

Appendix B: Stormwater Management Plan



STORMWATER MANAGEMENT PLAN

**Carroll County Energy (CCE)
Washington Township, Carroll County, Ohio**

September 18, 2013

Prepared by:



CESO, Inc.
402 2nd Street SE, Suite 310
Canton, OH 44702
Phone: 330.451.0975
Fax: 330.451.0983
www.cesoinc.com

On Behalf of:



CARROLL COUNTY ENERGY LLC
31 Milk Street, Suite 1001
Boston, MA 02109
www.carrollcountyenergy.com

TABLE OF CONTENTS

- i. COVER SHEET
- ii. TABLE OF CONTENTS
- I. PROJECT STORM WATER MANAGEMENT NARRATIVE
 - A. Introduction
 - B. Existing Drainage Conditions
 - C. Stormwater Pollution Prevention Approach
- II. APPENDIX
 - A. Storm Water Pollution Prevention Plans (SWPPP)
 - B. Water Quality Calculations
 - C. Water Quality Pond Discharge Rate Calculations

Project Stormwater Management Narrative

A. Introduction

The project site is located approximately 2.5 miles north of the village of Carrollton, between State Route 9 (Kensington Road NE) and Mobile Road (Township Road 275) in the Township of Washington, Carroll County, Ohio ("Project Site"). The proposed development consists of the clearing of the existing site and the construction of Carroll County Energy (the Project); a nominal 700 megawatt (MW) air-cooled 2x1 combined-cycle gas turbine facility.

The site is bounded by Carroll County land that is planned for commercial/industrial development to the north and agricultural land to the south, east and west. The Project Site includes a 77-acre parcel that will be used for the power block ("Facility Site"), a 23-acre parcel that will be utilized for construction laydown and parking ("Construction Laydown") and associated easements for utility interconnections. A paved access drive will enter the Project Site off of State Route 9 and serve the Facility Site. During construction, approximately 57 acres will be disturbed.

The 100-acre Project Site consists of agricultural and wooded land with minimal impervious area. The proposed development of this land will increase the amount of permanent impervious surface to 17 acres. Ohio National Pollutant Discharge Elimination System (NPDES) stormwater requirements dictate that the Water Quality Standards be met and the post construction water quality volume ("WQv") be equivalent to the volume of runoff from a 0.75 inch rainfall over the disturbed area. This will be achieved through the use of three water quality ponds. See Appendix B for these calculations. The proposed Project will result in greater than 5.0 acres of disturbance, thus Post-Construction Stormwater Quality Treatment as outlined in the Ohio EPA General Construction Permit is required and will be implemented. A preliminary Stormwater Pollution Prevention Plan ("SWPPP") has been prepared for the Project construction (provided in Appendix A of this report).

B. Existing Drainage Conditions

The existing Project Site consists of agricultural and wooded land. The site topography is hilly with a maximum elevation of roughly 1320' and a minimum elevation of roughly 1050'. The site drains naturally in four different directions into unnamed tributaries of Pipes Fork. These tributaries flow in a generally east / northeast direction to a point of confluence with Pipes Fork in the northeastern corner of the Project Site. As part of the preliminary due diligence and assessment of the Project Site, a wetlands determination was completed and several small wetlands and streams were identified. These are shown and identified on the preliminary SWPPP in Appendix A of this report.

C. Stormwater Pollution Prevention Approach

The preliminary SWPPP provides direction to the owner as to how stormwater pollution prevention should be handled during and after construction activities are complete. The two conditions require two distinctly different approaches. Initial methods focus on preventing loss of soil while post construction methods deal with not only soil loss but long term water quality measures as well.

During Construction Activities

The preliminary SWPPP attached in Appendix A shows the approach to controlling erosion and sediment during construction activities. The owner will require the contractor to comply with this SWPPP, as may be revised to reflect final Project design, which has been prepared based on the current Ohio Environmental Protection Agency (Ohio EPA) General Permit for Storm Water Discharge from Small and Large Construction Activities (“the Ohio EPA General Permit”), as amended.

The majority of the runoff from the disturbed area on the Project Site will be directed through three sediment basins that will be constructed in the locations shown on the preliminary SWPPP. These basins will be constructed per the Ohio Rainwater and Land Development Manual including a temporary outlet structure as shown on the detail included in the preliminary SWPPP. These basins will be maintained during construction by removing accumulated sediment if necessary. Runoff that does not go through these basins will be treated locally with filter socks or other acceptable Best Management Practices (“BMP”) to minimize soil loss. Areas of disturbance will be seeded upon completion.

After Construction Activities

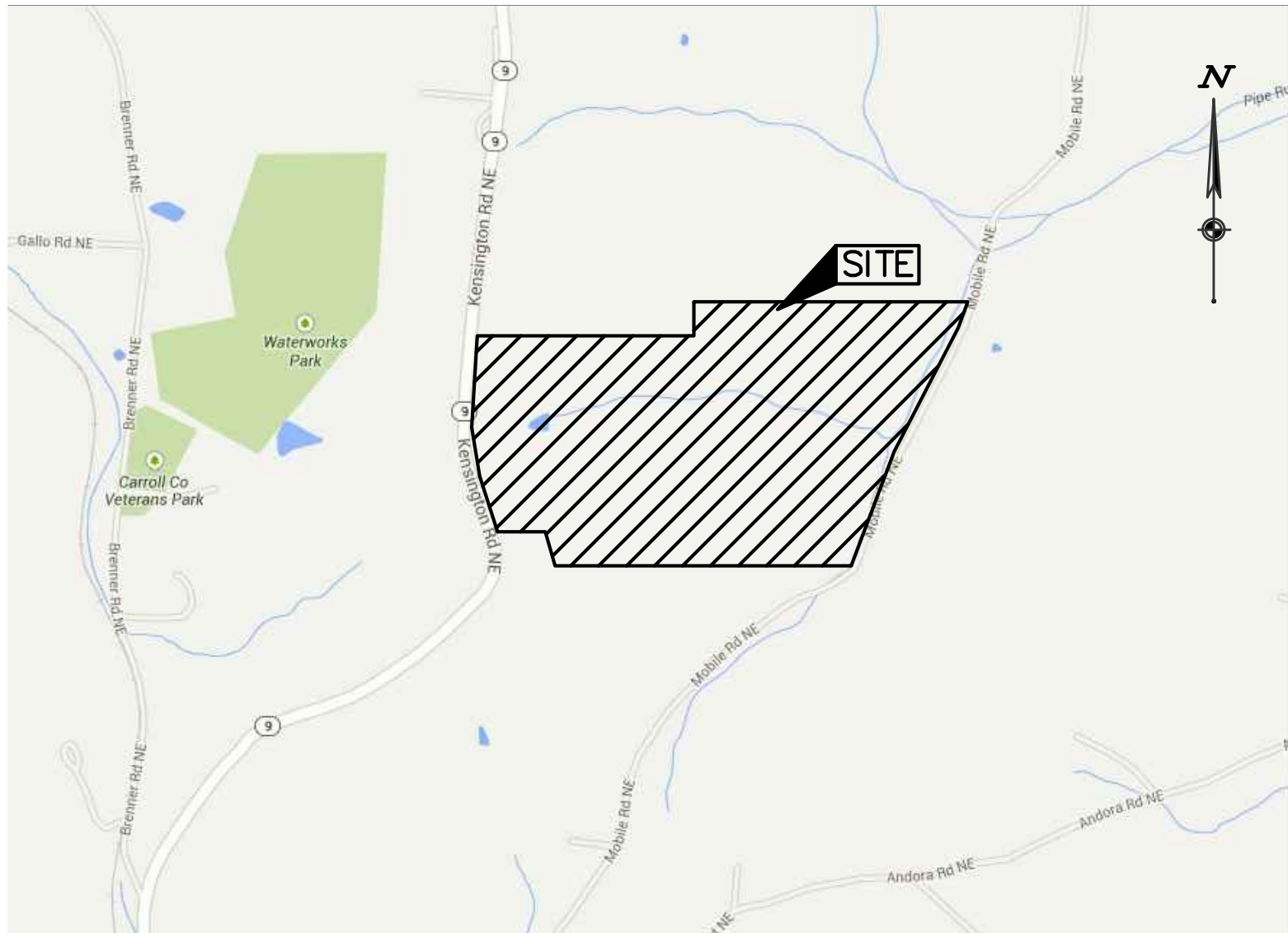
The preliminary SWPPP indicates the conceptual proposed grading of the site. As stated above, during construction three sediment basins will be constructed that will capture and retain sediment on site prior to final stabilization of the Project Site. As part of the final improvements to the Project site, these three basins will be converted into water quality ponds by cleaning out accumulated sediment, removal of the temporary sediment basin outlet structure and installation of the permanent outlet structure. With these improvements complete, the water quality ponds will provide the post-construction water quality treatment required by the Ohio EPA General Permit.

Runoff will be detained above ground in these ponds to allow sediment particles to settle out and will then be released through an orifice in the outlet structure. The permanent outlet structure installed upon completion of site construction will keep the ponds normally dry and only fill up during rain events. See the detail for this outlet included in the preliminary SWPPP. Once full they will drain through the orifice over the course of 48 hours as required by the Ohio Rainwater and Land Development Manual.

As the ponds are only required to hold the WQv, any additional water will be released through the windows of the outlet structure. Additionally, emergency spillways will be constructed in case the outlet structure does not function properly. Refer to Appendix A for the preliminary SWPPP showing the location of these ponds and details of the outlet structures. See Appendix B for the sizing calculations for the ponds and Appendix C for calculations showing the drawdown time of the ponds.

APPENDIX A

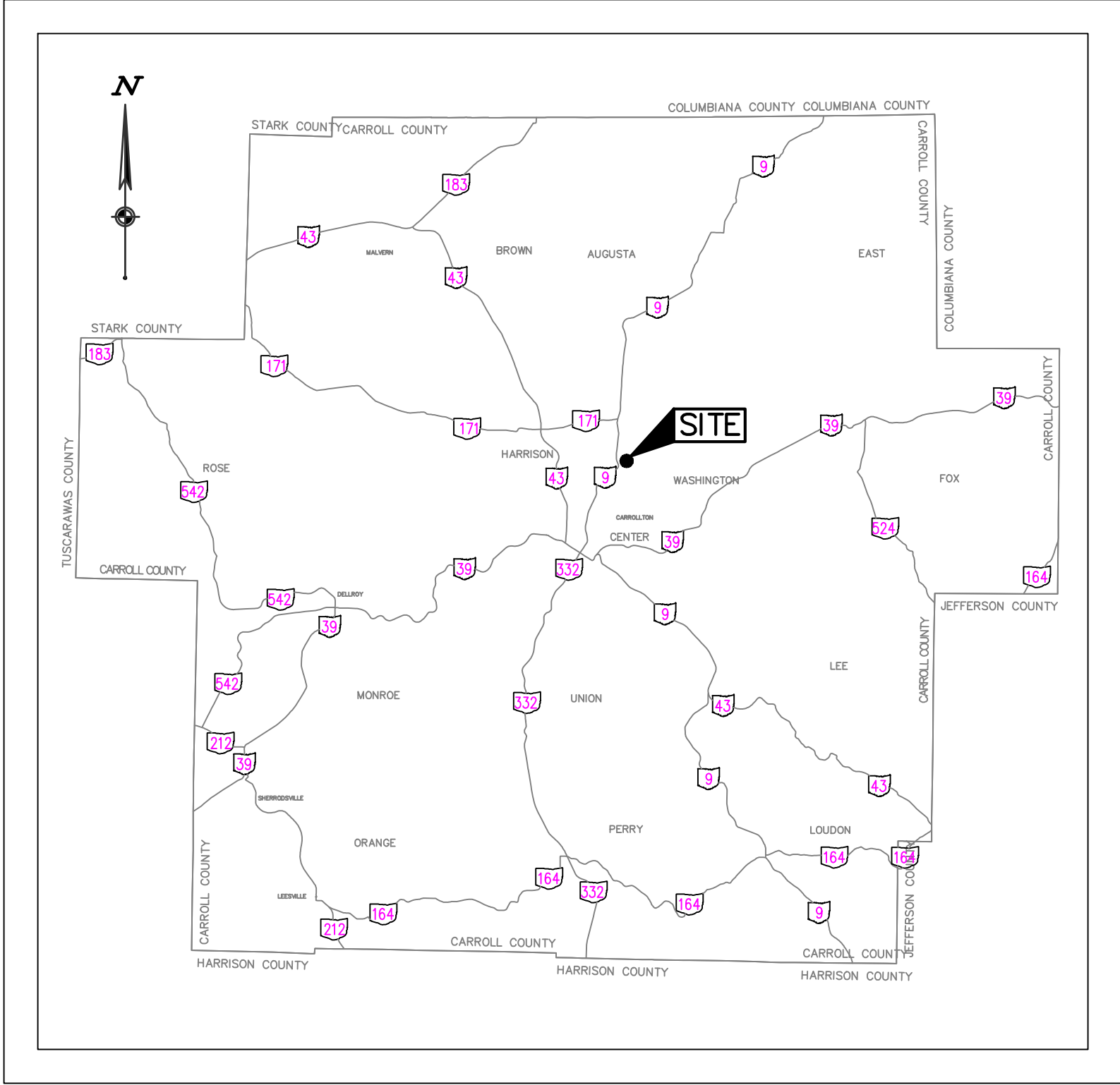
STORM WATER POLLUTION PREVENTION PLANS (SWPPP)



VICINITY MAP
N.T.S.

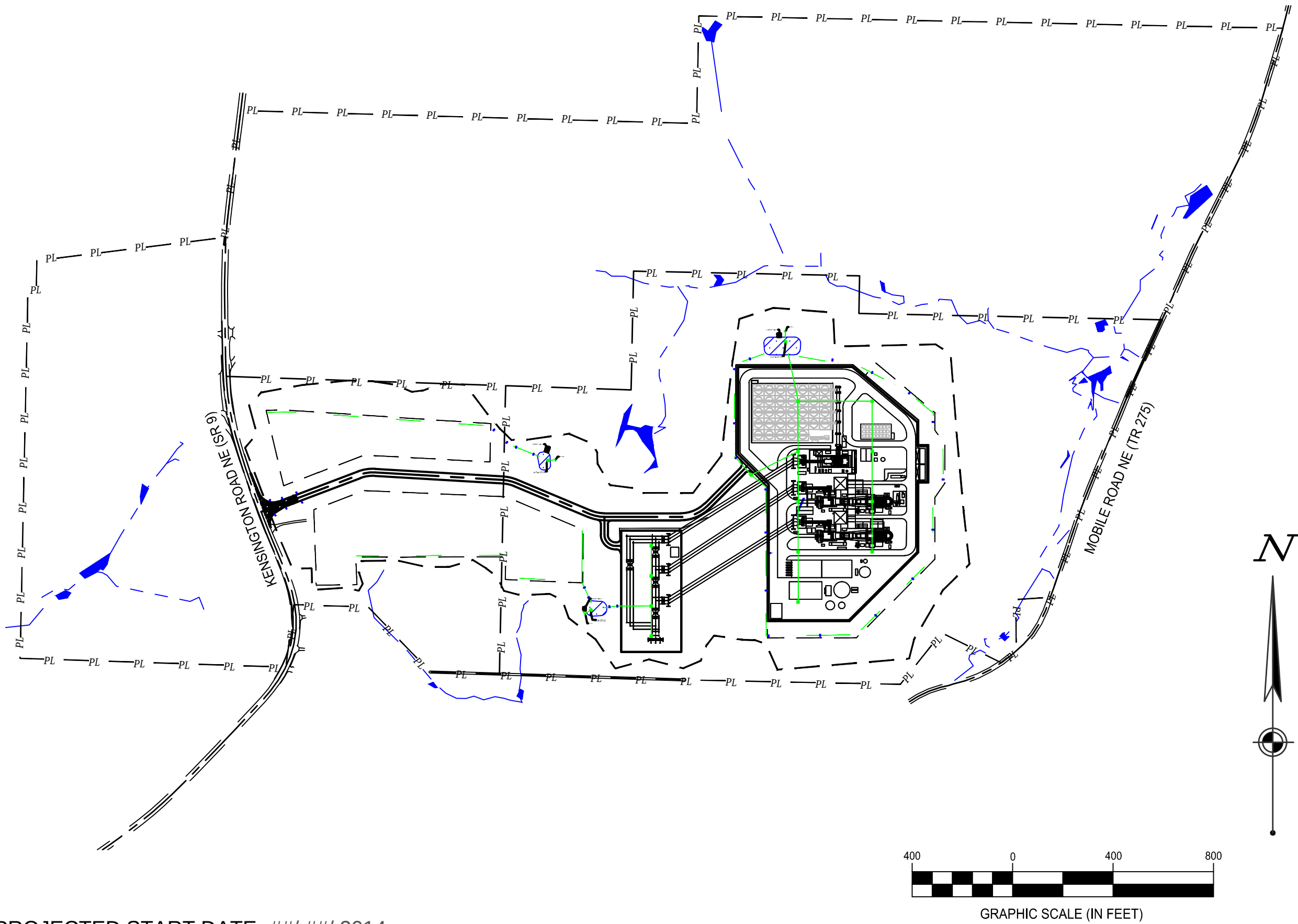
CARROLL COUNTY ENERGY STORMWATER POLLUTION PREVENTION PLAN

CARROLL COUNTY (SECTION 28)
WASHINGTON TOWNSHIP
CARROLL COUNTY, OHIO



LOCATION MAP
N.T.S.

STORMWATER POLLUTION PREVENTION PLAN SHEET INDEX	
Sheet Title	Sheet Number
TITLE SHEET	SW-1
SWPPP NOTES	SW-2
SWPPP - EXISTING SITE SOILS	SW-3
DURING CONSTRUCTION WEST SWPPP	SW-4
DURING CONSTRUCTION EAST SWPPP	SW-5
POST CONSTRUCTION WEST SWPPP	SW-6
POST CONSTRUCTION EAST SWPPP	SW-7
WATER QUALITY PONDS	SW-8
SWPPP DETAILS	SW-9



PROJECTED START DATE: ##/ ##/ 2014

PROJECTED COMPLETION DATE: ##/##/ 2017

OWNER/OPERATOR:
CARROLL COUNTY ENERGY, LLC
31 MILK STREET
SUITE 1001
BOSTON, MA 02109

ENGINEER:
CESO, INC.
402 2ND STREET SE SUITE 310
CANTON, OH 44702
CONTACT: DAN PETNO, P.E.
P: 330.451.0975
E: PETNO@CESOINC.COM



REVISIONS		DESCRIPTION
NO.	DATE	



TITLE SHEET

CARROLL COUNTY ENERGY

WASHINGTON TOWNSHIP CARROLL COUNTY, OHIO

**ENGINEERS • ARCHITECTS
SURVEYORS**
402 2nd STREET SE SUITE 310
CANTON, OH 44702
PH (330) 451-0975 FAX (330) 451-0983
WWW.CESOINC.COM

ISSUE:	1
DATE:	9/6/2013
JOB NO.:	5188
DESIGN:	JDM
DRAWN:	JEC
CHECKED:	DMK
SHEET NO.	SW-1

STORM WATER POLLUTION PREVENTION PLAN NOTES:

1.

