage features, particularly regarding working in and around fish habitat in Ontario. She is experienced in the Fisheries Act Authorization process, including evaluating the effects of development on aquatic habitat, designing fish habitat mitigation measures, and negotiating Fisheries Compensation Strategies. In addition, Kathleen serves as a team leader for aquatic science staff in Ontario, including professionals in the fields of fisheries biology, fluvial geomorphology, and aquatic invertebrate taxonomy.

EDUCATION

M.Sc., Watershed Ecosystems, Trent University,
Peterborough, Ontario, 2003

B.Sc. (Env.), Environmental Sciences, University of
Guelph, Guelph, Ontario, 1997

Certified in the Ecological Land Classification (ELC)
System for Southern Ontario, Ontario Ministry of Natural
Resources, Turkey Point, Ontario, 2000

Qualified Southern and Northern Ontario Wetlands
Evaluator, Ontario Ministry of Natural Resources, North
Bay, Ontario, 2000

Fisheries Assessment Specialist and Fisheries Contracts
Specialist, MTO/DFO/OMNR Fisheries Protocol Course,
Downsview, Ontario, 2006

Ontario Freshwater Mussel Identification Workshop /
Fisheries and Oceans Canada, Burlington, Ontario,
2008

Qualified Electrofishing Operator (Class 2), Ontario
Ministry of Natural Resources, Guelph, Ontario, 2010

MEMBERSHIPS

Member, North American Benthological Society

PROJECT EXPERIENCE

Environmental Assessments

Northwest Area Planning and Servicing Review,
Welland, Ontario* (Environmental Scientist)

*Conducted a review of natural heritage features and identified
development-related constraints in a newly designated urban
area.*

Willoughby Lands Golf Course Facility, Niagara Region,
Ontario* (Aquatic Ecologist)

*Obtained Fisheries Act Authorization for development of a golf
course facility. Supervised an underwater dive investigation to
survey aquatic habitat along a series of alternative Niagara
River water intake pipe alignments. The study lands also support
habitat for a rare aquatic plant and an extensive program was
proposed to ensure its protection. Environmental monitoring
during construction was conducted.*

* denotes projects completed with other firms

Kathleen R. O. Todd M.Sc.

Aquatic Ecologist / Project Manager

Municipal Water and Wastewater EAs, Various Sites, Ontario* (Aquatic Ecologist)

Evaluated natural heritage features in terms of ecological sensitivity and watermain and/or trunk sewer construction feasibility options (tunnel vs. open cut). Aquatic habitat conditions were assessed at all potential watercourse crossings and recommendations were provided regarding Fisheries Act requirements, construction mitigation measures and timing restrictions on in-water works. Also responsible for siting a chlorine booster station, surface water treatment plants and pumping stations, and mitigating impacts from emergency overflow of chlorinated water into adjacent watercourses.

Water and wastewater experience includes:

- City of Barrie, Surface Water Treatment Plant Class EA & Impact Assessment
- Region of Niagara (Point Abino), Water Supply Class EA
- Region of Peel (Brampton), West Brampton Reservoir, Pumping Station & Watermain Class EA
- Region of York (Etobicoke), Steeles Avenue West Forcemain Class EA
- Region of York (Markham), Southeast Collector Trunk Sewer Class EA

Natural Sciences & Heritage Resources

Environmental Impact Studies for Land Development, Various Sites, Ontario (Project Manager)

Assessed potential environmental impacts from land development proposals. Conducted ecological community inventories in watercourses, wetlands and woodlots. Prepared Environmental Management Plans providing net effects analyses, mitigation solutions to minimize impacts to the natural environment, buffer zone recommendations, and re-vegetation and restoration activities. Participated in consultation to address agency concerns. EIS experience includes:

- Block 34 East Landowners Group Inc., Block 34 East Natural Environment Report, Vaughan, Ontario
- Block 41-28W Development Group Inc., Block 41 Natural Environment Report, Vaughan, Ontario
- Boca East Investments Limited, Block 64 Master Environmental Servicing Plan (Natural Environment Chapter), Vaughan, Ontario
- Georgian International Land Corp., Buffalo Springs Development Environment Report, Township of Oro-Medonte
- Keirland Developments Inc., Meadows of Bear Creek Subdivision Phases 2 & 3 EIS, Barrie, Ontario
- Kleinburg Heights Holdings Inc., Kleinburg Heights Natural Environment Report, Vaughan, Ontario

Environmental Impact Studies for Land Development, Various Sites, Ontario* (Project Manager)

Assessed potential environmental impacts from land development proposals. Conducted ecological community inventories in watercourses, wetlands and woodlots. Prepared Environmental Management Plans providing net effects analyses, mitigation solutions to minimize impacts to the natural environment, buffer zone recommendations, re-vegetation and restoration activities, proposed trail routes and community stewardship programs. Participated in public open houses to address the concerns of local residents. Where required, environmental monitoring during construction was conducted. EIS experience includes:

- City of London, Dearness Home for Seniors Redevelopment EIS, London, Ontario
- Fieldgate Developments, Tresstown Subdivision EIS, Stouffville, Ontario
- Grey Gables School, Proposed Private School Site, Ecological Assessment, St. Catharines
- Lebovic-Fieldgate Developments, Functional Servicing Plan, Ecological Component, Stouffville, Ontario
- Norwest Land Corp., Kains Road East Development EIS, London, Ontario
- Quinte's Isle Campark, Scoped EIS, Prince Edward County, Ontario
- Sifton Properties Ltd., Equestrian Condominium Communities, Development Assessment Reports, Township of Middlesex Centre & Municipality of West Middlesex
- Sifton Properties Ltd., River Bend Community Phases 1&2 EIS, London, Ontario
- St. Joseph's Health Care Centre, Parkwood Hospital Scoped EIS, London, Ontario
- Westhill Redevelopment Company Limited, Aurora Golf Course Community EIS, Aurora, Ontario

River Bend Community Phases 1 & 2, Environmental Monitoring Protocol & Baseline Study*, London, Ontario (Environmental Scientist)

Established baseline aquatic, terrestrial and soils conditions in the vicinity of a golf course community. Subsequently, the Environmental Monitoring Program - Year 1 and, later, Year 3, were submitted to document any potential impacts.

* denotes projects completed with other firms

Kathleen R. O. Todd M.Sc.

Aquatic Ecologist / Project Manager

Ecological Risk Assessment of Residual Heavy Oil in a Wetland*, Drumbo, Ontario (Environmental Scientist)

Analyzed stream and wetland data to determine potential aquatic food chain impacts of a historical heavy oil release. Analyzed invertebrate community structure and identified exposure pathways and community end-points. Considered site remediation options on the basis of these data.

Proposed Acton Quarry Extension, Dufferin Aggregates, Acton, Ontario (Aquatic Ecologist / Project Manager)

The extension of the existing Acton Quarry is proposed to meet the need for additional close-to-market aggregate resources of high quality Amabel Dolostone. The area of focus encompasses approximately 615 ha, across two Conservation Authority watersheds within the Regional Municipality of Halton Hills. Kathleen has participated in extensive ecological field work, including aquatic species surveys and habitat assessments, inventories for potential Species at Risk habitat, and aquatic rehabilitation planning. She has co-authored technical reports produced in accordance with the PPS and ARA application requirements, as well as participated in interdisciplinary consultation with agencies and agency-appointed committees.

Otonabee Landfill Site Biological Assessment Study*, Peterborough, Ontario (Wetlands Ecologist)

Prepared a 'Surface Water Quality Study' to address background water quality and aquatic habitat conditions and a 'Natural Environment Report' to identify baseline wetland and terrestrial environment conditions. The study was designed to identify potential impacts from existing landfill operations and to predict future impacts from proposed landfill site expansion.

Forest City Industrial Lands, Wetland Evaluation & Environmental Assessment*, London, Ontario (Wetlands Ecologist)

Evaluated a locally significant wetland according to the Ontario Wetland Evaluation System and revised the existing boundaries of a provincially significant wetland in cooperation with MNR.

West Nile Virus Information Package, Ballantrae, Ontario (Environmental Scientist)

Designed a pamphlet to educate residents and golfers regarding West Nile virus, the status of the virus in York Region, and the client's proactive mosquito monitoring program.

Confidential Client, Environmental Baseline and Feasibility Study for a Decommissioned Gold Mine*, Northern, Ontario (Environmental Scientist)

Conducted aquatic and terrestrial habitat inventories to determine the environmental feasibility of re-opening a gold mine. Assessed streams, wetlands and woodlots. Conducted invertebrate and fish collections, avifauna and wildlife surveys, and vegetation community inventories.

Transportation Planning

MTO Aquatic and Terrestrial Biology Retainer Services, Southwestern Ontario (Project Manager / Fisheries Specialist)

Under the terms of two 2-year Retainer Agreements (2004-2006, 2007-2009) eleven individual assignments were completed, involving: characterizing existing ecological conditions, assessing site sensitivities and impacts related to proposed bridge/culvert repairs and highway improvements, recommending environmental mitigation measures, and conducting during/post-construction monitoring. Value added components included: fluvial geomorphological services, design and implementation of bio-engineered slope stabilization solutions, Permit to Take Water applications, and site rehabilitation and Planting Plans. Extensive agency liaison was required with staff from numerous Conservation Authority, MNR and DFO offices.

Municipal Road Improvement Projects, Various Sites, Ontario (Environmental Scientist)

Collected aquatic and terrestrial habitat field data, conducted environmental impact assessments, and obtained required agency approvals related to municipal transportation projects, including:

- City of Hamilton, Bridge & Culvert Master Plan*
- City of London, Airport Road Widening*
- City of London, Bradley Avenue Extension
- City of London, Western Road Widening
- Town of Markham, Woodbine Avenue By-Pass*
- Township of Wilmot, Haysville Bridge Replacement*

Natural Sciences Reports Related to MTO Highway Improvement Works, Various Sites, Ontario (Fisheries Specialist)

Produced numerous Natural Sciences reports related to highway improvement works. Where required, Fisheries Act Authorization was obtained and Fish Habitat Compensation Plans were developed. Potential impacts to aquatic habitat, terrestrial vegetation, wetlands and wildlife were described for the following studies:

* denotes projects completed with other firms

Kathleen R. O. Todd M.Sc.

Aquatic Ecologist / Project Manager

- Highway 6 (Flamborough)*
- Highway 6 (Guelph)
- Highway 6 By-Pass (Caledonia)*
- Highway 7 (Marmora)*
- Highway 7 (Peterborough)*
- Highway 7A/28/115 (Peterborough)*
- Highway 8 (Dublin)*
- Highways 11/17 (North Bay)
- Highways 11/17 (Thunder Bay)
- Highways 11/101 (Matheson)
- Highway 17 (Stonecliffe)*
- Highway 17/Municipal Road 55 (Sudbury)
- Highway 17 Southwest By-Pass (Sudbury)
- Highways 17/531 (North Bay)*
- Highway 21 (Bluewater)
- Highway 21 (Grand Bend)
- Highway 23 (Palmerston)
- Highway 24 Interchange Improvements (Cambridge)
- Highway 26 (Meaford)
- Highway 26 (Owen Sound)
- Highway 63 (Bancroft)*
- Highway 63 (North Bay)*
- Highway 401/403 (Woodstock)
- Highway 401/County Road 41 (Napanee)*
- Highway 518 (Orville)*

West Nile Virus Surveillance Program, Various Sites, Central Ontario (Aquatic Ecologist)

Evaluating the potential for MTO owned/managed properties (e.g. stormwater ponds) to be mosquito breeding habitats, and recommended suitable strategies to curtail mosquito breeding success.

Bridge Widening, CN Rail Mile 119.6*, Kingston, Ontario (Aquatic Ecologist)

Procured federal Fisheries Act Authorization related to a rail line widening project over a warmwater creek. Conducted a post-construction monitoring program to confirm the viability of the habitat compensation measures.

Environmental Data Collection, CN Rail Corridor*, Toronto to Hornepayne, Ontario (Environmental Scientist)

Identified, collected and assessed secondary source natural heritage data for a study area that followed the CNR corridor from Toronto to Hornepayne. The data were then transferred to a GIS database, to be used during emergency planning.

Water Resources Management

Minnow Lake Restoration*, Sudbury, Ontario (Aquatic Ecologist)

Coordinated a lake-wide monitoring program to evaluate the degree of water pollution resulting from stormwater discharge to an urban lake. Participated in frequent public consultation to liaise with residents of the Minnow Lake Restoration Group.

Fort Creek Restoration*, Sault Ste. Marie, Ontario (Aquatic Ecologist)

In consultation with DFO, completed a restoration plan for an urban creek that outlets to Lake Huron and provides salmon spawning habitat. Habitat enhancement involved the removal of in-stream debris, channel stabilization, riparian plantings, substrate enhancement, and creation of refuge areas. Fisheries Act Authorization was obtained, and environmental monitoring during construction was conducted.

