# SITE LOCATION

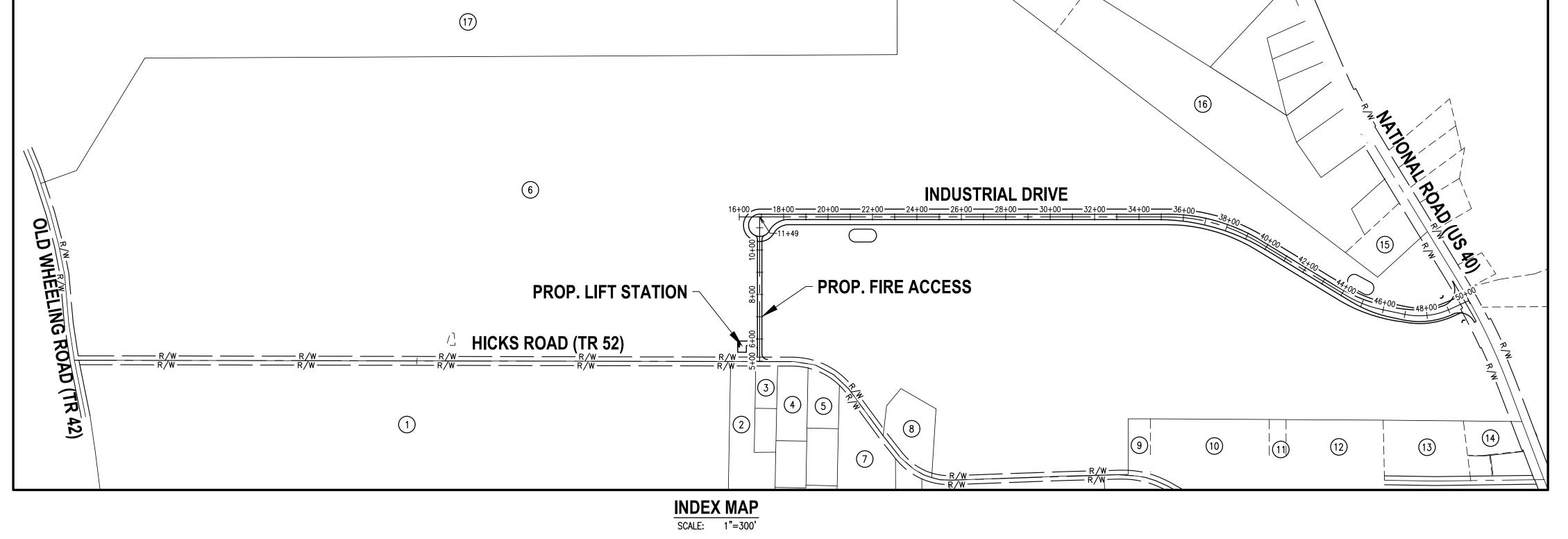
# SITE CONSTRUCTION DOCUMENTS FOR:

# INDUSTRIAL DRIVE MUSKINGUM COUNTY, OHIO





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### PROPERTY OWNER LEGEND

- BGT RENTALS LLC 51-70-03-10-000
  - PRINDLE, JENNIFER BETH 51-62-01-47-000
- KUSSMAUL, ROBERT G 51-62-01-48-000
- BUCHANAN, RONALD E & JANET A

51-62-01-46-000

PLANS PREPARED BY:

Environment / Energy / Infrastructure

- SCHAFER, SR DAVID L & DARLENE J 51-62-01-46-002
- ZANESVILLE MUSKINGUM COUNTY PORT AUTHORITY
- 51-70-03-13-000
- BRACKEN, CHASE 51-62-01-46-001 7.59 AC
- MURPHY JR, HOWARD M 51-62-01-49-001
- BGT RENTALS LLC 51-62-01-52-000
- BENLINE, TARA L. & NATHAN P. 010-017094-02.000

- ADAMS, JUSTIN M 51-62-01-54-000
- ZUMBRO SCOTT D & KELLY A 51-62-01-56-000
- ZUMBRO SCOTT D & KELLY A 51-62-01-59-001 2.34 AC
- CLARK, ULYSSES WAYNE 51-62-01-61-000
- KOHLER, ADAM & TAYLOR POITTS 010-017094-02.000 1.32 Ac

- DUTRO, JOSEPH R & CHERYL A 51-60-03-05-000
  - MERRY, SCOTT A & CYNTHIA K 51-70-03-14-000 98.12 AC

THE STANDARD DRAWINGS LISTED ON THESE PLANS SHALL BE CONSIDERED A PART THEREOF

### OHIO DEPARTMENT OF TRANSPORTATION **SUPPLEMENTAL** STANDARD CONSTRUCTION DRAWINGS **SPECIFICATIONS** 7-18-2014 WQ-1.1 1-18-2013 800 10-20-2017 1-15-2016 TC-41.20 10-18-2013 CB-1.2 1-15-2016 WQ-1.2 TC-41.30 10-18-2013 1-15-2016 7-20-2018 7-21-2017 7-20-2018 TC-41.50 10-18-2013 HW-2.1 **SPECIAL** 1-19-2018 TC-42.20 10-18-2013 1-18-2013 **PROVISIONS** MGS-2.1 1-19-2018 TC-65.10 1-17-2014 7-20-2012 7-19-2013 MGS-4.2 TC-65.11 7-21-2017 1-15-2016 MGS-5.2 7-15-2016 TC-71.10 1-19-2018

### **APPROVALS**

THE SIGNATURES BELOW SIGNIFY ONLY CONCURRENCE WITH THE GENERAL PURPOSE AND GENERAL LOCATION OF PROJECT. ALL TECHNICAL DETAILS REMAIN THE RESPONSIBILITY OF THE DESIGN ENGINEER PREPARING THE PLANS.

DATE MUSKINGUM COUNTY WATER MUSKINGUM COUNTY ENGINEER

DATE MUSKINGUM COUNTY SANITARY

JAMES ROBERTS, PE 52927

DATE

DRIVE COUNTY, OHIO SHEET TRIAL

MUSKINGUM

OB NUMBER: **ZAN012** 

UTILITY OWNERS: THE FOLLOWING UTILITIES AND OWNERS ARE LOCATED WITHIN THE WORK LIMITS OF THE PROJECT:

THE ENERGY COOPERATIVE 1500 GRANVILLE ROAD P.O. BOX 4970 NEWARK, OHIO 43058 800-255-6815

TELECOMMUNICATIONS/FIBER

AT&T

COLUMBIA GAS OF OHIO 2429 LINDEN AVE ZANESVILLE, OHIO 43701 800-344-4077

<u>Sanitary</u> MUSKINGUIM COUNTY 375 RICHARDS RD ZANESVILLE, OHIO 43701 740-452-4940 STAN LUCAS

TELECOMMUNICATIONS/FIBER

TIME WARNER CABLE

STORM WATER MUSKINGUM COUNTY ENGINEER MUSKINGUIM COUNTY 155 REHL RD 375 RICHARDS RD ZANESVILLE, OHIO 43701 ZANESVILLE, OHIO 43701 740-454-0155 740-453-0678 MARK EICHER DON MADDEN

> **ELECTRIC** AMERICAN ELECTRIC POWER 1900 LICKING ROAD ZANESVILLE, OHIO 43701 800-672-2231

UTILITY LOCATIONS: THE LOCATION OF UNDERGROUND UTILITIES SHOWN ON THE PLANS ARE AS OBTAINED FROM THE OWNERS OF UTILITIES AS REQUIRED BY SECTION 153.64 ORC. LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AND STRUCTURES SHOWN IN THE PLANS ARE APPROXIMATE ONLY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THEIR EXACT LOCATION AND ELEVATION WHEN WORKING IN THEIR VICINITY.

WHERE POTENTIAL GRADE CONFLICTS MIGHT OCCUR WITH EXISTING UTILITIES, THE CONTRACTOR SHALL UNCOVER SUCH UTILITIES SUFFICIENTLY IN ADVANCE OF CONSTRUCTION IN ORDER THAT THE EXACT ELEVATION MAY BE DETERMINED AND THE NECESSARY ADJUSTMENTS MADE. COST OF THE ABOVE, IF ANY, WILL BE INCLUDED IN THE PRICE BID FOR THE PERTINENT ITEM.

LOCATION, SUPPORT, PROTECTION AND RESTORATION OF ALL UTILITY LINES, SERVICES AND APPURTENANCES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE COST OF THIS WORK SHALL BE INCLUDED WITH THE PRICE BID FOR THE PERTINENT ITEM, UNLESS OTHERWISE NOTED ON THE PLANS. ESTIMATED QUANTITIES SHOWN ON THE PLANS FOR WATER AND SANITARY SEWER RELOCATIONS ARE FOR THOSE ITEMS ACTUALLY CALLED FOR AND SHOWN ON THE PLANS.

REVIEW OF PROJECT SITE: PRIOR TO BIDDING THE CONTRACTOR SHALL, BY PERSONAL EXAMINATION, SATISFY HIMSELF AS TO THE LOCATION OF THE PROPOSED WORK AND TO ACQUAINT HIMSELF THOROUGHLY WITH THE EXISTING CONDITIONS AND THE DIFFICULTIES THAT ARE LIKELY TO BE ENCOUNTERED IN THE PERFORMANCE OF THE PROPOSED WORK.

MISCELLANEOUS WORK: ALL ITEMS OF WORK CALLED FOR ON THE PLANS FOR WHICH NO SPECIFIC METHOD OF PAYMENT IS PROVIDED SHALL BE PERFORMED BY THE CONTRACTOR AND THE COST OF SAME SHALL BE INCLUDED IN THE PRICE BID FOR THE VARIOUS RELATED ITEMS.

PRIOR TO COMMENCEMENT OF WORK: A PRE-CONSTRUCTION CONFERENCE SHALL BE HELD PRIOR TO

- THE CONTRACTOR SHALL NOTIFY THE FOLLOWING INDIVIDUALS TO SCHEDULE THE PRE-CONSTRUCTION MEETING:
- MARK EICHER, MUSKINGUM COUNTY ENGINEER'S OFFICE AT (740) 454-0155; 2. STAN LUCAS, MUSKINGUM COUNTY SEWER DEPARTMENT AT (740) 452-4940;
- 3. DON MADDEN, MUSKINGUM COUNTY WATER DEPARTMENT AT (740) 588-4389;
- 4. BRIAN BOSCH, OHIO DEPARTMENT OF TRANSPORTATION (ODOT) AT (740) 323-5182
- MATT ABBOTT, ZANESVILLE-MUSKINGUM COUNTY PORT AUTHORITY AT (740) 455-0742
- 6. ETHAN BODE AT 740-224-0710, HULL;

THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING ANY ADDITIONAL SUBCONTRACTORS REQUIRED.

THE CONTRACTOR SHALL SUBMIT A PROPOSED SCHEDULE TO THE OWNER REFLECTING ALL WORK THAT IS TO BE CONDUCTED AND SECURE ANY NECESSARY LICENSES AND ZONING PERMITS NECESSARY.

AT LEAST SEVENTY-TWO (72) HOURS PRIOR TO COMMENCING CONSTRUCTION OPERATIONS IN AN AREA WHICH MAY INVOLVE UNDERGROUND UTILITY FACILITIES. THE CONTRACTOR SHALL NOTIFY THE REGISTERED UTILITY PROTECTION SERVICE AND THE OWNERS OF EACH UTILITY FACILITY SHOWN IN THE PLANS.

EMERGENCY PHONE NUMBER: THE CONTRACTOR SHALL PROVIDE THE PROJECT OWNER AND OHIO DEPARTMENT OF TRANSPORTATION WITH A 24 HOUR TELEPHONE NUMBER TO READILY CONTACT A RESPONSIBLE PARTY IN THE CASE OF AN EMERGENCY. COSTS AND/OR DAMAGES INCURRED RELATED TO WORK PERFORMED BY THE CONTRACTOR IN SUCH EMERGENCIES ARE THE CONTRACTOR'S RESPONSIBILITY AND NOT THAT OF THE PROJECT OWNER.

WORKING HOURS: WORKING HOURS ARE LIMITED TO 7:00AM TO 7:00PM MONDAY THROUGH FRIDAY & 7:00AM TO 5:00PM ON SATURDAY. NO WORK SHALL BE PERMITTED ON SUNDAY.

WEATHER CONDITIONS: ALL CONSTRUCTION AND MATERIAL USAGE SHALL BE IN ACCORDANCE WITH CLIMATIC CONDITIONS ADDRESSED IN CURRENT ISSUE OF THE OHIO DEPARTMENT OF TRANSPORTATION CONSTRUCTION AND MATERIALS SPECIFICATIONS.

SANITARY FACILITIES: THE CONTRACTOR SHALL FURNISH AND MAINTAIN SANITARY CONVENIENCE FACILITIES FOR WORKERS AND INSPECTORS FOR THE DURATION OF THE WORK.

SOIL TESTING AND EXCAVATION: THE OWNER WILL PROVIDE AND PAY FOR SOILS TESTING AND INSPECTION SERVICES BY A THIRD PARTY SOILS CONSULTANT. THE SOILS CONSULTANT SHALL INSPECT BACKFILLING OF THE SANITARY SEWER, TEST THE COMPACTION UNDER THE ROADWAY UP TO & PROVIDE FINAL RECOMMENDATIONS AND OVERSEE ANY STABILIZATION NECESSARY.

MODIFICATIONS: ANY MODIFICATIONS OR CHANGES TO THE WORK, AS SHOWN ON THE DRAWINGS, MUST HAVE PRIOR WRITTEN APPROVAL BY THE ENGINEER AND PROJECT OWNER AND SHALL BE SHOWN ON THE AS-BUILT PLANS.

SURVEYS: THE CONTRACTOR SHALL BE RESPONSIBLE FOR PERFORMING ALL DETAIL SURVEYS NEEDED FOR CONSTRUCTION. ALL CONSTRUCTION STAKING SHALL BE DONE BY OR UNDER THE DIRECTION OF A PROFESSIONAL REGISTERED SURVEYOR.

PROTECTION AND RESTORATION OF PROPERTY: THE CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION AND RESTORATION OF ALL PRIVATE AND PUBLIC PROPERTY IMPACTED BY THE CONTRACTOR'S OPERATIONS IN ACCORDANCE WITH ODOT ITEM 107.10

INDEMNIFICATION: THE CONTRACTOR WILL INDEMNIFY AND HOLD HARMLESS THE PROJECT OWNER AND THE ENGINEER AND THEIR AGENTS AND EMPLOYEES FROM AND AGAINST ALL CLAIMS, DAMAGES, LOSSES AND EXPENSES INCLUDING ATTORNEYS' FEES ARISING OUT OF OR RESULTING FROM PERFORMANCE OF THE WORK, PROVIDED THAT ANY SUCH CLAIMS, DAMAGE, LOSS OR EXPENSE IS ATTRIBUTABLE TO BODILY INJURY, SICKNESS, DISEASE OR DEATH, OR INJURY TO OR DESTRUCTION OF TANGIBLE PROPERTY, INCLUDING THE LOSS OF USE RESULTING THEREFROM; AND IS CAUSED IN WHOLE OR IN PART BY ANY NEGLIGENT OR WILLFUL ACT OR OMISSION OF THE CONTRACTOR, AND SUBCONTRACTOR, ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY ANY OF THEM OR ANYONE FOR WHOSE ACTS ANY OF THEM MAY BE LIABLE.

IN ANY AND ALL CLAIMS AGAINST THE PROJECT OWNER OR THE ENGINEER, OR ANY OF THEIR AGENTS OR EMPLOYEES, BY ANY EMPLOYEE OF THE CONTRACTOR, ANY SUBCONTRACTOR, ANYONE FOR WHOSE ACTS ANY OF THEM MAY BE LIABLE. THE INDEMNIFICATION OBLIGATION SHALL NOT BE LIMITED IN ANY WAY BY ANY LIMITATION ON THE AMOUNT OR TYPE OF DAMAGES, COMPENSATION OR BENEFITS PAYABLE BY OR FOR THE CONTRACTOR OR ANY SUBCONTRACTOR UNDER WORKERS COMPENSATION ACTS, DISABILITY BENEFIT ACTS, OR OTHER EMPLOYEE BENEFIT ACTS.

THE OBLIGATION OF THE CONTRACTOR UNDER THIS PARAGRAPH SHALL NOT EXTEND TO THE LIABILITY OF THE ENGINEER, HIS AGENTS OR EMPLOYEES ARISING OUT OF THE PREPARATION OR APPROVAL OF MAPS, PLANS, OPINIONS, REPORTS, SURVEYS, CHANGE ORDERS, DESIGNS OR SPECIFICATIONS.

LEGAL DIMENSION AND WEIGHT LIMITS: PURSUANT TO SECTIONS 5577.04 AND 5577.05 OHIO REVISED CODE (ORC), LEGAL LIMITS FOR DIMENSIONS AND WEIGHTS FOR HIGHWAY VEHICLES WERE AMENDED EFFECTIVE OCTOBER 1. 1992. THE AMENDED ORC MAY AFFECT THE CONTRACTOR'S COST FOR PERFORMING THE VARIOUS ITEMS OF WORK ON THIS PROJECT. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO FACTOR ANY ADDITIONAL COSTS RESULTING FROM THE AMENDED ORC INTO THE UNIT BID PRICE FOR THE VARIOUS ITEMS OF WORK TO BE PERFORMED ON THIS PROJECT. NO ADDITIONAL REIMBURSEMENT FOR THE COSTS WILL BE PAID BY THE PROJECT OWNER.

SAFETY: THE CONTRACTOR SHALL SOLELY BE RESPONSIBLE FOR COMPLYING WITH ALL FEDERAL. STATE, AND LOCAL SAFETY REQUIREMENTS, TOGETHER WITH EXERCISING PRECAUTIONS AT ALL TIMES FOR THE PROTECTION OF PERSONS INCLUDING EMPLOYEES AND PROPERTY. IT IS ALSO THE CONTRACTOR'S RESPONSIBILITY TO INITIATE, MAINTAIN, AND SUPERVISE ALL SAFETY REQUIREMENTS, PRECAUTIONS, AND PROGRAMS IN CONNECTION WITH THE WORK.

THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR SECURING THE PROJECT SITE FROM THE GENERAL PUBLIC BOTH DURING AND AFTER WORKING HOURS. THE CONTRACTOR SHALL PROVIDE, ERECT, AND MAINTAIN ALL LIGHTS, SIGNS, FENCES, OR ANY OTHER SAFETY DEVICE TO PREVENT UNAUTHORIZED PERSONNEL FROM HAZARDOUS OR DANGEROUS CONDITIONS ON THE PROJECT SITE. THE COST OF SUCH WORK SHALL BE INCLUDED IN THE VARIOUS ITEMS BID FOR FURNISHING AND INSTALLING MATERIALS ON THIS PROJECT.

USE OF FIRE HYDRANTS: THE CONTRACTOR IS HEREBY NOTIFIED THAT THE USE OF FIRE HYDRANTS WILL NOT BE PERMITTED AND THAT THE USE OF FIRE HYDRANTS WILL RESULT IN THE CONTRACTOR'S PROSECUTION FOR THEFT OF A PUBLIC UTILITY. THE CONTRACTOR SHALL COORDINATE WITH THE DIVISION OF WATER TO ACCESS THE WATER SUPPLY.

WORK LIMITS: THE CONTRACTOR SHALL CONFINE HIS ACTIVITIES TO THE PROJECT SITE UNDER DEVELOPMENT OR THE EXISTING RIGHT-OF-WAYS. CONSTRUCTION AND/OR PERMANENT EASEMENTS AND SHALL NOT TRESPASS UPON OTHER PRIVATE PROPERTY WITHOUT THE WRITTEN CONSENT OF THE OWNER.

ALL ADJOINING PROPERTIES DISTURBED DURING CONSTRUCTION OPERATIONS SHALL BE RESTORED TO THE SAME OR BETTER CONDITION. THIS INCLUDES GRADING, SEEDING, AND REMOVAL OF EXCESS MATERIAL.

SHOP DRAWINGS AND/OR PRODUCT DATA: THE CONTRACTOR SHALL SUBMIT FOR THE PROJECT OWNER'S, OR HIS REPRESENTATIVE'S, APPROVAL, THREE COPIES OF THE SHOP DRAWINGS AND/OR PRODUCT DATA. ALLOW 15 DAYS FOR REVIEW AND APPROVAL. TWO COPIES OF THE APPROVED SHOP DRAWINGS AND/OR PRODUCT DATA WILL BE RETAINED BY THE PROJECT OWNER AND ONE COPY WILL BE RETURNED TO THE CONTRACTOR.

IRON PINS AND MONUMENTS: THE CONTRACTOR SHALL REFERENCE ALL IRON PINS AND MONUMENTS BEFORE EXCAVATING AT OR NEAR THEM. IF ANY IRON PINS OR MONUMENTS ARE DESTROYED OR DAMAGED BY THE CONTRACTOR, THEY SHALL BE ACCURATELY REPLACED BY A REGISTERED SURVEYOR EMPLOYED BY THE CONTRACTOR AT THE COMPLETION OF THE PROJECT AND AT NO EXPENSE TO THE PROJECT OWNER OR THE PROPERTY OWNERS.

NON-RUBBER TIRE VEHICLES: NO NON-RUBBER TIRE VEHICLES SHALL BE MOVED ON ANY STREETS. EXCEPTIONS MAY BE GRANTED BY THE PROJECT OWNER WHERE SHORT DISTANCES AND SPECIAL CIRCUMSTANCES ARE INVOLVED. GRANTING OF EXCEPTIONS MUST BE IN WRITING AND ANY RESULTING DAMAGE MUST BE REPAIRED TO THE SATISFACTION OF THE PROJECT OWNER. THE CONTRACTOR SHALL USE EXTREME CARE WHEN OPERATING NON-RUBBER TIRE VEHICLES ON STREETS OR DRIVEWAYS TO AVOID MARKING OR DAMAGING THE PAVEMENT. PROTECTION OF THE PAVEMENT FROM DAMAGE RESULTING FROM THE TRACKS OF NON-RUBBER TIRE VEHICLES UTILIZED IN TRENCH EXCAVATION SHALL BE REQUIRED. A WOOD PLANK SYSTEM, USED TIRES, RUBBER MATS OR OTHER MEANS AS APPROVED BY THE PROJECT OWNER'S REPRESENTATIVE SHALL BE USED TO PROTECT THE PAVEMENT. THE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE VARIOUS ITEMS OF THE CONTRACT.

PAVEMENT CLEANING: THE CONTRACTOR IS HEREBY NOTIFIED THAT HE/SHE SHALL BE RESPONSIBLE FOR CLEANING OF STREETS OR ANY MUD, DIRT, SAND, GRAVEL, STONES, OR ANY KIND OF MATERIAL THAT HAVE DEPOSITED AS A RESULT OF HIS/HER OR SUBCONTRACTOR'S OPERATIONS. PAVEMENTS SHALL BE CLEANED AT THE END OF EACH WORK DAY OR MORE OFTEN AS DETERMINED BY THE PROJECT OWNER OR ITS REPRESENTATIVE. POWER WASHING IS NOT ALLOWED.

DUST CONTROL: THE CONTRACTOR IS ADVISED THAT HIS WORK WILL BE IN PROXIMITY TO OCCUPIED RESIDENCES. THEREFORE, IT IS EXPECTED THE CONTRACTOR WILL PERFORM HIS/HER EARTHWORK OPERATIONS TO MINIMIZE DUST. WHEN CONDITIONS ARE SUCH THAT DUST BECOMES A MAJOR PROBLEM OR AS ADVISED BY THE PROJECT OWNER, THE CONTRACTOR WILL APPLY A DUST PALLIATIVE PER ODOT ITEM 616.

CONSTRUCTION NOISE: ACTIVITIES AND LAND USE ADJACENT TO THIS PROJECT MAY BE AFFECTED BY CONSTRUCTION NOISE. IN ORDER TO MINIMIZE ANY ADVERSE CONSTRUCTION NOISE IMPACTS, ANY POWER-OPERATED CONSTRUCTION-TYPE DEVICE SHALL NOT BE OPERATED BETWEEN THE HOURS OF 7:00PM AND 7:00AM. IN ADDITION, ANY SUCH NOISE SHALL NOT BE OPERATED AT ANY TIME IN SUCH A MANNER THAT THE NOISE CREATED SUBSTANTIALLY EXCEEDS THE NOISE CUSTOMARILY AND NECESSARILY ATTENDANT TO THE REASONABLE AND EFFICIENT PERFORMANCE OF SUCH EQUIPMENT.

FIRE LANE POSTS, AS PER PLAN: FIRE LANE POSTS SHALL BE 4"x4"x6' TREATED POSTS, WITH 4' HEIGHT EXPOSED ABOVE FINISHED GRADE, POSTS SHALL BE INSTALLED AT AN OFFSET OF 14" TO THE CENTER OF THE POST FROM THE EDGE OF THE GRAVEL FIRE ACCESS ROAD AND SHALL HAVE REFLECTORS MOUNTED TO THE EAST AND WEST FACES OF THE POSTS. A LIGHT DUTY METAL CHAIN SHALL BE MOUNTED BETWEEN THE TWO POSTS.

FINAL CLEAN-UP: THE CONTRACTOR SHALL CLEAN UP ALL DEBRIS AND MATERIALS RESULTING FROM HIS OPERATIONS AND RESTORE ALL SURFACES, STRUCTURES, DITCHES, AND PROPERTY TO ITS ORIGINAL CONDITION TO THE SATISFACTION OF THE PROJECT OWNER OR ENGINEER.

ITEM 203 - EXCAVATION & EMBANKMENT-AS PER PLAN: THE ENGINEER DETERMINED QUANTITIES ARE AS FOLLOWS

BASE BID ITEM 203 - EXCAVATION AS PER PLAN 82,395 CU YD ITEM 203 - EMBANKMENT AS PER PLAN 28.967 CU YD ALTERNATE #2 ITEM 203 - EXCAVATION AS PER PLAN 63,913 CU YD ITEM 203 - EMBANKMENT AS PER PLAN 34,905 CU YD

BASE BID EXCAVATION AND EMBANKMENT CONSISTS OF ALL EARTHWORK REQUIRED TO CONSTRUCT THE ROADWAY, FIRE ACCESS DRIVE. DITCHES, AND STORM WATER DETENTION BASINS. INCLUDING MINOR GRADING OUTSIDE OF RIGHT-OF-WAY TO TIE INTO EXISTING GRADE. BASE BID GRADING USES 3:1 SLOPES TO TIE INTO EXISTING GRADE OUTSIDE OF RIGHT-OF-WAY. BASE BID LIMITS OF GRADING ARE SHOWN ON THE EROSION, SEDIMENT CONTROL & GRADING PLAN.SHEETS 10-17 (REFERENCE LEGEND & PLAN VIEW).

ALTERNATE #2 EXCAVATION AND EMBANKMENT CONSISTS OF ADDITIONAL EARTHWORK OUTSIDE OF RIGHT-OF-WAY TO CREATE MORE GRADUAL SLOPES TO TIE INTO EXISTING GRADE, FILLS IN LOW AREAS, AND STOCKPILES SOIL FOR FUTURE DEVELOPMENT. ALTERNATE #2 LIMITS AND GRADING ARE SHOWN ON THE EROSION, SEDIMENT CONTROL & GRADING PLAN, SHEETS 10-17 (REFERENCE LEGEND & PLAN VIEW). ALTERNATE #2 GRADING IS CONSISTENTLY SHOWN THROUGHOUT THE PLAN SET.

THE CONTRACTOR SHALL DETERMINE HIS OWN QUANTITIES TO BE USED FOR THE LUMP SUM LINE ITEM BIDS SUBMITTED FOR EXCAVATION AND EMBANKMENT. NO ADDITIONAL PAYMENT BEYOND THE SUBMITTED BID WILL BE GRANTED FOR DISCREPANCIES BETWEEN THE ENGINEERS CUT/FILL VERSUS THE CONTRACTOR CALCULATED CUT/FILL.

ITEM 832 - EROSION CONTROL, AS PER PLAN

THIS ITEM OF WORK SHALL BE COMPLETED PER THE SPECIFICATIONS AND STANDARD DRAWINGS FOUND IN THE CMS AND AS SHOWN IN THIS PLAN. ESTIMATED QUANTITIES FOR THE FOLLOWING ARE INCLUDED IN THE LUMP SUM BASE BID AND ALTERNATE #2:

PERIMETER FILTER FABRIC FENCE 6,620 LF CONCRETE WASHOUT AREA 1 EACH INLET PROTECTION 7 EACH DITCH CHECKS 31 EACH

ALTERNATE #2 PERIMETER FILTER FABRIC FENCE 3,732 LF

THE CONTRACTOR SHALL DETERMINE HIS OWN QUANTITIES TO BE USED FOR THE LUMP SUM LINE ITEM BIDS SUBMITTED FOR EROSION CONTROL. NO ADDITIONAL PAYMENT BEYOND THE SUBMITTED BID WILL BE GRANTED FOR DISCREPANCIES.

### DRAINAGE NOTES

ALL STORM SEWER, CULVERTS, HEADWALLS, CURB INLETS, MANHOLES, METHODS OF CONSTRUCTION, AND WORKMANSHIP FOR DRAINAGE AND APPURTENANCES SHOWN ON THESE PLANS SHALL CONFORM TO THE RULES AND REGULATIONS OF MUSKINGUM COUNTY AND ODOT ITEMS 602 & 611 CURRENT ON THE DATE OF CONTRACT UNLESS THE REQUIREMENTS OF SUCH RULES AND REGULATIONS ARE UPGRADED BY THE FOLLOWING NOTES OR BY THE CONSTRUCTION DETAILS SET FORTH HEREIN.

THE FLOW IN ALL SEWERS, DRAINS AND WATERCOURSES ENCOUNTERED SHALL BE MAINTAINED BY THE CONTRACTOR AT HIS OWN EXPENSE, AND WHENEVER SUCH WATERCOURSES AND DRAINS ARE DISTURBED OR DESTROYED DURING THE PROSECUTION OF THE WORK, THEY SHALL BE RESTORED BY THE CONTRACTOR AT HIS OWN EXPENSE TO A CONDITION SATISFACTORY TO THE COUNTY.

MATERIALS: ALL STORM SEWERS AND CULVERTS SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.

STORM SEWERS AND CULVERTS SHALL BE CORRUGATED POLYETHYLENE SMOOTH LINED PIPE (707.33) IN ACCORDANCE WITH ODOT ITEM 611. TYPES B-F (DEPENDING ON THE LOCATION). WITH A MINIMUM SIZE OF 12 INCHES.

STORM MANHOLES AND INLETS SHALL BE IN ACCORDANCE WITH THE STANDARD DRAWINGS AND INSTALLED AS PER ODOT ITEM 611.

ALL CATCH BASINS, MANHOLES, AND CURB INLETS SHALL HAVE CONCRETE CHANNELS POURED IN PLACE TO ASSURE POSITIVE DRAINAGE THROUGH THESE STRUCTURES.

ALL MANHOLES SHALL BE ADJUSTED TO GRADE USING PRECAST CONCRETE RINGS.

BACKFILL: ALL BACKFILL FOR STORM SEWER UNDER THE PAVEMENT'S INFLUENCE LINE SHALL BE AS PER ODOT ITEM 611. TYPE B. GRANULAR STRUCTURAL BACKFILL FOR THE ENTIRE TRENCH DEPTH. ALL OTHER BACKFILL AND BEDDING SHALL BE AS PER ODOT ITEM 611, TYPE C, NATURAL SOILS UNLESS OTHERWISE NOTED IN THE PLANS. PAYMENT FOR THIS WORK AND MATERIAL SHALL BE INCLUDED IN THE UNIT BID FOR FURNISHING AND INSTALLING PIPE.

PAYMENT: THE COST OF ANY DEWATERING OPERATIONS REQUIRED FOR THE CONSTRUCTION OF THE STORM SEWER SHALL BE INCLUDED IN THE PRICE BID FOR THE VARIOUS SEWER ITEMS.

THE COST OF ANY ROCK EXCAVATION SHALL BE INCLUDED IN THE PRICE BID FOR THE STORM SEWER. THE BIDDER SHALL DETERMINE IF ANY ROCK EXCAVATION WILL BE REQUIRED AND ADJUST HIS BIDS ACCORDINGLY.

ALL LABOR, MATERIAL, TOOLS, EQUIPMENT AND INCIDENTALS NECESSARY FOR EACH ITEM; FURNISHED, INSTALLED IN PLACE, JOINTING MADE, BEDDING, BACKFILL, PAVEMENT REPLACEMENT AND/OR REPAIR, AND TESTING SHALL BE INCLUDED IN THE UNIT BID PRICE FOR PIPE.

CROSSINGS AND CONNECTIONS TO EXISTING PIPES AND UTILITIES: WHERE PLANS PROVIDE FOR A PROPOSED CONDUIT TO BE CONNECTED TO, OR CROSS OVER OR UNDER AN EXISTING SEWER OR UNDERGROUND UTILITY, THE CONTRACTOR SHALL LOCATE THE EXISTING PIPES OR UTILITIES BOTH AS TO LINE AND GRADE BEFORE STARTING TO LAY THE PROPOSED CONDUIT.

IF IT IS DETERMINED THAT THE ELEVATION OF THE EXISTING CONDUIT, OR EXISTING APPURTENANCE TO BE CONNECTED, DIFFERS FROM THE PLAN ELEVATION OR RESULTS IN A CHANGE IN THE PLAN CONDUIT SLOPE, THE ENGINEER SHALL BE NOTIFIED BEFORE STARTING CONSTRUCTION OF ANY PORTION OF THE PROPOSED CONDUIT WHICH WILL BE AFFECTED BY THE VARIANCE IN THE EXISTING ELEVATIONS.

IF IT IS DETERMINED THAT THE PROPOSED CONDUIT WILL INTERSECT AN EXISTING SEWER OR UNDERGROUND UTILITY IF CONSTRUCTED AS SHOWN ON THE PLAN, THE ENGINEER SHALL BE NOTIFIED BEFORE STARTING CONSTRUCTION OF ANY PORTION OF THE PROPOSED CONDUIT WHICH WOULD BE AFFECTED BY THE INTERFERENCE WITH AN EXISTING FACILITY.

PAYMENT FOR ALL THE OPERATIONS DESCRIBED ABOVE SHALL BE INCLUDED IN THE CONTRACT PRICE FOR THE PERTINENT 611 CONDUIT ITEM.

### ITEM 602 - CONCRETE MASONRY, AS PER PLAN

THIS ITEM OF WORK SHALL BE COMPLETED PER THE SPECIFICATIONS FOUND IN THE CMS AND INCLUDES A QUANTITY FOR THE FOLLOWING:

HALF HEIGHT HEADWALL HW-2.1 (12") - 2 EACH HALF HEIGHT HEADWALL HW-2.1 (18") - 2 EACH HALF HEIGHT HEADWALL HW-2.1 (36") - 1 EACH FULL HEIGHT HEADWALL HW-1.1 (60") - 2 EACH SANITARY SEWER NOTES

TESTING: ALL SANITARY SEWERS SHALL BE PRESSURE TESTED FOR INFILTRATION AND EXFILTRATION, HAVING MAXIMUM TEST SECTIONS OF 400 FEET. LEAKAGE THROUGH JOINTS SHALL NOT EXCEED 100 GALLONS PER DAY PER INCH OF SEWER DIAMETER PER MILE OF PIPE. SANITARY SEWERS SHALL BE MANDREL TESTED AND LEAKAGE TESTED NO SOONER THAN 30 DAYS AFTER INSTALLATION, TESTING SHALL BE IN ACCORDANCE WITH ASTM D3034 ALL SANITARY MANHOLES SHALL BE VACUUM TESTED, IN ACCORDANCE WITH ASTM C1244. ALL TESTING SHALL BE PERFORMED UNDER A REPRESENTATIVE OF MUSKINGUM COUNTY. ALL TEST REPORTS SHALL BE FURNISHED TO MUSKINGUM COUNTY PRIOR TO ACCEPTANCE OF THE SYSTEM. ALL THE COST FOR THE ABOVE INCLUDING ANY REPAIRS AND RE-TESTING NECESSARY TO ACHIEVE A SUCCESSFUL TEST WILL BE INCLUDED IN THE UNIT PRICE BID FOR THE SANITARY SEWER.

STORM WATER CONNECTIONS: NO FOUNDATION DRAINS, ROOF DRAINS, OR OTHER STORM WATER DRAINS OF ANY KIND SHALL BE CONNECTED INTO THE SANITARY SEWER SYSTEM.

MANHOLE SEALING: SANITARY MANHOLE FRAME SEALING SHALL MEET THE FOLLOWING

EXTERNAL CHIMNEY SEAL SHALL BE MANUFACTURED BY CCI PIPELINE SYSTEMS (WRAPIDSEAL) OR A PRE-APPROVED EQUAL. AN INTERNAL EPOXY CHIMNEY SEAL BY SPECTRASHIELD OR SPAYROC SPRAYWALL CAN BE USED IN LIEU OF THE EXTERNAL CHIMNEY IF DESIRED. ALL AREAS WHERE THE SEAL IS TO BE ATTACHED MUST BE FREE FROM ANY DIRT, GREASE, RUST OR ANY LOOSE MORTAR.

MANHOLE TOPS: WHERE MANHOLES ARE LOCATED WITHIN ROAD GRADING LIMITS, THE TOPS SHALL BE BUILT TO ELEVATIONS SHOWN ON THE APPROVED PLANS OR DIRECTED BY THE COUNTY. ELSEWHERE, MANHOLES SHALL BE BUILT OR SUBSEQUENTLY ADJUSTED TO BE NOT MORE THAN THREE (3) INCHES ABOVE FINAL SURFACE GRADES ESTABLISHED FOR THE DEVELOPMENT.

MATERIALS: ALL SANITARY SEWERS SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.

SANITARY SEWER PIPE SHALL BE LAID WITH STONE OR GRAVEL BEDDING. ALL GRAVITY SANITARY SEWER PIPE SHALL BE PVC PLASTIC PIPE, SDR 35 (707.45) IN ACCORDANCE WITH ODOT ITEM 611, TYPES B-C (DEPENDING ON LOCATION).

FORCEMAIN SANITARY SEWER PIPE SHALL BE PVC PLASTIC PIPE, GREEN IN COLOR, C900 DR18 (748.02) WITH BELL AND SPIGOT JOINTS CONFORMING TO ASTM F-477. DUCTILE IRON PIPE AT AIR RELEASE VALVES SHALL MEET AWWA C151 AND JOINTS SHALL BE IN ACCORDANCE WITH AWWA C111.

SANITARY MANHOLES SHALL BE IN ACCORDANCE WITH THE STANDARD DRAWINGS AND INSTALLED AS PER ODOT ITEM 611.

WHERE THE SANITARY SEWER CROSSES UNDER A PROPOSED STORM SEWER, THE TRENCH SHALL BE BACKFILLED TO THE BOTTOM OF THE PROPOSED STORM SEWER WITH COMPACTED GRANULAR MATERIAL MEETING ODOT ITEM 304, TEN (10) FEET CENTERED ON THE STORM SEWER. THE COST OF THIS WORK IS TO BE INCLUDED IN THE PRICE BID FOR THE VARIOUS SEWER ITEMS. .

WHERE THE SANITARY SEWER CROSSES A PROPOSED STREET OR ROAD, THE TRENCH BACKFILL SHALL BE BEDDING MATERIAL FROM THE BOTTOM OF THE TRENCH TO A PLANE SIX (6) INCHES ABOVE THE PIPE; FROM THAT POINT TO A PLANE SIX (6) INCHES BELOW THE SUBGRADE, LOW STRENGTH MORTAR BACKFILL (ODOT 613) SHALL BE INSTALLED. AT THE DISCRETION OF THE COUNTY, AGGREGATE BASE (ODOT 304) MAY BE USED ABOVE THE PIPE. THE LIMITS OF PLACEMENT SHALL BE FROM THE RIGHT-OF-WAY LINE TO THE RIGHT-OF-WAY LINE.

ALL OTHER SANITARY SEWER TRENCH BACKFILL SHALL BE COMPACTED GRANULAR MATERIAL (#57 LIMESTONE), UNLESS OTHERWISE NOTED ON THE PLANS. THE COST OF BACKFILL IS TO BE INCLUDED IN THE PRICE BID FOR THE VARIOUS SEWER ITEMS.

GREEN METALLIC FIELD LOCATOR TAPE OF SIX (6) INCH WIDTH SHALL BE PLACED OVER ALL SANITARY SEWER AND FORCE MAIN LINES, WITHIN 12 TO 18 INCHES OF FINISHED GRADE. TEN (10) GAUGE SOLID TRACER WIRE SHALL ALSO BE INSTALLED ON ALL SANITARY FORCE MAINS.

CLEANING AND INSPECTION: ALL SANITARY SEWERS SHALL BE CLEANED AND VIDEO INSPECTED AFTER ALL OTHER UTILITIES LOCATED WITHIN THE RIGHT-OF-WAY ARE INSTALLED. THE COUNTY SHALL RECEIVE ONE (1) COPY OF THE INSPECTION REPORT IN PDF FORMAT AND ONE (1) COPY OF THE INSPECTION VIDEO ON A USB PRIOR TO THE FINAL ACCEPTANCE.

**DEWATERING:** THE COST OF ANY DEWATERING OPERATIONS REQUIRED FOR THE CONSTRUCTION OF THE SANITARY SEWER SHALL BE INCLUDED IN THE PRICE BID FOR THE VARIOUS SEWER ITEMS.

THE COST OF ANY ROCK EXCAVATION SHALL BE INCLUDED IN THE PRICE BID FOR THE SANITARY SEWER. THE BIDDER SHALL DETERMINE IF ANY ROCK EXCAVATION WILL BE REQUIRED AND ADJUST HIS BIDS ACCORDINGLY.

ALL LABOR, MATERIAL, TOOLS, EQUIPMENT AND INCIDENTALS NECESSARY FOR EACH ITEM; FURNISHED, INSTALLED IN PLACE, JOINTING MADE, BEDDING, BACKFILL, PAVEMENT REPLACEMENT AND/OR REPAIR, AND TESTING SHALL BE INCLUDED IN THE UNIT BID PRICE FOR PIPE.

RETION NO. NERAL ш 5 

OB NUMBER: **ZAN012** 

### **WATER NOTES**

OPERATION OF IN SERVICE VALVES SHALL BE BY MUSKINGUM COUNTY WATER DEPARTMENT PERSONNEL ONLY. A 24 HOUR NOTICE SHALL BE REQUIRED FOR SHUT DOWNS.

ALL WATER LINES SHALL BE INSTALLED WITH AT LEAST 10 FEET HORIZONTAL SEPARATION FROM SANITARY SEWER AND STORM SEWER LINES. WHENEVER A WATER LINE AND SEWER MUST CROSS, THE SEWER MAIN (STORM OR SANITARY) SHALL BE LAID SUCH THAT THE CROWN OF THE SEWER IS AT LEAST 18 INCHES BELOW THE INVERT OF THE WATER LINE MEASURED BETWEEN THE OUTSIDE PIPE WALLS. IN CASES WHERE THE REQUIRED SEPARATION CANNOT BE MAINTAINED, CLOSER INSTALLATION MAY BE PERMITTED ON A CASE—BY—CASE BASIS ONLY AFTER RECEIPT OF WRITTEN CONCURRENCE FROM THE OHIO EPA DIVISION OF DRINKING WATER. 2003 RECOMMENDED STANDARDS FOR WATER WORKS, SECTIONS 8.8.2 AND 8.8.3 SHALL GOVERN AS TO THE SEPARATION OF WATER LINE FROM CONTAMINATION SOURCES.

ALL WATER MAIN MATERIALS MUST MEET AWWA SPECIFICATIONS AND A STATEMENT OF VERIFICATION MUST BE FURNISHED TO MUSKINGUM COUNTY.

ALL BENDS, JOINTS, DEFLECTIONS AND FITTINGS SHALL BE APPROPRIATELY BLOCKED WITH CONCRETE, AS PER MUSKINGUM COUNTY AND ODOT SPECIFICATION 638.06.

ALL VALVES SHALL BE APPROPRIATELY BLOCKED WITH CONCRETE, AS PER ODOT SPECIFICATIONS 638.06. THE TOP OF ALL VALVE BOXES SHALL BE ENCASED IN 6" OF CONCRETE.

### WATER LINE PIPE MATERIAL

ALL MAIN LINE PIPE SHALL CARRY THE NATIONAL SANITATION FOUNDATION (NSF) SEAL OF APPROVAL FOR POTABLE WATER APPLICATIONS. PVC SDR SERIES PIPE (NORMALLY LIMITED TO 2"-3") SHALL CONFORM TO ASTM 2241 WITH JOINTS CONFORMING TO ASTM D3139 RATED CLASS 200 OR HIGHER. PVC MUNICIPAL MAINS (4"-12") SHALL CONFORM TO AWWA C-900 WITH BELL AND SPIGOT JOINTS CONFORMING TO ASTM F-477 RATED DR-14. PVC TRANSMISSION PIPE (14"-30") SHALL CONFORM TO AWWA C-905 WITH BELL AND SPIGOT JOINTS CONFORMING TO ASTM F-477 RATED DR 18. ALL HIGH-DENSITY POLYETHYLENE PIPE (HDPE) SHALL CONFORM TO AWWA C906 AND SHALL BE BUTT FUSED JOINTS. UNDER SPECIAL CONDITIONS, WATERLINE PIPE MATERIAL MAY BE DUCTILE IRON PIPE WITH PUSH-ON TYPE JOINTS, CEMENT LINED (AWWA C-104) AND SHALL MEET THE REQUIREMENTS OF AWWA C-150 AND AWWA C-151 WHERE APPROVED BY MUSKINGUM COUNTY.

### TRACER WIRE AND WARNING TAPE

INSULATED, SOLID, COPPER CONDUCTOR, 12 GAGE TRACER WIRE SHALL BE BURIED WITH ALL PVC AND HPDE WATER MAINS AND SERVICES LOCATED DIRECTLY ON TOP OF ABOVE THE PIPE. TRACER WIRE WILL BE TERMINATED OUTSIDE AND EXTENDED OVER THE TOP OF THE VALVE BOXES. ANY CONNECTIONS OF THE TRACER WIRE WILL BE MADE USING DRY—CON CONNECTORS. WARNING TAPE THAT IS THREE INCHES (3") WIDE, CONTINUOUS ALUMINUM FOIL CORE (0.00055 INCHES THICK), DETECTABLE BY INDUCTIVE AND CONDUCTIVE METHOD, AND PIGMENTED ON ONE PRINTED SIDE WITH 1½ INCH LETTERS WILL BE INSTALLED OVER PIPE APPROXIMATELY TWELVE INCHES (12") BELOW FINISH GRADE. FOR WATER MAINS TAPE WILL BE AWWA APPROVED, BLUE IN COLOR, AND IMPRINTED "CAUTION: WATER LINE BURIED BELOW."

### <u>FITTINGS</u>

FOR THREE INCH (3') THROUGH TWENTY-FOUR INCH (24") PIPE ALL FITTINGS SHALL BE CLASS 350 DUCTILE IRON CONFORMING TO THE REQUIREMENTS OF ANSI A21.53/AWWA C153. END CONNECTIONS WILL BE MECHANICAL JOINT TYPE WITH RUBBER GASKETS IN ACCORDANCE WITH ANSI A21.11/AWWA C111. FITTINGS WILL BE COATED INSIDE AND OUTSIDE WITH FUSION-BONDED EPOXY, 6 TO 8 MILS THICKNESS PER AWWA C550 AND AWWA C116. USE OF PVC PRESSURE PIPE FITTINGS IS LIMITED TO PIPE LESS THAN 3 INCH DIAMETER. PVC FITTINGS SHALL BE PUSH-ON TYPE, GASKETED BELL JOINTS, CLASS 200 MANUFACTURED IN ONE PIECE CONFORMING TO ASTM 1784 AND REQUIREMENTS OF SDR 21. HDPE FITTINGS SHALL BE SAME MATERIAL, SIZE, DIMENSION RATIO, AND PRESSURE CLASS AS PIPE MATERIAL. ALL FITTINGS SHALL BE INSTALLED WITH CONCRETE THRUST BLOCKS TO PREVENT MOVEMENT. A RESTRAINER GLAND SYSTEM SHALL BE USED ALONG WITH CONCRETE THRUST BLOCK AT TERMINATION OF THE WATERLINE.

### WATER LINE VALVES

WATER LINE VALVES TWO INCH THROUGH TWELVE INCH (2"-12") SHALL BE RESILIENT WEDGE GATE VALVE (RWGV) AND MEET THE REQUIREMENTS OF AWWA C509 OR C515, LATEST EDITION AS MANUFACTURED BY CLOW OR AMERICAN FLOW CONTROL, SERIES 2500. THE RWGV SHALL HAVE A 250 PSIG WORKING PRESSURE; DUCTILE IRON BODY, BONNET, AND WEDGE; ALL EXPOSED INTERNAL AND EXTERNAL IRON SURFACES TO BE FUSION BONDED EPOXY COATED IN COMPLIANCE WITH AWWA C550. RWGV SHALL HAVE STAINLESS STEEL BONNET BOLTS AND NUTS, NON-RISING BRONZE STEM, AND CONNECTIONS TO SUIT TYPE OF PIPE. THE RWGV SHALL OPEN "LEFT" OR "COUNTER-CLOCKWISE" AND SHALL BE SUPPLIED WITH A TWO INCH (2") SQUARE-BLACK WRENCH NUT. WATER LINE VALVES ON FOURTEEN INCH (14") AND LARGER DIAMETER PIPE WILL BE SPECIFIED BY THE WATER DEPARTMENT.

VALVE MANHOLES WHEN REQUIRED BY WATER DEPARTMENT SHALL BE FOUR FEET (4') DIAMETER PRE—CAST CONCRETE AND DESIGNED FOR AN H-20 LOADING.

VALVE BOXES SHALL BE 5-1/4 INCH I.D., CAST IRON, ADJUSTABLE, SLIP-TYPE BOX FITTED WITH A CAST IRON LID, MODEL 6855, AS MANUFACTURED BY TYLER PIPE, OR APPROVED EQUAL. BOX LID SHALL BE MARKED "W" OR "WATER." VALVE BOXES WILL BE SET TO FINISH GRADE.

### FIRE HYDRANTS

HYDRANTS SHALL BE CLOW MEDALLION 5-1/4" OR AMERICAN DARLING, MODEL B-62-B. FIRE HYDRANTS SHALL COMPLY WITH AWWA C502 LATEST EDITION, AND BE DRY BARREL TYPE, MOISTUREPROOF, "O" RING TYPE, SEALED AUTOMATIC LUBRICANT CHAMBER ENCLOSED OPERATING THREADS, COMPRESSION TYPE, AND OPENING AGAINST LINE PRESSURE. HYDRANTS SHALL HAVE ONE 5 INCH STORZ NOZZLE PUMPER OUTLET; FORGED OR EXTRUDED 6061-T6 ALUMINUM ASSEMBLY WITH BRASS FACE METAL SEAL AND HARD ANODIZED ALUMINUM STORZ RAMPS AND LUGS; HARRINGTON INTEGRAL HYDRANT STORZ - METAL FACE STORZ AS MANUFACTURED BY HARRINGTON, INC. OR EQUAL. THE CAP SHALL BE BLIND TYPE; FORGED OR EXTRUDED 6061-T6 HARD ANODIZED ALUMINUM STORZ RAMPS AND LUGS. CENTER CAP EQUIPPED WITH A SUCTION SEAL; REQUIRING STORZ SPANNER WRENCH FOR REMOVAL; CONNECTED TO NOZZLE ASSEMBLY OR HYDRANT WITH STAINLESS STEEL CHAIN OR 0.125" VINYL-COATED STAINLESS-STEEL CABLE. HYDRANTS SHALL ALSO HAVE TWO 2-1/2 INCH I.D. HOSE NOZZLES WITH STANDARD NATIONAL THREAD. THE CAPS SHALL BE DUCTILE CAST IRON BODY WITH 1-INCH SQUARE NUT, THREADS COMPATIBLE WITH HOSE NOZZLE THREADS; EACH CAP TP BE CONNECTED TO HYDRANT BY SEPARATE CHAIN. THE HYDRANT SHOE SHALL BE SIX-INCH (6") M.J. CONNECTION WITH 5 1/4 INCH INTERNAL VALVE, HYDRANTS SHALL BE "OPEN RING" TYPE. THE VALVE SEAT RING SHALL BE BRONZE WITH BRONZE THREAD ENGAGEMENT. ALL HYDRANTS SHALL BE DRAINABLE INTO PIPE BEDDING MATERIAL CONSISTING OF NO. 8 LIMESTONE GRAVEL POCKET, UNLESS SPECIFIED DIFFERENTLY BY MUSKINGUM COUNTY. ALL HYDRANTS SHALL HAVE TYPE 316 STAINLESS STEEL BOLTS AND NUTS BELOW THE BURY LINE. UNLESS OTHERWISE SPECIFIED, HYDRANTS SHALL BE BURIED A MINIMUM OF FOUR FEET (4') DEEP.

ALL HYDRANTS SHALL BE PAINTED USING ZINC CHROMATE (RUST-OLEUM #1573) PRIMER AND A FINISH COAT OF RUST-OLEUM #1548 SAFETY YELLOW. ANY DAMAGE TO PAINT WILL BE CLEANED WITH A WIRE BRUSH, PRIMED, AND A COMPLETE FINISH COAT APPLIED.

ALL HYDRANT LEADS SHALL CONSIST OF AN ANCHOR COUPLING WITH APPROPRIATE THRUST BLOCKS. AS A MINIMUM THE ANCHOR COUPLING SHALL INCLUDE A TWO FOOT (2') OR LONGER SECTION OF PIPE BETWEEN THE VALVE AND THE HYDRANT. ANY SPACER PIPE REQUIRED BETWEEN THE TEE AND THE VALVE SHALL CONSIST OF ANCHORING PIPE OR RESTRAINED JOINT PIPE. HYDRANT PIPING SHALL INCLUDE SWIVEL FITTINGS.

WATCH VALVES WITH BOX SHALL MEET WATER LINE VALVE REQUIREMENTS.

