



*Kenton C. Ward, CFM*  
*Surveyor of Hamilton County*  
*Phone (317) 776-8495*  
*Fax (317) 776-9628*

*Suite 188*  
*One Hamilton County Square*  
*Noblesville, Indiana 46060-2230*

August 7, 2015

TO: Hamilton County Drainage Board

RE: Mud Creek Drain – 106<sup>th</sup> & Cumberland S.E. High-Flow Shelf

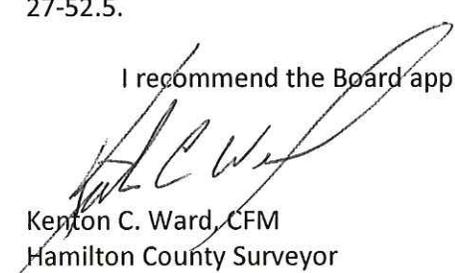
Attached are plans for the construction of the High-Flow Shelf for the southeast corner of 106<sup>th</sup> Street and Cumberland Road. This project proposal is a reconstruction of the Mud Creek Drain. This shelf is the first construction phase of the recommendations outlined in the study prepared by Christopher B. Burke, "Study of Alternatives to Reduce Flooding of Cumberland Road and 106<sup>th</sup> Street from Mud Creek", July 2013.

Of the recommendations set out in the study on page 23, the first was accomplished by the Board in November 2013 by the purchase of the southeast quadrant of the intersection. This project shall be the first construction phase of recommendation 3 which is the phased implementation of Alternate 7.

The cost of this project is \$405,000.00. The cost is to be paid out of the maintenance fund for Mud Creek as per the Board's motion of July 13, 2015. This is under the authority of IC 36-9-27-45.5.

Since the project is totally within the property boundaries of tract 13-15-08-00-00-001.000 which is owned by the Hamilton County Board of Commissioners and the funds needed are being used from the Mud Creek maintenance fund, I believe that this proposed reconstruction falls under IC 36-9-27-52.5.

I recommend the Board approve the reconstruction and set the project for bid.

  
Kenton C. Ward, CFM  
Hamilton County Surveyor

KCW/pll

**Opinion of Probable Cost for Mud Creek High-Flow Shelf & Wetland  
Channel & Wetland Improvements Overall Project Cost Summary**

Line	Description	Estimated Construction Cost	Estimated Professional Services Fee	Estimated Total Cost of Phase
1	<b>Proposed Channel Improvements along Big Cicero Creek</b>			
2	Phase 1 Improvements	\$ 382,000	\$ 23,000	\$ 405,000
3	Phase 2 Improvements	\$ 228,000	\$ 14,000	\$ 242,000
4	Phase 3 Improvements	\$ 154,000	\$ 10,000	\$ 164,000
5	Phase 4 Improvements	\$ 199,000	\$ 12,000	\$ 211,000
6				
7	<b>ESTIMATED TOTAL COST FOR PROJECT</b>	<b>\$ 963,000</b>	<b>\$ 59,000</b>	<b>\$ 1,022,000</b>

**Notes and Assumptions**

- 1 All costs are estimates based on the engineer's knowledge of common construction methods and materials. Christopher B. Burke Engineering does not guarantee that the actual bid price will not vary from the costs used with this estimate.
- 2 All costs are in 2015 dollars.
- 3 Estimated costs have been rounded.
- 4 This estimate does not include unforeseen costs increases that may result from shortages in fuel and materials as a result of a natural or man-made disaster.
- 5 Earthwork costs have been estimated with the assumption that all spoil material could be stockpiled on a site with a maximum 20 minute one-way haul.
- 6 This estimate does not include land acquisition costs necessary to construct the proposed alternative.
- 7 This estimate does not include the cost of the observation platform shown on the Drawings.

**Opinion of Probable Cost for Mud Creek High-Flow Shelf & Wetland  
Channel & Wetland Improvements - Phase I**

Line	Description	Estimated Quantities	Units	Unit Price	Estimated Cost (Rounded)
1	<b>Demolition</b>				
2	Tree Clearing & Grubbing	1	LS	\$ 20,000	\$ 20,000
3				Estimated Demolition Cost	\$ 20,000
4	<b>Channel Construction</b>				
5	Strip & Stockpile Topsoil	1,300	CY	\$ 10	\$ 13,000
6	Channel & Wetland Excavation	3,700	CY	\$ 10	\$ 37,000
7	Place & Compact Fill along Cumberland Rd	500	CY	\$ 15	\$ 8,000
8	Haul Spoils	3,700	CY	\$ 5	\$ 19,000
9	Finish Grading	14,100	SY	\$ 5	\$ 71,000
10	Topsoil Placement	2,400	CY	\$ 5	\$ 12,000
11	Obtain Topsoil Material	1,100	CY	\$ 20	\$ 22,000
12	Seeding	7,000	SY	\$ 1	\$ 7,000
13	Native Seeding	7,100	SY	\$ 5	\$ 36,000
14	Mulching	4,800	SY	\$ 1	\$ 5,000
15	Erosion Control Blankets	5,100	SY	\$ 3	\$ 15,000
16	Turf Reinforcement Mats	4,200	SY	\$ 8	\$ 34,000
17	Riprap Bank Protection	230	TN	\$ 35	\$ 8,000
18				Estimated Channel Construction Cost	\$ 287,000
19	<b>Miscellaneous</b>				
20	Erosion and Sediment Control (2%)	1	LS	\$ 7,000	\$ 7,000
21	Construction Surveying (1%)	1	LS	\$ 4,000	\$ 4,000
22	Maintenance of Traffic (1%)	1	LS	\$ 4,000	\$ 4,000
23	Construction Mobilization/Demobilization (5%)	1	LS	\$ 20,000	\$ 20,000
24	Project Administration & Unforeseen Additional Costs (10%)	1	LS	\$ 40,000	\$ 40,000
25				Estimated Miscellaneous Cost	\$ 75,000
26					
27				Estimated Total Construction Cost	<b>\$ 382,000</b>
28					
29	<b>Professional Services</b>				
30	Construction Observation (6%)	1	LS	\$ 23,000	\$ 23,000
31				Estimated Professional Services Cost	\$ 23,000
32					
33					
34				Estimated Total Cost for Project	<b>\$ 405,000</b>

**Notes and Assumptions**

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- Estimated costs have been rounded.
- This estimate does not include unforeseen costs increases that may result from shortages in fuel and materials as a result of a natural or man-made disaster.
- Earthwork costs have been estimated with the assumption that all spoil material could be stockpiled on a site with a maximum 20 minute one-way haul.
- This estimate does not include land acquisition costs necessary to construct the proposed alternative.
- This estimate does not include the cost of the observation platform shown on the Drawings.

**Opinion of Probable Cost for Mud Creek High-Flow Shelf & Wetland  
Channel & Wetland Improvements - Phase II**

Line	Description	Estimated Quantities	Units	Unit Price	Estimated Cost (Rounded)
1	<b>Wetland Construction</b>				
2	Strip & Stockpile Topsoil	900	CY	\$ 10	\$ 9,000
3	Channel & Wetland Excavation	1,800	CY	\$ 10	\$ 18,000
4	Place & Compact Trail 'Berms'	800	CY	\$ 15	\$ 12,000
5	Haul Spoils	1,800	CY	\$ 5	\$ 9,000
6	Finish Grading	9,800	SY	\$ 5	\$ 49,000
7	Topsoil Placement	1,400	CY	\$ 5	\$ 7,000
8	Obtain Topsoil Material	500	CY	\$ 20	\$ 10,000
9	Seeding	3,900	SY	\$ 1	\$ 4,000
10	Native Seeding	5,900	SY	\$ 5	\$ 30,000
11	Mulching	8,900	SY	\$ 1	\$ 9,000
12	Erosion Control Blankets	900	SY	\$ 3	\$ 3,000
13				Estimated Wetland Construction Cost	\$ 160,000
14	<b>Wetland / Trail Improvements</b>				
15	Trail Subbase	250	TN	\$ 25	\$ 6,000
16	Trail Asphalt	180	TN	\$ 75	\$ 14,000
17	Footbridges	3	EA	\$ 1,000	\$ 3,000
18	Wetland Plantings	470	EA	\$ 10	\$ 5,000
19	Site Signage	1	LS	\$ 2,000	\$ 2,000
20				Estimated Wetland / Trail Improvements Cost	\$ 30,000
21	<b>Miscellaneous</b>				
22	Erosion and Sediment Control (2%)	1	LS	\$ 4,000	\$ 4,000
23	Construction Surveying (1%)	1	LS	\$ 2,000	\$ 2,000
24	Maintenance of Traffic (1%)	1	LS	\$ 2,000	\$ 2,000
25	Construction Mobilization/Demobilization (5%)	1	LS	\$ 10,000	\$ 10,000
26	Project Administration & Unforeseen Additional Costs (10%)	1	LS	\$ 20,000	\$ 20,000
27				Estimated Miscellaneous Cost	\$ 38,000
28					
29				Estimated Total Construction Cost	<b>\$ 228,000</b>
30					
31	<b>Professional Services</b>				
32	Construction Observation (6%)	1	LS	\$ 14,000	\$ 14,000
33				Estimated Professional Services Cost	\$ 14,000
34					
35					
36				Estimated Total Cost for Project	<b>\$ 242,000</b>

**Notes and Assumptions**

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- This estimate does not include unforeseen costs increases that may result from shortages in fuel and materials as a result of a natural or man-made disaster.
- Earthwork costs have been estimated with the assumption that all spoil material could be stockpiled on a site with a maximum 20 minute one-way haul.
- This estimate does not include land acquisition costs necessary to construct the proposed alternative.
- This estimate does not include the cost of the observation platform shown on the Drawings.

**Opinion of Probable Cost for Mud Creek High-Flow Shelf & Wetland  
Channel & Wetland Improvements - Phase III**

Line	Description	Estimated Quantities	Units	Unit Price	Estimated Cost (Rounded)
<b>1</b>	<b>Wetland Construction</b>				
2	Strip & Stockpile Topsoil	600	CY	\$ 10	\$ 6,000
3	Channel & Wetland Excavation	1,400	CY	\$ 10	\$ 14,000
4	Place & Compact Trail 'Berms'	200	CY	\$ 15	\$ 3,000
5	Haul Spoils	1,400	CY	\$ 5	\$ 7,000
6	Finish Grading	6,300	SY	\$ 5	\$ 32,000
7	Topsoil Placement	900	CY	\$ 5	\$ 5,000
8	Obtain Topsoil Material	300	CY	\$ 20	\$ 6,000
9	Seeding	2,000	SY	\$ 1	\$ 2,000
10	Native Seeding	4,300	SY	\$ 5	\$ 22,000
11	Mulching	5,900	SY	\$ 1	\$ 6,000
12	Erosion Control Blankets	400	SY	\$ 3	\$ 1,000
13				Estimated Wetland Construction Cost	\$ 104,000
<b>14</b>	<b>Wetland / Trail Improvements</b>				
15	Trail Subbase	90	TN	\$ 25	\$ 2,000
16	Trail Asphalt	60	TN	\$ 75	\$ 5,000
17	Wetland Plantings	360	EA	\$ 10	\$ 4,000
18	Site Signage	1	LS	\$ 2,000	\$ 2,000
19				Estimated Wetland / Trail Improvements Cost	\$ 13,000
<b>20</b>	<b>Miscellaneous</b>				
21	Erosion and Sediment Control (2%)	1	LS	\$ 3,000	\$ 3,000
22	Construction Surveying (1%)	1	LS	\$ 2,000	\$ 2,000
23	Maintenance of Traffic (1%)	1	LS	\$ 2,000	\$ 2,000
24	Construction Mobilization/Demobilization (5%)	1	LS	\$ 10,000	\$ 10,000
25	Project Administration & Unforeseen Additional Costs (10%)	1	LS	\$ 20,000	\$ 20,000
26				Estimated Miscellaneous Cost	\$ 37,000
27					
28				<b>Estimated Total Construction Cost</b>	<b>\$ 154,000</b>
29					
<b>30</b>	<b>Professional Services</b>				
31	Construction Observation (6%)	1	LS	\$ 10,000	\$ 10,000
32				Estimated Professional Services Cost	\$ 10,000
33					
34					
35				<b>Estimated Total Cost for Project</b>	<b>\$ 164,000</b>

**Notes and Assumptions**

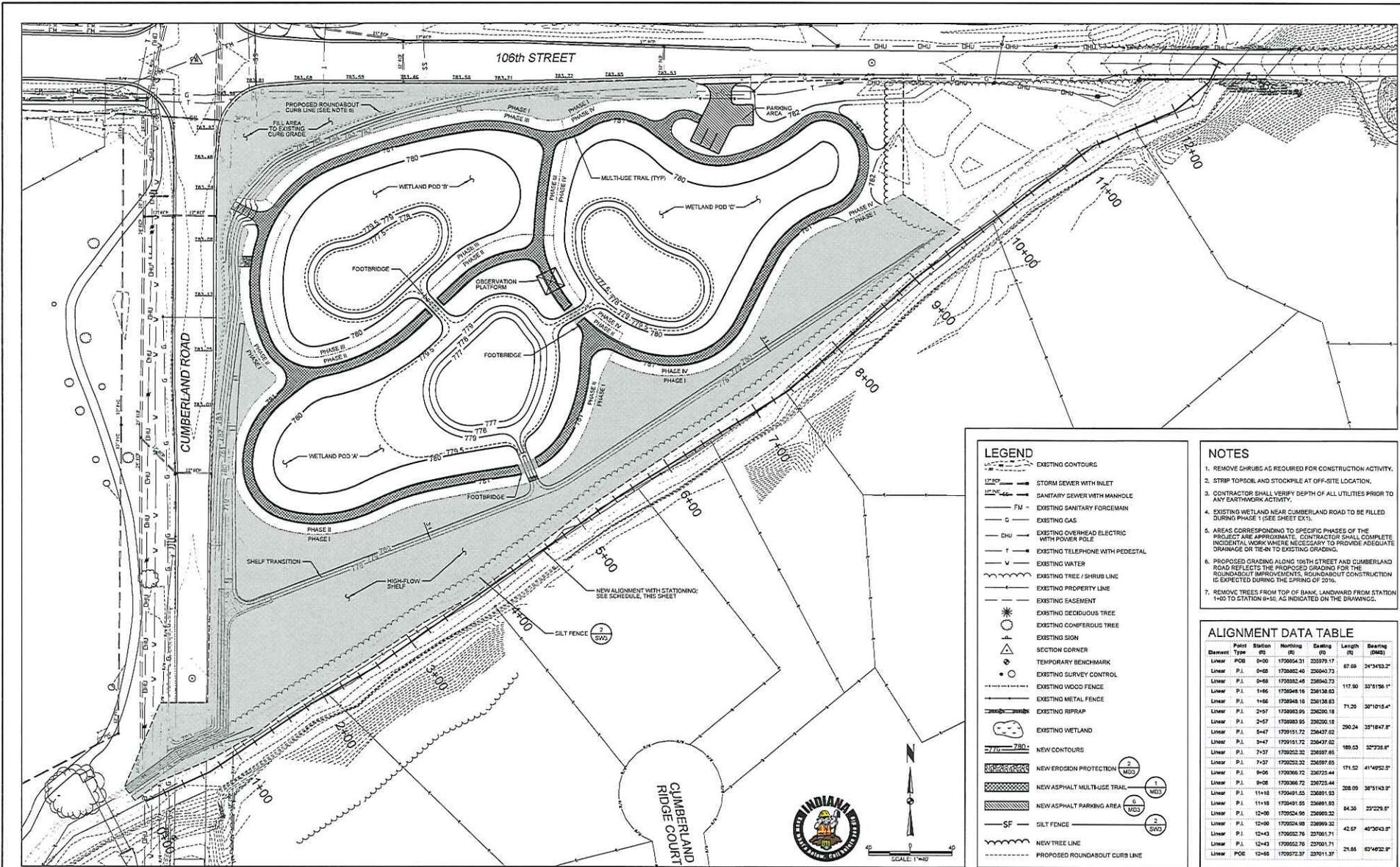
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- This estimate does not include the cost of the observation platform shown on the Drawings.

**Opinion of Probable Cost for Mud Creek High-Flow Shelf & Wetland  
Channel & Wetland Improvements - Phase IV**

Line	Description	Estimated Quantities	Units	Unit Price	Estimated Cost (Rounded)
<b>1</b>	<b>Wetland Construction</b>				
2	Strip & Stockpile Topsoil	900	CY	\$ 10	\$ 9,000
3	Channel & Wetland Excavation	1,100	CY	\$ 10	\$ 11,000
4	Place & Compact Trail 'Berms'	500	CY	\$ 15	\$ 8,000
5	Haul Spoils	1,100	CY	\$ 5	\$ 6,000
6	Finish Grading	9,400	SY	\$ 5	\$ 47,000
7	Topsoil Placement	1,300	CY	\$ 5	\$ 7,000
8	Obtain Topsoil Material	400	CY	\$ 20	\$ 8,000
9	Seeding	4,500	SY	\$ 1	\$ 5,000
10	Native Seeding	4,900	SY	\$ 5	\$ 25,000
11	Mulching	7,700	SY	\$ 1	\$ 8,000
12	Erosion Control Blankets	1,700	SY	\$ 3	\$ 5,000
13				Estimated Wetland Construction Cost	\$ 139,000
<b>14</b>	<b>Wetland / Trail Improvements</b>				
15	Trail / Parking Lot Subbase	210	TN	\$ 25	\$ 5,000
16	Trail / Parking Lot Asphalt	150	TN	\$ 75	\$ 11,000
17	Wetland Plantings	370	EA	\$ 10	\$ 4,000
18	Site Signage	1	LS	\$ 2,000	\$ 2,000
19				Estimated Wetland / Trail Improvements Cost	\$ 22,000
<b>20</b>	<b>Miscellaneous</b>				
21	Erosion and Sediment Control (2%)	1	LS	\$ 4,000	\$ 4,000
22	Construction Surveying (1%)	1	LS	\$ 2,000	\$ 2,000
23	Maintenance of Traffic (1%)	1	LS	\$ 2,000	\$ 2,000
24	Construction Mobilization/Demobilization (5%)	1	LS	\$ 10,000	\$ 10,000
25	Project Administration & Unforeseen Additional Costs (10%)	1	LS	\$ 20,000	\$ 20,000
26				Estimated Miscellaneous Cost	\$ 38,000
27					
28				<b>Estimated Total Construction Cost</b>	<b>\$ 199,000</b>
29					
<b>30</b>	<b>Professional Services</b>				
31	Construction Observation (6%)	1	LS	\$ 12,000	\$ 12,000
32				Estimated Professional Services Cost	\$ 12,000
33					
34					
35				<b>Estimated Total Cost for Project</b>	<b>\$ 211,000</b>

**Notes and Assumptions**

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**LEGEND**

- EXISTING CONTOUR
- STORM SEWER WITH INLET
- SANITARY SEWER WITH MANHOLE
- EXISTING SANITARY FORCEMAIN
- EXISTING GAS
- EXISTING OVERHEAD ELECTRIC WITH POWER POLE
- EXISTING TELEPHONE WITH PEDESTAL
- EXISTING WATER
- EXISTING TREE / SHRUB LINE
- EXISTING PROPERTY LINE
- EXISTING EASEMENT
- EXISTING DECIDUOUS TREE
- EXISTING CONIFEROUS TREE
- EXISTING SIGN
- SECTION CORNER
- TEMPORARY BENCHMARK
- EXISTING SURVEY CONTROL
- EXISTING WOOD FENCE
- EXISTING METAL FENCE
- EXISTING RIPRAP
- EXISTING WETLAND
- NEW CONTOURS
- NEW EROSION PROTECTION (2 MDS)
- NEW ASPHALT MULTI-USE TRAIL (1 MDS)
- NEW ASPHALT PARKING AREA (6 MDS)
- SF SILT FENCE (2 SFD)
- NEW TREE LINE
- PROPOSED ROUNDABOUT CURB LINE

- NOTES**
1. REMOVE CURBS AS REQUIRED FOR CONSTRUCTION ACTIVITY.
  2. STRIP TOPSOIL AND STOCKPILE AT OFF-SITE LOCATION.
  3. CONTRACTOR SHALL VERIFY DEPTH OF ALL UTILITIES PRIOR TO ANY EARTHWORK ACTIVITY.
  4. EXISTING WETLAND NEAR CUMBERLAND ROAD TO BE FILLED DURING PHASE 1 (SEE SHEET EX1).
  5. AREAS CORRESPONDING TO SPECIFIC PHASES OF THE PROJECT ARE APPROXIMATE. CONTRACTOR SHALL COMPLETE INCIDENTAL WORK WHERE NECESSARY TO PROVIDE ADEQUATE DRAINAGE OR TIE-IN TO EXISTING GRADING.
  6. PROPOSED GRADING ALONG 106TH STREET AND CUMBERLAND ROAD REFLECTS THE PROPOSED GRADING FOR THE ROUNDABOUT IMPROVEMENTS. ROUNDABOUT CONSTRUCTION IS EXPECTED DURING THE SPRING OF 2016.
  7. REMOVE TREES FROM TOP OF BANK, LANDWARD FROM STATION 1+00 TO STATION 0+50, AS INDICATED ON THE DRAWINGS.