ALL EROSION AND SEDIMENTATION CONTROL SHALL BE PERFORMED ACCORDING TO: SWPPP AND DETAIL PLANS; ACCORDING TO THE LATEST OHIO EPA AUTHORIZATION FOR CONSTRUCTION ACTIVITY UNDER THE "NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM" (NPDES); ANY AND ALL REQUIRED PERMITS, REPORTS, AND RELATED DOCUMENTS. SEE OHIO EPA PERMIT NO. OHC000004 FOR SWPPP RULES AND REGULATIONS. ALL CONTRACTORS AND SUBCONTRACTORS MUST BECOME FAMILIAR WITH ALL OF THE ABOVE.
2.

CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES AS REQUIRED BY THE SWPPP. ADDITIONAL BEST MANAGEMENT PRACTICES SHALL BE IMPLEMENTED AS DICTATED BY CONDITIONS AND GRADE CHANGES TO THE SITE AT NO ADDITIONAL COST TO OWNER THROUGHOUT ALL PHASES OF CONSTRUCTION.
3.

CONTRACTOR SHALL MINIMIZE CLEARING AND DISTURBANCE TO THE ENVIRONMENT TO THE MAXIMUM EXTENT POSSIBLE OR AS REQUIRED BY THE GENERAL PERMIT. EVERY EFFORT SHALL BE MADE TO PRESERVE THE NATURAL RIPARIAN SETBACK ADJACENT TO EXISTING STREAMS OR OTHER EXISTING SURFACE WATER BODIES.
4.

SEDIMENT STRUCTURE AND PERIMETER SEDIMENT BARRIERS SHALL BE IMPLEMENTED AS THE FIRST STEP OF GRADING WITHIN SEVEN (7) DAYS FROM THE START OF CLEARING AND GRUBBING, AND SHALL CONTINUE TO FUNCTION UNTIL THE SLOPE DEVELOPMENT AREA IS RESTABILIZED. SEDIMENT CONTROL DEVICES SHALL BE IMPLEMENTED FOR ALL AREAS REMAINING DISTURBED FOR OVER 14 DAYS.
5.

TEMPORARY SOIL STABILIZATION OF DISTURBED AREAS BY MEANS OF TEMPORARY VEGETATION, MULCHING, GEOTEXTILES, SOD, PRESERVATION OF EXISTING VEGETATION, AND OTHER APPROVED TECHNIQUES TO BE APPLIED AS FOLLOWS: WITHIN TWO (2) DAYS OF ANY AREA WITHIN 50 FEET OF A STREAM NOT AT FINAL GRADE REMAINING DORMANT FOR OVER TWENTY ONE (21) DAYS. WITHIN SEVEN (7) DAYS OF ANY AREA THAT WILL BE DORMANT FOR MORE THAN TWENTY ONE (21) DAYS. PRIOR TO THE ONSET OF WINTER WEATHER FOR AREAS THAT WILL BE IDLE OVER WINTER.
6.

PERMANENT SOIL STABILIZATION OF DISTURBED AREAS BY MEANS OF VEGETATION, LANDSCAPE TYPE MULCHING, MATTING, SOD, RIP RAP, AND OTHER APPROVED LANDSCAPING TECHNIQUES TO BE APPLIED AS FOLLOWS:

A) WITHIN SEVEN (7) DAYS OF ANY AREA THAT WILL BE DORMANT FOR ONE (1) YEAR OR MORE.

B) WITHIN TWO (2) DAYS OF ANY AREA WITHIN 50 FEET OF A STREAM AT FINAL GRADE.

C) WITHIN SEVEN (7) DAYS FOR ANY OTHER AREA AT FINAL GRADE.
7.

TEMPORARY SEEDING, MULCHING, AND FERTILIZER SPECIFICATIONS:

SEEDING: ANNUAL RYEGRASS AT 2.02 #/1,000 S.F.

MULCHING: STRAW MATERIAL SHALL BE UNPOTTED SMALL GRAIN STRAW APPLIED AT A RATE OF TWO (2) TON/ACRE, OR 80-100 POUNDS PER 1,000 S.F. MULCH MATERIALS SHALL BE RELATIVELY FREE OF ALL KINDS OF WEEDS AND SHALL BE FREE OF PROHIBITIVE NOXIOUS WEEDS. MULCH SHALL BE SPREAD UNIFORMLY BY HAND OR MECHANICAL MEANS. FROM NOVEMBER 01 THRU MARCH 15 INCREASE THE RATE OF STRAW MULCH TO THREE (3) TON/ACRE.

FERTILIZER: APPLY FERTILIZER AT HALF THE RATE OF PERMANENT APPLICATION AND AS PER STATE DOT SPECIFICATIONS. IF PROJECT CONDITIONS PREVENT FERTILIZING THE SOIL, THEN THIS ITEM MAY BE WAIVED.
8.

PERMANENT SEEDING SHALL BE IN ACCORDANCE WITH ODOT STANDARD SPECIFICATIONS.
9.

SLOPES SHALL BE LEFT IN A ROUGHENED CONDITION DURING THE GRADING PHASE TO REDUCE RUNOFF VELOCITIES AND EROSION. ALL SLOPES 3:1 OR GREATER THAN 3:1 SHALL BE TREATED WITH FLEXTERRA HP-FGM OR AN APPROVED EQUAL AS SPECIFIED IN THE PLANS.
10.

OHIO EPA SWPPP REGULATIONS REQUIRES THAT A SEDIMENT TRAP OR POND BE SIZED TO PROVIDE AT LEAST 104 CUBIC YARDS (67 CY FOR DEWATERING AND 37 CY FOR SEDIMENT STORAGE) OF STORAGE PER ACRE OF TOTAL CONTRIBUTING AREA. MAXIMUM DEPTH OF SEDIMENT SETTLING POND SHALL BE EQUAL OR LESS THAN 5- FEET WITH A LENGTH TO WIDTH RATIO GREATER THAN OR EQUAL TO 2:1)
11.

OUTLET STRUCTURES IN SEDIMENTATION BASINS SHALL BE MAINTAINED IN OPERATIONAL CONDITIONS AT ALL TIMES. SEDIMENT MUST BE REMOVED FROM BASINS AND OR TRAPS WHEN THE DESIGN CAPACITY HAS BEEN REDUCED BY 40% (APPROXIMATELY ONE-HALF OF POND DEPTH).
12.

NO SOLID (OTHER THAN SEDIMENT) OR LIQUID WASTE, INCLUDING BUILDING MATERIALS, SHALL BE DISCHARGED IN STORM WATER RUNOFF.
13.

ALL TOXIC WASTES, HAZARDOUS WASTES AND NON-SEDIMENT POLLUTANTS MUST BE DISPOSED OF IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL GUIDELINES. WASH OUT OF CEMENT TRUCKS SHOULD OCCUR IN DESIGNATED PIT OR DIKED AREAS, WHERE WASHINGS CAN BE REMOVED AND PROPERLY DISPOSED OFF-SITE WHEN THEY HARDEN. STORAGE TANKS SHOULD ALSO BE LOCATED IN PIT OR DIKED AREAS. IN ADDITION, SUFFICIENT OIL AND GREASE ABSORBING MATERIALS AND FLOTATION BOOMS TO CLEAN AND CONTAIN FUEL AND CHEMICAL SPILLS MUST BE KEPT ON SITE. NO TOXIC OR HAZARDOUS WASTES SHALL BE DISPOSED INTO STORM DRAINS, SEPTIC TANKS OR BY BURYING, BURNING OR MIXING THE WASTES.
14.

CONTAINERS SHALL BE AVAILABLE FOR DISPOSAL OF DEBRIS, TRASH, HAZARDOUS OR PETROLEUM WASTES. ALL CONTAINERS MUST BE COVERED AND LEAK-PROOF. ALL WASTE MATERIAL SHALL BE DISPOSED OF AT FACILITIES APPROVED FOR THE PERTINENT MATERIAL.
15.

RUBBISH, TRASH, GARBAGE, LITTER, OR OTHER SUCH MATERIALS SHALL BE DISPOSED INTO SEALED CONTAINERS. MATERIALS SHALL BE PREVENTED FROM LEAVING THE SITE THROUGH THE ACTION OF WIND OR STORM WATER DISCHARGE INTO DRAINAGE DITCHES OR WATERS OF THE STATE.
16.

BRICKS, HARDENING CONCRETE AND SOIL WASTE SHALL BE FREE FROM CONTAMINATION WHICH MAY LEACH CONSTITUENTS TO WATERS OF THE STATE.
17.

CLEAN CONSTRUCTION WASTES THAT WILL BE DISPOSED INTO THE PROPERTY SHALL BE SUBJECT TO ANY LOCAL PROHIBITIONS FROM THIS TYPE OF DISPOSAL.
18.

ALL CONSTRUCTION AND DEMOLITION DEBRIS (C&DD) WASTE SHALL BE DISPOSED OF IN AN OHIO EPA APPROVED C&DD LANDFILL AS REQUIRED BY OHIO REVISED CODE 3714. CONSTRUCTION DEBRIS MAY BE DISPOSED OF ON-SITE, BUT DEMOLITION DEBRIS MUST BE DISPOSED IN AN OHIO EPA APPROVED LANDFILL. ALSO, MATERIALS WHICH CONTAIN ASBESTOS MUST COMPLY WITH AIR POLLUTION REGULATIONS (SEE OHIO ADMINISTRATIVE CODE 3745-20).
19.

AREA SHALL BE DESIGNATED BY CONTRACTOR AND SHOWN ON SWPPP MAP FOR MIXING OR STORAGE OF COMPOUNDS SUCH AS FERTILIZERS, LIME, ASPHALT, OR CONCRETE. THESE DESIGNATED AREAS SHALL BE LOCATED AWAY FROM WATERCOURSES, DRAINAGE DITCHES, FIELD DRAINS, OR OTHER STORMWATER DRAINAGE AREA.
20.

EQUIPMENT FUELING & MAINTENANCE SHALL BE IN DESIGNATED AREAS ONLY. THESE DESIGNATED AREAS SHALL BE LOCATED AWAY FROM WATERCOURSES, DRAINAGE DITCHES, FIELD DRAINS, OR OTHER STORMWATER DRAINAGE AREA.
21.

A SPILL PREVENTION CONTROL AND COUNTERMEASURE (SPCC) PLAN MUST BE DEVELOPED FOR SITES WITH ONE ABOVE-GROUND STORAGE TANK OF 660 GALLONS OR MORE, TOTAL ABOVE-GROUND STORAGE OF 1,330 GALLONS OR BELOW-GROUND STORAGE OF 4,200 GALLONS OF FUEL.
22.

ALL DESIGNATED CONCRETE CHUTE OR WASHOUT AREAS SHALL BE LOCATED AWAY FROM WATERCOURSES, DRAINAGE DITCHES, FIELD DRAINS OR OTHER STORMWATER DRAINAGE AREAS.
23.

IN THE EVENT THAT HIGH GROUND WATER AT THIS SITE IS ENCOUNTERED, CONTRACTOR IS RESPONSIBLE FOR DESIGNING AND IMPLEMENTING A PLAN TO CONTROL BOTH SURFACE AND GROUND WATER DURING THE COURSE OF CONSTRUCTION. ALL DEWATERING ACTIVITIES SHALL PASS THROUGH A BMP PRIOR TO LEAVING THE SITE.
24.

DISCHARGE OF WATER WITH POTENTIAL SEDIMENT FROM THE SITE SHALL BE THROUGH A FILTER BAG, SUMP PIT OR OTHER SEDIMENT REMOVAL DEVICE.
25.

ALL CONTAMINATED SOIL MUST BE TREATED AND/OR DISPOSED IN AN OHIO EPA APPROVED SOLID WASTE MANAGEMENT FACILITY OR HAZARDOUS WASTE TREATMENT, STORAGE OR DISPOSAL FACILITIES (TSDFS).
26.

IF THE SITE CONTAINS CONTAMINATED SOIL, THE FOLLOWING SHALL BE USED TO PREVENT CONTAMINATION FROM BEING RELEASED

1.

BERMS, TRENCHES AND PITS TO COLLECT CONTAMINATED RUNOFF AND PREVENT DISCHARGES.

2.

PUMPING RUNOFF INTO A SANITARY SEWER (WITH PRIOR APPROVAL OF THE SANITARY SYSTEM OPERATOR) OR INTO A CONTAINER FOR TRANSPORT TO AN APPROPRIATE TREATMENT/DISPOSAL FACILITY.

3.

COVERING AREAS OF CONTAMINATION WITH TARPS OR OTHER METHODS THAT PREVENT STORM WATER FROM COMING INTO CONTACT WITH THE MATERIAL.
27.

IN THE EVENT OF AN ACCIDENTAL SPILL, IMMEDIATE ACTION WILL BE UNDERTAKEN BY THE GENERAL CONTRACTOR TO CONTAIN AND REMOVE THE SPILLED MATERIAL. ALL HAZARDOUS MATERIALS, INCLUDING CONTAMINATED SOIL AND LIQUID CONCRETE WASTE, WILL BE DISPOSED OF BY THE CONTRACTOR IN THE MANNER SPECIFIED BY FEDERAL, STATE AND LOCAL REGULATIONS AND BY THE MANUFACTURER OF SUCH PRODUCTS. AS SOON AS POSSIBLE, THE SPILL WILL BE REPORTED TO THE APPROPRIATE AGENCIES. AS REQUIRED UNDER THE PROVISIONS OF THE CLEAN WATER ACT, ANY SPILL OR DISCHARGE ENTERING WATERS OF THE UNITED STATES WILL BE PROPERLY REPORTED. THE GENERAL CONTRACTOR WILL PREPARE A WRITTEN RECORD OF ANY SPILL AND ASSOCIATED CLEAN-UP ACTIVITIES OF PETROLEUM PRODUCTS OR HAZARDOUS MATERIALS IN EXCESS OF 1 GALLON OR REPORTABLE QUANTITIES, WHICH EVER IS LESS.
28.

THE CONTRACTOR SHALL CONTACT THE OHIO EPA AT 800.282.9378, THE LOCAL FIRE DEPARTMENT AND THE LOCAL EMERGENCY PLANNING COMMITTEE IN THE EVENT OF A PETROLEUM SPILL (>25 GALLONS) OR THE PRESENCE OF SHEEN.
29.

DUST CONTROL USING APPROVED MATERIALS MUST BE PERFORMED WHEN NECESSARY. DUST SUPPRESSANTS SHALL NOT BE APPLIED NEAR CATCH BASINS FOR STORM SEWERS OR OTHER DRAINAGE WAYS. THE USE OF MOTOR OILS AND OTHER PETROLEUM BASED OR TOXIC LIQUIDS FOR DUST SUPPRESSION IS PROHIBITED.
30.

PROCESS WASTEWATERS (EQUIPMENT WASHING, LEACHATE ASSOCIATED WITH ON-SITE WASTE DISPOSAL AND CONCRETE WASH-OUTS) SHALL BE COLLECTED AND DISPOSED OF PROPERLY.
31.

ENGINEER WILL FILE SANITARY AND WATER PTI FORMS WITH THE OHIO EPA AS REQUIRED.
32.

PROTECTED STORAGE AREAS SHALL BE USED FOR INDUSTRIAL AND CONSTRUCTION MATERIALS IN ORDER TO MINIMIZE THE EXPOSURE OF SUCH MATERIALS TO STORMWATER.
33.

ALL CONTROL MEASURES STATED IN THE SWPPP SHALL BE MAINTAINED IN FULLY FUNCTIONAL CONDITION UNTIL TEMPORARY OR PERMANENT STABILIZATION OF THE SITE IS ACHIEVED. ALL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSPECTED BY A QUALIFIED PERSON IN ACCORDANCE TO THE CONTRACT DOCUMENTS OR THE APPLICABLE PERMIT, WHICHEVER IS MORE STRINGENT, AND REPAIRED.
34.

INSPECTIONS OF BMPS SHALL BE PERFORMED BY QUALIFIED PERSONS PROVIDED BY THE PERMITTEE AND THE INSPECTION LOGS ARE TO BECOME A PART OF THIS PLAN. INSPECTIONS RECORDS SHALL BE SIGNED BY THE INSPECTOR AND WILL BE KEPT FOR 3 YEARS AFTER THE NOTICE OF TERMINATION IS SUBMITTED.
35.

INSPECTIONS SHALL BE CONDUCTED AT LEAST ONCE IN EVERY 7 CALENDAR DAYS AND WITHIN 24 HOURS AFTER ANY STORM EVENT GREATER THAN 0.5 INCHES OF RAIN PER 24 HOUR PERIOD, FROM THE BEGINNING OF CONSTRUCTION THROUGH THE FINAL INSPECTION PRIOR TO THE NOTICE OF TERMINATION.
36.

NON-SEDIMENT POND BMPS TO BE REPAIRED WITHIN 3 DAYS OF INSPECTION AND SEDIMENT POND BMPS WITHIN 10 DAYS OF INSPECTION. BMPS NOT MEETING THE INTENDED FUNCTION SHALL BE REPLACED WITHIN 10 DAYS OF INSPECTION. MISSING BMPS SHALL BE INSTALLED WITHIN 10 DAYS OF INSPECTION.
37.

IF THE SITE IS STABILIZED AND WILL BE DORMANT FOR A LONG PERIOD OF TIME, LESS FREQUENT INSPECTIONS MAY BE REQUESTED OF THE OEPA VIA A WAIVER REQUEST.
38.

INLET PROTECTION DEVICES AND CONTROLS SHALL BE REPAIRED OR REPLACED WHEN THEY SHOW SIGNS OF UNDERMINING AND OR DETERIORATION.
39.

ALL SEEDED AREAS SHALL BE CHECKED REGULARLY TO ENSURE THAT A GOOD STANDING OF GRASS IS MAINTAINED. AREAS SHOULD BE FERTILIZED, WATERED, AND RESEEDED AS NEEDED.
40.

CHECK DAMS, FILTER SOCK AND INLET PROTECTION SHALL BE REPAIRED TO THEIR ORIGINAL CONDITION IF DAMAGED. SEDIMENT ACCUMULATION MUST BE REMOVED WHEN SEDIMENT HEIGHT REACHES ONE-HALF THE HEIGHT OF THE CHECK DAMS, FILTER SOCK AND INLET PROTECTION.
41.

MINIMIZE OFF-SITE SEDIMENT TRACKING OF VEHICLES BY THE USE OF STONE MATERIAL IN ALL CONSTRUCTION ENTRANCES, ALONG WITH REGULARLY SCHEDULED SWEEPING/GOOD HOUSEKEEPING. STABILIZED CONSTRUCTION ENTRANCES TO BE PROPERLY MAINTAINED AND IN GOOD WORKING ORDER AT ALL TIMES; THIS MAY REQUIRE PERIODIC TOP DRESSING OF THE STONE AS CONDITIONS DEMAND.
42.

