

PENNSYLVANIA PIPELINE PROJECT

CONSTRUCTION SPREAD 2 BLOCK VALVE POST CONSTRUCTION STORMWATER MANAGEMENT PLAN

FEBRUARY 2017

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PREPARED BY:



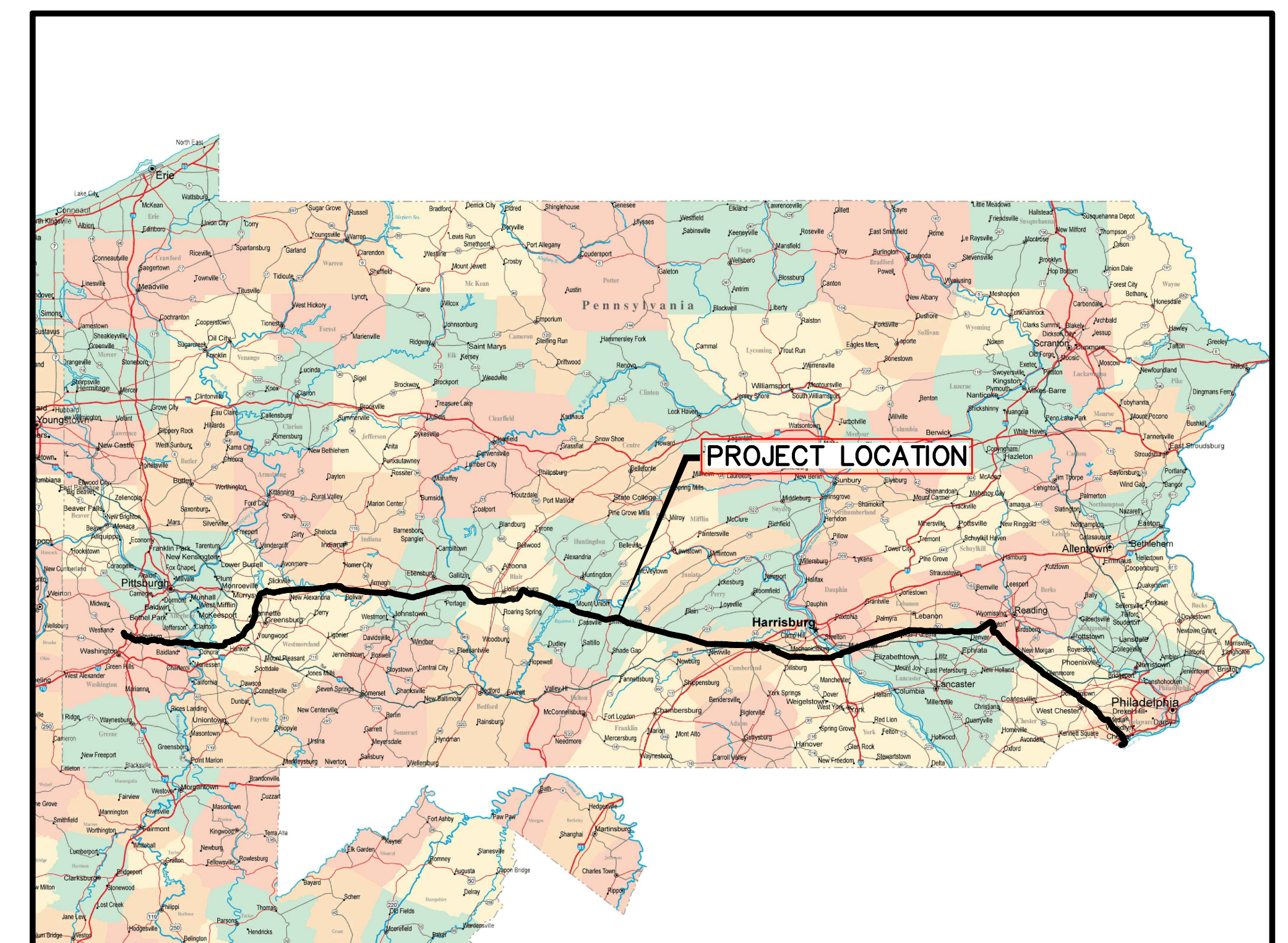
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PREPARED FOR:



SUNOCO PIPELINE L.P.
SINKING SPRING, PENNSYLVANIA



LOCATION MAP
PENNSYLVANIA PIPELINE PROJECT
HOUSTON, PENNSYLVANIA TO MARCUS HOOK, PENNSYLVANIA

NOTES:

1. TOPOGRAPHIC MAPPING AND FEATURES AT BLOCK VALVE SITE WAS TAKEN BY FIELD SURVEY. TOPOGRAPHIC MAPPING AND FEATURES FOR DRAINAGE AREA COMPILED FROM WWW.PASDA.PSU.EDU
2. THE PROJECT TAKES PLACE WITHIN BLAIR COUNTY AND HUNTINGDON COUNTY, PENNSYLVANIA.
3. TOWNSHIP BOUNDARIES TAKEN FROM WWW.PASDA.PSU.EDU.
4. 100-YEAR FEMA FLOODPLAINS FROM WWW.PASDA.PSU.EDU.
5. PIPELINE LOCATION AND RIGHT-OF-WAY FROM SUNOCO PIPELINE L.P.
6. THE RIGHTS-OF-WAYS AND EASEMENTS SHOWN ON THIS PLAN ARE THE RESPONSIBILITY OF SUNOCO PIPELINE L.P. TO SECURE WITH THE INDIVIDUAL PROPERTY OWNER. THE RIGHTS-OF-WAY AND EASEMENTS SHOWN ON THIS PERMIT DRAWING REPRESENT THE BEST AVAILABLE PROPERTY INFORMATION AS PROVIDED TO TETRA TECH, INC. BY SUNOCO PIPELINE L.P. THE RIGHTS-OF-WAY AND EASEMENTS SHALL BE VERIFIED AND LOCATED IN THE FIELD BY SUNOCO PIPELINE L.P.
7. PAST AND PRESENT LAND USE CONSISTS OF AGRICULTURAL, FORESTED AND RESIDENTIAL AREAS. POST CONSTRUCTION LAND USE WILL BE A MAINTAINED, VEGETATED RIGHT-OF-WAY.
8. DRAWINGS REPRESENT THE FINAL PLAN FOR CONSTRUCTION.
9. THE POST CONSTRUCTION STORMWATER MANAGEMENT PLAN, INSPECTION REPORTS, AND MONITORING REPORTS MUST BE AVAILABLE FOR REVIEW AND INSPECTION BY THE DEPARTMENT OR CONSERVATION DISTRICT.
10. THE LICENSED PROFESSIONAL OR DESIGNEE SHALL BE PRESENT ON SITE FOR THE CONSTRUCTION OF THE INFILTRATION BERMS AND TRENCHES.
11. A RECORDED INSTRUMENT WILL BE RECORDED AT THE RECORDER OF DEEDS TO PROVIDE FOR NECESSARY ACCESS FOR LONG TERM OPERATION AND MAINTENANCE FOR PCSM BMP'S. THE DEED WILL PROVIDE NOTICE THAT THE RESPONSIBILITY FOR THE LONG TERM OPERATION AND MAINTENANCE OF THE PCSM BMP'S IS A COVENANT THAT RUNS WITH THE LAND AND IS BINDING AND ENFORCEABLE BY SUBSEQUENT GRANTEEES.
12. AT BLOCK VALVE SITES, FIELD SURVEYS WERE CONDUCTED TO ACCURATELY REFLECT FIELD CONDITIONS TO FACILITATE THE DESIGN OF THE SITES. THESE SURVEYS WERE CONDUCTED IN THE IMMEDIATE VICINITY OF THE PAD AND ROAD TO BE DESIGNED. DUE TO THE NATURE OF POST CONSTRUCTION STORMWATER DESIGN CRITERIA, SURVEY COULD NOT BE CONDUCTED FOR THE ENTIRE DRAINAGE AREAS AT EACH LOCATION. IN THESE AREAS, LIDAR DATA WAS SUBSTITUTED. THEREFORE, THE PROPOSED GRADING FOR THE SITES, WHICH WAS DESIGNED FROM THE 1' CONTOUR INTERVAL SURVEY DATA, DOES NOT TIE INTO THE 2' CONTOUR INTERVAL LIDAR DATA.

SITE RESTORATION

FOLLOWING COMPLETION OF PIPELINE INSTALLATION AND TRENCH BACKFILLING, THE PIPELINE RIGHT OF WAY, ASSOCIATED WORKSPACES, AND TEMPORARY ACCESS ROADS SHALL BE RETURNED TO THE GENERAL GRADE PRESENT PRIOR TO PIPELINE INSTALLATION IN ORDER TO MAINTAIN PRECONSTRUCTION DRAINAGE PATTERNS. AFTER COMPLETION OF MAJOR CONSTRUCTION WORK, TOPSOIL THAT WAS STOCKPILED DURING CONSTRUCTION WILL BE PLACED ALONG THE ROW. GROUNDS DISTURBED BY ANY OF THE OPERATIONS NECESSARY TO COMPLETE THE WORK FOR THIS PROJECT ARE TO BE PERMANENTLY SEEDED, OR IF SPECIFIED, SOODED, UNLESS OCCUPIED BY STRUCTURES, PAVED OR DESIGNATED AS A PERMANENT ACCESS ROAD. DISTURBED AREAS, WHICH ARE AT FINAL GRADE, SHALL BE SEEDED AND MULCHED ONCE FINAL GRADES ARE ACHIEVED. THE PERMANENT SEED MIXTURE WILL RESTORE DISTURBED AREAS TO A MEADOW IN GOOD CONDITION OR BETTER. IF SEEDING CANNOT BE COMPLETED WITHIN A FOUR (4) DAY PERIOD DUE TO WEATHER CONDITIONS, THE DISTURBED AREA WILL BE MULCHED WITH STRAW AT THE RATE OF THREE (3) TONS PER ACRE. THIS STRAW WILL BE ANCHORED USING A METHOD OUTLINED ON DRAWING PCS-0.03.

SITE RESTORATION CONSTRUCTION SEQUENCE

A GENERALIZED CONSTRUCTION SEQUENCE IS PROVIDED BELOW. THE CONSTRUCTION SEQUENCE IS INTENDED TO PROVIDE A GENERAL COURSE OF ACTION TO CONFORM TO THE APPLICABLE REGULATORY AGENCY REQUIREMENTS FOR SITE RESTORATION AND POST-CONSTRUCTION STORMWATER MANAGEMENT OF THE SITE. NECESSARY STEPS FOR PROPER AND COMPLETE EXECUTION OF WORK PERTAINING TO THIS PLAN, WHETHER SPECIFICALLY MENTIONED OR NOT, ARE TO BE PERFORMED BY THE CONTRACTOR. THE CONTRACTOR WILL COMPLY WITH ALL REQUIREMENTS LISTED IN THIS SECTION. THE CONTRACTOR MAY BE REQUIRED TO ALTER CONTROLS BASED ON THE EFFECTIVENESS OF CONTROLS OR DIFFERING CONDITIONS ENCOUNTERED IN THE FIELD. THE APPROPRIATE COUNTY CONSERVATION DISTRICT AND DEP SHALL BE CONTACTED AND MUST APPROVE ANY DEVIATION TO THE AUTHORIZED PLANS. A PRE-CONSTRUCTION MEETING IS REQUIRED PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITY. THE PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION (PADEP) OR APPLICABLE COUNTY CONSERVATION DISTRICT, CONTRACTORS, THE LANDOWNER, APPROPRIATE MUNICIPAL OFFICIALS, AND THE PLAN PREPARER MUST BE INVITED TO THIS MEETING AT LEAST 7 DAYS IN ADVANCE.

1. GRADE SURFACE TO FINISHED GRADE ELEVATIONS AS SOON AS PRACTICABLE FOLLOWING COMPLETION OF PIPE INSTALLATION.
2. SURFACE ROUGHENING WILL BE UTILIZED TO ROUGH THE SOIL SURFACE WITH HORIZONTAL DEPRESSIONS FOR THE PURPOSE OF REDUCING RUNOFF VELOCITY, INCREASING INFILTRATION, AIDING THE ESTABLISHMENT OF VEGETATION, AND REDUCING EROSION. SURFACE ROUGHENING SHOULD BE APPLIED TO SLOPES 3H:1V OR STEEPER UNLESS A STABLE ROCK FACE IS PROVIDED OR IT CAN BE SHOWN THAT THERE IS NOT A POTENTIAL FOR SEDIMENT POLLUTION TO SURFACE WATERS. FOR ROUGHENED SURFACES WITHIN 50 FEET OF A SURFACE WATER, AND WHERE BLANKETING OF SEEDED AREAS IS PROPOSED AS THE MEANS TO ACHIEVING PERMANENT STABILIZATION, SPRAY-ON TYPE BLANKETS ARE RECOMMENDED. SURFACE ROUGHENING SHALL BE ACCOMPLISHED USING DOZERS AFFIXED WITH GROUSER TRACKED EQUIPMENT. DOZERS SHALL RUN UP AND DOWN THE SLOPES LEAVING HORIZONTAL GROOVES PERPENDICULAR TO THE SLOPE. DOZER BLADES SHALL BE RAISED AND NOT USED DURING SURFACE ROUGHENING. WHERE COMPACTION DOES OCCUR, CONTRACTOR SHALL SCARIFY THE SOIL OR PROVIDE ADDITIONAL ROUGHENING SUCH AS DEEP RIPPING OR CHISEL RIPPING TO RESTORE THE AREA TO A MINIMAL COMPACTED STATE. IN AREAS OF PROPOSED INFILTRATION, SOILS SHALL BE AMENDED TO 2' BELOW GRADE. SEE SOIL AMENDMENT AND RESTORATION CONSTRUCTION SEQUENCE BELOW.
3. PLACE TOPSOIL FROM TOPSOIL STOCKPILES AS THE UPPER LAYER OF BACKFILL. TOPSOIL SHALL NOT BE PLACED WHEN THE SUBGRADE IS FROZEN OR WHEN IT IS EXCESSIVELY WET OR DRY AND SHALL NOT BE HANDLED WHEN IN A FROZEN OR MUDDY CONDITION.
4. REMOVE GRAVEL AND GEOTEXTILE FROM THE TEMPORARY ACCESS ROADS AND SCARIFY THE SOIL. REFER TO STEP 2 OF THIS SEQUENCE TO ADDRESS COMPACTION AT ACCESS ROADS. AFTER ADDRESSING COMPACTION CONCERNS, PLACE TOPSOIL THAT WAS STRIPPED PRIOR TO INSTALLATION OF THE ACCESS ROADS.
5. IMMEDIATELY SEED AND MULCH DISTURBED AREAS IN ACCORDANCE WITH THE PERMANENT SEEDING SCHEDULE ONCE FINAL GRADE IS ESTABLISHED AND TOPSOIL IS PLACED.
6. MAINTAIN EROSION AND SEDIMENTATION CONTROL DEVICES UNTIL SITE WORK IS COMPLETE AND A UNIFORM 70-PERCENT PERENNIAL VEGETATIVE COVER IS ESTABLISHED. REGRADE AND REVEGETATE AREAS DISTURBED DURING THE REMOVAL OF THE EROSION AND SEDIMENT CONTROLS.

GEOWEB CONSTRUCTION SEQUENCE

1. GRADE SURFACE TO SUBGRADE ELEVATIONS AS SOON AS PRACTICABLE FOLLOWING COMPLETION OF PIPE INSTALLATION. DO NOT COMPACT.
2. IF NEEDED, SCARIFY THE SOIL OR PROVIDE ADDITIONAL ROUGHENING SUCH AS DEEP RIPPING OR CHISEL RIPPING TO RESTORE THE AREA TO A MINIMAL COMPACTED STATE.
3. INSTALL GEOTEXTILE SEPARATION LAYER IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
4. EXPAND GEOWEB TO REQUIRED DIMENSIONS AND ANCHOR EDGES WITH ATRA ANCHORS, IF NEEDED. JOIN ADJACENT SECTIONS WITH ATRA KEYS.
5. ANCHOR GEOWEB ON SLOPES GREATER THAN 5% WITH 24" ATRA ANCHORS PLACED ON A 3X8 CELL PATTERN.
6. MIX AND PLACE ENGINEERED INFILL MATERIAL (2/3 AASHTO #57 STONE AND 1/3 SCREENED TOPSOIL) INTO THE GEOWEB CELLS. INFILL MATERIAL SHALL BE FREE-FLOWING AND NOT FROZEN WHEN PLACED IN THE GEOWEB SECTIONS. LIMIT DROP HEIGHT TO 3 FEET TO AVOID DAMAGING OR DISPLACEMENT OF THE CELL WALL. SLIGHTLY OVERFILL THE CELLS AND LEVEL OFF MATERIAL ONCE SETTLEMENT IS NEGLIGIBLE. DO NOT COMPACT.
7. SEED AND MULCH FILLED SECTIONS IN ACCORDANCE WITH THE PERMANENT SEEDING SCHEDULE ONCE INFILL IS PLACED.
8. MAINTAIN EROSION AND SEDIMENTATION CONTROL DEVICES UNTIL SITE WORK IS COMPLETE AND A UNIFORM 70-PERCENT PERENNIAL VEGETATIVE COVER IS ESTABLISHED.

