



QUEEN'S UNIVERSITY FACILITIES

BAN RIGH STEAM MANHOLE REPLACEMENT

207 STUART STREET, RIDEAU BUILDING,
2ND FLOOR, QUEEN'S UNIVERSITY KINGSTON, ON K7L 3N6

QUEEN'S # PPS 18-00983
ISSUED FOR TENDER
APRIL 27TH, 2026

COVERS AND DRAWING LISTS

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C02 EXISTING CONDITIONS
C03 REMOVALS PLAN
C04 SITE PLAN
C05 SERVICING
C06 CIVIL DETAILS
C07 DETAILS

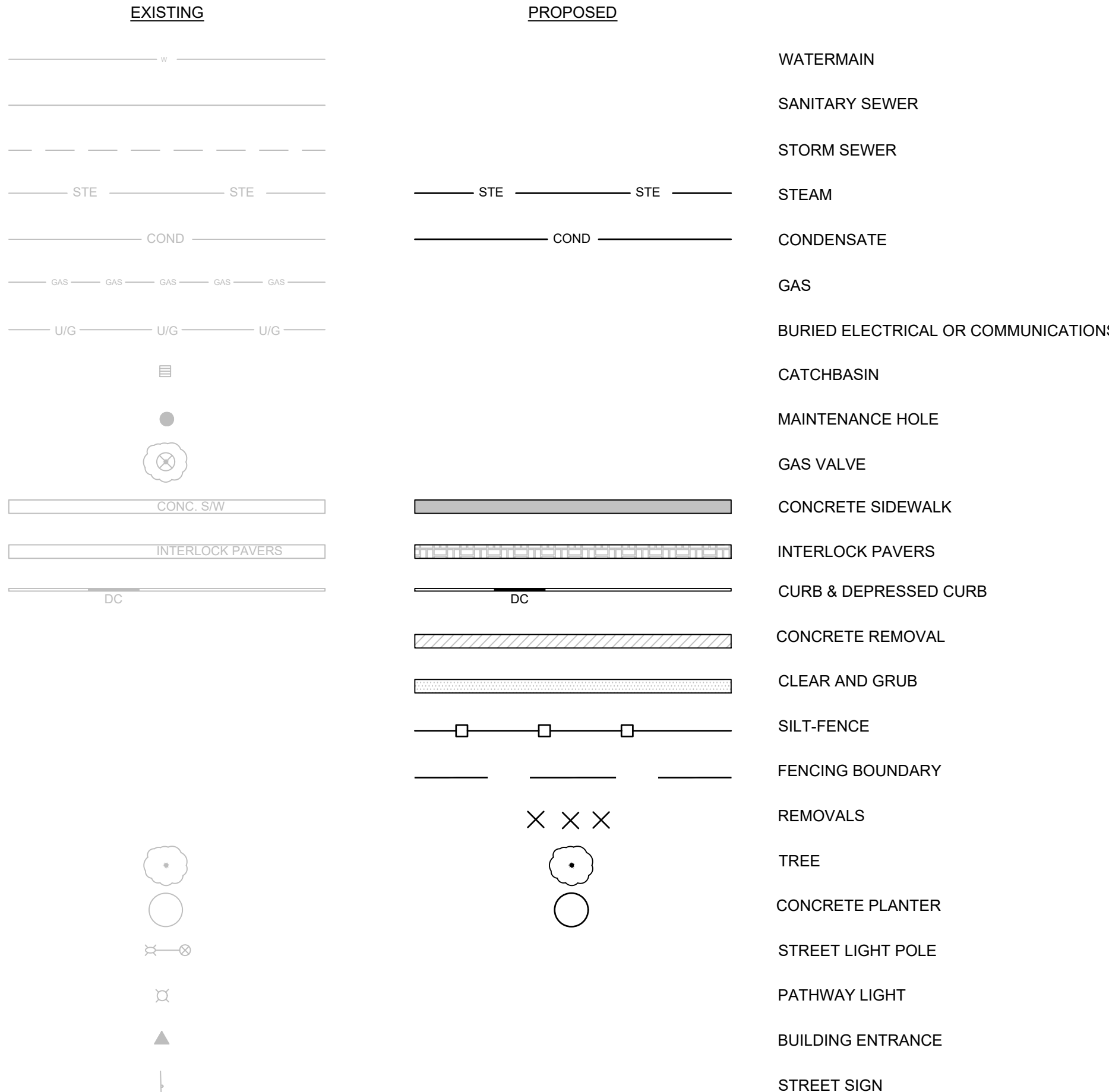
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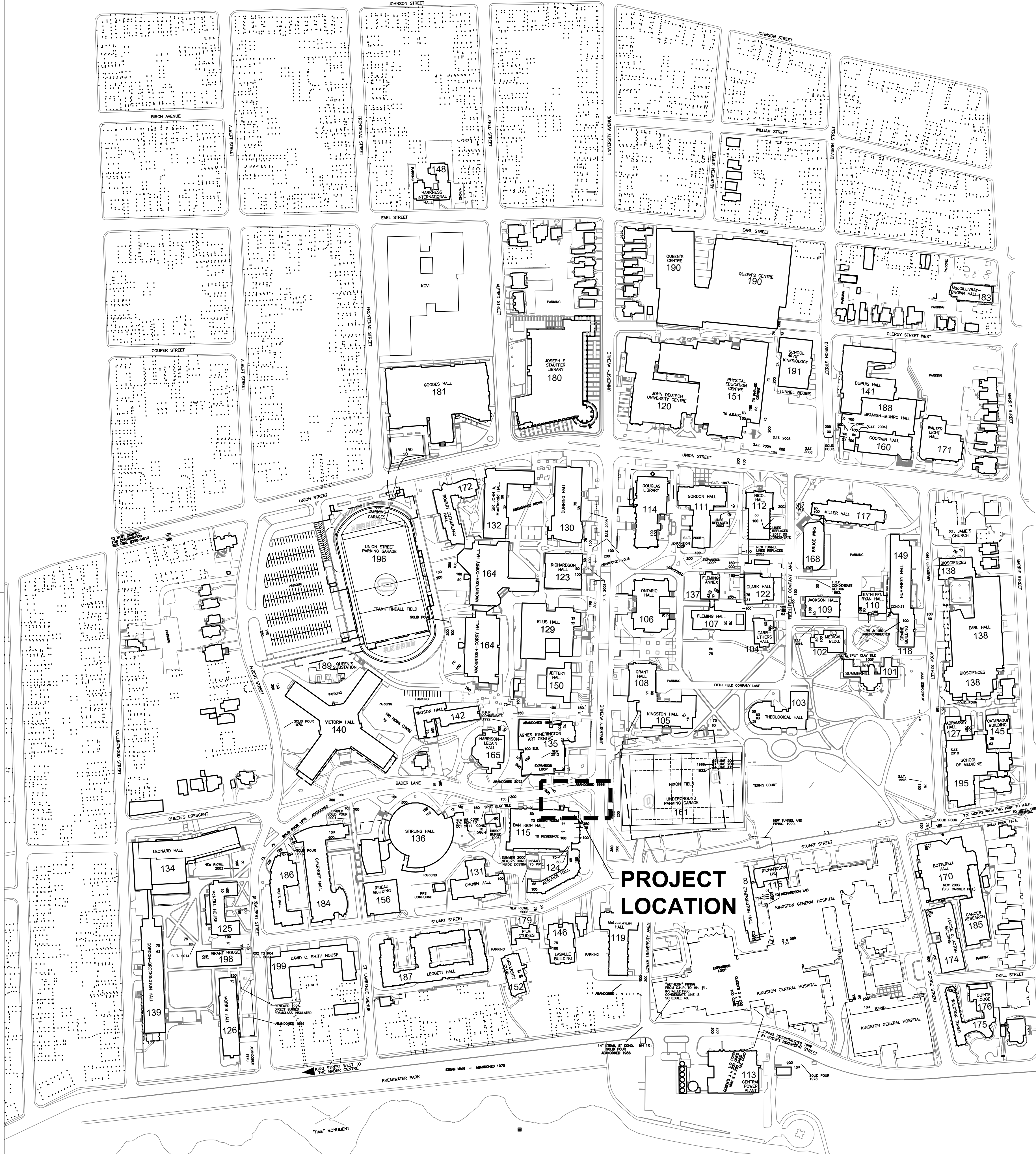
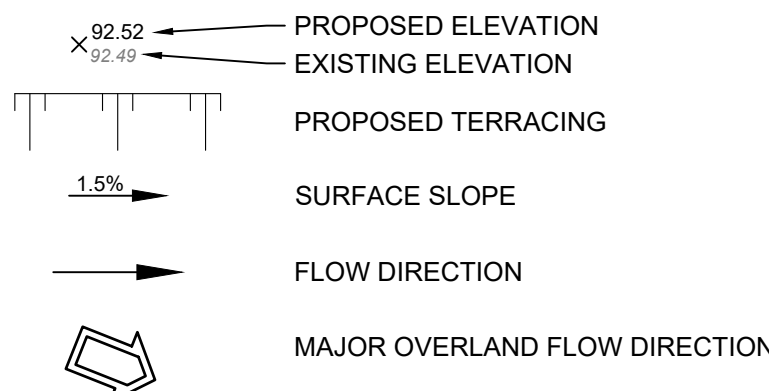
QUEEN'S UNIVERSITY BAN RIGH STEAM MANHOLE REPLACEMENT
28079-002