Environmental Effects Monitoring Programs for Mining Sector Clients, Various Sites, Canada (Benthic Ecologist)

Contributed benthic ecology chapter to numerous EEM reports for Canadian metal mines. Analyzed and reported on invertebrate data to determine whether the respective mine effluent was responsible for an aquatic community level effect. EEM experience includes:

- Hudson Bay Mining & Smelting Co. Ltd., Chisel North Mine, Snow Lake, Manitoba
- Hudson Bay Mining & Smelting Co. Ltd., Snow Lake Mill / Anderson Tailings, Snow Lake, Manitoba
- Hudson Bay Mining & Smelting Co. Ltd., Flin Flon Tailings Impoundment System and Trout Lake Mine, Flin Flon, Manitoba
- Hudson Bay Mining & Smelting Co. Ltd., Ruttan Mine, Leaf Rapids, Manitoba
- Hudson Bay Mining & Smelting Co. Ltd., Konuto Lake Mine, Denare Beach, Saskatchewan
- SMC (Canada) Ltd., McAlpine Mill, Cobalt, Ontario

Environmental Effects Monitoring Programs for Pulp and Paper Sector Clients, Various Sites, Canada (Benthic Ecologist)

Contributed the benthic ecology chapter to numerous EEM reports for Canadian pulp and paper mills. Statistically analyzed and reported on invertebrate data, according to Environment Canada biological monitoring protocols, to determine whether the respective mill effluent was responsible for an aquatic community level effect. EEM project experience includes:

- Cascades Fine Papers Group Thunder Bay Inc., Lake Superior, Thunder Bay, Ontario

* denotes projects completed with other firms

Kathleen R. O. Todd M.Sc.

Aquatic Ecologist / Project Manager

- Georgia-Pacific Canada Inc., Lake Gibson, Thorold, Ontario
- Kimberly-Clark Incorporated, Lake Superior, Terrace Bay, Ontario
- Marathon Pulp Inc., Lake Superior, Marathon, Ontario
- Nexfor Fraser Papers, Saint John River, Edmundston, New Brunswick
- Norampac Inc., Lake Superior, Red Rock, Ontario
- Spruce Falls Inc., Kapuskasing River, Kapuskasing, Ontario
- Stora Enso Port Hawkesbury Limited, Strait of Canso, Port Hawkesbury, Nova Scotia
- Tembec Industries Inc., Mattagami River, Smooth Rock Falls, Ontario

Watershed Based Biomonitoring Program for Urban Development, Oakville, Ontario (Benthic Ecologist)

Sampled and analyzed the Fourteen Mile Creek invertebrate community to establish baseline conditions, prior to the development of a housing subdivision. Six subsequent years of during-construction monitoring were conducted.

North and South Meade Creeks Subwatershed Plan*, Peterborough, Ontario (Aquatic Ecologist)

Conducted fish collections and population analyses, invertebrate sampling and identification, and collected and analyzed water chemistry samples. The information was used to predict the ecological sensitivity of Meade Creek and to provide recommendations regarding the extent and type of future development permitted in the watershed.

Pike River Aquatic Impact Assessment*, Field, Ontario (Benthic Ecologist)

Sampled fish, invertebrates and benthic sediments within the vicinity of a chlorinated discharge zone to determine the extent of chlorine related effects to the aquatic environment.

Biological Impact Assessment of a Closed Landfill on the Maitland River, Wingham, Ontario (Benthic Ecologist)

Analyzed Maitland River invertebrate community data within the vicinity of a closed landfill to determine the potential impact of landfill leachate.

Receiver Biomonitoring Program, Elmira, Ontario (Benthic Ecologist)

Analyzed invertebrate community data to determine the viability of an industrial contaminated groundwater collection and treatment system which discharges treated water to Canagagigue Creek.

Shekak River Post Impoundment Environmental Monitoring for the Shekak-Nagagami Hydroelectric Development, Hearst, Ontario (Aquatic Ecologist)

Addressed agency concerns regarding environmental monitoring in the headpond area of a river impoundment. Evaluated shoreline erosion and the viability of fish habitat compensation measures, including a walleye spawning shoal and aquatic invertebrate enhancement works.

Environmental Effects Monitoring Program for the Antamina Mine & Port Facility, Peru (Benthic Ecologist)

Analyzed biological (metal concentrations in fish and shellfish tissues, fish health, benthic invertebrate community structure) and physical (water and sediment chemistry) data collected in the vicinity of both an inland mine (freshwater environment) and a coastal mining port facility (marine environment) to determine if the local ecosystems were being adversely affected by mining/shipping operations.

Benthic Invertebrate Monitoring Program*, Caledonia, Ontario (Benthic Ecologist)

Assessed the Fox Creek invertebrate community to determine if the stream habitat was being adversely affected by adjacent mining effluent discharge.

* denotes projects completed with other firms

Kathleen R. O. Todd M.Sc.

Aquatic Ecologist / Project Manager

PUBLICATIONS

Todd, K.R.O., M.G. Fox and D.C. Lasenby. Presented at the 52nd Annual Meeting of the North American Benthological Society. Seasonal influence of riparian vegetation on stream macroinvertebrate community structure. *North American Benthological Society, Vancouver, B.C. (June 6-10), 2004.*

Todd, K.R.O. The Influence of Deciduous and Coniferous Riparian Vegetation on Aquatic Macroinvertebrate Community Structure in Low Order Streams of South Central Ontario. *M.Sc. Thesis, Trent University, 2003.*

Mark has 14 years of experience designing, coordinating, and implementing small and large scale aquatic habitat and impact assessments, encompassing numerous habitat types including lakes, ponds, large rivers, warmwater and coldwater streams. Mark has also developed and implemented many monitoring, mitigation, compensation and inventory processes. Past employment with Fisheries and Oceans Canada (DFO), and both the Grand River and St. Clair Region Conservation Authorities contributes to Mark's extensive working experience with regulatory and approvals processes related to the *Fisheries Act*, the *Conservation Authorities Act* and the *Drainage Act*. Mark's familiarity with *Fisheries Act* mitigation and compensation includes an understanding of the Habitat Alteration Assessment Tool (HAAT). He has extensive experience involving permitting and issues resolution related to the federal *Species at Risk Act* and the provincial *Endangered Species Act*. His experience also includes several transportation-related Environmental Assessments.

EDUCATION

Honours B.Sc. (Agriculture), University of Guelph /
Natural Resources Management, Guelph, Ontario, 2000

Royal Ontario Museum / Freshwater Fish Identification
Course, Toronto, Ontario, 2011

Class 1 Electrofishing Certificate / Ministry of Natural
Resources, Waterloo, Ontario, 2010

Ontario Freshwater Mussel Identification Workshop /
Fisheries and Oceans Canada - Canada Centre for
Inland Waters, Burlington, Ontario, 2007

Fisheries Assessment Specialist and Fisheries Contracts
Specialist, MTO/DFO/OMNR Fisheries Protocol Course,
Downsview, Ontario, 2006

PROJECT EXPERIENCE

Environmental Assessments

Locks 24 and 25 – VLH Turbine Installation, Canadian
Projects Limited, Lakefield, Ontario (Aquatic Biologist)
*Conducted aquatic assessments including walleye and bass
spawning and habitat surveys in support of an Environmental
Assessment (EA) for the installation of Very Low Head (VLH)
turbines at Dams 24 and 25 on the Otonabee River. As part of
the EA, will provide an analysis of impacts to walleye and bass
spawning habitat and habitat use by small-bodied fish. The
impact assessment will also be used as during the assessment of
the project using the Fisheries & Oceans Canada (DFO) Risk
Management Framework.*

Pier 27 Dockwall and Dredging, Hamilton Port Authority,
Hamilton, Ontario (Aquatic Biologist)

*Coordinated and conducted aquatic assessments in support of
the installation of a new dockwall and dredging to facilitate
shipping traffic. Coordinated with DFO regarding need for
Fisheries Act approval.*

Pier 22 Environmental Assessment, Hamilton Port
Authority, Hamilton, Ontario (Aquatic Biologist)

*Coordinated and conducted aquatic assessments in support of
site improvements. Negotiated compensation measures and
drafted letter of intent in pursuit of Fisheries Act Authorization.*

Bruce to Milton Transmission Line, Various, Ontario
(Fisheries Biologist)

*Planned, coordinated and assisted with execution of large-scale
fisheries field program to assess potential impacts of proposed
hydroelectric corridor reinforcement project and provided
relevant input to the provincial environmental assessment
process as well as the Fisheries Act and Conservation
Authorities Act permitting processes. Managed data entry,
analysis and completed reporting of aquatic resources sections.
Coordination of multi-disciplinary team and regulatory agencies
for acquisition of appropriate permits and approvals.*

Yellow Falls Hydroelectric Project, Smooth Rock Falls,
Ontario (Aquatic Biologist)

*Planned, coordinated and assisted with execution of fisheries
field program to assess potential impacts of proposed
hydroelectric dam project. Facilitated acquisition of permits and
approvals from relevant agencies. Assisted with fish, benthos,
habitat, water and sediment sampling. Authored significant
portions of the technical appendix related to aquatic study
results.*

Mark C. Pomeroy B.Sc.

Fisheries Biologist / Project Manager

Environmental Impact Assessments

Georgia Pacific Thorold Cycle 4 EEM, Thorold, Ontario
(Aquatic Ecologist)

Assisted in field sampling of fish, benthos, water and sediment for federally regulated pulp and paper environmental effects monitoring.

Spruce Falls Cycle 4 EEM, Kapuskasing, Ontario
(Aquatic Ecologist)

Assisted in field sampling of fish, benthos, water and sediment for federally regulated pulp and paper environmental effects monitoring.

Smooth Rock Falls Cycle 4 EEM, Smooth Rock Falls,
Ontario (Aquatic Ecologist)

Assisted in field sampling of fish, benthos, water and sediment for federally regulated pulp and paper environmental effects monitoring.

Highway and Transportation

King Street and Fountain Street Improvements Class
Environmental Assessment Study, Cambridge, Ontario
(Fisheries Biologist)

Planned, coordinated and conducted field investigations to assess aquatic habitat at watercourse crossings within the project study area. Data collected during field investigations was used to assess potential impacts of preferred option. Drafted text for relevant sections of Class EA document.

Franklin Boulevard Widening Class Environmental
Assessment Study, Cambridge, Ontario (Fisheries
Biologist)

Planned, coordinated and conducted field investigations to assess aquatic habitat at watercourse crossings within the project study area. Data collected during field investigations was used to assess potential impacts of preferred option. Drafted text for relevant sections of Class EA document.

Highway 69 - Patrol Yards between Parry Sound and
Sudbury, Ontario (Fisheries Biologist)

Planned, coordinated and conducted field investigations to assess aquatic habitat at watercourses within the project study area. Data collected during field investigations was used to assess potential impacts of proposed maintenance patrol yards located adjacent to Highway 69. Drafted text for inclusion in Fisheries and Aquatic Ecosystems Report. All work was conducted in accordance with the MTO/DFO/MNR Protocol (2006).

Highway 11 - High Falls Road Access Improvements
Class Environmental Assessment, Bracebridge, Ontario
(Fisheries Biologist)

Planned and conducted field investigations to assess aquatic habitat at watercourse crossings within the project study area. All work was conducted in accordance with the MTO/DFO/MNR Protocol (2006).

Highway 11 - Intersection Improvements, Powassan,
Ontario (Fisheries Biologist)

Planned, coordinated and conducted field investigations to assess aquatic habitat at watercourse crossings within the project study area. Data collected during field investigations was used to assess potential impacts of preferred option, including potential impacts to Brook Trout. Drafted text for inclusion in Fisheries and Aquatic Ecosystems Report. All work was conducted in accordance with the MTO/DFO/MNR Protocol (2006).

Highway 3 - Rehabilitation between Jarvis and Renton,
Ontario (Fisheries Biologist)

Planned, coordinated and conducted field investigations to assess aquatic habitat at watercourse crossings within the project study area. Data collected during field investigations was used to assess potential impacts of preferred option, including potential impacts to Brook Trout. Drafted Fisheries and Aquatic Ecosystems Report. All work was conducted in accordance with the MTO/DFO/MNR Protocol (2006), and included preparation and submission of "no HADD forms" to satisfy Fisheries Act requirements.

Highway 69 - Key River Bridge Replacement, Britt,
Ontario (Fisheries Biologist)

Planned, coordinated and conducted field investigations to assess aquatic habitat in Key River at proposed location of bridge replacement. Data collected during field investigations was used to assess potential impacts of bridge replacement activities. Drafted Fisheries and Aquatic Ecosystems Report. All work was conducted in accordance with the MTO/DFO/MNR Protocol (2006), and included preparation and submission of "no HADD forms" to satisfy Fisheries Act requirements.

Replacement of Coutts Line Bridge over Baptiste Creek,
Tilbury, Ontario (Fisheries Biologist)

Facilitated acquisition of provincial Endangered Species Act (ESA) approval (letter of advice) through provision of advice regarding construction techniques. Planned, coordinated and conducted field investigations to assess freshwater mussel community and habitat at bridge site.

* denotes projects completed with other firms

Mark C. Pomeroy B.Sc.