### DISINFECTION

FLUSHING AND DISINFECTION OF THE WATER MAIN SHALL BE THE RESPONSIBILITY OF THE PARTY CONSTRUCTING SAME AND SHALL BE PERFORMED IN ACCORDANCE WITH THE STANDARD PROCEDURES AND REQUIREMENTS OF THE MUSKINGUM COUNTY WATER DEPARTMENT AT NO COST TO THE COUNTY. DISINFECTION SHALL BE IN ACCORDANCE WITH AWWA C651. THE WATER DEPARTMENT WILL PROVIDE WATER FOR THE INITIAL FLUSHING AND DISINFECTION AT NO COST. ADDITIONAL WATER FOR FLUSHING AND TESTING WILL BE BILLED TO THE CONTRACTOR. THE MAIN LINE VALVE SHALL BE CLOSED AFTER DISINFECTION AND FLUSHING OF ALL LINES.

### TESTING

SAMPLING AND TESTING OF WATER MAINS SHALL BE PERFORMED BY MUSKINGUM COUNTY WATER DEPARTMENT PERSONNEL UTILIZING COUNTY EQUIPMENT AND FACILITIES. THE WATER DEPARTMENT COST OF OBTAINING ALL SAMPLES AND TIME TO PERFORM TESTING WILL BE BORNE BY THE CONTRACTOR. ALL TESTING WILL FOLLOW E.P.A. RULES AND REGULATIONS WHICH CURRENTLY CONSISTS OF TWO CONSECUTIVE SAMPLES, TWENTY—FOUR HOURS APART FOR EVERY 1500 FEET AND/OR TWO SAMPLES PER STREET RUN. NO WATER MAIN SHALL BE ALLOWED INTO SERVICE UNTIL ALL SERVICE CHARGES FOR SAMPLING AND TESTING DUE AND OWED TO THE WATER DEPARTMENT HAVE BEEN PAID AND SATISFACTORY TEST RESULTS ARE BACK TO THE RESPONSIBLE PARTY.

### THRUST BLOCKS

THRUST BLOCKS SHALL BE PROVIDED AT FITTINGS, VALVES OR CHANGES IN DIRECTION OF PIPE OR AS DETERMINED BY THE MUSKINGUM COUNTY WATER DEPARTMENT. THRUST BLOCKING WILL BE AN APPROVED MECHANICAL SYSTEM OF RESTRAINED JOINTS OR CONCRETE THRUST BLOCKING. JOINT RESTRAINT SYSTEMS NORMALLY USED ARE MEGALUG®, FIELD—LOK 350®, SUPER—LOCK®, OR FAST—GRIP®. WHERE MAKING A TIE—IN TO THE EXISTING SYSTEM A COMBINATION OF RESTRAINTS MAY BE REQUIRED. CONCRETE THRUST BLOCKING SHALL CONSIST OF CONCRETE WITH A MINIMUM 28—DAY COMPRESSIVE STRENGTH OF 4,000 PSI AND SHALL BE INSTALLED USING THE DIMENSIONS SHOWN IN THE STANDARD DRAWINGS. THE CONTRACTOR SHALL USE FORMS AND PLASTIC TO ENSURE ALL PIPE FITTING JOINTS AND BOLTS ARE FREE OF CONCRETE.

### CONNECTION TO EXISTING MAINS

CONNECTION OF NEW MAINS TO EXISTING MUSKINGUM COUNTY WATER MAINS SHALL GENERALLY BE MADE WITH TAPPING VALVES AND SLEEVES, UNLESS APPROVAL IS OBTAINED FROM MUSKINGUM COUNTY TO SHUT—OFF THE EXISTING MAIN. THE CONTRACTOR SHALL PERFORM ALL EXCAVATION AND PROVIDE AND INSTALL ALL MATERIALS. TAPPING SLEEVES WILL BE STAINLESS STEEL. TAPPING VALVES WILL MEET ALL REQUIREMENTS OF WATER LINE VALVES.

### **BACKFILL**

ALL BACKFILL FOR WATER LINES AND WATER SERVICES ON THIS PLAN SHALL BE NATIVE MATERIAL, FREE OF ORGANIC MATERIAL AND DEBRIS FOR THE ENTIRE TRENCH DEPTH, UNLESS OTHERWISE NOTED.

 NO.
 PLAN ISSUE/REVISION
 DATE
 DRAWN

 Street<br/>IN 43055<br/>10 344-5451<br/>10.344-8659<br/>LIC.com
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Environment / Energy / Infrastructure

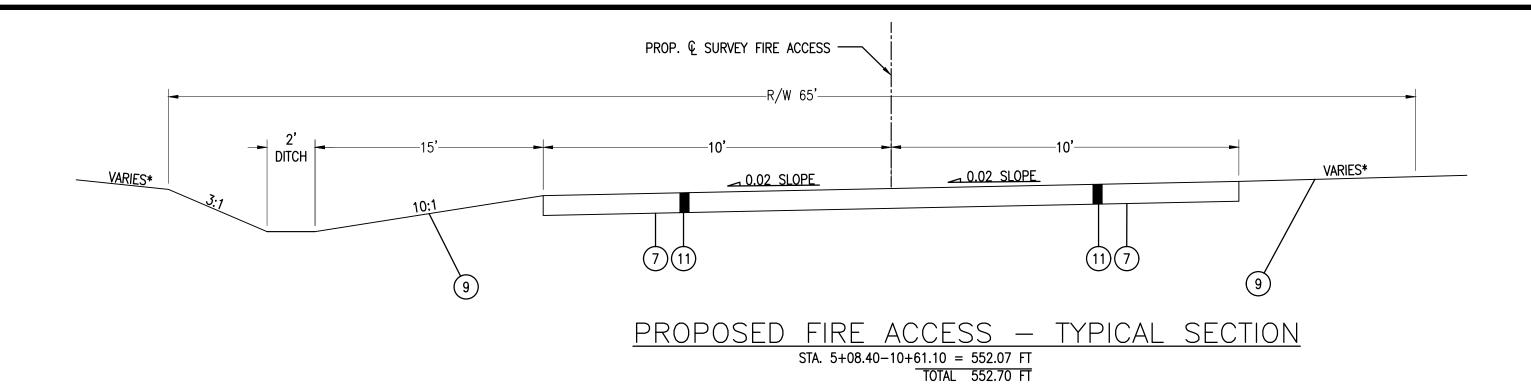
CONSTRUCTION PLANS:

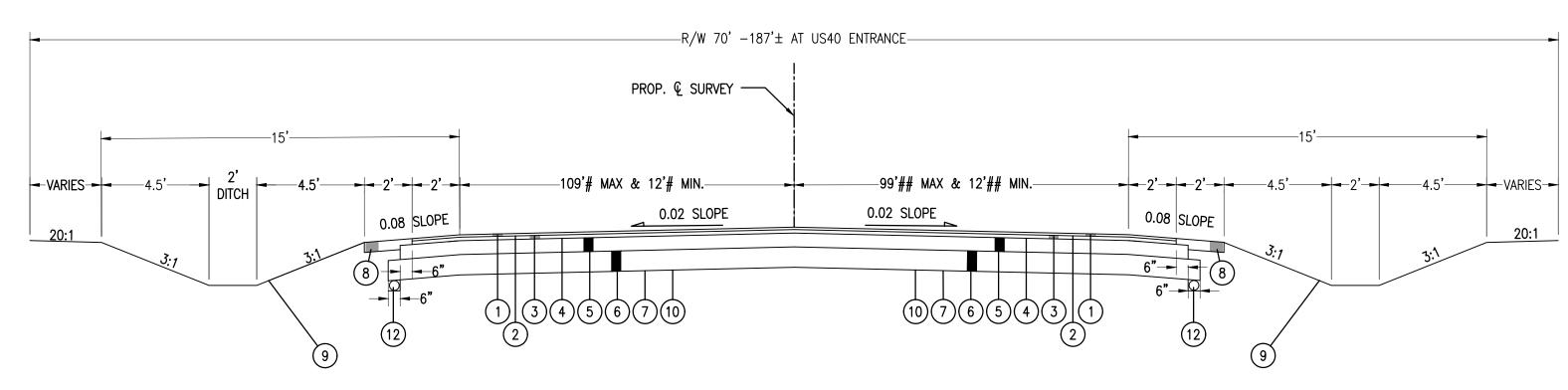
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SVILLE, MUSKINGUM COUNTY, O

GENERAL NOTES

JOB NUMBER: ZAN012





## PROPOSED INDUSTRIAL ROAD — TYPICAL SECTION STA. 16+59.93-49+88.61 = 3,328.68 FT TOTAL 3,328.68 FT

#NOTE:
TAPERS FROM 0.00' @ STA. 16+59.93 TO 12'.0± @ STA. 16+92.43
TAPERS FROM 12.0'± @ STA. 16+92.43 TO 12.0'± @ STA. 43+56.70
TAPERS FROM 12.0'± @ STA. 43+56.70 TO 26.0'± @ STA. 47+57.00
TAPERS FROM 26.0'± @ STA. 47+57.00 TO 26.0'± @ STA. 48+88.21
TAPERS FROM 26.0'± @ STA. 48+88.21 TO 109.0'± @ STA. 49+80.33

##NOTE:

TAPERS FROM 0.00' @ STA. 16+59.93 TO 88.0'± @ STA. 16+92.43

TAPERS FROM 88.0'± @ STA. 16+92.43 TO 12.0'± @ STA. 18+22.91

TAPERS FROM 12.0'± @ STA. 18+22.91 TO 12.0'± @ STA. 34+81.40

TAPERS FROM 12.0'± @ STA. 34+81.40 TO 18.2'± @ STA. 37+45.16

TAPERS FROM 18.2'± @ STA. 37+45.16 TO 12.0'± @ STA. 40+08.92

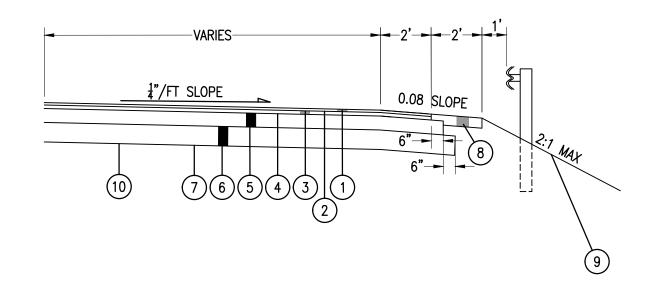
TAPERS FROM 12.0'± @ STA. 40+08.92 TO 12.0'± @ STA. 44+16.85

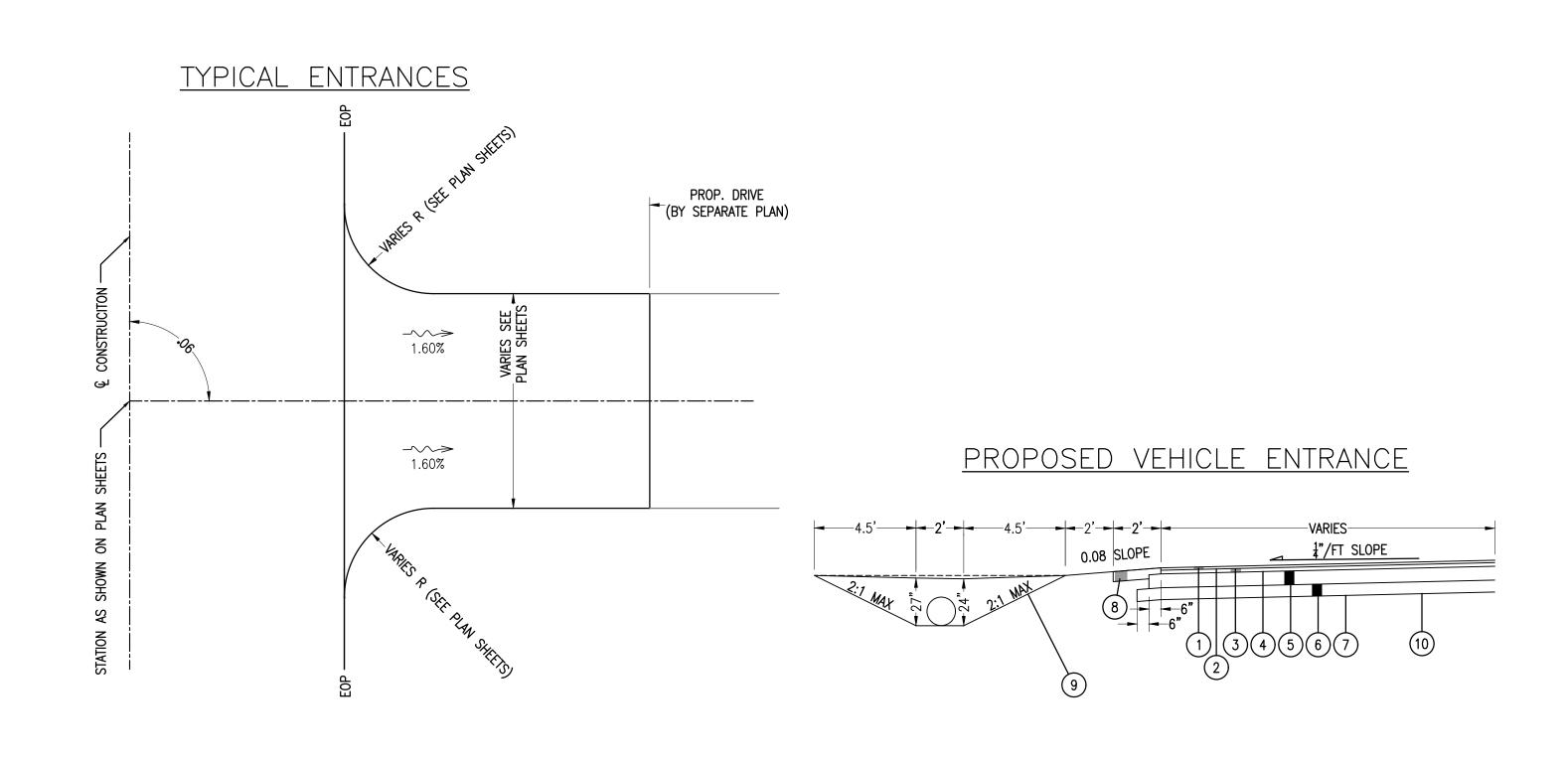
TAPERS FROM 12.0'± @ STA. 44+16.85 TO 26.0'± @ STA. 46+39.18

TAPERS FROM 26.0'± @ STA. 46+39.18 TO 26.0'± @ STA. 49+07.91

TAPERS FROM 26.0'± @ STA. 49+07.91 TO 99.0'± @ STA. 49+88.61

### PROPOSED GUARDRAIL TYPICAL





1) ITEM 441 - 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE 1, (448), PG70-22M

2 ITEM 407 - TACK COAT @ 0.05 GAL/SY

3 ITEM 441 - 2.5" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 2, (448), PG70-22M

(4) ITEM 407 - TACK COAT @ 0.075 GAL/SY

5 ITEM 301 - 5" ASPHALT CONCRETE BASE, PG64-22

6 ITEM 304 - 9" AGGREGATE BASE

7 ITEM 204 - SUBGRADE COMPACTION

8 ITEM 617 – 5" COMPACTED AGGREGATE
9 ITEM 659 – SEEDING & MULCHING, TYPE 2

10) ITEM 204 - PROOF ROLLING

(11) ITEM 304 – 12" AGGREGATE BASE

(12) ITEM 605 - 6" BASE PIPE UNDERDRAIN (ALTERNATE 1)

O. PLAN ISSUE/REVISION DATE

Hull & Associates, 59 Grant Street Newark, 0H 43055 Phone: (740) 344-865 Fax: (740) 344-866 www.hullinc.com

INDUSTRUCTION PLANS:
INDUSTRIAL DRIVE
ZANESVILLE, MUSKINGUM COUNTY, OHIO
TYPICAL SECTION

JOB NUMBER:
ZAN012

Line No.	Item	Description	Qty	Unit
		EARTHWORK		
1	201	CLEARING AND GRUBBING	LUMP	SUM
2	202	GUARDRAIL REMOVAL	276	LINET
3	202	ASPHALT PAVEMNT REMOVAL	80	SY
4	203	EXCAVATION, AS PER PLAN	LUMP	SUM
5	203	EMBANKMENT, AS PER PLAN	LUMP	SUM
6	203	EXCAVATION, AS DIRECTED BY ENGINEER	50	CY
7	203	EMBANKMENT, AS DIRECTED BY ENGINEER	50	CY
8	204	SUBGRADE COMPACTION	13,939	5Q YD
9	204	PROOF ROLLING	17	HOUR
10	255	FULL DEPTH PAVEMENT SAWING	280	LINE
		EROSION CONTROL		
11	601	ROCK CHANNEL PROTECTION, TYPE C WITH FILTER	110	CU YD
12	601	CRUSHED AGGREGATE SLOPE PROTECTION	900	5Q YD
13	659	SEEDING AND MULCHING, CLASS 2	37,240	5Q YD
14	659	REPAIR SEEDING AND MULCHING	1,862	5Q YD
15	659	WATER	202	M GAL
16	659	COMMERCIAL FERTILIZER	6	TON
17	659	LIME	7.7	ACRE
18	670	SLOPE EROSION PROTECTION	750.0	5Q YD
19	832	EROSION CONTROL, AS PER PLAN	LUMP	SUM
		DRAINAGE		
20		CONCRETE MASONRY, AS PER PLAN (FULL HEIGHT HEADWALLS)	25	CU YD
21		CONCRETE MASONRY, AS PER PLAN (HALF HEIGHT HEADWALLS)	2	CU YD
22		12" CONDUIT, TYPE B	129	LINFT
23		18" CONDUIT, TYPE B	176	LIN FT
24		36" CONDUIT, TYPE B	174	LIN FT
25		60" CONDUIT, TYPE B	140	LIN FT
26		CATCH BASIN, NO. 2-3	4	EACH
27		CATCH BASIN, NO. 2-4	1	EACH
28	611	CATCH BASIN, NO. 2-4, AS PER PLAN (OUTLET STRUCTURE)	2	EACH
29	301	ASPHALT CONCRETE BASE, PG64-22	1.883	CU YD
30		AGGREGATE BASE	3,908	CU YD
31		NON-TRACKING TACK COAT	1,647	GAL
32		ASPHALT CONCRETE SURFACE COURSE, TYPE 1 (448), PG 70-22M	589	CUYD
33		ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 2, (448), PG70-22M	922	CUYD
34		COMPACTED AGGREGATE, 5"	209	CU YD
35		GUARDRAIL, TYPE MGS	150	LINFT
36		GUARDRAIL, TYPE MGS HALF POST SPACING	625	LIN FT
37		ANCHOR ASSEMBLY, MGS TYPE T	2	EACH

		Description	Qty	Uni
		MAINTENANCE OF TRAFFIC		
38	614	MAINTAINING TRAFFIC	LUMP	SUI
20	621	SIGNAGE & STRIPING RPM	90	EAC
39				
40		RPM REFLECTOR	90	EA
41		REMOVAL OF GROUND MOUNTED SIGN AND DISPOSAL	1	EA
42	630	GROUND MOUNTED SUPPORTED, NO. 3 POST	280	LIN
43	630	SIGN, FLAT SHEET	97	50
44	644	STOP LINE	36	LIN
45	644	EDGE LINE, 4"	1.30	М
46	644	CENTER LINE	0.63	М
47	644	CHANNELIZING LINE, 8"	223	LIN
48	644	TRANSVERSE/DIAGONAL LINE	326	LIN
49	644	LANE ARROW	4	EA
50	SPEC	FIRE LANE POST, AS PER PLAN	4	EA
		WATER MAIN WORK		
51	638 12" WATERMAIN PVC PIPE & FITTINGS, AWWA C900, DR18		2,918	LIN
52	638 8" WATERMAIN PVC PIPE & FITTINGS, AWWA C900, DR18		299	LIN
53	638	8" GATE VALVE WITH ACCESSORIES		EA
54	638	638 12" GATE VALVE WITH ACCESSORIES		EA
55	638	i38 FIRE HYDRANT, TYPE A		EA
56	638	18"X12" TAPPING SLEEVE & VALVE	1	EA
57	638	PLUG & THRUST BLOCK	6	EA
		SANITARY SEWER WORK		
58	611	12" CONDUIT, TYPE B, AS PER PLAN	2638	LIN
59		8" CONDUIT, TYPE B, AS PER PLAN	192	LIN
60		MANHOLE, NO. 3	10	EA
61		8" SANITARY FORCEMAIN PVC PIPE & FITTINGS, AWWA C900 DR18	2,774	LIN
62		VIA DIRECTIONAL BORE 8" SANITARY FORCEMAIN PVC PIPE & FITTINGS, AWWA C900 RJ DR18	254	LIN
		8" PLUG VALVE, COMPLETE FURNISH AND INSTALL PER PLAN	2	EA
		8" SWING CHECK VALVE, COMPLETE FURNISH AND INSTALL PER PLAN	2	EA
		·		
		AUTO AIR VALVE, COMPLETE FURNISH AND INSTALL PER PLAN	3	EA SU
66	SPEC	LIFT STATION AND SITE, COMPLETE	LUMP	50
ı		INCIDENTALS		
67	SPEC	PERFORMANCE BOND	LUMP	SU
68		MOBILIZATION	LUMP	50

Line No.	Item	Description	Qty	Unit
ALTERNATE #1 - UNDERDRAINS				
1	605	6" BASE PIPE UNDERDRAINS	6,840	LINFT
2	611	PRECAST REINFORCED CONCRETE OUTLET	10	EACH

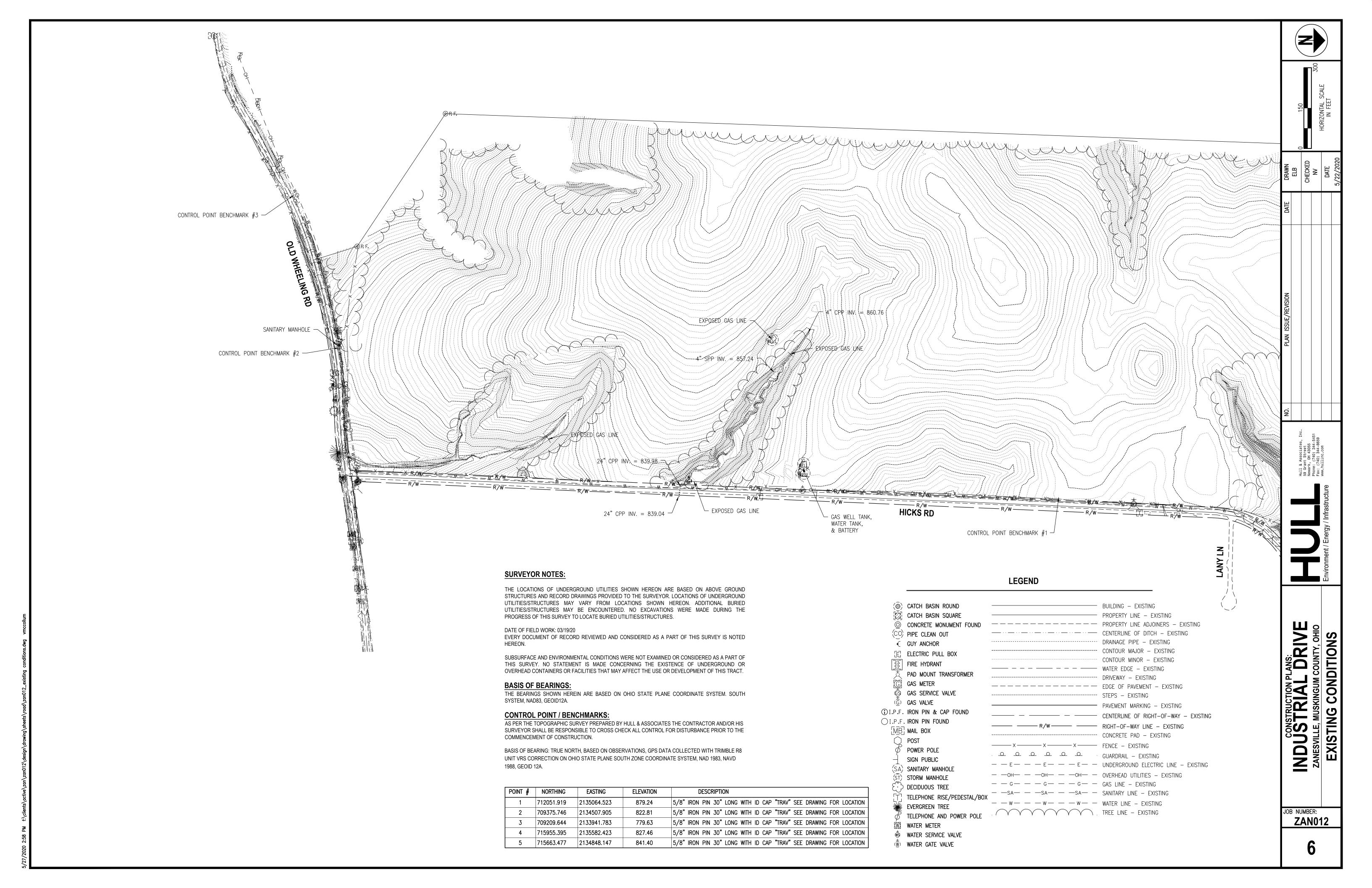
	Line No.	Item	Description	Qty	Unit
-	ALTERNATE #2 - OFF ROADWAY GRADING				
-	1	1 203 EXCAVATION, AS PER PLAN			
7	2	2 203 EMBANKMENT, AS PER PLAN			
	ALTERNATE #2 - EROSION CONTROL				
	3	659 SEEDING AND MULCHING, CLASS 2		65,700	SQYD
	4	4 659 REPAIR SEEDING AND MULCHING 3,28		3,285	SQYD
	5	5 659 WATER		355	MGAL
	6	659	COMMERCIAL FERTILIZER	9	TON
	7	659	LIME	13.6	ACRE
	8	832	EROSION CONTROL, AS PER PLAN	LUMP	SUM

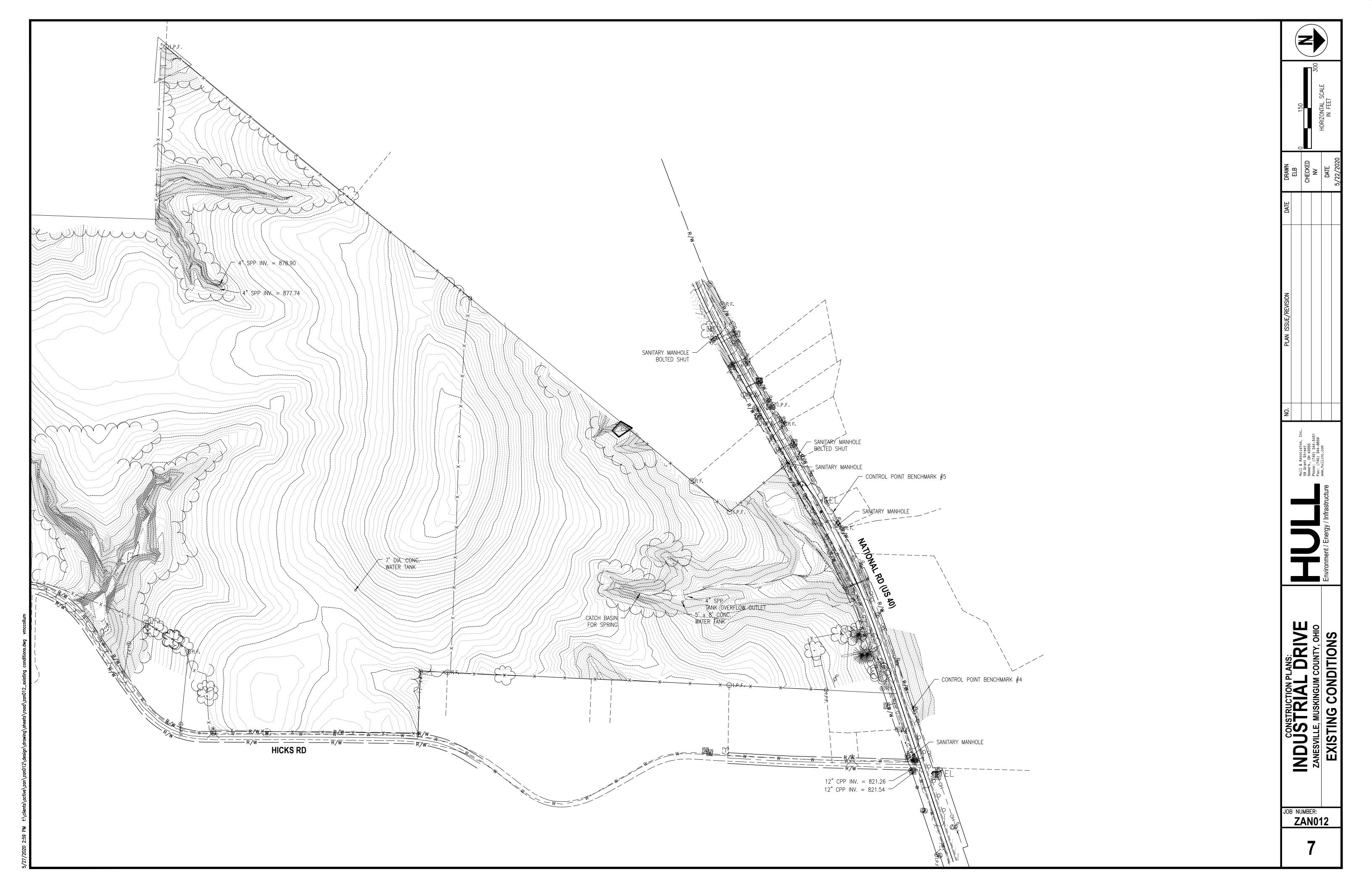
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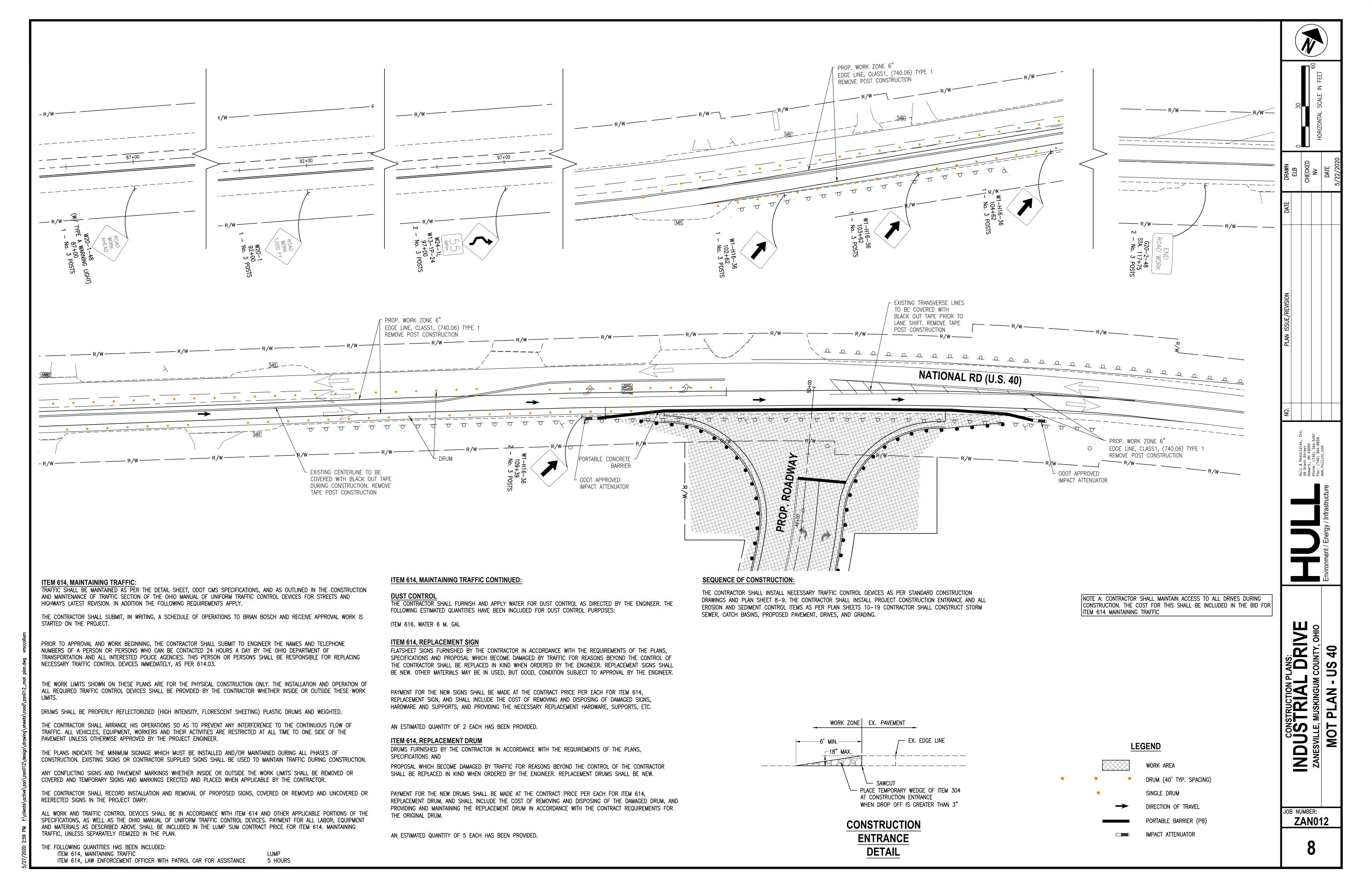
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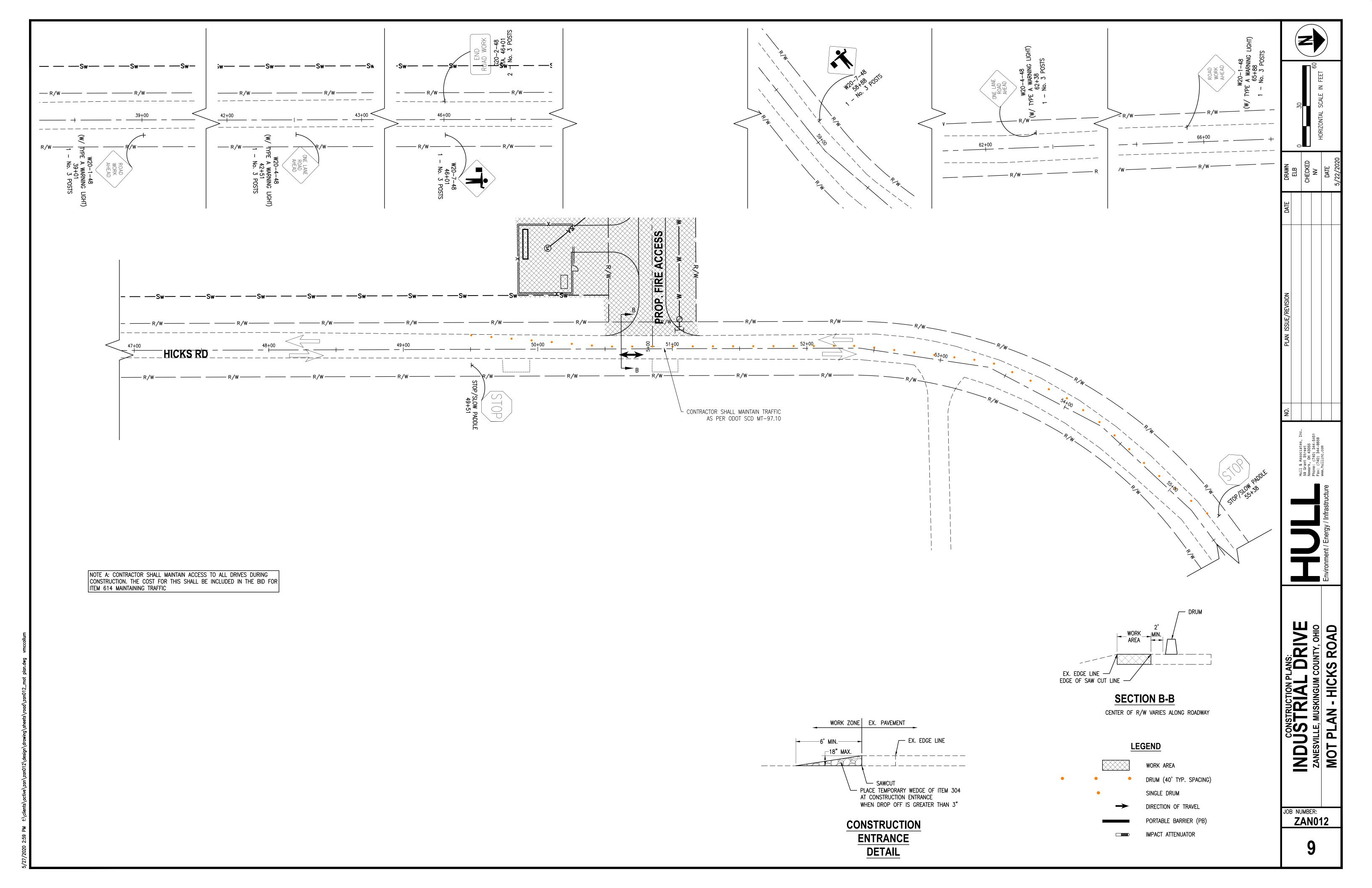
INDUSTRUCTION PLANS:
INDUSTRIAL DRIVE
ZANESVILLE, MUSKINGUM COUNTY, OHIO
QUANTITIES