**ALIGNMENT DATA TABLE**

Element Type	POB	Station	POE	Length	Beating (MDS)
Linear	POB	0+00	1700654.31	23579.17	67.68 24°34'53.2"
Linear	P.I.	0+60	1700882.46	23604.73	
Linear	P.I.	0+60	1700882.49	23604.73	
Linear	P.L.	1+66	1700848.16	23618.82	117.00 33°1'56.1"
Linear	P.L.	1+66	1700848.16	23618.82	
Linear	P.L.	2+67	1700993.09	23620.16	71.20 30°10'15.4"
Linear	P.L.	2+67	1700993.09	23620.16	
Linear	P.L.	5+47	1700151.72	23647.62	256.24 33°18'47.8"
Linear	P.L.	5+47	1700151.72	23647.62	169.53 32°23'8.1"
Linear	P.L.	7+37	1700252.32	23657.65	
Linear	P.L.	7+37	1700252.32	23657.65	
Linear	P.L.	9+06	1700366.72	23672.44	371.52 41°49'52.9"
Linear	P.L.	9+06	1700366.72	23672.44	
Linear	P.L.	11+16	1700491.53	23681.83	208.00 38°1'143.9"
Linear	P.L.	11+16	1700491.53	23681.83	
Linear	P.L.	12+00	1700524.98	23689.32	54.30 23°22'6.1"
Linear	P.L.	12+00	1700524.98	23689.32	
Linear	P.L.	12+43	1700602.76	23700.71	42.67 40°30'43.9"
Linear	P.L.	12+43	1700602.76	23700.71	
Linear	POE	12+68	1700727.37	23711.37	21.68 62°46'52.9"

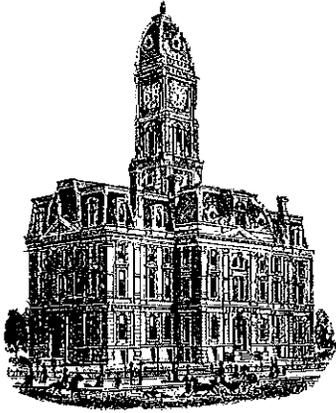
**CHRISTOPHER B. BURKE ENGINEERING, LLC**  
 PNC Center, Suite 1368 South  
 115 West Washington Street  
 Indianapolis, Indiana 46204  
 (317) 265-6000 FAX: (317) 632-3306

**MUD CREEK AT 106th STREET  
 HIGH-FLOW SHELF AND WETLAND**  
 HAMILTON COUNTY, INDIANA

DESIGN	DATE	BY	DATE
DRAWN		DJW	
CHECKED		BWM	
SCALE		AS NOTED	
DATE		4/25/2016	

PROJECT NO. 15/R142004.02000  
 SHEET 4 OF 15  
 DRAWING NO. SP1

**SITE PLAN LAYOUT-  
 ALIGNMENT DATA**



*Kent*  
*Kenton C. Ward, CFM*  
*Surveyor of Hamilton County*  
*Phone (317) 776-8495*  
*Fax (317) 776-9628*

*Suite 188*  
*One Hamilton County Square*  
*Noblesville, Indiana 46060-2230*

January 13, 2017

TO: Hamilton County Drainage Board

**RE: Mud Creek High Flow Shelf Ditch Reconstruction  
Final Inspection Report**

**FINAL REPORT**

This is the Inspector's Final Report on the Mud Creek High Flow Shelf Ditch Reconstruction, located in Section 8, Township 17 North, Range 5 East in Fall Creek Township, Hamilton County, Indiana.

The Date of the Surveyor's Report for the Mud Creek High Flow Shelf Ditch Reconstruction was August 7, 2015. The reconstruction was approved by the Board on August 10, 2015 (Hamilton County Drainage Board Minutes Book 16, Pages 266-267). The Engineer's estimate for the reconstruction was \$405,000.00. The bid was awarded to Morphe Construction on November 9, 2015 (Hamilton County Drainage Board Minutes Book 16, Pages 344-345). The base bid by Morphe Construction was for the amount of \$221,250.00.

The reconstruction consisted of implementing the first construction phase (Alternate 5) of the recommendations outlined in the study prepared by Christopher B. Burke, "Study of Alternatives to Reduce Flooding of Cumberland Road and 106<sup>th</sup> Street from Mud Creek", July 2013, CBBEL Project No. 12—0231.

The Mud Creek Shelf and Constructed Wetland Design contract with Christopher B. Burke Engineering was approved by the Board at the January 27, 2014 meeting for \$62,300.00 (Hamilton County Drainage Board Minutes Book 15, Page 336).

The Mud Creek Shelf and Constructed Wetland Design – Amendment No. 2 for additional design work by Christopher B. Burke Engineering was approved by the Board at the January 12, 2015 meeting. The Board’s motion included the contract was not to exceed \$13,400.00 (Hamilton County Drainage Board Minutes Book 16, Page 76). Of this only \$5,257.00 was expended for a total paid to Burke for engineering services for this project of \$67,557.00

The construction staking and as-built (record) drawings were prepared by Butler, Fairman & Seufert per contract approved by the Board on December 14, 2015. The Board’s motion included the contract was not to exceed \$45,000.00 (Hamilton County Drainage Board Minutes Book 16, Page 408). The total billed by Butler, Fairman & Seufert for services was \$16,252.06.

There was one (1) change order for additional work on the project as allowed by IC 36-9-27-80.5.

Change Order # 1 dated December 8, 2015 for the amount of **\$2,250.00** was approved by the Hamilton County Drainage Board at the December 14, 2015 meeting for the removal of three (3) dead diseased trees within the project limits (Hamilton County Drainage Board Minutes Book 16, Page 408).

Partial Pay Requests by Morphey Construction for this project submitted and paid as allowed in IC 36-9-27-81 are as follows:

Pay Request #1 submitted-12/23/2015	Paid 01/26/16	\$ 91,885.00
Pay Request #2 submitted-02/29/2016	Paid 03/29/16	\$ 10,752.50
Pay Request #3 submitted-07/06/2016	Paid 07/26/16	\$ 87,337.50
Pay Request #4 Retainage submitted-11/17/2016	Paid 12/13/16	<u>\$ 33,525.00</u>
Morphey Construction Total		<b>\$ 223,500.00</b>

The final costs for the reconstruction are as follows:

Contractor’s Bid – Morphey Construction -----	\$ 221,250.00
Cost by Morphey Construction of Change order #1 -----	<u>\$ 2,250.00</u>
Total Construction Cost -----	<b>\$ 223,500.00</b>

Christopher B. Burke Engineering ----- \$ 67,557.00

Butler Fairman & Seufert Construction Staking & Inspection ----- \$ 16,256.06

Total Reconstruction Cost ----- **\$307,313.06**

Engineer’s Estimate ----- \$ 405,000.00

Total Reconstruction Cost ----- \$ 307,313.06

Difference ----- **\$ 97,686.94**

Statement of All Incurred Expenses Paid signed by the contractor as required in IC 36-9-27—82(b) was received on July 22, 2016. The retainage for this contract has been released.

The as-built drawings for the shelf were completed by Butler, Fairman and Seufert and were reviewed for compliance and approved by Christopher B. Burke (See attached Floodplain Development Approval Memorandum dated November 8, 2016).

The cost of the reconstruction was paid out of the maintenance fund for Mud Creek per the Board's motion of July 13, 2015 (Hamilton County Drainage Board Minutes Book 16, Pages 245 & 246).

As of the date of this report, I hereby attest to and agree that the reconstruction was completed according to specified plans, change orders and inspections. All inspections have been completed by Butler, Fairman & Seufert (See attached Memo Letter from Dan Grolla of Butler Fairman & Seufert dated November 14, 2016).

I recommend the Board approve the drain's reconstruction as complete and acceptable.

Respectfully,



Jerry L. Liston  
New Construction Inspector  
Hamilton County Surveyor's Office



## FLOODPLAIN DEVELOPMENT APPROVAL MEMORANDUM

November 8, 2016

**TO:** Kenton C. Ward, CFM – Hamilton County Surveyor  
Jerry Liston – New Construction Inspector

**FROM:** Kerry Daily, E.I., CFM, CPESC, CPSWQ – CBBEL, Indianapolis

**SUBJECT:** **Mud Creek High Flow Shelf**  
**Mud Creek Regulated Drain**  
**CBBEL Project No. 050575.000AH**

The north bank of Mud Creek will be excavated between the 106<sup>th</sup> Street and Cumberland Road crossings of the stream. The excavation will vary from about 90 feet from the existing top of bank landward near Cumberland Road narrowing to no excavation near 106<sup>th</sup> Street. The depth of excavation ranges from about 1.5 to 3.5 feet. The purpose of the project is to provide a more stable channel and flow area for discharges associated with large storm events. A later phase of the project will involve wetland construction north of the shelf area.

Staff of CBBEL has reviewed the submitted information regarding the excavated shelf at the project site. Based on our review, this portion of the proposed project has been constructed according to the plans approved for the project.

No error or omission in the plans, calculations or applications (whether said plans, calculations or applications have been reviewed by the review engineer or not) shall permit or release the applicant and designer from constructing this work in any other manner than that provided for in the Ordinance.

cc: Butler, Fairman and Seufert, Inc.

KMD/kd

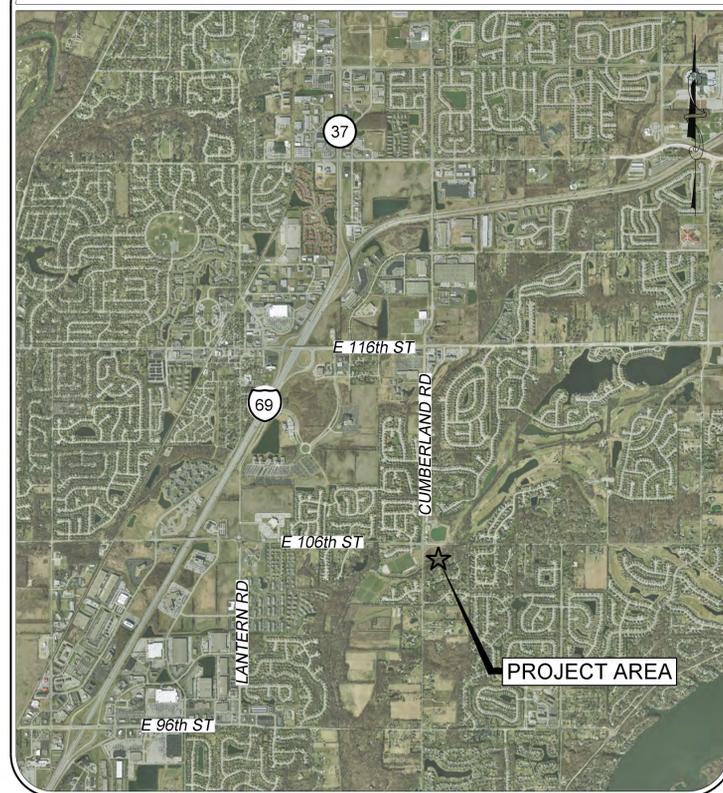
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# MUD CREEK AT 106th STREET HIGH-FLOW SHELF AND WETLAND

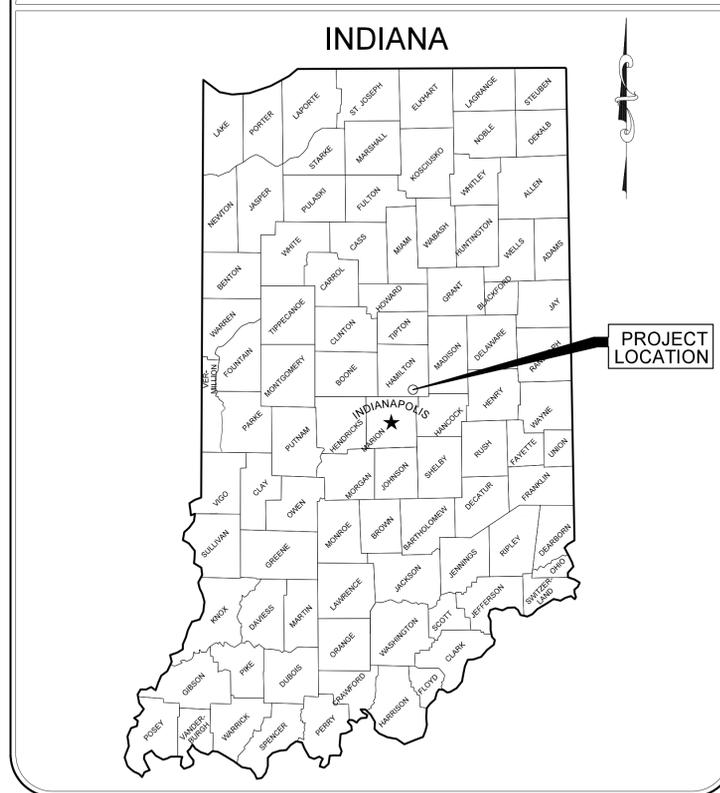


## HAMILTON COUNTY, INDIANA

VICINITY MAP



LOCATION MAP



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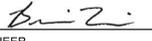


ISSUED FOR BID

PREPARED FOR:  
 HAMILTON CO. SURVEYOR'S OFFICE  
 KENT C. WARD, SURVEYOR  
 ONE HAMILTON COUNTY SQUARE  
 NOBLESVILLE, INDIANA 46060  
 (317) 776-8495

PREPARED BY:  
 CHRISTOPHER B. BURKE ENGINEERING, LLC  
 PNC Center, Suite 1368 South  
 115 West Washington Street  
 Indianapolis, Indiana 46204  
 Phone: (317) 266-8000 FAX: (317) 632-3306

CERTIFIED:

	 ENGINEER	8/10/2015 DATE
	BRIAN J. MEUNIER, P.E. INDIANA REGISTRATION No. PE11300321 EXPIRATION DATE: JULY 2016	

MUD CREEK AT 106th STREET  
 HIGH-FLOW SHELF AND WETLAND  
 HAMILTON COUNTY, INDIANA

**CONSTRUCTION NOTES**

- The CONTRACTOR shall stake out and mark limits of construction so they are clearly visible. All construction activities shall be performed within the designated construction limits.
- The CONTRACTOR shall clearly mark all underground utilities, culverts, and underground drains prior to construction.
- The CONTRACTOR shall deploy suitable equipment for the excavation, compaction, and grading of soil to construct the work. The CONTRACTOR shall perform excavation to the lines and grades shown on the plans.
- Responsibility for the repair of utilities and structures when broken or otherwise damaged shall be borne by the CONTRACTOR. Materials damaged by the CONTRACTOR during handling or placement operations shall be replaced in-kind by the CONTRACTOR at CONTRACTOR'S sole expense. Such damaged materials shall be removed from the site by the CONTRACTOR.
- The CONTRACTOR shall provide sufficient dewatering equipment and make satisfactory arrangements for the disposal of water collected or removed during construction without undue interference with other work or damage to surrounding property. The CONTRACTOR shall not place fill or topsoil within construction areas containing standing water. If the CONTRACTOR uses pumping equipment, care and measures shall be deployed to minimize intake of sediments and scouring at discharge points.
- All demolition items shall be removed from the site at the CONTRACTOR'S expense.
- Throughout the project duration, the contractor shall ensure positive drainage is maintained on the exposed soils to prevent excess absorption of rainfall. Ruts, holes, and other depressed areas shall be filled immediately to prevent ponding.
- The use of explosives is NOT permitted.
- Open burning is NOT permitted.
- Items noted or otherwise identified to be salvaged (if any) shall be returned to the OWNER in the original condition.
- The CONTRACTOR shall remove all reusable topsoil from excavation areas for placement on final graded areas. The CONTRACTOR shall install and maintain silt fencing around the perimeter of topsoil stockpile areas.
- Topsoil shall be placed in one loose lift in all areas where the underlying soils will not support vegetative growth. If adequate topsoil volumes are not available from on-site sources, the CONTRACTOR shall amend available soil to produce a suitable growth medium. The final surface shall be graded smooth to final design grades. All significant surface variations, including vehicle tire or equipment track ruts, shall be smoothed out with a grader box or other method. Final grading performed by dozers shall be done in a manner such that the track cleats are oriented parallel to the contours to minimize runoff velocity down the slope and to help maintain moisture in the topsoil to promote vegetative growth.
- Shop drawings of product certification information of all constructed of supplied project materials shall be submitted to the OWNER or ENGINEER for review prior to implementation or installation.
- Upon substantial completion and again at final completion of construction, prior to demobilization, the CONTRACTOR shall ensure that all excess construction materials and debris, including unsuitable soils, tree limbs, brush, trash, temporary erosion control measures, and miscellaneous construction materials are removed from the project site and disposed of properly. All disturbed areas shall be restored to the satisfaction of the OWNER and ENGINEER.
- The CONTRACTOR shall repair erosion damage to the finished surfaces at no additional cost to the OWNER. Accumulated sediment from erosion shall be removed by CONTRACTOR at no additional cost to the OWNER.
- The CONTRACTOR shall maintain final grades and vegetation in the wetland areas and channel shelf until the vegetation is established and accepted by the OWNER. The CONTRACTOR shall repair erosion damage to the finished surfaces and vegetation at his own expense.
- The CONTRACTOR shall perform post-construction maintenance on the new vegetation for a period of one (1) year from substantial completion. Vegetation must be established and accepted by the OWNER prior to final completion and release of retainage.

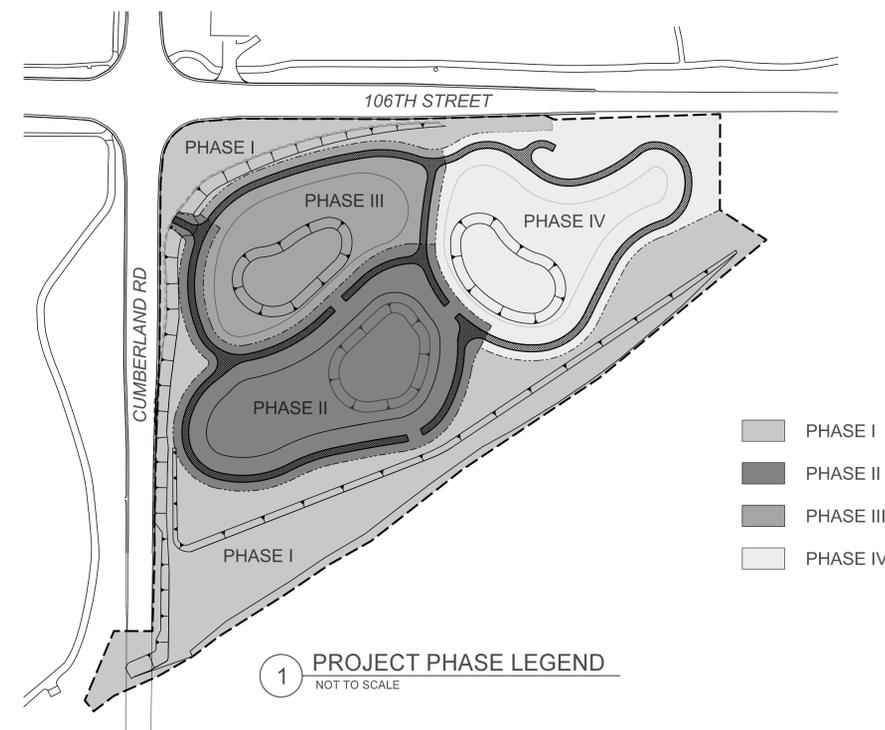
**GENERAL NOTES**

- The CONTRACTOR shall not perform work on any day between the hours of 7:00 p.m. to 7:00 a.m. or on Sunday and Holidays without prior approval from OWNER.
- The CONTRACTOR and any SUB-CONTRACTORS shall comply with the state and local laws and federal requirements of the Occupational Safety and Health Act of 1970 (OSHA), as they relate to their operations.
- The CONTRACTOR shall be required to comply with all state, local, and federal regulations regarding air, water and noise pollution. The CONTRACTOR shall not build fires on the site.
- The CONTRACTOR shall ensure that all employees and applicants employed in the performance of work with respect to hire, tenure, terms, conditions or privileges of employment of any matter directly related to employment will not be discriminated against because of race, religion, color, sex, disability, national origin, or ancestry.
- The CONTRACTOR shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the work and shall take all necessary precautions for the safety of all employees, visitors, equipment, or other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and underground facilities not designated for removal, relocation, or replacement on the plans.
- The CONTRACTOR shall call the Indiana Underground Plant Protection Service ("Holey-Moley") by dialing 811 at least 48 hours prior to commencement of land-disturbing activities to schedule a utility locate. It is the CONTRACTOR'S responsibility to verify the location of all existing utilities and to report any discrepancies or omissions with the existing utilities shown on the plans to the ENGINEER immediately.
- The CONTRACTOR shall protect all existing utilities as required to prevent damage. All utilities must be fully operational and accessible throughout the duration of the project. Any and all damage to existing utilities must be repaired in kind at the CONTRACTOR'S expense.
- There shall be no storage of equipment, materials, debris, soil, etc. in the street or right-of-way without written permission from the Town of Fishers.
- There shall be no storage of equipment, materials, debris, soil, etc. within the floodway of Mud Creek.
- Temporary traffic control is the responsibility of the CONTRACTOR. The CONTRACTOR shall coordinate with the Town of Fishers to determine exact traffic control requirements.
- The CONTRACTOR shall minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during construction operations. The CONTRACTOR shall not close or obstruct streets walks, or other adjacent occupied or used facilities without permission from the OWNER and authorities having jurisdiction. The CONTRACTOR may cross roads and streets during the performance of the work if necessary, at the approval of the OWNER, however, the CONTRACTOR shall protect all roads and streets at heavy-equipment crossings as needed to protect pavement. The CONTRACTOR shall provide road barriers and/or a flag person to control traffic during all times when construction equipment is crossing public roads or when otherwise warranted.
- Any pavement or curb damaged by construction activity shall be replaced in kind by the CONTRACTOR at no cost to the OWNER.
- If the CONTRACTOR finds a conflict, error or discrepancy in the construction documents of plans, the CONTRACTOR shall so report to the ENGINEER by email at once before proceeding with the work affected thereby and shall obtain a written interpretation or clarification from the ENGINEER.
- All work shall be constructed in accordance with the lines and grades shown on the plans. The full responsibility for keeping alignment and grades shall rest upon the CONTRACTOR at no additional cost to the OWNER.
- The CONTRACTOR shall immediately remove mud tracked by his vehicles onto the public roadways when the road is in use, otherwise, before a closed section is returned to service.
- The excavation shall be maintained such that positive drainage is provided at all times. The CONTRACTOR shall be responsible for all costs associated with dewatering of any excavation in order to provide positive drainage and any costs associated with the disposal of such water.
- The temporary erosion control system installed by the CONTRACTOR shall be properly maintained as indicated on the plans of as directed by the OWNER to control erosion and siltation at all times during the life of the contract. This work shall include repair of the various systems, removal of trapped sediment and cleaning or replacement of any silt filter fabric or other control measures. Accumulated silt in the work areas shall be removed from the site as an incidental cost to the project, or shall be used on-site if approved by the OWNER. Any additional materials and work required by the ENGINEER to control erosion shall be measured and paid for as specified. If the CONTRACTOR fails to maintain the temporary erosion control system as directed by the ENGINEER, the OWNER may at the expiration of a period of 48 hours, after having given the CONTRACTOR written notice, proceed to maintain the systems as deemed necessary, and the cost thereof be deducted from and compensation due the CONTRACTOR under this contract.
- The CONTRACTOR shall obtain permission from the necessary stakeholders for all work performed outside of the OWNER'S right-of-way.
- The CONTRACTOR shall be fully responsible to the OWNER for all acts and omissions of his SUB-CONTRACTORS, suppliers, and other persons and organizations performing or furnishing any of the work or goods under a direct or indirect contract with the CONTRACTOR just as the CONTRACTOR is