SOIL AMENDMENT AND RESTORATION CONSTRUCTION SEQUENCE

1. GRADE SURFACE TO FINISHED GRADE ELEVATIONS AS SOON AS PRACTICABLE FOLLOWING COMPLETION OF PIPE INSTALLATION.
2. IN THE DESIGNATED SOIL AMENDMENT AREA, TILL THE GROUND AND MIX IN THE COMPOST AT A RATIO OF 2:1 (SOIL:COMPOST) TO A DEPTH OF 24 INCHES.
3. IMMEDIATELY SEED AND MULCH DISTURBED AREAS ONCE FINAL GRADE IS ESTABLISHED IN ACCORDANCE WITH THE PERMANENT SEEDING SCHEDULE.
4. MAINTAIN EROSION AND SEDIMENTATION CONTROL DEVICES UNTIL SITE WORK IS COMPLETE AND A UNIFORM 70% PERENNIAL VEGETATIVE COVER IS ESTABLISHED.

POST CONSTRUCTION STORMWATER MANAGEMENT CONSTRUCTION SEQUENCE

1. GRADE SURFACE TO FINISHED GRADE ELEVATIONS AS SOON AS PRACTICABLE FOLLOWING COMPLETION OF PIPE INSTALLATION.
2. INSTALL POST CONSTRUCTION BMP'S AFTER COMPLETION OF PIPELINE CONSTRUCTION:

INFILTRATION BERM

1. INSTALL TEMPORARY SEDIMENT AND EROSION CONTROL BMP'S AS PER THE PENNSYLVANIA EROSION AND SEDIMENT POLLUTION CONTROL PROGRAM MANUAL.
2. INSTALL ORANGE CONSTRUCTION FENCING AROUND THE PONDING AREA OF THE INFILTRATION BERM AS SHOWN ON THE PCSM PLAN DRAWINGS. COMPLETE SITE GRADING AND STABILIZE WITHIN THE LIMIT OF DISTURBANCE EXCEPT WHERE THE INFILTRATION BERM WILL BE CONSTRUCTED AND THE EXTENT OF THE PONDING AREA; MAKE EVERY EFFORT TO MINIMIZE BERM FOOTPRINT AND NECESSARY ZONE OF DISTURBANCE (INCLUDING BOTH REMOVAL OF EXISTING VEGETATION AND DISTURBANCE OF EMPTY SOIL) IN ORDER TO MAXIMIZE INFILTRATION. IF EQUIPMENT MUST TRAVEL THROUGH THE PONDING AREA, TIMBER MATTING SHALL BE PLACED TO MINIMIZE COMPACTION, AND EQUIPMENT TRAFFIC SHALL BE MINIMIZED.
3. LIGHTLY SCARIFY THE SOIL IN THE AREA OF THE PROPOSED BERM BEFORE DELIVERING SOIL TO SITE.
4. BRING IN FILL MATERIAL TO MAKE UP THE MAJOR PORTION OF THE BERM. SOIL SHOULD BE ADDED IN 8-INCH LIFTS AND COMPACTED AFTER EACH ADDITION ACCORDING TO DESIGN SPECIFICATIONS. THE SLOPE AND SHAPE OF THE BERM SHOULD BE GRADED OUT AS SOIL IS ADDED.
5. PROTECT THE SURFACE PONDING AREA AT THE BASE OF THE BERM FROM COMPACTION.
6. COMPLETE FINAL GRADING OF THE BERM AFTER THE TOP LAYER OF SOIL IS ADDED. TAMP SOIL DOWN LIGHTLY AND SMOOTH SIDES OF THE BERM. THE CREST AND BASE OF THE BERM SHOULD BE AT LEVEL GRADE.
7. PLANT BERM WITH TURF, MEADOW PLANTS, SHRUBS OR TREES, AS DESIRED.
8. MULCH PLANTED AND DISTURBED AREAS WITH COMPOST MULCH TO PREVENT EROSION WHILE PLANTS BECOME ESTABLISHED.

SOIL AMENDMENT AND RESTORATION

1. GRADE SURFACE TO FINISHED GRADE ELEVATIONS AS SOON AS PRACTICABLE FOLLOWING COMPLETION OF PIPE INSTALLATION.
2. IN THE DESIGNATED SOIL AMENDMENT AREA, TILL THE GROUND AND MIX IN THE COMPOST AT A RATIO OF 2:1 (SOIL:COMPOST) TO A DEPTH OF 24 INCHES.
3. IMMEDIATELY SEED AND MULCH DISTURBED AREAS ONCE FINAL GRADE IS ESTABLISHED IN ACCORDANCE WITH THE PERMANENT SEEDING SCHEDULE.
4. MAINTAIN EROSION AND SEDIMENTATION CONTROL DEVICES UNTIL SITE WORK IS COMPLETE AND A UNIFORM 70% PERENNIAL VEGETATIVE COVER IS ESTABLISHED.

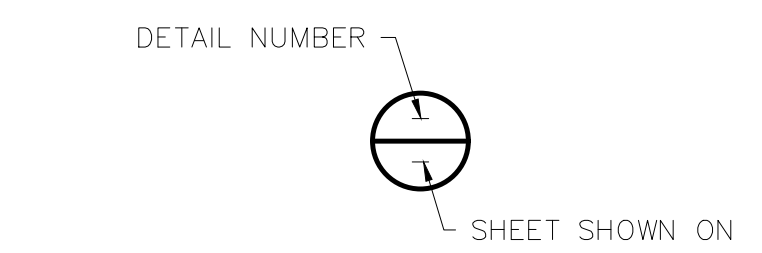
LEVEL SPREADER

1. THE UPHILL DEVELOPMENT SHALL BE STABILIZED BEFORE DIVERTING RUNOFF TO ANY DISPERSING FLOW TECHNIQUES.
2. ALL CONTRIBUTING STORMWATER ELEMENTS (INFILTRATION BERMS, INLETS, OUTLET CONTROL STRUCTURES, PIPES, ETC.) SHALL BE INSTALLED PRIOR TO INSTALLATION OF THE LEVEL SPREADER.
3. HDPE PIPE SHALL BE INSTALLED ALONG A CONTOUR UPHILL OF THE LEVEL SPREADER, WITH CARE TAKEN TO CONSTRUCT A SLIGHTLY SLOPED BOTTOM.
4. IF NECESSARY, INSTALL EROSION CONTROL MATTING ALONG THE LENGTH OF THE LEVEL SPREADER AND TO A DISTANCE DOWNHILL, AS SPECIFIED BY THE MANUFACTURER/SUPPLIER.
5. A BERM SHALL BE INSTALLED ALONG THE OUTLET OF THE HDPE PIPE TO ENSURE STORMWATER RUNOFF IS ROUTED TO THE LEVEL SPREADER.

LEGEND

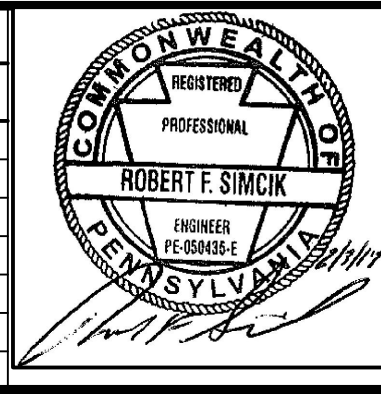
- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- EXISTING TREE LINE
- EXISTING FENCELINE
- EXISTING STREAM WITH FLOW DIRECTION
- EXISTING ELECTRIC OVERHEAD
- EXISTING ELECTRIC UNDERGROUND
- EXISTING LIGHT POLE
- EXISTING WATER LINE
- EXISTING GAS LINE
- EXISTING DOMINION GAS LINE
- EXISTING SANITARY SEWER LINE
- EXISTING BUILDING
- PROPERTY LINE
- COUNTY BOUNDARY
- TOWNSHIP BOUNDARY
- 100-YEAR FLOODWAY
- 100-YEAR FEMA FLOODWAY
- 100-YEAR FEMA FLOODPLAIN
- ORANGE CONSTRUCTION FENCE
- EXISTING PEM WETLAND
- EXISTING PFO WETLAND
- EXISTING PSS WETLAND
- PROPOSED PIPE LOCATION
- PROPOSED RIGHT-OF-WAY
- RIPARIAN FOREST BUFFER
- SOIL BOUNDARY
- SOIL TYPE/HYDROLOGY
- SOIL TYPE/HYDROLOGY
- LIMIT OF DISTURBANCE/AREA TO BE RESTORED
- WATER BAR
- TRENCH PLUGS
- AREA TO BE BORED
- CONVENTIONAL BORE
- UNDERDRAIN
- OVERALL DRAINAGE AREA
- POST CONSTRUCTION DETAINED DRAINAGE AREA
- POST CONSTRUCTION DETAINED TIME OF CONCENTRATION
- POST CONSTRUCTION UN-DETAINED TIME OF CONCENTRATION
- PRE CONSTRUCTION TIME OF CONCENTRATION
- PRE CONSTRUCTION IMPERVIOUS AREA
- PRE CONSTRUCTION MEADOW AREA
- PRE CONSTRUCTION FORESTED AREA
- POST CONSTRUCTION GRAVEL AREA
- POST CONSTRUCTION MEADOW AREA/VEGETATED GEOWEB
- POST CONSTRUCTION WOODED AREA
- INFILTRATION TEST LOCATION
- PONDING AREA

DETAIL INDICATOR



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| NO. | BY | DATE | REMARKS |
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SUNOCO PIPELINE L.P.
SINKING SPRING, PENNSYLVANIA
PENNSYLVANIA PIPELINE PROJECT
CONSTRUCTION SPREAD 2

1-20" & 1-16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES
POST CONSTRUCTION STORMWATER MANAGEMENT PLAN
GENERAL NOTES & LEGEND

| | |
|---------------------------|------------|
| DATE: | 11/23/16 |
| PROJECT NO.: | 112IC05958 |
| DESIGNED BY: | JB |
| DRAWN BY: | BH |
| CHECKED BY: | RS |
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| SHEET | 0.01 OF 18 |

LONG TERM INSPECTIONS AND MAINTENANCE FOR SITE RESTORATION AND PCSM CONTROLS:

LONG-TERM MAINTENANCE OF THE PIPELINE ROW WILL INCLUDE PERIODIC VISUAL INSPECTIONS FOR SUFFICIENT VEGETATIVE GROWTH AND COVER. INSUFFICIENT VEGETATIVE COVER IS DEFINED AS ANY AREA NOT ACHIEVING A UNIFORM 70-PERCENT PERENNIAL VEGETATIVE COVER. BARE SPOTS AND AREAS WITH INSUFFICIENT VEGETATIVE COVER WILL BE RESEEDED AND MULCHED WITHIN 24 HOURS OF DISCOVERY. THE RIGHT OF WAY WILL BE INSPECTED FOR SIGNS OF EROSION, ESPECIALLY ON STEEP SLOPES. CORRECTIVE MEASURES WILL BE TAKEN, AS NEEDED. IF THERE IS EVIDENCE OF TRENCH SETTLING, THE AREA WILL BE REGRADED TO MAINTAIN PRE-CONSTRUCTION DRAINAGE PATTERNS, MULCHED, AND SEEDED. A WRITTEN REPORT IS REQUIRED FOR EACH INSPECTION AND FOR EACH REPAIR OR MAINTENANCE ACTIVITY, AND THE REPORT SHOULD SPECIFY HOW TO ACCESS THE SITE. SPLP IS RESPONSIBLE FOR MAINTAINING THE ROW UNDER THE PROVISIONS OF THIS PERMIT.

PERMANENT PROPOSED ACCESS ROADS AND VALVE PADS WILL BE CONSTRUCTED AS PART OF THE PROJECT. THESE ACCESS ROADS WILL REMAIN AS A PERMANENT GRAVEL DRIVE AFTER CONSTRUCTION IS COMPLETE. THE ACCESS ROADS WILL BE INSPECTED PERIODICALLY, AND AGGREGATE WILL BE APPLIED TO THE PERMANENT ACCESS ROADS AS NEEDED TO MAINTAIN AN ADEQUATE THICKNESS.

INSPECTION AND MAINTENANCE PROCEDURES FOR PERMANENT POST-CONSTRUCTION STORMWATER MANAGEMENT FACILITIES AND STORMWATER CONVEYANCE BMPs ARE SUMMARIZED BELOW. IF ANY POST-CONSTRUCTION STORMWATER MANAGEMENT FACILITIES ARE CONSTRUCTED PRIOR TO STABILIZATION OF UPSLOPE CONTRIBUTORY DRAINAGE AREAS, INSPECTIONS SHALL OCCUR WEEKLY AND AFTER RUNOFF EVENTS UNTIL THE SURROUNDING AREA ACHIEVES STABILIZATION.

INFILTRATION BERM

- THE INFILTRATION BERM SHALL BE INSPECTED AT LEAST 4 TIMES PER YEAR TO ENSURE IT IS INFILTRATING PROPERLY AND NOT CLOGGED WITH SEDIMENT.
- MONITOR DRAWDOWN TIME AFTER THE FIRST MAJOR STORM EVENT (> 1-INCH RAINFALL DEPTH). THE BERM SHALL DEWATER WITHIN A MAXIMUM OF 72 HOURS. IF THE BERM IS NOT INFILTRATING WITHIN THE SPECIFIED TIMEFRAME, AMEND THE SOILS WITHIN THE PONDING AREA OF THE BERM (SEE SOIL AMENDMENT DETAIL IN PLANS).
- VEGETATION OVER THE BERM SHALL BE MAINTAINED AS NECESSARY, WHICH MAY REQUIRE ANNUAL MULCHING. ROUTINELY REMOVE ACCUMULATED DEBRIS AND INVASIVE PLANTS AS NEEDED.
- INSPECT FOR SIGNS OF FLOW CHANNELIZATION AND RESTORE LEVEL GRADIENT IMMEDIATELY AFTER ANY DEFICIENCIES ARE OBSERVED.

SOIL AMENDMENT AND RESTORATION

- THE SOIL RESTORATION PROCESS MAY NEED TO BE REPEATED OVER TIME, DUE TO COMPACTION BY USE AND/OR SETTLING.
- SOIL AMENDMENT AREAS SHALL BE INSPECTED AT LEAST 4 TIMES PER YEAR FOR SIGNS OF COMPACTION. TO REMEDY COMPACTION, TILL THE SOIL TO A DEPTH OF 24 INCHES AND MIX IN COMPOST AT A RATIO OF 2:1 (SOIL:COMPOST).

WATER DEFLECTOR

- INSPECTIONS TO BE DONE ANNUALLY AND WITHIN 48 HOURS AFTER EVERY MAJOR STORM EVENT (> 1 INCH RAINFALL DEPTH).
- ACCUMULATED SEDIMENT SHALL BE REMOVED FROM THE WATER DEFLECTOR. THE RUBBER BELT SHALL BE REPLACED WHEN IT IS WORN AND NO LONGER EFFECTIVE.

