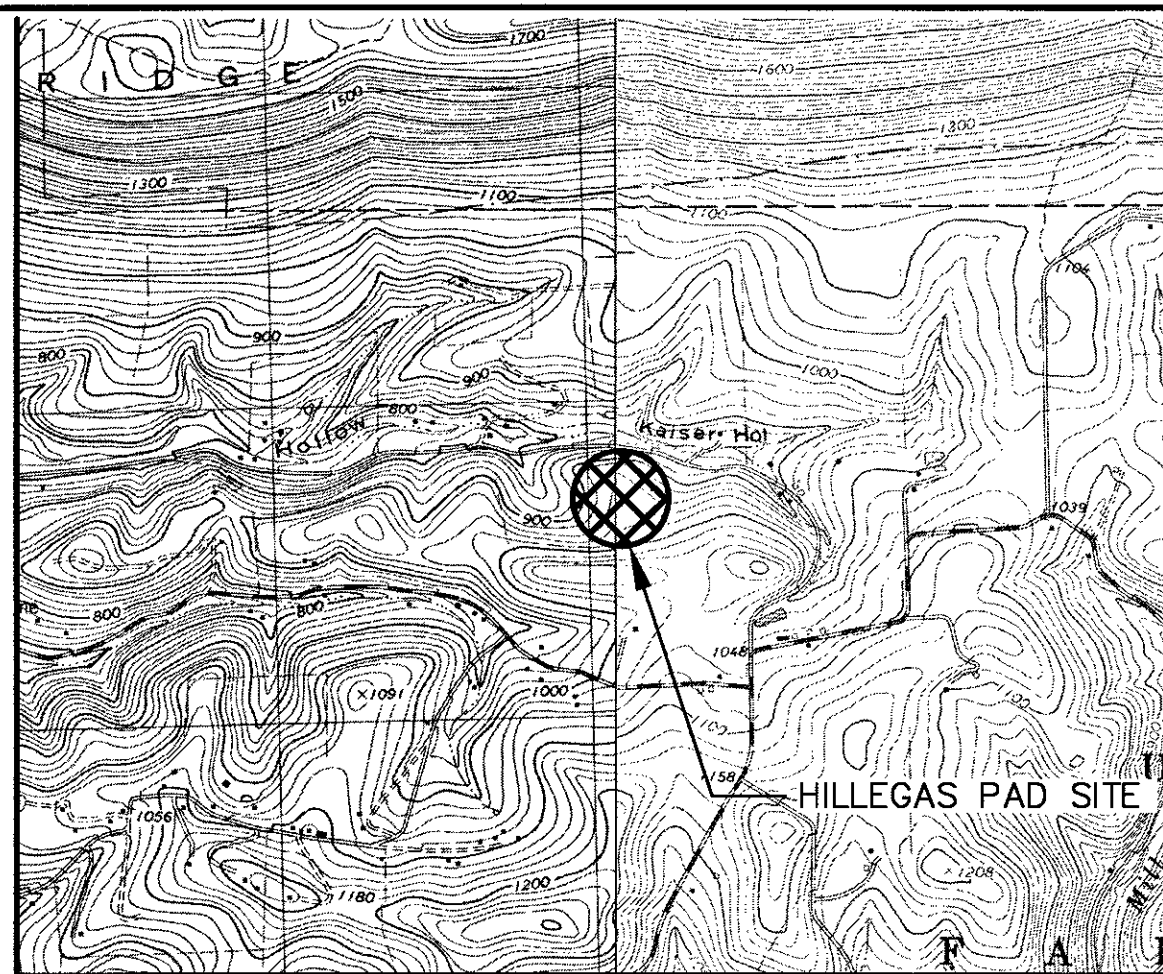
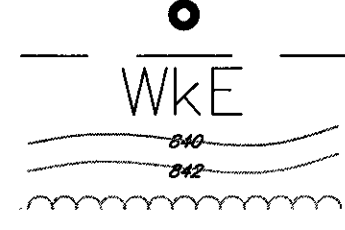




LOCATION MAP  
SCALE 0 2000 4000  
IN FEET

**LEGEND**  
PROPERTY BOUNDARY  
PROPERTY CORNER  
SOIL BOUNDARY  
SOIL LABEL  
EXISTING CONTOURS  
EXISTING TREELINE



LOCATIONS OF EXISTING UNDERGROUND UTILITIES/FACILITIES SHOWN HEREON HAVE BEEN DEVELOPED FROM RECORDS, FIELD MARKOUTS BY UTILITY OWNERS, AND/OR ABOVE-GROUND OBSERVATION OF THE SITE. NO EXCAVATIONS WERE PERFORMED IN THE PREPARATION OF THESE DRAWINGS. THEREFORE ALL UTILITIES SHOWN SHOULD BE CONSIDERED APPROXIMATE IN LOCATION, DEPTH, AND SIZE. THE POTENTIAL EXISTS FOR OTHER UNDERGROUND UTILITIES/FACILITIES TO BE PRESENT WHICH ARE NOT SHOWN ON THE DRAWINGS. ONLY THE VISIBLE LOCATIONS OF UNDERGROUND UTILITIES/FACILITIES AT THE TIME OF FIELD SURVEY SHALL BE CONSIDERED TRUE AND ACCURATE. COMPLETENESS OR ACCURACY OF UNDERGROUND UTILITIES/FACILITIES ARE NOT GUARANTEED BY GILMORE & ASSOCIATES INC.

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PENNSYLVANIA ONE CALL SYSTEM, INC.

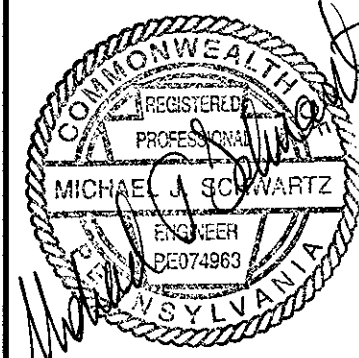
925 Inlet Run Road  
West Mifflin, Pennsylvania  
15122 - 1076



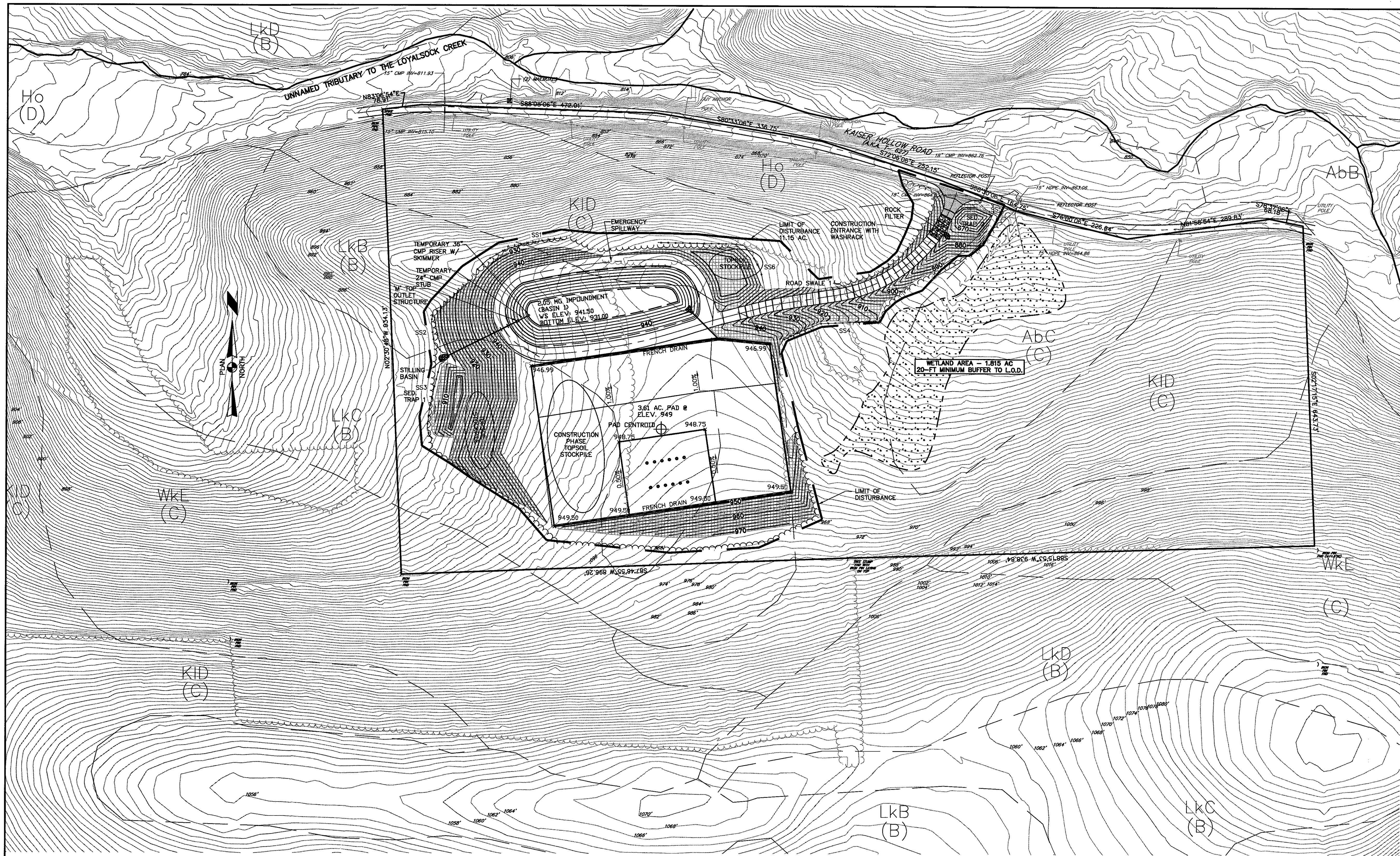
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PA LAW REQUIRES THREE WORKING DAYS NOTICE TO UTILITIES BEFORE YOU EXCAVATE, DRILL, BLAST OR DEMOLISH

**WELL OPERATOR:**

INFLECTION ENERGY, LLC  
1200 17TH ST., SUITE 1350  
DENVER, CO 80202  
(303) 531-2300

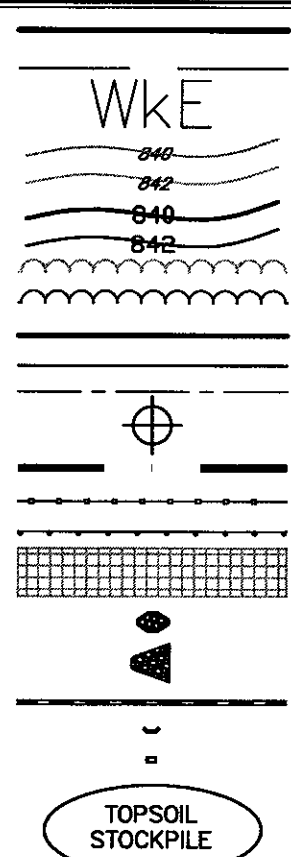


|                                                                                       |                                   |                                                                                                                           |         |
|---------------------------------------------------------------------------------------|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------|---------|
| 2                                                                                     | RELOCATE ACCESS PER INFLECTION    | 9/26/13                                                                                                                   | MJS     |
| 1                                                                                     | RELOCATE ACCESS PER PAEP COMMENTS | 9/10/13                                                                                                                   | MJS     |
| REV.                                                                                  | DESCRIPTION                       | DATE                                                                                                                      | BY      |
|                                                                                       |                                   | FINAL PLAN                                                                                                                |         |
|                                                                                       |                                   | EXISTING FEATURES                                                                                                         |         |
|                                                                                       |                                   | HILLEGAS - PAD                                                                                                            |         |
|                                                                                       |                                   | UPPER FAIRFIELD TOWNSHIP, LYCOMING COUNTY, PENNSYLVANIA                                                                   |         |
| TOTAL AREA:<br>33.60 AC.                                                              | TOTAL LOTS:<br>1                  |                                                                                                                           |         |
| DATE:<br>7/24/13                                                                      | SCALE:<br>1" = 100'               |                                                                                                                           |         |
|  |                                   | GILMORE & ASSOCIATES, INC.                                                                                                |         |
|                                                                                       |                                   | ENGINEERING & CONSULTING SERVICES                                                                                         |         |
|                                                                                       |                                   | COMMERCE CORPORATE CENTER<br>5100 TILGHMAN STREET, SUITE 150 ALLENTOWN, PA 18104 • (610) 365-8064 • www.gilmore-assoc.com |         |
|  |                                   | JOB NO.:<br>2012-07015A7                                                                                                  |         |
|                                                                                       |                                   | SHEET NO.:                                                                                                                |         |
| DESIGNED BY:<br>MJS                                                                   | DRAWN BY:<br>MJS                  | CHECKED BY:<br>SEP                                                                                                        | 1 OF 11 |



#### LEGEND

PROPERTY BOUNDARY  
SOIL BOUNDARY  
SOIL LABEL  
EXISTING CONTOURS  
PROPOSED CONTOURS  
EXISTING TREELINE  
PROPOSED TREELINE  
PAD BOUNDARY  
SITE ACCESS ROAD  
SITE ACCESS ROAD CENTERLINE  
WELL PAD CENTROID  
LIMIT OF DISTURBANCE  
SILT SOXX  
BAFFLES  
EROSION CONTROL MATTING  
(NAG SC250)  
ROCK FILTERS  
OUTLET PROTECTION  
HDPE STORMWATER PIPE  
ENDWALL  
TYPE 'M'-INLET  
TOPSOIL STOCKPILE  
(SEE DETAIL)



#### SOILS LEGEND

| Map Unit Symbol             | Map Unit Name                                                     |
|-----------------------------|-------------------------------------------------------------------|
| ABC                         | Albrights silt loam, 8 to 15 percent slopes                       |
| Ho                          | Holly silt loam                                                   |
| KID                         | Klinesville shaly silt loam, 15 to 25 percent slopes              |
| LKB                         | Leak kill channel silt loam, 3 to 8 percent slopes                |
| LKC                         | Leak kill channel silt loam, 8 to 15 percent slopes               |
| WKE                         | Wetland and Klinesville shaly silt loams, 25 to 80 percent slopes |
| Totals for Area of Interest |                                                                   |

#### WATERSHED NOTE

THE PROJECT IS LOCATED WITHIN THE LOYALSTOCK CREEK WATERSHED - CHAPTER 93 DESIGNATED USE: TSF (TROUT STOCKED FISHERY) AND EV (EXCEPTIONAL VALUE)

#### TOPSOIL STOCKPILE NOTE

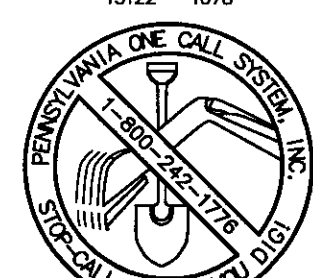
THE TOPSOIL STOCKPILE SIZES DEPICTED ARE THE MAXIMUM VOLUME REQUIRED FOR THE E&S STAGE. THEIR SIZE WILL BE REDUCED DURING THE P&S STAGE AND WILL BE COMPLETELY DISTRIBUTED AS PART OF THE SITE RESTORATION.