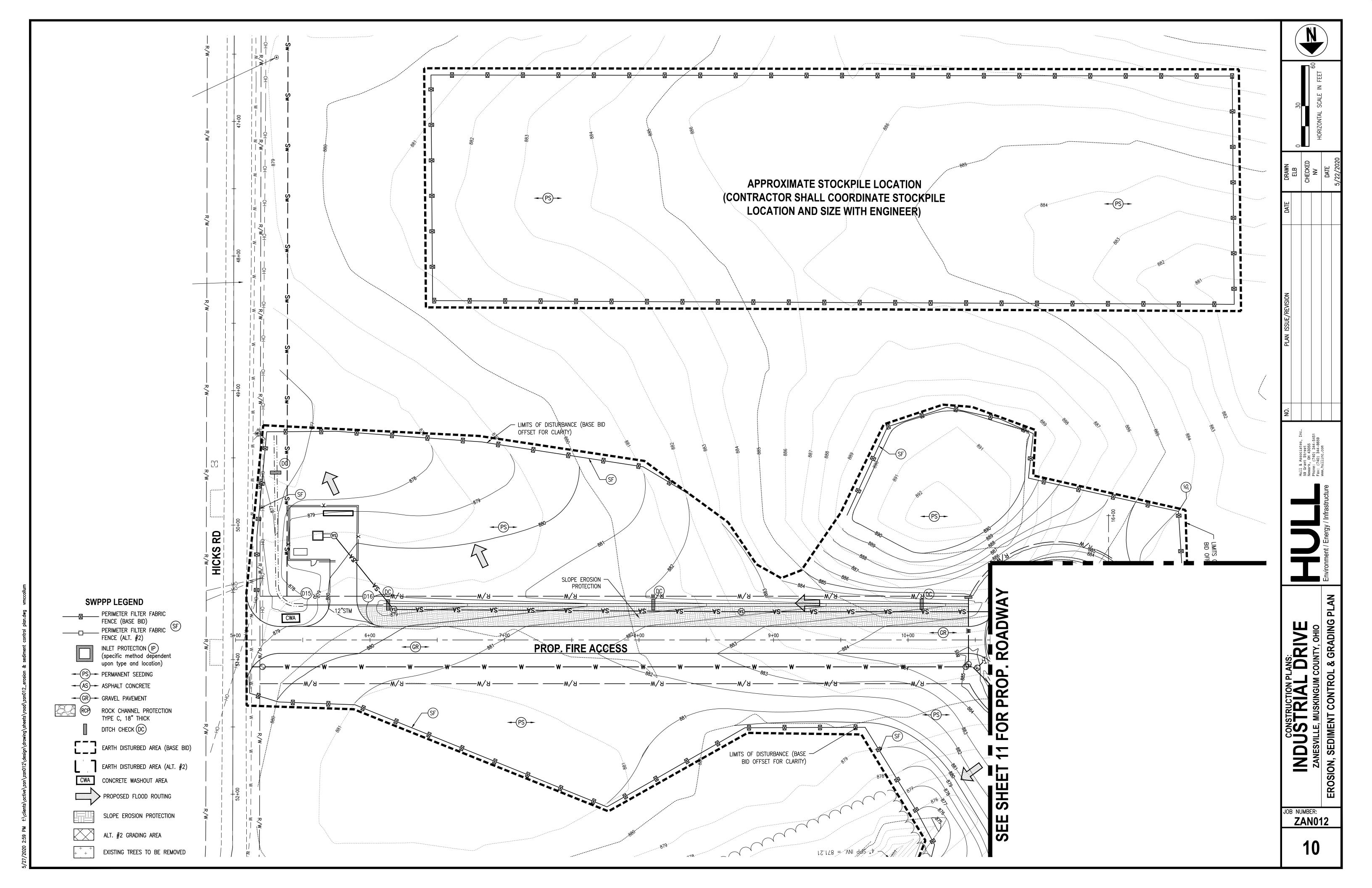
JOB NUMBER: ZAN012

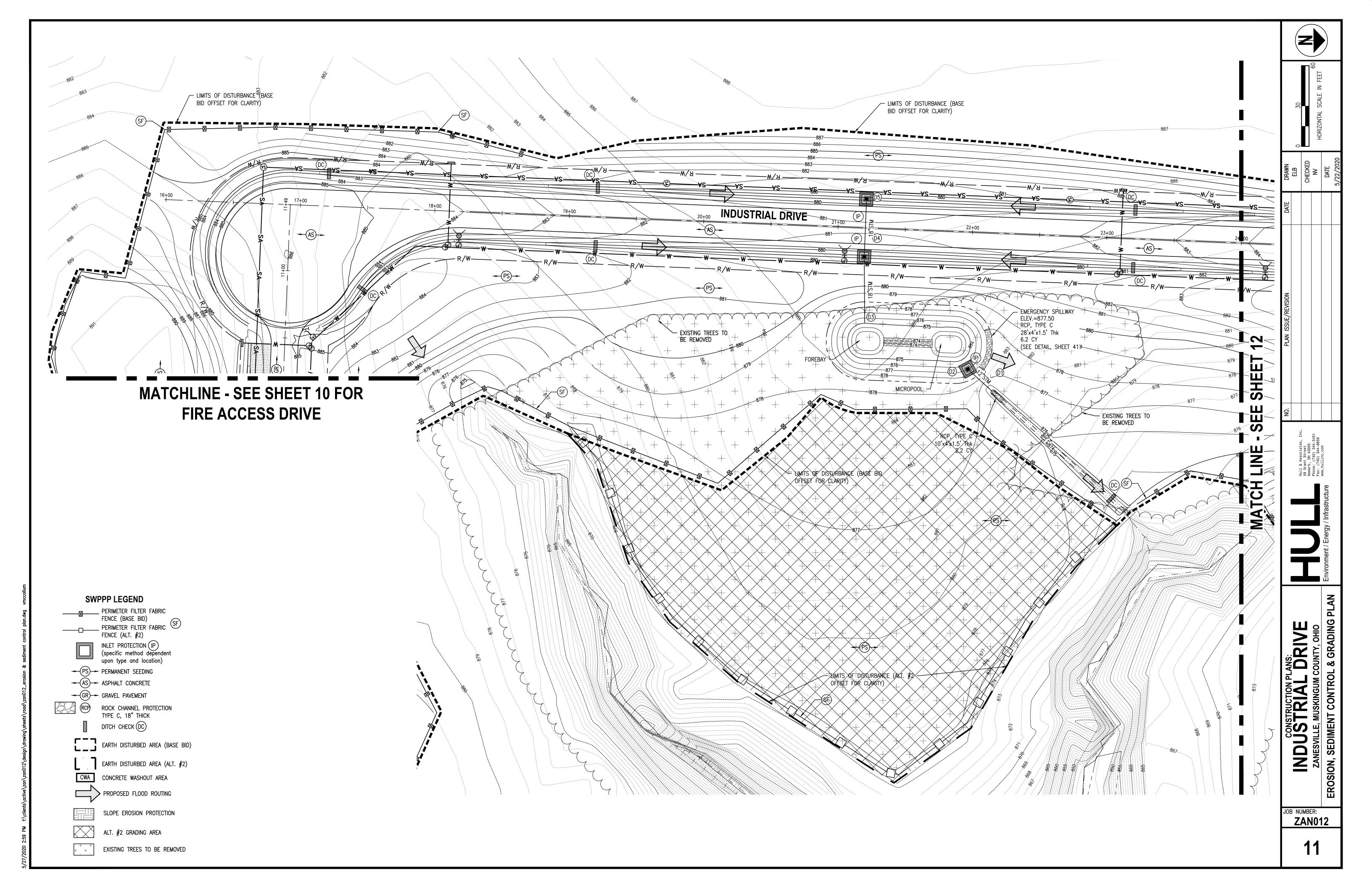


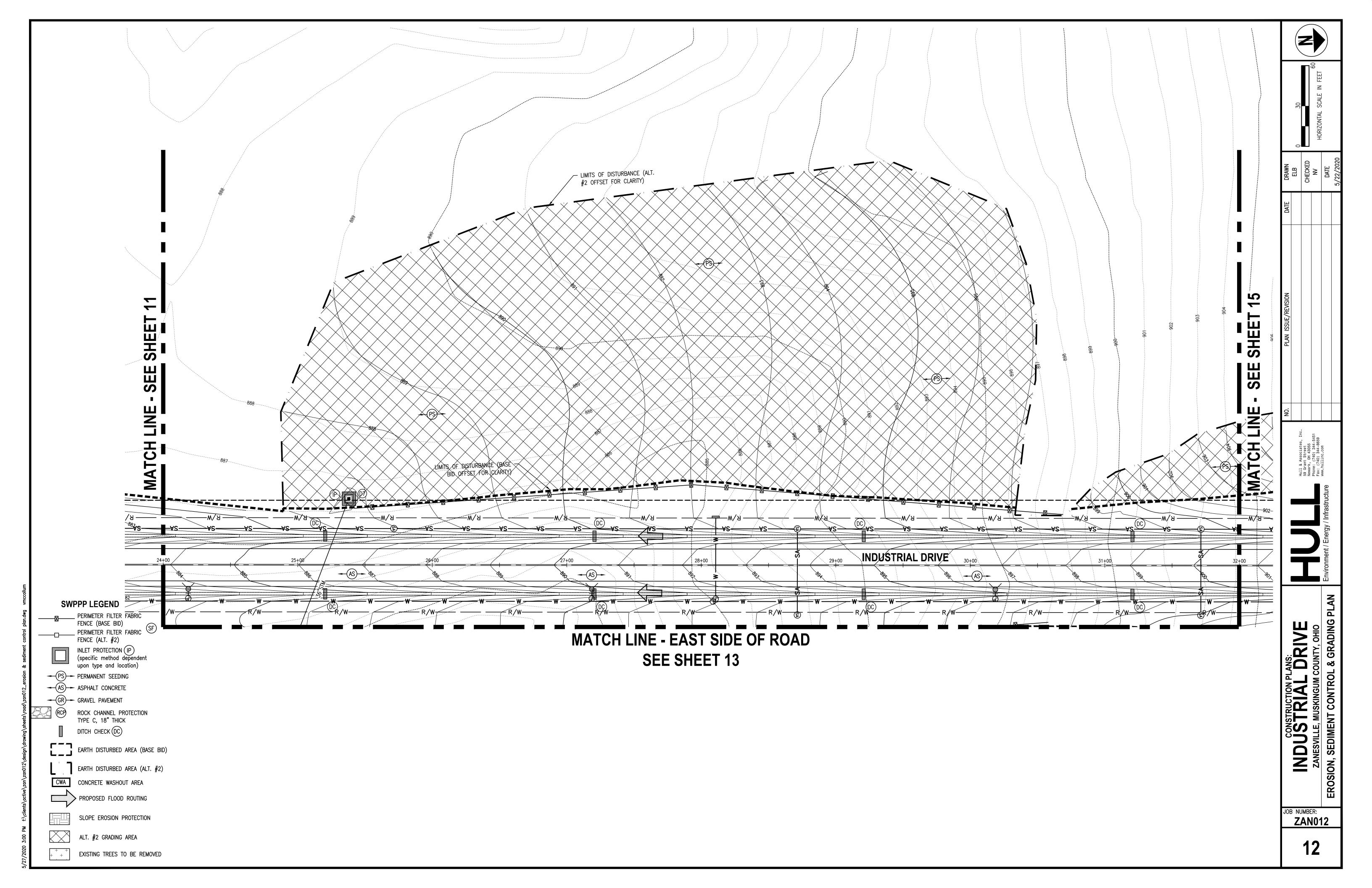


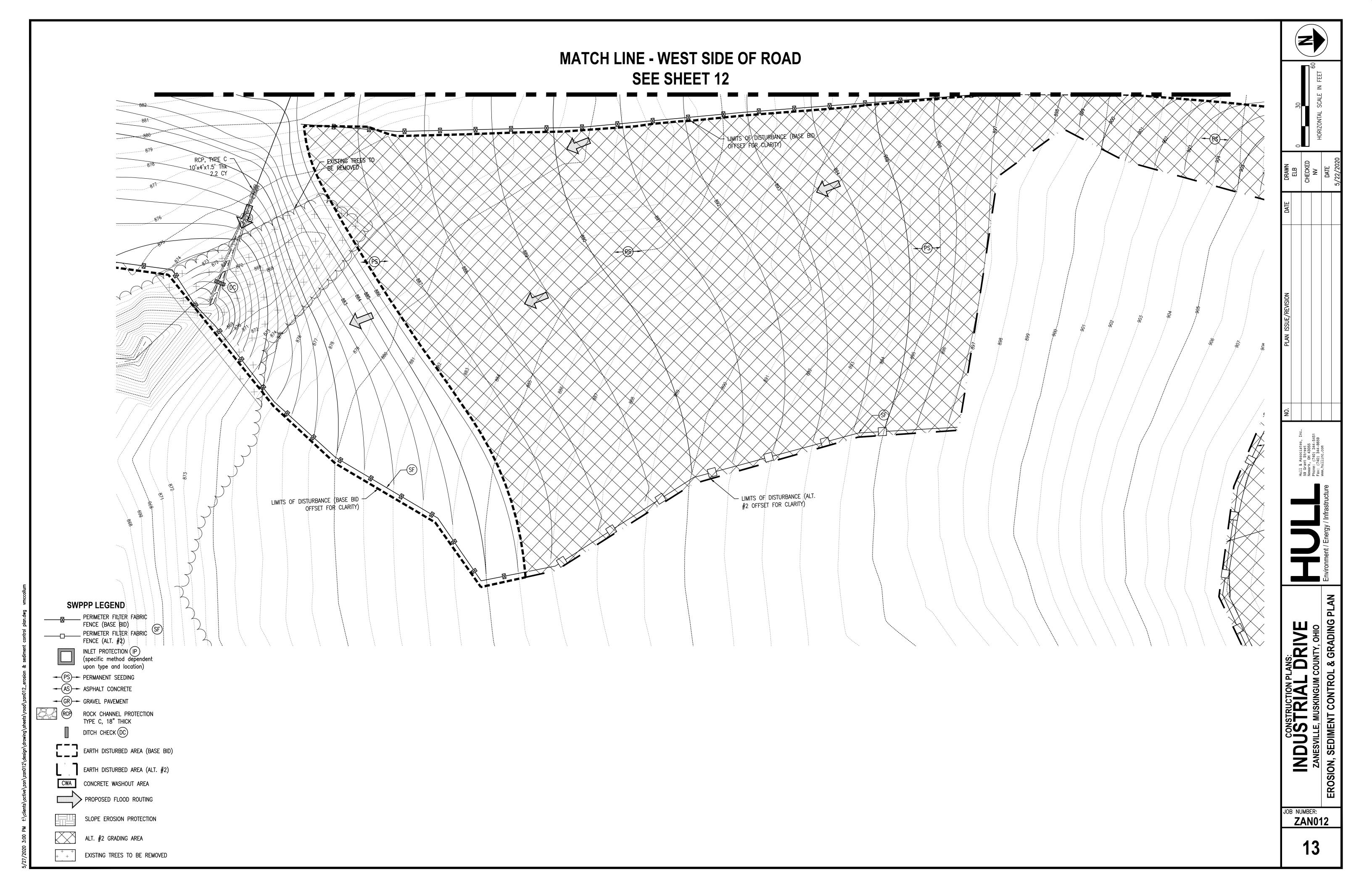


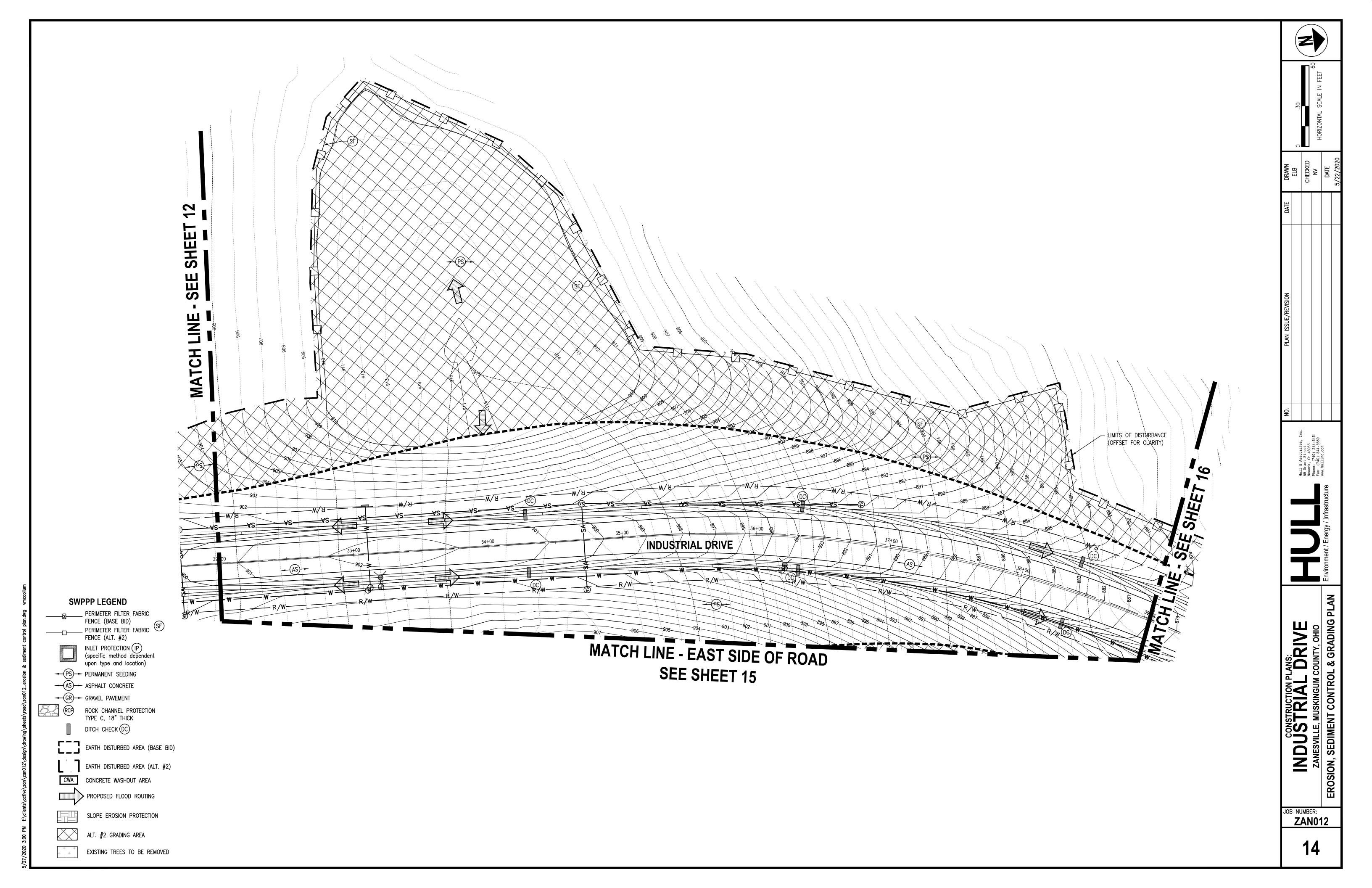


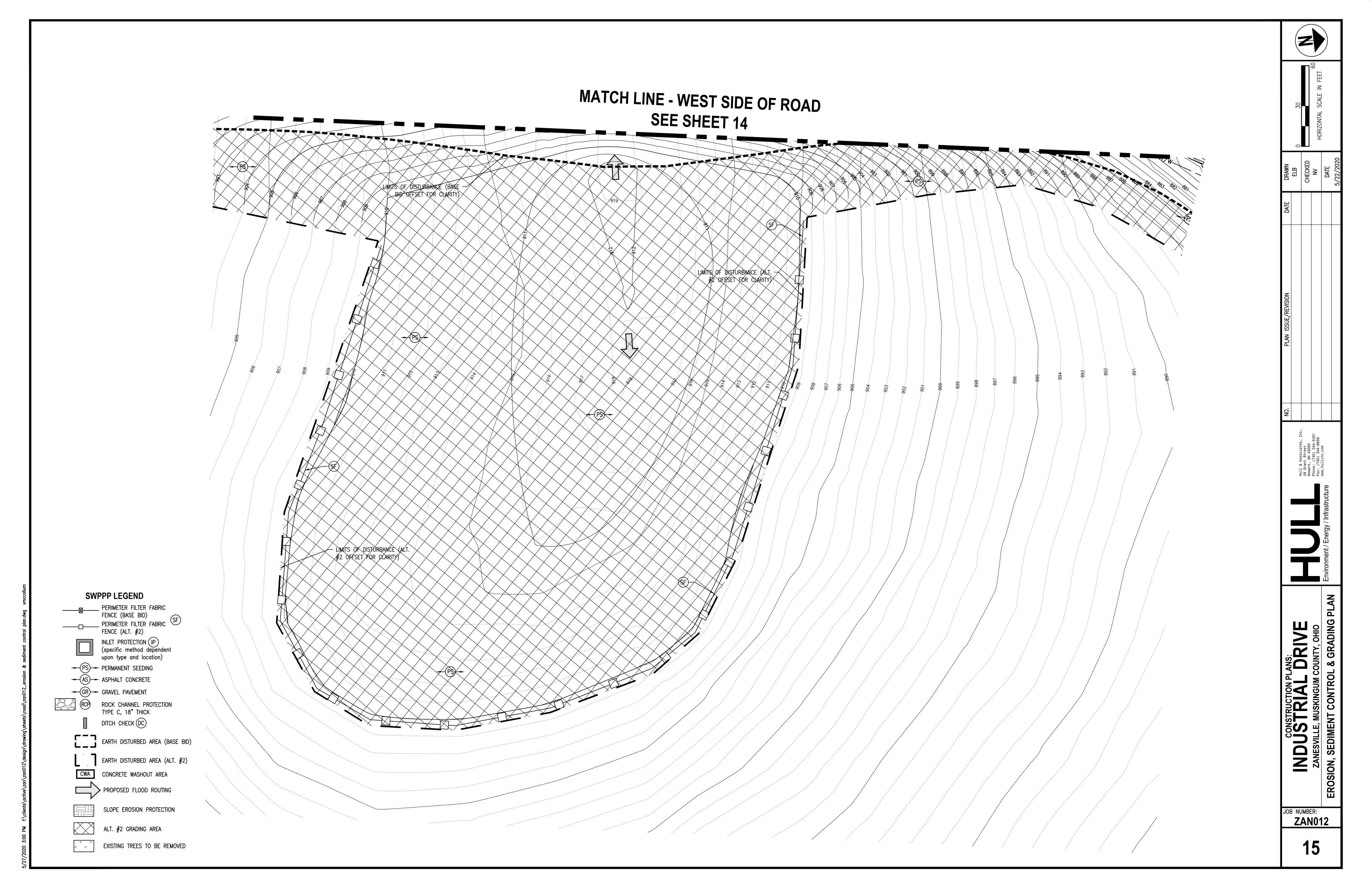


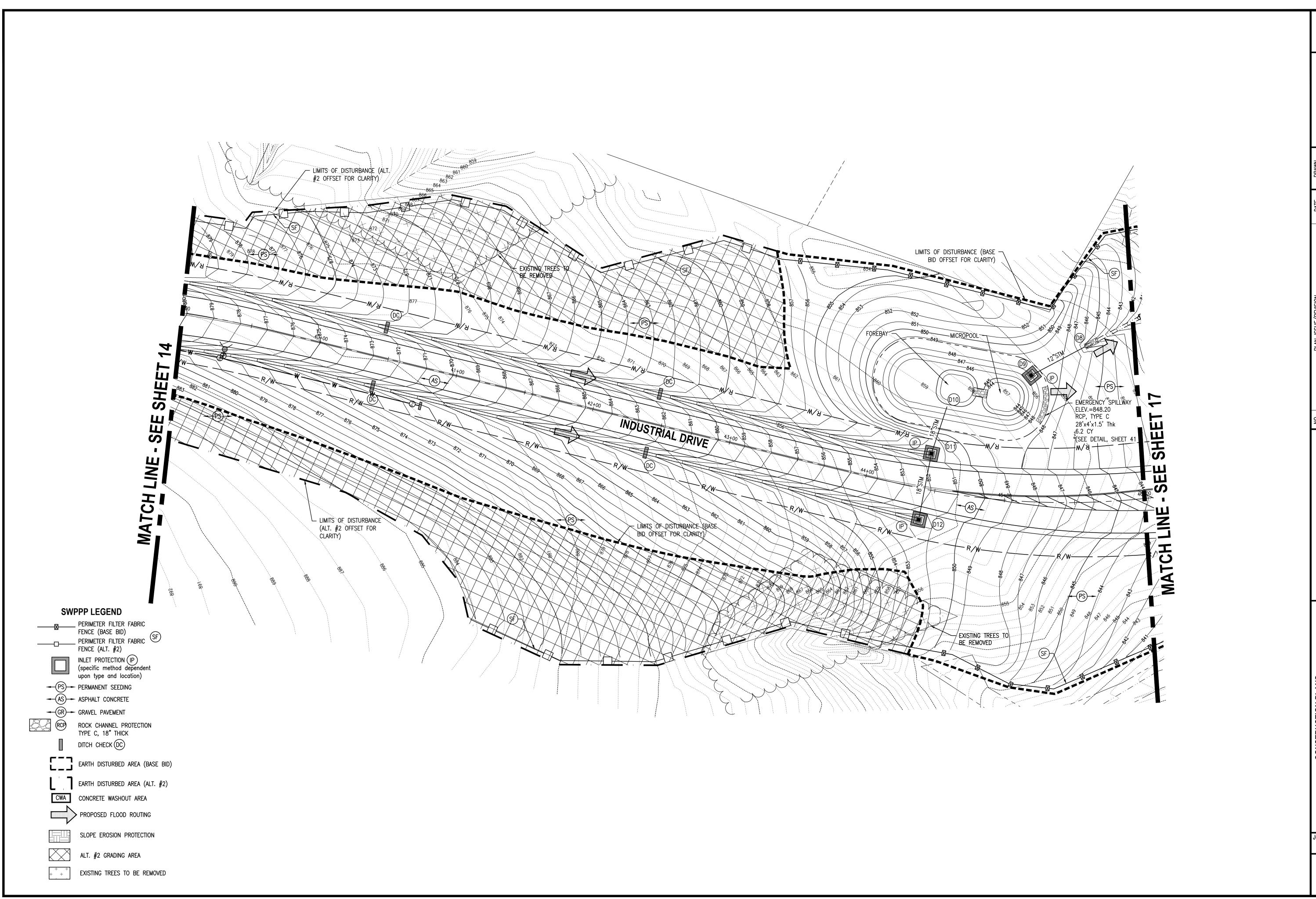












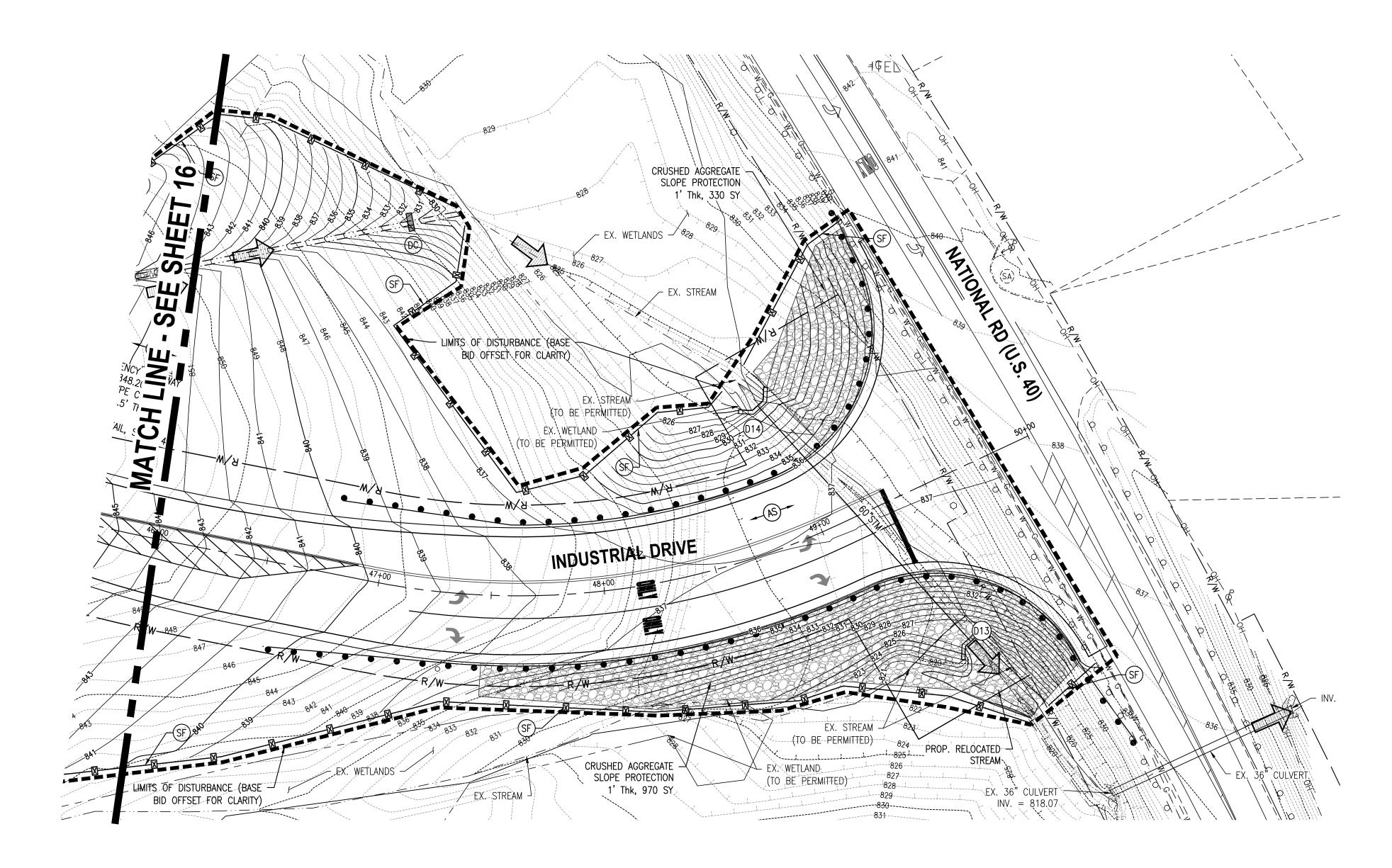
CONSTRUCTION PLANS:

INDUSTRIAL DRIVE

ZANESVILLE, MUSKINGUM COUNTY, OHIO

EROSION, SEDIMENT CONTROL & GRADING PLAN

JOB NUMBER: **ZAN012** 



SWPPP LEGEND

PS PERMANENT SEEDING

AS ASPHALT CONCRETE

ROCK CHANNEL PROTECTION TYPE C, 18" THICK

DITCH CHECK (DC)

CWA CONCRETE WASHOUT AREA

PROPOSED FLOOD ROUTING

EARTH DISTURBED AREA (BASE BID)

EARTH DISTURBED AREA (ALT. #2)

SLOPE EROSION PROTECTION

EXISTING TREES TO BE REMOVED

ALT. #2 GRADING AREA

GR GRAVEL PAVEMENT

PERIMETER FILTER FABRIC FENCE (BASE BID)

PERIMETER FILTER FABRIC SF
FENCE (ALT. #2)

INLET PROTECTION (IP)
(specific method dependent upon type and location)

	0 30		HORIZONTAL SCALF IN FF		
DRAWN	ELB	CHECKED	N	DATE	5/22/2020
DATE					
PLAN ISSUE/REVISION					
NO.					

CONSTRUCTION PLANS:

INDUSTRIAL DRIVE

ZANESVILLE, MUSKINGUM COUNTY, OHIO

EROSION, SEDIMENT CONTROL & GRADING PLAN

JOB NUMBER: **ZAN012** 

**DEVELOPER:** 

ZANESVILLE MUSKINGUM COUNTY PORT AUTHORITY 205 NORTH FIFTH STREET ZANESVILLE, OH 43701 P- 740-455-0742

CONTACT: MATT ABBOTT

### PROJECT DESCRIPTION

THE PROPOSED PROJECT IS APPROXIMATELY 30 ACRES AND IS LOCATED BETWEEN NATIONAL RD, HICKS RD. AND OLD WHEELING RD. IN ZANESVILLE, OHIO. THE PROJECT WILL INCLUDE THE CONSTRUCTION OF INDUSTRIAL DRIVE, DETENTION BASINS, STORM SEWER, GRAVITY AND FORCEMAIN SANITARY SEWER, WATER MAIN AND MASS GRADING.

### **RECEIVING STREAM:**

THE PROJECT DISCHARGES TO MULTIPLE UNNAMED STREAMS AND DITCHES ONSITE. WHICH ARE ULTIMATELY TRIBUTARY TO BOGGS CREEK AND SALT CREEK.

### **ADJACENT AREAS:**

THE PROPERTY IS BORDERED TO THE NORTH BY NATIONAL ROAD, TO THE EAST BY HICKS ROAD. TO THE SOUTH BY OLD WHEELING ROAD. AND TO THE WEST BY WOODLANDS.

### PROJECT DATA:

TOTAL AREA	10.05 AC.
PRE-CONSTRUCTION IMPERVIOUS AREA	0.00 AC.
PRE-CONSTRUCTION IMPERVIOUS AREA (%)	0.00%
POST CONSTRUCTION IMPERVIOUS AREA	2.29 AC.
POST CONSTRUCTION IMPERVIOUS AREA (%)	22.79 %
PRE-CONSTRUCTION RUNOFF COEFFICIENT	83.00
POST CONSTRUCTION RUNOFF COEFFICIENT	78.95
PROJECT EARTH DISTURBED AREA	30.0 AC.
ESTIMATED CONTRACTOR EARTH DISTURBED AREA	30.0 AC.
NOTICE OF INTENT EARTH DISTURBED AREA	30.0 AC

### **SOILS:** THE FOLLOWING SOILS ARE PRESENT ONSITE:

AaB - AARON SILT LOAM, 2 TO 8 PERCENT SLOPES AaC2 - AARON SILT LOAM, 8 TO 15 PERCENT SLOPES, ERODED AfC2 - ALFORD SILT LOAM, 8 TO 15 PERCENT SLOPES, ERODED CsC2 - COSHOCTON SILT LOAM, 8 TO 15 PERCENT SLOPES, ERODED CtE - COSHOCTON-WESTMORELAND SILT LOAMS, 25 TO 40 PERCENT SLOPES RgD - RIGLEY CHANNERY LOAM, 15 TO 25 PERCENT SLOPES WhC2 - WELLSTON SILT LOAM, 8 TO 15 PERCENT SLOPES WtC2 - WESTMORELAND SILT LOAM, 8 TO 15 PERCENT SLOPES WtD2 - WESTMORELAND SILT LOAM, 15 TO 25 PERCENT SLOPES ZnB - ZANESVILLE SILT LOAM, 3 TO 8 PERCENT SLOPES ZnC2 - ZANESVILLE SILT LOAM, 8 TO 15 PERCENT SLOPES

### **GRADING REQUIREMENTS:**

THE SITE WILL BE STRIPPED OF TOPSOIL AND WILL REQUIRE CUT AND FILL OVER PORTIONS OF THE PROJECT CONSTRUCT TO SUBGRADE.

### **EROSION AND SEDIMENT CONTROL MEASURES:**

EROSION AND SEDIMENT WILL BE CONTROLLED THROUGH THE USE OF INLET PROTECTION AT THE PROPOSED INLETS, TEMPORARY SEDIMENT CONTROL STRUCTURES, DITCH CHECKS, AND PERIMETER FILTER FABRIC FENCE.

### POST CONSTRUCTION WATER QUALITY:

WATER QUALITY WILL BE MAINTAINED THROUGH DETENTION BASINS AND WATER QUALITY ORIFICES IN THE BASIN OUTLET STRUCTURES.

### PERMANENT STABILIZATION:

THE SITE WILL BE STABILIZED BY THE USE OF SEEDING OR SODDING.

### MAINTENANCE:

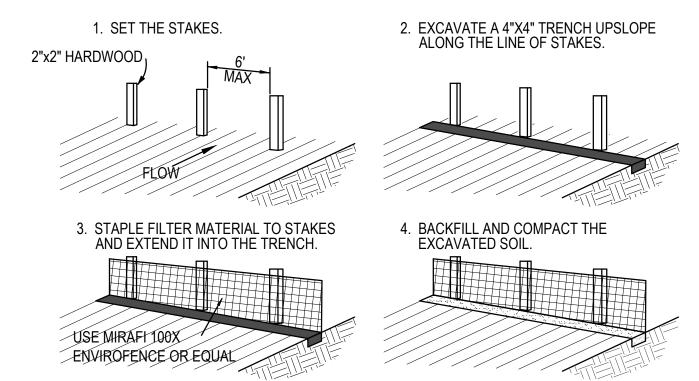
ALL EROSION CONTROL DEVICES ARE TO BE INSPECTED BY THE CONSTRUCTION SUPERINTENDENT DAILY AND WITHIN 24 HOURS AFTER ANY STORM EVENT GREATER THAN  $rac{1}{2}$ " OF RAIN PER 24 HOUR PERIOD. ANY DAMAGED FACILITIES ARE TO BE REPLACED / REPAIRED IMMEDIATELY AS MAY BE NECESSARY.

### **CONSTRUCTION SEQUENCE:**

- 1. UTILIZE A DESIGNATED CONSTRUCTION ENTRANCE WHICH IS THE FIRE ACCESS OFF
- 2. INSTALL PERIMETER FILTER FABRIC FENCE.
- 3. CONSTRUCT THE TEMPORARY/PERMANENT DETENTION POND(S) AND OUTLET
- 4. BEGIN EXCAVATION OF TEMPORARY DIVERSION SWALES TO ROUTE STORM WATER RUNOFF TO THE BASINS DURING CLEARING AND GRADING.
- 5. REMOVE THE EXISTING VEGETATION FROM THE REMAINDER OF THE SITE AS
- 6. GRADE THE SITE AS NECESSARY TO FORM THE ROADWAY PER TYPICAL SECTION, AS WELL AS GRADING OUTSIDE OF RIGHT OF WAY. FINE-GRADE AREAS AS NEEDED.
- STABILIZE ANY REMAINING DISTURBED AREAS.
- WHEN PERMANENT VEGETATION AND OTHER PERMANENT BMP'S ARE ESTABLISHED, REMOVE SEDIMENT AND ALL TEMPORARY BMP'S.

### SCHEDULE:

THE CONTRACTOR SHALL PROVIDE A SCHEDULE OF OPERATIONS TO THE OWNER. SEDIMENTATION AND EROSION CONTROL FEATURES SHALL BE PLACED IN ACCORDANCE WITH THIS SCHEDULE.



FILTER FABRIC FENCE

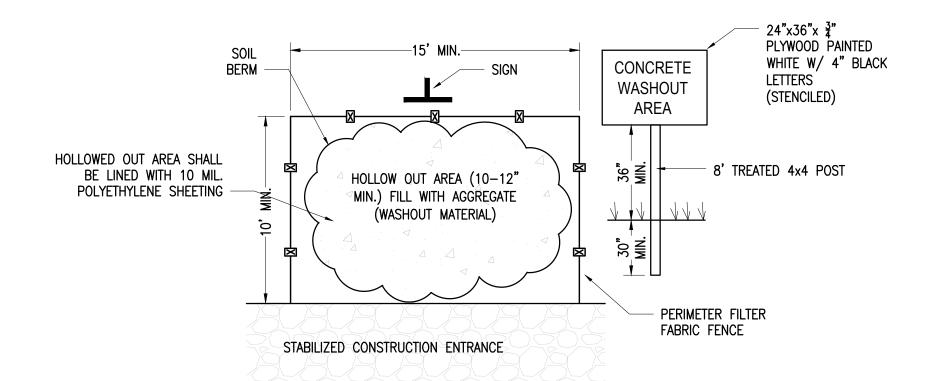
(Not to Scale)

2"x4" FRAME GEOTEXTILE OVER WIRE MESH BACKING 1. INLET PROTECTION SHALL BE CONSTRUCTED EITHER BEFORE BACKFILL UPSLOPE LAND DISTURBANCE AROUND BEGINS OR BEFORE THE INLET BECOMES FUNCTIONAL 2. THE EARTH AROUND THE INLET SHALL BE EXCAVATED COMPLETELY TO A DEPTH AT LEAST 18 INCHES.

- 3. THE WOODEN FRAME SHALL BE CONSTRUCTED OF 2-INCH BY 4-INCH CONSTRUCTION GRADE LUMBER. THE 2-INCH BY 4-INCH POSTS SHALL BE DRIVEN ONE (1) FT. INTO THE GROUND AT FOUR CORNERS OF THE INLET AND THE TOP PORTION OF 2-INCH BY 4-INCH FRAME ASSEMBLED USING THE OVERLAP JOINT SHOWN. THE TOP OF THE FRAME SHALL BE AT LEAST 6 INCHES BELOW ADJACENT ROADS IF PONDED WATER WILL POSE A SAFETY HAZARD TO TRAFFIC.
- 4. WIRE MESH SHALL BE OF SUFFICIENT STRENGTH TO SUPPORT FABRIC WITH WATER FULLY IMPOUNDED AGAINST IT. IT SHALL BE STRETCHED TIGHTLY AROUND THE FRAME AND FASTENED SECURELY TO THE
- 5. GEOTEXTILE MATERIAL SHALL HAVE AN EQUIVALENT OPENING SIZE OF 20-40 SIEVE AND BE RESISTANT TO SUNLIGHT. IT SHALL BE STRETCHED TIGHTLY AROUND THE FRAME AND FASTENED SECURELY. IT SHALL EXTEND FROM THE TOP OF THE FRAME TO 18 INCHES BELOW THE INLET NOTCH ELEVATION. THE GEOTEXTILE SHALL OVERLAP ACROSS ONE SIDE OF THE INLET SO THE ENDS OF THE CLOTH ARE NOT FASTENED TO THE SAME POST.
- 6. BACKFILL SHALL BE PLACED AROUND THE INLET IN COMPACTED 6-INCH LAYERS UNTIL THE EARTH IS EVEN WITH NOTCH ELEVATION ON ENDS AND TOP ELEVATION ON SIDES.
- 7. A COMPACTED EARTH DIKE OR CHECK DAM SHALL BE CONSTRUCTED IN THE DITCH LINE BELOW THE INLET IF THE INLET IS NOT IN A DEPRESSION. THE TOP OF THE DIKE SHALL BE AT LEAST 6 INCHES HIGHER THAN THE TOP OF THE FRAME.

### **GEOTEXTILE INLET PROTECTION**

(Rainwater and Land Development rev.6-24-09)



(Not to Scale) NO. 57 STONE FILTER FABRIC All materials shall conform to the current ODOT Construction and Materials Specifications

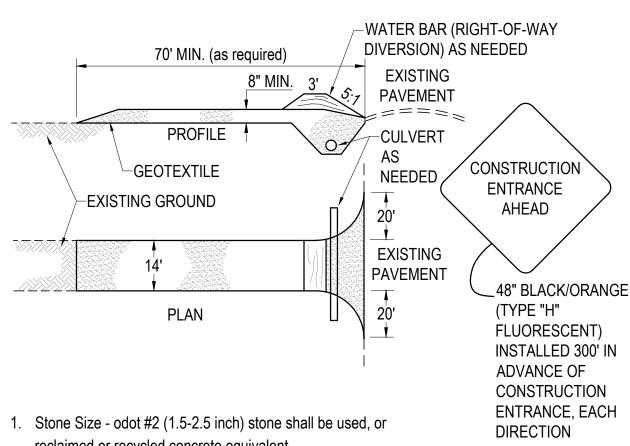
**TEMPORARY DITCH CHECK** 

**CONCRETE WASHOUT AREA** 

NOT TO SCALE

REMOVE THE UNIT WITH GRATE INSIDE BAG USING HANDLES, INSPECT CATCH BASIN OR MANHOLE AND REPLACE. REMOVE DRIED SEDIMENT FROM SURFACE OF UNIT AS NEEDED WITH STIFF BROOM OR SQUARE POINT SHOVEL. HANDLES REMOVE FINE MATERIAL FROM INSIDE ENVELOP AS DANDY BAG (OR APPROVED EQUAL) SECTION A-A

(Not to Scale)



reclaimed or recycled concrete equivalent.

2. Length - as long as required to stabilize high traffic areas but not less than 70 ft.

- 3. Thickness not less than eight (8) inches for light duty or at least ten (10) inches for heavy duty.
- 4. Width fourteen (14) feet minimum, but not less than the full width at points where ingress or egress occurs.
- 5. Geotextile laid over the entire area prior to placing stone. it shall be composed of strong rot-proof polymetric fibers and meet the following specifications:

min. tensile strength = 200 lbs. min. tear strength = 50 lbs. min. elongation = 20% permittivity = 1x10-3 cm/sec.

min. puncture strength = 80 psi min. burst strength = 320 psi equivalent opening size = eos < 0.6mm

- 6. Timing the construction entrance shall be installed as soon as is practicable before major grading
- 7. Culvert a pipe or culvert shall be constructed under the entrance if needed to prevent surface water from flowing across the entrance or to prevent runoff from being directed out onto paved
- 8. Water bar a water bar shall be constructed as part of the contruction entrance if needed to prevent surface runoff from flowing the length of the construction entrance and out onto paved surfaces.
- 9. Maintenance top dressing of additional stone shall be applied as conditions demand. mud spilled, dropped, washed or tracked onto public roads, or any surface where runoff is not checked by sediment controls, shall be removed immediately. removal shall be accomplished by scraping or
- 10. Construction entrances shall not be relied upon to remove mud from vehicles and prevent off-site tracking. vehicles that enter and leave the construction-site shall be restricted from muddy areas.
- 11. Removal the entrance shall remain in place until the disturbed area is stabilized or replaced with a permanent roadway or entrance.

STABILIZED CONSTRUCTION ENTRANCE

(Not to Scale)

SEDIMENT **EROSION**,

DRIVE

RICTION P

SO

DETAILS

GRADING

OB NUMBER: **ZAN012** 

THE CONTRACTOR SHALL FILE A CO-PERMITTEE FORM. INFORMATION ABOUT THE CO-PERMITTEE FORM CAN BE FOUND AT www.epa.state.oh.us/dsw/storm/stormform.html. THE CONTRACTOR SHALL FURNISH A COPY OF THE FORM SUBMITTED TO THE OHIO EPA TO THE PROJECT OWNER, OR OWNER'S REPRESENTATIVE, AND ZONING DEPARTMENT AT OR BEFORE THE PRE-CONSTRUCTION MEETING.

ALL CONTRACTOR'S AND SUB-CONTRACTORS SHALL PROVIDE SIGNATURES TO THE OWNER ACKNOWLEDGING THAT THEY REVIEWED AND UNDERSTAND THE CONDITIONS AND RESPONSIBILITIES OF THE GENERAL PERMIT AND THE SWP3. THESE SIGNATURES SHALL BE PROVIDED PRIOR TO COMMENCEMENT OF WORK ON THE CONSTRUCTION SITE.

EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO INITIAL DISTURBANCE ACTIVITIES OR AS SOON AS PRACTICAL. THE CONTRACTOR SHALL COMPLY WITH THE TERMS AND CONDITIONS OF THE OHIO EPA GENERAL PERMIT AND THE STORM WATER POLLUTION PREVENTION PLAN (SWP3) DEVELOPED FOR

DURING CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE PROPER SOIL EROSION MEASURES FOR PROTECTION OF ALL ADJOINING ROADS, LANDS, AND STREAMS. THE CONTRACTOR SHALL BE DESIGNATED A CO-PERMITTE TO THE GENERAL CONSTRUCTION STORM WATER NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEMS (NPDES) REQUIREMENTS UNDER THE MOST RECENT VERSION OF THE OHIO ENVIRONMENTAL PROTECTIVE AGENCY (OHIO EPA) GENERAL PERMIT (GENERAL PERMIT). REFER TO THE MOST RECENT VERSION OF THE O.D.N.R. MANUAL "RAINWATER AND LAND DEVELOPMENT THIRD EDITION 2006" AND ODOT "HANDBOOK FOR SEDIMENT AND EROSION CONTROL" FOR REQUIREMENTS.

ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE PLACED PRIOR TO OR AS THE FIRST STEP IN GRADING. THE CONTRACTOR SHALL PROVIDE SEDIMENT CONTROL AT ALL POINTS WHERE STORM WATER LEAVES THE LIMITS OF THE PROJECT, ALL POINTS WHERE STORM WATER ENTERS A STREAM THAT TRAVERSES THE PROJECT, AND ALL POINTS WHERE STORM WATER ENTERS PORTIONS OF COMPLETED UNDERGROUND PIPING.

### SWPPP UPDATES

THE SWP3 PLAN IS A DYNAMIC PLAN BASED UPON SITE CONDITIONS AND THE CONSTRUCTION SCHEDULE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING AND UPDATING THE SWP3 PLAN AS THE PROJECT PROCEEDS.

THE CONSTRUCTION BMP'S WITHIN THESE PLANS REPRESENT THE MINIMUM REQUIRED ONSITE. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN ONSITE BMP'S AS THE PROJECT PROGRESSES AT NO ADDITIONAL COST OVER THE ITEMS BID.

### INSPECTION

THE CONTRACTOR SHALL PROVIDE A QUALIFIED INSPECTION PERSONNEL TO CONDUCT INSPECTIONS PER PART III.G.2 OF THE GENERAL PERMIT. RECORDS OF THESE INSPECTIONS SHALL BE KEPT AND MADE AVAILABLE TO THE OWNER, THE OWNER'S REPRESENTATIVE, OR THE JURISDICTIONAL AGENCIES IF REQUESTED.

AS PER THE GENERAL PERMIT, AT A MINIMUM, ALL CONTROLS ON THE SITE SHALL BE INSPECTED AT LEAST ONCE EVERY 7 CALENDAR DAYS AND WITHIN 24 HOURS AFTER ANY STORM EVENT GREATER THAN ONE-HALF INCH OF RAIN PER 24 HOUR PERIOD. INSPECTION PERIODS MAY BE REDUCED PER PART III.G.2 OF THE GENERAL PERMIT.

### MAINTENANCE

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE MAINTENANCE AND REPAIR OF ALL TEMPORARY AND PERMANENT CONTROL PRACTICES TO ENSURE CONTINUED PERFORMANCE OF THEIR INTENDED FUNCTION. SHOULD A STRUCTURE OR FEATURE BECOME DAMAGED. THE CONTRACTOR SHALL REPAIR OR REPLACE AT NO ADDITIONAL COST TO THE OWNER.

### TREE PRESERVATION

ANY AREA SHOWN IN THE CONSTRUCTION DRAWINGS OR ON THE STORM WATER POLLUTION PREVENTION PLAN AS A "TREE PRESERVATION" OR "TREE PROTECTION" AREA. THE CONTRACTOR SHALL ENCLOSE THE AREA WITH T-POSTS AND CONSTRUCTION FENCING.

### TEMPORARY SEEDING

SEEDING DATES	SPECIES	Lb. / 1000 ft2	Lb /	Acre	
March 1	Oats	3	128	(4	bushel)
to	Tall Fescue	1	40	•	•
August 15	Annual Ryegrass	1	40		
	Perennial Ryegrass	1	40		
	Tall Fescue	1	40		
	Annual Ryegrass	1	40		
	Annual Ryegrass	1.25	55		
	Perennial Ryegrass	3.25	142		
	Creeping Red Fescue	0.4	17		
	Kentucky Bluegrass	0.4	17		
	Oats	3	128	(3	bushel)
	Tall Fescue	1	40	`	•
	annual ryegrass	1	40		
August 16	Rye	3	112	(2	bushel)
to	Tall Fescue	1	40		
November	Annual Ryegrass	1	40		
	Wheat	3	120	(2	bushel)
	Tall Fescue	1	40	•	•
	Annual Ryegrass	1	40		
	Perennial Rye	1	40		
	Tall Fescue	1	40		
	Annual Ryegrass	1	40		
	Annual Ryegrass	1.25	40		
	Perennial Ryegrass	3.25	40		
	Creeping Red Fescue	0.4	40		
	Kentucky Bluegrass	0.4	40		
November 1	, ,				

(Rainwater and Land Development rev.6-24-09) STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES SUCH AS DIVERSIONS AND SEDIMENT TRAPS SHALL BE INSTALLED AND STABILIZED WITH TEMPORARY SEEDING PRIOR TO GRADING THE REST OF THE CONSTRUCTION SITE.

THE SEEDBED SHOULD BE PULVERIZED AND LOOSE TO ENSURE THE SUCCESS OF ESTABLISHING VEGETATION. TEMPORARY SEEDING SHOULD NOT BE POSTPONED IF IDEAL SEEDBED PREPARATION IS NOT POSSIBLE.

SOIL AMENDMENTS—TEMPORARY VEGETATION SEEDING RATES SHALL ESTABLISH ADEQUATE STANDS OF VEGETATION, WHICH MAY REQUIRE THE USE OF SOIL AMENDMENTS. BASE RATES FOR LIME AND FERTILIZER SHALL BE USED.

SEEDING METHOD—SEED SHALL BE APPLIED UNIFORMLY WITH A CYCLONE SPREADER, DRILL, CULTIPACKER SEEDER, OR HYDROSEEDER. WHEN FEASIBLE, SEED THAT HAS BEEN BROADCAST SHALL BE COVERED BY RAKING OR DRAGGING AND THEN LIGHTLY TAMPED INTO PLACE USING A ROLLER OR CULTIPACKER. IF HYDROSEEDING IS USED, THE SEED AND FERTILIZER WILL BE MIXED ON-SITE AND THE SEEDING SHALL BE DONE IMMEDIATELY AND WITHOUT INTERRUPTION.

Feb. 29 NOTE: OTHER APPROVED SEED SPECIES MAY BE SUBSTITUTED.

Use mulch only or dormant

### MULCHING TEMPORARY SEEDING

seeding.

1. APPLICATIONS OF TEMPORARY SEEDING SHALL INCLUDE MULCH, WHICH SHALL BE APPLIED DURING OR IMMEDIATELY AFTER SEEDING. SEEDINGS MADE DURING OPTIMUM SEEDING DATES ON FAVORABLE. VERY FLAT SOIL CONDITIONS MAY NOT NEED MULCH TO ACHIEVE ADEQUATE STABILIZATION.

- STRAW-IF STRAW IS USED, IT SHALL BE UNROTTED SMALL-GRAIN STRAW APPLIED AT A RATE OF 2 TONS PER ACRE OR 90 LBS./ 1,000 SQ. FT. (2-3 BALES)
- HYDROSEEDERS-IF WOOD CELLULOSE FIBER IS USED, IT SHALL BE USED AT 2000 LBS./ AC. OR 46 LB./ 1.000-SQ.-FT.
- OTHER-OTHER ACCEPTABLE MULCHES INCLUDE MULCH MATTINGS APPLIED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS OR WOOD CHIPS APPLIED AT 6 TON/ AC.

### STRAW MULCH SHALL BE ANCHORED IMMEDIATELY TO MINIMIZE LOSS BY WIND OR WATER. ANCHORING METHODS:

- MECHANICAL—A DISK, CRIMPER, OR SIMILAR TYPE TOOL SHALL BE SET STRAIGHT TO PUNCH OR ANCHOR THE MULCH MATERIAL INTO THE SOIL. STRAW MECHANICALLY ANCHORED SHALL NOT BE FINELY CHOPPED BUT LEFT TO A LENGTH OF APPROXIMATELY 6 INCHES
- MULCH NETTING—NETTING SHALL BE USED ACCORDING TO THE MANUFACTURERS RECOMMENDATIONS. NETTING MAY BE NECESSARY TO HOLD MULCH IN PLACE IN AREAS OF CONCENTRATED RUNOFF AND ON CRITICAL SLOPES.
- SYNTHETIC BINDERS—SYNTHETIC BINDERS SUCH AS ACRYLIC DLR (AGRI-TAC), DCA-70. PETROSET. TERRA TRACK OR EQUIVALENT MAY BE USED AT RATES RECOMMENDED BY THE MANUFACTURER.
- WOOD-CELLULOSE FIBER-WOOD-CELLULOSE FIBER BINDER SHALL BE APPLIED AT A NET DRY WT. OF 750 LB./AC. THE WOOD-CELLULOSE FIBER SHALL BE MIXED WITH WATER AND THE MIXTURE SHALL CONTAIN A MAXIMUM OF 50 LB. / 100 GAL.

### PERMANENT SEEDING

(Rainwater and Land Development rev.6-24-09) SITE PREPARATION

	Seeding	g Rate	NI (	
Seed Mix	Lbs Ac	Lbs. 1,000 Sq.Ft.	Notes:	
Gener	al Use	1,000 04.1 t.		
Creeping Red Fescue	20-40	$\frac{1}{2}$ -1	For close	
Perennial Ryegrass	10-20	$\frac{1}{4} - \frac{1}{2}$	mowing & waterways w/	i
Kentucky Bluegrass	20-40	$\frac{1}{2}$ - 1	<2 ft/sec	
Tall Fescue	40-50	$1 - 1\frac{1}{4}$		
Turf-type (dwarf) Fescue	90	2 <del>1</del>		
Steep Banks	or Cut Sl	opes		
Tall Fescue	40-50	$1 - 1\frac{1}{4}$		
Crown Vetch	10-20	$\frac{1}{4} - \frac{1}{2}$	Do not seed later than	
Tall Fescue	20-30	$\frac{1}{2} - \frac{3}{4}$	August	
Flat Pea	20-25	$\frac{1}{2} - \frac{3}{4}$	Do not seed later than	
Tall Fescue	20-30	$\frac{1}{2} - \frac{3}{4}$	August	
Road Ditche	s and Sw	ales	_	
Tall Fescue	40-50	$1 - 1\frac{1}{4}$		
Turf-type (dwarf) Fescue	90	2 <del>1</del>		
Kentucky Bluegrass	5	0.1		
Law	/ns			
Kentucky Bluegrass Perennial Ryegrass	100-120	2		
Kentucky Bluegrass Creeping Red Fescue	100-120	1½ -2	For shaded areas.	

(MAXIMIZING INFILTRATION WILL HELP CONTROL BOTH RUNOFF RATE AND WATER QUALITY.) SUBSOILING SHOULD BE DONE WHEN THE SOIL MOISTURE IS LOW ENOUGH TO ALLOW THE SOIL TO CRACK OR FRACTURE. SUBSOILING SHALL NOT BE DONE ON SLIP-PRONE AREAS WHERE SOIL PREPARATION SHOULD BE LIMITED TO WHAT IS NECESSARY FOR ESTABLISHING VEGETATION. THE SITE SHALL BE GRADED AS NEEDED TO PERMIT THE USE OF CONVENTIONAL EQUIPMENT FOR

SUBSOILER, PLOW, OR OTHER

IMPLEMENT SHALL BE USED TO

REDUCE SOIL COMPACTION AND

ALLOW MAXIMUM INFILTRATION.

SEEDBED PREPARATION AND SEEDING. TOPSOIL SHALL BE APPLIED WHERE NEEDED TO ESTABLISH VEGETATION.

### EEDBED PREPARATION

LIME—AGRICULTURAL LIMESTONE SHALL BE APPLIED TO ACID SOIL AS RECOMMENDED BY A SOIL TEST. IN LIEU OF A SOIL TEST, LIME SHALL BE APPLIED AT THE RATE OF 100 POUNDS PER 1,000-SQ. FT. OR 2 TONS PER

FERTILIZER—FERTILIZER SHALL BE APPLIED AS RECOMMENDED BY A SOIL TEST. IN PLACE OF A SOIL TEST, FERTILIZER SHALL BE APPLIED AT A RATE OF 25 POUNDS PER 1.000-SQ. FT. OR 1000 POUNDS PER ACRE OF A 10-10-10 OR

12-12-12 ANALYSES. 3. THE LIME AND FERTILIZER SHALL BE WORKED INTO THE SOIL WITH A DISK HARROW, SPRING-TOOTH HARROW. OR OTHER SUITABLE FIELD IMPLEMENT TO A DEPTH OF 3 INCHES. ON SLOPING LAND, THE SOIL SHALL BE WORKED ON THE CONTOUR.

### SEEDING DATES AND SOIL CONDITIONS

SEEDING SHOULD BE DONE MARCH 1 TO MAY 31 OR AUGUST 1 TO SEPTEMBER 30. IF SEEDING OCCURS OUTSIDE OF THE ABOVE SPECIFIED DATES, ADDITIONAL MULCH AND IRRIGATION MAY BE REQUIRED TO ENSURE A MINIMUM OF 80% GERMINATION. TILLAGE FOR SEEDBED PREPARATION SHOULD BE DONE WHEN THE SOIL IS DRY ENOUGH TO CRUMBLE AND NOT FORM RIBBONS WHEN COMPRESSED BY HAND. FOR WINTER SEEDING, SEE THE FOLLOWING SECTION ON DORMANT SEEDING.

### DORMANT SEEDINGS

. SEEDINGS SHOULD NOT BE MADE FROM OCTOBER 1 THROUGH NOVEMBER 20. DURING THIS PERIOD, THE SEEDS ARE LIKELY TO GERMINATE BUT PROBABLY WILL NOT BE ABLE TO SURVIVE THE WINTER. 2. THE FOLLOWING METHODS MAY BE USED FOR "DORMANT SEEDING":

• FROM OCTOBER 1 THROUGH NOVEMBER 20, PREPARE THE SEEDBED, ADD THE REQUIRED AMOUNTS OF LIME AND FERTILIZER, THEN MULCH AND ANCHOR. AFTER NOVEMBER 20, AND BEFORE MARCH 15, BROADCAST THE SELECTED SEED MIXTURE. INCREASE THE SEEDING RATES BY 50% FOR THIS TYPE OF SEEDING.

• FROM NOVEMBER 20 THROUGH MARCH 15, WHEN SOIL CONDITIONS PERMIT, PREPARE THE SEEDBED, LIME AND FERTILIZE, APPLY THE SELECTED SEED MIXTURE, MULCH AND ANCHOR. INCREASE THE

SEEDING RATES BY 50% FOR THIS TYPE OF SEEDING. • APPLY SEED UNIFORMLY WITH A CYCLONE SEEDER, DRILL, CULTIPACKER SEEDER, OR HYDRO-SEEDER (SLURRY MAY INCLUDE SEED AND FERTILIZER) ON A FIRM, MOIST SEEDBED.

• WHERE FEASIBLE, EXCEPT WHEN A CULTIPACKER TYPE SEEDER IS USED, THE SEEDBED SHOULD BE FIRMED FOLLOWING SEEDING OPERATIONS WITH A CULTIPACKER, ROLLER, OR LIGHT DRAG. ON SLOPING LAND. SEEDING OPERATIONS SHOULD BE ON THE CONTOUR WHERE FEASIBLE.

### MULCHING

1. MULCH MATERIAL SHALL BE APPLIED IMMEDIATELY AFTER SEEDING. DORMANT SEEDING SHALL BE MULCHED. 100% OF THE GROUND SURFACE SHALL BE COVERED WITH AN APPROVED MATERIAL.

• STRAW-IF STRAW IS USED IT SHALL BE UNROTTED SMALL-GRAIN STRAW APPLIED AT THE RATE OF 2 TONS PER ACRE OR 90 POUNDS (TWO TO THREE BALES) PER 1,000-SQ. FT. THE MULCH SHALL BE SPREAD UNIFORMLY BY HAND OR MECHANICALLY APPLIED SO THE SOIL SURFACE IS COVERED. FOR UNIFORM DISTRIBUTION OF HAND-SPREAD MULCH, DIVIDE AREA INTO APPROXIMATELY 1,000-SQ.-FT. SECTIONS AND SPREAD TWO 45-LB. BALES OF STRAW IN EACH SECTION.

• HYDROSEEDERS—IF WOOD CELLULOSE FIBER IS USED, IT SHALL BE APPLIED AT 2,000 LB./AC. OR 46 LB./1,000 SQ. FT. • OTHER-OTHER ACCEPTABLE MULCHES INCLUDE ROLLED EROSION CONTROL MATTINGS OR BLANKETS APPLIED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS OR WOOD CHIPS APPLIED AT 6 TONS

PER ACRE. 3. STRAW AND MULCH ANCHORING METHODS

STRAW MULCH SHALL BE ANCHORED IMMEDIATELY TO MINIMIZE LOSS BY WIND OR WATER. • MECHANICAL-A DISK, CRIMPER, OR SIMILAR TYPE TOOL SHALL BE SET STRAIGHT TO PUNCH OR ANCHOR THE MULCH MATERIAL INTO THE SOIL. STRAW MECHANICALLY ANCHORED SHALL NOT BE

FINELY CHOPPED BUT, GENERALLY, BE LEFT LONGER THAN 6 INCHES. • MULCH NETTING—NETTING SHALL BE USED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS. NETTING MAY BE NECESSARY TO HOLD MULCH IN PLACE IN AREAS OF CONCENTRATED RUNOFF AND

ON CRITICAL SLOPES. • ASPHALT EMULSION—ASPHALT SHALL BE APPLIED AS RECOMMENDED BY THE MANUFACTURE OR AT THE RATE OF 160 GALLONS PER ACRE.

• SYNTHETIC BINDERS—SYNTHETIC BINDERS SUCH AS ACRYLIC DLR (AGRI-TAC), DCA-70, PETROSET, TERRA TACK OR EQUIVALENT MAY BE USED AT RATES SPECIFIED BY THE MANUFACTURER. • WOOD CELLULOSE FIBER-WOOD CELLULOSE FIBER SHALL BE APPLIED AT A NET DRY WEIGHT OF 750 POUNDS PER ACRE. THE WOOD CELLULOSE FIBER SHALL BE MIXED WITH WATER WITH THE

### IRRIGATION

Permanent seeding shall include irrigation to establish vegetation during dry weather or ON ADVERSE SITE CONDITIONS, WHICH REQUIRE ADEQUATE MOISTURE FOR SEED GERMINATION AND PLANT

IRRIGATION RATES SHALL BE MONITORED TO PREVENT EROSION AND DAMAGE TO SEEDED AREAS FROM EXCESSIVE RUNOFF.

MIXTURE CONTAINING A MAXIMUM OF 50 POUNDS CELLULOSE PER 100 GALLONS OF WATER.

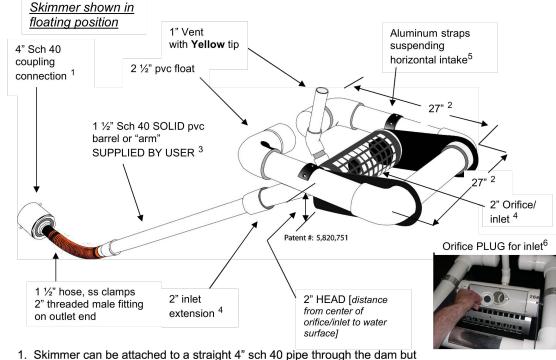
PERMANENT S	STABILIZATION
AREA REQUIRING PERMANENT STABILIZATION	TIME FRAME TO APPLY EROSION CONTROLS
ANY AREAS THAT WILL LIE DORMANT FOR ONE (1) OR MORE YEARS	WITHIN SEVEN (7) DAYS OF THE MOST RECENT DISTURBANCE
ANY AREAS WITHIN 50 FEET OF A SURFACE WATER OF THE STATE AND AT FINAL GRADE	WITHIN TWO (2) DAYS OF REACHING FINAL GRADE
ANY OTHER AREAS AT FINAL GRADE	WITHIN SEVEN (7) DAYS OF REACHING FINAL GRADE IN THAT AREA

TEMPORARY STABILIZATION				
AREA REQUIRING TEMPORARY STABILIZATION	TIME FRAME TO APPLY EROSION CONTROLS			
ANY DISTURBED AREAS WITHIN 50 FEET OF A SURFACE WATER OF THE STATE AND NOT AT FINAL GRADE	WITHIN TWO (2) DAYS OF THE MOST RECENT DISTURBANCE IF THAT AREA WILL REMAIN IDLE FOR MORE THAN 14 DAYS.			
FOR ALL CONSTRUCTION ACTIVITIES, ANY DISTURBED AREAS THAT WILL BE DORMANT FOR MORE THAN 14 DAYS BUT LESS THAN ONE YEAR, AND NOT WITHIN 50 FEET OF A SURFACE WATER OF THE STATE	WITHIN SEVEN (7) DAYS OF THE MOST RECENT DISTURBANCE WITHIN THE AREA FOR RESIDENTIAL SUBDIVISION, DISTURBED AREAS MUST BE STABILIZED AT LEAST SEVEN (7) DAYS PRIOR TO TRANSFER OF PERMIT COVERAGE FOR THE INDIVIDUAL LOT(S).			
DISTURBED AREAS THAT WILL BE IDLE OVER WINTER	PRIOR TO THE ONSET OF WINTER WEATHER			

WHERE VEGETATIVE STABILIZATION TECHNIQUES MAY CAUSE STRUCTURAL INSTABILITY OR ARE OTHERWISE UNOBTAINABLE. ALTERNATIVE STABILIZATION TECHNIQUES MUST BE EMPLOYED. PERMANENT AND TEMPORARY STABILIZATION IS DEFINED IN PART VII OF THE OHIO ENVIRONMENTAL PROTECTION AGENCY GENERAL PERMIT AUTHORIZATION FOR STORM WATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM, PERMIT NUMBER OHCOOOOO5, EFFECTIVE APRIL 23, 2018, AND EXPIRES APRIL 22, 2023. SOURCE: OHIO EPA PERMIT No. OHCO00005, PART II, SUBSECTION (B) ON PAGE 9 OF 60.

### 2" Faircloth Skimmer® Cut Sheet J. W. Faircloth & Son, Inc.

www.FairclothSkimmer.com



- the pipe may need to be anchored to the bottom at the connection so it is secure. Coupling can be removed and hose attached to outlet using the threaded 2" fitting. Typical methods used: a) on a metal structure a steel stub out welded on the side at the bottom with a 2" threaded coupling or reducer(s); b) a concrete structure with a hole or orifice at the bottom - use a steel plate with a hole cut in it and coupling welded to it that will fit over the hole in the concrete and bolted to the structure with sealant; or c) grout a 4" pvc pipe in a hole in the concrete to connect the skimmer.
- 2. Dimensions are approximate, not intended as plans for construction.

include 1 1/2" Sch 40 SOLID pvc barrel or "arm" SUPPLIED BY USER.

- 3. Barrel (solid, not foam core pipe) should be 1.4 times the depth of water with a minimum length of 6' so the inlet can be pulled to the side for maintenance. If more than 8' long, weight may have to be added to inlet to counter the increased buoyancy.
- 4. Orifice/inlet tapers down from 2" maximum inlet to a 1 ½" barrel and hose. Barrel is smaller to reduce buoyancy and tendency to lift inlet but is sufficient for flow through inlet because of slope. The orifice/inlet can be reduced using the plug and cutter provided to control the outflow rate – see #6.
- 5. Horizontal intake is 4" pipe between the straps with aluminum screen door for access to the inlet and
- 6. Capacity: 3,283 cubic feet per day maximum with 2" inlet and 2" head. Inlet can be reduced by installing a smaller orifice using the plug and cutter provided to adjust flow rate for the particular
- drawdown time required. Please use the sizing template available at www.fairclothskimmer.com 7. Ships assembled. User glues inlet extension and barrel, installs vent, cuts orifice in plug and attaches to outlet pipe or structure. Includes float, flexible hose with fittings, rope, orifice plug & cutter. Does NOT

2inchCut 5-1-19

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Calculate Skimmer Size f	or Faircloth Skimn	ner®		
Basin Volume in Cubic Feet	5,276 Cu.Ft	Skimmer Size	2.0 Inch	
Days to Drain*	2 Days	Orifice Radius	0.9 Inch[es]	
		Orifice Diameter	1.7 Inch[es]	
*In NC assume 3 days to drain	If no results maximum flow rate for a single skimmer is exceeded. More than one skimmer may be required.			