Fisheries Biologist / Project Manager

Replacement of Dawn Mills Bridge over Sydenham River Creek, Dresden, Ontario (Fisheries Biologist)

Dawn Mills Bridge is located over a reach of the Sydenham River known to contain one of the largest number of taxa of federally regulated Species at Risk fish and mussels in Canada. Facilitated acquisition of federal approvals (Fisheries Act and Species at Risk Act, letter of advice) through provision of advice regarding construction techniques. Planned, coordinated and conducted field investigations to assess freshwater mussel habitat at bridge site.

Chinguacousy Road Widening, Brampton, Ontario (Fisheries Biologist)

Conducted fish community assessment to determine presence of Redside Dace (a provincially Endangered species). Drafted applications for Fisheries Act Authorization, Conservation Authorities Act approval, and Endangered Species Act approval. Provided input to engineering design for compensation measures related to Redside Dace habitat.

Detroit Windsor Truck Ferry Improvements (Design) (GWP 3071-06-00), Windsor, Ontario (Fisheries Biologist)

Provided aquatic community and habitat assessment services as well as input regarding project design, construction staging and silt and sediment control planning. Acquired approvals under Fisheries Act and Conservation Authorities Act related to fish habitat. Negotiated compensation measures with Conservation Authority prior to project design change, resulting in no HADD.

Highway 24 - Intersection Improvements, Cambridge, Ontario (Fisheries Biologist)

Provided fish rescue services. Performed environmental inspection duties related to implementation of the Fisheries Act compensation plan and resolution of onsite issues related to construction.

Detroit Windsor Truck Ferry Improvements (Contract Administration) (WP 3071-06-00), Windsor, Ontario (Fisheries Biologist)

Construction monitoring services related to Fisheries Act implications (fish removals, species at risk identification training for contract staff, staging and implementation design review), provision of advice regarding alternative staging/construction operations to prevent impacts to aquatic habitat/organisms.

Fanshawe Park Road Widening, London, Ontario (Fisheries Biologist)

Facilitated acquisition of approvals from DFO for the realignment of Heard Drain/Snake creek during the expansion of Fanshawe Park Road. Performed construction inspection services, resolved onsite implementation issues related to the Fisheries Act.

Natural Resource Services

Municipal Drain Classification Program*, Various, Ontario (Drain Assessment Technician)

Planned and implemented large scale sampling protocol designed by DFO to assess the sensitivity of various municipal drains to disturbance. Sampling program encompassed all drains within the Grand River watershed and consisted of habitat, thermal and fish community characterization based on extensive field sampling. Analyzed substantial quantities of field data, summarized results and produced interim and final reports.

Fish Habitat Study*, Strathroy, Ontario (Biological Technician)

Planned and implemented field program to sample fish community in reservoirs managed by the St. Clair Region Conservation Authority. Responsible for writing final report concerning existing fish habitat status and providing recommendations based on field data. Participated in water quality and benthic community field sampling programs.

Various Environmental Assessments*, Sarnia, Ontario (Fish Habitat Biologist)

Assessed project proposals for impacts to fish habitat as defined in the Fisheries Act. Issued Letters of Advice and Authorization under the Fisheries Act. Carried out screening level environmental assessments of proposed projects under the Canadian Environmental Assessment Act. Participated in outreach programs and inter-agency work groups regarding Species at Risk recovery. Acquired familiarity with the Habitat Alteration Assessment Tool (HAAT).

Renewable Energy

St. Columban Wind Project, Huron County, Ontario (Fisheries Biologist)

Planned, coordinated and conducted field investigations to assess potential aquatic impacts resulting from proposed wind project consisting of fifteen turbines. Drafted Water Assessment and Water Body Report as mandated under Ontario Reg. 359/09.

* denotes projects completed with other firms

Mark C. Pomeroy B.Sc.

Fisheries Biologist / Project Manager

Plateau Wind Project, Grey County, Ontario (Fisheries Biologist)

Planned, coordinated and conducted field investigations to update previous field work to assess potential aquatic impacts resulting from proposed wind project consisting of eighteen turbines. Drafted relevant sections of the Environmental Screening Report (ESR) as mandated under Ontario Reg. 116/01. Provided advice concerning provincial species at risk concerns.

Grand Renewable Energy Park, Haldimand County, Ontario (Fisheries Biologist)

Planned, coordinated and conducted field investigations to assess potential aquatic impacts resulting from proposed wind and solar project consisting of sixty-seven turbines and 425,000 solar panels. Drafted Water Assessment and Water Body Report as mandated under Ontario Reg. 359/09.

Springwood Wind Project, Belwood, Ontario (Fisheries Biologist)

Conducted field investigations to assess potential aquatic impacts resulting from proposed wind project consisting of and assisted with draft Water Assessment and Water Body Report under Ontario Reg. 359/09.

Whittington Wind Project, Dufferin County, Ontario (Fisheries Biologist)

Planned and coordinated field investigations to assess potential aquatic impacts resulting from proposed wind project consisting of three turbines. Drafted Water Assessment and Water Body Report as mandated under Ontario Reg. 359/09.

Fairview Wind Project, Stayner, Ontario (Fisheries Biologist)

Planned and coordinated field investigations to assess potential aquatic impacts resulting from proposed wind project consisting of eight turbines. Drafted Water Assessment and Water Body Report as mandated under Ontario Reg. 359/09.

White Pines Wind Project, Prince Edward County, Ontario (Fisheries Biologist)

Planned, coordinated and conducted field investigations to assess potential aquatic impacts resulting from proposed wind project consisting of twenty-nine turbines. Drafted Water Assessment and Water Body Report as mandated under Ontario Reg. 359/09 (in progress).

Urban Land

Berczy Dam Removal, Markham, Ontario (Fisheries Biologist)

Provided fish rescue services, including resolution of issues related to Species at Risk.

Medway Sanitary Trunk Sewer Extension, London, Ontario (Fisheries Biologist)

Drafted Fisheries Act application and Endangered Species Act application for pipeline crossing of Medway Creek. Coordinated and completed aquatic habitat assessment and relocation of freshwater mussels. Negotiated compensation measures prior to project design change, resulting in no HADD.

Fox Hollow Subdivision, London, Ontario (Fisheries Biologist)

Facilitated acquisition of approvals from DFO for the realignment of the Heard Drain/Snake Creek and the installation of a stormwater management pond in relation to construction of the Fox Hollow Subdivision. Performed construction inspection services, resolved onsite implementation issues related to the Fisheries Act.

* denotes projects completed with other firms

Katie Easterling is an Aquatic Ecologist with Stantec's Environmental Services group in Kitchener. She has approximately 6 years of field experience in both the aquatic and terrestrial disciplines. Previous fieldwork includes: fish habitat assessments, fish community sampling, fish salvages, REA water body assessments, trout spawning surveys, walleye spawning surveys and baseline aquatic surveys for various pipeline, rail line, transportation, renewable energy and municipal projects. Furthermore, she has experience conducting preliminary or baseline terrestrial habitat assessments, Species at Risk surveys, and breeding bird surveys. Reporting skills include: aquatic existing conditions reports, REA water assessment and water body reports, terrestrial existing conditions reports, Environmental Screening/Review Reports, Natural Heritage Evaluations (NHE) and Environmental Impact Statements (EIS). Additionally, Katie has consulted with First Nations, municipal, provincial and federal government agencies as part of fieldwork or reporting activities.

Katie is proficient in a variety of fish sampling techniques, including: Fall Walleye Index Netting (FWIN), Near Shore Community Index Netting (NSCIN), fyke netting, seine netting, gill netting and boat and backpack electrofishing. She has experience PIT tagging, anesthetizing fish, weighing, measuring, sexing, determining gonadal condition, removing aging structures (otoliths and scales) and aging fish. She also holds a certificate in radio telemetry and is certified in Ecological Land Classification (ELC). Her educational background focused on terrestrial, wildlife and aquatic biology, and includes a degree in Zoology and a Fish and Wildlife diploma. Prior to joining Stantec, Katie worked as an Ecological Research Assistant with Parks Canada, a Conservation Interpreter with the Long Point Region Conservation Authority and has previous consulting experience working as a Research Assistant for The Impact Group and a Biologist for URS. She also spent a summer work term at the OPG Nanticoke Plant working as an Assistant Mechanical Maintainer.

EDUCATION

Diploma – Fish and Wildlife Technician, Fleming College, Lindsay, Ontario, 2007

Hon.B.Sc– Major Zoology, Minor Biology, University of Toronto, Toronto, Ontario, 2003

PROFESSIONAL ASSOCIATIONS

Canadian Environmental Certifications and Approvals Board – Environmental Professional-in-Training (EPt) 2009-present

MEMBERSHIPS/ASSOCIATIONS

American Fisheries Society, Ontario Chapter Member, 2007 – present

American Fisheries Society, Ontario Chapter Executive Committee – Treasurer, 2011 - present

SPECIALIZED TRAINING

MTO/DFO/OMNR Fisheries Protocol Training Session for Fisheries Specialists, 2011

ROM Fish Identification Course, 2011

MNR Renewable Energy Natural Heritage Assessment Training, 2011

MNR Bat Monitoring Workshop for Wind Power Projects, 2010

Certified Traffic Control Technician, 2010

Class Two (II) Electrofishing Crew Leader Certification Course, 2006 and 2009

Contractor Orientation Course, CN Rail, 2009

Bat Acoustic Analysis Course, 2008

Ecological Land Classification, 2006

Radio Telemetry Certificate, 2006

Wetland Classification, 2006

Pleasure Craft Operators Course, 2006

PROJECT EXPERIENCE

Ministry of Transportation (MTO)

Aquatic

Detail Design, Highway 35, WP 102-99-01 Trent Canal Bridge Rehabilitation, Site 32-065 (Rosedale), MTO Eastern Region (2011 & 2012) (Role: Aquatic Ecologist)

Prepared the Aquatic Existing Conditions Report as part of the Detailed Design process for the Highway 35 site at the Trent Severn Waterway.

Detail Design, Highway 35, WP 4166-09-01 Corben Creek Structural Culvert Replacement, Site 32-165C, WP 4165-09-01 Martin Creek Structural Culvert Rehabilitation, Site 32-063BC and WP 4075-09-01 South McLaren Creek Structural Culvert Rehabilitation, Site 32-072BC, MTO Eastern Region (2011 & 2012) (Role: Aquatic Ecologist)

Conducted fish habitat and fish community assessments at 3 locations in the area surrounding Hwy 35 outside Lindsay, Ontario. This involved using a backpack electrofisher or minnow traps (where applicable) to determine fish species and habitat present in order to assess the community structure and supplement watercourse sensitivity information provided by the MNR. Reporting tasks included the Aquatic Existing Conditions Report

Detail Design, Highway 7, WP 4007-08-01/02 Mariposa Creek Structural Culvert Rehabilitation, Site 32-124BC and Mariposa Brook Structural Culvert Replacement, Site 32-161C, MTO Eastern Region (2011 & 2012) (Role: Aquatic Ecologist)

Conducted fish habitat and fish community assessments at 2 locations in the area surrounding Hwy 7 outside Lindsay Ontario. This involved using a backpack electrofisher or minnow traps (where applicable) to determine fish species and habitat present in order to assess the community structure and supplement watercourse sensitivity information provided by the MNR. Reporting tasks included the Aquatic Existing Conditions Report

Route Planning – Highway 144 Bypass around Chelmsford (GWP 5023-03-00), MTO Northeast Region (2011) (Role: Aquatic Ecologist)

Conducted fish habitat and fish community assessments at 63 locations in the area surrounding Hwy 144 near Chelmsford, Ontario. This involved using a backpack electrofisher or minnow traps (where applicable) to determine fish species and habitat present in order to assess the community structure and supplement watercourse sensitivity information provided by the MNR. Reporting tasks included the Aquatic Existing Conditions Report

Route Planning – Hwy 17 Sudbury to Markstay (GWP 5031-09-00), MTO Northeast Region (2011) (Role: Aquatic Ecologist)

Prepared the Aquatic Existing Conditions Report as part of the preliminary route planning study for Highway 17 between Sudbury and Markstay.

Highway 3, 6 and 24 Fish Community and Fish Habitat Assessment for Detailed Design (GWP 3115-09-00, GWP 3048-03-00 and GWP 362-98-00), MTO Southwest Region (2011) (Role: Aquatic Ecologist)

Conducted a detailed spring, summer and fall fish community and fish habitat assessment of 20 watercourse crossings for the rehabilitation/resurfacing of Highways 3, 6 and 24 surrounding the communities of Simcoe, Delhi and Port Dover. Reporting tasks included the Aquatic Existing Conditions Report and Impact Assessment Report for each highway.

Hwy 6 Fish Salvage, MTO Southwest Region (2009) (Role: Project Biologist)

Conducted a fish salvage as part of an MTO highway widening project located along Hwy 6 near Varney, ON. Fish collected were identified, measured and released downstream of the in-water work area.

Terrestrial

Route Planning – Hwy 144 Bypass around Chelmsford (GWP 5023-03-00), MTO Northeast Region (2011) (Role: Project Biologist)

Classified the vegetation communities within the Study Area based on FEC and ELC guidelines in addition to identifying potential SAR habitat for a proposed bypass route around Chelmsford.