IF THE ACTION OF VEHICLES TRAVELING OVER THE STABILIZED CONSTRUCTION ENTRANCE DOES NOT SUFFICIENTLY REMOVE MOST OF THE DIRT AND MUD, THEN THE TIRES MUST BE WASHED BEFORE VEHICLES ENTER A PUBLIC ROAD. PROVISIONS MUST BE MADE TO INTERCEPT THE WATER AND TRAP THE SEDIMENT BEFORE IT IS CARRIED OFF THE SITE.
43.

ALL MATERIALS SPILLED, DROPPED, WASHED, OR TRACKED ONTO THE ROADWAYS OR INTO THE STORM SEWERS MUST BE REMOVED IMMEDIATELY.
44.

THE TEMPORARY PARKING AND STORAGE AREA SHALL BE KEPT IN GOOD CONDITION (SUITABLE FOR PARKING AND STORAGE) BY GENERAL CONTRACTOR. THIS MAY REQUIRE PERIODIC TOP DRESSING OF THE TEMPORARY PARKING AS CONDITIONS DEMAND.
45.

CONTRACTORS AND SUBCONTRACTORS WILL BE RESPONSIBLE FOR REMOVING ALL SEDIMENT FROM THE SITE, INCLUDING DETENTION PONDS, AND STORM SEWER SYSTEMS. SEDIMENT DEPOSITION DURING SITE STABILIZATION MUST ALSO BE REMOVED.
46.

ALL RIP RAP MUST BE PLACED OVER GEOTEXTILE FABRIC GEOTEXTILE FABRIC SHOULD ALSO BE PLACED UNDER THE STONE OF THE STABILIZED CONSTRUCTION EXIT.
47.

STONE CONSTRUCTION EXIT TO BE MAINTAINED BY CONTRACTOR UNTIL SITE HAS BEEN PAVED OR IS NO LONGER REQUIRED.
48.

ALL CATCH BASIN GRATES ARE TO BE PROTECTED WITH INLET BAGS AFTER THEY ARE INSTALLED. THEY SHOULD BE ROUTINELY CLEANED AND MAINTAINED.
49.

ROCK CHECK DAMS SHOULD BE ROUTINELY CLEANED ONCE SEDIMENT BEGINS TO APPEAR ON THE UPSTREAM SIDE OF THE ROCK.
50.

ON-SITE AND OFF-SITE STOCKPILE AND BORROW AREAS SHALL BE PROTECTED FROM EROSION AND SEDIMENTATION BY THE USE OF BEST MANAGEMENT PRACTICES. THESE AREAS MUST BE SHOWN IN THE SITE MAP AND PERMITTED IN ACCORDANCE WITH GENERAL PERMIT REQUIREMENTS. AT A MINIMUM, SILT FENCE TO BE PLACED AT PERIMETER OF STOCKPILE AREA TO PREVENT SOIL FROM LEAVING THE STOCKPILE AREA.
51.

CONTRACTOR TO DELINEATE STOCK PILE LOCATION ON PLANS TO BE KEPT ON SITE DURING CONSTRUCTION.
52.

CONSTRUCT STOCKPILES IN ACCESSIBLE LOCATIONS THAT DO NOT INTERFERE WITH NATURAL DRAINAGE. INSTALL APPROPRIATE CONTROL DEVICES TO TRAP SEDIMENT SUCH AS SILT FENCE IMMEDIATELY ADJACENT TO THE STOCKPILE OR SEDIMENT TRAPS OR BASINS DOWNSTREAM OF STOCKPILE. STOCKPILE SIDE SLOPES SHALL NOT EXCEED A RATIO OF 2:1.
53.

IF STOCKPILE IS STORED FOR MORE THAN 21 DAYS, IT SHOULD BE TEMPORARY SEEDED, OR COVERED WITH A TARP.
54.

ALL CONSTRUCTION SHALL BE STABILIZED AT THE END OF EACH DAY; THIS INCLUDES BACKFILLING OF TRENCHES FOR UTILITY CONSTRUCTION AND PLACEMENT OF GRAVEL OR ASPHALT FOR ROAD CONSTRUCTION.
55.

THE LAST LAYER OF SOIL, INCLUDING TOP SOIL SHOULD BE COMPACTED TO 80% - 85% OF THE MAXIMUM STANDARD PROCTOR DENSITY, IN AREAS OUTSIDE THE PARKING LOT THAT WILL RECEIVE VEGETATION. THIS IS PARTICULARLY IMPORTANT IN CUT SLOPE AND EMBANKMENT AREAS. IN PAVEMENT AND ISLAND AREAS, IT IS RECOMMENDED THAT THE SOIL BE COMPACTED TO 98% AND 95% OF THE MAXIMUM STANDARD PROCTOR DENSITY RESPECTIVELY; THE LAST COMPACTED LAYER MAY BE SCARIFIED TO IMPROVE THE SOIL GROWTH CHARACTERISTICS.
56.

THE POST CONSTRUCTION REQUIREMENTS OF OHIO EPA PERMIT OHC000004 SHALL BE MET BY THE THREE WATER QUALITY BASINS ON THE SITE.
57.

ALL WATER FROM DEWATERING ACTIVITIES SHALL BE PROCESSED THROUGH A BMP PRIOR TO LEAVING THE SITE.
58.

CONTRACTOR TO ENSURE STREETS SHALL BE CLEARED OF DEBRIS FROM SITE AND SWEEP CLEAN ON AN AS NEEDED BASIS. AT NO POINT SHOULD DIRT, DEBRIS, OR ANY MATERIAL BE STORED OR LEFT ON THE STREET.
59.

ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED BY THE INSPECTOR IN THE FIELD.
- SITE NOTES
- THE PROPOSED PROJECT IS THE CARROLL COUNTY ENERGY 700MW AIR COOLED 2x1 COMBINED CYCLE. THE PROJECT SITE IS 100 ACRES INCLUDING THE 77 ACRE FACILITY SITE, OF WHICH 17 ACRES WILL BE USED FOR THE POWER BLOCK. 57 ACRES WILL BE DISTURBED AS PART OF THIS PROJECT.
- THE PRE-CONSTRUCTION RUNOFF CURVE NUMBER IS 69.
THE POST-CONSTRUCTION RUNOFF CURVE NUMBER IS 81.
- THE PROJECT SITE INCLUDES WETLANDS, TWO OF WHICH ARE TO BE REMOVED DURING THIS PROJECT. ALL OTHER AREAS ARE TO BE PROTECTED AND NOT DISTURBED DURING CONSTRUCTION.
- GEOTECHNICAL SUMMARY
REFER TO PRELIMINARY SUBSURFACE EXPLORATION REPORT BY TETRATECH, DATED JULY 2013.
- SOILS ON SITE CONSIST OF:
BERKS SHALY SILT LOAM, 3-8% SLOPE (BkB)
BERKS SHALY SILT LOAM, 8-15% SLOPE (BkC)
BERKS SHALY SILT LOAM, 15-25% SLOPE (BkD)
COSHOCKTON-KEENE SILT LOAM, 3-8 % SLOPE (CoB)
CULLEOKA SILT LOAM, 3-8 % SLOPE (CuB)
ELBA SILTY CLAY LOAM, 8-5% SLOPE (EbC2)
GLENFORD SILT LOAM, 8-15% SLOPE (GfC)
GUERNSEY SILTY CLAY LOAM, 8-15% SLOPE (GuC2)
WESTMORELAND COSHOCTON SILT, 8-15% SLOPE (WmC)
WESTMORELAND COSHOCTON SILT, 15-25% SLOPE (WmD)
- THE PRE-EXISTING SITE CONDITION IS UNDEVELOPED AGRICULTURAL AND WOODEN LAND. THE SITE IS BORDERED BY AGRICULTURAL LAND THAT IS PLANNED FOR INDUSTRIAL DEVELOPMENT TO THE NORTH BY MAGES DEVELOPMENT AND AGRICULTURAL LAND TO THE SOUTH, EAST AND WEST.
- SEQUENCE OF CONSTRUCTION
- DURING CONSTRUCTION CONTRACTOR SHALL INSTALL/PLACE ORANGE MESH CONSTRUCTION/BARRIER FENCING ALONG THE DESIGNATED STREAM CORRIDOR PROTECTION ZONE LINE WHICH RUNS ADJACENT TO THE PROJECT SITE. A SIGN INDICATING THE SPACE AS A "STREAM CORRIDOR PROTECTION ZONE - NO DISTURBANCE PERMITTED" TO BE INSTALLED EVERY 250-300 FEET.
1.

INSTALL ALL TEMPORARY EROSION CONTROL MEASURES. INSPECTION OF EROSION CONTROL MEASURE AS OUTLINED IN SWPPP NOTES. REPAIRS AND/ OR REPLACEMENTS SHALL BE MADE AS NEEDED.

2.

CONSTRUCT TEMPORARY PARKING, DRIVE AND STORAGE AREA.

3.

BEGIN CLEARING & GRUBBING AS NEEDED.

4.

STRIP AND STOCKPILE TOPSOIL.

5.

BEGIN GRADING THE SITE. MAKING SURE THAT EROSION CONTROL MEASURES ARE IN PLACE, WORKING PROPERLY AND MAINTAINED THROUGHOUT GRADING OPERATIONS.

6.

TEMPORARY SEED DISTURBED AREAS.

7.

BEGIN CONSTRUCTION OF BUILDING PADS AND STRUCTURES.

8.

INSTALL UTILITIES AS DESIGNED.

9.

REDISTRIBUTE TOPSOIL PER LANDSCAPE PLAN. PERMANENTLY SEED, MULCH & LANDSCAPE REMAINDER OF PERVIOUS AREAS.

10.

COMPLETE BUILDING CONSTRUCTION.

11.

PERFORM SITE PAVING.

12.

COMPLETE POST CONSTRUCTION WALK THROUGH WITH THE ENGINEER.

13.

REMOVE EROSION AND SEDIMENT CONTROL MEASURES AFTER PERMANENT VEGETATION HAS BEEN ESTABLISHED.
- EROSION AND SEDIMENT CONTROL NARRATIVE
- PLAN ENGINEERS:

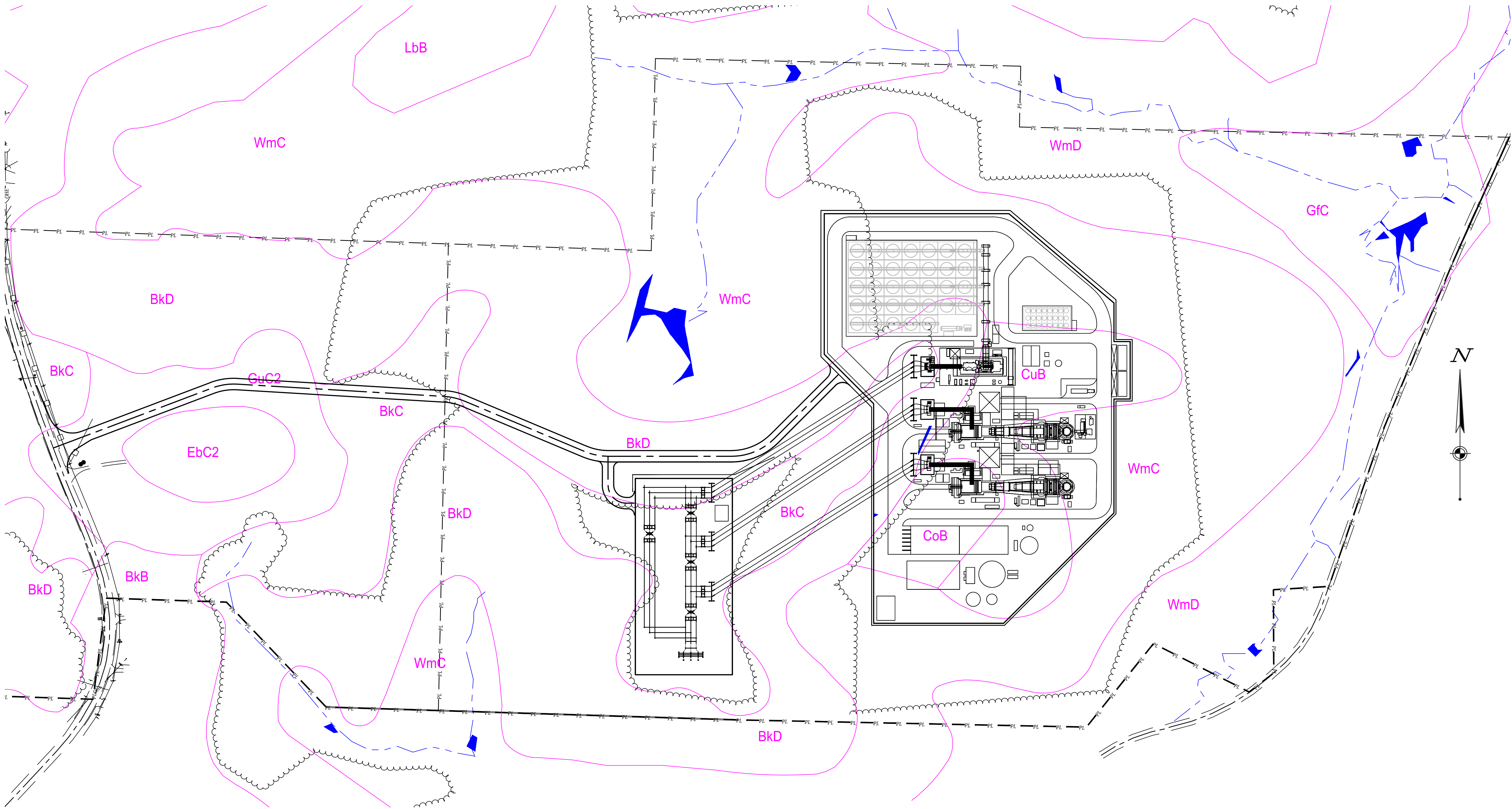
CESO, INC.
402 2ND STREET SE, SUITE 310
CANTON, OHIO 44702
PHONE: (330) 451-0975
FAX: (330) 451-0983

DEVELOPER:

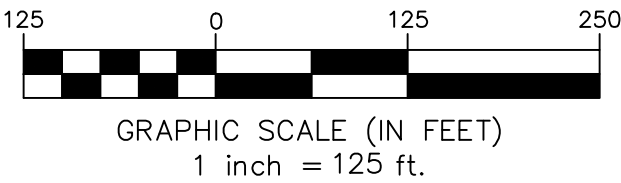
CARROLL COUNTY ENERGERY, LLC
31 MILK STREET
SUITE 1001
BOSTON, MA 02109
- EROSION & SEDIMENT SEDIMENT CONTROL: EROSION AND SEDIMENT RUNOFF SHALL BE CONTROLLED THROUGH A COMBINATION OF EROSION CONTROL DEVICES AS SHOWN ON THE EROSION CONTROL PLAN AND DETAIL SHEETS.
- MAINTENANCE: MAINTENANCE OF THE EROSION AND SEDIMENT CONTROL ITEMS SHALL BE IN ACCORDANCE WITH THE NOTES LISTED ON THIS SHEET. SEE THE SITE NOTES AND SEQUENCE OF CONSTRUCTION NOTES SHOWN ON THIS SHEET FOR ADDITIONAL INFORMATION.
- | REVISIONS
NO. | DATE | DESCRIPTION |
|------------------|------|-------------|
| | | |
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| | | |
- CarrollCountyENERGY
- SWPPP NOTES
- CARROLL COUNTY ENERGY
- WASHINGTON TOWNSHIP CARROLL COUNTY, OHIO
- ENGINEERS • ARCHITECTS
SURVEYORS

CESO

402 2nd STREET SE, SUITE 310
CANTON, OH 44702
PH (330) 451-0975 FAX (330) 451-0983
WWW.CESOTNC.COM
- | | |
|-----------|----------------|
| ISSUE: | 1 |
| DATE: | 9/18/2013 |
| JOB NO.: | 5188 |
| DESIGN: | JDM |
| DRAWN: | JEC |
| CHECKED: | ARROLL, COUNTY |
| SHEET NO. | SW-2 |
- Z:\ADVANCED POWER\5188 - CARROLL COUNTY ELECTRIC\CIVIL\PLAN\5188 - CCE SWPPP.DWG - 9/18/2013 2:22 PM



SITE SOIL BREAKDOWN				
SOIL SYMBOL	SOIL NAME	SLOPE	AREA (ACRES)	AREA (PERCENT OF TOTAL)
BkB	BERKS SHALY SILT LOAM	3-8%	0.6	0.60%
BkC	BERKS SHALY SILT LOAM	8-15%	11.1	11.16%
BkD	BERKS SHALY SILT LOAM	15-25%	24.2	24.32%
CoB	COSHOCTON-KEENE SILT LOAM	3-8%	1.9	1.91%
CuB	CULLEOKA SILT LOAM	3-8%	5.4	5.43%
EbC2	ELBA SILTY CLAY LOAM	8-15%	1.6	1.61%
GfC	GLENFORD SILT LOAM	8-15%	5.7	5.73%
GuC2	GUERNSEY SILTY CLAY LOAM	8-15%	5.4	5.43%
WmC	WESTMORELAND COSHOCTON SILT	8-15%	27.1	27.23%
WmD	WESTMORELAND COSHOCTON SILT	15-25%	16.5	16.58%
			99.5	100.00%



REVISIONS		DATE	DESCRIPTION
NO.			