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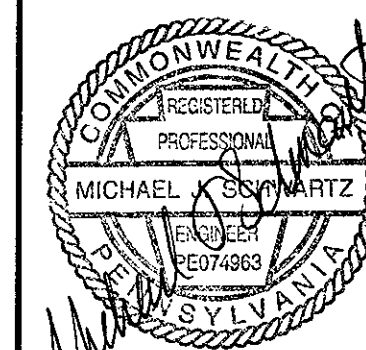
925 Irish Run Road  
West Mifflin, Pennsylvania  
15122 - 1078



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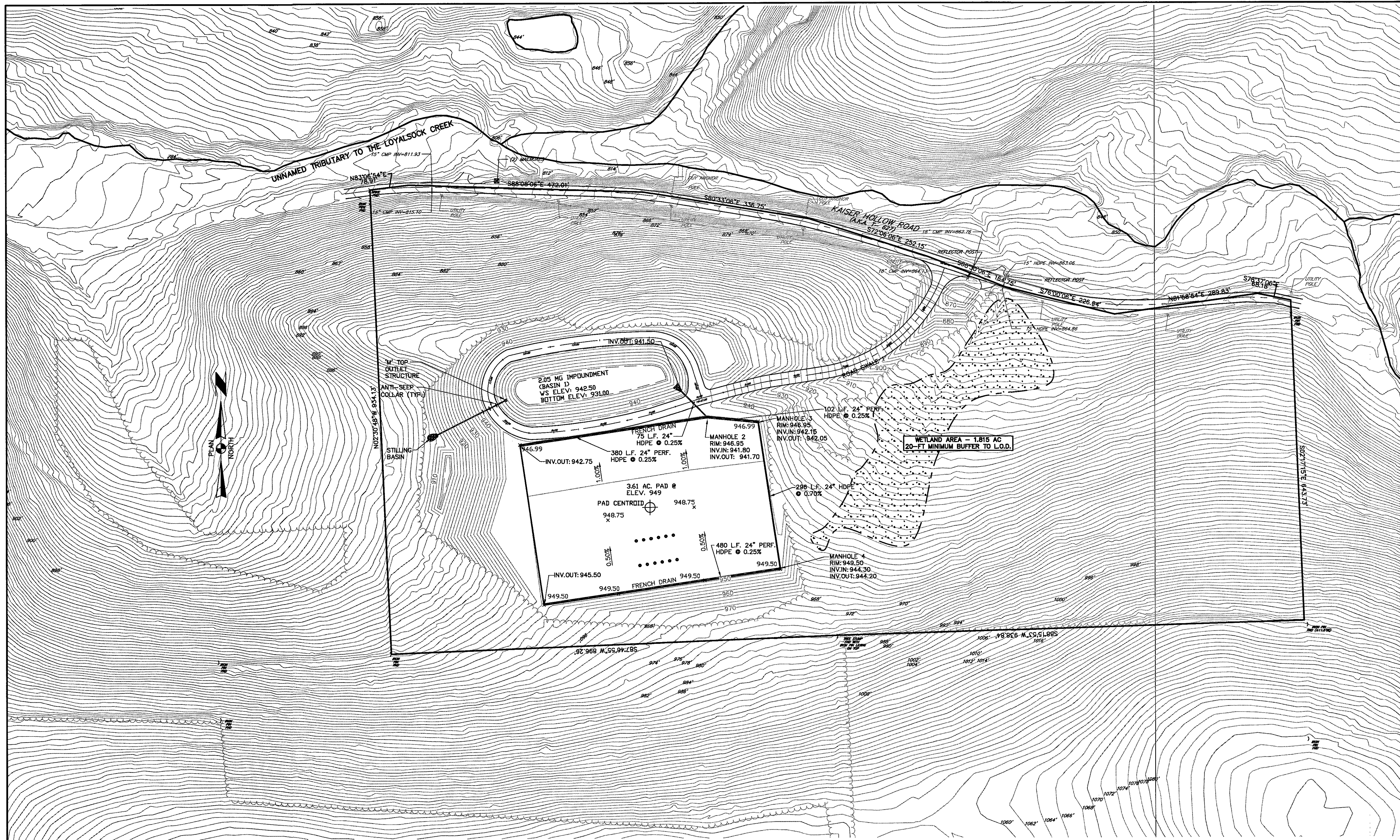
#### WELL OPERATOR:

INFLECTION ENERGY, LLC  
1200 17TH ST., SUITE 1350  
DENVER, CO 80202  
(303) 531-2300



|                                                                                              |                                    |         |     |
|----------------------------------------------------------------------------------------------|------------------------------------|---------|-----|
| 2                                                                                            | RELOCATE ACCESS PER INFLECTION     | 9/26/13 | MJS |
| 1                                                                                            | RELOCATE ACCESS PER PADEP COMMENTS | 9/10/13 | MJS |
| REV.                                                                                         | DESCRIPTION                        | DATE    | BY  |
| FINAL PLAN                                                                                   |                                    |         |     |
| EROSION AND SEDIMENT CONTROL PLAN                                                            |                                    |         |     |
| HILLEGAS - PAD                                                                               |                                    |         |     |
| UPPER FAIRFIELD TOWNSHIP, LYCOMING COUNTY, PENNSYLVANIA                                      |                                    |         |     |
| GILMORE & ASSOCIATES, INC.                                                                   |                                    |         |     |
| ENGINEERING & CONSULTING SERVICES                                                            |                                    |         |     |
| 5100 TILGHMAN STREET, SUITE 150 ALLENTOWN, PA 18104 • (610) 386-8084 • www.gilmore-assoc.com |                                    |         |     |
| JOB NO.: 2012-07015A7                                                                        |                                    |         |     |
| SHEET NO.: 2 OF 11                                                                           |                                    |         |     |
| TOTAL AREA: 33.60 AC. TOTAL LOTS: 1                                                          |                                    |         |     |
| DATE: 7/24/13 SCALE: 1" = 100'                                                               |                                    |         |     |
| DESIGNED BY: MJS DRAWN BY: MJS CHECKED BY: SEP                                               |                                    |         |     |

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| LEGEND               |     |
|----------------------|-----|
| PROPERTY BOUNDARY    | --- |
| SOIL BOUNDARY        | --- |
| SOIL LABEL           | WkE |
| EXISTING CONTOURS    | --- |
| PROPOSED CONTOURS    | --- |
| EXISTING TREELINE    | --- |
| PROPOSED TREELINE    | --- |
| PAD BOUNDARY         | --- |
| SITE ACCESS ROAD     | --- |
| OUTLET PROTECTION    | --- |
| HDPE STORMWATER PIPE | --- |
| ENDWALL              | --- |
| TYPE 'M'-INLET       | --- |

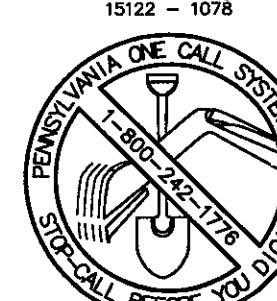
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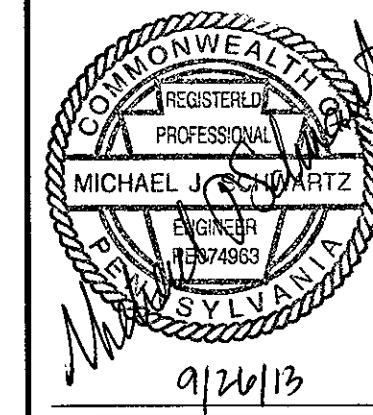
925 Irwin Run Road  
West Mifflin, Pennsylvania  
15122 - 1078

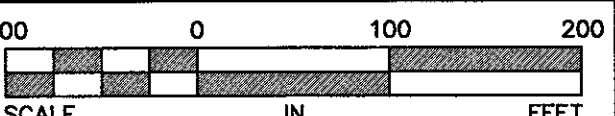


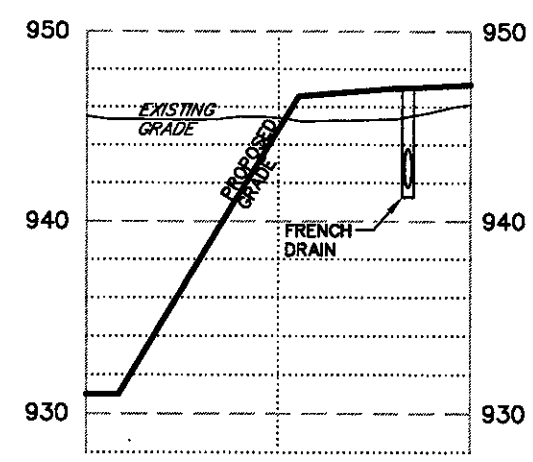
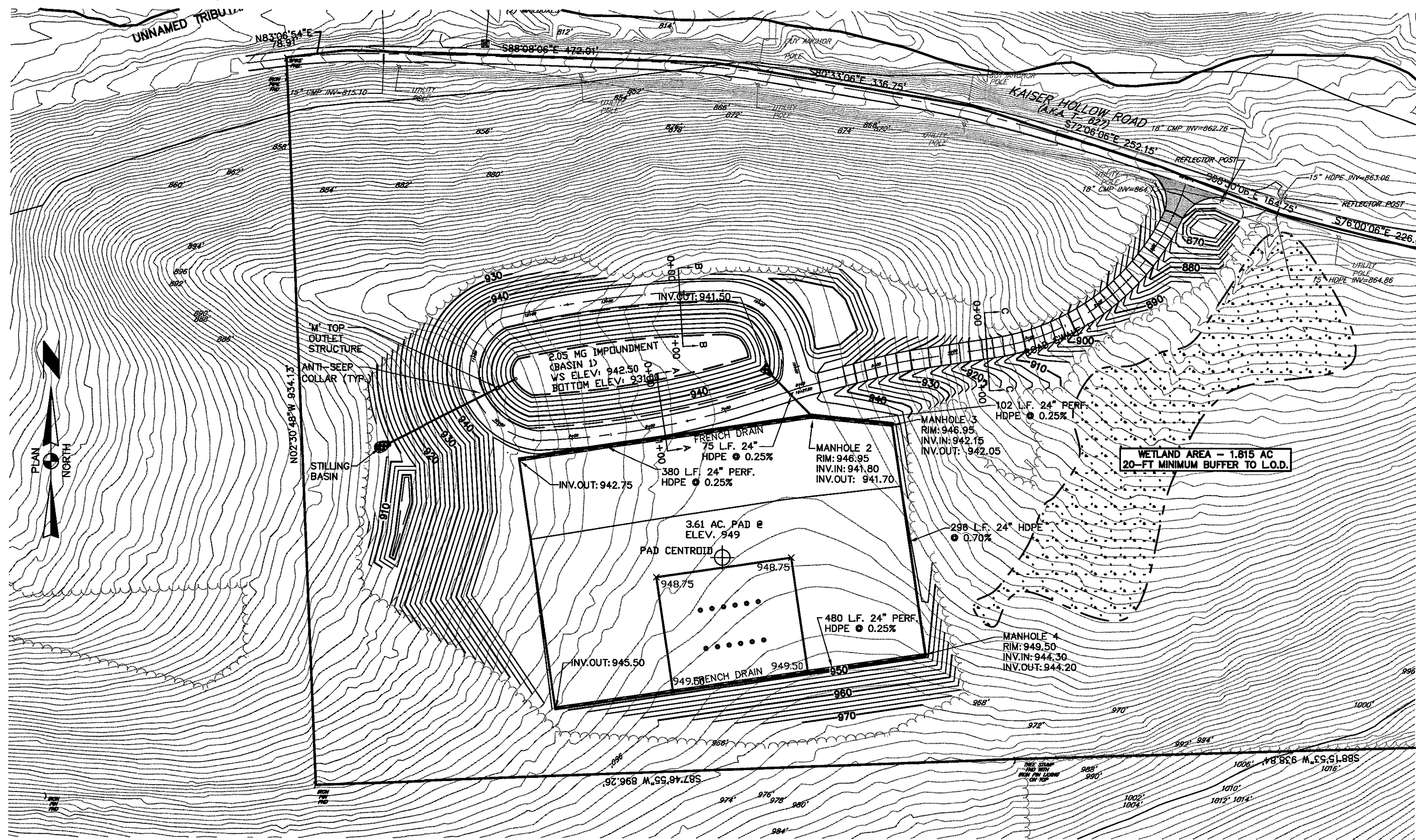
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PA LAW REQUIRES THREE WORKING DAYS  
NOTICE TO UTILITIES BEFORE YOU EXCAVATE,  
DRILL, BLAST OR DEMOLISH