### SOUTH DETENTION BASIN SKIMMER CALCULATIONS

The second secon				
5,628 Cu.Ft		Skimmer Size	2.0	Inch
2 Days		Orifice Radius	0.9	Inch[es]
77		Orifice Diameter	1.8	Inch[es]
	2 Days	2 Days	Days Orifice Radius Orifice Diameter	2 Days Orifice Radius 0.9

### NORTH DETENTION BASIN SKIMMER CALCULATIONS

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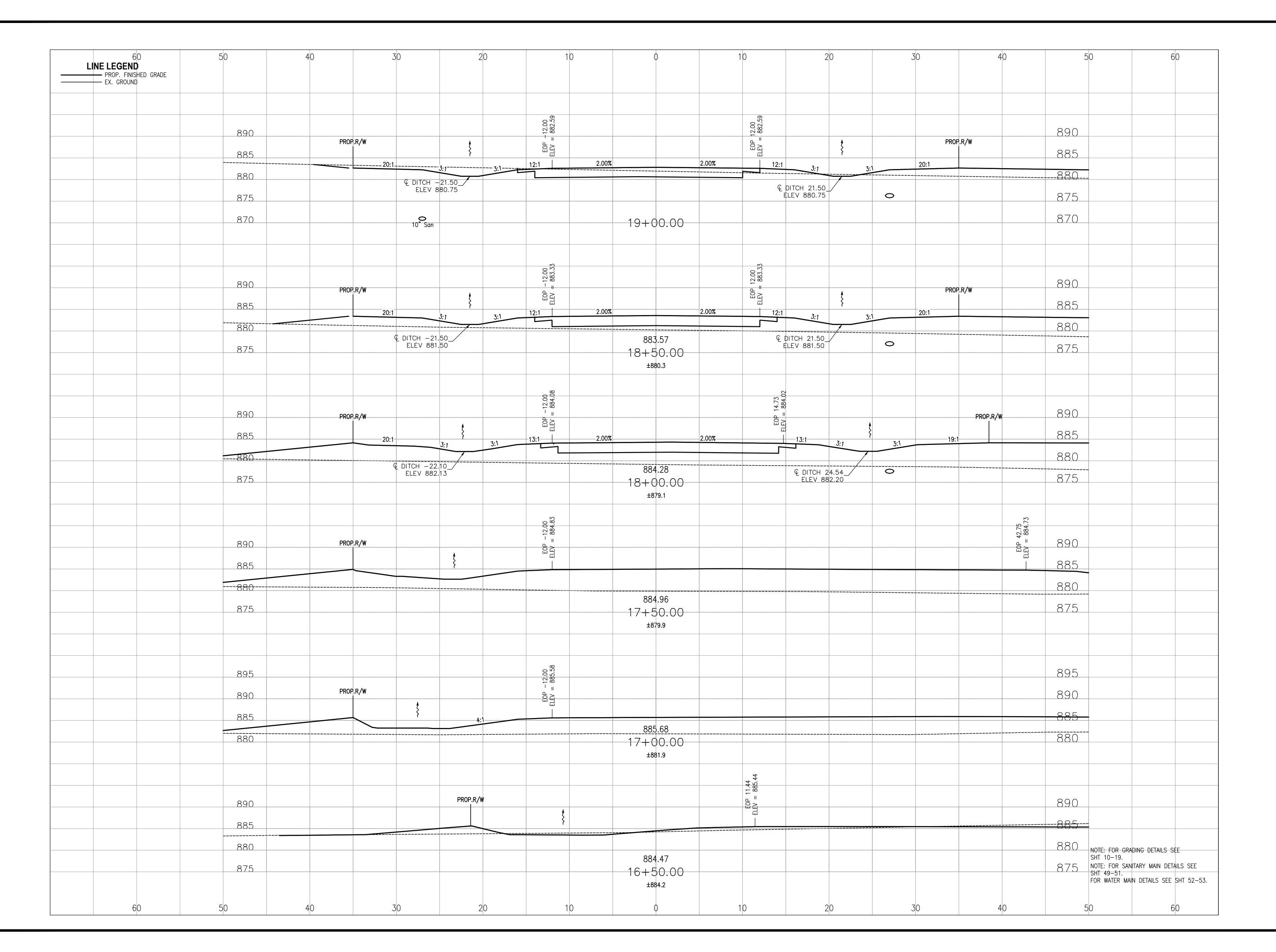
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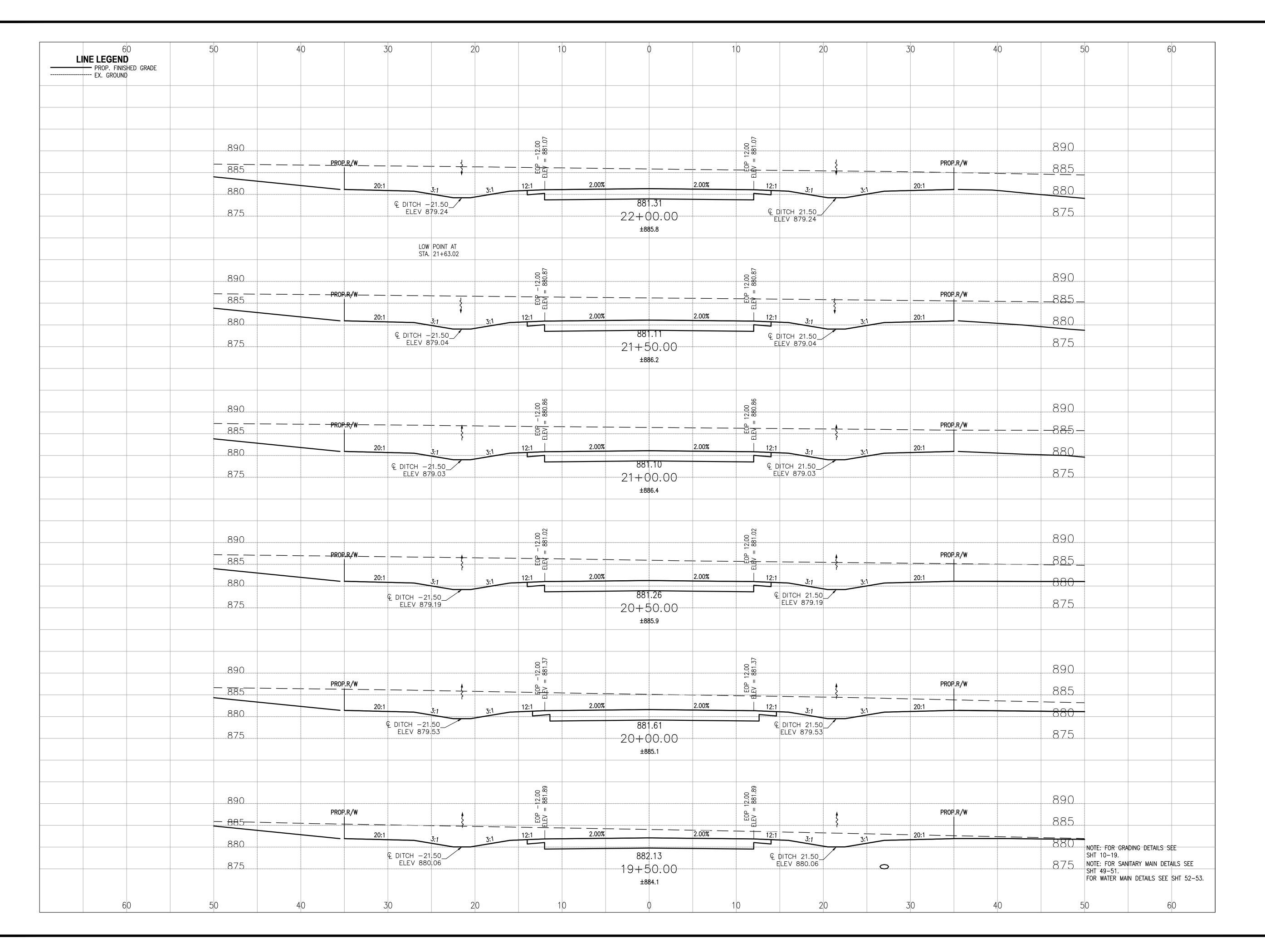
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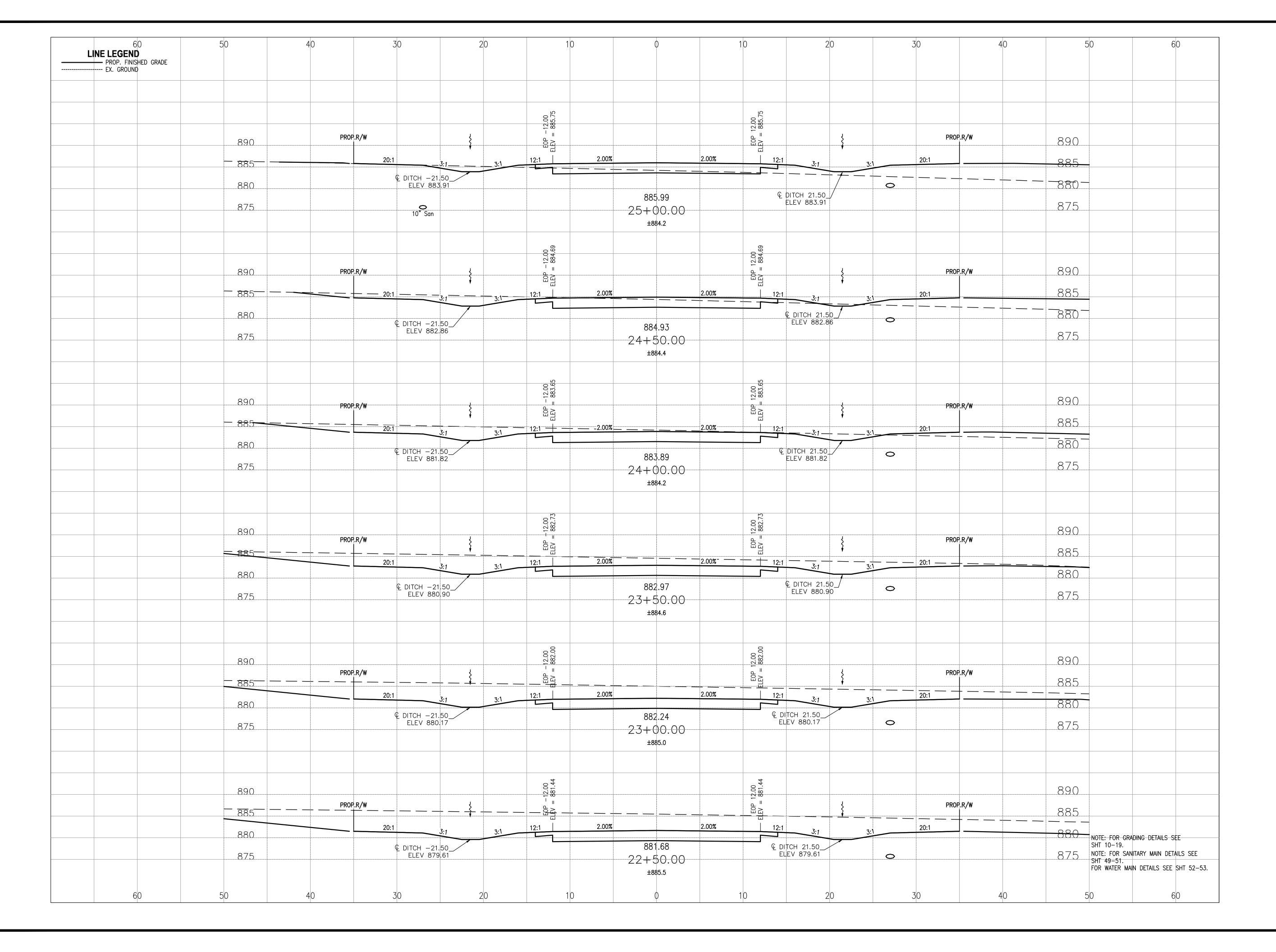
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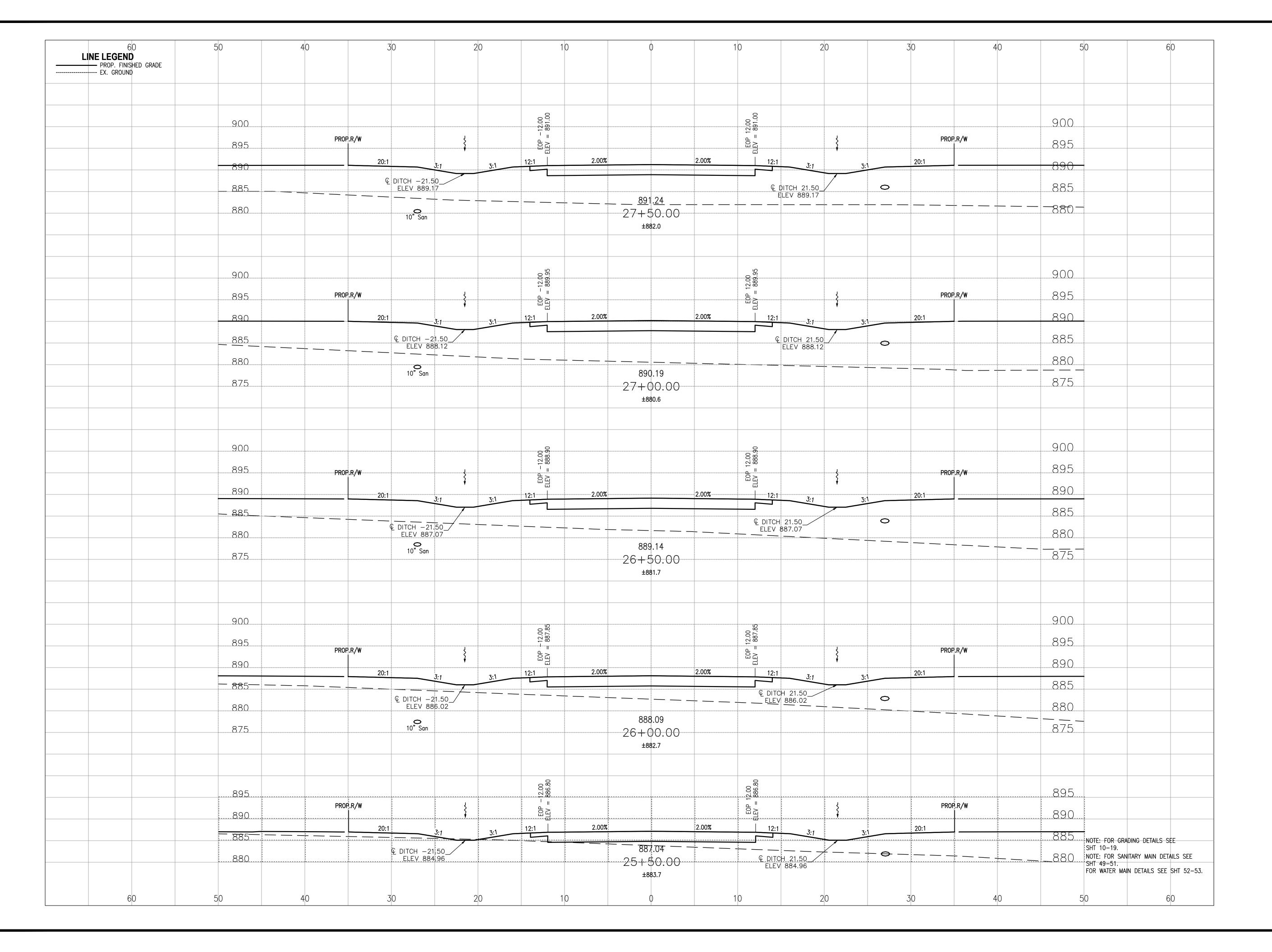
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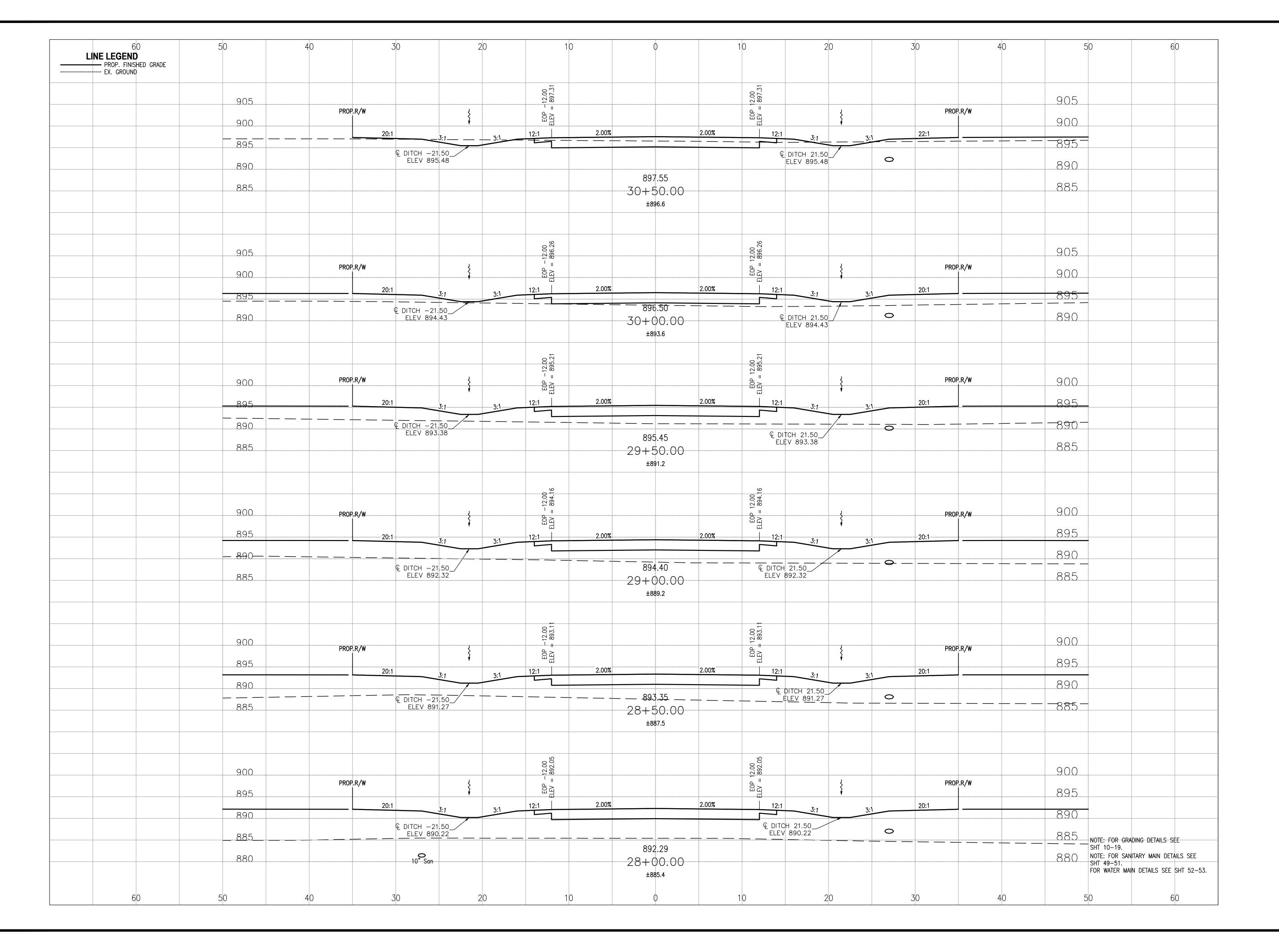
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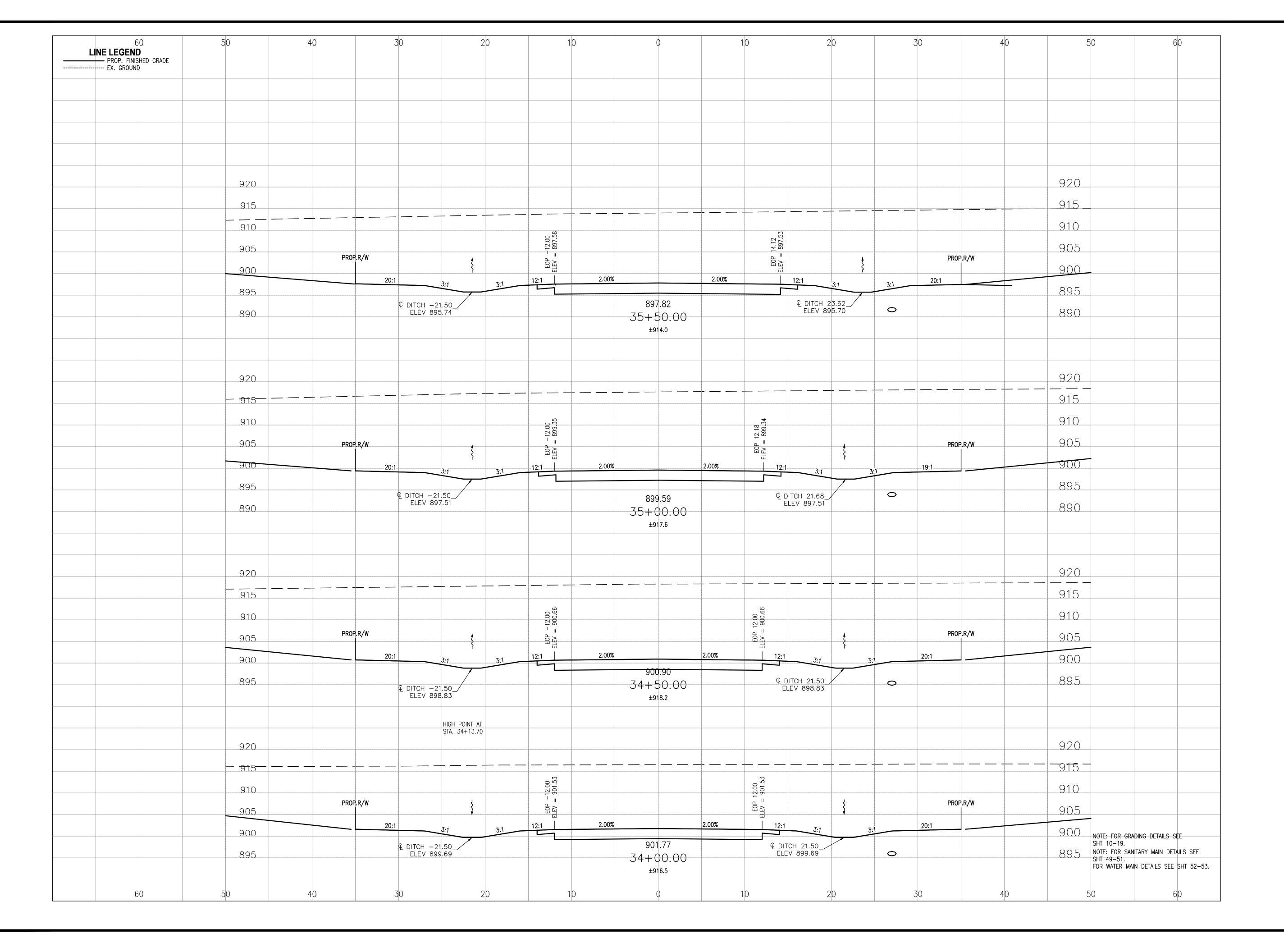
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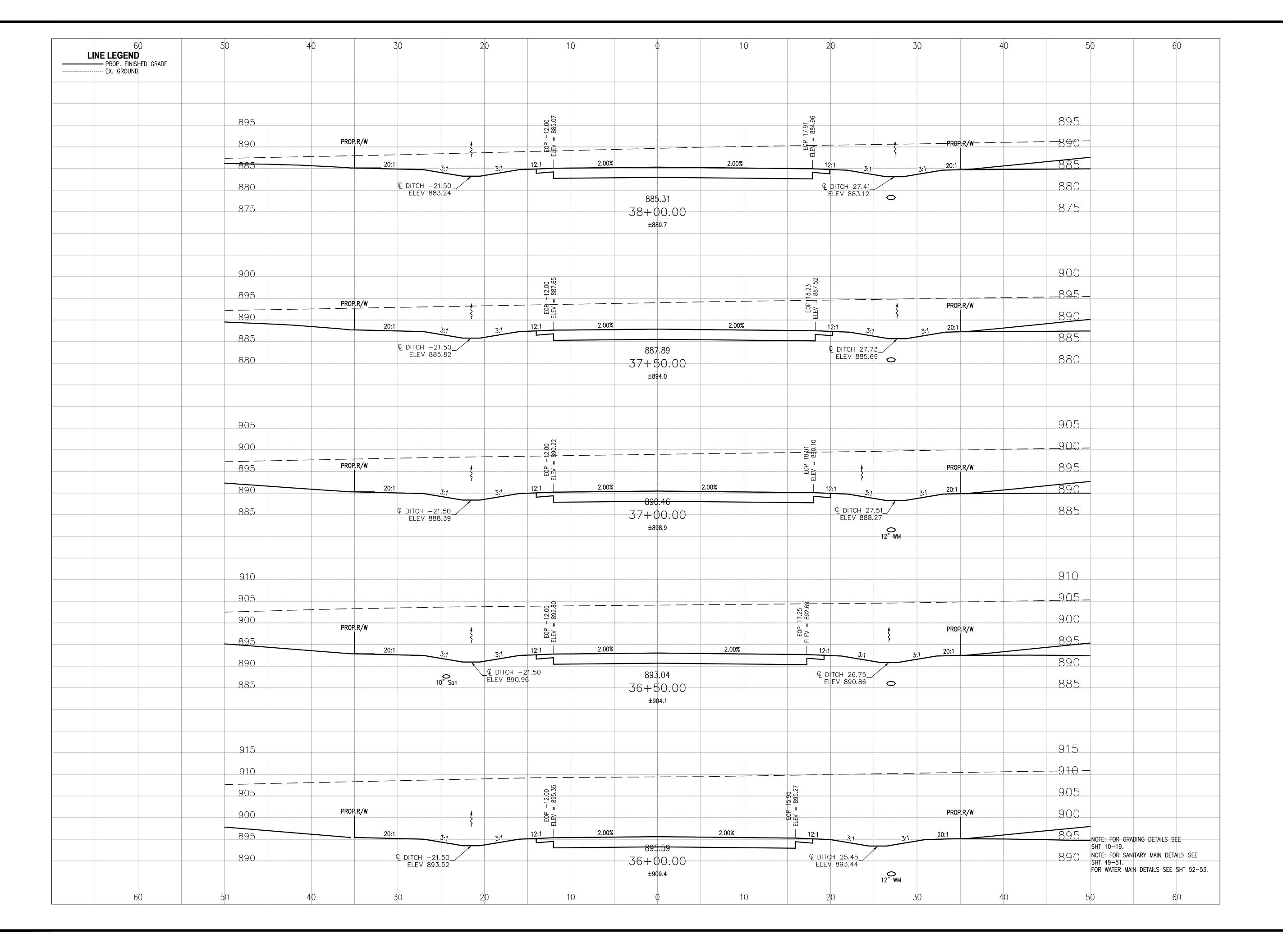
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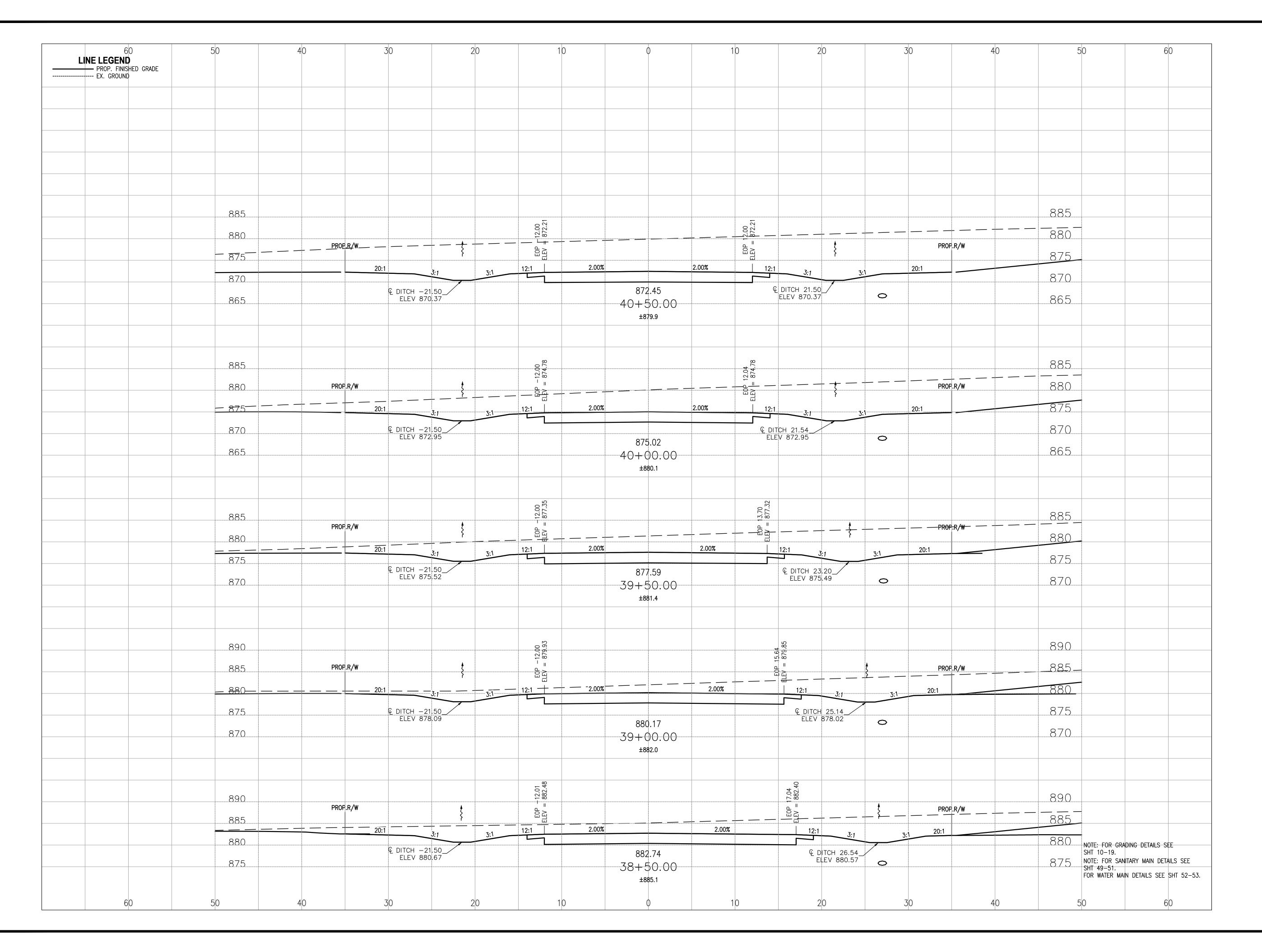
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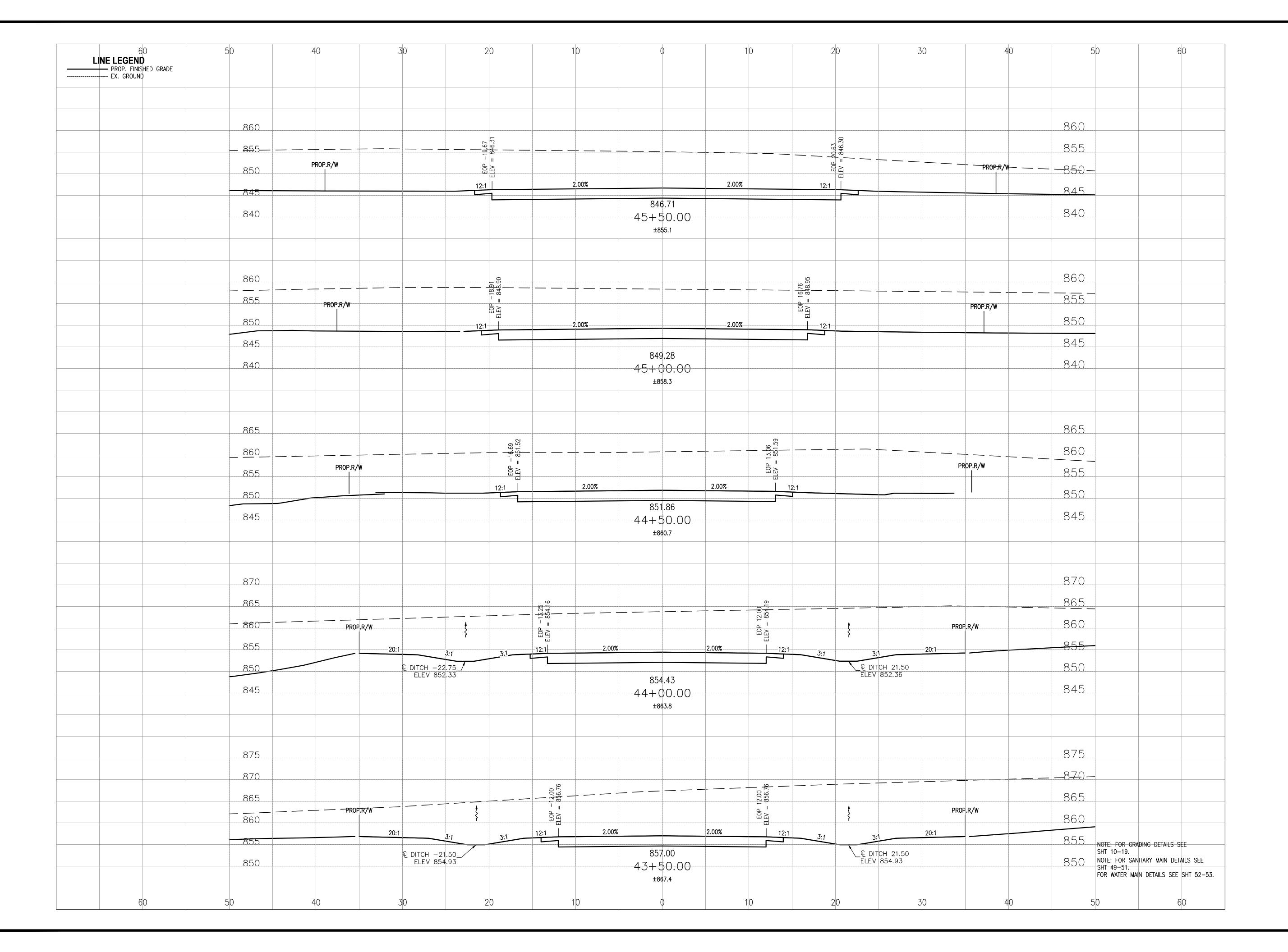
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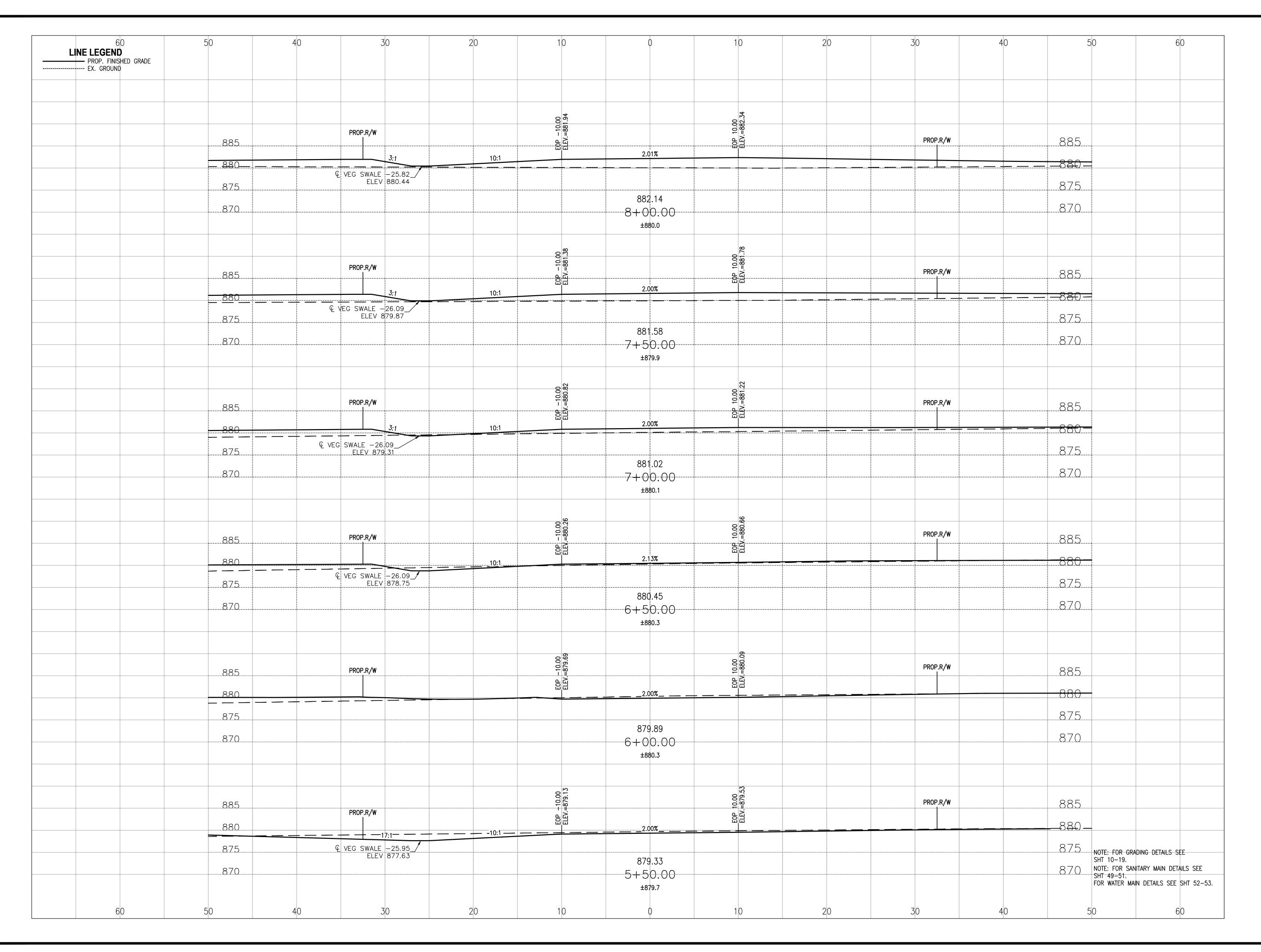
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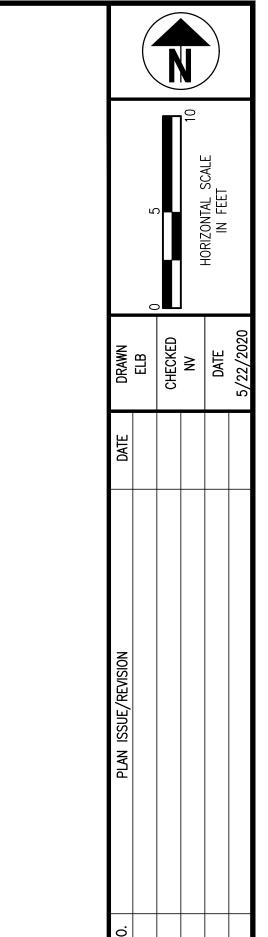
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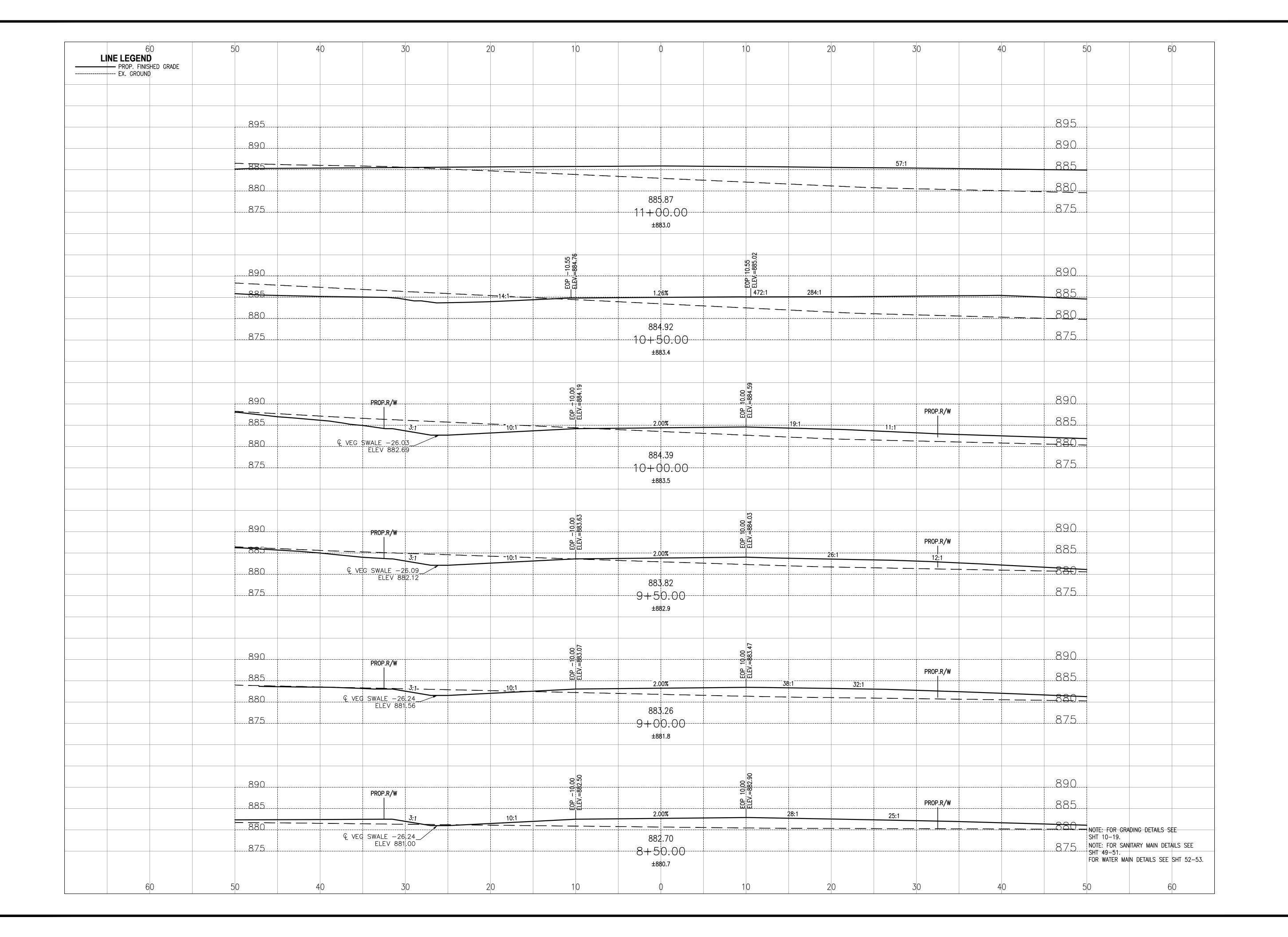




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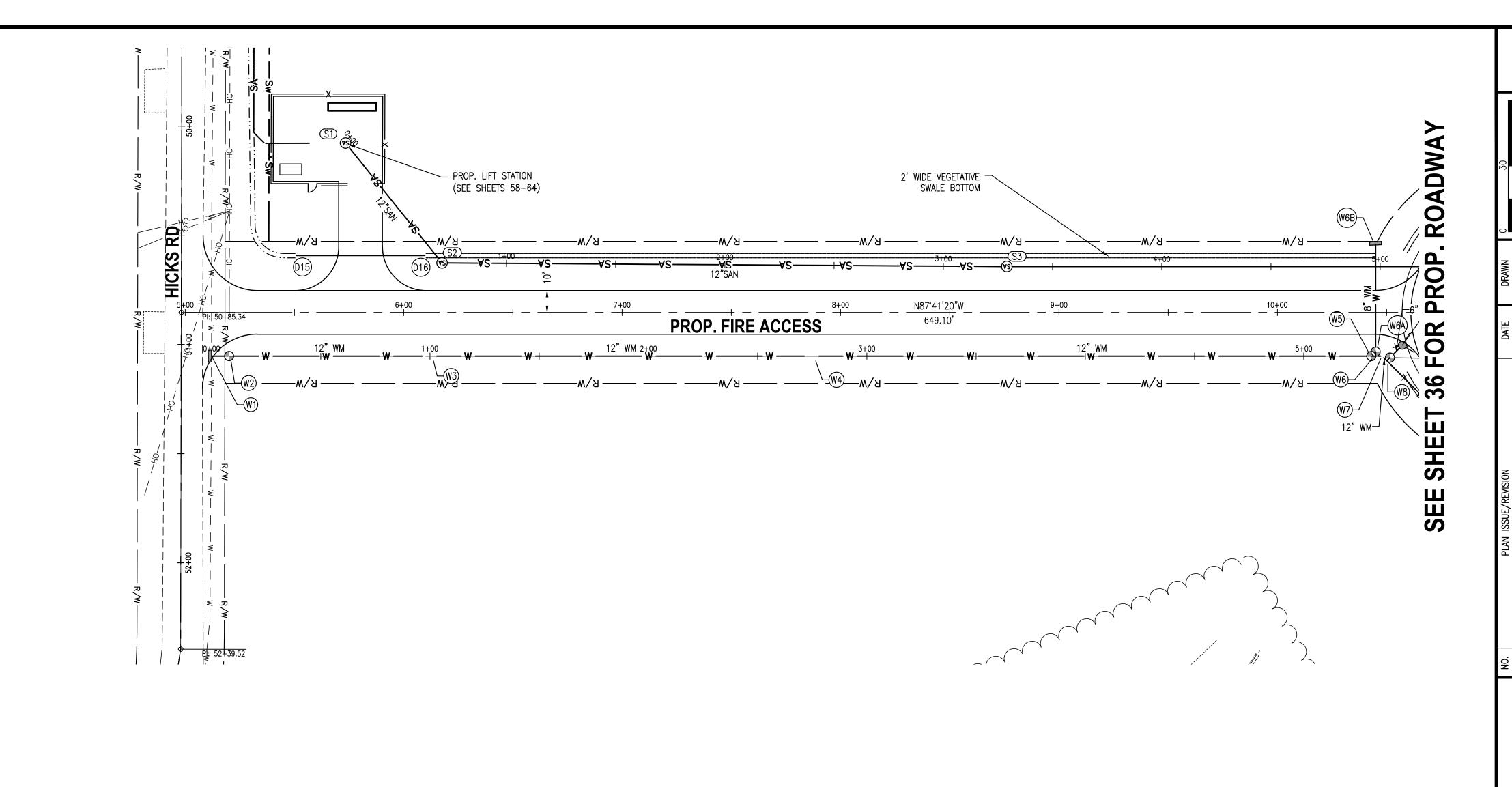
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STA. 6+17.57, 22.7L FIRE ACCESS RD

STA. 8+76.10, 21.0L FIRE ACCESS RD

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18"x12" TAPPING SLEEVE STA. 5+12.06, 20.0R FIRE ACCESS RD & VALVE

D15 CULVERT

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S1 WET WELL

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S3 SAN. MH.