- responsible for the CONTRACTOR'S own acts and omissions. The CONTRACTOR shall assume sole obligation for the payment of any monies due the any SUB-CONTRACTOR, supplier, or other person or organization, except as may be otherwise required by laws and regulations.
- Upon completion of the work and prior to acceptance of the project, the CONTRACTOR shall be required to furnish the OWNER and ENGINEER each with one set of marked-up plans showing the as-constructed location and elevations of all construction components.
  - The CONTRACTOR shall be responsible to secure the construction site against unauthorized entrance by persons and vehicles outside of and during working hours. This includes securing the site against dumping and trespassers. The cost of any additional security measures deemed necessary by the CONTRACTOR shall be incidental to the contract. If the CONTRACTOR fails to maintain security of safety measures at the project site, the OWNER may at the expiration of a period of 48 hours, after having given the CONTRACTOR written notice, proceed to provide additional measures as deemed necessary, and the cost thereof shall be deducted from any compensation due, or which may become due to the CONTRACTOR under this contract.
  - The CONTRACTOR shall allow the OWNER, ENGINEER, or OWNER'S representative's access to the site at all times.
  - The OWNER is responsible for the following permits for this project:
    - Indiana Department of Natural Resources Construction in a Floodway Permit,
    - Indiana Department of Environmental Management Section 401 Water Quality Certification,
    - United States Army Corps of Engineers Section 404 Permit, and
    - Indiana Department of Environmental Management Rule 5 Permit.
 Copies of all permits obtained will be provided to the CONTRACTOR by the OWNER. The CONTRACTOR is responsible for compliance with permit conditions and requirements. The CONTRACTOR shall be responsible for obtaining all other permits and/or licenses as required by law/ordinance or regulation.
  - Do not work in the waterway from April 1 through April 30 without prior written approval from the Indiana Department of Natural Resources Division of Fish and Wildlife.
  - Do not cut any trees suitable for Indiana bat roosting (greater than 3-inches DBH, living or dead, with loose hanging bark) from April 1 to September 30.

**GENERAL CONSTRUCTION SEQUENCE**

- This General Construction Sequence has been assembled for project guidance and may be adjusted to meet the CONTRACTOR'S specific plans; however, the sequence of Step 2 through Step 7 shall not be altered. Step 2 through Step 7 shall be completed for each of the project's four phases. The CONTRACTOR shall generally perform the following steps to complete the project.
  - Stake the construction limits.
  - Locate, mark, and protect all existing utilities.
  - Install temporary traffic control measures as required by the Town of Fishers.
  - Construct staging area and construction entrance.
  - Install concrete washout as indicated on the plans.
  - Install silt fence as indicated on the plans.
- Phase I:**
  - Perform clearing of unwanted surface objects in the channel shelf area as indicated on the plans and as directed by the OWNER and ENGINEER. Remove debris from the project site and dispose of material in an approved manner.
  - Remove topsoil from disturbance areas as indicated on plans, except for channel shelf.
  - Construct channel shelf. CONTRACTOR shall utilize rapid stabilization methods, as described in the Erosion Control Sequence on Sheet SW4.
  - Amend grading on the remainder of the site to provide positive drainage, as needed.
  - Install riprap as indicated on the plans.
  - Apply topsoil to all areas that are to be seeded.
  - Stabilize all disturbed areas of the project that are completed, as work proceeds, with temporary or permanent seeding, mulch, and erosion control blankets as described on the drawings. Apply fertilizer, lime (if needed), mulch, and seed to permanently stabilize.
  - Remove temporary erosion control measures upon OWNER'S approval and after vegetation is established and approved by the ENGINEER.
- The CONTRACTOR shall provide to the OWNER and ENGINEER an as-built topographic survey which includes documentation of all aspects of the project.
  - Phase II - Phase IV:**
    - Remove topsoil for areas to be disturbed within Wetland Pod.
    - Excavate and grade constructed wetland area as indicated on the plans.
    - Apply topsoil to all areas that are to be seeded.
    - Install wetland plantings as indicated on the plans.
    - Construct pedestrian trail footbridges, [and parking area] as indicated on the plans.
    - Install environmental signage along pedestrian trail as indicated on plans.
    - Stabilize all disturbed areas of the project that are completed, as work proceeds, with temporary or permanent seeding, mulch, and erosion control blankets as described on the drawings. Apply fertilizer, lime (if needed), mulch, and seed to permanently stabilize.
    - Remove temporary erosion control measures upon OWNER'S approval and after vegetation is established and approved by the ENGINEER.
  - The CONTRACTOR shall provide to the OWNER and ENGINEER an updated as-built topographic survey which includes documentation of all aspects of the project.
  - Repeat Step 18 through Step 26 for Phase III and Phase IV construction activities.



1 PROJECT PHASE LEGEND  
NOT TO SCALE

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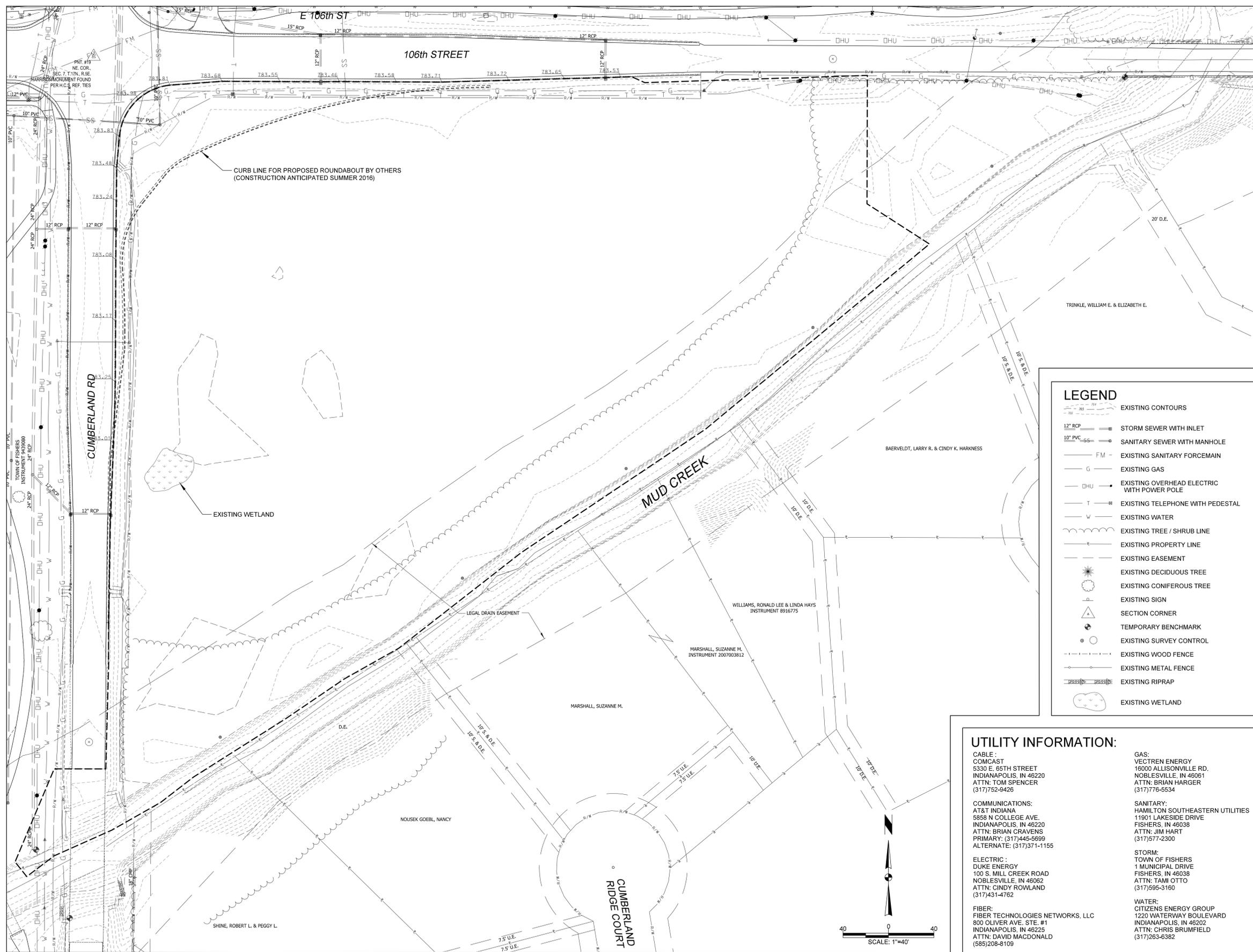
PROJECT:  
**MUD CREEK AT 106th STREET  
 HIGH-FLOW SHELF AND WETLAND**  
 HAMILTON COUNTY, INDIANA

NO.	DATE	ISSUED FOR BID	FILE NAME	SCALE:	AS NOTED
1	8/10/15	ISSUED FOR BID	R:\2014\14-004\00000\Work Hub\Design\IGN Plans\04-Issued for Bid\140004_GN1.dgn	DATE:	8/3/2015

BRIAN J. MEUNIER  
 REGISTERED  
 No. PE11300321  
 STATE OF INDIANA  
 PROFESSIONAL ENGINEER

TITLE:  
**PROJECT OVERVIEW / NOTES**

PROJECT NO.  
 19.R140004.00000  
 SHEET 2 OF 15  
 DRAWING NO.  
**GN1**



SURVEY ORIGINALLY COMPLETED FOR TOWN OF FISHERS AND USED WITH PERMISSION.  
 SURVEYOR'S REPORT  
 Project: 106th Street and Cumberland Road - Intersection Improvement  
 Client: Town of Fishers, Indiana

This project is located in Sections 5, 6, 7 & 8, Township 17 North, Range 5 East of the Second Principal Meridian, Town of Fishers, Delaware & Fall Creek Townships, Hamilton County, Indiana. The scope of this project was to obtain data to be used for possible design improvements to the intersection of 106th Street and Cumberland Road. A Location Control Route Survey Plat (LCRSP) with accompanying original survey field book and topographic data was to be provided to the client. The LCRSP will serve as a basis of describing any right-of-way required for said improvements. It is not a property retracement survey. Any apparent property lines and corners, subdivision lines and corners, or section lines and corners are based upon physical evidence or testimony. If additional U.S.P.L.S.S. corners are required for said improvements, they should be tied to this survey.

The Basis of Bearing for the survey is the Indiana State Plane Coordinate System (ISPCS), East Zone (NAD 83 2011), which is a grid coordinate system. The horizontal control system was established by using the National Geodetic Survey's Online Positioning User Service (OPUS). Using Trimble R6 GPS equipment, an OPUS solution was performed at Control Point #1, and the following information resulted from said solution:

Control Point #1  
 Latitude: N 39°56'27.17875"  
 Longitude: W 85°59'45.89717"  
 Northing: 1709333.2349  
 Easting: 235716.6382

Trimble Business Center (TBC) software using a least squares adjustment was used in the processing of the GPS data. The following information pertains to said control work:

Projection Name: Indiana State Plane Coordinate System - East Zone  
 Projection Type: Transverse Mercator  
 Horizontal Datum: North American Datum of 1983 (NAD 83), 2011 Adjustment  
 Geoid Model: GEOID12A  
 Reference Frame: WGS 84  
 Project Units: U.S. Survey Feet

After the horizontal control system was established, it was converted to a local, ground system by scaling the control data from said grid system to a ground system using a combination factor of X=1.000055630 (1/X=0.999944440) that was applied at Control Point #1. The system was then translated by subtracting 1,699,333.2349 from all northings and by subtracting 225,716.6382 from all eastings of each point. This resulted in Control Point #1 having local, ground coordinates of N: 10,000.0000, E: 10,000.0000. No rotation was performed. All distances and coordinates shown hereon are ground distances and coordinates.

The vertical datum of the project was established by holding Indiana Department of Natural Resources Benchmark HAM 86, 1989 which has a published elevation of 784.773 feet. It is on the National Geodetic Vertical Datum of 1929 (NGVD 29). Additional temporary benchmarks were established through differential leveling using a Sokkia automatic level. The project's vertical datum is NGVD 1929.

Cross-sections and topographic information within the project limits were collected using Trimble R6 GPS equipment, a Nikon total station, and an electronic field book. The topography of the project is graphically represented in AutoCAD Civil 3D 2012 format and coordinate information is provided in a ".txt" file in the following format: Point Number, Northing, Easting, Elevation, Description

Right-of-way and deed line information is shown per subdivision plats and deeds on file with the Office of the Recorder of Hamilton County, Indiana. Where no right-of-way records exist, the existing right-of-way is shown as the edge of the travel lane. Owner information shown is based on current tax records in the Auditor's Office of said county.

In accordance with Title 865 of the Indiana Administrative Code, the following observations and opinions are offered regarding the monuments found or set for the survey. Unless otherwise noted, all monuments found and set were found or set flush with grade.

Harrison Monuments were found at the north quarter corner of Section 7 (Pnt. #18), the northeast corner of Section 7 (Pnt. #19), the north quarter corner of Section 8 (Pnt. #20), the east quarter corner of Section 6 (Pnt. #21) and the east quarter corner of Section 7 (Pnt. #22) all in Township 17 North, Range 5 East per Hamilton County Surveyor reference ties. The uncertainty associated with the locations of these monuments, in my opinion, is negligible.

The uncertainty associated with the locations of any of the route survey control lines due to occupation or possession lines, in my opinion, is negligible.

This survey (performed in the field from March 4, 2013 to March 25, 2013 under my supervision), to the best of my knowledge and belief, was executed according to the provisions of Title 865 of the Indiana Administrative Code regarding route surveys, covering the entire survey.

The project's original coordinate system was the Indiana State Plane Coordinate System, East Zone. It was established by performing an Opus solution at CP #1 which resulted in the following values: N:1709333.2349, E:235716.6382, Lat: 39°56'27.17875"N, Long:85°59'45.89717"W. The project was moved to a local, ground system by scaling all data by the Opus solution combination factor of 1.000055630 (1/X=0.999944440) holding CP #1 as the base point. The data was then translated by subtracting 1,699,333.2349 from all northings and by subtracting 225,716.6382 from all eastings. This resulted in CP#1 having the coordinates of N:10000.0000, E:10000.0000. All distances and coordinates are local, ground distances and coordinates.

NOTE: FOLLOWING THE ORIGINAL SURVEY, THE SURVEY AND DESIGN DATA WAS SHIFTED TO ALLOW CP#1 TO REGAIN THE ORIGINAL, STATE PLANE COORDINATE VALUES: N:1709333.2349, E:235716.6382, Lat: 39°56'27.17875"N, Long:85°59'45.89717"W. MINOR DIFFERENCES BETWEEN TRUE STATE PLANE COORDINATES AND THE CURRENT PROJECT'S COORDINATE SYSTEM MAY OCCUR.

### LEGEND

- EXISTING CONTOURS
- STORM SEWER WITH INLET
- SANITARY SEWER WITH MANHOLE
- EXISTING SANITARY FORCEMAIN
- EXISTING GAS
- EXISTING OVERHEAD ELECTRIC WITH POWER POLE
- EXISTING TELEPHONE WITH PEDESTAL
- EXISTING WATER
- EXISTING TREE / SHRUB LINE
- EXISTING PROPERTY LINE
- EXISTING EASEMENT
- EXISTING DECIDUOUS TREE
- EXISTING CONIFEROUS TREE
- EXISTING SIGN
- SECTION CORNER
- TEMPORARY BENCHMARK
- EXISTING SURVEY CONTROL
- EXISTING WOOD FENCE
- EXISTING METAL FENCE
- EXISTING RIPRAP
- EXISTING WETLAND

### UTILITY INFORMATION:

**CABLE:**  
 COMCAST  
 5330 E. 65TH STREET  
 INDIANAPOLIS, IN 46220  
 ATTN: TOM SPENCER  
 PRIMARY: (317)445-5699  
 ALTERNATE: (317)371-1155

**COMMUNICATIONS:**  
 AT&T INDIANA  
 5858 N COLLEGE AVE.  
 INDIANAPOLIS, IN 46220  
 ATTN: BRIAN CRAVENS  
 PRIMARY: (317)445-5699  
 ALTERNATE: (317)371-1155

**ELECTRIC:**  
 DUKE ENERGY  
 100 S. MILL CREEK ROAD  
 NOBLESVILLE, IN 46062  
 ATTN: CINDY ROWLAND  
 (317)431-4762

**FIBER:**  
 FIBER TECHNOLOGIES NETWORKS, LLC  
 800 OLIVER AVE, STE. #1  
 INDIANAPOLIS, IN 46225  
 ATTN: DAVID MACDONALD  
 (585)208-8109

**GAS:**  
 VECTREN ENERGY  
 16000 ALLISONVILLE RD.  
 NOBLESVILLE, IN 46061  
 ATTN: BRIAN HARGER  
 (317)776-5534

**SANITARY:**  
 HAMILTON SOUTHEASTERN UTILITIES  
 11901 LAKESIDE DRIVE  
 FISHERS, IN 46038  
 ATTN: JIM HART  
 (317)577-2300

**STORM:**  
 TOWN OF FISHERS  
 1 MUNICIPAL DRIVE  
 FISHERS, IN 46038  
 ATTN: TAMI OTTO  
 (317)595-3160

**WATER:**  
 CITIZENS ENERGY GROUP  
 1220 WATERWAY BOULEVARD  
 INDIANAPOLIS, IN 46202  
 ATTN: CHRIS BRUMFIELD  
 (317)263-6382

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PROJECT:  
**MUD CREEK AT 106th STREET  
 HIGH-FLOW SHELF AND WETLAND**  
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NO.	DATE	ISSUED FOR	BY	CHKD.
1	8/10/15	ISSUED FOR BID	BJM	
FILE NAME:		R:\2014\14-0004\0000\Work Hub\Design\IGN Plans\04-Issued for Bid\140004_EX1.dgn		

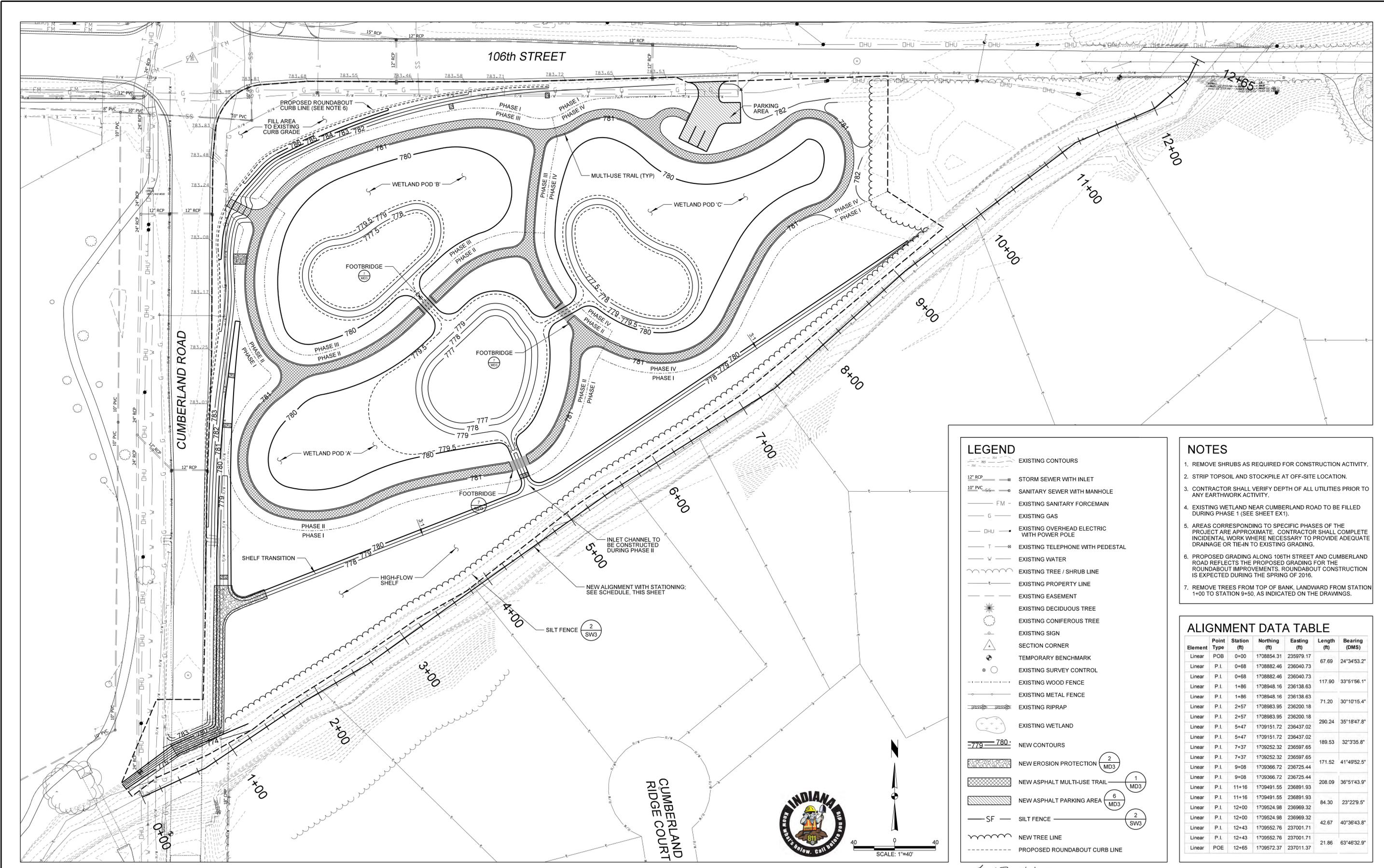
DSGN.	BJM
DWN.	DJW
CHKD.	BWM
SCALE:	AS NOTED
DATE:	8/3/2015