SITE SERVICING AND REINSTATEMENT

QUEEN'S UNIVERSITY MAIN CAMPUS



GRADING



0	ISSUED FOR TENDER	27/04/26
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0 25mm

CLIENT:

CONSULTANT: www.ilrichards.ca

CONSULTANT:



PROJECT

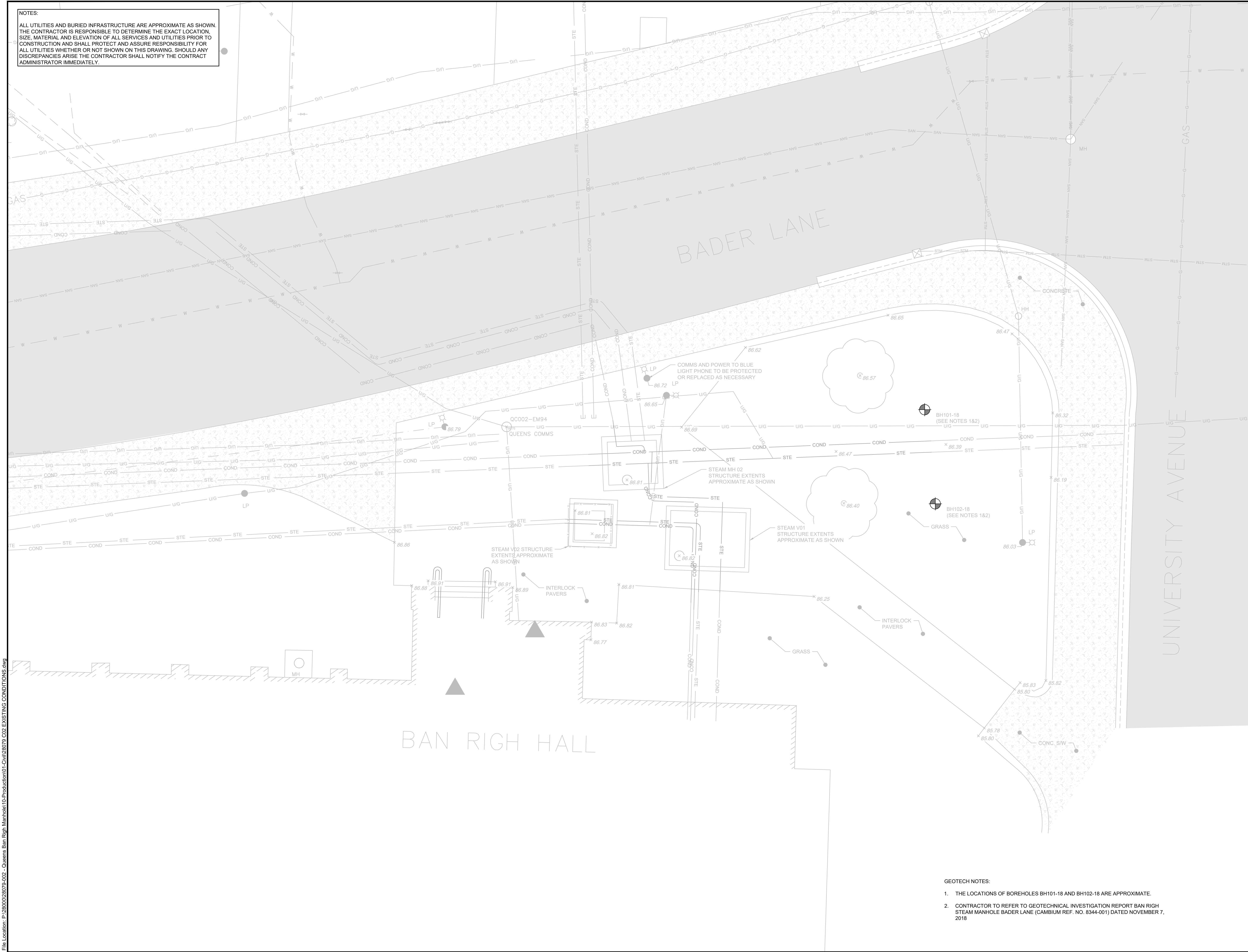
QUEEN'S BAN RIGH STEAM MANHOLE REPLACEMENT