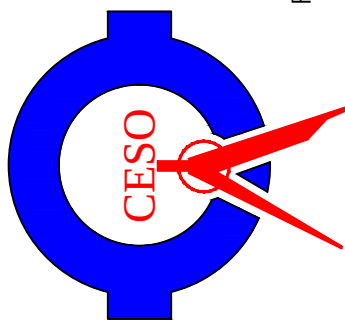
CarrollCountyENERGY

SWPPP - EXISTING SITE SOILS

CARROLL COUNTY ENERGY

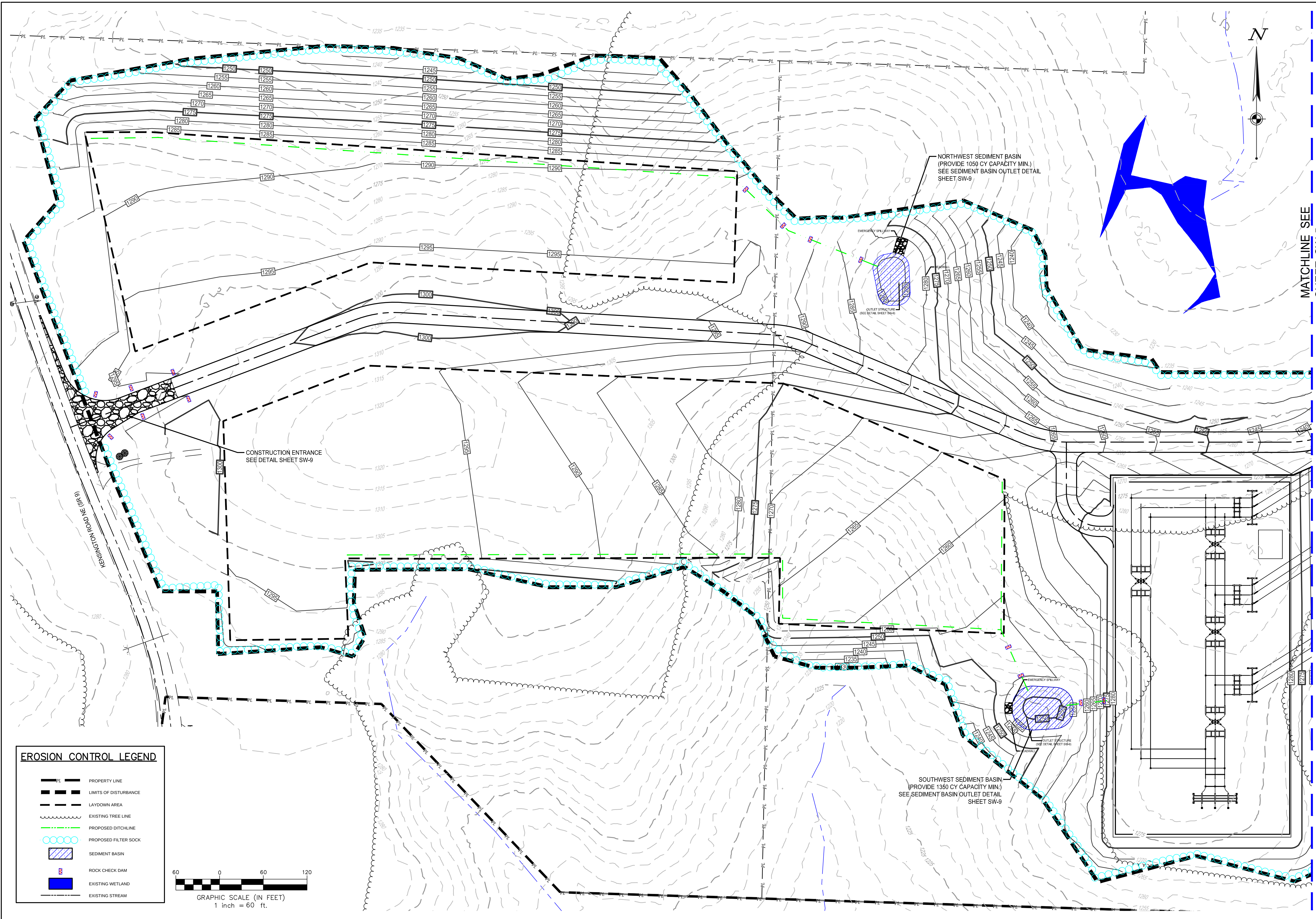
WASHINGTON TOWNSHIP CARROLL COUNTY, OHIO

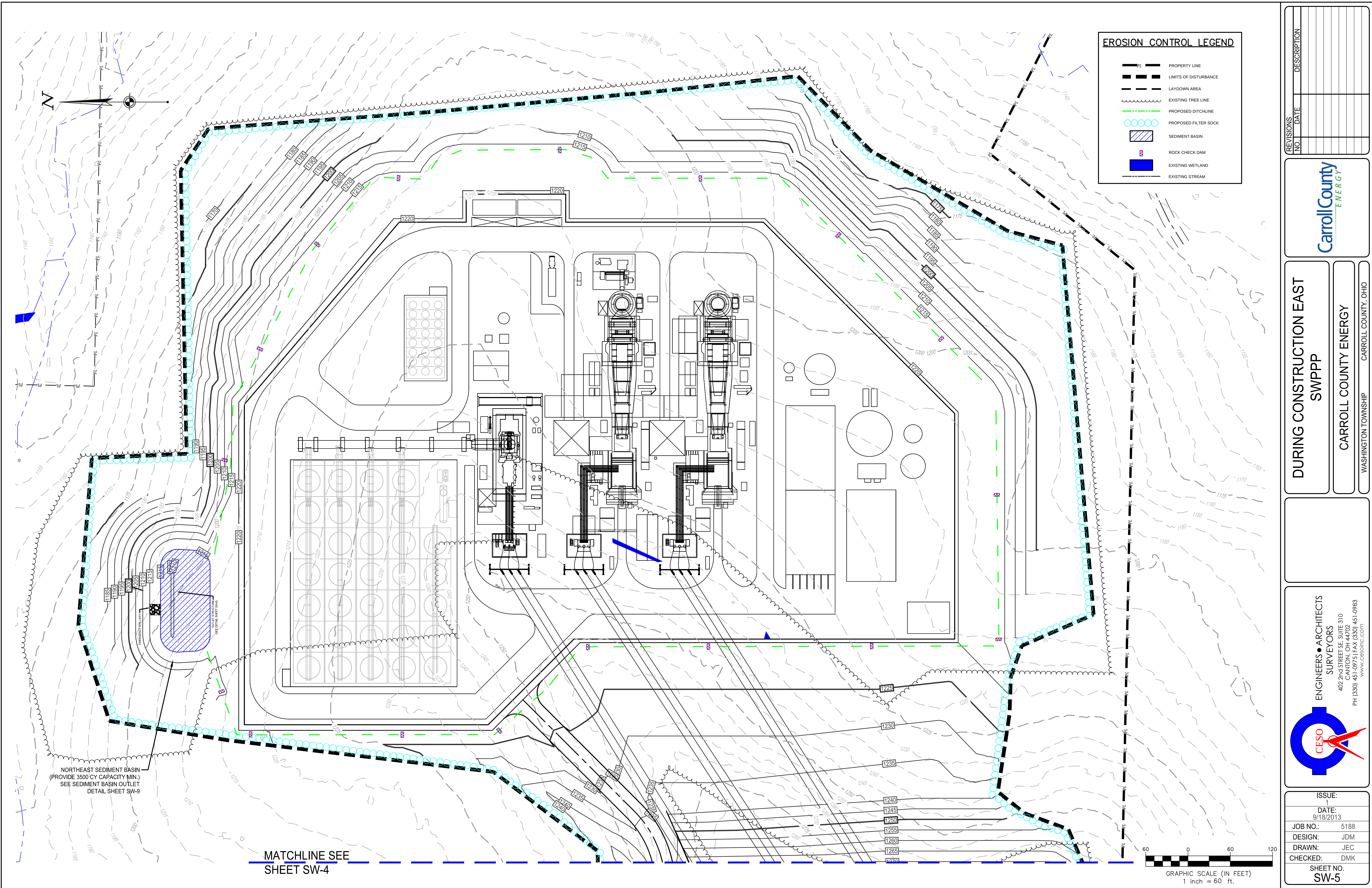
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DATE:	9/18/2013
JOB NO.:	5188
DESIGN:	JDM
DRAWN:	JEC
CHECKED:	DMK
SHEET NO.	SW-3





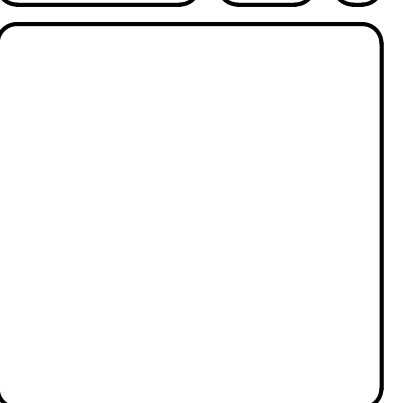
REVISIONS	DESCRIPTION	
	NO.	DATE



DURING CONSTRUCTION EAST SWPPP

CARROLL COUNTY ENERGY

WASHINGTON TOWNSHIP CARROLL COUNTY, OHIO



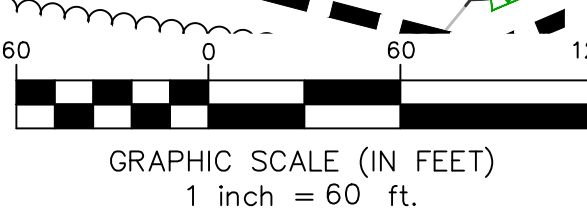
**ENGINEERS • ARCHITECTS
SURVEYORS**
402 2nd STREET SE SUITE 310
CANTON, OH 44702
PH (330) 451-0975 FAX (330) 451-0983
WWW.CESOTNC.COM