Highway 401 Interchanges GWP 3070-09-00, MTO Southwest Region (2011) (Role: Project Biologist)

Prepared the terrestrial existing conditions report as part of the detail design stage for three Highway 401 interchanges between Woodstock and London.

Windsor-Essex Parkway Owner's Engineer, MTO Southwest Region (2010-2011) (Role: Project Biologist)*

Project Biologist for the acquisition of a Design, Build, Finance and Maintain consortia for the Windsor-Essex Parkway (WEP) which extends Highway 401 through Windsor below grade and includes an at-grade Highway 3. Conducted and reported on the Ecological Land Classification (ELC) and habitat availability for plant Species at Risk within the Windsor-Essex Parkway footprint as a requirement of ESA 17(2) B, ESA 17(2) C and ESA 17(2) D permits. Assisted with the preparation of Management, Monitoring and Habitat Restoration Plans for multiple Species at Risk, as required in the ESA 17 D permit. Co-ordinated and participated in one of the largest transplantation efforts for plant Species at Risk, which involved locating and identifying various plant Species at Risk within the Windsor-Essex Parkway footprint and transplanting to a region outside the area of impact.

Hwy 11 Madill-Church Road Interchange, MTO Northeast Region (2011) (Role: Project Biologist)*

Compiled and reported on the effectiveness of various wildlife detection/avoidance systems as part of a value added study for MTO.

Renewable Energy Aquatic

Niagara Region Wind Corporation (2012) (Role: Aquatic Ecologist)

Conducted the REA water assessment at multiple locations across the project area.

Hydroelectric Facilities - Lock 24 and 25 Dams on the Trent-Severn Waterway, Coastal HydroPower (2012) (Role: Aquatic Ecologist)

Conducted 4 Walleye spawning surveys at Lock 24 and 25 to determine if suitable habitat is present at the locks and the number of staging/spawning Walleye within the project footprint.

Cedar Point REA Water Body Assessment, Suncor Energy Products Inc. (2011) (Role: Aquatic Ecologist)

Conducted the REA water body assessment for a renewable energy project, which involved fish habitat assessments at 99 locations across the Study Area.

Adelaide REA Water Body Assessment, Suncor Energy Products Inc. (2011) (Role: Aquatic Ecologist)

Conducted the REA water assessment and prepared the water body report for a renewable energy project, which involved fish habitat assessments at 41 locations across the Study Area.

Napier Wind Project REA Water Body Assessment, wpd Canada Corporation (2011) (Role: Aquatic Ecologist)

Conducted the REA water assessment and prepared the water body report for a renewable energy project, which involved fish habitat assessments at 3 locations across the Study Area.

Amherst Island REA Water Body Assessment, Windlectric Inc. (2011) (Role: Aquatic Ecologist)

Conducted the REA water assessment and prepared the water body report for a renewable energy project on Amherst Island, which involved fish community and a preliminary fish habitat assessment at 39 locations across the Island.

Fish Habitat Assessment, SkyPower (2009) (Role: Project Biologist)

As part of a wind farm Environmental Assessment under O.Reg. 116, a fish habitat assessment was conducted to determine the baseline conditions and watercourse sensitivity according to the DFO matrix at each of the proposed watercourse crossings.

Terrestrial

Pre-Construction Bat Monitoring Surveys, Clients included Suncor Energy Products Inc., Acciona, RES Canada and SkyPower (2007-2009) (Role: Project Biologist)

Under O.Reg. 116 AnaBat detectors were installed on MET towers and design/constructed/installed multiple ground AnaBat detector units at various wind farms in Southern Ontario. Monitored pre-construction bat activity and identified species using spectrogram analysis to report on the activity level surrounding the proposed wind farms.

Post-Construction Bird and Bat Mortality Monitoring, Suncor (2008) and Enbridge (2009 and 2010) (Role: Project Biologist)

Conducted post-construction bird and bat mortality monitoring, scavenger impact trials and searcher efficiency trials at the Ripley and Enbridge Ontario Wind Farms near Kincardine, Ontario as a requirement under O.Reg. 116.

Winter Bird Surveys, Suncor Energy Products Inc. (2009) (Role: Project Biologist)

As a requirement of O.Reg.116, avian monitoring surveys were conducted to characterize the bird community of two sites in Southern Ontario during the over-wintering period.

Oil and Gas Pipeline

Aquatic

Detailed Fish Habitat Assessment and Reporting, Nova Chemicals (2011) (Role: Aquatic Ecologist)

Fish habitat was assessed at 9 proposed crossings for a pipeline route and existing conditions were summarized as part of an EA.

Detailed Fish Habitat Assessment and Reporting, TransCanada Pipeline Ltd (2009 & 2011) (Role: Project Biologist)

As part of a pipeline expansion project, a detailed fish habitat survey was conducted following MTO protocols at 10 watercourse crossings. Methodology included detailed habitat mapping 50 m upstream and 100 m downstream. Fish habitat conditions were summarized and watercourse sensitivity determined according to the DFO matrix in the Fish and Fish Habitat Assessment Report as part of a CEEA Environmental Assessment.

Baseline Aquatic Survey, Enbridge Gas Distribution Inc. (2009) (Role: Project Biologist)

As part of the Pipeline to Serve York Energy Centre LP Environmental Assessment, aquatic baseline conditions at all watercourse crossings were summarized as part of the preliminary assessment of reasonable routing opportunities for the proposed pipeline.

Fish Salvage and Construction Monitoring, Enbridge Pipelines (2008 and 2009) (Role: Project Biologist)

In-water construction work was monitored and fish salvages were conducted at various watercourses across Ontario as part of a pipeline maintenance or repair project. The fish collected were identified, measured and released downstream of the in-water work area.

Baseline Aquatic Habitat Survey, TransCanada Pipeline Ltd (2009) (Role: Project Biologist)

As part of an Environmental Assessment for the proposed Thorold Sales Meter Station to connect the TransCanada Mainline to the Enbridge Gas Distribution pipeline, baseline aquatic conditions were assessed as part of the report.

Terrestrial

Ecological Land Classification, TransCanada Pipelines Ltd (2011) (Role: Biologist)

Ecological Land Classification (ELC) surveys were conducted along the proposed pipeline expansion route, which documented the vegetation communities present.

**Species at Risk Survey, TransCanada Pipelines Ltd (2009)
(Role: Project Biologist)**

Species at Risk surveys were conducted at four work areas along a pipeline right-of-way between Belleville and Brockville, Ontario. Surveys included looking for and assessing possible habitat conditions for Butternut, Henslow's Sparrow, Grey Fox, Blanding's Turtle, Eastern Milksnake and Eastern Ratsnake.

Herptile Rescue, Enbridge Pipeline Inc. (2009) (Role: Project Biologist)

As part of a large pipeline maintenance project situated within a beaver pond located near the Ganarquois River, a herptile rescue was performed to remove any snakes, turtles and frogs from the trench-box once in-filling was started. All species found within or immediately adjacent to the trench-box were removed and relocated within the beaver pond but outside of the work zone.

**Terrestrial Assessment, Enbridge Pipelines Inc. (2008)
(Role: Project Biologist)**

Preliminary aquatic and terrestrial assessments of various dig sites along a pipeline in Southern Ontario were conducted to establish the existing baseline conditions. Surveys involved recording bird species observed, vegetation cover species found at the dig site and assessing any aquatic habitat found on-site.

Nesting Bird Surveys, TransCanada Summer (2007) (Role: Project Biologist)

Nesting bird surveys were performed at various remote locations throughout Northern Ontario, which included finding and identifying any active and inactive nests within and surrounding the proposed work area along a pipeline right-of-way.

**Railroad
Aquatic**

Fish Salvage and Construction Monitoring, Canadian National Railway (2010) (Role: Project Biologist)

As part of a railway expansion project, in-water construction work was monitored and multiple fish salvages were performed at various bridge and culvert construction locations.

Detailed Fish Community and Habitat Surveys and Reporting, Canadian National Railway (2009) (Role: Project Biologist)

As part of a railway expansion project, detailed fish community and habitat surveys were conducted following MTO protocols at over 20 watercourse crossings. Methodology included detailed habitat mapping 50 m upstream and 100 m downstream, electrofishing to determine fish community present in the stream and water chemistry sampling. Fish community and habitat conditions were summarized and watercourse sensitivity determined according to the DFO matrix in the Fish and Fish Habitat Assessment Report as part of a CEAA Environmental Screening.

Fish Habitat Surveys and Reporting, Canadian Pacific (CP) Railway (2009) (Role: Project Biologist)

As part of a CEAA Environmental Screening Report, a fish habitat and aquatic baseline survey was conducted along a proposed rail siding within a wetland. The assessment consisted of a visual assessment of water depth, aquatic vegetation, available cover, substrate and the presence of barriers to fish movement within the area of the proposed siding.

Terrestrial

**Nesting Bird Surveys, Canadian National Railway (2010)
(Role: Project Biologist)**

Nesting bird surveys were performed along various stretches of CN's RoW to find and identify any active or inactive nests within the proposed work area.

Municipal

Aquatic

Arkell Well Field Adaptive Management Plan (AMP), City of Guelph (2011) (Role: Aquatic Ecologist)

As part of a yearly monitoring program, fish habitat was assessed using the OSAP protocol at four monitoring stations outside the city of Guelph.

Trout Spawning Surveys (2010) (Role: Project Biologist)

Conducted multiple trout spawning surveys along two coldwater creeks in the eastern region of the GTA for two municipal road expansion projects. Fieldwork involved surveying the creeks 50 m upstream and 100 m downstream to determine if Rainbow Trout were staging or spawning in the creek and within the vicinity of the bridge.

Aquatic Habitat Surveys, Town of Ajax (2009-2010) (Role: Project Biologist)

The Town of Ajax is committed to improving water quality along its Lake Ontario waterfront and in Duffins Creek and Duffins Marsh. As part of this, preliminary fieldwork was conducted to assess the existing conditions at each of the stormwater outfalls, including terrestrial and aquatic habitat. The assessment consisted of a visual assessment of water depth, aquatic and terrestrial vegetation, available cover, substrate and the presence of barriers to fish movement upstream or downstream.

Baseline Aquatic Survey, Regional Municipality of York (2009) (Role: Project Biologist)

As part of an Environmental Assessment for Cole Engineering Group Limited (Cole Engineering), a baseline terrestrial and aquatic survey was conducted for the Fairy Lake Garden Pond Maintenance Project in the Town of Newmarket. The assessment consisted of a visual assessment of water depth, aquatic vegetation, available cover, substrate and the presence of barriers to fish movement upstream or downstream of Garden Pond; which was used to assess Garden Pond's function as fish habitat both within the pond and the pond's function within the Fairy Lake/East Holland River watershed.

Fish Sampling, Durham-York Region (2008) (Role: Project Biologist)

Various stations along Tooley Creek in Durham Region were electrofished to obtain composite samples of whole fish that were identified, weighed, measured and bagged for a metals analysis as part of a human health risk report for the proposed Durham-York Residual Waste Study.

Terrestrial

Habitat Assessment, Durham-York Region July (2007) (Role: Project Biologist)

Multiple sites around the regions were assessed for wildlife usage, fisheries and ideal browse, nesting and cover habitat. Recommendations for a preferred site were given based on a combination of these factors and how the potential loss of habitat through development would affect the local wildlife.

Other Experience

Aquatic

Phase 3 Environmental Effects Monitoring (EEM): Periodic Monitoring, Kirkland Lake, ON (2011) (Role: Aquatic Ecologist)

This EEM program began in 2010 (continuing through 2012) and involved the collection of water, sediment, fish and benthos to assess possible environmental effects caused by the mine and followed federal Metal Mining Effluent Regulation (MMER) guidelines. Fyke nets and a boat electrofisher were used to capture target small-bodied species. The fish were dissected, sexed, livers and gonads were weighed and eggs were collected.

Lake Gibson Angler Survey, Ontario Power Generation, Thorold, Ontario (2011) (Role: Aquatic Ecologist)

Lake Gibson is a hydro-electric reservoir owned and operated by Ontario Power Generation (OPG). As detailed in the OPG Risk Management Plan, OPG is required to monitor the persistence of sediment contamination and its expression in the environment within Lake Gibson. The program was designed to identify, quantify and compare the levels of contamination over time and the impact on sediments, water, benthic invertebrates, and fish in the system. Katie was involved as a field biologist interviewing anglers at Lake Gibson to assess the effectiveness of OPG's communication with the public regarding the contamination of Lake Gibson sediment and fishes.

Piles Development (Keswick) Corporation - DFO authorization PE 07-0957 (2011) (Role: Aquatic Ecologist)

An evaluation of fish habitat, fish passage and the fish community was conducted within the channel realignment to confirm the compensation measures and structures are

functioning as designed and are providing fish habitat. Fish community sampling was conducted using a backpack electrofisher.

Box Grove - DFO Authorization for Works Affecting Fish and Fish Habitat No. BU-04-3082 (2011) (Role: Aquatic Ecologist)

This survey was conducted to satisfy conditions included in the Department of Fisheries and Oceans (DFO) Authorization for Works Affecting Fish and Fish Habitat (DFO Authorization No. BU-04-3082). Condition 4.2 of the Authorization is to enhance fish passage through the creation of a low flow channel following the removal of a 30 m long culvert. The culvert removal and new channel construction were completed in spring 2010. This survey was conducted as part of the post construction monitoring program required by the DFO Authorization.