LEVEL SPREADER

- INSPECTIONS TO BE DONE ANNUALLY AND WITHIN 48 HOURS AFTER EVERY MAJOR STORM EVENT (> 1 INCH RAINFALL DEPTH).
- THE RECEIVING LAND SHALL BE IMMEDIATELY RESTORED TO DESIGN CONDITIONS AFTER ANY DISTURBANCE. VEGETATED AREAS SHALL BE SEEDED AND BLANKETED.
- IT IS CRITICAL THAT EVEN SHEET FLOW CONDITIONS ARE SUSTAINED THROUGHOUT THE LIFE OF THE LEVEL SPREADER, AS THEIR EFFECTIVENESS CAN DETERIORATE DUE TO LACK OF MAINTENANCE, INADEQUATE DESIGN/LOCATION, AND POOR VEGETATION COVER.
 - THE AREA BELOW THE LEVEL SPREADER SHALL BE INSPECTED FOR CLOGGING, DENSITY OF VEGETATION, DAMAGE BY FOOT OR VEHICULAR TRAFFIC, EXCESSIVE ACCUMULATIONS, AND CHANNELIZATION. INSPECTIONS SHALL BE MADE ON A QUARTERLY BASIS FOR THE FIRST TWO YEARS FOLLOWING INSTALLATION, AND THEN ON A SEMIANNUAL BASIS THEREAFTER. INSPECTIONS SHALL ALSO BE MADE AFTER EVERY STORM EVENT GREATER THAN 1-INCH.
 - SEDIMENT AND DEBRIS SHALL BE ROUTINELY REMOVED (BUT NEVER LESS THAN SEMIANNUALLY), OR UPON OBSERVATION, WHEN BUILDUP OCCURS IN THE CLEAN OUTS. REGRAIDING AND RESEEDING MAY BE NECESSARY IN THE AREAS BELOW THE LEVEL SPREADER. REGRAIDING MAY ALSO BE REQUIRED WHEN POOLS OF STANDING WATER ARE OBSERVED ALONG THE SLOPE. (IN NO CASE SHOULD STANDING WATER BE ALLOWED FOR LONGER THAN 72 HOURS).
 - MAINTAINING A VIGOROUS VEGETATIVE COVER ON THE AREAS BELOW THE LEVEL SPREADER IS CRITICAL FOR MAXIMIZING POLLUTANT REMOVAL EFFICIENCY AND EROSION PREVENTION. IF VEGETATIVE COVER IS NOT FULLY ESTABLISHED WITHIN THE DESIGNATED TIME, IT MAY NEED TO BE REPLACED WITH AN ALTERNATIVE SPECIES. (IT IS STANDARD PRACTICE TO CONTRACTUALLY REQUIRE THE CONTRACTOR TO REPLACE DEAD VEGETATION.) UNWANTED OR INVASIVE GROWTH SHALL BE REMOVED ON AN ANNUAL BASIS. BIWEEKLY INSPECTIONS ARE RECOMMENDED FOR AT LEAST THE FIRST GROWING SEASON, OR UNTIL THE VEGETATION IS PERMANENTLY ESTABLISHED. ONCE THE VEGETATION IS ESTABLISHED, INSPECTIONS OF HEALTH, DIVERSITY, AND DENSITY SHALL BE PERFORMED AT LEAST TWICE A YEAR, DURING BOTH THE GROWING AND NON-GROWING SEASON. VEGETATIVE COVER SHALL BE SUSTAINED AT 85% AND REPLACED IF DAMAGE GREATER THAN 50% IS OBSERVED.

DIVERSION BERM

- INSPECTIONS TO BE DONE ANNUALLY AND WITHIN 48 HOURS AFTER EVERY MAJOR STORM EVENT (> 1 INCH RAINFALL DEPTH).
- MAINTAIN TURF GRASS AND OTHER VEGETATION BY MOWING AND RE-MULCHING.
- ROUTINELY REMOVE ACCUMULATED TRASH AND DEBRIS.
- REMOVE INVASIVE PLANTS AS NEEDED.
- INSPECT FOR SIGNS OF FLOW CHANNELIZATION; RESTORE LEVEL GRADIENT IMMEDIATELY AFTER DEFICIENCIES ARE OBSERVED.

GEOWEB MAINTENANCE

IN AREAS WHERE VEGETATED GEOWEB IS INSTALLED, IN ADDITION TO INSPECTING THE VEGETATION COVERAGE, THE GEOWEB WILL BE INSPECTED FOR SIGNS OF DAMAGE AFFECTING GEOWEB PERFORMANCE, E.G., DISPLACED CELLS OR SIGNIFICANTLY TORN CELLS. IF THE INFILL TOPSOIL/AGGREGATE MIX SETTLES OVER TIME AND EXPOSES THE GEOWEB, IT WILL BE FILLED WITH THE SAME INFILL MIXTURE AND RE-SEEDED. NOTE THAT WITH AGE, IT IS NOT UNUSUAL THAT THE TOP OF THE GEOWEB SECTIONS MAY BECOME EXPOSED AND TRAMPLED WITH USE. THIS DOES NOT AFFECT THE PERFORMANCE OF THE CELLULAR CONFINEMENT. IF GEOWEB BECOMES TORN, IT WILL BE REPAIRED. IF THE GEOWEB BECOMES EXPOSED, IT WILL BE FILLED WITH THE SAME INFILL MIXTURE AND RE-SEEDED.

GENERAL O&M SCHEDULE:

INSPECTION AND MAINTENANCE PROCEDURES FOR PERMANENT POST-CONSTRUCTION STORMWATER MANAGEMENT FACILITIES AND STORMWATER CONVEYANCE BMPs ARE SUMMARIZED BELOW. IF ANY POST-CONSTRUCTION STORMWATER MANAGEMENT FACILITIES ARE CONSTRUCTED PRIOR TO STABILIZATION OF UPSLOPE CONTRIBUTORY DRAINAGE AREAS, INSPECTIONS SHALL OCCUR WEEKLY AND AFTER RUNOFF EVENTS UNTIL THE SURROUNDING AREA ACHIEVES STABILIZATION. SITES LOCATED WITHIN KARST TERRAIN REQUIRE MORE FREQUENT LONG-TERM INSPECTIONS, AS SPECIFIED IN THE SINKHOLE REPAIR PLAN IN ATTACHMENT 2.

AFTER STABILIZATION HAS OCCURRED THE PCSM BMPs WILL CONTINUE TO BE INSPECTED BY SUNOCO OPERATIONS IN ACCORDANCE WITH 25 PA. CODE 10-2.8(m) RELATED TO PCSM LONG-TERM OPERATION AND MAINTENANCE REQUIREMENTS AND RECORDED IN THE POST CONSTRUCTION STORMWATER MANAGEMENT INSTRUMENT FILING COMPLETED FOR EACH VALVE SITE THAT HAS A PCSM BMP.

IN ADDITION TO THE REGULARLY SCHEDULED INSPECTION AND MAINTENANCE ACTIVITIES, THE INFILTRATION BMPs (INFILTRATION BERMS) SHOULD ALSO BE INSPECTED WITHIN 72 HOURS AFTER ALL STORM EVENTS THAT MEET OR EXCEED THE RAINFALL AMOUNT FOR THE 2-YEAR, 24-HOUR STORM EVENT. THE INSPECTOR SHALL ENSURE THAT INFILTRATION BMPs FULLY DEWATER WITHIN 72 HOURS. THE TABLE BELOW PROVIDES THE 2-YEAR, 24-HOUR NOAA RAINFALL AMOUNTS CORRESPONDING TO THE BLOCK VALVES ASSOCIATED WITH THIS PROJECT.

| BLOCK VALVE | 2-YEAR 24-HOUR RAINFALL (INCHES) |
|--------------|----------------------------------|
| KOONIZ ROAD | 2.44 |
| BUSH ROAD | 2.45 |
| NEWPORT ROAD | 2.51 |
| COONEY ROAD | 2.62 |

A

B

C

D

E

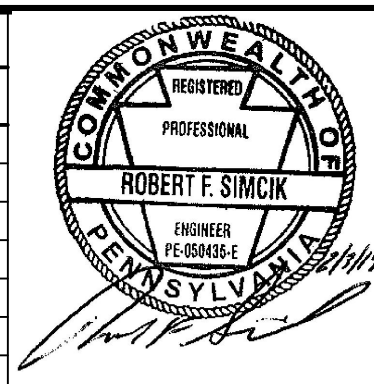
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SUNOCO PIPELINE L.P.
SINKING SPRING, PENNSYLVANIA

PENNSYLVANIA PIPELINE PROJECT
CONSTRUCTION SPREAD 2

1-20" & 1-16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES

POST CONSTRUCTION STORMWATER MANAGEMENT PLAN

NOTES

| | |
|--------------|-----------------|
| DATE: | 11/23/16 |
| PROJECT NO.: | 1121C05958 |
| DESIGNED BY: | JB |
| DRAWN BY: | SH |
| CHECKED BY: | RS |
| COPYRIGHT: | TETRA TECH INC. |
| SHEET: | PCS-0.02 |
| OF: | 18 |

TEMPORARY SEEDING

TEMPORARY GRASS COVER SHALL BE ESTABLISHED IN THE FOLLOWING AREAS:

- WHERE SOIL STOCKPILES ARE TO BE EXPOSED FOR A PERIOD GREATER THAN FOUR (4) DAYS, THE STOCKPILE SHALL BE SEEDED.
- WHERE VEGETATIVE FILTERS MUST BE ESTABLISHED BELOW FILTER BAGS, A MINIMUM DISTANCE OF 10 FT SHALL BE SEEDED DOWN SLOPE OF THE TRAP OUTLET.

TEMPORARY COVER

SEED MIXTURE FOR TEMPORARY COVER SHALL CONSIST OF 100% ANNUAL RYEGRASS. SEED SHALL BE APPLIED AT THE RATE OF 40 LB/ACRE OR AS RECOMMENDED BY A LOCAL RECOGNIZED SEED SUPPLIER APPROVED BY THE OWNER'S REPRESENTATIVE. PRIOR TO SEEDING, APPLY 1 TON OF AGRICULTURAL GRADE LIMESTONE PER ACRE PLUS 10-10-10 FERTILIZER AT THE RATE OF 500 LB. PER ACRE AND WORK INTO SOIL.

MULCHING

THE PURPOSE OF MULCH IS TO REDUCE RUNOFF AND EROSION, PREVENT SURFACE COMPACTION OR CRUSTING, CONSERVE MOISTURE, AID IN ESTABLISHING PLANT COVER, AND CONTROL WEEDS. MULCH SHALL BE APPLIED ON ANY AREA SUBJECT TO EROSION, OR WHICH HAS UNFAVORABLE CONDITIONS FOR PLANT ESTABLISHMENT AND GROWTH. THE PRACTICE MAY BE USED ALONE OR IN CONJUNCTION WITH OTHER STRUCTURAL AND VEGETATIVE CONSERVATION PRACTICES, SUCH AS WATERWAYS, PONDS, SEDIMENTATION TRAPS OR CRITICAL AREA PLANTING. ON SEDIMENT PRODUCING AREAS WHERE THE PERIOD OF EXPOSURE IS LESS THAN TWO (2) MONTHS, MULCH MATERIALS SHALL BE APPLIED ACCORDING TO THE FOLLOWING GUIDELINES:

- STRAW MULCH SHALL BE APPLIED AT THE RATE OF THREE TONS PER ACRE. CHEMICALLY TREATED OR SALTED STRAW IS NOT ACCEPTABLE AS MULCH.
- STRAW MULCH SHALL BE ANCHORED IMMEDIATELY AFTER APPLICATION BY AT LEAST ONE OF THE FOLLOWING METHODS.
 - "CRIMPED" INTO THE SOIL USING TRACTOR DRAWN EQUIPMENT (STRAIGHT BLADED COULTER OR SIMILAR). THIS METHOD IS LIMITED TO SLOPES NO STEEPER THAN 3:1. MACHINERY SHOULD BE OPERATED ON THE CONTOUR. (CRIMPING OF HAY OR STRAW BY RUNNING IT OVER WITH TRACKED MACHINERY IS NOT RECOMMENDED)
 - ASPHALT, EITHER EMULSIFIED OR CUT-BACK, CONTAINING NO SOLVENTS OR OTHER DILUTING AGENTS TOXIC TO PLANT OR ANIMAL LIFE, UNIFORMLY APPLIED AT THE RATE OF 31 GALLONS PER 1000 FT².
 - SYNTHETIC BINDERS (CHEMICAL BINDERS) MAY BE USED AS RECOMMENDED BY THE MANUFACTURER TO ANCHOR MULCH PROVIDED SUFFICIENT DOCUMENTATION IS PROVIDED TO SHOW THAT IT IS NON-TOXIC TO NATIVE PLANT AND ANIMAL SPECIES.
 - LIGHTWEIGHT PLASTIC, FIBER, OR PAPER NETS MAY BE STAPLED OVER THE MULCH ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.

MULCHED AREAS SHALL BE CHECKED PERIODICALLY AND AFTER EACH RUNOFF EVENT (E.G. RAIN, SNOWMELT, ETC) FOR DAMAGE UNTIL THE DESIRED PURPOSE OF THE MULCHING IS ACHIEVED. DAMAGED PORTIONS OF THE MULCH OR TIE-DOWN MATERIAL SHALL BE REPAIRED UPON DISCOVERY.

REVEGETATION

LIMING RATES

MINIMUM 6 TONS PER ACRE AT 100% EFFECTIVE NEUTRALIZING VALUE (% ENV), UNLESS THE SOIL TEST DETERMINES THAT A LESSER AMOUNT IS NEEDED. TO DETERMINE THE ACTUAL AMOUNT OF REGULAR LIME TO APPLY, DIVIDE THE AMOUNT CALLED FOR BY THE SOIL TEST BY THE % ENV FOR THE PRODUCT USED. FOR EXAMPLE, IF 6 TONS PER ACRE IS NEEDED AND THE ENV FOR THE LIME USED IS 88%, DIVIDE 6 BY 0.88 RESULTING IN 6.8 TONS NEEDED TO BE APPLIED. FOR DOLOMITIC LIME, WHICH HAS A SIGNIFICANT AMOUNT OF MAGNESIUM IN IT, DIVIDE THE AMOUNT CALLED FOR BY THE SOIL TEST BY THE % CALCIUM CARBONATE EQUIVALENT (% CCE) LISTED FOR THE PRODUCT INSTEAD OF THE % ENV. THE % CCE MAY BE ABOVE 100% WHICH ACCOUNTS FOR THE FACT THAT MAGNESIUM HAS A GREATER EFFECT PER POUND THAN THE CALCIUM IN REGULAR LIME. NOTE: WORK IN LIME AND FERTILIZER TO A DEPTH OF 4 IN. USING SUITABLE EQUIPMENT. WHEN A SOIL TEST REQUIRES MORE THAN 8,000 POUNDS OF LIME PER ACRE, THE LIME MUST BE MIXED INTO THE TOP 6 INCHES OF SOIL.

FERTILIZATION RATES

APPLY 10-20-20 AT 600 POUNDS/ACRE, IF TOP DRESSED OR 1,000 POUNDS/AC, IF INCORPORATED, UNLESS THE SOIL TEST DETERMINES THAT THE RATE CAN BE LESS THAN THESE MINIMUMS.

| SOIL AMENDMENT APPLICATION RATE EQUIVALENTS | | | | |
|---------------------------------------------|------------|-------------------|--------------------|-----------------------------------------------------------------|
| SOIL AMENDMENT | PER ACRE | PER 1,000 SQ. FT. | PER 1,000 SQ. YDS. | NOTES |
| PERMANENT SEEDING APPLICATION RATE | | | | |
| AGRICULTURAL LIME | 6 TONS | 240 LBS. | 240 LBS. | OR AS PER SOIL TEST; MAY NOT BE REQUIRED IN AGRICULTURAL FIELDS |
| 10-20-20 FERTILIZER | 1,000 LBS. | 25 LBS. | 210 LBS. | OR AS PER SOIL TEST; MAY NOT BE REQUIRED IN AGRICULTURAL FIELDS |

| RECOMMENDED SEED MIXTURES | | | |
|---------------------------|--------------------------------------|------------------------|---------------|
| MIXTURE NO. | SPECIES | SEEDING RATES - PLS(1) | |
| | | MOST SITES | ADVERSE SITES |
| 1 (2) | SPRING OATS (SPRING), OR 64 96 | 64 | 96 |
| | ANNUAL RYEGRASS (SPRING OR FALL), OR | 10 | 15 |
| | WINTER WHEAT (FALL), OR | 90 | 120 |
| | WINTER RYE (FALL) | 56 | 112 |
| 2 (3) | TALL FESCUE, OR 75 | 60 | 75 |
| | FINE FESCUE, OR 40 | 35 | 40 |
| | KENTUCKY BLUEGRASS, PLUS 25 30 | 25 | 30 |
| | REDTOP(4), OR | 3 | 3 |
| 3 | PERENNIAL RYEGRASS | 15 | 20 |
| | BIRDSFOOT TREFOIL, PLUS 6 10 | 6 | 10 |
| 4 | TALL FESCUE | 30 | 35 |
| | BIRDSFOOT TREFOIL, PLUS | 6 | 10 |
| 5 (5) | REED CANARYGRASS | 10 | 15 |
| | CROWNVEITCH, PLUS | 20 | 25 |
| 6 (5,6) | TALL FESCUE, OR | 20 | 25 |
| | PERENNIAL RYEGRASS | 10 | 15 |
| 7 (5) | CROWNVEITCH, PLUS | 20 | 30 |
| | ANNUAL RYEGRASS | 20 | 25 |
| 8 | BIRDSFOOT TREFOIL, PLUS | 20 | 30 |
| | CROWNVEITCH, PLUS | 20 | 30 |
| 9 (7) | TALL FESCUE, OR | 20 | 25 |
| | PERENNIAL RYEGRASS | 20 | 25 |
| 10 | REDTOP(4) | 3 | 3 |
| | TALL FESCUE, PLUS | 40 | 60 |
| 11 | FINE FESCUE | 10 | 15 |
| | DEERTONGUE, PLUS | 15 | 20 |
| 12(8) | BIRDSFOOT TREFOIL | 6 | 10 |
| | SWITCHGRASS, OR | 15 | 20 |
| 13 | BIG BLUESTEM, PLUS | 15 | 20 |
| | BIRDSFOOT TREFOIL | 6 | 10 |
| | ORCHARDGRASS, OR | 20 | 30 |
| | SMOOTH BROMEGRASS, PLUS | 25 | 35 |
| | BIRDSFOOT TREFOIL | 6 | 10 |