BRIAN J. MEUNIER  
 No. PE11300321  
 STATE OF INDIANA  
 REGISTERED PROFESSIONAL ENGINEER

## EXISTING CONDITIONS

PROJECT NO. 19.R140004.00000  
 SHEET 3 OF 15  
 DRAWING NO. EX1





### LEGEND

- EXISTING CONTOURS
- STORM SEWER WITH INLET
- SANITARY SEWER WITH MANHOLE
- EXISTING SANITARY FORCEMAIN
- EXISTING GAS
- EXISTING OVERHEAD ELECTRIC WITH POWER POLE
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- EXISTING SIGN
- SECTION CORNER
- TEMPORARY BENCHMARK
- EXISTING SURVEY CONTROL
- EXISTING WOOD FENCE
- EXISTING METAL FENCE
- EXISTING RIPRAP
- EXISTING WETLAND
- NEW CONTOURS
- NEW EROSION PROTECTION (2 MD3)
- NEW ASPHALT MULTI-USE TRAIL (1 MD3)
- NEW ASPHALT PARKING AREA (6 MD3)
- SILT FENCE (2 SW3)
- NEW TREE LINE
- PROPOSED ROUNDABOUT CURB LINE

- ### NOTES
- REMOVE SHRUBS AS REQUIRED FOR CONSTRUCTION ACTIVITY.
  - STRIP TOPSOIL AND STOCKPILE AT OFF-SITE LOCATION.
  - CONTRACTOR SHALL VERIFY DEPTH OF ALL UTILITIES PRIOR TO ANY EARTHWORK ACTIVITY.
  - EXISTING WETLAND NEAR CUMBERLAND ROAD TO BE FILLED DURING PHASE 1 (SEE SHEET EX1).
  - AREAS CORRESPONDING TO SPECIFIC PHASES OF THE PROJECT ARE APPROXIMATE. CONTRACTOR SHALL COMPLETE INCIDENTAL WORK WHERE NECESSARY TO PROVIDE ADEQUATE DRAINAGE OR TIE-IN TO EXISTING GRADING.
  - PROPOSED GRADING ALONG 106TH STREET AND CUMBERLAND ROAD REFLECTS THE PROPOSED GRADING FOR THE ROUNDABOUT IMPROVEMENTS. ROUNDABOUT CONSTRUCTION IS EXPECTED DURING THE SPRING OF 2016.
  - REMOVE TREES FROM TOP OF BANK, LANDWARD FROM STATION 1+00 TO STATION 9+50, AS INDICATED ON THE DRAWINGS.

### ALIGNMENT DATA TABLE

Element	Point Type	Station (ft)	Northing (ft)	Easting (ft)	Length (ft)	Bearing (DMS)
Linear	POB	0+00	1708854.31	235979.17	67.69	24°34'53.2"
Linear	P.I.	0+68	1708882.46	236040.73		
Linear	P.I.	0+68	1708882.46	236040.73	117.90	33°51'56.1"
Linear	P.I.	1+86	1708948.16	236138.63		
Linear	P.I.	1+86	1708948.16	236138.63	71.20	30°10'15.4"
Linear	P.I.	2+57	1708983.95	236200.18		
Linear	P.I.	2+57	1708983.95	236200.18	290.24	35°18'47.8"
Linear	P.I.	5+47	1709151.72	236437.02		
Linear	P.I.	5+47	1709151.72	236437.02	189.53	32°33'5.8"
Linear	P.I.	7+37	1709252.32	236597.65		
Linear	P.I.	7+37	1709252.32	236597.65	171.52	41°49'52.5"
Linear	P.I.	9+08	1709366.72	236725.44		
Linear	P.I.	9+08	1709366.72	236725.44	208.09	36°51'43.9"
Linear	P.I.	11+16	1709491.55	236891.93		
Linear	P.I.	11+16	1709491.55	236891.93	84.30	23°22'9.5"
Linear	P.I.	12+00	1709524.98	236969.32		
Linear	P.I.	12+00	1709524.98	236969.32	42.67	40°36'43.8"
Linear	P.I.	12+43	1709552.76	237001.71		
Linear	P.I.	12+43	1709552.76	237001.71	21.86	63°46'32.9"
Linear	POE	12+65	1709572.37	237011.37		

**CHRISTOPHER B. BURKE ENGINEERING, LLC**  
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 115 West Washington Street  
 Indianapolis, Indiana 46204  
 (317) 266-8000 FAX: (317) 632-3306

PROJECT: **MUD CREEK AT 106th STREET  
 HIGH-FLOW SHELF AND WETLAND**  
 HAMILTON COUNTY, INDIANA

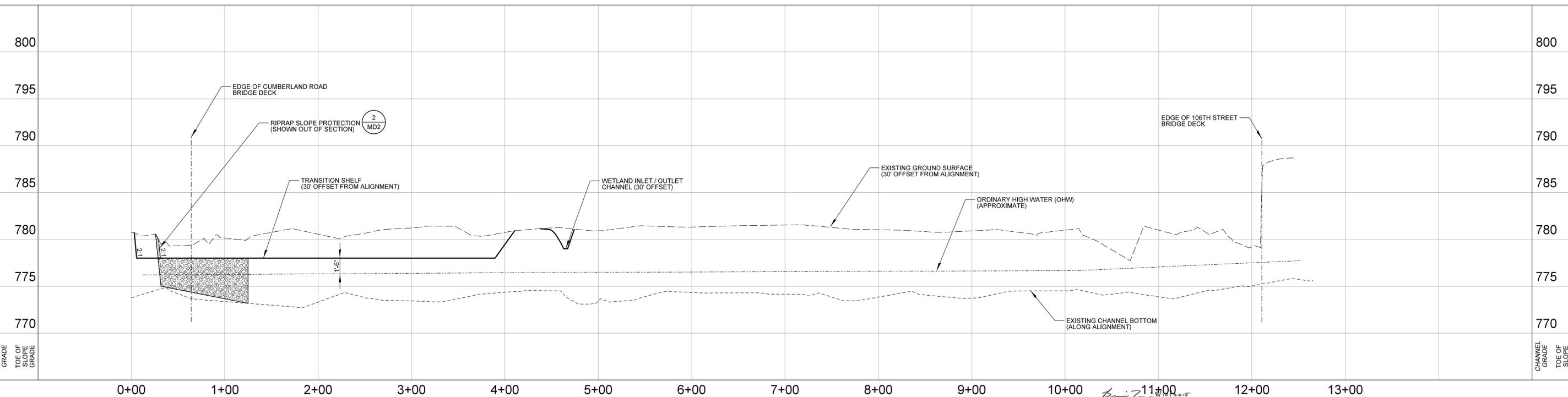
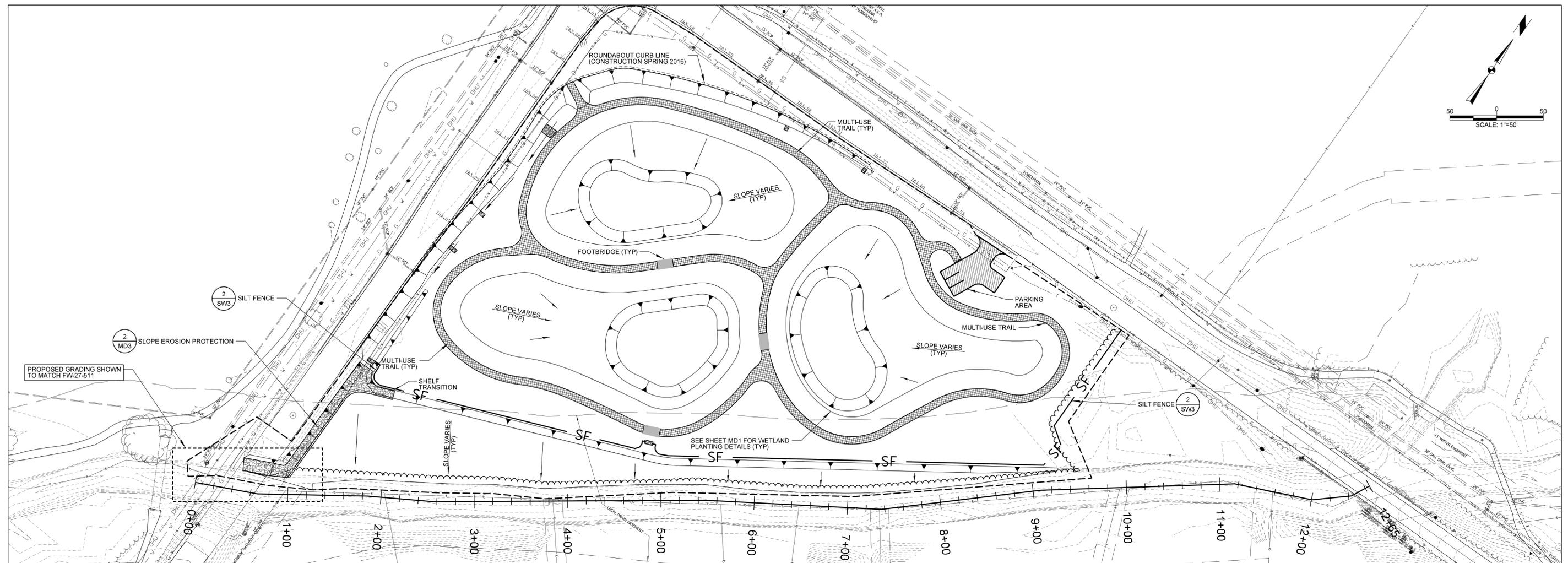
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1	8/10/15	ISSUED FOR BID	DATE:	8/3/2015

DESIGNER: **BJM**  
 DRAWN: **DJW**  
 CHECKED: **BWM**  
 SCALE: **AS NOTED**  
 DATE: **8/3/2015**

**BRIAN J. MEUNIER**  
 No. **PE11300321**  
 STATE OF INDIANA  
 PROFESSIONAL ENGINEER

TITLE: **SITE PLAN LAYOUT-  
 ALIGNMENT DATA**

PROJECT NO. **19.R140004.00000**  
 SHEET **4** OF **15**  
 DRAWING NO. **SP1**



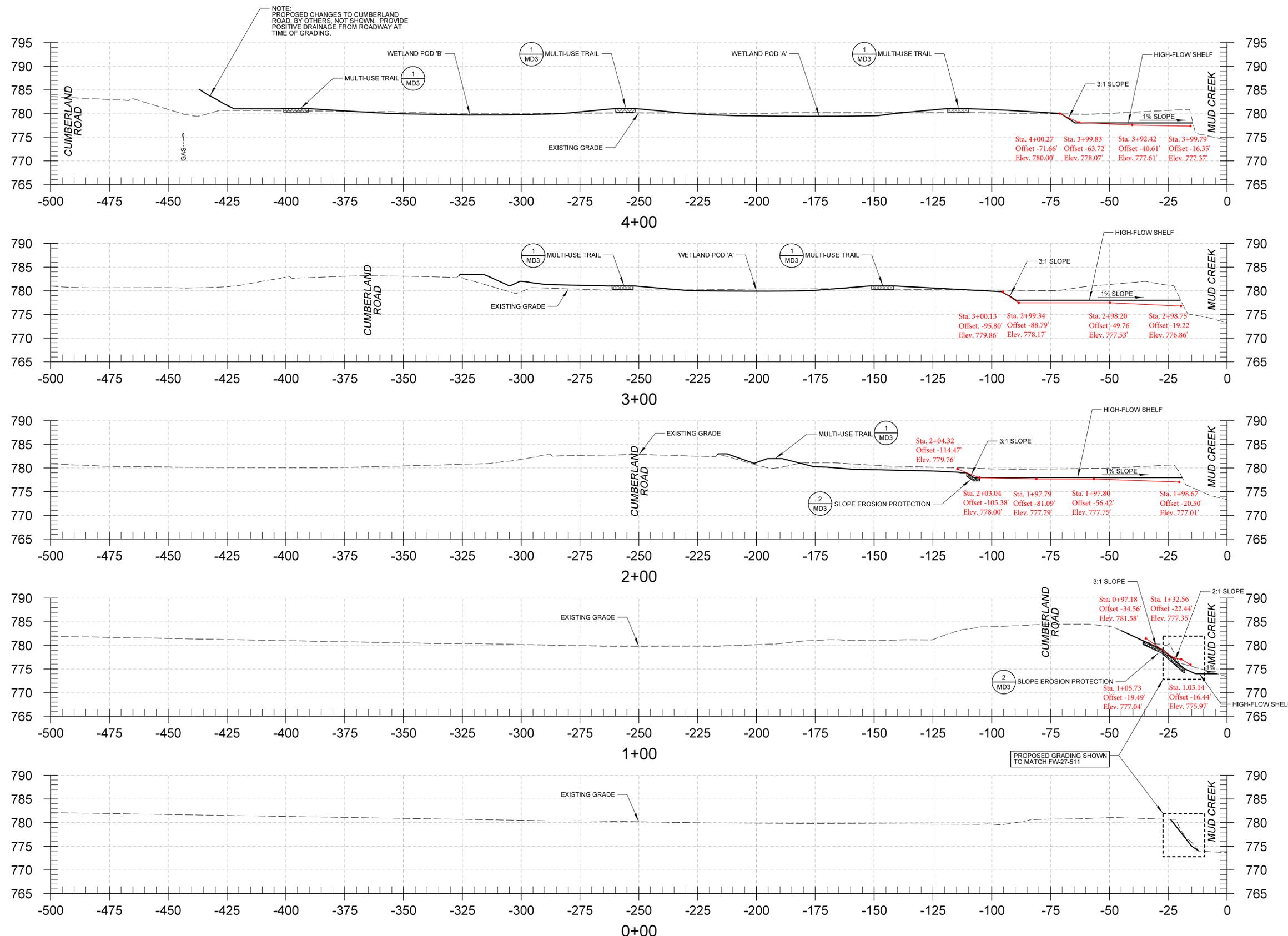
**CHRISTOPHER B. BURKE ENGINEERING, LLC**  
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PROJECT:  
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 HAMILTON COUNTY, INDIANA

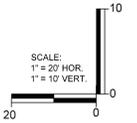
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1	8/10/15	ISSUED FOR BID	BJM	DATE:	8/3/2015
NO.	DATE	NATURE OF REVISION	CHKD.		
FILE NAME:	R:1201414-0004.00000\Work Hub\Design\IGN Plans\04-Issued for Bid\140004_PP1.dgn				

DESIGNER: BJM  
 DRAWN: DJW  
 CHECKED: BWM  
 DATE: 8/3/2015

TITLE: **PLAN AND PROFILE**  
 PROJECT NO. 19.R140004.00000  
 SHEET 5 OF 15  
 DRAWING NO. **PP1**



RECORD DRAWING INFORMATION  
 OF CONSTRUCTED PROJECT  
 COLLECTED DURING CONSTRUCTION  
 DATED 08/22/2016



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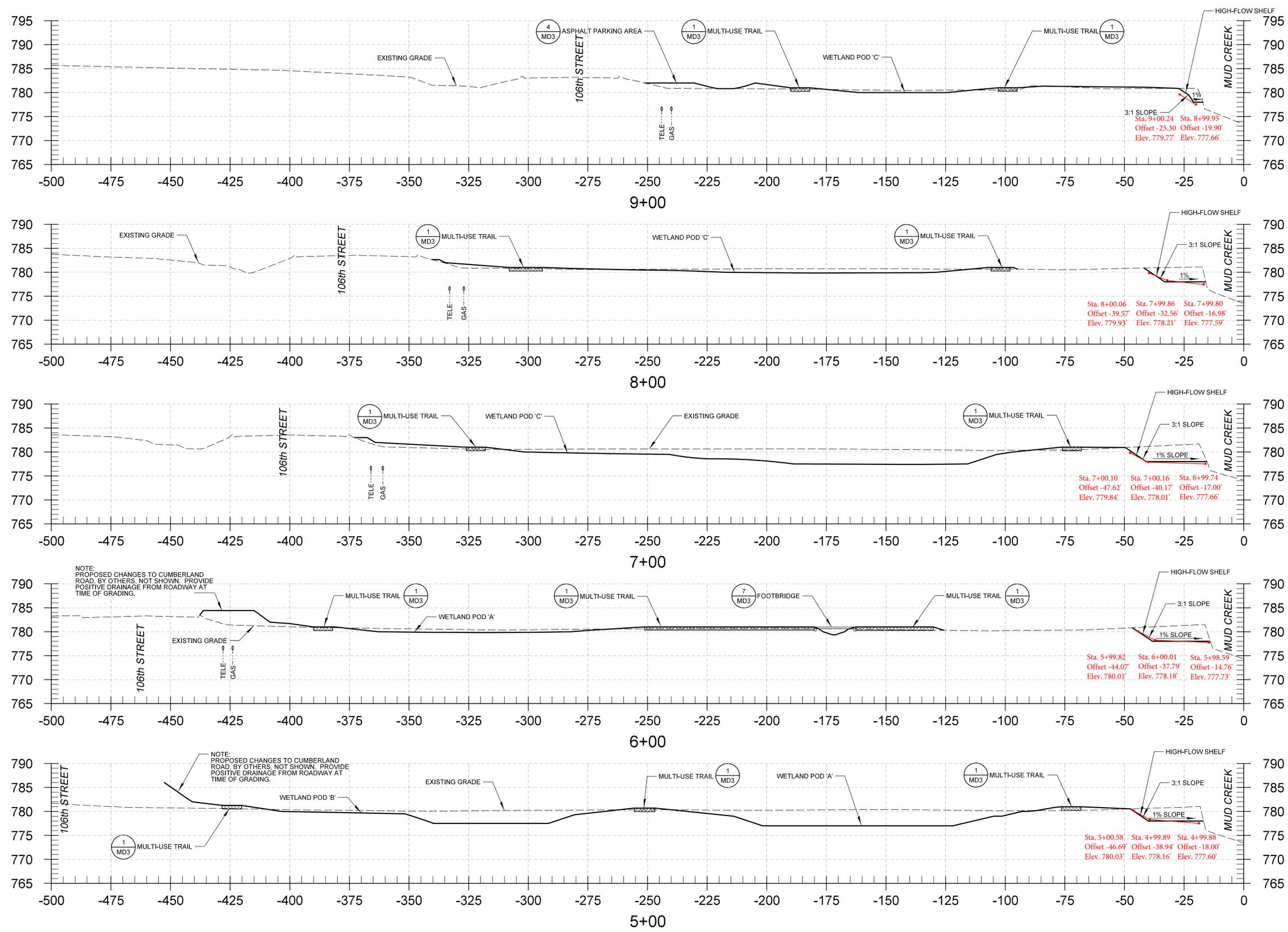
PROJECT:  
**MUD CREEK AT 106th STREET  
 HIGH-FLOW SHELF AND WETLAND**  
 HAMILTON COUNTY, INDIANA

NO.	DATE	ISSUED FOR BID	CHKD.	DATE	AS NOTED
1	8/10/15	ISSUED FOR BID	BJM	8/3/2015	
FILE NAME:		R:\2014\14-0004\0000\Work Hub\Design\IGN Plans\04-Issued for Bid\140004_XS1.dgn			

DESIGNER: **BJM**  
 DRAWN: **DJW**  
 CHECKED: **BWM**  
 DATE: 8/3/2015

**CROSS SECTIONS  
 STA. 0+00 TO STA. 4+00**

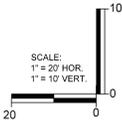
PROJECT NO. 19.R140004.00000  
 SHEET 6 OF 15  
 DRAWING NO. **XS1**



NOTE:  
 PROPOSED CHANGES TO CUMBERLAND  
 ROAD, BY OTHERS, NOT SHOWN. PROVIDE  
 POSITIVE DRAINAGE FROM ROADWAY AT  
 TIME OF GRADING.

NOTE:  
 PROPOSED CHANGES TO CUMBERLAND  
 ROAD, BY OTHERS, NOT SHOWN. PROVIDE  
 POSITIVE DRAINAGE FROM ROADWAY AT  
 TIME OF GRADING.