Benthic Invertebrate and Water Quality Sampling, Fox Meadows Estates (2009) (Role: Project Biologist)

Benthic invertebrate sampling was conducted following the OBBN protocol and water quality samples were collected and submitted for testing. Results from the sampling effort were summarized and compared to previous years in an effort to gage and mitigate potential impacts from a residential development expansion.

Fish Community Survey (2006) (Role: Fisheries Field Biologist)*

FWIN, NSCIN, gill netting and Seine netting techniques were used to perform a fish surveys on a lake and rivers in the Kawartha Lakes system. Processing of the sampled fish included weighing, measuring, sexing, determining gonadal condition, removing aging structures and aging.

Terrestrial

Preliminary Aquatic and Terrestrial Assessment, Canada Post (2008) (Role: Project Biologist)

Preliminary aquatic and terrestrial assessments of various sites in Southern Ontario were conducted to establish the existing baseline conditions. Surveys involved recording bird species observed, vegetation cover species found on the site and assessing potential impacts on nearby Valued Ecosystem Components (VECs) and any aquatic systems.

Category B Class EA, Ontario Realty Corporation (ORC) (2008) (Role: Project Biologist)

Conducted the background research and evaluation of existing natural heritage baseline conditions for multiple ORC properties situated across Ontario.

Preliminary Aquatic and Terrestrial Assessment, Canada Post (2008) (Role: Project Biologist).

Preliminary aquatic and terrestrial assessments of various sites in Southern Ontario were conducted to establish the existing baseline conditions. Surveys involved recording bird species observed, vegetation cover species found on the site and assessing potential impacts on nearby Valued Ecosystem Components (VECs) and aquatic systems.

Ecological Receptors of Concern Surveys, Various Clients. (2008) (Role: Project Biologist).

Conducted biological surveys of flora and fauna on potentially contaminated sites to assess the current site conditions.

Soil Sampling Survey, Brampton Brick (2007) (Role: Project Biologist)

Collected soil samples to assess the impact of emissions on the surrounding terrestrial environment as part of the phytotoxicology assessment of the Brampton Brick facility.

Forest and Wetland Classification, Parks Canada (2006) (Role: Ecological Research Assistant)*

Performed rapid assessments of 400 m forest plots and 100 m wetland plots to evaluate and classify sites along the Trent-Severn Waterway from Rice Lake to Canal Lake. Classification was based on biological features such as flora and fauna present and physiological features such as soil and drainage. Data collected was used to create a mapping inventory of the Trent-Severn system for Parks Canada and the Ministry of Natural Resources.

**Denotes experience with other firms*

Joel (Joe) Keene has 14 years of extensive marine and freshwater experience, including mark recapture studies and species inventory projects investigating fish population stability, species identification, measurement and marking of fish collected. He has processed over 11,000 samples from over 400 freshwater and marine projects, both in Canada and internationally. Joe has performed fecundity analysis on several fish species and marine mussels, and is experienced in the collection of soil, sediments, water, fish, crayfish, clam and benthic samples in the field using a variety of techniques and equipment. In addition, Joe is experienced with morphological and histological analysis, as well as detailed necropsies and dissection. He has been involved with a number of projects involving freshwater mussel species at risk (SAR) in Ontario and is familiar with both provincial and federal approvals processes for surveys and moves related to these organisms.

Joe's expertise includes compilation and statistical analysis of benthic data to derive various biological indices, including, but not limited to, Hilsenhoff Biodiversity Index, Percent Model Affinity, Simpson's Diversity and Evenness indices, EPT indices and BioMAP. He has researched and prepared scientific reports, studies, presentations and reviews relating to benthic studies and aquatic biology including Environmental Effects Monitoring (EEM) programs.

EDUCATION

M.Sc., University of Guelph / Aquaculture, Guelph, Ontario, 1997

B.Sc. (Specialized Honours), University of Guelph / Marine Biology, Guelph, Ontario, 1994

Certificate, Royal Ontario Museum / Fish Identification, Toronto, Ontario, 2001

Certification, Ontario Freshwater Mussel Identification Workshop, Guelph, Ontario, 2008

Class 2 Electrofishing Crew Leader, Class 2 Electrofishing Training Course, Guelph, Ontario, 2010

Proposed Burlington Quarry Expansion, Burlington, Ontario (Aquatic Ecologist)

Joe participated in the implementation and delivery of a multi year Natural Environment Existing Conditions program and report. The report was included as part of the application for the proposed Burlington Quarry expansion. The program involved the establishment of appropriate sampling stations for fish, benthos, water, thermal conditions and discharge.

Periodic Monitoring EEM Program, Kirkland Lake, Ontario (Benthic Taxonomist / Aquatic Ecologist)

Joe conducted the analysis, interpretation and reporting of benthic data produced for the Environmental Effects Monitoring (EEM) program in 2008 which was conducted to assess the impacts of mine effluent on the receiving waters at the KLG site. He was also involved in the interpretation and reporting of water quality, sediment and fisheries data.

Magnitude and Extent Environmental Effects Monitoring, Flin Flon and Snow Lake, Manitoba (Aquatic Ecologist / Field Crew / Benthic Taxonomist)

*Joe was involved in the planning and benthic site selection for three Environmental Effects Monitoring (EEM) projects in the Flin Flon and Snow Lake areas of Manitoba for Hudson Bay Mining and Smelting. He collected benthic, sediment and water samples and processed, enumerated and identified organisms from the benthic samples. He performed the QA/QC and statistical analysis of the benthic data for each of the three EEM programs. Joe also assisted with the design and implementation of a tissue metal concentration study in amphipods (*Hyaella*) collected from several sites in the Flin Flon and Snow Lake areas.*

MEMBERSHIPS

Member, North American Benthological Society

PROJECT EXPERIENCE

Aquatic Ecology

Middle - Grand River WWTP Assimilative Capacity Study, Kitchener, Ontario (Aquatic Ecologist)

Joe assisted with the planning and implementation of a field program to map and quantitatively sample aquatic vegetation to provide estimates of macrophyte biomass, used in the GRCA's GRSM Model in support of the ACS for the Kitchener wastewater treatment plant. Joe was involved in completing routine surface water sampling on the Grand River as part of this project.

* denotes projects completed with other firms

**Georgia-Pacific Cycle 5 Environmental Effects Monitoring
- Investigation of Cause, Thorold, Ontario (Aquatic
Ecologist/Field Crew Leader)**

*As part of an Environmental Effects Monitoring (EEM) program on Beaverdams Creek and Lake Gibson in Thorold, Ontario, Joe was involved in the planning, experimental design and site selection for a caged bivalve study to determine the effects of pulp and paper mill effluent on growth, survival and reproductive success in mussels (*Lasmigona compressa*). He collected water samples during the collection, deployment and retrieval of the mussels to test for a variety of parameters including metals, pH, conductivity, turbidity, nutrients and chlorophyll. He also conducted an effluent plume delineation survey within Lake Gibson.*

**Freshwater Mussel Detection and Relocation in Medway
Creek and the Grand River, London, Ontario (Aquatic
Ecologist)**

Involved in the identification and relocation of freshwater mussel species at risk from Medway Creek in London, Ontario and the Grand River in Kitchener-Waterloo, Ontario.

**Environmental Youth Corps, University of Guelph,
Guelph, Ontario* (Aquatic Ecologist)**

*Conducted histological analyses of Sea lamprey (*Petromyzon marinus*) for use in fecundity and sex determination studies.*

**Mark Recapture and Species Inventory Project*, North
Shore of Lake Ontario (Aquatic Ecologist)**

Electrofished several rivers, investigating the effects of low head barrier dams on fish distribution. Performed species identification, measuring and marking of fish, and collection of stream physical data.

**American eel (*Anguilla rostrata*) downstream migration
and discrimination study for New York Power Authority*,
New York (Aquatic Ecologist)**

Performed eel collection using hoop nets and electrofishers, morphological analysis of external characteristics, and detailed necropsies including the collection of otoliths, blood, ovary and eel muscle tissues. He also conducted histological analysis of ovary tissue, focusing on oocyte developmental stage and diameters.

**Mark Recapture Study and Species Inventory Project,
Mill Creek, Guelph, Ontario* (Aquatic Ecologist)**

Participated in project investigating fish population stability. Performed species identification, measuring, weighing and marking of fish collected using an electrofisher.

Benthic Services

**Spencer Creek Invertebrate Study, Flamborough, Ontario
(Benthic Taxonomist/Field Crew Leader)**

Joe has coordinated the field program of benthic sampling in Spencer Creek near Flamborough, Ontario from 2006 to 2010 which monitors effects of a housing development on the benthic communities in the area. He has been responsible for the sorting and identification of benthic macroinvertebrates from the site and has performed the analysis of the resulting data. He was responsible for quality assurance/quality control analysis and the production of reports summarizing current conditions for each year, as well as an analysis of trends or changes over time.

**14 Mile Creek Invertebrate Study, Oakville, Ontario
(Benthic Taxonomist/Field Crew Leader)**

Joe has coordinated the field program of benthic sampling in 14 Mile Creek near Oakville, Ontario from 2006 to 2010 which monitors effects of a housing development on the benthic communities in the area. He has been responsible for the sorting and identification of benthic macroinvertebrates from the site and has performed the analysis of the resulting data. He was responsible for quality assurance/quality control analysis and the production of reports summarizing current conditions for each year, as well as an analysis of trends or changes over time.

**DFO Small Bodied Fish Gut Content Analysis, Ontario
(Benthic Taxonomist)**

Joe conducted gut content analysis on 736 small bodied fish for Fisheries and Oceans, Canada. The study involved weights and measures of fish and gut contents as well as detailed identification and enumeration of benthic macroinvertebrates from the stomach and intestinal tract of dissected fish. Data will be used to compare resident fish diets both before and after Round Goby introduction.

**Acton Quarry Expansion, Acton, Ontario (Aquatic
Biologist)**

As an Aquatic Biologist, Joe participated in field studies for a multi-year Natural Environment Existing Conditions program and report. The report was included as a part of the application for the proposed Acton Quarry expansion. The program involved establishing appropriate sampling stations for baseline monitoring of fish, benthos, water, thermal conditions and discharge. He was also responsible for the sorting and identification of benthic macroinvertebrates collected as part of the multi-year field surveys, as well as the subsequent analysis and reporting of benthic community data.

* denotes projects completed with other firms

Joel L. Keene B.Sc., M.Sc. (Aqua)
Aquatic Ecologist / Benthic Taxonomist

Proposed Burlington Quarry Expansion, Burlington, Ontario (Aquatic Ecologist)

Joe participated in the implementation and delivery of a multi year Natural Environment Existing Conditions program and report. The report was included as part of the application for the proposed Burlington Quarry expansion. The program involved the establishment of appropriate sampling stations for fish, benthos, water, thermal conditions and discharge.

Mount Forest Waste Water Treatment Plant (WWTP) Study*, Mount Forest, Ontario (Benthic Taxonomist / Field Crew)

Joe was responsible for the collection and identification of benthic macroinvertebrates upstream and downstream of existing and proposed Waste Water Treatment Plant (WWTP) discharge locations to establish baseline environmental conditions on the South Saugeen River.

2006 Biomonitoring-Crompton, Elmira, Ontario (Benthic Taxonomist)

Joe participated in the field program of benthic sampling in Canagagigue Creek near Elmira, Ontario from 2006 to 2008 which monitors effects of a polluted site near the creek on the benthic communities in the area. He has been responsible for the sorting and identification of benthic macroinvertebrates from the site and has performed the analysis of the resulting data. He was responsible for quality assurance/quality control analysis and the production of reports summarizing current conditions for each year, as well as an analysis of trends or changes over time. Prior to 2006, he was responsible for the sorting and identification of the benthic samples through a different firm.

Tembec Enterprises Inc. Cycle 5 EEM, Kapuskasing, Ontario (Benthic Taxonomist)

As part of an Environmental Effects Monitoring (EEM) program on the Kapuskasing River, Ontario, Joe was involved in the planning, collection, sorting and identification of benthic samples for the purpose of characterizing the benthic communities upstream and downstream of a pulp and paper mill on the Kapuskasing River. He also collected water and sediment samples at each benthic station and assessed physical parameters such as pH, conductivity, dissolved oxygen, temperature and flows. He has performed statistical analysis of the resulting benthic data and produced reports summarizing current conditions for each year, as well as an analysis of trends or changes over time.

Proposed Quarry, Flamborough, Flamborough, Ontario (Benthic Taxonomist/Field Crew)

Joe has been involved in several aspects of the surface water monitoring of lands adjacent to the proposed quarry in an effort to provide a picture of the background ecology and hydrology. He has collected, processed, identified and analyzed benthic samples from Flamboro and Mountsberg Creeks and their tributaries over several years. He has conducted bimonthly monitoring of a number of surface water stations in the area for water depth, flow and water quality. He has also taken part in a pump test which required daily assessments of flow, depth, turbidity, pH, temperature, dissolved oxygen, conductivity, metals and bacterial samples and was responsible for coordinating daily laboratory water sample deliveries and dissemination of results to stakeholders.

