VORYS

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Founded 1909

Ryan D. Elliott
Direct Dial (614) 464-5483
Direct Fax (614) 719-4683
Email rdelliott@vorys.com

June 2, 2016

Ms. Barcy F. McNeal
c/o Public Utilities Commission of Ohio
180 E. Broad St., 11th Floor
Columbus, OH 43215-3793

Re: Paulding Wind Farm III LLC
OPSB Case No. 10-369-EL-BGN
Condition Compliance

Dear Ms. McNeal:

Please find attached copies of various email correspondence and related attachments from Paulding Wind Farm III LLC ("Paulding") to OPSB Staff regarding compliance with certain Conditions of the Certificate of Environmental Compatibility and Public Need for the Timber Road III Wind Farm. The Conditions for which this notice is being provided and the public documents submitted to Staff, as applicable, are listed below.

- Condition 5 – Pre-Construction Conference (Agenda attached)
- Condition 6 – Turbine Model Identification
- Condition 7 – Final Turbine Foundation Design (Foundation Design Drawings attached)
- Condition 9 – Complaint Resolution (Complaint Resolution Plan attached)
- Condition 10 – Batch Plant Locations (Map of Potential Location for Portable Batch Facility attached)
- Condition 19 – Environmental Specialist
- Condition 20 – Mussel Survey (Survey Report attached)
- Condition 22 – Stream Impacts
- Condition 27 – Geotechnical Investigation (Paulding submitted a final copy of the Geotechnical Report to OPSB Staff on March 28, 2016)
- Condition 30 – Emergency Action Plan (Site Emergency Action Plan attached)
- Conditions 34 and 35 – Transportation Plan (Paulding submitted a copy its final Road Use Agreement to OPSB Staff on May 24, 2016)
- Condition 42 – NTIA Approval (Notice to NTIA and NTIA Approval attached)

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- Conditions 44 and 45 – Microwave Systems (Microwave Study attached)
- Condition 50 – Notice to Airports
- Conditions 52(a) and (i) – Decommissioning Plan and Cost Evaluation (Decommissioning Plan/Cost Evaluation attached)

Thank you for your attention to this matter.

Sincerely,

Ryan D. Elliott

RDE/rde
Enclosures

Elliott, Ryan D.

From:	Distelrath, Sarah
Sent:	Wednesday, May 18, 2016 5:17 PM
To:	Jon Pawley (Jon.Pawley@puc.state.oh.us); 'Christopher.Cunningham@puc.state.oh.us'; 'grant.zeto@puc.state.oh.us'
Cc:	Bowser, Erin; Brooks, Chris
Subject:	RE: Timber Road I and Timber Road III Wind Farms and Transmission Line - Preconstruction Meeting Details
Attachments:	EDPR OPSB Pre Construction Meeting 20160520.docx

Grant, Jon and Chris,

Attached is a meeting agenda. The topics included within table 3a and 4a will be the main focus of the preconstruction meeting.

Please feel free to review the meeting agenda and let me know if you would like any changes by COB tomorrow 5.19.2016.

Thank you!
Sarah D.

Sarah Distelrath
EDP Renewables North America LLC
Development - Eastern Region
155 E. Market, Suite 307 Indianapolis, IN 46204
Direct 317.636.0866 Cell 713.449.8224 Fax 317.636.1418
www.edpr.com
Take action. Use energy efficient products.

From: Distelrath, Sarah
Sent: Wednesday, May 04, 2016 11:21 AM
To: Jon Pawley (Jon.Pawley@puc.state.oh.us) <Jon.Pawley@puc.state.oh.us>; 'Christopher.Cunningham@puc.state.oh.us' <Christopher.Cunningham@puc.state.oh.us>
Cc: Bowser, Erin <Erin.Bowser@edpr.com>; Brooks, Chris <Chris.Brooks@edpr.com>; 'grant.zeto@puc.state.oh.us' <grant.zeto@puc.state.oh.us>
Subject: Timber Road I and Timber Road III Wind Farms and Transmission Line - Preconstruction Meeting Details

Jon and Chris,

The Preconstruction meeting details are below for Paulding Wind Farm, LLC Case No. 09-980-EL-BGN, Paulding Wind Farm III, LLC Case No. 10-369-EL-BGN, and Timber Road III Transmission Line Case Number 15-1737-EL-BTX:

Date: May 20th 2016

Time: 10am – 12pm.
Location: Black Swamp Nature Center located at 753 Fairground Dr. Paulding, OH 45879

Please let us know if you have any questions.

Thank you,
Sarah D.

Sarah Distelrath
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EDPR OPSB Pre-construction Meeting

5.20.2016

Agenda

1. Introductions and Sign In
2. Meeting Room Safety
3. Paulding Wind LLC and Paulding Wind III LLC Project Area Permit Conditions
   a. Environmental Construction Conditions

Paulding	Paulding III	Condition	Time
28	30	Emergency/Safety Plan	2 min.
26	28	WTG Safety manual	2 min.
30	32	Training potential hazards of ice conditions	2 min.
29	31	Restrict public access	2 min.
15	12	Vandalism/Signage	2 min.
25	18	Fugitive dust rules	2 min.
12	13	Field Tile	2 min.
11	11	Finding of Cultural, Architectural, or archaeological significance	5 min.
23	25	Encounter Threatened or Endangered Species	5 min.
2/3/17	2/3/15	• Grading and Drainage ○ Graded areas will be smoothed, compacted, freed from irregular surface changes, and sloped to drain • Ground Water Mitigation ○ SWPPP ○ NPDES ○ SPCC • Ecological Impact Mitigation ○ Vegetation Mitigation within sensitive areas like wetlands • Perm. Wetland Impacts of the Project - Greg • Avoidance of Wetlands in the Project Area ○ Agricultural District Impact Mitigation • Silt fences will outline all designated construction areas, no vehicles will travel or park outside of designated construction areas. • Laydown Yard, Foundations and Underground Collection ▪ Soil: • We will separate topsoil layer from excavated subsoil and rock, without blocking any water ways • We will put back the soil in the same order it was as before • Any sub soil that is not suitable will be removed upon confirmation from the landowner ▪ Concrete trucks will be washed out in foundation wholes or outside of ag land as confirmed with landowner ▪ Erection crane set up and breakdown will only be on access roads and	15 min.

		work pads • If the crane needs to travel on ag land, then only when soils are hard and dry otherwise improvements will be needed in order to protect the soils • Permanent Access Road • Landowners will be compensated for any Crop Damage due to construction	
13/14	14/17	Restoration activities and Disposal of Gravel and other Construction Materials	15 min.

Conditions submitted to OPSB as of May 20, 2016 and Conditions to be submitted either before start of construction or after construction - S. Distelrath

Paulding	Paulding III	Condition	Date Submitted	Comments
5	5	Pre Construction Meeting	5.20.2016	
na	8	Signed ISA	3.17.2016	
7	6	WTG model ID	2.1.2016	
8	Na	Preliminary Foundation Design	2.1.2016	
8	7	Final Foundation Design	3.28.2016	
43	42	NTIA	3.17.2016	
na	44	Licensed microwave report	3.17.2016	
na	45	Mitigation Microwave interference	5.11.2016	
41	50	Airport Notifications	3.18.2016	
52	59	Notice of Start of Construction	4.25.2016	
53	55	Permitted WTG locations to be used in future cases if not constructed	na	
51	58	Inactivity for 5 years	9.12.2014	
6	na	Responses to Staff interrogatories and data requests	4.1.2016	
10	9	Complaint Resolution	4.1.2016	
28	30	Emergency/Safety Plan	4.1.2016	
24	27	Geotechnical Report	3.28.2016	
48	53	Engineering Drawings	4.1.2016	
49	54	Changes to Eng. Drawings	TBD	
31	33	Transportation Plan	4.1.2016	
33	34	RUA - construction road repair	5.16.2016	
na	35	RUA - decom road repair	5.16.2016	
9	10	Batch Plants	3.28.2016	
19	20	Presence/Absence Mussel survey	5.17.2016	
20	22	Stream work during fish spawning (April 15 - June 30)	5.16.2016	
na	21	HDD	5.16.2016	Updated information to provide to staff by 5.19.2016 as HDD will be used at all public road and other stream crossings for UG collection
40	49	FAA and ODOT	12.09.2016	32 out of 48
4 / 16	4 / 14	All Permits/NPDES,SWPPP,SPCC,erosion...	4.25.2016	County Building Permits are in progress; we will submit within 7 days after issuance per Condition 4
32	36	ODOT permits	5.9.2016	
34	37	Acoustic Study	4.1.2016	
35	38	Acoustic mitigation		Underway for 2 receptors
36	39	Acoustic modeling during operations		Additional acoustic modeling will occur in the

				event there is a sound complaint per condition 36 and 39
39	41	Shadow Flicker mitigation		Mitigation Study still underway for one receptor
47	52	Decommissioning	5.3.2016	Decommissioning Bond will be in place prior to excavation to first turbine foundation
27	29	OUPS member		In progress; will be in place by July 30, 2016
46	43	TV reception degradation		Will follow complaint resolution plan
44	47	FAA/long-range radar		Wind Farm will work to mitigate any effects to radar
45	48	NEXRAD		Wind Farm will work with NWS.
50	57	As-Built Specs		Wind Farm will provide As-built within 60 days
na	60	Blasting Plan		Project does not anticipate blasting during const. or operations; however, if blasting becomes necessary project will submit a blasting plant.
1	1	Layout		Yes we will construct the layout as identified within the supplemental amendment filing
54	56	WTG location		Wind Farm
21	23	Post-Construction avian and bat mortality monitoring plan		

Transmission Line Permit Conditions

a. Environmental Construction Conditions - W. Beck

Pauldin g III	**Condition**	**Time**
17	Seasonal cutting dates of October 1 through March 31	1 min
16	No mechanized clearing within 25 feet of any stream channel	2 min
13	Minimize damage to Field Tile and soil	5 min
14	Archaeological Survey	10 min
15	Streamside vegetation restoration plan	2 min
2/3	Construction Methods a. Transmission Line installed within the 150 foot wide right-of-way on average 75 feet from the center line. b. Grading and Drainage c. Temporary Access Roads d. Stringing of Cable e. Dust Control/Muddy Conditions Mitigation measures a. Socioeconomic Mitigation i. Land Use Impact Mitigation i. After construction, temp. Disturbed areas will be seeded and stabilized if necessary to re-establish vegetative cover. i. Cultural Resources Mitigation	15 min

	i. Unanticipated Discovery Plan update i. Noise Mitigation i. Noise-related procedures will be implemented according to OSHA requirements a. Ecological Impact Mitigation i. Waterbody, Wetland and Major Species Mitigation i. The Layout design completely avoids waterbodies. ii. Use of existing farm roads and crop areas to access either side of ditches allows for minimized stream impacts iii. Our IFC drawings for construction are clearly marked with 50ft buffer zones established iv. Discus wetland mitigation and avoidance v. SWPPP 1. designed to protect surface waters, wetlands, and ground water 2. Soil erosion plan and sedimentation control plan to prevent adverse impacts from storm water runoff. i. SPCC measures will be implemented to prevent the release of hazardous substances. 1. These measures will not allow refueling of construction equipment within 100 feet of any stream or wetland, and all contractors will be required to keep materials on hand to control and contain a petroleum spill 2. These materials will include a shovel, tank patch kit, and oil-absorbent materials 3. Any spills will be reported in accordance with ODNR regulations. Contractors will be responsible for ensuring responsible action on the part of construction personnel.	
20/21	Removal and disposal of Temp gravel and other construction staging areas	

Conditions submitted to OPSB as of May 20, 2016 and Conditions to be submitted either before start of construction or after construction - S. Distelrath

Paulding III	Condition	Date Submitted	Comments
1	Layout Installation		With the exceptions of minor modifications, accepted and approved by staff
4	Pre Construction Meeting	5.20.2016	
5	Complaint Resolution	4.19.2016	
6	Engineering Drawings	4.19.2016	
7	Changes to Eng. Drawings	NA	
8	As-built specs		Will submit 60 days after operations
9	All permits	5.9.2016	
10	5 year no continuous course of construction		Permit becomes invalid
12	Public information program	4.21.2016	
18	RUA & ODOT permits	5.16.2016	
19	Gen. Construction Activities		Project will adhere to time limits for construction activities as stated in condition 19
23	FAA and ODOT Office of Aviation requirements	5.18.2016	
24	FAA lighting	5.18.2016	
25	Airport notification	4.21.2016	
26	FAA and ODOT final pole coordination	NA	
27	NPDES, SWPPP, SPCC and soil issues adherence	4.27.2016	

	to the Ohio EPA BMP related to erosion and sedimentation control		
22	Drinking Water	NA	

Elliott, Ryan D.

From:	Settineri, Michael J. <mjsettineri@vorys.com>
Sent:	Monday, February 01, 2016 6:22 PM
To:	Zeto, Grant
Cc:	Distelrath, Sarah
Subject:	Case Nos. 09-980 and 10-369 - Compliance Submittals: Turbine Foundation and Turbine selections
Attachments:	Preliminary Foundation Drawings_20151111.pdf

Good evening Grant. Please see the below email correspondence and attached files from Sarah Distelrath regarding the projects for Case No. 09-980 and 10-369. Please treat the attached drawings as confidential engineering drawings. Please call Sarah directly with any questions.
Regards,
Mike
Mike Settineri
Vorys, Sater, Seymour and Pease LLP
52 East Gay Street
Columbus, Ohio 43215
telephone (614) 464-5462
facsimile (614) 719-5146

1. Please find attached the preliminary foundation drawings. The attachment will meet Stipulation condition number 8 within Paulding Wind Farm, LLC Case No. 09-980-EL-BGN. Although not a condition within the Opinion Order and Certificate, the attached document also shows the preliminary foundation drawings for Paulding Wind Farm II, LLC Case No.10-369-EL-BGN.
2. Per Stipulation condition number 7 within Paulding Wind Farm, LLC Case No. 09-980-EL-BGN and per Stipulation condition number 6 within Paulding Wind Farm II, LLC Case No. 10-369-EL-BGN the turbine model we will chose to build is the G114 2.1MW at 93mHH.

edp renewables

Sarah Distelrath
EDP Renewables North America LLC
Development - Eastern Region
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Direct 317.636.0866 Cell 713.449.8224 Fax 317.636.1418
www.edpr.com
Take action. Use energy efficient products.

From the law offices of Vorys, Sater, Seymour and Pease LLP.

Elliott, Ryan D.

From: Distelrath, Sarah
Sent: Monday, March 28, 2016 3:36 PM
To: 'grant.zeto@puc.state.oh.us'
Cc: Brooks, Chris; Bowser, Erin
Subject: Timber Road I and Timber Road III - Condition Response for Foundation Design
Attachments: Timber Road III Wind Project Foundation Design Drawings.pdf

Grant,

Foundation Design

Please find attached the Turbine Foundation Design for all 48 turbines within both Paulding Wind Farm, LLC Case No. 09-980-EL-BGN and Paulding Wind Farm III, LLC Case No. 10-369-EL-BGN project boundaries.

The attachment will meet Stipulation Condition number 8 within Paulding Wind Farm, LLC Case No. 09-980-EL-BGN and condition number 7 within Paulding Wind Farm III, LLC Case No. 10-369-EL-BGN.

Thank you,
Sarah Distelrath

Sarah Distelrath
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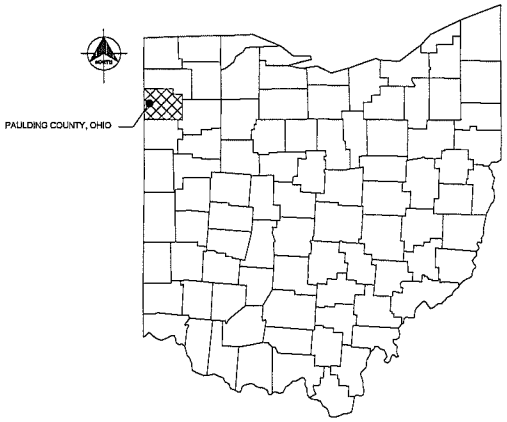
TIMBER ROAD III WIND PROJECT

TURBINE FOUNDATION DESIGN DRAWINGS



TIMBER ROAD III PROJECT LOCATION MAP

TURBINE FOUNDATION DRAWING INDEX

SHEET #	REV.	SHEET TITLE
S-0	C	COVER SHEET
S-1	B	62'-6" DIAMETER FOUNDATION PLAN SHEET
S-2	B	62-6" DIAMETER FOUNDATION DETAIL SHEET
S-3	B	66'-6" DIAMETER FOUNDATION PLAN SHEET
S-4	B	66'-6" DIAMETER FOUNDATION DETAIL SHEET
S-5	B	CONDUIT AND REBAR PLACEMENT DETAILS SHEET
S-6	B	SPECIFICATION SHEET 1
S-7	B	SPECIFICATION SHEET 2
S-8	C	SPECIFICATION SHEET 3
S-9	A	FOUNDATION LOCATION TABLE

ABBREVIATIONS

B.O.	BOTTOM OF	T&B	TOP AND BOTTOM
C.C.	CENTER-TO-CENTER	T.O.C.	TOP OF CONCRETE
℄	CENTER LINE	TYP.	TYPICAL
CLR.	CLEAR	U.N.O.	UNLESS NOTED OTHERWISE
EL.	ELEVATION	W/	WITH
E.W.	EACH WAY	Ø	DIAMETER
GAL.	GALLON	PSF	POUNDS PER SQUARE FOOT
I.D.	INSIDE DIAMETER	PCF	POUNDS PER CUBIC FOOT
MIN.	MINIMUM	PSI	POUNDS PER SQUARE INCH
MAX.	MAXIMUM	CU. YDS.	CUBIC YARDS
NOM.	NOMINAL	LBS	POUNDS
N.T.S.	NOT TO SCALE	LB/YD^3	POUNDS PER CUBIC YARD
O.C.	ON CENTER	LB/FT2/H	POUNDS PER SQUARE FT/HOUR
O.D.	OUTSIDE DIAMETER	F.S.	FACTOR OF SAFETY
R	RADIUS		

RRC

RRC POWER & ENERGY, LLC
11282 - 86th AVENUE NORTH
MAPLE GROVE, MN 55369
PHONE (612) 225-1240
www.RRCcompanies.com

PREPARED FOR:
PAULDING WIND FARM III

TIMBER ROAD III WIND PROJECT

PAULDING COUNTY, OHIO

FOR REVIEW ONLY
NOT SEALED FOR CONSTRUCTION

REV.	DATE	ISSUE DESCRIPTION
C	03/18/2016	ISSUED FOR REVIEW
B	12/07/2015	REVISION
A	11/11/2015	PRELIMINARY DESIGN

PROJECT MGR: B. KRAUSE
CHECKED BY: T. CROOK
DESIGNED BY: J. STRIPLING
DRAWN BY: M. HENKEL

SCALE: N.T.S.

0 2"
BAR MUST SCALE 2" FOR FULL SIZE
OR 1" FOR HALF SIZE DRAWING

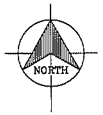
PROJECT NUMBER: MD1510047

DRAWING NAME:
GAMESA G114 2.1MW T93M IEC CIII WIND TURBINE FOUNDATION

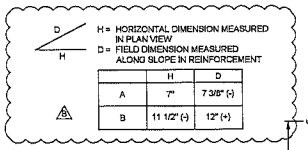
COVER SHEET

DRAWING No.	SHEET:	REVISION
S-0	1 OF 10	C

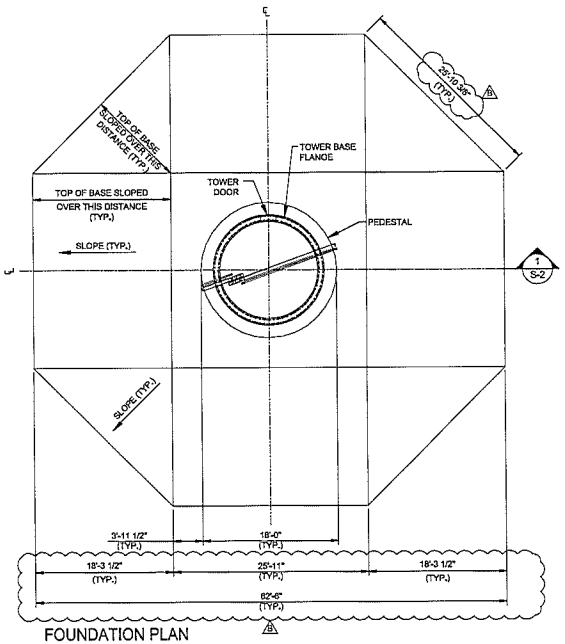
CADFILE: TIMBER ROAD III DRAWING SET



PLAN NORTH
REFER TO GENERAL ARRANGEMENT DRAWINGS FOR FOUNDATION ALIGNMENT ON SITE



	H	D
A	7"	7 3/8" (-)
B	11 1/2" (-)	12" (+)

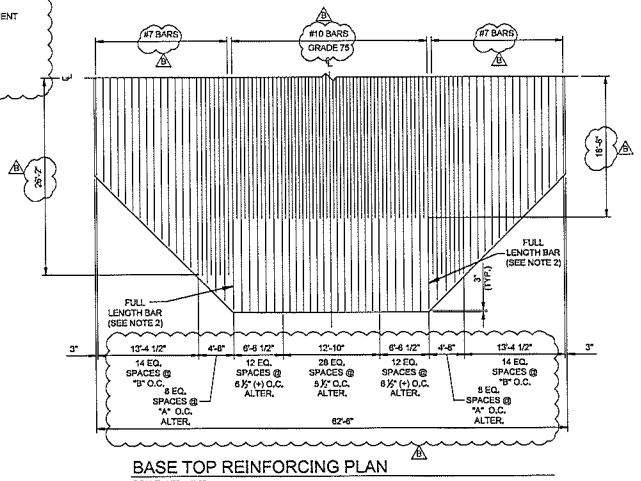


FOUNDATION PLAN

SCALE: 1/8" = 1'-0"

NOTES:

1. ELECTRICAL CONDUIT SIZE, NUMBER, AND LOCATIONS MUST BE PROVIDED BY THE ELECTRICAL ENGINEER. FOR FINAL PLACEMENT AND REQUIREMENTS SEE ELECTRICAL DRAWINGS.
2. THE LARGE ELECTRICAL CONDUIT GROUP SHALL NOT OCCUPY MORE THAN THREE (3) CONSECUTIVE ANCHOR BOLT SPACES. AN EMPTY ANCHOR BOLT SPACE IN BETWEEN THE CONDUITS SHALL BE INCLUDED WHEN FOUR (4) OR MORE BOLT SPACES MUST BE OCCUPIED BY THE LARGE CONDUIT GROUPING.

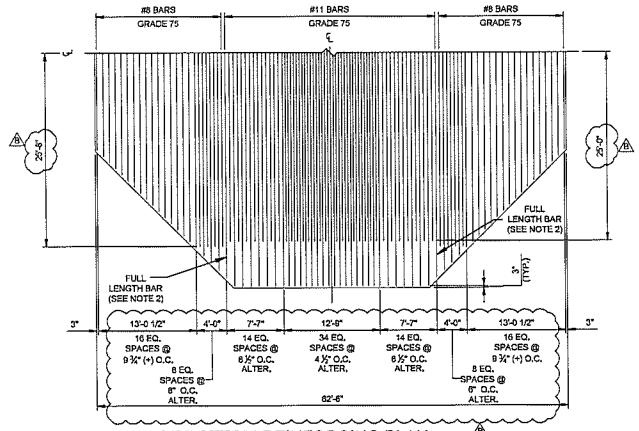


BASE TOP REINFORCING PLAN

SCALE: 1/8" = 1'-0"

NOTES:

1. REINFORCEMENT LAYOUT AND SPACING SHOWN IN ONE DIRECTION ONLY FOR CLARITY. FINAL REINFORCEMENT SHALL BE PLACED EACH WAY.
2. WHEN AN ALTERNATING REBAR LAYOUT IS USED BY THE FABRICATOR, THE OUTERMOST #10 BARS MUST BE FULL LENGTH.

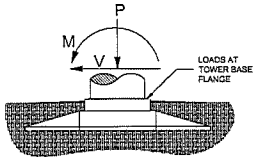


BASE BOTTOM REINFORCING PLAN

SCALE: 1/8" = 1'-0"

NOTES:

1. REINFORCEMENT LAYOUT AND SPACING SHOWN IN ONE DIRECTION ONLY FOR CLARITY. FINAL REINFORCEMENT SHALL BE PLACED EACH WAY.
2. WHEN AN ALTERNATING REBAR LAYOUT IS USED BY THE FABRICATOR, THE OUTERMOST #11 BARS MUST BE FULL LENGTH.



FOUNDATION DESIGN LOADS

SCALE: N.T.S.

DESIGN CRITERIA

1. FOUNDATION DESIGN LOADS

   EXTREME CHARACTERISTIC LOADS (UNFACTORED) LOCATED AT THE BOTTOM OF THE TOWER BASE FLANGE:

   P = 737.7 kips (3,281.7 kN)

   V = 193.7 kips (861.8 kN)

   M = 61,975.0 k-ft (84,028.8 kN-m)

2. ESTIMATED STRUCTURAL MATERIAL QUANTITIES

   a. BASE CONCRETE: 511.5 CU. YDS. (MIN.)
   b. PEDESTAL CONCRETE: 37.0 CU. YDS. (MIN.)
   c. LEAN CONCRETE: 20.0 CU. YDS.
   d. STEEL REINFORCEMENT (GRADE 60): 20,900 LBS.
   e. STEEL REINFORCEMENT (GRADE 75): 71,800 LBS.

   NOTE: ESTIMATED MATERIAL QUANTITIES DO NOT INCLUDE ANY MATERIAL REQUIRED FOR INSTALLATION PURPOSES (STANDEES, DOBIES, ETC.)

3. STRUCTURAL MATERIAL PROPERTIES

   a. BASE CONCRETE STRENGTH (28-DAY): 5,000 PSI
   b. PED. CONCRETE STRENGTH (28-DAY): 5,500 PSI
   c. LEAN CONCRETE STRENGTH (28-DAY): 2,000 PSI
   d. GROUT STRENGTH (28-DAY): 13,750 PSI
   e. STEEL REINFORCEMENT (ASTM A615): GRADE 60 (U.N.O.)
   f. EMBEDMENT PLATE (ASTM A572): 1 1/2", GRADE 50
   g. ANCHOR BOLTS (ASTM A722): #11, GRADE 150
   h. CONCRETE DENSITY RANGE: 145 TO 150 PCF

4. GEOTECHNICAL CONDITIONS

   a. MIN. NET ALLOWABLE BEARING CAPACITY (F.S. = 3.0): 2,500 PSF
   b. MIN. ALLOWABLE DISTANCE FROM TOP OF GRADE TO GROUNDWATER: ≥ 4'-0"
   c. MIN. COMPACTED DRY BACKFILL DENSITY: 95 PCF
   d. MAX. COMPACTED WET BACKFILL DENSITY: 135 PCF

RRC

RRC POWER & ENERGY, LLC
11282 - 88th AVENUE NORTH
MAPLE GROVE, MN 55369
PHONE (612) 225-1240
www.RRCcompanies.com

PREPARED FOR:
PAULDING WIND FARM III

TIMBER ROAD III WIND PROJECT

PAULDING COUNTY, OHIO

FOR REVIEW ONLY
NOT SEALED FOR CONSTRUCTION

REV	DATE	ISSUE DESCRIPTION
B	03/18/2016	ISSUED FOR REVIEW
A	11/11/2015	PRELIMINARY DESIGN

PROJECT MGR: B. KRAUSE
CHECKED BY: T. CROOK
DESIGNED BY: J. STRIPLING
DRAWN BY: M. HENKEL
SCALE: N.T.S.

BAR MUST SCALE 2" FOR FULL SIZE OR 1" FOR HALF SIZE DRAWING

PROJECT NUMBER: MD1510047

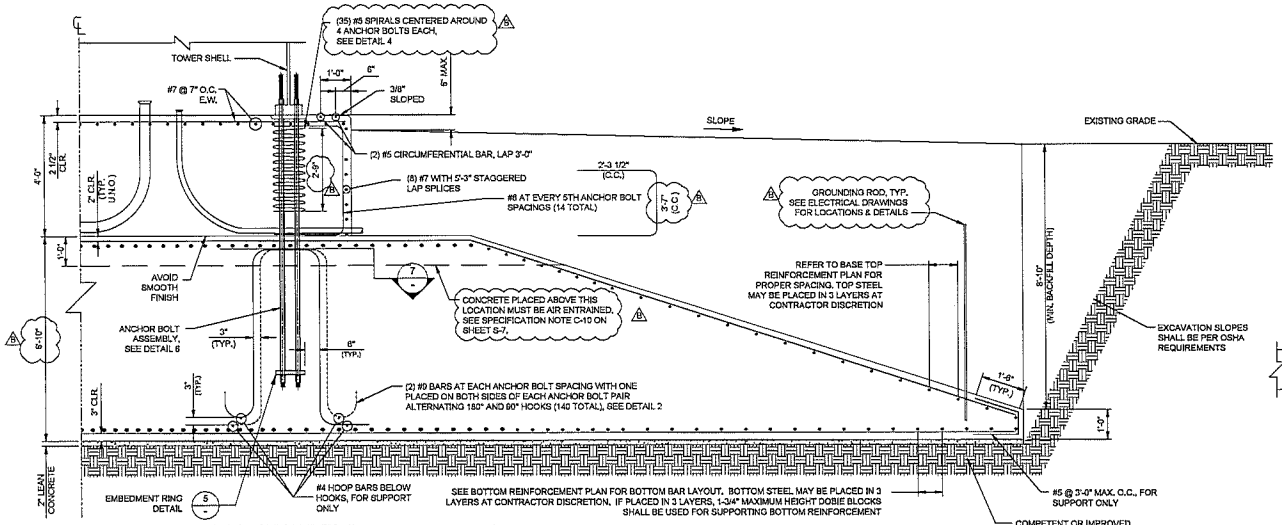
DRAWING NAME:
GAMESA G114 2.1MW T93M IEC CIII WIND TURBINE FOUNDATION

PLAN SHEET

62'-6" DIAMETER FOUNDATION

DRAWING No.	SHEET:	REVISION
S-1	2 OF 10	B

CADFILE: TIMBER ROAD III DRAWING SET

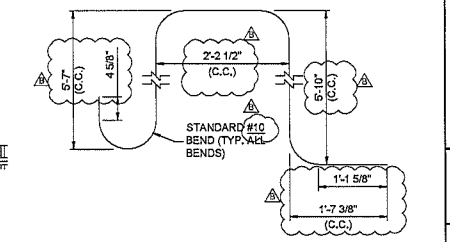


FOUNDATION SECTION DETAIL

SCALE: 1/2" = 1'-0"

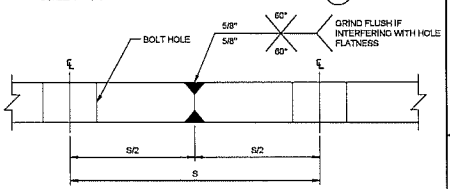
NOTES:

1. ELECTRICAL CONDUITS SHOWN FOR REFERENCE ONLY. SEE ELECTRICAL DRAWINGS FOR EXACT LOCATIONS AND SIZES.
2. FOR CONSOLIDATION OF BASE CONCRETE, SEE NOTE CM-12.A IN THE SPECIFICATIONS. FOR CONSOLIDATION OF THE FINAL LIFT OF BASE CONCRETE, SEE NOTE CM-12.A.1.
3. STIRRUPS MAY BE ADJUSTED SLIGHTLY WHERE INTERFERENCES WITH ELECTRICAL CONDUITS EXIST. CONDUITS SHOULD BE PLACED AS NEAR TO THE SURFACE OF THE FOUNDATION BASE AS POSSIBLE TO MINIMIZE STIRRUP INTERFERENCES.
4. THE LARGE ELECTRICAL CONDUIT GROUP SHALL NOT OCCUPY MORE THAN THREE (3) CONSECUTIVE ANCHOR BOLT SPACES. AN EMPTY ANCHOR BOLT SPACE IN BETWEEN THE CONDUITS SHALL BE INCLUDED WHEN FOUR (4) OR MORE BOLT SPACES MUST BE OCCUPIED BY THE LARGE CONDUIT GROUPING.
5. ENSURE THERE IS ADEQUATE SPACE BETWEEN THE STIRRUP LEGS FOR PROPER CONCRETE BOND. DO NOT ALLOW THE LEGS TO OVERLAP EACH OTHER IN DIRECT CONTACT.
6. THE PEDESTAL/BASE JOINT SHALL BE SEALED TO PREVENT MOISTURE INFILTRATION. JOINT SEALANT PRODUCT SHALL COMPLY WITH ASTM C920 (NON-SELF-LEVELING), UV-RESISTANT, AND WEATHER-RESISTANT, SIKAFLEX 1-A OR SIMILAR.



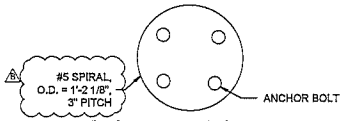
VERTICAL REINFORCING DETAIL

SCALE: 1" = 1'-0"



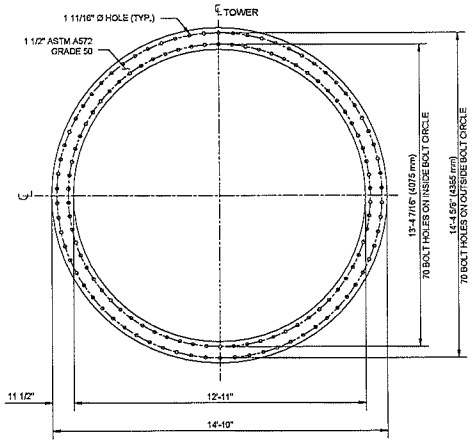
EMBEDMENT PLATE WELD DETAIL

SCALE: NONE



SPIRAL DETAIL

SCALE: 1-1/2" = 1'-0"



EMBEDMENT RING DETAIL

SCALE: 3/8" = 1'-0"

ANCHOR BOLT ASSEMBLY NOTES:

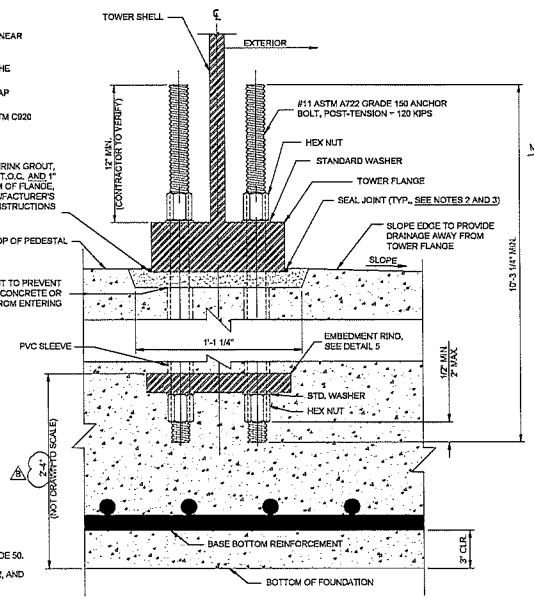
1. PEDESTAL AND VERTICAL REINFORCEMENT NOT SHOWN FOR CLARITY.
2. FLANGE SHALL BE EMBEDDED INTO THE GROUT 1/4" TO 1/2". A MINIMUM 1/4" WIDE BY 1/4" DEEP GAP SHALL BE CREATED IN THE GROUT ALONG THE INSIDE AND OUTSIDE OF THE FLANGE BEFORE THE GROUT STIFFENS. ONCE THE GROUT CURES, THE GAP SHALL BE FILLED WITH A WEATHER-RESISTANT AND UV-RESISTANT SEALANT FLUSH WITH OR HIGHER THAN THE TOP OF THE GROUT TO PREVENT WATER FROM INFILTRATING THE JOINT.
3. BOTTOM OF TOWER FLANGE SHALL NOT BE INSTALLED ABOVE TOP OF CONCRETE.

EMBEDMENT RING DETAIL NOTES:

1. SEE DETAIL 3 FOR EMBEDMENT PLATE WELD DETAIL.

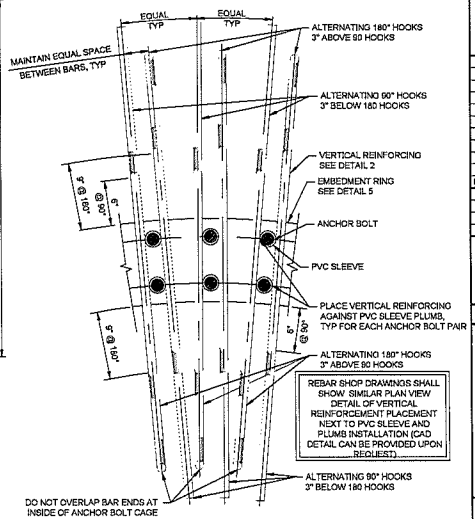
TEMPLATE RING DETAIL NOTES:

1. THICKNESS: 1-1/2" MIN.
2. MATERIAL: ASTM A36 GRADE 36 OR ASTM A572 GRADE 50.
3. HOLES: MATCH EMBEDMENT RING SIZE, NUMBER, AND LOCATIONS.
4. BEVEL: MIN. 20 DEGREES.
5. WIDTH: REFER TO THE GROUT WIDTH SHOWN IN DETAIL 6.



ANCHOR BOLT ASSEMBLY

SCALE: 2-1/2" = 1'-0"



VERTICAL REINFORCING SECTION

SCALE: N.T.S.

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PAULDING WIND FARM III

TIMBER ROAD III WIND PROJECT

PAULDING COUNTY, OHIO

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CHECKED BY: T. CROOK
DESIGNED BY: J. STRIPLING
DRAWN BY: M. HENKEL
SCALE: N.T.S.

BAR MUST SCALE 2" FOR FULL SIZE OR 1" FOR HALF SIZE DRAWING

PROJECT NUMBER: M01510047

DRAWING NAME:

GAMESA G114 2.1MW T93M IEC CIII WIND TURBINE FOUNDATION

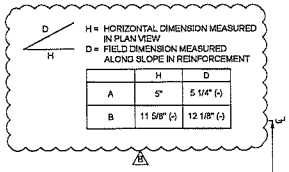
DETAIL SHEET

62'-6" DIAMETER FOUNDATION

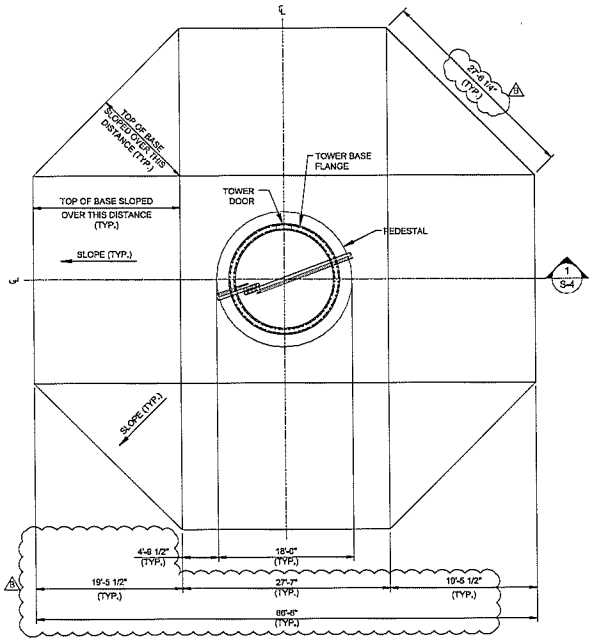
DRAWING No.	SHEET	REVISION
S-2	3 OF 10	B

CADFILE: TIMBER ROAD III DRAWING SET

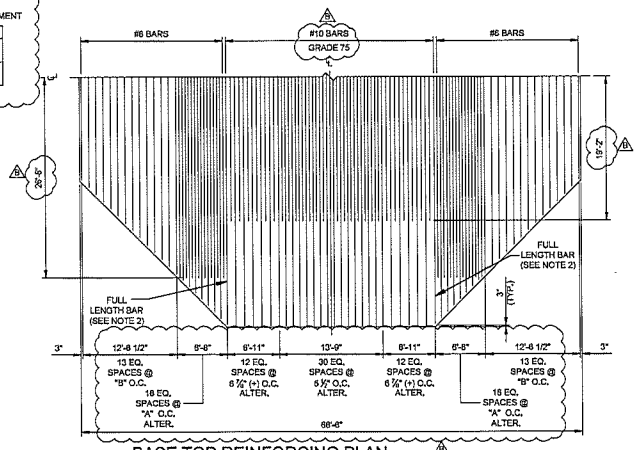
PLAN NORTH
REFER TO GENERAL ARRANGEMENT DRAWINGS FOR FOUNDATION ALIGNMENT ON SITE



	H	D
A	5"	5 1/4" (-)
B	11 5/8" (-)	12 1/8" (-)



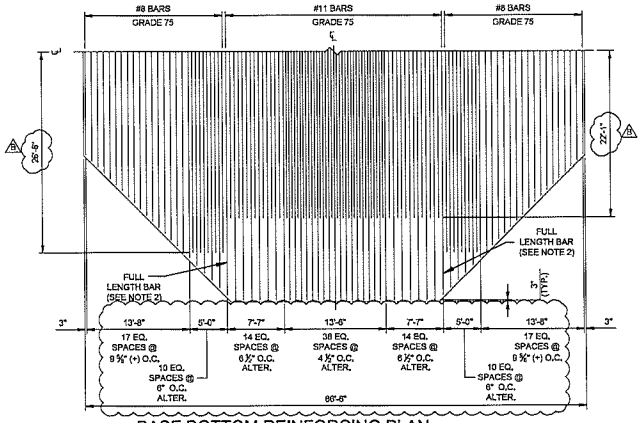
FOUNDATION PLAN
SCALE: 1/8" = 1'-0"



BASE TOP REINFORCING PLAN
SCALE: 1/8" = 1'-0"

NOTES:

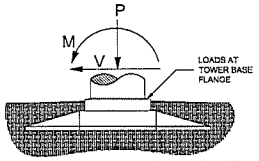
1. REINFORCEMENT LAYOUT AND SPACING SHOWN IN ONE DIRECTION ONLY FOR CLARITY. FINAL REINFORCEMENT SHALL BE PLACED EACH WAY.
2. WHEN AN ALTERNATING REBAR LAYOUT IS USED BY THE FABRICATOR, THE OUTERMOST #10 BARS MUST BE FULL LENGTH.



BASE BOTTOM REINFORCING PLAN
SCALE: 1/8" = 1'-0"

NOTES:

1. REINFORCEMENT LAYOUT AND SPACING SHOWN IN ONE DIRECTION ONLY FOR CLARITY. FINAL REINFORCEMENT SHALL BE PLACED EACH WAY.
2. WHEN AN ALTERNATING REBAR LAYOUT IS USED BY THE FABRICATOR, THE OUTERMOST #11 BARS MUST BE FULL LENGTH.



FOUNDATION DESIGN LOADS
SCALE: N.T.S.

DESIGN CRITERIA

1. FOUNDATION DESIGN LOADS

   EXTREME CHARACTERISTIC LOADS (UNFACTORED) LOCATED AT THE BOTTOM OF THE TOWER BASE FLANGE:

   P = 737.7 kips (3,281.7 kN)

   V = 193.7 kips (861.8 kN)

   M = 61,975.0 k-ft (84,026.8 kN-m)

2. ESTIMATED STRUCTURAL MATERIAL QUANTITIES

   a. BASE CONCRETE: 570.6 CU. YDS. (MIN.)
   b. PEDESTAL CONCRETE: 37.0 CU. YDS. (MIN.)
   c. LEAN CONCRETE: 22.6 CU. YDS.
   d. STEEL REINFORCEMENT (GRADE 60): 21,500 LBS.
   e. STEEL REINFORCEMENT (GRADE 75): 76,700 LBS.

   NOTE: ESTIMATED MATERIAL QUANTITIES DO NOT INCLUDE ANY MATERIAL REQUIRED FOR INSTALLATION PURPOSES (STANDEES, DOBIES, ETC.)

3. STRUCTURAL MATERIAL PROPERTIES

   a. BASE CONCRETE STRENGTH (28-DAY): 5,000 PSI
   b. PED. CONCRETE STRENGTH (28-DAY): 5,500 PSI
   c. LEAN CONCRETE STRENGTH (28-DAY): 2,000 PSI
   d. GROUT STRENGTH (28-DAY): 13,750 PSI
   e. STEEL REINFORCEMENT (ASTM A615): GRADE 60 (U.N.O.)
   f. EMBEDMENT PLATE (ASTM A572): 1 1/2", GRADE 50
   g. ANCHOR BOLTS (ASTM A722): #11, GRADE 150
   h. CONCRETE DENSITY RANGE: 145 TO 150 PCF

4. GEOTECHNICAL CONDITIONS

   a. MIN. NET ALLOWABLE BEARING CAPACITY (F.S. = 3.0): 2,100 PSF
   b. MIN. ALLOWABLE DISTANCE FROM TOP OF GRADE TO GROUNDWATER: ≥ 0'-0"
   c. MIN. COMPACTED DRY BACKFILL DENSITY: 95 PCF
   d. MAX. COMPACTED WET BACKFILL DENSITY: 135 PCF

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DRAWN BY: M. HENKEL
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BAR MUST SCALE 2" FOR FULL SIZE OR 1" FOR HALF SIZE DRAWING

PROJECT NUMBER: MD1510047

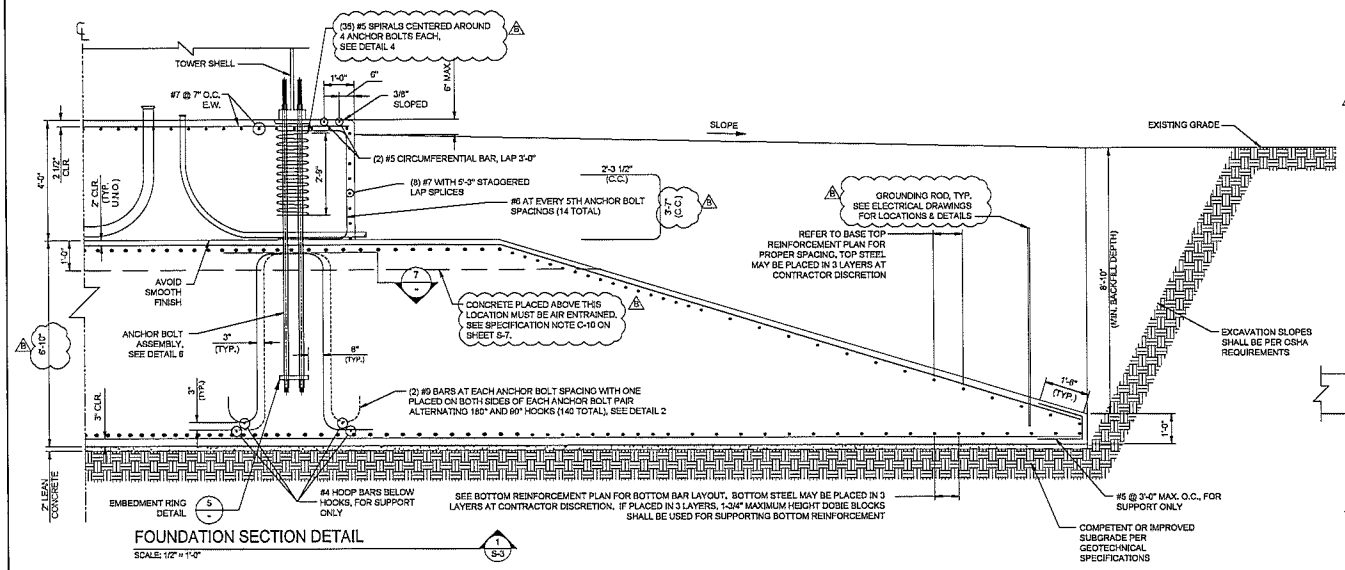
DRAWING NAME:
GAMESA G114 2.1MW T93M IEC CIII WIND TURBINE FOUNDATION

PLAN SHEET

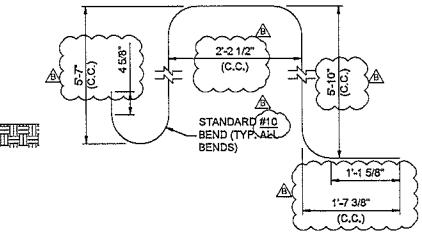
66'-6" DIAMETER FOUNDATION

DRAWING No.	SHEET:	REVISION
S-3	4 OF 10	B

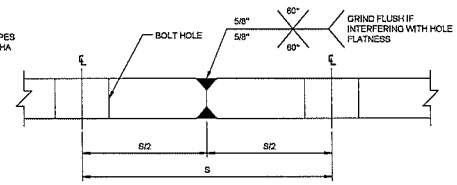
CADFILE: TIMBER ROAD III DRAWING SET



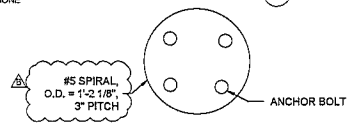
FOUNDATION SECTION DETAIL 1 S-3
SCALE: 1/2" = 1'-0"



VERTICAL REINFORCING DETAIL 2
SCALE: 1" = 1'-0"



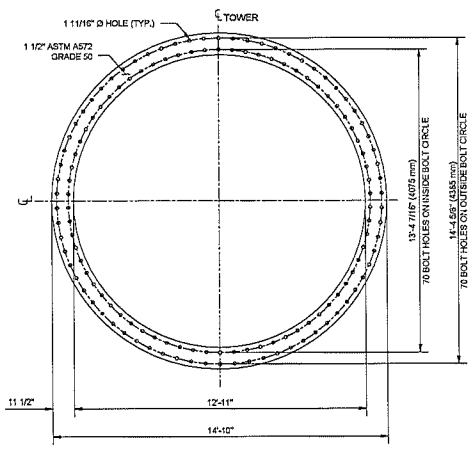
EMBEDMENT PLATE WELD DETAIL 3
SCALE: NONE



SPIRAL DETAIL 4
SCALE: 1-1/2" = 1'-0"

NOTES:

1. ELECTRICAL CONDUITS SHOWN FOR REFERENCE ONLY. SEE ELECTRICAL DRAWINGS FOR EXACT LOCATIONS AND SIZES.
2. FOR CONSOLIDATION OF BASE CONCRETE, SEE NOTE CM-12.A IN THE SPECIFICATIONS. FOR CONSOLIDATION OF THE FINAL LIFT OF BASE CONCRETE, SEE NOTE CM-12.A.1.
3. STIRRUPS MAY BE ADJUSTED SLIGHTLY WHERE INTERFERENCES WITH ELECTRICAL CONDUITS EXIST. CONDUITS SHOULD BE PLACED AS NEAR TO THE SURFACE OF THE FOUNDATION BASE AS POSSIBLE TO MINIMIZE STIRRUP INTERFERENCES.
4. THE LARGE ELECTRICAL CONDUIT GROUP SHALL NOT OCCUPY MORE THAN THREE (3) CONSECUTIVE ANCHOR BOLT SPACES. AN EMPTY ANCHOR BOLT SPACE IN BETWEEN THE CONDUITS SHALL BE INCLUDED WHEN FOUR (4) OR MORE BOLT SPACES MUST BE OCCUPIED BY THE LARGE CONDUIT GROUPING.
5. ENSURE THERE IS ADEQUATE SPACE BETWEEN THE STIRRUP LEGS FOR PROPER CONCRETE BOND. DO NOT ALLOW THE LEGS TO OVERLAP EACH OTHER IN DIRECT CONTACT.
6. THE PEDESTAL/BASE JOINT SHALL BE SEALED TO PREVENT MOISTURE INFILTRATION. JOINT SEALANT PRODUCT SHALL COMPLY WITH ASTM C920 (NON-SELF-LEVELING), UV-RESISTANT, AND WEATHER-RESISTANT, SIKAFLEX 1-A OR SIMILAR.



EMBEDMENT RING DETAIL 5
SCALE: 3/8" = 1'-0"

ANCHOR BOLT ASSEMBLY NOTES:

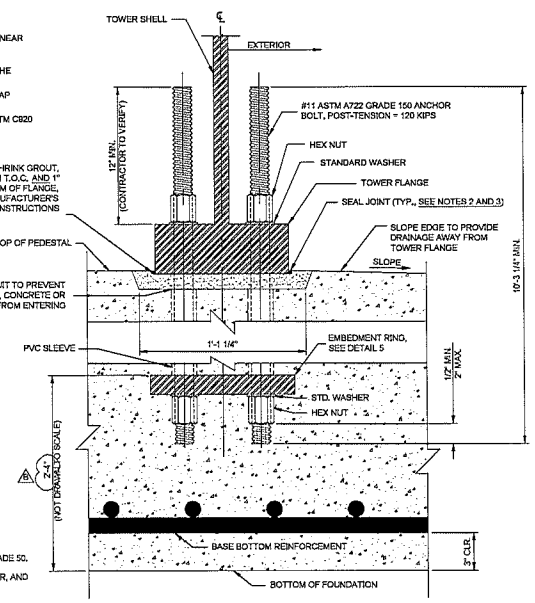
1. PEDESTAL AND VERTICAL REINFORCEMENT NOT SHOWN FOR CLARITY.
2. FLANGE SHALL BE EMBEDDED INTO THE GROUT 1/4" TO 1/2". A MINIMUM 1/4" WIDE BY 1/4" DEEP GAP SHALL BE CREATED IN THE GROUT ALONG THE INSIDE AND OUTSIDE OF THE FLANGE BEFORE THE GROUT STIFFENS. ONCE THE GROUT CURES, THE GAP SHALL BE FILLED WITH A WEATHER-RESISTANT AND UV-RESISTANT SEALANT FLUSH WITH OR HIGHER THAN THE TOP OF THE GROUT TO PREVENT WATER FROM INFILTRATING THE JOINT.
3. BOTTOM OF TOWER FLANGE SHALL NOT BE INSTALLED ABOVE TOP OF CONCRETE.

EMBEDMENT RING DETAIL NOTES:

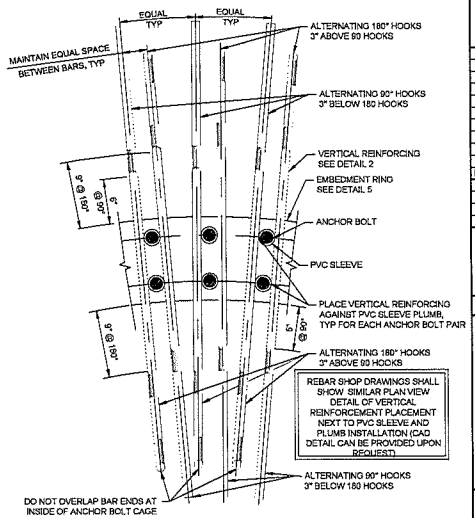
1. SEE DETAIL 3 FOR EMBEDMENT PLATE WELD DETAIL.