WELL OPERATOR:

INFLECTION ENERGY, LLC  
1200 17TH ST., SUITE 1350  
DENVER, CO 80202  
(303) 531-2300

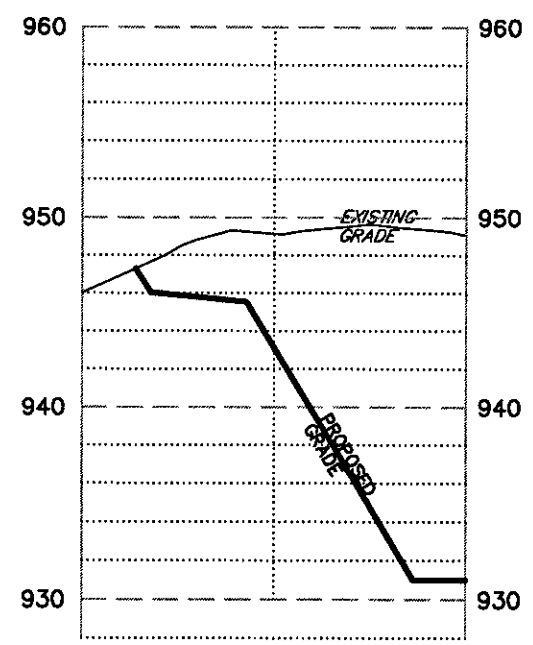


|                                                                                       |                                    |                                                                                                                                                                                                |         |                    |
|---------------------------------------------------------------------------------------|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------------------|
| 2                                                                                     | RELOCATE ACCESS PER INFLECTION     |                                                                                                                                                                                                | 9/26/13 | MJS                |
| 1                                                                                     | RELOCATE ACCESS PER PADEP COMMENTS |                                                                                                                                                                                                | 9/10/13 | MJS                |
| REV.                                                                                  | DESCRIPTION                        |                                                                                                                                                                                                | DATE    | BY                 |
|                                                                                       |                                    | FINAL PLAN<br>POST-CONSTRUCTION STORMWATER<br>MANAGEMENT PLAN<br><b>HILLEGAS - PAD</b><br>UPPER FAIRFIELD TOWNSHIP, LYCOMING COUNTY, PENNSYLVANIA                                              |         |                    |
| TOTAL AREA:<br>33.60 AC.                                                              |                                    | TOTAL LOTS:<br>1                                                                                                                                                                               |         |                    |
| DATE:<br>7/24/13                                                                      |                                    | SCALE:<br>1" = 100'                                                                                                                                                                            |         |                    |
|  |                                    | GILMORE & ASSOCIATES, INC.<br>ENGINEERING & CONSULTING SERVICES<br>COMMERCIAL CORPORATE CENTER<br>5100 TILGHMAN STREET, SUITE 150 ALLENTOWN, PA 18104 • (610) 356-8054 • www.gilmore-assoc.com |         |                    |
|                                                                                       |                                    |                                                                                                           |         |                    |
|                                                                                       |                                    | JOB NO.:<br>2012-07015A7<br>SHEET NO.:<br><b>3 OF 11</b>                                                                                                                                       |         |                    |
| DESIGNED BY:<br>MJS                                                                   |                                    | DRAWN BY:<br>MJS                                                                                                                                                                               |         | CHECKED BY:<br>SEP |



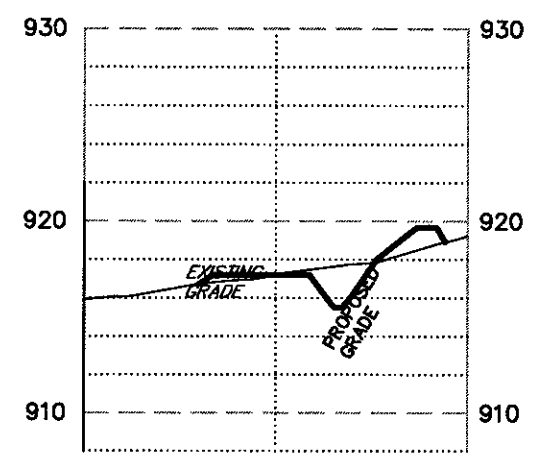
CROSS-SECTION A-A

SCALE:  
HORIZ: 1" = 50'  
VERT: 1" = 10'



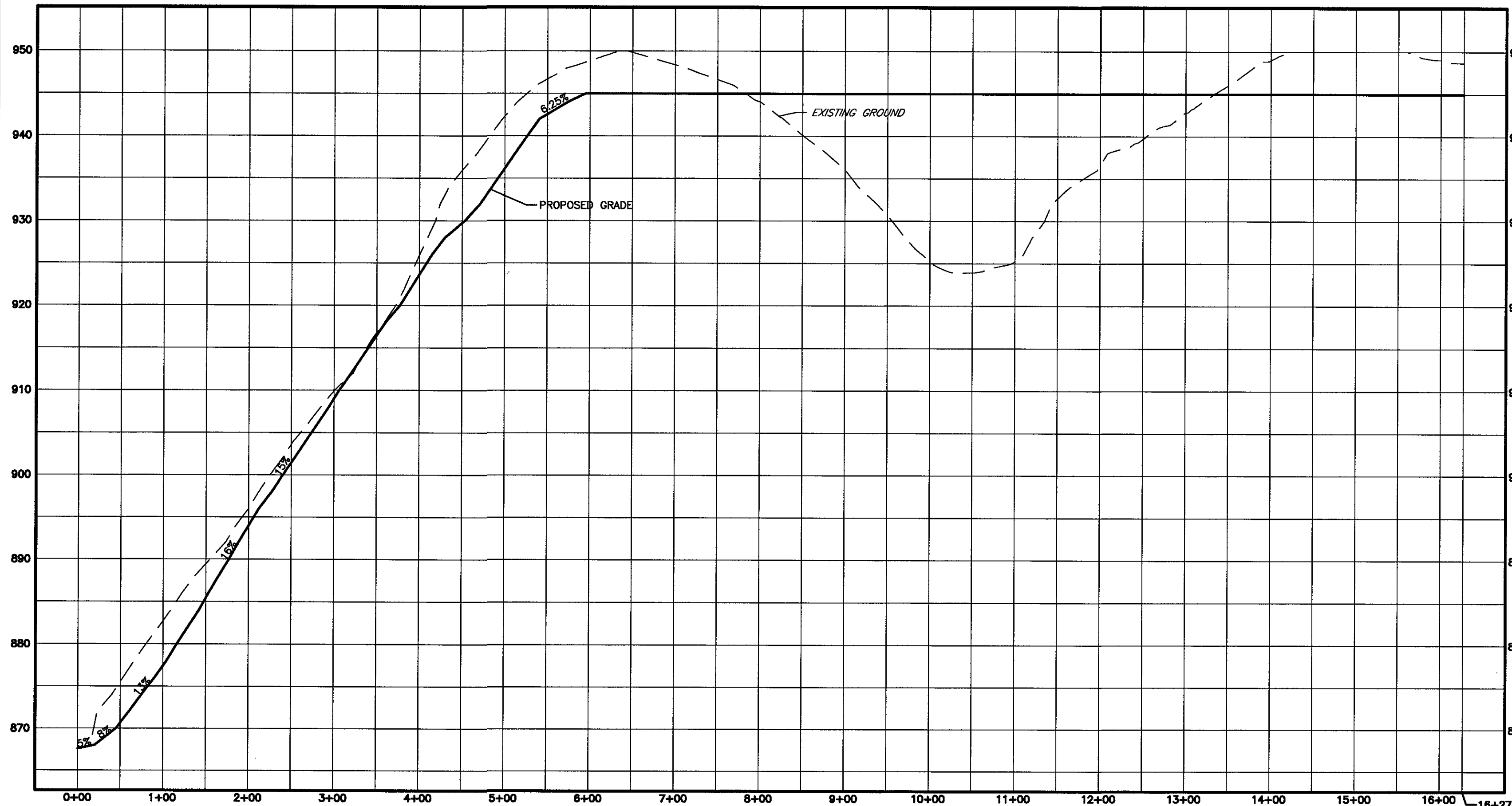
CROSS-SECTION B-B

SCALE:  
HORIZ: 1" = 50'  
VERT: 1" = 10'



CROSS-SECTION C-C

SCALE:  
HORIZ: 1" = 50'  
VERT: 1" = 10'



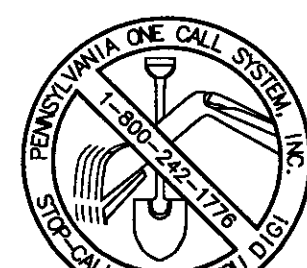
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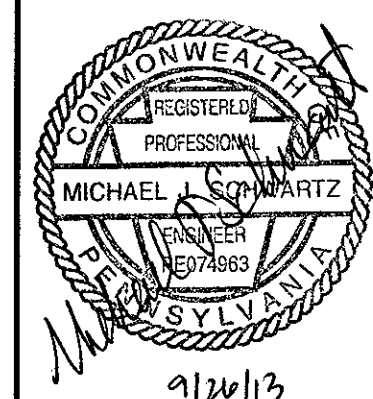
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15122 - 1078



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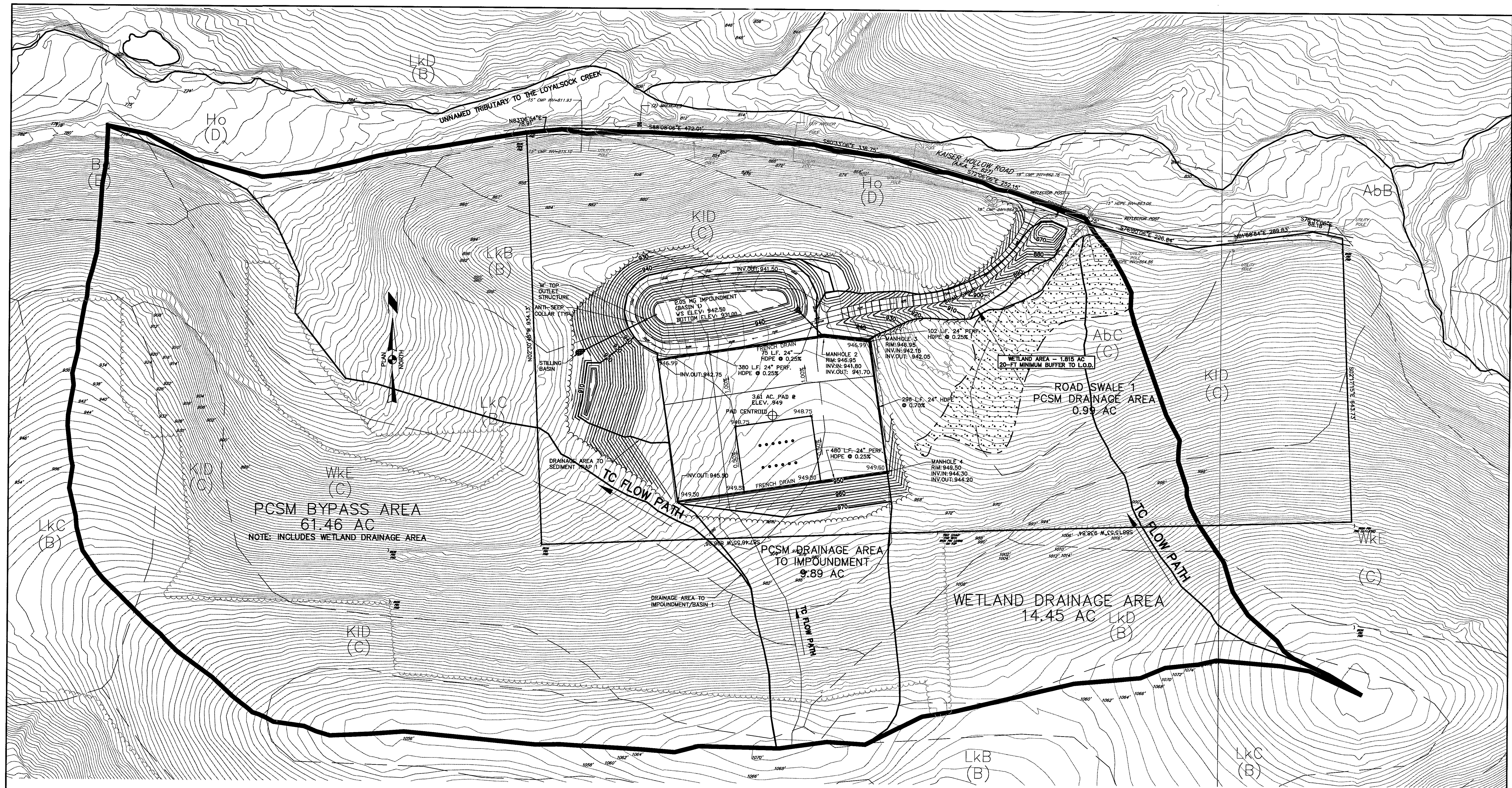
INFLECTION ENERGY, LLC  
1200 17TH ST., SUITE 1350  
DENVER, CO 80202  
(303) 531-2300