12" GATE VALVE VERT DEFLECTION

VERTICAL DEFLECTION

VERTICAL DEFLECTION

W5 12" GATE VALVE

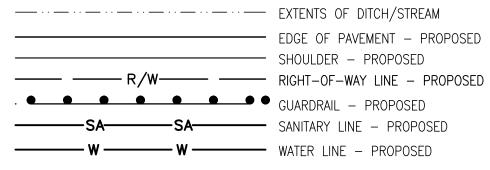
12" GATE VALVE

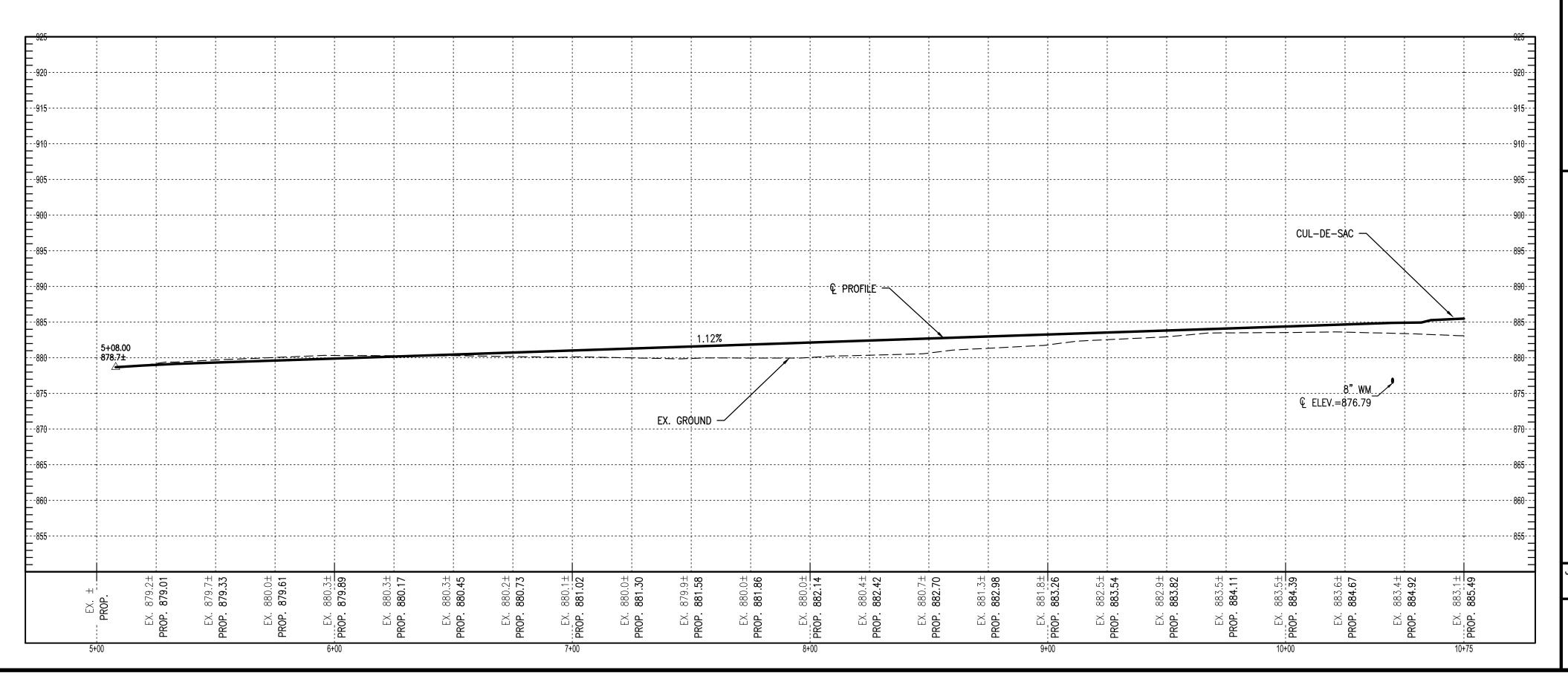
12"X6" TEE VERT DEFLECTION

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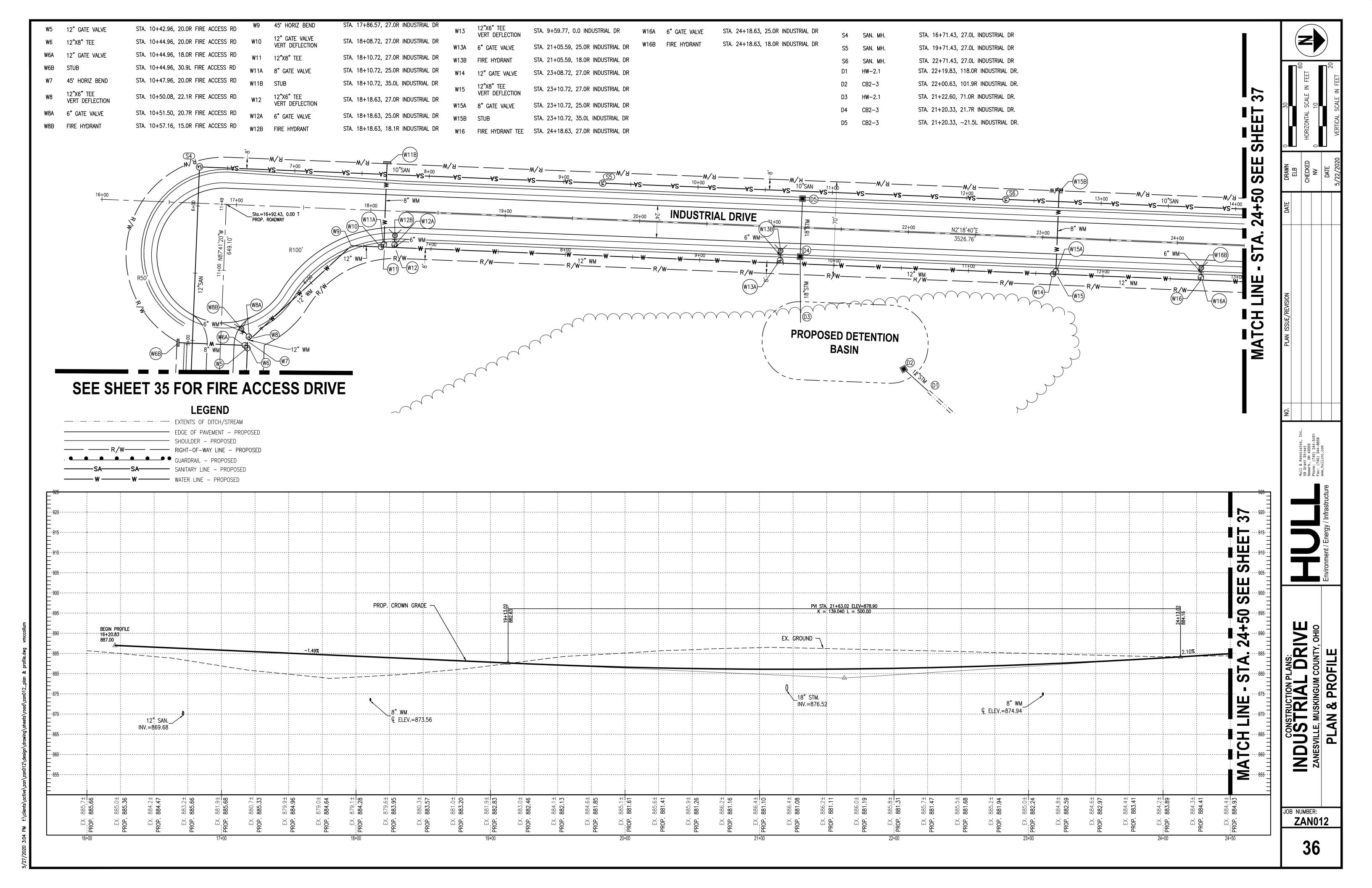
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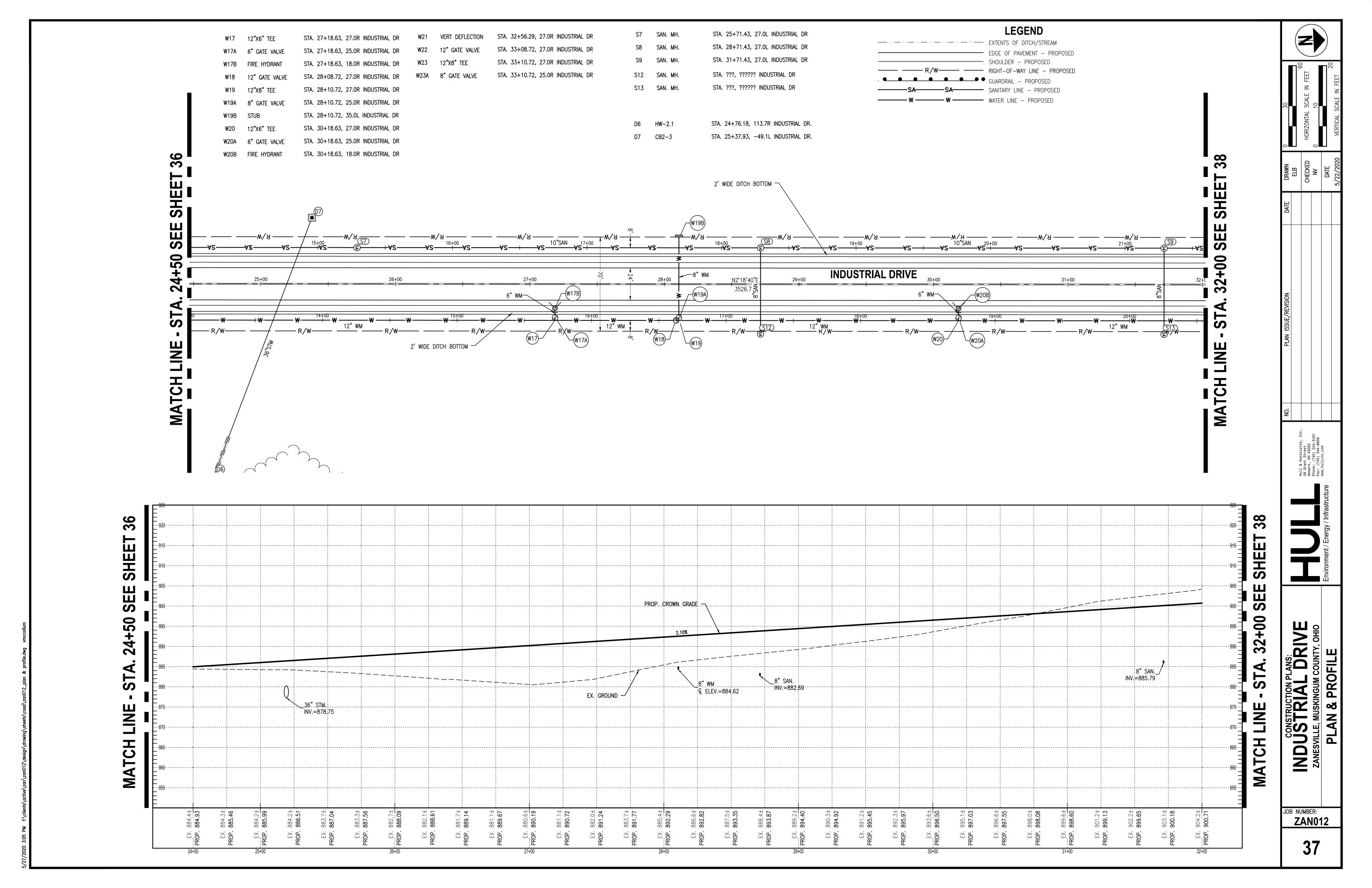


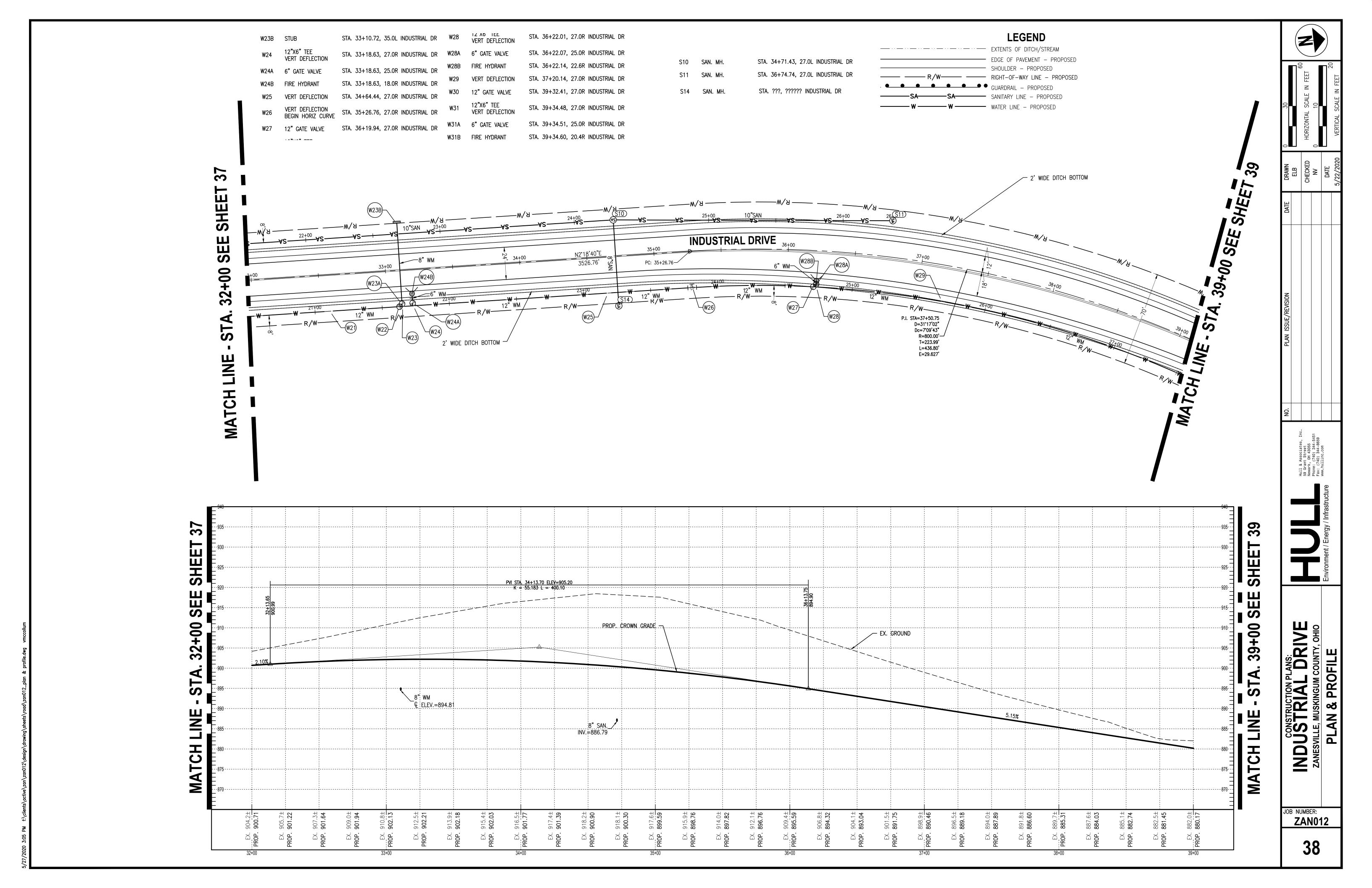


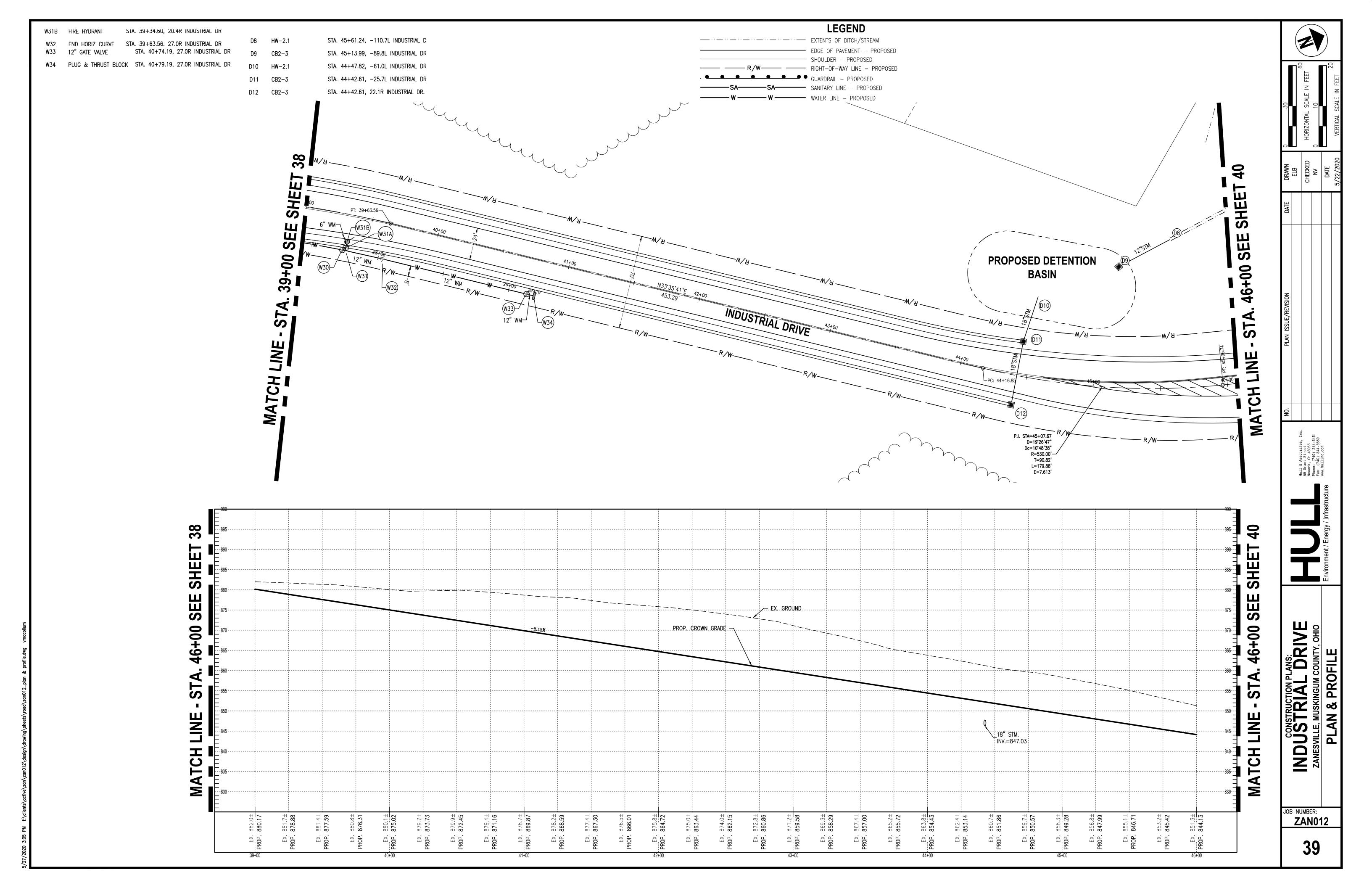
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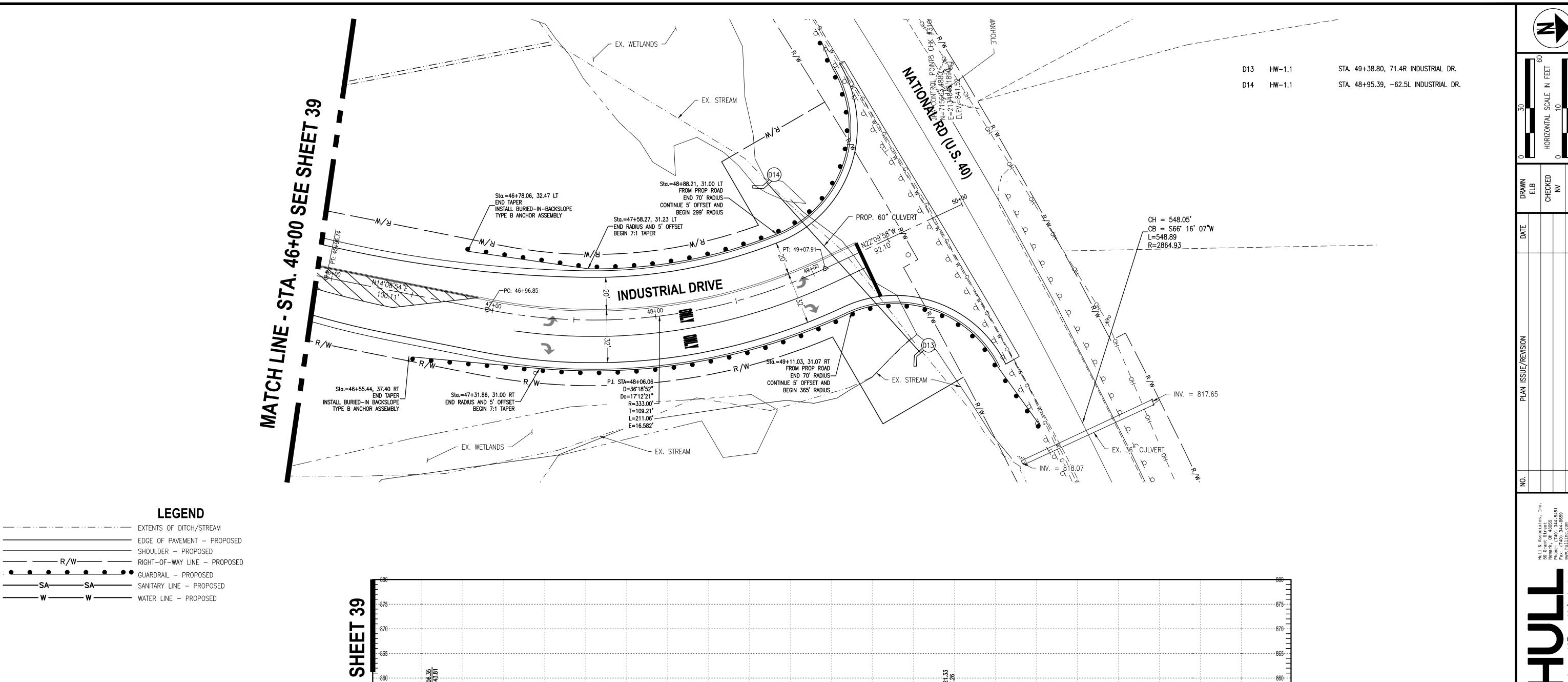
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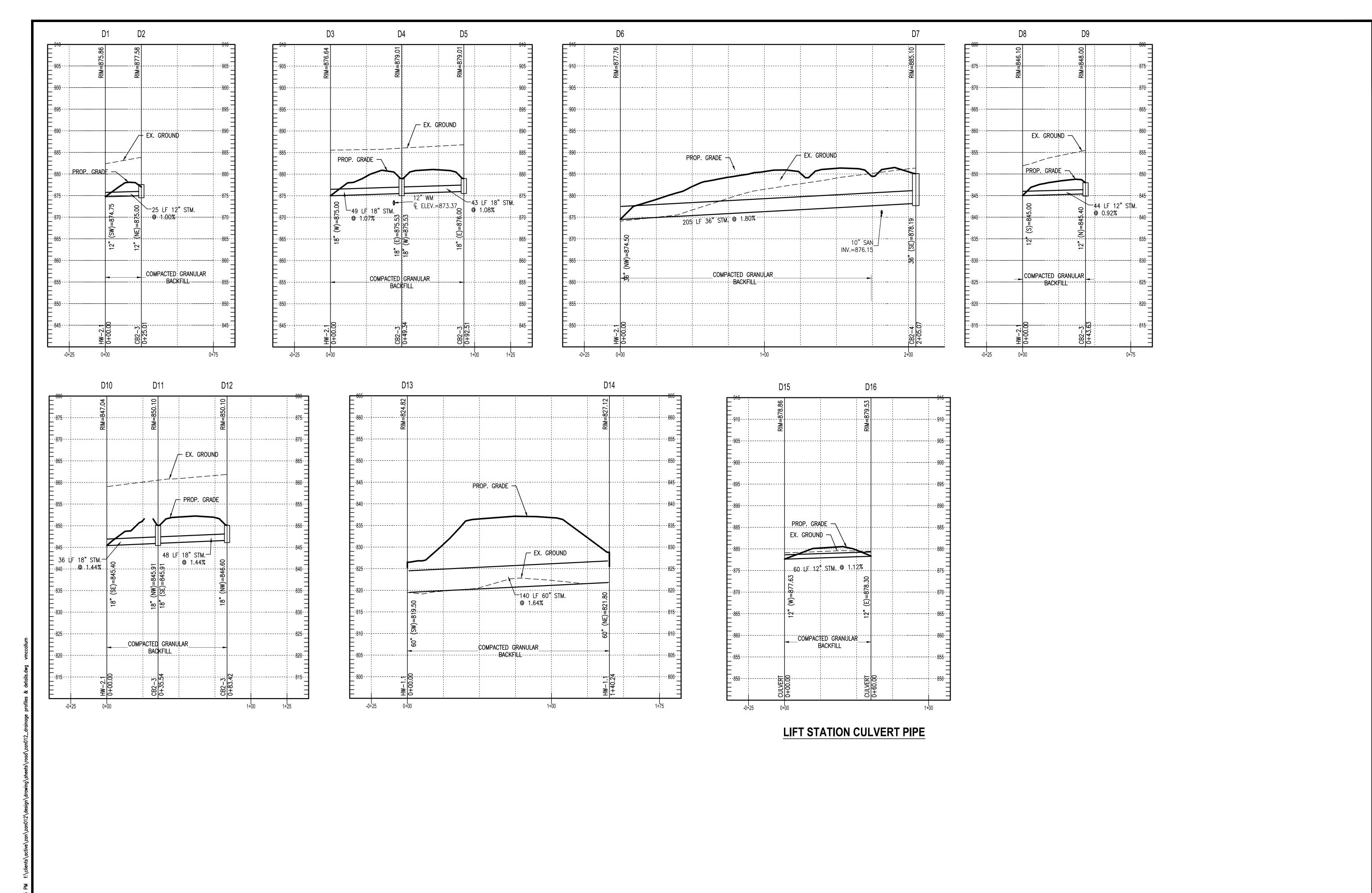






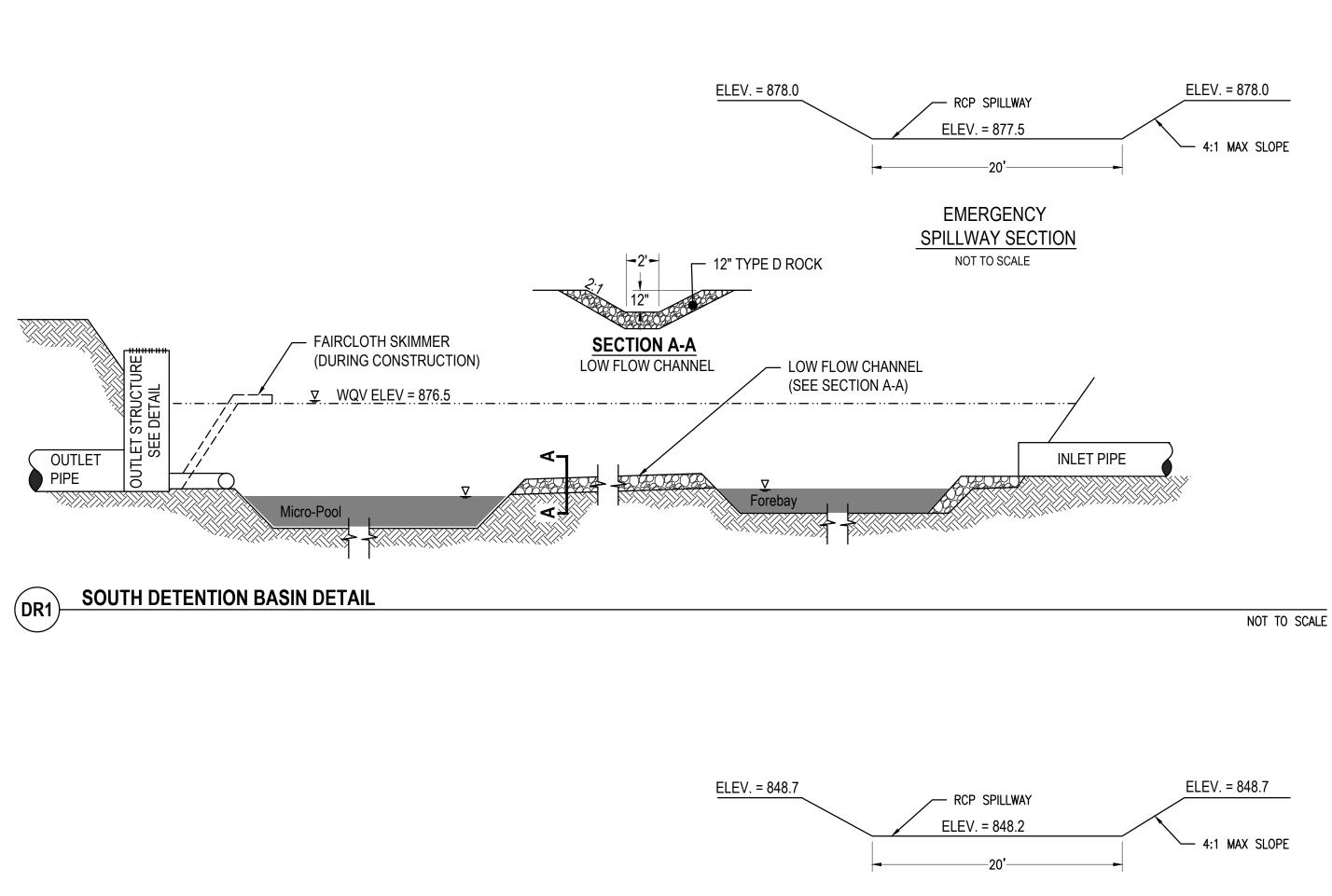
SEE PVI STA. 47+63.84 ELEV=835.70 K = 51.292 L = 314.98 46+00 EX. GROUND END PROFILE 50+00.00 838.05 PROP. CROWN GRADE — -STA. 0.99% **MATCH LINE** 60" STM.\_\_ INV.=823.22 835.8± **837.19** 845.6± 839.84 824.7± **837.01** 844.3± **839.07** EX. :

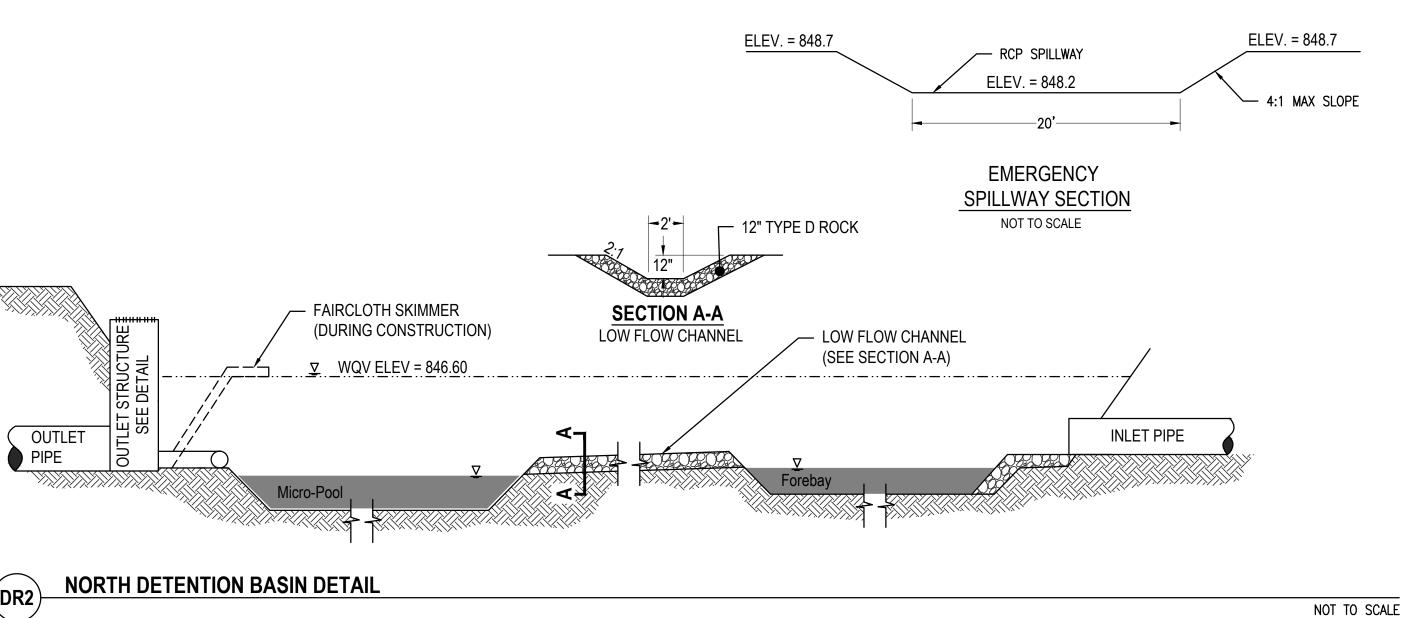
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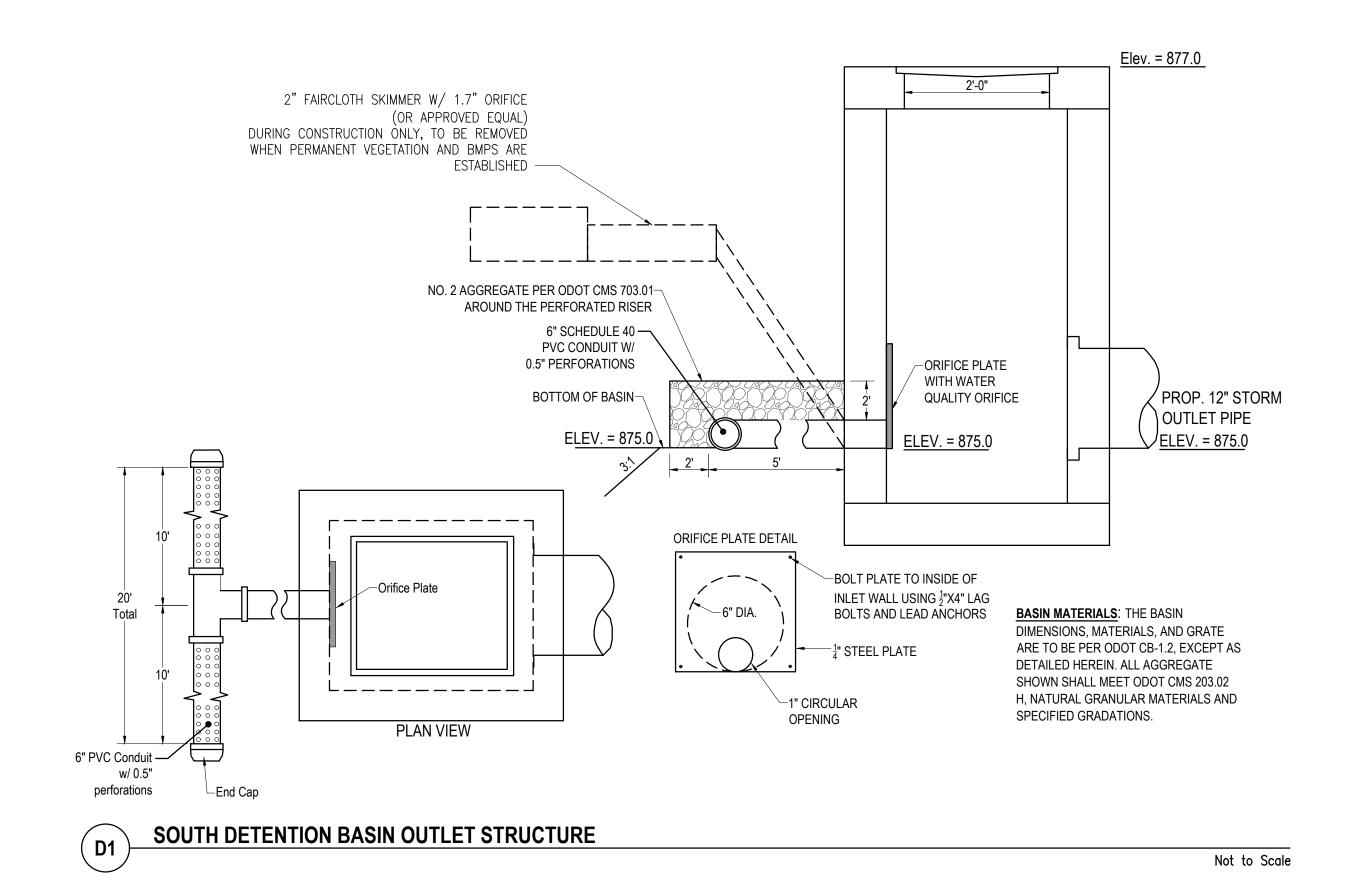


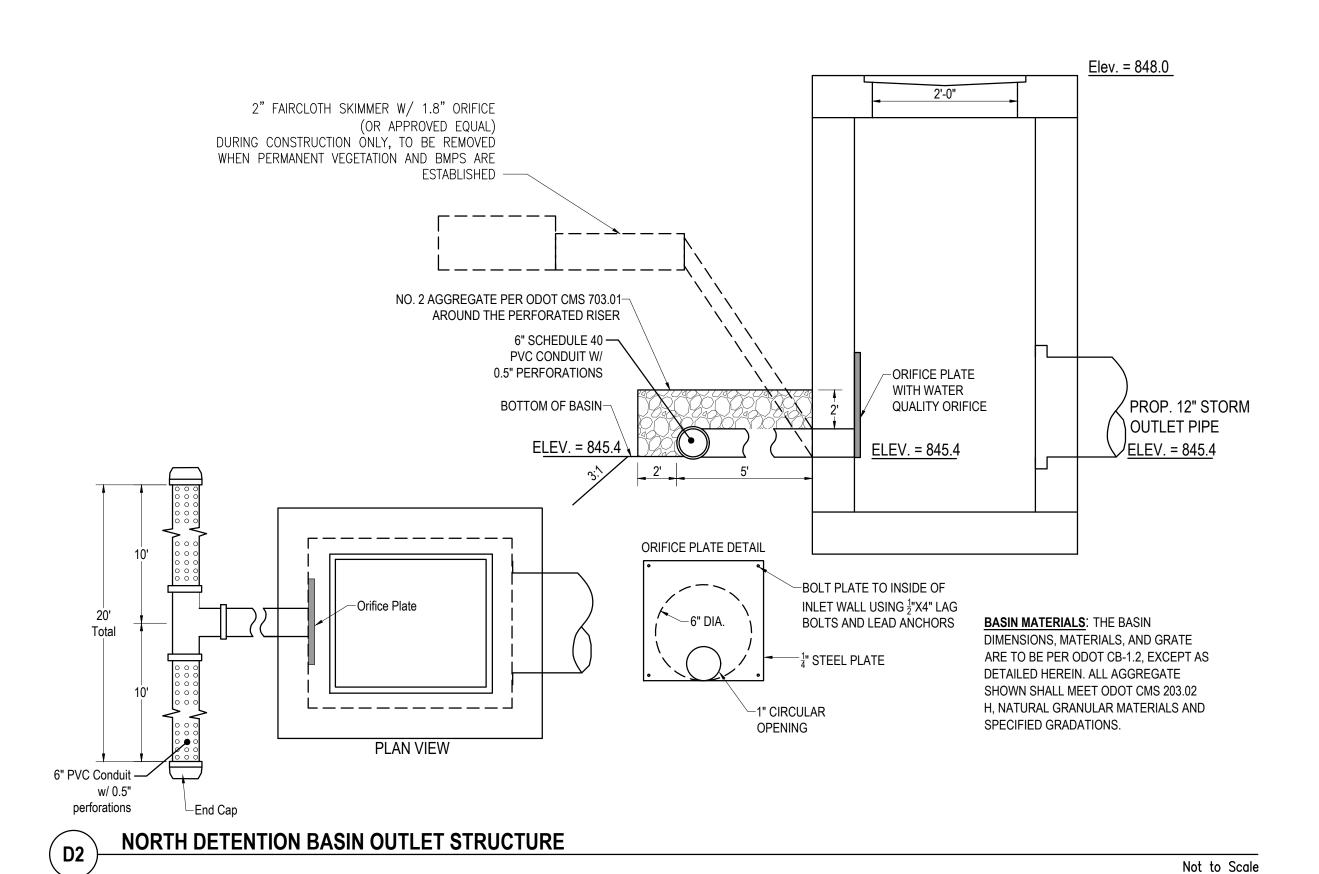
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DRAINAGE PROFILES & DETAILS





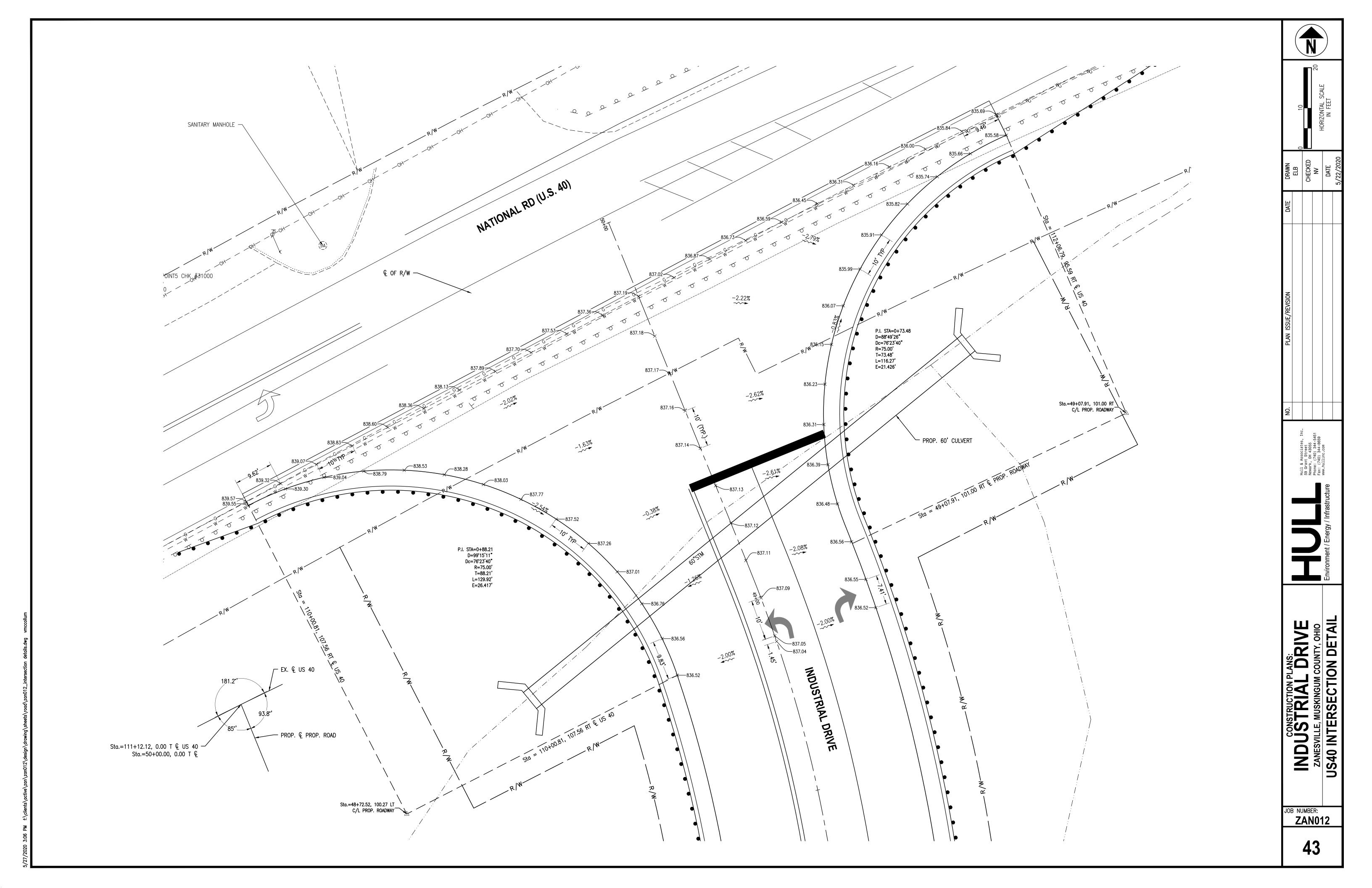


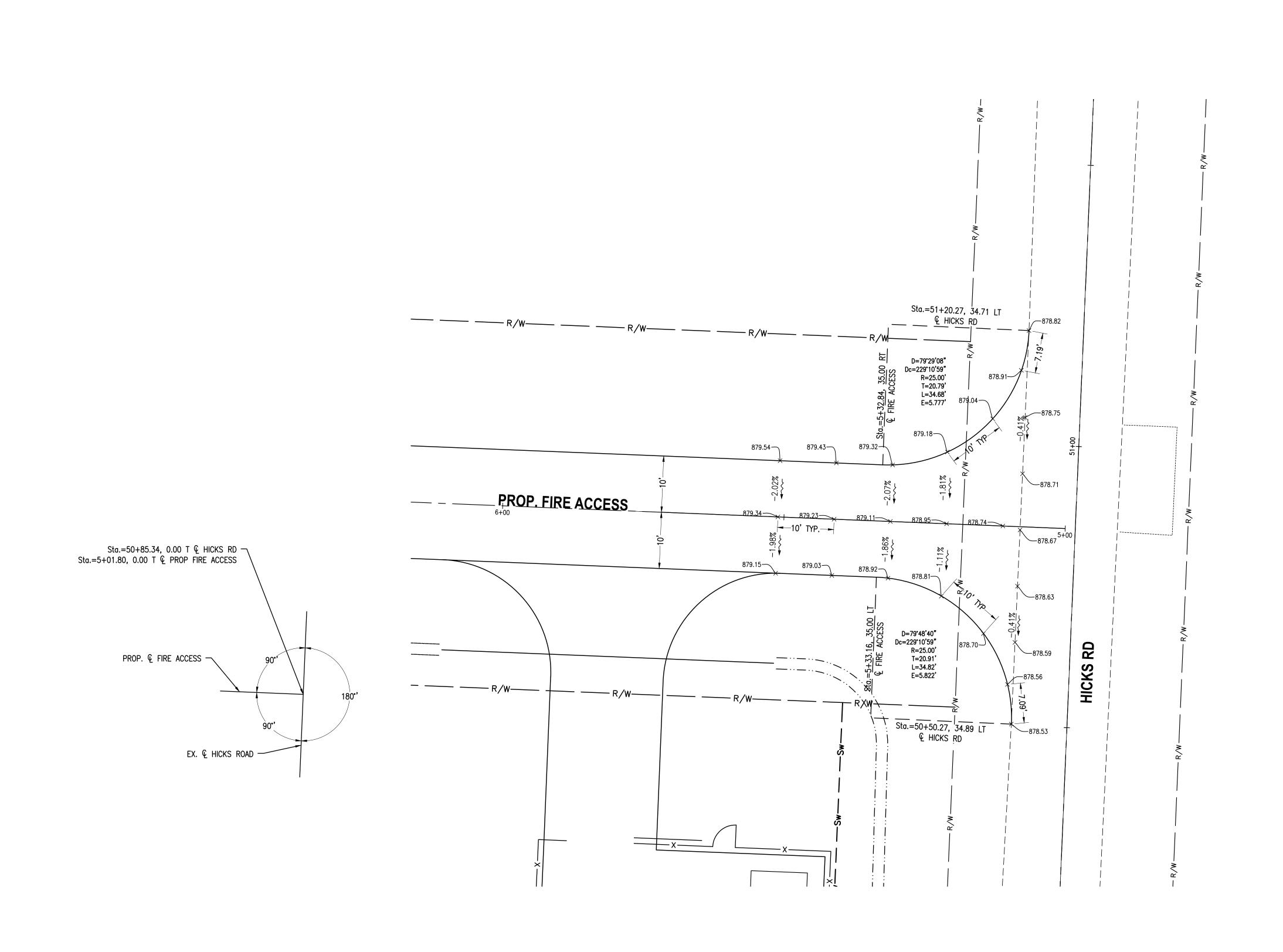


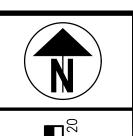
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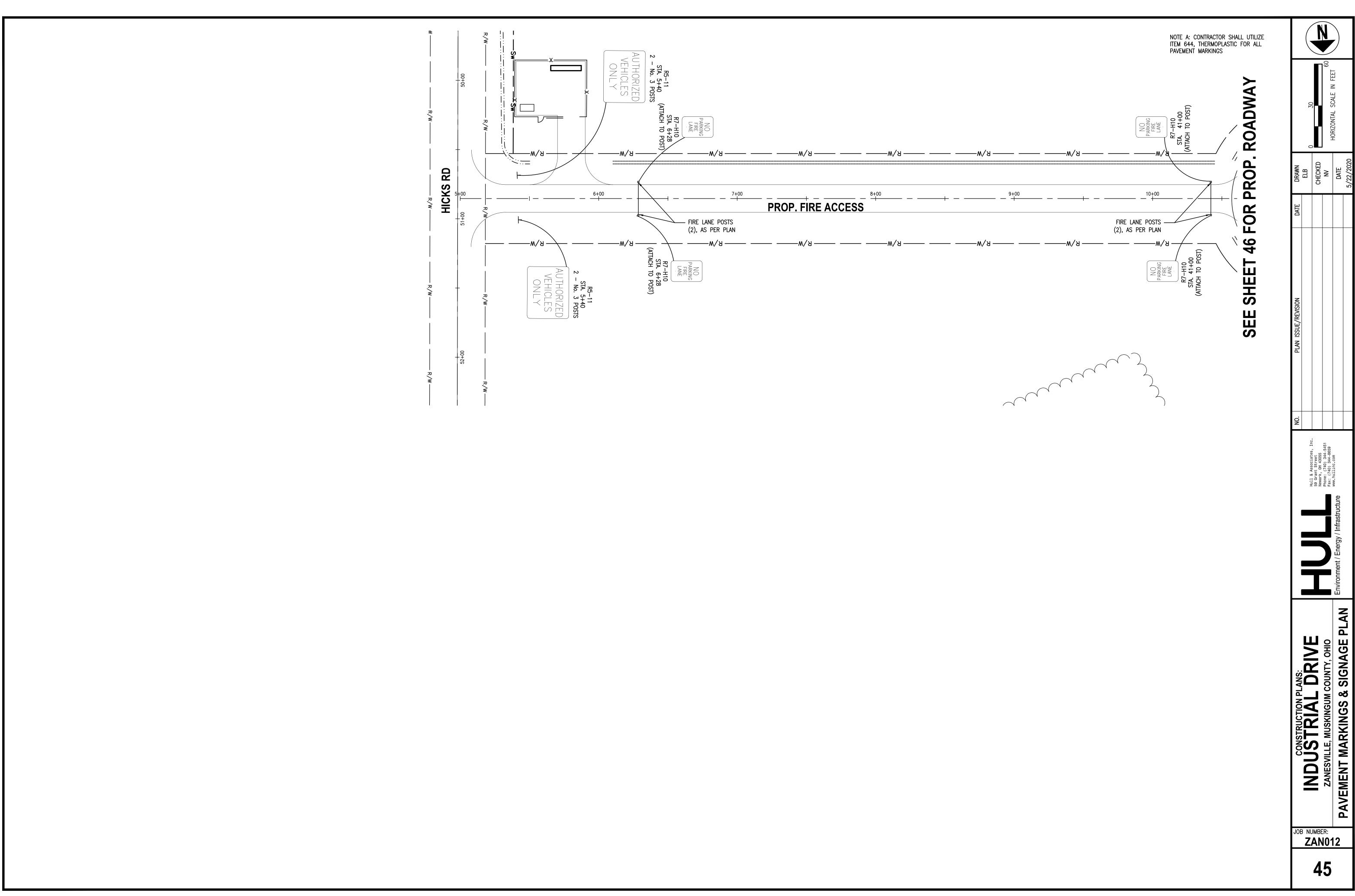
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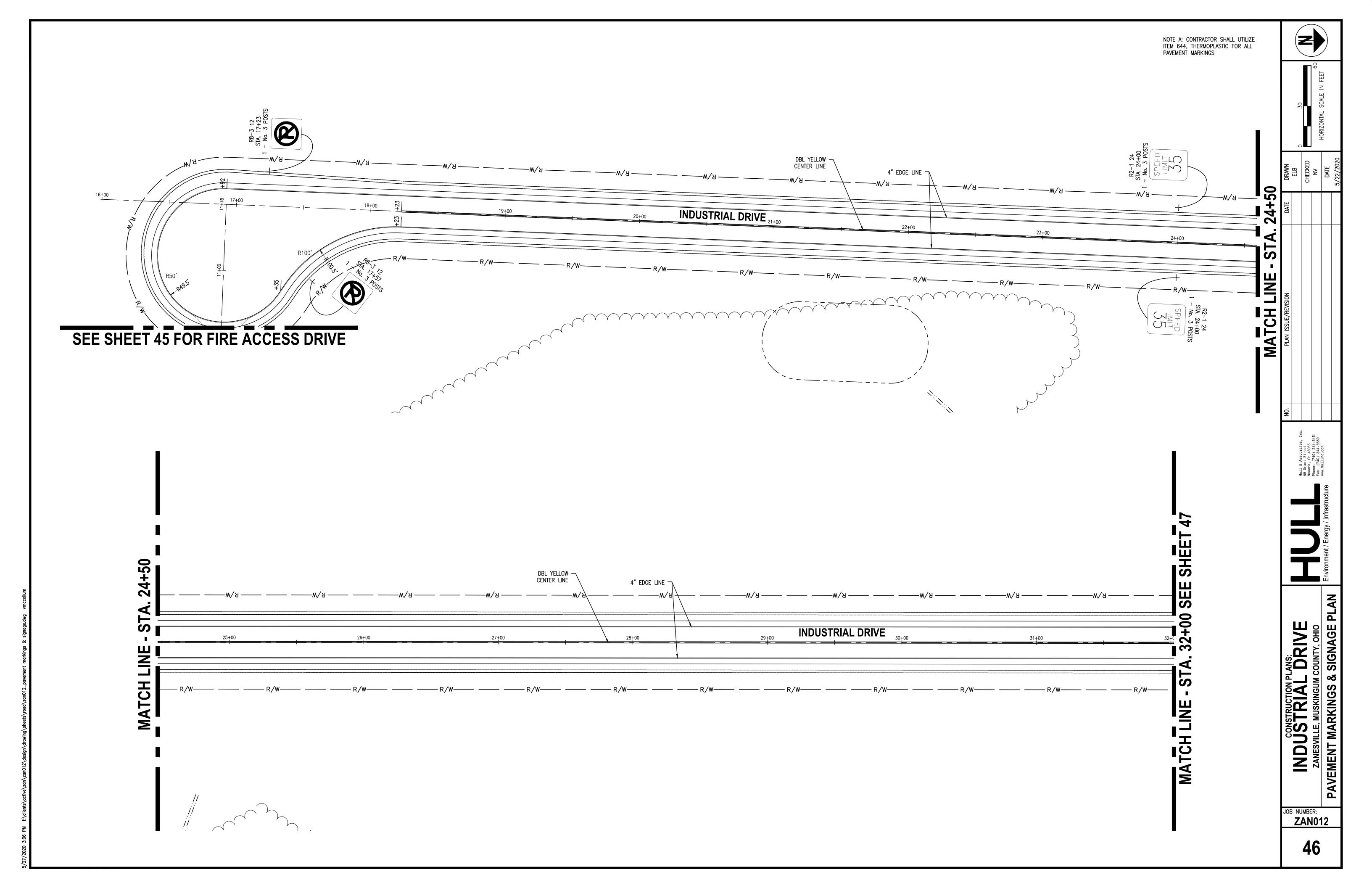
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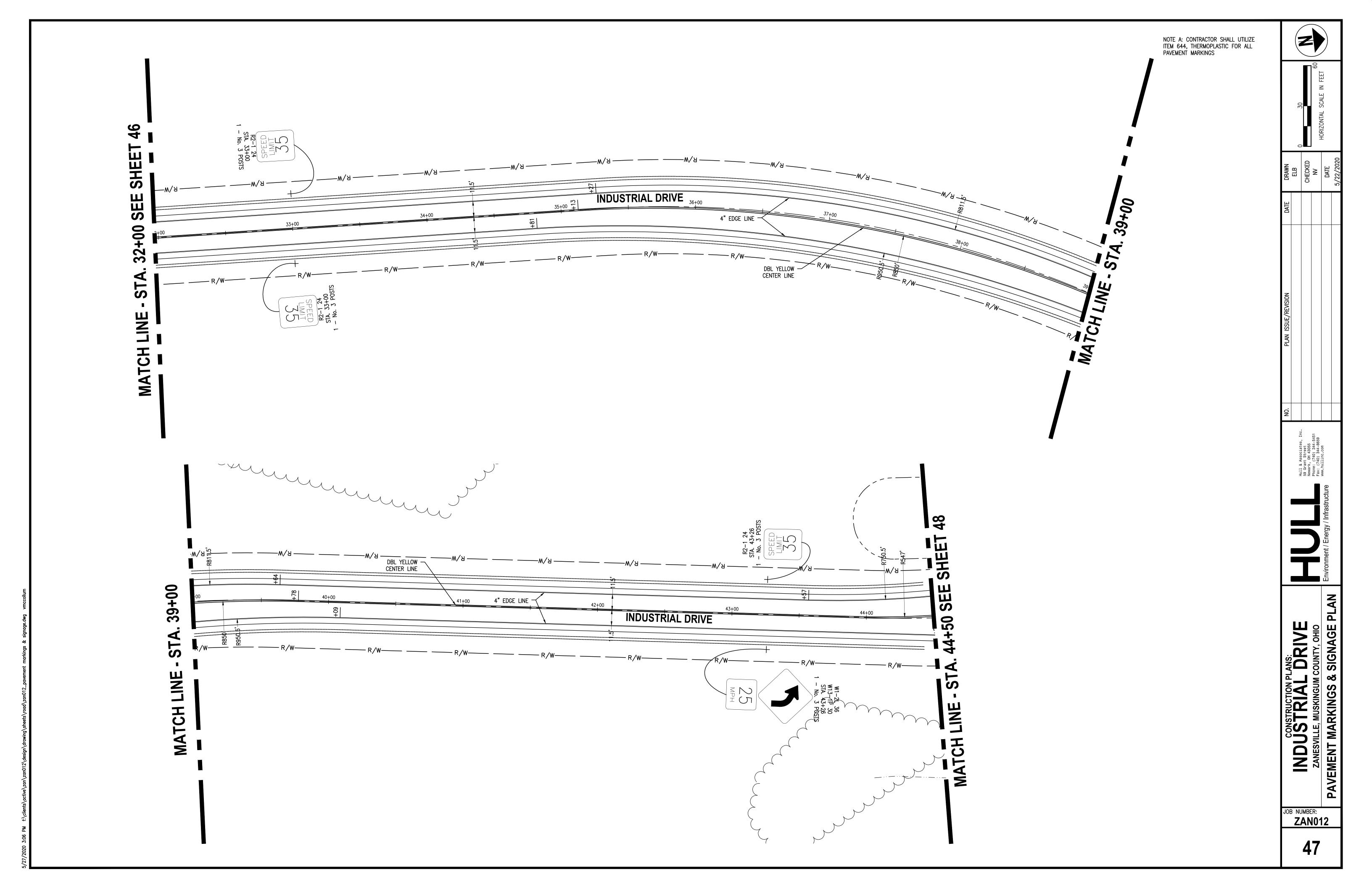
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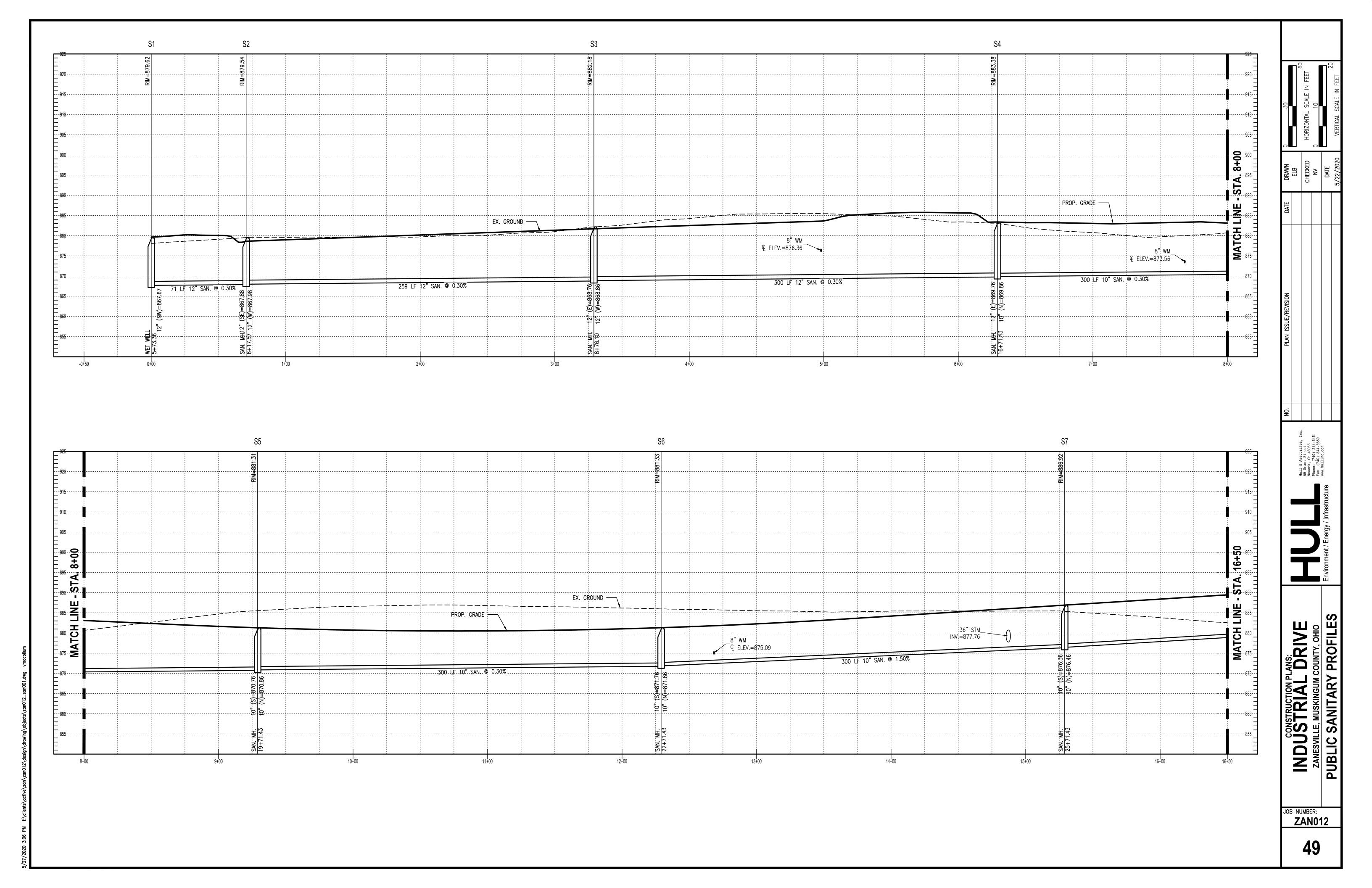
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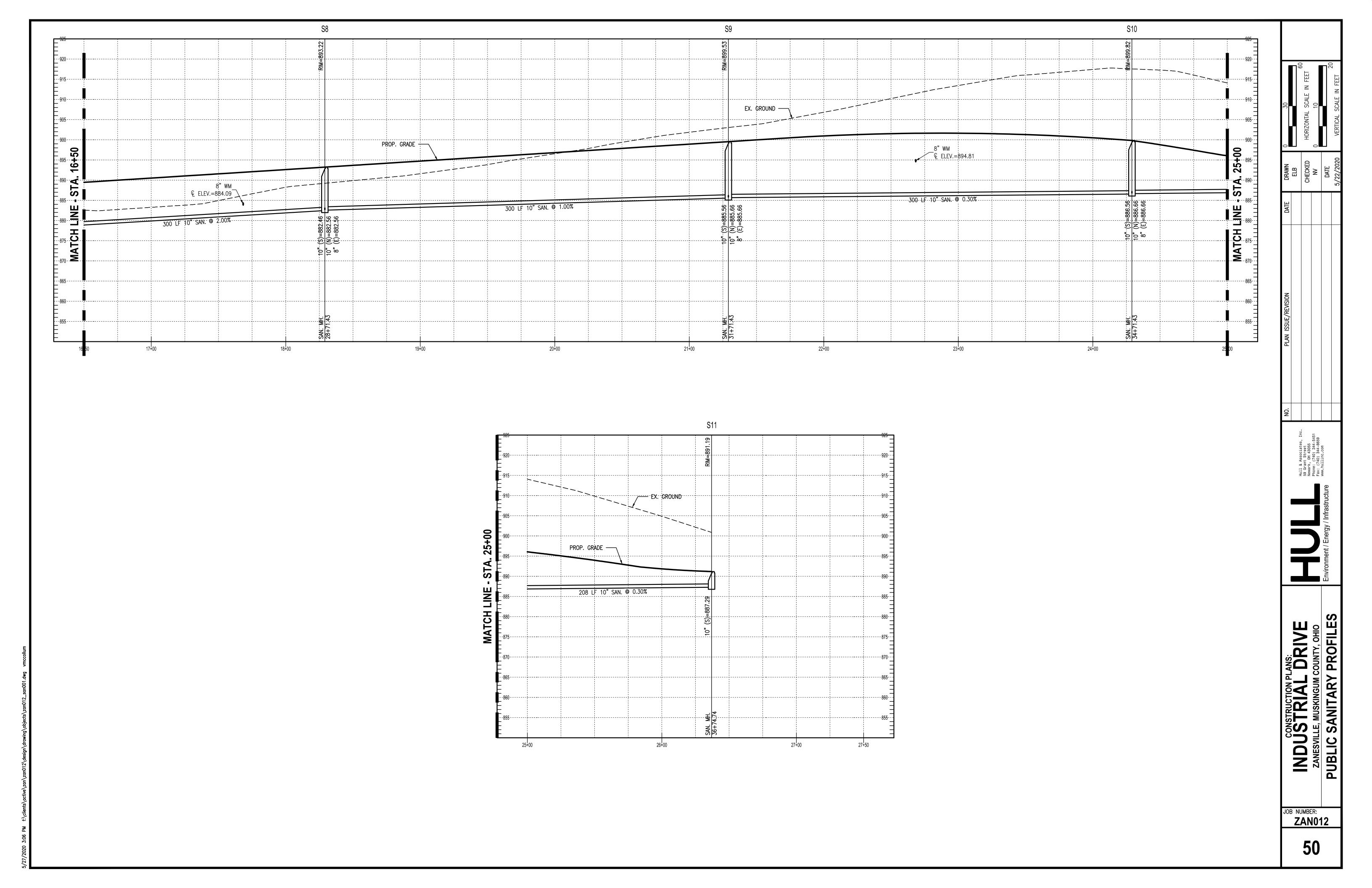