TEMPLATE RING DETAIL NOTES:

1. THICKNESS: 1-1/2" MIN.
2. MATERIAL: ASTM A36 GRADE 36 OR ASTM A572 GRADE 50.
3. HOLES: MATCH EMBEDMENT RING SIZE, NUMBER, AND LOCATIONS.
4. BEVEL: MIN. 20 DEGREES.
5. WIDTH: REFER TO THE GROUT WIDTH SHOWN IN DETAIL 6.



ANCHOR BOLT ASSEMBLY 6
SCALE: 2-1/2" = 1'-0"



REBAR SHOP DRAWINGS SHALL SHOW SIMILAR PLAN VIEW DETAIL OF VERTICAL REINFORCEMENT PLACEMENT NEXT TO PVC SLEEVE AND PLUMB INSTALLATION (CAD DETAIL CAN BE PROVIDED UPON REQUEST)

VERTICAL REINFORCING SECTION 7
SCALE: N.T.S.

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DRAWN BY: M. HENKEL
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DRAWING NAME:

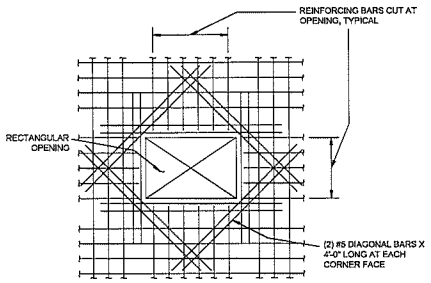
GAMESA G114 2.1MW T93M IEC CIII WIND TURBINE FOUNDATION

DETAIL SHEET

66'-6" DIAMETER FOUNDATION

DRAWING No.	SHEET:	REVISION
S-4	5 OF 10	B

CADFILE: TIMBER ROAD III DRAWING SET

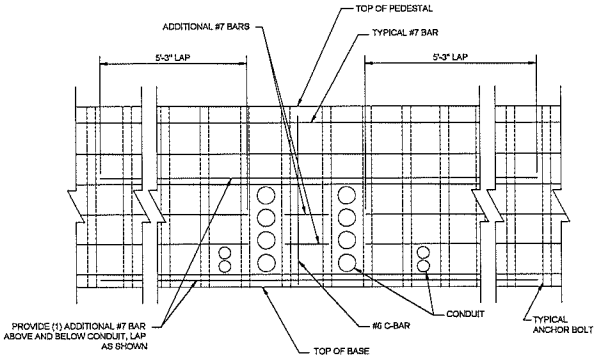


PEDESTAL TOP MAT REINFORCING DETAIL - SCENARIO 1 (1)

SCALE: 1/2" = 1'-0"

NOTES:

1. THIS DETAIL IS INTENDED TO BE USED WHEN REINFORCEMENT IS REQUIRED TO BE CUT-OFF IN BOTH DIRECTIONS DUE TO A REQUIRED OPENING.
2. ADD 1/2 REINFORCING BARS CUT AT OPENING TO EACH SIDE OF OPENING BETWEEN NORMAL REINFORCING AT 3" C.C. ADDED REINFORCING SHALL EXTEND PAST THE OPENING A MINIMUM of 6'-0".



PEDESTAL CIRCUMFERENTIAL REINFORCING DETAIL (2)

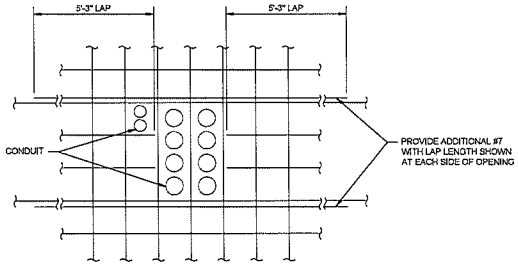
SCALE: 1" = 1'-0"

NOTES:

1. THIS DETAIL IS INTENDED TO BE USED WHEN REINFORCEMENT ON THE SIDE OF THE PEDESTAL IS REQUIRED TO BE CUT-OFF IN ONLY ONE DIRECTION.
2. PEDESTAL VERTICAL REINFORCEMENT NOT SHOWN FOR CLARITY.

GENERAL NOTES:

1. IF THE ELECTRICAL CONDUITS DO NOT ALLOW THE PEDESTAL REINFORCEMENT TO BE PLACED BETWEEN THE CONDUITS, THESE GENERAL REINFORCEMENT DETAILS SHALL BE INCORPORATED.
2. GROUNDING CABLE SHALL NOT BE WELDED (INCLUDES CAD-WELD) TO THE STRUCTURAL REINFORCEMENT. INSTEAD TIE A SMALLER NON-STRUCTURAL PIECE OF REBAR TO THE STRUCTURAL REINFORCEMENT AND WELD TO THAT BAR INSTEAD WHERE NEEDED.
3. ELECTRICAL CONDUITS ARE SHOWN FOR REFERENCE ONLY. REFER TO ELECTRICAL DRAWINGS FOR EXACT SIZE, LOCATION, AND PLACEMENT.



PEDESTAL TOP MAT REINFORCING DETAIL - SCENARIO 2 (3)

SCALE: 1" = 1'-0"

NOTES:

1. THIS DETAIL IS INTENDED TO BE USED WHEN REINFORCEMENT ON THE TOP OF THE PEDESTAL IS REQUIRED TO BE CUT-OFF IN ONLY ONE DIRECTION.

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BAR MUST SCALE 2" FOR FULL SIZE OR 1" FOR HALF SIZE DRAWING

PROJECT NUMBER: MD1510047

DRAWING NAME:
GAMESA G114 2.1MW T93M IEC CIII WIND TURBINE FOUNDATION

CONDUIT AND REBAR PLACEMENT DETAILS SHEET

DRAWING No.	SHEET:	REVISION
S-5	6 OF 10	B

CADFILE: TIMBER ROAD III DRAWING SET

ALL CONCRETE CONSTRUCTION SHALL CONFORM TO ALL REQUIREMENTS OF ACI 301 PUBLISHED BY THE AMERICAN CONCRETE INSTITUTE, FARMINGTON HILLS, MICHIGAN, EXCEPT AS MODIFIED BY THESE DESIGN DRAWINGS.

TURBINE REFERENCE DATA:

TR-1 TURBINE TYPE: GAMESA G114 2.1MW T93M IEC IIIA.

TR-2 TOWER FOUNDATION DESIGN LOADINGS: "FOUNDATION LOADS FOR G114_2.1MW_T93 FOR TIMBER ROAD III WIND FARM IN OHIO, USA" FROM GAMESA DATED AUGUST 20, 2015, REF, W10-01-ECM254 v2.0. A

TR-3 TURBINE TOWER FLANGE GEOMETRY: "BARS CAGE T.SPEC G114 2.1MW T93 TIMBER ROAD III M39" FIGURE 1 FROM GAMESA DATED AUGUST 11, 2015 REF: W10-01-ECM251v1.0.

TR-4 ASSUMED DESIGN LIFE OF FOUNDATION = 25 YEARS. A

FOUNDATION LOADINGS:

FL-1 ASCE 7 WIND PARAMETERS:

A. WIND VELOCITY: 90 MPH.

B. EXPOSURE CATEGORY: C.

C. OCCUPANCY CATEGORY: II.

FL-2 IBC SEISMIC PARAMETERS:

A. S_S: 0.181. A

B. S_1: 0.059.

C. OCCUPANCY CATEGORY: II.

D. SITE CLASSIFICATION: C.

STRUCTURAL CODES:

SC-1 DESIGN BUILDING CODE: MICHIGAN BUILDING CODE, 2009 ED.

SC-2 REINFORCED CONCRETE CODE: ACI 318-08.

SC-3 STEEL CODE: AISC 13TH EDITION.

SC-4 ASCE 7-05.

GEOTECHNICAL DATA:

GEOTECHNICAL REPORT AND RECOMMENDATIONS FOR THIS PROJECT ARE BASED ON:

"GEOTECHNICAL REPORT, TIMBER ROADS (SIC) III WIND POWER PROJECT, PAULDING COUNTY, OHIO" BY RRC POWER & ENERGY, LLC DATED MARCH 8, 2016, RRC PROJECT NO. MD1510047. A

QUESTIONS, COMMENTS, RFIS, AND SUBMITTALS REGARDING THE GEOTECHNICAL SPECIFICATIONS SHALL BE DIRECTED TO THE GEOTECHNICAL ENGINEER OF RECORD.

GD-1 REQUIRED NET ALLOWABLE BEARING PRESSURE (F.S. = 3.0): SEE SHEETS S-1 AND S-3.

GD-2 THE FOUNDATION SUBGRADE AND EXCAVATION SHALL BE PREPARED IN THE FOLLOWING MANNER:

A. THE EXCAVATION AREA SHALL BE CLEARED OF DELETERIOUS MATERIALS SUCH AS VEGETATION, ROOT SYSTEMS, ORGANIC TOPSOIL, DEBRIS, EXISTING FILL, AND SOFT, FROZEN, OR OTHERWISE UNSUITABLE MATERIALS.

B. ROOT ZONE SOILS, ORGANIC-RICH TOPSOIL (SOIL WITH 5% OR MORE ORGANICS), VEGETATION, AND SOFT OR OTHERWISE UNSUITABLE MATERIALS FROM THE SURFACE OF THE PROPOSED CONSTRUCTION AREAS SHALL BE STOCKPILED FOR POSSIBLE USE AS TOPSOIL OR SHALL BE REMOVED FROM THE SITE. ORGANIC SOILS SHALL NOT BE USED AS BACKFILL BENEATH OR BESIDE THE TURBINE FOUNDATIONS.

C. MODIFICATION OF UNSUITABLE SOILS SHALL CONSIST OF OVER-EXCAVATION AND REPLACEMENT WITH ANY OF THE FOLLOWING MATERIALS:

1. NATIVE LEAN CLAY AND SAND SOILS MAY BE REUSED BENEATH THE FOUNDATION WITH APPROVAL OF THE PROPOSED MATERIAL BY THE GEOTECHNICAL ENGINEER.

i. THESE REUSED MATERIALS SHALL BE COMPACTED TO A MINIMUM OF 97% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D698 OR 95% AS DETERMINED BY ASTM D1557 AND SHALL BE MOISTURE CONDITIONED WITHIN -2% TO +3% (CLAY SOILS) OR WITHIN 3% (SAND SOILS) OF OPTIMUM MOISTURE CONTENT. B

ii. THE MATERIAL SHALL HAVE A MAXIMUM PLASTICITY INDEX OF (12) AND A MAXIMUM LIQUID LIMIT OF 40. A

iii. THE NATIVE MATERIAL SHALL BE PLACED IN THIN, LOOSE LIFTS NOT EXCEEDING EIGHT (8) INCHES PRIOR TO COMPACTING. IF THE TESTING AGENCY CANNOT TEST THIS FULL DEPTH, (I.E., 8-INCH NUCLEAR GAUGE) THEN THE LIFTS SHALL BE REDUCED ACCORDINGLY.

2. IMPORTED LEAN CLAY AND SAND SOILS MAY BE USED BENEATH THE FOUNDATION WITH THE APPROVAL BY THE GEOTECHNICAL ENGINEER.

i. THESE IMPORTED MATERIALS SHALL BE COMPACTED TO A MINIMUM OF 97% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D698 OR 95% AS DETERMINED BY ASTM D1557 AND SHALL BE MOISTURE CONDITIONED WITHIN -2% TO +3% (CLAY SOILS) OR WITHIN 3% (SAND SOILS) OF OPTIMUM MOISTURE CONTENT. B

ii. THE MATERIAL SHALL HAVE A MAXIMUM PLASTICITY INDEX OF (12) AND A MAXIMUM LIQUID LIMIT OF 40. A

iii. THE NATIVE MATERIAL SHALL BE PLACED IN THIN, LOOSE LIFTS NOT EXCEEDING EIGHT (8) INCHES PRIOR TO COMPACTING. IF THE TESTING AGENCY CANNOT TEST THIS FULL DEPTH, (I.E., 8-INCH NUCLEAR GAUGE) THEN THE LIFTS SHALL BE REDUCED ACCORDINGLY.

3. STRUCTURAL FILL MEETING THE CRITERIA SHOWN IN THESE SPECIFICATIONS.

D. IN AREAS WHERE UNSTABLE SUBGRADE CONDITIONS ARE ENCOUNTERED AT THE FOUNDATION BEARING ELEVATION, AS DETERMINED BY THE ON-SITE GEOTECHNICAL REPRESENTATIVE, GRANULAR OR ROCK MATERIALS WITH OR WITHOUT GEOGRID/GEOTEXTILE AT THE BASE OF THESE FOUNDATION EXCAVATIONS MAY BE USED.

1. AS A GUIDE, ROCK MATERIAL LESS THAN SIX (6) INCHES IN MAXIMUM OVERALL LENGTH MAY BE USED AT THE BOTTOM OF THE OVER-EXCAVATED AREAS AND CAPPED OFF WITH WELL-GRADED FILL MATERIALS.

2. THE MAXIMUM THICKNESS OF THIS LAYER SHALL NOT EXCEED TWO (2) FEET.

E. IF OVER-EXCAVATION IS REQUIRED, EXTEND A MINIMUM LATERAL DISTANCE BEYOND THE OUTSIDE EDGES OF THE FOUNDATION FOOTPRINT EQUAL TO THE DEPTH OF OVER-EXCAVATION AND THEN DOWNWARD AT A 1H:1V SLOPE TO THE REQUIRED OVER-EXCAVATION DEPTH.

F. A UNIFORM SUBGRADE SUPPORT BELOW THE TURBINE FOUNDATION SHALL BE MAINTAINED TO REDUCE THE POTENTIAL FOR EXCESSIVE DIFFERENTIAL FOUNDATION SETTLEMENT.

1. IF COMPACTED FILL IS USED BELOW THE FOUNDATION, THE THICKNESS OF STRUCTURAL FILL BELOW TURBINE FOUNDATION SHALL BE MINIMUM ONE (1) FOOT.

2. THE STRUCTURAL FILL THICKNESS SHALL BE KEPT AS UNIFORM AS POSSIBLE WITH NO ABRUPT THICKNESS CHANGE, WITH AN OVERALL THICKNESS DIFFERENCE OF TWO (2) FEET OR LESS ACROSS THE TURBINE FOUNDATION FOOTPRINT.

G. IN AREAS WHERE A COMBINATION OF SOIL AND BEDROCK ARE EXPOSED AT THE FOUNDATION BEARING ELEVATION, THE SOIL SUBGRADE SHALL BE OVER-EXCAVATED TO COMPETENT BEDROCK AND REPLACED WITH EITHER LEAN CONCRETE HAVING A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 1,000 PSI OR COMPACTED STRUCTURAL FILL.

1. IF COMPACTED STRUCTURAL FILL IS USED, EITHER THE BEDROCK PORTION OF THE FOUNDATION SUBGRADE MAY BE EXCAVATED OR THE LOWER PORTION OF THE SOIL SUBGRADE EXCAVATION MAY BE FILLED WITH LEAN CONCRETE SO THAT THE STRUCTURAL FILL THICKNESS DIFFERENCE CAN BE KEPT AT TWO (2) FEET OR LESS ACROSS THE FOUNDATION WIDTH.

H. A QUALIFIED GEOTECHNICAL REPRESENTATIVE SHALL BE PRESENT DURING SITE PREPARATION OPERATIONS TO OBSERVE STRIPPING AND GRUBBING DEPTHS, OBSERVE THE REMOVAL OF UNSUITABLE SOILS, OBSERVE THE PREPARATION OF THE SUBGRADE, AND TO VERIFY THAT THE EXPOSED SUBGRADE HAS BEEN PREPARED IN ACCORDANCE WITH THESE SPECIFICATIONS.

I. IF THE FOUNDATION SUBGRADE SOILS ARE DISTURBED DURING EXCAVATION OF THE TURBINE FOUNDATIONS AND PRIOR TO PROOF-ROLL OBSERVATIONS, A QUALIFIED REPRESENTATIVE OF THE GEOTECHNICAL ENGINEER SHALL EVALUATE THE NEED FOR REWORKING THE SUBGRADE AND/OR RE-COMPACTION REQUIREMENT.

1. DISTURBED FOUNDATION SUBGRADE SOILS REQUIRING RECOMPACTION SHALL BE COMPACTED TO ACHIEVE A MINIMUM COMPACTION OF 97% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D698, OR TO 97% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D 1557 AND MOISTURE CONDITIONED TO WITHIN +/- 2% OF OPTIMUM.

2. THE RESULTING RE-COMPACTED FOUNDATION SUBGRADE SURFACE SHALL BE TESTED USING NUCLEAR DENSITY GAUGES OR OTHER APPROVED METHOD BY THE GEOTECHNICAL ENGINEER.

J. REQUIRED GROUND IMPROVEMENT TECHNIQUES BEYOND OVER-EXCAVATION (IF ANY) SHALL BE COORDINATED WITH THE GEOTECHNICAL ENGINEER OF RECORD

K. WHERE THE FOUNDATION SUBGRADES ARE OR BECOME FROZEN, THE FROZEN SOILS SHALL BE COMPLETELY REMOVED FROM BELOW THE FOUNDATION AND ITS OVERSIZE AREA. THE FROZEN SOILS SHALL BE REPLACED BY SUITABLY MOISTURE CONDITIONED AND COMPACTED SOILS. IF THE REPLACEMENT IS PERFORMED IN NEAR- OR BELOW- FREEZING TEMPERATURES, ONLY THE PLACEMENT OF GRANULAR MATERIALS WILL SUFFICE. TURBINE FOUNDATIONS SHALL NOT BE CONSTRUCTED OVER FROZEN SOILS OR A FROZEN MUD MAT.

L. STRIPPING, EXCAVATION, GRADING, AND SUBGRADE PREPARATION SHALL BE PERFORMED IN A MANNER AND SEQUENCE THAT WILL PROVIDE POSITIVE DRAINAGE THROUGHOUT CONSTRUCTION AND PROVIDE PROPER CONTROL OF EROSION.

M. PONDING OF WATER NEAR THE FOUNDATION ELEMENTS FROM IMPROPER DRAINAGE SHALL NOT BE PERMITTED AND ALL DEWATERING IS THE RESPONSIBILITY OF THE CONTRACTOR.

1. IF WATER INFILTRATION IN THE EXCAVATION IS ENCOUNTERED AS DETERMINED BY THE ON-SITE GEOTECHNICAL REPRESENTATIVE, FOUNDATION EXCAVATIONS SHALL INCLUDE THE EXCAVATION OF ONE OR MORE SUMP PITS LOCATED WITHIN THE EXCAVATION AND OUTSIDE OF A 1H:1V AREA EXTENDING DOWN AND AWAY FROM THE OUTER EDGE OF THE MUD MAT THAT WILL SERVE TO COLLECT INFILTRATED OR PRECIPITATED WATER FOR PUMPING.

2. ACCUMULATED WATER SHALL BE REMOVED FROM SUBGRADES AND WORK AREAS IMMEDIATELY PRIOR TO PERFORMING FURTHER WORK IN THE AREA.

3. THE PLANNED SITE WORK AREAS SHALL BE GRADED TO PREVENT WATER FROM PONDING IN CONSTRUCTION AREAS AND/OR FLOWING INTO EXPOSED SUBGRADE AREAS.

4. EXPOSED SOILS SHALL BE CROWNED, SLOPED, AND SMOOTH-DRUM ROLLED AT THE END OF THE DAY TO FACILITATE DRAINAGE IF INCLEMENT WEATHER IS FORECASTED.

5. SOILS THAT BECOME DISTURBED OR WEAKENED FROM ACCUMULATED WATER SHALL BE IMPROVED BY AERATION AND RECOMPACTION, CHEMICAL TREATMENT, OR REMOVAL AND REPLACEMENT WITH NEW COMPACTED FILL.

6. CONSIDERATION SHOULD BE GIVEN TO CONSULTING A DEWATERING CONTRACTOR FOR DETERMINING THE MEANS AND METHODS FOR PROPERLY DEWATERING THE FOUNDATION EXCAVATIONS DURING CONSTRUCTION IF DEWATERING IS REQUIRED.

N. THE CONTRACTOR SHALL SUBMIT A SUBGRADE TESTING PROCEDURE TO THE GEOTECHNICAL ENGINEER OF RECORD FOR APPROVAL PRIOR TO CONSTRUCTION.

1. PROOF-ROLLING SHALL BE PERFORMED IN THE PRESENCE OF THE GEOTECHNICAL ENGINEER OR QUALIFIED GEOTECHNICAL REPRESENTATIVE USING A FULLY-LOADED FRONT-END LOADER OR SIMILAR EQUIPMENT TO ASSESS THE NEED FOR ANY SHALLOW REMEDIAL MEASURES.

2. THE USE OF EITHER STATIC OR DYNAMIC CONE PENETROMETER (DEPENDING ON THE SUBGRADE MATERIALS EXPOSED AT THE FOUNDATION BEARING ELEVATION) MAY ALSO BE USED WITH APPROVAL OF THE GEOTECHNICAL ENGINEER OF RECORD.

O. EXCAVATION MEANS AND METHODS SHALL BE DETERMINED BY THE CONTRACTOR.

GD-3 BACKFILL MATERIAL OVER AND AROUND THE FOUNDATION SHALL HAVE THE MINIMUM DEPTH AS SHOWN ON THESE DESIGN DRAWINGS AND SHALL BE PREPARED ACCORDING TO THE FOLLOWING:

A. MINIMUM COMPACTED DRY DENSITY: 95 PCF.

B. MAXIMUM COMPACTED WET DENSITY: 135 PCF.

C. THE USE OF ON-SITE SAND AND LEAN CLAY SOILS AS BACKFILL AGAINST FOUNDATIONS IS CONSIDERED ACCEPTABLE PROVIDED THE MATERIALS ARE PROCESSED AND PLACED IN ACCORDANCE WITH THESE SPECIFICATIONS.

1. FOR STOCKPILED MATERIALS THAT EXHIBIT ELEVATED MOISTURE CONTENTS CONSIDERATION SHALL BE GIVEN TO DRYING OUT THE MATERIAL PRIOR TO COMPACTING AS BACKFILL OVER THE FOUNDATIONS.

2. METHODS FOR DRYING OUT ANY STOCK-PILED MATERIALS FOR USE AS BACKFILL MATERIAL SHALL BE COORDINATED WITH THE GEOTECHNICAL ENGINEER OF RECORD.

3. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING PROPER COMPACTION OF THE BACKFILL MATERIAL IS ACHIEVED AND THE ALLOWABLE COMPACTED UNIT DENSITY RANGE IS MAINTAINED DURING CONSTRUCTION ACCORDING TO THESE SPECIFICATIONS.

D. BACKFILL MATERIALS SHALL BE FREE OF ORGANICS, EXPANSIVE CLAYS (IF ENCOUNTERED), ROOTS, AND DELETERIOUS MATERIALS BEFORE THE STOCKPILE IS ALLOWED FOR REUSE.

E. THE PROPOSED BACKFILL MATERIAL SHALL BE APPROVED BY THE GEOTECHNICAL REPRESENTATIVE PRIOR TO ITS USE.

F. BACKFILL MATERIAL PLACED ON TOP AND AROUND THE FOUNDATION SHALL BE IN THIN, LOOSE LIFTS NOT EXCEEDING 12 INCHES PRIOR TO COMPACTING, IF THE TESTING AGENCY CANNOT TEST THIS FULL DEPTH, (I.E., 12-INCH NUCLEAR GAUGE) THEN THE LIFTS SHALL BE REDUCED ACCORDINGLY.

G. BACKFILL TO BE PLACED OVER THE TURBINE FOUNDATION SHALL BE COMPACTED TO A MINIMUM OF 95% OF THE MAXIMUM DRY DENSITY ACCORDING TO ASTM D698 AND MOISTURE CONDITIONED WITHIN -2 TO +3% (CLAY SOILS) OR WITHIN +/- 3% (SAND SOILS) OF OPTIMUM MOISTURE CONTENT. B

1. ALL SURFACES SHALL BE COMPACTED TO A FIRM, UNYIELDING CONDITION.

2. WHEN THE BACKFILL ZONE IS COMPRISED OF GRANULAR MATERIALS AND THE BEARING SOILS CONSIST OF CLAYS, A TWELVE (12) INCH THICK CLAY CAP, EXTENDING A MINIMUM OF FIVE (5) FEET BEYOND THE TURBINE FOUNDATION EDGE, SHALL BE USED. A

H. EXCAVATED BEDROCK MATERIALS SHALL BE PROCESSED TO A MAXIMUM SIZE OF SIX (6) INCHES PRIOR TO USE WITHIN THE BACKFILL MATRIX. IF OCCASIONAL LARGER PARTICLES ARE ENCOUNTERED, THEY MAY BE NESTED WITH COMPACTED SOIL FINES, BUT ONLY OUTSIDE OF THE FOUNDATION PERIMETER. THE NUMBER OF NESTED PARTICLES SHOULD NOT INTERFERE WITH THE COMPACTION OF THE SURROUNDING SOILS.

I. SAMPLES OF THE FILL MATERIAL SHALL BE OBTAINED DURING EXCAVATION BY AN EXPERIENCED GEOTECHNICAL ENGINEER OR HIS REPRESENTATIVE TO DETERMINE MOISTURE DENSITY RELATIONSHIPS AS PER ASTM D698 (STANDARD PROCTOR) AND CLASSIFICATION TESTING FOR ACCEPTABILITY. ALL TESTING SHALL BE COMPLETED BY AN APPROVED, INDEPENDENT TESTING AGENCY.

J. DURING EXCAVATION AND GRADING, PROPOSED BACKFILL MATERIAL NOT IMMEDIATELY PLACED AND COMPACTED SHALL BE STOCKPILED AND PROTECTED FROM MOISTURE BY SEALING THE SURFACE WITH LIGHT COMPACTION.

K. FILL PLACEMENT AT THE SITE SHALL INCLUDE IN-SITU DENSITY TESTING TO DOCUMENT THAT PLACEMENT OF THE FILL MATERIAL MEETS OR EXCEEDS THESE PROJECT SPECIFICATIONS. EACH LIFT OF COMPACTED FILL SHALL BE CLOSELY OBSERVED AND TESTED BY AN APPROVED, INDEPENDENT TESTING AGENCY.

1. IF THE RESULTS OF IN-PLACE DENSITY TESTS INDICATE THE SPECIFIED MOISTURE OR COMPACTION LIMITS HAVE NOT BEEN MET, THE AREA REPRESENTED BY THE TEST SHALL BE REWORKED AND RETESTED AS REQUIRED UNTIL THE SPECIFIED MOISTURE AND COMPACTION REQUIREMENTS ARE ACHIEVED.

L. DURING CONSTRUCTION, THE TOP SURFACE OF THE FILL SHALL BE KEPT WITH SUFFICIENT SLOPE (MINIMUM 2% GRADIENT) TO ALLOW RUNOFF OF WATER DURING RAINFALL WITHOUT INDUCING EROSION.

M. IN AREAS WHERE STRUCTURAL ELEMENTS, SUCH AS TRANSFORMER PADS OR CRANE PADS, ARE LOCATED WITHIN THE BACKFILL ZONE, THESE BACKFILL SOILS SHALL BE COMPACTED TO A MINIMUM OF 97% OF THE MAXIMUM DRY DENSITY AS OUTLINED BY ASTM D698, AND MOISTURE CONDITIONED TO WITHIN 0% (SAND SOILS) OR WITHIN -2 TO +3% (CLAY SOILS) OF OPTIMUM MOISTURE CONTENT. ALTERNATELY, STRUCTURAL FILL SHALL BE USED IN THESE AREAS. B

1. NON-FROST SUSCEPTIBLE FILL MATERIAL SHALL BE USED BELOW THE TRANSFORMER PADS AND STAIR PADS.

GD-4 STRUCTURAL FILL TO BE PLACED BELOW THE TURBINE FOUNDATION SHALL BE COMPACTED TO A MINIMUM OF 95% OF THE MAXIMUM DRY DENSITY ACCORDING TO ASTM D1557 AND MOISTURE CONDITIONED WITHIN 2% OF OPTIMUM MOISTURE CONTENT.

A. STRUCTURAL FILL MATERIAL BELOW THE TURBINE FOUNDATIONS SHALL CONSIST OF NON-EXPANSIVE, WELL-GRADED MATERIAL WITH SUFFICIENT BINDER FOR COMPACTION PURPOSES AND MUST MEET SPECIFICATIONS OF OHIO DEPARTMENT OF TRANSPORTATIONS AS OUTLINED IN SECTION 703 OF THE 2010 CONSTRUCTION AND MATERIAL SPECIFICATION FOR STRUCTURAL BACKFILL TYPE 2 OR BETTER. IF OTHER MATERIALS ARE TO BE CONSIDERED, THEY SHALL CONFORM TO THE FOLLOWING GENERAL SPECIFICATION: A

SIEVE SIZE	PERCENT FINER BY WEIGHT
3/4"	100 (MAX.)
3/8"	85-100
NO. 4	60-100
NO. 8	45-85
NO. 50	7-55
NO. 200	0-15

PROPERTY	LIMITATION
LIQUID LIMIT	25 (MAX.)
PLASTICITY LIMIT	6 (MAX.)
LA ABRASION	50 (MAX.)

B. THE PROPOSED STRUCTURAL FILL MATERIAL SHALL BE APPROVED BY THE GEOTECHNICAL ENGINEER OF RECORD PRIOR TO ITS USE.

C. STRUCTURAL FILL SHALL BE PLACED IN LIFTS HAVING A MAXIMUM THIN, LOOSE LIFTS NOT EXCEEDING EIGHT (8) INCHES PRIOR TO COMPACTING. IF THE TESTING AGENCY CANNOT TEST THIS FULL DEPTH, (I.E., 8-INCH NUCLEAR GAUGE) THEN THE LIFTS SHALL BE REDUCED ACCORDINGLY.

D. ALL SURFACES SHALL BE COMPACTED TO A FIRM, UNYIELDING CONDITION.

E. ACTUAL DEPTHS OF SUBEXCAVATIONS SHALL BE VERIFIED BY OBSERVATIONS AND TESTING OF THE FOUNDATION SUBGRADE SOILS AFTER EXCAVATING TO THE DESIGN FOUNDATION SUBGRADE ELEVATION.

F. COMPACTION SHALL ONLY BE CARRIED OUT DURING FAVORABLE WEATHER CONDITIONS. FILL MATERIAL SHALL NOT BE ALLOWED TO FREEZE, AND PLACED FILL MATERIAL SUBGRADES SHALL BE FIRM AND STABLE AFTER PLACEMENT AND COMPACTION. CARE SHALL BE TAKEN THAT FROZEN MATERIALS ARE NOT PLACED AS FILL NOR SHALL NEW FILL BE PLACED ON FROZEN GROUND.

G. STRUCTURAL FILL SHALL BE FREE OF DELETERIOUS, ORGANIC, OR FROZEN MATTER.

H. SHOULD THE RESULTS OF THE IN-PLACE DENSITY TESTS INDICATE THE SPECIFIED MOISTURE OR COMPACTION REQUIREMENTS HAVE NOT BEEN MET, THE AREA REPRESENTED BY THE TEST SHALL BE REWORKED AND RETESTED AS REQUIRED UNTIL THE SPECIFIED MOISTURE AND COMPACTION REQUIREMENTS ARE ACHIEVED.

GD-5 TURBINE FOUNDATIONS LOCATED ADJACENT TO NATURAL OR MAN-MADE SLOPES SHALL BE LATERALLY SETBACK FROM THE TOP OF THE SLOPE. THIS SETBACK DISTANCE CAN BE ESTIMATED BY ESTABLISHING AN IMAGINARY PLANE DRAWN AT A 45-DEGREE ANGLE EXTENDING DOWNWARD FROM THE EDGE OF THE FOUNDATION, OR TO A MINIMUM LATERAL DISTANCE OF 50 FEET FROM THE EDGE OF THE FOUNDATION. B

A. THE TURBINE FOUNDATION SHALL NOT BE LOCATED IN ANY AREA WHERE THIS SETBACK PLANE WILL INTERCEPT ANY PORTION OF THE DOWNHILL SLOPE. IF A PROPOSED TURBINE FOUNDATION WILL VIOLATE THIS CRITERIA, THE FOUNDATION CAN BE MOVED EITHER HORIZONTALLY OR DEEPENED A SUFFICIENT DISTANCE TO MEET THE SETBACK REQUIREMENT PROVIDED THE DEPTH OF BACKFILL OVER THE FOUNDATION DOES NOT EXCEED THE DEPTH SHOWN ON THESE DESIGN DRAWINGS.

B. IN ALL SUCH CASES, PROPER DRAINAGE MEASURES SHALL BE TAKEN TO REDUCE THE IMPACTS TO MAN-MADE CUT AND FILL SLOPES AS WELL AS ALL UNDISTURBED NATURAL SLOPES.

GD-6 A QUALIFIED GEOTECHNICAL ENGINEER OR ENGINEERING GEOLOGIST SHALL BE RETAINED BY THE OWNER TO CONFIRM ALL FOUNDATION GEOTECHNICAL ASPECTS DURING FOUNDATION CONSTRUCTION.

GD-7 ALL BEARING CAPACITIES AT DESIGN BURIAL DEPTHS SHALL BE VERIFIED BY GEOTECHNICAL REPRESENTATIVE PRIOR TO PLACEMENT OF REINFORCING STEEL OR CONCRETE TO CONFIRM MINIMUM NET ALLOWABLE BEARING PRESSURES.

GD-8 GEOTECHNICAL REPRESENTATIVE SHALL RECORD SOIL DESIGNATION AND ANY PERCHED/GROUNDWATER ENCOUNTERED. ANY TIME WATER ENCOUNTERED IS CONSIDERED TO BE GROUNDWATER AND IS NEARER TO THE NATURAL GROUND SURFACE THAN THE FOUNDATION HAS BEEN DESIGNED FOR AT THAT LOCATION, THE STRUCTURAL ENGINEER SHALL BE CONTACTED IN WRITING WITH RESOLUTION PRIOR TO INSTALLATION OF ANY LEAN CONCRETE MAT, REINFORCING STEEL, OR STRUCTURAL CONCRETE.

GD-9 SUBGRADE SHALL BE FREE FROM FROST AND ICE PRIOR TO LEAN CONCRETE PLACEMENT.

GD-10 LEAN CONCRETE MAT SHALL BE PLACED AS LEVEL AS POSSIBLE TO ALLOW FOR INSTALLATION OF BOTTOM MAT OF REINFORCING STEEL.

GD-11 FINAL SITE GRADING SHALL ENSURE NO PONDING OCCURS DIRECTLY OVER FOUNDATION EXCAVATION.

GD-12 STRUCTURAL BACKFILL AROUND BASE AND/OR PEDESTAL MAY BE PLACED WHEN CONCRETE COMPRESSIVE STRENGTHS ARE 60% OF THE 28-DAY REQUIREMENTS SPECIFIED ON DESIGN DRAWINGS. THE FOUNDATION BASE CONCRETE HAS CURED FOR A MINIMUM OF 72 HOURS, AND THE FOUNDATION PEDESTAL CONCRETE HAS CURED FOR A MINIMUM OF 48 HOURS.

A. BACKFILL EQUIPMENT SHALL NOT COME IN CONTACT WITH THE FOUNDATION CONCRETE WHILE BACKFILLING AND NO VIBRATORY EQUIPMENT SHALL BE USED TO COMPACT THE BACKFILL UNLESS THERE IS A MINIMUM OF 12 INCHES OF BACKFILL MATERIAL BETWEEN THE FOUNDATION CONCRETE BASE SURFACE AND THE COMPACTION EQUIPMENT AT ALL TIMES. VIBRATORY COMPACTION EQUIPMENT SHALL NOT MAKE DIRECT CONTACT WITH EITHER THE FOUNDATION BASE OR PEDESTAL CONCRETE.

GD-13 WHEN TURBINE IS FULLY ERECTED AND OPERATIONAL, NO DISTURBANCES SHALL BE MADE TO THE BACKFILL MATERIAL DIRECTLY OVER THE FOUNDATION FOOTPRINT.

CONCRETE:

C-1 28-DAY CONCRETE COMPRESSIVE STRENGTH, FOR BASE: 5,000 PSI, FOR PEDESTAL: 5,500 PSI.

C-2 CEMENT: ASTM C150, TYPE I, TYPE III, OR TYPE II. B

C-3 FLY ASH (IF USED): ASTM C618, CLASS F (CLASS C ONLY WITH APPROVAL), MAXIMUM 25% OF CEMENTITIOUS MATERIAL CONTENT. A

C-4 AGGREGATE: ASTM C33, SIZE 67 OR 57.

A. WHEN A SINGLE SIZE OR COMBINATION OF TWO OR MORE SIZES OF AGGREGATES IS USED, THE FINAL GRADING SHALL CONFORM TO THE GRADING REQUIREMENTS OF ASTM C33 UNLESS OTHERWISE SPECIFIED. AGGREGATES USED IN CONCRETE SHALL BE OBTAINED FROM THE SAME SOURCES AND HAVE THE SAME SIZE RANGES AS THE AGGREGATES USED IN THE CONCRETE REPRESENTED BY SUBMITTED HISTORICAL DATA OR USED IN TRIAL MIXTURES.

B. SECTION 11.2 OF ASTM C33 SHALL BE REVISED AND IMPLEMENTED AS FOLLOWS: FINE AND COARSE AGGREGATE FOR USE IN CONCRETE SHALL NOT CONTAIN ANY MATERIALS THAT ARE DELETERIOUSLY REACTIVE WITH ALKALINE IN THE CEMENT IN AN AMOUNT SUFFICIENT TO CAUSE EXCESSIVE EXPANSION OF MORTAR OR CONCRETE. IF SUCH MATERIALS ARE PRESENT IN INJURIOUS AMOUNTS, SEPARATE CONSIDERATION NEED BE TAKEN FOR CORRECTIVE ACTION WHICH SHALL CLEARLY DEMONSTRATE THROUGH TESTING SATISFACTORY PERFORMANCE FOR PROJECT DESIGN LIFE.

C-5 CURING AGENT: ASTM C309, TYPE 2 (WHITE PIGMENTED).

C-6 FOR DURABILITY PURPOSES, WATER/CEMENTITIOUS MATERIALS (W/CM) RATIO SHALL BE DETERMINED IN THE FOUNDATION ENGINEER-APPROVED MIX DESIGN, NOT TO EXCEED 0.45, AND FIELD PERSONNEL SHALL CONFORM TO THE W/CM RATIO AS DETERMINED IN THE FOUNDATION ENGINEER-APPROVED MIX DESIGN.

C-7 SLUMP: MAXIMUM 5 INCHES AT POINT OF PLACEMENT.

A. WHEN THE USE OF A TYPE I OR II PLASTICIZING ADMIXTURE CONFORMING TO ASTM C1017 OR WHEN A TYPE F OR G HIGH-RANGE WATER-REDUCING ADMIXTURE CONFORMING TO ASTM C494 IS PERMITTED TO INCREASE THE SLUMP OF CONCRETE, CONCRETE SHALL HAVE A SLUMP OF 2 TO 5 INCHES BEFORE THE ADMIXTURE IS ADDED AND A MAXIMUM SLUMP OF 8 INCHES AT POINT OF PLACEMENT AFTER THE ADMIXTURE IS ADDED.

C-8 WATER USED FOR MIXING AND TO MAKE ICE SHALL MEET THE REQUIREMENTS OF ASTM C1602. USE POTABLE WATER UNLESS ALTERNATIVE SOURCES OF WATER COMPLYING WITH ASTM C1602 ARE PERMITTED.

A. NON-MUNICIPAL WATER SOURCES, SUCH AS PRIVATE (NON-PUBLIC) WELL WATER SOURCES, SHALL MEET THE REQUIREMENTS OF ASTM C1602 TABLE 2.

C-9 IF USED, ADMIXTURES SHALL MEET THE REQUIREMENTS OF THE FOLLOWING:

A. AIR-ENTRAINING MIXTURES: ASTM C260.

B. CHEMICAL ADMIXTURES: ASTM C494.

C. CHEMICAL ADMIXTURES FOR USE IN PRODUCING FLOWING CONCRETE: ASTM C1017.

RRC

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PREPARED FOR:

PAULDING WIND FARM III

TIMBER ROAD III WIND PROJECT

PAULDING COUNTY, OHIO

FOR REVIEW ONLY
NOT SEALED FOR CONSTRUCTION

REV	DATE	ISSUE DESCRIPTION
B	03/18/2016	ISSUED FOR REVIEW
A	11/11/2015	PRELIMINARY DESIGN

PROJECT MGR: B. KRAUSE
CHECKED BY: T. CROOK
DESIGNED BY: J. STRIPLING
DRAWN BY: M. HENKEL
SCALE: N.T.S.

0 2"
BAR MUST SCALE 2" FOR FULL SIZE OR 1" FOR HALF SIZE DRAWING

PROJECT NUMBER: MD1510047

DRAWING NAME:

GAMESA G114 2.1MW T93M IEC CIII WIND TURBINE FOUNDATION

SPECIFICATION SHEET 1

DRAWING No.	SHEET:	REVISION
S-6	7 OF 10	B

CADFILE: TIMBER ROAD III DRAWING SET

D. ADMIXTURES USED IN CONCRETE SHALL BE THE SAME AS THOSE USED IN THE CONCRETE REPRESENTED BY SUBMITTED FIELD TEST RECORDS OR USED IN TRIAL MIXTURES.

C-10 AIR CONTENT AT POINT OF PLACEMENT: 5.5% +/-1.5% FOR ALL OF THE PEDESTAL CONCRETE AND THE PORTION OF BASE CONCRETE AS SHOWN ON SHEETS S-2 AND S-4. ALTERNATIVELY, AIR ENTRAINED CONCRETE MAY BE USED FOR ALL FOUNDATION BASE AND PEDESTAL CONCRETE. NO SPECIFIED AIR CONTENT REQUIRED IN THE REMAINING BASE CONCRETE OR LEAN (MUD MAT) CONCRETE.

A. ENTRAPPED AIR ONLY SHALL NOT BE USED WHEN AIR CONTENT HAS BEEN SPECIFIED.

C-11 IF DOBIE BLOCKS ARE USED FOR SUPPORTING BOTTOM REINFORCEMENT, DOBIES SHALL HAVE MINIMUM COMPRESSIVE STRENGTH AS REQUIRED BY THE CONCRETE CAST IN THE BASE.

A. DOBIE BLOCKS SHALL NOT BE MADE OF CLAY.

EXECUTION OF CONCRETE MIXING AND PLACEMENT:

CM-1 UNLESS OTHERWISE SPECIFIED, MEASURE, BATCH, AND MIX CONCRETE MATERIALS AND CONCRETE IN CONFORMANCE WITH ASTM C94.

CM-2 CONCRETE SHALL POSSESS THE SPECIFIED CHARACTERISTICS IN THE FRESHLY MIXED STATE AT THE POINT OF PLACING. TRANSPORT AND DELIVER CONCRETE IN EQUIPMENT CONFORMING TO THE REQUIREMENTS OF ASTM C94.

CM-3 CONCRETE SHALL BE PLACED IN ACCORDANCE WITH THE SPECIFIED EDITION OF ACI 318. PLACEMENT METHOD SHALL ENSURE PROPER CONSOLIDATION OF CONCRETE AS DEFINED BY ACI.

CM-4 SLUMP ADJUSTMENT:

A. WHEN CONCRETE ARRIVES AT THE POINT OF DELIVERY THAT IS UNSUITABLE FOR PLACING AT THAT SLUMP, THE SLUMP MAY BE ADJUSTED TO THE REQUIRED VALUE BY ADDING WATER UP TO THE AMOUNT ALLOWED IN THE ACCEPTED MIXTURE PROPORTIONS UNLESS OTHERWISE SPECIFIED BY THE ENGINEER.

B. ADDITION OF WATER SHALL BE IN ACCORDANCE WITH ASTM C94.

C. DO NOT EXCEED THE SPECIFIED WATER-CEMENTITIOUS MATERIAL RATIO OR SLUMP.

D. DO NOT ADD WATER TO CONCRETE DELIVERED IN EQUIPMENT NOT ACCEPTABLE FOR MIXING.

E. IF PLASTICIZING OR HIGH-RANGE WATER-REDUCING ADMIXTURES ARE ADDED TO THE CONCRETE AT THE SITE TO ACHIEVE FLOWABLE CONCRETE, DO NOT ADD WATER TO THE CONCRETE.

F. MEASURE SLUMP AND AIR CONTENT OF AIR-ENTRAINED CONCRETE AFTER SLUMP ADJUSTMENTS TO VERIFY COMPLIANCE WITH SPECIFIED REQUIREMENTS.

CM-5 TIME FOR COMPLETION OF DISCHARGE SHALL COMPLY WITH ASTM C94 UNLESS OTHERWISE PERMITTED. WHEN DISCHARGE IS PERMITTED AFTER MORE THAN 90 MINUTES HAVE ELAPSED SINCE BATCHING OR AFTER THE DRUM HAS REVOLVED 300 REVOLUTIONS, VERIFY AIR CONTENT OF AIR-ENTRAINED CONCRETE, SLUMP, AND TEMPERATURE OF CONCRETE TO BE AS SPECIFIED.

CM-6 DO NOT PLACE CONCRETE UNTIL DATA ON MATERIALS AND MIXTURE PROPORTIONS ARE ACCEPTED.

CM-7 THE CONTRACTOR SHALL PLACE THE MINIMUM CONCRETE VOLUME FOR THE BASE/PEDESTAL AS SHOWN BY THE DIMENSIONS/ESTIMATED QUANTITIES SHOWN ON THESE DESIGN DRAWINGS.

CM-8 WHEN THE FOUNDATION BASE AND PEDESTAL CONCRETE ARE PLACED IN SEPARATE POURS (NON-MONOLITHICALLY), BASE CONCRETE SHALL CURE FOR A MINIMUM OF 24 HOURS AND UNTIL IT IS OF SUFFICIENT STIFFNESS TO RESIST DAMAGE BEFORE PLACING THE PEDESTAL CONCRETE.

CM-9 WHEN THE FOUNDATION CONCRETE IS PLACED MONOLITHICALLY, THE FOLLOWING PROCEDURES SHALL BE FOLLOWED:

A. IF THE PEDESTAL AND BASE PORTIONS OF THE FOUNDATION HAVE DIFFERENT SPECIFICATIONS, IN ORDER TO ENSURE THE CORRECT CONCRETE MIX IS USED IN THE PEDESTAL, THE LAST SEVEN (7) CUBIC YARDS OF THE BASE CONCRETE SHALL BE PLACED USING THE SAME CONCRETE MIXTURE THAT WILL BE USED IN THE PEDESTAL. ALTERNATIVELY, THE AIR-ENTRAINED PEDESTAL MIX MAY BE USED IN THE BASE AND THE PEDESTAL.

B. THE BASE CONCRETE SHALL BE COMPLETELY TOPPED OFF AND PROPERLY CONSOLIDATED ACCORDING TO THESE SPECIFICATIONS PRIOR TO PLACING THE PEDESTAL CONCRETE.

CM-10 CONVEYING EQUIPMENT:

A. RAPIDLY CONVEY CONCRETE FROM MIXER TO THE PLACE OF FINAL DEPOSIT BY METHODS THAT PREVENT SEGREGATION OR LOSS OF INGREDIENTS AND ENSURE THE REQUIRED QUALITY OF CONCRETE. DO NOT USE ALUMINUM PIPES OR CHUTES.

B. CLEAN CONVEYING EQUIPMENT BEFORE EACH PLACEMENT.

C. USE BELT CONVEYORS THAT ARE HORIZONTAL OR AT A SLOPE THAT WILL NOT CAUSE EXCESSIVE SEGREGATION OR LOSS OF INGREDIENTS. USE ACCEPTABLE DISCHARGE BAFFLE OR HOPPER AT THE DISCHARGE END TO PREVENT SEGREGATION. DO NOT ALLOW MORTAR TO ADHERE TO THE RETURN LENGTH OF THE BELT.

D. USE METAL OR METAL-LINED CHUTES HAVING ROUNDED BOTTOMS, AND SLOPED BETWEEN ONE VERTICAL TO TWO HORIZONTAL AND ONE VERTICAL TO THREE HORIZONTAL. CHUTES LONGER THAN 20 FEET LONG AND CHUTES NOT MEETING SLOPE REQUIREMENTS MAY BE USED PROVIDED THE DISCHARGE IS INTO A HOPPER BEFORE DISTRIBUTION INTO THE PLACEMENT AREA.

E. USE PUMPING EQUIPMENT THAT PERMITS PLACEMENT RATES THAT AVOID COLD JOINTS AND PREVENTS SEGREGATION IN DISCHARGE OF PUMPED CONCRETE.

CM-11 DEPOSITING CONCRETE:

A. DEPOSIT CONCRETE CONTINUOUSLY IN ONE LAYER OR IN LAYERS TO HAVE FRESH CONCRETE DEPOSITED ON IN-PLACE CONCRETE THAT IS STILL PLASTIC.

B. DO NOT DEPOSIT FRESH CONCRETE ON CONCRETE THAT HAS HARDENED SUFFICIENTLY TO CAUSE FORMATION OF SEAMS OR PLANES OF WEAKNESS WITHIN THE SECTION.

C. DO NOT USE CONCRETE THAT HAS SURFACE-DRIED, PARTIALLY HARDENED, OR CONTAINS FOREIGN MATERIAL.

D. DEPOSIT CONCRETE AS NEAR AS PRACTICABLE TO THE FINAL POSITION TO AVOID SEGREGATION.

CM-12 CONSOLIDATION PER ACI 309:

A. CONSOLIDATE CONCRETE BY VIBRATION INCLUDING FINAL LIFT OF CONCRETE. THOROUGHLY WORK CONCRETE AROUND REINFORCEMENT AND EMBEDDED ITEMS AND INTO CORNERS OF FORMS, ELIMINATING AIR AND STONE POCKETS THAT MAY CAUSE HONEYCOMBING, PITTING, OR PLANES OF WEAKNESS.

1. FINAL LIFT OF BASE CONCRETE SHALL BE CONSOLIDATED AS SPECIFIED ABOVE. IN ADDITION, DUE TO THE EXTENDED TIME OF EXPOSURE OF THE SECOND TO LAST LIFT, THE NECESSARY EFFORT SHOULD BE TAKEN TO ENSURE THE VIBRATOR IS ALLOWED AMPLE TIME TO PENETRATE THROUGH THE FINAL LIFT INTO THE PREVIOUS LIFT IN ORDER TO ADEQUATELY KNIT THE TWO LAYERS TOGETHER. THIS WILL PROVIDE THE CRITICAL HORIZONTAL SHEAR TRANSFER OF THE TOP MAT OF REINFORCING TO THE CONCRETE BELOW.

B. USE INTERNAL VIBRATORS OF THE LARGEST SIZE AND POWER THAT CAN PROPERLY BE USED IN THE CONCRETE PLACEMENT.

C. DO NOT USE VIBRATORS TO MOVE CONCRETE.

D. VIBRATION OF CONCRETE SHALL FOLLOW THE METHOD BELOW:

1. VIBRATION OF CONCRETE SHALL PROCEED RAPIDLY TO THE BOTTOM OF THE FRESH LAYER AND PENETRATE AT LEAST 6 INCHES INTO THE PRECEDING LAYER INCLUDING FINAL LIFT OF CONCRETE.

2. THE VIBRATOR SHALL BE MANIPULATED IN AN UP-AND-DOWN MOTION, GENERALLY FOR 5 TO 15 SECONDS TO KNIT THE TWO LAYERS TOGETHER. THE VIBRATOR SHALL THEN BE WITHDRAWN GRADUALLY WITH A SERIES OF UP-AND-DOWN MOTIONS. THE DOWN MOTION SHALL BE A RAPID DROP.

3. THE SPACING BETWEEN VIBRATOR INSERTIONS SHALL BE APPROXIMATELY 12" TO 18".

CM-13 CURING AND PROTECTION:

A. APPLY THE COMPOUND IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AS SOON AS WATER SHEEN HAS DISAPPEARED FROM THE CONCRETE SURFACE AND AFTER FINISHING OPERATIONS. THE APPLICATION RATE SHALL NOT BE LESS THAN 1 GAL/200 SQUARE FEET.

B. DO NOT USE CURING COMPOUND ON ANY SURFACE WHERE CONCRETE OR OTHER MATERIAL WILL BE BONDED, UNLESS THE CURING COMPOUND WILL NOT PREVENT BOND OR UNLESS MEASURES ARE TAKEN TO COMPLETELY REMOVE THE CURING COMPOUND FROM AREAS TO RECEIVE BONDED APPLICATIONS.

C. IMMEDIATELY AFTER PLACEMENT, PROTECT CONCRETE FROM PREMATURE DRYING, EXCESSIVELY HOT OR COLD TEMPERATURES, AND MECHANICAL INJURY.

D. PROTECT CONCRETE DURING THE CURING PERIOD SUCH THAT THE CONCRETE TEMPERATURE DOES NOT FALL BELOW THE REQUIREMENTS SHOWN IN THE COLD WEATHER CONCRETING SECTION.

E. DO NOT ALLOW WINDY CONDITIONS TO CAUSE EXCESSIVE OR ACCELERATED DRYING OF THE FOUNDATION BEFORE BACKFILL IS PLACED OVER THE FOUNDATION.

CM-14 TOP OF BASE SHALL BE FINISHED WITH ROUGH TROWEL FINISH OR ROLLER BUG. TOP OF PEDESTAL SHALL BE FINISHED WITH TROWEL AND BROOM FINISH.

MASS CONCRETING:

MC-1 THE FOLLOWING REQUIREMENTS SHALL BE MET WHEN CONCRETE PLACEMENT IS CONSIDERED TO BE MASS CONCRETE. THE OTHER REQUIREMENTS OF THESE DESIGN DOCUMENTS SHALL BE MET UNLESS MORE STRINGENT REQUIREMENTS FOUND IN THIS SECTION CONTROL.

MC-2 MASS CONCRETING PRECAUTIONS SHALL BE REQUIRED WHEN THE MINIMUM CROSS-SECTIONAL DIMENSION APPROACHES OR EXCEEDS 2-1/2 FEET OR WHEN CEMENT CONTENTS ABOVE 600 LB/YD^3 ARE USED.

MC-3 SUBMIT BRAND NAMES, MANUFACTURER'S CERTIFICATIONS, AND TEST DATA ON HEAT OF HYDRATION.

MC-4 DO NOT USE ASTM C150 TYPE III CEMENT.

MC-5 DO NOT USE CALCIUM CHLORIDE OR OTHER ACCELERATING ADMIXTURES UNLESS SPECIFICALLY PERMITTED.

MC-6 CONCRETE PLACED IN COLD WEATHER SHALL MEET THE REQUIREMENTS OF THE COLD WEATHER CONCRETING SECTION.

MC-7 PLACE CONCRETE IN LAYERS NOT MORE THAN 18 INCHES THICK. EXTEND VIBRATOR HEADS INTO PREVIOUSLY PLACED LAYER OF PLASTIC CONCRETE.