|                                                                                                                                                                            |                                    |                                                                 |                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|-----------------------------------------------------------------|---------------------|
| 2                                                                                                                                                                          | RELOCATE ACCESS PER INFLECTION     | 9/26/13                                                         | MJS                 |
| 1                                                                                                                                                                          | RELOCATE ACCESS PER PADEP COMMENTS | 9/10/13                                                         | MJS                 |
| REV.                                                                                                                                                                       | DESCRIPTION                        | DATE                                                            | BY                  |
| <b>FINAL PLAN</b><br><b>PLAN AND PROFILE</b><br><b>HILLEGAS - PAD</b><br>UPPER FAIRFIELD TOWNSHIP, LYCOMING COUNTY, PENNSYLVANIA                                           |                                    |                                                                 |                     |
| TOTAL AREA:<br>33.60 AC.                                                                                                                                                   | TOTAL LOTS:<br>1                   | DATE:<br>7/24/13                                                | SCALE:<br>1" = 100' |
| <b>GILMORE &amp; ASSOCIATES, INC.</b><br>ENGINEERING & CONSULTING SERVICES<br>5100 TILGHMAN STREET, SUITE 150 ALLENTOWN, PA 18104 • (610) 366-8064 • www.gilmore-assoc.com |                                    |                                                                 |                     |
|                                                                                                                                                                            |                                    | <b>JOB NO.:</b><br>2012-07015A7<br><b>SHEET NO.:</b><br>4 OF 11 |                     |
| DESIGNED BY:<br>MJS                                                                                                                                                        | DRAWN BY:<br>MJS                   | CHECKED BY:<br>SEP                                              |                     |







| LEGEND                             |  |
|------------------------------------|--|
| PROPOSED CONTOURS                  |  |
| EXISTING CONTOURS                  |  |
| EXISTING TREELINE                  |  |
| POST-DEVELOPMENT DRAINAGE BOUNDARY |  |
| TO FLOW PATH                       |  |

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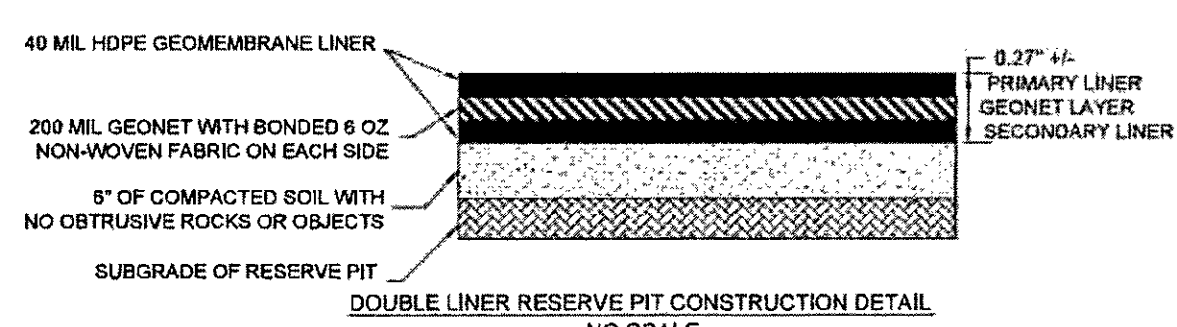
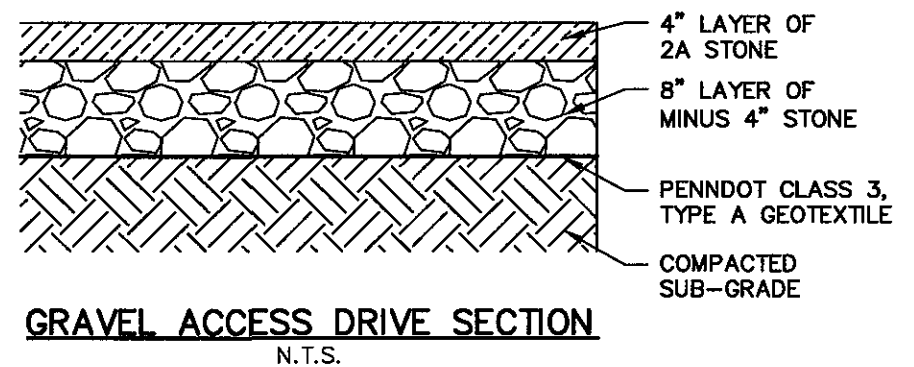
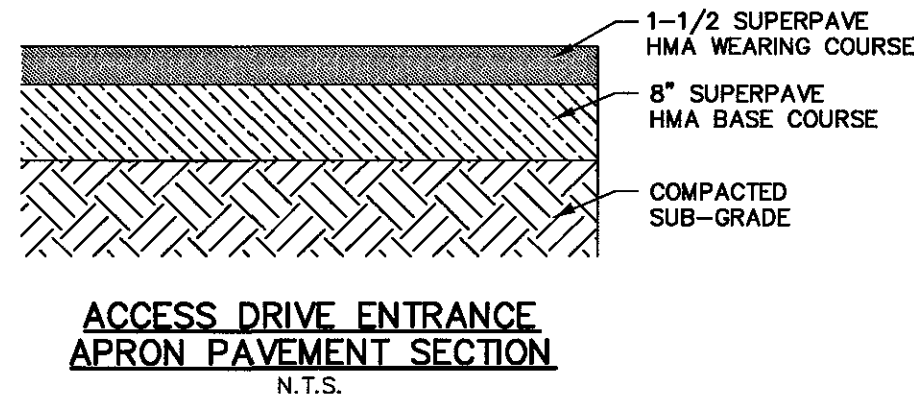
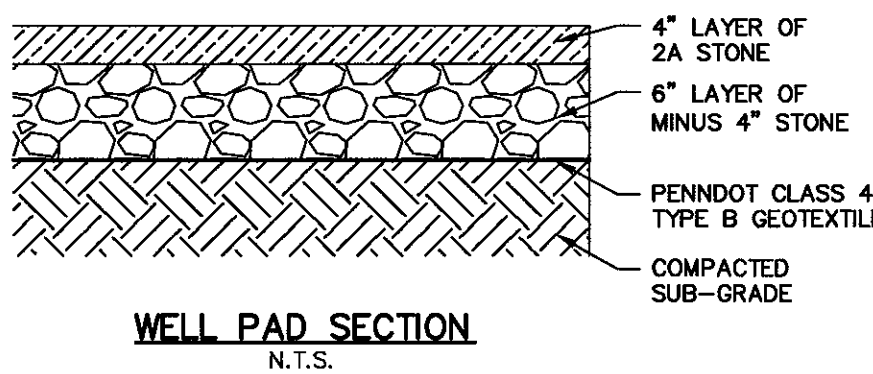
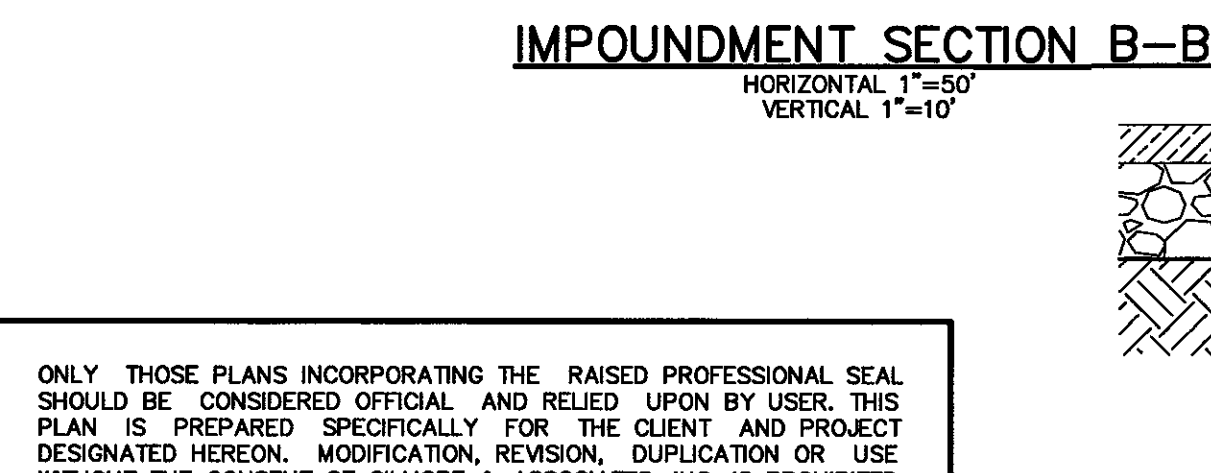
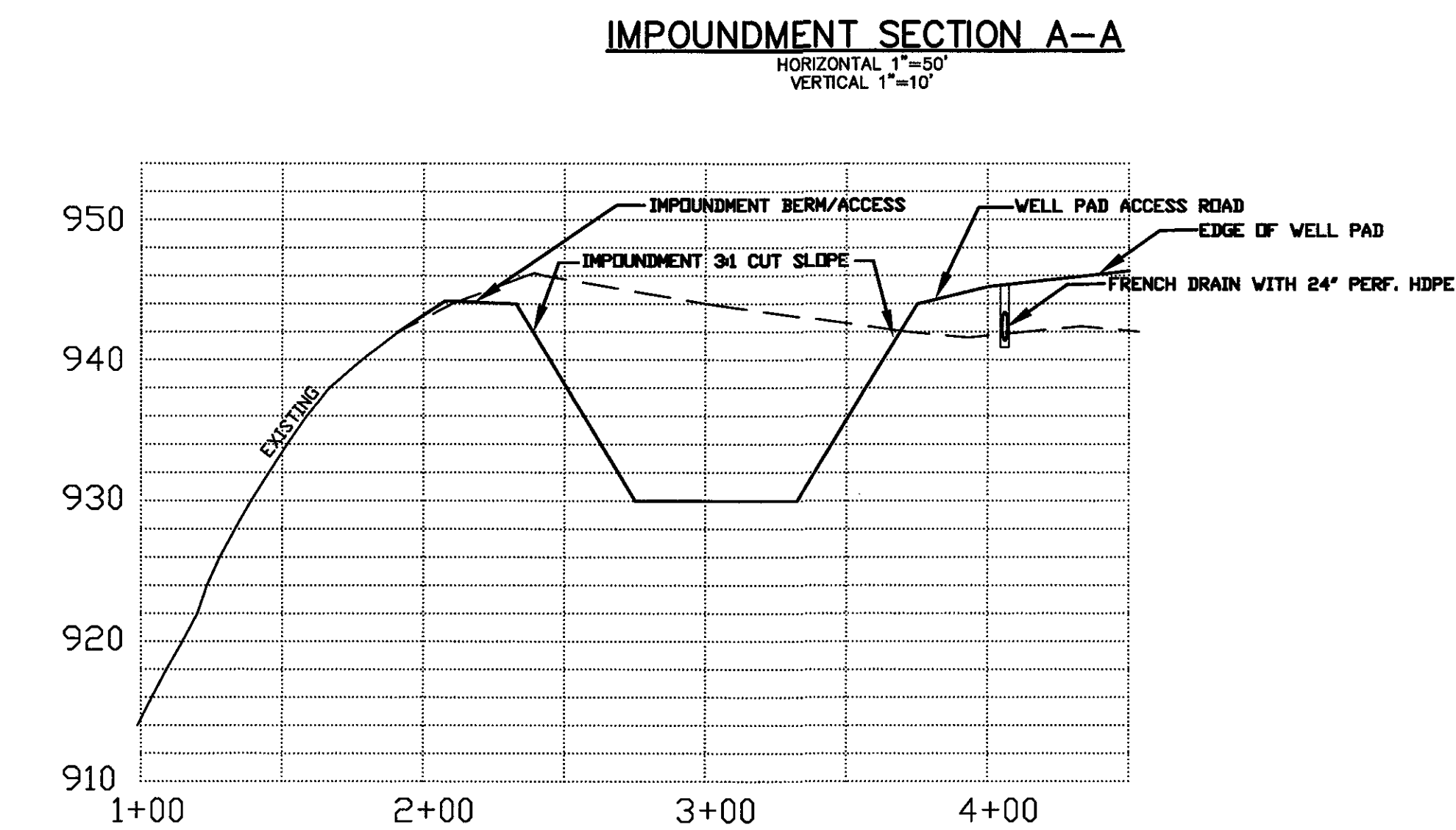
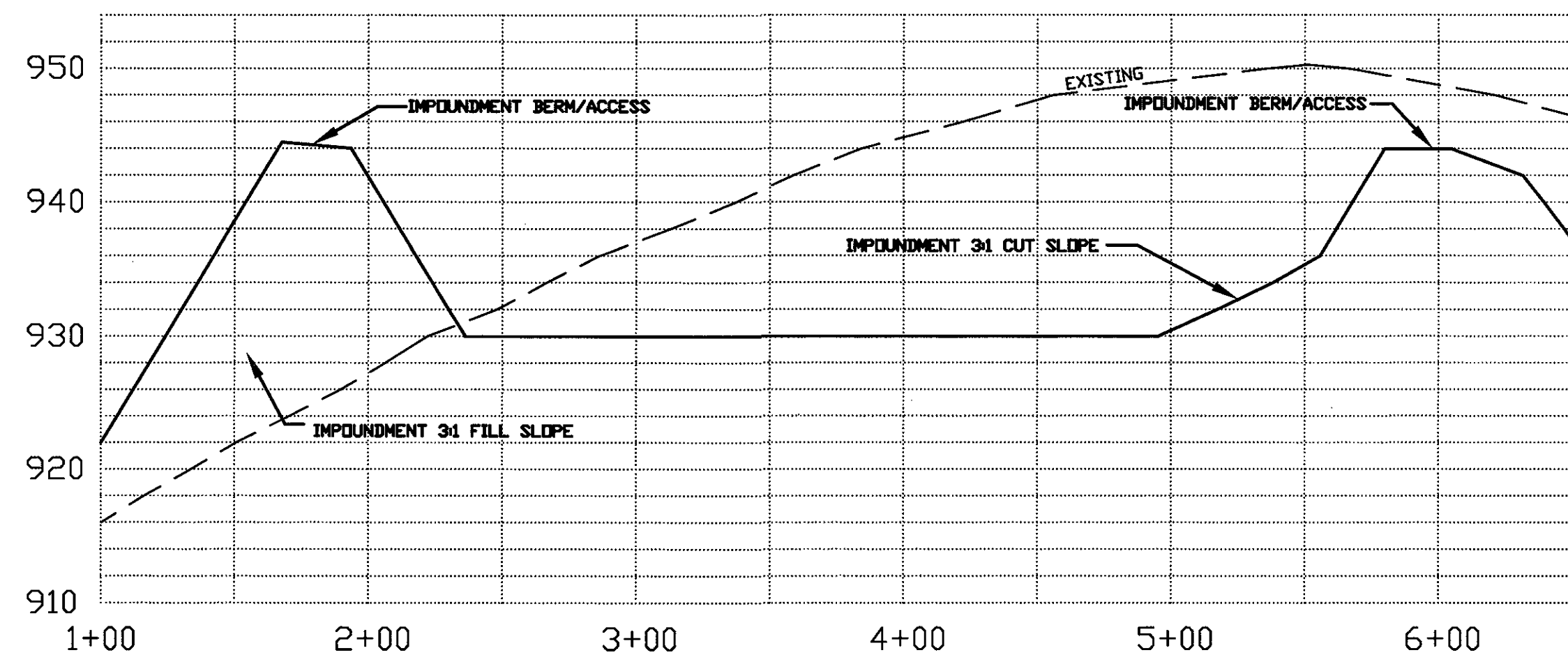
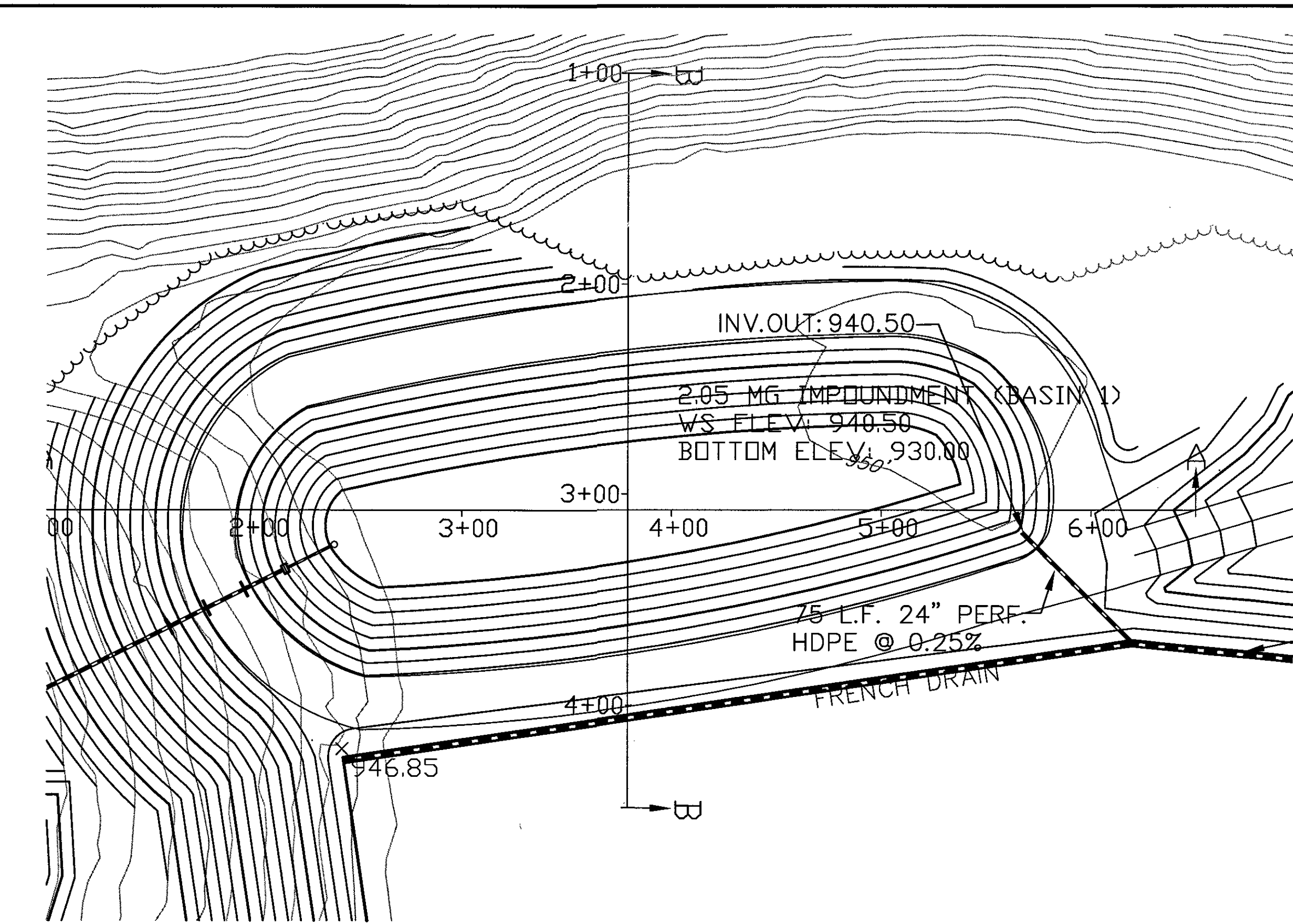
COMMONWEALTH OF PENNSYLVANIA  
REGISTERED PROFESSIONAL ENGINEER  
MICHAEL J. SCHWARTZ  
PA074963  
9/26/13