NOTES:

- PURE LIVE SEED (PLS) IS THE PRODUCT OF THE PERCENTAGE OF PURE SEED TIMES PERCENTAGE GERMINATION DIVIDED BY 100. FOR EXAMPLE, TO SECURE THE ACTUAL PLANTING RATE FOR SWITCHGRASS, DIVIDE 12 POUNDS PLS SHOWN ON THE SEED TAG. THUS, IF THE PLS CONTENT OF A GIVEN SEED LOT IS 35 PERCENT, DIVIDE 12 PLS BY 0.35 TO OBTAIN 34.3 POUNDS OF SEED REQUIRED TO PLANT ONE-ACRE. ALL MIXTURES IN THIS TABLE ARE SHOWN IN TERMS OF PLS.
- IF HIGH-QUALITY SEED IS USED, FOR MOST SITES SEED SPRING OATS AT A RATE OF TWO BUSHELS PER ACRE, WINTER WHEAT AT 11.5 BUSHELS PER ACRE, AND WINTER RYE AT ONE BUSHEL PER ACRE. IF GERMINATION IS BELOW 90 PERCENT, INCREASE THESE SUGGESTED SEEDING RATES BY 0.5 BUSHEL PER ACRE.
- THIS MIXTURE IS SUITABLE FOR FREQUENT MOWING. DO NOT CUT SHORTER THAN 4 INCHES.
- KEEP SEEDING RATE TO THAT RECOMMENDED IN TABLE. THESE SPECIES HAVE MANY SEEDS PER POUND AND ARE VERY COMPETITIVE. TO SEED SMALL QUANTITIES OF SMALL SEEDS SUCH AS WEEPING LOVEGRASS AND REDTOP, DILUTE WITH DRY SAWDUST, SAND, RICE HULLS, BUCKWHEAT HULLS, ETC.
- USE FOR HIGHWAY SLOPES AND SIMILAR SITES WHERE THE DESIRED SPECIES AFTER ESTABLISHMENT IS BIG BLUESTEM.
- USE ONLY IN EXTREME SOUTHEASTERN OR EXTREME SOUTHWESTERN PA. SERECIA LESPEDEZA IS NOT WELL ADAPTED TO MOST OF PA.
- DO NOT MOW SHORTER THAN 9 TO 10 INCHES.
- NOTE NOT APPLICABLE BECAUSE CROWNVEITCH IS NOT PROPOSED.
- IF LIMING, FERTILIZATION, AND PREPARATION OF SEEDBED ARE PROPERLY DONE AND IF CARE IS TAKEN TO DRILL AND COVER THE SEED (OR MULCH APPLIED), THE RATE FOR "MOST SITES" SHOULD SUFFICE. HOWEVER, ON ERODED OR COARSE AND POORLY PREPARED SEEDBEDS, PARTICULARLY IF THE SOIL IS VERY ACIDIC OR INFERTILE, THE RATE FOR "ADVERSE SITES" SHOULD BE USED.

| PENN DOT FORMULA B | | | | |
|--------------------|-----------------------|----------|--------------------|------------------|
| SEEDING RATE | 3 LBS PER 1,000 SQ FT | | | |
| SPECIES | % BY WT. | PURITY % | MIN. % GERMINATION | MAX. % WEED SEED |
| KENTUCKY BLUEGRASS | 50 | 98 | 80 | 0.20 |
| PERENNIAL RYE | 20 | 98 | 90 | 0.15 |
| RED FESCUE | 30 | 98 | 85 | 0.15 |

| SITE CONDITIONS | NURSE CROP | SEED MIXTURE (SELECT ONE MIXTURE) |
|--------------------------------------------------------------------------------------|------------|-----------------------------------|
| SLOPES AND BANKS (NOT MOWED) | | |
| WELL-DRAINED | 1 PLUS | 3, 5, 8, OR 12 (1) |
| VARIABLE DRAINAGE | 1 PLUS | 3 OR 7 |
| SLOPES AND BANKS (MOWED) | | |
| WELL-DRAINED | 1 PLUS | 2 OR 10 |
| SLOPES AND BANKS (GRAZED/HAY) | | |
| WELL-DRAINED | 1 PLUS | 2,3, OR 13 |
| GULLIES AND ERODED AREAS | 1 PLUS | 3, 5, 7, OR 12 (1) |
| EROSION CONTROL FACILITIES (BMPS) | | |
| SOD WATERWAYS, SPILLWAYS, FREQUENT WATER FLOW AREAS | 1 PLUS | 2, 3, OR 4 |
| DRAINAGE DITCHES | 1 PLUS | 2, 3, OR 4 |
| SHALLOW, LESS THAN THREE FEET DEEP | 1 PLUS | 2, 3, OR 4 |
| DEEP, NOT MOWED | 1 PLUS | 5 OR 7 |
| POND BANKS, DIKES, LEVEES, DAMS, DIVERSION CHANNELS, AND OCCASIONAL WATER FLOW AREAS | 1 PLUS | 2 OR 3 |
| MOWED AREAS | 1 PLUS | 5 OR 7 |
| NON-MOWED AREAS | 1 PLUS | 5 OR 7 |
| FOR HAY OR SILAGE ON DIVERSION CHANNELS AND OCCASIONAL WATER FLOW AREAS | 1 PLUS | 3 OR 13 |
| HIGHWAYS (2) | | |
| NON-MOWED AREAS | 1 PLUS | 5, 7, 8, 9, OR 10 |
| WELL-DRAINED | 1 PLUS | 5, 7, 8, 9, OR 10 |
| VARIABLE DRAINAGE | 1 PLUS | 3 OR 7 |
| POORLY DRAINAGE | 1 PLUS | 3 OR 9 |
| AREAS MOWED SEVERAL TIMES PER YEAR | 1 PLUS | 2, 3, OR 10 |
| UTILITY ROW | | |
| WELL-DRAINED | 1 PLUS | 5, 8, OR 12 (1) |
| VARIABLE DRAINAGE | 1 PLUS | 3 OR 7 |
| WELL-DRAINED AREAS FOR GRAZING/HAY | 1 PLUS | 2, 3, OR 13 |
| EFFLUENT DISPOSAL AREAS | 1 PLUS | 3 OR 4 |
| SANITARY LANDFILLS | 1 PLUS | 3, 5, 7, 11 (1), OR 12 (1) |
| SURFACE MINES | | |
| SPOILS, MINE WASTES, FLY ASH, SLAG, SETTLING BASIN | 1 PLUS | 3, 4, 5, 7, 8, 9, 11 (1) OR 12(1) |
| RESIDUES AND OTHER SEVERELY DISTURBED AREAS (LIME TO SOIL TEST) | 1 PLUS | 3 OR 4 |
| SEVERELY DISTURBED AREAS FOR GRAZING/HAY | 1 PLUS | 3 OR 13 |

NOTES:

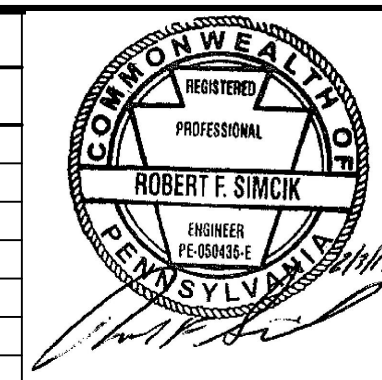
- FOR SEED MIXTURES 11 AND 12, ONLY USE SPRING OATS OR WEEPING LOVEGRASS (INCLUDED IN MIX) AS NURSE CROP.
- CONTACT THE PENNDOT DISTRICT ROADSIDE SPECIALIST FOR SPECIFIC SUGGESTIONS ON TREATMENT TECHNIQUES AND MANAGEMENT PRACTICES.

| MULCH APPLICATION RATES | | | | |
|-------------------------|----------------------------|-------------------|---------------------|------------------------------------------------------------------------|
| MULCH TABLE | APPLICATION RATE (MINIMUM) | | | NOTES |
| | PER ACRE | PER 1,000 SQ. FT. | PER 1,000 SQ. YDS. | |
| STRAW | 3 TONS | 140 LBS. | 1,240 LBS. | EITHER WHEAT OR OAT STRAW, FREE OF WEEDS, NOT CHOPPED OR FINELY BROKEN |
| HAY | 3 TONS | 140 LBS. | 1,240 LBS. | TIMOTHY, MIXED CLOVER AND TIMOTHY OR OTHER NATIVE FORAGE GRASSES |
| WOODCHIPS | 4 TO 6 TONS | 185 TO 275 LBS. | 1,650 TO 2,500 LBS. | MAY PREVENT GERMINATION OF GRASSES AND LEGUMES |
| HYDROMULCH | 1 TON | 47 LBS. | 415 LBS. | SEE LIMITATIONS ABOVE |



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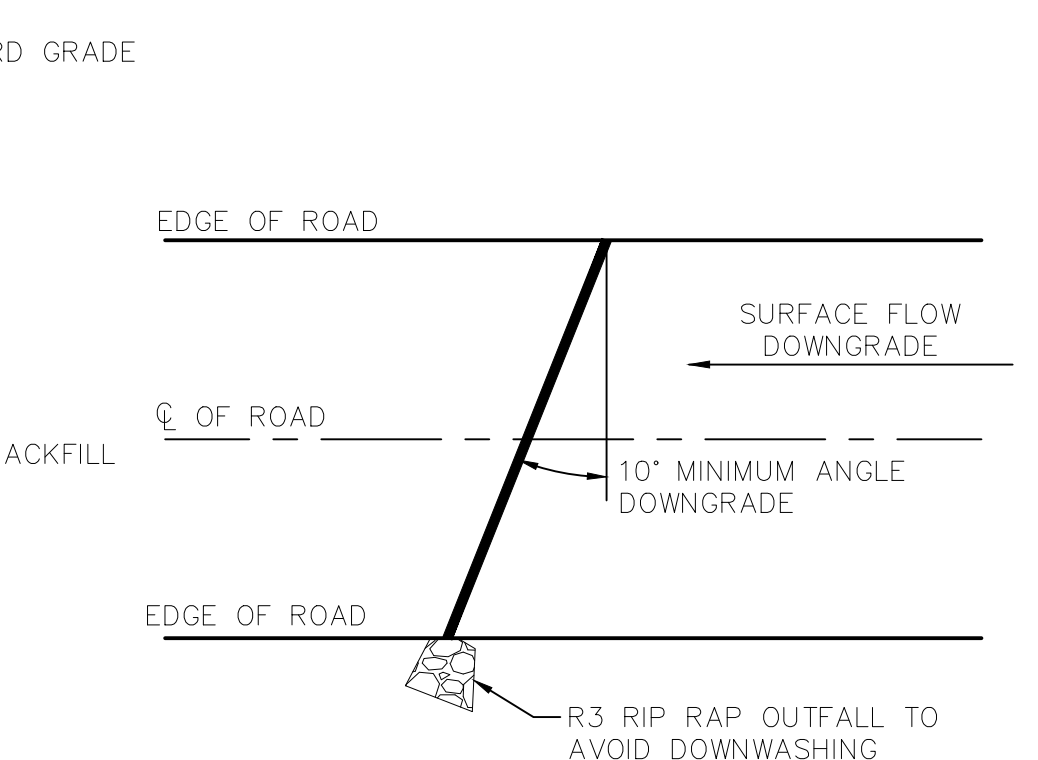
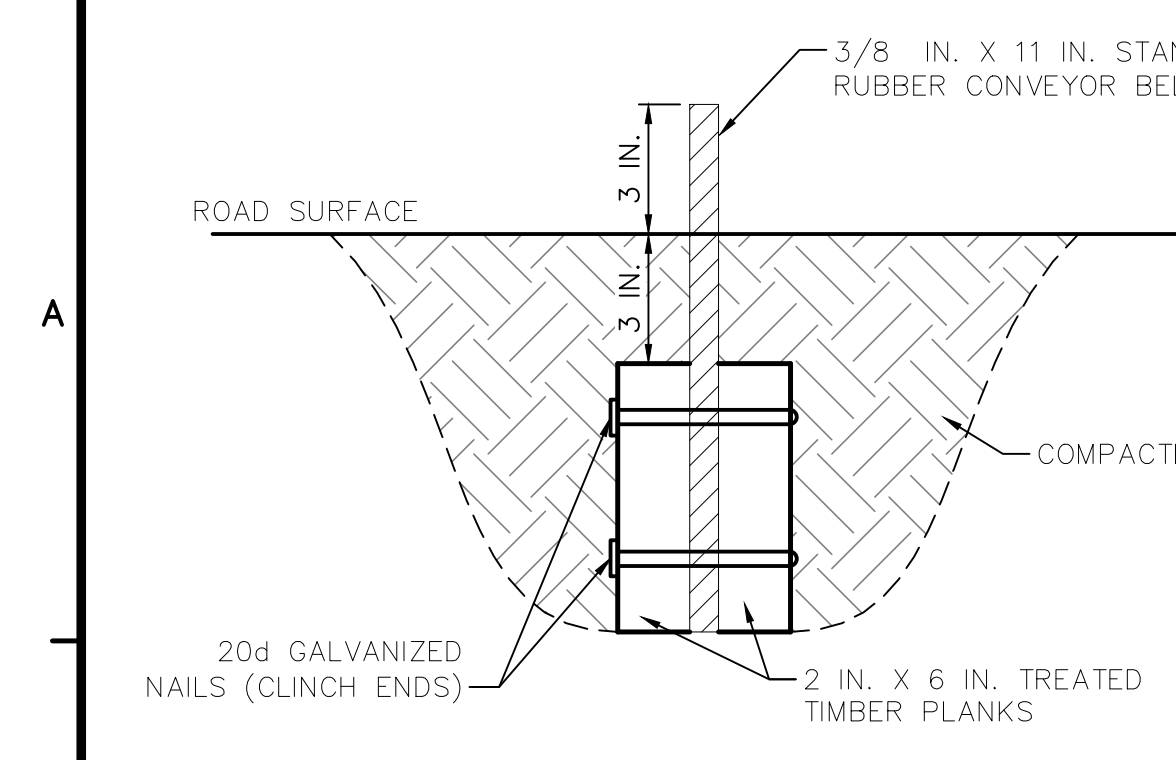
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SUNOCO PIPELINE L.P.
SINKING SPRING, PENNSYLVANIA
PENNSYLVANIA PIPELINE PROJECT
CONSTRUCTION SPREAD 2

1-20" & 1-16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES
POST CONSTRUCTION STORMWATER MANAGEMENT PLAN
SEEDING SPECIFICATIONS

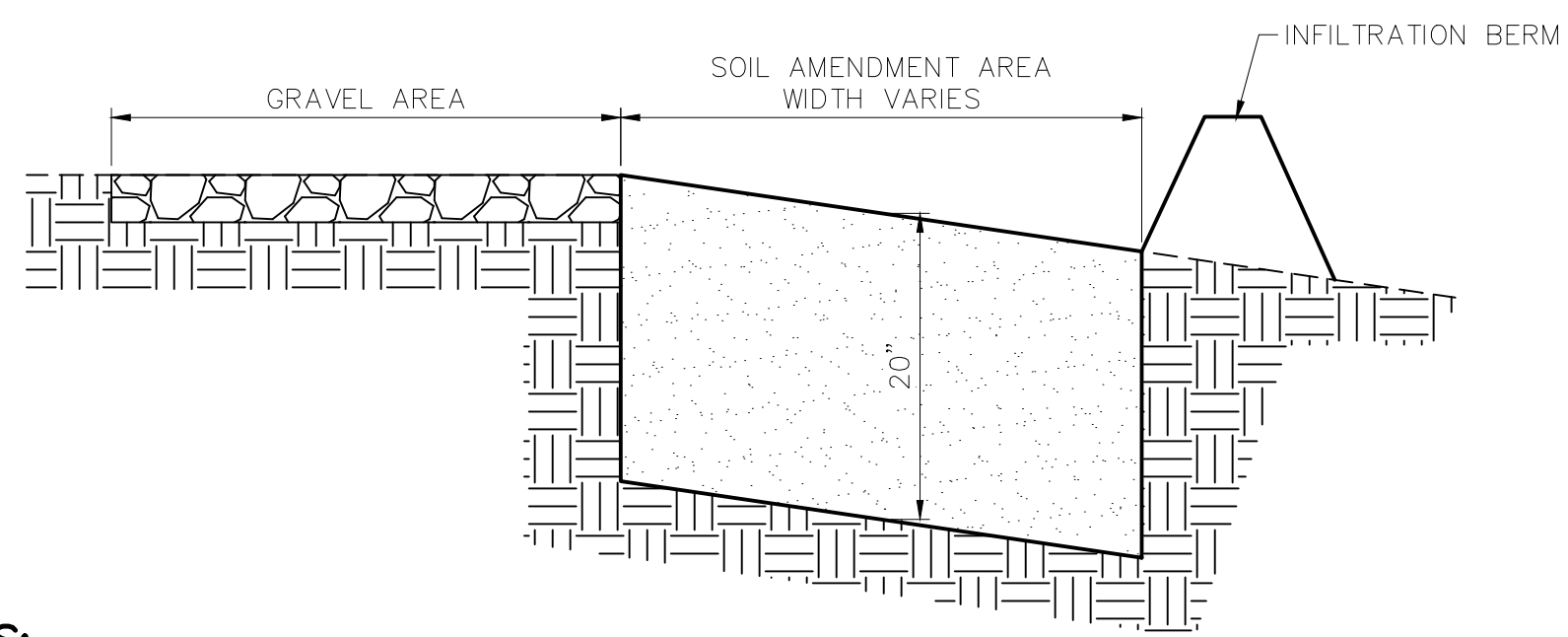
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| DATE: | 11/23/16 |
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| OF: | 18 |



- NOTE:
- DEFLECTOR SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT.
 - ACCUMULATED SEDIMENT SHALL BE REMOVED FROM DEFLECTOR WITHIN 24 HOURS OF INSPECTION.
 - BELT SHALL BE REPLACED WHEN WORN AND NO LONGER EFFECTIVE.
 - MAXIMUM SPACING OF DEFLECTORS SHALL BE AS SHOWN IN TABLE.