MC-8 DURING PROTECTION FROM FREEZING AND MOISTURE LOSS, AS REQUIRED BY THE COLD WEATHER CONCRETING AND THE EXECUTION OF CONCRETE MIXING AND PLACEMENT SECTIONS, DO NOT USE STEAM OR OTHER CURING METHODS THAT WILL ADD HEAT TO THE CONCRETE.

MC-9 KEEP FORMS AND EXPOSED CONCRETE CONTINUOUSLY WET DURING THE CURING PERIOD WHENEVER THE SURROUNDING AIR TEMPERATURE IS ABOVE 90 °F.

MC-10 UNLESS OTHERWISE SPECIFIED, COOL THE CONCRETE GRADUALLY SO THAT THE DROP IN CONCRETE SURFACE TEMPERATURE DURING AND AT THE CONCLUSION OF THE SPECIFIED CURING PERIOD DOES NOT EXCEED 20 °F IN ANY 24 HOUR PERIOD.

MC-11 BASE AND PEDESTAL CONCRETE MIX DESIGN THAT IS CONSIDERED MASS CONCRETE SHALL BE DESIGNED AND SEALED BY A PROFESSIONAL ENGINEER. MIX DESIGN SHALL BE DESIGNED WITH PLACEMENT SPECIFICATIONS TO ENSURE MAXIMUM CONCRETE TEMPERATURE AT THE CORE OF THE FOUNDATION BASE DOES NOT EXCEED 158 °F AND MAXIMUM TEMPERATURE RANGE FROM THE CORE OF THE BASE TO THE BASE SURFACE DOES NOT HAVE A TEMPERATURE DIFFERENTIAL IN EXCESS OF 35 °F.

A. ACCEPTABLE MATERIALS FOR PREVENTING EXCESSIVE TEMPERATURE DECREASES AND DIFFERENTIALS ARE INSULATING BLANKETS; BATT INSULATION WITH MOISTURE-PROOF COVERING; AND LAYERS OF DRY POROUS MATERIAL SUCH AS STRAW, HAY, OR MULTIPLE LAYERS OF IMPERVIOUS PAPER MEETING ASTM C171.

B. TIMING THE REMOVAL OF THESE PROTECTIVE MEASURES IS CRITICAL AND SHALL BE IMPLEMENTED IN SUCH A WAY AS TO AVOID THERMAL SHRINKAGE CRACKS CAUSED BY A RAPID DECREASE IN CONCRETE SURFACE TEMPERATURE UPON PROTECTION REMOVAL.

HOT WEATHER CONCRETING:

HW-1 THE RECOMMENDATIONS OF ACI 305 SHALL BE FOLLOWED FOR CONDITIONS OF HOT WEATHER CONCRETING.

HW-2 THE TEMPERATURE OF THE CONCRETE AS PLACED SHALL NOT EXCEED THE ALLOWABLE PLACEMENT TEMPERATURE AS NOTED IN THE FOUNDATION ENGINEER-APPROVED CONCRETE MIX DESIGN OR AS DETERMINED BY INTERNAL CONCRETE TEMPERATURE MONITORING DATA WITH THE APPROVAL OF THE FOUNDATION ENGINEER.

A. TEMPERATURE MONITORING PROCEDURE, IF USED, SHALL BE DETERMINED BY THE FOUNDATION ENGINEER OF RECORD.

HW-3 LOSS OF SLUMP, FLASH SET, OR COLD JOINTS SHALL NOT BE ACCEPTABLE.

HW-4 ACCEPTED EVAPORATION CONTROL MEASURES SHALL PROVIDE ADEQUATE PROTECTION OF, AND PREVENT RAPID EVAPORATION FROM, THE FRESH CONCRETE SURFACE.

A. AN EVAPORATION RETARDANT SHALL BE APPLIED TO THE FRESH CONCRETE PRIOR TO APPLICATION OF THE CURING AGENT IF THE CONCRETE AND AIR TEMPERATURES, RELATIVE HUMIDITY OF THE AIR, AND THE WIND SPEED HAVE THE CAPACITY TO EVAPORATE FREE WATER FROM THE FRESH CONCRETE SURFACE AT A RATE THAT IS EQUAL TO OR GREATER THAN 0.2 LB/FT2/H, UNLESS OTHERWISE ACCEPTED BY THE STRUCTURAL ENGINEER OF RECORD.

B. DETERMINE THE EVAPORATION RATE OF SURFACE WATER BY USE OF THE UNO EQUATION AS DESCRIBED IN ACI 305.1-14. THE UNO EQUATION SHALL BE STATED IN THE HOT WEATHER PROCEDURE.

1. THE INPUT DATA FOR THE UNO EQUATION SHALL BE OBTAINED FROM A HANDHELD ANEMOMETER. THE HANDHELD ANEMOMETER SHALL BE CERTIFIED BY THE MANUFACTURER AS ACCURATE TO WITHIN 2° F, 5 PERCENT RELATIVE HUMIDITY, AND 1 MPH WIND SPEED. USE EQUIPMENT IN ACCORDANCE WITH THE PRODUCT MANUFACTURER'S RECOMMENDATIONS.

2. ONCE THE INPUT DATA HAS BEEN OBTAINED FROM THE HANDHELD ANEMOMETER, IT IS ACCEPTABLE TO CALCULATE THE EVAPORATION RATE BY PLUGGING THE INPUT DATA INTO THE ACI MOBILE PHONE APPLICATION OR BY CALCULATOR.

3. THE EVAPORATION RATE SHALL BE CHECKED AS SOON AS REASONABLY POSSIBLE AFTER CONCRETE PLACEMENT HAS FINISHED AND AT LEAST ONCE IN BOTH THE MORNING AND AFTERNOON ON EACH DAY PRIOR TO BACKFILL PLACEMENT.

C. IN LIEU OF CALCULATING THE EVAPORATION RATE, EVAPORATION RETARDANT MAY BE APPLIED TO ALL FOUNDATIONS PRIOR TO APPLICATION OF THE CURING AGENT AT THE CONTRACTOR'S DISCRETION.

HW-5 OBTAIN ACCEPTANCE BY THE STRUCTURAL ENGINEER OF RECORD OF HOT WEATHER CONCRETING PROCEDURE.

HW-6 WHEN TEMPERATURE OF STEEL REINFORCEMENT, EMBEDMENTS, OR FORMS IS GREATER THAN 120 °F, FOG STEEL REINFORCEMENT, EMBEDMENTS, AND FORMS WITH WATER IMMEDIATELY BEFORE PLACING CONCRETE. REMOVE STANDING WATER BEFORE PLACING CONCRETE.

COLD WEATHER CONCRETING:

CW-1 THE RECOMMENDATIONS OF ACI 306 SHALL BE FOLLOWED FOR CONDITIONS OF COLD WEATHER CONCRETING.

CW-2 WHEN THE AVERAGE OF THE HIGHEST AND LOWEST TEMPERATURE DURING THE PERIOD FROM MIDNIGHT TO MIDNIGHT IS EXPECTED TO DROP BELOW 40 °F FOR MORE THAN THREE SUCCESSIVE DAYS, THE TEMPERATURE OF THE CONCRETE SHALL BE MAINTAINED BETWEEN 50 °F AND 85 °F.

CW-3 THESE MINIMUM REQUIREMENTS MAY BE TERMINATED WHEN TEMPERATURES ABOVE 50 °F OCCUR DURING MORE THAN HALF OF ANY 24 HOUR PERIOD.

CW-4 MAINTAIN CONCRETE PROTECTION TO PREVENT FREEZING OF THE CONCRETE. REMOVE PROTECTION IN SUCH A MANNER THAT THE MAXIMUM DECREASE IN TEMPERATURE MEASURED AT THE SURFACE OF THE CONCRETE IN A 24 HOUR PERIOD SHALL NOT EXCEED 30 °F.

CW-5 WHEN THE SURFACE TEMPERATURE OF THE CONCRETE IS WITHIN 20 °F OF THE AMBIENT OR SURROUNDING TEMPERATURE, PROTECTION MEASURES MAY BE REMOVED.

CW-6 THE TEMPERATURE OF THE CONCRETE AS PLACED SHALL NOT EXCEED THE ALLOWABLE PLACEMENT TEMPERATURE AS NOTED IN THE FOUNDATION ENGINEER-APPROVED CONCRETE MIX DESIGN OR AS DETERMINED BY INTERNAL CONCRETE TEMPERATURE MONITORING DATA WITH THE APPROVAL OF THE FOUNDATION ENGINEER.

A. TEMPERATURE MONITORING PROCEDURE, IF USED, SHALL BE DETERMINED BY THE FOUNDATION ENGINEER OF RECORD.

CW-7 DO NOT PLACE CONCRETE AROUND THE EMBEDMENT RING UNLESS THE EMBEDMENT RING IS AT A TEMPERATURE ABOVE 32 °F.

CW-8 DURING PERIODS NOT DEFINED AS COLD WEATHER, BUT WHEN FREEZING TEMPERATURES MAY OCCUR, PROTECT CONCRETE SURFACES AGAINST FREEZING FOR THE FIRST 24 HOURS AFTER PLACING.

CW-9 THE TEMPERATURE OF THE CONCRETE AT THE POINT OF MIXING (TYPICALLY AT THE BATCH PLANT) SHALL BE NO MORE THAN 15 °F ABOVE THE TEMPERATURE OF THE CONCRETE AT THE POINT OF PLACEMENT.

CW-10 THE CONCRETE SURFACE TEMPERATURE SHALL BE MONITORED AND RECORDED AT LEAST TWICE DAILY FOR THREE DAYS MINIMUM AFTER CONCRETE PLACEMENT.

CW-11 THE IN-PLACE CONCRETE STRENGTH SHALL BE DETERMINED BY ONE OF THE FOLLOWING METHODS:

A. OPTION #1: MATURITY METHOD PER ASTM C1074. IF THIS OPTION IS SELECTED, THE FOUNDATION ENGINEER SHALL BE NOTIFIED IN ORDER TO COORDINATE A TESTING AND MEASUREMENT PROCEDURE. AT A MINIMUM, THE TESTING AND MEASUREMENT PROCEDURE SHALL MEET THE FOLLOWING REQUIREMENTS:

1. THE EXECUTION OF THE CONSTRUCTION SEQUENCE SHALL DEPEND ON THE IN-PLACE CONCRETE STRENGTH ACCORDING TO THE SPECIFIED STRENGTHS SHOWN IN SECTIONS "CD" AND "TE" OF THESE SPECIFICATIONS.

2. MATURITY OF THE FIELD-CURED CONCRETE SHALL BE MEASURED/CALCULATED AND USED TO DETERMINE STRENGTH BY COMPARISON TO THE STRENGTH-MATURITY RELATIONSHIP ESTABLISHED FROM THE LAB-CURED CYLINDERS.

3. MATURITY USING THE TIME-TEMPERATURE METHODOLOGY SHALL BE REPORTED IN UNITS OF TEMPERATURE x TIME (FOR EXAMPLE °F•H). TEMPERATURE REFERS TO CONCRETE TEMPERATURE AND NOT AIR TEMPERATURE.

4. A DATUM TEMPERATURE OF 32 °F SHALL BE USED. IF SUBSTANTIATING EVIDENCE CAN BE PROVIDED, THEN A LOWER DATUM TEMPERATURE MAY BE USED WITH APPROVAL OF THE STRUCTURAL ENGINEER. ASTM C1074 ANNEX A1.1 MAY BE USED TO ESTABLISH THE DATUM TEMPERATURE.

5. MATURITY METERS/ DATA LOGGERS SHALL BE ENGIUS INTELLIROCK BRAND OR APPROVED EQUIVALENT. IF MATURITY METERS ARE USED, THEN THEY SHALL BE CORRECTED TO INCORPORATE THE 32 °F DATUM TEMPERATURE UNLESS A DIFFERENT DATUM TEMPERATURE IS APPROVED.

6. FOR FIELD CONCRETE NOT CONTINUOUSLY MONITORED WITH DATA LOGGERS, TEMPERATURE READINGS TO BE USED IN MATURITY CALCULATIONS SHALL BE TAKEN AT THE FOLLOWING FREQUENCY:

i. AT THE TIME OF THE COMPLETION OF THE CONCRETE PLACEMENT.

ii. MINIMUM EVERY TWELVE (12) HOURS FOR THE FIRST SEVEN (7) DAYS.

iii. MINIMUM EVERY THREE (3) DAYS AFTER THE FIRST SEVEN (7) DAYS.

iv. READINGS SHALL OCCUR MORE FREQUENTLY AT THE CONTRACTOR'S DISCRETION IF NEEDED TO SUPPORT THE CONSTRUCTION SCHEDULE. READINGS MAY BE TERMINATED WHEN NO LONGER REQUIRED TO SUPPORT THE CONSTRUCTION SCHEDULE.

7. REUSABLE TEMPERATURE SENSORS SHALL BE PROTECTED FROM DAMAGE AND FREEZING FROM EXTERNAL MOISTURE WHICH COULD CAUSE INACCURATE READINGS.

8. SENSORS SHALL BE PLACED WITHIN THE TOP 6 INCHES OF THE FOUNDATION BASE LOCATED MID-WAY UP THE SLOPE AND WITHIN THE TOP 6 INCHES OF THE FOUNDATION PEDESTAL CONCRETE APPROXIMATELY 24 INCHES TO 36 INCHES FROM THE EDGE OF THE PEDESTAL.

9. SENSORS SHALL BE FULLY SURROUNDED BY CONCRETE AND NOT IN DIRECT CONTACT WITH METALLIC ELEMENTS.

10. CONTRACTOR SHALL PREPARE AND MAINTAIN AN ACCURATE RECORD OF MATURITY CALCULATIONS.

B. OPTION #2: TO SUPPORT THE CONSTRUCTION SEQUENCE, ONE (1) ADDITIONAL CONCRETE CYLINDER PER 100 CU. YD. OF CONCRETE PLACED IN THE FOUNDATION BASE AND ONE (1) ADDITIONAL CONCRETE CYLINDER PER FOUNDATION PEDESTAL SHALL BE FIELD-CURED UNDER THE SAME CURING CONDITIONS AS THE FOUNDATION CONCRETE FOR EACH OF THE TESTING INTERVALS DESCRIBED BELOW. THE FIELD-CURED CYLINDERS AND THE CORRESPONDING LAB-CURED CYLINDERS SHALL BE TESTED AT THE FOLLOWING INTERVALS TO DETERMINE THE ADEQUACY OF THE IN-PLACE CONCRETE TO SUPPORT THE CONSTRUCTION SEQUENCE AS WELL AS TO ESTABLISH A CORRELATION BETWEEN THE FIELD-CURED AND LAB-CURED CONCRETE STRENGTHS:

1. TOWER ERECTION OCCURS LESS THAN 28 DAYS AFTER FOUNDATION CONCRETE PLACEMENT IS COMPLETE:

i. PRIOR TO FOUNDATION BACKFILL PLACEMENT.

ii. PRIOR TO POST-TENSIONING ANCHOR BOLTS.

iii. PRIOR TO ERECTION OF NACELLE AND ROTOR.

2. TOWER ERECTION OCCURRING MORE THAN 28 DAYS AFTER FOUNDATION CONCRETE PLACEMENT IS COMPLETE:

i. PRIOR TO FOUNDATION BACKFILL PLACEMENT.

CW-12 CURING SHALL BE IMPLEMENTED IMMEDIATELY AFTER CONCRETE PLACEMENT TO PREVENT SURFACE DRYING AND TO ENSURE SURFACE DURABILITY.

A. IF THE APPROVED CURING AGENT PRODUCT IS NOT DESIGNED TO BE USED IN COLD WEATHER CONDITIONS, THEN THE CONCRETE SHALL BE COVERED BY PLASTIC SHEETS OF AT LEAST 8 MIL THICKNESS IMMEDIATELY AFTER THE FINAL PASS OF THE ROLLER SCREED IN LIEU OF APPLYING THE CURING AGENT. NO PART OF THE CONCRETE SURFACE SHALL BE LEFT EXPOSED DURING THE CURING PERIOD.

B. THE SCREEDING, CONSOLIDATION, AND CURING STEPS OF CONCRETE CONSTRUCTION SHALL BE PERFORMED AS CLOSELY AS POSSIBLE TO EACH OTHER TO PREVENT DRYING OF THE CONCRETE.

C. AT NO TIME SHALL CONCRETE BE LEFT UNPROTECTED FOR MORE THAN 20 MINUTES AFTER CONSOLIDATION.

WET WEATHER CONCRETING:

WW-1 DO NOT BEGIN TO PLACE CONCRETE WHILE RAIN, SLEET, OR SNOW IS FALLING UNLESS ADEQUATE PROTECTION IS PROVIDED AND ACCEPTANCE OF PROTECTION IS OBTAINED BY THE STRUCTURAL ENGINEER OF RECORD.

WW-2 DO NOT ALLOW RAIN WATER TO INCREASE MIXING WATER OR DAMAGE THE SURFACE OF THE CONCRETE.

MATERIAL STORAGE AND HANDLING:

MS-1 STORE CEMENTITIOUS MATERIALS IN DRY, WEATHER-TIGHT BUILDINGS, BINS, OR SILOS THAT WILL EXCLUDE CONTAMINANTS.

MS-2 STORE AND HANDLE AGGREGATE IN A MANNER THAT WILL AVOID SEGREGATION AND PREVENT CONTAMINATION WITH OTHER MATERIALS OR OTHER SIZES OF AGGREGATES. STORE AGGREGATES IN LOCATIONS THAT WILL PERMIT THEM TO DRAIN FREELY. DO NOT USE AGGREGATES THAT CONTAIN FROZEN LUMPS.

MS-3 PROTECT MIXING WATER AND ICE FROM CONTAMINATION DURING STORAGE AND DELIVERY.

MS-4 PROTECT STORED ADMIXTURES AGAINST CONTAMINATION, EVAPORATION, OR DAMAGE. PROVIDE AGITATION EQUIPMENT FOR ADMIXTURES USED IN THE FORM OF SUSPENSIONS OR NONSTABLE SOLUTIONS TO ENSURE UNIFORM DISTRIBUTION OF THE INGREDIENTS. PROTECT LIQUID ADMIXTURES FROM FREEZING AND FROM TEMPERATURE CHANGES THAT WOULD ADVERSELY AFFECT THEIR CHARACTERISTICS.

MS-5 PREVENT BENDING, COATING WITH EARTH, OIL, OR OTHER MATERIAL, OR OTHERWISE DAMAGING THE REINFORCEMENT.

EXECUTION OF TOWER ERECTION:

TE-1 ANCHOR BOLT POST-TENSIONING, AND BASE AND MID-TOWER SECTIONS CAN BE ERECTED WHEN THE FOUNDATION BASE AND PEDESTAL CONCRETE COMPRESSIVE STRENGTHS HAVE REACHED A MINIMUM OF 70% OF THE 28-DAY REQUIREMENTS.

TE-2 FULL TURBINE TOWER, NACELLE, AND BLADES CAN BE ERECTED WHEN THE FOUNDATION BASE AND PEDESTAL CONCRETE COMPRESSIVE STRENGTHS HAVE REACHED A MINIMUM OF 90% OF THE 28-DAY REQUIREMENTS.

TE-3 THE FULL 28-DAY FOUNDATION BASE AND PEDESTAL CONCRETE COMPRESSIVE STRENGTHS ARE REQUIRED PRIOR TO TURBINE OPERATION.

TE-4 THE PROJECT FOUNDATION ENGINEER SHALL BE NOTIFIED OF THE NUMBER OF TOWER SECTIONS TO BE ERECTED PRIOR TO GROUT PLACEMENT IN ORDER TO DETERMINE THE SIZE, NUMBER, AND LOCATIONS OF SHIMS WHEN USED TO SUPPORT THE TOWER.

TE-5 SHIMS USED TO SUPPORT THE TOWER DURING GROUT PLACEMENT SHALL BE MADE OF ASTM-APPROVED STEEL (PREFERABLY CIRCULAR OR WITHOUT SHARP CORNERS) OR OF AN APPROVED MATERIAL THAT APPROPRIATELY SIMULATES THE MODULUS OF ELASTICITY OF THE GROUT.

GROUT:

G-1 GROUT: NON-FERROUS, NON-SHRINK GROUT WITH THE SPECIFIED STRENGTH REQUIRED BELOW:

A. 28-DAY STRENGTH: 13,750 PSI.

B. MINIMUM GROUT STRENGTH REQUIRED PRIOR TO ANCHOR BOLT POST-TENSION: 7,500 PSI.

C. MINIMUM GROUT STRENGTH REQUIRED PRIOR TO FULL ERECTION OF TOWER SECTIONS, TURBINE, AND BLADES: 12,375 PSI.

RRC

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PREPARED FOR:
PAULDING WIND FARM III

TIMBER ROAD III WIND PROJECT

PAULDING COUNTY, OHIO

FOR REVIEW ONLY
NOT SEALED FOR CONSTRUCTION

REV	DATE	ISSUE DESCRIPTION
B	03/18/2016	ISSUED FOR REVIEW
A	11/11/2015	PRELIMINARY DESIGN

PROJECT MGR: B. KRAUSE
CHECKED BY: T. CROOK
DESIGNED BY: J. STRIPLING
DRAWN BY: M. HENKEL
SCALE: N.T.S.

0 2"
BAR MUST SCALE 2" FOR FULL SIZE OR 1" FOR HALF SIZE DRAWING

PROJECT NUMBER: M01510047

DRAWING NAME:
GAMESA G114 2.1MW T93M IEC CIII WIND TURBINE FOUNDATION

SPECIFICATION SHEET 2

DRAWING No.	SHEET:	REVISION
S-7	8 OF 10	B

CADFILE: TIMBER ROAD III DRAWING SET

G-2 ONLY EPOXY GROUTS ARE ACCEPTABLE WITH APPROVAL BY STRUCTURAL ENGINEER.

A. WHEN AN EPOXY GROUT IS USED, ANTI-SEIZE BRAND PRODUCT OR SIMILAR MUST BE USED BETWEEN THE GROUT AND THE TOWER FLANGE IN ORDER TO PREVENT THE EPOXY GROUT FROM BONDING TO THE TOWER FLANGE.

B. WHEN AN EPOXY GROUT IS USED, WAIT A MINIMUM OF 48 HOURS TO POST-TENSION THE ANCHOR BOLTS AFTER THE EPOXY GROUT WAS PLACED AND CURED AT A MINIMUM TEMPERATURE OF 65° F IN ORDER TO AVOID POTENTIAL ISSUES WITH TEMPERATURE-RELATED STRENGTH AND EXPANSION EFFECTS.

1. IF TENSIONING IS PERFORMED PRIOR TO 48 HOURS AFTER GROUT PLACEMENT OR IF THE GROUT IS CURED AT A TEMPERATURE LOWER THAN 65° F, THEN THE TENSION IN THE ANCHOR BOLTS MUST BE RECHECKED AFTER A MINIMUM OF SEVEN (7) DAYS AFTER FIRST TENSIONING.

C. WHEN AN EPOXY GROUT IS USED, THE GROUT MUST PROVIDE A MINIMUM EFFECTIVE BEARING AREA OF 85% PER ASTM C1339.

G-3 THE 28-DAY GROUT STRENGTH IS REQUIRED PRIOR TO TURBINE OPERATION.

G-4 THE CONTRACTOR MAY USE A GROUT THAT REACHES THE REQUIRED GROUT STRENGTH PRIOR TO 28-DAYS AT THEIR DISCRETION TO FACILITATE TOWER AND TURBINE ERECTION.

G-5 CONSULT THE MANUFACTURER OF THE FOUNDATION ENGINEER-APPROVED GROUT PRODUCT CONCERNING THE USE OR NEED FOR EXPANSION JOINTS AS WELL AS PROPER HOT AND COLD WEATHER USE OF THE PRODUCT.

G-6 ANY GROUT CRACK REPAIR PRODUCTS SUBMITTED FOR APPROVAL SHALL COMPLY WITH ASTM C881 TYPE IV.

G-7 GROUT JOINT SEALANT PRODUCT SHALL COMPLY WITH ASTM C920 (NON-SELF-LEVELING), UV-RESISTANT, AND WEATHER-RESISTANT (SIKAFLEX 1-A OR SIMILAR).

REINFORCEMENT:

R-1 REINFORCING STEEL: ASTM A615 (GRADE 60 U.N.O.).

R-2 REINFORCEMENT DETAILING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF ACI 318.

R-3 MINIMUM DIAMETER OF BENDS IN REINFORCEMENT SHALL CONFORM TO THE FOLLOWING (UNLESS NOTED OTHERWISE):

BAR SIZE	MINIMUM INSIDE BEND DIAMETER
NO. 3 THROUGH 8	SIX BAR DIAMETERS
NO. 9, 10, AND 11	EIGHT BAR DIAMETERS
NO. 14 AND 18	TEN BAR DIAMETERS

R-4 SPACING OF REINFORCEMENT MAY BE ADJUSTED TO ACCOMMODATE CONDUIT INTERFERENCES AND CLEARANCE ISSUES AROUND THE ANCHOR BOLT ASSEMBLY. REINFORCEMENT SPACING SHALL NOT EXCEED 1'-6" OVER A 2'-0" WIDTH AND SHALL MAINTAIN A MINIMUM CLEAR SPACE BETWEEN PARALLEL REINFORCEMENT OF 1.5". THE TOTAL NUMBER OF BARS SHALL BE PROVIDED AS SHOWN ON THESE DESIGN DRAWINGS.

R-5 NO WELDING OF REINFORCING BARS OR TORCHING TO BEND REINFORCING BARS SHALL BE ALLOWED WITHOUT THE SPECIFIC APPROVAL OF THE STRUCTURAL ENGINEER.

R-6 REINFORCEMENT INSTALLER/FABRICATOR IS RESPONSIBLE FOR THE DESIGN AND PLACEMENT OF REINFORCING SUPPORT CHAIRS/DOBIES, ETC.

R-7 WHEN CONCRETE IS PLACED, REINFORCEMENT SHALL BE FREE OF MATERIALS DELETERIOUS TO BOND.

METALS:

M-1 EMBEDMENT RING:

A. THICKNESS: 1-1/2".

B. MATERIAL: ASTM A572, GRADE 50.

C. FLATNESS: 3/8" (10 mm).

D. REQUIRED WELD MATERIAL STRENGTH: 70 KSI.

M-2 ANCHOR BOLTS:

A. NOMINAL DIAMETER: 1-3/8" (#11).

B. GRADE: ASTM A722 (GRADE 150). B C

C. POST-TENSION: 120 KIPS, WITH +5 KIPS, -0 KIPS TOLERANCE.

D. MINIMUM REQUIRED LENGTH: 10'-3".

E. ENCASED IN PVC PIPE SLEEVE MEETING ASTM D2241, PVC LENGTH: 8'-4 1/2".

F. HEX NUTS: ASTM A108.

1. PER EDPR REQUIREMENTS, ANCHOR BOLT NUTS SHALL BE HOT DIP GALVANIZED PER ASTM A153. B

G. HARDENED WASHERS: ASTM F436.

1. PER EDPR REQUIREMENTS, ANCHOR BOLT WASHERS SHALL BE HOT DIP GALVANIZED PER ASTM A153. B

H. ANCHOR BOLTS SHALL BE INSTALLED WITH A MINIMUM PROJECTION OF 12" (CONTRACTOR TO VERIFY) ABOVE TOWER FLANGE. THIS DIMENSION SHALL BE INCREASED AS REQUIRED TO SUIT POST-TENSIONING INSTALLATION AND REQUIRED MAINTENANCE.

I. ANCHOR BOLTS SHALL BE INSTALLED WITH MINIMUM ½" AND MAXIMUM 2" PROJECTION BELOW NUT. CONTRACTOR SHALL USE NECESSARY METHODS TO RESTRAIN EMBEDMENT PLATE NUT FROM TURNING DURING CONCRETE VIBRATION.

J. NO WELDING OF ANCHOR BOLTS IS ALLOWED.

K. PER EDPR REQUIREMENTS, ANCHOR BOLTS SHALL BE INSTALLED WITH MOLYKOTE 1000 PASTE WATERPROOF THREAD LUBRICANT. B

REQUIRED SUBMITTALS:

RS-1 CONCRETE SUPPLIER SHALL SUBMIT A STRUCTURAL MIX DESIGNED BY A REGISTERED PROFESSIONAL ENGINEER IN THE PROJECT STATE FOR APPROVAL PER MINIMUM REQUIREMENTS OF THESE DESIGN DRAWINGS.

RS-2 CONCRETE MIX DESIGN SUBMITTAL SHALL INCLUDE THE FOLLOWING INFORMATION:

A. AGGREGATES: TYPES, PIT OR QUARRY LOCATIONS, SHIPPING LOCATIONS, PRODUCERS' NAMES, GRADATIONS, SPECIFIC GRAVITIES EVIDENCE SHALL NOT BE MORE THAN 90 DAYS OLD.

B. TEST FOR DELETERIOUS AGGREGATE MATERIALS PER ASTM C33.

C. TEST FOR DELETERIOUS AGGREGATE EXPANSION PER ASTM C289. ALTERNATIVELY, OTHER ASTM TESTING METHODS MAY BE USED, UPON ENGINEER APPROVAL, WHICH ESTABLISHES THAT THE AGGREGATES BEING PROPOSED FOR USE WILL NOT CAUSE DELETERIOUS EXPANSION DUE TO ALKALI SILICA REACTIVITY (ASR).

D. PROPORTIONS OF ALL MATERIALS.

E. CEMENTITIOUS MATERIALS: TYPES, MANUFACTURING LOCATIONS, SHIPPING LOCATIONS, AND CERTIFICATES SHOWING COMPLIANCE WITH ASTM C150, ASTM C595, ASTM C618, ASTM C845, ASTM C989, OR ASTM C1157.

F. BRAND, TYPE, PRODUCERS, MANUFACTURER'S TECHNICAL DATA SHEETS, AND CERTIFICATION DATA OF ALL ADMIXTURES TO BE USED.

G. SOURCE OF MIXING WATER AND ICE.

H. 28-DAY COMPRESSIVE STRENGTH TEST RESULTS OF TRIAL MIXES MEETING THE REQUIREMENTS OF ACI 318 CHAPTER 5.

I. SLUMP TESTED ACCORDING TO ASTM C143 AND SHALL BE WITHIN 3/4 INCH OF THE MAXIMUM SPECIFIED.

J. AIR CONTENT TESTED ACCORDING TO ASTM C231, C173, OR C138 AIR CONTENT SHALL BE WITHIN 0.5% OF THE REQUIRED AVERAGE AIR CONTENT.

K. TEMPERATURE TESTED ACCORDING TO ASTM C1064 AND SHALL BE WITHIN 10 °F OF THE INTENDED MAXIMUM TEMPERATURE OF THE CONCRETE AS MIXED AND DELIVERED.

L. SHRINKAGE TEST RESULTS (IF AVAILABLE).

M. STANDARD DEVIATION VALUE OF 28 DAY STRENGTH FOR CONCRETE PRODUCTION FACILITY (IF AVAILABLE).

RS-3 WHEN THE PROJECT SITE IS EXPECTED TO ENDURE TEMPERATURES BELOW 32 °F, SUBMIT A COLD WEATHER CONCRETING PROCEDURE TO BE APPROVED BY THE PROJECT STRUCTURAL ENGINEER.

A. SUBMIT PROPOSED METHOD OF MEASURING CONCRETE SURFACE TEMPERATURE.

RS-4 SUBMIT A HOT WEATHER CONCRETING PROCEDURE TO BE APPROVED BY THE PROJECT STRUCTURAL ENGINEER.

A. SUBMIT PROPOSED METHOD OF MEASURING CONCRETE SURFACE TEMPERATURE.

B. NOT WEATHER CONCRETING PROCEDURE SHALL INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING ITEMS:

1. MODEL NUMBER OF MANUFACTURER CERTIFIED HANDHELD ANEMOMETER TO BE USED ON THE PROJECT MEETING THE REQUIREMENTS STATED IN THE HOT WEATHER SPECIFICATIONS UNLESS EVAPORATION RETARDANT WILL BE USED ON ALL FOUNDATIONS.

2. UNO EQUATION AND INPUT DATA MEASUREMENT REQUIREMENTS FOR WIND SPEED, TEMPERATURE, AND RELATIVE HUMIDITY AS DESCRIBED IN ACI 305.1-14 UNLESS EVAPORATION RETARDANT WILL BE USED ON ALL FOUNDATIONS.

3. STRUCTURAL ENGINEER OF RECORD-APPROVED BRAND OF EVAPORATION RETARDANT TO BE USED PRIOR TO APPLICATION OF CURING AGENT IN THE EVENT OF EXCESSIVE EVAPORATION CONDITIONS.

RS-5 SUBMIT A WET WEATHER CONCRETING PROCEDURE TO BE APPROVED BY THE PROJECT STRUCTURAL ENGINEER.

RS-6 FOR ANY PRODUCT MATERIAL USED IN OR ON THE FOUNDATIONS NOT COVERED ELSEWHERE IN THESE SPECIFICATIONS, SUBMIT PRODUCT TECHNICAL DATA TO THE STRUCTURAL ENGINEER OF RECORD INCLUDING: B

A. ACKNOWLEDGMENT THAT PRODUCT SUBMITTED MEETS THE REQUIREMENTS OF THE STANDARD REFERENCED.

B. MANUFACTURER'S INSTALLATION INSTRUCTIONS. B

RS-7 REINFORCING STEEL:

A. SUBMIT STEEL REINFORCEMENT MILL CERTIFICATES WITH CRSI PLANT CERTIFICATION.

B. SHOP DRAWINGS SHALL SHOW GRADE, SIZES, NUMBER, CONFIGURATION, SPACING, LOCATION, AND ALL FABRICATION AND PLACEMENT DETAILS. PLACEMENT DETAILS SHALL INCLUDE INSTALLATION OF TOP REINFORCING MAT AROUND ANCHOR BOLT CAGE.

C. SUBMIT A LIST OF SPLICES AND REQUEST TO USE SPLICES NOT INDICATED ON THESE DESIGN DRAWINGS.

D. SUBMIT REQUEST AND PROCEDURE TO FIELD BEND OR STRAIGHTEN REINFORCEMENT PARTIALLY EMBEDDED IN CONCRETE.

E. SHOP DRAWINGS SHALL PROVIDE SUFFICIENT DETAIL TO PERMIT INSTALLATION OF REINFORCEMENT WITHOUT REFERENCING THE CONTRACT DRAWINGS.

F. SUBMIT A REQUEST TO RELOCATE ANY REINFORCEMENT THAT EXCEEDS SPECIFIED PLACEMENT TOLERANCES.

G. OBTAIN APPROVAL OF SHOP DRAWINGS BY STRUCTURAL ENGINEER OF RECORD BEFORE FABRICATION.

RS-8 ANCHOR BOLTS:

A. SUBMIT ANCHOR BOLTS AND ASSOCIATED HARDWARE FOR APPROVAL BY THE STRUCTURAL ENGINEER OF RECORD.

B. SUBMIT MILL CERTIFICATES FOR ANCHOR BOLTS INDICATING YIELD AND ULTIMATE STRENGTHS FOR APPROVAL BY THE STRUCTURAL ENGINEER OF RECORD.

C. SUBMIT A POST-TENSIONING PROCEDURE FOR APPROVAL. PROCEDURE SHALL INCLUDE THE POST-TENSIONING METHOD TO BE USED, AND DEFINED SEQUENCE OF POST-TENSIONING BOLTS. PROCEDURE SUBMITTED SHALL PROVIDE NECESSARY ACCURACY TO MEET POST-TENSION TOLERANCES DEFINED ON THESE DRAWINGS.

1. TENSION THE ANCHOR BOLTS USING HYDRAULIC JACKS EQUIPPED WITH A PRESSURE GAUGE CALIBRATED TO THE JACK WITHIN AN ACCURACY OR PLUS OR MINUS 2%.

2. CALIBRATE THE GAUGE OR DYNAMOMETER IMMEDIATELY BEFORE USE ON PROJECT.

3. THE PRESSURE GAUGE SHALL HAVE GRADUATIONS NO LARGER THAN 100 PSI.

4. JACKING FORCE REQUIRED TO PRODUCE THE PRESTRESSING FORCE AND CALCULATED ELONGATION SHALL BE STATED IN POST-TENSIONING PROCEDURE.

5. DURING POST-TENSIONING, DOCUMENT THAT THE PRESTRESSING FORCE IS ADEQUATE BY COMPARING THE MEASURED ELONGATIONS TO THE CALCULATED ELONGATIONS WITHIN 1/16".

D. SUBMIT A CALIBRATION PROCEDURE AND TESTING PROCEDURE PROPOSED FOR APPROVAL BY THE STRUCTURAL ENGINEER OF RECORD.

E. SUBMIT ANCHOR BOLT TEST DATA SHOWING YIELD AND ULTIMATE TENSION VALUES USING RANDOM MATERIAL SAMPLES THAT ARE REPRESENTATIVE OF THE MATERIAL TO BE DELIVERED TO THE PROJECT.

1. WHEN GRADE 75 OR GRADE 90 BOLTS ARE SPECIFIED, TEST A MINIMUM OF SIX (6) ANCHOR BOLTS TOTAL IN ACCORDANCE WITH ASTM A370.

2. WHEN GRADE 150 BOLTS ARE SPECIFIED, TEST A MINIMUM OF FIVE (5) ANCHOR BOLTS PER PER HEAT RUN IN ACCORDANCE WITH ASTM A370.

F. SUBMIT ANCHOR BOLT QUALITY CHECK PROCEDURE TO STRUCTURAL ENGINEER OF RECORD FOR APPROVAL.

RS-9 EMBEDMENT PLATE:

A. SUBMIT MILL CERTIFICATES FOR EMBEDMENT PLATE INDICATING THE MINIMUM YIELD STRENGTH OF THE MATERIALS.

B. SHOW WELD OR SPLICE DETAIL FOR CONNECTING PLATE SEGMENTS.

RS-10 TEMPLATE PLATE: REFER TO NOTES ON EMBEDMENT RING DETAIL.

RS-11 SUBMIT A GROUT PRODUCT TO BE APPROVED BY THE STRUCTURAL ENGINEER OF RECORD.

RS-12 SUBMIT A GROUTING PROCEDURE TO BE APPROVED BY THE STRUCTURAL ENGINEER OF RECORD.

RS-13 SUBMIT TECHNICAL DATA SHEET OF JOINT SEALANT PRODUCT TO BE USED FOR SEALING THE JOINT BETWEEN THE GROUT AND THE TOWER FLANGE.

RS-14 SUBMIT TECHNICAL DATA SHEET OF CONCRETE CURING AGENT TO BE USED.

RS-15 SUBMIT TECHNICAL DATA SHEET OF CONCRETE EVAPORATION RETARDANT TO BE USED.

RS-16 SUBMIT ELECTRICAL DRAWINGS FOR REVIEW TO ASSESS PLACEMENT OF ELECTRICAL CONDUITS IN RELATION TO THE STRUCTURAL COMPONENTS OF THE FOUNDATION DESIGN.

RS-17 THE STRUCTURAL ENGINEER OF RECORD REVIEW OF THE SHOP DRAWINGS DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR THE ACCURACY CONTAINED WITHIN EVERY DOCUMENT SUBMITTED.

RS-18 A SPECIFICATION OF THE INTENDED STRUCTURAL BACKFILL MATERIAL SHALL BE SUBMITTED TO THE GEOTECHNICAL ENGINEER OF RECORD FOR REVIEW AND APPROVAL.

INSTALLATION TOLERANCES:

ALL CONCRETE CONSTRUCTION TOLERANCES SHALL CONFORM TO ALL REQUIREMENTS OF ACI 117 PUBLISHED BY THE AMERICAN CONCRETE INSTITUTE, FARMINGTON HILLS, MICHIGAN, EXCEPT AS MODIFIED BY THESE DESIGN DRAWINGS.

IT-1 OVERALL BASE HEIGHT AND BASE TOP REINFORCEMENT TOLERANCE: +1", -½".

IT-2 TEMPLATE AND EMBEDMENT RING LOCATION IN PLAN: +/- ¼".

IT-3 CLEAR COVER TOLERANCES: +/- ½".

IT-4 EMBEDMENT RING ELEVATION DIMENSION FROM SUBGRADE (OR MUDMAT): +/- ½".

IT-5 PEDESTAL DIAMETER: -½", +2".

IT-6 BASE DIAMETER: -1", +3".

IT-7 ANCHOR BOLT PLUMBNESS TOLERANCE: ¼ DEGREE MAXIMUM.

TESTING/INSPECTION REQUIREMENTS:

TI-1 CONTRACTOR SHALL HIRE QUALIFIED TESTING AGENCY TO PERFORM TESTING ON SOILS, CONCRETE AND GROUT AS SPECIFIED IN THIS DESIGN DOCUMENT.

TI-2 OWNER SHALL SUBMIT ALL TESTING DATA TO THE GEOTECHNICAL AND STRUCTURAL ENGINEERS OF RECORD AT END OF PROJECT. STRUCTURAL ENGINEER SHALL BE CONTACTED IN WRITING IF ANY OF THE TESTS PERFORMED DO NOT MEET THE SPECIFICATIONS OF THIS DOCUMENT.

TI-3 CONCRETE TESTING SHALL BE PERFORMED RANDOMLY AND IN ACCORDANCE WITH THE FOLLOWING:

A. OBTAIN CONCRETE SAMPLES IN ACCORDANCE WITH ASTM C172. OBTAIN AT LEAST ONE (1) COMPOSITE SAMPLE FOR EACH 100 CU. YD. IN THE BASE AND A MINIMUM OF ONE SAMPLE FOR EACH PEDESTAL.

B. DETERMINE SLUMP OF EACH COMPOSITE SAMPLE TAKEN IN ACCORDANCE WITH ASTM C143.

C. DETERMINE TEMPERATURE OF EACH COMPOSITE SAMPLE TAKEN IN ACCORDANCE WITH ASTM C1064.

D. DETERMINE AIR CONTENT OF EACH COMPOSITE SAMPLE USING ASTM C231, C173, OR C138.

E. TESTING AGENCY SHALL PERFORM CONCRETE COMPRESSIVE STRENGTH TESTS ACCORDING TO ASTM C39.

1. IF 6" X 12" CYLINDERS ARE BEING USED, CONCRETE CYLINDERS SHALL BE TESTED AT THE FOLLOWING TIME INTERVALS:

i. ONE (1) PRIOR TO BACKFILL OPERATIONS.

ii. ONE (1) PRIOR TO ANCHOR BOLT POST-TENSIONING.

iii. ONE (1) PRIOR TO ERECTION OF NACELLE AND ROTOR.

iv. TWO (2) AT 28-DAYS.

v. TWO (2) SPARE CYLINDERS (TO BE TESTED ONLY IF NEEDED).

2. IF 4" X 8" CYLINDERS ARE ALLOWED AND BEING USED (SEE NOTE F BELOW), CONCRETE CYLINDERS SHALL BE TESTED AT THE FOLLOWING TIME INTERVALS:

i. ONE (1) PRIOR TO BACKFILL OPERATIONS.

ii. ONE (1) PRIOR TO ANCHOR BOLT POST-TENSIONING.

iii. ONE (1) PRIOR TO ERECTION OF NACELLE AND ROTOR.

iv. THREE (3) AT 28-DAYS.

v. THREE (3) SPARE CYLINDERS (TO BE TESTED ONLY IF NEEDED).

3. UNLESS AIR IS TESTED ON EVERY LOAD OF CONCRETE, TESTING AGENCY SHALL PROVIDE AIR AND SLUMP TESTING FOR FIRST THREE (3) TRUCKLOADS DELIVERED EACH DAY TO ENSURE BATCH PLANT CONCRETE IS WITHIN SPECIFICATIONS.

F. CONCRETE CYLINDER TESTS SHALL BE PERFORMED USING 6" X 12" CYLINDERS, HOWEVER, 4" X 8" CYLINDERS MAY BE USED PROVIDED THE NOMINAL MAXIMUM COARSE AGGREGATE SIZE IS 1" OR SMALLER (NOMINAL MAXIMUM COARSE AGGREGATE SIZE IS THE FIRST SIEVE SIZE WHERE A PORTION OF THE AGGREGATE IS ALLOWED TO BE RETAINED).

G. THE STRENGTH OF CONCRETE SHALL BE CONSIDERED SATISFACTORY WHEN:

1. THE AVERAGES OF ALL SETS OF THREE CONSECUTIVE COMPRESSIVE STRENGTH TEST RESULTS MOLDED AND CURED IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM C31 EQUAL OR EXCEED F'C.

2. NO INDIVIDUAL STRENGTH TEST RESULT FALLS BELOW F'C BY MORE THAN 500 PSI WHEN F'C IS 5000 PSI OR LESS, OR BY MORE THAN 0.10F'C WHEN F'C IS MORE THAN 5000 PSI.

H. THERE IS NO TESTING REQUIREMENT FOR THE LEAN (MUD MAT) CONCRETE.

TI-4 GROUT TESTING SHALL BE PERFORMED ACCORDING TO THE FOLLOWING:

A. FOR EPOXY GROUTS, COMPRESSIVE STRENGTH SHALL BE TESTED IN ACCORDANCE WITH ASTM C579, METHOD B.

B. FOR CEMENT-BASED GROUTS, COMPRESSIVE STRENGTH SHALL BE TESTED IN ACCORDANCE WITH ASTM C1107. A

C. TESTING AGENCY SHALL SAMPLE GROUT FOR COMPRESSIVE STRENGTH TESTS ACCORDING TO ASTM C1107 (FOR CEMENTITIOUS GROUT) OR ASTM C579, METHOD B (FOR EPOXY GROUT) EXCEPT AS MODIFIED IN THIS SECTION. GROUT CUBES SHALL BE TESTED AT THE FOLLOWING TIME INTERVALS:

1. WHEN A CEMENT-BASED GROUT IS USED:

i. ONE (1) MIN. PRIOR TO ANCHOR BOLT POST-TENSIONING.

ii. ONE (1) MIN. PRIOR TO ERECTION OF NACELLE AND ROTOR.

iii. THREE (3) MIN. PRIOR TO TURBINE OPERATION.

iv. THREE (3) MIN. SPARE CUBES (TO BE TESTED ONLY IF NEEDED).

2. WHEN AN EPOXY-BASED GROUT IS USED:

i. THREE (3) MIN. TO BE TESTED AT INTERVALS DETERMINED AT THE CONTRACTOR'S DISCRETION PRIOR TO ANCHOR BOLT POST-TENSIONING AND ERECTION OF NACELLE AND ROTOR.

ii. SIX (6) MIN. PRIOR TO TURBINE OPERATION, BUT TESTED NO SOONER THAN SEVEN (7) DAYS AFTER GROUT PLACEMENT.

iii. SIX (6) MIN. SPARE CUBES (TO BE TESTED ONLY IF NEEDED), BUT TESTED NO SOONER THAN SEVEN (7) DAYS AFTER GROUT PLACEMENT.

3. GROUT CUBES MUST ACHIEVE THE STRENGTH SPECIFIED IN THESE DRAWINGS PRIOR TO THESE ERECTION STEPS.

TI-5 AT ANY LOCATION WHERE STRUCTURAL BACKFILL IS REQUIRED UNDER THE FOUNDATION, THE TESTING AGENCY SHALL TEST COMPACTION PERCENT AND MOISTURE CONTENT AT EACH LIFT IN ACCORDANCE WITH THESE DRAWING SPECIFICATIONS.

ANCHOR BOLT POST-TENSION MAINTENANCE (BY OWNER):

AB-1 THE FOLLOWING ON-GOING ANCHOR BOLT POST-TENSION MAINTENANCE SCHEDULE AND PROCEDURE SHALL BE FOLLOWED:

A. RANDOMLY CHECK THE POST-TENSION ON 10% OF THE BOLTS ON EACH TURBINE FOUNDATION; CHECK AN EQUAL NUMBER OF BOLTS ON THE INSIDE AND OUTSIDE OF THE TOWER. THE ANCHOR BOLT POST-TENSION VALUES AT EACH TURBINE FOUNDATION SHALL BE CHECKED AT THE FOLLOWING INTERVALS:

1. SIX (6) MONTHS AFTER TURBINE OPERATION BEGINS.

2. YEARS 1-5: ANNUALLY.

3. OVER 5 YEARS: EVERY 2 YEARS.

B. PASSING IS ACHIEVED WHEN ALL POST-TENSION VALUES ON THE ANCHOR BOLTS EXCEED 90% OF THE ORIGINAL POST-TENSION VALUE. A HYDRAULIC JACK SHALL BE USED TO PULL EACH OF THE SELECTED ANCHOR BOLTS TO THE 90% VALUE. WHEN PULLING BOLTS TO THIS POST-TENSION, THERE SHALL BE NO GAPS BETWEEN THE NUTS AND WASHERS, AND THE NUT SHALL NOT BE ABLE TO BE TURNED BY HAND. IF ANY INDIVIDUAL BOLT PER TURBINE FAILS BY LIFTING OFF THE WASHER AND ALLOWING THE NUT TO BE TURNED BY HAND, THE REMAINING 90% OF BOLTS ON THAT PARTICULAR TURBINE FOUNDATION SHALL BE CHECKED. IF THE 90% POST-TENSION VALUE IS NOT MET ON ANY PARTICULAR BOLT, THAT FAILING BOLT SHALL BE POST-TENSIONED TO 100% OF THE ORIGINAL REQUIRED POST-TENSION.

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PREPARED FOR:

PAULDING WIND FARM III

TIMBER ROAD III WIND PROJECT

PAULDING COUNTY, OHIO

FOR REVIEW ONLY
NOT SEALED FOR CONSTRUCTION

RBV	DATE	ISSUE DESCRIPTION
C	03/18/2016	ISSUED FOR REVIEW
B	12/07/2015	REVISION
A	11/11/2015	PRELIMINARY DESIGN

PROJECT MGR: B. KRAUSE
CHECKED BY: T. CROOK
DESIGNED BY: J. STRIPLING
DRAWN BY: M. HENKEL

SCALE: N.T.S.

0 2"
BAR MUST SCALE 2" FOR FULL SIZE
OR 1" FOR HALF SIZE DRAWING

PROJECT NUMBER: MD1510047

DRAWING NAME:

GAMESA G114 2.1MW T93M IEC CIII WIND TURBINE FOUNDATION

SPECIFICATION SHEET 3

DRAWING No.	SHEET:	REVISION
S-8	9 OF 10	C

CADFILE: TIMBER ROAD III DRAWING SET

TURBINE LOCATIONS BASED ON "Table A1_MD1510047_Timber Roads_RC.xls" PROVIDED IN GEOTECHNICAL REPORT APPENDIX A DATED 3/8/2016.

FINAL TURBINE ID	LATITUDE	LONGITUDE	62'-6" FOUNDATION	66'-6" FOUNDATION	ESTIMATED GROUNDWATER DEPTH (FT. BELOW EXISTING GRADE)	COMMENTS
T-1	41.148109044	-84.790289209	X		4.8	
T-2	41.144905682	-84.790534873		X	1.1	
T-3	41.141373751	-84.790539098		X	0.5	
T-4	41.137408823	-84.790059048		X	2.2	
T-5	41.124599974	-84.793722328		X	0.0	
T-6	41.119703870	-84.792457127	X		4.9	
T-7	41.116173990	-84.792465378	X		4.0	
T-8	41.112694340	-84.793691504		X	0.0	
T-9	41.101028126	-84.798662753		X	1.0	
T-10	41.087143750	-84.798390432		X	0.0	
T-11	41.083805216	-84.801293016		X	0.0	
T-12	41.158470583	-84.774882066	X		6.0	
T-13	41.155665305	-84.774749266		X	2.3	
T-14	41.145857252	-84.777794147		X	0.0	
T-15	41.141763582	-84.775361903	X		5.1	
T-16	41.138026714	-84.775379991		X	0.1	
T-17	41.134366624	-84.776027628		X	1.2	
T-18	41.130818211	-84.777183324		X	2.3	
T-19	41.127243915	-84.775891259	X		4.1	
T-20	41.123767634	-84.777289285		X	0.0	
T-21	41.112650627	-84.776673656		X	0.4	
T-22	41.105292135	-84.777013415		X	1.0	
T-23	41.094558305	-84.774639656	X		4.5	
T-24	41.090716089	-84.774193938		X	1.7	
T-25	41.087432980	-84.773079320		X	1.0	
T-26	41.160056789	-84.757811466		X	0.7	
T-27	41.156682269	-84.753500431		X	2.9	
T-28	41.146582130	-84.759072320				LOCATION ON HOLD
T-29	41.137260220	-84.754332350		X	3.3	
T-30	41.134290050	-84.754040422		X	2.1	
T-31	41.130741090	-84.753809025	X		4.5	
T-32	41.118803179	-84.753831096		X	3.1	
T-33	41.115653558	-84.753850688	X		4.2	
T-34	41.095201786	-84.757294067	X		6.8	
T-35	41.087133780	-84.754793960		X	0.2	
T-36	41.084208110	-84.754545390		X	0.0	
T-37	41.081233960	-84.755020320		X	1.3	
T-38	41.160498528	-84.738971097		X	1.5	
T-39	41.157096863	-84.736415794		X	0.0	
T-40	41.153903766	-84.734333161		X	1.7	
T-41	41.148005419	-84.734847235		X	3.4	
T-42	41.144913180	-84.734966822		X	1.3	
T-43	41.141632602	-84.734747037		X	0.0	
T-44	41.138857598	-84.733821032	X		5.3	
T-45	41.131554784	-84.737397435	X		5.2	
T-46	41.128208239	-84.737373914	X		5.1	
T-47	41.125248582	-84.737342090	X		5.0	
T-48	41.118104822	-84.737497373	X		4.9	
T-49	41.115038683	-84.737229450		X	0.0	
T-50	41.112032579	-84.737194350	X		7.8	
T-51	41.162393070	-84.720380260		X	2.9	
T-52	41.159283140	-84.718218530	X		8.2	
T-53	41.156003560	-84.718052270	X		4.6	
T-54	41.147398070	-84.715583380		X	0.0	
T-55	41.144119430	-84.716795250		X	2.0	
T-56	41.140986340	-84.716914980		X	1.7	
T-57	41.130149211	-84.719238201		X	1.4	
T-58	41.126498521	-84.717884062	X		8.2	
T-59	41.117108402	-84.716194271	X		5.0	
T-60	41.112323816	-84.714556592				LOCATION ON HOLD
TOTAL			20	38	58	

NOTES:

1. FOR ANY LOCATIONS THAT REQUIRE SUBGRADE MATERIAL IMPROVEMENTS, REFER TO THE GEOTECHNICAL SPECIFICATION SECTION OF THESE DRAWINGS FOR THOSE REQUIREMENTS.

RRC

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PREPARED FOR:
PAULDING WIND FARM III

TIMBER ROAD III WIND PROJECT

PAULDING COUNTY, OHIO

FOR REVIEW ONLY
NOT SEALED FOR CONSTRUCTION

REV	DATE	ISSUE DESCRIPTION
A	03/18/2016	ISSUED FOR REVIEW

PROJECT MGR: B. KRAUSE
CHECKED BY: T. CROOK
DESIGNED BY: J. STRIPLING
DRAWN BY: M. HENKEL
SCALE: N.T.S.