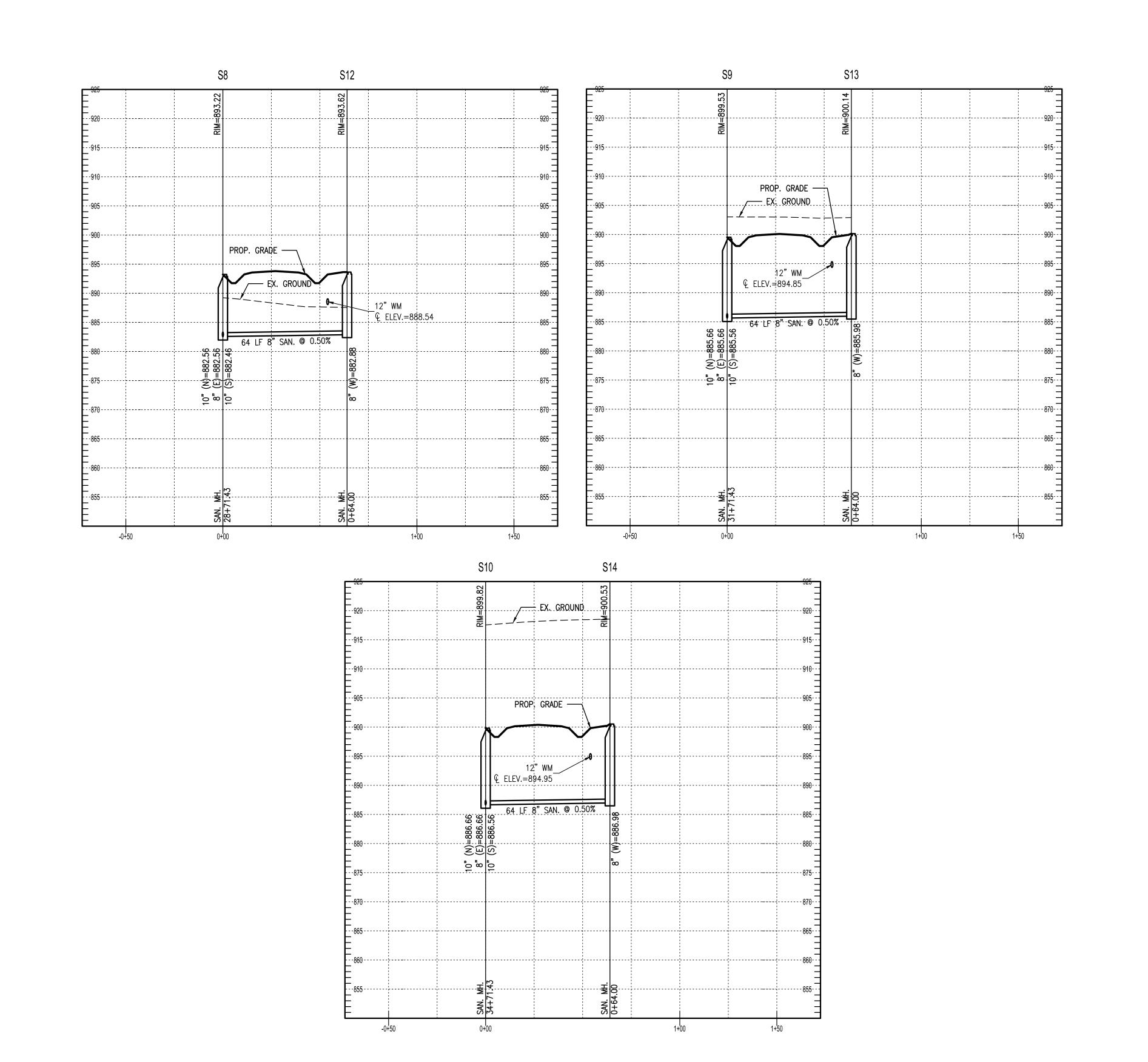




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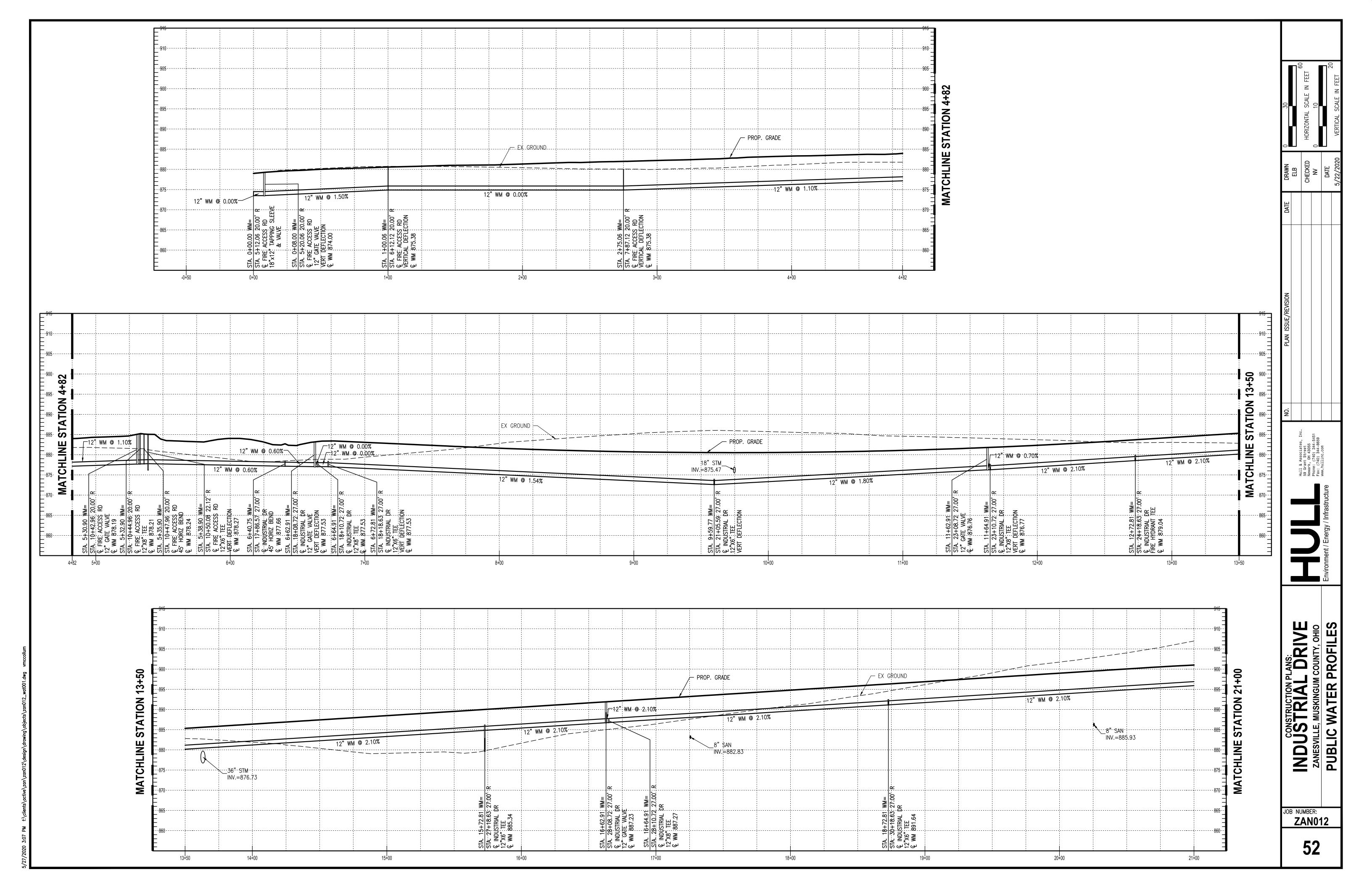


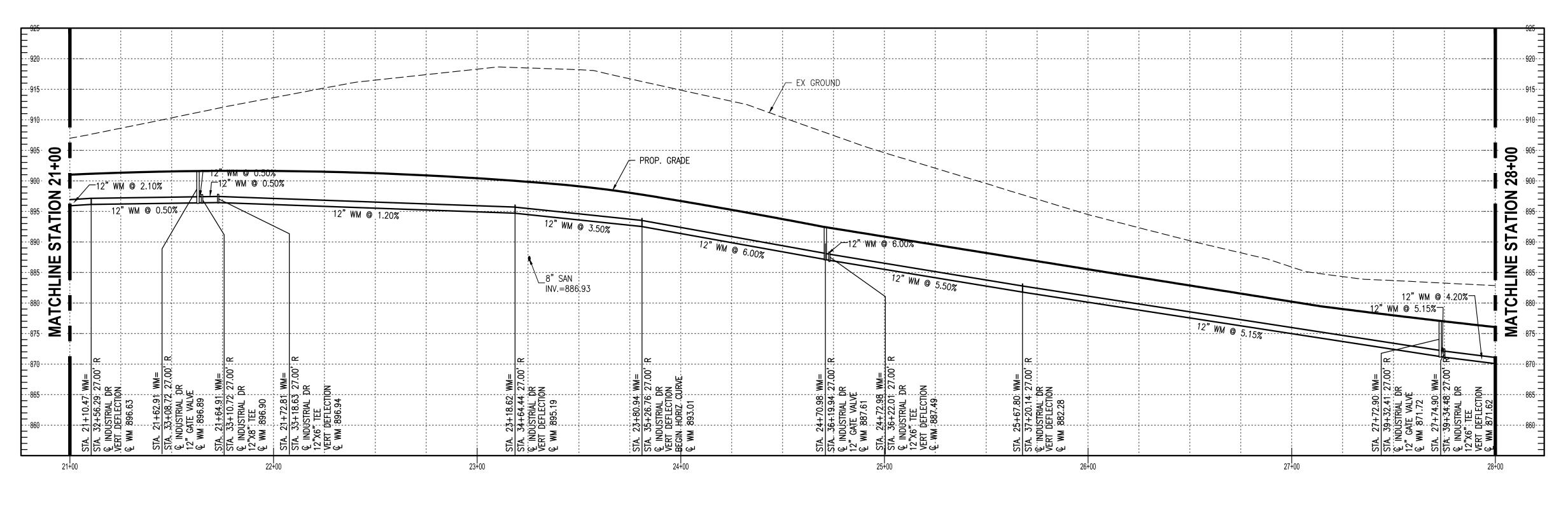


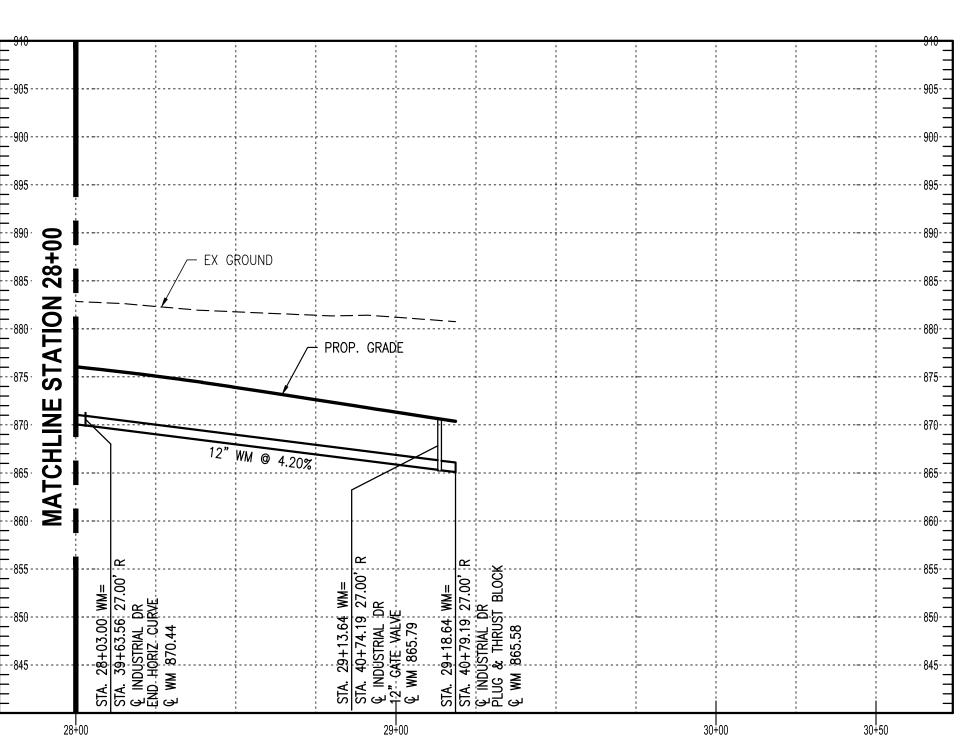
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INDUSTRUCTION PLANS:
INDUSTRIAL DRIVE
ZANESVILLE, MUSKINGUM COUNTY, OHIO
PUBLIC SANITARY PROFILES



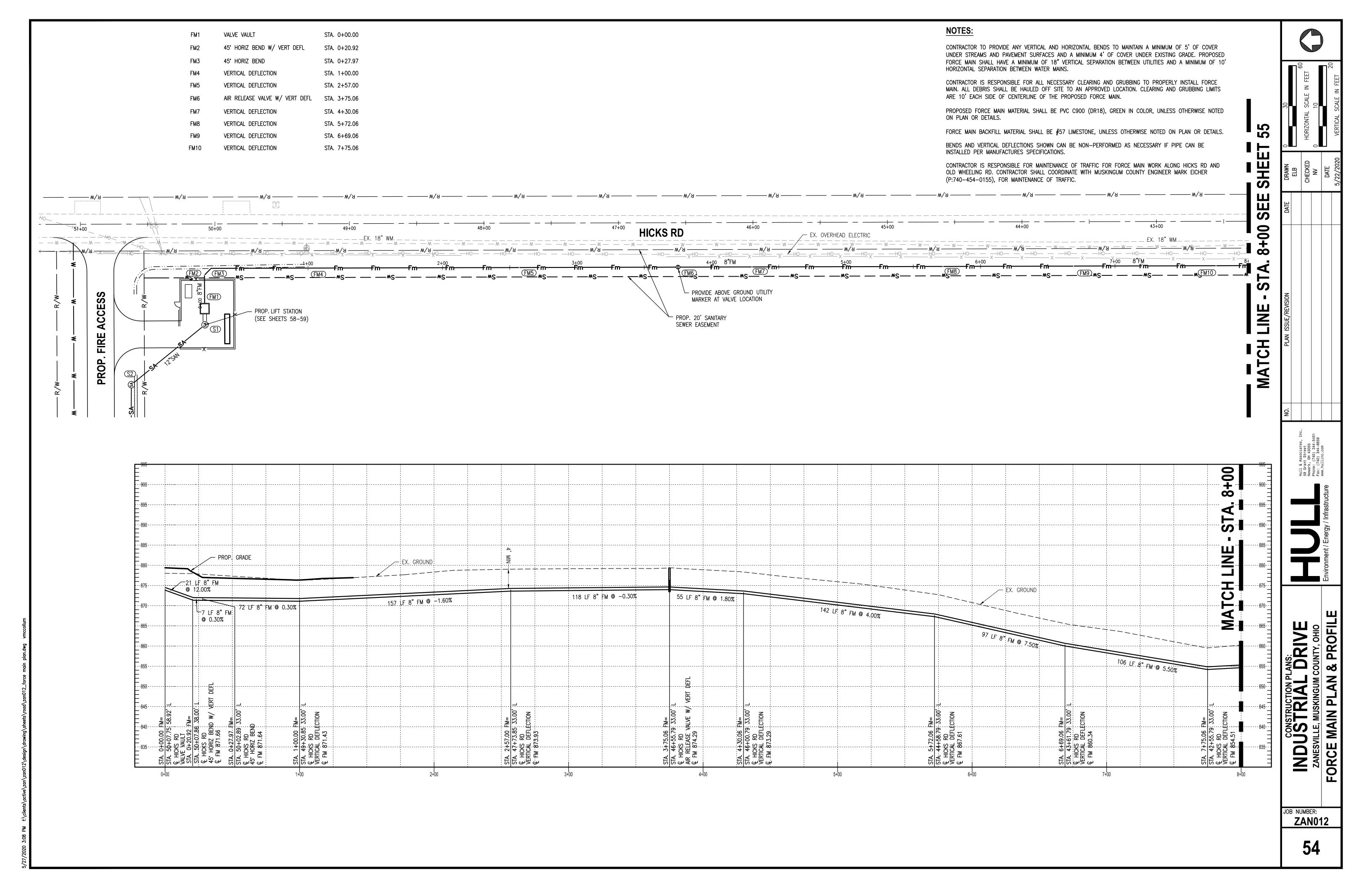


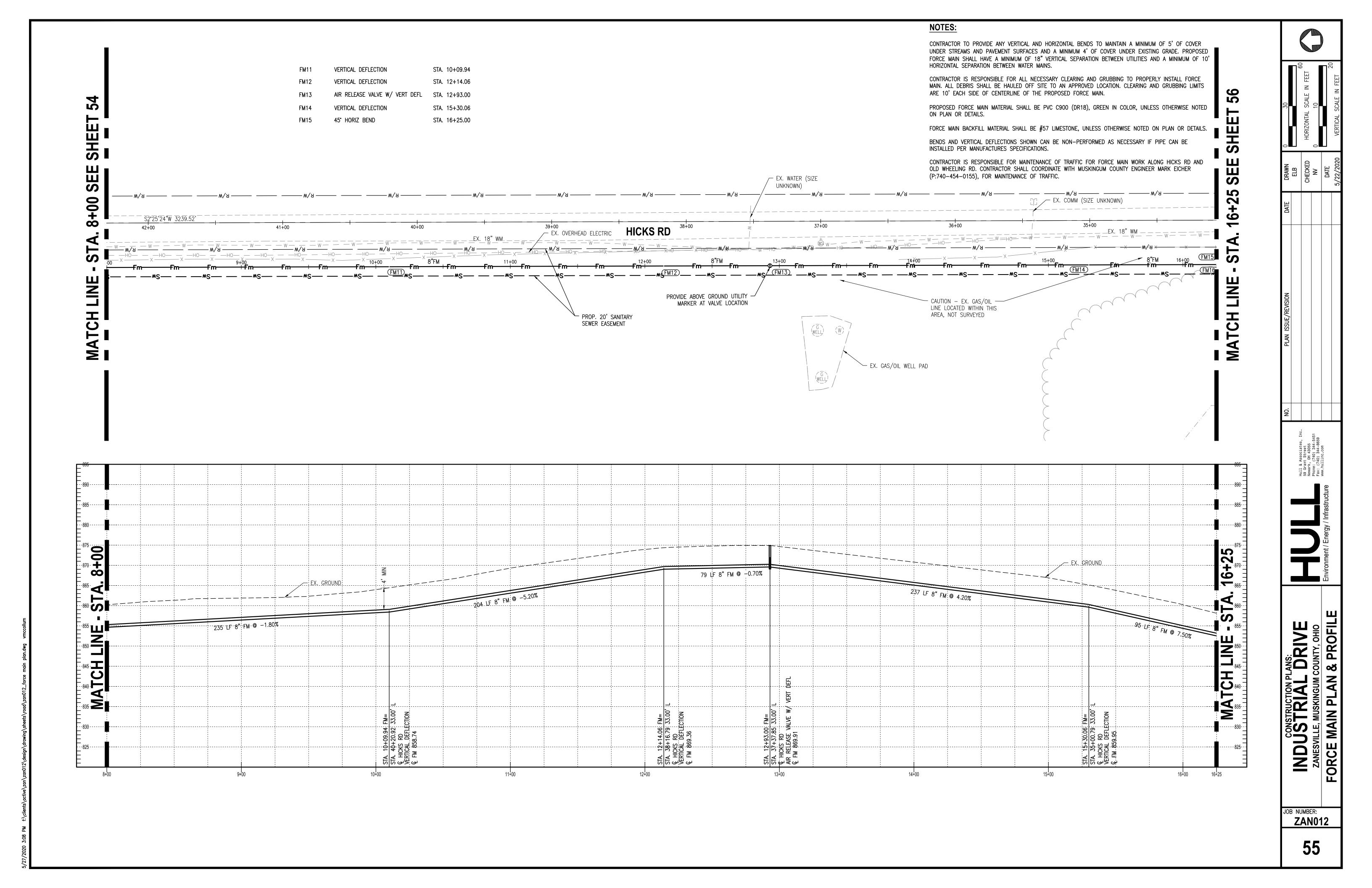


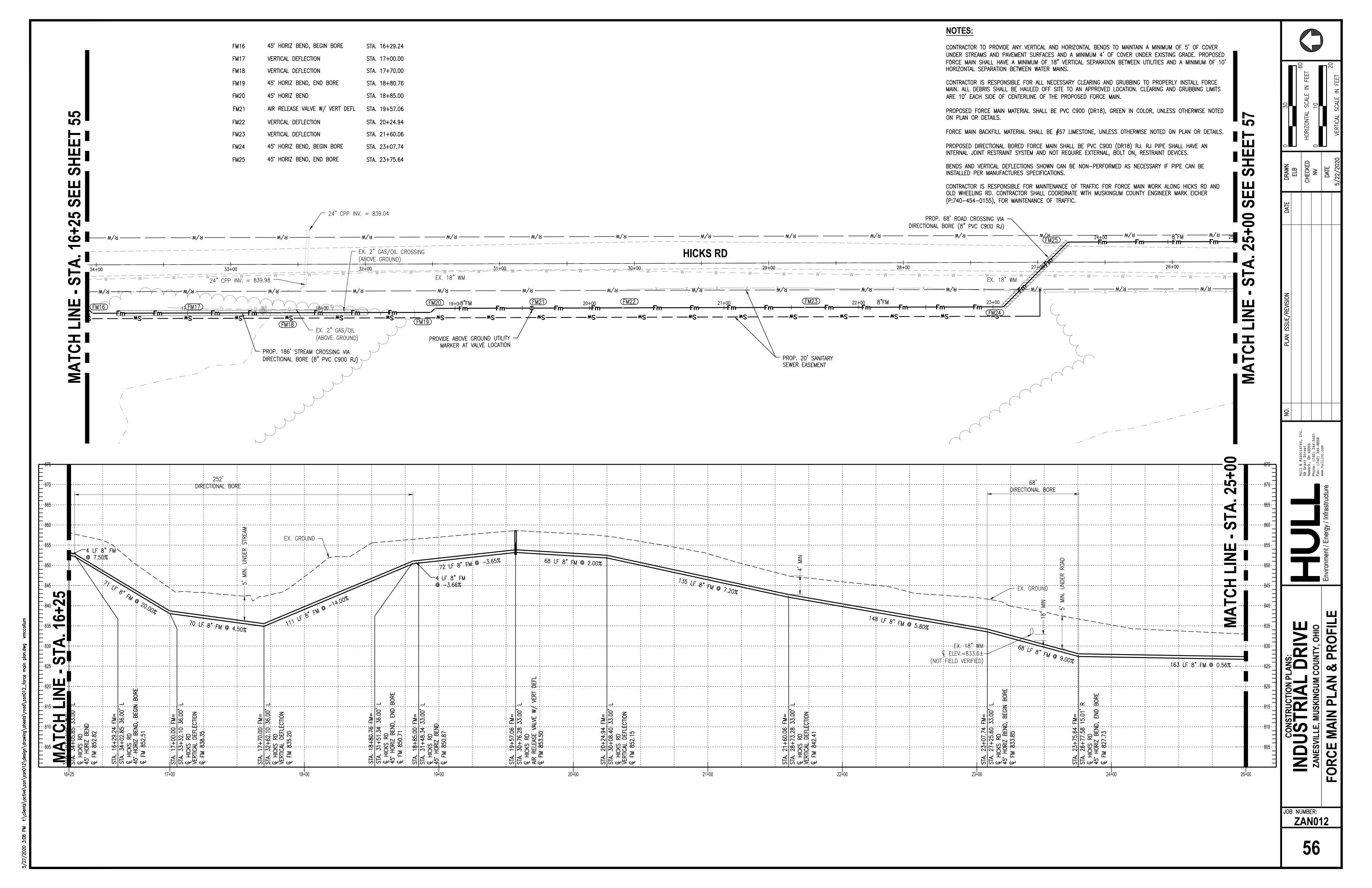
Hull & Associates, Inc. 59 Grant Street
No. PLAN ISSUE/REVISION
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Newark, OH 43055
Phone: (740) 344-5451
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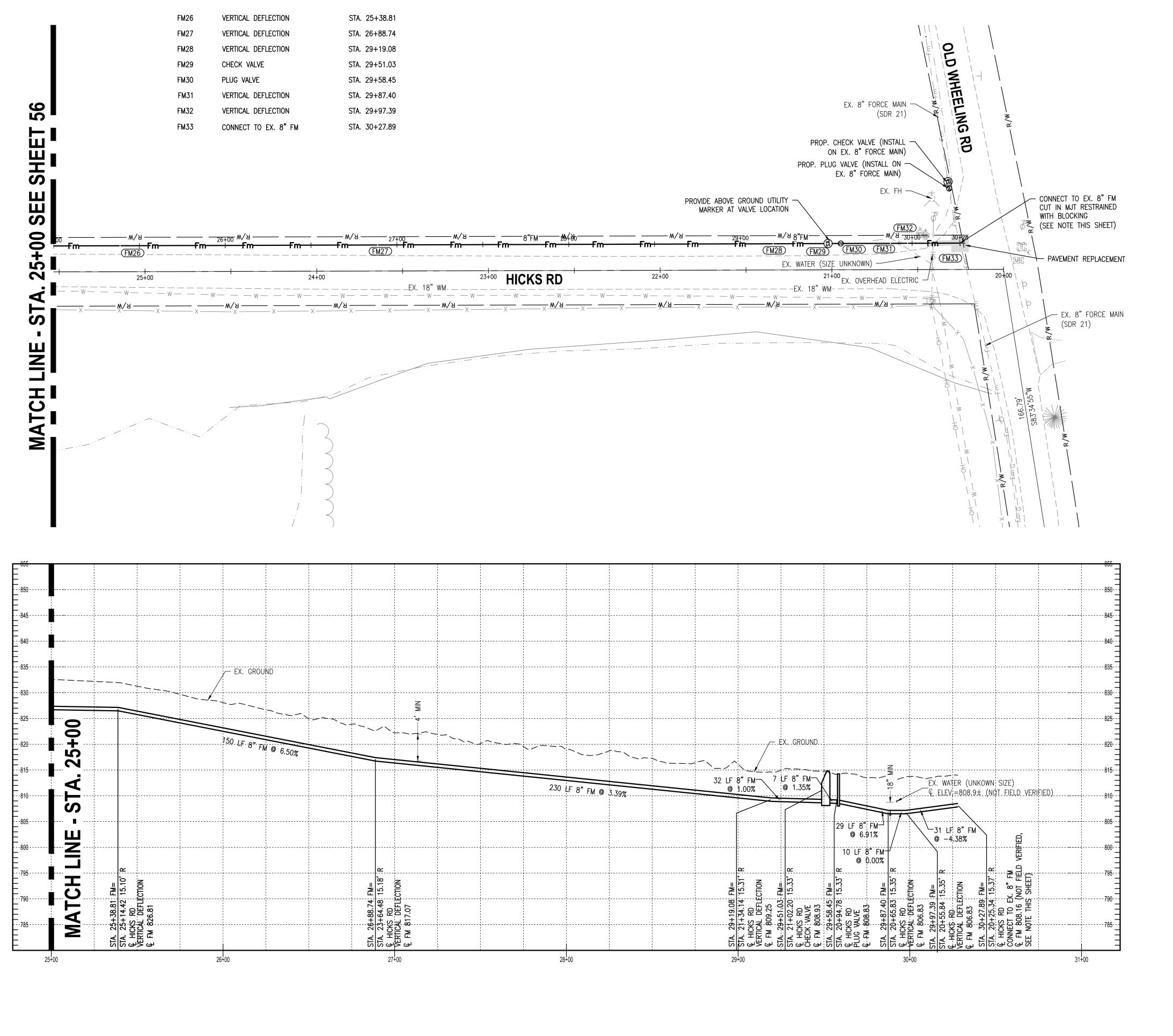
Environment / Energy / Infrastructure

INDUSTRUCTION PLANS:
INDUSTRIAL DRIVE
ZANESVILLE, MUSKINGUM COUNTY, OHIO
PUBLIC WATER PROFILES









# NOTES:

CONTRACTOR TO PROVIDE ANY VERTICAL AND HORIZONTAL BENDS TO MAINTAIN A MINIMUM OF 5' OF COVER UNDER STREAMS AND PAVEMENT SURFACES AND A MINIMUM 4' OF COVER UNDER EXISTING GRADE. PROPOSED FORCE MAIN SHALL HAVE A MINIMUM OF 18" VERTICAL SEPARATION BETWEEN UTILITIES AND A MINIMUM OF 10' HORIZONTAL SEPARATION BETWEEN WATER MAINS.

CONTRACTOR IS RESPONSIBLE FOR ALL NECESSARY CLEARING AND GRUBBING TO PROPERLY INSTALL FORCE MAIN. ALL DEBRIS SHALL BE HAULED OFF SITE TO AN APPROVED LOCATION. CLEARING AND GRUBBING LIMITS ARE 10' EACH SIDE OF CENTERLINE OF THE PROPOSED FORCE MAIN.

PROPOSED FORCE MAIN MATERIAL SHALL BE PVC C900 (DR18), GREEN IN COLOR, UNLESS OTHERWISE NOTED ON PLAN OR DETAILS

FORCE MAIN BACKFILL MATERIAL SHALL BE #57 LIMESTONE, UNLESS OTHERWISE NOTED ON PLAN OR DETAILS.

BENDS AND VERTICAL DEFLECTIONS SHOWN CAN BE NON-PERFORMED AS NECESSARY IF PIPE CAN BE INSTALLED PER MANUFACTURES SPECIFICATIONS.

PRIOR TO CONSTRUCTION, CONTRACTOR SHALL FIELD VERIFY EXISTING SANITARY FORCE MAIN HORIZONTAL LOCATION AND VERTICAL ELEVATION AT PROPOSED FORCE MAIN CONNECTION LOCATION AND SHALL NOTIFY ENGINEER OF FIELD VERIFIED ELEVATION AND COORDINATES. CONTRACTOR SHALL COORDINATE WITH MUSKINGUM COUNTY SEWER DEPARTMENT MANAGER STAN LUCAS (P:740-452-4940), FOR ALL WORK ASSOCIATED WITH EXISTING FORCE MAIN.

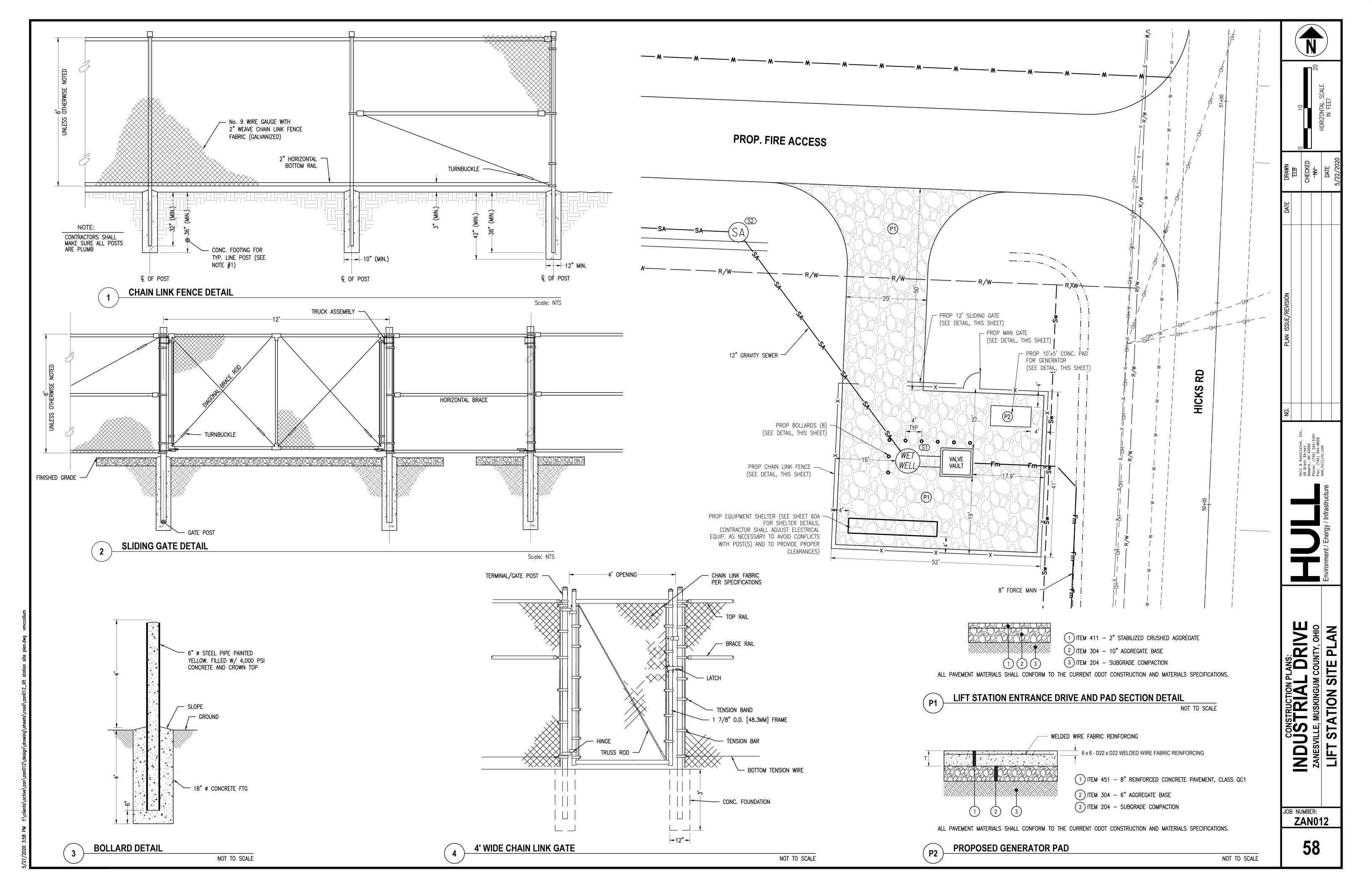
PRIOR TO ANY PROPOSED WORK ON EXISTING FORCE MAIN, INCLUDING

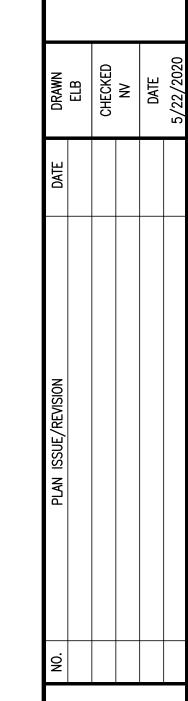
CONNECTION AND VALVES, CONTRACTOR SHALL NOTIFY MUSKINGUM COUNTY SEWER DEPARTMENT MANAGER STAN LUCAS (P:740-452-4940) AT LEAST 24 HOURS BEFORE BEGINNING WORK. CONTRACTOR SHALL COORDINATE WITH MUSKINGUM COUNTY SEWER DEPARTMENT ON EXISTING LIFT STATION SHUTDOWN WINDOW AND TIMELINE. EXISTING LIFT STATION AND FORCE MAIN SHUT DOWN WILL BE A MAX OF 4 HOURS AT ONE TIME. CONTRACTOR WILL NOT BE RESPONSIBLE FOR HAULING WASTE FROM EXISTING LIFT STATION DURING SHUTDOWN. CONTRACTOR WILL BE RESPONSIBLE FOR HAULING AND PROPERLY DISPOSING OF ANY WASTE IN EXISTING FORCE MAIN AT PROPOSED FORCE MAIN TIE IN LOCATION.

CONTRACTOR IS RESPONSIBLE FOR MAINTENANCE OF TRAFFIC FOR FORCE MAIN WORK ALONG HICKS RD AND OLD WHEELING RD. CONTRACTOR SHALL COORDINATE WITH MUSKINGUM COUNTY ENGINEER MARK EICHER (P:740-454-0155), FOR MAINTENANCE OF TRAFFIC.

INDUSTRUCTION PLANS:
INDUSTRIAL DRIVE
ZANESVILLE, MUSKINGUM COUNTY, OHIO
FORCE MAIN PLAN & PROFILE

IOB NUMBER: **ZAN012** 

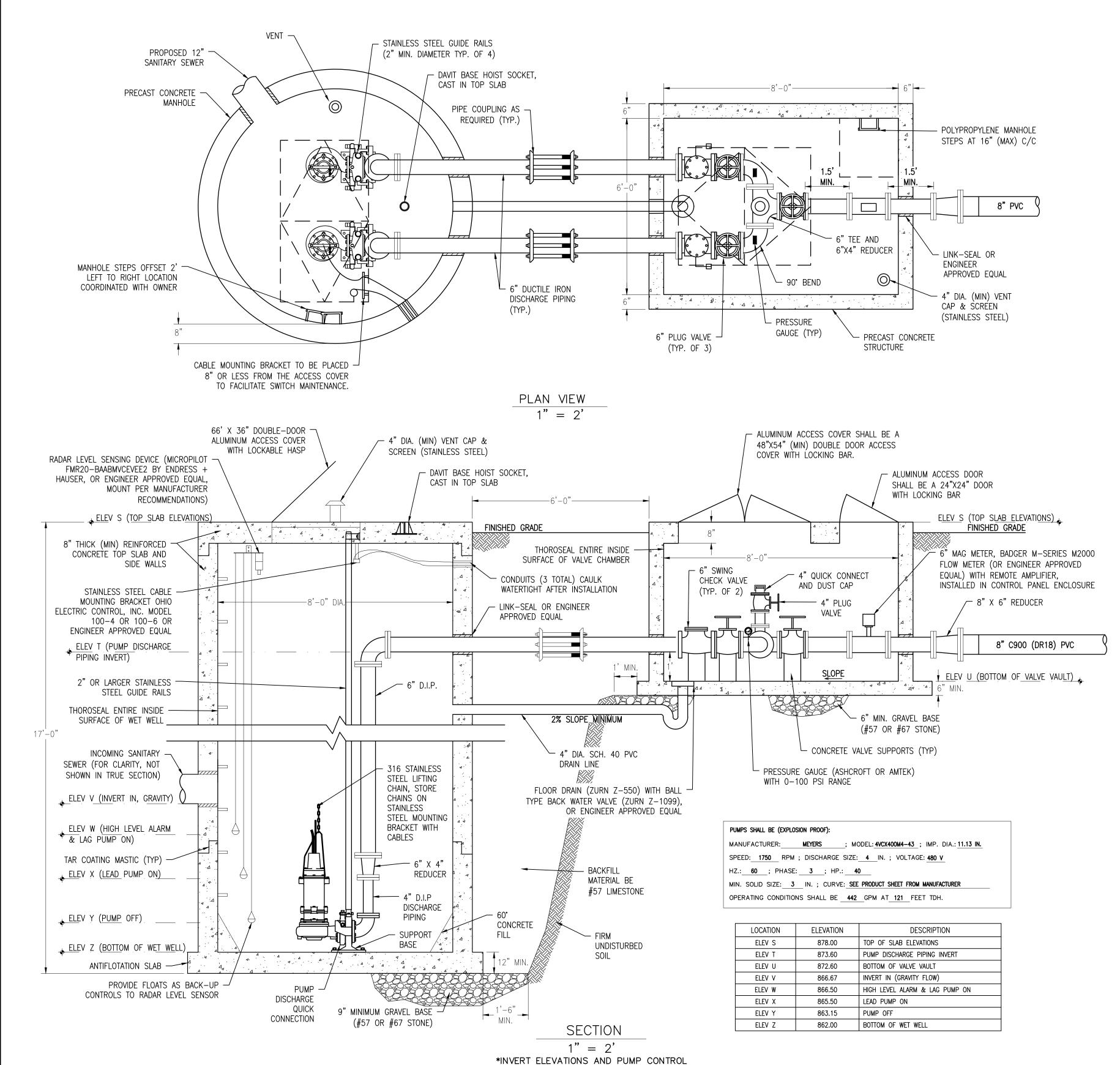




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ironment / Energy / Infrastructure

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ELEVATIONS NOT SHOWN TO SCALE

# PUMP STATION NOTES:

# SUBMITTALS

- 1. THE PUMP STATION MANUFACTURER SHALL FURNISH SHOP DRAWINGS FOR ENGINEER'S APPROVAL PRIOR TO ANY PURCHASE OF EQUIPMENT OR PRODUCTION OF CONCRETE PRODUCTS.
- 2. SUBMIT SHOP DRAWINGS SHOWING DIMENSIONS, DETAILS OF CONSTRUCTION, AND INSTALLATION FOR PUMPS, MOTORS, SUPPORTS, CONTROLS, WET WELL, AND OTHER EQUIPMENT AND MATERIALS TO PROVIDE COMPLETE AND PROPER PERFORMANCE OF THE WORK OF THE LIFT STATION OPERATION AND CONTROLS.

# <u>GUARANTEES</u>

1. PROVIDE A ONE YEAR WRITTEN WARRANTY FOR ALL WORK PROVIDED AND INSTALLED FOR THE PUMP STATION INCLUDING ALL LABOR REQUIRED AND ALL MATERIAL REPLACEMENTS NECESSARY FOR THE PROPER PERFORMANCE OF THE WORK, AND INCLUDING THE DESIGN, MATERIALS, AND WORKMANSHIP FOR THE PERIOD TO COMMENCE UPON PUMP STATION START-UP.

# PUMP SPECIFICATIONS

- 1. PUMPS SHALL BE A MYERS SOLIDS HANDLING SUBMERSIBLE PUMP, MODEL 4VCX400M4-43, AS MANUFACTURED BY MYERS, OR ENGINEER-APPROVED EQUAL. PUMP SHALL BE FURNISHED WITH A 40 HP MOTOR TO MEET TARGET OPERATING CONDITION OF 442 GPM @ 121 FT TDH. MOTOR SHALL BE SUITABLE FOR 40 HP DUTY, 60 Hz, 1750 RPM. PUMP SHALL COME FURNISHED WITH 4-INCH BREAKAWAY FITTINGS AND DISCHARGE ELBOW AND RAIL BRACKETS FOR MOUNTING PUMP ON CONTRACTOR-FURNISHED PIPE RAILS.
- 2. SCADA INTEGRATOR SHALL PROVIDE PLC-RTU PUMP CONTROL PANEL, WITH SHORT CIRCUIT AND OVERLOAD PROTECTION FOR THE PUMP. PANEL SHALL BE NEMA 4X STAINLESS STEEL ENCLOSURE WITH LOCKABLE DEAD FRONT SWING-OUT COVER, COMPLETE WITH STAINLESS STEEL STAND. THE CONTROL PANEL SHALL BE EQUIPPED WITH HAND-OFF-AUTO SELECTOR SWITCHES, INDICATOR LIGHTS, AND PLC-FLOAT CONTROL SWITCH. THE CONTROL SHALL INCLUDE HIGH AND LOWER WATER ALARM FUNCTIONS THAT ACTIVATE A FLASHING RED COMMON ALARM LIGHT, SHUTS DOWN THE PUMP AND REQUIRES A MANUAL RESET. SCADA INTEGRATOR SHALL ALSO PROVIDE AN INTRINSICALLY SAFE WET WELL INTERFACE PANEL WITH ELECTRICAL (SAFE) BARRIERS AND TERMINALS INTERFACING TO THE RADAR SENSOR AND BACK-UP FLOATS. BOTH CONTROL PANELS SHALL BE WIRED IN ACCORDANCE WITH ALL APPLICABLE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE. LEVEL CONTROLS, INCLUDING PRIMARY RADAR LEVEL MEASUREMENT AND BACK-UP LEVEL FLOAT SWITCHES, ARE TO BE FURNISHED BY THE PUMP MANUFACTURER AND NECESSARY TERMINAL BLOCK FOR CONNECTION OF LEVEL CONTROLS AND OTHER WIRING FOR PROPER INSTALLATION. NOTE: THE SCADA INTEGRATOR CURRENTLY UTILIZED BY THE COUNTY IS MICRO-COMM, INC.
- 3. RAIL PUMP OUT SYSTEM, TOP GUIDE RAIL SUPPORTS, HATCHES, ETC. SHALL BE GALVANIZED.
- 4. THE PUMP DISCHARGE SEAL SHALL INCLUDE ADJUSTABLE GUIDE RAIL SUPPORTS AND PUMP DISCHARGE ELBOW TO ALIGN WITH HYDRAULIC SEALING FLANGE ON PUMP DISCHARGE PIPING.

# <u>GENERAL</u>

- I. INTERCONNECTING WIRING BETWEEN THE PUMP AND CONTROL PANEL SHALL BE FURNISHED AND INSTALLED BY THE PUMP MANUFACTURER WHO WILL ALSO PROVIDE TESTING AND CHECKOUT OF THE PUMP CONTROL SYSTEM.
- 2. ALL DUCTILE IRON PIPING IN THE LIFT STATION AND IN THE VALVE VAULT SHALL BE PAINTED. COORDINATE PAINT COLOR WITH THE OWNER.
- 3. INSTALL ALL EQUIPMENT IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND SHOP DRAWINGS AS APPROVED BY THE ENGINEER.
- 4. AS SOON AS PRACTICAL AFTER INSTALLATION, HAVE THE MANUFACTURER'S ENGINEER CHECK OUT THE PUMP STATION OPERATION AND CONTROLS. PROMPTLY MAKE ALL CHANGES AND ADDITIONS AS REQUIRED FOR THE APPROVAL OF THE MANUFACTURER'S ENGINEER.
- 5. WHEN ALL REQUIRED APPROVALS OF THIS PORTION OF THE WORK HAVE BEEN OBTAINED, AND AT A TIME DESIGNATED BY THE OWNER, THE MANUFACTURERS FIELD TECHNICIAN SHALL THOROUGHLY DEMONSTRATE TO THE LOCAL OPERATING PERSONNEL THE OPERATION AND MAINTENANCE OF ALL ITEMS INSTALLED.

# DRAIN PIPE REPAIR

NOT TO SCALE

SIZE				DE	GRE	OF E	BEND	)					
OF	1	1 1/	4 <b>°</b>	22	1/	2 <b>°</b>		45	•		90	•	
PIPE	L"	D"	V c. f.	L"	D"	V c. f.	L"	D"	Vc.f.	L"	D"	Vc.f.	
3"	4	3	0.1	6	4	0.2	10	4	0.3	10	4	0.3	<u>                                    </u>
4"	5	4	0.2	9	5	0.4	14	5	0.6	14	5	0.6	90° BENDS
6"	8	6	0.5	12	7	0.7	20	8	1.4	18	9	1.7	A
8"	9	8	0.7	16	9	1.4	24	12	2.7	25	11	4.0	
12"	14	12	1.8	24	14	3.6	36	18	6.8	32	18	10.7	
16"	18	16	3.4	32	18	6.7	36	32	13.4	41	26	25.4	
20"	25	20	6.4	30	30	11.5	49	36	20.5	50	32	46.5	
24"	27	24	9.0	39	34	18.4	60	42	35.0	58	40	77.7	BENDS LESS THAN 90°
STE	EL V	MLL	BE US	SED .	AS F	REQUIR	ED I	BY <sup>-</sup>	THE EN	IGINE	ER		4" MAX.

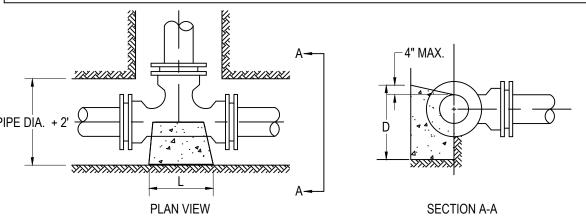
# AND HORIZONTAL BENDS

NOT TO SCALE

- 1. CONCRETE SHALL BE PLACED AGAINST UNDISTURBED EARTH WITH A
- MINIMUM SOIL BEARING CAPACITY OF 3000 PSF.
  2. CONTRACTOR SHALL PROVIDE CLEARANCE FOR REMOVAL OF BOLTS.