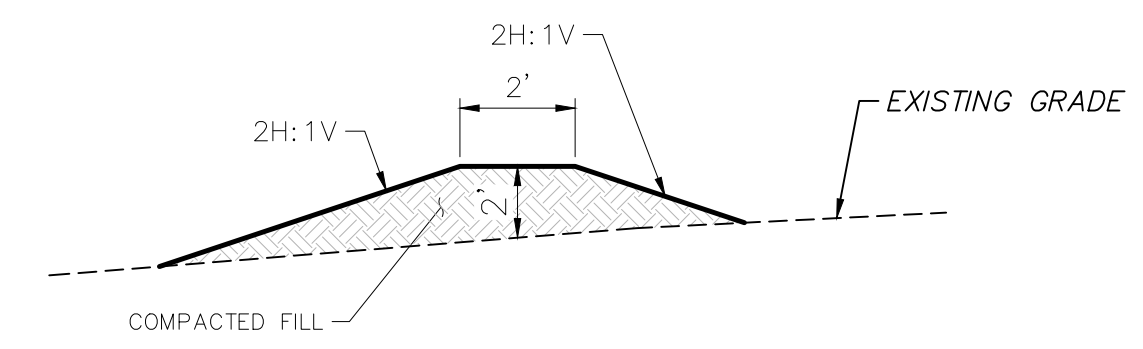
| ROAD GRADE (PERCENT) | SPACING BETWEEN DIPS, CULVERTS, OR DEFLECTORS (FEET) |
|----------------------|------------------------------------------------------|
| <2 | 300 |
| 3 | 235 |
| 4 | 200 |
| 5 | 180 |
| 6 | 165 |
| 7 | 155 |
| 8 | 150 |
| 9 | 145 |
| 10 | 140 |

WATER DEFLECTOR
NOT TO SCALE



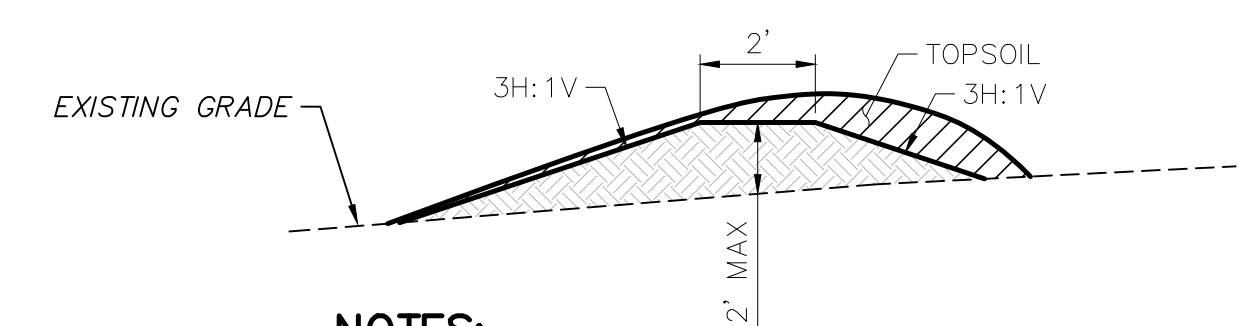
- NOTES:
- SOIL AMENDMENT MEDIAN SHOULD CONSIST OF SOIL AND COMPOST AT A RATIO OF 2:1 (SOIL:COMPOST).
 - SOIL AMENDMENT SHOULD NOT BE USED ON SLOPES GREATER THAN 30%.
 - COMPOST CAN BE SUBSTITUTED WITH MULCH, MANURE, SAND, OR ON-SITE SOILS WITH AT LEAST 5% ORGANIC CONTENT.
 - SOIL AMENDMENT AREA TO BE INSTALLED ON DOWN GRADIENT SIDE OF ROAD.
 - NO VEHICULAR TRAFFIC WILL BE PERMITTED TO DRIVE IN THE SOIL AMENDMENT AREA TO MINIMIZE THE POSSIBILITY OF COMPACTION.
 - THE SOIL AMENDMENT AREA WILL BE INSPECTED BIANNUALLY TO VERIFY ITS EFFECTIVENESS.
 - ALL CONSTRUCTION SHOULD BE COMPLETED AND STABILIZED BEFORE BEGINNING SOIL RESTORATION.

SOIL AMENDMENT DETAIL
NOT TO SCALE

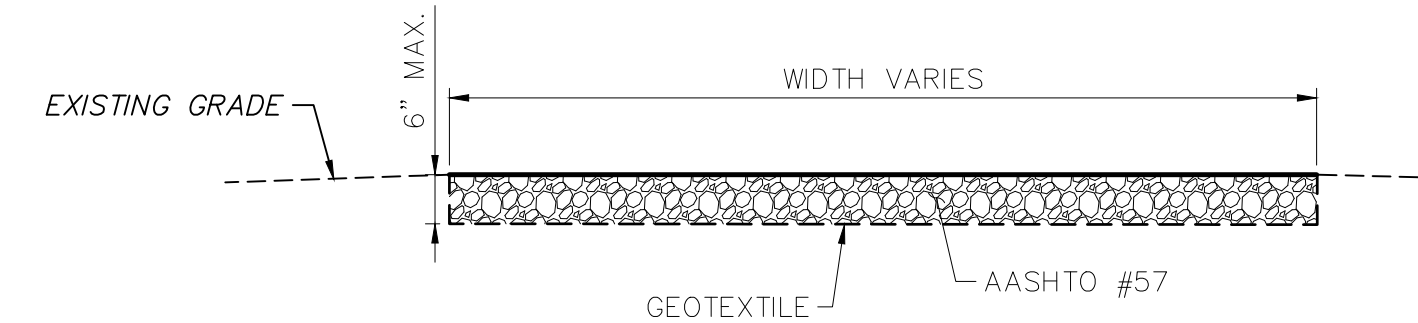


DIVERSION BERM DETAIL
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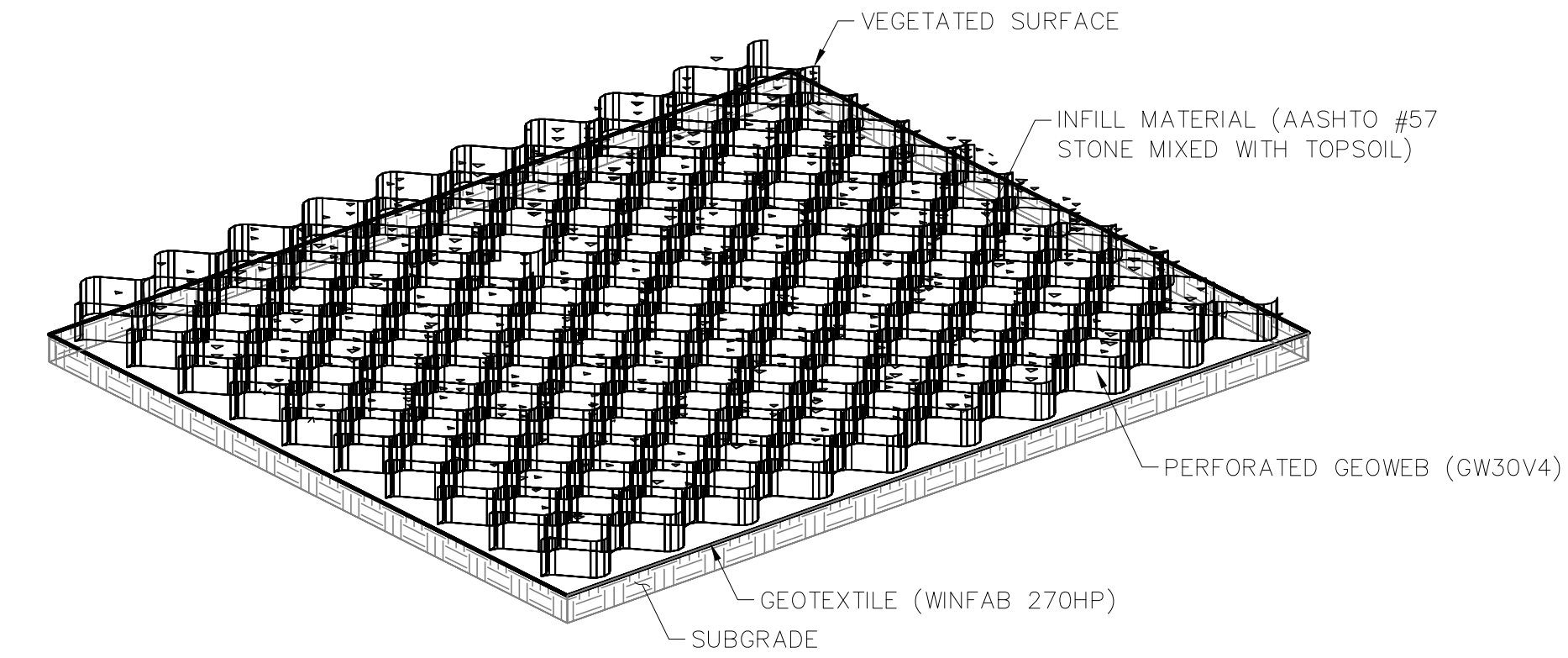
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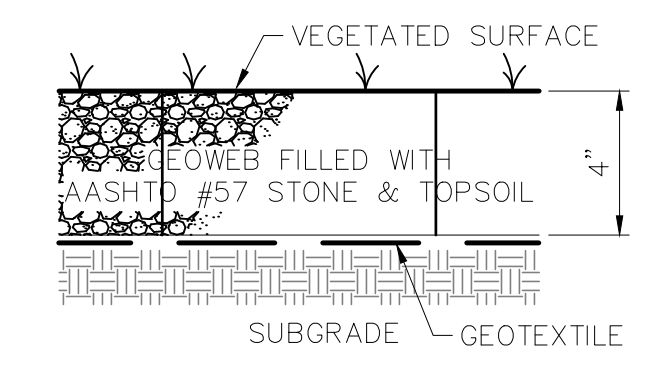
NOTE: 1. FILL WITH TOPSOIL TO ACHIEVE DESIRED SHAPE.
INFILTRATION BERM DETAIL
NOT TO SCALE



TYPICAL AGGREGATE ACCESS ROAD DETAIL
NOT TO SCALE



ISOMETRIC



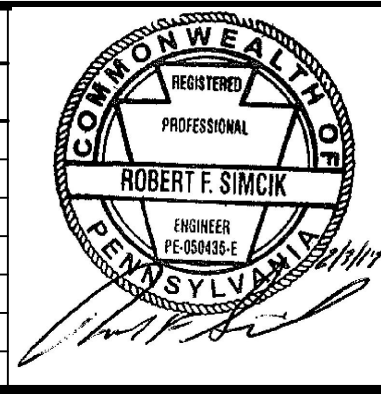
SECTION

- NOTES:
- PREPARE THE SUBGRADE AS SHOWN ON THE CONSTRUCTION DRAWINGS.
 - DO NOT COMPACT SUBGRADE.
 - PROVIDE WOVEN HIGH STRENGTH STABILIZATION GEOTEXTILE (WINFAB 270HP).
 - EXPAND THE GEOWEB SECTIONS INTO POSITION AND CONNECT THE END TO END AND INTERLEAF CONNECTIONS WITH ATRA KEYS.
 - GEOWEB CELL INFILL MATERIAL SHALL BE A MIX OF AASHTO #57 STONE AND SCREENED TOPSOIL IN AN APPROXIMATE RATIO OF 2/3 #57 AND 1/3 TOPSOIL.
 - PLACE THE SPECIFIED INFILL MATERIAL INTO CELLS AND TRACK UNTIL CELL IS FILLED AND SETTLEMENT OF INFILL IS NEGLIGIBLE.
 - ROUGH GRADE CONTOURS DEPICT THE TOP OF SUBGRADE IN AREAS WHERE GEOWEB IS TO BE INSTALLED.
 - TOP OF GEOWEB IS AT ELEVATION 4 INCHES ABOVE ROUGH GRADE SHOWN ON GRADING PLAN.
 - ON SLOPES GREATER THAN 5%, ANCHOR GEOWEB WITH 24" ATRA ANCHORS IN A 3x8 CELL PATTERN.

BLOCK VALVE GEOWEB DETAIL
NOT TO SCALE

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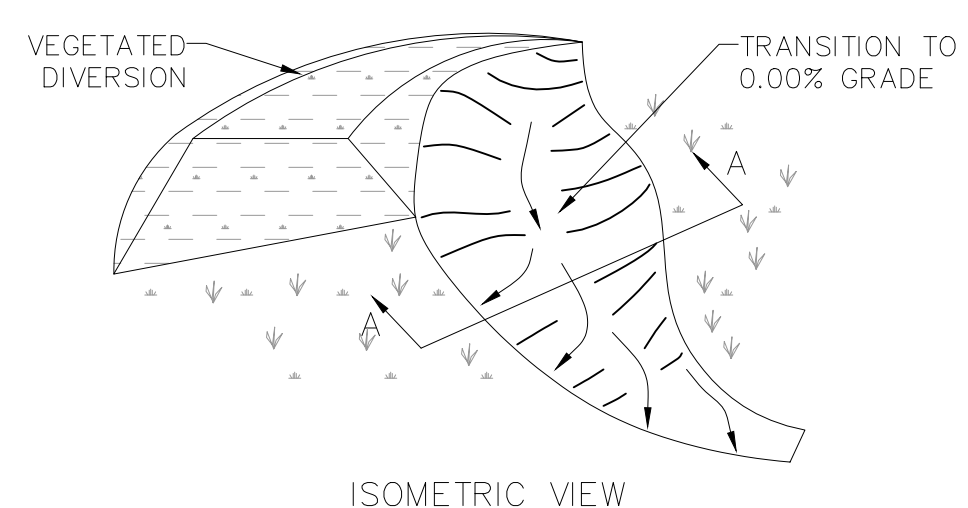
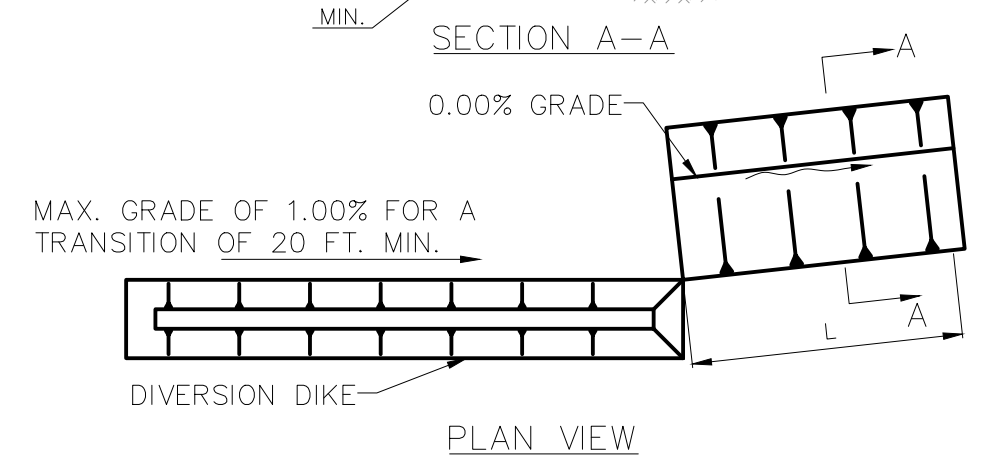
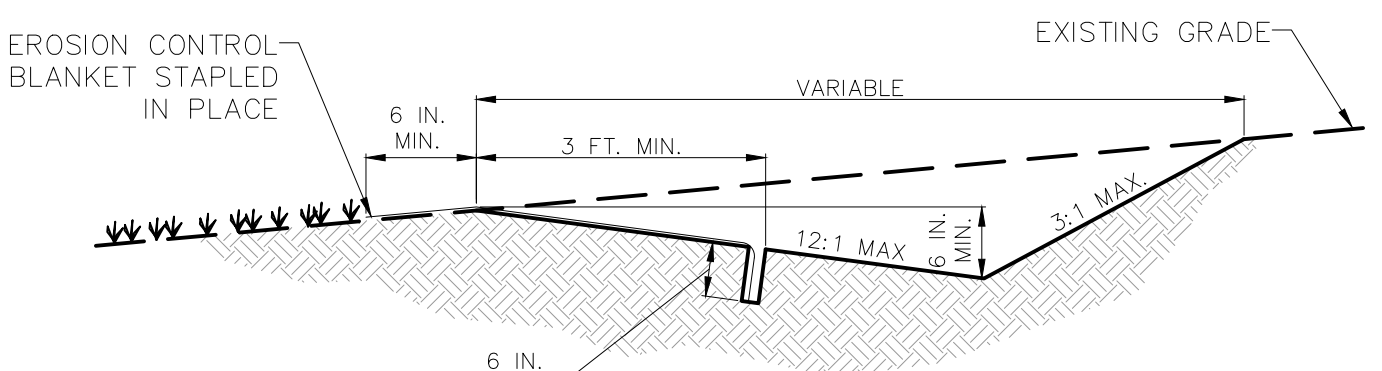
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CONSTRUCTION SPREAD 2