0 2"
BAR MUST SCALE 2" FOR FULL SIZE OR 1" FOR HALF SIZE DRAWING

PROJECT NUMBER: MD1510047

DRAWING NAME:
GAMESA G114 2.1MW T93M IEC CIII WIND TURBINE FOUNDATION

TURBINE LOCATION TABLE

DRAWING No.	SHEET	REVISION
S-9	10 OF 10	A

CADFILE: TIMBER ROAD III DRAWING SET

Elliott, Ryan D.

From: Distelrath, Sarah
Sent: Friday, April 01, 2016 1:43 PM
To: grant.zeto@puc.state.oh.us
Cc: Brooks, Chris; Bowser, Erin
Subject: RE: Timber Road I and Timber Road III - Condition Response for Complaint Resolution
Attachments: OPSB_ComplaintResolution_20160401.doc

Grant,

Complaint Resolution

Please find attached the Complaint Resolution for both Paulding Wind Farm, LLC Case No. 09-980-EL-BGN and Paulding Wind Farm III, LLC Case No. 10-369-EL-BGN.

The attachment will meet Stipulation Condition number 10 within Paulding Wind Farm, LLC Case No. 09-980-EL-BGN and condition number 09 within Paulding Wind Farm III, LLC Case No. 10-369-EL-BGN.

Thank you,
Sarah Distelrath

Sarah Distelrath
EDP Renewables North America LLC
Development - Eastern Region
155 E. Market, Suite 307 Indianapolis, IN 46204
Direct 317.636.0866 Cell 713.449.8224 Fax 317.636.1418
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Paulding Wind Farm I LLC, a wholly-owend subsidiary of EDP Renwables North America LLC (EDPR)

and

Paulding Wind Farm III LLC, a wholly-owend subsidiary of EDP Renwables North America LLC (EDPR)

Timber Road Complaint Resolution Plan

PURPOSE: To ensure that the wind farm does not make living conditions materially worse for residents of the community, a transparent and effective complaint resolution plan will be implemented so that members of the community have a mechanism for seeking resolution for interferences or disturbances experienced that are a direct result of the wind farm.

BACKGROUND: EDPR is committed to ensuring that an accessible process is in place for community members to voice concerns pertaining to the wind farm and for those concerns to be addressed as quickly and effectively as possible. Maintaining detailed record of all complaints and the resolutions that follow is an important aspect of the complaint resolution plan.

POLICY: The policy of EDPR is to take all reasonable actions necessary to rectify legitimate interference or disturbances that are a direct result of the wind farm. Where reasonable actions are implemented and do not minimize the interference or disturbance, EDPR will compensate the impacted resident by entering into a

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Corporate Headquarters
808 Travis, Suite 700
Houston, TX 77002
T: 713 265 0350 F: 713 265 0365

participation agreement that will provide annual compensation for the life of the wind farm project.

PROCEDURE:

1.) EDPR will offer to residents whose occupied residence is near a wind turbine a participation agreement prior to the wind farm being commercially operational. This will be done in order to educate residents about the wind farm and to compensate them even though it is not anticipated that they will receive any negative effects, disturbance or interference as a direct result of the wind farm.

2.) EDPR has established a toll free number , and EDPR will ensure that the phone number is provided to the county commissioners, township trustees, emergency responders and the schools and public libraries within the project area prior to Timber Road III and Timber Road I wind farms being commercially poerational. A resident with a complaint may either call the toll free number, at 1-866-263-5594 and leave a message 24 hours a day, or, go to the Operations and Maintenance Facility for the wind farm to register a complaint.

3.) EDPR will be responsible for keeping a log book which registers every complaint that is received. The log book will contain all pertinent information about the person making the complaint, the issues surrounding the complaint and the date that it was received. The log book will also contain the resolution that was suggested and implemented and the date that the matter was resolved. EDPR personnel will forward complaints about interference or disturbance that are a direct result of the wind farm to the Ohio Power Siting Board within 48 hours of receiving the complaint and

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will generate a quarterly report outlining the nature of the resolution. Quarterly reports will be sent to the Staff of the Ohio Power Siting Board on the following date of each year (April 15th, July 15th, October 15th and January 15th).

4) Residents who register a complaint with EDPR will receive correspondence from the company no later than 48 hours after registering the complaint. The intent of the initial correspondence is to garner more information about the individual's complaint. Within 30 days of the complaint being received EDPR will take all reasonable action to resolve the legitimate complaint about interference or disturbance that is a direct result of the wind farm facility. If it is determined that the reasonable action taken by does not satisfactorily mitigate the interference or disturbance, EDPR will provide compensation to the resident in the form of a participation agreement in which annual compensation shall be provided to the resident.

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Elliott, Ryan D.

From: Distelrath, Sarah
Sent: Monday, March 28, 2016 4:09 PM
To: 'grant.zeto@puc.state.oh.us'
Cc: Brooks, Chris; Bowser, Erin
Subject: Timber Road I and Timber Road III - Condition Response for Proposed Batch Plant Locations
Attachments: OPSB_PossibleBatchPlantwithinProjectAreaLocation_20160223.pdf

Grant,

Proposed Batch Plant Locations

In compliance with Paulding Wind Farm III LLC condition #10 of the Joint Stipulation and Recommendation in Case No. 10-369-EL-BGN and Paulding Wind Farm LLC condition #9 of the Joint Stipulation and Recommendation in Case No. 09-980-EL-BGN issued by the Ohio Power Siting Board of Ohio, what follows are three potential locations on which a concrete batch plant may be built for construction of the facility.

The first potential location would be outside of the boundary of the project area at an existing batch plant facility in Paulding, Ohio. The address for this facility is: 121 German Street Paulding, Ohio 45879.

The second potential location would be Baker-Shindler Ready Mix, located at 525 Cleveland Ave Defiance, OH 43512.

The third potential location would be a portable batch facility just North of Payne, Ohio as depicted within the attached map.

Thank you,
Sarah Distelrath

Sarah Distelrath
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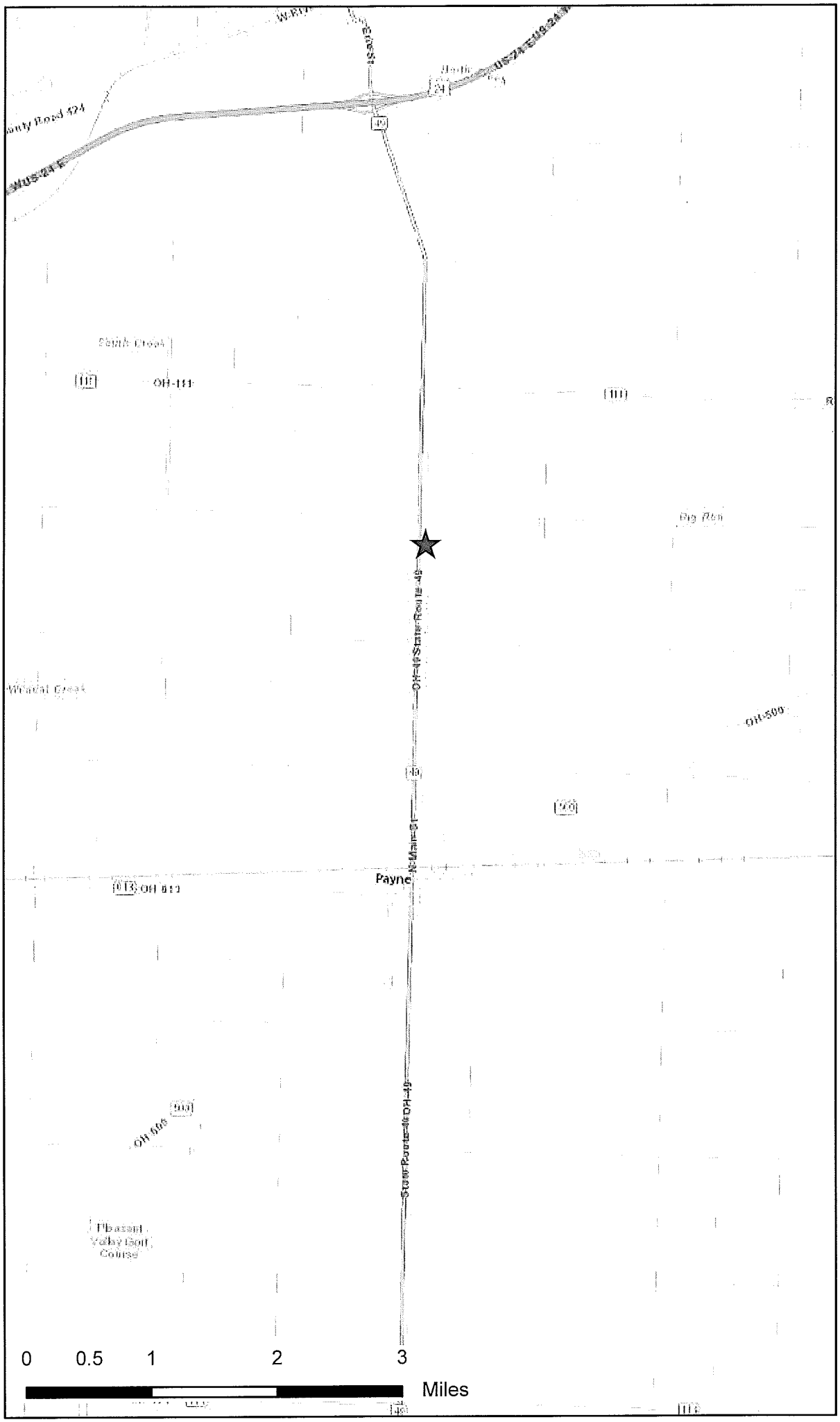

Possible Batch Plant Location

Legend

Batch Plant

N

Date: Febuary 23, 2016

Notes:
Base Map: ESRI Street Map

edp renewables

Elliott, Ryan D.

From: Distelrath, Sarah
Sent: Tuesday, May 24, 2016 6:22 PM
To: 'grant.zeto@puc.state.oh.us'
Cc: Brooks, Chris; Bowser, Erin; 'Dawdy, Gregory'
Subject: Timber Road I and Timber Road III - Environmental Specialist

Grant,

Environmental Specialist

We have hired on Greg Dawdy from Tetra Tech as our environmental specialist. He will be on site during construction activities that may affect environmentally sensitive areas. Greg is familiar with water quality protection issues and able to field-identify mussels and potential threatened or endangered species of plants and animals that may be encountered during facility construction.

The contents of this email will satisfy condition number 18 and 19 Paulding Wind Farm, LLC Case No. 09-980-EL-BGN and Paulding Wind Farm III, LLC Case No. 10-369-EL-BGN will not apply.

Thank you,
Sarah Distelrath

Sarah Distelrath
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Elliott, Ryan D.

From: Distelrath, Sarah
Sent: Thursday, May 19, 2016 6:23 PM
To: grant.zeto@puc.state.oh.us
Cc: Brooks, Chris; Bowser, Erin; Cunningham, Christopher (Christopher.Cunningham@puc.state.oh.us)
Subject: Timber Road I and Timber Road III - Muscle Survey
Attachments: Timber Road III Mussel Survey Report Final.pdf

Grant,

Muscle Survey

Attached is the muscle survey completed for both Paulding Wind Farm, LLC and Paulding Wind Farm III, LLC.

The contents of this email will satisfy condition number 19 and 20 Paulding Wind Farm, LLC Case No. 09-980-EL-BGN and Paulding Wind Farm III, LLC Case No. 10-369-EL-BGN will not apply.

Please let me know if you have any questions regarding this condition.

Thank you,
Sarah D.

Sarah Distelrath
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From: Distelrath, Sarah
Sent: Thursday, March 17, 2016 4:54 PM
To: 'grant.zeto@puc.state.oh.us' <grant.zeto@puc.state.oh.us>
Cc: Brooks, Chris <Chris.Brooks@edpr.com>; Bowser, Erin <Erin.Bowser@edpr.com>
Subject: Timber Road I and Timber Road III - Condition Response for Updated Licensed Microwave Report

Grant,

Microwave Beam Path Report

Please find attached an updated Microwave Beam Path Report. The attachment will meet Stipulation condition number 44 within Paulding Wind Farm, LLC Case No. 09-980-EL-BGN. Although not a condition

within the Opinion Order and Certificate, the attached document also includes turbines within the Paulding Wind Farm III, LLC Case No. 10-369-EL-BGN.

In addition to meeting Stipulation conditions, the attached also satisfies the OPSB request to provide documentation all wind turbines are sited in locations that would not obstruct existing Fresnel zones. The report states within the final page, Section 5 Conclusion, "Based on the cross sectional analysis, it was determined that the blades should clear the Fresnel Zones. Therefore, no turbines will cause obstruction to the licensed microwave system in the area."

Thank you,
Sarah Distelrath

Sarah Distelrath
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Timber Road III Pre-Construction Freshwater Mussel Survey Report
Paulding County, Ohio

Final Report

Prepared for:

EDP Renewables, North America

134 North LaSalle Street, Suite 2050
Chicago, Illinois 60602

Prepared by:

T. Travis Brown

Western EcoSystems Technology, Inc.
408 West 6th Street
Bloomington, Indiana 47404

May 19, 2016

EXECUTIVE SUMMARY

EDP Renewables (EDPR) is planning the development of the Timber Road Phase III wind project (Project) in Paulding County, Ohio (OH). EDPR requested that Western EcoSystems Technology, Inc. (WEST) conduct freshwater mussel surveys at the site. All native freshwater mussels (*Unionidae*) are protected in the State of Ohio (Section 1533.324 of the Ohio Revised Code), and 10 federally-listed mussel species occur in the state. In addition, a mussel survey is required as an Ohio Power Siting Board (OPSB) permit condition for this Project. A study plan describing survey protocols used in this project was reviewed and accepted by the Ohio Department of Natural Resources (ODNR) prior to fieldwork.

Presence/absence mussel surveys were conducted within stream segments that will be impacted by trenching activities for the installation of culverts and the underground electric system or from potential frac-out as a result of utilizing HDD (horizontal directional drilling). To meet this objective, mussel reconnaissance surveys were conducted at 19 sites, and a follow-up in-stream timed search survey was conducted at one site where marginal evidence of freshwater mussel populations was encountered (weathered dead shells).

During the in-stream survey, a weathered dead valve from a giant floater (*Pyganodon grandis*) and weathered dead valves from a creeper (*Strophitus undulatus*) were found downstream of the area of potential impact. Habitat encountered in the Project area was extremely marginal in terms of its likelihood to support populations of mussels. All waterways assessed during this survey have been altered by human activities. Streams have been heavily channelized, and field tiles contribute most of the water flowing through these systems. The majority of waterways observed is likely to be dry during parts of the year and may have only contained water due to recent spring rains. While weathered dead valves of two mussel species indicates that there are likely to be small populations of mussels upstream of one site (site 5), the two species encountered are not rare and do not indicate particularly high quality mussel habitat.

The results of reconnaissance and in-stream surveys indicate that it is unlikely there will be any effect to freshwater mussel populations in the Project area as a result of construction activities. The use of HDD, where possible, further reduces the likelihood of any impact on native mussels.

STUDY PARTICIPANTS

Western EcoSystems Technology, Inc.

Travis Brown	Project Manager, OH-Approved Malacologist
Karl Dubridge	Field Technician
Rebecca Schmitt	Technical Editor

REPORT REFERENCE

Brown, T.T. 2016. Timber Road III Pre-Construction Mussel Survey Report, Paulding County, Ohio. Prepared by Western EcoSystems Technology, Inc. (WEST), Bloomington, Indiana.

ACKNOWLEDGEMENTS

We thank Erin O'Shea (EDP Renewables) for funding and John Navarro (ODNR) for review of the study plan.

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Appendix B: Survey Datasheets

INTRODUCTION

EDP Renewables (EDPR) is planning the development of the Timber Road Phase III wind project (Project) in Paulding County, Ohio (OH). EDPR requested that Western EcoSystems Technology, Inc. (WEST) conduct freshwater mussel surveys at the site. All native freshwater mussels (*Unionidae*) are protected in the State of Ohio (Section 1533.324 of the Ohio Revised Code), and 10 federally-listed mussel species occur in the state. In addition, a mussel survey is required as an Ohio Power Siting Board (OPSB) permit condition for this Project.

The surveys were located in Paulding County, OH. Land use in the Project area is dominated by row crop agriculture. Livestock operations, such as dairies, are also present in the project area, with the remainder of land cover consisting primarily of hayfields, grasslands, isolated stands of deciduous forest, and residential areas.

All streams in the Project area were either Group 1 or unlisted streams (Ohio Department of Natural Resources [ODNR] and US Fish and Wildlife Service [USFWS] 2016, Appendix A), where federally-listed species were not expected. Streams sampled included: North Creek, South Creek, Wildcat Creek, several named ditches, and unnamed tributary streams and ditches (Figure 1, Table 1). Streams in the Project area are part of the Maumee River system. Twelve-digit Hydrologic Unit Codes (HUC) for the Project area included: 041000050201 and 041000071205. The aquatic life use designation for streams in this area is warmwater habitat (Ohio Environmental Protection Agency [OEPA] 2016). The Ohio Mussel Atlas (Ohio State University 2016) shows a single collection site from this area, and giant floater (*Pyganodon grandis*) is the only species reported from the site.

METHODS

Approval of the methods described here was provided by ODNR via e-mail on April 14, 2016 (Pers. Comm. John Navarro, ODNR). Surveys were conducted by ODNR-approved mussel surveyor (Travis Brown permit number 17-265) on April 25-29, 2016. The survey methodology was developed using the Ohio Mussel Survey Protocol (ODNR and USFWS 2015). However, this methodology was adapted to address the requirements of the Project's OPSB permit. Specifically, the Ohio Mussel Survey Protocol does not require mussel surveys in streams that are not listed in Appendix A of that document with a watershed size less than 10 square miles (mi^2; 26 square kilometers [km^2] e.g., Wildcat Creek). All streams except for a portion of South Creek within the Project area are located in watersheds less than 10 mi^2 (26 km^2). However, as per the Project permit, presence/absence mussel surveys were conducted "within stream segments that will be impacted by trenching activities for the installation of culverts and the underground electric system or from potential frac-out as a result of utilizing HDD." To meet this objective, the following two surveys were completed: 1) mussel reconnaissance surveys, and 2) in-stream timed search surveys.

Table 1. Characteristics of stream crossings assessed during the Timber Road III mussel survey.

Area of Direct Impact

Crossing ID	Name	(Center) Latitude	Longitude	Township	County	Drainage Area (mi^2)[a]
1	North Creek	41.15790	-84.77490	Harrison	Paulding	1.47
2	North Creek	41.15940	-84.75380	Harrison	Paulding	2.27
3	Unnamed Ditch	41.16160	-84.71970	Harrison	Paulding	0.05
4	Unnamed Ditch	41.15050	-84.77510	Harrison	Paulding	0.05
5	South Creek	41.14590	-84.73480	Harrison	Paulding	10.3
6	South Creek	41.13970	-84.77540	Harrison	Paulding	1.92
7	Mansfield Ditch	41.12400	-84.78490	Harrison	Paulding	<0.01
8	Unnamed Ditch	41.12150	-84.77520	Harrison	Paulding	0.07
9	Unnamed Ditch	41.12120	-84.73200	Harrison	Paulding	0.54
10	Big Run	41.12130	-84.72680	Harrison	Paulding	0.76
11	Wildcat Creek	41.09950	-84.79890	Harrison	Paulding	<0.01
12	Wildcat Creek	41.09930	-84.75560	Harrison	Paulding	1.4
13	Wildcat Creek	41.10170	-84.75070	Harrison	Paulding	6.42
14	Smile Ditch	41.08760	-84.79430	Harrison	Paulding	0.29
15	Stabler Ditch	41.08870	-84.78470	Harrison	Paulding	0.44
16	Stabler Ditch	41.08860	-84.77480	Harrison	Paulding	1.09
17	Wooding Ditch	41.09090	-84.76520	Harrison	Paulding	0.39
18	Brady Ditch	41.08500	-84.75550	Harrison	Paulding	0.24
19	Smile Ditch	41.08490	-84.79430	Harrison	Paulding	0.28

[a]Source: http://water.usgs.gov/osw/streamstats/ohio.html

Reconnaissance Mussel Survey Methods

Appendix B of the Ohio Mussel Survey Protocol provides guidelines for a reconnaissance survey to be conducted as a first step at small streams where federally-listed species are not expected. Reconnaissance surveys were conducted first to determine the presence or absence of native freshwater mussels. The area of direct impact (ADI), as well as a 122-meter (m, 400-foot [ft]) downstream (DS) buffer and a 61-m (200-ft) upstream (US) buffer were surveyed. Beginning at the downstream end of the buffer zone, the stream substrates were visually searched for evidence of shells, shell fragments, or live mussels. All stream habitats (not just suitable habitats) were visually inspected, but special attention was paid to heterogeneous substrates, where living mussels could be difficult to see (e.g., sand and gravel interspersed with cobbles). A plexiglass-bottom bucket was used during the survey to aid in viewing the substrates. Each stream segment that contained water was searched for a minimum of 60 minutes unless evidence of native freshwater mussels was encountered before that time.

In-Stream Mussel Survey Methods

Where native mussels were identified in the sample reach during reconnaissance, a qualified biologist (Travis Brown) conducted timed searches of that segment. Timed search surveys were used to sample the ADI, as well as US and DS buffers. Surveys were conducted within the ADI, and extended 10 m (33 ft) US and 25 m (82 ft) DS from the ADI. The survey area extended from bank-to-bank within each reach. Timed search surveys consisted of visually searching throughout each section (ADI, US, and DS) for at least 1 minute/m^2 of heterogeneous substrate.

Searching consisted of visual and tactile searches that include moving cobble and woody debris; hand sweeping away silt, sand, and/or small detritus; and disturbing/probing the upper five centimeter (cm) of substrate in order to better view the mussels which may be there. All dead shells found were collected and retained. These shells were identified and determined to be freshly dead (dead less than one year), weathered dead (dead one to five years), or subfossil (dead more than five years). Only living and freshly dead shells were used to indicate an extant population of mussels within a reach.

RESULTS

Reconnaissance Mussel Survey Results

During a previous jurisdictional waters delineation, 32 sections of stream/ditch were identified that are near Project infrastructure. Three additional locations were identified where electrical collection lines will be placed under the stream/ditch channel using HDD. Of these 35 total locations, eight will consist of overhead transmission line crossings, where no in-stream impacts are anticipated. In addition, potential in-stream impacts have been avoided at eight locations by siting infrastructure away from stream channels. At the remaining 19 locations, Project infrastructure will cross a stream channel, and reconnaissance surveys were conducted at these locations.

Three locations were dry at the time of survey, and required no further survey. Water was present at 16 locations; however, no evidence of freshwater mussel populations was found at 15 of the sites. The only reconnaissance survey area where mussel shells were encountered was on South Creek (Site 5). Weathered dead valves of a single giant floater were found at this site. Weathered dead shells do not trigger an in-stream freshwater mussel survey (ODNR and USFWS 2016); however, due to an incidental observation of a state-threatened species (pondhorn [*Uniomerus tetralasmus*]) at a bridge crossing approximately 770 m (0.48 mi) downstream of Site 5, an in-stream mussel survey was completed at this location.

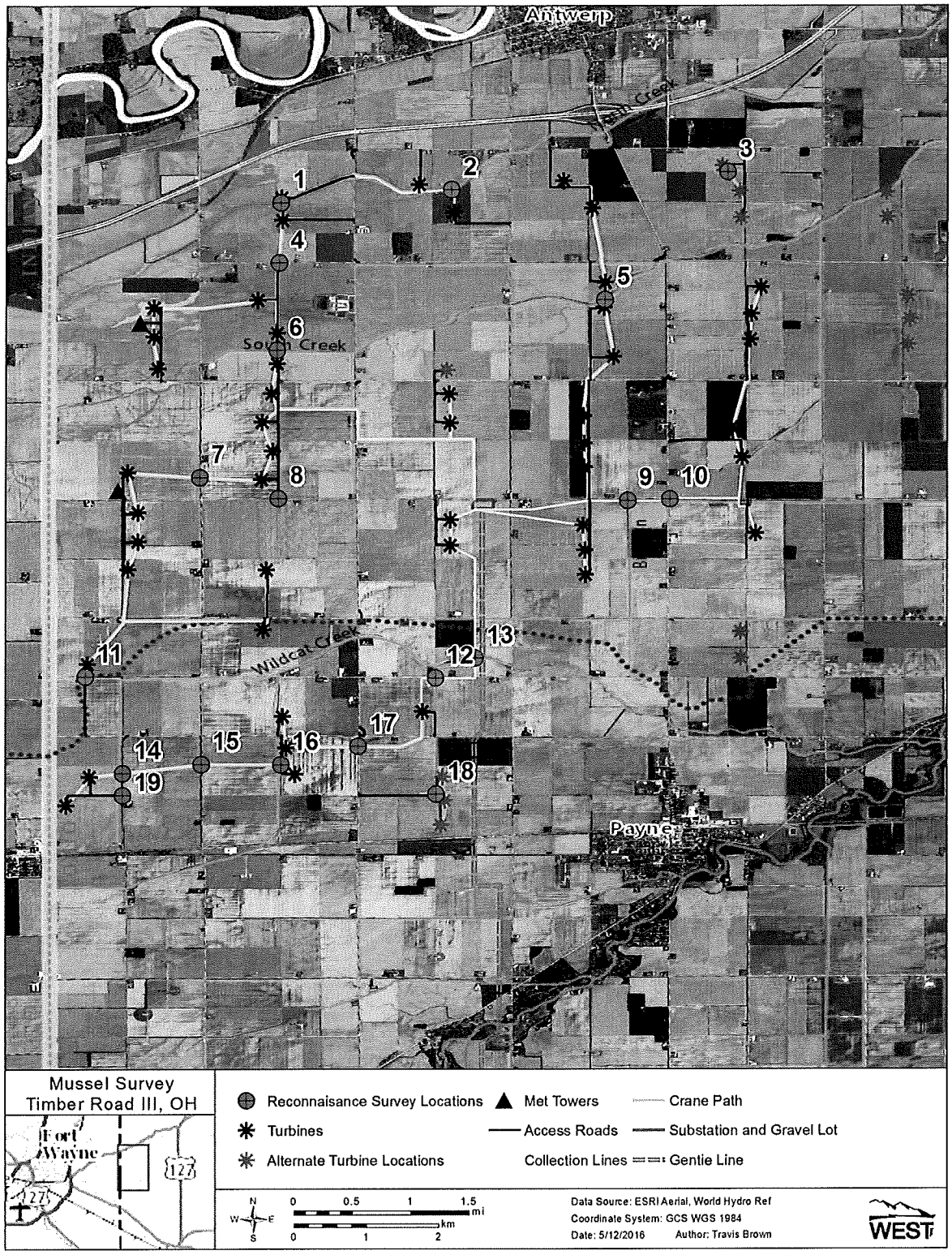


Figure 1. Reconnaissance survey locations for the Timber Road III mussel survey.

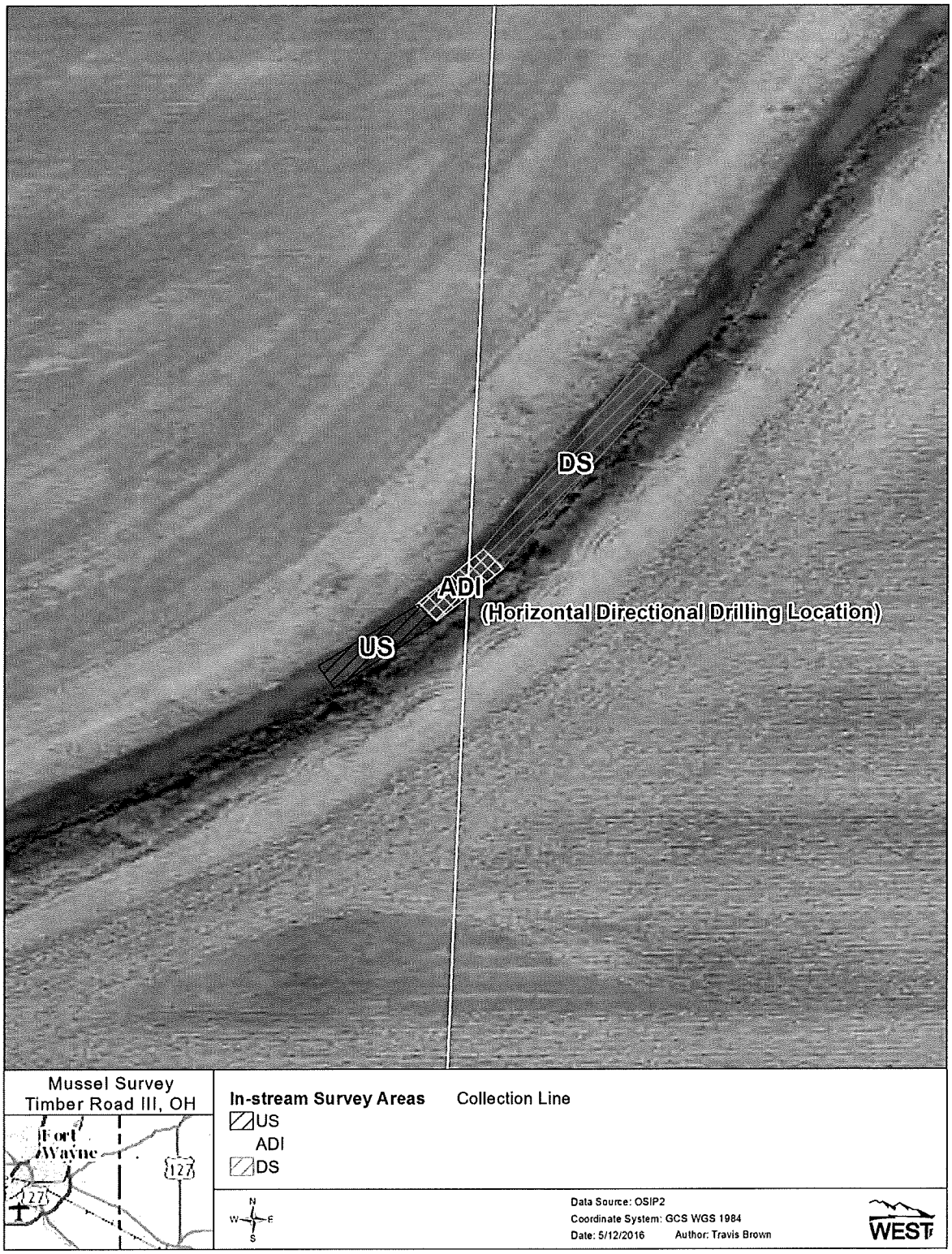


Figure 2. Layout of the follow-up in-stream mussel survey at sample site 5 for the Timber Road III mussel survey.

Table 2. Description of locations and results of reconnaissance surveys for the Timber Road III mussel survey.

Site	Downstream Start		Downstream End		Upstream Start		Upstream End		Total Length (ft)	Avg. Width (ft)	Mussel Habitat?
	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.			
1	41.15840	-84.77350	41.15790	-84.77490	41.15790	-84.77490	41.15770	-84.77570	659	5	No
2	41.16020	-84.75260	41.15940	-84.75370	41.15940	-84.75380	41.15940	-84.75450	623	5	No
3	Dry - Not Applicable										No
4	Dry - Not Applicable										No
5	41.14680	-84.73400	41.14590	-84.73480	41.14580	-84.73490	41.14550	-84.73550	634	6	Marginal
6	41.13960	-84.77380	41.13970	-84.77530	41.13970	-84.77550	41.13970	-84.77620	652	4	No
7	41.12520	-84.78490	41.12410	-84.78490	41.12400	-84.78490	41.12340	-84.78490	663	3	No
8	Dry - Not Applicable										No
9	41.12130	-84.73070	41.12120	-84.73200	41.12110	-84.73200	41.12050	-84.73200	607	4	No
10	41.12130	-84.72510	41.12130	-84.72670	41.12130	-84.72690	41.12130	-84.72760	696	4	No
11	41.09950	-84.79740	41.09950	-84.79890	41.09950	-84.79890	41.09950	-84.79920	500	4	No
12	41.10050	-84.75560	41.09940	-84.75570	41.09910	-84.75570	41.09860	-84.75560	697	2	No
13	41.10140	-84.74830	41.10180	-84.74950	41.10150	-84.75150	41.10100	-84.75220	1254	4	No
14	41.08880	-84.79430	41.08770	-84.79430	41.08750	-84.79430	41.08690	-84.79430	681	3	No
15	41.08980	-84.78470	41.08870	-84.78470	41.08860	-84.78470	41.08800	-84.78470	668	3	No
16	41.08990	-84.77480	41.08870	-84.77480	41.08860	-84.77480	41.08800	-84.77480	682	1	No
17	41.09210	-84.76520	41.09090	-84.76520	41.09080	-84.76520	41.09030	-84.76520	659	2	No
18	41.08640	-84.75560	41.08520	-84.75550	41.08480	-84.75550	41.08480	-84.75550	556	2	No
19	41.08610	-84.79430	41.08490	-84.79430	41.08480	-84.79430	41.08420	-84.79430	671	2	No

In-Stream Mussel Survey Results

An in-stream survey was completed at site 5 on April 27, 2016. The survey area included the ADI (7 m [23 ft]), DS buffer (25 m [82 ft]), and US buffer (10 m [33 ft]). The water temperature was 51.5°F (10.8°C), and water visibility extended to the bottom. The substrate was mostly a thick layer of unstable silt with small areas of gravel encountered occasionally. There were no differences in substrate or other conditions between the ADI, DS, and US areas. Water quality and substrate appeared to be extremely marginal in terms of their ability to support freshwater mussels. Numerous leeches were encountered during surveys, and overall water quality appeared to be very poor.

The only evidence of freshwater mussels encountered during the survey was a weathered dead valve from a giant floater and weathered dead valves from a creeper (*Strophitus undulatus*).

CONCLUSIONS

Habitat encountered in the Project area was extremely marginal in terms of its likelihood to support populations of mussels. All waterways assessed during this survey have been altered by human activities. Streams have been heavily channelized, and field tiles contribute most of the water flowing through these systems. Most waterways observed are likely to be dry during parts of the year and may have only contained water due to recent spring rains. While weathered dead valves of two mussel species indicates that there are likely to be small populations of mussels upstream of one site (site 5), the two species encountered are not rare and do not indicate particularly high quality mussel habitat (Watters et al. 2009).

The results of reconnaissance and in-stream surveys indicate that it is unlikely there will be any effect to freshwater mussel populations in the Project area as a result of construction activities. The use of HDD, where possible, further reduces the likelihood of any impact on native mussels.

REFERENCES

Ohio Department of Natural Resources (ODNR) and US Fish and Wildlife Service (USFWS). Ohio Mussel Survey Protocol, April 2015. Available at: http://wildlife.ohiodnr.gov/licenses-and-permits/specialty-licenses-permits#tabr4

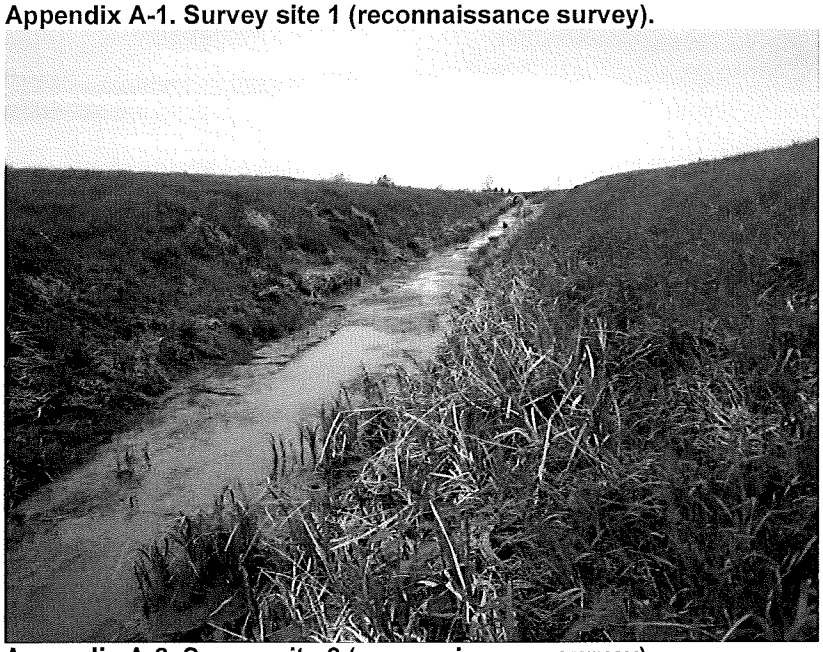
Ohio Environmental Protection Agency (OEPA). 2016. Water Quality and Hyrologic Units, Division of Surface Water, Ohio EPA. Interactive online GIS accessed May 11, 2016 at: http://oepa.maps.arcgis.com/apps/webappviewer/index.html?id=0058fe0949454ce9b0ccd721182d1447

Ohio State University. 2016. Ohio Mussel Atlas. Online GIS Resource, Accessed January 2016 at: http://www.biosci.ohio-state.edu/~molluscs/OSUM2/index.html

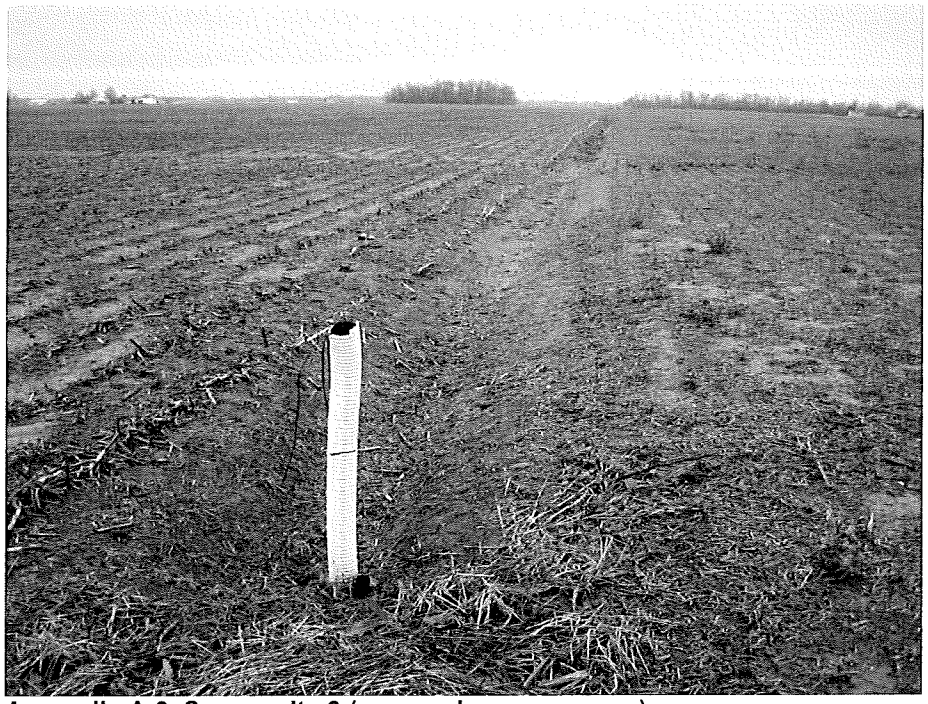
Watters, G. T., M. A. Hoggarth, and D. H. Stansberry. 2009. The Freshwater Mussels of Ohio. The Ohio State University Press, Columbus, Ohio.

Appendix A: Photograph Log

Appendix A-1. Survey site 1 (reconnaissance survey).



Appendix A-2. Survey site 2 (reconnaissance survey).



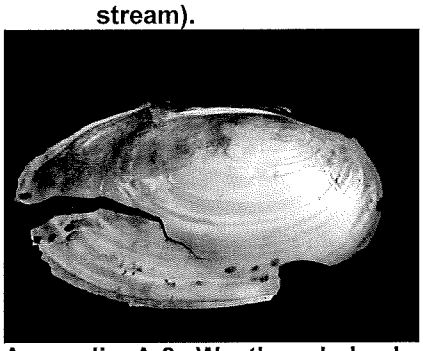
Appendix A-3. Survey site 3 (reconnaissance survey).

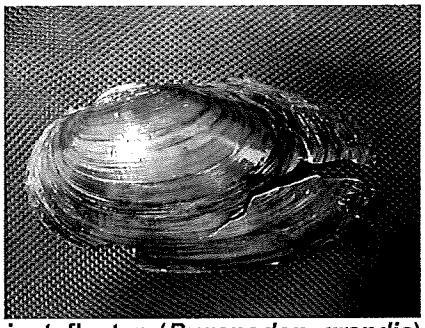
Appendix A-4. Survey site 4 (reconnaissance survey).

Appendix A-5. Survey site 5 ADI area (reconnaissance survey and in-stream).

Appendix A-6. Survey site 5 US area (reconnaissance survey and in-stream).

Appendix A-7. Survey site 5 DS area (reconnaissance survey and in-stream).





Appendix A-8. Weathered dead giant floater (*Pyganodon grandis*) valve from site 5.

Appendix A-9. Weathered dead creeper shell (*Strophitus undulatus*) from site 5.

Appendix A-10. Survey site 6 (reconnaissance survey).

Appendix A-11. Survey site 7 (reconnaissance survey).

Appendix A-12. Survey site 8 (reconnaissance survey).

Appendix A-13. Survey site 9 (reconnaissance survey).

Appendix A-14. Survey site 10 (reconnaissance survey).

Appendix A-15. Survey site 11 (reconnaissance survey).

Appendix A-16. Survey site 12 (reconnaissance survey).

Appendix A-17. Survey site 13 (reconnaissance survey).

Appendix A-18. Survey site 14 (reconnaissance survey).

Appendix A-19. Survey site 15 (reconnaissance survey).

Appendix A-20. Survey site 16 (reconnaissance survey).

Appendix A-21. Survey site 17 (reconnaissance survey).

Appendix A-22. Survey site 18 (reconnaissance survey).

Appendix A-23. Survey site 19 (reconnaissance survey).

Appendix B: Survey Datasheets

Pt 1

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Timber Road III Mussel Survey

County: Paulding Township: Harrison

Latitude (DD.DDDD): 41.15790 Longitude (DD.DDDD): -84.77990

Stream Name: North Creek Group # (From Appendix A): Group 1

Methods

Name of Surveyor(s): Travis Brown

Qualification of Surveyor(s): ☑ USFWS Approved ☐ ODNR Approved ☐ Aquatic Biologist (minimum)

Date of Survey: 4-29-2016 Distance Surveyed (ft.): 659

Total Survey Time (min. x people): 1 X 60 Scientific Collector's Permit Number(s): 17-265

Note any deviations from the Ohio Mussel Habitat Assessment Methods :

< 10 mi², but surveyed anyway.

Habitat Description of Survey Area

Drainage Area at Survey Location (mi²): 1.47 Water Temp. (°F): 50°F Air Temp. (°F): 55°F

Substrate Types (include %):

☐ Boulder ____ ☐ Gravel ____ ☐ Bedrock ____ ☐ Detritus ____ ☑ Silt 50

☐ Cobble ____ ☑ Sand 40 ☐ Hardpan ____ ☐ Muck 10 ☐ Artificial ____

Water Level: ☐ High ☐ Up ☑ Normal ☐ Low ☐ Dry/Interstitial

Visibility: ☐ 0-15 cm ☐ 15-30 cm ☐ 30-50 cm ☐ >50 cm ☑ Visible to Bottom

Average Depth (cm): Riffle ____ Run ____ Pool 14

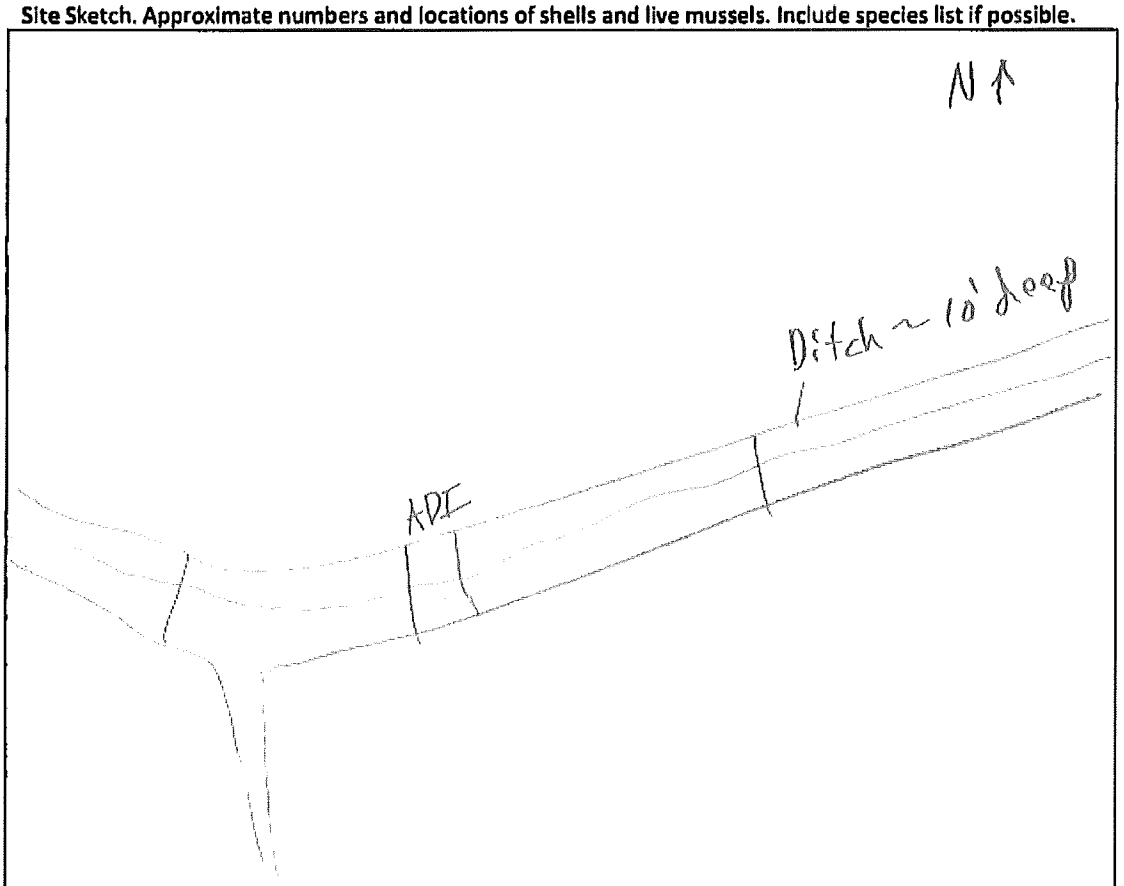
Max Depth (cm): Riffle ____ Run ____ Pool 16

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

☑ None ☐ Mussel Shell Only - Subfossil ☐ Mussel Shell Only - Weathered Dead ☐ Mussel Shell Only - Fresh Dead ☐ Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Required Attachments 1) Location Map and 2) Photo Log

Pt. 2

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Timber Road III Mussel Survey

County: Paulding Township: Harrison

Latitude (DD.DDDD): 41.15981 Longitude (DD.DDDD): 84.75315

Stream Name: North Creek Group # (From Appendix A): Group 1

Methods

Name of Surveyor(s): Travis Brown, Karl Dubridge

Qualification of Surveyor(s): ☑ USFWS Approved ☑ ODNR Approved ☑ Aquatic Biologist (minimum)

Date of Survey: 4-27-2016 Distance Surveyed (ft.): 623

Total Survey Time (min. x people): 2x30 Scientific Collector's Permit Number(s): 17-265

Note any deviations from the Ohio Mussel Habitat Assessment Methods :

Habitat Description of Survey Area

Drainage Area at Survey Location (mi^2): 2.27 Water Temp. (°F): 61.3°F Air Temp. (°F): 60°F

Substrate Types (include %):

☐ Boulder ____ ☐ Gravel ____ ☐ Bedrock ____ ☐ Detritus ____ ☑ Silt 40

☐ Cobble ____ ☑ Sand 60 ☐ Hardpan ____ ☐ Muck ____ ☐ Artificial ____

Water Level: ☐ High ☐ Up ☑ Normal ☐ Low ☐ Dry/Interstitial

Visibility: ☐ 0-15 cm ☐ 15-30 cm ☐ 30-50 cm ☐ >50 cm ☑ Visible to Bottom

Average Depth (cm): Riffle ____ Run ____ Pool 30

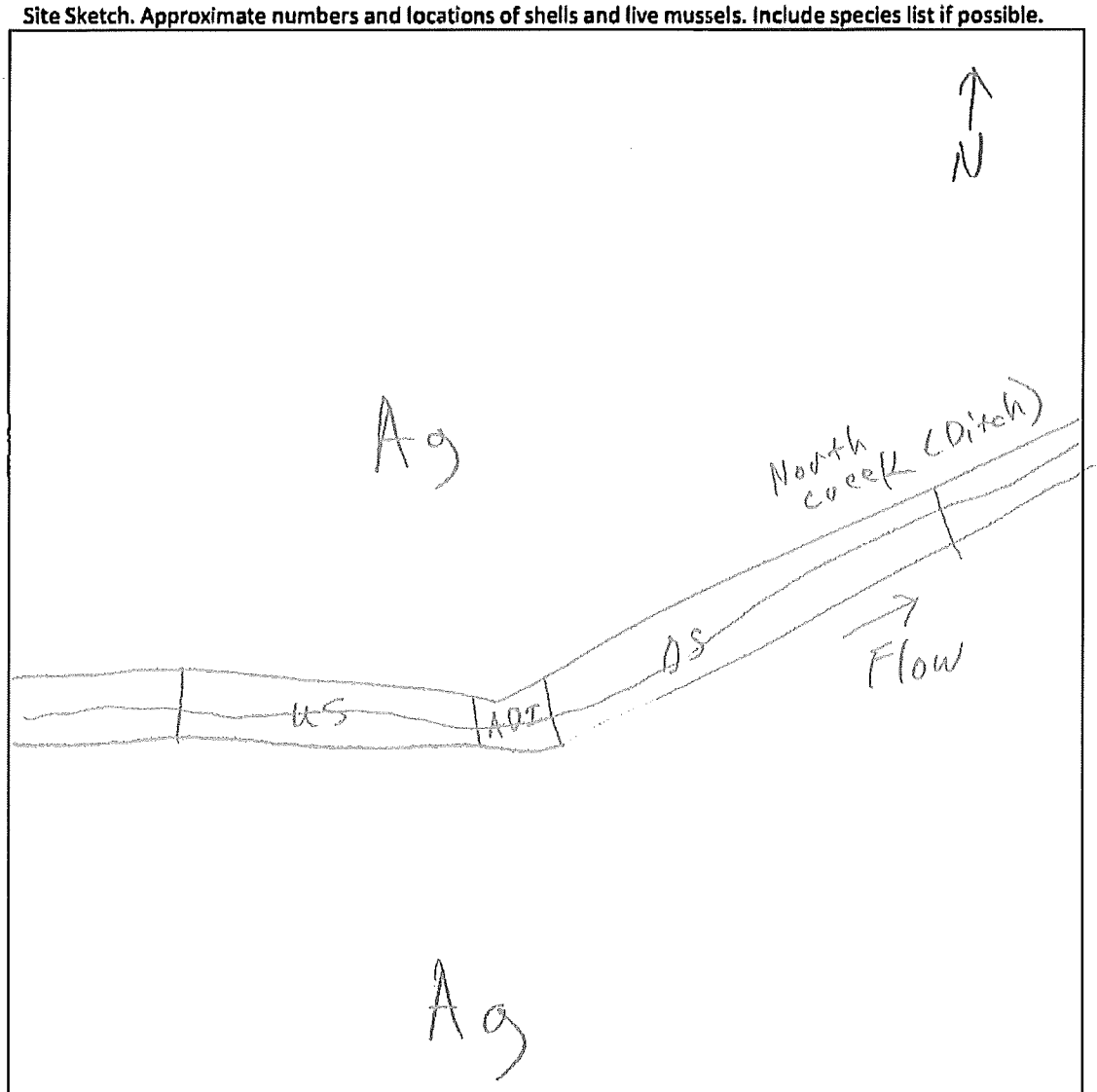
Max Depth (cm): Riffle ____ Run ____ Pool 40

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

☑ None ☐ Mussel Shell Only - Subfossil ☐ Mussel Shell Only - Weathered Dead ☐ Mussel Shell Only - Fresh Dead ☐ Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Required Attachments 1) Location Map and 2) Photo Log

Pt. 3

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Timber Road III Mussel

County: _____ Township: _____

Latitude (DD.DDDD): _____ Longitude (DD.DDDD): _____

Stream Name: _____ Group # (From Appendix A): _____

Methods

Name of Surveyor(s): _____

Qualification of Surveyor(s): ☐ USFWS Approved ☐ ODNR Approved ☐ Aquatic Biologist (minimum)

Date of Survey: 4-27-2016 Distance Surveyed (ft.): _____

Total Survey Time (min. x people): _____ Scientific Collector's Permit Number(s): _____

Note any deviations from the Ohio Mussel Habitat Assessment Methods :

Dry Not Assessed Further

Habitat Description of Survey Area

Drainage Area at Survey Location (mi^2): _____ Water Temp. (°F): _____ Air Temp. (°F): _____

Substrate Types (include %):

☐ Boulder ____ ☐ Gravel ____ ☐ Bedrock ____ ☐ Detritus ____ ☐ Silt ____

☐ Cobble ____ ☐ Sand ____ ☐ Hardpan ____ ☐ Muck ____ ☐ Artificial ____

Water Level: ☐ High ☐ Up ☐ Normal ☐ Low ☐ Dry/Interstitial

Visibility: ☐ 0-15 cm ☐ 15-30 cm ☐ 30-50 cm ☐ >50 cm ☐ Visible to Bottom

Average Depth (cm): Riffle _____ Run _____ Pool _____

Max Depth (cm): Riffle _____ Run _____ Pool _____

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

☐ None ☐ Mussel Shell Only - Subfossil ☐ Mussel Shell Only - Weathered Dead ☐ Mussel Shell Only - Fresh Dead ☐ Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.

Required Attachments 1) Location Map and 2) Photo Log

Pt. 4

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Timber Road III Mussel

County: _____ Township: _____

Latitude (DD.DDDD): _____ Longitude (DD.DDDD): _____

Stream Name: _____ Group # (From Appendix A): _____

Methods

Name of Surveyor(s): _____

Qualification of Surveyor(s): ☐ USFWS Approved ☐ ODNR Approved ☐ Aquatic Biologist (minimum)

Date of Survey: 4-27-2016 Distance Surveyed (ft.): _____

Total Survey Time (min. x people): _____ Scientific Collector's Permit Number(s): _____

Note any deviations from the Ohio Mussel Habitat Assessment Methods :

DRY

Habitat Description of Survey Area

Drainage Area at Survey Location (mi^2): _____ Water Temp. (°F): _____ Air Temp. (°F): _____

Substrate Types (include %):

☐ Boulder ____ ☐ Gravel ____ ☐ Bedrock ____ ☐ Detritus ____ ☐ Silt ____

☐ Cobble ____ ☐ Sand ____ ☐ Hardpan ____ ☐ Muck ____ ☐ Artificial ____

Water Level: ☐ High ☐ Up ☐ Normal ☐ Low ☐ Dry/Interstitial

Visibility: ☐ 0-15 cm ☐ 15-30 cm ☐ 30-50 cm ☐ >50 cm ☐ Visible to Bottom

Average Depth (cm): Riffle _____ Run _____ Pool _____

Max Depth (cm): Riffle _____ Run _____ Pool _____

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

☐ None ☐ Mussel Shell Only - Subfossil ☐ Mussel Shell Only - Weathered Dead ☐ Mussel Shell Only - Fresh Dead ☐ Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.