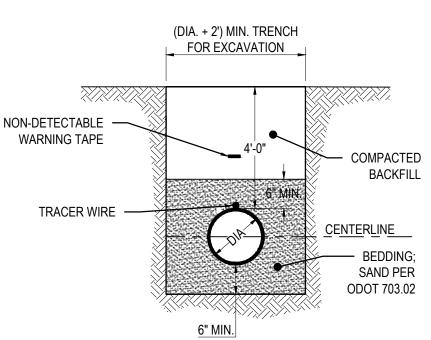
R	R BRANCH																							
U	3"			4"			6"			8"				12	,,		16	"	20"				24	,,
N	L"	D"	Vc.f.	L"	D"	Vc.f.	L"	D"	Vc.f.	L"	D"	Vc.f.	L"	D"	Vc.f.	L"	D"	Vc.f.	L"	D"	Vc.f.	L"	D"	Vc.
3"	12	5	0.5																					
4"	10	6	0.5	11	8	0.8																		
6"	9	7	0.5	11	8	0.8	18	12	1.9															
8"	8	8	0.5	10	9	0.7	18	12	1.9	23	16	3.5												
12"	6	12	0.6	8	12	0.8	18	12	1.9	23	16	3.5	38	22	8.7									
16"	6	16	0.8	6	16	0.8	14	16	2.0	20	18	3.3	36	23	8.7	49	30	13.6						
20	6	20	1.0	6	20	1.0	11	20	1.9	18	20	3.3	35	24	8.7	46	32	13.6	60	38	26.5			
24	6	24	1.2	6	24	1.2	9	24	1.9	15	24	3.3	30	28	8.7	42	36	14.0	54	42	26.3	68	48	45.4
S1	EEL	. WI	LL BE	US	SED	AS F	REQU	JIRE	D BY	TH	E E	NGINE	ER	•										

SECTION A-A



# BACKING FOR TEES NOT TO SCALE

NOTES:
1. CONCRETE SHALL BE PLACED AGAINST UNDISTURBED EARTH WITH A MINIMUM SOIL BEARING CAPACITY OF 3000 PSF.
2. CONTRACTOR SHALL PROVIDE CLEARANCE FOR REMOVAL OF BOLTS.



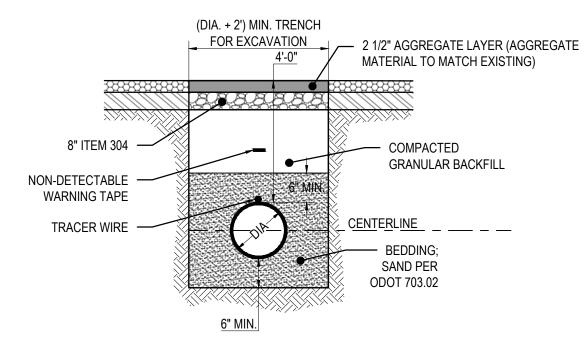
# TRENCH DETAIL IN GRASSY AREA

NOT TO SCALE

NOTE:

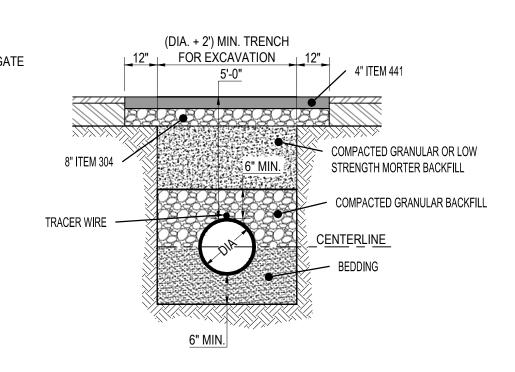
1. BEDDING SHALL BE REQUIRED ON ALL PIPE INSTALLATION.

ADDITIONAL BEDDING OF 4" (10" TOTAL) IN AREAS CONTAINING ROCK EXCAVATION.



# TRENCH DETAIL IN STONE DRIVE NOT TO SCALE

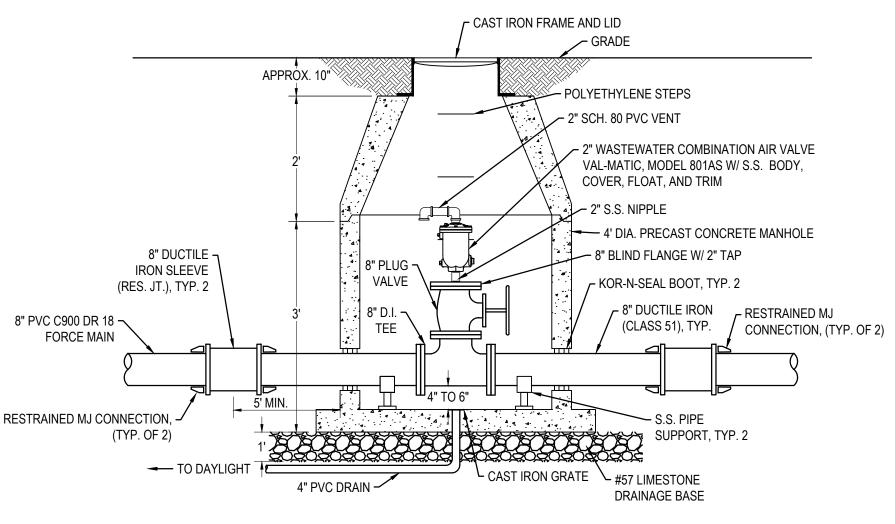
1. BEDDING SHALL BE REQUIRED IN ALL AREAS CONTAINING ROCK EXCAVATION.



# TRENCH DETAIL UNDER OR WITHIN 3' OF PAVEMENT

NOT TO SCALE

 BEDDING SHALL BE REQUIRED IN ALL AREAS CONTAINING ROCK EXCAVATION.
 LOW STRENGTH MORTAR SHALL BE INSTALLED AS REQUIRED BY ODOT WITHIN 3' OF PAVEMENT.

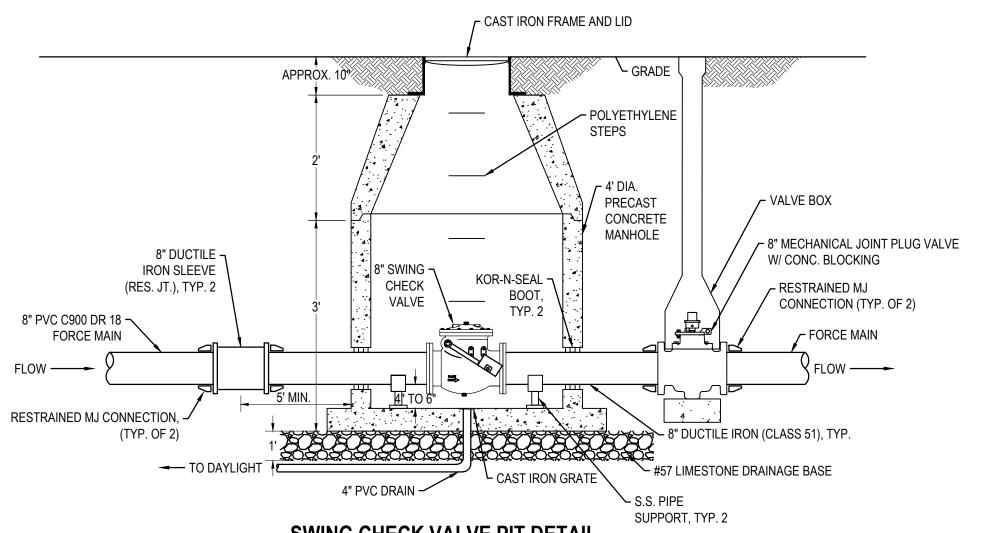


# **AUTOMATIC AIR VALVE DETAIL**

NOT TO SCALE

NOTES:

1. CONTRACTOR SHALL UTILIZE GRADE RINGS TO MAINTAIN PROPER BURIAL DEPTH ON THE PIPE.
2. CONTRACTOR SHALL VISUAL INSPECT PROPER OPERATION OF EACH AUTOMATIC AIR VALVE.
3. CONTRACTOR SHALL PROVIDE ANY NECESSARY SUPPORT FOR AIR VALVE.



# SWING CHECK VALVE PIT DETAIL NOT TO SCALE

NOTES:
1. CONTRACTOR SHALL UTILIZE GRADE RINGS TO MAINTAIN PROPER BURIAL DEPTH ON THE PIPE.
2. CONTRACTOR SHALL VISUAL INSPECT PROPER OPERATION OF EACH SWING CHECK VALVE.
3. CONTRACTOR SHALL PROVIDE ANY NECESSARY SUPPORT FOR CHECK VALVE.

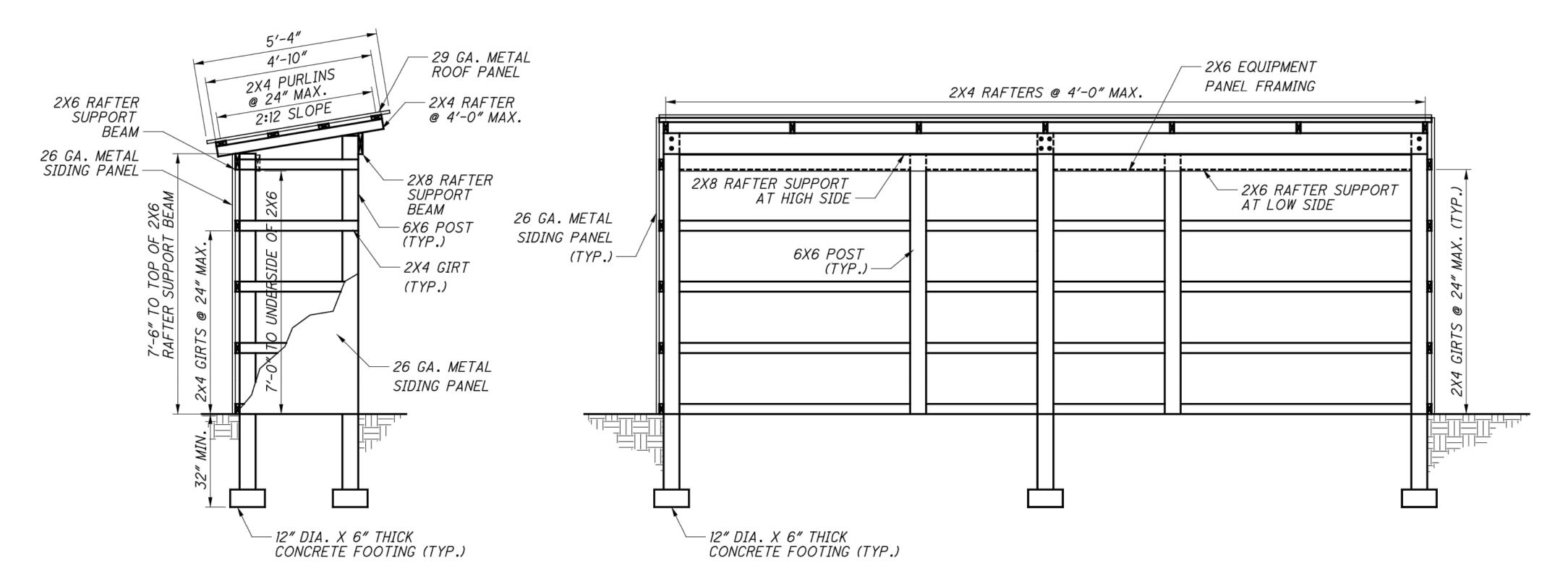


NDUSTRUCTION PLANS:
NDUSTRICTION PLANS:
ZANESVILLE, MUSKINGUM COUNTY, OF
FORCE MAIN DETAILS

IOB NUMBER: ZAN012

TYPICAL CONNECTION DETAIL

SECTION VIEW



# NOTE:

HIGH SIDE ELEVATION VIEW

CONTRACTOR SHALL ADJUST ELECTRICAL EQUIP. AS NECESSARY TO AVOID CONFLICTS WITH POST(S) AND TO PROVIDE PROPER CLEARANCES.

# **GENERAL STRUCTURAL NOTES**

#### GOVERNING CODES

OHIO BUILDING CODE - 2017 (REFERENCES ASCE-7 2010)

### DESIGN LOADS

1. ROOF LOAD

A. GROUND SNOW LOAD (Pq) =25 PSF B. SNOW EXPOSURE FACTOR (Ce) = 0.9

- C. IMPORTANCE FACTOR (I) = 0.8 1.2
- D. THERMAL FACTOR (Ct) =
- 2. WIND LOAD A. DESIGN WIND SPEED = 115 MPH
  - 1.15 B. IMPORTANCE FACTOR = C. EXPOSURE CATEGORY =
  - D. INTERNAL PRESSURE COEFFICIENT (G CPI)= 0.55

# **FOUNDATIONS**

FOUNDATION DESIGN IS BASED ON THE ASSUMPTION OF FAVORABLE SOIL CONDITIONS. SOIL BEARING CAPACITY OF THE PROJECT SITE HAS BEEN ESTIMATED AT 1500 PSF. CONTRACTOR SHALL PERFORM COMPACTION TESTS TO VERIFY A MINIMUM BEARING CAPACITY OF 1500 PSF.

#### CONCRETE

CONCRETE UTILIZED FOR THE POST FOOTINGS SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI AT 28 DAYS.

# WOOD

- 1. DIMENSIONAL LUMBER SHALL BE #2 SPRUCE PINE FIR OR BETTER, UNLESS NOTED OTHERWISE.
- 2. PRESSURE TREAT LUMBER WITH ACQ (ALKALINE COPPER QUAT). CBA-A, OR CA-B (COPPER AZOLE), OR NON-DOT BORATE PRESSURE TREATED LUMBER. PRESSURE TREAT TO 0.60 FOR POLES AND 0.25 ELSEWHERE.
- 3. ALL NAILS AND FASTENERS SHALL BE HOT DIPPED GALVANIZED OR STAINLESS STEEL.
- 4. UNLESS NOTED OTHERWISE, CONNECTIONS SHALL BE MADE PER TABLE 2304.10.1 "FASTENING SCHEDULE", IN REFERENCED BUILDING CODE.
- 5. SIMPSON STRONG-TIE CONNECTORS SPECIFIED IN THE PLANS SHALL BE ZMAX (G185) OR HOT DIPPED GALVANIZED AND SHALL BE MANUFACTURED BY THE SIMPSON STRONG-TIE COMPANY AND SHALL BE FASTENED AS SPECIFIED IN THE SIMPSON STRONG-TIE PRODUCT AND INSTRUCTION MANUAL.

# METAL PANEL

- 1. METAL ROOF PANEL SHALL BE 29 GAGE MINIMUM.
- 2. METAL SIDING PANEL SHALL BE 26 GAGE MINIMUM.
- 3. ALL METAL SIDING AND ROOF PANEL SHALL BE PRE-PAINTED. COLOR TO BE SELECTED BY OWNER. CONTRACTOR SHALL SUPPLY OWNER WITH COLOR SELECTION CHART.
- 4. METAL PANELS SHALL BE FASTENED WITH ZINC-COATED SCREWS WITH SEALING WASHER (COLOR TO MATCH METAL), AS RECOMMENDED BY MANUFACTURER. SCREWS SHALL BE EVENLY SPACED.
- 5. METAL PANEL COMPONENTS SHALL BE INSTALLED AS PER MANUFACTURER'S RECOMMENDATIONS. ALL RECOMMENDED TRIM SHALL BE INSTALLED TO COVER JOINT AT ENDS. NOT ALL TRIM IS SHOWN IN DETAIL. IT IS THE CONTRACTOR'S RESPONSIBILITY TO SUBMIT ALL TRIM BEING USED AS A SUBMITTAL.

# CONSTRUCTION AND SAFETY

CONTRACTOR SHALL BRACE ENTIRE STRUCTURE AS REQUIRED TO MAINTAIN STABILITY UNTIL COMPLETE AND FUNCTIONING AS THE DESIGNED UNIT.

DATE

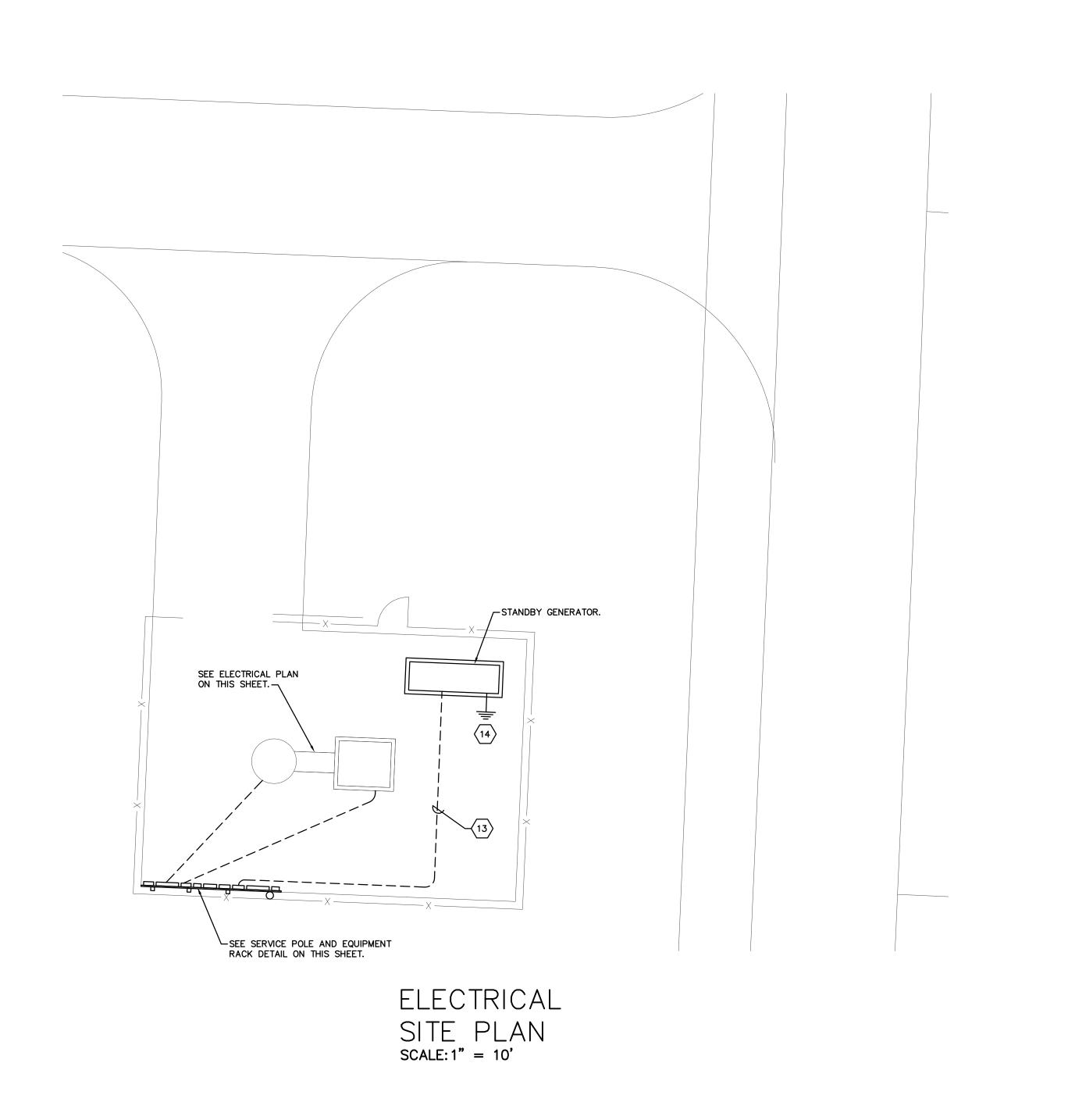
Hull & Associates, 59 Grant Street Newark, OH 43055 Phone: (740) 344-865 Fax: (740) 344-865 www hulling com

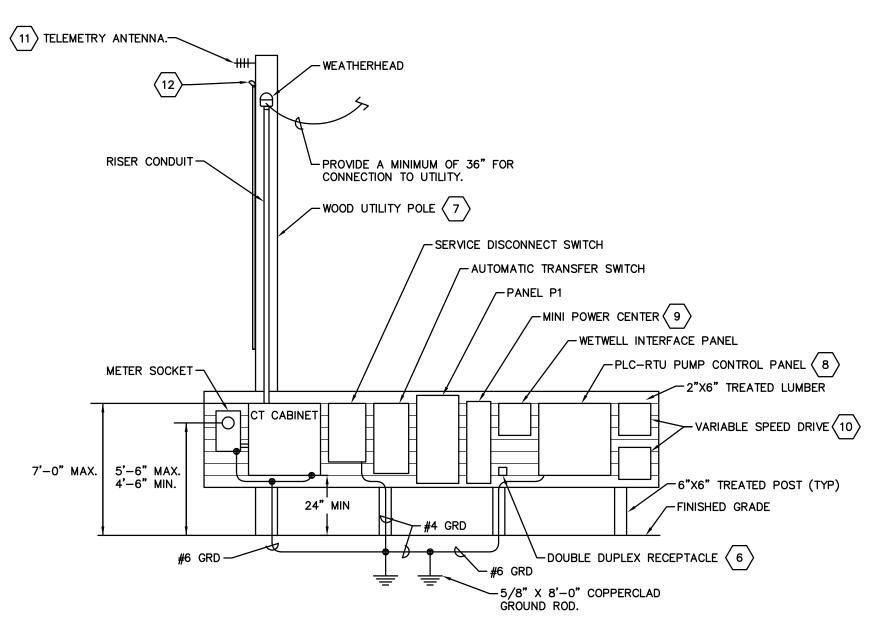
JM COUNTY, OHIO

SHELTER DETAIL STRUCTION PL TRIAL EQUIPMENT INDI ZANES\ ELECTRIC E

> OB NUMBER: **ZAN012**

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NOTES: 1. CONFIRM SERVICE INSTALLATION REQUIREMENTS WITH THE ELECTRIC UTILITY COMPANY PRIOR TO ANY WORK. SERVICE POLE AND EQUIPMENT RACK DETAIL SCALE: NONE

SEE SITE ELECTRICAL PLAN FOR CONTINUATION.

# CODED NOTES O

- POWER CABLE FURNISHED WITH PUMP.
- 2. CONTROL/SIGNAL CABLE FURNISHED WITH LEVEL SENSOR/FLOAT.
- 3. 1 1/2" CONDUIT FOR CONTROL AND TWO CONDUITS FOR POWER TO PUMP CONTROL
- . 1" CONDUIT WITH SIGNAL CABLE FOR FLOW METER TO PUMP CONTROL PANEL. CABLE FURNISHED WITH FLOW METER.
- CONDUIT PENETRATIONS SHALL BE MADE WATERTIGHT WITH GROUT, CAULK OR MECHANICAL SEAL.
- . RECEPTACLE SHALL BE WEATHERPROOF WITH GROUND FAULT CIRCUIT INTERRUPTER. CONNECT TO PC-1-2.
- PROVIDE POLE HEIGHT AS REQUIRED TO MAINTAIN A MINIMUM OF 18' CLEARANCE OVER ROADWAY, STREETS AND DRIVEWAYS.
- 8. CONNECT TO PC-1-4.
- 9. MINI POWER CENTER SHALL BE SQUARE D MPZB5S40F OR EQUAL.
- 10. CONFIRM MOUNTING REQUIREMENTS. VFD MAY BE MOUNTED IN PUMPS CONTROL PANEL DEPENDING ON CONTROL PANEL MANUFACTURER.
- 1. MOUNT ANTENNA A MINIMUM OF 20' ABOVE FINISHED GRADE. COORDINATE ORIENTATION ON POLE WITH SYSTEM INTEGRATOR.
- 12. PROVIDE A WEATHERHEAD AND A 3/4" CONDUIT TO PLC-RTU PUMP CONTROL PANEL.
- 13. 1" CONDUIT WITH BRANCH CIRCUITS FOR GENERATOR BATTERY CHARGER AND WATER HEATER TO PANEL PC-1; AND GENERATOR FEEDER CONDUIT TO AUTOMATIC TRANSFER SWITCH, SEE ONE LINE DIAGRAM.
- 14. PROVIDE A 5/8" X 10' GROUND ROD AND CONNECT TO GENERATOR GROUND LUG OR FRAME WITH A BARE #6 COPPER CONDUCTOR.

E1-20110.DWG

6130 Wilcox Road Dublin, Ohio 43016

DESIGNED BY D.POWELL

PRATER
Engineering Associates, Inc.

DRAWN BY DLP

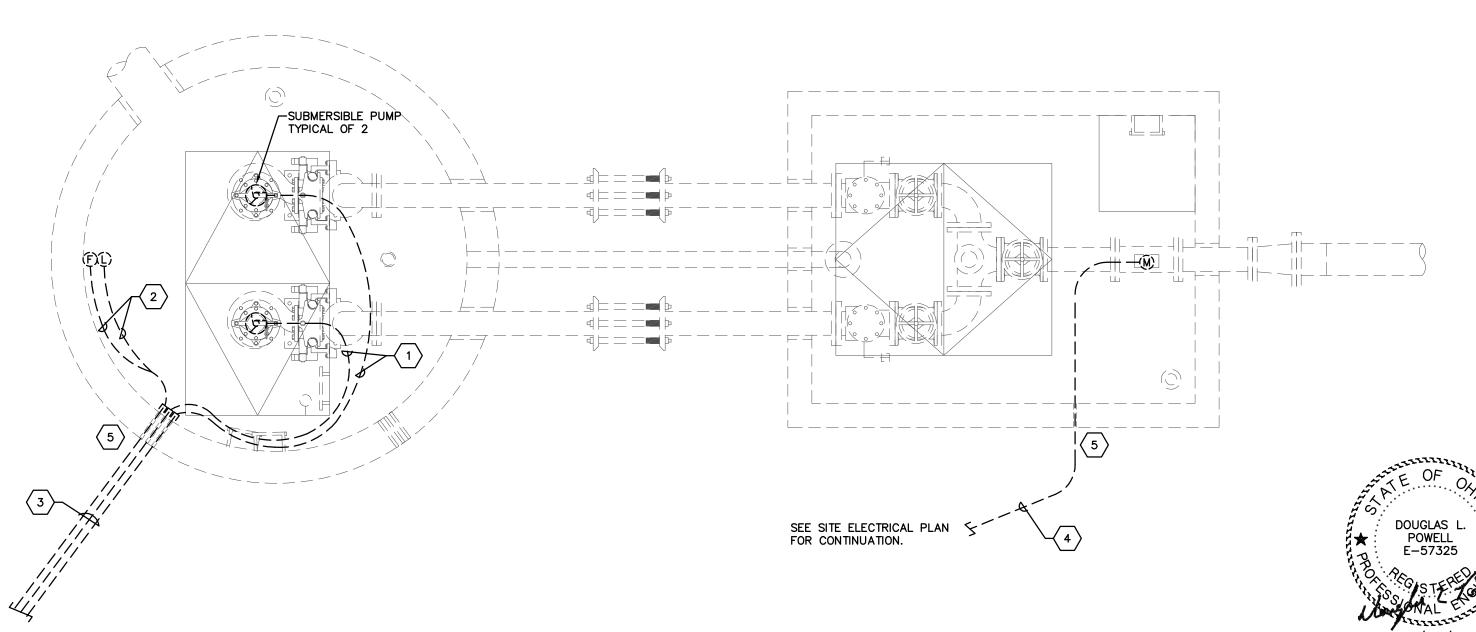
JOB NUMBER: **ZAN012** 

(614) 766 4896 FAX: (614) 766 2354

JOB NUM. 20110

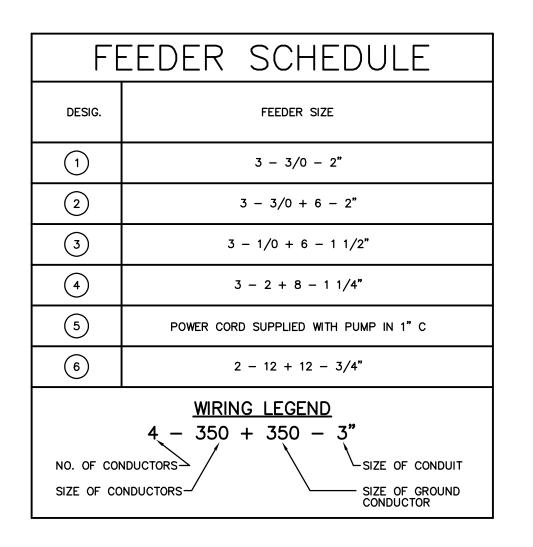
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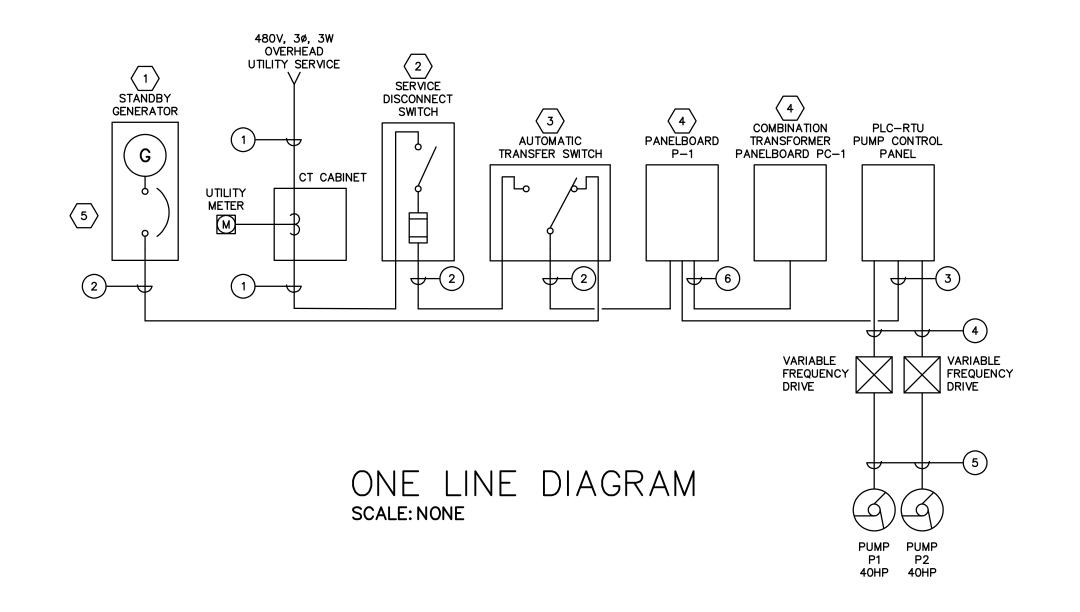
61



ELECTRICAL

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





C	OD	ED	NO	ΓΕ	S	(
3 PHASE	3 WIRE	STANDRY	CENERATOR	WITH	2004	CIE

- 125KW, 480V, 3 PHASE, 3 WIRE STANDBY GENERATOR WITH 200A CIRCUIT BREAKER. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
- 480V, 3 POLE, 200A FUSIBLE DISCONNECT SWITCH, SUITABLE FOR USE AS A SERVICE DISCONNECT. PROVIDE WITH 200A FUSES.
- 5. 480V, 3 PHASE, 200A TRANSFER SWITCH.
- 4. SEE PANELBOARD SCHEDULE ON THIS SHEET.
- 5. IF PROVIDED, REMOVE THE NEUTRAL TO GROUND BONDING JUMPER IN THE GENERATOR.

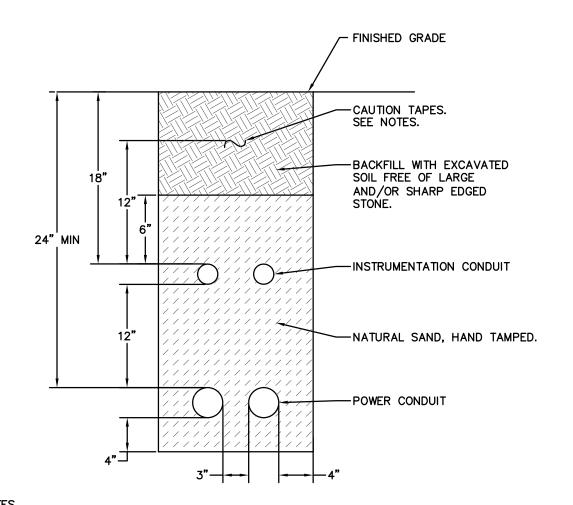
Εl	LECTRICAL LEGEND
SYMBOL	DESCRIPTION
	DUPLEX RECEPTACLE W/ GROUND FAULT INTERRUPTER (WEATHER RESISTANT)
(Ē	LEVEL FLOATS
0	RADAR LEVEL SENSOR
W	MAGNETIC FLOW METER
$\bigcirc$	THREE PHASE MOTOR
	ELECTRICAL PANEL

		Panel ID: Location: Mounting:	P-1 PUMP SURFA	STATION CF		age: ase: Vire:	480 3 3	Volts	3	Panel T		POWER NEMA 3R		
		Main Type:	MCB	OL.	Main S		200	Amp	s					
			СКТ	CKT	CONN.				CONN.	CKT	CKT			
GND	WIRE	BRANCH CIRCUIT	BKR	BKR	LOAD	СКТ	PHASE	СКТ	LOAD	BKR	BKR	BRANCH CIRCUIT	WIRE	GND
SIZE	SIZE	DESCRIPTION	SIZE	OPTION	(KVA)	NO.		NO.	(KVA)	OPTION	SIZE	DESCRIPTION	SIZE	SIZE
**	**	PUMP CONTROL	150/3		33.810	1	Α	2	2.500		20/2	PANEL PC-1	12	12
_	**	PANEL			33.810	3	В	4	2.500				12	-
_	**	<del></del>			33.810	5	Α	6	0.000			SPACE	-	-
_	l – l	SPACE			0.000	7	В	8	0.000			SPACE	l –	-
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\*\* SEE ONE LINE DIAGRAM

Phase C: 33.8 KVA 122.1 AMPS
Total: 106.4 KVA

		Panel ID:	PC-1		Volte	age: 12	20/240	Volts		Panel Ty	/pe:	INTEGRAL TRANSFORME	R/P0	WER
		Location:	PUMP	STATION	Ph	ase:	1			Enclosur	e:	NEMA 3R		
		Mounting:	SURFA	CE	٧	Vire:	3							
		Primary Main Type:	MCB	Primo	ary Main S	Size:	20	Amp:	3	Transfor	mer Siz	e: 5 kVA		
		Secondary Main Type:	MCB	Secondo	ary Main S	Size:	30	Amp:	3	Primary	Voltage	: 480 V		
			CKT	CKT	CONN.				CONN.	CKT	CKT			
GND	WIRE	BRANCH CIRCUIT	BKR	BKR	LOAD	CKT	PHASE	[скт]	LOAD	BKR	BKR	BRANCH CIRCUIT	WIRE	GND
SIZE	SIZE	DESCRIPTION	SIZE	OPTION	(KVA)	NO.		NO.	(KVA)	OPTION	SIZE	DESCRIPTION	SIZE	SIZE
10	10	GENERATOR HEATER	20/1		1.500	1	Α	2	0.360		20/1	RECEPTACLE	12	12
12	12	BATTERY CHARGER	20/1		0.240	3	В	4	1.200		20/1	REMOTE TERMINAL UNIT	12	12
_	-	SPARE	20/1		0.000	5	Α	6	0.000		20/1	SPARE	-	-
_	-	SPARE	20/1		0.000	7	В	8	0.000		20/1	SPARE	-	-
_	_	SPARE	20/1		0.000	9	Α	10	0.000		20/1	SPARE	-	
		Co	nnected	Load Pa	nel Summ	ary								
					Phase	e A:	1.9	KVA	15.5	AMPS				
					Phase	e B:	1.4	KVA	11.8	AMPS				
					To	otal:	3.3	KVA						

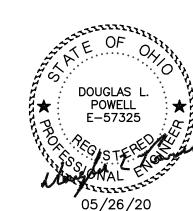


NOTES

1. INSTALLATION SHALL COMPLY WITH THE REQUIREMENTS OF NEC ARTICLE 310 &

- INSTALLATION SHALL COMPLY WITH THE REQUIREMENTS OF NEC ARTICLE 310 & LOCAL CODES / REGULATIONS.
   CONDUIT SHALL BE DIRECT BURY SCHEDULE 80 PVC SEE SITE PLAN FOR CONDUIT SIZE AND QUANTITIES.
   PROVIDE A RED ELECTRIC CAUTION TAPE WHERE SHOWN.
   MAINTAIN 12" OF SEPARATION BETWEEN POWER AND INSTRUMENTATION CONDUITS. WHEN INSTRUMENTATION CONDUITS ARE NOT PRESENT IN THE SAME TRENCH, TOP OF POWER CONDUITS TO BE 24" BELOW FINISHED GRADE, AND ELECTRIC CAUTION TAPE SHALL BE 12" ABOVE POWER CONDUITS.

TYPICAL DIRECT BURIED DUCTBANK DETAIL SCALE: NONE



E2-20110.DWG

PRATER Engineering Associates, Inc.

(614) 766 4896 FAX: (614) 766 2354 6130 Wilcox Road Dublin, Ohio 43016 CHECKED BY PEA DESIGNED BY D.POWELL DRAWN BY DLP JOB NUM. 20110

CONSTRUCTION PLA

INDUSTRICAL DETAILS 8 JOB NUMBER: **ZAN012** 

SCHEDULES

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PART 1 GENERAL
PART 2 BASIC MATERIALS
PART 3 POWER DISTRIBUTION
PART 4 GROUNDING
PART 5 STANDBY GENERATOR

PART 6 INSTRUMENTATION

#### 1.2 GENERAL

- A. THE PARTY PERFORMING THE WORK UNDER THIS SECTION HEREINAFTER REFERRED TO AS THE CONTRACTOR, SHALL FURNISH ALL LABOR, MATERIAL, TOOLS, EQUIPMENT, SERVICES, AND RELATED ACCESSORIES FOR A COMPLETE INSTALLATION OF ALL ELECTRICAL WORK AS INDICATED IN THE DRAWINGS AND SPECIFICATIONS. ITEMS OMITTED FROM EITHER THE SPECIFICATIONS OR THE DRAWINGS, BUT SHOWN OR DESCRIBED IN THE OTHER, AND ALL ITEMS NECESSARY TO MAKE THE ELECTRICAL SYSTEM COMPLETE AND WORKABLE SHALL FORM A PART OF THE WORK.
- B. RACEWAY, WIRING, CABLING, PULL BOXES, JUNCTION BOXES, ETC. SHOWN IN THE CONTRACT DOCUMENTS ARE DIAGRAMMATIC IN NATURE TO SHOW INTENT ONLY. AS THE RESULT OF DIFFERENCES BETWEEN VARIOUS MANUFACTURERS REQUIREMENTS, ALL RACEWAY, WIRING, AND CABLING MAY NOT BE SHOWN ON THE DRAWINGS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO INCLUDE IN THEIR BID ANY ADDITIONAL RACEWAYS, WIRING, AND CABLING REQUIRED FOR THE PROPER INSTALLATION AND OPERATION OF THE SYSTEMS BEING PROPOSED FOR USE ON THIS PROJECT.
- C. ANY DISCREPANCIES WITHIN DRAWINGS AND SPECIFICATIONS SHALL BE PROMPTLY BROUGHT TO THE ATTENTION OF THE ENGINEER FOR CLARIFICATION DURING THE BIDDING PERIOD. NO ALLOWANCE SHALL SUBSEQUENTLY BE MADE TO THE CONTRACTOR BY REASON OF HIS FAILURE TO HAVE BROUGHT SAID DISCREPANCIES TO THE ATTENTION OF THE ENGINEER DURING THE BIDDING PERIOD OR OF ANY ERROR ON THE CONTRACTOR'S PART.
- D. THE CONTRACTOR SHALL CHECK ALL EXISTING FIELD CONDITIONS (OR CIVIL, STRUCTURAL, ARCHITECTURAL AND MECHANICAL TRADES WORK) FOR POSSIBLE INTERFERENCE CAUSED BY CONDITIONS IN THE FIELD BEFORE BID IS MADE. NO ALLOWANCE SHALL SUBSEQUENTLY BE MADE TO THE CONTRACTOR BY REASON OF HIS FAILURE TO HAVE MADE SUCH EXAMINATIONS OR OF ANY ERROR ON HIS PART.
- E. THE CONTRACTOR SHALL BE HELD TO HAVE EXAMINED THE PREMISES AND SITE SO AS TO COMPARE THEM WITH THE CONTRACT DOCUMENTS AND TO HAVE SATISFIED THEMSELF AS TO THE CONDITIONS OF THE PREMISES, THE SITE, ANY OBSTRUCTIONS, THE ACTUAL LEVELS, ACCESS PANELS, AND ALL OTHER EXISTING CONDITIONS. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN THE FIELD, SHALL CHECK LOCATION OF AND CONNECTION TO THE EXISTING FACILITIES, AND SHALL ASSUME ALL RESPONSIBILITY FOR
- F. SHOULD ANY CHANGES IN THE DRAWINGS AND SPECIFICATIONS BE REQUIRED TO CONFORM TO THE ABOVE REGULATIONS, THE CONTRACTOR SHALL NOTIFY THE OWNER OR HIS REPRESENTATIVE AT THE TIME OF SUBMITTING HIS BID. AFTER ENTERING INTO THE OWNER—CONTRACTOR AGREEMENT, THE CONTRACTOR SHALL BE HELD TO COMPLETE ALL WORK NECESSARY TO MEET THESE REQUIREMENTS WITHOUT ADDITIONAL EXPENSE TO THE OWNER.
- G. THE CONTRACTOR SHALL RECEIVE, STORE, UNCRATE, PROTECT, AND INSTALL OWNER FURNISHED EQUIPMENT WITH ALL APPURTENANCES REQUIRED TO PLACE THE EQUIPMENT IN OPERATION, READY FOR USE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE EQUIPMENT WHEN RECEIVED, AS IF HE HAD PURCHASED THE EQUIPMENT HIMSELF.
- H. THE CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND INSPECTIONS REQUIRED FOR THE WORK.
- I. THE CONTRACTOR SHALL NOT ALLOW OR CAUSE ANY OF THE WORK TO BE COVERED UP OR ENCLOSED OR COVERED UP BEFORE SUCH INSPECTION AND TEST SHALL BE UNCOVERED AT THE CONTRACTOR'S EXPENSE; AFTER IT HAS BEEN INSPECTED, THE CONTRACTOR SHALL RESTORE THE WORK TO ITS ORIGINAL CONDITION AT HIS OWN EXPENSE.
- J. ALL GENERAL TRADES AND MECHANICAL DRAWINGS SHALL BE CHECKED BEFORE INSTALLING ANY OUTLETS, POWER WIRING, ETC.
- K. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, IN A NEAT AND WORKMANLIKE MANNER CONSISTENT WITH RECOGNIZED GOOD PRACTICE, AND SHALL BE SUBJECT TO THE APPROVAL OF THE OWNER OR HIS REPRESENTATIVE.
- L. IF THE CONTRACTOR FAILS TO DO ANY REQUIRED PATCHING OR REPAIR ANY DAMAGE RESULTING FROM THE INSTALLATION OF THE ELECTRICAL WORK, SUCH PATCHING OR REPAIRING SHALL BE DONE BY THE OWNER AND THE COST SHALL BE PAID BY THE CONTRACTOR.
- M. ALL EQUIPMENT FURNISHED WITH FINISHED SURFACES FROM MANUFACTURER ARE NOT TO BE DEFACED IN ANY WAY AND SHALL BE CLEANED TO ORIGINAL FINISH AT TIME OF COMPLETION OF WORK EXCEPT WHERE OTHERWISE NOTED.
- N. THE CONTRACTOR SHALL CONDUCT SUCH TESTS AND ADJUSTMENTS OF EQUIPMENT AS REQUIRED TO VERIFY EQUIPMENT PERFORMANCE. SUCH TESTS SHALL BE CONDUCTED IN THE PRESENCE OF THE OWNER OR HIS REPRESENTATIVE.
- O. THE CONTRACTOR SHALL REMOVE ALL DEBRIS RESULTING FROM THE WORK, AS WELL AS ALL TOOLS, EQUIPMENT, ETC., FROM THE SITE UPON COMPLETION OF THIS CONTRACT. ALL EQUIPMENT, INCLUDING LIGHTING FIXTURES AND LENSES SHALL BE CLEAN AND FREE FROM DIRT, GREASE, FINGER MARKS, ETC., BEFORE FINAL ACCEPTANCE.
- P. LOCATIONS OF CONDUITS, SWITCHES, RECEPTACLES, LIGHTS, MOTORS, OUTLETS, ETC., SHOWN ON DRAWINGS ARE APPROXIMATE. THE CONTRACTOR SHALL USE GOOD JUDGMENT IN PLACING THE PRECEDING TO ELIMINATE ALL INTERFERENCE WITH DUCTS, PIPING, ETC.

- Q. THE CONTRACTOR SHALL VISIT THE SITE AND FULLY INFORM HIMSELF CONCERNING ALL CONDITIONS AFFECTING THE SCOPE OF THE WORK. CLEARANCES, WHEN POSSIBLE, SHALL BE GREATER THAN THOSE REQUIRED BY CODE.
- R. ELECTRICAL WORK SHALL MEET OR EXCEED THE STANDARDS OF INSTALLATION AND WORKMANSHIP SET FORTH IN THE LATEST EDITION OF THE NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION ENTITLED NECA STANDARD FOR GOOD WORKMANSHIP IN ELECTRICAL CONSTRUCTION, NATIONAL ELECTRICAL CODE, NATIONAL ELECTRICAL SAFETY CODE, STANDARDS OF NATIONAL BUREAU OF FIRE UNDERWRITERS AND ANY FEDERAL, STATE, OR LOCAL CODES APPLYING.
- S. THE ENGINEER OR OWNER RESERVES THE RIGHT TO DIRECT THE REMOVAL OR REPLACEMENT OF ANY ITEM WHICH, IN THEIR OPINION, DOES NOT PRESENT AN ORDERLY, NEAT, OR WORKMANLIKE APPEARANCE PROVIDED THAT SUCH AN ITEM CAN BE INSTALLED IN AN ORDERLY WAY BY METHODS USUAL IN SUCH WORK.

#### 1.3 CODES AND STANDARDS

A. ALL WORK, MATERIAL, AND EQUIPMENT SHALL COMPLY WITH ALL REQUIREMENTS OF THE LATEST EDITIONS AND INTERIM AMENDMENTS OF THE NATIONAL ELECTRICAL CODE (NEC), NATIONAL ELECTRICAL SAFETY CODE, NATIONAL FIRE PROTECTION ASSOCIATION, OSHA, AMERICANS WITH DISABILITIES ACT (ADA), AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS AND ORDINANCES. ALL ELECTRICAL EQUIPMENT PROVIDED UNDER THIS CONTRACT SHALL BE NEW (EXCEPT WHERE OTHERWISE NOTED) AND SHALL COMPLY WITH THE REQUIREMENTS OF THE UNDERWRITERS' LABORATORIES (UL) AND BEAR THE UL LABEL.

#### 1.4 SUBMITTALS

- A. THE CONTRACTOR SHALL TURN OVER ALL CERTIFICATES OF APPROVAL FOR INSPECTIONS OF ELECTRICAL WORK TO THE OWNER PROMPTLY WHEN RECEIVED. THESE CERTIFICATES MUST BE RECEIVED BEFORE PAYMENT WILL BE MADE FOR THE WORK INVOLVED.
- B. PROVIDE SHOP DRAWINGS FOR ALL MATERIALS LISTED IN THIS SPECIFICATION.
- C. THE OWNER OR HIS REPRESENTATIVE RESERVES THE RIGHT TO REJECT ANY EQUIPMENT OR MATERIALS WHICH ARE NOT IN COMPLIANCE WITH THESE SPECIFICATIONS, OR THE APPROVED SHOP DRAWINGS, EITHER BEFORE OR AFTER INSTALLATION AT NO EXPENSE TO THE OWNER AND EQUIPMENT SHALL BE REPLACED WITH APPROVED EQUIPMENT BY THE CONTRACTOR AT NO COST TO THE OWNER.

#### 1.5 RECORD DRAWINGS

A. THE CONTRACTOR SHALL KEEP AN UP-TO-DATE RECORD OF ALL DEVIATIONS FROM THE CONTRACT DOCUMENTS. AT COMPLETION OF THIS PROJECT, THE CONTRACTOR SHALL DELIVER A SET OF AS-BUILT DRAWINGS AND SPECIFICATIONS SHOWING THESE DEVIATIONS TO THE OWNER. REFER TO SECTION 01200, FIELD PROCEDURES.

#### 1.6 GURANTEE

A. ALL EQUIPMENT FURNISHED AND WORK PERFORMED UNDER THE CONTRACT DOCUMENTS SHALL BE GUARANTEED AGAINST DEFECTS IN MATERIALS OR WORKMANSHIP FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF FINAL ACCEPTANCE. ANY FAILURE OF EQUIPMENT OR WORK DUE TO DEFECTS IN MATERIALS OR WORKMANSHIP SHALL BE CORRECTED BY THE CONTRACTOR AT NO COST TO THE OWNER.

# PART 2 BASIC MATERIALS

# 2.1 CONDUIT

- A. ALL CONDUIT SHALL BE RIGID METAL CONDUIT, EXCEPT WHERE OTHERWISE NOTED.
- B. ALL CONDUIT SHALL BE 3/4" MINIMUM EXCEPT WHERE OTHERWISE NOTED. ALL CONDUITS IN FINISHED SPACES SHALL BE CONCEALED.
- C. ALL CONDUITS AND FITTINGS SHALL BE RUN IN STRAIGHT LINES PARALLEL WITH OR AT RIGHT ANGLES TO BUILDING WALLS, PARTITIONS, FLOORS AND CEILINGS. WHEN THE LOCATION ON THE PLANS INTERFERES WITH OTHER WORK IN PLACE OR SUBSEQUENTLY TO BE PLACED, THE CONTRACTOR SHALL WORK OUT A SATISFACTORY LOCATION, FREE FROM INTERFERENCES.
- D. INDIVIDUAL CONDUITS SHALL BE RIGIDLY SUPPORTED AND CLAMPED WITH ONE—HOLE CONDUIT CLAMPS, CONDUIT BEAM CLAMPS, CONDUIT HANGERS, OR WALL BRACKETS, AS REQUIRED FOR THE TYPE OF CONSTRUCTION AND/OR AS INDICATED ON THE DRAWINGS. THE USE OF PERFORATED FLAT STEEL STRAPS FOR SUPPORTING CONDUITS WILL NOT BE PERMITTED. CONDUITS SHALL BE SECURED SO THAT THEY CANNOT BE MOVED WITHOUT THE USE OF TOOLS.
- E. WHERE A GROUP OF CONDUITS RUN TOGETHER, SUPPORT THE CONDUITS ON HANGERS FABRICATED FROM LIGHT STEEL FRAMING UNLESS OTHERWISE SHOWN ON THE DRAWINGS.
- F. USE LIQUID TIGHT FLEXIBLE METAL CONDUIT FOR FINAL CONNECTIONS TO TRANSFORMERS, MOTORS, LIMIT SWITCHES, AND SIMILAR DEVICES SUBJECT TO MOVEMENT AND VIBRATION.
- G. PROVIDE PULL BOXES, JUNCTION BOXES, SPLICE BOXES AND FITTINGS WHERE SHOWN AND AT OTHER LOCATIONS AS NECESSARY AND REQUIRED BY THE NATIONAL ELECTRICAL CODE.

# 2.2 WIRE

- A. ALL SINGLE CONDUCTOR POWER WIRE SHALL HAVE 600 VOLT, TYPE THHN/THWN-2 INSULATION, EXCEPT CONDUCTORS INSTALLED UNDERGROUND SHALL BE TYPE XHHW-2. CONDUCTORS SHALL BE STRANDED COPPER, EXCEPT WHERE OTHERWISE NOTED.
- B. MINIMUM WIRE SIZE SHALL BE NO. 12 AWG.
- C. CONDUCTORS FOR POWER AND LIGHTING FEEDERS AND BRANCH CIRCUITS SHALL HAVE CONDUCTOR IDENTIFICATION. CONDUCTOR IDENTIFICATION SHALL BE AS CALLED FOR IN THE NATIONAL

- ELECTRIC CODE. A SEPARATE COLOR SHALL BE USED FOR EACH PHASE CONDUCTOR OF EACH VOLTAGE SYSTEM. COLOR CODING SHALL BE CONSISTENT THROUGHOUT.
- D. CONDUCTORS FOR CONTROL, SIGNAL, AND COMMUNICATIONS WIRING SHALL BE IDENTIFIED AT ALL TERMINAL AND SPLICE POINTS WITH PERMANENT SELF—ADHESIVE WIRE IDENTIFICATION MARKERS. WIRE MARKERS SHALL BE MADE OF VINYL IMPREGNATED CLOTH, VINYL PLASTIC, OR OTHER PERMANENT MATERIALS. WIRE MARKERS MADE OF PAPER TAPE SHALL NOT BE USED.

#### 2.3 WIRING DEVICES

- A. WIRING DEVICES SHALL BE HEAVY DUTY, SPECIFICATION GRADE AS MANUFACTURED BY BRYANT, HUBBELL, LEVITON. ALL DEVICES SHALL HAVE A WHITE FINISH.
- B. RECEPTACLES SHALL BE NEMA 5-20R, WEATHER RESISTANT WITH SELF TESTING GROUND FAULT CIRCUIT INTERRUPTER.
- C. DEVICE COVERPLATES SHALL BE DIE CAST, WEATHERPOOF WHILE IN

#### 2.4 BOXES

- A. OUTLET AND DEVICE BOXES SHALL BE CAST TYPE FS OR FD.
- B. PULL AND JUNCTION BOXES SHALL BE NEMA 4X STAINLESS STEEL.

#### 2.5 SUPPORTING DEVICES

A. PROVIDE ALL ANGLE IRON, CHANNELS, RODS, SUPPORTS, OR HANGERS REQUIRED TO INSTALL ANY ELECTRICAL EQUIPMENT CALLED FOR BY THE CONTRACT DOCUMENTS.