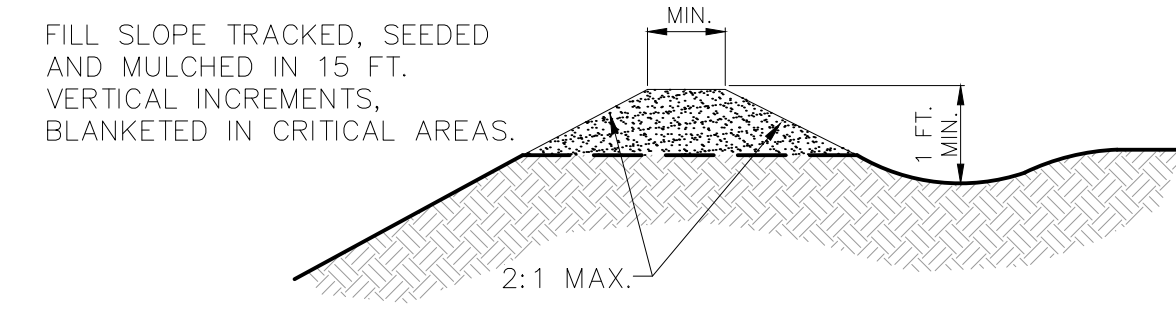
1-20" & 1-16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES
POST CONSTRUCTION STORMWATER MANAGEMENT
DETAILS

| | |
|---------------------------|------------|
| DATE: | 11/23/16 |
| PROJECT NO.: | 112IC05958 |
| DESIGNED BY: | JB |
| DRAWN BY: | BH |
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EARTHEN LEVEL SPREADER
NOT TO SCALE

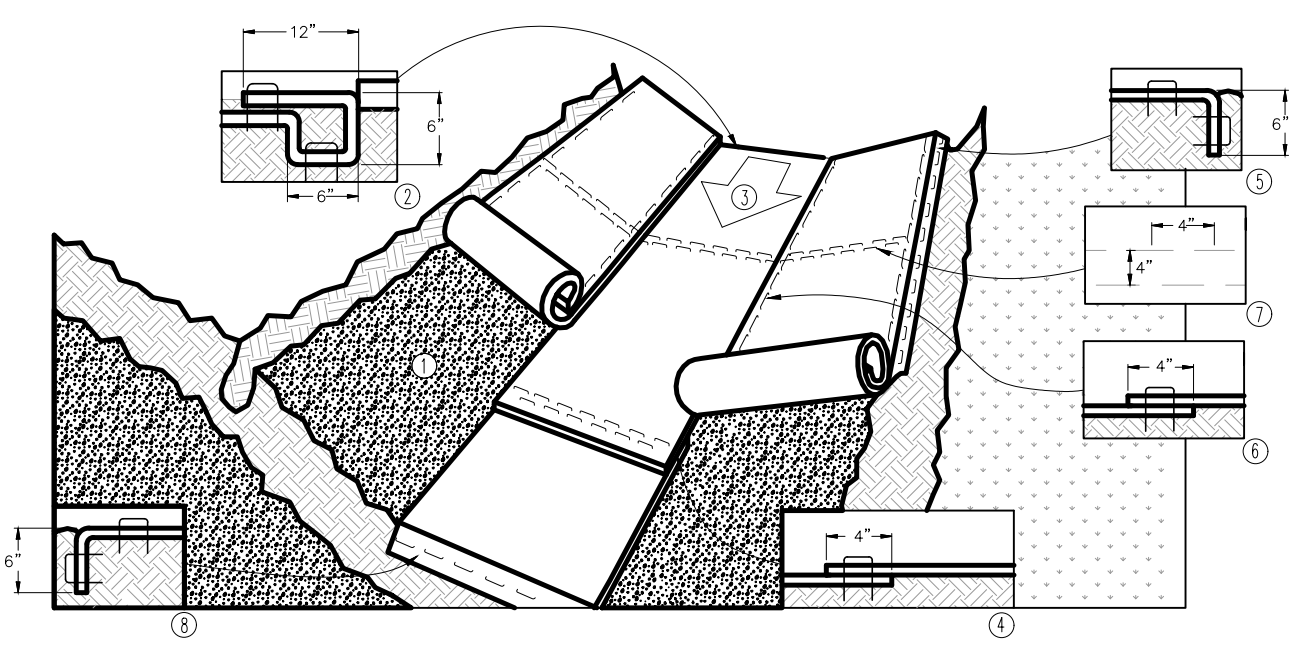
| CHANNEL DESIGNATION | LEVEL SPREADER TYPE | LENGTH (FT) | DOWNSLOPE OUTFALL |
|---------------------|------------------------|-------------|-------------------|
| BUSH RD. | | | |
| DD-1 | EARTHEN LEVEL SPREADER | 173 | GRASS/ROCK |



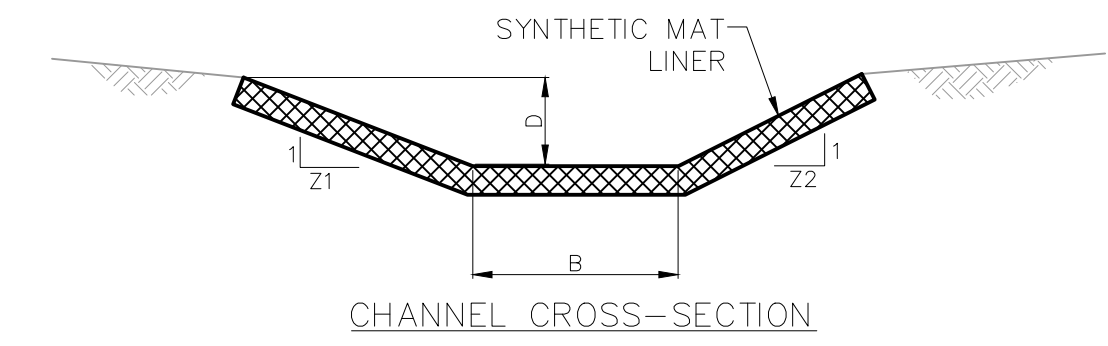
NOTES:

- TEMPORARY BERMS SHALL BE PLACED, MAINTAINED, AND ADJUSTED CONTINUOUSLY UNTIL 90% VEGETATIVE GROWTH IS ESTABLISHED ON THE EXTERIOR SLOPES WITH PERMANENT STORM DRAINAGE FACILITIES FUNCTIONING.
- BERMS SHALL OUTLET TO SLOPE PIPES, CHANNELS, OR OTHER APPROVED MEANS OF CONVEYING RUNOFF TO A SEDIMENT TRAP, SEDIMENT BASIN, OR COLLECTOR CHANNEL.
- CHANNEL BEHIND BERM SHALL HAVE POSITIVE GRADE TO OUTLET AND AN APPROPRIATE PROTECTIVE LINING.
- BERM SHALL BE ADEQUATELY COMPACTED TO PREVENT FAILURE.
- AN ACCEPTABLE ALTERNATIVE TO TOP-OF-SLOPE BERM IS TO CONTINUOUSLY GRADE THE TOP OF FILL TO DIRECT RUNOFF AWAY FROM THE FILLSLOPE TO A COLLECTOR CHANNEL, SEDIMENT TRAP, OR SEDIMENT BASIN.

TOP OF SLOPE BERM
NOT TO SCALE



- PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED.
- BEGIN AT THE TOP OF THE CHANNEL BY ANCHORING THE BLANKET IN A 6" DEEP X 6" WIDE TRENCH WITH APPROXIMATELY 12" OF BLANKET EXTENDED BEYOND THE UPSLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" APART ACROSS THE WIDTH OF THE BLANKET.
- ROLL CENTER BLANKET IN DIRECTION OF WATER FLOW IN BOTTOM OF CHANNEL. BLANKETS WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL BLANKETS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS REQUIRED BY THE MANUFACTURER.
- PLACE CONSECUTIVE BLANKETS END OVER END (SHINGLE STYLE) WITH A 4" OVERLAP. USE A DOUBLE ROW OF STAPLES STAGGERED 4" APART AND 4" ON CENTER TO SECURE BLANKETS.
- ANCHOR FULL LENGTH EDGE OF BLANKETS AT TOP OF SIDE SLOPES WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN A 6" DEEP X 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
- OVERLAP ADJACENT BLANKETS APPROXIMATELY 4" AND STAPLE 4" ON CENTER PLACE THE EDGE OF THE OVERLAPPING BLANKET (BLANKET BEING INSTALLED ON TOP) EVEN WITH THE COLORED SEAM STITCH ON THE BLANKET BEING OVERLAPPED TO ENSURE PROPER SEAM ALIGNMENT.
- PLACE A STAPLE CHECK SLOT AT 50 FOOT INTERVALS ALONG CHANNEL. USE A DOUBLE ROW OF STAPLES STAGGERED 4" APART AND 4" ON CENTER OVER ENTIRE WIDTH OF THE CHANNEL.
- ANCHOR THE TERMINAL END OF THE BLANKETS WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN A 6" DEEP X 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
- ALTER HORIZONTAL STAPLE SPACING IF NECESSARY TO ALLOW STAPLES TO SECURE THE CRITICAL POINTS ALONG THE CHANNEL SURFACE. CRITICAL POINTS ARE OVERLAPS, SEAMS, AND CHANNEL BOTTM/SIDE SLOPE VERTICES.



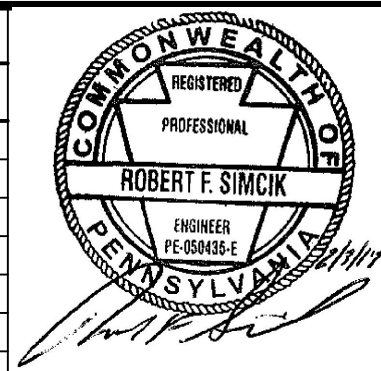
| CHANNEL NO. | STATIONS | BOTTOM WIDTH B (FT) | DEPTH D (FT) | TOP WIDTH W (FT) | Z1 (FT) | Z2 (FT) |
|-------------|--------------|---------------------|--------------|------------------|---------|---------|
| KOONTZ RD. | | | | | | |
| DD-1 | 0+00 TO 1+55 | 1 | 1.5 | 7 | 2 | 2 |
| BUSH RD. | | | | | | |
| DD-1 | 0+00 TO 1+90 | 1 | 2 | 9 | 2 | 2 |
| DD-2 | 0+00 TO 0+50 | 1 | 1.5 | 7 | 2 | 2 |
| NEWPORT RD. | | | | | | |
| DD-1 | 0+00 TO 3+05 | 1 | 1.5 | 7 | 2 | 2 |
| CD-1 | 0+00 TO 2+00 | 0 | 1.5 | 6 | 2 | 2 |

DIVERSION CHANNEL
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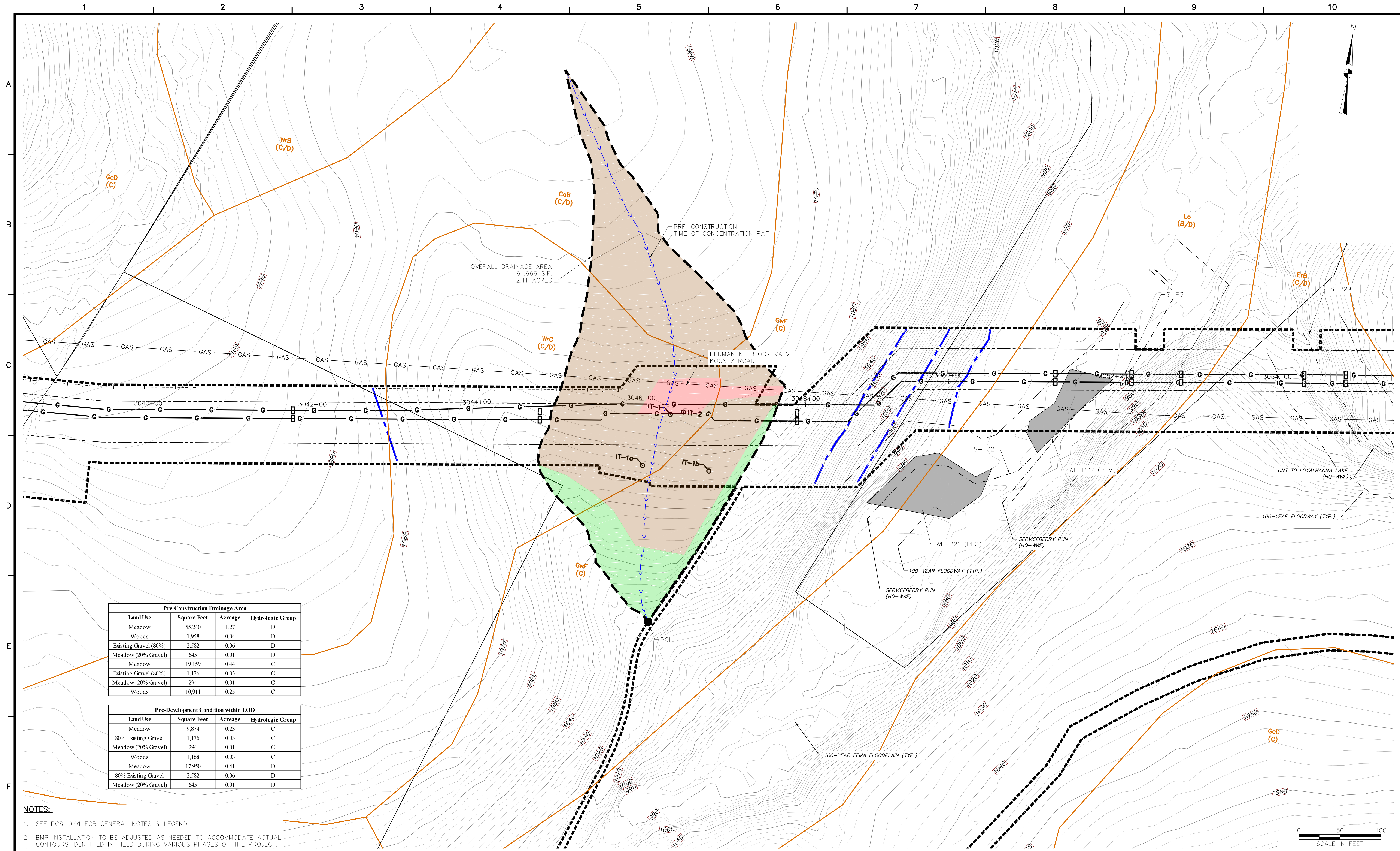
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|-----------|----|------|---------|
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SUNOCO PIPELINE L.P.
SINKING SPRING, PENNSYLVANIA
PENNSYLVANIA PIPELINE PROJECT
CONSTRUCTION SPREAD 2

1-20" & 1-16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES
POST CONSTRUCTION STORMWATER MANAGEMENT
DETAILS

| | |
|---------------------------|------------|
| DATE: | 11/23/16 |
| PROJECT NO.: | 112IC05958 |
| DESIGNED BY: | JB |
| DRAWN BY: | BH |
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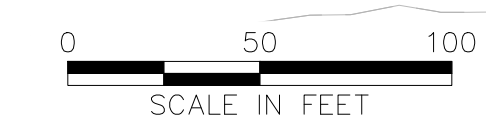


| Pre-Construction Drainage Area | | | |
|--------------------------------|-------------|---------|------------------|
| Land Use | Square Feet | Acreage | Hydrologic Group |
| Meadow | 55,240 | 1.27 | D |
| Woods | 1,958 | 0.04 | D |
| Existing Gravel (80%) | 2,582 | 0.06 | D |
| Meadow (20% Gravel) | 645 | 0.01 | D |
| Meadow | 19,159 | 0.44 | C |
| Existing Gravel (80%) | 1,176 | 0.03 | C |
| Meadow (20% Gravel) | 294 | 0.01 | C |
| Woods | 10,911 | 0.25 | C |

| Pre-Development Condition within LOD | | | |
|--------------------------------------|-------------|---------|------------------|
| Land Use | Square Feet | Acreage | Hydrologic Group |
| Meadow | 9,874 | 0.23 | C |
| 80% Existing Gravel | 1,176 | 0.03 | C |
| Meadow (20% Gravel) | 294 | 0.01 | C |
| Woods | 1,168 | 0.03 | C |
| Meadow | 17,950 | 0.41 | D |
| 80% Existing Gravel | 2,582 | 0.06 | D |
| Meadow (20% Gravel) | 645 | 0.01 | D |

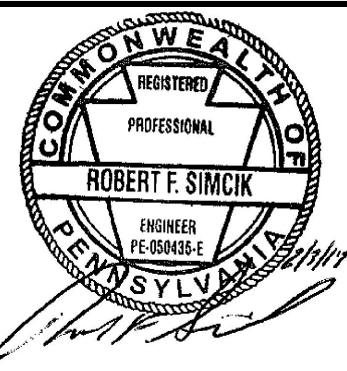
NOTES:

- SEE PCS-0.01 FOR GENERAL NOTES & LEGEND.
- BMP INSTALLATION TO BE ADJUSTED AS NEEDED TO ACCOMMODATE ACTUAL CONTOURS IDENTIFIED IN FIELD DURING VARIOUS PHASES OF THE PROJECT.