Required Attachments 1) Location Map and 2) Photo Log

Recon & In-Stream

Pt. 5

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Timber Road III Mussel

County: Paulding Township: Harrison

Latitude (DD.DDDD): 41.14588 Longitude (DD.DDDD): 84.73491

Stream Name: Southcreek Group # (From Appendix A): Group 1

Methods

Name of Surveyor(s): Travis Brown, Karl Dubridge

Qualification of Surveyor(s): ☑ USFWS Approved ☑ ODNR Approved ☑ Aquatic Biologist (minimum)

Date of Survey: 4-27-2016 Distance Surveyed (ft.): 634 (Recon) 155 (In-Stre

Total Survey Time (min. x people): 60x2 Scientific Collector's Permit Number(s): 17-265

Note any deviations from the Ohio Mussel Habitat Assessment Methods :

Habitat Description of Survey Area

Drainage Area at Survey Location (mi²): 10.3 Water Temp. (°F): 51.5 Air Temp. (°F): 45

Substrate Types (include %):

☐ Boulder ____ ☑ Gravel 20 ☐ Bedrock ____ ☐ Detritus ____ ☑ Silt 80

☐ Cobble ____ ☐ Sand ____ ☐ Hardpan ____ ☐ Muck ____ ☐ Artificial ____

Water Level: ☐ High ☐ Up ☑ Normal ☐ Low ☐ Dry/Interstitial

Visibility: ☐ 0-15 cm ☐ 15-30 cm ☐ 30-50 cm ☐ >50 cm ☑ Visible to Bottom

Average Depth (cm): Riffle 10 Run 20 Pool 30

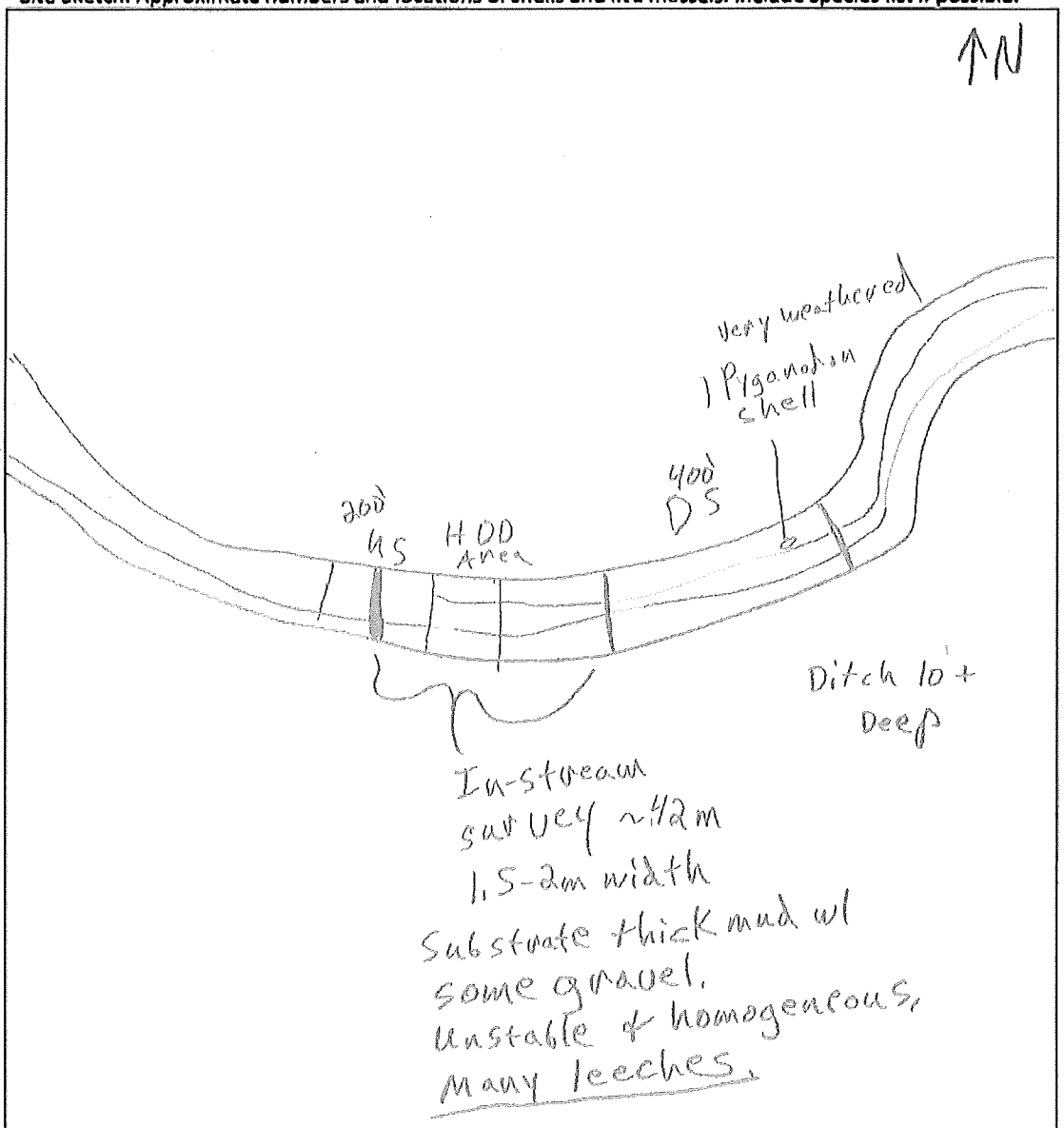
Max Depth (cm): Riffle 15 Run 30 Pool 40

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

☐ None ☐ Mussel Shell Only - Subfossil ☑ Mussel Shell Only - Weathered Dead ☐ Mussel Shell Only - Fresh Dead ☐ Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Required Attachments 1) Location Map and 2) Photo Log

Pt. 5

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Timber Road III Mussel Survey

County: Paulding Township: Harrison

Latitude (DD.DDDD): 41.13957 Longitude (DD.DDDD): 84.77528

Stream Name: South Creek Group # (From Appendix A): Group 1

Methods

Name of Surveyor(s): Travis Brown, Karl Dubridge

Qualification of Surveyor(s): ☑ USFWS Approved ☑ ODNR Approved ☑ Aquatic Biologist (minimum)

Date of Survey: 4-27-2016 Distance Surveyed (ft.): 652

Total Survey Time (min. x people): ~~30x~~ 2 Scientific Collector's Permit Number(s): 17-265

Note any deviations from the Ohio Mussel Habitat Assessment Methods :

Habitat Description of Survey Area

Drainage Area at Survey Location (mi²): 1.92 Water Temp. (°F): 51.4 Air Temp. (°F): 50

Substrate Types (include %):

☐ Boulder ____ ☐ Gravel ____ ☐ Bedrock ____ ☐ Detritus ____ ☑ Silt 60

☐ Cobble ____ ☑ Sand 40 ☐ Hardpan ____ ☐ Muck ____ ☐ Artificial ____

Water Level: ☐ High ☐ Up ☑ Normal ☐ Low ☐ Dry/Interstitial

Visibility: ☐ 0-15 cm ☐ 15-30 cm ☐ 30-50 cm ☐ >50 cm ☑ Visible to Bottom

Average Depth (cm): Riffle 9 Run 11 Pool 24

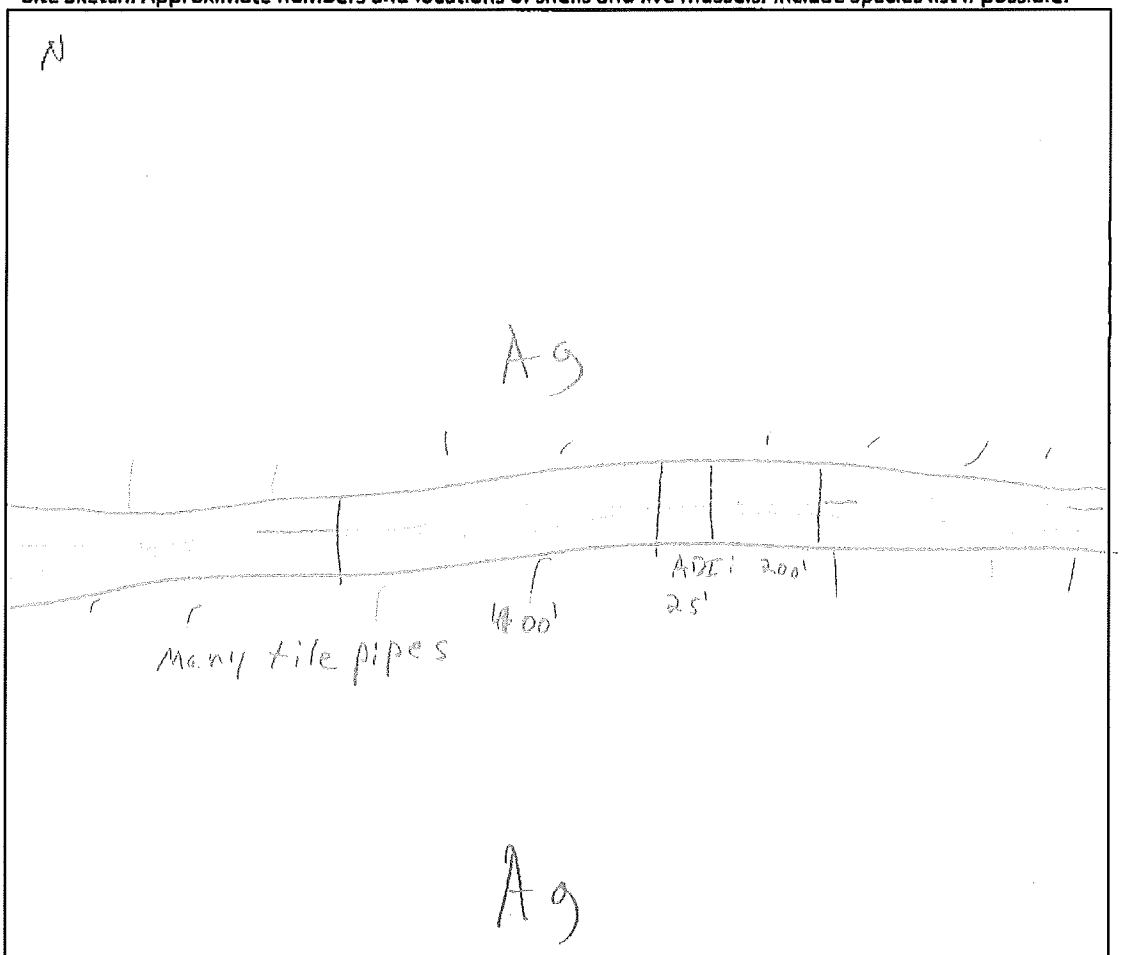
Max Depth (cm): Riffle 10 Run 15 Pool 30

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

☑ None ☐ Mussel Shell Only - Subfossil ☐ Mussel Shell Only - Weathered Dead ☐ Mussel Shell Only - Fresh Dead ☐ Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Required Attachments 1) Location Map and 2) Photo Log

Pt. 7

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Timber Road///Mussel

County: Paulding Township: Harrison

Latitude (DD.DDDD): 41.123999 Longitude (DD.DDDD): 84.724900

Stream Name: Mansfield Ditch Group # (From Appendix A): unlisted

Methods

Name of Surveyor(s): Travis Brown

Qualification of Surveyor(s): ☑ USFWS Approved ☑ ODNR Approved ☑ Aquatic Biologist (minimum)

Date of Survey: 4-28-2016 Distance Surveyed (ft.): 663

Total Survey Time (min. x people): 60x1 Scientific Collector's Permit Number(s): 17-265

Note any deviations from the Ohio Mussel Habitat Assessment Methods :

< 10 mi² watershed, but conducted recon survey.

Habitat Description of Survey Area

Drainage Area at Survey Location (mi²): <0.01 Water Temp. (°F): 50 Air Temp. (°F): 51

Substrate Types (include %):

☐ Boulder ____ ☐ Gravel ____ ☐ Bedrock ____ ☑ Detritus 30 ☑ Silt 35

☐ Cobble ____ ☑ Sand 35 ☐ Hardpan ____ ☐ Muck ____ ☐ Artificial ____

Water Level: ☐ High ☐ Up ☑ Normal ☐ Low ☐ Dry/Interstitial

Visibility: ☐ 0-15 cm ☐ 15-30 cm ☐ 30-50 cm ☐ >50 cm ☑ Visible to Bottom

Average Depth (cm): Riffle ____ Run ____ Pool 20

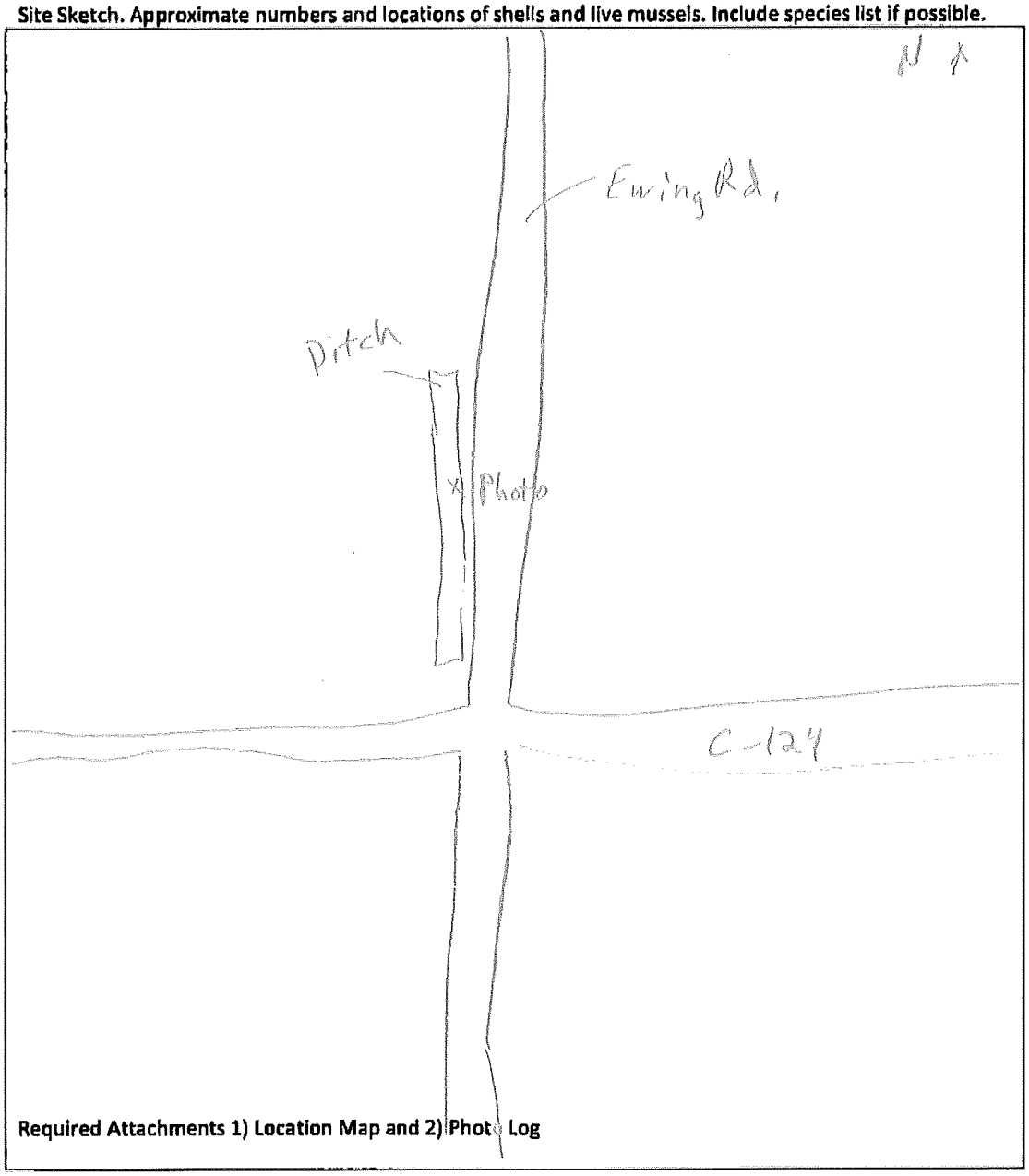
Max Depth (cm): Riffle ____ Run ____ Pool 30

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

☑ None ☐ Mussel Shell Only - Subfossil ☐ Mussel Shell Only - Weathered Dead ☐ Mussel Shell Only - Fresh Dead ☐ Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Required Attachments 1) Location Map and 2) Photo Log

Pt. 8

Dry

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Timber Road III Mussel

County: _____ Township: _____

Latitude (DD.DDDD): _____ Longitude (DD.DDDD): _____

Stream Name: _____ Group # (From Appendix A): _____

Methods

Name of Surveyor(s): _____

Qualification of Surveyor(s): ☐ USFWS Approved ☐ ODNR Approved ☐ Aquatic Biologist (minimum)

Date of Survey: _____ Distance Surveyed (ft.): _____

Total Survey Time (min. x people): _____ Scientific Collector's Permit Number(s): _____

Note any deviations from the Ohio Mussel Habitat Assessment Methods :

Dry — No Survey

Habitat Description of Survey Area

Drainage Area at Survey Location (mi^2): _____ Water Temp. (°F): _____ Air Temp. (°F): _____

Substrate Types (include %):

☐ Boulder _____ ☐ Gravel _____ ☐ Bedrock _____ ☐ Detritus _____ ☐ Silt _____

☐ Cobble _____ ☐ Sand _____ ☐ Hardpan _____ ☐ Muck _____ ☐ Artificial _____

Water Level: ☐ High ☐ Up ☐ Normal ☐ Low ☐ Dry/Interstitial

Visibility: ☐ 0-15 cm ☐ 15-30 cm ☐ 30-50 cm ☐ >50 cm ☐ Visible to Bottom

Average Depth (cm): Riffle _____ Run _____ Pool _____

Max Depth (cm): Riffle _____ Run _____ Pool _____

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

☐ None ☐ Mussel Shell Only - Subfossil ☐ Mussel Shell Only - Weathered Dead ☐ Mussel Shell Only - Fresh Dead ☐ Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.

Required Attachments 1) Location Map and 2) Photo Log

Pt. 9

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Timber Road III Mussel Survey

County: Paulding Township: Harrison

Latitude (DD.DDDD): 41.12101 Longitude (DD.DDDD): 84.73196

Stream Name: NA Group # (From Appendix A): unlisted

Methods

Name of Surveyor(s): Travis Brown

Qualification of Surveyor(s): ☑ USFWS Approved ☑ ODNR Approved ☑ Aquatic Biologist (minimum)

Date of Survey: 4-28-2016 Distance Surveyed (ft.): 607

Total Survey Time (min. x people): 10x1 Scientific Collector's Permit Number(s): 17-265

Note any deviations from the Ohio Mussel Habitat Assessment Methods :

Watershed < 10 mi², but conducted recon survey.

Habitat Description of Survey Area

Drainage Area at Survey Location (mi²): 0.54 Water Temp. (°F): 50.7 Air Temp. (°F): 52°F

Substrate Types (include %):

☐ Boulder ____ ☐ Gravel ____ ☐ Bedrock ____ ☐ Detritus ____ ☑ Silt 50

☐ Cobble ____ ☑ Sand 50 ☐ Hardpan ____ ☐ Muck ____ ☐ Artificial ____

Water Level: ☐ High ☐ Up ☑ Normal ☐ Low ☐ Dry/Interstitial

Visibility: ☐ 0-15 cm ☐ 15-30 cm ☐ 30-50 cm ☐ >50 cm ☑ Visible to Bottom

Average Depth (cm): Riffle ____ Run ____ Pool 25

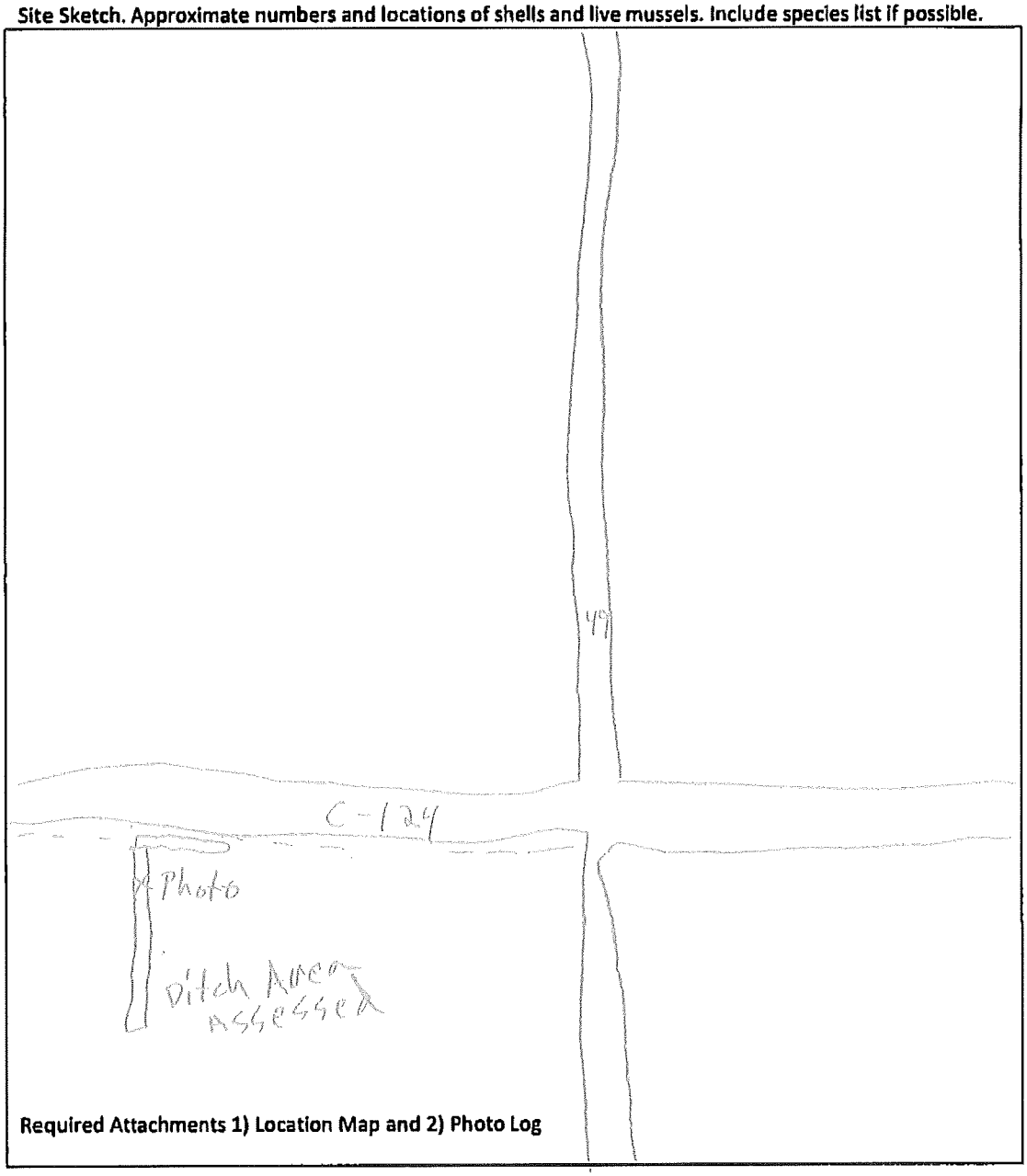
Max Depth (cm): Riffle ____ Run ____ Pool 35

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

☑ None ☐ Mussel Shell Only - Subfossil ☐ Mussel Shell Only - Weathered Dead ☐ Mussel Shell Only - Fresh Dead ☐ Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Required Attachments 1) Location Map and 2) Photo Log

Pt-10

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Timber Road III Mussel Survey

County: Paulding Township: Harrison

Latitude (DD.DDDD): 41.12131 Longitude (DD.DDDD): 84.72622

Stream Name: NA Group # (From Appendix A): Unlisted

Methods

Name of Surveyor(s): Travis Brown

Qualification of Surveyor(s): ☑ USFWS Approved ☑ ODNR Approved ☑ Aquatic Biologist (minimum)

Date of Survey: 4-28-2016 Distance Surveyed (ft.): 696

Total Survey Time (min. x people): 60x1 Scientific Collector's Permit Number(s): 17-265

Note any deviations from the Ohio Mussel Habitat Assessment Methods :

Ditch w/ watershed < 10 mi², but conducted recon survey.

Habitat Description of Survey Area

Drainage Area at Survey Location (mi²): 0.76 Water Temp. (°F): 51 Air Temp. (°F): 52

Substrate Types (include %):

☐ Boulder ____ ☐ Gravel ____ ☐ Bedrock ____ ☑ Detritus 10 ☑ Silt 45

☐ Cobble ____ ☑ Sand 45 ☐ Hardpan ____ ☐ Muck ____ ☐ Artificial ____

Water Level: ☐ High ☐ Up ☑ Normal ☐ Low ☐ Dry/Interstitial

Visibility: ☐ 0-15 cm ☐ 15-30 cm ☐ 30-50 cm ☐ >50 cm ☑ Visible to Bottom

Average Depth (cm): Riffle ____ Run ____ Pool 25

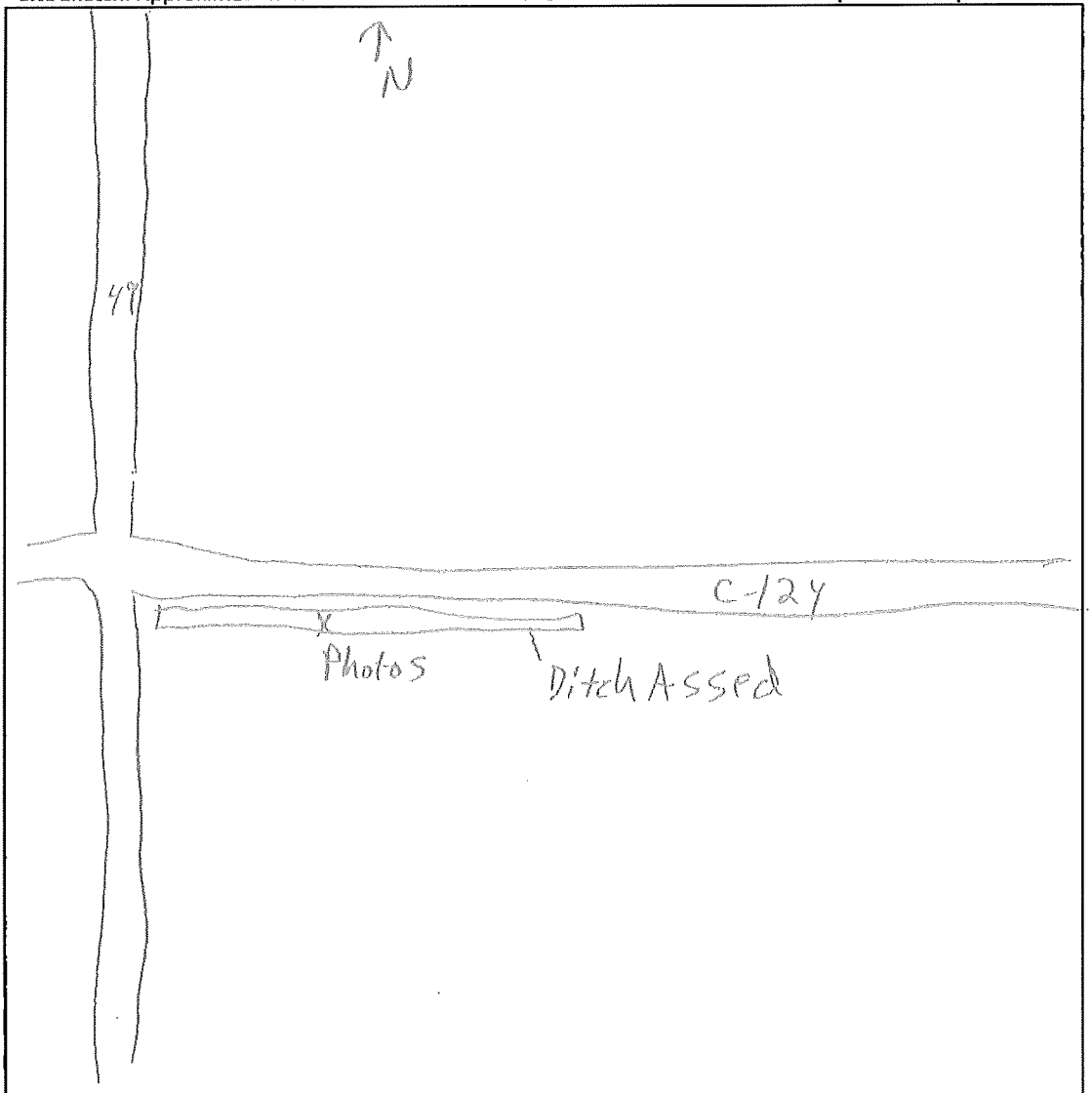
Max Depth (cm): Riffle ____ Run ____ Pool 35

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

☑ None ☐ Mussel Shell Only - Subfossil ☐ Mussel Shell Only - Weathered Dead ☐ Mussel Shell Only - Fresh Dead ☐ Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Required Attachments 1) Location Map and 2) Photo Log

Pt. 11

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Timber Road III Mussel Survey

County: Paulding Township: Harrison

Latitude (DD.DDDD): 41.09954 Longitude (DD.DDDD): 84.79805

Stream Name: NA Group # (From Appendix A): Unlisted

Methods

Name of Surveyor(s): Travis Brown, Karl Dabridge

Qualification of Surveyor(s): ☑ USFWS Approved ☑ ODNR Approved ☑ Aquatic Biologist (minimum)

Date of Survey: 4-27-2016 Distance Surveyed (ft.): 500

Total Survey Time (min. x people): 30 x 2 Scientific Collector's Permit Number(s): 17-265

Note any deviations from the Ohio Mussel Habitat Assessment Methods :

Habitat Description of Survey Area

Drainage Area at Survey Location (mi²): <0.01 Water Temp. (°F): 53.7 Air Temp. (°F): 55

Substrate Types (include %):

☐ Boulder ____ ☐ Gravel ____ ☐ Bedrock ____ ☐ Detritus ____ ☑ Silt 50

☐ Cobble ____ ☑ Sand 50 ☐ Hardpan ____ ☐ Muck ____ ☐ Artificial ____

Water Level: ☐ High ☐ Up ☑ Normal ☐ Low ☐ Dry/Interstitial

Visibility: ☐ 0-15 cm ☐ 15-30 cm ☐ 30-50 cm ☐ >50 cm ☑ Visible to Bottom

Average Depth (cm): Riffle ____ Run ____ Pool 15

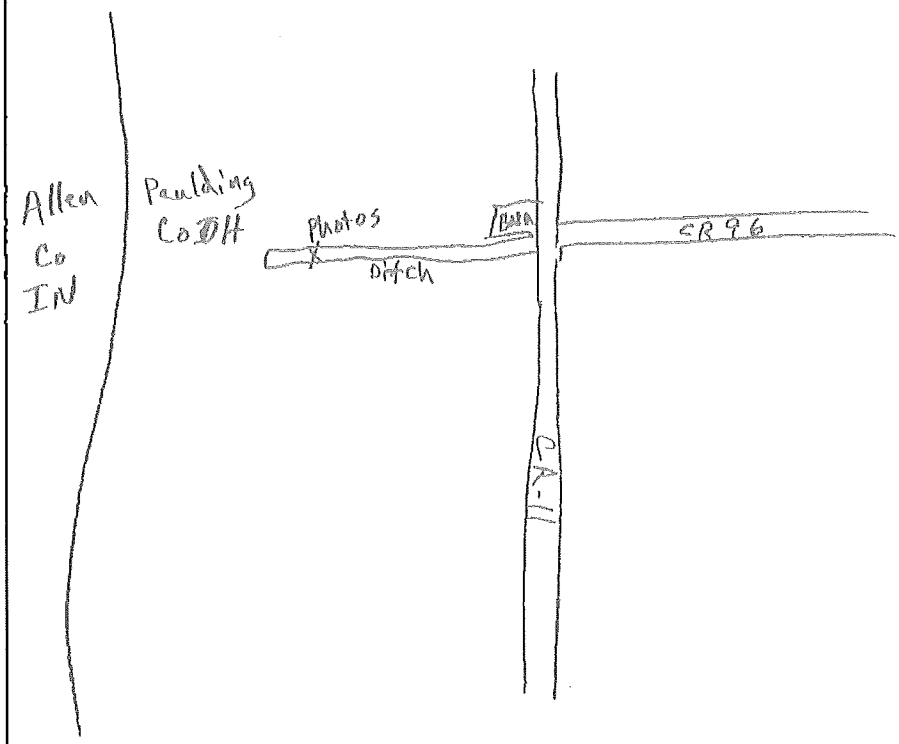
Max Depth (cm): Riffle ____ Run ____ Pool 16

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

☑ None ☐ Mussel Shell Only - Subfossil ☐ Mussel Shell Only - Weathered Dead ☐ Mussel Shell Only - Fresh Dead ☐ Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Required Attachments 1) Location Map and 2) Photo Log

P+12

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Timber Road III mussel

County: Paulding Township: Harrison

Latitude (DD.DDDD): 41.0993 Longitude (DD.DDDD): -84.7556

Stream Name: ~~NA~~ Wildcat Creek Group # (From Appendix A): unlisted

Methods

Name of Surveyor(s): Travis Brown, Karl Dabridge

Qualification of Surveyor(s): ☑ USFWS Approved ☑ ODNR Approved ☑ Aquatic Biologist (minimum)

Date of Survey: 4-27-2016 Distance Surveyed (ft.): 697

Total Survey Time (min. x people): _____ Scientific Collector's Permit Number(s): 17-265

Note any deviations from the Ohio Mussel Habitat Assessment Methods :

Habitat Description of Survey Area

Drainage Area at Survey Location (mi²): 1.4 Water Temp. (°F): 58.2°F Air Temp. (°F): 56°F

Substrate Types (include %):

☐ Boulder ____ ☐ Gravel ____ ☐ Bedrock ____ ☐ Detritus ____ ☑ Silt 50

☐ Cobble ____ ☑ Sand 50 ☐ Hardpan ____ ☐ Muck ____ ☐ Artificial ____

Water Level: ☐ High ☐ Up ☑ Normal ☐ Low ☐ Dry/Interstitial

Visibility: ☐ 0-15 cm ☐ 15-30 cm ☐ 30-50 cm ☐ >50 cm ☑ Visible to Bottom

Average Depth (cm): Riffle 2 Run ____ Pool 25

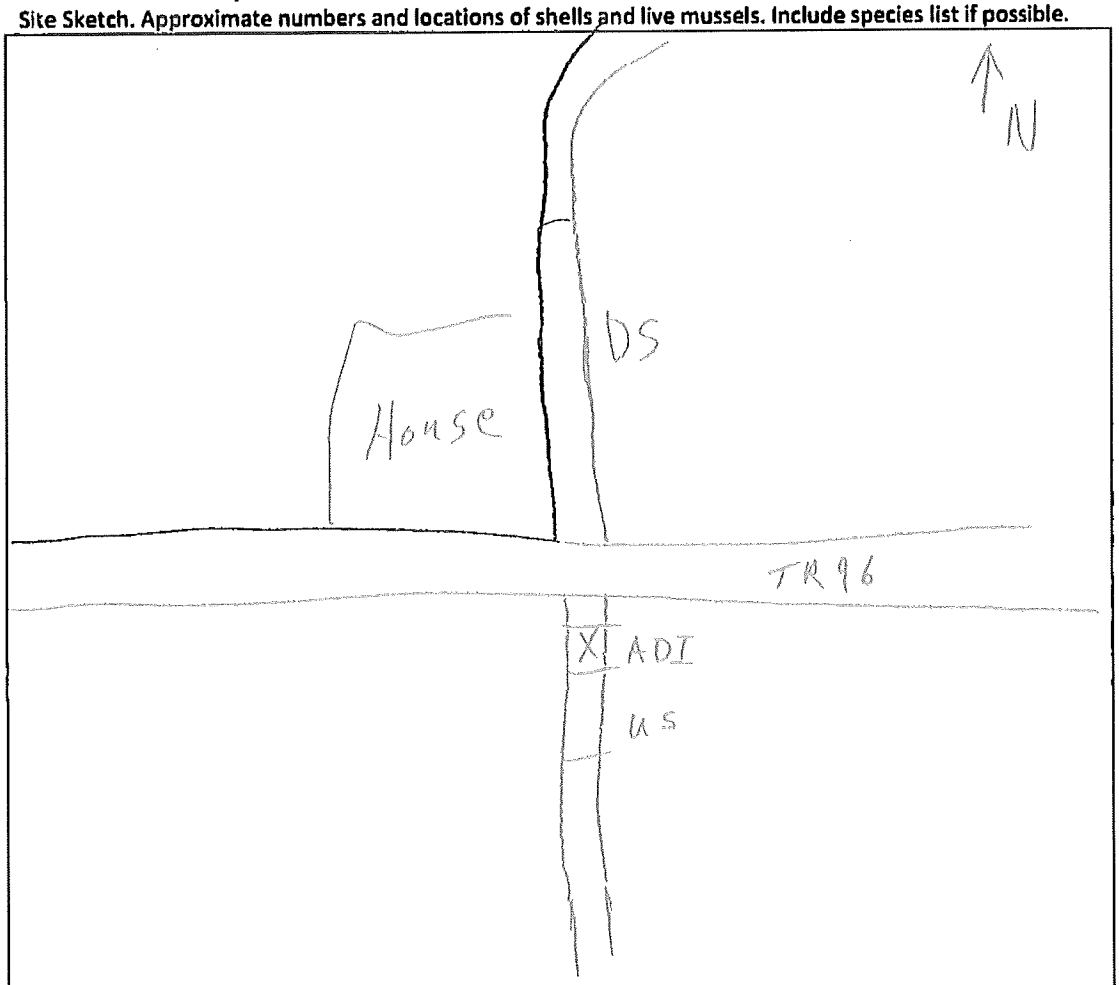
Max Depth (cm): Riffle 2 Run ____ Pool 30

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

☑ None ☐ Mussel Shell Only - Subfossil ☐ Mussel Shell Only - Weathered Dead ☐ Mussel Shell Only - Fresh Dead ☐ Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Required Attachments 1) Location Map and 2) Photo Log

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Timber Rd. III

County: Paulding Township: Harrison

Latitude (DD.DDDD): 41.10088 Longitude (DD.DDDD): 84.74718

Stream Name: Wildcat Creek Group # (From Appendix A): Unlisted

Methods

Name of Surveyor(s): T. Travis Brown

Qualification of Surveyor(s): ☑ USFWS Approved ☑ ODNR Approved ☐ Aquatic Biologist (minimum)

Date of Survey: 4-25-2016 Distance Surveyed (ft.): 1,254

Total Survey Time (min. x people): 60 x 1 Scientific Collector's Permit Number(s): 17-265

Note any deviations from the Ohio Mussel Habitat Assessment Methods :

Habitat Description of Survey Area

Drainage Area at Survey Location (mi²): 6.42 Water Temp. (°F): 54° Air Temp. (°F): 60°F

Substrate Types (include %):

☐ Boulder ____ ☐ Gravel ____ ☐ Bedrock ____ ☑ Detritus 10 ☑ Silt 88

☑ Cobble 2 ☐ Sand ____ ☐ Hardpan ____ ☐ Muck ____ ☐ Artificial ____

Water Level: ☐ High ☑ Up ☐ Normal ☐ Low ☐ Dry/Interstitial

Visibility: ☐ 0-15 cm ☐ 15-30 cm ☐ 30-50 cm ☐ >50 cm ☑ Visible to Bottom

Average Depth (cm): Riffle 2 Run 10 Pool 15

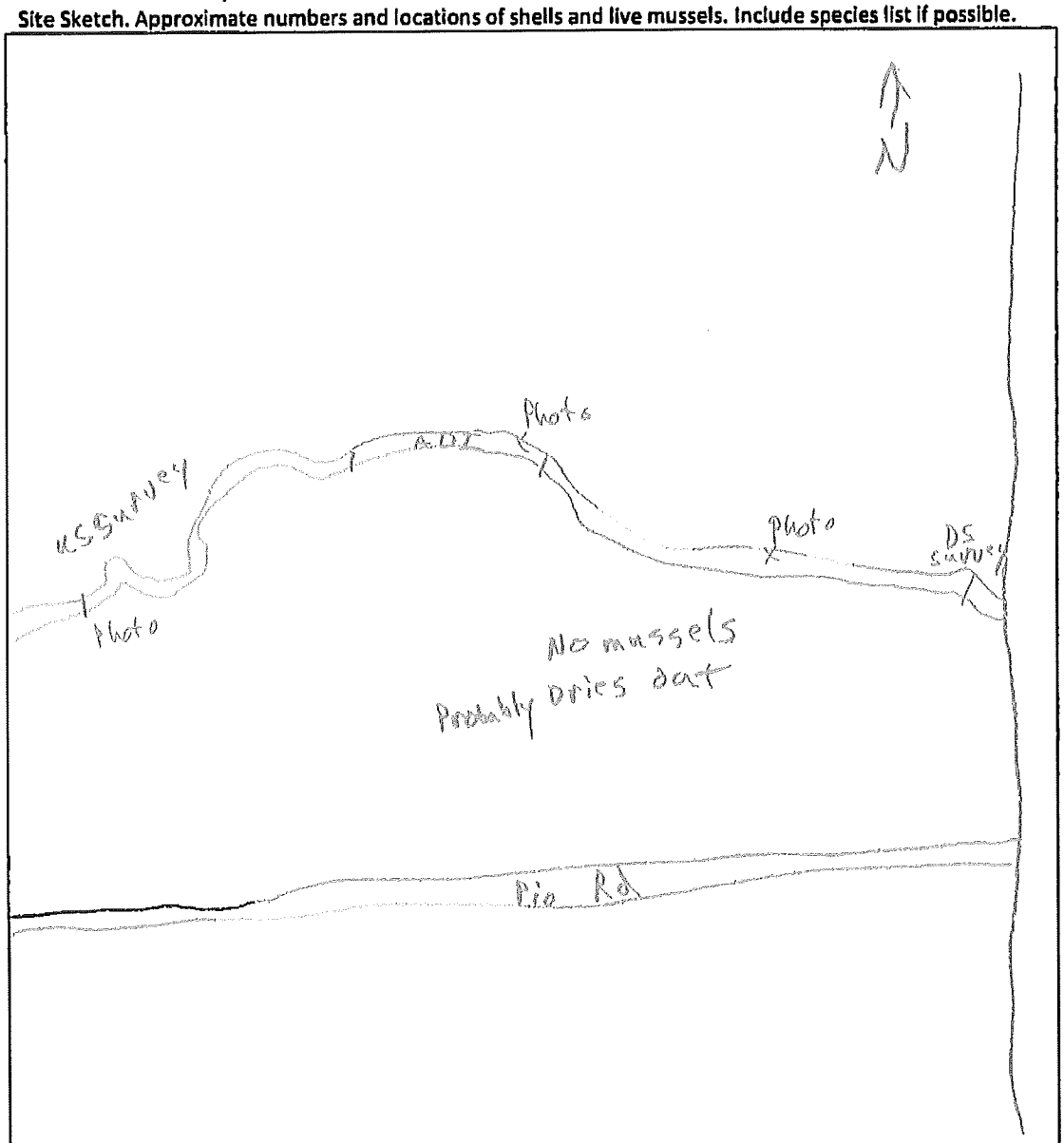
Max Depth (cm): Riffle 4 Run 15 Pool 20

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

☑ None ☐ Mussel Shell Only - Subfossil ☐ Mussel Shell Only - Weathered Dead ☐ Mussel Shell Only - Fresh Dead ☐ Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Required Attachments 1) Location Map and 2) Photo Log

At, 14

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Timber Road III Mussel Survey

County: Paulding Township: Harrison

Latitude (DD.DDDD): 41.08520 Longitude (DD.DDDD): 84.79426

Stream Name: NA Group # (From Appendix A): unlisted

Methods

Name of Surveyor(s): Travis Brown, Karl Dubuidge

Qualification of Surveyor(s): ☑ USFWS Approved ☑ ODNR Approved ☑ Aquatic Biologist (minimum)

Date of Survey: 4-27-2016 Distance Surveyed (ft.): 681

Total Survey Time (min. x people): 30X2 Scientific Collector's Permit Number(s): 17-265

Note any deviations from the Ohio Mussel Habitat Assessment Methods :

Habitat Description of Survey Area

Drainage Area at Survey Location (mi^2): _____ Water Temp. (°F): 55.9°F Air Temp. (°F): 55°F

Substrate Types (include %):

☐ Boulder ____ ☐ Gravel ____ ☐ Bedrock ____ ☐ Detritus ____ ☑ Silt 50

☐ Cobble ____ ☑ Sand 50 ☐ Hardpan ____ ☐ Muck ____ ☐ Artificial ____

Water Level: ☐ High ☐ Up ☑ Normal ☐ Low ☐ Dry/Interstitial

Visibility: ☐ 0-15 cm ☐ 15-30 cm ☐ 30-50 cm ☐ >50 cm ☑ Visible to Bottom

Average Depth (cm): Riffle ____ Run ____ Pool 16

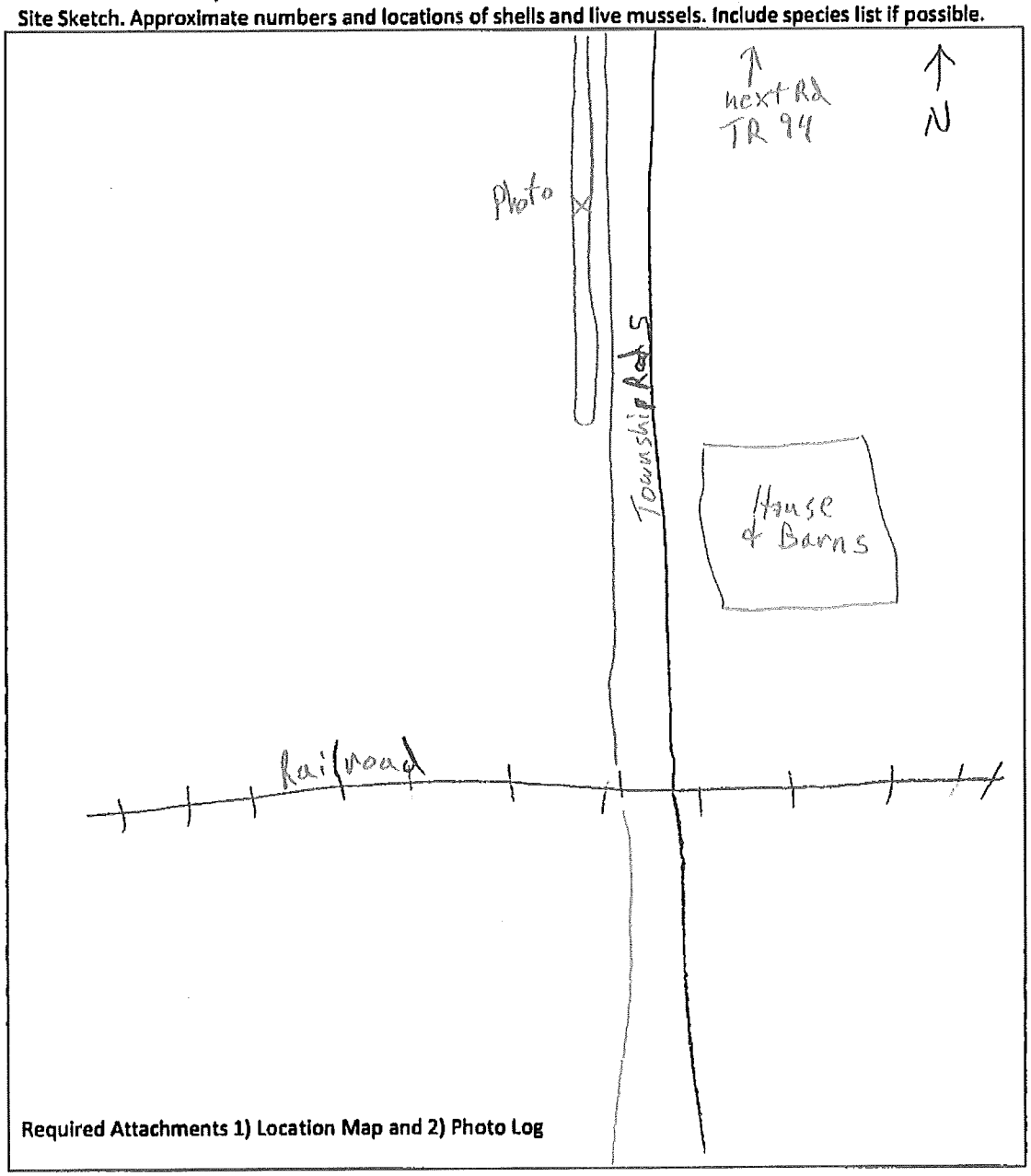
Max Depth (cm): Riffle ____ Run ____ Pool 20

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

☑ None ☐ Mussel Shell Only - Subfossil ☐ Mussel Shell Only - Weathered Dead ☐ Mussel Shell Only - Fresh Dead ☐ Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Required Attachments 1) Location Map and 2) Photo Log

Pt. 15

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Timber Road III Mussel

County: Paulding Township: Harrison

Latitude (DD.DDDD): 41.03844 Longitude (DD.DDDD): 84.78463

Stream Name: N/A Group # (From Appendix A): unlisted

Methods

Name of Surveyor(s): Travis Brown, Karl Dubridge

Qualification of Surveyor(s): ☑ USFWS Approved ☑ ODNR Approved ☑ Aquatic Biologist (minimum)

Date of Survey: 4-27-2016 Distance Surveyed (ft.): 668

Total Survey Time (min. x people): 30X2 Scientific Collector's Permit Number(s): 17-265

Note any deviations from the Ohio Mussel Habitat Assessment Methods :

Habitat Description of Survey Area

Drainage Area at Survey Location (mi²): 0.44 Water Temp. (°F): 55.7 Air Temp. (°F): 50

Substrate Types (include %):

☐ Boulder ____ ☐ Gravel ____ ☐ Bedrock ____ ☐ Detritus ____ ☑ Silt 50

☐ Cobble ____ ☑ Sand 50 ☐ Hardpan ____ ☐ Muck ____ ☐ Artificial ____

Water Level: ☐ High ☐ Up ☑ Normal ☐ Low ☐ Dry/Interstitial

Visibility: ☐ 0-15 cm ☐ 15-30 cm ☐ 30-50 cm ☐ >50 cm ☐ Visible to Bottom

Average Depth (cm): Riffle ____ Run ____ Pool 12

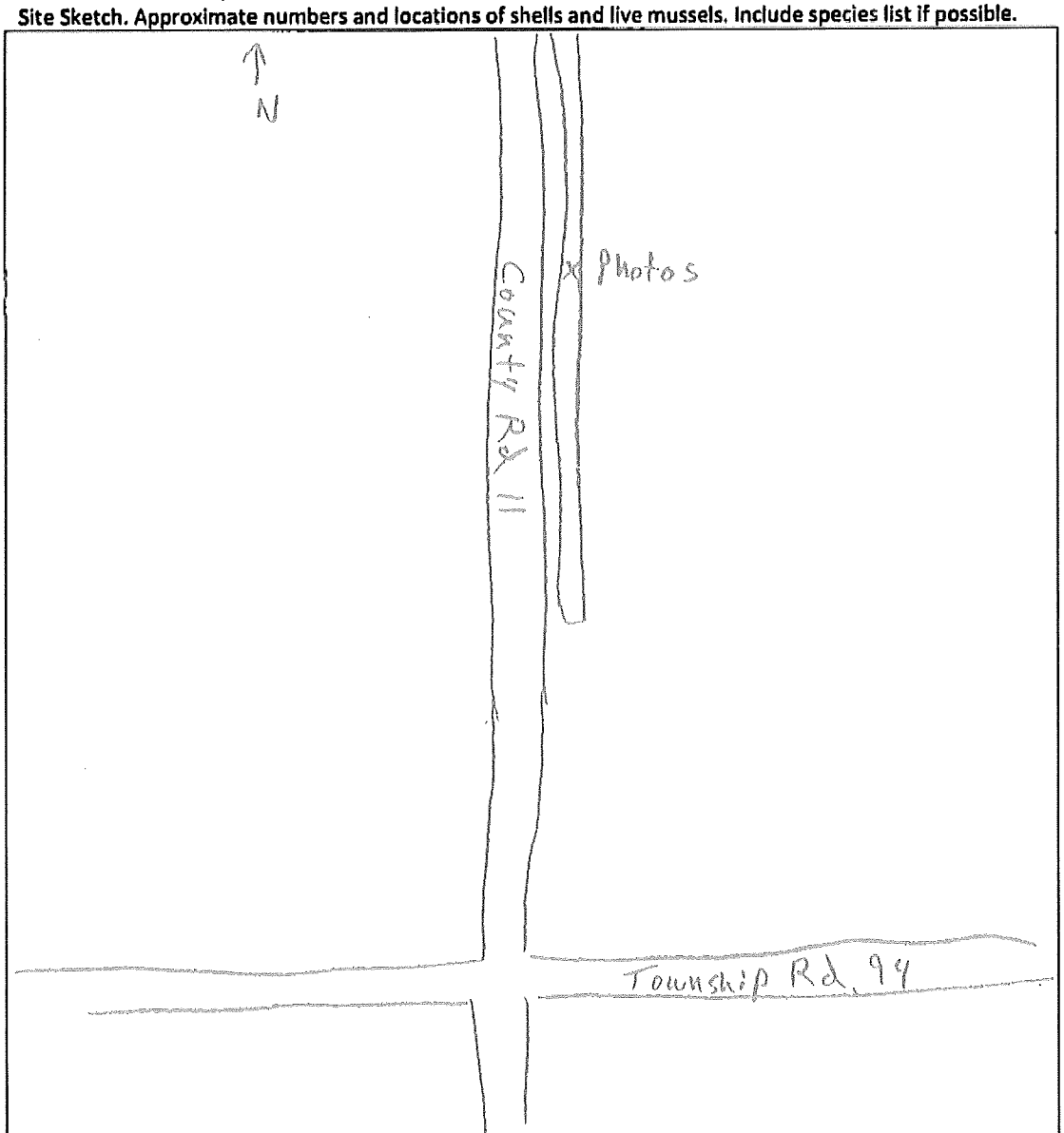
Max Depth (cm): Riffle ____ Run ____ Pool 15