Wescast Invertebrate Study, Wingham, Ontario (Benthic Taxonomist/Field Crew Leader)

Joe has coordinated the field program of benthic sampling in the Maitland River near Wingham, Ontario from 2006 to 2009 which monitors effects of a historic landfill on the benthic communities in the area. He has been responsible for the sorting and identification of benthic macroinvertebrates from the site and has performed the analysis of the resulting data. He was responsible for quality assurance/quality control analysis and the production of reports summarizing current conditions for each year, as well as an analysis of trends or changes over time. Prior to 2006, he was responsible for the sorting and identification of the benthic samples through a different firm.

Bridge Street Bridge Rehabilitation, Kitchener, Ontario (Field Crew Leader/Benthic Taxonomist)

*Joe was involved in the identification, collection and relocation of freshwater mussels from the Grand River in Kitchener, Ontario. This mussel move was performed to minimize impacts of bridge reconstruction and repair on local mussel populations which included the wavyrayed lampmussel (*Lampsilis fasciola*); a freshwater species at risk (SAR). Joe was involved in the planning, collection, identification and relocation aspects of this mussel move.*

Extensive Variety of Taxonomic Experience, 1999-2011 (Aquatic Invertebrate Taxonomist)

Joe has processed over 11,000 samples from over 400 projects in 12 years. Joe is skilled in the identification of benthic macroinvertebrates from lentic and lotic environments. His experience encompasses marine and freshwater systems across Canada and internationally.

* denotes projects completed with other firms

PUBLICATIONS

Sonnenberg, H., J. Keene, R. Park, K. Bernard, and S. Dickieson. Challenges overcome and lessons learned from using freshwater bivalves during two Investigation of Cause (IOC) Environmental Effects Monitoring (EEM) studies. *Presented at the 37th Annual Aquatic Toxicity Workshop, Toronto, Ontario, 2010.*

Are the costs to meet environmental effects monitoring (EEM) benthic sample precision and accuracy criteria justified?. *Proceedings of the 32nd Annual Aquatic Toxicity Workshop, 2005.*

Holloway, A.C., J. Keene, D.G. Noakes, R.D. Moccia. Effects of clove oil and MS-222 on blood hormone profiles in rainbow trout, *Oncorhynchus mykiss* (Walbaum). *Aquaculture Research*, 35: 1025-1030, 2004.

Keene, J.L., D.L.G. Noakes, R.D. Moccia, C.G. Soto. The efficacy of clove oil as an anaesthetic for rainbow trout, *Oncorhynchus mykiss* (Walbaum). *Aquaculture Research*, 29: 89-101, 1998.

Kelly Clayton is a member of the Environmental Management Group at Stantec Consulting with four years of industry experience. She has a Graduate Certificate in Ecosystem Restoration and a Bachelor of Environmental Science, majoring in environmental geography and area of emphasis in biotic systems. Kelly has gained valuable experience through her formal employment and her extensive participation in volunteer projects in Ontario, as well as the United States of America. Her experience at teaching college-level environmental monitoring has imbued Kelly with a practical ability to apply Ecological Monitoring and Assessment Network (EMAN) and Ontario Stream Assessment Protocol (OSAP) protocols.

Kelly has conducted a wide array of environmental monitoring that includes bird migration surveys, salmon spawning counts, butterfly and odonate surveys, as well as fish assessment and vegetation surveys. She is familiar with the use of all manner of such survey equipment as GPS and radio telemetry equipment, seine nets, hoop nets, gill nets, fyke nets, minnow traps, basking traps and spring haul traps. Kelly is experienced at the identification of flora and fauna, and is capable of handling wildlife. Certified in ELC (Ecological Land Classification), Class II Electrofishing, and Ontario Benthic Biomonitoring Network, Kelly has the ideal background to support a wide variety of both Terrestrial and Aquatic natural heritage studies. Her laboratory experience has honed Kelly's skills in data processing and analysis, and she has a demonstrated ability to interpret and report findings accurately.

EDUCATION

B.Sc. (Env.), University of Guelph / Environmental Science, Guelph, Ontario, 2007

Graduate Certificate, Niagara College / Ecosystem Restoration, Niagara-on-the-Lake, Ontario, 2009

Class II Electrofishing Certificate, Niagara College / Ecosystem Restoration, St. Catharines, Ontario, 2008

Ontario Benthic Biomonitoring Network Certificate, Niagara College / Ecosystem Restoration, St. Catharines, Ontario, 2009

Certificate, Ecological Land Classification (ELC), Lindsay, Ontario, 2010

Certificate, Tallgrass Ontario / Seed Collector, Burlington, Ontario, 2010

Certificate, Ontario Wildlife Rehabilitation Network (OWREN), London, Ontario, 2010

Certificate, St. Johns Ambulance / CPR and First Aid, Burlington, Ontario, 2010

Workplace Hazardous Materials Information System (WHMIS), Burlington, Ontario, 2010

Licence, Boat Smart / Pleasure Craft Operators, Orangeville, Ontario, 2008

Certificate, ROM / Ontario Fish Identification Workshop, Toronto, Ontario, 2011

PROJECT EXPERIENCE

Education

Niagara College Environmental Monitoring Program*, Niagara-on-the-Lake, Ontario (Part-time Teacher)

Taught two sections of students at a second-year, college level. Demonstrated and explained Ontario Stream Assessment Protocol (OSAP) and Ontario Benthic Biomonitoring (OBBN) protocols. Discussed proper field and lab sampling/analysis techniques for water, sediment, and benthos. Prepared assignments, lectures, and exams (both written and practical). Evaluated students based on performance.

Linear Infrastructure

Thunder Bay Generating Station Pipeline Project, Thunder Bay, Ontario (Aquatic Ecologist)

Researched and summarized data for existing conditions report as part of the EA process.

* denotes projects completed with other firms

Kelly Clayton B.Sc. (Env.)

Ecologist

Union Gas Pipeline Construction, Nanticoke, Ontario (Aquatic Ecologist)

Researched and summarized data for existing conditions report as part of the EA process.

Mining

Environmental Effects Monitoring (EEM) Program: Vale Inco, Sudbury, Ontario (Aquatic Ecologist)

Collected fish and water samples for toxicity testing.

Environmental Effects Monitoring (EEM) Program: Hudson Bay Mining and Smelting, Flin Flon, Manitoba (Aquatic Ecologist)

Collected Hyalella, water samples and sediment samples for toxicity testing.

Natural Sciences & Heritage Resources

Proposed Melancthon Quarry, Melancthon, Ontario (Aquatic Ecologist)

Conducted fish community surveys (electrofishing).

New Hamburg Oxbow, New Hamburg, Ontario (Aquatic Ecologist)

Collected water samples and water quality data twice monthly.

Blue Springs Creek Ground and Surface Water Monitoring, Arkell, Ontario (Aquatic Ecologist)

Downloaded weekly temperature and water level data and performed stream discharge measurements.

Ontario Power Generation - Lake Gibson Project, Thorold, Ontario (Aquatic Ecologist)

Collected benthic invertebrate and water samples. Safety boat operator.

Mill Creek Surface Water Monitoring Program, Milton, Ontario (Aquatic Ecologist)

Performed monthly stream discharge measurements and downloaded water level and temperature logger data. Graphed hydrological data.

Greenhouse Effluent Filtration Design Team, Niagara College*, Niagara-on-the-Lake, Ontario (Biologist)

Conducted environmental impact assessment on receiving stream and suggested several filtration design methods.

Bird Studies Canada Marsh Monitoring Program*, Hamilton, Ontario (Volunteer)

Conducted amphibian surveys on Royal Botanical Gardens property. Aided in the development of the BSC database.

Species at Risk Inventory at Legends on the Niagara Golf Course*, Chippewa, Ontario (Student Consultant)

Designed and conducted survey methods. Produced research and consultant proposals. Made recommendations for further restoration efforts.

St. Clair River Horizontal Directional Drill, Sarnia, Ontario (Aquatic Ecologist)

Performed analysis and presentation of in-situ and laboratory water quality data. Reported on results of water quality monitoring program.

Island Lake Conservation Area, Credit Valley Conservation*, Orangeville, Ontario (Conservation Technician)

Served as a client services representative, which entailed conservation awareness education. Maintained conservation area grounds.

Royal Botanical Gardens*, Hamilton, Ontario (Restoration Ecologist)

Coordinated summer students and assisted in the planning and implementation of restoration activities. Participated in habitat rehabilitation strategies (cattail and waterlily plantings). Maintained floodplain connections.

Assisted the Species at Risk Biologist in the creation of snake hibernacula. Assisted in turtle monitoring using radio telemetry, basking traps and hoop nets. Assisted Terrestrial Ecologist with Prairie grassland rehabilitation techniques (Prescribed burns and Prairie plantings). Conducted environmental monitoring (salmon spawning count, waterfowl migration count, aquatic vegetation surveys, butterfly and odonate counts).

Performed wildlife population management (carp (Cyprinus carpio) seining in Cootes Paradise Marsh and RBG ponds, electrofishing for carp), and beaver dam maintenance. Operated Cootes Paradise Fishway carp barrier (to separate non-native species from native) and ran educational presentations at Cootes Paradise Fishway.

Collected water quality measurements and performed data entry, data quality control and analysis, in addition to report writing. Assisted in development of educational materials (pamphlets and signage).

* denotes projects completed with other firms

Kelly Clayton B.Sc. (Env.)

Ecologist

Various Environmental Effects Monitoring (EEM) Studies, Ontario (Aquatic Ecologist)

Conducted fish population monitoring, benthic invertebrate identification and report writing/data management in support of various EEM studies for both Mining and Pulp and Paper industry projects.

Renewable Energy

White Pines Wind Farm, Picton, Ontario (Aquatic Ecologist)

Performed water-body assessments on mapped watercourses.

Fairview Wind Farm, Stayner, Ontario (Aquatic Ecologist)

Performed water-body assessments on mapped watercourses.

Pristine Power Wind Power, St. Columban, Ontario (Aquatic Ecologist)

Conducted fish community surveys (electrofishing).

Algonquin Power Wind Project, Amherst Island, Ontario (Aquatic Ecologist)

Conducted shoreline habitat mapping and fish community surveys.

Solar Power Plan Design Team, University of Guelph, City of Guelph*, Guelph, Ontario (Student)

Designed a solar power plan for the City of Guelph to coordinate with Community Energy Plan. Conducted public surveys on solar power interest. Coordinated with key stakeholders. Conducted cost/benefit analysis, baseline research regarding solar power use, prepared proposal, and presented plan to key stakeholders.

Port Dover Wind Farm, Port Dover, Ontario (Assistant Aquatic Ecologist)

Fish population monitoring (electrofishing).

Melancthon Wind Power Project, Melancthon and Amaranth Townships, Ontario (Biologist)

Conducted bat and bird mortality monitoring studies and raptor monitoring (winter raptor counts) as well as habitat assessments and data analysis.

Transportation Planning

MTO Highway 3, 6 and 24, Simcoe, Ontario (Aquatic Ecologist)

Conducted fish community surveys (electrofishing).

* denotes projects completed with other firms

Kelly Clayton B.Sc. (Env.)

Ecologist

PUBLICATIONS

Fuller, M.M., K. Clayton, N. Ward. Project Paradise Season Summary Report 2009. *Royal Botanical Gardens. Hamilton, Ontario. RBG Report No. 2010-01*, 2010.

Clayton, K. Carroll's Bay Recovery and Management Strategy. *Royal Botanical Gardens. Hamilton, Ontario*, 2010.

Clayton, K. Recovery and Management Strategy for Carroll's Bay Marsh. *Presentation at the Project Paradise Workshop*, 2010.

Marc Faiella's experience has included industry and development sector projects. He has conducted field investigations, liaised with representatives of government agencies, regulators and worked with First Nations, synthesized data and produced reports. Marc's specific areas of expertise include Environmental Effects Monitoring (EEM), Environmental Impact Studies (EIS) and Fish Habitat Assessments. He has assessed potential impacts to aquatic habitats at a number of mining and development-related sites, such as metal mines, quarries, pulp and paper mills, subdivisions, city drainage systems and wind energy projects. Marc's technical experience has focused mainly on aquatic habitats. He has conducted fisheries inventories and Species at Risk project surveys based on provincial protocols, trout spawning surveys, collected benthic invertebrate samples, and collected water, sediment and non-lethal and lethal fish tissue samples for mercury. Marc has gained practical experience with all construction phases of DFO applied work sites. In addition, Marc has on-site experience at remote northern sites where access is gained via helicopter, ATV, boat and hiking.