|                                                                                                                                                                 |                                    |                          |     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|--------------------------|-----|
| 2                                                                                                                                                               | RELOCATE ACCESS PER INFLECTION     | 9/26/13                  | MJS |
| 1                                                                                                                                                               | RELOCATE ACCESS PER PADEP COMMENTS | 9/10/13                  | MJS |
| REV.                                                                                                                                                            | DESCRIPTION                        | DATE                     | BY  |
| FINAL PLAN                                                                                                                                                      |                                    |                          |     |
| PCSM STAGE DRAINAGE AREA MAP                                                                                                                                    |                                    |                          |     |
| HILLEGAS - PAD                                                                                                                                                  |                                    |                          |     |
| UPPER FAIRFIELD TOWNSHIP, LYCOMING COUNTY, PENNSYLVANIA                                                                                                         |                                    |                          |     |
| GILMORE & ASSOCIATES, INC.<br>ENGINEERING & CONSULTING SERVICES<br>5100 TILGHMAN STREET, SUITE 150 ALLENTOWN, PA 18104 • (610) 366-9064 • www.gilmore-assoc.com |                                    |                          |     |
| TOTAL AREA:<br>33.80 AC.                                                                                                                                        | TOTAL LOTS:<br>1                   | JOB NO.:<br>2012-07015A7 |     |
| DATE:<br>7/24/13                                                                                                                                                | SCALE:<br>1" = 100'                | SHEET NO.:<br>7 OF 11    |     |
| DESIGNED BY:<br>MJS                                                                                                                                             | DRAWN BY:<br>MJS                   | CHECKED BY:<br>SEP       |     |









# IMPOUNDMENT LINER SYSTEM REQUIREMENTS

- THE LINER SYSTEM FOR IMPOUNDMENTS SHALL INCLUDE THE FOLLOWING ELEMENTS:
  - SUB-BASE
  - PRIMARY LINER
- SUB-BASE REQUIREMENTS
  - THE SUB-BASE SHALL BEAR THE WEIGHT OF THE LINER SYSTEM, WATER, AND EQUIPMENT OPERATING ON THE IMPOUNDMENT WITHOUT CAUSING OR ALLOWING A FAILURE OF THE LINER SYSTEM.
  - ACCOMMODATE POTENTIAL SETTLEMENT WITHOUT DAMAGE TO THE LINER SYSTEM.
  - BE A BARRIER TO THE TRANSMISSION OF LIQUIDS.
  - COVER THE BOTTOM AND SIDELANDS OF THE IMPOUNDMENT.
  - CONSIST OF AN UPPER & LOWER LAYER THAT IS:
    - COMPACTED TO A STANDARD PROCTOR DENSITY OF 95%.
    - NO MORE PERMEABLE THAN 1 cm/s, BASED ON LABORATORY AND FIELD TESTING.
    - HARD, UNIFORM, SMOOTH AND FREE OF DEBRIS, ROCK FRAGMENTS, PLANT MATERIALS AND OTHER FOREIGN MATERIAL.
    - FREE OF COARSE ROCK FRAGMENTS GREATER THAN 0.75" DIAMETER.
  - THE SUB-BASE SHALL BE COVERED WITH NON-WOVEN GEOTEXTILE FABRIC TO CUSHION THE SECONDARY LINER AND ALLOW FOR ADEQUATE VENTING BETWEEN THE SECONDARY LINER AND SUB-BASE TO PREVENT ENTRAPMENT OF GASES BENEATH THE LINER SYSTEM.
- PRIMARY LINER REQUIREMENTS
  - THE PRIMARY LINER SHALL PREVENT THE MIGRATION OF WATER AND WASTEWATER THROUGH THE LINER TO THE GREATEST DEGREE THAT IS TECHNOLOGICALLY POSSIBLE.
  - THE EFFECTIVENESS OF THE PRIMARY LINER IN PREVENTING THE MIGRATION OF WATER AND WASTEWATER MAY NOT BE ADVERSELY AFFECTED BY THE PHYSICAL OR CHEMICAL CHARACTERISTICS OF WATER OR WASTEWATER FROM THE IMPOUNDMENT.
  - THE LINER SHALL BE DESIGNED, CONSTRUCTED AND MAINTAINED SO THAT THE PHYSICAL AND CHEMICAL CHARACTERISTICS OF THE LINE ARE NOT ADVERSELY AFFECTED BY THE WASTE AND THE LINER IS RESISTANT TO PHYSICAL, CHEMICAL AND OTHER FAILURE DURING TRANSPORTATION, HANDLING, INSTALLATION AND USE. LINER COMPATIBILITY SHALL SATISFY EPA METHOD 908, COMPATIBILITY TEST FOR WASTES AND MEMBRANE LINERS, OR OTHER DOCUMENTED DATA APPROVED BY THE DEPARTMENT.
  - THE PRIMARY LINER SHALL:
    - BE COMPOSED OF A SYNTHETIC MATERIAL WITH A COEFFICIENT OF PERMEABILITY NOT GREATER THAN 1 cm/s, BASED ON LABORATORY TESTING.
    - HAVE A MINIMUM THICKNESS OF 40 MIL UNLESS A GREATER THICKNESS IS REQUIRED BY MANUFACTURER RECOMMENDATIONS.
    - BE INSTALLED ACCORDING TO MANUFACTURER'S SPECIFICATION UNDER THE SUPERVISION OF AN AUTHORIZED REPRESENTATIVE OF THE MANUFACTURER. AN APPROVED QUALITY ASSURANCE AND QUALITY CONTROL PLAN SHALL BE IMPLEMENTED IN THE FIELD DURING THE INSTALLATION OF THE LINER.
    - BE INSPECTED FOR UNIFORMITY, DAMAGE AND IMPERFECTIONS DURING CONSTRUCTION AND INSTALLATION.