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

☑ None ☐ Mussel Shell Only - Subfossil ☐ Mussel Shell Only - Weathered Dead ☐ Mussel Shell Only - Fresh Dead ☐ Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Required Attachments 1) Location Map and 2) Photo Log

Pt. 16

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Timber Road III Mussel

County: Paulding Township: Harrison

Latitude (DD.DDDD): 41.0958 Longitude (DD.DDDD): 84.77523

Stream Name: NA Group # (From Appendix A): unlisted

Methods

Name of Surveyor(s): Travis Brown, Karl Dubridge

Qualification of Surveyor(s): ☑ USFWS Approved ☑ ODNR Approved ☑ Aquatic Biologist (minimum)

Date of Survey: 4-27-2016 Distance Surveyed (ft.): 682

Total Survey Time (min. x people): 50x2 Scientific Collector's Permit Number(s): 17-265

Note any deviations from the Ohio Mussel Habitat Assessment Methods :

Habitat Description of Survey Area

Drainage Area at Survey Location (mi^2): 1.09 Water Temp. (°F): 55.5 Air Temp. (°F): 50°

Substrate Types (include %):

☐ Boulder ____ ☐ Gravel ____ ☐ Bedrock ____ ☐ Detritus ____ ☑ Silt 50

☐ Cobble ____ ☑ Sand 50 ☐ Hardpan ____ ☐ Muck ____ ☐ Artificial ____

Water Level: ☐ High ☐ Up ☑ Normal ☐ Low ☐ Dry/Interstitial

Visibility: ☐ 0-15 cm ☐ 15-30 cm ☐ 30-50 cm ☐ >50 cm ☑ Visible to Bottom

Average Depth (cm): Riffle ____ Run ____ Pool 20

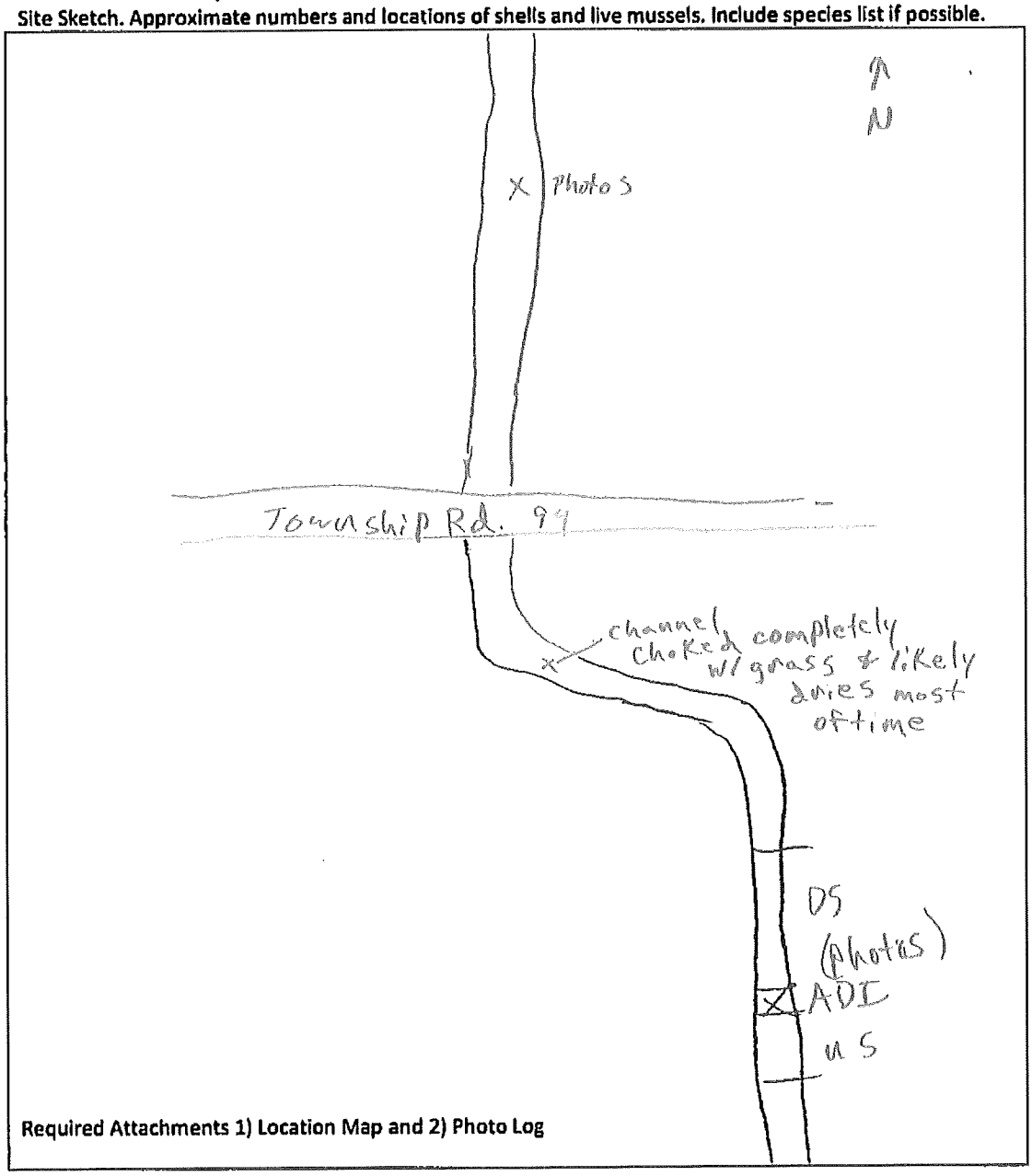
Max Depth (cm): Riffle ____ Run ____ Pool 24

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

☑ None ☐ Mussel Shell Only - Subfossil ☐ Mussel Shell Only - Weathered Dead ☐ Mussel Shell Only - Fresh Dead ☐ Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Required Attachments 1) Location Map and 2) Photo Log

Pt. 17

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Timber Road III Mussel Survey

County: Paulding Township: Harrison

Latitude (DD.DDDD): 41.09110 Longitude (DD.DDDD): 84.76510

Stream Name: ~~AA~~ Wooding Ditch Group # (From Appendix A): Unlisted

Methods

Name of Surveyor(s): Travis Brown, Karl Dubridge

Qualification of Surveyor(s): ☑ USFWS Approved ☑ ODNR Approved ☐ Aquatic Biologist (minimum)

Date of Survey: 4-27-2016 Distance Surveyed (ft.): 659

Total Survey Time (min. x people): 30 x 2 Scientific Collector's Permit Number(s): 17-265

Note any deviations from the Ohio Mussel Habitat Assessment Methods :

Habitat Description of Survey Area

Drainage Area at Survey Location (mi²): 0.39 Water Temp. (°F): 53.0 Air Temp. (°F): 47°F

Substrate Types (include %):

☐ Boulder ____ ☐ Gravel ____ ☐ Bedrock ____ ☐ Detritus ____ ☑ Silt 50

☐ Cobble ____ ☑ Sand 50 ☐ Hardpan ____ ☐ Muck ____ ☐ Artificial ____

Water Level: ☐ High ☐ Up ☑ Normal ☐ Low ☐ Dry/Interstitial

Visibility: ☐ 0-15 cm ☐ 15-30 cm ☐ 30-50 cm ☐ >50 cm ☑ Visible to Bottom

Average Depth (cm): Riffle ____ Run ____ Pool 6

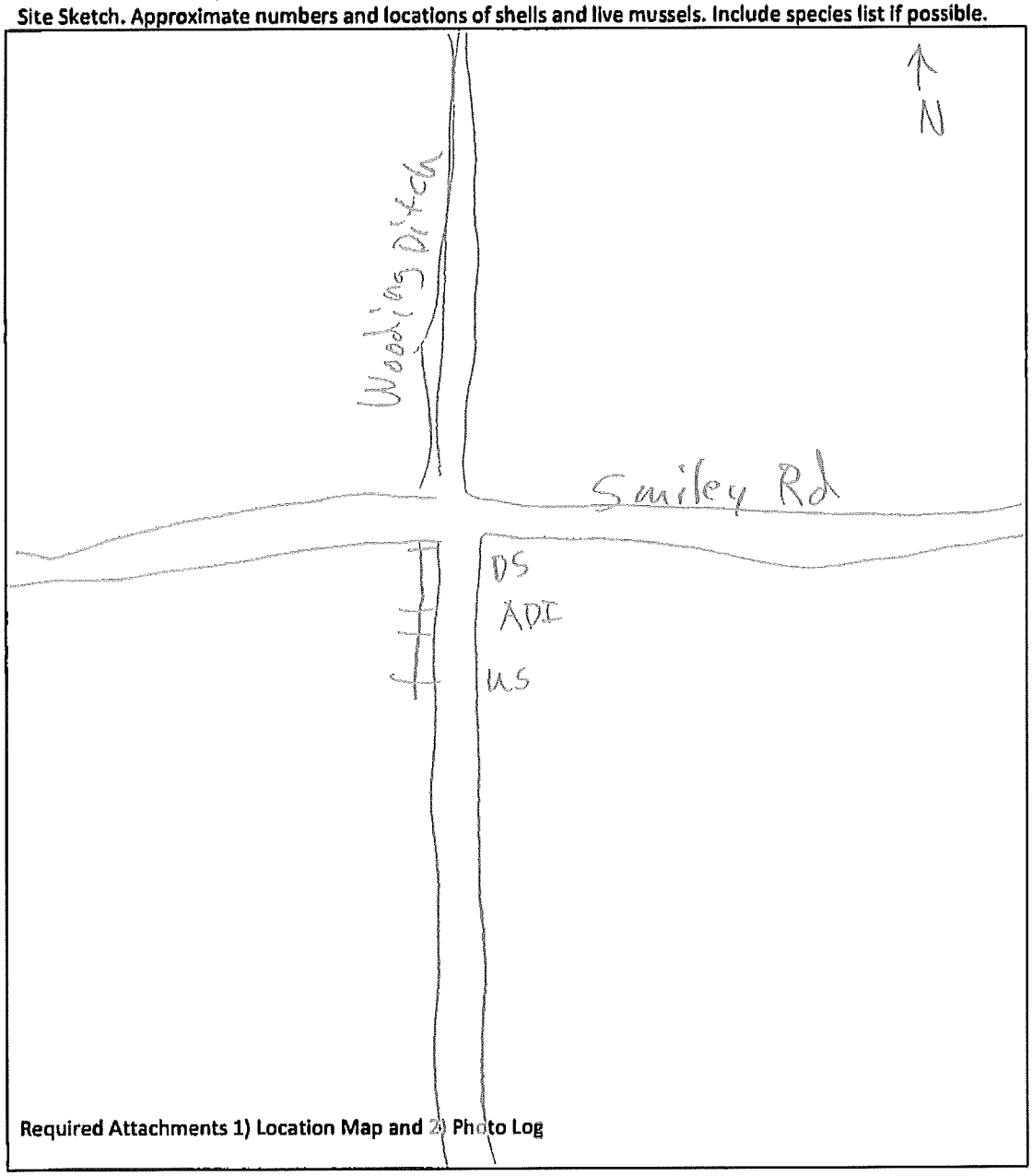
Max Depth (cm): Riffle ____ Run ____ Pool 7

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

☑ None ☐ Mussel Shell Only - Subfossil ☐ Mussel Shell Only - Weathered Dead ☐ Mussel Shell Only - Fresh Dead ☐ Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Required Attachments 1) Location Map and 2) Photo Log

Pt. 18

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Timber Road III Mussel

County: Paulding Township: Harrison

Latitude (DD.DDDD): 41.08906 Longitude (DD.DDDD): 84.75555

Stream Name: NA Group # (From Appendix A): unlisted

Methods

Name of Surveyor(s): Travis Brown, Karl Dabnidge

Qualification of Surveyor(s): ☑ USFWS Approved ☑ ODNR Approved ☑ Aquatic Biologist (minimum)

Date of Survey: 4-27-2016 Distance Surveyed (ft.): 556

Total Survey Time (min. x people): 30x2 Scientific Collector's Permit Number(s): 17-265

Note any deviations from the Ohio Mussel Habitat Assessment Methods :

Habitat Description of Survey Area

Drainage Area at Survey Location (mi^2): 0.24 Water Temp. (°F): 53.7 Air Temp. (°F): 47

Substrate Types (include %):

☐ Boulder ____ ☐ Gravel ____ ☐ Bedrock ____ ☐ Detritus ____ ☑ Silt 50

☐ Cobble ____ ☑ Sand 50 ☐ Hardpan ____ ☐ Muck ____ ☐ Artificial ____

Water Level: ☐ High ☐ Up ☑ Normal ☐ Low ☐ Dry/Interstitial

Visibility: ☐ 0-15 cm ☐ 15-30 cm ☐ 30-50 cm ☐ >50 cm ☑ Visible to Bottom

Average Depth (cm): Riffle ____ Run ____ Pool 7

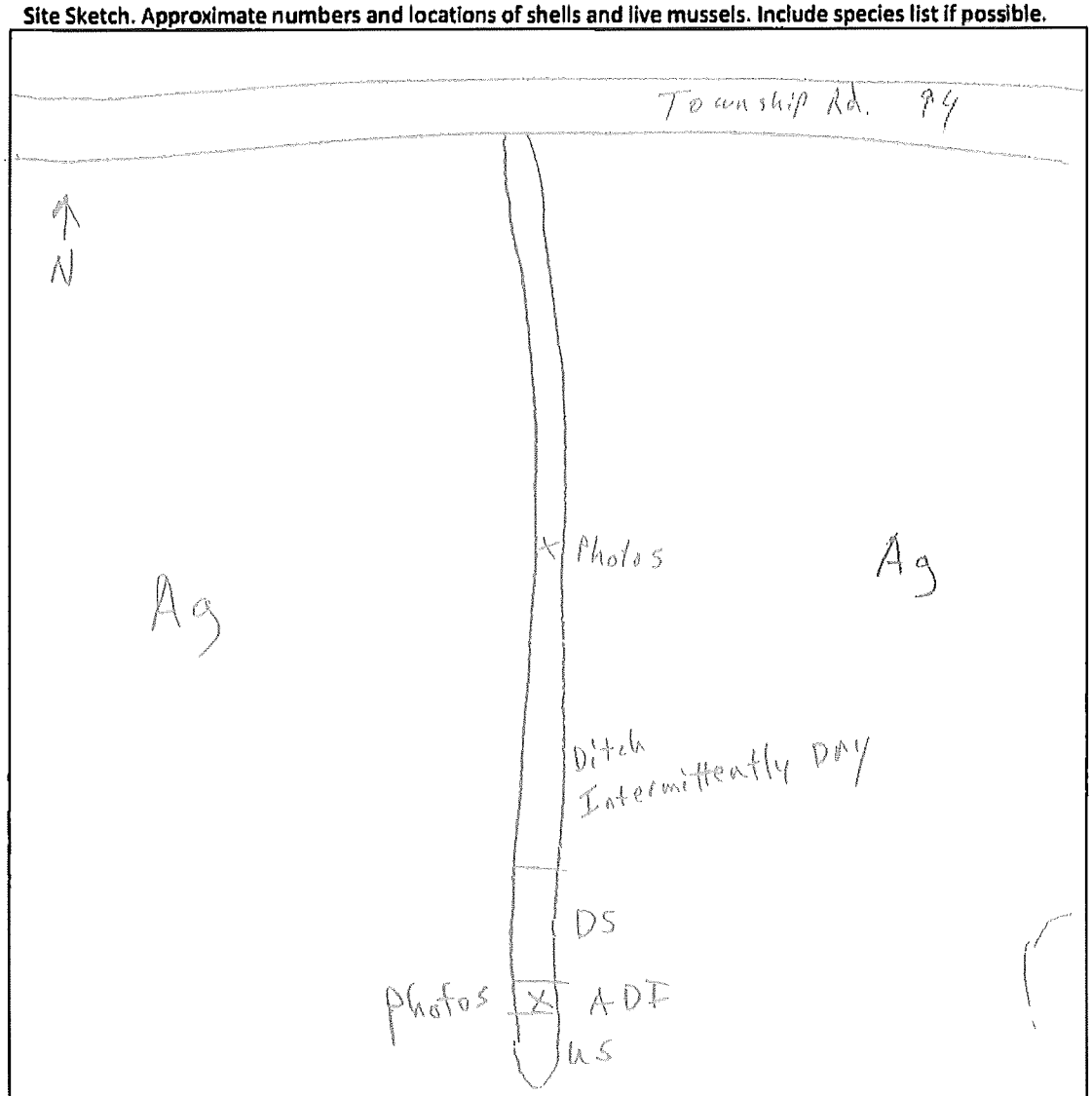
Max Depth (cm): Riffle ____ Run ____ Pool ____

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

☑ None ☐ Mussel Shell Only - Subfossil ☐ Mussel Shell Only - Weathered Dead ☐ Mussel Shell Only - Fresh Dead ☐ Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Required Attachments 1) Location Map and 2) Photo Log

Pt. 19

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Timber Road III Mussel Survey

County: Paulding Township: Harrison

Latitude (DD.DDDD): 41.0849 Longitude (DD.DDDD): -84.79430

Stream Name: Smiley Ditch Group # (From Appendix A): Unlisted

Methods

Name of Surveyor(s): Travis Brown

Qualification of Surveyor(s): ☑ USFWS Approved ☑ ODNR Approved ☑ Aquatic Biologist (minimum)

Date of Survey: 4-29-2016 Distance Surveyed (ft.): 671

Total Survey Time (min. x people): 60 x 1 Scientific Collector's Permit Number(s): 17-265

Note any deviations from the Ohio Mussel Habitat Assessment Methods :

Habitat Description of Survey Area

Drainage Area at Survey Location (mi²): 0.28 Water Temp. (°F): 51°F Air Temp. (°F): 55°F

Substrate Types (include %):

☐ Boulder ____ ☐ Gravel ____ ☐ Bedrock ____ ☐ Detritus ____ ☑ Silt 50

☐ Cobble ____ ☑ Sand 50 ☐ Hardpan ____ ☐ Muck ____ ☐ Artificial ____

Water Level: ☐ High ☐ Up ☑ Normal ☐ Low ☐ Dry/Interstitial

Visibility: ☐ 0-15 cm ☐ 15-30 cm ☐ 30-50 cm ☐ >50 cm ☑ Visible to Bottom

Average Depth (cm): Riffle ____ Run ____ Pool 16

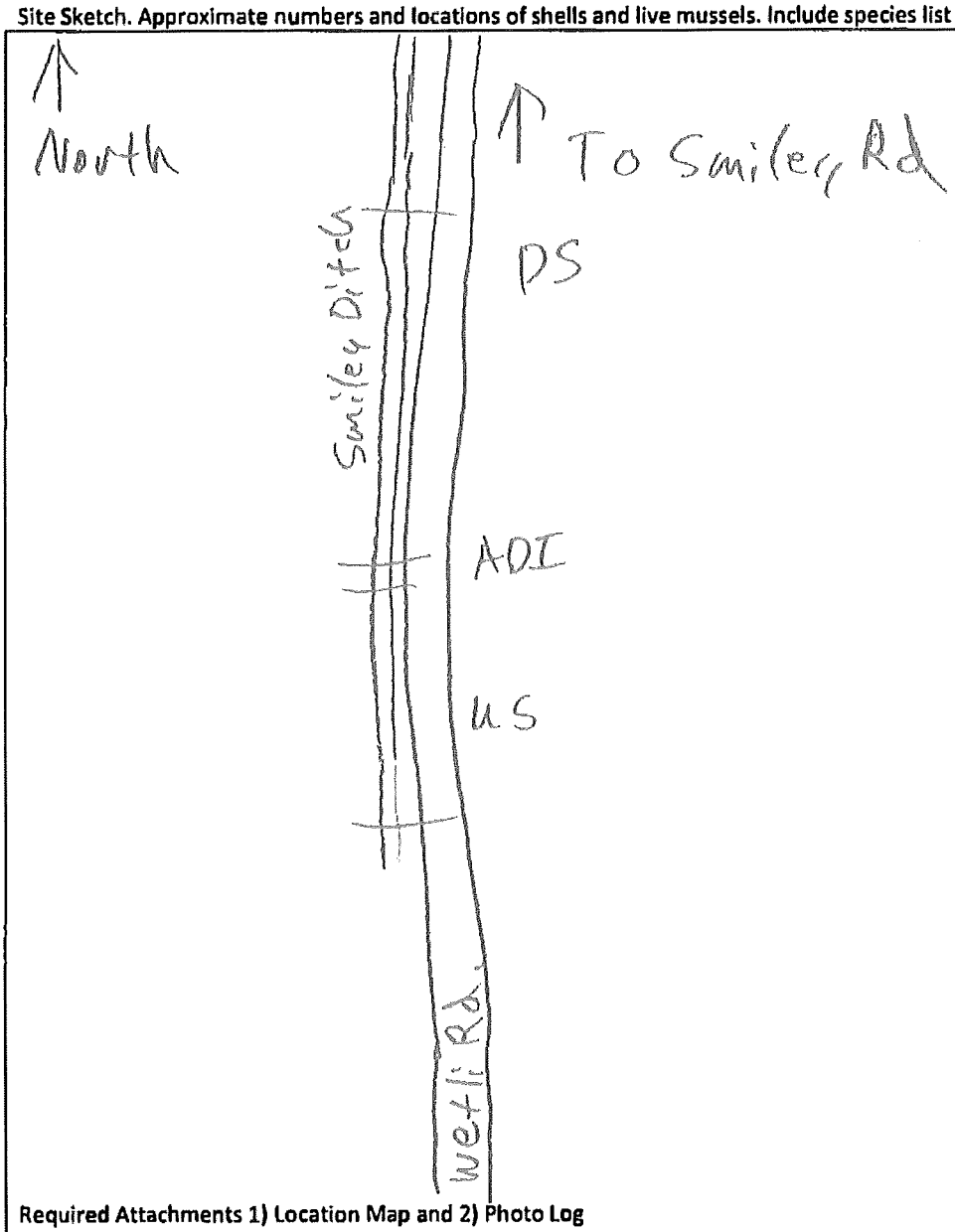
Max Depth (cm): Riffle ____ Run ____ Pool 20

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

☑ None ☐ Mussel Shell Only - Subfossil ☐ Mussel Shell Only - Weathered Dead ☐ Mussel Shell Only - Fresh Dead ☐ Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Required Attachments 1) Location Map and 2) Photo Log

Appendix C: Ohio Scientific Collection Permit

DIVISION OF WILDLIFE

Chief, Division of Wildlife: **Raymond W. Petering**

WILD ANIMAL PERMIT: 17-265

SCIENTIFIC COLLECTION

DATE ISSUED

4/7/2016

TIMOTHY T. BROWN
WESTERN ECOSYSTEMS TECHNOLOGY, INC.
408 WEST 6TH ST.
BLOOMINGTON, IN 47404

Others authorized on permit

NO

is hereby granted permission to take, possess, and transport at any time and in any manner specimens of wild animals, subject to the conditions and restrictions listed below or any documents accompanying this permit. This permit, unless revoked earlier by the Chief, Division of Wildlife, is effective from:

3/16/2016 to: 3/15/2017

The Chief of the Division of Wildlife will not issue permits for Dangerous Wild Animal (DWA) species (ORC 935.01 except native DWA, required for specific projects. The permit issued by the Chief does not relieve the permittee of any responsiblity to obtain a permit pursuant to R.C. Chapter 935 except as specified for the animals and purposes permitted herein. The permittee must adhere to all additional requirements under R.C. Chapter 935.

THIS PERMIT IS RESTRICTED AS FOLLOWS:

1. At least 15 days prior to the initiation of field work, please provide John Navarro (john.navarro@dnr.state.oh.us) with a study plan as specified in the Ohio Mussel Survey Protocol (April 2014) @ http://wildlife.ohiodnr.gov/licenses-and-permits/specialty-licenses-permits.
2. May collect mussels, including endangered species, and fish for survey and inventory.
3. Mussel specimens may be temporarily held per USFWS guidelines outlined in your federal permit and released within 3 hours to the collection location.
4. Twenty-four hours prior to all collecting activities, contact must be made with the local wildlife officer to advise locations and duration of sampling.
5. Must maintain and follow restrictions of current U.S. Fish and Wildlife Service permit TE35521B-0.
6. Collection is prohibited in the Killbuck, Big Darby, Little Darby, tributaries to and east branch of the Chagrin River above I-90, Fish Creek (Williams County) and Division of Wildlife property without explicit written permission from the Division of Wildlife. Sampling is further restricted in streams that may have federally listed mussels. See Appendix A of the Ohio Mussel Survey Protocol (April 2014 @ http://wildlife.ohiodnr.gov/licenses-and-permits/specialty-licenses-permits) for locations of federally listed mussels.
7. Please notify John Navarro by email or phone at 614-265-6715 if a new location for a state-listed species is found. Contact Mr. Navarro within 24 hrs if an undocumented invasive species is found.
8. Any voucher specimens collected are to be deposited at The Ohio State University, Museum of Biological Diversity, 1315 Kinnear Road, Columbus, OH 43212 USA, 614-292-6170.
9. An annual electronic report must be submitted in the Wildlife Diversity Database Excel spreadsheet format. The file may be downloaded from wildohio.gov or contact the permit coordinator.
10. All work conducted on live mussels, as well as identification of all mussels collected must be conducted by an individual that has met the qualifications specified in Appendix D of the Ohio Mussel Survey Protocol (April 2014 @ http://wildlife.ohiodnr.gov/licenses-and-permits/specialty-licenses-permits).

Locations of Collecting:
STATEWIDE WITH NOTED EXCEPTIONS

Equipment and method used in collection:

HAND COLLECTION, SUBSTRATE EXCAVATIONS, ELECTROFISHING, CAST NETS, DIP NETS, SEINES, FYKE NETS, FUNNEL TRAPS.

Name and number of each species to be collected:
MUSSELS, INCLUDING ENDANGERED SPECIES AND FISH FOR SURVEY AND INVENTORY PURPOSES. MUST MAINTAIN A CURRENT ENDANGERED SPECIES LETTER PERMIT WITH THE DIVISION OF WILDLIFE.

RESTRICTIVE DOCUMENTS ACCOMPANYING THIS PERMIT? YES

NO ENDANGERED SPECIES OR AQUATIC NUISANCE SPECIES MAY BE TAKEN WITHOUT WRITTEN PERMISSION FROM THE CHIEF

DIVISION OF WILDLIFE

Raymond W. Petering, Chief

April 7, 2016

Timothy Travis Brown
Western Ecosystems Technology, Inc.
408 W. 6th St.
Bloomington, IN 47404

Dear Mr. Brown:

This letter authorizes you and those working under your direct, on-site supervision, to work with state and federally listed endangered or threatened species of mussels in Ohio, such as the purple catspaw (*Epioblasma o. obliquata*). By authority of the Endangered Species Act (ESA), you are hereby designated as an agent of the ODNR Division of Wildlife (DOW) to conduct work on federally listed species of mussels in Ohio. Your designation as an agent of DOW is effective beginning March 16, 2016 and will expire March 15, 2017. If necessary, you may request an extension of this designation to continue your work with federally listed species in Ohio.

Effective until March 15, 2017, this designation allows you to (1) collect endangered specimens of endangered mussels for survey and inventory purposes, (2) add dead specimens of state or federally endangered species salvaged during field work to the OSU Museum of Biological Diversity's permanent collection, (3) continue to monitor mussel beds of federally listed mussels in Ohio, (4) locate additional locations of mussel beds of federally listed mussels in Ohio. Any and all work conducted on mussels, as well as identification of mussels, must be conducted by named permittees that are federally permitted. Assistants are only permitted to work under the direct, on-site supervision of named permittees. At least 15 days prior to the initiation of field work, please provide John Navarro (john.navarro@dnr.state.oh.us) with a study plan specifying objectives, location, dates, and all other details, for DOW review and approval.

The United States Fish and Wildlife Service (USFWS) and DOW are partners in a cooperative agreement under Section 6c of the ESA. Your designation as an agent of the DOW means your work with federally listed species in Ohio is permitted under federal regulations 50 CFR 17.21c and 50 CFR 17.31b. This includes aid to sick, injured, or orphaned species [50 CFR 17.21c (3) (i)] and salvage of dead specimens useful for scientific study [50 CFR 17.21c (3) (iii)]. You must notify the USFWS of any such taking as outlined in 50 CFR 17.21c (4). In addition to salvage activities, you are authorized to take species of federally endangered mussels, as outlined in 50 CFR 17.21c (5), provided your activities meet the guidelines outlined in 50 CFR 17.21c (5) (i) - 50 CFR 17.21c (5) (iv).

Note that a separate permit under Section 10 of the ESA is necessary in the case where you might hold live federally listed species of mussel longer than 45 days. Permit requests under Section 10 of the ESA should be directed to endangered species biologist Angela Boyer in Columbus, Ohio (614-416-8993 ext. 22). If you have questions about whether any proposed activities are covered under this authority or need any other assistance, contact the USFWS.

Information gathered from your work and the potential to propagate mussels will be valuable to the DOW and USFWS for the survival of these endangered mussels in Ohio. A report in the Wildlife Database Excel spreadsheet format and any prepared reports summarizing your findings should be provided to John Navarro, Program Administrator, at the Division of Wildlife Headquarters, 2045 Morse Rd Bldg G., Columbus, OH 43229-6693 and Angela Boyer, Endangered Species Coordinator, U.S. Fish and Wildlife Service, 4625 Morse Road, Suite 104, Columbus, OH 43230 by 15 March of each year.

Sincerely,

RAYMOND W. PETERING
Chief

RP:mm

cc: J. Navarro
A. Boyer, USFWS
District Law Supervisors
File

Elliott, Ryan D.

From: Distelrath, Sarah
Sent: Monday, May 16, 2016 10:44 AM
To: 'grant.zeto@puc.state.oh.us'
Cc: Brooks, Chris; Bowser, Erin
Subject: Timber Road I and Timber Road III - Stream Restrictions
Attachments: RE: TR III - Streams ID request

Grant,

Stream Restrictions during (April 15 – June 30)

The attached e-mail confirms that the applicant will not impact any class 3 primary headwater streams, exceptional warm water habitat; coldwater habitat; warm water habitat; and streams potentially supporting threatened and endangered species. As confirmed by the applicant's environmental consultants, EDR, the Stipulation condition number 20 and 22 Paulding Wind Farm, LLC Case No. 09-980-EL-BGN and Paulding Wind Farm III, LLC Case No. 10-369-EL-BGN will not apply.

Please let me know if you have any questions regarding this condition.

Thank you,
Sarah D.

Sarah Distelrath
EDP Renewables North America LLC
Development - Eastern Region
155 E. Market, Suite 307 Indianapolis, IN 46204
Direct 317.636.0866 Cell 713.449.8224 Fax 317.636.1418
www.edpr.com
Take action. Use energy efficient products.

From: Distelrath, Sarah
Sent: Thursday, March 17, 2016 4:54 PM
To: 'grant.zeto@puc.state.oh.us' <grant.zeto@puc.state.oh.us>
Cc: Brooks, Chris <Chris.Brooks@edpr.com>; Bowser, Erin <Erin.Bowser@edpr.com>
Subject: Timber Road I and Timber Road III - Condition Response for Updated Licensed Microwave Report

Grant,

Microwave Beam Path Report

Please find attached an updated Microwave Beam Path Report. The attachment will meet Stipulation condition number 44 within Paulding Wind Farm, LLC Case No. 09-980-EL-BGN. Although not a condition

within the Opinion Order and Certificate, the attached document also includes turbines within the Paulding Wind Farm III, LLC Case No. 10-369-EL-BGN.

In addition to meeting Stipulation conditions, the attached also satisfies the OPSB request to provide documentation all wind turbines are sited in locations that would not obstruct existing Fresnel zones. The report states within the final page, Section 5 Conclusion, "Based on the cross sectional analysis, it was determined that the blades should clear the Fresnel Zones. Therefore, no turbines will cause obstruction to the licensed microwave system in the area."

Thank you,
Sarah Distelrath

Sarah Distelrath
EDP Renewables North America LLC
Development - Eastern Region
155 E. Market, Suite 307 Indianapolis, IN 46204
Direct 317.636.0866 Cell 713.449.8224 Fax 317.636.1418
www.edpr.com
Take action. Use energy efficient products.

Elliott, Ryan D.

From: Erin O'Shea
Sent: Monday, May 16, 2016 10:30 AM
To: Jacob Runner; Distelrath, Sarah
Cc: Benjamin Brazell
Subject: RE: TR III - Streams ID request

Thank you Jacob.

Sarah, since we have no in stream work for Flatrock Creek, the condition does not apply to the project.

Erin O'Shea
EDP Renewables, North America
Environmental Affairs
312.533.1051

From: Jacob Runner [mailto:jrunner@edrdpc.com]
Sent: Monday, May 16, 2016 7:26 AM
To: Erin O'Shea <erin.oshea@edpr.com>; Distelrath, Sarah <Sarah.Distelrath@edpr.com>
Cc: Benjamin Brazell <BBrazell@edrdpc.com>
Subject: RE: TR III - Streams ID request

Hi Erin,
Only Flatrock creek is subject to the seasonal in-stream work restrictions. According to Section C. 4. (d) of the 2011 Ecological MOA between ODOT, USFWS, ODNR, and FHWA. Modified Warmwater Habitat streams do not require any in-stream restrictions. In addition it clearly states that Warmwater Habitat streams with a watershed of less than 20 square miles (i.e., Wildcat Creek) do not require any in-stream restrictions. Let me know if you have any questions.
Jake

From: Erin O'Shea [mailto:erin.oshea@edpr.com]
Sent: Thursday, May 12, 2016 11:47 AM
To: Benjamin Brazell <BBrazell@edrdpc.com>
Cc: Distelrath, Sarah <Sarah.Distelrath@edpr.com>
Subject: FW: TR III - Streams ID request

Hey Ben, will you please confirm we do not have any of the below types of streams that will be impacted at TRIII?

Erin O'Shea
EDP Renewables, North America
Environmental Affairs
312.533.1051

From: Distelrath, Sarah
Sent: Thursday, May 12, 2016 8:38 AM
To: Erin O'Shea <erin.oshea@edpr.com>; Poe, Allison <Allison.Poe@edpr.com>
Cc: Bowser, Erin <Erin.Bowser@edpr.com>; Brooks, Chris <Chris.Brooks@edpr.com>
Subject: RE: TR III - Streams ID request

Erin and Allison,

The OPSB condition identifies stream work that will cause restriction to construction between April 15 – June 30th. Can you review the project area to see if we have any streams that fit any of the highlighted categories? I we do have streams, can you please identify which ones they are that will need to be restricted?

Paulding Wind and Paulding Wind III LLC shall not work in the following types of streams during fish spawning restricted periods (April 15 to June 30), unless a waiver is issued by ODNR and approved by staff releasing applicant from a portion of, or the entire restriction period: class 3 primary headwater streams; exceptional warm water habitat; Coldwater habitat; warm water habitat; and streams potentially supporting threatened and endangered species.

Thank you!
Sarah D.

Sarah Distelrath
EDP Renewables North America LLC
Development - Eastern Region
155 E. Market, Suite 307 Indianapolis, IN 46204
Direct 317.636.0866 Cell 713.449.8224 Fax 317.636.1418
www.edpr.com
Take action. Use energy efficient products.

From: Erin O'Shea
Sent: Thursday, May 05, 2016 4:59 PM
To: Distelrath, Sarah <Sarah.Distelrath@edpr.com>; Poe, Allison <Allison.Poe@edpr.com>
Cc: Bowser, Erin <Erin.Bowser@edpr.com>; Brooks, Chris <Chris.Brooks@edpr.com>
Subject: RE: TR III - Streams class 3 ID request

There are no streams within the TRIII project area that are classified as Class 3.

I am not sure if you need the info for the Tline too, but there aren't any Class 3 streams along the Tline either.

Erin O'Shea
EDP Renewables, North America
Environmental Affairs
312.533.1051

From: Distelrath, Sarah
Sent: Thursday, May 05, 2016 3:48 PM
To: Erin O'Shea <erin.oshea@edpr.com>; Poe, Allison <Allison.Poe@edpr.com>
Cc: Bowser, Erin <Erin.Bowser@edpr.com>; Brooks, Chris <Chris.Brooks@edpr.com>
Subject: TR III - Streams class 3 ID request

Erin or Allison,

Can you please check to see if we have any streams within TR III project area that is classified as a class 3 stream? Please let me know if you need anything at all to complete this analysis.

Thank you!

Sarah D.

Sarah Distelrath
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Elliott, Ryan D.

From: Distelrath, Sarah
Sent: Monday, March 28, 2016 9:47 AM
To: 'grant.zeto@puc.state.oh.us'
Cc: Brooks, Chris; Bowser, Erin
Subject: Timber Road I and Timber Road III - Condition Response for Full Geotechnical Investigation

Grant,

Full Geotechnical Investigation

Please use this link [https://edpr.securevdr.com/d-s28313a8937c4176a] to access the Paulding Wind Farm, LLC Case No. 09980-EL-BGN and Paulding Wind Farm III, LLC Case No. 10-369-EL-BGN Geotechnical Report.

Grant, can you please send me the name and email address that you recommend that I send the link to within the ODNR Division of Geological Survey as noted within the stipulation 24 and 27?

After we send the link to the ODNR in addition to the link provided in this email, we will meet Stipulation Condition number 24 within Paulding Wind Farm, LLC Case No. 09-980-EL-BGN and condition number 27 within Paulding Wind Farm III, LLC Case No. 10-369-EL-BGN.

Thank you!
Sarah Distelrath

Sarah Distelrath
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Elliott, Ryan D.

From: Distelrath, Sarah
Sent: Friday, April 01, 2016 1:58 PM
To: grant.zeto@puc.state.oh.us
Cc: Brooks, Chris; Bowser, Erin
Subject: Timber Road I and Timber Road III - Condition Response for Emergency Action Plan
Attachments: Timber Road Emergency Action Plan.docx

Grant,

Emergency Action Plan

Please find attached the Emergency Action for both Paulding Wind Farm, LLC Case No. 09-980-EL-BGN and Paulding Wind Farm III, LLC Case No. 10-369-EL-BGN. The attached Emergency action plan was developed in consultation with the Paulding County EMS.

The attachment will meet Stipulation Condition number 28 within Paulding Wind Farm, LLC Case No. 09-980-EL-BGN and condition number 30 within Paulding Wind Farm III, LLC Case No. 10-369-EL-BGN.

Thank you,
Sarah Distelrath

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Document Type: SOI	Document Code: H&S

Site Emergency Action Plan

Timber Road Wind Farm

Version Control			
Version #	**Date**	**Content**	**Justification**
1.1	2011-06-01	Initial Version	N/A
1.2	2013-04-11	Site Specific	Update Information
1.3	2014-10-07	Site Specific	Update Information
1.4	2015-06-10	Site Specific	Update Information

Prepared By:	**Reviewed By:**	**Reviewed By:**	**Approved By:**
Title: Dept:	Title: Dept:	Title: Dept:	Title: Dept:
Date:	Date:	Date:	Date:

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1 Introduction

The purpose of an Emergency Action Plan is to protect the employees from serious injury, property loss, or loss of life in the event of an actual or potential major disaster. A major disaster may include, but is not limited to, any of the following: fire, tornado, earthquake, bomb threat, or hazardous chemical spill. In the event of a major disaster, this Emergency Action Plan describes the initial responsibilities and actions which shall occur in order to protect the safety of all employees, contractors, and visitors until the appropriate local/county responders take over.

2 Scope of application

For the protection of employees, an Emergency Action plan is a requirement by OSHA 1910.38. It is also necessary and prudent for the protection of visitors. It is a requirement that the employer review with each employee upon initial assignment or when the plan changes, those parts of the plan that the employee must know to protect themselves in the event of an emergency. In addition, the written plan shall be made available for all employees, contractors, and visitors to review and plan for their evacuation.

3 Legislative & Regulatory

The Occupational Safety and Health Administration established a requirement for employers to provide an Emergency Action Plan (29 CFR 1910.38).

4 Definitions & Acronyms

Emergency Assembly Area: Predetermined area where employees, contractors, and visitors should meet after an emergency evacuation of the building.

EAP: Emergency Action Plan

SSC: Site Safety Coordinator

5 Overview

5.1 Objective

It is impossible to provide specific information for all situations and there is no guarantee implied by this plan that a perfect response to disaster emergency incidents will be practical or possible. Therefore, this plan is meant to only be a guide for employees and a document to help them to familiarize themselves with basic emergency planning, response and evaluation.

5.2 Areas Involved

- Office personnel
- Contractors
- Visitors

5.3 Inputs

- Emergency Assembly Map
- Telephone Bomb Threat Checklist
- Employee List (separate from this document)

5.4 Outputs

- Notification to fire department
- 911 call for medical emergencies
- Notification to supervisor

6 Design

6.1 Pre Planning

Preparation will increase the margin of safety in an emergency. To evacuate successfully:

- Train employees in ways of assisting others
- Inform employees about how/who to communicate in an emergency
- Assign specific tasks
- Identify employees with specific needs
- Provide a site/building specific plan
- Evacuation route maps are posted in the building. Employees should know at least two evacuation routes. The following information should be marked on the maps. (See Attachments 9.2 and/ or 9.3)
  - Emergency and accessible exits
  - Evacuation routes
  - Location of fire extinguishers
  - Inclement severe weather (Tornado) shelter

6.2 Notification of Emergency Warning

In the event of a disaster, the warning may come from any of the following sources: commercial radio or television, NOAA radio, web/internet, building smoke detection, emergency siren or local authorities. It is recommended that several sources be monitored to assist in determining when emergency situations exist since no one system can cover all circumstances. A person receiving notification of a possible disaster, or a building emergency should immediately notify employees/contractors/visitors and immediate supervisor who will initiate evacuation of the building and/ or project area.

6.3 ERP Team Assignments and Responsibilities

- Review plan annually, revise as necessary, and make copies available to building employees and Corporate Health and Safety Department
- Plan training exercises to test evacuation plan
- Instruct personnel on their duties.
- Direct all initial emergency actions including the following:
  - Assign tasks to personnel to carry out specific actions
  - Order evacuation, if deemed necessary
- Assess nature and extent of all emergencies
- Assume initial control of all emergency action until local emergency personnel arrive

6.4 Evacuation Routes & Meeting Places

- A map of evacuation routes will be displayed throughout the building. Each map will show the way to an exit, depending on where persons are located. It will be the responsibility of **Managers/ Chaperones** to inform employees/visitors of these evacuation routes. The **Operations Manager** shall verify that signs are in place and up to date during self-site inspections.
- Meeting places will be established to account for individuals.
  a. Primary meeting place: Parking Lot Northwest Corner
  b. Secondary meeting place: Storage Building Southwest Corner

- Establish a procedure to account for employees and coordinate with contractors to receive a confirmed headcount
- Establish a procedure for reporting to emergency personnel any missing, trapped or injured occupants

6.5 Tower Rescue

This section is intended to inform all personnel of techniques involved during elevated work so they can perform their work safely. All equipment used for fall protection shall comply with ANSI Z359.1 and Subpart M (Fall Protection Standard). All employees performing elevated tower work must have formal "Tower Safety and Rescue training" as specified by company policy. When ascending a tower, there must be a minimum of two climbers that have had formal training in Tower Safety and Rescue Training. Proof of certification for each climbing employee must be on site at all times. Local emergency response authorities will be given turbine locations in the event of an injury; the injured person will be lowered to the base of the turbine and met by local emergency response authorities.

6.6 Disabilities

Each person has different skills and abilities. This calls for specific provisions for individuals with disabilities in the event of an emergency. The employee with a disability is responsible for informing his/her immediate supervisor that he/she will require assistance during an evacuation. It is important not to assume that persons with obvious disabilities need assistance, or to assume what type of assistance they may need.

6.7 Fire Procedures

6.7.1 Building Fires

- Verbally warn employees in the immediate area upon discovery of smoke or fire. All employees are required to evacuate the building.
- Dial 9-1-1 to report the fire to the authorities.
- Give your name, address with closest major intersection and type of emergency.
- Stay on the line with dispatcher until all necessary information has been given.
- CLOSE THE DOORS AS YOU LEAVE.
- Use stairways. When out, move away from building to the **PRIMARY MEETING PLACE (secondary if primary is compromised)** for a head count. You should be as far out from the building as it is high. Leave walks and drives open for fire and emergency responders.
- If necessary for a safe, orderly evacuation, activate fire extinguishers. At the discretion of the individual, use extinguisher if trained and assigned to do so.
- Notify:
  1. Firefighters if you suspect someone may be trapped inside the building.
  2. Immediate supervisor, police and other emergency services if needed.

6.7.2 Grass, Brush Fires

- In the event of grass and brush fires, employees shall contact EDPR Operations with the exact location and size of the fire.
- Operations shall contact 911 or local emergency response and coordinate with the notifying employee to lead firefighting equipment to the fire.
- Employees will be notified by radio or cell phone of the plant entrance at which to rendezvous with the fire department, if needed.
- Operations will contact any home owners in the area with the location and size of the fire. Employees may be directed by Operations to visit any dwellings that may be in the anticipated path of fire.

- Employees shall at no time attempt to extinguish or "fight" a large brush or grass fire. The employee role is to notify Operations and lead firefighting equipment to the scene.

6.7.3 Turbine Fire

- Turbine fires which occur when the turbine is not occupied will be handled the same as a grass/brush fire.
- If fire occurs in the bottom control cabinet while employees are working in the nacelle, employees shall immediately open all nacelle hatches, then following all fall safe procedures, remain in smoke free air until directed by firefighting personnel to climb down.
- If fire should occur in the nacelle while employees are present, employees shall abandon all tool and equipment and immediately descend the tower ladder or evacuate via an emergency descent device.

6.7.4 Electrical Facilities Fire

- In the event of a fire inside a substation enclosure, employees shall notify Operations with the location and source of the fire.
- Operations shall contact 911 or local emergency contacts and coordinate with the reporting employees to lead firefighting equipment to the location of the substation.
- Transformers and capacitors contain flammable, combustible material and all personnel must remain in safe areas away from these explosive sources.

6.8 Environmental Emergencies

6.8.1 Tornado or Severe Thunderstorm Procedure

- **Prevention and practice before the storm:** Turn on local TV, radio or NOAA Weather Radio and stay alert for warnings.
  - Tornado or Thunderstorm Watch: Weather conditions are favorable for the possible development of tornadoes or severe thunderstorms. Continue normal activities but have someone monitor the situation and notify others if conditions deteriorate.
  - Tornado or Thunderstorm Warning: A tornado or thunderstorm is occurring or sighted in the area. In addition to dark clouds and/or hail the emergency siren may sound.
  - Primary Tornado Shelter: Site Restroom (Male)
  - Secondary Tornado Shelter: Site Restroom (Female)
- **Know the warning signs of a tornado:** Weather forecasting science is not perfect and some tornadoes do occur without a tornado warning. There is no substitute for staying alert to the sky. Besides an obviously visible tornado, here are some things to look and listen for:
  - Strong, persistent rotation in the cloud base.
  - Whirling debris on the ground under a cloud base -- tornadoes sometimes do not have a funnel!
  - Hail or heavy rain followed by either dead calm or a fast, intense wind shift. Many tornadoes are wrapped in heavy precipitation and can't be seen.
  - Day or night - Loud, continuous roar or rumble,
  - Night - Small, bright, blue-green to white flashes at ground level near a thunderstorm (as opposed to silvery lightning up in the clouds). These mean power lines are being snapped by very strong wind, maybe a tornado.
  - Night - *Persistent* lowering from the cloud base, illuminated or silhouetted by lightning -- especially if it is on the ground or there is a blue-green-white power flash underneath.

- **Turbines:** Employees working in turbine nacelles, upon issuance of a tornado watch or warning in the immediate vicinity, (30 mile radius) shall descend and exit the turbine **immediately** or seek shelter in the base of the tower as appropriate. If any of the tornado warning signs are observed, employees shall take cover in low lying areas and not attempt to drive to a building.

After a tornado has passed through the area and an all clear has been given by EDPR NA Management, Employees will regroup at the Primary Shelter Location.

- **Inside a building:** Go to the basement, lowest floor, small center room (like a bathroom or closet), under a stairwell, or in an interior hallway or room with no windows. Go to the center of the room. Stay away from corners because they tend to attract debris.
  - Get under sturdy protection (heavy table or work bench), or cover yourself with a mattress or sleeping bag.
  - Know where very heavy objects rest on the floor above and do not go under them. They may fall down through a weakened floor and crush you.

- **If you are in a vehicle:** Park the car as quickly and safely as possible -- out of the traffic lanes. Get out and seek shelter in a sturdy building. If in the open country, run to low ground away from any cars (which may roll over on you). Lie flat and face-down, protecting the back of your head with your arms. Avoid seeking shelter under bridges, which can create deadly traffic hazards while offering little protection against flying debris.

- **In the open outdoors:** If possible, seek shelter in a sturdy building. If not, lie flat and face-down on low ground, protecting the back of your head with your arms. Get as far away from trees and cars as you can; they may be blown onto you in a tornado.

- **AFTER A TORNADO:** Wait for emergency personnel to arrive. Carefully render aid to those who are injured. Stay away from power lines and puddles with wires in them as they may still be conducting electricity. Watch your step to avoid broken glass, nails, and other sharp objects. Stay out of any heavily damaged houses or buildings as they could collapse at any time. Do not use matches or lighters, in case of leaking natural gas pipes or fuel tanks nearby. Remain calm and alert, and listen for information and instructions from emergency crews or local officials.

6.8.2 Blizzard

- **If indoors:**
  - Stay Indoors.
  - Stay calm and await instructions from National Weather Service.
  - If there is no heat:
    - Close off unneeded room or areas.
    - Stuff towels or rags in cracks under doors.
    - Cover windows at night.
  - Eat and drink. Food provides the body with energy and heat. Fluids prevent dehydration.
  - Wear layers of loose-fitting, lightweight, warm clothing, if available

- **If outdoors:**
  - Find a dry shelter. Cover all exposed parts of the body.

- If stranded in a vehicle:
  - Stay in car or truck.
  - Run motor to turn heater on about every 10 minutes every hour and make sure to open the window a little for fresh air.
  - Check the tailpipe before turning on engine – a blocked tailpipe can send carbon monoxide into the vehicle and cause death.
  - Make yourself visible to rescuers (hazard lights or honk horn).
  - Stay hydrated – if no water is available melt snow and drink.
  - Exercise to keep blood circulating and to keep warm.

6.8.3 Icing Conditions

- **Evaluating Icing on Blades/External Equipment:**
  - Weather forecasts must be consulted at the beginning of each day and discussed during the pre-work meetings. Weather should be monitored throughout the day in order to plan for any inclement weather.
  - In conditions in which the weather is favorable for ice shedding, an initial inspection from a safe location should be performed before any work begins on the WTG or PMT. Conditions that can indicate icing or ice shedding could occur include:
    a) Below normal production for current wind speed/ irregular patterns in production
    b) Visible ice or snow on the turbine
    c) Signs of fallen ice around the turbine or in the surrounding area
    d) Temperature around the freezing point
    e) Freezing rain within the last 24 hours
    f) Gusty or strong winds
    g) Strong or direct sunlight
  - If shedding of ice is observed in the area, personnel should not attempt to enter the WTG. Personnel should remain in a safe location and contact site management immediately.

- **Approaching Wind Turbine:**
  - The turbine should be stopped remotely and nacelle shall be yawed to the desired location via SCADA. If possible, the blades should be aligned down wind and opposite the entry door.
  - Once all WTG motion has stopped, personnel should wait at least 5 minutes to ensure no ice is shedding before approaching the turbine.
  - At least one crewmember must be designated at the WTG where work is being performed and any neighboring turbine that is running to watch for shedding ice. Constant communication with the rest of the team should be maintained. Binoculars or a spotting scope should be used to help identify ice on blades, nacelle or hub. If ice is observed, personnel should notify site management immediately before proceeding.
  - Approach the WTG with extreme caution and park the service vehicle 60 feet away from the turbine. When parking vehicle attempt to reduce the need for personnel to walk through deep snow or ice. To avoid walking and handling materials through deep snow/ice, the vehicle may need to be parked closer than the normal distance from the WTG.
  - Approach the WTG from behind the hub to decrease the risk of being hit if ice falls from the hub.
  - No work shall be performed on top of the WTG, including any transitions to the hub, wind vane or FAA lights if there is ice present on the walking surfaces.
  - All WTG work in or on the towers must be delayed until the ice has shed and/or there is no danger of ice shedding.

- If personnel are inside of a WTG when ice shedding begins, exiting from the tower is forbidden until it has ceased.

- **Approach to PMT Switching During an Icing Event to be Followed in Addition other Safety Standards:**
  - Timber Road I, Timber Road II and Timber Road III turbine transformers are located in the Nacelle.

6.8.4 Earthquake

An earthquake usually occurs without any type of warning. Due to the suddenness, all personnel should attempt to get under a table or desk. After the earthquake has stopped, initiate the following procedure.

- **Indoor Safety:**
  - If an earthquake strikes, you may be able to take cover under a heavy desk or table. It can provide you with air space if the building collapses. If you get under a table and it moves, try to move with it.
  - Inner walls or door frames are the least likely to collapse and may also shield against falling objects. If other cover is not available, go to an inner corner or doorway, away from windows or glass panels.
  - Stay away from glass, hanging objects, cabinets with doors that could swing open, bookcases, or other large furniture that could fall.
  - Grab something to shield your head and face from falling debris and broken glass.
  - If the lights go out, use a battery-operated flashlight. Don't use candles, matches, or lighters during or after the earthquake. If there is a gas leak, an explosion could result.
  - If you are in the kitchen, quickly turn off appliances and take cover at the first sign of shaking.

- **Performing work in a wind turbine:**
  - Stay inside the turbine, but avoid standing below openings from above where objects could fall. Distance yourself from electrical panels.
  - Quickly take a look around the work area for heavy equipment, construction or maintenance in process, as materials may fall, tip over, or collapse in the area. Stay clear.
  - If outside in the wind plant during an earthquake and closely adjacent to overhead objects such as turbines or met towers, immediately move farther away if possible and be cognizant of the need to avoid falling objects.

- **Automobiles:**
  - If you are in a moving automobile, stop as quickly and safely as possible and move over to the shoulder or curb, away from utility poles, overhead wires, and under- or overpasses.
  - Stay in the vehicle, set the parking brake, and turn on the radio for emergency broadcast information.
  - A car may jiggle violently on its springs, but it is a good place to stay until the shaking stops.

- **After The Earthquake:**
  - Once the initial shock is over, calmly walk out of the area to the wind plant's Emergency Assembly Area (EAA).
  - Be prepared for additional earth movements called "aftershocks." Although most of these are smaller than the main earthquake, some may be large enough to cause additional damage or bring down weakened structures.

- **Checking Utilities:**
  - An earthquake may break gas, electrical, and water lines. If you smell gas:

- Open windows
- Shut off the main gas valve
- Do not turn any electrical appliances or lights on or off
- Go outside
- Report the leak to authorities
- Do not reenter the building until a utility official says it is safe to do so.