ISSUE:	1
DATE:	9/18/2013
JOB NO.:	5188
DESIGN:	JDM
DRAWN:	JEC
CHECKED:	DMK
SHEET NO.	SW-5

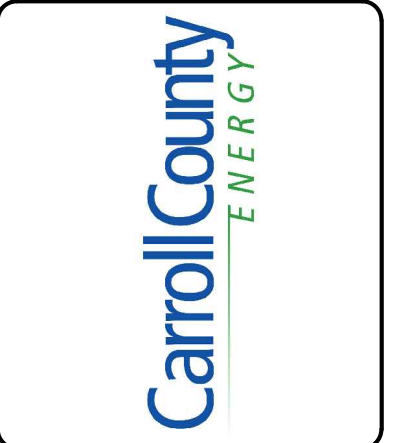


EROSION CONTROL LEGEND

— PL —	PROPERTY LINE
---	LIMITS OF DISTURBANCE
---	LAYDOWN AREA
~~~~~	EXISTING TREE LINE
---	PROPOSED DITCHLINE
[Hatched Box]	SEDIMENT BASIN
[Blue Box]	EXISTING WETLAND
---	EXISTING STREAM
[Green Box]	PROPOSED CATCH BASIN
---	PROPOSED STORM PIPE
[Dotted Box]	PROPOSED FLEXTERRA



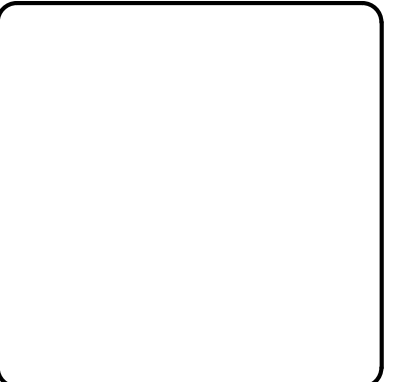
REVISIONS NO.	DATE	DESCRIPTION



**POST CONSTRUCTION WEST SWPPP**

**CARROLL COUNTY ENERGY**

WASHINGTON TOWNSHIP CARROLL COUNTY, OHIO

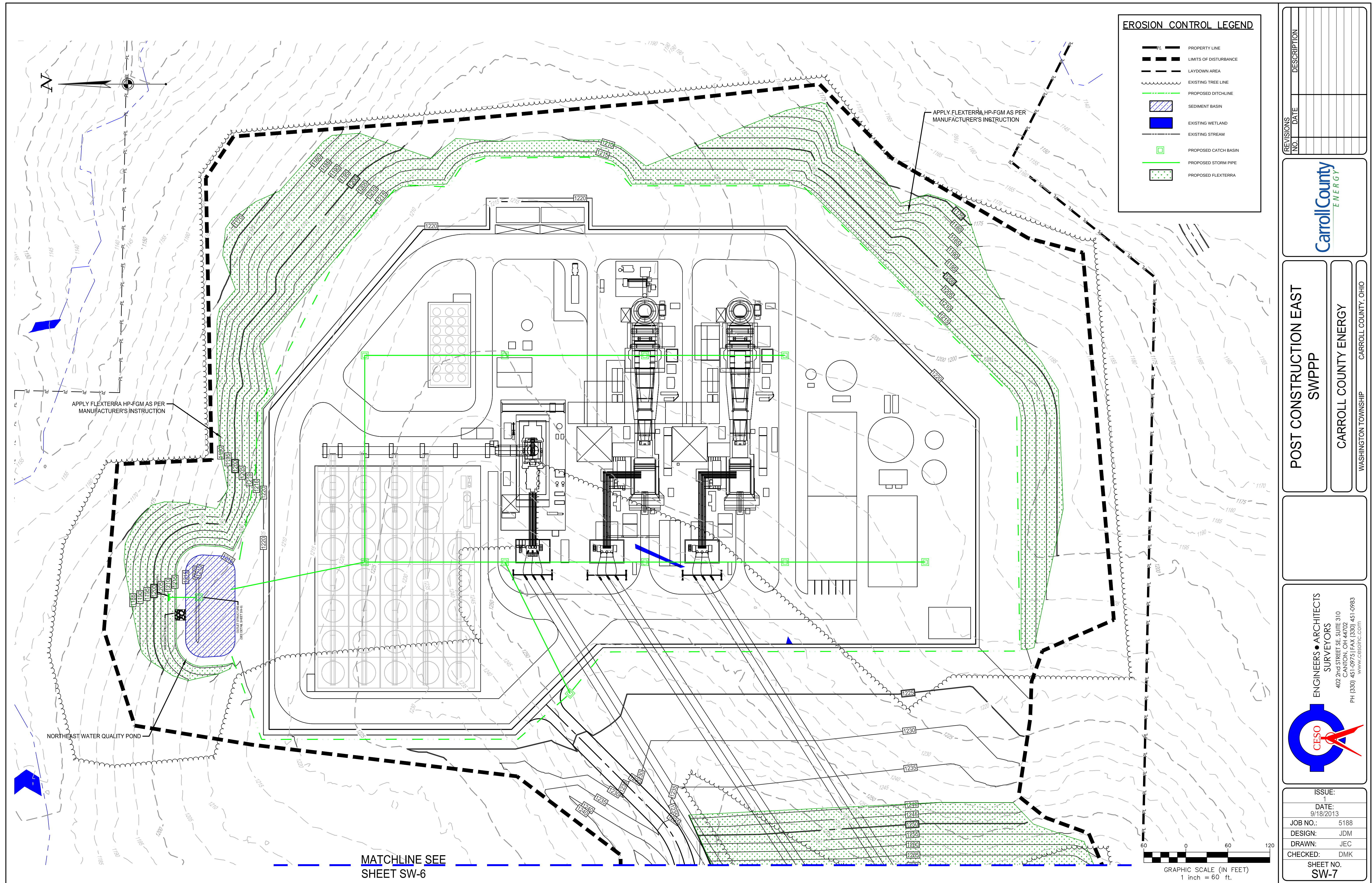


**ENGINEERS • ARCHITECTS SURVEYORS**

**CESO**

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CANTON, OH 44702  
PH (330) 451-0975 FAX (330) 451-0983  
WWW.CESONC.COM

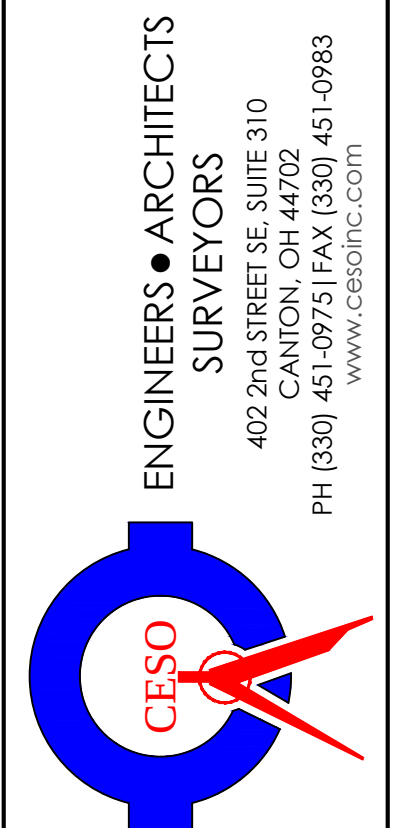
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DATE:	9/18/2013
JOB NO.:	5188
DESIGN:	JDM
DRAWN:	JEC
CHECKED:	DMK
SHEET NO.	SW-6

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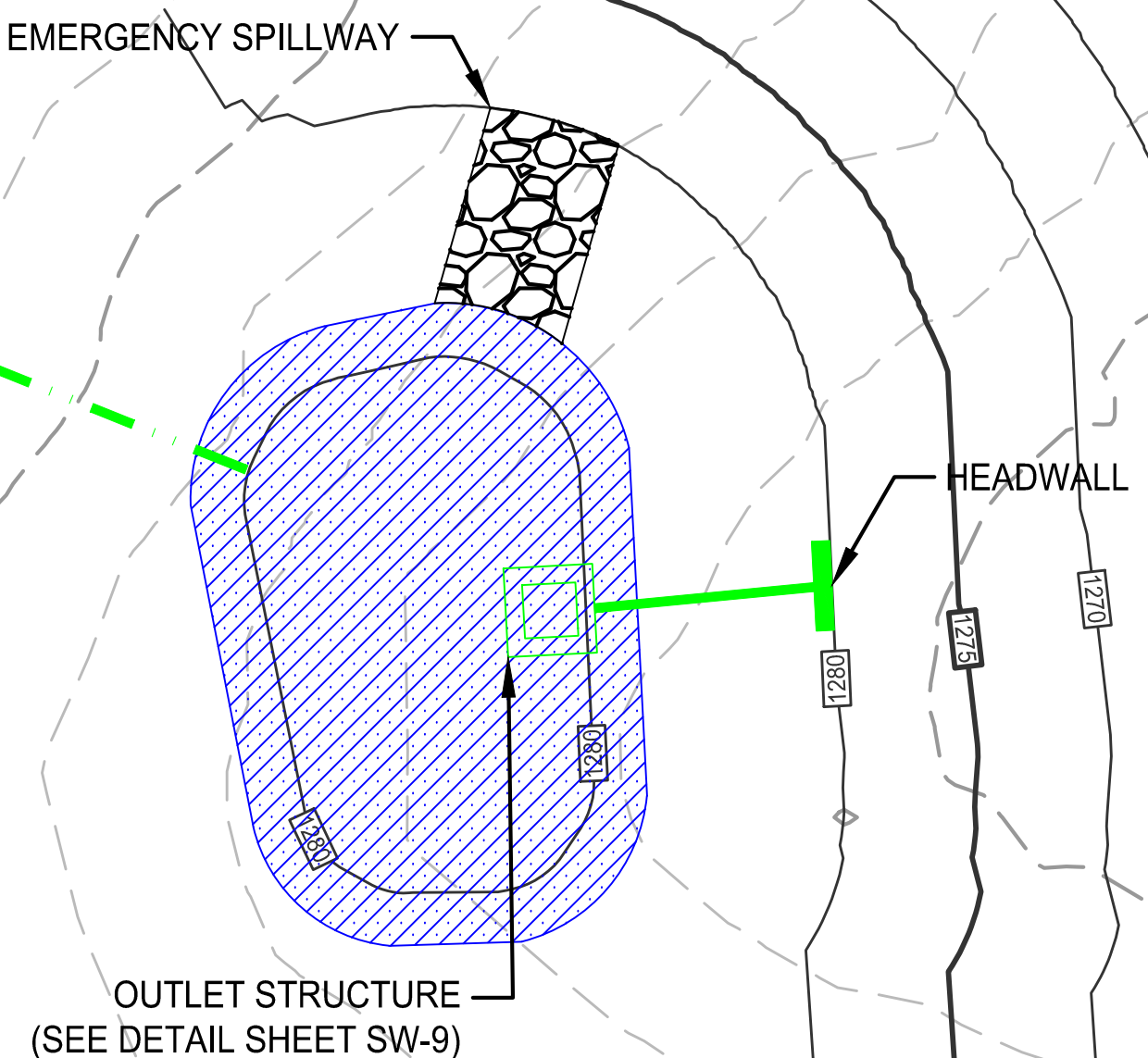
POST CONSTRUCTION EAST  
SWPPP

CARROLL COUNTY ENERGY

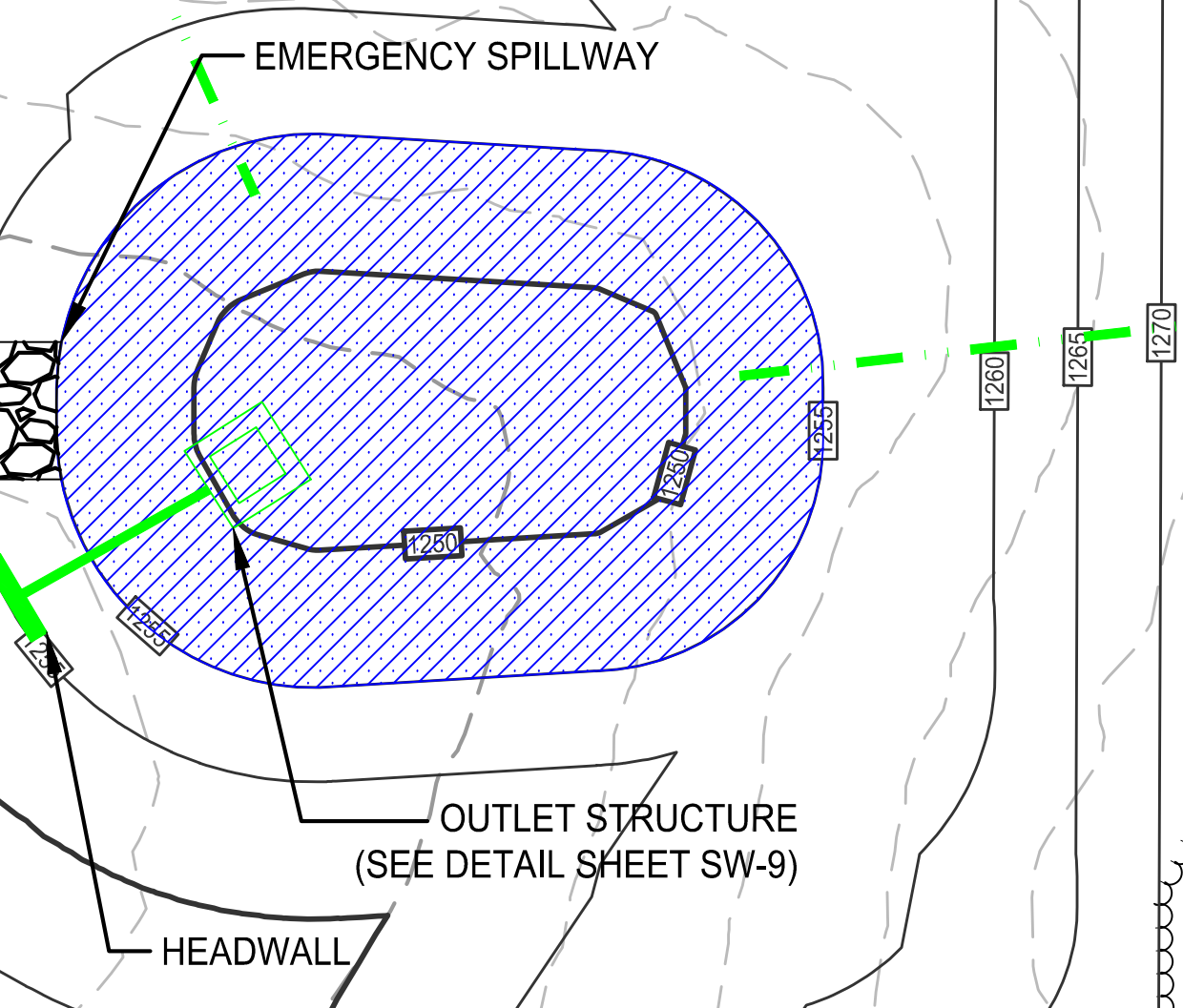
WASHINGTON TOWNSHIP      CARROLL COUNTY, OHIO



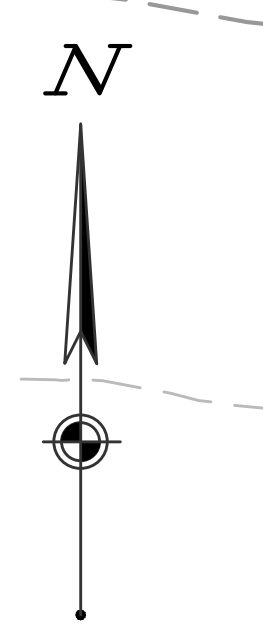
ISSUE: 1	
DATE: 9/18/2013	
JOB NO.:	5188
DESIGN:	JDM
DRAWN:	JEC
CHECKED:	DMK
SHEET NO. SW-7	



NORTHWEST WATER QUALITY POND  
1:20 SCALE



SOUTHWEST WATER QUALITY POND  
1:20 SCALE



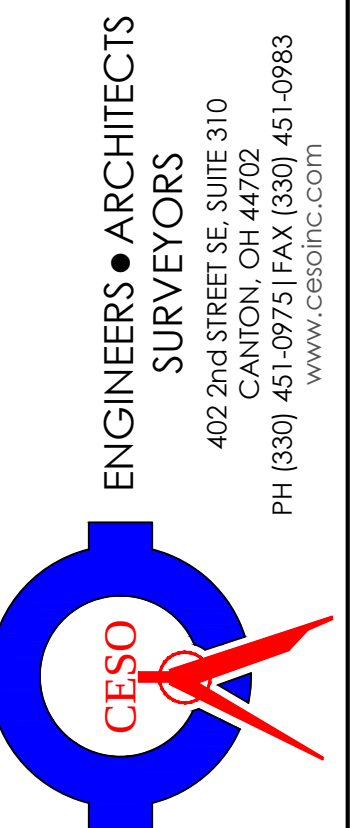
NORTHEAST WATER QUALITY POND  
1:20 SCALE

Water Quality Pond Table										
Pond	Length (ft)	Width (ft)	L:W Ratio	Depth (ft)	Total Volume (CF)	Water Quality Volume (ac-ft)	Area Drained (acres)	Discharge Rate (cfs)	Drawdown Time (hr)	Orifice Elevation (ft)
NORTHWEST	100	50	2:1	5	10800	0.25	10	0.09	48.6	1277
SOUTHEAST	100	50	2:1	5	17550	0.32	13	0.09	48.9	1249
NORTHEAST	150	75	2:1	5	31050	0.84	34	0.04	49.3	1210

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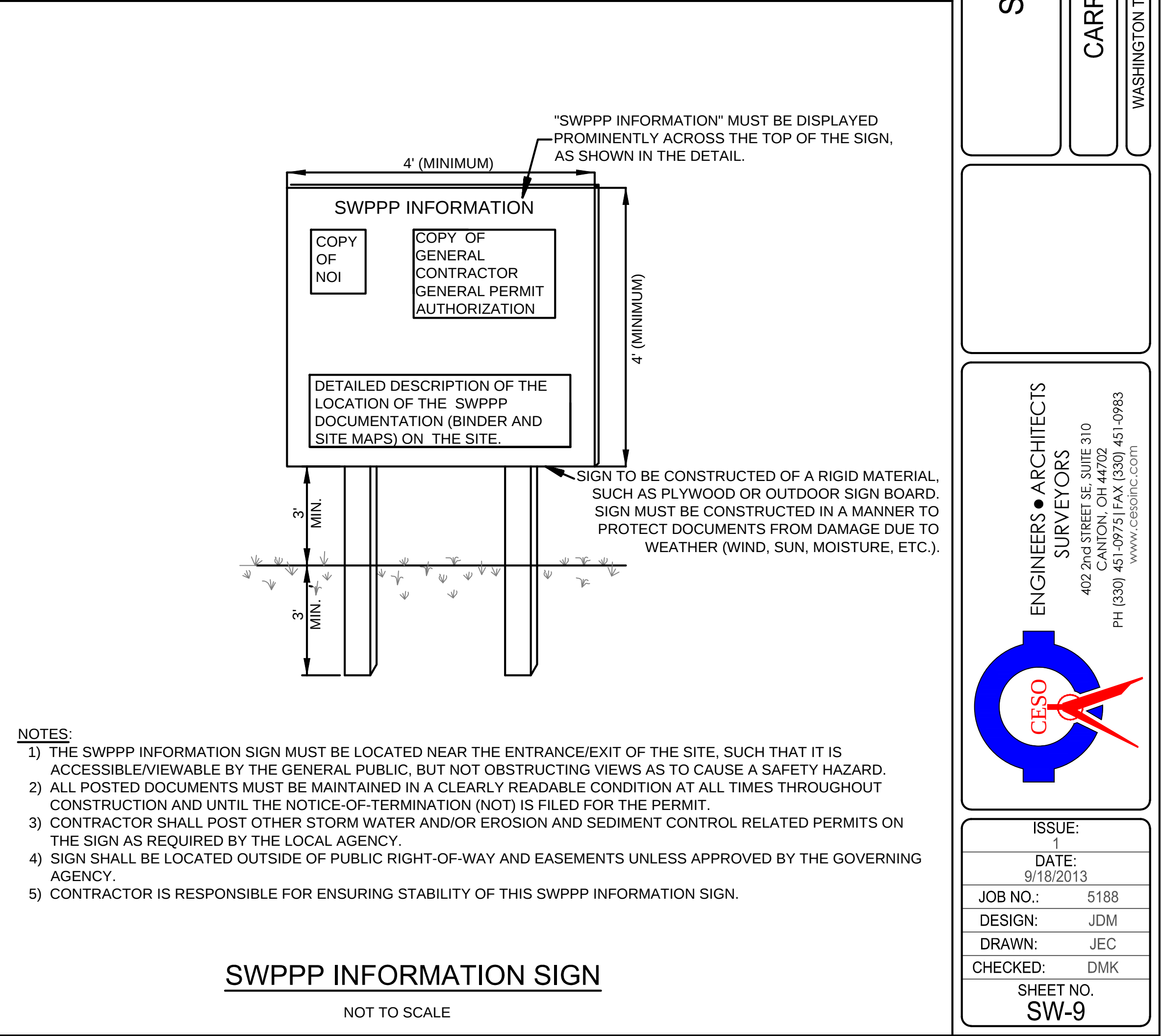
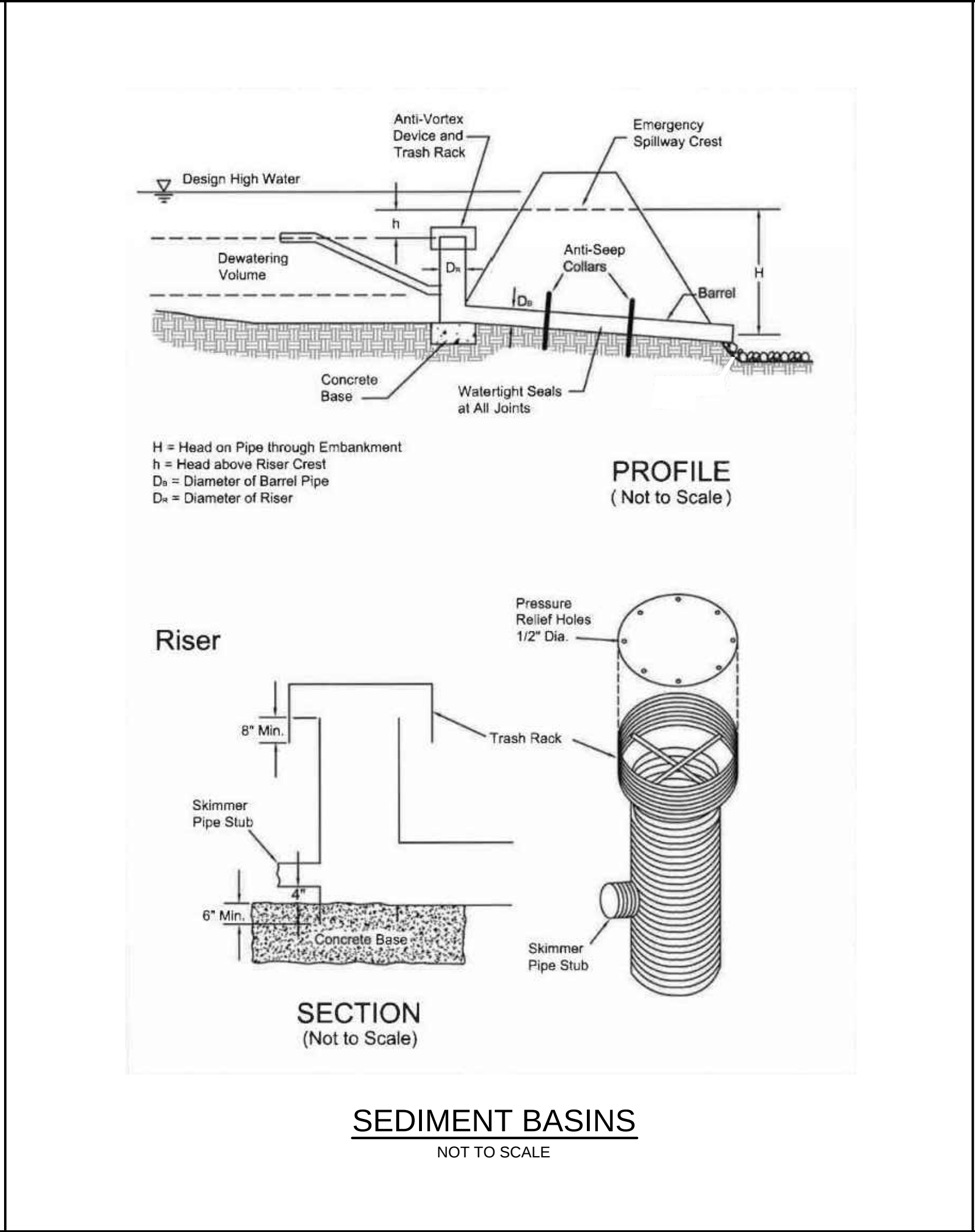
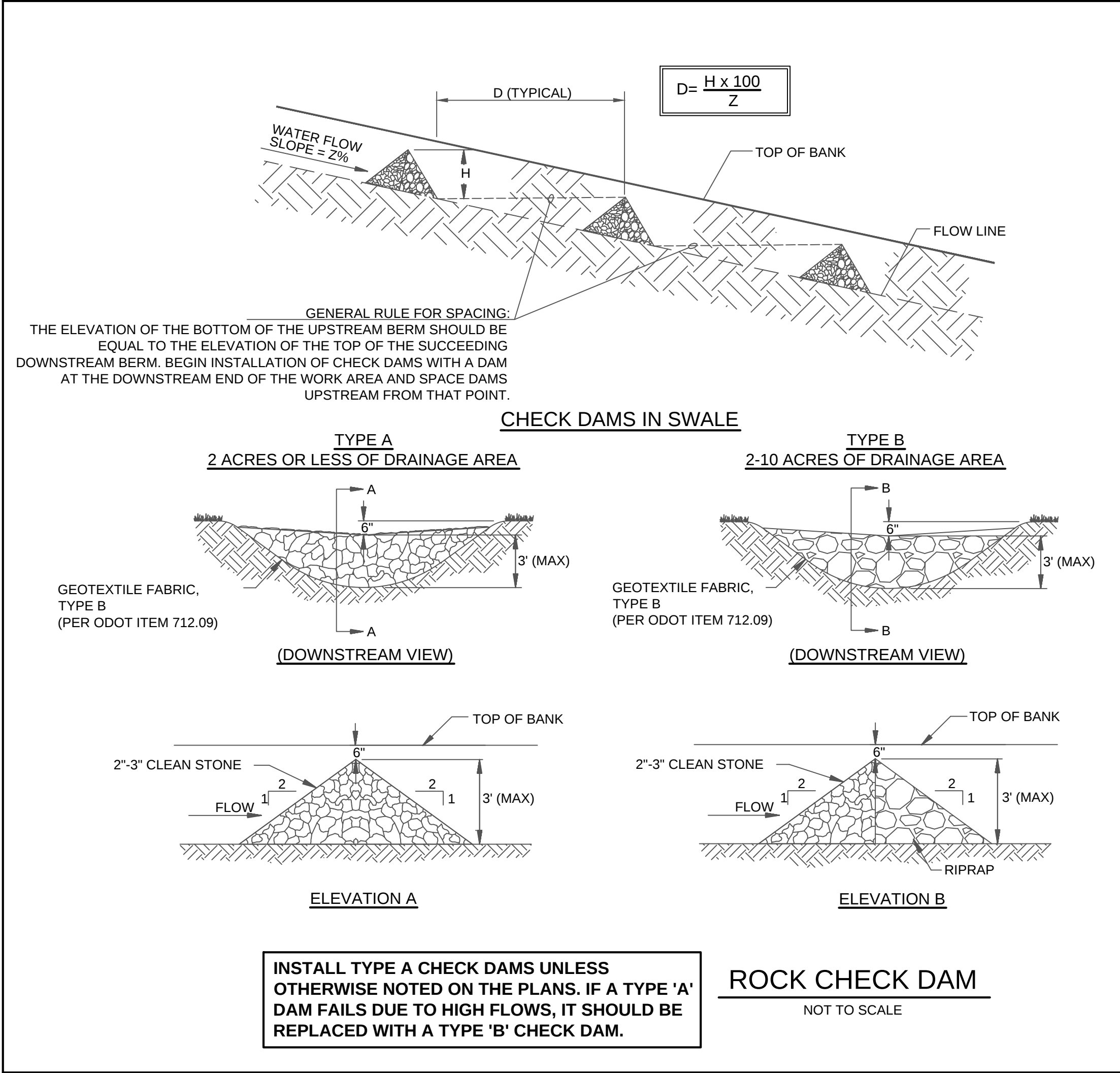
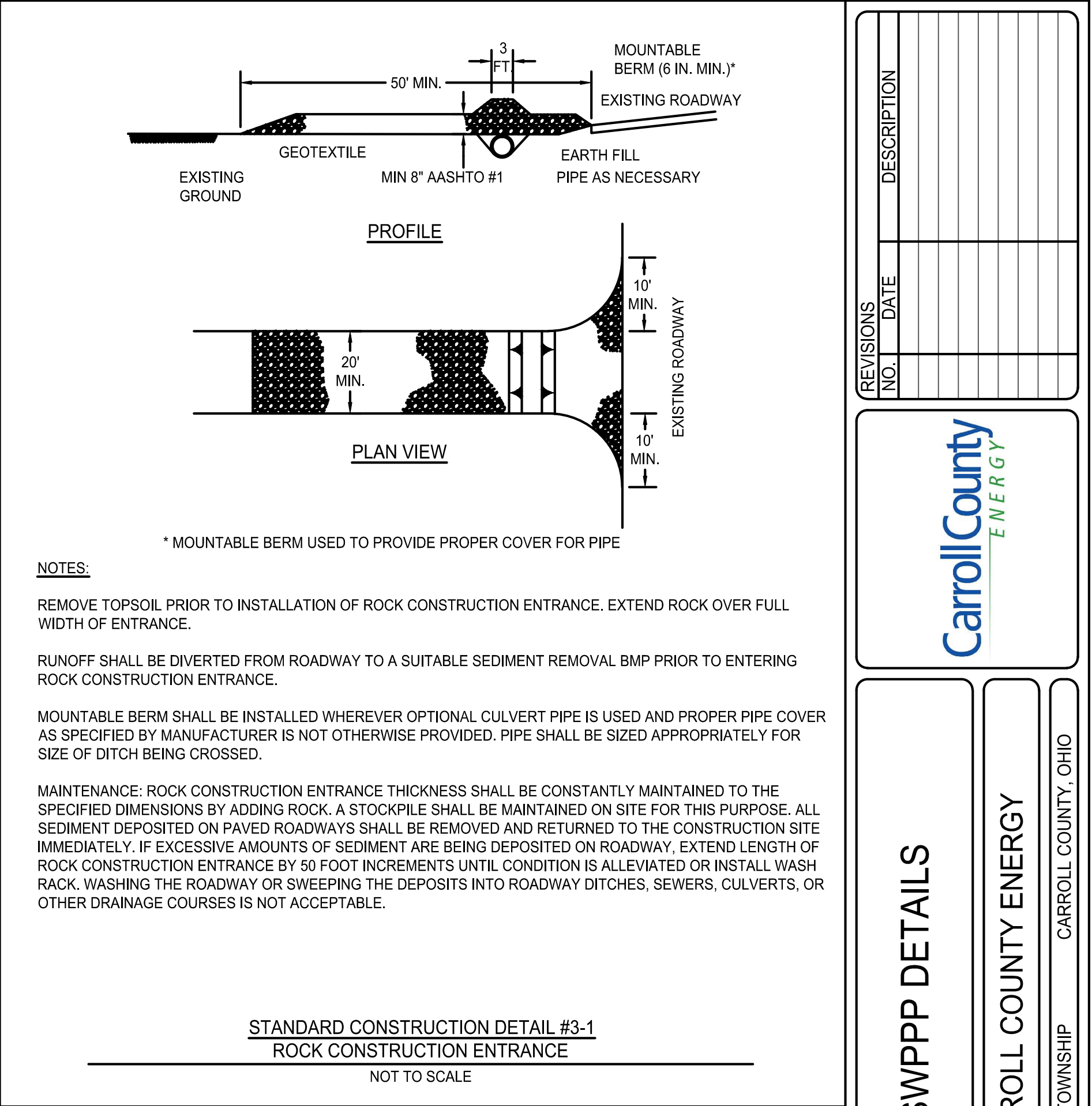
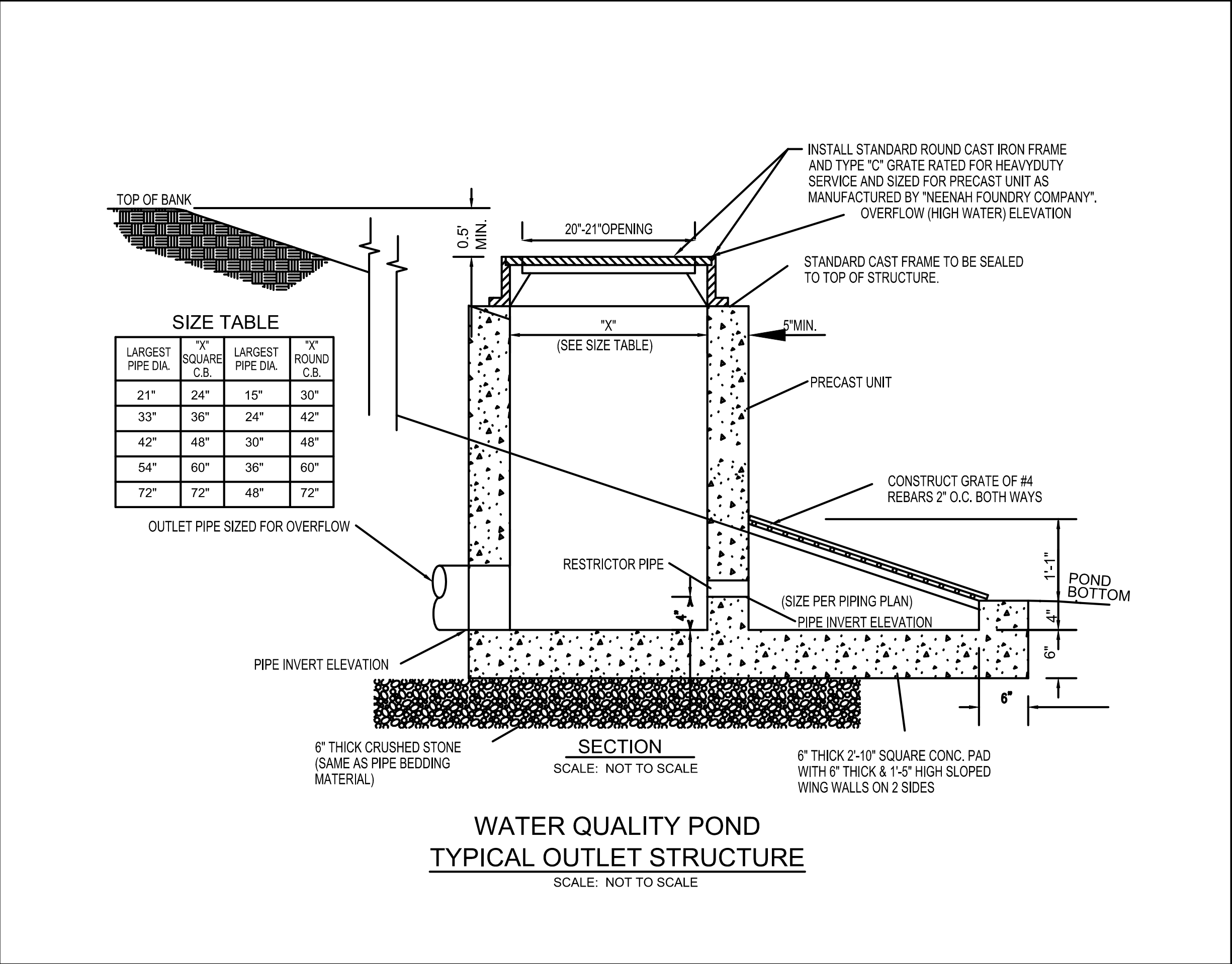
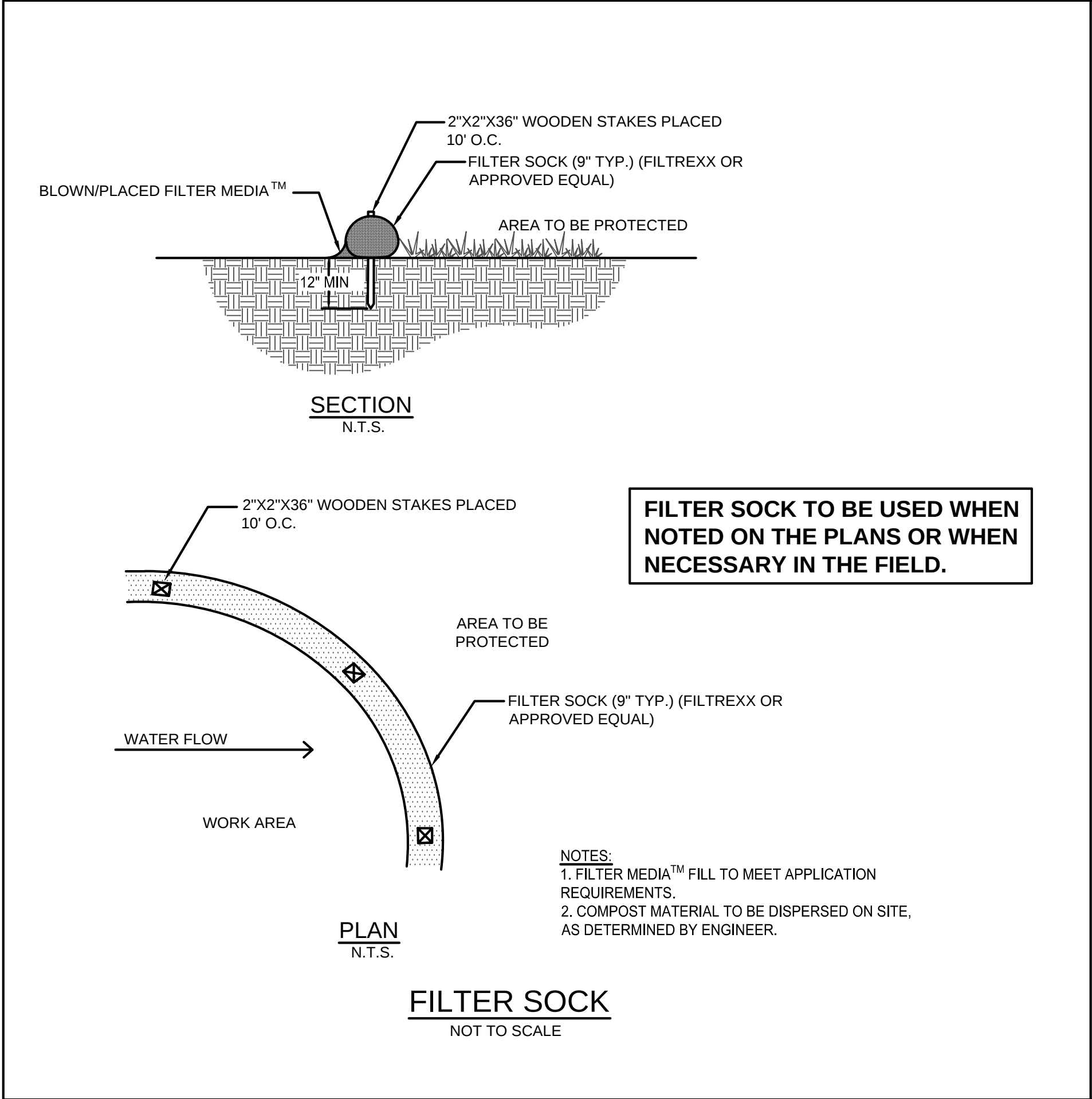
# WATER QUALITY PONDS

CARROLL COUNTY ENERGY

WASHINGTON TOWNSHIP  
CARROLL COUNTY, OHIO

ISSUE: 1	
DATE: 9/18/2013	
JOB NO.:	5188
DESIGN:	JDM
DRAWN:	JEC
CHECKED:	DMK

SHEET NO.  
SW-8



# **APPENDIX B**

## **WATER QUALITY CALCULATIONS**

### WATER QUALITY VOLUME CALCULATIONS

Project: Carroll County Energy  
Location: Washington Township, Carroll County, Ohio

Job Number: 5188  
Date: September 17, 2013

Northwest Pond

WQv = C * P * A / 12	
WQv = Water Quality Volume in acre-feet	0.14
C = Runoff Coefficient (per calculation provided in ODNR Manual)	0.23
P = 0.75 in precipitation depth	0.75
A = area draining into the BMP in acres	10.00

Southwest Pond

WQv = C * P * A / 12	
WQv = Water Quality Volume in acre-feet	0.19
C = Runoff Coefficient (per calculation provided in ODNR Manual)	0.23
P = 0.75 in precipitation depth	0.75
A = area draining into the BMP in acres	13.00

Northeast Pond

WQv = C * P * A / 12	
WQv = Water Quality Volume in acre-feet	0.49
C = Runoff Coefficient (per calculation provided in ODNR Manual)	0.23
P = 0.75 in precipitation depth	0.75
A = area draining into the BMP in acres	34.00

Table 1

Land Use	C
Industrial & Commercial	0.8
High Density Residential (>15 dwelling/acre)	0.5
Medium Density Residential (4-15 dwelling/acre)	0.4
Low Density Residential (1-4 dwelling/acre)	0.3
Open Space and Recreational Areas	0.2

Table 1

Land Use	C
Industrial & Commercial	0.8
High Density Residential (>15 dwelling/acre)	0.5
Medium Density Residential (4-15 dwelling/acre)	0.4
Low Density Residential (1-4 dwelling/acre)	0.3
Open Space and Recreational Areas	0.2

Table 1

Land Use	C
Industrial & Commercial	0.8
High Density Residential (>15 dwelling/acre)	0.5
Medium Density Residential (4-15 dwelling/acre)	0.4
Low Density Residential (1-4 dwelling/acre)	0.3
Open Space and Recreational Areas	0.2

Permanent Pool / Extended  
Detention Volume =  
1.2 * WQv = 0.17

Permanent Pool / Extended  
Detention Volume =  
1.2 * WQv = 0.22

Permanent Pool / Extended  
Detention Volume =  
1.2 * WQv = 0.59

# **APPENDIX C**

## **WATER QUALITY POND DISCHARGE RATE CALCULATIONS**

Updated: 9/17/13  
DETENTION BASIN DRAW DOWN CALCULATIONS

Project:..... CARROLL COUNTY ENERGY  
Location:..... WASHINGTON TWP.,  
CARROLL COUNTY, OH

Job No: 5188  
Date: Sept. 17, 2013

**Northwest Pond**

Basin Invert:..... 1277.00 Ft.  
Increments:..... 0.10 Ft.

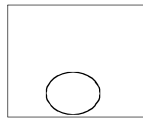
Elev.	Height	Area (SF)	Incremental Volume	Cubic Ft.	Total Volume	Acre Ft.
1277.00	0.00 Ft.	175 SF	0 CFT	0 CFT	0.000 Ac/Ft.	
1277.10	0.10 Ft.	352 SF	26 CFT	26 CFT	0.001 Ac/Ft.	
1277.20	0.20 Ft.	528 SF	44 CFT	70 CFT	0.002 Ac/Ft.	
1277.30	0.30 Ft.	705 SF	62 CFT	132 CFT	0.003 Ac/Ft.	
1277.40	0.40 Ft.	881 SF	79 CFT	211 CFT	0.005 Ac/Ft.	
1277.50	0.50 Ft.	1,058 SF	97 CFT	308 CFT	0.007 Ac/Ft.	
1277.60	0.60 Ft.	1,235 SF	115 CFT	423 CFT	0.010 Ac/Ft.	
1277.70	0.70 Ft.	1,411 SF	132 CFT	555 CFT	0.013 Ac/Ft.	
1277.80	0.80 Ft.	1,588 SF	150 CFT	705 CFT	0.016 Ac/Ft.	
1277.90	0.90 Ft.	1,764 SF	168 CFT	873 CFT	0.020 Ac/Ft.	
1278.00	1.00 Ft.	1,058 SF	141 CFT	1,014 CFT	0.023 Ac/Ft.	
1278.10	1.10 Ft.	1,142 SF	110 CFT	1,124 CFT	0.026 Ac/Ft.	
1278.20	1.20 Ft.	1,226 SF	118 CFT	1,242 CFT	0.029 Ac/Ft.	
1278.30	1.30 Ft.	1,311 SF	127 CFT	1,369 CFT	0.031 Ac/Ft.	
1278.40	1.40 Ft.	1,395 SF	135 CFT	1,504 CFT	0.035 Ac/Ft.	
1278.50	1.50 Ft.	1,479 SF	144 CFT	1,648 CFT	0.038 Ac/Ft.	
1278.60	1.60 Ft.	1,563 SF	152 CFT	1,800 CFT	0.041 Ac/Ft.	
1278.70	1.70 Ft.	1,647 SF	161 CFT	1,961 CFT	0.045 Ac/Ft.	
1278.80	1.80 Ft.	1,732 SF	169 CFT	2,130 CFT	0.049 Ac/Ft.	
1278.90	1.90 Ft.	1,816 SF	177 CFT	2,307 CFT	0.053 Ac/Ft.	
1279.00	2.00 Ft.	1,479 SF	165 CFT	2,472 CFT	0.057 Ac/Ft.	
1279.10	2.10 Ft.	1,527 SF	150 CFT	2,622 CFT	0.060 Ac/Ft.	
1279.20	2.20 Ft.	1,574 SF	155 CFT	2,777 CFT	0.064 Ac/Ft.	
1279.30	2.30 Ft.	1,622 SF	160 CFT	2,937 CFT	0.067 Ac/Ft.	
1279.40	2.40 Ft.	1,670 SF	165 CFT	3,102 CFT	0.071 Ac/Ft.	
1279.50	2.50 Ft.	1,718 SF	169 CFT	3,271 CFT	0.075 Ac/Ft.	
1279.60	2.60 Ft.	1,765 SF	174 CFT	3,445 CFT	0.079 Ac/Ft.	
1279.70	2.70 Ft.	1,813 SF	179 CFT	3,624 CFT	0.083 Ac/Ft.	
1279.80	2.80 Ft.	1,861 SF	184 CFT	3,808 CFT	0.087 Ac/Ft.	
1279.90	2.90 Ft.	1,908 SF	188 CFT	3,996 CFT	0.092 Ac/Ft.	
1280.00	3.00 Ft.	1,956 SF	193 CFT	4,189 CFT	0.096 Ac/Ft.	
1280.10	3.10 Ft.	2,009 SF	198 CFT	4,388 CFT	0.101 Ac/Ft.	
1280.20	3.20 Ft.	2,063 SF	204 CFT	4,591 CFT	0.105 Ac/Ft.	
1280.30	3.30 Ft.	2,116 SF	209 CFT	4,800 CFT	0.110 Ac/Ft.	
1280.40	3.40 Ft.	2,170 SF	214 CFT	5,014 CFT	0.115 Ac/Ft.	