# IMPOUNDMENT CONSTRUCTION STANDARDS:

- SITE PREPARATION SHALL INCLUDE THE FOLLOWING:
  - THE FOUNDATION FOR AN IMPOUNDMENT EMBANKMENT MUST BE STRIPPED AND GRUBBED TO A DEPTH OF TWO FEET PRIOR TO ANY PLACEMENT & COMPACTION OF EARTHFILL.
  - ANY UNEXPECTED SPRINGS IN THE FOUNDATION AREA MUST BE DRAINED TO THE OUTSIDE/DOWNSTREAM SIDE OF THE EMBANKMENT WITH A DAM SECTION TWO FEET BY TWO FEET IN DIMENSION CONSISTING OF PERFORATED TYPE A SAND, COMPACTED BY HAND TAMPER. NO GEOTEXTILES TO BE USED AROUND SAND. THE LAST THREE FEET OF THIS DRAIN AT THE OUTSIDE/DOWNSLOPE MUST BE ASHITO IN MATERIAL.
- SOILS STANDARDS FOR IMPOUNDMENT SHALL INCLUDE THE FOLLOWING:
  - SOILS TO BE USED FOR EMBANKMENT CONSTRUCTION SHALL BE CLASSIFIED IN ACCORDANCE WITH ASTM D-2487 (UNIFIED SOILS CLASSIFICATION). A MINIMUM OF THREE SAMPLES MUST BE CLASSIFIED.
  - SOILS ACCEPTABLE FOR DAM EMBANKMENT CONSTRUCTION ARE LIMITED TO GC, GM, SC, SM, CL, OR ML. SOILS MUST CONTAIN A MINIMUM OF 20% OF PLUS NO. 200 SIEVE MATERIAL.
- SOIL COMPACTION SHALL BE PERFORMED AS FOLLOWS:
  - COMPACTION FOR EMBANKMENT DONE WITH A SHEEPSFOOT OR PAD ROLLER
  - LOOSE LIFT THICKNESS SHALL BE 12" OR LESS
  - MAXIMUM PARTICLE SIZE MUST BE NO GREATER THAN 12"
  - 5 PASS MINIMUM OF THE COMPACTION EQUIPMENT OVER THE ENTIRE SURFACE OF EACH LIFT IS REQUIRED.
  - COMPACTION TO AVOID NON-MOVEMENT OF THE EMBANKMENT MATERIAL IS REQUIRED.
- EMBANKMENT DESIGN SHALL INCLUDE THE FOLLOWING:
  - MINIMUM EMBANKMENT TOP WIDTH OF 12' IS REQUIRED
  - MINIMUM MAX & OUTSIDE SLOPES OF 3:1 H ARE REQUIRED
  - COMPACTED ROCKFILL OR RIPRAP MAY BE USED ON THE DOWNSTREAM FACE OF THE EMBANKMENT AS A COVER HAVING A MINIMUM DEPTH OF TWO FEET, OR TO FLATTEN A SOIL EMBANKMENT. CONSTRUCTION IN ACCORDANCE WITH THESE STANDARDS, HAVING A DOWNSTREAM SLOPE OF 3:1 H OR FLATTER TO A DOWNSTREAM SLOPE OF 3:1 H OR FLATTER. THE ROCKFILL MUST BE DURABLE, WELL GRADED, AND UNDERLAIN BY A CLASS 2, TYPE A GEOTEXTILE
  - EXPOSED EMBANKMENT SLOPES, NOT COVERED BY COMPACTED ROCKFILL OR RIPRAP, MUST BE LINED, FERTILIZED, SEEDED AND MULCHED. PERMANENT VEGETATIVE GROUND COVERING COMPLIANCE WITH PA CODE CHAPTER 102.22 MUST BE ESTABLISHED UPON COMPLETION OF DAM CONSTRUCTION.
- THE BOTTOM OF THE IMPOUNDMENT SHALL BE 20 INCHES ABOVE THE SEASONAL GROUNDWATER TABLE AT A MINIMUM.
- IN ORDER TO PRESERVE THE INTEGRITY OF THE LINER SYSTEM THE IMPOUNDMENT SHALL BE EQUIPPED WITH A MANHOLE SYSTEM FOR DRAINAGE AND WASTEWATER FLUIDS FROM THE IMPOUNDMENT.
- A MINIMUM OF 2' FREEBOARD MUST BE MAINTAINED AT ALL TIMES DURING THE OPERATION OF ALL DAMS.
- ALL LINER MATERIALS FOR DAM IMPOUNDMENTS MUST MEET THE REQUIREMENTS OF PA CODE CHAPTER 78.58-78.63. LINERS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS.
- DAM EMBANKMENTS MUST BE MAINTAINED WITH GRASSY VEGETATION COVER, FREE OF BRUSH & TREES.

# PE LINER PLACEMENT STANDARDS:

- LINER ROLLS SHALL BE SHIPPED TO THE JOB SITE IN A MANNER NOT TO DAMAGE THE ROLLS. THE ROLLS SHALL BE STORED AND PROTECTED FROM PUNCTURE, DIRT, GREASE, EXCESSIVE HEAT, OR OTHER DAMAGE. THEY SHALL BE STORED ON A PREPARED SMOOTH SURFACE (NOT WOODEN PALLET) AND SHALL BE STACKED NO MORE THAN TWO ROLLS HIGH. LINER ROLLS SHALL BE DEPLOYED USING A SPREADER BAR ASSEMBLY ATTACHED TO A FRONTEND LOADER BUCKET OR BY OTHER METHODS APPROVED BY THE LINER MANUFACTURER. THE LINER SHALL BE PLACED IN THE GENERAL DIRECTION OF MAXIMUM SLOPE. ALL OF THE PLACED LINER SHALL BE ADEQUATELY BALLASTED BY SANDBAGS TO PROTECT IT FROM WIND UPLIFT FORCES. THE LINER SHALL BE PLACED ON A DAILY BASIS AND BEADED AND SECURED BY THE END OF THE WORKDAY. NO CONSTRUCTION EQUIPMENT SHALL BE ALLOWED DIRECTLY ON THE LINER EXCEPT FOR LIGHT ATVS AND GENERATORS TO POWER THE SEAMING MACHINES.
- THE LINER SHALL NOT BE PLACED DURING FOG, PRECIPITATION, IN THE PRESENCE OF EXCESSIVE WINDS, OR IN TEMPERATURES LESS THAN 40 DEGREES FAHRENHEIT. THE LINER SHALL BE LOOSELY LAD OVER THE FOUNDATION WITH SUFFICIENT SLACK (ABOUT 2 PERCENT) TO ACCOMMODATE THERMAL EXPANSION AND CONTRACTION ENCOUNTERED DURING CONSTRUCTION. EACH PANEL SHALL BE LAD OUT AND POSITIONED TO MINIMIZE THE NUMBER AND LENGTH OF THE GEOMEMBRANE FIELD JOINTS AND TO BE CONSISTENT WITH ACCEPTED INSTALLATION PRACTICE. THE METHODS USED TO PLACE PANELS SHALL MINIMIZE WRINKLES ESPECIALLY ALONG FIELD SEAMS. WHEN NECESSARY, A GEOTEXTILE RUB SHEET WILL BE USED UNDER THE GEOMEMBRANE TO PREVENT DAMAGE WHEN DRAGGING OR MOVING THE PANELS.

# PE LINER WELDING STANDARDS:

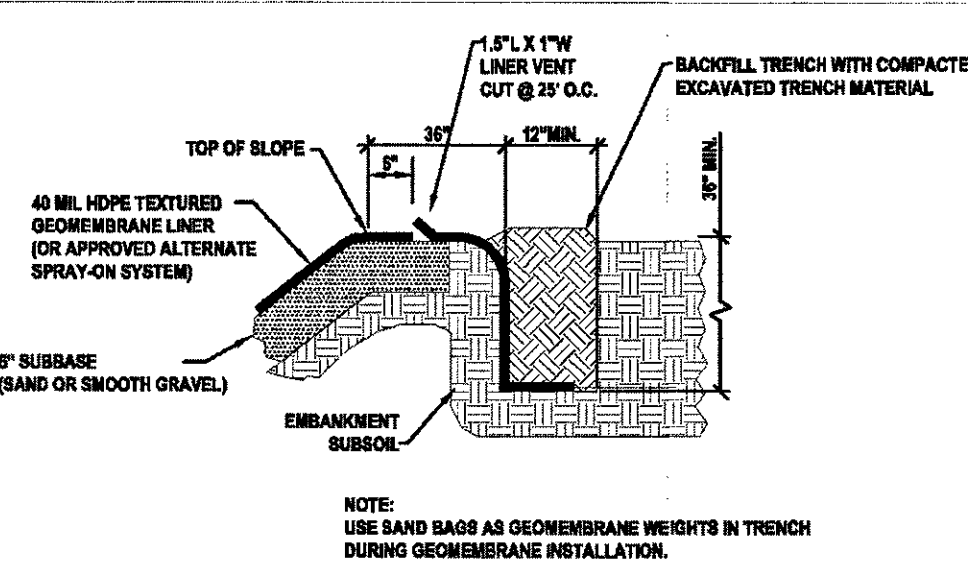
- THE PRIMARY METHOD OF LINER SEAM WELDING SHALL BE DONE BY HOT SHOE FUSION WELD THAT PRODUCES A DOUBLE TRACK WELD SEAM WITH AIR CHANNEL.
  - NON-LINEAR SEAMS, PIPE PENETRATIONS, T-SEAMS, DETAILS AND PATCH WELDING SHALL BE DONE BY FILLET EXTRUSION WELDING.
- GENERAL SEAM WELDING PROCEDURES:
- SURFACES SHALL BE CLEAN AND DRY.
  - WELDING SHALL NOT BE ATTEMPTED WHEN THE AMBIENT SHEET TEMPERATURE IS BELOW 45 DEGREES FAHRENHEIT OR ABOVE 90 DEGREES FAHRENHEIT.
  - THERE SHALL BE A MINIMUM 4" OVERLAP OF LINER PANELS TO BE SEAM WELDED. THE TWO SHEETS SHALL BE STRAIGHTENED TO KEEP THE SEAM EDGES SMOOTH AND WRINKLE-FREE. UPSLOPE PANELS SHALL BE WELDED FIRST. WELDS SHALL BE PERFORMED PRIOR TO FIELD SEAMING EACH MORNING AND AFTERNOON.
  - TEST WELDS SHALL BE PERFORMED PRIOR TO FIELD SEAMING EACH MORNING AND AFTERNOON.
  - THE AREA WHICH IS TO RECEIVE THE EXTRUSION BEAD SHALL BE GRIND TO REMOVE SURFACE CONTAMINATION AND SURFACE TENSION.
  - THE WELDING ROD SHALL BE FREE FROM DIRT, DUST, MOISTURE, AND TANGLES AT ALL TIMES.
  - A CONSTANT FORWARD WELDING SPEED SHALL BE MAINTAINED PRIOR TO ACTUAL EXTRUDATE WELDING.
  - THE BOTTOM PORTION OF THE WELDING DIE SHALL STAY IN INTIMATE CONTACT WITH THE LINER AND CONFORM TO VARIOUS SEAM ANGLES AND CONFIGURATIONS.
  - THE WELDER DIE SHALL BE KEPT "ON CENTER" AT ALL TIMES, ENSURING THAT AN EQUAL AMOUNT OF EXTRUDATE BEAD IS APPLIED TO BOTH PORTIONS OF LINER OVERLAP (TOP AND BOTTOM).
  - A CONSTANT FORWARD WELDING SPEED SHALL BE MAINTAINED, TO ENSURE A SMOOTH AND UNIFORM EXTRUDATE BEAD.
  - ALL PATCHES SHALL HAVE A 4" RADIUS AT CORNERS, AND BE SECURELY TACKED TO THE LINER.