- **Other Precautions:**
  - Check to see if sewage lines are intact before using bathrooms or plumbing.
  - Do not touch downed power lines or objects in contact with downed lines. Report electrical hazards to the authorities.
  - Immediately clean up spilled medicines, drugs, flammable liquids, and other potentially hazardous materials.
  - Stay off all telephones except to report an emergency. Replace telephone receivers that may have been knocked off by the earthquake.
  - Cooperate fully with public safety officials. Respond to requests for volunteer assistance from police, fire fighters, emergency management officials, and relief organizations, but do not go into damaged areas unless assistance has been requested.

6.8.5 Flooding

Flooding can occur as a result of either long-term, sustained precipitation or short-term intense weather events. Monitoring of emergency broadcasts is important to ensure proper preparation for such events.

- **If ordered to evacuate:**
  - Time permitting, turn off the gas, electricity, and water and move vital materials and equipment to higher ground.
  - Disconnect appliances to prevent electrical shock when power is restored,
  - DO NOT attempt to drive or walk across creeks or flooded roads.

- **Driving Flood Facts**:
  - Six inches of water will reach the bottom of most passenger cars causing loss of control and possible stalling.
  - A foot of water will float many vehicles.
  - Two feet of rushing water can carry away most vehicles including sport utility vehicles (SUV's) and pick-ups.

- **After a Flood:**
  Listen for news reports to learn whether the community's water supply is safe to drink.
  - Avoid floodwaters; water may be contaminated by oil, gasoline, or raw sewage. Water may also be electrically charged from underground or downed power lines.
  - Avoid moving water.
  - Be aware of areas where floodwaters have receded. Roads may have weakened and could collapse under the weight of a car.
  - Stay away from downed power lines, and report them to the power company.
  - Return home only when authorities indicate it is safe.
  - Stay out of any building if it is surrounded by floodwaters.
  - Use extreme caution when entering buildings; there may be hidden damage, particularly in foundations.

- o Service damaged septic tanks, cesspools, pits, and leaching systems as soon as possible. Damaged sewage systems are serious health hazards.
- o Clean and disinfect everything that got wet. Mud left from floodwater can contain sewage and chemicals.

6.8.6 Lightning

- No personnel are permitted in or near a turbine during, as well as, at least one hour after an electrical storm has passed due to the risk of static electricity on the blades.
- A warning will be issued to the site by the Site Operations Manager of his designee when the lightning is detected within 50 miles of the site. Crews will be notified that lightning has been detected within 50 miles and the tower evacuation may be required.
- Each crew must acknowledge the warning by radio or cell phone. Also crews should monitor the area themselves upon notification because many lightning strikes go undetected by the monitoring services.
- A stand down notification will be issued when lightning is detected within thirty (30) miles of the site. Upon notification crews will stop work, acknowledge the notification by radio or cell phone, evacuate the wind turbine generator (WTG), and return to the O&M Building.
- The stand down will remain in effect until the site has received an "ALL CLEAR". An "ALL CLEAR" will be issued when the lightning has been outside of the 30 mile radius for thirty (30) minutes.
- All site personnel must notify the Site Operations Manager or his designee and Owners of any lightning in the area.

6.9 Criminal Activity/Hostile Intruder

- If you observe a crime in progress, behavior which you suspect is criminal or hostile behavior call **911 or appropriate number from emergency contact list.** Report as much information as possible including:
  - o Activity
  - o Person's description
    - i. Height, Weight, Sex, Clothing, Weapons
  - o Location
  - o Direction of Travel
  - o Vehicle Description
    - i. Color, Year, Make, Model, License plate information, Additional distinctive features
- DO NOT APPROACH OR ATTEMPT TO APPREHEND THE PERSON(S) INVLOVED.
- Stay on the phone with the police dispatcher and provide additional information as changes in the situation occur until the first law enforcement officer arrives at your location.

6.10 Medical Emergencies

6.10.1 Injury Illness Ground

Emergency Medical Services (EMS) personnel or those individuals who are trained by a certified First Aid trainer will provide first aid. Until rescue personnel arrive, administer first aid in the building, or in the event of a complete evacuation, at the designated Emergency Assembly Area (EAA) outside.

- **Call 911 immediately if the injury is life threatening.** Provide the following information to the emergency dispatcher.
  - o Nature of medical emergency
  - o Location of emergency (road #, turbine #, substation)
  - o Your name and phone number which you are calling from.

- Provide additional information which may be useful.
- Do not move victim unless absolutely necessary.

- Call the following personnel trained in CPR and First Aid to provide the required assistance prior to the arrival of the professional medical help:
  - Brian Alberts Phone: 419-263-8097
  - Shawn Gragg Phone: 419-263-8159
  - Tracy Brown Phone: 419-263-0137

- The First Aid Kit(s) location: Conference Room/ Vestas' Crew Room/ Company Vehicles
- In case of rendering assistance to personnel exposed to hazardous materials. Consult the MSDS and wear the appropriate personal protective equipment. Attempt first aid ONLY if trained and qualified. Call 911 and refer to Hazardous Substance Spill Section of this document.

6.10.2 Injury Illness Tower

- In the event of an injury/illness requiring medical treatment to employees working in a nacelle or tower, Operations shall be contacted immediately.
- Operations shall contact 911 and coordinate rendezvous points with ambulance service and site personnel. Rendezvous points shall generally be at the site of the injury. However, if Emergency Responders are unable to locate the site, the O&M building will serve as a rendezvous point. (Note: multiple site personnel may be required to lead both EMT first responders and then follow-on emergency vehicles to the injured location.)
- In the event an injured or ill employee is not capable of climbing down the tower, attending employees shall assess the situation, and respond according the appropriate action before lowering injured employees.
- In the event of lowering an individual via descent device, it should be communicated to treat the victim for suspension trauma and/ or as a "crush" victim.

6.11 Biological, Radiological, Explosive, Chemical (BREC) Threat

The threat that a bomb/BREC has been planted is usually made via telephone. In the majority of cases, these threats have been proved to be false and no device or material was located. However, the potential for loss of human life and property is so great that each situation must be pursued and evaluated. A calm response to the bomb threat caller could result in obtaining additional information.

- **Telephone threat:**
  - Remain Calm
  - Attempt to keep the caller on the lines as long as possible by asking the caller to repeat the message. Record words spoken (as many words as possible) by the person and use the telephone threat check list (see checklist below).
    - Ask for the exact location where threat has been or going to be planted.
    - Get as much information as possible about the caller (*i.e. vocal characteristics, sex, group affiliation, reason*)
    - Clues from background noises, which might indicate caller's location or area which call was placed.
      - Immediately after the caller hangs up, report the threat to **911** and report it to your supervisor.
      - Remain available, as law enforcement personnel will want to interview you.
      - Wait for further direction from your supervisor.
      - Do not spread rumors.
- **Written Threat:**
  - Remain calm.

- o Avoid unnecessary handling in order to preserve possible fingerprint(s), handwriting or typewriting, paper, and postal marks. These will prove essential in tracing the threat and identifying the writer.
- o While written messages are usually associated with generalized threats and extortion attempts, a written warning of a specific device my occasionally be received; it should never be ignored.
- o Immediately contact local authorities and report to immediate supervisor.
- o Wait for further instructions.
- o Do not spread rumors.

- **Suspicious Package:**
  - o If a suspicious package or device is found, **immediately** notify the appropriate law enforcement authorities.
  - o Do not shake or empty the contents of any suspicious package or envelope.
  - o Put the package or envelope down on a stable surface; do not sniff, touch, taste, or look closely at it or at any contents that may have spilled.
  - o Alert others in the area but **DO NOT use the fire alarm.**
  - o Leave the area. Close any doors and assemble outside the room's entrance.
  - o Do not allow anyone to reenter the area.
  - o Wash hands with soap and water to prevent spreading potentially infectious material to face or skin.
  - o If possible, create a list of persons who were in the room or area when the suspicious letter or package was recognized and a list of persons who also may have handled it.
- **Hazardous Substance:**

  The following are locations of:

  Spill Containment Equipment: Storage Building/ EDPR Vehicles/ Substation

  Material Safety Data Sheet: Owner's Office/ Vestas' Crew Room

  SPCC Plan: Owner's Office

  A separate Spill Prevention, Control and Countermeasures plan (SPCC) has been developed to address spills in detail. Please refer to that plan for more detailed instructions regarding spill prevention and response.

  In the event of a hazardous spill or potentially hazardous substance:
  - o Type of oil or hazardous substance involved
  - o Estimated quantity of spillage
  - o Fire Risk
  - o MSDS recommendations and considerations
  - o Inform Supervisor
  - o If safe, contain spill

Should the spill be too extensive to be resolved using the available spill kit, then the spill should be contained as far as is practicable and the site's environmental contractor should be contacted to resolve the situation.

The spill should be reported to the National Response Center (NRC) and The State:
NRC: 1-800-424-8802
State: See SPCC Plan for reporting requirements.

The following information will be required when reporting the incident:
- o Clearly identify the location of the spill
- o What substance is involved

- Approximate quantity spilled
- Approximate concentration of the spilled material, if appropriate
- Identify the source of the spill
- Identify who is cleaning the spill
- Identify any resources damaged, if applicable
- Provide contact information
- Did the spill leave site/reach water

7 Training Requirements

- Assigned personnel shall be trained on how to assist others in the proper evacuation of the building.
- Employees shall be informed on the Site Specific Emergency Action Plan.

8 References

- 29 CFR 1910.38

9 Attachments

- **9.1** Telephone Bomb Threat Checklist
- **9.2** Map of Evacuation Routes/ Life Safety Plan [Operations Building]
- **9.3** Map of Evacuation Routes/ Life Safety Plan [Storage Building]
- **9.4** Map of Emergency Assembly Areas
- **9.5** Emergency Contact List
- **9.6** Accident Investigation and Reporting (Witness/ Employee Report)
- **9.7** Timber Road II, Timber Road I and Timber Road III Site Maps
- **9.8** Active Contingency Watch Contact List

9.1_Telephone Bomb Threat Checklist

YOUR NAME:		TIME:		DATE:
CALLER'S IDENTITY SEX:	Male ☐	Female ☐	Adult ☐	Juvenile ☐
APPROXIMATE AGE:				
ORIGIN OF CALL:	Local ☐	Long Distance ☐	Telephone Booth ☐	
CALLERS ATTITUDE & LANGUATE				
☐ Well Spoken ☐ Taped Message	☐ Incoherent ☐ Message Being Read	☐ Profane/Foul ☐ Irrational	☐ Angry ☐ Calm	
{PRIVATE}VOICE CHARACTERISTICS				
☐ Loud/High Pitch ☐ Raspy ☐ Deep Breaths	☐ Nasal ☐ Excited ☐ Crying	☐ Lisp ☐ Rapid ☐ Whisper	☐ Disguised ☐ Deep ☐ Stutter	☐ Slow ☐ Normal ☐ Accent
BACKGROUND NOISES				
☐ Street Noises ☐ Static ☐ Radio/TV ☐ Cell Phone	☐ Long Distance ☐ Restaurant ☐ Wildlife ☐ Music	☐ Factory Machines ☐ Local ☐ PA System ☐ Office Sounds	☐ Weather ☐ Other Voices ☐ Motor ☐ Other	☐ Trains ☐ Airplanes ☐ Party ☐ None

Pretend Difficulty Hearing - Keep Caller Talking - If Caller Seems Agreeable To Further Conversation, Ask Questions Like:

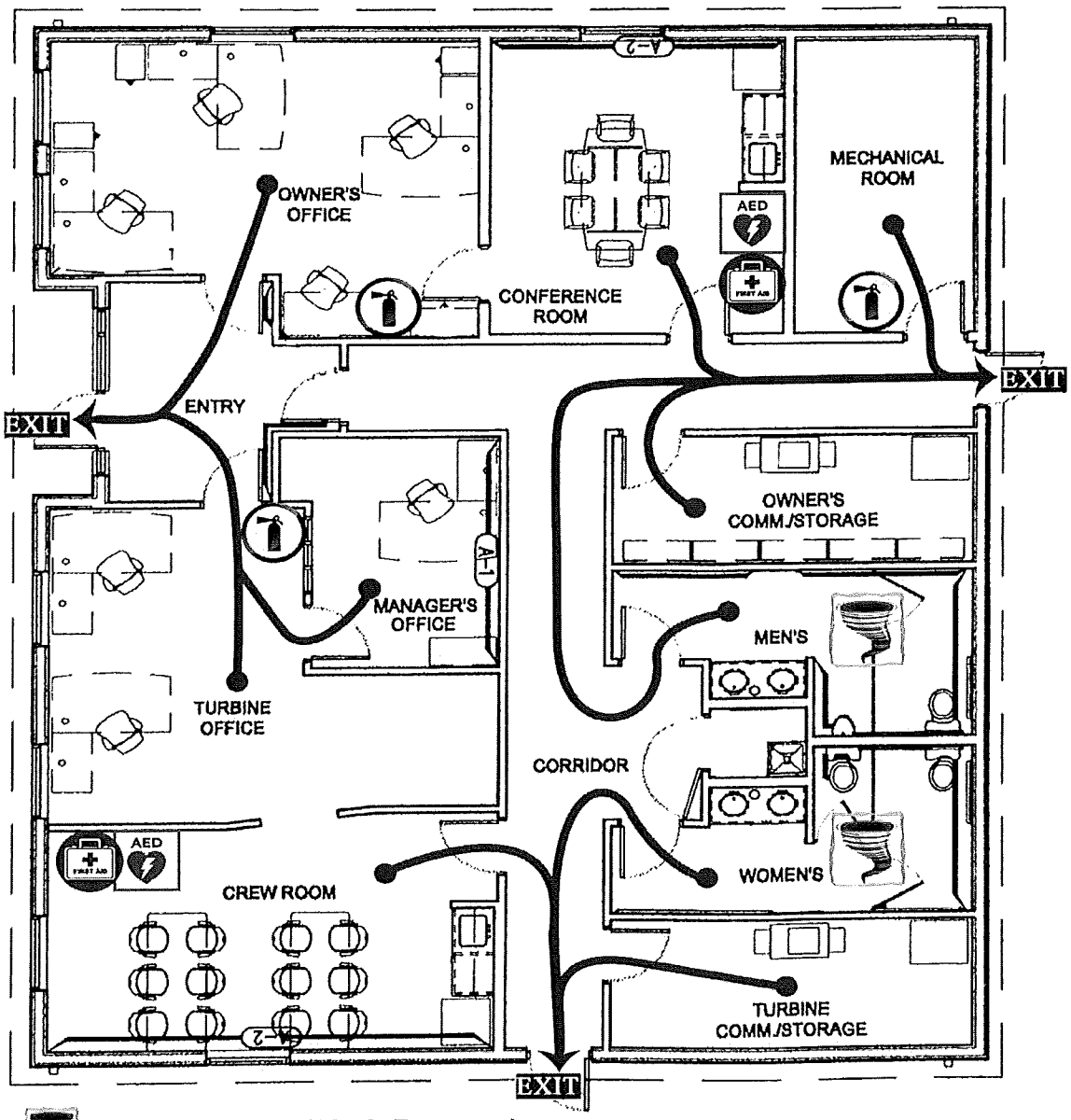
When will it go off?	Certain hour time remaining?
Where is it located?	Which Area of Building?
What kind of bomb?	What kind of package?

If building is occupied, inform caller that detonation could cause injury or death.

Call the Emergency Response Coordinator at 419-263-0137 or Police Department at 911, and relay information about call.

Did the caller appear familiar with building (by his/her description of the bomb location)? Write out the message in its entirety and any other comments on a separate sheet of paper and attach to this checklist. Notify your supervisor immediately.

9.2_Map of Evacuation Routes/ Life Safety Plan [Operations Building]



Tornado Shelter (Men's Restroom)

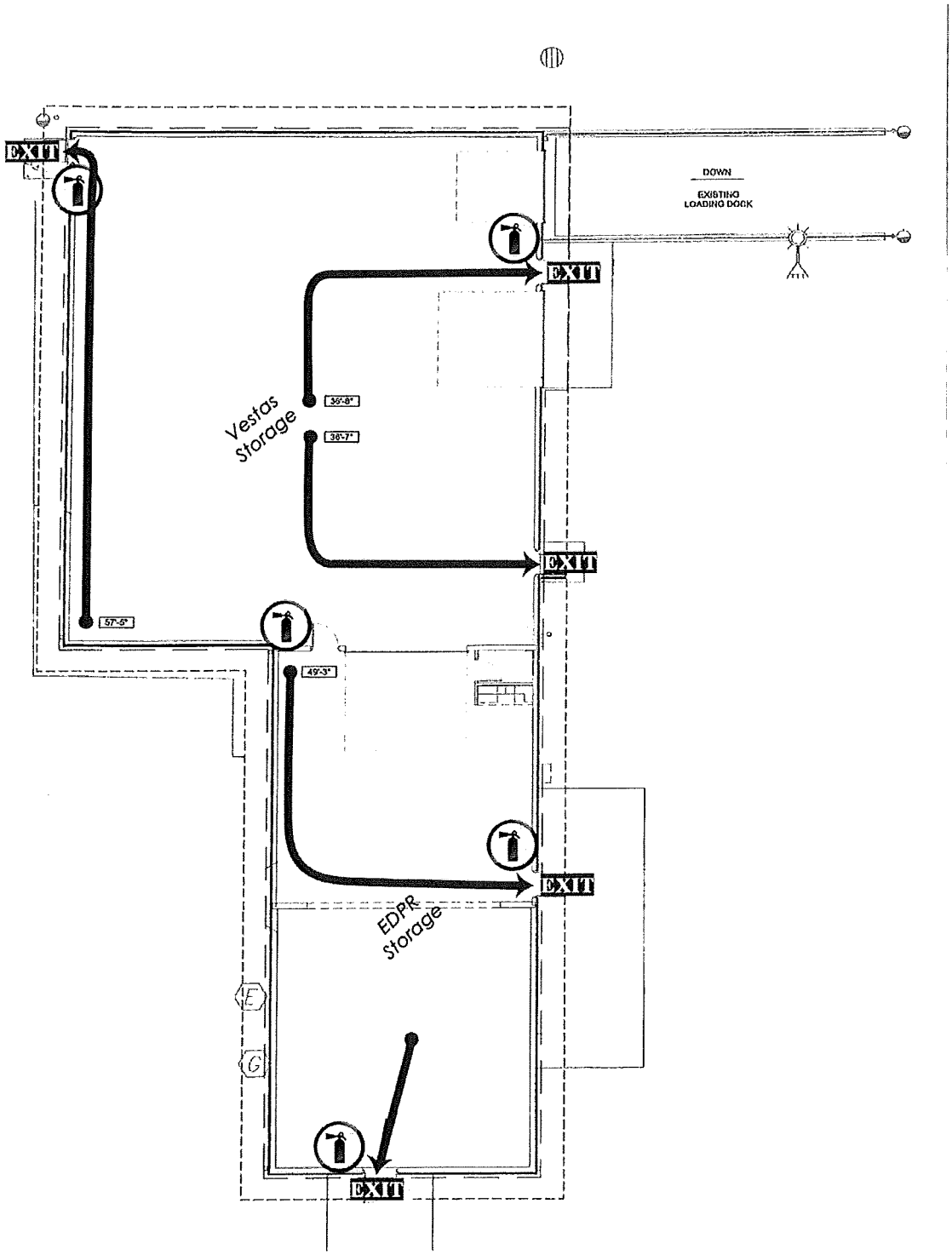
First Aid Kit (Shared Conference Room/ Vestas Crew Room)

Fire Extinguishers (Owner's Office/ Supplier's Office/ Mechanical Room)

AED (Shared Conference Room/ Vestas Crew Room)

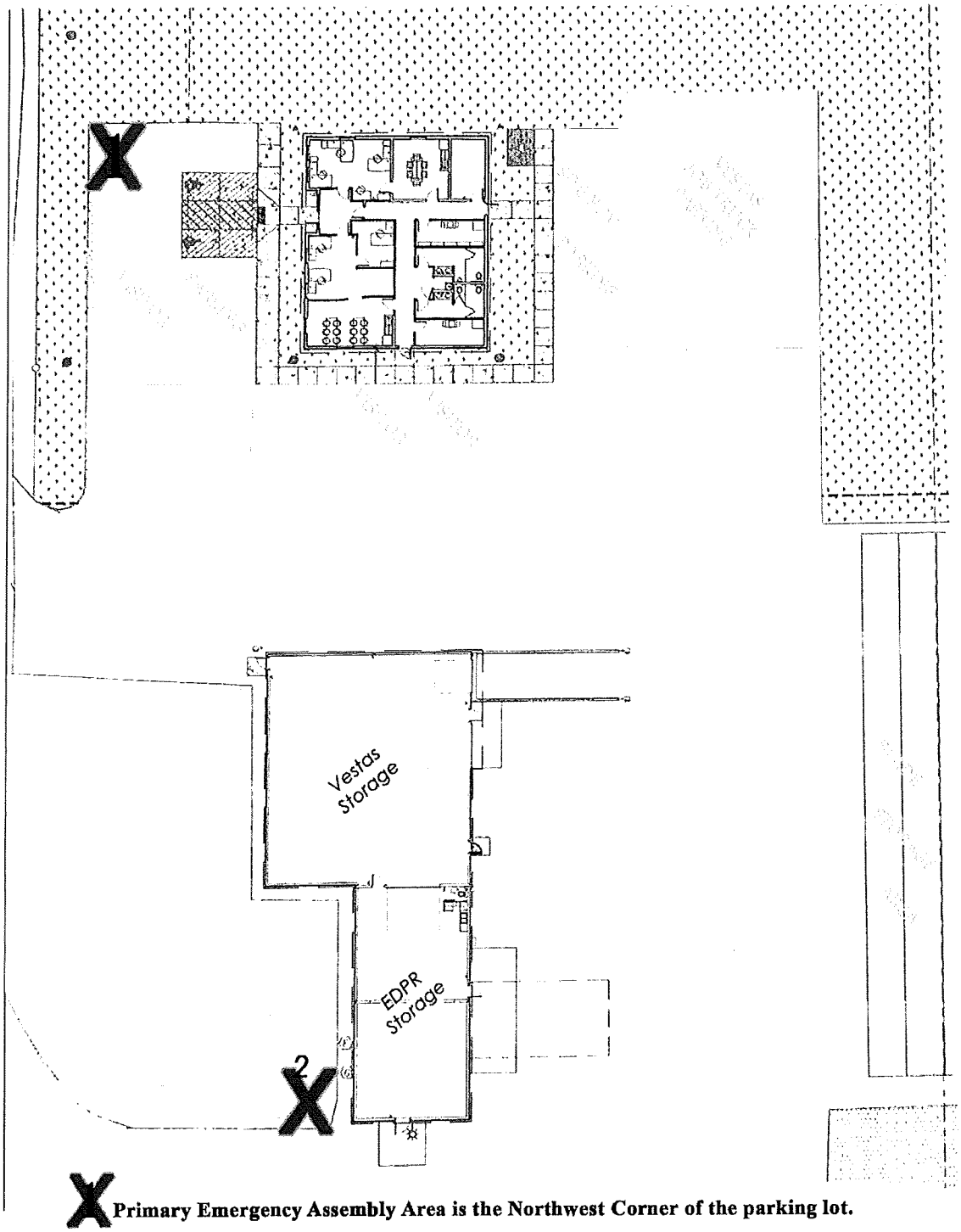
Primary Emergency Assembly Area is the Northwest Corner of the parking lot.
Secondary Emergency Assembly Area is the Southwest Corner of the Storage Building.

9.3_Map of Evacuation Routes/ Life Safety Plan [Storage Building]



Fire Extinguishers (Owner's Storage/ Supplier's Storage)

9.4_Map of Emergency Assembly Areas



Primary Emergency Assembly Area is the Northwest Corner of the parking lot.

Secondary Emergency Assembly Area is the Southwest Corner of the Storage Building.

9.5_Emergency Contact List

Timber Road Contact List			
Life Threatening Emergency Call 9-1-1			
EDPR Operations	Timber Road Office		(419) 263-0137
EDPR Operations Manager	Brian Alberts		(419) 263-8097
EDPR Operations Lead Technician	Shawn Gragg		(419) 263-8159
Vestas Americas	Timber Road Office		(503) 327-7498
Vestas Americas Site Supervisor	Jeff Hill		(419) 605-5994
Payne Volunteer Fire Department	402 North Laura Street, Payne, OH 45880		(419) 263-2823
Van Wert Fire Department	515 East Main Street, Van Wert, OH 45891		(419) 238-4918
Paulding County Hospital	1035 West Wayne Street, Paulding, OH 45879		(419) 399-4080
Parkview Hospital	10501 Corporate Drive, Fort Wayne, IN 46845		(260) 373-7092
Paulding County Sheriff	500 East Perry Street, Paulding, Ohio		(419) 399-3791
Ohio State Patrol (Van Wert)	10234 County Highway 434, Van Wert, OH 45891		(419) 238-3055
Federal Bureau of Investigation (FBI)	Cleveland Field Office		(216) 522-1400
Focus Area	Organization	Contact Name	Phone Number
Operations (ALL)	EDPR Eastern II Region, ROM	Tod Nash	(315) 874-4200
Turbine Reliability	EDPR Eastern II Region, TRE	Stan Kraeger	(315) 286-6225
Turbine Operations	ROCC Primary Control Contact		(713) 356-2573
High Voltage	EDPR Eastern II Region, HVRE	Bryan Peyres	(309) 660-4268
Health and Safety	EDPR Corporate Safety	Gary Lee	(713) 356-2475
Health and Safety	Occupational Safety and Health Administration		(419) 259-7542
Poison Control	National Capital Poison Center		(800) 222-1222
Environmental Reporting	Ohio Environmental Protection Agency		(800) 282-9738
Environmental Reporting	Ohio State Emergency Response Commission		(614) 644-2260
Environmental Response	Safety-Kleen	Joe Kahn	(260) 740-6088
Environmental Reporting	National Response Center (NRC)		(800) 424-8802
Excavation/ Digging	Ohio Utilities Protection Services		(800) 362-2764
Radios/ Communication	McAfee's Communications		(419) 586-3413
Mowing Services	Rosswurm Lawn Care	Ted Rosswurm	(419) 263-2249
Snow Removal	Moore Farms	Ben Moore	(260) 410-0267
Civil Services/ Road Maintenance	Dan Gordon Enterprises	Dan Gordon	(260) 750-0091
High Voltage/ Interconnect	AEP Dispatch		(614) 413-4353
Turbine Mowing	Dan Gordon Enterprises	Dan Gordon	(260) 750-0091

9.6_Employee/ Witness Report

Horizon Wind Energy Employee/Witness Report

You are: Horizon Employee ☐ other Witness ☐	Name: _
Date of accident: _____/_____/_____	Hour of accident:_____AM ☐ PM ☐
Address, city, state, & zip of accident:	
Describe what happened and what caused the accident: _____	
Describe what action can be taken to prevent a recurrence: _____	

_____ _____

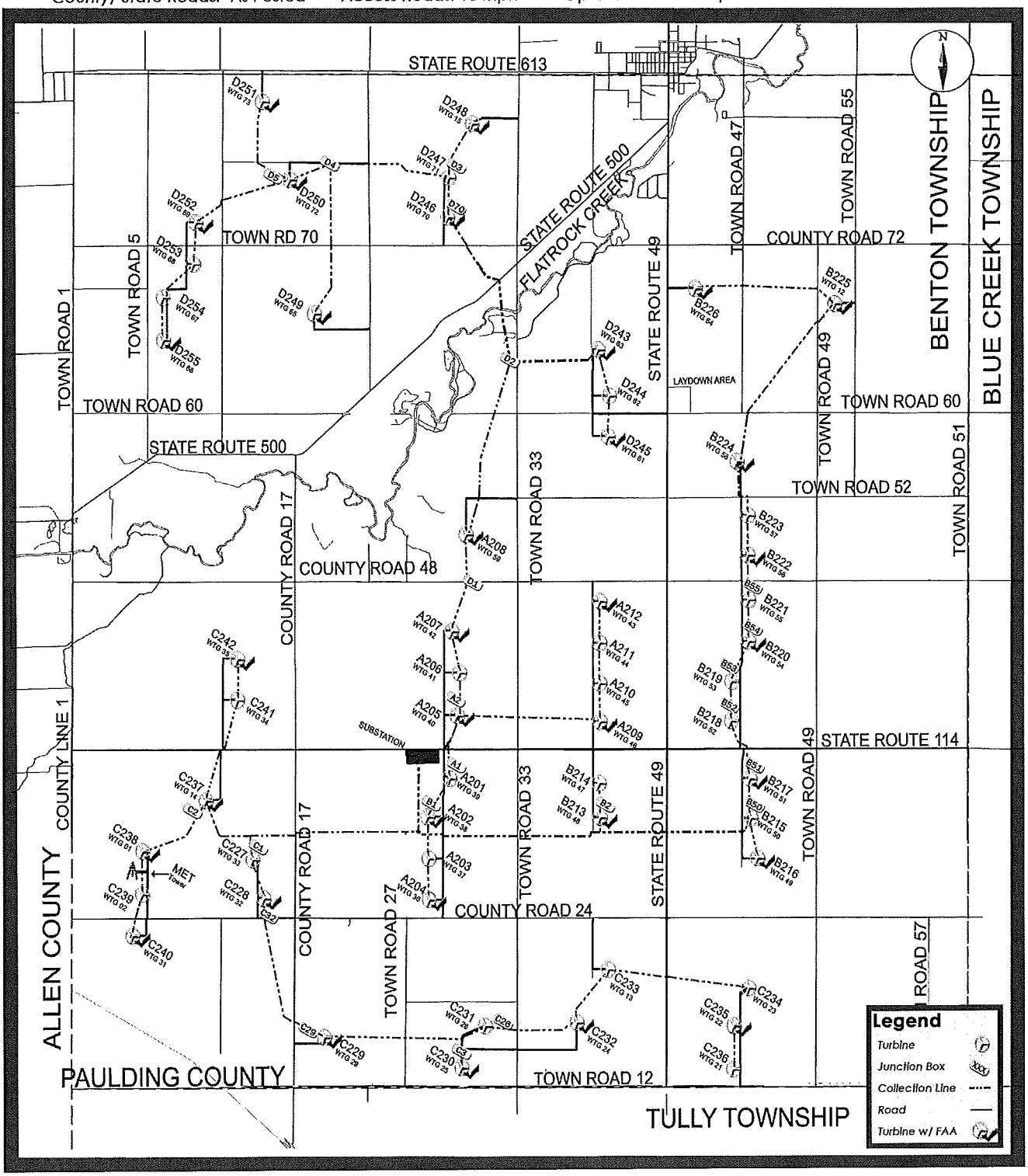
Signature of employee or witness Date

Send completed report to your Supervisor/Manager

9.7_Timber Road II Site Map

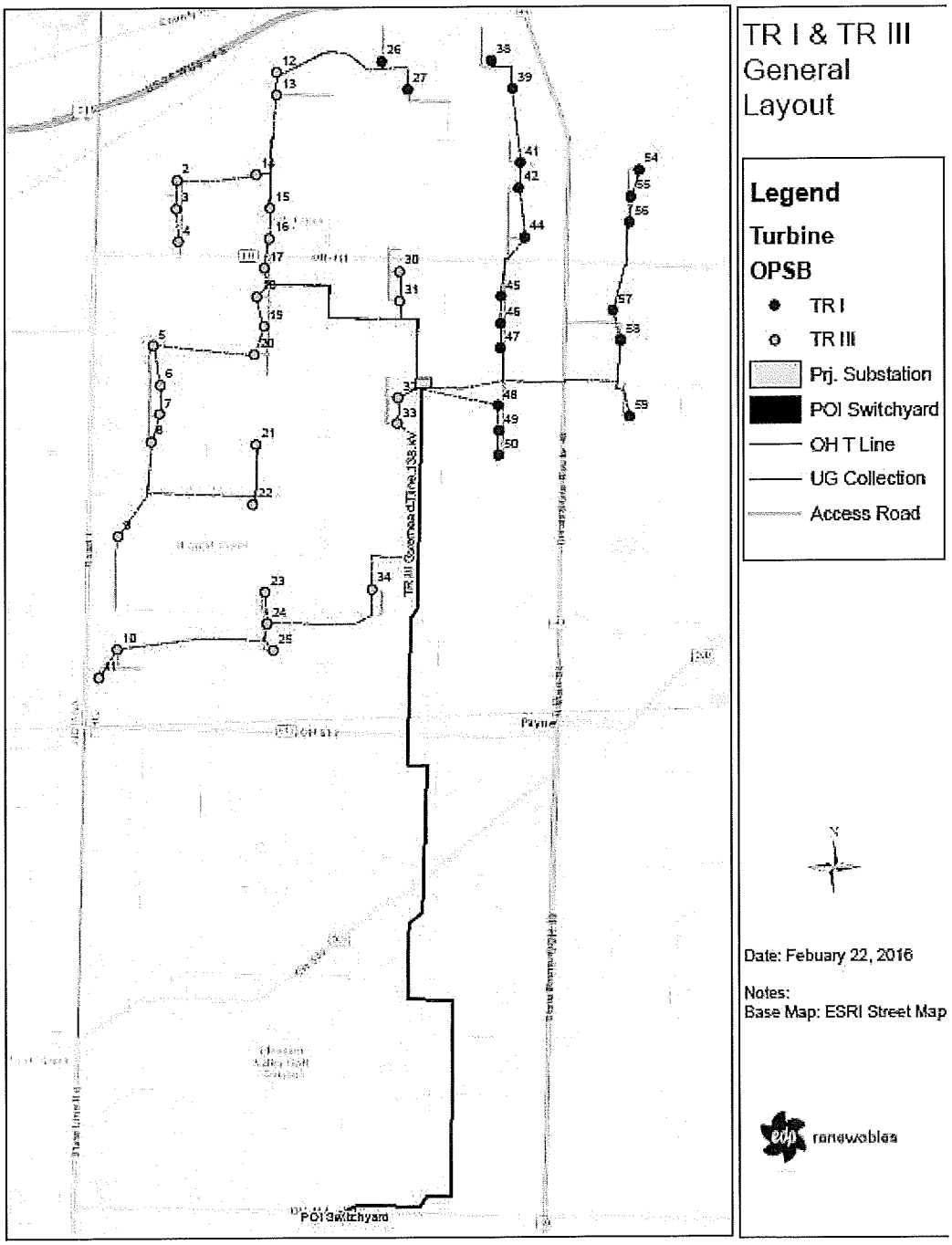
Site Speed Limits

County/ State Roads: As Posted *Access Roads: 15 mph* *Operations Lot: 5 mph*



9.7_Timber Road I and Timber Road III Site Maps

[To be updated with Asbuilt Map 6months to 12 months after COD]



9.8_Timber Road Project Watch Contingency Information

FOCUS	NAME	ORGANIZATION	PHONE	EMAIL
ALL (if available)	Brian Alberts	EDP RENEWABLES NA, LLC	419-263-8097	Brian.alberts@edpr.com
ALL	Tod Nash (NE ROM)	EDP RENEWABLES NA, LLC	315-874-4200	Tod.Nash@edpr.com
Turbine Operations (EDPR)	Shawn Gragg (Lead Tech)	EDP RENEWABLES NA, LLC	419-263-8159	Shawn.gragg@edpr.com
Turbine Operations (VESTAS)	Ryan Bergmann (Service Mgr)	Vestas Americas	503-781-2274	rybgm@vestas.com
Electrical Systems Outage	ROCC Primary Contact (1st)	EDP RENEWABLES NA, LLC	713-356-2573	rocc@edpr.com
Electrical Systems Outage	ROCC Secondary (2nd)	EDP RENEWABLES NA, LLC	713-356-2544	
Electrical Systems Outage	ROCC Emergency (3rd)	EDP RENEWABLES NA, LLC	713-828-1550	
Electrical Systems Outage	Brian Peyres (NE HVRE)	EDP RENEWABLES NA, LLC	309-660-4268	brian.peyres@edpr.com
Electrical Systems Outage	AEP Dispatch	American Electric Power	614-413-4353	
Electrical Systems Outage	Tim Maine	Maine Technical Services, Inc	315-272-7959	tmaine@mainetechnicalservices.com
Electrical Systems Regulatory	Regional Generation Dispatch	PJM		
Electrical Regulatory (NERC)	Robin Hill	EDP RENEWABLES NA, LLC	713-356-2432	Robin.hill@edpr.com
Environmental Response	Joe Kahn	Safety Kleen	260-484-8034	Joseph.kahn@safetykleen.com
Environmental Reporting	National Response Center(NRC)	1-800-424-8802		
Civil (Locating)	Ohio Utilities Protection Service	1-800-362-2764		
Ops Building Maintenance				
Site Safety (Corp. Level)	Gary Lee	EDP RENEWABLES NA, LLC	713-356-2475	Gary.Lee@edpr.com
Law Enforcement (Local)	Dispatch	Paulding County Sherriff	419-399-3791	
Fire Response	Dispatch	Payne Vol. Fire	419-263-2823	
Fire Response (Alt)	Dispatch	Van Wert Fire	419-238-4918	
Law Enforcement (Federal)	Cleveland Field Office	FBI	216-522-1400	
Solid Waste (recycling)	Rob Gerken	Erie Recycling & Services	419-258-2345	eriierecycling@frontier.com
Solid Waste (refuse)	Dispatch	Werlor Inc.	419-784-4285	
Communication (EDPR IT)	Helpdesk	EDP RENEWABLES NA, LLC	713-265-0345	support@edpr.com
Communication (Radios)	James Harsh	McAfee's Communications	419-586-3413	
Water (Ops Building)	Rick Swagger	Culligan Water Systems	260-750-7948	

Elliott, Ryan D.

From: Distelrath, Sarah <Sarah.Distelrath@edpr.com>
Sent: Tuesday, May 24, 2016 6:13 PM
To: grant.zeto@puc.state.oh.us; Jon Pawley (Jon.Pawley@puc.state.oh.us)
Cc: Bowser, Erin; Brooks, Chris
Subject: RE: Timber Road I and Timber Road III - amendment and transmission Line RUA
Attachments: Complete Executed RUA_05-24-2016.pdf

Grant and Jon,

Attached is the fully executed RUA for the following case numbers:

Paulding Wind Farm, LLC Case No. 09-980-EL-BGN
Paulding Wind Farm III, LLC Case No. 10-369-EL-BGN

Timber Road III Transmission Line Case Number 15-1737-EL-BTX

Thank you,
Sarah D.

Sarah Distelrath
EDP Renewables North America LLC
Development - Eastern Region
155 E. Market, Suite 307 Indianapolis, IN 46204
Direct 317.636.0866 Cell 713.449.8224 Fax 317.636.1418
www.edpr.com
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From: Distelrath, Sarah
Sent: Monday, May 16, 2016 4:12 PM
To: 'grant.zeto@puc.state.oh.us' <grant.zeto@puc.state.oh.us>; Jon Pawley (Jon.Pawley@puc.state.oh.us) <Jon.Pawley@puc.state.oh.us>
Cc: Bowser, Erin <Erin.Bowser@edpr.com>; Brooks, Chris <Chris.Brooks@edpr.com>
Subject: Timber Road I and Timber Road III - amendment and transmission Line RUA

Paulding Wind Farm, LLC Case No. 09-980-EL-BGN
Paulding Wind Farm III, LLC Case No. 10-369-EL-BGN

Timber Road III Transmission Line Case Number 15-1737-EL-BTX

RUA

Grant and Jon,

Attached is an RUA that will be for both the Transmission Line as well as the wind farm project area. We expect full execution and will send it over by the end of this week.

1. (For Grant Zeto)
    a. The attached will support condition 33 for Paulding Wind Farm, LLC Case No. 09-980-EL-BGN and condition 34 and 35 for Paulding Wind Farm III, LLC Case No. 10-369-EL-BGN

2. (For Jon Pawley)
    a. The attached RUA will support condition 18 for Timber Road III Transmission Line Case Number 15-1737-EL-BTX

Please let me know if you have any questions.

Thank you,
Sarah D.

Sarah Distelrath
EDP Renewables North America LLC
Development - Eastern Region
155 E. Market, Suite 307 Indianapolis, IN 46204
Direct 317.636.0866 Cell 713.449.8224 Fax 317.636.1418
www.edpr.com
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Elliott, Ryan D.

From: Distelrath, Sarah
Sent: Thursday, March 17, 2016 5:16 PM
To: 'grant.zeto@puc.state.oh.us'
Cc: Brooks, Chris; Bowser, Erin
Subject: Timber Road I and Timber Road III - Condition Response for NTIA Approval
Attachments: NTIA Response 14 March 2016.PDF; NTIA Notification Timber Road 3 Jan 14 2016.pdf

Grant,

NTIA Approval

Please find attached the NTIA approval response stating no agencies had issues with the permitted turbine locations within Paulding Wind Farm, LLC Case No. 09-980-EL-BGN and Paulding Wind Farm III, LLC Case No. 10-369-EL-BGN.

The attachment will meet Stipulation Condition number 43 within Paulding Wind Farm, LLC Case No. 09-980-EL-BGN and condition number 42 within Paulding Wind Farm III, LLC Case No. 10-369-EL-BGN.

Also attached is the Notification to NTIA requesting the review of both Paulding Wind Farm, LLC and Paulding Wind Farm III, LLC permitted turbines.

Thank you,
Sarah Distelrath

edp renewables

Sarah Distelrath
EDP Renewables North America LLC
Development - Eastern Region
155 E. Market, Suite 307 Indianapolis, IN 46204
Direct 317.636.0866 Cell 713.449.8224 Fax 317.636.1418
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UNITED STATES DEPARTMENT OF COMMERCE
National Telecommunications and Information Administration
Washington, D.C. 20230

MAR 14 2016

Mr. Frank O'Brien
GIS Analyst
COMSEARCH
19700 Janelia Farm Blvd.
Ashburn, VA 20147

Re: Timber Road 3 Project: Paulding County, OH and Allen County, IN

Dear Mr. O'Brien:

In response to your request on January 14, 2016, the National Telecommunications and Information Administration provided to the federal agencies represented in the Interdepartment Radio Advisory Committee (IRAC) the plans for the Timber Road 3 Wind Project, located in Paulding County, Ohio and Allen County, Indiana.

After a 45+ day period of review, no agencies had issues with turbine placement in this area.

While the IRAC agencies did not identify any concerns regarding radio frequency blockage, this does not eliminate the need for the wind energy facilities to meet any other requirements specified by law related to these agencies. For example, this review by the IRAC does not eliminate any need that may exist to coordinate with the Federal Aviation Administration concerning flight obstruction.

Thank you for the opportunity to review these proposals.

Sincerely,

Peter A. Tenhula
Deputy Associate Administrator
Office of Spectrum Management

Date: January 14, 2016

Type of Notification: New

Project: Timber Road 3

County: Paulding (OH) and Allen (IN)

State: Ohio and Indiana

Project Sponsor: EDP Renewables North America LLC– Frank O'Brien <fobrien@comsearch.com>

Turbine Description:

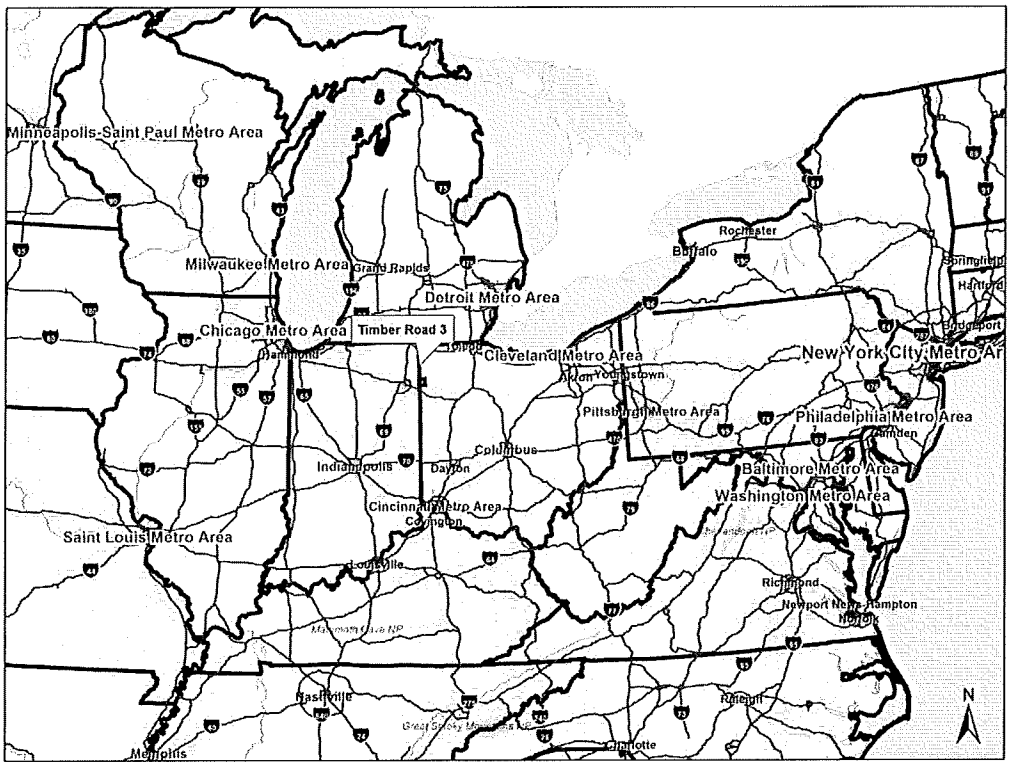
Number of Turbines: 63
Turbine Hub Height AGL (meters): 93
Turbine Blade Diameter (meters): 114
Maximum Blade Tip Height AGL (meters): 150

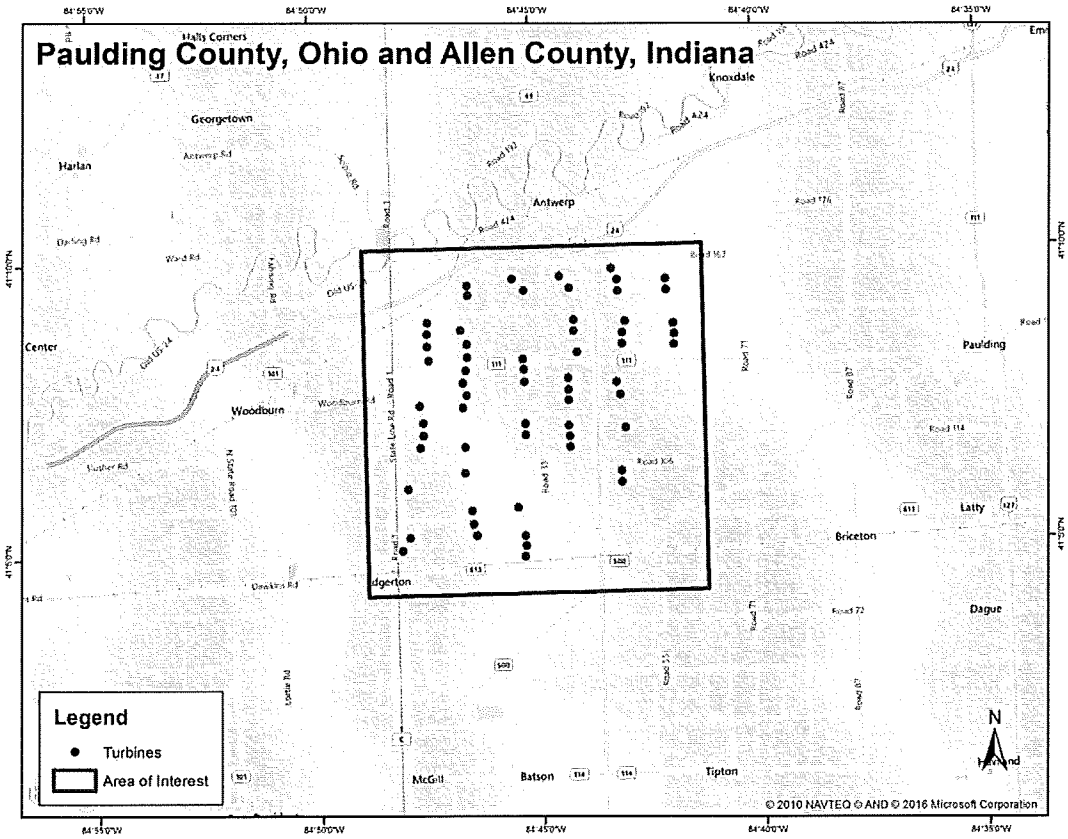
Turbine Locations: attached spreadsheet

Wind Farm Boundary Points:

Identifier	Latitude	Longitude
Pt1	41:10:07.774	084:48:47.444
Pt2	41:10:07.774	084:41:11.012
Pt3	41:04:13.903	084:41:11.012
Pt4	41:04:13.903	084:48:47.444

Maps:


Minneapolis-Saint Paul Metro Area
Milwaukee Metro Area
Grand Rapids
Detroit Metro Area
Chicago Metro Area
Timber Road 3
Cleveland Metro Area
Rochester
Buffalo
New York City Metro Ar
Pittsburgh Metro Area
Philadelphia Metro Area
Columbus
Indianapolis
Dayton
Baltimore Metro Area
Washington Metro Area
Cincinnati Metro Area
Saint Louis Metro Area
Louisville
Richmond
Nashville
Memphis
Charlotte
N


Paulding County, Ohio and Allen County, Indiana
Knoxdale
Georgetown
Harlan
Antwerp
Center
Woodburn
Paulding
Latty
Briceton
Dague
McGill
Batson
Tipton
Legend
Turbines
Area of Interest
N
© 2010 NAVTEQ © AND © 2016 Microsoft Corporation

Elliott, Ryan D.

From: Distelrath, Sarah
Sent: Wednesday, May 11, 2016 2:03 PM
To: 'grant.zeto@puc.state.oh.us'
Cc: Brooks, Chris; Bowser, Erin
Subject: RE: Timber Road I and Timber Road III - Condition Response for Microwave Mitigation
Attachments: Microwave Study Timber Road 3 February 2016.pdf

Grant,

Microwave Beam Path Mitigation

The attached Microwave Beam Path Report, the same report as submitted to you on 3.17.2016 confirmed that no turbines cause obstruction to the licensed microwave systems in the area, therefore, no mitigation is needed for both Paulding Wind Farm, LLC Case No. 09-980-EL-BGN and Paulding Wind Farm III, LLC Case No. 10-369-EL-BGN.

The contents and attachment to this email will be Stipulation condition number 44 and 45 for Paulding Wind Farm III, LLC Case No. 10-369-EL-BGN and Although not a condition within the Opinion Order and Certificate, the attached document and contents of this email includes references to turbines within Paulding Wind LLC Case No. 09-980-EL-BGN.

Thank you,
Sarah D.

Sarah Distelrath
EDP Renewables North America LLC
Development - Eastern Region
155 E. Market, Suite 307 Indianapolis, IN 46204
Direct 317.636.0866 Cell 713.449.8224 Fax 317.636.1418
www.edpr.com
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From: Distelrath, Sarah
Sent: Thursday, March 17, 2016 4:54 PM
To: 'grant.zeto@puc.state.oh.us' <grant.zeto@puc.state.oh.us>
Cc: Brooks, Chris <Chris.Brooks@edpr.com>; Bowser, Erin <Erin.Bowser@edpr.com>
Subject: Timber Road I and Timber Road III - Condition Response for Updated Licensed Microwave Report

Grant,

Microwave Beam Path Report

Please find attached an updated Microwave Beam Path Report. The attachment will meet Stipulation condition number 44 within Paulding Wind Farm, LLC Case No. 09-980-EL-BGN. Although not a condition within the Opinion Order and Certificate, the attached document also includes turbines within the Paulding Wind Farm III, LLC Case No. 10-369-EL-BGN.

In addition to meeting Stipulation conditions, the attached also satisfies the OPSB request to provide documentation all wind turbines are sited in locations that would not obstruct existing Fresnel zones. The report states within the final page, Section 5 Conclusion, "Based on the cross sectional analysis, it was determined that the blades should clear the Fresnel Zones. Therefore, no turbines will cause obstruction to the licensed microwave system in the area."

Thank you,
Sarah Distelrath

Sarah Distelrath
EDP Renewables North America LLC
Development - Eastern Region
155 E. Market, Suite 307 Indianapolis, IN 46204
Direct 317.636.0866 Cell 713.449.8224 Fax 317.636.1418
www.edpr.com
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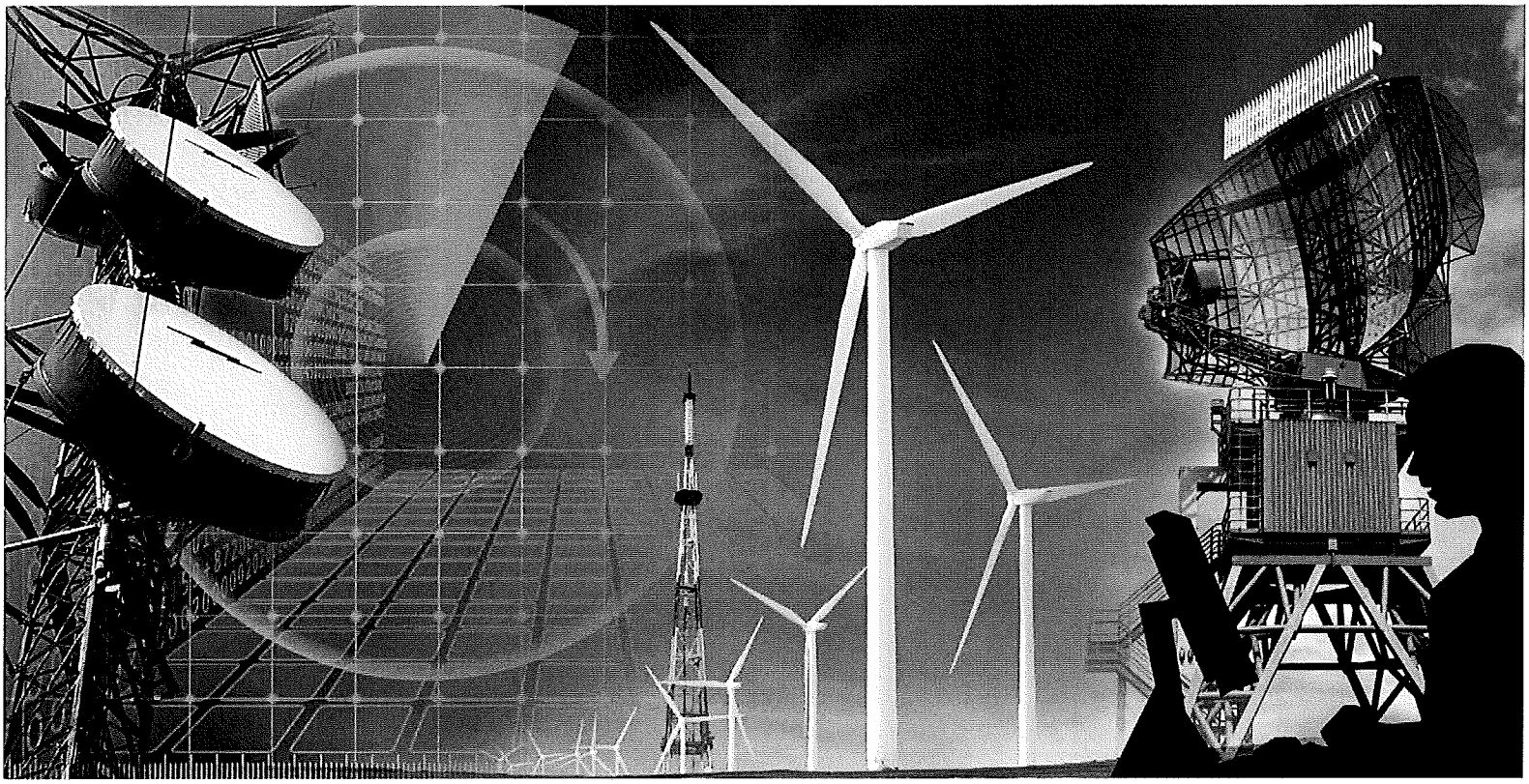
Wind Power GeoPlanner™

Microwave Study

Timber Road 3



Prepared on Behalf of
Paulding Wind Farm III
LLC

February 29, 2016

COMSEARCH®
A CommScope Company

Table of Contents

1. Introduction - 1 -

2. Project Overview - 1 -

3. Fresnel Zone Analysis - 2 -

4. Cross Sectional Analysis - 7 -

5. Conclusion - 8 -

6. Contact - 8 -

1. Introduction

Microwave bands that may be affected by the installation of wind turbine facilities operate over a wide frequency range (900 MHz – 23 GHz). Comsearch has developed and maintains comprehensive technical databases containing information on licensed microwave networks throughout the United States. These systems are the telecommunication backbone of the country, providing long-distance and local telephone service, backhaul for cellular and personal communication service, data interconnects for mainframe computers and the Internet, network controls for utilities and railroads, and various video services. This report focuses on the potential impact of wind turbines on licensed non-federal government microwave systems.