RECORD DRAWING INFORMATION  
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PROJECT:  
**MUD CREEK AT 106th STREET  
 HIGH-FLOW SHELF AND WETLAND**  
 HAMILTON COUNTY, INDIANA

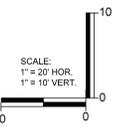
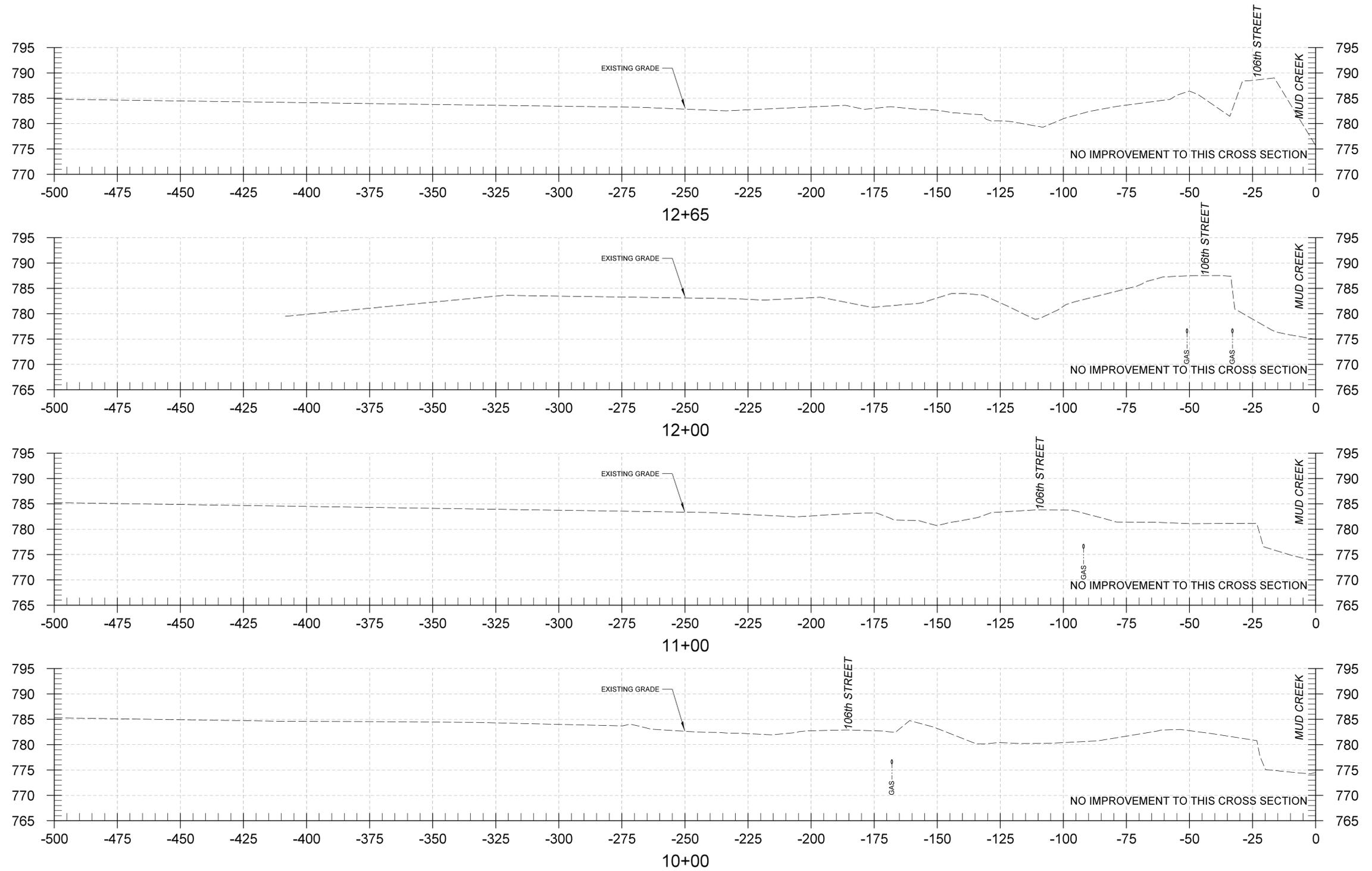
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1	8/10/15	ISSUED FOR BID		1	8/10/15	ISSUED FOR BID
FILE NAME:	R:\2014\14-0004\00000\Work Hub\Design\IGN Plans\04-Issued for Bid\140004_XS1.dgn					

DATE: 8/3/2015  
 SCALE: AS NOTED  
 DSGN. BY: BJM  
 DWN. BY: DJW  
 CHKD. BY: BWM



**CROSS SECTIONS  
 STA. 5+00 TO 9+00**

PROJECT NO. 19.R140004.00000  
 SHEET 7 OF 15  
 DRAWING NO. XS2

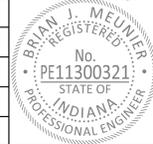


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PROJECT:  
**MUD CREEK AT 106th STREET  
 HIGH-FLOW SHELF AND WETLAND**  
 HAMILTON COUNTY, INDIANA

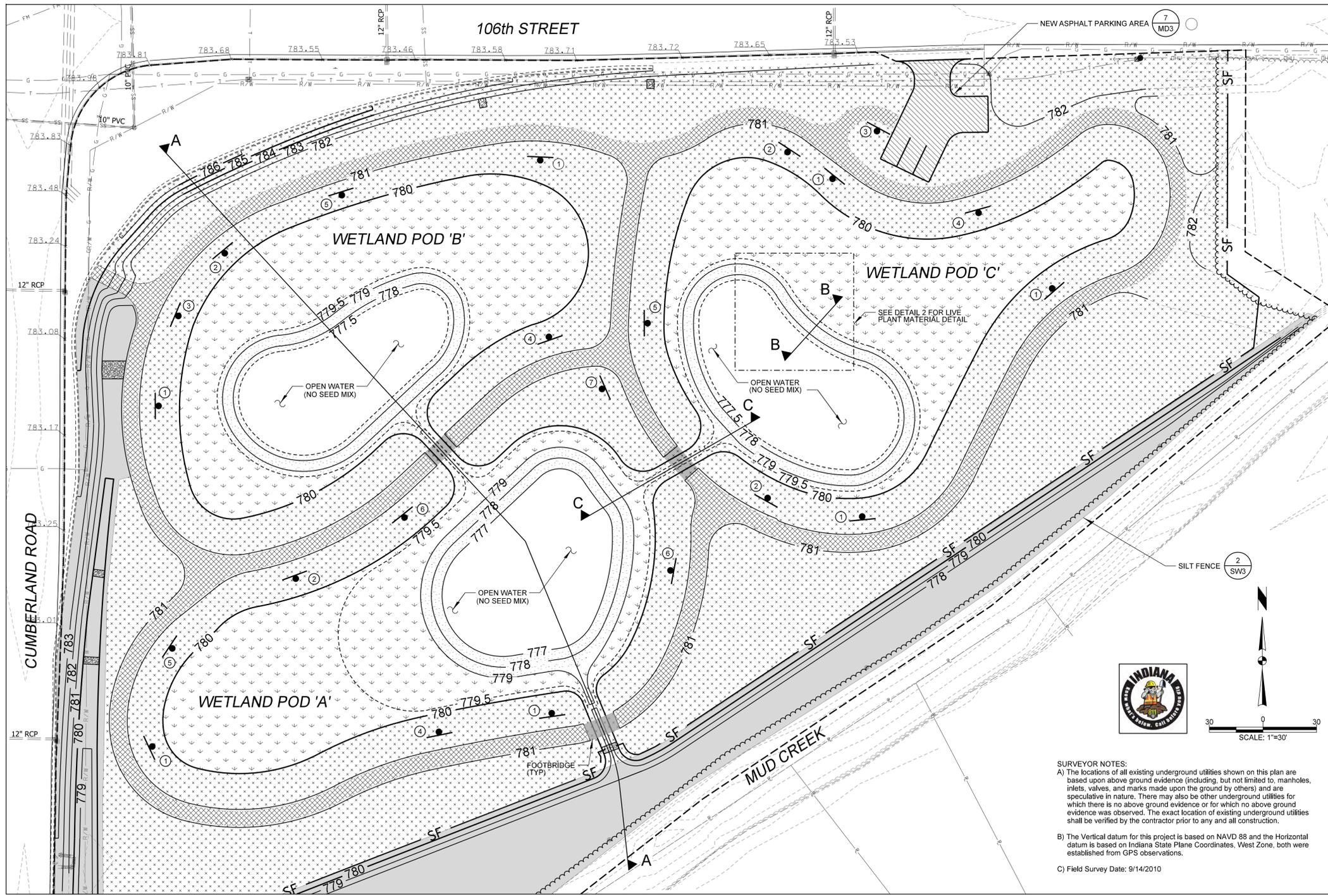
NO.	DATE	ISSUED FOR BID	NATURE OF REVISION	CHKD.	DATE
1	8/10/15	ISSUED FOR BID		BJM	8/3/2015

DSGN.	BJM
DWN.	DJW
CHKD.	BWM
SCALE:	AS NOTED
DATE:	8/3/2015



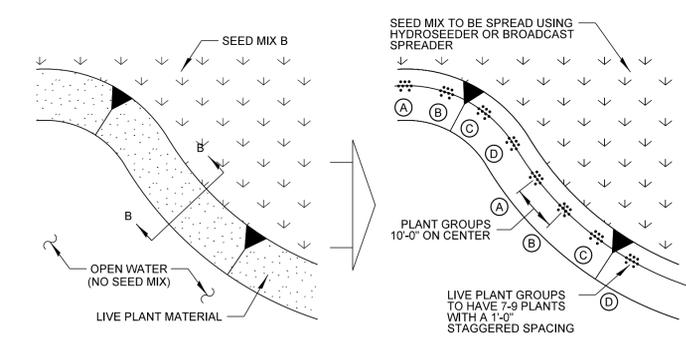
TITLE:  
**CROSS SECTIONS  
 STA. 10+00 TO 12+65**

PROJECT NO.  
 19.R140004.00000  
 SHEET 8 OF 15  
 DRAWING NO.  
**XS3**

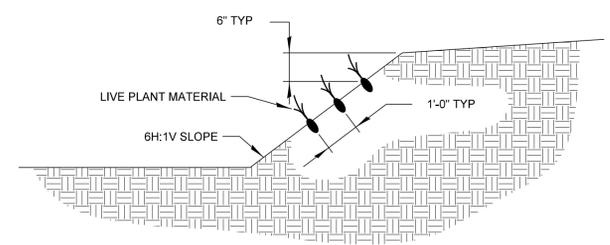


**LEGEND**

--- 612 ---	EXISTING CONTOUR	--- 611 ---	PROPOSED CONTOUR
⊕	MAG NAIL	⊕	EXISTING SPOT ELEVATION
⊕	TEMPORARY BENCHMARK	⊕	PROPOSED SPOT ELEVATION
⊕	GUY ANCHOR	SF	SILT FENCE
⊕	POWER POLE	→	FLOW ARROW
— OH —	OVERHEAD UTILITY	①	SIGN
▨	SEED MIX A	②	SIGN NUMBER, SEE SIGN SCHEDULE
▨	SEED MIX B	▨	NEW ASPHALT PARKING AREA
▨	SEED MIX C	▨	NEW ASPHALT MULT-USE TRAIL
▨	LIVE PLANT MATERIAL		

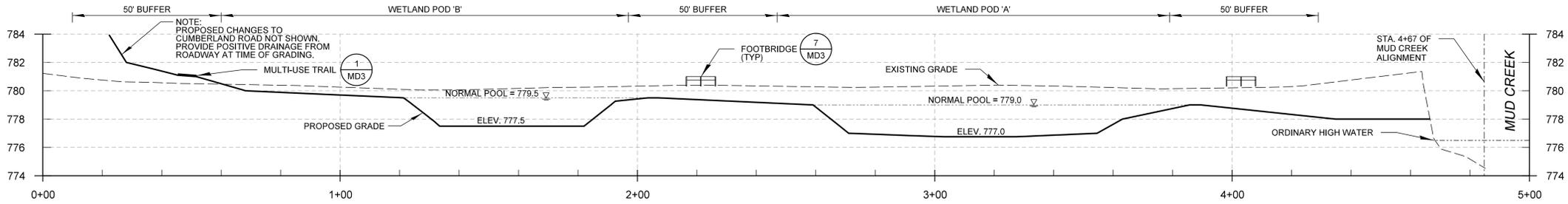


Group	Common Name	Scientific Name
A	Blue Flag	<i>Iris virginica shrevei</i>
B	White Water Lily	<i>Nymphaea alba</i>
C	Pickereel Weed	<i>Pontederia cordata</i>
D	Giant Burreed	<i>Sparganium eurycarpum</i>

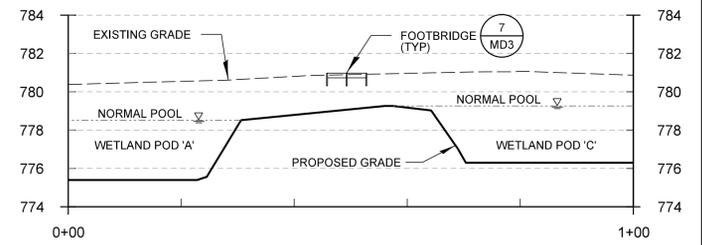


**2** LIVE PLANT MATERIAL DETAIL  
NOT TO SCALE

**SURVEYOR NOTES:**  
 A) The locations of all existing underground utilities shown on this plan are based upon above ground evidence (including, but not limited to, manholes, inlets, valves, and marks made upon the ground by others) and are speculative in nature. There may also be other underground utilities for which there is no above ground evidence or for which no above ground evidence was observed. The exact location of existing underground utilities shall be verified by the contractor prior to any and all construction.  
 B) The Vertical datum for this project is based on NAVD 88 and the Horizontal datum is based on Indiana State Plane Coordinates, West Zone, both were established from GPS observations.  
 C) Field Survey Date: 9/14/2010



**1** SECTION A-A  
NOT TO SCALE



**3** SECTION C-C  
NOT TO SCALE

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**MUD CREEK AT 106th STREET  
 HIGH-FLOW SHELF AND WETLAND**  
 HAMILTON COUNTY, INDIANA

NO.	DATE	ISSUED FOR	BY
1	8/10/15	ISSUED FOR BID	BJM
2			DJW
3			BWM
4			
5			
6			
7			
8			
9			
10			

**BRIAN J. MEUNIER**  
 No. PE11300321  
 STATE OF INDIANA  
 PROFESSIONAL ENGINEER

**WETLAND LAYOUT**  
 PROJECT NO. 19.R140004.00000  
 SHEET 9 OF 15  
 DRAWING NO. MD1

**Seed Mix A - Emergent Wetland Mix**

Common Name	Scientific Name	Ounces/Acre
<b>Grasses and Sedges:</b>		
Bristly Sedge	<i>Carex comosa</i>	4
Porcupine Sedge	<i>Carex hystericina</i>	2
Lund Sedge	<i>Carex lurida</i>	4
Fox Sedge	<i>Carex vulpinoidea</i>	5
Blunt Spike Rush	<i>Eleocharis obtusa</i>	2
Rice Cut Grass	<i>Leersia oryzoides</i>	2
Soft Rush	<i>Juncus effusus</i>	0.5
Hard-Stemmed Bulrush	<i>Scirpus acutus</i>	2
Dark Green Bulrush	<i>Scirpus atrovirens</i>	0.5
Softstem Bulrush	<i>Scirpus validus</i>	2
<b>Forbs:</b>		
Sweet Flag	<i>Acorus americanus</i>	2
Water Plantain	<i>Alisma subcordatum</i>	2
Marsh Milkweed	<i>Asclepias incarnata</i>	3
False Aster	<i>Boltonia latisquama</i>	2
Spotted Joe-Pye Weed	<i>Eupatorium maculatum</i>	2
Autumn Sneezeweed	<i>Helenium autumnale</i>	2
Swamp Rose Mallow	<i>Hibiscus palustris</i>	2
Blue Flag	<i>Iris virginica shrevei</i>	2
Cardinal Flower	<i>Lobelia cardinalis</i>	0.5
Great Blue Lobelia	<i>Lobelia siphilitica</i>	0.5
Water Horehound	<i>Lycopus americanus</i>	2
Monkeyflower	<i>Mimulus ringens</i>	1
Arrow Arum	<i>Peltandra virginica</i>	10
Ditch Stonecrop	<i>Penthorum sedoides</i>	1
Pickereel Weed	<i>Pontederia cordata</i>	6
Common Arrowhead	<i>Sagittaria latifolia</i>	2
Giant Burreed	<i>Sparganium eurycarpum</i>	4
Blue Vervain	<i>Verbena hastata</i>	2

**Seed Mix B**

Common Name	Scientific Name	Ounces/Acre
<b>Graminoids:</b>		
Big Bluestem	<i>Andropogon gerardii</i>	16
Canada Wild Rye	<i>Elymus canadensis</i>	32
Virginia Wild Rye	<i>Elymus virginicus</i>	12
Switchgrass	<i>Panicum virgatum</i>	4
Little Bluestem	<i>Schizachyrium scoparium</i>	32
Indian Grass	<i>Sorghastrum nutans</i>	16
<b>Forbs:</b>		
Smooth Aster	<i>Aster laevis</i>	1
New England Aster	<i>Aster novae-angliae</i>	2
White False Indigo	<i>Baptisia leucantha</i>	2
Wild Senna	<i>Cassia hebecarpa</i>	2
Tall Coreopsis	<i>Coreopsis tripteris</i>	2
Purple Coneflower	<i>Echinacea purpurea</i>	4
Rattlesnake Master	<i>Eryngium yuccifolium</i>	3
Sawtooth Sunflower	<i>Helianthus grosseserratus</i>	1
Western Sunflower	<i>Helianthus occidentalis</i>	1
False Sunflower	<i>Heliopsis helianthoides</i>	3
Prairie Blazing Star	<i>Liatris pycnostachya</i>	1
Bergamot	<i>Monarda fistulosa</i>	0.5
Foxglove Beardtongue	<i>Penstemon digitalis</i>	0.5
Purple Prairie Clover	<i>Petalostemum virginianum</i>	1
Prairie Cinquefoil	<i>Potentilla arguta</i>	1
Mountain Mint	<i>Fycnanthemum virginianum</i>	0.5
Yellow Coneflower	<i>Ratibida pinnata</i>	4
Black-Eyed Susan	<i>Rudbeckia hirta</i>	4
Sweet Black-Eyed Susan	<i>Rudbeckia submentosa</i>	3
Rosinweed	<i>Silphium integrifolium</i>	2
Compass Plant	<i>Silphium laciniatum</i>	2
Prairie Dock	<i>Silphium terebinthinaceum</i>	2
Stiff Goldenrod	<i>Solidago rigida</i>	2
Riddell's Goldenrod	<i>Solidago riddellii</i>	1
Tall Ironweed	<i>Vernonia altissima</i>	2
Culver's Root	<i>Veronicastrum virginicum</i>	0.5
<b>Temporary Cover:</b>		<b>Pounds/Acre</b>
Seed Oats	<i>Avena sativa</i>	60
Annual Rye Grass	<i>Lolium perenne</i>	60

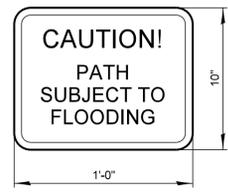
**Seed Mix C**

Common Name	Scientific Name	Pounds/Acre
<b>Graminoids:</b>		
Seed Oats	<i>Avena sativa</i>	60
Orchard Grass	<i>Dactylis glomerata</i>	12
Annual Rye Grass	<i>Lolium perenne</i>	60



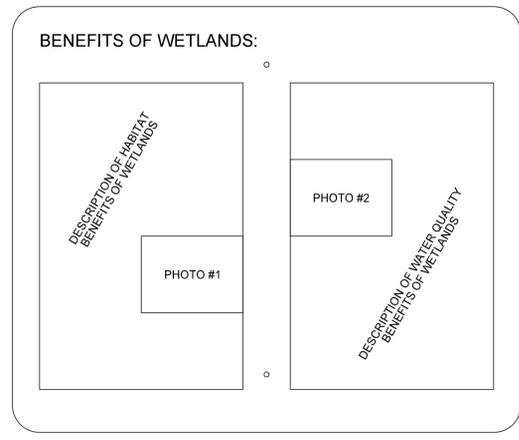
NOTE: REFLECTIVE METAL SIGN SHALL HAVE GREEN BACKGROUND W/ WHITE LETTERS

SIGN NO. 1

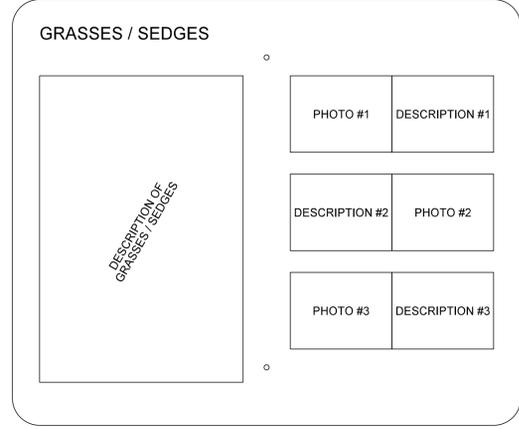


NOTE: REFLECTIVE METAL SIGN SHALL HAVE AMBER BACKGROUND W/ BLACK LETTERS

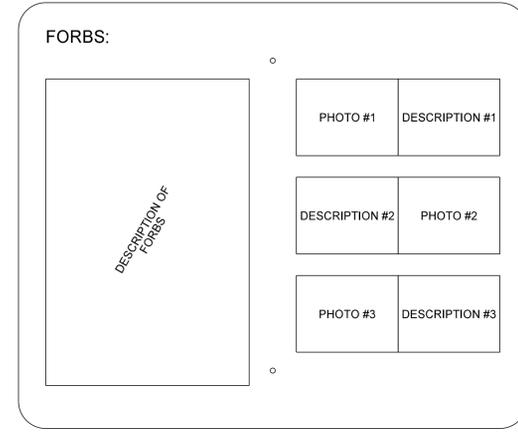
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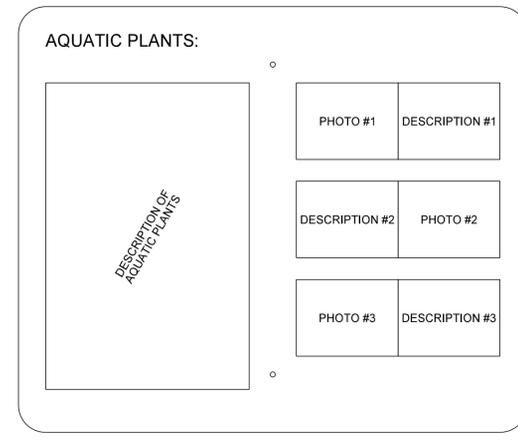
SIGN NO. 3