# SEAM TESTING:

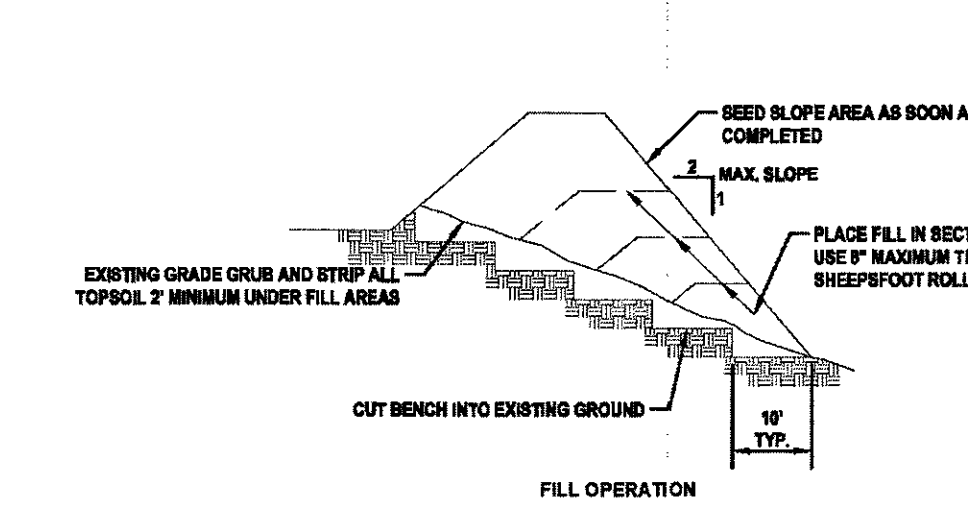
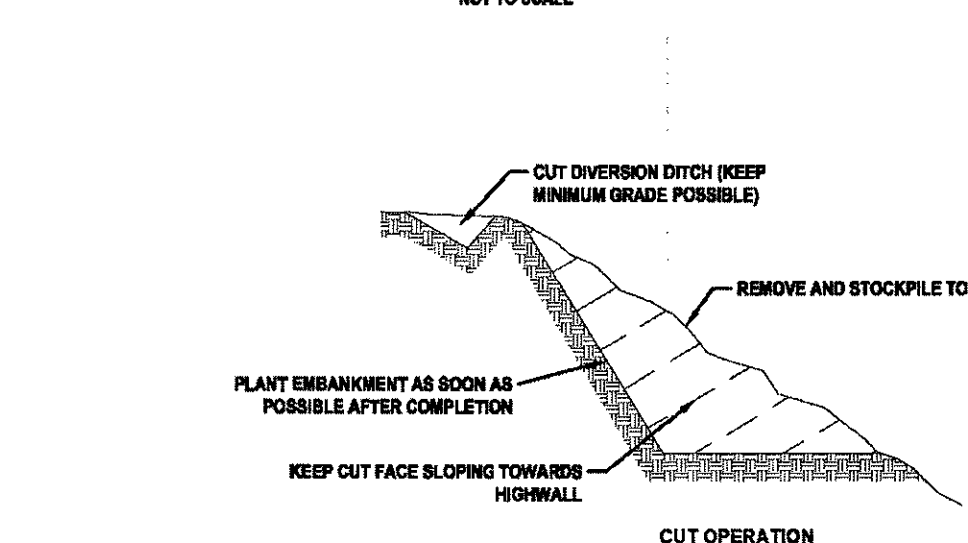
- SEAMS SHALL BE TESTED UNDER FIELD CONDITIONS AT THE BEGINNING OF EACH SEAMING PERIOD AND ONCE IN THE MORNING AND ONCE IN THE AFTERNOON. THREE SPECIMENS SHALL BE TESTED BY A TENSOMETER IN SHEAR AND PEEL MODES. TEST SEAMS SHALL MEET THE REQUIREMENTS OF MATERIAL SPECIFICATION 804. EACH SPECIMEN SHALL BE 1 INCH WIDE WITH THE GRIP SEPARATION RATE OF 2 INCHES PER MINUTE. ALL PEEL TESTS SHALL INCLUDE A FILM TENSOR (FTB) VALUE. THE FTB IS DEFINED AS A FAILURE OF ONE OF THE BONDED SHEETS BEFORE COMPLETE SEPARATION IN THE BONDED AREA.
- NON-DESTRUCTIVE SEAM TESTING - AIR PRESSURE TEST SHALL BE PERFORMED ON ALL DOUBLE-WEDGE FUSION SEAMS. THE AIR PRESSURE TEST EQUIPMENT AND PROCEDURES SHALL CONFORM TO THIS SPECIFICATION AND THE LINER MANUFACTURER'S SPECIFICATIONS. SEAL BOTH ENDS OF THE SEAM TO BE TESTED. INSERT THE PRESSURE NEEDLE INTO THE SEAM AIR CHANNEL. PRESSURIZE THE AIR CHANNEL THROUGH THE NEEDLE TO 25 TO 30 POUNDS PER SQUARE INCH.
- MONITOR ANY PRESSURE DROPS FOR 15 MINUTES. A LOSS OF PRESSURE IN EXCESS OF 4 POUNDS PER SQUARE INCH OR A CONTINUOUS LOSS OF PRESSURE IS AN INDICATION OF A LEAK. TERMINATE THE TEST BY RELIEVING THE PRESSURE FROM THE OPPOSING END OF THE SEAM. THE PRESSURE SHALL IMMEDIATELY DROP TO ZERO UPON OPENING THE OPPOSING END OF THE SEAM. IF THIS DOES NOT OCCUR, THE SEAM CHANNEL SHALL BE CHECKED FOR OBSTRUCTIONS AND RETESTED. ALL DEFECTS SHALL BE MARKED FOR REPAIR.
- VACUUM BOX TESTS SHALL BE PERFORMED ON ALL EXTRUSION WELDS. THE VACUUM BOX EQUIPMENT AND TEST PROCEDURE SHALL CONFORM TO THIS SPECIFICATION AND THE LINER MANUFACTURERS SPECIFICATIONS. APPLY SOAPY WATER SOLUTION TO THE SEAM AREA TO BE TESTED. THE VACUUM BOX, EQUIPPED WITH A TRANSPARENT VIEWING WINDOW, SHALL BE CENTERED OVER THE SEAM AREA AND A VACUUM OF 3 POUNDS PER SQUARE INCH SHALL BE DRAWN. THE SEAM AREA SHALL BE VISUALLY MONITORED FOR ANY SOAP BUBBLES FOR 15 SECONDS. SEAM TESTING SHALL CONTINUE BY OVERLAPPING A MINIMUM OF 6 INCHES BETWEEN EACH TEST INTERVAL. ALL DEFECTS SHALL BE MARKED FOR REPAIR.
- DESTRUCTIVE SEAM TESTING - IF REQUIRED, SEAM SAMPLES SHALL BE CUT AT NO MORE THAN ONE SAMPLE PER 500 FEET OF WELD FOR DESTRUCTIVE SEAM TESTING. ALL DESTRUCTIVE SEAM SAMPLES SHALL BE TESTED BY A TENSOMETER IN SHEAR AND PEEL MODES TO VERIFY SEAMS MEET THE REQUIREMENTS OF MATERIAL SPECIFICATION 804.

# REPAIRS:

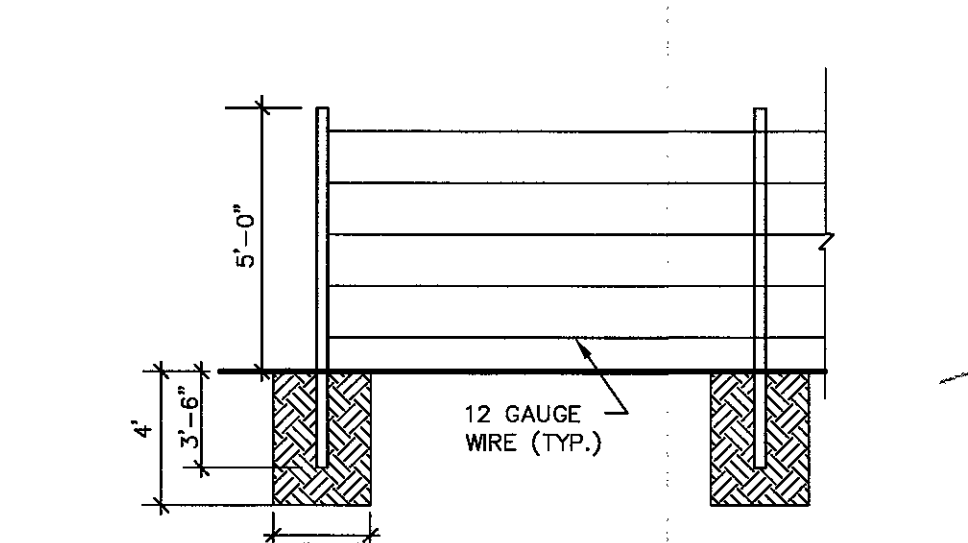
- ALL DEFECTIVE LINER AREAS AND BAD SEAMS SHALL BE REPAIRED AND TESTED BEFORE THE INSTALLATION IS COMPLETED.
- TEARS, PUNCTURES, MATERIAL DEFECTS - ALL TEARS, PUNCTURES, AND MATERIAL DEFECTS IN LINER SHALL BE REPAIRED BY INSTALLING A PATCH OVER THE DEFECTIVE AREA. SURFACES OF THE LINER TO BE PATCHED SHALL BE CLEANED BEFORE THE REPAIR. TO ENSURE PROPER BONDING OF THE EXTRUSION WELD, EDGES OF THE PATCH MATERIAL AND THE ADJACENT LINER SHALL BE PROPERLY ABRASSED BY A LIGHT GRINDING. THIS OPERATION SHALL BE DONE NO MORE THAN 15 MINUTES BEFORE THE WELDING OPERATION. THE ABRASION SHALL REMOVE NO MORE THAN 10 PERCENT OF THE MATERIAL THICKNESS. ALL PATCHES SHALL BE OF THE SAME LINER MATERIAL, AND EXTEND A MINIMUM OF 6 INCHES BEYOND THE EDGES OF THE DEFECT AREA. ALL PATCHES SHALL HAVE ROUNDED CORNERS AND SHALL BE EXTRUSION WELDED TO THE LINER. ALTERNATIVELY, A BEAD OF EXTRUDATE SHALL BE PLACED OVER ALL HOLES THAT ARE LESS THAN 0.5 INCH IN DIAMETER.
- SEAM REPAIR - ALL FAILED SEAMS SHALL BE REPAIRED BY INSTALLING A CAP STRIP OVER THE ENTIRE LENGTH OF FAILED SEAM. THE CAP STRIP SHALL BE OF THE SAME LINER MATERIAL AND SHALL EXTEND THE FAILED SEAM A MINIMUM OF 6 INCHES IN ALL DIRECTIONS. ALTERNATIVELY, THE SEAM ALONG THE UPPER FLAP CAN BE EXTRUSION WELDED TO THE LINER ALONG THE ENTIRE LENGTH OF THE FAILED SEAM.



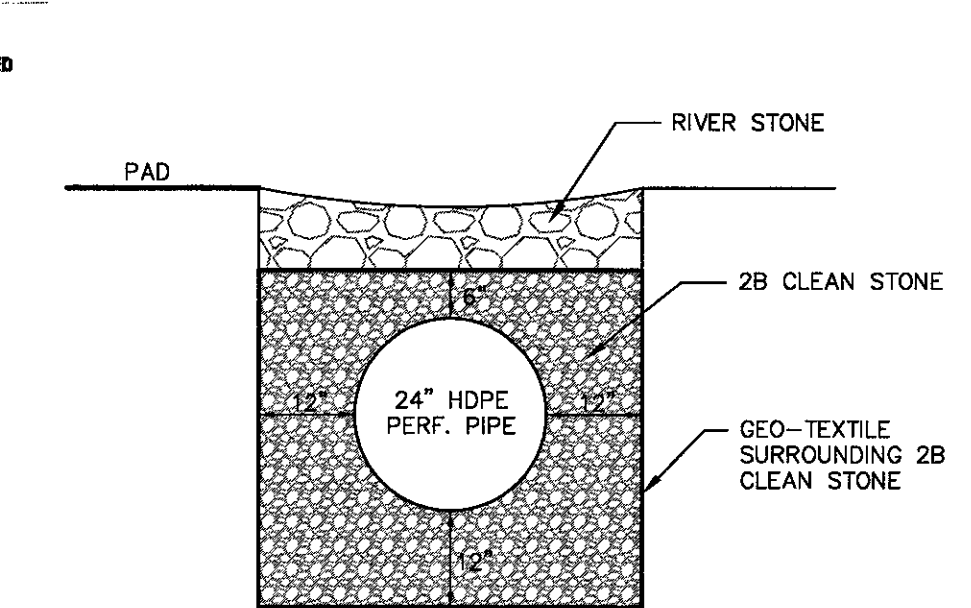
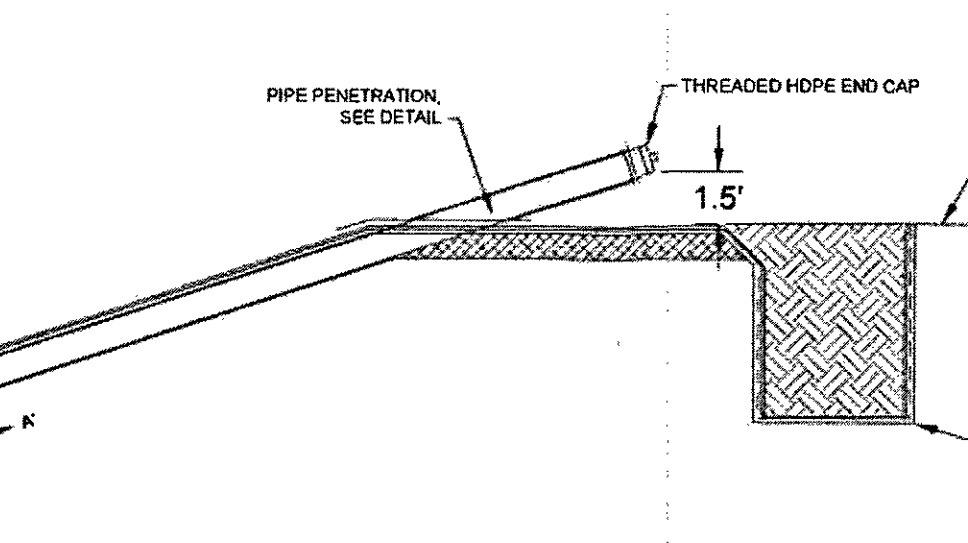
# FRESHWATER IMPOUNDMENT LINER SYSTEM & ANCHOR TRENCH DETAIL