1280.50	3.50 Ft.	2,223 SF	220 CFT	5,234 CFT	0.120 Ac/Ft.	
1280.60	3.60 Ft.	2,276 SF	225 CFT	5,459 CFT	0.125 Ac/Ft.	
1280.70	3.70 Ft.	2,330 SF	230 CFT	5,689 CFT	0.131 Ac/Ft.	
1280.80	3.80 Ft.	2,383 SF	236 CFT	5,925 CFT	0.136 Ac/Ft.	
1280.90	3.90 Ft.	2,437 SF	241 CFT	6,166 CFT	0.142 Ac/Ft.	
1281.00	4.00 Ft.	2,490 SF	246 CFT	6,412 CFT	0.147 Ac/Ft.	
1281.10	4.10 Ft.	2,697 SF	259 CFT	6,672 CFT	0.153 Ac/Ft.	
1281.20	4.20 Ft.	2,903 SF	280 CFT	6,952 CFT	0.160 Ac/Ft.	
1281.30	4.30 Ft.	3,110 SF	301 CFT	7,252 CFT	0.166 Ac/Ft.	
1281.40	4.40 Ft.	3,316 SF	321 CFT	7,574 CFT	0.174 Ac/Ft.	
1281.50	4.50 Ft.	3,523 SF	342 CFT	7,916 CFT	0.182 Ac/Ft.	
1281.60	4.60 Ft.	3,730 SF	363 CFT	8,278 CFT	0.190 Ac/Ft.	
1281.70	4.70 Ft.	3,936 SF	383 CFT	8,661 CFT	0.199 Ac/Ft.	
1281.80	4.80 Ft.	4,143 SF	404 CFT	9,065 CFT	0.208 Ac/Ft.	
1281.90	4.90 Ft.	4,349 SF	425 CFT	9,490 CFT	0.218 Ac/Ft.	
1282.00	5.00 Ft.	4,556 SF	445 CFT	9,935 CFT	0.228 Ac/Ft.	
1282.10	5.10 Ft.	4,557 SF	456 CFT	10,391 CFT	0.239 Ac/Ft.	
1282.20	5.20 Ft.	4,558 SF	456 CFT	10,847 CFT	0.249 Ac/Ft.	
1282.30	5.30 Ft.	4,559 SF	456 CFT	11,303 CFT	0.259 Ac/Ft.	
1282.40	5.40 Ft.	4,560 SF	456 CFT	11,758 CFT	0.270 Ac/Ft.	
1282.50	5.50 Ft.	4,561 SF	456 CFT	12,215 CFT	0.280 Ac/Ft.	
1282.60	5.60 Ft.	4,562 SF	456 CFT	12,671 CFT	0.291 Ac/Ft.	
1282.70	5.70 Ft.	4,563 SF	456 CFT	13,127 CFT	0.301 Ac/Ft.	
1282.80	5.80 Ft.	4,564 SF	456 CFT	13,583 CFT	0.312 Ac/Ft.	
1282.90	5.90 Ft.	4,565 SF	456 CFT	14,040 CFT	0.322 Ac/Ft.	
1283.00	6.00 Ft.	4,566 SF	457 CFT	14,496 CFT	0.333 Ac/Ft.	

# OUTFLOW STRUCTURE DATA

$$Q=C*A*(2*G*H)^{.5}$$

ORIFICE 1

Northwest Pond



Inv. El. 1277.00  
Diameter 1.25 In.  
C = 0.60  
Q Full= 0.01 CFS

Inverts can not be any lower than..... 1277.00

Elev.	Height	Orifice 1 Control	Total Flow	Time Vol/Flow = Time	Sum of Time (Min)	(Hour)
1277.00	0.00 Ft.	0.00 CFS	0.00 CFS	0.0	Min.	0.0
1277.10	0.10 Ft.	0.01 CFS	0.01 CFS	49.5	Min.	0.8
1277.20	0.20 Ft.	0.02 CFS	0.02 CFS	46.5	Min.	1.6
1277.30	0.30 Ft.	0.02 CFS	0.02 CFS	50.3	Min.	2.4
1277.40	0.40 Ft.	0.02 CFS	0.02 CFS	54.6	Min.	3.3
1277.50	0.50 Ft.	0.03 CFS	0.03 CFS	58.8	Min.	4.3
1277.60	0.60 Ft.	0.03 CFS	0.03 CFS	62.9	Min.	5.4
1277.70	0.70 Ft.	0.03 CFS	0.03 CFS	66.8	Min.	6.5
1277.80	0.80 Ft.	0.04 CFS	0.04 CFS	70.4	Min.	7.7
1277.90	0.90 Ft.	0.04 CFS	0.04 CFS	73.9	Min.	8.9
1278.00	1.00 Ft.	0.04 CFS	0.04 CFS	58.9	Min.	9.9
1278.10	1.10 Ft.	0.04 CFS	0.04 CFS	43.6	Min.	10.6
1278.20	1.20 Ft.	0.04 CFS	0.04 CFS	44.9	Min.	11.4
1278.30	1.30 Ft.	0.05 CFS	0.05 CFS	46.1	Min.	12.1
1278.40	1.40 Ft.	0.05 CFS	0.05 CFS	47.3	Min.	12.9
1278.50	1.50 Ft.	0.05 CFS	0.05 CFS	48.5	Min.	13.7
1278.60	1.60 Ft.	0.05 CFS	0.05 CFS	49.7	Min.	14.5
1278.70	1.70 Ft.	0.05 CFS	0.05 CFS	50.8	Min.	15.4
1278.80	1.80 Ft.	0.05 CFS	0.05 CFS	51.9	Min.	16.3
1278.90	1.90 Ft.	0.06 CFS	0.06 CFS	53.0	Min.	17.1
1279.00	2.00 Ft.	0.06 CFS	0.06 CFS	47.9	Min.	17.9
1279.10	2.10 Ft.	0.06 CFS	0.06 CFS	42.7	Min.	18.7
1279.20	2.20 Ft.	0.06 CFS	0.06 CFS	43.0	Min.	19.4
1279.30	2.30 Ft.	0.06 CFS	0.06 CFS	43.3	Min.	20.1
1279.40	2.40 Ft.	0.06 CFS	0.06 CFS	43.6	Min.	20.8
1279.50	2.50 Ft.	0.06 CFS	0.06 CFS	44.0	Min.	21.5
1279.60	2.60 Ft.	0.07 CFS	0.07 CFS	44.3	Min.	22.3
1279.70	2.70 Ft.	0.07 CFS	0.07 CFS	44.7	Min.	23.0
1279.80	2.80 Ft.	0.07 CFS	0.07 CFS	45.0	Min.	23.8
1279.90	2.90 Ft.	0.07 CFS	0.07 CFS	45.4	Min.	24.5
1280.00	3.00 Ft.	0.07 CFS	0.07 CFS	45.7	Min.	25.3
1280.10	3.10 Ft.	0.07 CFS	0.07 CFS	46.1	Min.	26.1
1280.20	3.20 Ft.	0.07 CFS	0.07 CFS	46.6	Min.	26.8
1280.30	3.30 Ft.	0.07 CFS	0.07 CFS	47.1	Min.	27.6
1280.40	3.40 Ft.	0.08 CFS	0.08 CFS	47.6	Min.	28.4
1280.50	3.50 Ft.	0.08 CFS	0.08 CFS	48.0	Min.	29.2
1280.60	3.60 Ft.	0.08 CFS	0.08 CFS	48.5	Min.	30.0
1280.70	3.70 Ft.	0.08 CFS	0.08 CFS	49.0	Min.	30.8
1280.80	3.80 Ft.	0.08 CFS	0.08 CFS	49.4	Min.	31.7
1280.90	3.90 Ft.	0.08 CFS	0.08 CFS	49.9	Min.	32.5
1281.00	4.00 Ft.	0.08 CFS	0.08 CFS	50.4	Min.	33.3
1281.10	4.10 Ft.	0.08 CFS	0.08 CFS	52.4	Min.	34.2
1281.20	4.20 Ft.	0.08 CFS	0.08 CFS	55.8	Min.	35.1
1281.30	4.30 Ft.	0.08 CFS	0.08 CFS	59.2	Min.	36.1
1281.40	4.40 Ft.	0.09 CFS	0.09 CFS	62.6	Min.	37.2
1281.50	4.50 Ft.	0.09 CFS	0.09 CFS	65.9	Min.	38.3
1281.60	4.60 Ft.	0.09 CFS	0.09 CFS	69.1	Min.	39.4
1281.70	4.70 Ft.	0.09 CFS	0.09 CFS	72.2	Min.	40.6
1281.80	4.80 Ft.	0.09 CFS	0.09 CFS	75.3	Min.	41.9
1281.90	4.90 Ft.	0.09 CFS	0.09 CFS	78.3	Min.	43.2
1282.00	5.00 Ft.	0.09 CFS	0.09 CFS	81.3	Min.	44.5
1282.10	5.10 Ft.	0.09 CFS	0.09 CFS	82.4	Min.	45.9
1282.20	5.20 Ft.	0.09 CFS	0.09 CFS	81.6	Min.	47.3
1282.30	5.30 Ft.	0.09 CFS	0.09 CFS	80.8	Min.	48.6
1282.40	5.40 Ft.	0.09 CFS	0.09 CFS	80.1	Min.	50.0
1282.50	5.50 Ft.	0.10 CFS	0.10 CFS	79.4	Min.	51.3
1282.60	5.60 Ft.	0.10 CFS	0.10 CFS	78.7	Min.	52.6
1282.70	5.70 Ft.	0.10 CFS	0.10 CFS	78.0	Min.	53.9
1282.80	5.80 Ft.	0.10 CFS	0.10 CFS	77.3	Min.	55.2
1282.90	5.90 Ft.	0.10 CFS	0.10 CFS	76.7	Min.	56.5
1283.00	6.00 Ft.	0.10 CFS	0.10 CFS	76.0	Min.	57.7

Updated: 9/17/13  
DETENTION BASIN DRAW DOWN CALCULATIONS

Project:..... CARROLL COUNTY ENERGY  
Location:..... WASHINGTON TWP.,  
CARROLL COUNTY, OH

Job No: 5188  
Date: Sept. 17, 2013

**Southwest Pond**

Basin Invert:..... 1249.00 Ft.  
Increments:..... 0.10 Ft.

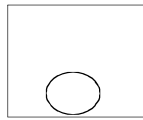
Elev.	Height	Area (SF)	Incremental Volume	Cubic Ft.	Total Volume	Acre Ft.
1249.00	0.00 Ft.	135 SF	0 CFT	0 CFT	0.000 Ac/Ft.	
1249.10	0.10 Ft.	387 SF	26 CFT	26 CFT	0.001 Ac/Ft.	
1249.20	0.20 Ft.	639 SF	51 CFT	77 CFT	0.002 Ac/Ft.	
1249.30	0.30 Ft.	891 SF	76 CFT	154 CFT	0.004 Ac/Ft.	
1249.40	0.40 Ft.	1,143 SF	102 CFT	256 CFT	0.006 Ac/Ft.	
1249.50	0.50 Ft.	1,395 SF	127 CFT	382 CFT	0.009 Ac/Ft.	
1249.60	0.60 Ft.	1,647 SF	152 CFT	535 CFT	0.012 Ac/Ft.	
1249.70	0.70 Ft.	1,899 SF	177 CFT	712 CFT	0.016 Ac/Ft.	
1249.80	0.80 Ft.	2,151 SF	202 CFT	914 CFT	0.021 Ac/Ft.	
1249.90	0.90 Ft.	2,403 SF	228 CFT	1,142 CFT	0.026 Ac/Ft.	
1250.00	1.00 Ft.	1,395 SF	190 CFT	1,332 CFT	0.031 Ac/Ft.	
1250.10	1.10 Ft.	1,488 SF	144 CFT	1,476 CFT	0.034 Ac/Ft.	
1250.20	1.20 Ft.	1,581 SF	153 CFT	1,630 CFT	0.037 Ac/Ft.	
1250.30	1.30 Ft.	1,675 SF	163 CFT	1,792 CFT	0.041 Ac/Ft.	
1250.40	1.40 Ft.	1,768 SF	172 CFT	1,965 CFT	0.045 Ac/Ft.	
1250.50	1.50 Ft.	1,861 SF	181 CFT	2,146 CFT	0.049 Ac/Ft.	
1250.60	1.60 Ft.	1,954 SF	191 CFT	2,337 CFT	0.054 Ac/Ft.	
1250.70	1.70 Ft.	2,047 SF	200 CFT	2,537 CFT	0.058 Ac/Ft.	
1250.80	1.80 Ft.	2,141 SF	209 CFT	2,746 CFT	0.063 Ac/Ft.	
1250.90	1.90 Ft.	2,234 SF	219 CFT	2,965 CFT	0.068 Ac/Ft.	
1251.00	2.00 Ft.	1,861 SF	205 CFT	3,170 CFT	0.073 Ac/Ft.	
1251.10	2.10 Ft.	1,913 SF	189 CFT	3,358 CFT	0.077 Ac/Ft.	
1251.20	2.20 Ft.	1,966 SF	194 CFT	3,552 CFT	0.082 Ac/Ft.	
1251.30	2.30 Ft.	2,018 SF	199 CFT	3,752 CFT	0.086 Ac/Ft.	
1251.40	2.40 Ft.	2,070 SF	204 CFT	3,956 CFT	0.091 Ac/Ft.	
1251.50	2.50 Ft.	2,123 SF	210 CFT	4,166 CFT	0.096 Ac/Ft.	