#### PART 3 POWER DISTRIBUTION

#### 3.1 PANELBOARDS

- A. PANELBOARDS SHALL BE CIRCUIT BREAKER TYPE AND SHALL HAVE VOLTAGE RATING, CURRENT RATING, NUMBER OF PHASES, AND NUMBER OF WIRES AS SHOWN ON THE DRAWINGS. ALL PANELS SHALL HAVE A SOLID NEUTRAL BAR AND A GROUND BAR. PANELS SHALL BE DEAD FRONT TYPE CONSTRUCTION WITH A GALVANIZED CODE GAUGE SHEET STEEL CABINET WITHOUT KNOCKOUTS. PANELS SHALL BE A MINIMUM OF 20" WIDE EXCEPT WHERE OTHERWISE NOTED. PANELS SHALL BE COMPLETE WITH DOOR AND LOCK. PANELS SHALL BE SUITABLE FOR SURFACE OR FLUSH MOUNTING AS NOTED. ENCLOSURE SHALL BE RATED NEMA 1 UNLESS OTHERWISE NOTED. PANELS SHALL HAVE COPPER MAIN VERTICAL BUS. CIRCUIT BREAKERS SHALL BE BOLT—IN TYPE.
- B. PANELS SHALL HAVE AN INTEGRATED SHORT CIRCUIT RATING (IN RMS SYMMETRICAL AMPERES) OF NOT LESS THAN THE INTERRUPTING RATING OF THE LOWEST RATED CIRCUIT BREAKER IN THE PANEL. PANELS SHALL HAVE THE NUMBER AND SIZE OF CIRCUIT BREAKERS AS SHOWN ON THE DRAWINGS. WHERE SPACES ARE CALLED FOR, PANEL BUS SHALL BE EXTENDED BEHIND THE SPACES.
- C. NON-PADLOCKING TYPE CIRCUIT BREAKER HANDLE-LOCKING DEVICES SHALL BE PROVIDED WHERE SHOWN ON THE DRAWINGS.
- D. EACH PANEL SHALL HAVE A TYPEWRITTEN DIRECTORY ON THE INSIDE OF THE DOOR DESIGNATING THE USE AND LOCATION OF EACH CIRCUIT.
- E. ALL PANELS SHALL BE OF THE SAME MANUFACTURER.
  PANELBOARDS SHALL BE MANUFACTURED BY CUTLER—HAMMER,
  GENERAL ELECTRIC, OR SQUARE D.

# 3.2 VARIABLE FREQUENCY DRIVES

- A. PROVIDE VARIABLE FREQUENCY DRIVES (VFD) SUITABLE FOR OPERATION AT THE CURRENT, VOLTAGE, AND HORSEPOWER INDICATED ON THE DRAWINGS. CONFORM TO REQUIREMENTS OF NEMA ICS 3.1.
- B. VFD SHALL BE THREE PHASE, 480 V WITH A DISPLACEMENT POWER FACTOR OF 0.98 OVER ENTIRE RANGE OF OPERATING SPEED AND LOAD AND A SERVICE FACTOR OF 1.0. THE MINIMUM EFFICIENCY SHALL BE 96% AT HALF SPEED; 98% AT FULL SPEED.
- C. VFD SHALL EMPLOY A PWM (PULSE WIDTH MODULATED) POWER ELECTRONIC SYSTEM WITH METAL OXIDE VARISTOR SURGE PROTECTION ON THE INPUT. INSULATED GATE BIPOLAR TRANSITORS SHALL CONVERT DC BUS VOLTAGE TO VARIABLE FREQUENCY AND VOLTAGE.
- D. VFD SHALL INCLUDE INDEPENDENT MULTI-FUNCTION ANALOG INPUTS, INDEPENDANT MULTI-FUNCTION DITIGAL INPUTS, INDEPANDANT ANALOG OUTPUTS, AND A FORM C FALUT CONTACT.
- E. VFD SHALL HAVE AN ELAPSED TIME METER.
- F. VFD SHALL HAVE THE FOLLOWING MINIMUM PROTECTIVE FUNCTIONS: OVERHEAT, MOTOR OVERLOAD, VFD OVERLOAD, SHORT CIRCUIT, OVERVOLTAGE, UNDERVOLTAGE, INPUT PHASE LOSS, OUTPUT GROUND FAULT AND OVERCURRENT.
- G. VFD SHALL INCLUDE LOSS OF INPUT SIGNAL PROTECTION, WITH A SELECTABLE RESPONSE STRATEGY INCLUDING RUNNING AT A PRESET SPEED.
- H. VFD SHALL HAVE AN UNDERLOAD DETECTION FUNCTION THAT MONITORS THE LOAD AND WILL STOP THE SYSTEM IN THE EVENT OF PUMP SHAFT FAILURE.
- I. VFD SHALL INCLUDE ELECTRONIC THERMAL OVERLOAD PROTECTION FOR BOTH THE DRIVE AND MOTOR.
- J. ENCLOSURE SHALL BE NEMA 3R.
- K. VFD SHALL BE YASKAWA P1000 TYPE.

# 3.3 DISCONNECT SWITCHES

A. DISCONNECT SWITCHES SHALL BE THREE PHASE, 600 V,
QUICK-MAKE, QUICK-BREAK, HEAVY-DUTY TYPE. FUSIBLE
DISCONNECT SWITCHES SHALL HAVE FUSE CLIPS FOR U.L. LISTED
NEMA CLASS FUSES. FUSE CLIPS FOR RK-1 OR J FUSES SHALL BE

SPRING-REINFORCED. FUSED SWITCHES AND FUSES SHALL HAVE A MINIMUM INTEGRATED INTERRUPTING RATING OF 50,000, RMS SYMMETRICAL AT 480 V AC. ENCLOSURE SHALL BE NEMA 4X STAINLESS STEEL.

#### 3.4 CIRCUIT BREAKERS

A. ALL CIRCUIT BREAKERS SHALL BE QUICK—MAKE, QUICK—BREAK, WITH THERMAL—MAGNETIC TRIPS AND A MINIMUM INTERRUPTING RATING OF 22,000 AMPERES AT 277 VOLTS, RMS SYMMETRICAL. PROVIDE GROUND FAULT INTERRUPTER TYPE CIRCUIT BREAKERS WHERE NOTED.

#### 3.5 FUSES

- A. PROVIDE A COMPLETE SET OF FUSES FOR ALL FUSIBLE EQUIPMENT ON THE JOB. ALL FUSES SHALL BE OF THE SAME MANUFACTURER AND SHALL HAVE AN INTERRUPTING RATING OF 200,000 A, RMS SYMMETRICAL, EXCEPT OTHERWISE NOTED. ALL FUSES SHALL BEAR A UL LABEL AND NEMA CLASS DESIGNATION. FUSE IDENTIFICATION LABELS SHOWING SIZE AND TYPE OF FUSE INSTALLED SHALL BE PLACED INSIDE THE COVER OF EACH SWITCH OR PIECE OF EQUIPMENT.
- B. FUSES RATED 600A AND LESS SHALL BE TIME DELAY,
  DUAL—ELEMENT CURRENT LIMITING TYPE, UL LISTED NEMA CLASS
  RK—1, EXCEPT WHERE OTHERWISE NOTED.
- C. FUSES RATED ABOVE 600A SHALL BE TIME DELAY, CURRENT LIMITING TYPE, UL LISTED, NEMA CLASS L, EXCEPT WHERE OTHERWISE NOTED.
- D. FUSES SHALL BE MANUFACTURED BY BUSSMANN OR LITTELFUSE.

# 3.6 IDENTIFICATION

A. PROVIDE ON EACH PANELBOARD, DISCONNECT SWITCH, ETC. A 1" X 3" LAMINATED PHENOLIC NAMEPLATE TO IDENTIFY THE EQUIPMENT. NAMEPLATES SHALL BE ENGRAVED TO SHOW BLACK LETTERS ON A WHITE BACKGROUND. NAMEPLATES SHALL BE FASTENED TO THE DOOR WITH TWO SELF—TAPPING METAL SCREWS AND SHALL BE REMOVABLE.

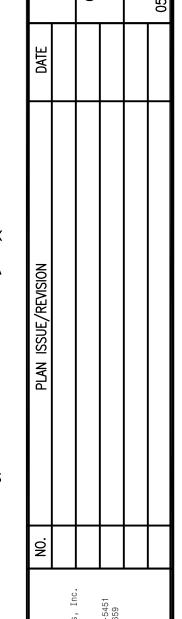
#### PART 4 GROUNDING

#### 4.1 GENERAL

- A. PROVIDE ALL MATERIALS AND LABOR REQUISITE TO INSTALL AN APPROVED GROUNDING SYSTEM TO AN APPROVED, ADEQUATE GROUND SOURCE, PER NEC.
- B. GROUND ALL CONDUITS, FIXTURES, RECEPTACLES, MOTORS, PANELS AND OTHER EXPOSED NONCURRENT CARRYING METAL PARTS OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ALL PROVISIONS OF THE NATIONAL ELECTRICAL CODE.
- C. PROVIDE A GROUND WIRE IN ALL FEEDER AND BRANCH CIRCUITS.
- D. WHERE GROUNDING CONDUCTORS ARE SUBJECT TO MECHANICAL INJURY, THEY SHALL BE INSTALLED IN A RIGID NON-FERROUS RACEWAY.

# 4.2 MATERIALS

- A. CONDUCTORS FOR GROUNDING SYSTEM SHALL BE SOFT OR MEDIUM HARD DRAWN, STRANDED, BARE COPPER, EXCEPT WHERE OTHERWISE NOTED. ALL CONDUCTORS #8 AWG AND SMALLER SHALL BE INSULATED, GREEN IN COLOR.
- B. ALL CONNECTION OF GROUND CONDUCTORS TO STRUCTURAL MEMBERS, PIPES, AND SPLICES OF GROUND CONDUCTORS SHALL BE MADE BY EXOTHERMIC WELDS, EXCEPT WHERE OTHERWISE NOTED. ALL CONNECTIONS TO BAR LUGS SHALL BE EXOTHERMIC WELD OR COMPRESSION TYPE. BOLTED TYPE CONNECTION OF GROUND CONDUCTORS MAY ONLY BE MADE WHERE TERMINAL LUGS OR BLOCKS HAVE BEEN FURNISHED AND INSTALLED IN EQUIPMENT BY THE MANUFACTURER. EXOTHERMIC WELDS SHALL BE CADWELD OR THERM—O—WELD.
- C. GROUND RODS SHALL BE 5/8" DIAMETER BY 10' LONG, COPPER CLAD STEEL.



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USTRICTION PLANS:
USTRIAL DRIVE
VILLE, MUSKINGUM COUNTY, OHIO

CONSTRUC INDUSTRUC ZANESVILLE, MUSKI

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DESIGNED BY DRAWN BY CHECKED BY JOB NUM.
D.POWELL DLP PEA 20110

JOB NUMBER:
ZAN012

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B. MINIMUM RATING BASED ON A MAXIMUM ALTITUDE OF 1000 FEET. AND AN AMBIENT TEMPERATURE OF 104 DEGREES F OR LESS AND A RELATIVE HUMIDITY OF 95%, @ 1800 RPM:

STANDBY KW WITH FAN - 125 KW STANDBY KVA WITH FAN - 156.25 KVA POWER FACTOR - 0.8 VOLTAGE - 480/277V, 3 PHASE, 4 WIRE

FREQUENCY - 60 HERTZ MINIMUM STARTING KVA - 440 @ 35% VOLTAGE DIP

C. THE STANDBY RATING SHALL BE AVAILABLE FOR THE DURATION OF THE OUTAGE. THE GENERATOR MUST ACCEPT RATED LOAD IN ONE

D. THE GENERATOR SET SHALL BE LISTED TO UL2200. THE ENGINE SHALL BE EPA CERTIFIED FROM THE FACTORY.

#### 5.2 GENERAL

- A. THE STANDBY SYSTEM SHALL BE WARRANTED BY THE MANUFACTURER AGAINST DEFECTIVE MATERIALS AND FACTORY WORKMANSHIP FOR A PERIOD OF FIVE (5) YEARS. SUCH DEFECTIVE PARTS SHALL BE REPAIRED OR REPLACED AT THE MANUFACTURER'S OPTION, FREE OF CHARGE FOR PARTS, LABOR AND TRAVEL. THE WARRANTY PERIOD SHALL COMMENCE WHEN THE STANDBY POWER SYSTEM IS FIRST PLACED INTO SERVICE.
- B. AFTER COMPLETION OF THE INSTALLATION AT THE SITE, A TWO (2) HOUR ON-SITE TEST SHALL BE PERFORMED WHICH INCLUDES THE OPERATION OF ALL SAFETIES, CONTROLS AND AUTOMATIC TRANSFER SWITCH. THE GENERATOR SHALL BE TESTED UNDER FULL RATED LOAD BY LOAD BANK AT UNITY POWER FACTOR. RESISTIVE LOAD BANKS FOR TESTING SHALL BE PROVIDED BY THE CONTRACTOR. ALL NECESSARY CABLES REQUIRED TO CONNECT THE LOAD BANK TO THE GENERATOR SHALL BE PROVIDED BY THE CONTRACTOR. THE ON-SITE TWO (2) HOUR TEST SHALL BE WITNESSED BY THE OWNER'S REPRESENTATIVE. THE CONTRACTOR SHALL PROVIDE ALL FUEL REQUIRED FOR TESTING AND SHALL FILL THE FUEL TANK AFTER TESTING.
- C. MOUNTING THE UNIT SHALL BE MOUNTED ON A STRUCTURAL STEEL SUBBASE AND SHALL BE PROVIDED WITH SUITABLE VIBRATION ISOLATORS.

#### 5.3 ENGINE

- A. THE GENERATOR SET SHALL BE LISTED TO UL2200. THE ENGINE SHALL BE EPA CERTIFIED FROM THE FACTORY.
- B. THE ENGINE SHALL BE FUELED BY DIESEL AND SHALL BE EQUIPPED WITH AN ELECTRONIC ISOCHRONOUS GOVERNOR CAPABLE OF 0.25% STEADY STATE FREQUENCY REGULATION; A POSITIVE ENGAGEMENT SOLENOID SHIFT STARTING MOTOR: AN AUTOMATIC BATTERY CHARGING ALTERNATOR WITH A SOLID STATE VOLTAGE REGULATOR: A POSITIVE DISPLACEMENT FULL PRESSURE LUBRICATION OIL PUMP: DRY TYPE REPLACEABLE AIR CLEANER ELEMENTS: AND A FUEL TRANSFER PUMP WITH FUEL FILTER AND SHUT OFF VALVE. THE ENGINE SHALL BE LIQUID COOLED.
- C. THE ENGINE SHALL BE LIQUID-COOLED BY A CLOSED LOOP, UNIT MOUNTED RADIATOR RATED TO OPERATE THE GENERTOR SET AT FULL LOAD AT AN AMBIENT TEMPERATURE OF 122 DEGRESS F.

# 5.4 ALTERNATOR

- A. THE ALTERNATOR SHALL BE SALIENT-POLE, BRUSHLESS, 2/3-PITCH, WITH DRIP-PROOF CONSTRUCTION AND AMORTISSEUR ROTOR WINDINGS, AND SKEWED FOR SMOOTH VOLTAGE WAVEFORM. THE RATINGS SHALL MEET THE NEMA STANDARD (MG1-32.40) TEMPERATURE RISE LIMITS. THE INSULATION SHALL BE CLASS H PER UL1446 AND THE VARNISH SHALL BE A VACUUM PRESSURE IMPREGNATED, FUNGUS RESISTANT EPOXY. TEMPERATURE RISE OF THE ROTOR AND STATOR SHALL BE LIMITED TO 130°C STANDBY. THE PMG BASED EXCITATION SYSTEM SHALL BE OF BRUSHLESS CONSTRUCTION CONTROLLED BY A DIGITAL, THREE PHASE SENSING SOLID STATE, VOLTAGE REGULATOR. THE AVR SHALL BE CAPABLE OF PROPER OPERATION UNDER SEVERE NONLINEAR LOADS AND PROVIDE INDIVIDUAL ADJUSTMENTS FOR VOLTAGE RANGE, STABILITY AND VOLTS-PER-HERTZ OPERATIONS. THE AVR SHALL BE PROTECTED FROM THE ENVIRONMENT BY CONFORMAL COATING. THE WAVEFORM HARMONIC DISTORTION SHALL NOT EXCEED 5% TOTAL RMS MEASURED LINE-TO-LINE AT FULL RATED LOAD. THE TIF FACTOR SHALL NOT EXCEED 50.
- B. THE GENERATOR SHALL BE INHERENTLY CAPABLE OF SUSTAINING AT LEAST 300% OF RATED CURRENT FOR AT LEAST 10 SECONDS UNDER A 3-PHASE SYMMETRICAL SHORT CIRCUIT WITHOUT THE ADDITION OF SEPARATE CURRENT-SUPPORT DEVICES.
- C. THE ALTERNATOR SHALL BE DIRECTLY CONNECTED TO THE FLYWHEEL HOUSING WITH A SEMI-FLEXIBLE COUPLING BETWEEN THE ROTOR AND THE FLYWHEEL.

# 5.5 GENERATOR OVERCURRENT AND FAULT PROTECTION

A. THE GENERATOR SHALL BE PROVIDED WITH A FACTORY INSTALLED, 80% RATED, THERMO-MAGNETIC LINE CIRCUIT BREAKER RATED AT 150 AMPERES THAT IS UL489 LISTED.

# 5.6 BATTERY

- A. MAINTENANCE FREE BCI GROUP 24 BATTERY SHALL COMPLY WITH THE NFPA REQUIREMENTS FOR ENGINE CRANKING CYCLES. THIS BATTERY SHALL BE RATED ACCORDING TO SAE STANDARDS J-537 WITH A MINIMUM COLD CRANKING AMP OF 650 AMPS AND A MINIMUM RESERVE CAPACITY OF 120 MINUTES AT 80F. THE BATTERY PLATES SHALL BE CONSTRUCTED OF A CALCIUM-LEAD ALLOY.
- B. BATTERY RACK AND BATTERY CABLES CAPABLE OF HOLDING THE MANUFACTURER'S RECOMMENDED BATTERIES SHALL BE SUPPLIED.

#### 5.7 BATTERY CHARGER

A. 10-AMPERE AUTOMATIC FLOAT/EQUALIZE BATTERY CHARGER CAPABLE OF CHARGING BOTH LEAD-ACID AND NI-CAD TYPE BATTERIES. WITH AUTOMATIC 3-STAGE FLOAT TO EQUALIZATION CHARGE; VOLTAGE REGULATION OF 1% FROM NO TO FULL LOAD OVER 10% AC INPUT LINE VOLTAGE VARIATIONS; BATTERY CHARGING CURRENT AMMETER AND BATTERY VOLTAGE VOLTMETER WITH 5% FULL-SCALE ACCURACY: LED LAMP FOR POWER ON INDICATION: CURRENT LIMITING DURING ENGINE CRANKING, SHORT CIRCUIT, AND REVERSE POLARITY CONDITIONS; TEMPERATURE COMPENSATION FOR AMBIENT TEMPERATURES FOR -40°C TO 60°C; ALARM CIRCUIT BOARD FEATURING ALARM CONTACTS FOR LOW BATTERY VOLTAGE. HIGH BATTERY VOLTAGE, AND BATTERY CHARGER MALFUNCTION. CHARGER SHALL BE UL 1012 LISTED.

#### 5.8 BLOCK HEATER

A. THERMOSTATICALLY CONTROLLED, 1,500 WATT, 110-120 VAC -SINGLE PHASE. TO MAINTAIN MANUFACTURERS RECOMMENDED ENGINE COOLANT TEMPERATURE TO MEET THE START-UP REQUIREMENTS OF NFPA 110, LEVEL 1.

#### 5.9 WEATHERPROOF ENCLOSURE

- A. PROVIDE A SOUND ATTENUATED. WEATHERPROOF ENCLOSURE FOR THE GENERATOR SYSTEM. THE ENCLOSURE SHALL BE DESIGNED TO ATTACH TO THE GENERATOR SET BASE. THE ENCLOSURE SHALL BE COATED WITH ELECTROSTATIC APPLIED POWDER PAINT, BAKED AND FINISHED TO MANUFACTURER'S SPECIFICATIONS. THE COLOR WILL BE MANUFACTURER'S STANDARD.
- B. THE ENCLOSURE SHALL OFFER PROTECTION AS SPECIFIED BY OSHA FROM ALL MOVING PARTS OF THE ENGINE. GENERATOR AND GENERATOR COUPLING. IT SHALL BE CONSTRUCTED WITH HINGED, REMOVABLE DOORS TO ALLOW FULL ACCESS TO THE ENGINE, ALTERNATOR, AND CONTROL PANEL FOR MAINTENANCE. RADIATOR AND RADIATOR FAN ASSEMBLY SHALL BE TOTALLY ENCLOSED.
- C. LOUVERS SHALL ALLOW SUFFICIENT AIR FLOW TO ALLOW FULL LOAD OPERATION OF THE GENERATOR SET. THE LOUVERS SHALL INCLUDE GRAVITY DAMPERS TO KEEP MOISTURE FROM ENTERING THE ENCLOSURE.
- D. ALL NECESSARY FITTINGS AND VALVES SHALL BE PROVIDED BY THE MANUFACTURER TO FACILITATE DRAINING THE LUBE OIL AND COOLING WATER TO THE OUTSIDE OF THE ENCLOSURE. IN ADDITION. THE ENGINE CRANKCASE BREATHER SHALL BE EXTENDED TO THE OUTSIDE OF THE ENCLOSURE AND DISCHARGE DIRECTLY UNDER THE RADIATOR AIR DISCHARGE.
- THE CRITICAL SILENCER SHALL BE MOUNTED ON THE DISCHARGE HOOD OF THE ENCLOSURE OR MOUNTED INSIDE THE MAIN GENERATOR COMPARTMENT. A GALVANIZED STEEL SKIRT SHALL BE PROVIDED AROUND THE ENCLOSURE OPENING TO PREVENT SNOW AND RAIN ENTRY INTO THE ENCLOSURE. THE SILENCER SHALL BE FITTED WITH A RAIN CAP.

#### 5.10 FUEL OIL STORAGE

- A. THE GENERATOR SET SHALL BE SUPPLIED WITH A DOUBLE WALL SECONDARY CONTAINMENT SUB-BASE FUEL TANK OF SUFFICIENT CAPACITY TO HOLD DIESEL FUEL REQUIRED FOR 48 HOURS OF OPERATION AT FULL LOAD. THE SUB-BASE FUEL SYSTEM SHALL BE LISTED UNDER UL 142 AND WILL BEAR THEIR MARK OF UL APPROVAL.
- B. NORMAL VENTING SHALL BE SIZED IN ACCORDANCE WITH THE AMERICAN PETROLEUM INSTITUTE STANDARD NO 2000. THE EMERGENCY VENT OPENING SHALL BE SIZED TO ACCOMMODATE THE TOTAL CAPACITY OF BOTH NORMAL AND EMERGENCY VENTING AND SHALL BE NOT LESS THAN THAT DERIVED FROM NFPA 30, TABLE 2-8, AND BASED ON THE WETTED SURFACE AREA OF THE TANK. THE VENT IS TO BE SPRING-PRESSURE OPERATED.
- C. PROVIDE 2" NPT OPENING WITHIN THE PRIMARY TANK AND LOCKABLE MANUAL FILL CAP.
- D. A DIRECT READING, UL LISTED, MAGNETIC FUEL LEVEL GAUGE WITH A HERMETICALLY SEALED, VACUUM TESTED DIAL, TO ELIMINATE FOGGING, SHALL BE PROVIDED.
- E. A FLOAT SWITCH FOR REMOTE OR LOCAL ANNUNCIATION OF A (50% STANDARD) LOW FUEL LEVEL CONDITION SHALL BE SUPPLIED.

# 5.11 CONTROLS AND STARTING SYSTEM

- A. ALL ENGINE ALTERNATOR CONTROLS AND INSTRUMENTATION SHALL BE DESIGNED, BUILT, WIRED, TESTED AND SHOCK MOUNTED IN A NEMA 1 ENCLOSURE TO THE ENGINE-GENERATOR SET BY THE MANUFACTURER. IT SHALL CONTAIN PANEL LIGHTING AND A FUSED DC CIRCUIT TO PROTECT THE CONTROLS.
- B. SAFETY SHUTDOWN MONITORING SYSTEM SHALL INCLUDE ENGINE MONITOR WITH INDIVIDUAL LIGHTS AND ONE COMMON EXTERNAL ALARM CONTACT INDICATING THE FOLLOWING CONDITIONS:

**OVERCRANK** OVERSPEED HIGH COOLANT TEMPERATURE LOW OIL PRESSURE

C. ENGINE INSTRUMENTATION LOCATED ON THE CONTROL PANEL SHALL CONSIST OF:

OIL PRESSURE GAUGE COOLANT TEMPERATURE GAUGE DC AMMETER ENGINE RUN HOURMETER

D. ALTERNATOR INSTRUMENTATION MUST INCLUDE DIGITAL METERS TO INDICATE OUTPUT VOLTAGE, AMPERAGE AND FREQUENCY.

# 5.12 AUTOMATIC TRANSFER SWITCH

A. TRANSFER SWITCHES SHALL BE 3 POLE, SOLID NEUTRAL, DOUBLE THROW, ACTUATED BY TWO ELECTRICAL OPERATORS MOMENTARILY ENERGIZED AND CONNECTED TO THE TRANSFER MECHANISM BY AN OVERCENTER LINKAGE.

- B. THE TIME DELAY BETWEEN THE OPENING OF THE CLOSED CONTACTS AND THE CLOSING OF THE OPEN CONTACTS WILL ALLOW THE LOADS TO BE DEMAGNETIZED BEFORE TRANSFER. THE TRANSFER SWITCH SHALL ALLOW THE MOTOR AND TRANSFORMER LOADS TO BE REENERGIZED AFTER TRANSFER WITH NORMAL INRUSH CURRENT.
- C. THIS TRANSFER SWITCH SHALL BE CAPABLE OF TRANSFERRING SUCCESSFULLY IN EITHER DIRECTION WITH 70% OF RATED VOLTAGE APPLIED TO THE SWITCH TERMINALS.
- D. THE NORMAL AND EMERGENCY CONTACTS SHALL BE POSITIVELY INTERLOCKED TO PREVENT SIMULTANEOUS CLOSING.
- E. SWITCHING MECHANISM SHALL PROVIDE "QUICK-MAKE"; "QUICK-BREAK" OPERATION OF CONTACTS.
- F. FUNCTIONAL OPERATION THE NORMAL AND EMERGENCY POWER SOURCE WILL BE CONTINUOUSLY MONITORED IN ALL 3 PHASE LEGS AND THE CONDITION SHALL BE CONSIDERED ABNORMAL IF THE VOLTAGE OF ANY PHASE DROPS BELOW 80% (ADJUSTABLE). AN ABNORMAL CONDITION WILL, AFTER A TIME DELAY OF 3 SECONDS. INITIATE TRANSFER SEQUENCE TO ALTERNATE SOURCE OF POWER. AT THIS TIME AN AUXILIARY CONTACT WILL CLOSE TO INITIATE ENGINE START. THE ALTERNATE SOURCE WILL BE MONITORED AND LOAD TRANSFER INHIBITED UNTIL 90% OF VOLTAGE AND FREQUENCY IS ATTAINED. THE LOAD WILL THEN BE TRANSFERRED TO THE ALTERNATE SOURCE AFTER AN ADJUSTABLE TIME DELAY SET FOR ONE SECOND UNLESS OTHERWISE INSTRUCTED. AFTER RESTORATION OF NORMAL POWER TO THE PRESET VOLTAGE DIFFERENTIAL (90%), THE TRANSFER SWITCH SHALL RETRANSFER THE LOAD TO THE NORMAL POWER SOURCE AUTOMATICALLY AFTER AN ADJUSTABLE TIME DELAY OF 0-30 MINUTES. IF THE EMERGENCY SOURCE SHOULD FAIL BEFORE THE TRANSFER SWITCH HAS BEEN RETRANSFERRED TO NORMAL, THE SWITCH SHOULD AUTOMATICALLY RETURN TO THE NORMAL SOURCE IF IT IS AVAILABLE. AFTER RETRANSFER OF THE LOAD BACK TO THE NORMAL SOURCE, THE SYSTEM SHALL CONTINUOUSLY MONITOR FOR FUTURE ABNORMAL CONDITIONS. THE ENGINE SHALL CONTINUE TO RUN FOR AN ADJUSTABLE PERIOD OF TIME, (0-5 MINUTES) UNLOADED FOR COOL DOWN. DUAL OPERATOR SWITCHES SHALL BE UTILIZED AS SHOWN ON THE DRAWINGS TO PROVIDE A DWELL PERIOD ADJUSTABLE FROM 0-2 MINUTES DURING TRANSFER IN EITHER DIRECTION TO ALLOW MOTOR AND TRANSFORMER LOADS TO DEMAGNETIZE. TIME SETTING SHALL BE COORDINATED WITH THE OWNER'S REPRESENTATIVE.
- G. THE FOLLOWING ADDITIONAL ACCESSORIES FOR CONTROL OR INDICATION SHALL BE PROVIDED:
  - A DOOR MOUNTED, TWO-POSITION, MAINTAINED CONTACT, TEST SWITCH TO SIMULATE A NORMAL POWER FAILURE.

DOOR MOUNTED, PRESS TO TEST TYPE PILOT LIGHT (OR L.E.D.) FOR INDICATING THE TRANSFER SWITCH IS IN THE NORMAL POSITION.

FOR INDICATING THE TRANSFER SWITCH IS IN THE EMERGENCY POSITION.

DOOR MOUNTED, PRESS TO TEST TYPE PILOT LIGHT (OR L.E.D.)

DOOR MOUNTED, PRESS TO TEST TYPE PILOT LIGHT (OR L.E.D.) FOR INDICATING THE GENERATOR IS NOT OPERABLE.

AUXILIARY CONTACT ON MAIN SHAFT CLOSED ON NORMAL; QUANTITY OF TWO (2). AUXILIARY CONTACT ON MAIN SHAFT CLOSED ON EMERGENCY;

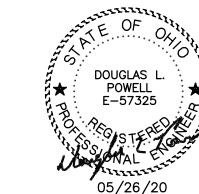
A CONTACT FOR A "PRE-TRANSFER" SIGNAL TO THE ELEVATOR CONTROLLER PRIOR TO INITIATING TRANSFER FROM NORMAL TO EMERGENCY AND PRIOR TO RETRANSFER FROM EMERGENCY TO NORMAL. THE TRANSFER SHALL BE DELAYED BY AN ADJUSTABLE TIME DELAY OF UP TO 1 MINUTE.

- H. THE TRANSFER SWITCHES, COMPLETE WITH ALL TIMERS, RELAYS, AND ACCESSORIES, SHALL BE LISTED BY UNDERWRITERS' LABORATORIES, INC. UNDER STANDARD UL-1008 (AUTOMATIC TRANSFER SWITCHES) AND APPROVED FOR USE ON EMERGENCY SYSTEMS PER NFPA 76A REQUIREMENTS.
- I. SWITCHES SHALL BE LISTED BY UNDERWRITERS' LABORATORIES, INC., STANDARD UL-1008 WITH WITHSTAND AND CLOSE-IN OF 22,000A.

# 5.13 START-UP, ACCEPTANCE TESTS AND INSTRUCTION

QUANTITY OF TWO (2).

A. ON COMPLETION OF THE INSTALLATION, START-UP SHALL BE PERFORMED BY A FACTORY-TRAINED DEALER SERVICE REPRESENTATIVE. ACCEPTANCE TESTS SHALL BE AS DIRECTED ELSEWHERE IN THIS SPECIFICATION. APPROVED OPERATING AND MAINTENANCE INSTRUCTION BOOKS SHALL BE TURNED OVER AT THIS TIME AND PROCEDURES EXPLAINED TO OPERATING PERSONNEL.



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- A. THE WORK TO BE ACCOMPLISHED UNDER THIS SECTION SHALL CONSIST OF FURNISHING THE EQUIPMENT NECESSARY FOR A COMPLETE AUTOMATIC CONTROL AND MONITORING SYSTEM TO FUNCTION AS SPECIFIED HEREIN AND AS SHOWN ON THE DRAWINGS. IT IS THE SYSTEM INTEGRATOR'S RESPONSIBILITY TO SUPPLY A SYSTEM THAT IS COMPATIBLE WITH EXISTING MICRO-COMM, INC. SCADA EQUIPMENT. THE COMPLETE SYSTEM SHALL BE DESIGNED. FABRICATED, PROGRAMMED, TESTED, STARTED UP, AND WARRANTED BY A SINGLE SUPPLIER TO INSURE A SINGLE SOURCE OF RESPONSIBILITY.
- B. THE EXISTING MICRO-COMM SCADA SYSTEM MODIFICATIONS TO **INCLUDE:**
- PROPOSED INDUSTRIAL DRIVE SEWAGE LIFT STATION REMOTE UNIT (PLC-RTU).
- MODIFICATION TO THE EXISTING MICRO-COMM CENTRAL UNIT, INCORPORATING THE PROPOSED RTU DATA INTO THE EXISTING CENTRAL UNIT, LOCATED AT THE WASTEWATER OFFICE.

#### 6.2 MANUFACTURER SUPPORT

- A. THE FOLLOWING SHALL BE PERFORMED AND/OR SUPPLIED BY A MANUFACTURER AUTHORIZED SYSTEM INTEGRATOR.
- ENGINEERING SUBMITTAL AND SHOP DRAWINGS. ALL THE PAPERWORK AND FEES NECESSARY TO OBTAIN AN FCC RADIO LICENSE IN THE NAME OF THE OWNER.
- ALL USER LICENSES AND FEES FOR SOFTWARE SUPPLIED IN THIS SYSTEM WITH LICENSES IN THE NAME OF THE OWNER.
- SPARE PARTS AND MAINTENANCE TOOLS.
- OPERATION AND MAINTENANCE MANUALS.
- PROGRAMMING. TESTING.
- START-UP LABOR AND SERVICES.
- OWNER TRAINING.

#### 6.3 SUBMITTALS

A. PROVIDE A COMPLETE SUBMITTAL PRIOR TO EQUIPMETN FABRICATION. SUBMITTAL SHALL INCLUDE PRODUCT DATA, SHOP DRAWINGS, PANEL LAYOUT DRAWINGS, INSTALLATION DRAWINGS, AND A DESCRIPTION OF THE OPERATOR'S INTERFACE SIOFTWARE INCLUDING SAMPLE TEXT SCREENS AND MENUS, SAMPLE GRAPHICS AND SAMPLE REPORT LOGS AND GRAPHS.

#### 6.4 WARRANTY.

A. THE CONTROL SYSTEM MANUFACTURER SHALL SUPPLY A FIVE (5) YEAR PARTS AND LABOR WARRANTY AND COMPREHENSIVE SUPPORT PROGRAM FOR ALL ITEMS AND SOFTWARE SUPPLIED UNDER THIS SECTION (INCLUDING PLC/RTU FRONT PANEL DISPLAYS, EXCEPT AS NOTED BELOW). POWER SURGES AND LIGHTNING DAMAGE SHALL BE INCLUDED AS PART OF THE WARRANTY.

#### 6.5 PROGRAMMABLE LOGIC CONTROLLERS & LOCAL I/O EQUIPMENT

A. INDUSTRIAL PROGRAMMABLE LOGIC CONTROLLERS (PLCS) SHALL BE USED AT ALL LOCATIONS. THE PLCS SHALL HAVE AN OPERATIONAL RANGE OF 0-60DEGC AND 5-95% RELATIVE HUMIDITY. THE PLCS SHALL ALL BE FROM THE SAME FAMILY OF CONTROLLERS. SCALABLE FROM VERY SMALL TO VERY LARGE APPLICATIONS, AND PROGRAMMED FROM IDENTICAL PROGRAMMING SOFTWARE USED FOR ALL PROCESSORS. THE PLCS SHALL BE MICRO-COMM M1600 SERIES CONTROLLERS.

# 6.6 1.1 RADIO TRANSCEIVERS & ACCESSORIES

# A. GENERAL

- THE CONTROL SYSTEM SHALL BE SPECIFICALLY DESIGNED FOR RADIO CHANNEL DATA COMMUNICATIONS. THE CORE OF THE SYSTEM SHALL BE OVER FCC LICENSED RADIO FREQUENCY SPECTRUM INTENDED FOR SCADA AND REMOTE-CONTROL PURPOSES. THE SYSTEMS INTEGRATOR SHALL BE RESPONSIBLE OF OBTAINING THE NECESSARY FCC LICENSES FOR ONE OR MORE FREQUENCIES AS NEEDED TO ESTABLISH BOTH SUPERVISORY AND DISTRIBUTED CONTROL
- 2. ALL OF THE EQUIPMENT REQUIRED FOR OPERATION OF THE SYSTEM SHALL BE DIRECTLY OWNED BY THE OWNER AND INCLUDED AS PART OF THIS CONTRACT. SYSTEMS USING THIRD PARTY REPEATERS, TRUNKING MASTERS, OR LEASED EQUIPMENT WILL NOT BE ALLOWED.
- THE OVERALL SYSTEM DESIGN AND OPERATION SHALL PROVIDE A 20DB PAD OVER THE MINIMUM REQUIRED FOR OPERATION ON ALL PRIMARY DATA PATHS (PRIMARY PATHS MAY INCLUDE DATA RELAYS) TO INSURE A 98% RELIABILITY OF COMMUNICATIONS. REMOTE SITE COMMUNICATIONS FOR DISTRIBUTED PEER-TO-PEER COMMUNICATIONS SHALL PROVIDE 30DB OF PAD TO ENSURE OPERATION UNDER ALL WEATHER CONDITIONS AND PROVIDE A 99.9% COMMUNICATIONS RELIABILITY. THE 20DB AND 30DB PAD REQUIREMENTS AND FCC RULE COMPLIANCE SHALL BE DEMONSTRATED (AT NO ADDITIONAL COST) TO THE ENGINEER AT HIS REQUEST. THE TESTING SHALL BE ACCOMPLISHED USING AN IFR AM/FM 1000S COMMUNICATIONS ANALYZER OR EQUAL EQUIPMENT.

# B. COMMUNICATIONS

- THE CTU-RTU SUPERVISORY COMMUNICATIONS AND RTU-RTU DISTRIBUTED CONTROL COMMUNICATIONS SYSTEM SHALL OPERATE IN A HALF-DUPLEX MODE OVER A SINGLE "LICENSED" RADIO FREQUENCY USING "POINT-TO-POINT" COMMUNICATION TECHNIQUES. THE RTUS SHALL MONITOR FOR THE CHANNEL TO AVOID DATA COLLISIONS WITH OTHER RTUS DURING PEER-TO-PEER COMMUNICATIONS. THE SYSTEM SHALL BE CAPABLE OF SHARING THE RADIO CHANNEL WITH OTHER RADIO TELEMETRY SYSTEM.
- 2. ALL DATA TRANSMITTED SHALL BE IN DIGITAL WORD FORM USING FSK (FREQUENCY SHIFT KEYING) TRANSMISSION. ALL TRANSMISSIONS SHALL INCLUDE THE ADDRESS OF THE SENDER AND THE RECEIVER, AND BE SUBJECT TO CHECK SUM, PARITY, AND FRAMING ERROR CHECKS, TO INSURE A MINIMUM DATA RELIABILITY OF 1 ERROR IN 1,000,000,000 BITS. ANY TRANSMISSIONS THAT FAIL THE DATA CHECKING WILL BE RETRIED UNTIL CORRECT. NO DATA CORRECTION METHODS WILL BE ALLOWED. A PLUG-IN RS232C DATA PORT SHALL BE PROVIDED AT ALL LOCATIONS IN THE SYSTEM TO ALLOW THE USE OF A STANDARD DATA TERMINAL TO VIEW DATA

EXCHANGES BETWEEN THE SITES AND TO PROVIDE A MEANS OF EXTENSIVE DE-BUGGING.

THE SYSTEM SHALL PROVIDE A COMPLETE DATA UPDATE AT LEAST ONCE EVERY (2) MINUTES WITH SOME FUNCTIONS UPDATING FASTER AS REQUIRED BY LOCAL SYSTEM CONDITIONS. THE RADIO TRANSCEIVERS SHALL BE AN ICOM DATA RADIO.

#### 6.7 INSTRUMENTATION & ACCESSORIES

#### A. GENERAL

ALL ITEMS IN THE CONTROL SYSTEM (ELECTRONIC CARDS, POWER SUPPLIES, RADIOS, TIME DELAYS, RELAYS, ETC.) SHALL BE OF PLUG- IN CONSTRUCTION, MAKE USE OF A PLUG-IN WIRING HARNESS, USE PLUG-IN TERMINAL BLOCKS, AND BE INTERCHANGEABLE WITHOUT RECALIBRATION. TO ENSURE FIELD REPAIR-ABILITY BY NON-TECHNICAL PERSONNEL, EQUIPMENT THAT MUST BE UN-WIRED FOR REPLACEMENT WILL NOT BE

THE FOLLOWING INSTRUMENTATION DEVICES AND TECHNIQUES SHALL BE USED AS SPECIFICALLY CALLED FOR IN THE RTU AND CTU INPUT/OUTPUT SECTIONS OF THIS SPECIFICATION.

#### B. POWER SUPPLIES

THE DC POWER SUPPLIES SHALL PROVIDE ±0.1% LINE AND LOAD REGULATION WITH  $\pm 10\%$  INPUT VARIATIONS. THEY SHALL HAVE A TEMPERATURE COEFFICIENT OF ±0.02% PER DEGREE C. THE INPUT/OUTPUT ISOLATION SHALL BE 100 MOHMS DC (900VOLTS AC) WITH OUTPUT TRANSIENT RESPONSE OF 50 MICROSECONDS MAXIMUM. THE POWER SUPPLIES SHALL BE SIZED TO OPERATE THE REMOTE UNIT EQUIPMENT WITH OR WITHOUT THE BACK-UP BATTERY IN PLACE. POWER SUPPLIES SHALL BE A POWER ONE SERIES MAP130, SOLA SLS, OR APPROVED EQUAL

#### C. BATTERY BACK-UP OPERATION

THE REMOTE UNITS INDICATED SHALL BE SUPPLIED WITH BATTERY BACK-UP OPERATION. THE RECHARGEABLE BATTERIES SHALL BE THE SEALED SOLID GELLED ELECTROLYTE TYPES, DESIGNED FOR FLOAT OR STANDBY SERVICE. UNLESS NOTED OTHERWISE IN THE RTU DESCRIPTIONS, BATTERIES SHALL BE SIZED TO MAINTAIN 24-HOUR SERVICE AT WATER TOWER REMOTES AND 8-HOUR SERVICE AT PUMP STATIONS AND OTHER REMOTES. THE REMOTE SHALL INCLUDE A CHARGING MODULE TO RECHARGE THE BATTERY WHEN POWER IS RESUMED, MAINTAIN THE CHARGE BETWEEN OUTAGES, AND PROVIDE A LOW VOLTAGE CUT-OFF TO PROTECT THE BATTERY FROM EXCESSIVE DISCHARGE DURING PROLONGED OUTAGES. ALL DISCRETE, ANALOG, AND PULSE INPUTS (I.E. SWITCH CLOSURES, PRESSURE, LEVEL, FLOWS, ETC.) SHALL CONTINUE TO FUNCTION ON BATTERY BACK UP. BATTERIES SHALL BE GLOBE GEL/CELL OR APPROVED EQUAL

#### D. SINGLE PHASE 120VAC SURGE PROTECTIVE DEVICE

1. A 120VAC SURGE PROTECTIVE DEVICE (SPD) SHALL BE INSTALLED ON THE 120V INCOMING POWER IN THE RTU PANEL POWER SUPPLY. THE SPD UNIT SHALL BE UL 1449 THIRD EDITION LISTED, PRE-WIRED WITH CONDUCTOR LEADS A MINIMUM OF 24-INCHES IN LENGTH AND CONTAIN LED INDICATOR LIGHTS TO INDICATE POWER IS APPLIED TO THE SPD AND ALL IS OK (GREEN). SURGE CURRENT CAPACITY SHALL BE 50KA MINIMUM. L-N AND N-G PROTECTION. AND THE VOLTAGE PROTECTION RATING (VPR) SHALL BE 600V FOR 120VAC

# E. KEYPAD & DISPLAY UNIT

1. AS DETAILED IN THE APPENDIX, THE OPTIONAL KEYPAD & DISPLAY UNIT SHALL HAVE A 4X20 BACK-LIGHTED LCD DISPLAY TO DISPLAY THE STATUS OF ALL LOCAL INPUTS AND THE TANK LEVEL OF THE ASSOCIATED CONTROL WATER TOWER LEVEL. THE 5X5 KEYPAD SHALL PROVIDE FOR OPERATOR INPUT OF SET POINTS AND TIMER SETTINGS. THE OPERATOR INTERFACE SHALL BE MENU DRIVEN AND PROVIDE FOR DEDICATED KEYS FOR CURSOR POSITION AND INPUT FUNCTIONS. THE OPERATOR INTERFACE SHALL PROVIDE FOR UP TO 50 SCREENS OF DATA DISPLAY. THE KEYPAD & DISPLAY UNIT SHALL BE SUPPLIED AND MOUNTED ON THE FRONT OF THE PLC ENCLOSURE IF DETAILED IN THE SPECIFIC PLC I/O REQUIREMENT LIST. THE KEYPAD & DISPLAY UNIT SHALL MAINTAIN THE NEMA 4 RATING OF THE PLC ENCLOSURE.

# F. RADAR LEVEL SENSORS

THE FREE SPACE RADAR SENSOR IS USED FOR CONTINUOUS, NON-CONTACT LEVEL MEASUREMENT OF LIQUIDS, PASTES AND SLURRIES. THE MEASUREMENT IS NOT AFFECTED BY CHANGING MEDIA, TEMPERATURE CHANGES, GAS BLANKETS OR VAPORS. SETUP, PROGRAMMING AND COMMISSIONING OF THIS DEVICE IS POSSIBLE VIA 4-20MA OR WIRELESS VIA APP USING BLUETOOTH.

- THE PULSED TIME OF FLIGHT RADAR TRANSMITTER SHALL OPERATE AT 26 GHZ USING 2-WIRE TECHNOLOGY FOR LEVEL MEASUREMENT AND/OR OPEN CHANNEL FLOW MEASUREMENT. ACCURACY SHALL BE +/- 0.08". PROCESS TEMPERATURE RANGE IS -40 TO 176 DEGREES F AND PRESSURE RANGE IS FROM -14.5 TO 43 PSI. THE PROCESS CONNECTION SHALL BE 1"NPT, 1.5"NPT, 2"NTP OR 3"-6" ANSI FLANGE CONNECTION BY APPLICATION. THE RADAR DEVICE SHALL HAVE BLUETOOTH WIRELESS TECHNOLOGY INTERFACE AND CAN BE OPERATED AND CONFIGURED VIA THIS INTERFACE USING THE SMARTBLUE APP. THE RADAR UNIT SHALL BE RATED FOR IP66/68, NEMA4X/6P. THE RADAR SENSOR BODY MATERIAL SHALL BE MADE OF PVDF. THE RADAR SENSOR MUST HAVE HERMETICALLY SEALED WIRING AND FULLY POTTED
- ELECTRONICS ELIMINATING WATER INGRESS. 3. RADAR TRANSMITTERS SHALL BE ENDRESS HAUSER -MICROPILOT FMR20.

# G. HIGH/LOW WETWELL FLOATS

1. THE HIGH/LOW WETWELL ALARM FLOATS SHALL BE DIRECT ACTING FLOAT SWITCHES. THE FLOATS SHALL HAVE A POLYPROPYLENE CASE CONTAINING A HERMETICALLY SEALED MERCURY SWITCH AND BE SUPPLIED WITH 40' OF PVC TYPE STO CABLE. THE FLOAT SWITCHES SHALL BE ANCHOR SCIENTIFIC ROTO-FLOAT SERIES, CYNERGY3 FFT SERIES, OR APPROVED EQUAL.

# H. ENTRY ALARM

UNAUTHORIZED ENTRY ALARMS AT REMOTE SITES SHALL BE ACCOMPLISHED THROUGH A PERIMETER ALARM SYSTEM

POWERED FROM THE COMMON 12VDC-POWER SUPPLY. THE SYSTEM SHALL INCLUDE THE NECESSARY STRUCTURE ENTRANCE MAGNETIC DOOR SWITCHES. SHOULD AN INTRUDER ENTER THE STRUCTURE WITHOUT ACKNOWLEDGING HIS PRESENCE. AN ENTRY ALARM WILL BE SENT TO THE CENTRAL UNIT. THE ENTRY ALARM SHALL HAVE AN ADJUSTABLE TIME DELAY (0-60 SECONDS) TO ALLOW AUTHORIZED PERSONNEL TIME TO ACKNOWLEDGE THEIR PRESENCE WHEN ENTERING THE STRUCTURE AND PROVIDE A RE-ARMING DELAY WHEN LEAVING THE STRUCTURE. THE RTU DOOR MOUNTED KEY SWITCH SHALL BE CONSTRUCTED SO THAT THE KEY CAN ONLY BE REMOVED IN THE "ARMED" POSITION. THE ALARM SYSTEM CAN BE IMPLEMENTED AS PART OF THE RTU LOGIC SYSTEM OR BE A DIGITAL CONTROL SYSTEMS (DCS) OR APPROVED EQUAL.

#### 6.8 EXECUTION

#### A. FCC LICENSING

1. THE SYSTEM MANUFACTURER/SUPPLIER SHALL BE RESPONSIBLE FOR COLLECTING ALL INFORMATION, GENERATING ALL PAPERWORK, AND PAYING ALL FEES REQUIRED FOR MODIFYING THE LICENSE ON BEHALF OF THE OWNER.

#### B. SYSTEM START-UP

THE MANUFACTURER SHALL SUPPLY "FACTORY" PERSONNEL FOR START-UP SERVICE AS NEEDED TO INSURE SATISFACTORY OPERATION. SUBSEQUENT TRIPS TO THE JOB SITE TO CORRECT DEFECTS SHALL BE MADE AT NO CHARGE TO THE OWNER DURING THE WARRANTY PERIOD.

#### 6.9 APPENDIX

A. SEWAGE LIFT STATION REMOTE UNIT (RTU-PLC) REQUIREMENTS: 1. INDUSTRIAL DRIVE INSTALLATION REQUIREMENTS:

A) THE SYSTEM INTEGRATOR SHALL SUPPLY THE PUMP STATION SCADA EQUIPMENT, HOUSED IN A NEMA 4/12 WALL MOUNT ENCLOSURE. THE PUMP STATION ENCLOSURE SHALL INCLUDE AN INTERNAL POWER SWITCH, BULKHEAD COAXIAL CABLE LIGHTNING ARRESTOR, PLC, RADIO AND A POWER LINE LIGHTNING ARRESTOR AS SPECIFIED EARLIER.

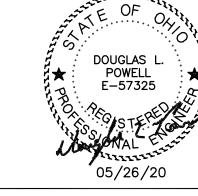
B) THE CONTRACTOR WILL BE RESPONSIBLE FOR THE INSTALLATION OF THE SCADA PANEL, INCLUDING INSTRUMENTATION, WIRING, CONDUIT AND ANTENNA. THE CONTRACTOR INSTALLATION REQUIREMENTS SHALL BE DETAILED BY THE SYSTEM INTEGRATOR. C) THE ANTENNA SHALL BE MOUNTED ON A 20' POWER POLE

WITH 3/4" RIGID CONDUIT AND A WEATHER-HEAD RUN TO THE RTU ENCLOSURE, AS PREVIOUSLY SPECIFIED. FRONT PANEL DISPLAY REQUIREMENTS: KEYPAD LCD DISPLAY

- DISCRETE OUTPUTS: A) PUMP #1 CALL
- B) PUMP #2 CALL
- C) PLC LEVEL CONTROL "NORMAL" ("FAILURE" WILL ACTIVATE BACK-UP FLOAT PUMP CONTROL) D) SPARE
- DISCRETE INPUTS:
- A) POWER FAILURE
- B) PUMP #1 RUNNING C) PUMP #2 RUNNING
- D) PUMP #1 FAIL
- E) PUMP #2 FAIL
- F) ENTRY/INTRUSION ALARM
- G) BACKUP FLOAT CONTROL "ACTIVE" HIGH WETWELL LEVEL (FROM FLOAT SWITCH)
- ATS GENERATOR ACTIVE
- GENERATOR RUNNING
- K) GENERATOR ALARM
- L) SPARE
- 5. ANALOG INPUTS: A) WETWELL LEVEL INDICATION (NEW RADAR LEVEL SENSOR AS SPECIFIED EARLIER)
- B) FLOW RATE/TOTAL (SIGNAL FROM FLOW METER, SUPPLIED BY OTHERS)
- C) PUMP #1 VFD SPEED
- D) PUMP #2 VFD SPEED
- E) SPARE ANALOG OUTPUTS:
- A) PUMP #1 VFD SPEED CONTROL B) PUMP #2 VFD SPEED CONTROL

#### B. SEWAGE LIFT STATION BACKUP FLOAT CONTROL PANEL REQUIREMENTS:

- INDUSTRIAL DRIVE INSTALLATION REQUIREMENTS:
- A) THE SYSTEM INTEGRATOR SHALL SUPPLY A "BACKUP FLOAT CONTROL PANEL" IN A NEMA 4/12 ENCLOSURE, WITH A UL-698A BARRIER SECTION. THE CONTROL PANEL SHALL OPERATOR THE PUMPS, BASED OFF OF FLOAT ACTIVATION, IN THE EVENT OF A PRIMARY CONTROL FAILURE (PLC OR LEVEL SENSOR FAILURE). THE CONTROL PANEL WILL BE COMPOSED OF RELAY LOGIC, TIMERS, SWITCHES AND LIGHTS. ELECTRONIC CONTROLLERS, PLCS OR PROCESSORS WILL NOT BE ALLOWED FOR BACK-UP PUMP CONTROL OPERATION.
- 2. FRONT PANEL "OPERATIONAL" REQUIREMENTS:
- A) TELEMETRY/FLOAT CONTROL SWITCH B) FLOAT CONTROL "ACTIVE" LIGHT
- C) PUMP #1 LEAD/LAG SWITCH
- D) PUMP #1 FLOAT CALL LIGHT E) PUMP #1 RUNNING LIGHT
- F) PUMP #2 LEAD/LAG SWITCH
- G) PUMP #2 FLOAT CALL LIGHT H) PUMP #2 RUNNING LIGHT
- UL-698 EXPLOSION PROOF SECTION:
- A) TERMINAL BLOCKS TO INTERFACE TO ALL WETWELL DEVICES B) INTRINSICALLY SAFE ISOLATION MODULE FOR THE RADAR INSTRUMENT
- C) INTRINSICALLY SAFE BARRIER FOR THE FLOAT SWITCHES
- 4. FLOAT CONTROL OPERATION: A) FLOAT: HIGH LEVEL ALARM
  - B) FLOAT: LAG PUMP "CALL"
  - C) FLOAT: LEAD PUMP "CALL"
- D) FLOAT: LOW LEVEL "PUMP(S) OFF"



E4-20110.DWG PRATER

DRAWN BY

DLP

DESIGNED BY

D.POWELL

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