EDUCATION

Tech. Dipl., Sir Sanford Fleming College / Ecosystem Management, Lindsay, Ontario, 2005

Training Certificate, Royal Ontario Museum Fish Identification Workshop, Royal Ontario Museum, Ontario, 2006

Certificate, MTO/DFO/OMNR Protocol, Toronto, Ontario, 2006

Certificate, St. John Ambulance / First Aid and CPR, Guelph, Ontario, 2010

P.A.L. and Firearms, Brampton, Ontario, 2005

Sir Sanford Fleming College / Short Wave Radio, Lindsay, Ontario, 2004

Sir Sanford Fleming College / Chainsaw Operator, Lindsay, Ontario, 2004

Certificate, Pleasure Craft Operator, Toronto, Ontario, 2005

Training Certificate, Class 1 Electrofishing Certificate, MNR, Ministry of Natural Resources, Ontario, 2012

Fisheries and Oceans Canada / Ontario Freshwater Mussel Identification Workshop, Burlington, Ontario, 2011

MEMBERSHIPS

Canadian Environmental Practitioner In Training (CEPIT),
Canadian Environmental Certification Approvals Board

PROJECT EXPERIENCE

Environmental Assessments

Communal Irrigation Study, Township of Melancthon, Ontario (Crew Lead)

Obtained appropriate licences to conduct presence / absence and fish utility surveys within the Pine and Noisy River watersheds. Served as crew lead, overseeing fish surveys that were conducted in 2008 and preparations for proposed surveys in the spring / summer of 2009. Responsible for assembling report figures, maps and analysis of collected fisheries data, in tandem with Stantec's in-house GIS / graphics department.

Bruce to Milton Transmission Reinforcement Project, Multiple Sites, Ontario (Crew Lead)

Key member of the study team for the proposed hydro corridor expansion from Bruce Nuclear to a Milton, Ontario. Liaised with several Ministry of Natural Resources offices to coordinate issuance of permits and processing of historical fisheries data requests. Worked directly with the project manager to complete a work plan to safely and efficiently complete spring and summer fisheries surveys along the approximate 180 km corridor. Led a 2-person crew to conduct stream cross section surveys used to determine appropriate sizing of culverts. Coordinated production of detailed mapping and figures upon completion of the surveys, in tandem with Stantec's in-house GIS / graphics department, and was key in production of the independent Class EA report.

Marc A. Faiella Tech. Dipl., CEPIT

Environmental Technician

Port Alma Wind Power Project, Port Alma, Ontario (Field Crew / Data Analyst)

Exclusively responsible for conducting background topography research. Performed tree measurements for entire survey area, identified and mapped tree species locations using aerial photo base. Constructed tests for future heights (software) and produced reports detailing results. These results had significant bearing on wind turbine selection and placement.

Brampton MESP, Phase I, Springdale Environmental Site Assessment, Brampton, Ontario (Habitat Assessor)

Responsible for obtaining background information and conducted field work to assess study area. Compiled field notes and detailed data using an air photo base. Prepared final technical memorandum for submission.

Environmental Site Management

Randall Drain Branch A Restoration, Environment Inspection and Post-construction Monitoring, Waterloo, Ontario (Environmental Inspector)

Responsible for overseeing that approved plans to remediate a damaged watercourse on the City of Waterloo's airport property, as outlined by The Department of Fisheries and Oceans, Grand River Conservation Authority and Stantec Consulting Ltd., were carried out accordingly. Works included properly diverting flow downstream, efficiently dewatering the damaged area and relocating any stranded aquatic species downstream. Worked closely with the construction crew to ensure all remediation phases met Fisheries Act requirements. Prepared final report.

Mining

Vale Technology Development - Hydrology and Aquatic Assessment, Sudbury, Ontario (Aquatic Technician)

Marc was part of a two person crew that conducted a fishery presence/absence survey in a number of lakes associated with mining practices. Fish were identified, measured and tissue samples were collected for laboratory analysis.

Environmental Effects Monitoring (EEM) Program: Periodic Monitoring Phase, Hudson Bay Mining and Smelting, 2007, Flin Flon, Manitoba (Aquatic Technician)

Participated in metal mine EEM Periodic Monitoring phase, involving fisheries and benthic invertebrate surveys. Collected benthic and water samples in the field as well as fish, using various collection techniques. Completed habitat assessments, plume measurements and fish necropsies. Upon completion of field work, performed data analysis and reporting for the EEM report.

Environmental Effects Monitoring (EEM) Program: Focused Monitoring Phase, Hudson Bay Mining and Smelting, 2009, Flin Flon, Manitoba (Aquatic Technician)

Participated in metal mine EEM Focused Monitoring phase, involving fisheries and benthic invertebrate surveys. Collected benthic and water samples in the field as well as fish, using various collection techniques. Completed habitat assessments, plume measurements and fish necropsies. Upon completion of field work, performed data analysis and reporting for the final EEM report.

Environmental Effects Monitoring (EEM) Program: Periodic Monitoring Phase, Hudson Bay Mining and Smelting, 2007, Snow Lake, Manitoba (Aquatic Technician)

One of a 2-person crew stationed in Snow Lake for metal mine EEM Periodic Monitoring phase, involving fisheries and benthic invertebrate surveys. Collected benthic and water samples in the field as well as fish, using various collection techniques. Completed habitat assessments, plume measurements and fish necropsies. Upon completion of field work, performed data analysis and reporting for the EEM report.

Environmental Effects Monitoring (EEM) Program: Focused Monitoring Phase, Hudson Bay Mining and Smelting, 2009, Snow Lake, Manitoba (Aquatic Technician)

One of a 2-person crew stationed in Snow Lake for metal mine EEM Focused Monitoring phase, involving fisheries and benthic invertebrate surveys. Collected benthic and water samples in the field as well as fish, using multiple collection techniques. Completed habitat assessments, plume measurements and fish necropsies. Upon completion of field work, performed data analysis and reporting for the final EEM report.

Natural Sciences & Heritage Resources

Hydro One Series Capacitor Station (Project Manager)

Responsible for a fisheries sampling survey to determine the presence or absence of fish species near a proposed capacitor station. Secured a Fish Collection Licence from OMNR, compiled maps to assist in field investigations, assembled field staff, initiated survey and prepared report for internal and external circulation.

* denotes projects completed with other firms

**Melancthon Wind Energy Project Tree Surveys,
Melancthon, Ontario (Aquatic Technician)**

Measured tree heights and the species identified with use of a laser-sighted measuring device. Performed a desktop exercise, whereby heights were projected over a 20 year period. These projections were then synthesized on aerial photos, showing potential hazards to turbines, thus assisting with selection of wind turbine placement and selection of site-appropriate turbine models.

Oil & Gas

**Enbridge Pipeline Crossing, Sarnia, Ontario (Aquatic
Construction Monitor)**

Marc was responsible for monitoring the St. Clair River for "frack-outs" that may occur during the horizontal drilling and pipe line installation under the St. Clair River. Marc was also responsible for collecting water samples for laboratory analysis and recording current river conditions using a YSI water quality meter.

Power

**Biological Monitoring for the Shekak-Nagagami
Generating Station, Hearst, Ontario (Field Crew Lead)**

Responsible for compiling appropriate field gear to complete the Year-13 monitoring study along the Shekak and Nagagami Rivers in the vicinity of a hydroelectric dam. Participated in surveys, which included: fish inventories through electrofishing, fish tissue collection via gillnets, benthic sampling and water quality and sediment quality collection through several collection techniques. Performed data analysis and completion of the report. Worked closely with Brookfield Power, the MNR and Hearst employees to obtain necessary information and data to complete the project.

**Hydro One Series Capacitor Station, Huntsville, Ontario
(Project Management / Crew Leader)**

Undertook a fisheries sampling survey to determine the presence or absence of fish species near a proposed capacitor station. Duties included securing fisheries permits from related agencies, compilation of maps to assist with surveys, assembly of staff, planned and implemented the field program and prepare report for internal and external circulation.

**Yellow Falls Hydroelectric Project, Smooth Rock Falls,
Ontario (Aquatic Technician)**

Crew member responsible for extensive fish, benthic, water and habitat surveys along the Matagami River. Fish surveys included setting and retrieving gillnets, electrofishing, identification of fish species, retrieving age indicators from fish, characteristic measurements and collecting non-lethal samples for mercury analysis. Collected benthic invertebrates using various sampling techniques for later sorting and identification. Collected water samples and substrate samples using various sampling techniques and equipment for lab testing. Worked closely with a First Nations crew member for the duration of the project and, upon completion of the field surveys, performed data analysis and report writing.

Roads and Highways

**Highway 11 Access Improvements. Preliminary Design.
MTO Northeastern Region, Huntsville, Ontario (Fisheries
Specialist)**

Marc conducted an inventory of aquatic resources adjacent to the existing highway. The fish and fish habitat investigations were completed on three watercourses in the Study Area, and were conducted in accordance with the 2006 MTO/DFO/OMNR Protocol

**Highway 11 Access Improvements. Preliminary Design.
MTO Northeastern Region, Huntsville, Ontario (Fisheries
Specialist)**

Marc conducted an inventory of aquatic resources adjacent to the existing highway. The fish and fish habitat investigations were completed on three watercourses in the Study Area, and were conducted in accordance with the 2006 MTO/DFO/OMNR Protocol

**Highway 8 and Highway 401 Interchange
Improvements. Preliminary Design. MTO Southwestern
Region, Kitchener, Ontario (Fisheries Specialist)**

Marc conducted an inventory of aquatic resources within the study area. The fish and fish habitat investigations were completed following the 2006 MTO/DFO/OMNR Protocol. An exception to this occurred at the Grand River, where fish inventories were not conducted in order to avoid disturbances to mussel Species at Risk that are known to occur in the area

**Highway 3 Rehabilitation, Renton to Jarvis. Detail
Design. MTO West Region, Ontario (Fisheries Specialist)**

Marc participated in detailed Natural Heritage features assessments and a Fish Habitat Existing Conditions Report in accordance with the 2006 MTO/DFO/OMNR Protocol. Three major water crossings (Nanticoke Creek and two crossings of Black Creek) were assessed in addition to other smaller crossings

Marc A. Faiella Tech. Dipl., CEPIT

Environmental Technician

Wind Power

White Pines Wind Energy, Prince Edward County,
Ontario (Field Crew Lead)

Marc conducted aquatic habitat assessments and a fisheries presence/absence surveys to determine aquatic features under REA (Renewable Energy Act). He also assisted in producing a photo log and figures that assisted in the application process for construction work permits.

Fairview Wind Energy, Staynor, Ontario (Field Crew
Lead)

Marc conducted aquatic habitat assessment surveys to assess their designation under the REA (Renewable Energy Act). In addition, Marc conducted electrofishing surveys to assess the presence or absence of fish species and was also part responsible for producing a photo log and figures to assist in the application process for associated construction work permits.

Port Dover Wind Energy, Port Dover, Ontario (Aquatic
Technician)

Marc conducted field surveys to assess aquatic features and to determine its designation under the REA (Renewable Energy Act). Marc was also part responsible for producing reports, photo logs and figures to aid in the application process to gain associated construction work permits.

Amherst Island Wind Energy, Amherst, Ontario (Field
Crew Lead)

Responsible for collecting fisheries habitat characteristics along the proposed shoreline of Lake Ontario to aid in obtaining associated construction work permits. Marc was also responsible for conducting a presence/absence survey using several capture methods such as, gill nets, boat electrofishing, Fyke nets and minnow traps.

Mitch Ellah is an aquatic ecologist who serves Stantec's Environmental Services group. He has significant experience conducting field research in the Canadian Arctic and various locations in southern and northern Ontario and Quebec. Mitch has been involved in all aspects of aquatic and terrestrial projects, including the review of background data, correspondence with government agencies, site investigation and data collection, and report writing. He is knowledgeable in, and proficient at field surveys and standardized protocols involving data collection for water quality and quantity, benthic macroinvertebrates, fish, bird, herpetofauna, aquatic plants and forest communities. Mitch has performed vegetation surveys using Ecological Land Classification (ELC) and Ontario Wetland Evaluation (OWES) protocols. He has excellent fish identification skills, and is proficient at conducting aquatic habitat and fish community assessments using electrofishing equipment, gill nets, fyke nets, seine nets and minnow traps. Mitch worked progressively for three field seasons in the Canadian Arctic investigating treatment wetlands in Nunavut and NWT Inuit communities. Mitch's knowledge of ecology and biotic identification, his strong communication skills and proven abilities at multi-discipline teamwork are complemented by his research experience, providing him with valuable technical expertise to meet a variety of project needs.