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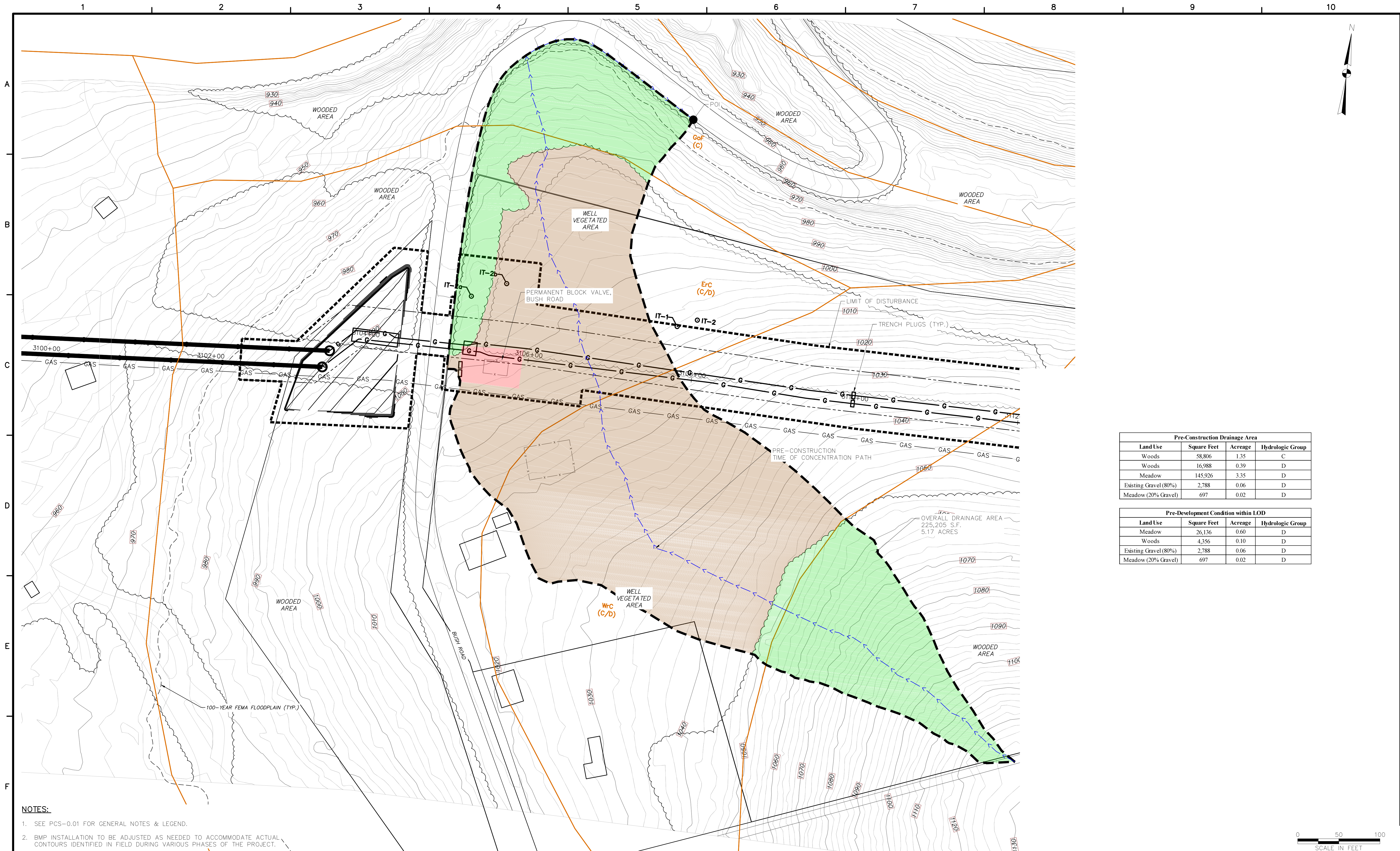
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SUNOCO PIPELINE L.P.
SINKING SPRING, PENNSYLVANIA
PENNSYLVANIA PIPELINE PROJECT
CONSTRUCTION SPREAD 2

1-20" & 1-16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES
KOONTZ ROAD BLOCK VALVE
PRE-CONSTRUCTION CONDITION PLAN

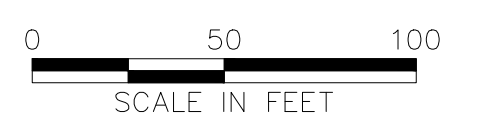
| | |
|---------------------------|------------|
| DATE: | 11/23/16 |
| PROJECT NO.: | 1121C05958 |
| DESIGNED BY: | BM |
| DRAWN BY: | BM |
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| SHEET 2.01A OF 18 | |



| Pre-Construction Drainage Area | | | |
|--------------------------------|-------------|---------|------------------|
| Land Use | Square Feet | Acreage | Hydrologic Group |
| Woods | 58,806 | 1.35 | C |
| Woods | 16,988 | 0.39 | D |
| Meadow | 145,926 | 3.35 | D |
| Existing Gravel (80%) | 2,788 | 0.06 | D |
| Meadow (20% Gravel) | 697 | 0.02 | D |

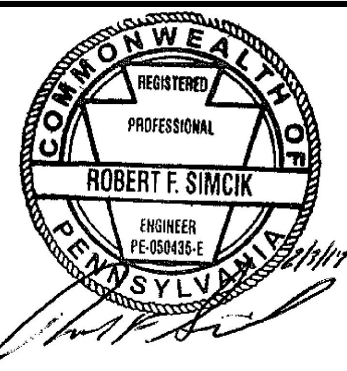
| Pre-Development Condition within LOD | | | |
|--------------------------------------|-------------|---------|------------------|
| Land Use | Square Feet | Acreage | Hydrologic Group |
| Meadow | 26,136 | 0.60 | D |
| Woods | 4,356 | 0.10 | D |
| Existing Gravel (80%) | 2,788 | 0.06 | D |
| Meadow (20% Gravel) | 697 | 0.02 | D |

- NOTES:**
- SEE PCS-0.01 FOR GENERAL NOTES & LEGEND.
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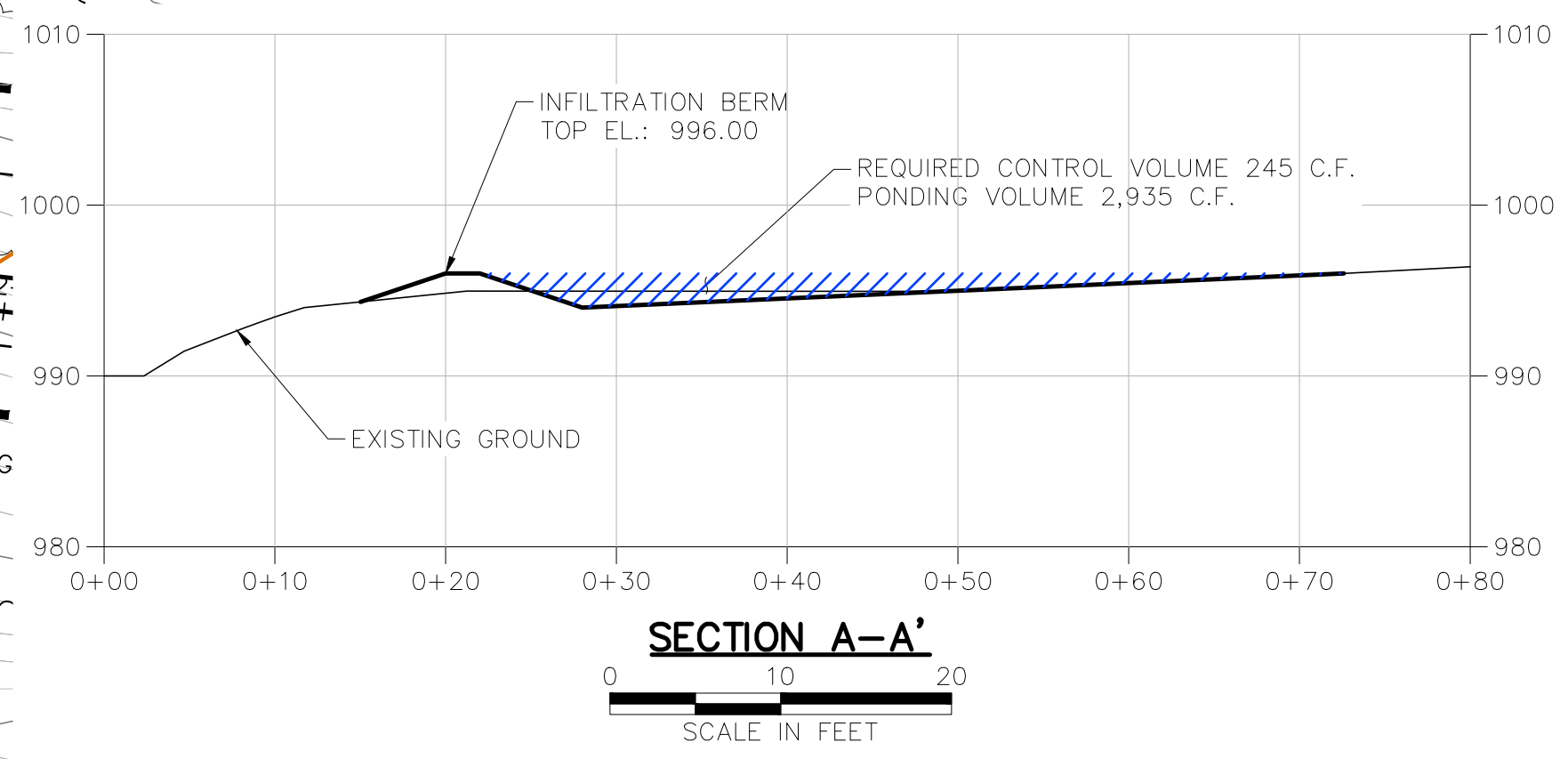
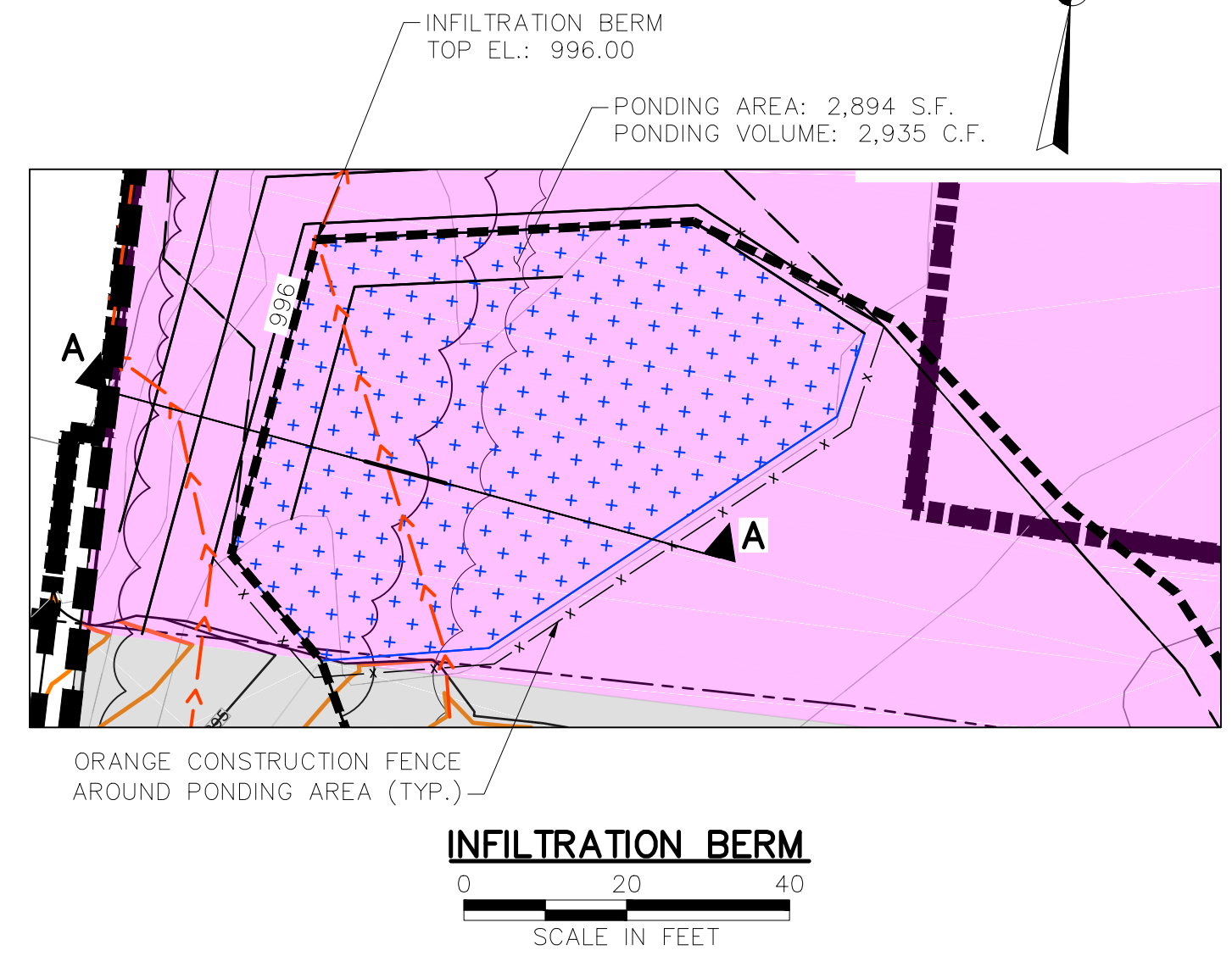
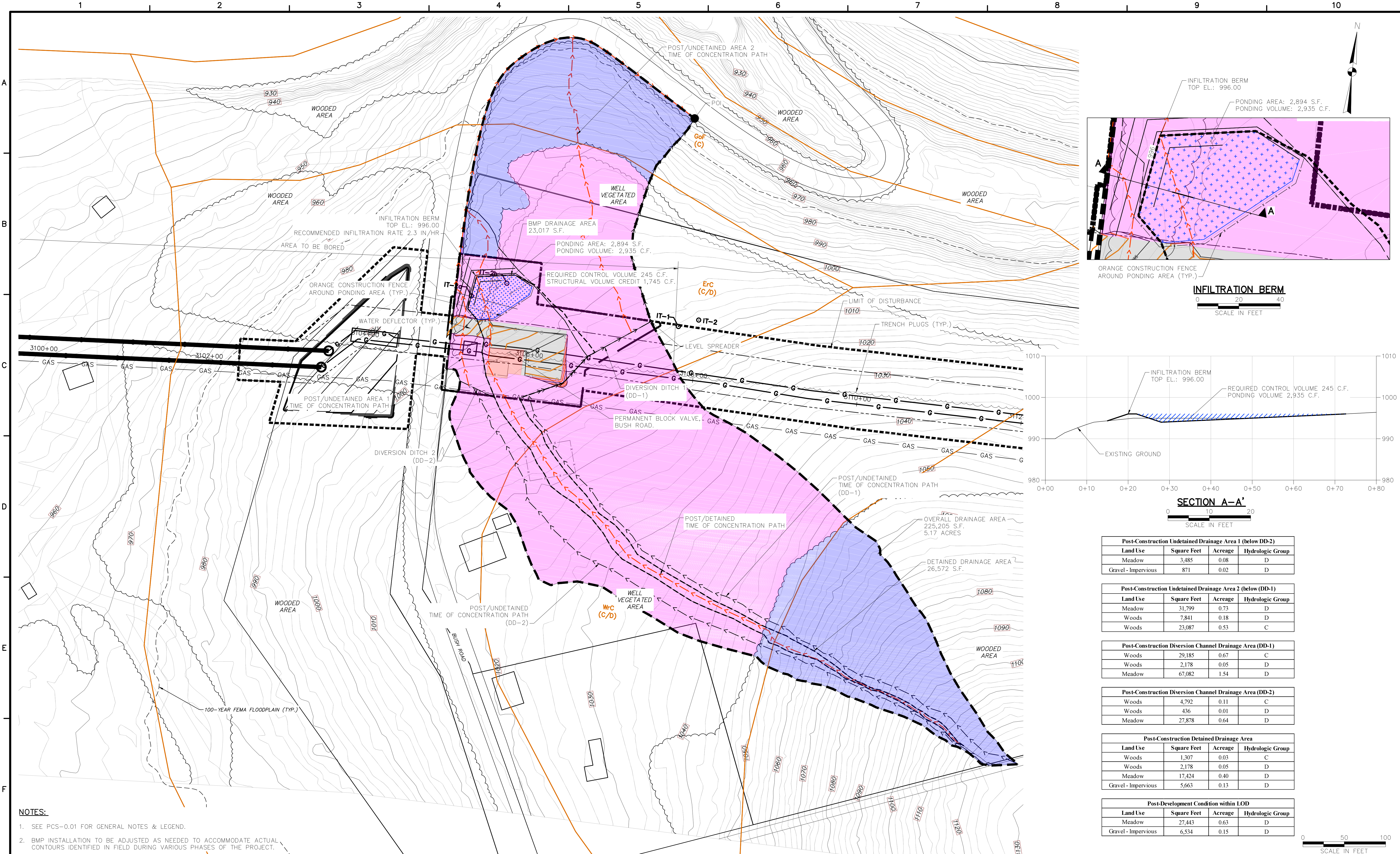