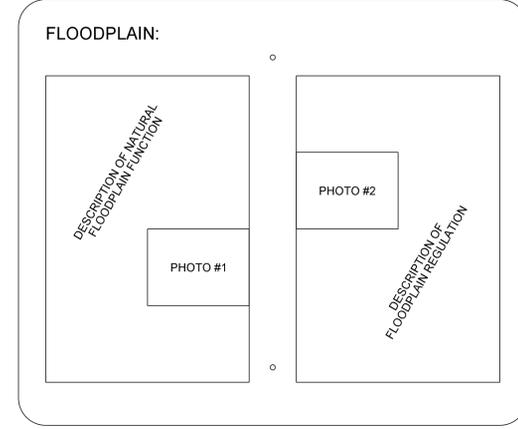
SIGN NO. 4



SIGN NO. 5



SIGN NO. 6



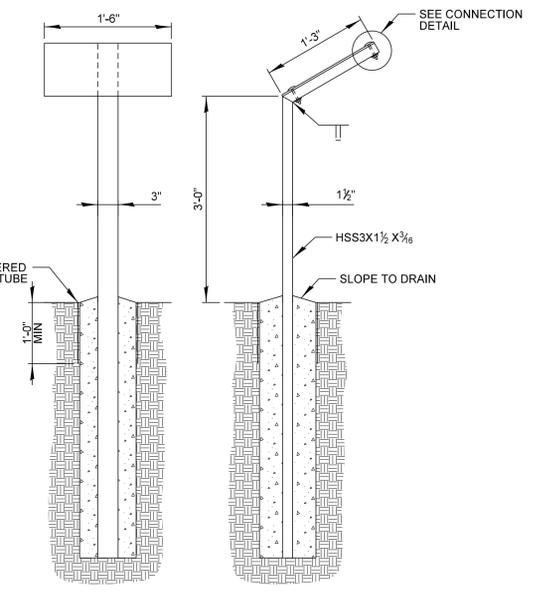
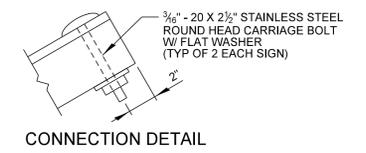
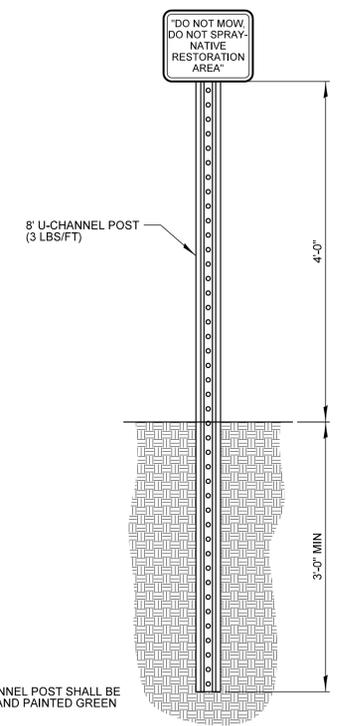
SIGN NO. 7

Sign No.	Sign Content	Mounting Type
1	Do Not Mow / Spray	A
2	Caution: Flooding	A
3	Benefits of Wetlands	B
4	Grasses / Sedges	B
5	Forbs	B
6	Aquatic Plants	B
7	Floodplain / Floodway	B

NOTE: THE SPECIFIC PHOTOS AND SIGN CONTENT WILL BE DETERMINED PRIOR TO WETLAND CONSTRUCTION AND WILL BE ADDRESSED IN AN ADDENDUM OR FIELD ORDER.

2 SIGN SCHEDULE & DETAILS NOT TO SCALE

3 SIGN MOUNTING TYPE 'A' NOT TO SCALE



4 SIGN MOUNTING TYPE 'B' NOT TO SCALE

1 SEED MIXES NOT TO SCALE

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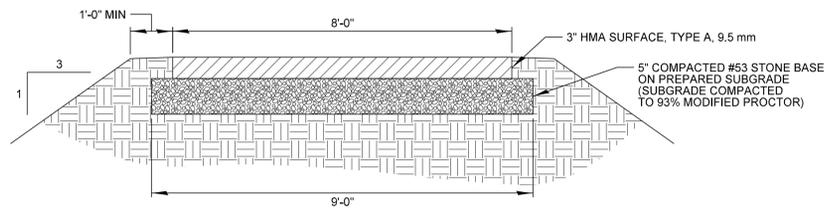
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DSGN.	BJM
DWN.	DJW
CHKD.	BWM
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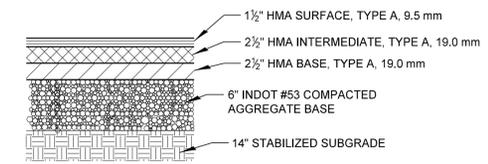
BRIAN J. MEUNIER  
 REGISTERED  
 No. PE11300321  
 STATE OF INDIANA  
 PROFESSIONAL ENGINEER

TITLE:  
**WETLAND AND SIGNAGE DETAILS**  
 PROJECT NO. 19.R140004.00000  
 SHEET 10 OF 15  
 DRAWING NO. MD2



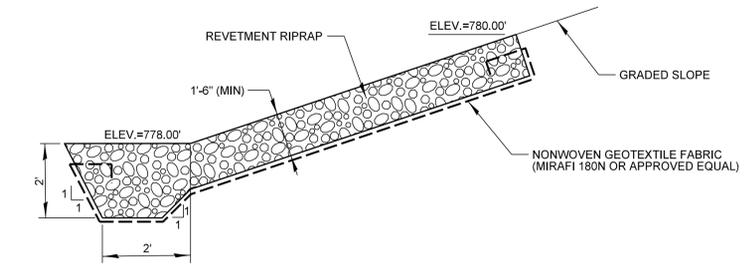
CITY OF FISHERS STANDARD DRAWING

**1 MULTI-USE TRAIL TYPICAL DETAIL**  
NOT TO SCALE

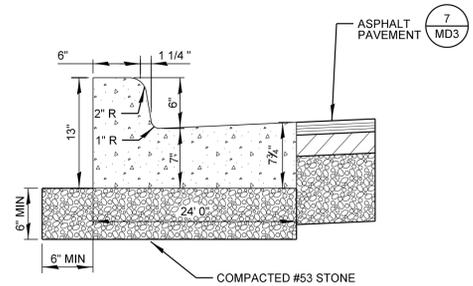


CITY OF FISHERS STANDARD DRAWING

**4 PARKING LOT ASPHALT**  
NOT TO SCALE

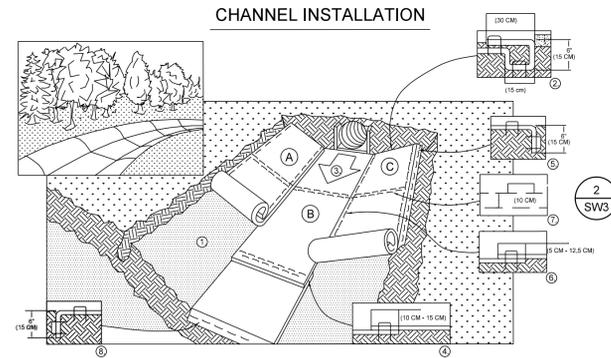


**2 SLOPE EROSION PROTECTION DETAIL**  
NOT TO SCALE



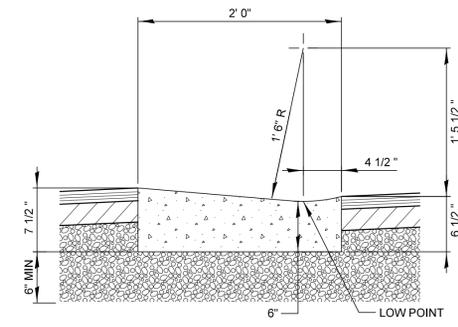
CITY OF FISHERS STANDARD DRAWING

**5 CURB & GUTTER**  
NOT TO SCALE



DETAIL SOURCE: NORTH AMERICAN GREEN

**3 TURF REINFORCEMENT MAT**  
NOT TO SCALE

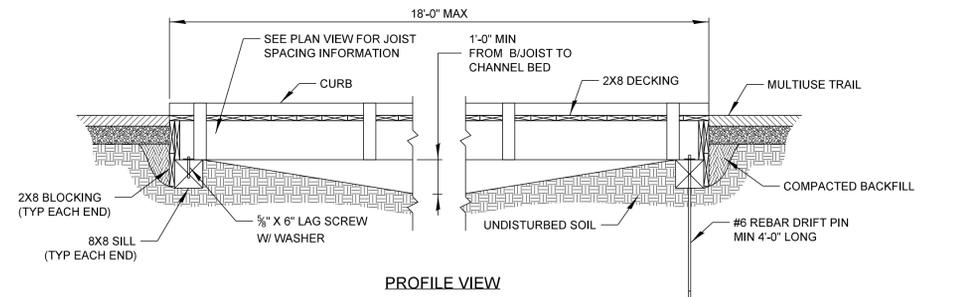


CITY OF FISHERS STANDARD DRAWING

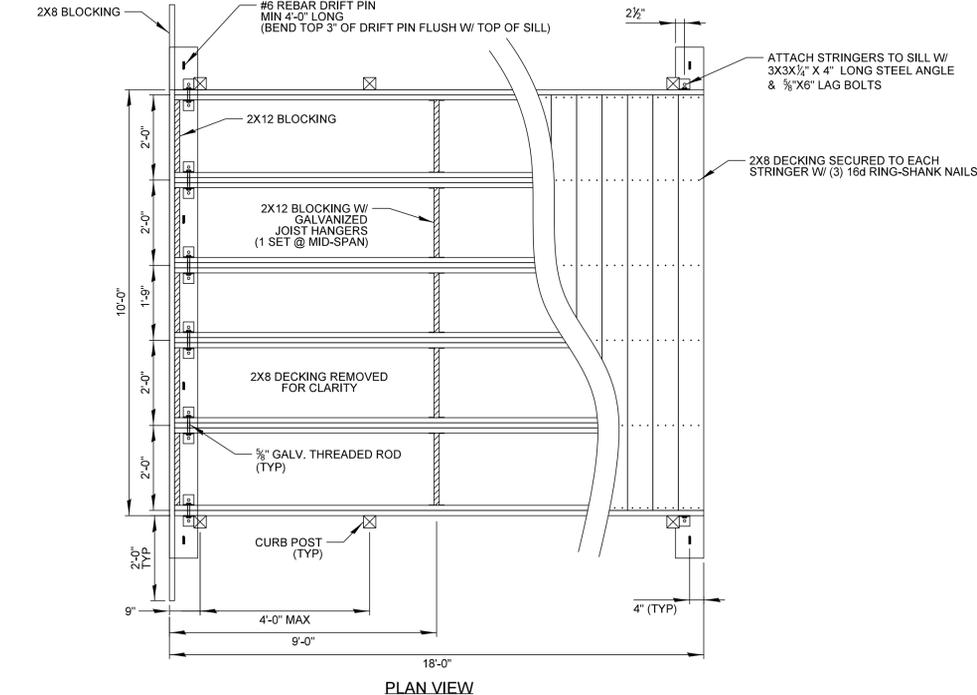
**6 VALLEY CURB**  
NOT TO SCALE

- LOADING & DESIGN CRITERIA:**
1. ANY MODIFICATIONS TO THIS PLAN MUST BE APPROVED BY ENGINEER
  2. GROUND SNOW LOAD:  $P_g = 70$  PSF (REDUCED IN COMBINATION WITH PEDESTRIAN LOAD)
  3. DECK LIVE LOAD: PEDESTRIAN (AASHTO) = 85 PSF
  4. STRINGER LIVE LOAD DEFLECTION LIMIT:  $L / 360$
  5. BRIDGE STRUCTURE SHALL MEET ADA REQUIREMENTS. MAXIMUM SPACING BETWEEN PLANKS MUST NOT EXCEED  $1/2$ " AFTER SEASONING.
- HARDWARE:**
1. ALL BOLTS, WASHERS, NUTS, AND MISCELLANEOUS METAL HARDWARE SHALL BE ASTM 307 HOT DIPPED GALVANIZED
  2. FASTENERS SHALL BE HOT DIPPED GALVANIZED RING SHANK NAILS OR WOOD SCREWS. DRIFT PINS SHALL BE DEFORMED NO. 6 REINFORCING BARS MEETING ASTM A615.
- GLUE:**
1. APPLY GLUE BETWEEN EACH LAMINATION USING A WATERPROOF EXTERIOR ADHESIVE COMPATIBLE WITH THE PRESERVATIVE TREATMENT SUCH AS PL-500 BY CONTECH, OR APPROVED EQUAL. APPLY  $3/8$ " CONTINUOUS BEAD @  $1 1/2$ " O.C.
- CONSTRUCTION:**
1. SILLS SHALL BEAR ON NATIVE SOIL OR LEDGE ROCK FREE FROM COMPRESSIBLE ORGANIC MATERIAL AND CAPABLE OF SUPPORTING THE BRIDGE UNDER FULL LOAD. PROVIDE UNIFORM BEARING UNDER ENTIRE LENGTH OF SILL.
  2. STRINGERS WITH CAMBER SHALL BE POSITIONED SO THAT THE CAMBER IS UP AND KNOTS NEAR THE EDGE WILL BE IN THE TOP HALF OF THE STRINGERS
  3. DECKING PLANKS SHALL BE LAID WITH THE HEART SIDE DOWN
  4. LAG BOLTS AND LAG SCREWS SHALL BE TIGHTENED UNTIL THE WOOD MATERIAL BEGINS TO COMPRESS.

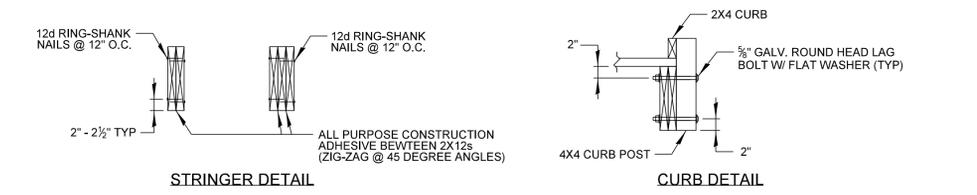
- LUMBER:**
1. LUMBER FOR STRINGERS, DECKING, CURB, POSTS, SILL AND BLOCKING SHALL BE NO. 2 (OR BETTER) PRESSURE TREATED SOUTHERN YELLOW PINE
  2. DRAWINGS ARE PREPARED USING S4S FINISHED DIMENSIONS UNLESS NOTED OTHERWISE. IF ROUGH SAWN LUMBER IS USED, ADJUST DIMENSIONS AS REQUIRED
  3. ALL LUMBER SHALL BE SAWN AND FABRICATED PRIOR TO PRESERVATIVE TREATMENT WITH RESPECTIVE PRESERVATIVE



PROFILE VIEW



PLAN VIEW



STRINGER DETAIL

CURB DETAIL

ADAPTED FROM THE U.S. FOREST SERVICE STANDARD PEDESTRIAN BRIDGE DETAILS.

**7 TYPICAL FOOTBRIDGE FRAMING DETAILS**  
NOT TO SCALE

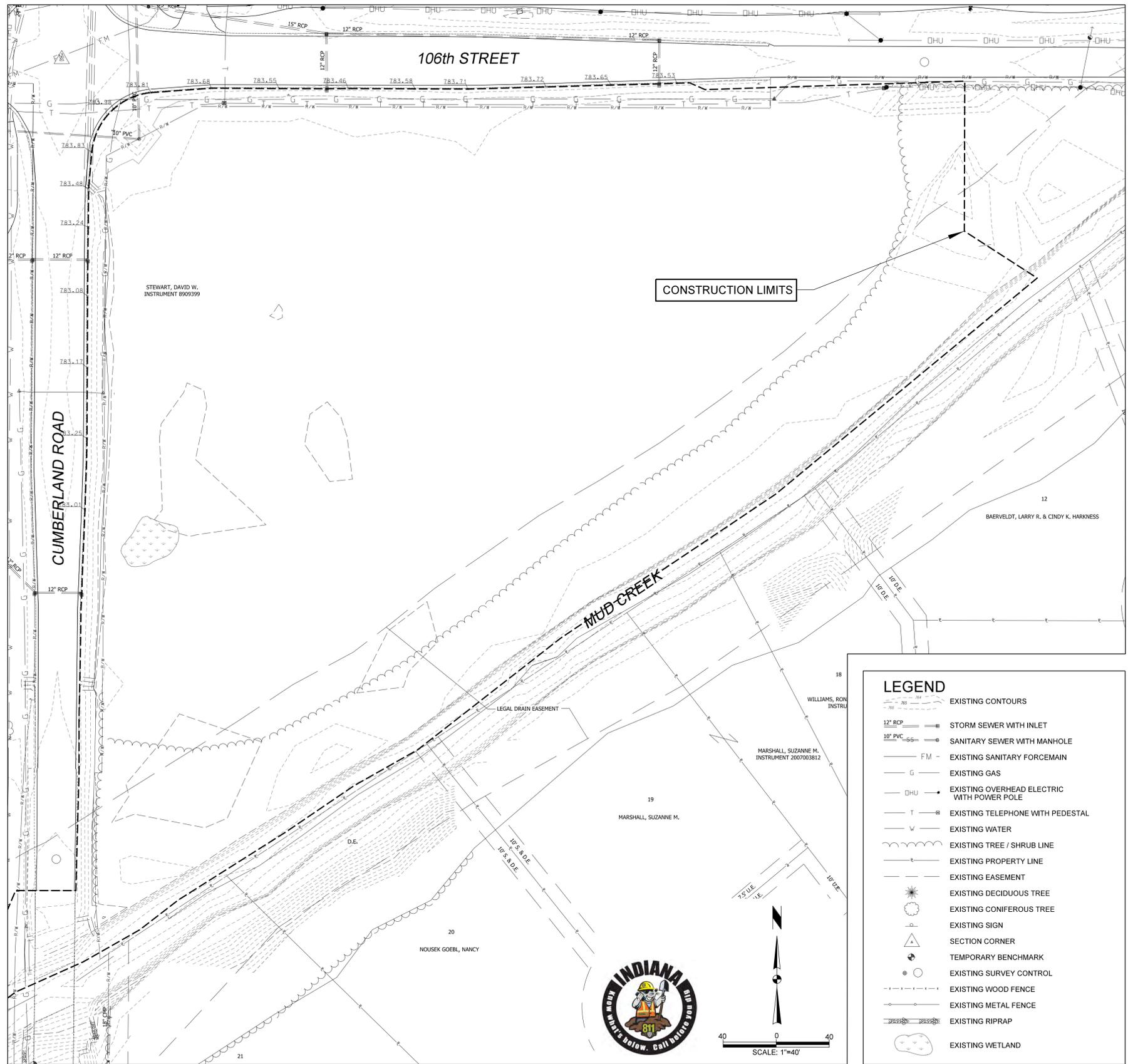
**CHRISTOPHER B. BURKE ENGINEERING, LLC**  
PNC Center, Suite 1368 South  
115 West Washington Street  
Indianapolis, Indiana 46204  
(317) 266-8000 FAX: (317) 632-3306

PROJECT:  
**MUD CREEK AT 106th STREET  
HIGH-FLOW SHELF AND WETLAND**  
HAMILTON COUNTY, INDIANA

NO.	DATE	ISSUED FOR BID	CHKD.	DATE	FILE NAME
1	8/10/15	ISSUED FOR BID	BJM		R:1201411-004-00000\Work Hub\Design\IGN Plans\04-Issued for Bid\140004_MD3.dgn
NATURE OF REVISION		SCALE:	AS NOTED	DATE:	8/3/2015

**BRIAN J. MEUNIER**  
REGISTERED  
No. PE11300321  
STATE OF INDIANA  
PROFESSIONAL ENGINEER

PROJECT NO. 19.R140004.00000  
SHEET 11 OF 15  
DRAWING NO. **MD3**  
**MISCELLANEOUS DETAILS**



EXISTING SITE



SOILS MAP

SOIL DESCRIPTION:

**Sh - Shoals silt loam**  
 This soil map unit occurs in flood plains. Shoals and similar soils make up 90 percent of soil composition. This somewhat poorly drained soil has a moderate permeability, low shrink-swell potential, and high potential for frost action. The surface runoff is slow. Organic matter content is moderate. The available water capacity is high. The potential for corrosion is high for steel and low for concrete.  
 Based on soil properties, the Shoals soils are rated somewhat to very limited which signifies that the soil has properties that are moderately favorable for the specified use and the limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. The soil also has properties that are unfavorable for the specified use and the limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected. The Shoals soils are very limited for shallow excavations due to depth of saturated zone, flooding and unstable excavation walls. Shoal soils are very limited for use as pond reservoir area due to seepage. Shoal soils are somewhat limited for paths and trails due to depth to saturated zone, flooding and dust.