EDUCATION

B.Sc. (Honours), Trent University / Environmental Resource Science, Peterborough, Ontario, 2011

Tech. Dipl., Sir Sandford Fleming College / Environmental Technologist Diploma, Lindsay, Ontario, 2009

Tech. Dipl., Sir Sandford Fleming College / Environmental Technician Diploma, Lindsay, Ontario, 2008

Certificate, Ministry of Natural Resources / Ontario Wetland Evaluation System (OWES), Lindsay, Ontario, 2009

Certificate, Royal Ontario Museum / Fish Identification Workshop, Toronto, Ontario, 2011

Certificate, Stantec Consulting Ltd. / Class 2 Electrofishing Training, Guelph, Ontario, 2012

PROJECT EXPERIENCE

Natural Sciences & Heritage Resources

Hydro One Clarington Transformer Station, Clarington, Ontario (Field Ecologist)

Conducted fisheries and aquatic habitat assessment for proposed transformer station development

Shell Oil and Gas, Montreal, Quebec (Field Ecologist)

Conducted site investigation for amphibian and reptile populations, and amphibian breeding call surveys

Natural Heritage Site Inventories and Reporting*, Various Locations (Field Ecologist)

Bat maternity roost surveys in forest settings, various wildlife surveys including amphibians, reptiles, mammals, and birds; data collection and report writing for renewable energy REA environmental assessment projects; ELC vegetation community and wildlife habitat assessments; online database research for technical report preparation, including MNR Biodiversity Index and various atlases

Proposed Melancthon Quarry, Melancthon, Ontario (Field Ecologist)

Conducted species at risk surveys targeting Whip-poor-will using standardized MNR protocol

* denotes projects completed with other firms

Mitch Ellah Tech. Dipl., B.Sc. (Hons.)

Aquatic Ecologist

Proposed Simpson's Quarry EA, Bancroft, Ontario (Field Ecologist)

Conducted field sampling, including breeding bird, waterfowl breeding, and amphibian surveys, aquatic assessments, habitat characterizations, as well as species at risk surveys that included Blanding's Turtle and Whip-poor-will

Renewable Energy

Niagara Region Wind Corp. Wind Farm, Niagara Region, Ontario (Field Ecologist)

Conducted aquatic assessments using REA water body designations, fish community presence/absence study and habitat characterization related to proposed wind farm

Bow Lake Wind Farm, Montreal River Harbour, Ontario (Field Ecologist)

Conducted fieldwork related to natural heritage terrestrial assessment that included locating bat maternity roosts, amphibian surveys, and habitat delineation. Aquatic fieldwork included habitat characterization and water body determination congruent with the Renewable Energy Act (REA) and fish community assessments

Cedar Point Wind Farm, Middlesex County, Ontario (Field Ecologist)

Conducted snake cover board searches to determine presence/absence of snake population and diversity

Capital Power (K2) Wind Farm, Goderich, Ontario (Field Ecologist)

Conducted aquatic assessments using REA water body designations, fish community presence/absence study and habitat characterization related to proposed wind farm

Research / Laboratories

Centre for Alternative Wastewater Treatment (CAWT), Sir Sandford Fleming College*, Baker Lake, Nunavut (Arctic Field and Laboratory Research Technician)

Remote study site in Baker Lake, NU; researcher for an International Polar Year project and United Nations Environmental Program

Centre for Alternative Wastewater Treatment (CAWT), Sir Sandford Fleming College*, Various Sites, Nunavut and Northwest Territories (Arctic Field and Laboratory Research Technologist)

Remote study sites in Baker Lake, NU, Gjoa Haven, NU and Holman, NT; results used for the continuation of the International Polar Year research project

Centre for Alternative Wastewater Treatment (CAWT), Sir Sandford Fleming College*, Alert, Nunavut (Arctic Field and Laboratory Research Technician)

A partnership project with Department of National Defense and Environment Canada Wastewater Division; remote study site in Alert, NU; sole researcher to plan, research, organize equipment, work with partners and set-up laboratory; conducted bird surveys for Environment Canada

Water

Komoka Wastewater Treatment Plant, Komoka, Ontario (Field Ecologist)

Conducted benthic macroinvertebrate and water quality sampling for wastewater treatment plant discharge

Fox Meadow Subdivision EEM, Peterborough, Ontario (Field Ecologist)

Conducted benthic macroinvertebrates and water quality sampling for EEM of subdivision encroachment on PSW

Canagagigue Creek EEM, Elmira, Ontario (Field Ecologist)

Water quality and quantity measuring, benthic macroinvertebrate, and fish community assessment at chemical plant discharge site

Blue Springs EEM, Guelph, Ontario (Field Ecologist)

Routine flow measurement, monitoring and maintenance of rain gauges, Barologgers, air temperature loggers and in-stream water level loggers to assess potential effects of aggregate operations and groundwater draw down on fish habitat in a coldwater stream

Mill Creek EEM, Guelph, Ontario (Field Ecologist)

Routine flow measurement, monitoring and maintenance of rain gauges, Barologgers, air temperature loggers and in-stream water level loggers to assess potential effects of aggregate operations and groundwater draw down on fish habitat in a coldwater stream

* denotes projects completed with other firms

Mitch Ellah Tech. Dipl., B.Sc. (Hons.)

Aquatic Ecologist

PUBLICATIONS

Chemical and Biological Changes in an Arctic Treatment Watershed to Assess the Value of Macroinvertebrate Biomonitoring. *Undergraduate Thesis, Trent University, Peterborough, Ontario, 2011.*

Trevor Chandler is a geomorphologist, with 18 years experience, working in concert with Stantec's Aquatic Group. He has participated in a number of environmental and fluvial investigations that have included Environmental Effects Monitoring and effluent plume delineations for Pulp and Paper and Mining Sector clients, natural channel design and restoration, channel stability studies, erosion threshold and meander belt assessments for planning, and post impoundment monitoring and fisheries mortality investigations at hydroelectric facilities. Current projects include delineation of mining effluent in central Manitoba, the restoration of a degraded urban watercourse to support Redside Dace, an at-risk fish species, meander belt assessments, channel stability and fluvial erosion threshold analyses, and an investigation of meander planform evolution along a large southern Ontario river.

EDUCATION

M.Sc., University of Guelph / Fluvial Geomorphology,
Guelph, Ontario, 1992

B.E.S. (Honors Co-op), University of Waterloo /
Environmental Studies, Waterloo, Ontario, 1990

Certificate, Wildland Hydrology Inc. / River Morphology
& Applications (Level II), Asheville, North Carolina,
2011

Wildland Hydrology Inc. / Applied Fluvial
Geomorphology Course (Level I), Guelph, Ontario,
1993

PROJECT EXPERIENCE

Environmental Assessments

Plume Delineation Investigation, Spruce Falls, Ontario
(Environmental Scientist)

In situ conductivity and river and effluent discharge records were used to delineate the effluent plume concentrations along the Kapuskasing River over a period of one year.

Sedimentation Investigation, Humber Arm,
Newfoundland (Environmental Scientist)

Custom sedimentation towers were designed, constructed and deployed for two weeks to collect inorganic sediments in a 40 m deep marine environment. The towers consisted of an array of duplicate collectors spaced at four different depths in the water column. One array was deployed in the vicinity of pulp and paper and municipal discharges and the other in an undisturbed reference area.

Environmental Effects Monitoring (EEM) Plume
Investigations, Various Sites, Ontario, Quebec and
Newfoundland (Environmental Scientist)

Eight separate plume investigations, using rhodamine WT as an active tracer, were conducted at eight pulp and paper mills in Ontario, Quebec and Newfoundland. Receiving environments included large rivers, lakes, tidal estuaries, and marine environments.

Environmental Effects Monitoring (EEM), Flin Flon,
Manitoba (Environmental Scientist)

Mining effluent plume investigations, using in situ conductivity, were undertaken along an effluent plume flowpath that extended over 100 km from the end-of-pipe through a variety of hydraulic environments.

Geomorphologic Assessments

Estimated Meander Belt Delineation, Credit Valley
Watershed*, Southwestern Ontario (Geomorphologist)

All permanent and intermittent watercourses within the Credit River System upstream of Mississauga, ON were delineated into distinct reaches. Meander belts were estimated along all reaches using detailed topographic mapping and high resolution aerial photography.

Sydenham River Fluvial Geomorphology Assessment*,
Southwestern Ontario (Geomorphologist)

The mainstem and all tributary watercourses in the basin were delineated into geomorphically and hydrologically distinct reaches and the stability of each reach assessed by field survey. Recommendations were made to enhance channel stability and improve water quality.

* denotes projects completed with other firms

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Mini-Regional Curve Analysis, Brampton, Ontario (Geomorphologist)

A series of small to medium-sized streams west of Brampton were surveyed to develop a regional curve. The purpose of the analysis was to develop a tool to predict appropriate bankfull and inner-bank dimensions for the restoration of highly disturbed watercourses.

Ontario Stream Assessment Protocol, Highland Creek*, Toronto, Ontario (Geomorphologist)

Fisheries habitat was systematically inventoried throughout the watershed in each of 22 channel reaches.

Highland Creek Geomorphology Study*, Toronto, Ontario (Geomorphologist)

A series of detailed geomorphological field investigations were systematically undertaken in each of the 22 delineated reaches in the watershed. Measurements in each reach included total station survey of 10 cross-sections of channel and floodplain, long profile survey, Wolman pebble counts and bank geometry and materials characterization.

Waterloo Creek Geomorphic Inventory*, Waterloo, Ontario (Geomorphologist)

All watercourses within the City were identified and delineated into distinct morphological and hydrological reaches. All watercourses were walked, erosion sites identified, and reach stability assessed using Rapid Geomorphic Assessment technique.

Greater Toronto Airports Authority (GTAA) Fluvial Geomorphology Study, Etobicoke, Ontario (Geomorphologist)

A fluvial geomorphology study of the Etobicoke Creek was undertaken to address creek stability issues that posed a potential risk to runways and other airport infrastructure. Problem areas were identified and potential solutions presented.

Shekak-Nagagami Erosion Assessment, Hearst, Ontario (Geomorphologist)

Fluvial investigations for a hydroelectric generating station, monitoring design and implementation of the field program (e.g. fishing efforts, water/sediment sampling and erosion pin installation), desktop analyses and historical assessment of the Shekak and Nagagami Rivers for the purpose of quantifying system-wide, long-term bank erosion rates and directions.

Mining

Effluent Plume Study, Lake Gibson, St. Catharines, Ontario (Environmental Scientist)

Effluent concentrations were measured using in situ conductivity in a highly modified receiving environment affected by artificial pumping.

Mine Closure Investigations, Poirier and Selbaie, Quebec (Environmental Scientist)

Mining effluent concentrations were measured using in situ conductivity throughout the baseline and post-closure monitoring phases of the project.

Environmental Effects Monitoring (EEM), Snow Lake, Manitoba (Environmental Scientist)

Mining plume delineation surveys were conducted using in situ conductivity on an embayment on a large inland lake. Effluent discharge rates and weather conditions were monitored to determine the effect on the concentration, size, and shape of the effluent plume in the receiving environment.

Environmental Effects Monitoring (EEM), Snow Lake, Manitoba (Environmental Scientist)

A mining plume delineation survey, using in situ conductivity, was undertaken along the effluent flow path which traversed a variety of hydraulic environments ranging from a small watercourse to large lakes.

Stream Restoration

Northrup Creek Channel Restoration, Greece, New York (Geomorphologist)

A two kilometre section of watercourse is being re-aligned in order to alleviate the effects of long term fill placement within the floodplain. The field investigations involved geomorphic assessments conducted to determine appropriate watercourse dimensions. The Bank Erosion Hazard Index (BEHI) and Near Bank Stress (NBS) models were utilized to assess existing bank stability and potential for future erosion. The restored watercourse will exhibit a natural planform that alleviates flooding and incorporates a variety of natural hydraulic habitats, such as woody debris bank treatments and rock constructed riffles.

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Laurel Creek Geomorphic Assessment, Waterloo, Ontario (Geomorphologist)

A 400 metre section of watercourse is being restored which will involve the removal of a channel constriction and vertical gabion banks, improvements to floodplain connection and the installation of a rock constructed riffle over an existing exposed sanitary sewer crossing. BEHI and NBS models were applied to isolate sections of the watercourse where bank treatments were deemed necessary.

Snake Road Tributary Restoration, Burlington, Ontario (Geomorphologist)

A fluvial assessment and topographical survey were undertaken to restore a small section of watercourse affected by erosion that had exposed a formerly buried gas pipeline.

Tributary to Grand River Culvert Removal, Cambridge, Ontario (Geomorphologist)

A derelict corrugated steel pipe culvert is being removed and the channel and floodplain are being restored to a natural condition. A topographical survey of the stable watercourse upstream and downstream of the crossing was utilized to guide the restoration.

Tributary to Fairchild Creek, Brantford, Ontario (Geomorphologist)

A fluvial geomorphological investigation and topographical survey was undertaken to restore fish passage to a watercourse affected by invasive exotic vegetation growth.

Tributary to Nichol Drain Restoration, Elora, Ontario (Geomorphologist)

An existing online pond is to be filled and the pre-existing channel restored to reduce thermal impacts to the watercourse. Water levels in an existing upstream wetland feature are to be maintained.

Fourteen Mile Creek W2 Tributary Restoration, Oakville, Ontario (Geomorphologist)

An unstable section of the tributary was restored using a combination of pools, riffles and log drop structures to dissipate energy. The design incorporates natural materials and live woody vegetation to further control bank erosion.

Credit River Tributary Restoration, Brampton, Ontario (Geomorphologist)

A 260 m section of concrete-lined watercourse is being restored using the principles of natural channel design. The restored watercourse will exhibit a variety of natural hydraulic habitats, such as woody debris bank treatments and riffles, functional over a range of flows. The design includes deep pools and other habitat features considered beneficial to Redside Dace, an at-risk fish species.

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