1251.60	2.60 Ft.	2,175 SF	215 CFT	4,380 CFT	0.101 Ac/Ft.	
1251.70	2.70 Ft.	2,227 SF	220 CFT	4,601 CFT	0.106 Ac/Ft.	
1251.80	2.80 Ft.	2,279 SF	225 CFT	4,826 CFT	0.111 Ac/Ft.	
1251.90	2.90 Ft.	2,332 SF	231 CFT	5,056 CFT	0.116 Ac/Ft.	
1252.00	3.00 Ft.	2,384 SF	236 CFT	5,292 CFT	0.121 Ac/Ft.	
1252.10	3.10 Ft.	2,442 SF	241 CFT	5,533 CFT	0.127 Ac/Ft.	
1252.20	3.20 Ft.	2,500 SF	247 CFT	5,781 CFT	0.133 Ac/Ft.	
1252.30	3.30 Ft.	2,558 SF	253 CFT	6,033 CFT	0.139 Ac/Ft.	
1252.40	3.40 Ft.	2,616 SF	259 CFT	6,292 CFT	0.144 Ac/Ft.	
1252.50	3.50 Ft.	2,674 SF	264 CFT	6,557 CFT	0.151 Ac/Ft.	
1252.60	3.60 Ft.	2,732 SF	270 CFT	6,827 CFT	0.157 Ac/Ft.	
1252.70	3.70 Ft.	2,790 SF	276 CFT	7,103 CFT	0.163 Ac/Ft.	
1252.80	3.80 Ft.	2,848 SF	282 CFT	7,385 CFT	0.170 Ac/Ft.	
1252.90	3.90 Ft.	2,906 SF	288 CFT	7,673 CFT	0.176 Ac/Ft.	
1253.00	4.00 Ft.	2,964 SF	293 CFT	7,966 CFT	0.183 Ac/Ft.	
1253.10	4.10 Ft.	3,028 SF	300 CFT	8,266 CFT	0.190 Ac/Ft.	
1253.20	4.20 Ft.	3,091 SF	306 CFT	8,572 CFT	0.197 Ac/Ft.	
1253.30	4.30 Ft.	3,155 SF	312 CFT	8,884 CFT	0.204 Ac/Ft.	
1253.40	4.40 Ft.	3,219 SF	319 CFT	9,203 CFT	0.211 Ac/Ft.	
1253.50	4.50 Ft.	3,283 SF	325 CFT	9,528 CFT	0.219 Ac/Ft.	
1253.60	4.60 Ft.	3,346 SF	331 CFT	9,859 CFT	0.226 Ac/Ft.	
1253.70	4.70 Ft.	3,410 SF	338 CFT	10,197 CFT	0.234 Ac/Ft.	
1253.80	4.80 Ft.	3,474 SF	344 CFT	10,541 CFT	0.242 Ac/Ft.	
1253.90	4.90 Ft.	3,537 SF	351 CFT	10,892 CFT	0.250 Ac/Ft.	
1254.00	5.00 Ft.	3,601 SF	357 CFT	11,249 CFT	0.258 Ac/Ft.	
1254.10	5.10 Ft.	3,670 SF	364 CFT	11,612 CFT	0.267 Ac/Ft.	
1254.20	5.20 Ft.	3,740 SF	371 CFT	11,983 CFT	0.275 Ac/Ft.	
1254.30	5.30 Ft.	3,809 SF	377 CFT	12,360 CFT	0.284 Ac/Ft.	
1254.40	5.40 Ft.	3,879 SF	384 CFT	12,745 CFT	0.293 Ac/Ft.	
1254.50	5.50 Ft.	3,948 SF	391 CFT	13,136 CFT	0.302 Ac/Ft.	
1254.60	5.60 Ft.	4,017 SF	398 CFT	13,534 CFT	0.311 Ac/Ft.	
1254.70	5.70 Ft.	4,087 SF	405 CFT	13,939 CFT	0.320 Ac/Ft.	
1254.80	5.80 Ft.	4,156 SF	412 CFT	14,352 CFT	0.329 Ac/Ft.	
1254.90	5.90 Ft.	4,226 SF	419 CFT	14,771 CFT	0.339 Ac/Ft.	
1255.00	6.00 Ft.	4,295 SF	426 CFT	15,197 CFT	0.349 Ac/Ft.	

# OUTFLOW STRUCTURE DATA

$$Q=C*A*(2*G*H)^{.5}$$

ORIFICE 1

Southwest Pond



Inv. El. 1249.00  
Diameter 1.25 In.  
C = 0.60  
Q Full= 0.01 CFS

Inverts can not be any lower than..... 1249.00

Elev.	Height	Orifice 1 Control	Total Flow	Time Vol/Flow = Time		Sum of Time (Min) (Hour)	
1249.00	0.00 Ft.	0.00 CFS	0.00 CFS	0.0	Min.	0.0	0.0
1249.10	0.10 Ft.	0.01 CFS	0.01 CFS	49.0	Min.	49.0	0.8
1249.20	0.20 Ft.	0.02 CFS	0.02 CFS	54.2	Min.	103.2	1.7
1249.30	0.30 Ft.	0.02 CFS	0.02 CFS	62.4	Min.	165.6	2.8
1249.40	0.40 Ft.	0.02 CFS	0.02 CFS	70.0	Min.	235.7	3.9
1249.50	0.50 Ft.	0.03 CFS	0.03 CFS	77.0	Min.	312.7	5.2
1249.60	0.60 Ft.	0.03 CFS	0.03 CFS	83.5	Min.	396.1	6.6
1249.70	0.70 Ft.	0.03 CFS	0.03 CFS	89.5	Min.	485.6	8.1
1249.80	0.80 Ft.	0.04 CFS	0.04 CFS	95.1	Min.	580.7	9.7
1249.90	0.90 Ft.	0.04 CFS	0.04 CFS	100.4	Min.	681.1	11.4
1250.00	1.00 Ft.	0.04 CFS	0.04 CFS	79.2	Min.	760.4	12.7
1250.10	1.10 Ft.	0.04 CFS	0.04 CFS	57.2	Min.	817.6	13.6
1250.20	1.20 Ft.	0.04 CFS	0.04 CFS	58.2	Min.	875.7	14.6
1250.30	1.30 Ft.	0.05 CFS	0.05 CFS	59.2	Min.	934.9	15.6
1250.40	1.40 Ft.	0.05 CFS	0.05 CFS	60.2	Min.	995.2	16.6
1250.50	1.50 Ft.	0.05 CFS	0.05 CFS	61.2	Min.	1056.4	17.6
1250.60	1.60 Ft.	0.05 CFS	0.05 CFS	62.3	Min.	1118.7	18.6
1250.70	1.70 Ft.	0.05 CFS	0.05 CFS	63.3	Min.	1182.0	19.7
1250.80	1.80 Ft.	0.05 CFS	0.05 CFS	64.3	Min.	1246.3	20.8
1250.90	1.90 Ft.	0.06 CFS	0.06 CFS	65.4	Min.	1311.7	21.9
1251.00	2.00 Ft.	0.06 CFS	0.06 CFS	59.6	Min.	1371.2	22.9
1251.10	2.10 Ft.	0.06 CFS	0.06 CFS	53.6	Min.	1424.8	23.7
1251.20	2.20 Ft.	0.06 CFS	0.06 CFS	53.7	Min.	1478.6	24.6
1251.30	2.30 Ft.	0.06 CFS	0.06 CFS	54.0	Min.	1532.5	25.5
1251.40	2.40 Ft.	0.06 CFS	0.06 CFS	54.2	Min.	1586.7	26.4
1251.50	2.50 Ft.	0.06 CFS	0.06 CFS	54.4	Min.	1641.1	27.4
1251.60	2.60 Ft.	0.07 CFS	0.07 CFS	54.7	Min.	1695.8	28.3
1251.70	2.70 Ft.	0.07 CFS	0.07 CFS	54.9	Min.	1750.7	29.2
1251.80	2.80 Ft.	0.07 CFS	0.07 CFS	55.2	Min.	1805.9	30.1
1251.90	2.90 Ft.	0.07 CFS	0.07 CFS	55.5	Min.	1861.4	31.0
1252.00	3.00 Ft.	0.07 CFS	0.07 CFS	55.8	Min.	1917.2	32.0
1252.10	3.10 Ft.	0.07 CFS	0.07 CFS	56.1	Min.	1973.3	32.9
1252.20	3.20 Ft.	0.07 CFS	0.07 CFS	56.6	Min.	2029.9	33.8
1252.30	3.30 Ft.	0.07 CFS	0.07 CFS	57.0	Min.	2086.9	34.8
1252.40	3.40 Ft.	0.08 CFS	0.08 CFS	57.4	Min.	2144.3	35.7
1252.50	3.50 Ft.	0.08 CFS	0.08 CFS	57.9	Min.	2202.2	36.7
1252.60	3.60 Ft.	0.08 CFS	0.08 CFS	58.3	Min.	2260.5	37.7
1252.70	3.70 Ft.	0.08 CFS	0.08 CFS	58.7	Min.	2319.2	38.7
1252.80	3.80 Ft.	0.08 CFS	0.08 CFS	59.1	Min.	2378.3	39.6
1252.90	3.90 Ft.	0.08 CFS	0.08 CFS	59.6	Min.	2437.9	40.6
1253.00	4.00 Ft.	0.08 CFS	0.08 CFS	60.0	Min.	2497.9	41.6
1253.10	4.10 Ft.	0.08 CFS	0.08 CFS	60.5	Min.	2558.4	42.6
1253.20	4.20 Ft.	0.08 CFS	0.08 CFS	61.0	Min.	2619.4	43.7
1253.30	4.30 Ft.	0.08 CFS	0.08 CFS	61.5	Min.	2681.0	44.7
1253.40	4.40 Ft.	0.09 CFS	0.09 CFS	62.1	Min.	2743.0	45.7
1253.50	4.50 Ft.	0.09 CFS	0.09 CFS	62.6	Min.	2805.6	46.8
1253.60	4.60 Ft.	0.09 CFS	0.09 CFS	63.1	Min.	2868.8	47.8
1253.70	4.70 Ft.	0.09 CFS	0.09 CFS	63.6	Min.	2932.4	48.9
1253.80	4.80 Ft.	0.09 CFS	0.09 CFS	64.2	Min.	2996.6	49.9
1253.90	4.90 Ft.	0.09 CFS	0.09 CFS	64.7	Min.	3061.2	51.0
1254.00	5.00 Ft.	0.09 CFS	0.09 CFS	65.2	Min.	3126.4	52.1
1254.10	5.10 Ft.	0.09 CFS	0.09 CFS	65.7	Min.	3192.1	53.2
1254.20	5.20 Ft.	0.09 CFS	0.09 CFS	66.3	Min.	3258.5	54.3
1254.30	5.30 Ft.	0.09 CFS	0.09 CFS	66.9	Min.	3325.4	55.4
1254.40	5.40 Ft.	0.09 CFS	0.09 CFS	67.5	Min.	3392.9	56.5
1254.50	5.50 Ft.	0.10 CFS	0.10 CFS	68.1	Min.	3461.0	57.7
1254.60	5.60 Ft.	0.10 CFS	0.10 CFS	68.7	Min.	3529.7	58.8
1254.70	5.70 Ft.	0.10 CFS	0.10 CFS	69.3	Min.	3598.9	60.0
1254.80	5.80 Ft.	0.10 CFS	0.10 CFS	69.8	Min.	3668.7	61.1
1254.90	5.90 Ft.	0.10 CFS	0.10 CFS	70.4	Min.	3739.1	62.3
1255.00	6.00 Ft.	0.10 CFS	0.10 CFS	71.0	Min.	3810.1	63.5

Updated: 9/17/13  
DETENTION BASIN DRAW DOWN CALCULATIONS

Project:..... CARROLL COUNTY ENERGY  
Location:..... WASHINGTON TWP.,  
CARROLL COUNTY, OH

Job No: 5188  
Date: Sept. 17, 2013

**Northeast Pond**

Basin Invert:..... 1210.00 Ft.  
Increments:..... 0.10 Ft.

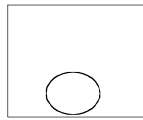
Elev.	Height	Area (SF)	Incremental Volume	Cubic Ft.	Total Volume	Acre Ft.
1210.00	0.00 Ft.	410 SF	0 CFT	0 CFT	0.000	Ac/Ft.
1210.10	0.10 Ft.	1,423 SF	92 CFT	92 CFT	0.002	Ac/Ft.
1210.20	0.20 Ft.	2,436 SF	193 CFT	285 CFT	0.007	Ac/Ft.
1210.30	0.30 Ft.	3,448 SF	294 CFT	579 CFT	0.013	Ac/Ft.
1210.40	0.40 Ft.	4,461 SF	395 CFT	974 CFT	0.022	Ac/Ft.
1210.50	0.50 Ft.	5,474 SF	497 CFT	1,471 CFT	0.034	Ac/Ft.
1210.60	0.60 Ft.	6,487 SF	598 CFT	2,069 CFT	0.047	Ac/Ft.
1210.70	0.70 Ft.	7,500 SF	699 CFT	2,768 CFT	0.064	Ac/Ft.
1210.80	0.80 Ft.	8,512 SF	801 CFT	3,569 CFT	0.082	Ac/Ft.
1210.90	0.90 Ft.	9,525 SF	902 CFT	4,471 CFT	0.103	Ac/Ft.