**We - Westland silty clay loam**  
 This soil map unit occurs in depressions on outwash plains. This poorly drained soil has slow permeability, moderate shrink-swell potential, and high for frost action. The surface runoff is ponded or is very slow. Organic matter content is high. The available water capacity is high. The potential for corrosion is high for steel and low for concrete.  
 Based on soil properties, the Westland soils are very limited which signifies that the soil has properties that are unfavorable for the specified use and the limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected. Westland soils are very limited for shallow excavations due to depth to saturated zone, ponding, and unstable excavation walls. Westland soils are very limited for use as pond reservoir area due to seepage. Westland soils are very limited for paths and trails due to depth to saturated zone, ponding, and dust.

PROJECT DESCRIPTION

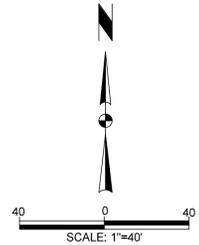
The purpose of the project will be to construct an upstream channel transition necessary for the future implementation of improvements to the Cumberland Road Bridge crossing, as well as the addition of wetland and multiuse trail features on the adjacent parcel. The channel transition consists of a shelf in the right channel bank having the following approximate dimensions: 840± foot length, 4-foot depth, width tapering from 0 feet to approximately 90 feet. The channel transition also includes scour protection measures. Another component of the construction will be the construction of several plots for the future installation of wetland plantings. Minor grading adjustments are planned to promote an environment suitable for the planned wetland types. A multiuse trail that passes around the perimeter and between the wetland plots and an observation platform are also included.

PERSON ON-SITE RESPONSIBLE FOR EROSION AND SEDIMENT CONTROL

Kenton Ward, Surveyor  
 1 Hamilton County Square  
 Noblesville, Indiana 46060  
 (317) 776-8495

**LEGEND**

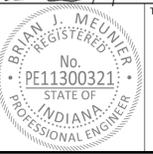
- - - - - EXISTING CONTOURS
- 12" RCP - - - - - STORM SEWER WITH INLET
- 10" PVC - - - - - SANITARY SEWER WITH MANHOLE
- - - - - F.M. - EXISTING SANITARY FORCEMAIN
- - - - - G - EXISTING GAS
- - - - - DHU - EXISTING OVERHEAD ELECTRIC WITH POWER POLE
- - - - - T - EXISTING TELEPHONE WITH PEDESTAL
- - - - - W - EXISTING WATER
- - - - - EXISTING TREE / SHRUB LINE
- - - - - EXISTING PROPERTY LINE
- - - - - EXISTING EASEMENT
- ☀ - EXISTING DECIDUOUS TREE
- 🌲 - EXISTING CONIFEROUS TREE
- ⚠ - EXISTING SIGN
- △ - SECTION CORNER
- ⊙ - TEMPORARY BENCHMARK
- ⊙ - EXISTING SURVEY CONTROL
- - - - - EXISTING WOOD FENCE
- - - - - EXISTING METAL FENCE
- - - - - EXISTING RIPRAP
- ☁ - EXISTING WETLAND



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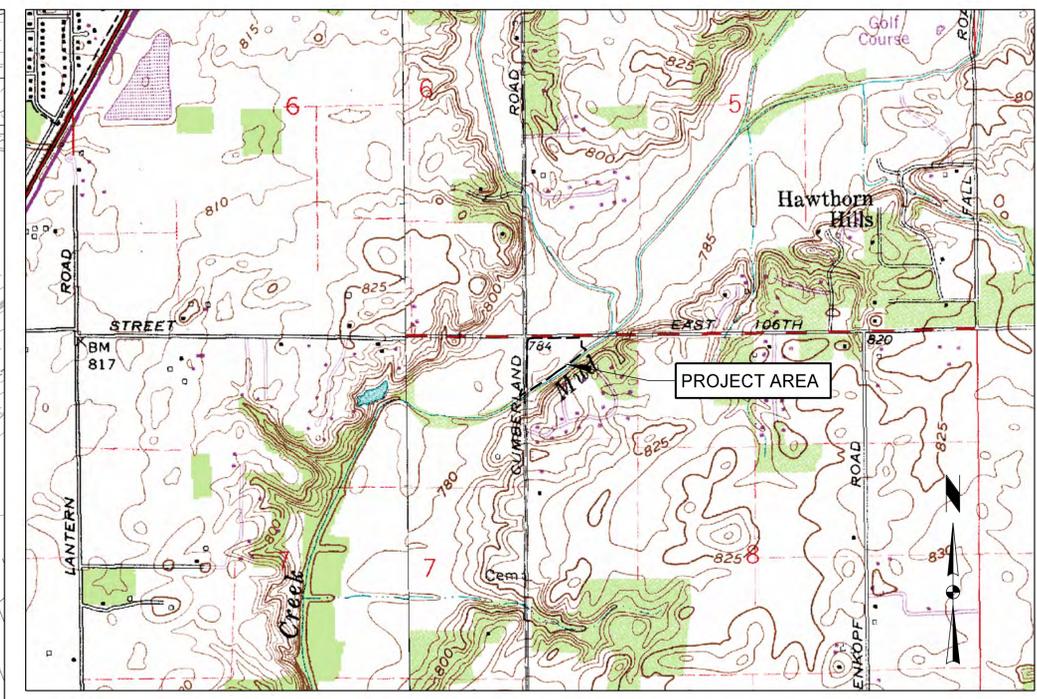
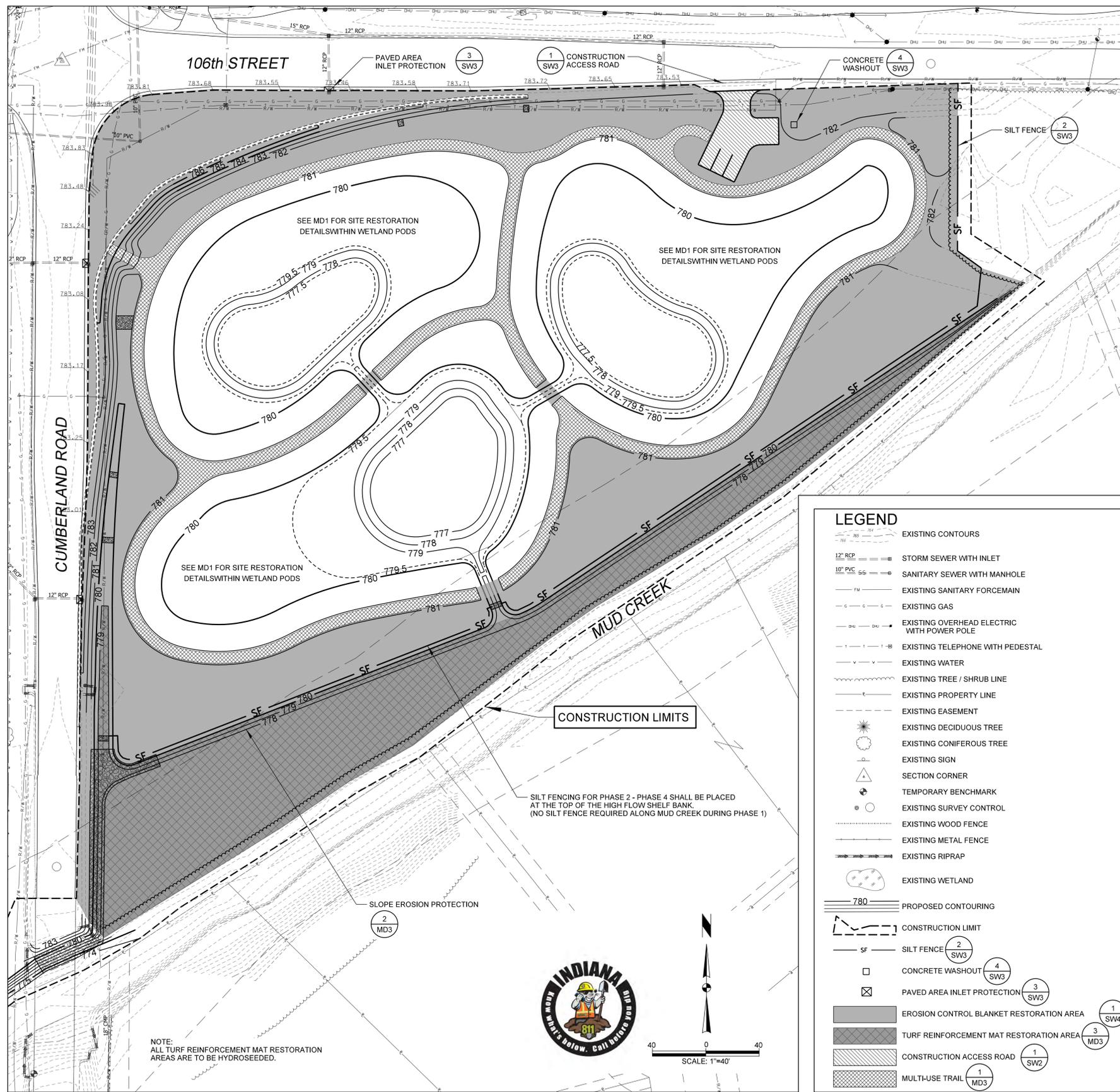
PROJECT:  
**MUD CREEK AT 106th STREET  
 HIGH-FLOW SHELF AND WETLAND**  
 HAMILTON COUNTY, INDIANA

NO.	DATE	ISSUED FOR BID	BJM	CHKD.
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FILE NAME:		R:\2014\14-0004\00000\Work Hub\Design\Design Plans\04-Issued for Bid\140004_SW1.dgn		



**STORMWATER POLLUTION  
 PREVENTION PLAN  
 EXISTING CONDITIONS**

PROJECT NO.  
 19.R140004.00000  
 SHEET 12 OF 15  
 DRAWING NO.  
**SW1**



CHECKLIST

- Part A - Assessment of Construction Plan Elements**
- A1 A plan index is hereby provided.
  - A2 A vicinity map, in lieu of a reduced sized plat, is provided on Cover Sheet.
  - A3 The purpose of the project will be to construct an upstream channel transition necessary for the future implementation of improvements to the Cumberland Road Bridge crossing, as well as the addition of wetland and multiuse trail features on the adjacent parcel.
  - A4 A vicinity map is provided on Sheet SW1.
  - A5 The project site is located in the northwest quarter section of Section 8, Township 17 North, Range 5 East, in Fall Creek Township, Hamilton County, Indiana - LAT: 39°56'24"; LONG: -86°59'42".
  - A6 Refer to Sheet SP1 for the location of proposed site modifications.
  - A7 14-digit Hydrologic Unit Code: 05120201110040.
  - A8 The following permits will be required for this project: the Indiana Department of Natural Resources (Construction in a Floodway Submittal), the Indiana Department of Environmental Management (401 and Rule 5 Submittal), the U.S. Army Corps of Engineers (404), the Hamilton County Surveyor's Office (Stormwater Permit), the Hamilton County Soil and Water Conservation District (Rule 5 Submittal). The permitting authority for the Rule 5 permit submittal is the Indiana Department of Environmental Management (IDEM), under the authority of the Environmental Protection Agency (EPA).
  - A9 Stormwater from the construction areas will drain into Mud Creek.
  - A10 Waterway adjacent to the site: Mud Creek.
  - A11 Mud Creek is the receiving waters for this project.
  - A12 There are no known potential discharges to groundwater.
  - A13 The project site is within the floodway as shown on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for Hamilton County, Indiana and Incorporated Areas, Map Number 18057C0255F, effective date February 19, 2003.
  - A14 The peak 10-year and 100-year discharges from the site will not change significantly due to land use or surface cover.
  - A15 Land uses adjacent to the construction site are as follows:  
North - Commercial areas and recreational open space  
South - Residential areas  
East - Residential areas  
West - Residential areas and recreational open space
  - A16 Refer to Sheet SP1 for the location and limits of all disturbed areas.
  - A17 The existing vegetative cover is primarily grass and lightly wooded areas.
  - A18 Refer to Sheet SW1 for soils map and descriptions.
  - A19 The stormwater system consists of a shelf along the north bank of Mud Creek, as well as a small open-channel connection to constructed wetlands.
  - A20 Spoil material resulting from the work shall be stockpiled at an offsite location. The location and extent of the stockpile shall be the responsibility of CONTRACTOR. CONTRACTOR shall comply with all state and federal requirements when stockpiling spoil materials.
  - A21 CONTRACTOR shall not stockpile any material on-site overnight, or during non-working hours. CONTRACTOR shall provide to OWNER a site layout and copies of all required permit approvals for any offsite stockpile or laydown areas.
  - A22 Existing elevations are found on Sheet EX1, SP1, PP1, XS1-XS3, and MD1.
  - A23 Proposed elevations are found on Sheet SP1, PP1, XS1-XS3, and MD1.
- Part B - Stormwater Pollution Prevention Plan - Construction Component**
- B1 Pollutant sources associated with construction activities are: eroded soils and sediments, oils, greases, coolants, petroleum fuels and other fluids associated with the operation of construction machinery, and fertilizers associated with seeding and planting.
  - B2 Refer to Sheet SW4 for a sequence describing stormwater quality measure implementation relative to land disturbing activities.
  - B3 Refer to Sheets SW2 and SW3 for the stable construction entrance location and specifications.
  - B4 Proposed sediment control measures include: silt fencing.  
Refer to Sheets SW2 and SW3 for locations, details, and specifications for sediment control measures under sheet flow conditions.
  - B5 Proposed sediment control measure include: Riprap, TRM, and ECB.  
Refer to Sheets SW2, SW3, SW4 for locations, details and specifications for sediment control measures under concentrated flow.
  - B6 Storm sewer inlet protection measures are detailed on Sheet SW3.
  - B7 Proposed runoff control measures included: Silt fence, Riprap, TRM and ECB.  
Refer to Sheets SW2, SW3, and SW4 for locations, details and specifications for runoff control measures.
  - B8 Stormwater outlet protection measures are detailed on Sheets SW2, SW3, and SW4.
  - B9 Grade stabilization structures are not proposed for this project.
  - B10 Refer to Sheets SW2 through SW4 for locations, details, dimensions, and specifications for each stormwater quality measure.
  - B11 Refer to Sheets SW2 and SW3 for temporary surface stabilization methods.
  - B12 Refer to Sheets SW2, SW3 and SW4 for permanent surface stabilization methods.
  - B13 The contractor shall provide a stone surface material staging area. All liquid material shall be stored in a weather-proof, vandalism-resistant enclosure or removed from the site during non-work hours. An on-site fueling area shall be designated away from drainage channels and inlets that would permit the rapid movement of spilled fuel to adjacent waterways. If more than 200 gallons of fuels is stored on-site, appropriate temporary containment facilities shall be installed to prevent mitigation of spills. All materials shall be handled, applied, and disposed in strict accordance with manufacturer's recommendations. Any accidents and spills must be immediately reported to the Indiana Department of Environmental Management by dialing their emergency line: (888)-233-7745 as well as appropriate Hamilton County emergency officials. CONTRACTOR shall begin cleanup of a spill immediately in a manner approved by IDEM. For the purpose of a spill, the contractor is considered the permittee in charge of the site during the time of the spill throughout the construction period.
  - B14 Refer to Sheets SW3 and SW4 for monitoring and maintenance guidelines for each proposed stormwater quality measure.
  - B15 Erosion and sediment control specifications for individual building lots are not applicable for this project.
- Part C - Stormwater Pollution Prevention Plan - Post Construction Component**
- C1 The pollutant sources associated with the proposed land use include, but are not limited to, eroded soils and sediments, trash from littering and other types of improper disposal or storage.
  - C2 Refer to Sheet SW4 for the sequence of the installation of the post-construction stormwater quality measures.
  - C3 The post-construction stormwater quality measures include a dense vegetative cover over all disturbed areas. Non-impervious areas will be permanently seeded. Refer to Sheets SW2 and SW4 for post-construction stormwater quality measures.
  - C4 Refer to Sheets SW2 and SW4 for locations, details, dimensions, and specifications for each post-construction stormwater quality measure.
  - C5 Refer to Sheet SW4 for maintenance guidelines for post-construction stormwater quality measures. The owner will be responsible for future long-term maintenance.

**LEGEND**

	EXISTING CONTOURS
	STORM SEWER WITH INLET
	SANITARY SEWER WITH MANHOLE
	EXISTING SANITARY FORCEMAIN
	EXISTING GAS
	EXISTING OVERHEAD ELECTRIC WITH POWER POLE
	EXISTING TELEPHONE WITH PEDESTAL
	EXISTING WATER
	EXISTING TREE / SHRUB LINE
	EXISTING PROPERTY LINE
	EXISTING EASEMENT
	EXISTING DECIDUOUS TREE
	EXISTING CONIFEROUS TREE
	EXISTING SIGN
	SECTION CORNER
	TEMPORARY BENCHMARK
	EXISTING SURVEY CONTROL
	EXISTING WOOD FENCE
	EXISTING METAL FENCE
	EXISTING RIPRAP
	EXISTING WETLAND
	PROPOSED CONTOURING
	CONSTRUCTION LIMIT
	SILT FENCE
	CONCRETE WASHOUT
	PAVED AREA INLET PROTECTION
	EROSION CONTROL BLANKET RESTORATION AREA
	TURF REINFORCEMENT MAT RESTORATION AREA
	CONSTRUCTION ACCESS ROAD
	MULTI-USE TRAIL

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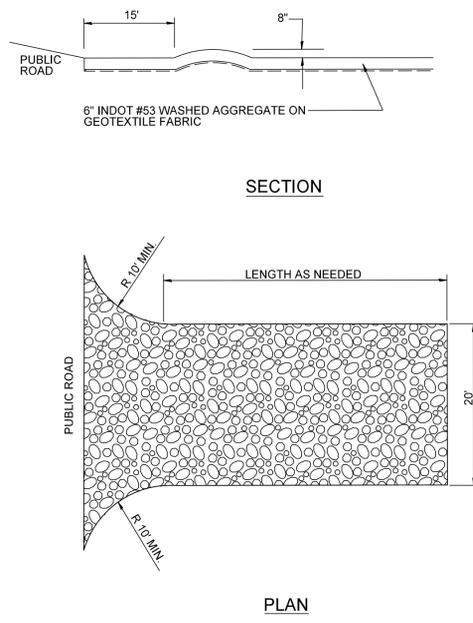
PROJECT:  
**MUD CREEK AT 106th STREET  
 HIGH-FLOW SHELF AND WETLAND**  
 HAMILTON COUNTY, INDIANA

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		NATURE OF REVISION			



**STORMWATER POLLUTION  
 PREVENTION PLAN  
 PROPOSED CONDITIONS**

PROJECT NO. 19.R140004.00000  
 SHEET 13 OF 15  
 DRAWING NO. SW2



**STABILIZED CONSTRUCTION ACCESS ROAD**

**Requirements:**

- Construction entrance material shall be 6 inches of washed stone (INDOT No. 53) on geotextile fabric.
- Construction entrance width shall be 20-foot minimum or full width of entrance/exit, whichever is greater.
- Construction entrance shall have a minimum length of 50-feet.

**Installation:**

- Avoid locating on steep slopes or at curves in public roads.
- Remove all vegetation and questionable material from the foundation area, and grade and crown for positive drainage.
- If slope towards road exceeds 2%, construct a 6-8-inch high water bar (ridge) with 3:1 side slopes across the foundation area about 15-feet from the entrance to divert runoff away from the road.
- Install pipe under pad if needed to maintain proper public road drainage.
- Geotextile underliner fabric shall be installed on the graded foundation.
- Place stone to dimensions and grade shown on plans, leaving surface smooth and sloped for drainage.
- Divert all surface runoff and drainage from the stone pad to a sediment trap or basin.

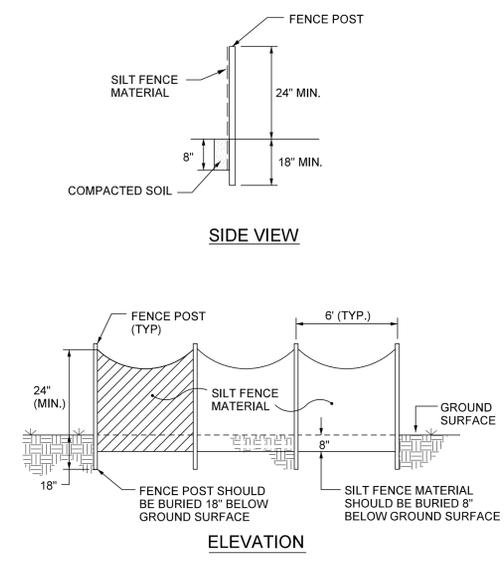
**Maintenance:**

Inspect construction access road weekly and after each storm event or heavy use. Reshape as needed for drainage and runoff control. Topdress with clean stone as needed. Immediately remove mud and sediment tracked or washed into public roads by brushing or sweeping. Flushing should only be used if the water is conveyed into a sediment trap or basin. Repair any broken road pavement immediately.

**Post-Construction:**

Remove construction access road stone and geotextile after construction activities have been completed and approved by the Onsite Representative or Owner. Restore all disturbed area to pre-construction conditions to the satisfaction of ownership. This may require topsoil placement and grading, and seeding. Equipment should remain onsite to accomplish this to the satisfaction of ownership.

1 CONSTRUCTION ACCESS ROAD  
NOT TO SCALE



**SILT FENCING**

**Requirements:**

- Fence posts shall be buried 18-inches minimum below the ground surface.
- Fence posts shall be spaced at a maximum of 6-feet laterally.
- Silt fence fabric shall be buried 8-inches minimum below the ground surface.
- Fence post shall have a minimum height above the ground surface of 24-inches.