2. Project Overview

Project Information

Name: Timber Road 3

County: Paulding

State: Ohio

Number of Turbines: 62

Blade Diameter: 114 meters

Hub Height: 93 meters

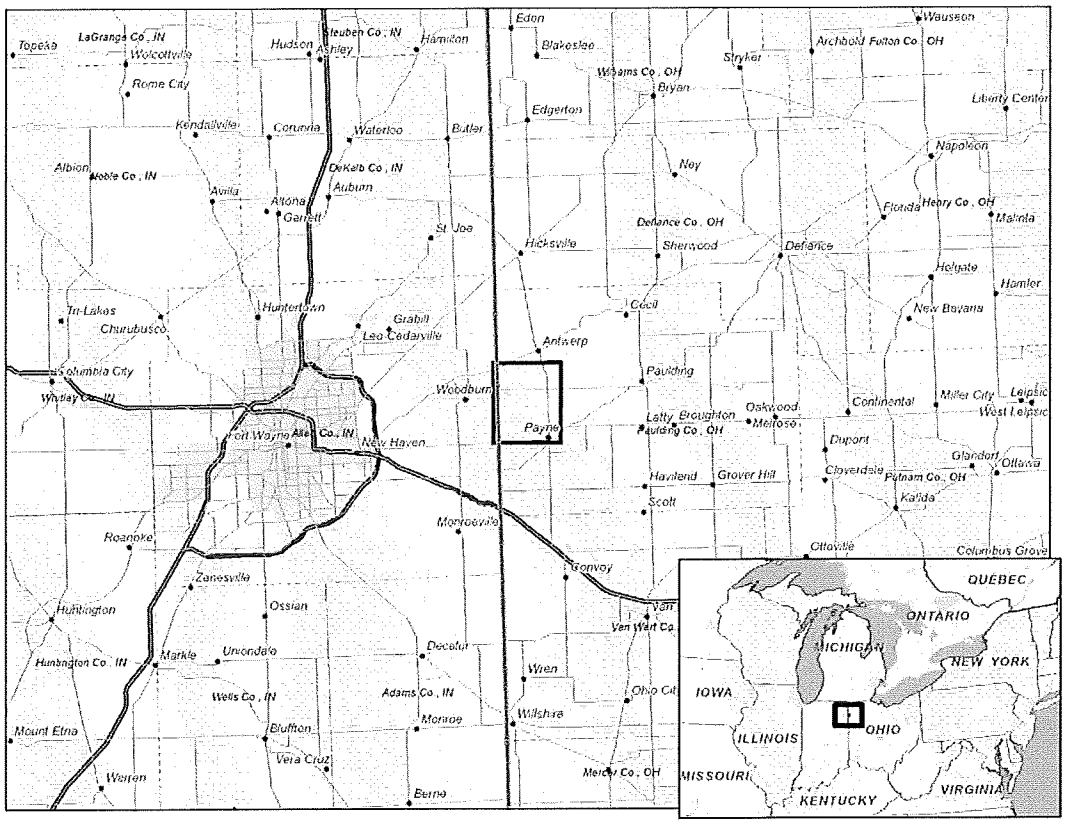


Figure 1: Area of Interest

3. Fresnel Zone Analysis

Methodology

Our obstruction analysis was performed using Comsearch's proprietary microwave database, which contains all non-government licensed paths from 0.9 - 23 GHz[1]. First, we determined all microwave paths that intersect the area of interest[2] and listed them in Table 1. These paths and the area of interest that encompasses the planned turbine locations are shown in Figure 2.

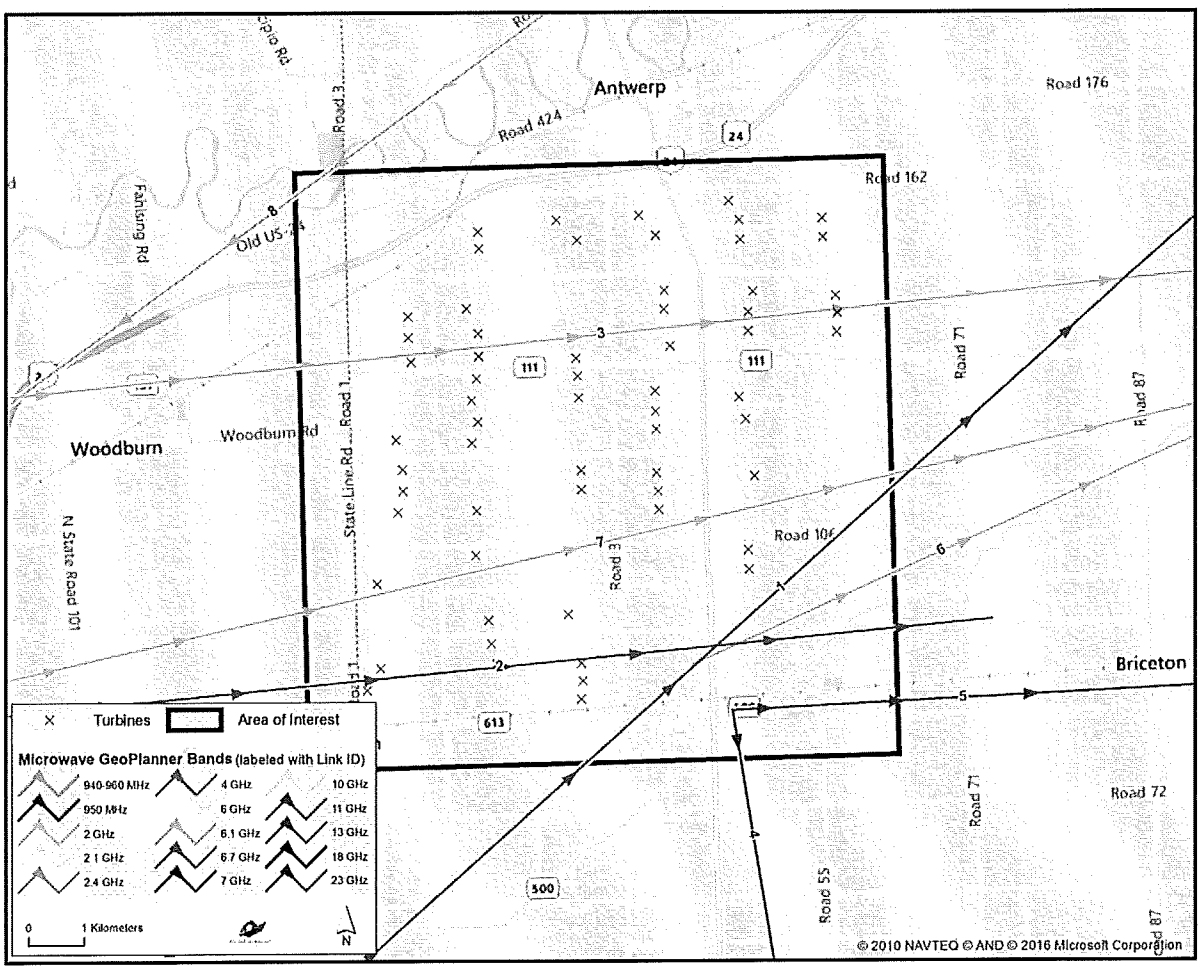


Figure 2: Microwave Paths that Intersect the Area of Interest

[1] Please note that this analysis does not include unlicensed microwave paths or federal government paths that are not registered with the FCC.

[2] We use FCC-licensed coordinates to determine which paths intersect the area of interest. It is possible that as-built coordinates may differ slightly from those on the FCC license.

ID	Callsign 1	Callsign 2	Band	Path Length (km)	Licensee
1	KJI65	KYK81	Upper 6 GHz	55.74	Panhandle Eastern Pipe Line Company, L.P
2	WAZ563	WAZ596	Upper 6 GHz	31.41	Norfolk Southern Railway
3	WQOD566	WQOD564	Lower 6 GHz	51.96	Appalachian Broadcasting
4	WQRY696	WQRX772	11 GHz	18.18	Sprintcom, Inc
5	WQRY696	WQRY695	11 GHz	12.61	Sprintcom, Inc
6	WQTF467	WQTF470	Lower 6 GHz	12.85	Verizon Wireless (VAW) LLC - Ohio
7	WQVT311	WQVT312	Lower 6 GHz	31.85	Paulding-Putnam Electric Cooperative
8	WQEL946	WPQX475	Lower 6 GHz	21.67	INDIANA MICHIGAN POWER COMPANY

Table 1: Summary of Licensed Microwave Paths that Intersect the Area of Interest

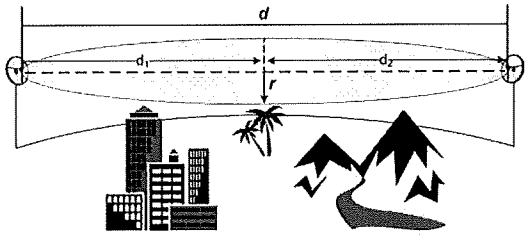
(See enclosed mw_geopl.xlsx for more information and GP_dict_matrix_description.xls for detailed field descriptions)

Verification of Coordinate Accuracy

It is possible that as-built coordinates may differ from those on the FCC licenses. For this project, path IDs 2-3 and 7 cross within close proximity of the proposed turbines and the tower locations for these paths will have a critical impact on the result. Therefore, we verified these locations using aerial photography. Some of the towers were found to be slightly off and were moved to their locations based on the aerial photos[3].

Next, we calculated a Fresnel Zone for each path based on the following formula:

$$r \cong 17.3\sqrt{\frac{n}{F_{GHz}}\left(\frac{d_1 d_2}{d_1 + d_2}\right)}$$



Where,

- r = Fresnel Zone radius at a specific point in the microwave path, meters
- n = Fresnel Zone number, 1
- F_{GHz} = Frequency of microwave system, GHz
- d_1 = Distance from antenna 1 to a specific point in the microwave path, kilometers
- d_2 = Distance from antenna 2 to a specific point in the microwave path, kilometers

[3] See enclosed mw_geopl.shp and mw_geopl_fcc.shp for details.

In general, this is the area where the planned wind turbines should be avoided, if possible. A depiction of the Fresnel Zones for each microwave path listed can be found in Figure 3, and is also included in the enclosed shapefiles[4,5].

Figure 3: Fresnel Zones in the Area of Interest

[4] The ESRI® shapefiles enclosed are in NAD 83 UTM Zone 16 projected coordinate system.

[5] Comsearch makes no warranty as to the accuracy of the data included in this report beyond the date of the report. The data provided in this report is governed by Comsearch's data license notification and agreement located at http://www.comsearch.com/files/data_license.pdf.

Discussion of Potential Two Dimensional Obstructions

Total Licensed Microwave Paths	Paths with Affected Fresnel Zones	Total Turbines	Turbines intersecting the Fresnel Zones
8	2	62	2

Table 2: Fresnel Zone Analysis Result

For this project, 62 turbines were considered in the analysis, each with a blade diameter of 114 meters and turbine hub height of 93 meters. Of those turbines, two were found to intersect the Fresnel Zones of two microwave paths. Figure 4 and Figure 5 contain a detailed depiction of the potential obstruction scenarios and Table 3 contains a summary of the affected turbines. A cross sectional analysis was performed in Section 4 to determine the diagonal clearance value for these cases.

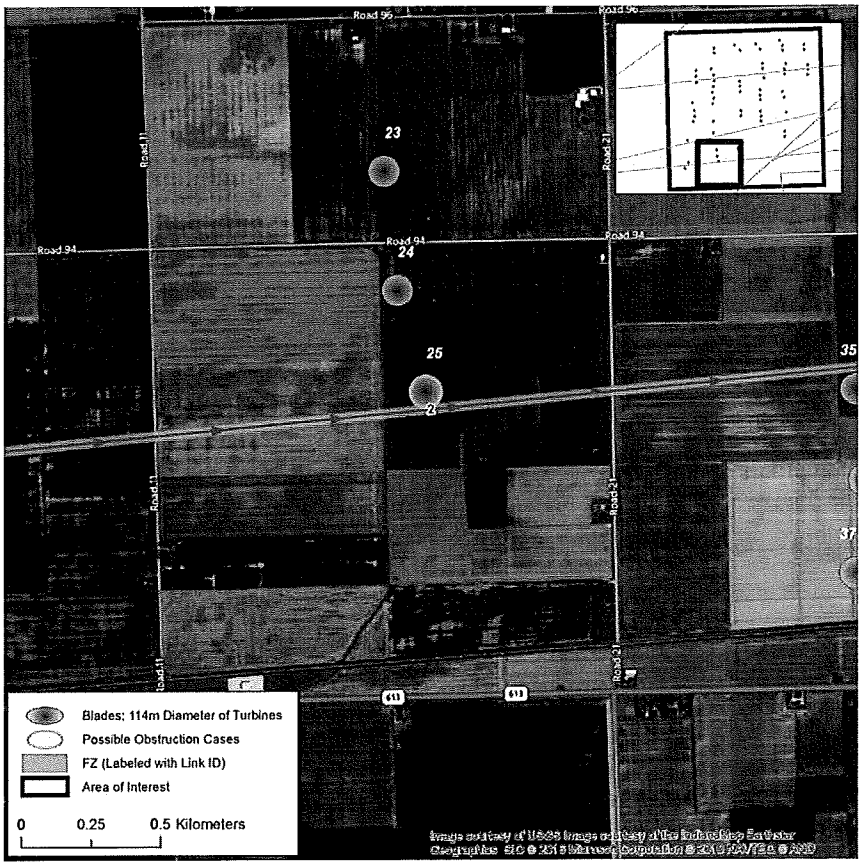


Figure 4: Potential Obstruction Case (Turbine 25)

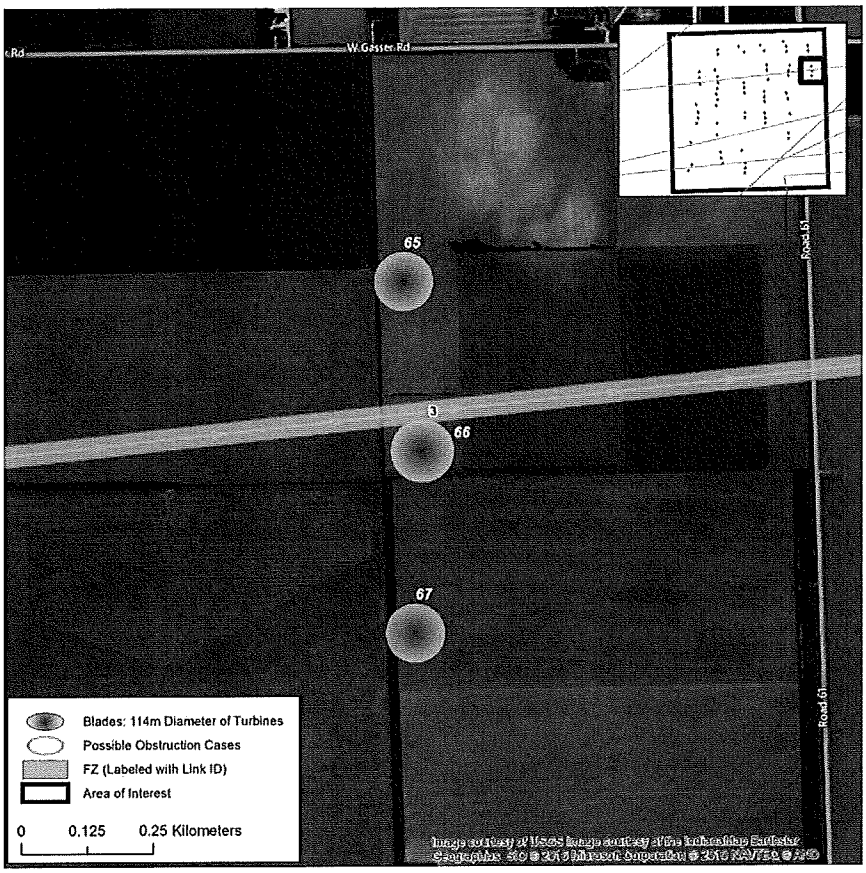


Figure 5: Potential Obstruction Case (Turbine 66)

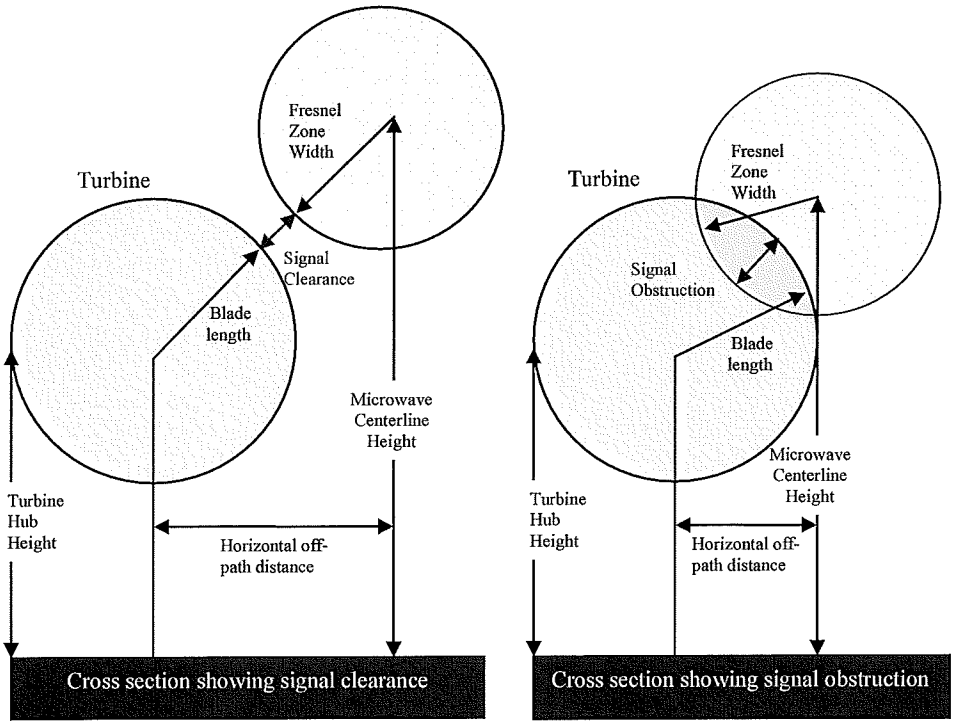
Turbine ID	Latitude (NAD83)	Longitude (NAD83)	Affected Microwave Path ID	Fresnel Zone Width at Turbine Location (m)	Horizontal off-path Distance (m)	Distance along the path from site 1 (km)	Horizontal Clearance (m)
25	41.087433	-84.773079	2	16.96	63.85	22.37	-10.11
66	41.143502	-84.697226	3	19.83	72.39	41.90	-4.45

Table 3: Turbines that Intersect Fresnel Zones

4. Cross Sectional Analysis

Our Fresnel Zone analysis in the previous section identified two potential obstruction cases that need to be further examined from a cross sectional perspective. The cases that will be analyzed in this section can be found in Table 3.

Our cross sectional analysis calculates the precise height and width of 100% of the first Fresnel Zone at the turbine location based on the antenna heights of the two link endpoints and the earth curvature bulge at the specific turbine location. The horizontal off-path distance was calculated in the previous section and the turbine hub height and blade length were provided by the client. The cross sectional analysis uses these values to calculate the clearance between the blades and the microwave Fresnel Zone as shown in the two diagrams below.



The results of the cross sectional calculations can be seen in Table 4 below. It shows positive clearance values indicating clearance of the Fresnel Zones. .

Microwave Path ID	Fresnel Zone Width at Turbine Location (m)	Microwave Centerline Height at Turbine Location (m)	Turbine ID	Hub Height (m)	Blade Length (m)	Cross Sectional Clearance (m)
2	16.96	51.51	25	93	57	2.19
3	19.83	56.42	66	93	57	4.27

Table 4: Cross Sectional Analysis Results

5. Conclusion

Our study identified eight licensed microwave paths intersecting the Timber Road 3 wind energy project area. The Fresnel Zones for these microwave paths were calculated and mapped. Two turbines were found to intersect the two dimensional Fresnel Zones of two microwave paths. Based on the cross sectional analysis, it was determined that the blades should clear the Fresnel Zones. Therefore, no turbines will cause obstruction to the licensed microwave system in the area.

6. Contact

For questions or information regarding the Microwave Study, please contact:

Contact person: Denise Finney
Title: Account Manager
Company: Comsearch
Address: 19700 Janelia Farm Blvd., Ashburn, VA 20147
Telephone: 703-726-5650
Fax: 703-726-5595
Email: dfinney@comsearch.com
Web site: www.comsearch.com

Elliott, Ryan D.

From: Distelrath, Sarah
Sent: Friday, March 18, 2016 1:55 PM
To: 'grant.zeto@puc.state.oh.us'
Cc: Brooks, Chris; Bowser, Erin
Subject: Timber Road I and Timber Road III - Condition Response for Airport Outreach
Attachments: OPSB Airport Study Scan.pdf

Grant,

Airport Outreach

Please find attached the Airport Outreach letters that were send to nearby Airports within an 8 mile radius of both Paulding Wind Farm, LLC Case No. 09-980-EL-BGN and Paulding Wind Farm III, LLC Case No. 10-369-EL-BGN project boundaries.

The attachment will meet Stipulation Condition number 41 within Paulding Wind Farm, LLC Case No. 09-980-EL-BGN and condition number 50 within Paulding Wind Farm III, LLC Case No. 10-369-EL-BGN.

Thank you,
Sarah Distelrath

Sarah Distelrath
EDP Renewables North America LLC
Development - Eastern Region
155 E. Market, Suite 307 Indianapolis, IN 46204
Direct 317.636.0866 Cell 713.449.8224 Fax 317.636.1418
www.edpr.com
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TIMBER ROAD
WIND FARM

March 16, 2016

Mr. Mike Brady
411 Townline Rd.
Payne, OH 45880

Dear Mr. Brady

This letter is to notify you that Timber Road III Wind Farm Boundary is within two (2) miles of your airport. We are planning on building a one hundred point eight (100.8) MW project that includes forty eight (48) turbines at tip heights up to four-hundred ninety two (492) ft.

We will be starting construction around early to mid May 2016; after final approval from the Ohio Power and Siting Board to gain our state permit.

If you have any questions please contact Andrew Magner at: (317) 636.0866.

Sincerely,

Andrew Magner

www.edpr.com

EDP Renewables North America LLC
Corporate Headquarters
808 Travis, Suite 700
Houston, TX 77002
T: 713 265 0350 F: 713 265 0365

edp renewables

TIMBER ROAD
WIND FARM

March 16, 2016

Mr. Barry Steinman
23526 Dawkins Rd.
Woodburn, IN 46797

Dear Mr. Steinman

This letter is to notify you that Timber Road III Wind Farm Boundary is slightly more than two (2) miles from your airport. We are planning on building a one hundred point eight (100.8) MW wind farm project that includes forty eight (48) turbines at tip heights up to four-hundred ninety two (492) ft.

We will be starting construction around early to mid May 2016; after final approval from the Ohio Power and Siting Board to gain our state permit.

If you have any questions please contact Andrew Magner at: (317) 636.0866.

Sincerely,

Andrew Magner

EDP Renewables North America LLC
Corporate Headquarters
808 Travis, Suite 700

edp renewables

TIMBER ROAD
WIND FARM

March 16, 2016

Mrs. Gloria Gerig
606 Brobst Rd.
Woodburn, IN 46797

Dear Mrs. Gerig

This letter is to notify you that Timber Road III Wind Farm Boundary is slightly more than two (2) miles from your airport. We are planning on building a one hundred point eight (100.8) MW wind farm project that includes forty eight (48) turbines at tip heights up to four-hundred ninety two (492) ft.

We will be starting construction around early to mid May 2016; after final approval from the Ohio Power and Siting Board to gain our state permit.

If you have any questions please contact Andrew Magner at: (317) 636.0866.

Sincerely,

Andrew Magner

www.edpr.com

EDP Renewables North America LLC
Corporate Headquarters
808 Travis, Suite 700
Houston, TX 77002
T: 713 265 0350 F: 713 265 0365

edp renewables

TIMBER ROAD
WIND FARM

March 16, 2016

Mr. Jim Calvin
13961 RD 162
Paulding, OH 45879-0045

Dear Mr. Calvin

This letter is to notify you that Timber Road III Wind Farm Boundary is slightly more than eight (8) miles from your airport. We are planning on building a one hundred point eight (100.8) MW wind farm project that includes forty eight (48) turbines at tip heights up to four-hundred ninety two (492) ft.

We will be starting construction around early to mid May 2016; after final approval from the Ohio Power and Siting Board to gain our state permit.

If you have any questions please contact Andrew Magner at: (317) 636.0866.

Sincerely,

Andrew Magner

www.edpr.com

EDP Renewables North America LLC
Corporate Headquarters
808 Travis, Suite 700
Houston, TX 77002
T: 713 265 0350 F: 713 265 0365

edp renewables

TIMBER ROAD
WIND FARM

March 16, 2016

Charles Buehler
PO Box 45
Paulding, OH 45879-0045

Dear Mr. Buehler

This letter is to notify you that Timber Road III Wind Farm Boundary is slightly more than five (5) miles from your airport. We are planning on building a one hundred point eight (100.8) MW wind farm project that includes forty eight (48) turbines at tip heights up to four-hundred ninety two (492) ft.

We will be starting construction around early to mid May 2016; after final approval from the Ohio Power and Siting Board to gain our state permit.

If you have any questions please contact Andrew Magner at: (317) 636.0866.

Sincerely,

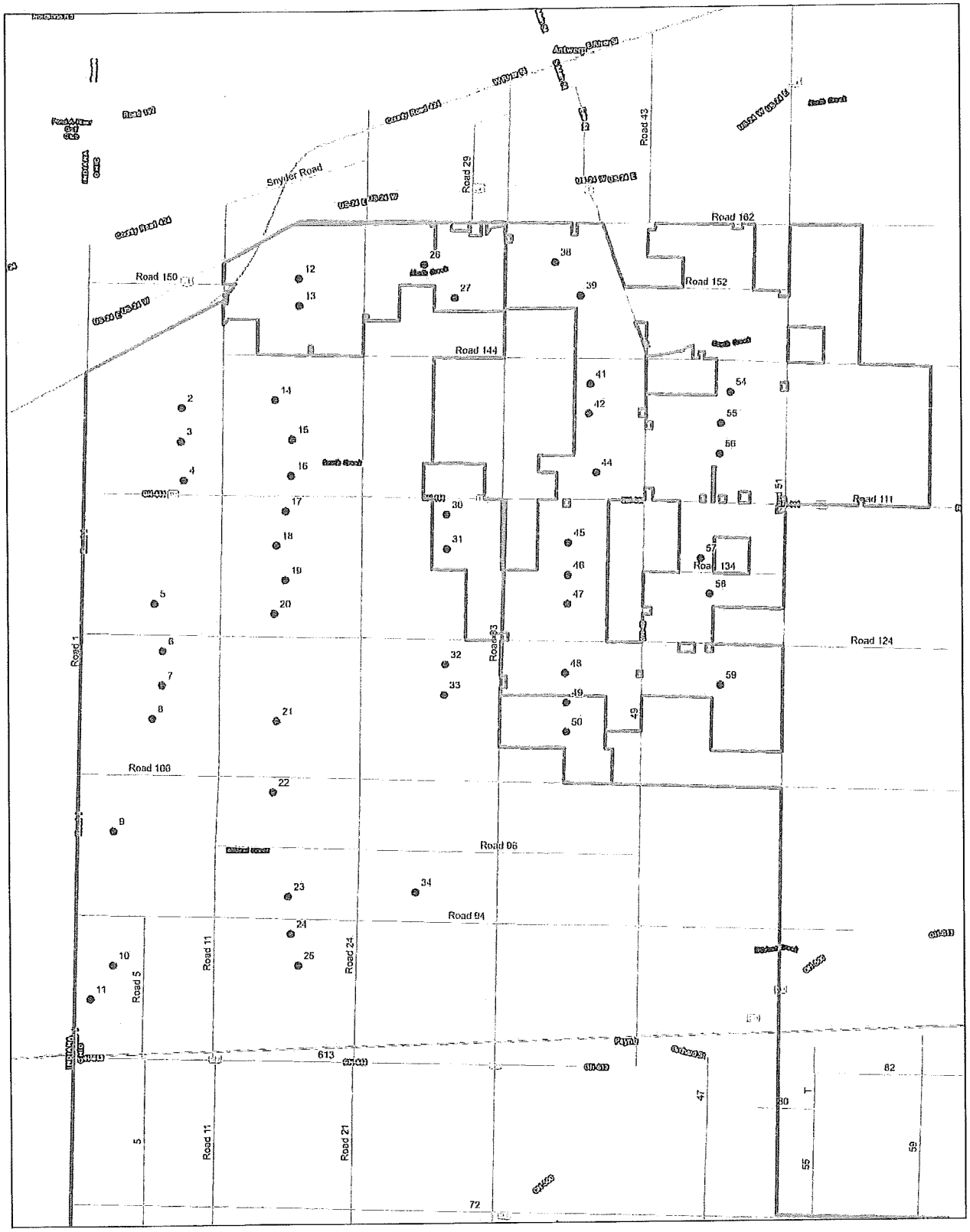
Andrew Magner

Andrew Magner

www.edpr.com

EDP Renewables North America LLC
Corporate Headquarters
808 Travis, Suite 700
Houston, TX 77002
T: 713 265 0350 F: 713 265 0365

Timber Road III Wind Farm - Project Boundary Map - 3/16/16



Timber Road III Wind Farm

Paulding County, Ohio

Project Boundary Map

Author: A. Magner - 3.16.16

renewables

0 0.3 0.6 1.2 1.8 2.4 Miles

TR3_48WTG_Primary
TimberRoadIIIBoundary
Paulding County Roads

Elliott, Ryan D.

From:	Distelrath, Sarah
Sent:	Tuesday, May 03, 2016 4:50 PM
To:	'grant.zeto@puc.state.oh.us'
Cc:	Brooks, Chris; Bowser, Erin
Subject:	Timber Road I and Timber Road III - Decommissioning Plan
Attachments:	Timber Road I Wind Farm Decom Study_4-8-16.pdf; Timber Road III Wind Farm Decom Study_4-8-16.pdf

Grant,

Decommissioning Plan

Attached is the Paulding Wind Farm, LLC Case No. 09-980-EL-BGN and Paulding Wind Farm III, LLC Case No. 10-369-EL-BGN Decommissioning Plans.

The contents of this email confirms the Applicant meets Stipulation Condition number 47 (a) within Paulding Wind Farm, LLC Case No. 09-980-EL-BGN and Stipulation Condition number 52 (a) within Paulding Wind Farm III LLC Case No. 10-369-EL-BGN.

Thank you,
Sarah Distelrath

Sarah Distelrath
EDP Renewables North America LLC
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Direct 317.636.0866 Cell 713.449.8224 Fax 317.636.1418
www.edpr.com
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Elliott, Ryan D.

From: Distelrath, Sarah
Sent: Monday, May 09, 2016 3:26 PM
To: grant.zeto@puc.state.oh.us
Cc: Brooks, Chris; Bowser, Erin
Subject: Timber Road I and Timber Road III - Decommissioning Plan Cost
Attachments: Timber Road I Wind Farm Decom Study_4-8-16.pdf; Timber Road III Wind Farm Decom Study_4-8-16.pdf

Grant,

Decommissioning Plan Cost

Attached is the Paulding Wind Farm, LLC Case No. 09-980-EL-BGN and Paulding Wind Farm III, LLC Case No. 10-369-EL-BGN Decommissioning Plans, which include cost per turbine within Section 3.2 Decommissioning Costs on report page 3-3 for each report..

The contents of this email is submitted to you for review and approval regarding Stipulation Condition number 47 (h) within Paulding Wind Farm, LLC Case No. 09-980-EL-BGN and Stipulation Condition number 52 (i) within Paulding Wind Farm III LLC Case No. 10-369-EL-BGN.

Please let me know if you have any questions.

Thank you!
Sarah D.

Sarah Distelrath
EDP Renewables North America LLC
Development - Eastern Region
155 E. Market, Suite 307 Indianapolis, IN 46204
Direct 317.636.0866 Cell 713.449.8224 Fax 317.636.1418
www.edpr.com
Take action. Use energy efficient products.

From: Distelrath, Sarah
Sent: Tuesday, May 03, 2016 4:50 PM
To: 'grant.zeto@puc.state.oh.us' <grant.zeto@puc.state.oh.us>
Cc: Brooks, Chris <Chris.Brooks@edpr.com>; Bowser, Erin <Erin.Bowser@edpr.com>
Subject: Timber Road I and Timber Road III - Decommissioning Plan

Grant,

Decommissioning Plan

Attached is the Paulding Wind Farm, LLC Case No. 09-980-EL-BGN and Paulding Wind Farm III, LLC Case No. 10-369-EL-BGN Decommissioning Plans.

The contents of this email confirms the Applicant meets Stipulation Condition number 47 (a) within Paulding Wind Farm, LLC Case No. 09-980-EL-BGN and Stipulation Condition number 52 (a) within Paulding Wind Farm III LLC Case No. 10-369-EL-BGN.

Thank you,
Sarah Distelrath

Sarah Distelrath
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BURNS McDONNELL

Decommissioning Plan and Decommissioning Obligation Cost Evaluation

Timber Road III Wind Farm

edp renewables
powered by nature

EDP Renewables North America, LLC

Decommissioning Cost Evaluation
Project No. 90573

April 8, 2016

Decommissioning Plan and Decommissioning Obligation Cost Evaluation

Timber Road III Wind Farm

prepared for

EDP Renewables North America, LLC
Decommissioning Cost Evaluation
Houston, Texas

Project No. 90573

April 8, 2016

prepared by

Burns & McDonnell Engineering Company, Inc.
Kansas City, Missouri

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LIST OF ABBREVIATIONS

Abbreviation	Term/Phrase/Name
BMcD	Burns & McDonnell Engineering Company, Inc.
BMP	Best Management Practice
EDP	EDP Renewables North America
kV	kilovolts
MW	Megawatts
O&M	Operations and Maintenance
Project	Timber Road III Wind Farm
ROW	Right-of-Way

1.0 EXECUTIVE SUMMARY

1.1 Introduction

Burns & McDonnell Engineering Company, Inc. ("BMcD") was retained by Paulding Wind Farm III LLC, a wholly owned subsidiary of EDP Renewables North America LLC ("EDP") to conduct a decommissioning cost evaluation for the Paulding Wind Farm III LLC ("Timber Road III Wind Farm") ("Project") located in Paulding County, Ohio, approximately 22 miles east of Fort Wayne, Indiana. The Project includes 29-Gamesa G114-2.1 megawatt ("MW") wind turbine generators and has a total nominal rating of approximately 60.9 MW.

The purpose of the decommissioning cost evaluation was to review the wind farm and to make a recommendation regarding the decommissioning plan for retiring the facility at the end of its useful life.

1.2 Results

BMcD estimates that the Project should have an expected useful life of 30 years or more. When it is determined that the Project should be retired, the above-grade steel structures and turbine nacelles are assumed to have significant scrap value to a salvage contractor. Removal of the turbine nacelles, towers, and associated equipment is assumed to have sufficient value as scrap to completely offset the removal costs of these items. However, the Project will also incur costs for removal and disposal of the blades, foundations and other Project facilities as well as for the restoration of the site following the removal of salvageable equipment.

The decommissioning costs include the costs to return the site to a condition compatible with the surrounding land, similar to the conditions that existed before development of the Project. Included are the costs to retire the power generating equipment that is part of the Project as well as the costs to retire the Project's balance of plant facilities. All equipment, structures, and supporting facilities will be removed to a depth of four (4) feet below grade. At plant construction, underground cable for the power collection system is assumed to be buried at a depth below four (4) feet below grade and, therefore, will be abandoned in place at decommissioning. However, if the contractor deems the salvageable value of the collector system to be greater than the cost for removal, the contractor shall remove the collector system at its own cost.

Based on the results of this evaluation, the estimated decommissioning cost for the Project (including 10 percent contingency) is estimated to be approximately $2,723,000 ($93,897 per turbine) for wind turbine decommissioning plus $474,000 ($16,345 per turbine) for balance of plant decommissioning costs, resulting in total decommissioning costs of approximately $3,197,000 ($110,241 per turbine).

2.0 INTRODUCTION

Burns & McDonnell Engineering Company, Inc. ("BMcD") was retained by EDP Renewables North America, LLC ("EDP") to conduct a decommissioning cost evaluation for the Timber Road III Wind Farm ("Project") located in Paulding County, Ohio, approximately 22 miles east of Fort Wayne, Indiana. The Project includes 29-Gamesa G114-2.1 megawatt ("MW") wind turbine generators and has a total nominal rating of approximately 60.9 MW.

The purpose of the decommissioning cost evaluation was to review the wind farm and to make a recommendation regarding the decommissioning plan for retiring the facility at the end of its useful life.

2.1 Wind Turbine Units

The Project consists of 29-Gamesa G114-2.1 MW wind turbines resulting in a total nominal rating of approximately 60.9 MW. Each wind turbine includes a 93 meter (or 305 feet) conical tubular steel tower which supports the turbine nacelle mounted on top. The nacelle of each turbine includes three (3) blades mounted to the nacelle rotor with a total rotor diameter of approximately 114 meters (or 374 feet). The turbine tower and nacelle weigh approximately 203 metric tons and 99 metric tons, respectively, with individual blade weights of approximately 13 metric tons for this turbine model.

Each wind turbine tower is supported by a concrete foundation. Foundation design drawings specific to the Project indicated an 18-foot diameter circular concrete pedestal, approximately four (4) feet tall, which is situated on top of an octagonal spread footing.

Each wind turbine has an access road to support construction and allow for vehicle access to facilitate inspections and maintenance of the turbines and associated equipment. These access roads are assumed to be crushed rock surfaced roads (e.g. gravel).

2.2 Substation and Interconnection

The Project site will include an underground 34.5 kilovolt ("kV") electrical power collection system that collects the electrical power from the wind turbines and routes it to a Project substation (associated with Timber Road I). The Project substation increases the voltage from 34.5 kV to 138 kV.

The substation is located adjacent to the site and is interconnected to existing 138-kV transmission lines near the site via additional 138-kV Project overhead lines.

2.3 Maintenance/Warehouse Facility

The Project does not include an independent operation and maintenance (O&M) facility on the Project site. It shares an existing nearby facility constructed with a previous phase of the development. The Project will include one (1) permanent meteorological tower.

The overall Project configuration is shown in Appendix A.

3.0 DECOMMISSIONING

3.1 Decommissioning Plan

BMcD estimates the Project should have an expected useful life of approximately 30 years. When it is determined that the Project should be retired, the above-grade steel and copper equipment is assumed to have significant scrap value to a salvage contractor. Removal of the turbine nacelles, towers, and associated equipment is assumed to have sufficient value as scrap to completely offset the removal costs of these items. However, for the purpose of this study, no scrap value for any equipment or scrap metal has been included to offset decommissioning costs. The basis of this decommissioning cost evaluation is that the Project will incur costs for removal and disposal of the blades, foundations and other project facilities and for the restoration of the site following the removal of equipment, but receives no scrap value credit to offset these costs. All recyclable materials will be recycled to the extent possible. All other non-recyclable waste materials will be disposed of in accordance with state and federal law.

The wind turbine blades will be removed from the wind turbine nacelle rotors using a crane, cut into manageable sized sections, loaded onto a trailer, and hauled to a local landfill for disposal. The wind turbine blades are constructed from a composite material that is assumed to have no salvage value at the time of decommissioning. The turbine nacelles will be removed from the towers with a crane and loaded onto a trailer. The towers will be disassembled and loaded onto a trailer as well. The nacelle and towers will be hauled to the nearest scrap yard for recycling. The cost estimate presented in this report includes the cost to haul the turbines and nacelles to the scrap yard, but does not include any of the salvage value that would be received by the owner from the scrap yard.

All concrete wind turbine foundations will be removed to a depth of four (4) feet below grade. The concrete will be demolished, loaded into a dump truck and hauled to a local landfill for disposal. The portions of the concrete foundation that is greater than four (4) feet below grade will be abandoned in place. The 18-foot diameter circular concrete pedestal, situated on top of the octagonal spread footing, will be completely removed. The remainder of the spread footings associated with the wind turbines remain in place. Voids left from the removal of the concrete footings will be backfilled with surrounding subsoil and topsoil and fine graded to ensure suitable drainage.

The Project step-up transformer, control building, crushed rock surfacing and surrounding fencing is assumed to be removed as part of another phase of the wind farm development (Timber Road I).

To the extent required, crushed rock surfacing will be removed. The lease agreements with the landowners allow the turbine access roads to be left in place at the end of the facility life at the option of

the landowner. For purposes of this study, it is assumed that 50 percent of the turbine access roads will remain in place after decommissioning of the facility. Areas where crushed rock surfacing has been removed will be fine graded to ensure suitable drainage. In right-of-way ("ROW") and non-agricultural areas, the ground will be seeded to prevent erosion. For purpose of this study, it is assumed that 10 percent of the removed road area will be seeded. In other areas, the ground will not be seeded to allow for the areas to be returned to agricultural usage. The removed crushed rock will be loaded into a dump truck and hauled offsite. The cost to remove the crushed rock, load it into dump trucks, and haul it offsite will be at the expense of the Project.

Prior to commencing activities associated with foundation removal, crushed rock surfacing removal, or any earthwork activities, an approved erosion control plan will need to be developed by the demolition contractor. Best Management Practices ("BMPs") applicable at the time that decommissioning activities occur will need to be implemented by the contractor for control of storm water runoff. Since decommissioning activities are not anticipated to occur for 30 years or more, BMPs may differ from current standards. However, if decommissioning took place in the near future, BMcD would anticipate BMPs to be implemented such as silt fencing and proper compaction, seeding, and mulching practices. BMPs will need to be reviewed by the contractor prior to commencing decommissioning activities to determine appropriate BMPs at that time. To the extent necessary, the Project or the contractor will need to obtain any permits relating to decommissioning activities, including permits from the Ohio Environmental Protection Agency and the U.S. Army Corps of Engineers. The costs included in this study are sufficient for a demolition contractor to develop suitable plans for the control of surface water drainage and of water accumulation; and a plan, where appropriate, for backfilling, soil stabilization, compacting, and grading prior to commencing demolition activities.

All disturbed areas will be returned to as close to predevelopment conditions as possible. This will allow all land disturbed by the construction of the Project to be returned to agricultural use at the end of the useful life of the Project. The cost estimates provided in the following section include activities and costs to return the land to a condition suitable for agricultural use subsequent to decommissioning of the Project.

The activities associated with the decommissioning plan described above are anticipated to be completed within a six (6) month timeframe, according to the following schedule:

- Decommissioning Planning & Permitting 2 months
- Demolition 3 months
- Site Restoration 1 month

This timetable and the cost estimates provided should provide EDP and the demolition contractor sufficient time and budget to comply with any applicable health and safety regulations.

3.2 Decommissioning Costs

The decommissioning cost estimate includes the cost to return the site to a condition compatible with the surrounding land, similar to the conditions that existed before development of the Project. Included are the costs to retire the Project's wind turbines as well as the cost to retire the Project's balance of plant facilities. Table 3-1 and Table 3-2 present the decommissioning costs for the wind turbines and balance of plant, respectively, for the wind farm.

Table 3-1: Estimated Cost for Wind Turbine Decommissioning (2016$)

Estimated Cost	$	2,475,000	
10% Contingency	$	248,000	
Total Cost	$	2,723,000	($93,897 per turbine)

Table 3-2: Estimated Cost for Balance of Plant Decommissioning (2016$)

Estimated Cost	$	431,000	
10% Contingency	$	43,000	
Total Cost	$	474,000	($16,345 per turbine)

Breakdowns of the above costs are included in Appendix B.

3.3 Decommissioning Assumptions

The following assumptions were made as the basis for the cost estimates:

1. All costs are in 2016 dollars using a demolition site cost index of 96.0 percent for Fort Wayne, Indiana.
2. An offsite landfill is used for disposal of demolition waste.
   a. Landfill is located approximately 25 miles east of the site location in Defiance, Ohio.
   b. Disposal costs for clean waste estimated at $28 per ton which includes a $9 per ton tax for disposal per discussions with a local landfill.
3. No hazardous construction material abatement is required.
4. No environmental costs have been included to address site clean-up of contaminated soils, hazardous materials, or other conditions present on-site having a negative environmental impact.
5. Wind turbine nacelles, turbine towers, transformers, switches, breakers, cabling, and other electrical equipment are removed from the Project by the demolition contractor. No scrap value is included in this study for this equipment.
6. Facility includes one (1) meteorological tower located onsite which consists of approximately 18,000 pounds of galvanized steel.
7. Demolition costs for the meteorological tower have been accounted for and are included in the wind turbine demolition costs.
8. Buildings are removed as part of site demolition activities.
9. Underground electrical power collection system cabling will be abandoned in place as it is assumed to be greater than four (4) feet below finished grade.
10. All foundations will be removed to four (4) feet below finished grade.
11. Based on lease agreements, 50 percent of crushed rock surfacing associated with the wind turbine access roads will be removed. All other crushed rock surfacing locations other than access roads (i.e., O&M building area, equipment areas, etc.) associated with site will be completely removed.
12. Areas, including ROW and non-agricultural areas, will be seeded. Approximately 10 percent of the removed road areas will be seeded and are assumed to be immediately repurposed for agriculture use following demolition.
13. Because no topsoil or subsoil is typically removed from the site, the existing topsoil and subsoil will be re-graded in areas where crushed rock surfacing and foundations have been removed to achieve suitable site drainage to natural drainage patterns.

14. Disturbed site areas will be graded. Public ROW areas as well as those that are not agricultural will be seeded to provide a suitable ground cover to prevent soil erosion. Areas on private land will not be seeded, but will be left in a condition suitable for agricultural use.

Market conditions may result in cost variations at the time of contract execution.

4.0 STATEMENT OF LIMITATIONS

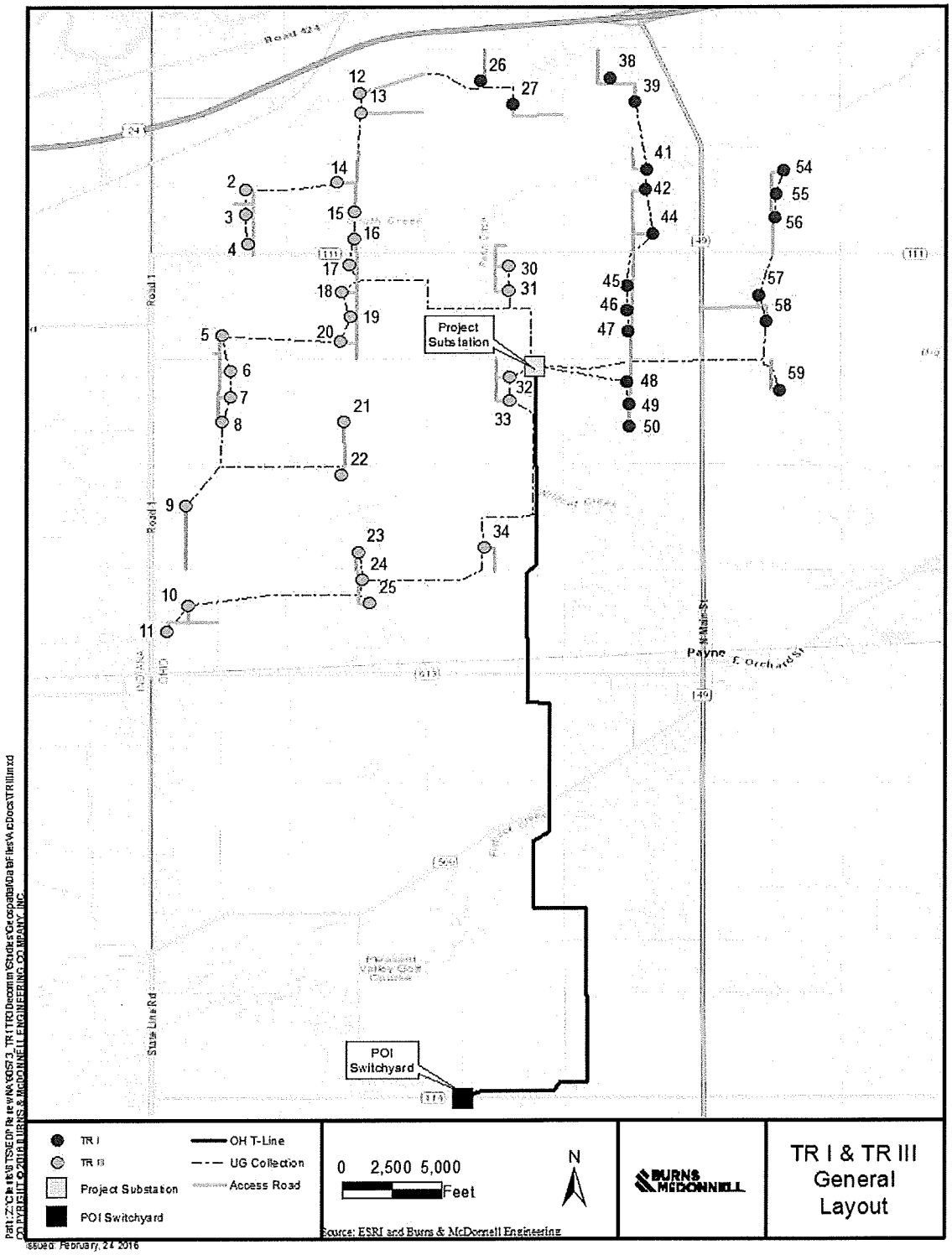
In preparation of this decommissioning obligation cost evaluation, BMcD has relied upon information provided by the client. While BMcD has no reason to believe that the information provided to BMcD, and upon which BMcD has relied, is inaccurate or incomplete in any material respect, BMcD has not independently verified such information and cannot guarantee its accuracy or completeness.

Engineer's estimates and projections of demolition costs are based on Engineer's experience, qualifications and judgment. Since Engineer has no control over weather, cost and availability of labor, material and equipment, labor productivity, construction contractors' procedures and methods, and other factors, Engineer does not guarantee the accuracy of its estimates and projections.

The cost estimates were prepared based on current knowledge of site conditions, current regulations, and current hazardous material classifications. Engineer has no evidence or reason to believe that the cost estimate will be inaccurate in 30 years; however, Engineer's estimates do not include allowances for unforeseen environmental liabilities associated with unexpected environmental contamination due to events not considered part of normal operations, such as fuel tank ruptures, oil spills, etc. Estimates also do not include allowances for environmental remediation associated with changes in classification of hazardous materials.

APPENDIX A – SITE LAYOUT AND CONFIGURATION

Figure A-1: Site Layout and Configuration



APPENDIX B – DECOMMISSIONING COST BREAKDOWN

Table B-1: Estimated Cost for Wind Turbine Decommissioning (2016$)

Timber Road III Wind Farm
Decommissioning Cost Evaluation
Project No. 90573
Cost Estimate Breakdown (29 Gamesa G114-2.1 Turbines)

Wind Turbine Nacelle & Tower Removal Cost			
Nacelle & Tower Removal	$	850,000	
Hauling	$	1,012,000	
Total	**$**	**1,862,000**	
Total Nacelle & Tower Scrap Value	**$**	**-**	[1]
Wind Turbine Blade & Foundation Removal Cost			
Blade & Foundation Removal	$	485,000	
Hauling	$	31,000	
Disposal	$	97,000	
Total	$	**613,000**	
Blade & Foundation Scrap Value	$	**-**	[1]
Total Estimated Cost	**$**	**2,475,000**	
Contingency (10%)	**$**	**248,000**	
Net Total Cost with Contingency	$	**2,723,000**	

[1] Scrap values are excluded from this study.

Table B-2: Estimated Cost for Balance of Plant Decommissioning (2016$)

Timber Road III Wind Farm
Decommissioning Cost Evaluation
Project No. 90573
Cost Estimate Breakdown (29 Gamesa G114-2.1 Turbines)

Met Tower and Foundation Removal Cost			
Tower & Foundation Removal	$	15,000	
Hauling	$	1,000	
Disposal	$	2,000	
Total	**$**	**18,000**	
Tower & Foundation Scrap Value	**$**	**-**	[1]
Crushed Rock Road Surface Removal Cost			
Surfacing Removal	$	127,000	
Hauling	$	280,000	
Disposal	$	-	
Total	**$**	**407,000**	
Crushed Rock Scrap Value	**$**	**-**	[2]
Seeding Cost	**$**	**6,000**	[3]
Total Estimated Cost	$	**431,000**	
Contingency (10%)	**$**	**43,000**	
Total with Contingency	**$**	**474,000**	

[1] Scrap values are excluded from this study.

[2] At the end of its useful Life, crushed rock from access roads are assumed to be removed and the ownership of material to be transferred to the demolition contractor resulting in zero hauling or disposal costs to the Project.

[3] 10% of removed access roads are assumed to be seeded.

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Summary: Correspondence Condition compliance electronically filed by Mr. Ryan D. Elliott on behalf of Paulding Wind Farm III LLC