1211.00	1.00 Ft.	5,474 SF	750 CFT	5,221 CFT	0.120	Ac/Ft.
1211.10	1.10 Ft.	5,669 SF	557 CFT	5,778 CFT	0.133	Ac/Ft.
1211.20	1.20 Ft.	5,864 SF	577 CFT	6,355 CFT	0.146	Ac/Ft.
1211.30	1.30 Ft.	6,060 SF	596 CFT	6,951 CFT	0.160	Ac/Ft.
1211.40	1.40 Ft.	6,255 SF	616 CFT	7,567 CFT	0.174	Ac/Ft.
1211.50	1.50 Ft.	6,450 SF	635 CFT	8,202 CFT	0.188	Ac/Ft.
1211.60	1.60 Ft.	6,645 SF	655 CFT	8,857 CFT	0.203	Ac/Ft.
1211.70	1.70 Ft.	6,840 SF	674 CFT	9,531 CFT	0.219	Ac/Ft.
1211.80	1.80 Ft.	7,036 SF	694 CFT	10,225 CFT	0.235	Ac/Ft.
1211.90	1.90 Ft.	7,231 SF	713 CFT	10,938 CFT	0.251	Ac/Ft.
1212.00	2.00 Ft.	6,450 SF	684 CFT	11,622 CFT	0.267	Ac/Ft.
1212.10	2.10 Ft.	6,553 SF	650 CFT	12,272 CFT	0.282	Ac/Ft.
1212.20	2.20 Ft.	6,657 SF	660 CFT	12,933 CFT	0.297	Ac/Ft.
1212.30	2.30 Ft.	6,760 SF	671 CFT	13,603 CFT	0.312	Ac/Ft.
1212.40	2.40 Ft.	6,863 SF	681 CFT	14,285 CFT	0.328	Ac/Ft.
1212.50	2.50 Ft.	6,967 SF	691 CFT	14,976 CFT	0.344	Ac/Ft.
1212.60	2.60 Ft.	7,070 SF	702 CFT	15,678 CFT	0.360	Ac/Ft.
1212.70	2.70 Ft.	7,173 SF	712 CFT	16,390 CFT	0.376	Ac/Ft.
1212.80	2.80 Ft.	7,276 SF	722 CFT	17,113 CFT	0.393	Ac/Ft.
1212.90	2.90 Ft.	7,380 SF	733 CFT	17,845 CFT	0.410	Ac/Ft.
1213.00	3.00 Ft.	7,483 SF	743 CFT	18,588 CFT	0.427	Ac/Ft.
1213.10	3.10 Ft.	7,592 SF	754 CFT	19,342 CFT	0.444	Ac/Ft.
1213.20	3.20 Ft.	7,701 SF	765 CFT	20,107 CFT	0.462	Ac/Ft.
1213.30	3.30 Ft.	7,810 SF	776 CFT	20,882 CFT	0.479	Ac/Ft.
1213.40	3.40 Ft.	7,919 SF	786 CFT	21,669 CFT	0.497	Ac/Ft.
1213.50	3.50 Ft.	8,028 SF	797 CFT	22,466 CFT	0.516	Ac/Ft.
1213.60	3.60 Ft.	8,137 SF	808 CFT	23,274 CFT	0.534	Ac/Ft.
1213.70	3.70 Ft.	8,246 SF	819 CFT	24,094 CFT	0.553	Ac/Ft.
1213.80	3.80 Ft.	8,355 SF	830 CFT	24,924 CFT	0.572	Ac/Ft.
1213.90	3.90 Ft.	8,464 SF	841 CFT	25,765 CFT	0.591	Ac/Ft.
1214.00	4.00 Ft.	8,573 SF	852 CFT	26,616 CFT	0.611	Ac/Ft.
1214.10	4.10 Ft.	8,688 SF	863 CFT	27,480 CFT	0.631	Ac/Ft.
1214.20	4.20 Ft.	8,802 SF	875 CFT	28,354 CFT	0.651	Ac/Ft.
1214.30	4.30 Ft.	8,917 SF	886 CFT	29,240 CFT	0.671	Ac/Ft.
1214.40	4.40 Ft.	9,032 SF	897 CFT	30,137 CFT	0.692	Ac/Ft.
1214.50	4.50 Ft.	9,147 SF	909 CFT	31,046 CFT	0.713	Ac/Ft.
1214.60	4.60 Ft.	9,261 SF	920 CFT	31,967 CFT	0.734	Ac/Ft.
1214.70	4.70 Ft.	9,376 SF	932 CFT	32,899 CFT	0.755	Ac/Ft.
1214.80	4.80 Ft.	9,491 SF	943 CFT	33,842 CFT	0.777	Ac/Ft.
1214.90	4.90 Ft.	9,605 SF	955 CFT	34,797 CFT	0.799	Ac/Ft.
1215.00	5.00 Ft.	9,720 SF	966 CFT	35,763 CFT	0.821	Ac/Ft.
1215.10	5.10 Ft.	9,841 SF	978 CFT	36,741 CFT	0.843	Ac/Ft.
1215.20	5.20 Ft.	9,961 SF	990 CFT	37,731 CFT	0.866	Ac/Ft.
1215.30	5.30 Ft.	10,082 SF	1,002 CFT	38,733 CFT	0.889	Ac/Ft.
1215.40	5.40 Ft.	10,202 SF	1,014 CFT	39,747 CFT	0.912	Ac/Ft.
1215.50	5.50 Ft.	10,323 SF	1,026 CFT	40,774 CFT	0.936	Ac/Ft.
1215.60	5.60 Ft.	10,443 SF	1,038 CFT	41,812 CFT	0.960	Ac/Ft.
1215.70	5.70 Ft.	10,564 SF	1,050 CFT	42,862 CFT	0.984	Ac/Ft.
1215.80	5.80 Ft.	10,684 SF	1,062 CFT	43,925 CFT	1.008	Ac/Ft.
1215.90	5.90 Ft.	10,805 SF	1,074 CFT	44,999 CFT	1.033	Ac/Ft.
1216.00	6.00 Ft.	10,925 SF	1,086 CFT	46,085 CFT	1.058	Ac/Ft.

# OUTFLOW STRUCTURE DATA

$$Q=C*A*(2*G*H)^{.5}$$

ORIFICE 1

## Northeast Pond



Inv. El. 1210.00  
Diameter 1.25 In.  
C = 0.60  
Q Full= 0.01 CFS

Inverts can not be any lower than..... 1210.00

Elev.	Height	Orifice 1 Control	Total Flow	Time Vol/Flow = Time	Sum of Time (Min)	(Hour)
1210.00	0.00 Ft.	0.00 CFS	0.00 CFS	0.0	Min.	0.0
1210.10	0.10 Ft.	0.01 CFS	0.01 CFS	172.2	Min.	2.9
1210.20	0.20 Ft.	0.02 CFS	0.02 CFS	203.7	Min.	6.3
1210.30	0.30 Ft.	0.02 CFS	0.02 CFS	240.0	Min.	10.3
1210.40	0.40 Ft.	0.02 CFS	0.02 CFS	272.3	Min.	14.8
1210.50	0.50 Ft.	0.03 CFS	0.03 CFS	301.5	Min.	19.8
1210.60	0.60 Ft.	0.03 CFS	0.03 CFS	328.2	Min.	25.3
1210.70	0.70 Ft.	0.03 CFS	0.03 CFS	352.9	Min.	31.2
1210.80	0.80 Ft.	0.04 CFS	0.04 CFS	376.0	Min.	37.4
1210.90	0.90 Ft.	0.04 CFS	0.04 CFS	397.8	Min.	44.1
1211.00	1.00 Ft.	0.04 CFS	0.04 CFS	312.9	Min.	49.3
1211.10	1.10 Ft.	0.04 CFS	0.04 CFS	221.1	Min.	53.0
1211.20	1.20 Ft.	0.04 CFS	0.04 CFS	218.6	Min.	56.6
1211.30	1.30 Ft.	0.05 CFS	0.05 CFS	216.8	Min.	60.2
1211.40	1.40 Ft.	0.05 CFS	0.05 CFS	215.4	Min.	63.8
1211.50	1.50 Ft.	0.05 CFS	0.05 CFS	214.4	Min.	67.4
1211.60	1.60 Ft.	0.05 CFS	0.05 CFS	213.8	Min.	71.0
1211.70	1.70 Ft.	0.05 CFS	0.05 CFS	213.3	Min.	74.5
1211.80	1.80 Ft.	0.05 CFS	0.05 CFS	213.1	Min.	78.1
1211.90	1.90 Ft.	0.06 CFS	0.06 CFS	213.1	Min.	81.6
1212.00	2.00 Ft.	0.06 CFS	0.06 CFS	199.1	Min.	84.9
1212.10	2.10 Ft.	0.06 CFS	0.06 CFS	184.5	Min.	88.0
1212.20	2.20 Ft.	0.06 CFS	0.06 CFS	183.0	Min.	91.1
1212.30	2.30 Ft.	0.06 CFS	0.06 CFS	181.7	Min.	94.1
1212.40	2.40 Ft.	0.06 CFS	0.06 CFS	180.6	Min.	97.1
1212.50	2.50 Ft.	0.06 CFS	0.06 CFS	179.5	Min.	100.1
1212.60	2.60 Ft.	0.07 CFS	0.07 CFS	178.6	Min.	103.1
1212.70	2.70 Ft.	0.07 CFS	0.07 CFS	177.8	Min.	106.0
1212.80	2.80 Ft.	0.07 CFS	0.07 CFS	177.0	Min.	109.0
1212.90	2.90 Ft.	0.07 CFS	0.07 CFS	176.4	Min.	111.9
1213.00	3.00 Ft.	0.07 CFS	0.07 CFS	175.8	Min.	114.9
1213.10	3.10 Ft.	0.07 CFS	0.07 CFS	175.4	Min.	117.8
1213.20	3.20 Ft.	0.07 CFS	0.07 CFS	175.0	Min.	120.7
1213.30	3.30 Ft.	0.07 CFS	0.07 CFS	174.8	Min.	123.6
1213.40	3.40 Ft.	0.08 CFS	0.08 CFS	174.6	Min.	126.5
1213.50	3.50 Ft.	0.08 CFS	0.08 CFS	174.4	Min.	129.4
1213.60	3.60 Ft.	0.08 CFS	0.08 CFS	174.3	Min.	132.3
1213.70	3.70 Ft.	0.08 CFS	0.08 CFS	174.2	Min.	135.2
1213.80	3.80 Ft.	0.08 CFS	0.08 CFS	174.1	Min.	138.1
1213.90	3.90 Ft.	0.08 CFS	0.08 CFS	174.1	Min.	141.0
1214.00	4.00 Ft.	0.08 CFS	0.08 CFS	174.1	Min.	143.9
1214.10	4.10 Ft.	0.08 CFS	0.08 CFS	174.2	Min.	146.8
1214.20	4.20 Ft.	0.08 CFS	0.08 CFS	174.4	Min.	149.7
1214.30	4.30 Ft.	0.08 CFS	0.08 CFS	174.6	Min.	152.7
1214.40	4.40 Ft.	0.09 CFS	0.09 CFS	174.8	Min.	155.6
1214.50	4.50 Ft.	0.09 CFS	0.09 CFS	175.0	Min.	158.5
1214.60	4.60 Ft.	0.09 CFS	0.09 CFS	175.3	Min.	161.4
1214.70	4.70 Ft.	0.09 CFS	0.09 CFS	175.6	Min.	164.3
1214.80	4.80 Ft.	0.09 CFS	0.09 CFS	175.8	Min.	167.3
1214.90	4.90 Ft.	0.09 CFS	0.09 CFS	176.1	Min.	170.2
1215.00	5.00 Ft.	0.09 CFS	0.09 CFS	176.4	Min.	173.1
1215.10	5.10 Ft.	0.09 CFS	0.09 CFS	176.8	Min.	176.1
1215.20	5.20 Ft.	0.09 CFS	0.09 CFS	177.2	Min.	179.0
1215.30	5.30 Ft.	0.09 CFS	0.09 CFS	177.7	Min.	182.0
1215.40	5.40 Ft.	0.09 CFS	0.09 CFS	178.1	Min.	185.0
1215.50	5.50 Ft.	0.10 CFS	0.10 CFS	178.6	Min.	187.9
1215.60	5.60 Ft.	0.10 CFS	0.10 CFS	179.0	Min.	190.9
1215.70	5.70 Ft.	0.10 CFS	0.10 CFS	179.5	Min.	193.9
1215.80	5.80 Ft.	0.10 CFS	0.10 CFS	180.0	Min.	196.9
1215.90	5.90 Ft.	0.10 CFS	0.10 CFS	180.5	Min.	199.9
1216.00	6.00 Ft.	0.10 CFS	0.10 CFS	180.9	Min.	202.9

**This foregoing document was electronically filed with the Public Utilities**

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**Case No(s). 13-1752-EL-BGN**

Summary: Application Appendix B: Stormwater Management Plan electronically filed by Ms. Miranda R Leppla on behalf of Carroll County Energy LLC