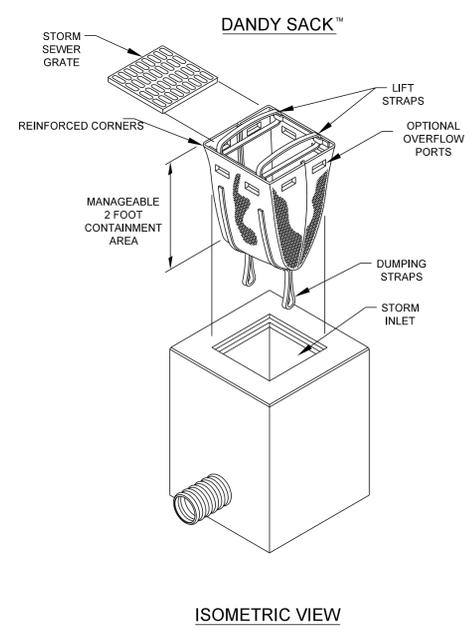
**Installation:**

- Dig an 8-inch deep trench along proposed fence line (a trenching machine is needed on long runs).
- Pound stake in trench 18-inches minimum. Be sure to stretch fabric taut when pounding stakes. (Note: Stake must be on the downhill or downstream side of the fence).
- Drape loose end of geotextile into trench.
- Backfill and compact soil on both sides.

**Maintenance:**

Inspect the silt fence periodically and after each storm event. If fence fabric tears, starts to decompose, or in any way becomes ineffective, replace the affected portion immediately. Remove deposited sediment when it reaches half the height of the fence at its lowest point or is causing the fabric to bulge. Take care to avoid undermining the fence during cleanout. After the contributing drainage area has been stabilized, remove the fence and sediment deposits, bring the disturbed area to grade and stabilize.

2 SILT FENCE DETAIL  
NOT TO SCALE



**PAVED AREA INLET PROTECTION**

**Requirements:**

- The inlet protection unit shall be a sewn geotextile fabric unit.
- The unit shall have lifting straps to allow removal of the unit and manual inspection of the storm water system.

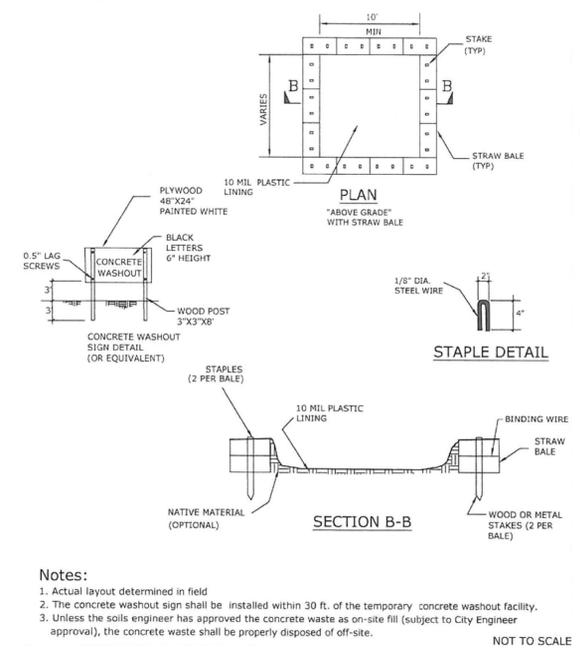
**Installation:**

- Remove the grate from the inlet and stand on end.
- Move the top lifting straps out of the way and place the grate into the Dandy Sack in a manner so that the grate is below the top straps and above the lower straps.
- Insert the grate into the inlet using the lifting straps.

**Maintenance:**

Inspect the unit after each storm event and on a weekly basis. All accumulated sediment and debris around the unit are to be removed after each storm event. Empty the unit if the containment area is more than 1/3 full of sediment. To empty, utilize the lifting straps to lift the unit out of the inlet. Remove the grate. Transport the unit to an appropriate location for removal of the contents. Reinstall unit as described above.

3 PAVED AREA INLET PROTECTION  
NOT TO SCALE



**ABOVE GRADE CONCRETE WASHOUT**

**Requirements:**

- Minimum of ten feet wide by ten feet long, but sized to contain all liquid and waste that is expected to be generated between scheduled cleanout periods.
- The polyethylene lining should be of adequate size to extend over the berm or containment system.
- May utilize an earthen berm, straw bales, sandbags, or other acceptable barriers that will maintain its shape integrity and support the polyethylene lining.
- Minimum four-inch freeboard as part of the design.
- Minimum of ten millimeter polyethylene sheeting that is free of holes, tears, and other defects. The sheeting selected should be of an appropriate size to fit the washout system without seams or overlap of the lining.

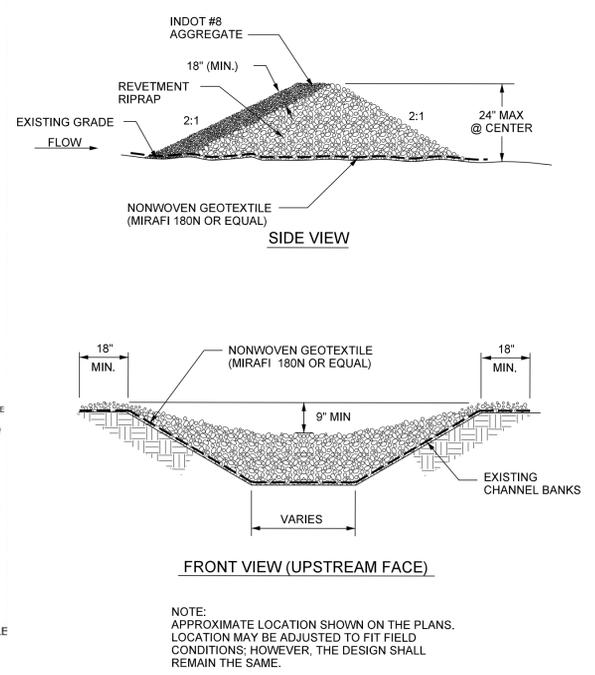
**Installation:**

- Install signage.
- Install orange safety fencing or equivalent.
- Place straw bales, sandbags (bags should be ultraviolet-stabilized geotextile fabric), soil material, or other appropriate materials that can be used to construct a containment system.
- Install the polyethylene liner containment system.
- A base shall be constructed and prepared that is free of rocks or other debris that may cause tears or punctures in the polyethylene lining.
- Place flags, safety fencing or equivalent to provide a barrier to construction equipment and other traffic.
- Install signage that identifies the concrete washout areas.
- Post signs directing contractors and suppliers to designated areas.

**Maintenance:**

- Inspect daily and after each storm event.
- Inspect the integrity of the overall structure including, where applicable, the containment system.
- Inspect the system for leaks, spills, and tracking soil be equipment.
- Inspect the polyethylene lining for failure, including tears and punctures.
- Once system reaches 50% capacity and hardens, remove and dispose of the material.
- Upon removal of the solids, inspect the structure. Repair the structure as needed or construct a new system.

4 CONCRETE WASHOUT  
NOT TO SCALE



**ROCK CHECK DAM**

**Requirements:**

- Dam center shall have a maximum height of 2-ft and should be at least 9-inches lower than the outer edges at natural ground elevation.
- Dam side slope shall be 2:1 or flatter.
- Distance between dams shall be spaced so the toe of the upstream dam is the same elevation as the top of the downstream dam.
- Dam shall be constructed using INDOT Revetment Riprap.
- Upstream face of the dam shall have an 18-inches minimum thick layer of INDOT No. 8 aggregate.

**Installation:**

- Excavate a cutoff trench into the ditch banks, and extend it to a minimum of 18-inches beyond the abutments.
- Place a nonwoven geotextile (Mirafi 180N or equivalent) in the trench and channel to the lines and dimensions of the dam shown in the detail.
- Place the rock in the cutoff trench and channel to the lines and dimensions shown in the detail.
- Extend the rock at least 18-inches beyond the channel banks to keep overflow water from undercutting the dam as it re-enters the channel.
- Install as many dams as necessary to satisfy the spacing requirement.
- Stabilize the channel above the uppermost dam.
- Recognizing that water will flow over and around the lowermost dam, protect the channel downstream from it with an erosion-resistant lining for a distance of 6-ft unless the channel is protected through other means.

**Maintenance:**

Inspect rock check dam and the channel after each storm event and repair any damage immediately. If significant erosion occurs, install a riprap liner in that portion of the channel. Remove sediment accumulated behind the rock check dam as needed to maintain channel capacity, to allow low flow drainage through the rock check dam, and to prevent flows from displacing sediment. Add rock to the check dam as needed to maintain design height and cross section. When the rock check dam is no longer needed, remove the rock completely and stabilize the channel.

5 TEMPORARY ROCK CHECK DAM  
NOT TO SCALE

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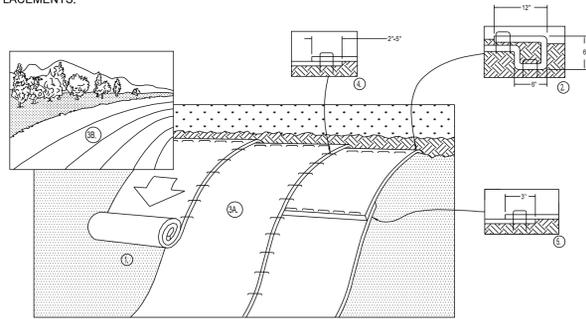
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Professional Engineer Seal for Brian J. Meunier, No. PE11300321, State of Indiana.

**STORMWATER POLLUTION  
 PREVENTION PLAN  
 NOTES AND DETAILS**

PROJECT NO. 19.R140004.00000  
 SHEET 14 OF 15  
 DRAWING NO. SW3

NOTE:  
SEE MANUFACTURER'S STAPLE  
PATTERN GUIDES FOR ACTUAL  
RECOMMENDED PLACEMENTS.



SLOPE INSTALLATION

- PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECP's), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED.
  - NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
- BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE RECP's IN A 6" (15 CM) DEEP X 6" (15 CM) WIDE TRENCH WITH APPROXIMATELY 12" (30cm) OF RECP's EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE RECP's WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30 CM) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30 CM) PORTION OF RECP's BACK OVER SEED AND COMPACTED SOIL. SECURE RECP's OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30 CM) APART ACROSS THE WIDTH OF THE RECP's.
- ROLL THE RECP's (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE. RECP's WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECP's MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
- THE EDGES OF PARALLEL RECP's MUST BE STAPLED WITH APPROXIMATELY 2" - 5" (5 CM - 12.5 CM) OVERLAP DEPENDING ON RECP's TYPE.
- CONSECUTIVE RECP's SPICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE (7.5 CM) OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" (30 CM) APART ACROSS ENTIRE RECP's WIDTH.
  - NOTE: "IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15 CM) MAY BE NECESSARY TO PROPERLY SECURE THE RECP's.

**Requirements:**

North American Green S150BN erosion control blanket or approved equivalent.

**Installation:**

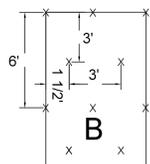
- Begin at the top of the slope by anchoring the blanket in a 6-inch by 6-inch wide trench with approximately 12-inches of blanket extended beyond the up-slope portion of the trench. Anchor the blanket with a row of staples/stakes approximately 12-inches apart in the bottom of the trench. Backfill and compact the trench after stapling.
- Roll the blanket down the slope, blankets will unroll with the appropriate side against the soil surface. All blankets must be securely fastened to soil surface by placing staples/stakes in appropriate locations as per manufacturer's specifications.
- The edges of parallel blankets must be stapled with approximately 2- to 5-inches overlap. Place the edges of the overlapping blanket even with the colored seam stitch on the previously installed blanket.
- Consecutive blankets spliced down the slope must be placed end over end (shingle style) with an appropriate 3-inches overlap. Staple through overlapped area, approximately 12-inches apart across entire blanket width.
- Install seeding as specified by manufacturer.
- Install erosion control blanket at locations specified on plans.

**Maintenance:**

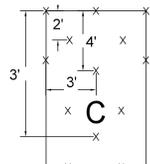
During vegetative establishment, inspect after storm events for erosion below the blanket. If any area shows erosion, pull back the portion of the blanket covering it, add soil, reseed the area, and re-lay and staple the blanket. After vegetative establishment, check the treated area periodically. Add additional staples as necessary to securely anchor the erosion control blanket.

**EROSION CONTROL BLANKET INSTALLATION**

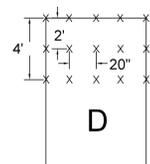
1 NOT TO SCALE



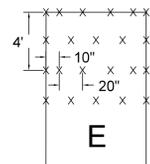
1.2 STAPLES PER SQ YD  
(FOR USE WHERE SLOPE ≤ 3H:1V)



1.75 STAPLES PER SQ YD  
(FOR USE IN AREAS WITH WHERE 3H:1V < SLOPE < 2H:1V)



3.5 STAPLES PER SQ YD  
(FOR USE ON BANK OF HIGH FLOW SHELF)



3.8 STAPLES PER SQ YD  
(FOR USE ON BOTTOM OF HIGH FLOW SHELF)

DETAIL SOURCE: NORTH AMERICAN GREEN

**EROSION CONTROL BLANKET STAPLE GUIDE**

2 NOT TO SCALE

TEMPORARY SEEDING SCHEDULE AND NOTES												
STABILIZATION PRACTICE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
PERMANENT SEEDING			A									
DORMANT SEEDING											B	
TEMPORARY SEEDING	C			C				C				
MULCHING	D											

**SEEDING NOTES:**

- FOR BEST RESULTS: (A) LEGUME SEED SHOULD BE INNOCIULATED; (B) SEEDING MIXTURES CONTAINING LEGUMES SHOULD PREFERABLY BE SPRING-SEEDED, ALTHOUGH THE GRASS MAY BE FALL-SEEDED, AND (C) IF LEGUMES ARE FALL-SEEDED, DO SO IN EARLY FALL.
- AN OAT OR WHEAT COMPANION OR NURSE CROP MAY BE USED WITH ANY OF THE PERMANENT SEEDING MIXTURES; SEE "A" THIS SCHEDULE. IF SO, IT IS BEST TO SEED DURING THE FALL SEEDING PERIOD, ESPECIALLY AFTER SEPT. 15.

A= KENTUCKY 31 FESCUE 95 LBS./ACRE  
PERENNIAL RYE GRASS 65 LBS./ACRE  
JASPER RED FESCUE 10 LBS./ACRE  
LADINO CLOVER 1 TO 2 LBS./ACRE

B= ADD 50% MORE SEED TO MIXTURES IN "A" ABOVE.

C= ANNUAL RYEGRASS 60 LBS./ACRE  
CATS (SPRING) 150 LBS./ACRE  
WINTER WHEAT (FALL) 150 LBS./ACRE

D= STRAW MULCH AT 2 1/2 TONS/ACRE W/LIQUID BINDER.

"//>" = IRRIGATION NEEDED DURING JUNE, JULY AND/OR SEPTEMBER

\*\* = IRRIGATION NEEDED FOR 2 TO 3 WEEKS AFTER APPLYING SOD.

**TEMPORARY VEGETATION**

**Requirements:**

Plant species shall be selected on the basis of quick germination, growth, and time of year. Seeding should be done as often as possible following construction activity. Daily seeding on rough graded areas when the soil is loose and moist is usually most effective.

**Installation:**

**Temporary Seed Bed Preparation:**

- Test soil to determine its nutrient levels.
- Fertilize as recommended by soil testing. If testing is not done, apply 400-600 lbs/acre of 12-12-12 analysis, or equivalent, fertilizer.
- Work the fertilizer into the soil 2-4-inches deep with a disc or rake operated across the slope.

**Temporary Seeding:**

- Use temporary seed mix as specified on plans.
- Apply seed uniformly with a drill or cultipacker-seeder or by broadcasting, and cover to the appropriate depth for the seed used.
- If drilling or broadcasting, firm the seedbed with a roller or cultipacker.
- Mulch seeded area to increase seeding success. Anchor all mulch by tackifying.

**Maintenance:**

Inspect periodically after planting to ensure that vegetative stands are adequately established; reseed if necessary. Check for erosion damage after storm event and repair; reseed and mulch if necessary.

**PERMANENT VEGETATION**

**Requirements:**

Plant species shall be selected on the basis of soil type, soil pH, region of the state, time of year, and planned use of the area to be seeded. Follow requirements in Mitigation Plan document for the stream mitigation site.

**Installation:**

**Permanent Seed Bed Preparation:**

- Test soil to determine pH and nutrient levels.
- If soil pH is unsuitable for the species to be seeded, apply lime according to test recommendations.
- Till the soil to obtain a uniform seedbed, working the fertilizer and lime into the soil 2-4-inches deep with a disc or rake operated across the slope.

**Permanent Seeding:**

Optimum seeding dates are March 1 through May 10 and August 10 through September 30. Permanent seeding done between May 10 and August 10 may need to be irrigated. As an alternative, use temporary seeding until the preferred date for permanent seeding.

- Use seed mix as specified on Sheet MD2.
- Apply seed uniformly with a hydroseeder, drill or cultipacker-seeder, or by broadcast, and cover to a depth of 1/4 to 1/2-inches.
- If drilling or broadcasting, firm the seedbed with a roller or cultipacker.
- Mulch all seeded areas and anchor with a tackifier. Use erosion control blankets on areas sloping 4:1 or steeper if erosion becomes a problem or if directed by the ENGINEER. (Note: if seeding is done with a hydroseeder, fertilize and mulch can be applied with the seed in a slurry mixture).

**Maintenance:**

Inspect periodically, especially after storm events, until the stand is successfully established (characteristics of a successful stand include: vigorous dark green or blue-ish green seedlings; uniform density with nurse plants, legumes, and grasses well intermixed; and the perennials remaining green throughout the summer, at least at the plant base). Add fertilizer the following growing season according to soil test recommendations. Repair damaged, bare or sparse areas by filling any gullies, re-fertilizing, over- or reseeding. If plant cover is sparse or patchy, review the plant material chosen, soil fertility, moisture condition, and mulching after re-preparing the seedbed. If vegetation fails to grow, perform soil testing to determine acidity or nutrient deficiency problems. If additional fertilization is needed to get a satisfactory stand, do so according to soil test recommendations.

**SEEDING NOTES AND SCHEDULE**

3 NOT TO SCALE

**EROSION CONTROL SEQUENCE**

- Before construction, stake the project limits.
- Install perimeter protection in the form of silt fence around construction limits noted on the plans.
- Strip topsoil from site as necessary for completion of project, except for the high flow shelf area.
- Install new construction access road(s). Throughout construction, CONTRACTOR shall control dust on the project site with water trucks. CONTRACTOR shall perform street sweeping as necessary to keep public and private roadways being used as transportation routes clean of dirt, dust, and incidental construction debris.
- Install paved area inlet protection as noted on the plans.
- Install concrete washout as noted on the plans.
- Perform all necessary site grading. CONTRACTOR shall minimize size, area of disturbance, and time of exposure. See Note 8 for specific requirements for the high flow shelf area.
- Place riprap with geotextile on high flow shelf bank near Cumberland Road. CONTRACTOR shall utilize rapid stabilization methods for the high flow shelf area. The high flow shelf shall be seeded and protected with TRM no more than 3 working days after the initial clearing of the area, or the time required to construct 250 continuous linear feet of the shelf, whichever is greater.
- Place seed, fertilizer, and ECB/TRM on all remaining disturbed areas, as shown in the drawings.
- Maintain erosion and sediment practices throughout the duration of the project.
- Remove all temporary erosion control measures upon OWNER'S approval and after vegetation is established and approved by the ENGINEER.

**GENERAL NOTES FOR EROSION AND SEDIMENT CONTROL SEQUENCE**

- The CONTRACTOR shall install, monitor, and maintain all required erosion control measures in accordance with Indiana 327 Rule 5, and the "Indiana Storm Water Quality Manual", which is hereby incorporated in these drawings by reference and made a part thereof.
- Temporary erosion and sediment control features to prevent sediment from leaving the site shown on the plans are at approximate locations. Erosion control features shall be inspected following each rainfall event. Accumulated sediment shall be removed immediately. Damaged erosion and sediment control features shall be repaired and replaced immediately.
- Construction debris and waste, such as garbage, debris, cleaning waste, etc., shall be removed from the site and kept out of water courses. Proper disposal and management of all waste is required.
- The duration of time which an area remains exposed shall be kept to a practical minimum depending on the weather. If construction activity is to cease for more than 14 days, the disturbed areas shall be temporarily seeded.
- Temporary erosion control features include construction entrance, silt fencing, rock check dam, and vegetation.
- Permanent erosion control features include riprap, ECB, TRM, and permanent vegetation.
- Permanently stabilize with seed and mulch all disturbed areas that are unable to be permanently seeded. Permanent seeding for each phase of the project shall be completed as a part of each phase, and shall be completed at the earliest time practicable.
- Throughout construction, maintain the erosion control measures as described on the plans.
- Remove all silt from the project site after permanent vegetation is established; redistribute in appropriate areas or dispose offsite.

**CHRISTOPHER B. BURKE ENGINEERING, LLC**  
PNC Center, Suite 1368 South  
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Indianapolis, Indiana 46204  
(317) 266-8000 FAX: (317) 632-3306

PROJECT:  
**MUD CREEK AT 106th STREET  
HIGH-FLOW SHELF AND WETLAND**  
HAMILTON COUNTY, INDIANA

NO.	DATE	ISSUED FOR	BY	SCALE:	AS NOTED
1	8/10/15	ISSUED FOR BID	BJM		
		NATURE OF REVISION	BJM		
			CHKD.		
FILE NAME:	R:\2014\14-0004\00000\Work Hub\Design\IGN Plans\04-Issued for Bid\140004_SW4.dgn				

Brian J. Meunier  
REGISTERED  
No. PE11300321  
STATE OF INDIANA  
PROFESSIONAL ENGINEER

PROJECT NO. 19.R140004.00000  
SHEET 15 OF 15  
DRAWING NO. SW4

**STORMWATER POLLUTION PREVENTION PLAN NOTES AND DETAILS**