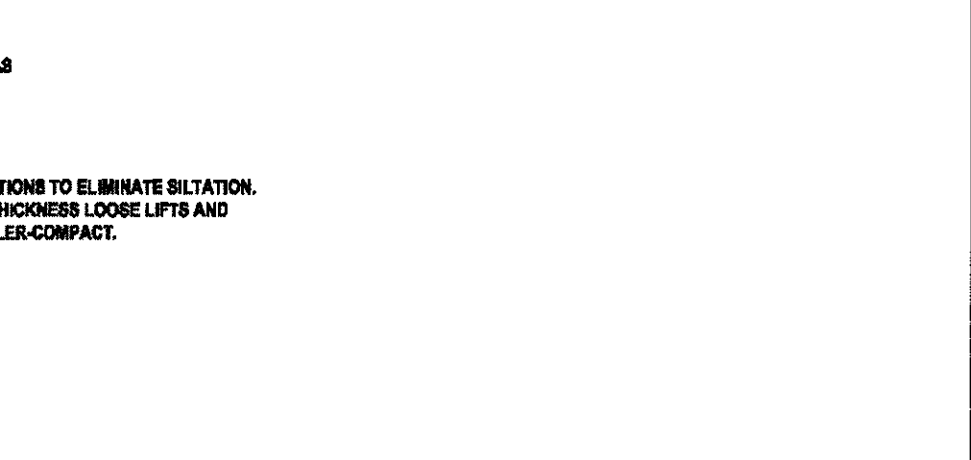
# TYPICAL METHOD FOR CUT & FILL OPERATIONS



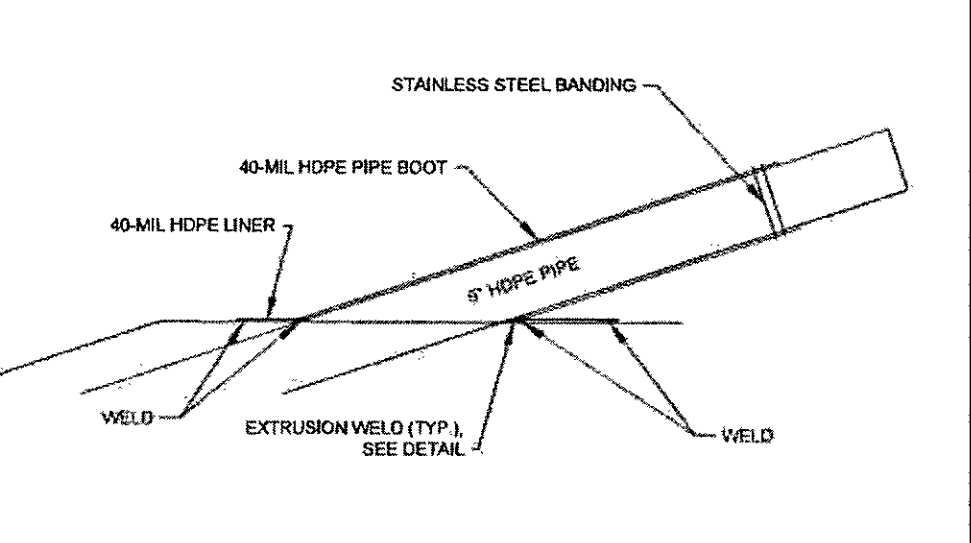
# 5 WIRE IMPOUNDMENT FENCE DETAIL



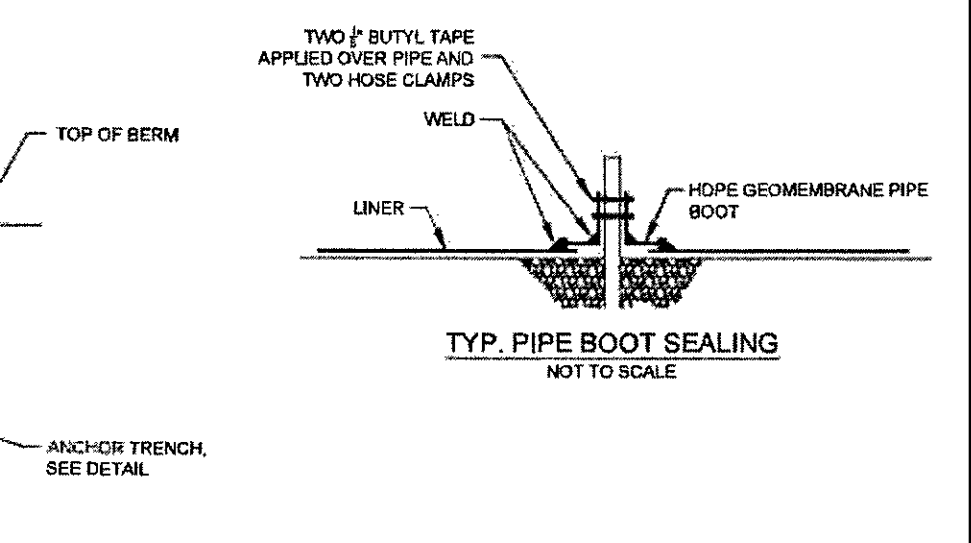
# FRENCH DRAIN (TYPICAL SECTION)



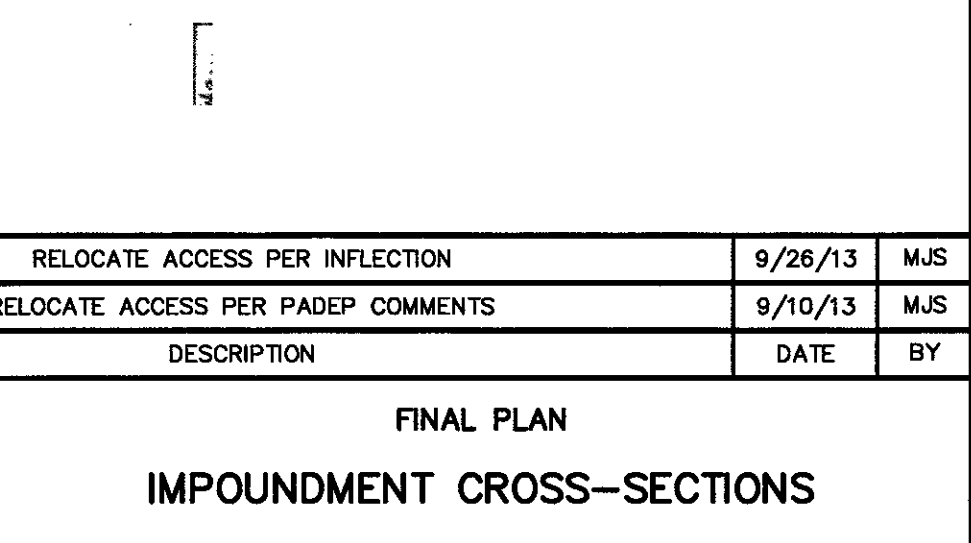
# TYPICAL METHOD FOR CUT & FILL OPERATIONS



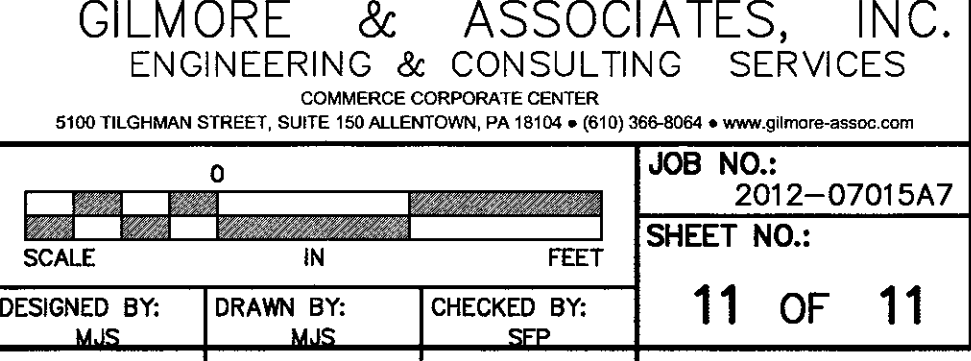
# 5 WIRE IMPOUNDMENT FENCE DETAIL



# PIPE PENETRATION DETAIL



# TYP. PIPE BOOT SEALING

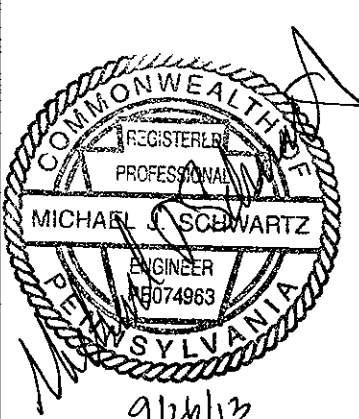


LOCATIONS OF EXISTING UNDERGROUND UTILITIES/FACILITIES SHOWN HEREON HAVE BEEN DEVELOPED FROM RECORDS, FIELD MARKINGS BY UTILITY OWNERS, AND/OR ABOVE-GROUND OBSERVATION OF THE SITE. NO EXCAVATIONS WERE PERFORMED IN THE PREPARATION OF THESE DRAWINGS; THEREFORE ALL UTILITIES SHOWN SHOULD BE CONSIDERED APPROXIMATE IN LOCATION, DEPTH, AND SIZE. THE POTENTIAL EXISTS FOR OTHER UNDERGROUND UTILITIES/FACILITIES TO PRESENT WHICH ARE NOT SHOWN ON THE DRAWINGS. ONLY THE VISIBLE LOCATIONS OF UNDERGROUND UTILITIES/FACILITIES AT THE TIME OF FIELD SURVEY SHALL BE CONSIDERED TRUE AND ACCURATE. COMPLETENESS OR ACCURACY OF UNDERGROUND UTILITIES/FACILITIES ARE NOT GUARANTEED BY GILMORE & ASSOCIATES INC.

ALL CONTRACTORS WORKING ON THIS PROJECT SHALL VERIFY LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES/FACILITIES PRIOR TO START OF WORK AND SHALL COMPLY WITH THE REQUIREMENTS OF 102 PA CODE CHAPTER 102.22, 1974, AS LAST AMENDED ON MARCH 29, 2007, PENNSYLVANIA ACT 181. GILMORE & ASSOCIATES INC. HAS OBTAINED A PA-ONE CALL SERIAL NUMBER \*\*\*\*\* (2013) FOR DESIGN PURPOSES ONLY.

PENNSYLVANIA ONE CALL SYSTEM, INC.  
925 Irwin Run Road  
West Mifflin, Pennsylvania  
15122 - 1078

BEFORE YOU DIG ANYWHERE IN PENNSYLVANIA CALL 1-800-242-1776  
NON-MEMBERS MUST BE CONTACTED DIRECTLY  
PA LAW REQUIRES THREE WORKING DAYS NOTICE TO LOCATE BEFORE YOU EXCAVATE, DRILL, BLAST OR DEMOLISH

|                                                                                           |  |                                                                                       |  |                                                                                                                                                                                                 |  |                            |  |                    |
|-------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------|--|--------------------|
| WELL OPERATOR:                                                                            |  | REV.                                                                                  |  | DESCRIPTION                                                                                                                                                                                     |  | DATE                       |  | BY                 |
| INFLECTION ENERGY, LLC<br>1200 17TH ST., SUITE 1350<br>DENVER, CO 80202<br>(303) 531-2300 |  |                                                                                       |  | FINAL PLAN                                                                                                                                                                                      |  |                            |  |                    |
|                                                                                           |  | TOTAL AREA:<br>33.60 AC.                                                              |  | TOTAL LOTS:<br>1                                                                                                                                                                                |  | IMPOUNDMENT CROSS-SECTIONS |  |                    |
|                                                                                           |  | DATE:<br>7/24/13                                                                      |  | SCALE:                                                                                                                                                                                          |  | HILLEGAS - PAD             |  |                    |
|      |  |  |  | UPPER FAIRFIELD TOWNSHIP, LYCOMING COUNTY, PENNSYLVANIA                                                                                                                                         |  |                            |  |                    |
|                                                                                           |  |                                                                                       |  | GILMORE & ASSOCIATES, INC.<br>ENGINEERING & CONSULTING SERVICES<br>COMMERCIAL CORPORATE CENTER<br>5100 TILGHMAN STREET, SUITE 150 ALLENTOWN, PA 18104 • (610) 366-8064 • www.gilmore-associ.com |  | JOB NO.:<br>2012-07015A7   |  |                    |
|                                                                                           |  |                                                                                       |  |                                                                                                            |  | SHEET NO.:                 |  |                    |
|                                                                                           |  |                                                                                       |  | DESIGNED BY:<br>MJS                                                                                                                                                                             |  | DRAWN BY:<br>MJS           |  | CHECKED BY:<br>SFP |
|                                                                                           |  |                                                                                       |  |                                                                                                                                                                                                 |  | 11 OF 11                   |  |                    |

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