SUNOCO PIPELINE L.P.
 SINKING SPRING, PENNSYLVANIA
 PENNSYLVANIA PIPELINE PROJECT
 CONSTRUCTION SPREAD 2

1-20" & 1-16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES

BUSH ROAD BLOCK VALVE
 PRE-CONSTRUCTION CONDITION PLAN

| | |
|---------------------------|------------|
| DATE: | 11/23/16 |
| PROJECT NO.: | 112IC05958 |
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| Post-Construction Undetained Drainage Area 2 (below DD-2) | | | |
|-----------------------------------------------------------|-------------|---------|------------------|
| Land Use | Square Feet | Acreage | Hydrologic Group |
| Meadow | 3,485 | 0.08 | D |
| Gravel - Impervious | 871 | 0.02 | D |

| Post-Construction Undetained Drainage Area 2 (below DD-1) | | | |
|-----------------------------------------------------------|-------------|---------|------------------|
| Land Use | Square Feet | Acreage | Hydrologic Group |
| Meadow | 31,799 | 0.73 | D |
| Woods | 7,841 | 0.18 | D |
| Woods | 23,087 | 0.53 | C |

| Post-Construction Diversion Channel Drainage Area (DD-1) | | | |
|----------------------------------------------------------|-------------|---------|------------------|
| Land Use | Square Feet | Acreage | Hydrologic Group |
| Woods | 29,185 | 0.67 | C |
| Woods | 2,178 | 0.05 | D |
| Meadow | 67,082 | 1.54 | D |

| Post-Construction Diversion Channel Drainage Area (DD-2) | | | |
|----------------------------------------------------------|-------------|---------|------------------|
| Land Use | Square Feet | Acreage | Hydrologic Group |
| Woods | 4,792 | 0.11 | C |
| Woods | 436 | 0.01 | D |
| Meadow | 27,878 | 0.64 | D |

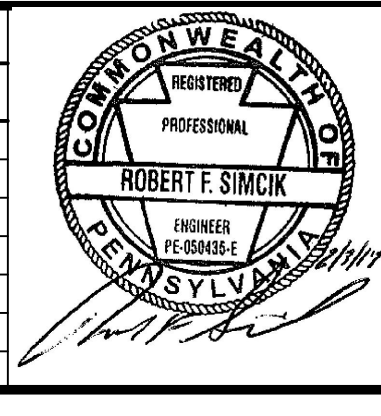
| Post-Construction Detained Drainage Area | | | |
|------------------------------------------|-------------|---------|------------------|
| Land Use | Square Feet | Acreage | Hydrologic Group |
| Woods | 1,307 | 0.03 | C |
| Woods | 2,178 | 0.05 | D |
| Meadow | 17,424 | 0.40 | D |
| Gravel - Impervious | 5,663 | 0.13 | D |

| Post-Development Condition within LOD | | | |
|---------------------------------------|-------------|---------|------------------|
| Land Use | Square Feet | Acreage | Hydrologic Group |
| Meadow | 27,443 | 0.63 | D |
| Gravel - Impervious | 6,534 | 0.15 | D |

NOTES:
 1. SEE PCS-0.01 FOR GENERAL NOTES & LEGEND.
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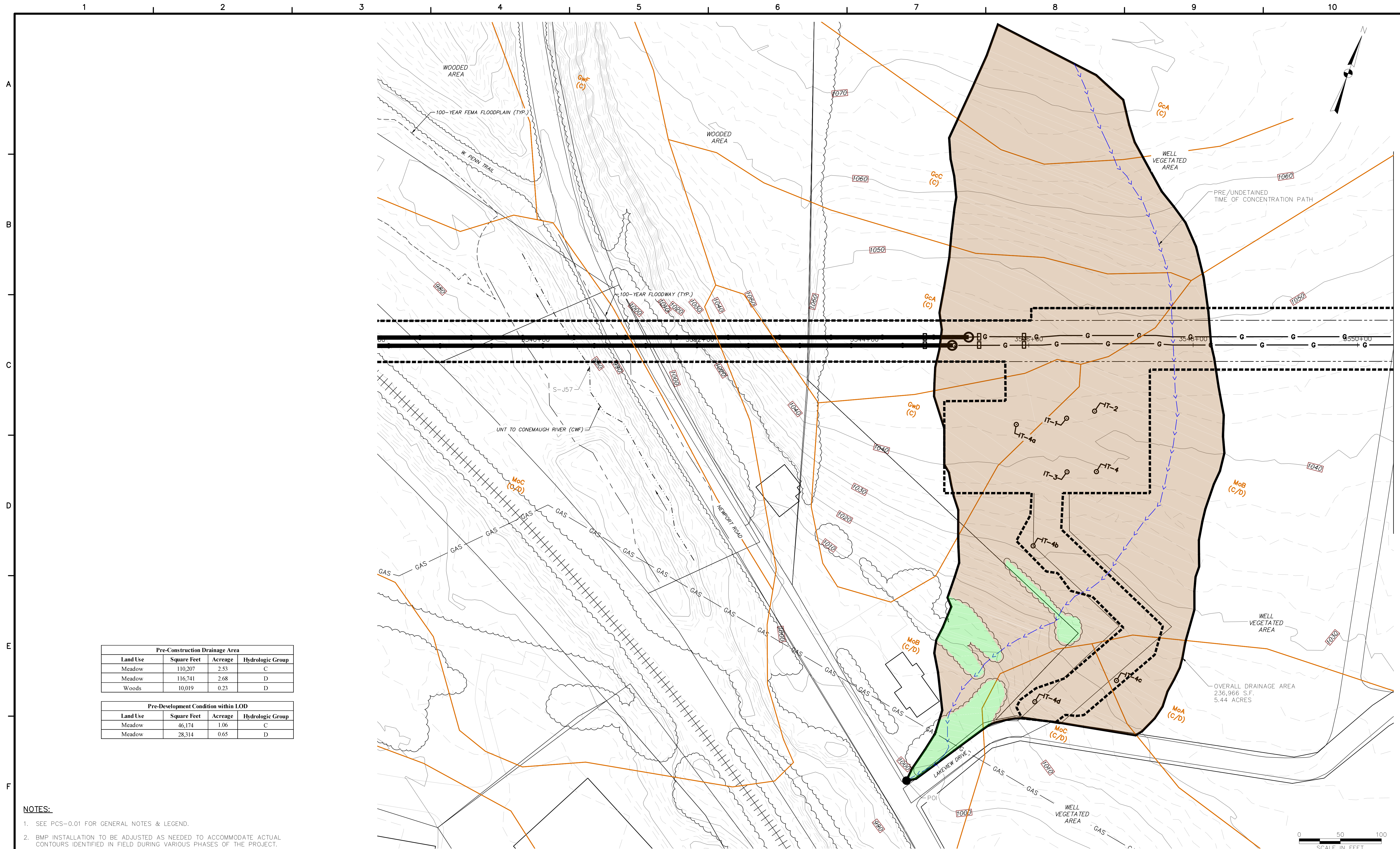


SUNOCO PIPELINE L.P.
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PENNSYLVANIA PIPELINE PROJECT
CONSTRUCTION SPREAD 2

1-20" & 1-16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES

BUSH ROAD BLOCK VALVE
POST CONSTRUCTION STORMWATER MANAGEMENT PLAN

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| Pre-Construction Drainage Area | | | |
|--------------------------------|-------------|---------|------------------|
| Land Use | Square Feet | Acreage | Hydrologic Group |
| Meadow | 110,207 | 2.53 | C |
| Meadow | 116,741 | 2.68 | D |
| Woods | 10,019 | 0.23 | D |

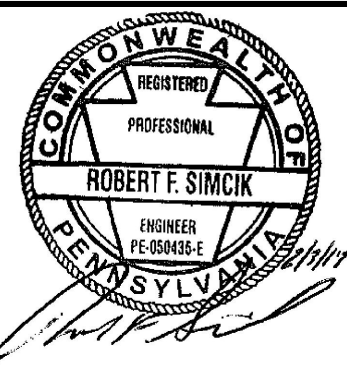
| Pre-Development Condition within LOD | | | |
|--------------------------------------|-------------|---------|------------------|
| Land Use | Square Feet | Acreage | Hydrologic Group |
| Meadow | 46,174 | 1.06 | C |
| Meadow | 28,314 | 0.65 | D |

- NOTES:**
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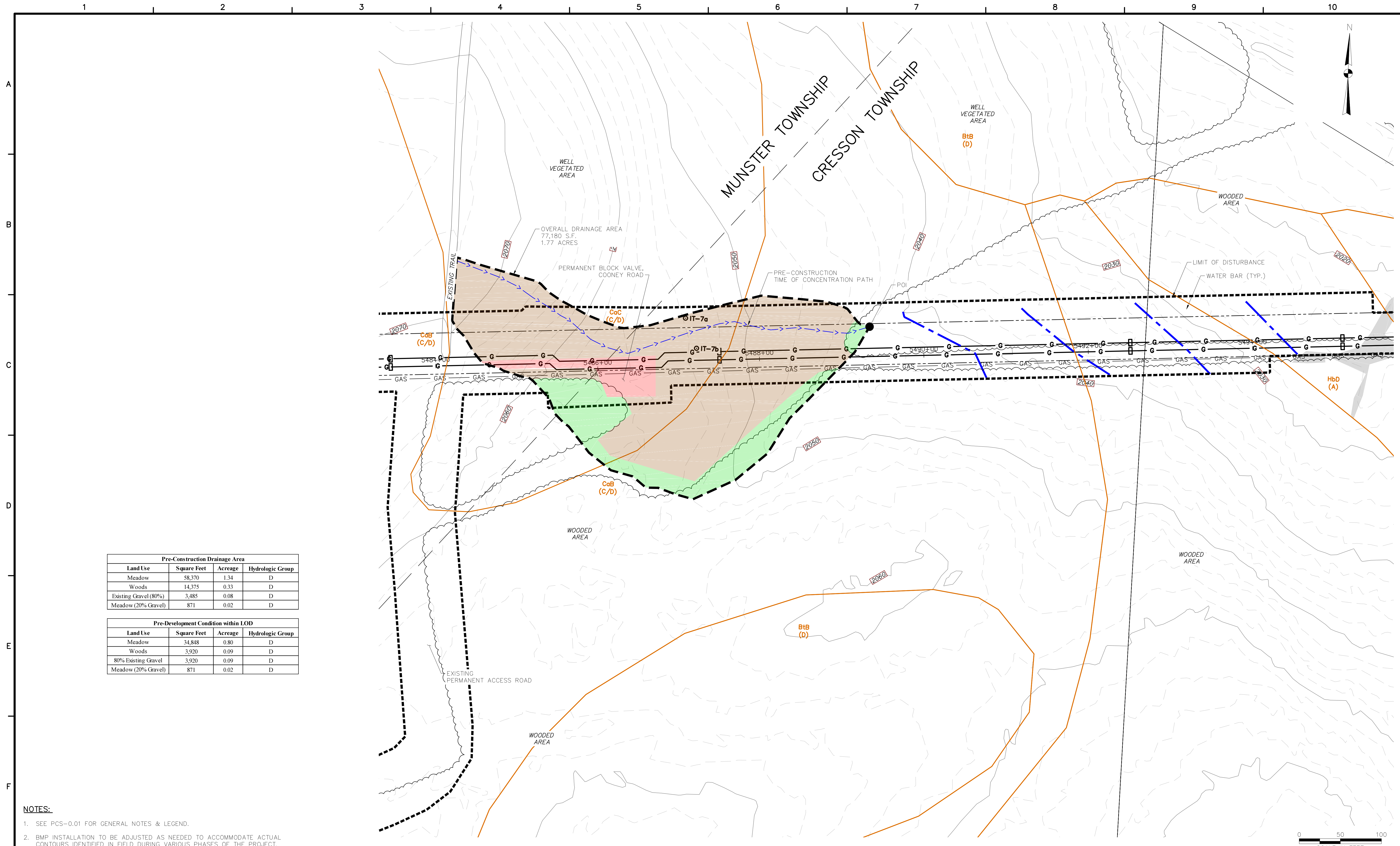


SUNOCO PIPELINE L.P.
SINKING SPRING, PENNSYLVANIA
PENNSYLVANIA PIPELINE PROJECT
CONSTRUCTION SPREAD 2

1-20" & 1-16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES

NEWPORT ROAD BLOCK VALVE
PRE-CONSTRUCTION CONDITION PLAN

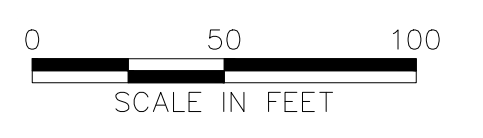
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| Pre-Construction Drainage Area | | | |
|--------------------------------|-------------|---------|------------------|
| Land Use | Square Feet | Acreage | Hydrologic Group |
| Meadow | 58,370 | 1.34 | D |
| Woods | 14,375 | 0.33 | D |
| Existing Gravel (80%) | 3,485 | 0.08 | D |
| Meadow (20% Gravel) | 871 | 0.02 | D |

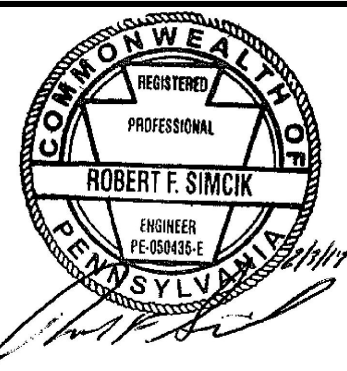
| Pre-Development Condition within LOD | | | |
|--------------------------------------|-------------|---------|------------------|
| Land Use | Square Feet | Acreage | Hydrologic Group |
| Meadow | 34,848 | 0.80 | D |
| Woods | 3,920 | 0.09 | D |
| 80% Existing Gravel | 3,920 | 0.09 | D |
| Meadow (20% Gravel) | 871 | 0.02 | D |

- NOTES:**
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SUNOCO PIPELINE L.P.
SINKING SPRING, PENNSYLVANIA
PENNSYLVANIA PIPELINE PROJECT
CONSTRUCTION SPREAD 2

1-20" & 1-16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES

COONEY ROAD BLOCK VALVE
PRE-CONSTRUCTION CONDITION PLAN

| | |
|---------------------------|------------|
| DATE: | 11/23/16 |
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