BADER LANE, KINGSTON, ONTARIO, K7L 2S8

DRAWING

LEGEND AND LOCATION PLAN

DESIGN: SS	DRAWING #: C01
DRAWN: PSC	
CHECKED: MC	
JLR #: 28079-002	



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SCALE: 1:75

CLIENT:




CONSULTANT:

 **J.L. Richards**
ENGINEERS • ARCHITECTS • PLANNERS

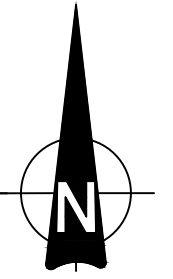
CONSULTANT:

PROFESSIONAL STAMP



LICENCED PROFESSIONAL ENGINEER
S.A. SEXTON
100113373
2026-04-27
PROVINCE OF ONTARIO

PROJECT NORTH



PROJECT:

**QUEEN'S BAN RIGH STEAM
MANHOLE REPLACEMENT**

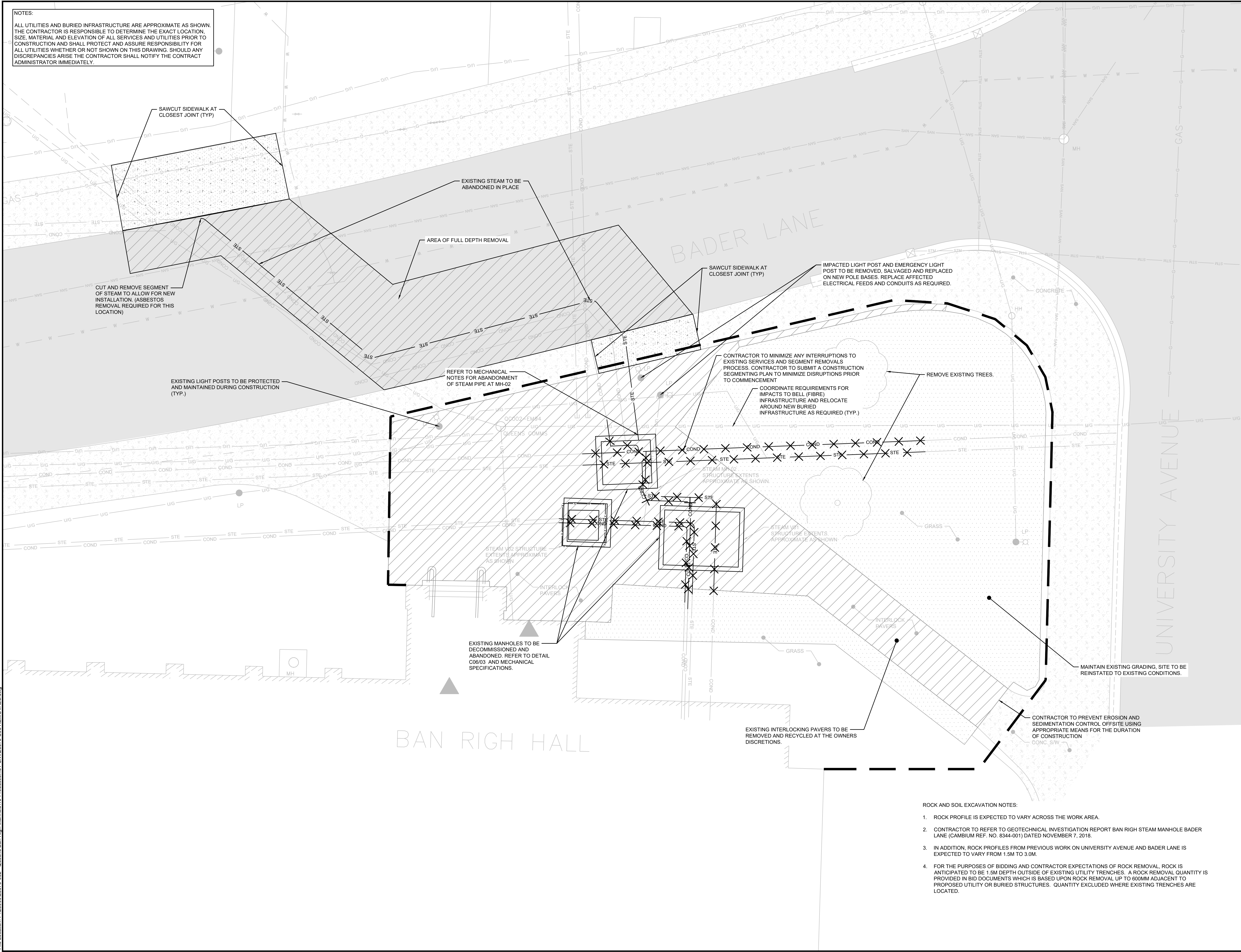
BADER LANE, KINGSTON, ONTARIO, K7L 2S8

DRAWING:

EXISTING CONDITIONS

DESIGN: SS	DRAWING #:
DRAWN: PSC	C02
CHECKED: MC	
JLR #: 28079-002	

- GEOTECH NOTES:
- THE LOCATIONS OF BOREHOLES BH101-18 AND BH102-18 ARE APPROXIMATE.
 - CONTRACTOR TO REFER TO GEOTECHNICAL INVESTIGATION REPORT BAN RIGH STEAM MANHOLE BADER LANE (CAMBIUM REF. NO. 8344-001) DATED NOVEMBER 7, 2018




NOTES:
ALL UTILITIES AND BURIED INFRASTRUCTURE ARE APPROXIMATE AS SHOWN. THE CONTRACTOR IS RESPONSIBLE TO DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL SERVICES AND UTILITIES PRIOR TO CONSTRUCTION AND SHALL PROTECT AND ASSURE RESPONSIBILITY FOR ALL UTILITIES WHETHER OR NOT SHOWN ON THIS DRAWING. SHOULD ANY DISCREPANCIES ARISE THE CONTRACTOR SHALL NOTIFY THE CONTRACT ADMINISTRATOR IMMEDIATELY.


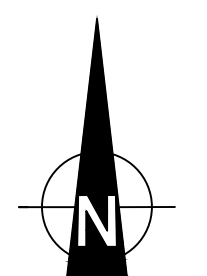
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CLIENT:


CONSULTANT:

J.L. Richards
ENGINEERS - ARCHITECTS - PLANNERS

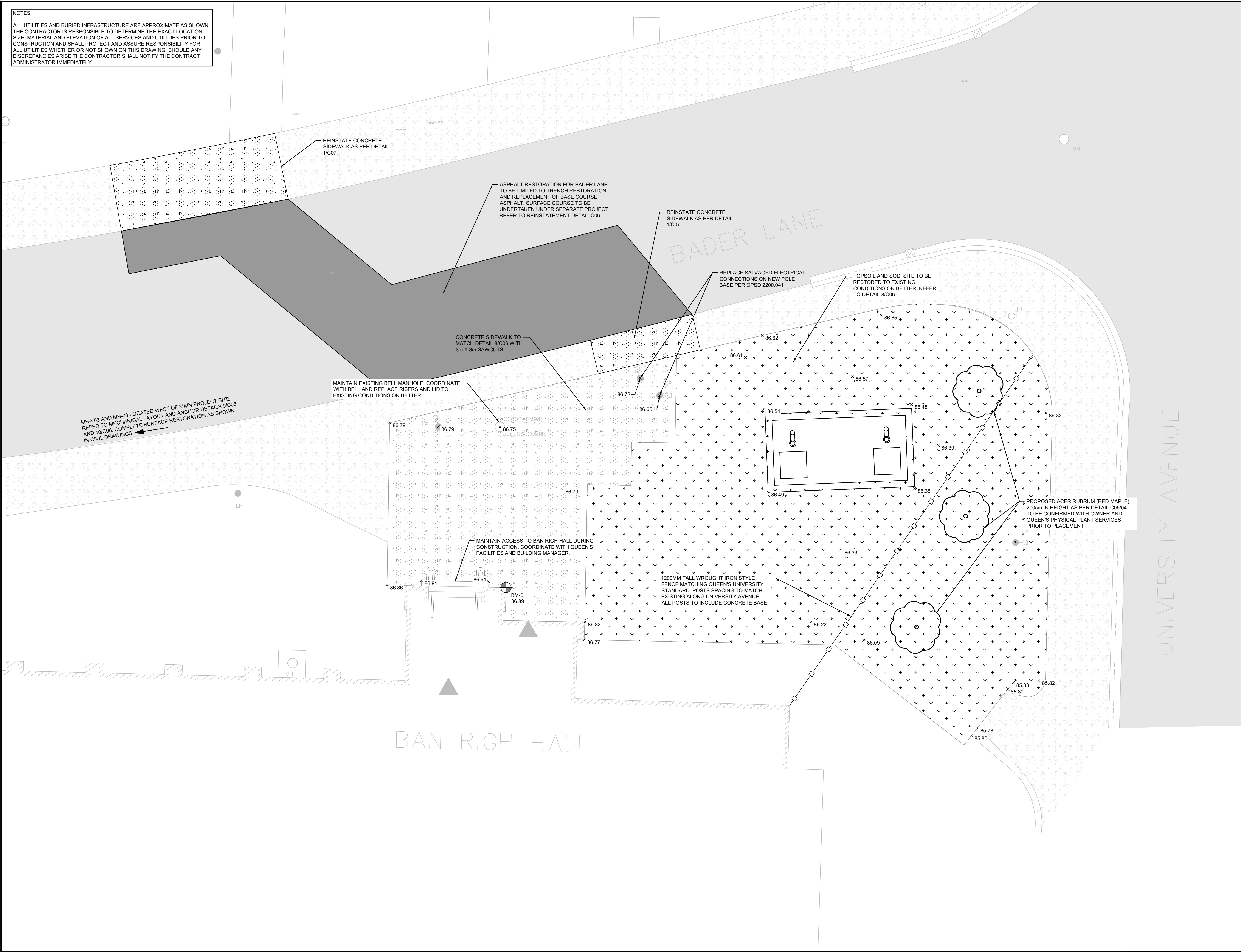
CONSULTANT:

PROJECT NORTH


PROJECT:
QUEEN'S BAN RIGH STEAM MANHOLE REPLACEMENT
BADER LANE, KINGSTON, ONTARIO, K7L 2S8

DRAWING:
REMOVALS PLAN
DESIGN: SS
DRAWN: PSC
CHECKED: MC
JLR #: 28079-002
DRAWING #:
C03

- ROCK AND SOIL EXCAVATION NOTES:
1. ROCK PROFILE IS EXPECTED TO VARY ACROSS THE WORK AREA.
 2. CONTRACTOR TO REFER TO GEOTECHNICAL INVESTIGATION REPORT BAN RIGH STEAM MANHOLE BADER LANE (CAMBIUM REF. NO. 8344-001) DATED NOVEMBER 7, 2018.
 3. IN ADDITION, ROCK PROFILES FROM PREVIOUS WORK ON UNIVERSITY AVENUE AND BADER LANE IS EXPECTED TO VARY FROM 1.5M TO 3.0M.
 4. FOR THE PURPOSES OF BIDDING AND CONTRACTOR EXPECTATIONS OF ROCK REMOVAL, ROCK IS ANTICIPATED TO BE 1.5M DEPTH OUTSIDE OF EXISTING UTILITY TRENCHES. A ROCK REMOVAL QUANTITY IS PROVIDED IN BID DOCUMENTS WHICH IS BASED UPON ROCK REMOVAL UP TO 600MM ADJACENT TO PROPOSED UTILITY OR BURIED STRUCTURES. QUANTITY EXCLUDED WHERE EXISTING TRENCHES ARE LOCATED.

NOTES:
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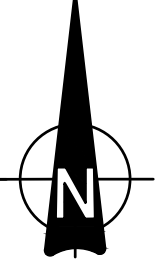
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CONSULTANT:

PROJECT NORTH


PROJECT:
QUEEN'S BAN RIGH STEAM
MANHOLE REPLACEMENT
BADER LANE, KINGSTON, ONTARIO, K7L 2S8

DRAWING:
SITE PLAN
DESIGN: SS
DRAWN: PSC
CHECKED: MC
JLR #: 28079-002
DRAWING #:
C04

ALL UTILITIES AND BURIED INFRASTRUCTURE ARE APPROXIMATE AS SHOWN. THE CONTRACTOR IS RESPONSIBLE TO DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL SERVICES AND UTILITIES PRIOR TO CONSTRUCTION AND SHALL PROTECT AND ASSURE RESPONSIBILITY FOR ALL UTILITIES WHETHER OR NOT SHOWN ON THIS DRAWING. SHOULD ANY DISCREPANCIES ARISE THE CONTRACTOR SHALL NOTIFY THE CONTRACT ADMINISTRATOR IMMEDIATELY.

CONTRACTOR IS RESPONSIBLE FOR LOCATING AND COORDINATING THE RELOCATION OF UNDERGROUND COMMUNICATION (INCLUDING FIBRE) WITHIN THE CONSTRUCTION FOOTPRINT. COORDINATION INCLUDES EFFORTS REQUIRED TO PLAN AND IMPLEMENT RELOCATION ENSURING MINIMAL DISRUPTION TO USERS AS REQUIRED BY QUEEN'S ITS. QUEEN'S ITS WILL PROVIDE CONTRACTOR WITH DOWNTIME LIMITATIONS AT ONSET OF PROJECT. ALL EQUIPMENT, MATERIAL AND LABOUR TO RELOCATE COMMS INFRASTRUCTURE IS TO BE INCLUDED WITHIN CONTRACT.

ALL STEAM AND CONDENSATE PIPING TO BE
CONCRETE ENCASED REFER TO DETAIL
6/C06 AND MECHANICAL DETAILS FOR
MORE INFORMATION

- 200mm GOOSE-NECK VENT TO BE
ONTO PRECAST MANHOLE ONSITE

CONCRETE ANCHOR. —
REFER TO DETAIL 7/288.

CONCRETE ANCHOR.
REFER TO DETAIL 3/C

↓ THROUGH SECTIONS.

REFER TO MECHANICAL FOR CONNECTION
DETAILS

— PRECAST RECTANGULAR MANHOLE INCLUDING ANCHORED
PIPE RESTRAINTS AND 500mm x 500mm x 150mm DEEP
SUMP HOLE AND PUMP. INTERNAL DIMENSIONS L6.15m x
W3.00m x H2.15m. PENETRATIONS ARE APPROXIMATE TO B
CONFIRMED ONSITE AND REFLECTED ON SHOP DRAWING
SUBMITTAL. REFER TO DETAIL 2/C06

900mm x 900mm SINGLE-DOOR
ALUMINUM ACCESS HATCH (MSL)

0	ISSUED FOR TENDER	27/04/26
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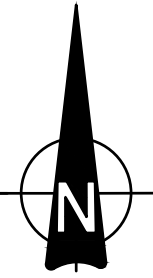
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CONSULTANT:



PROJECT NORTH



PROJECT:

QUEEN'S BAN RICH STEAM MANHOLE REPLACEMENT

BADER LANE, KINGSTON, ONTARIO, K7L 2S8

DRAWING:

SERVICING

DESIGN: 88

DRAWN: 500

CHECKED: 11/2

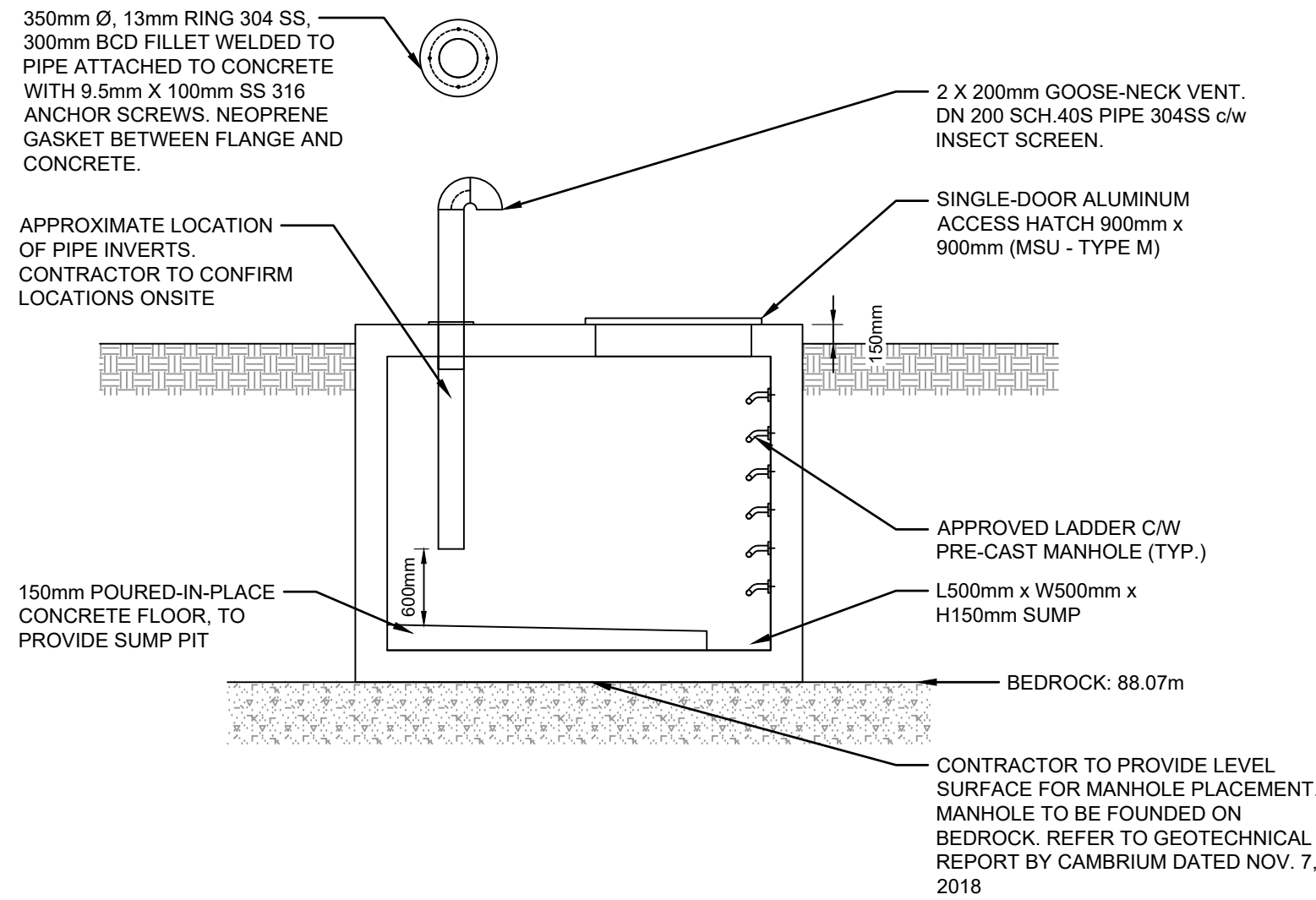
MC
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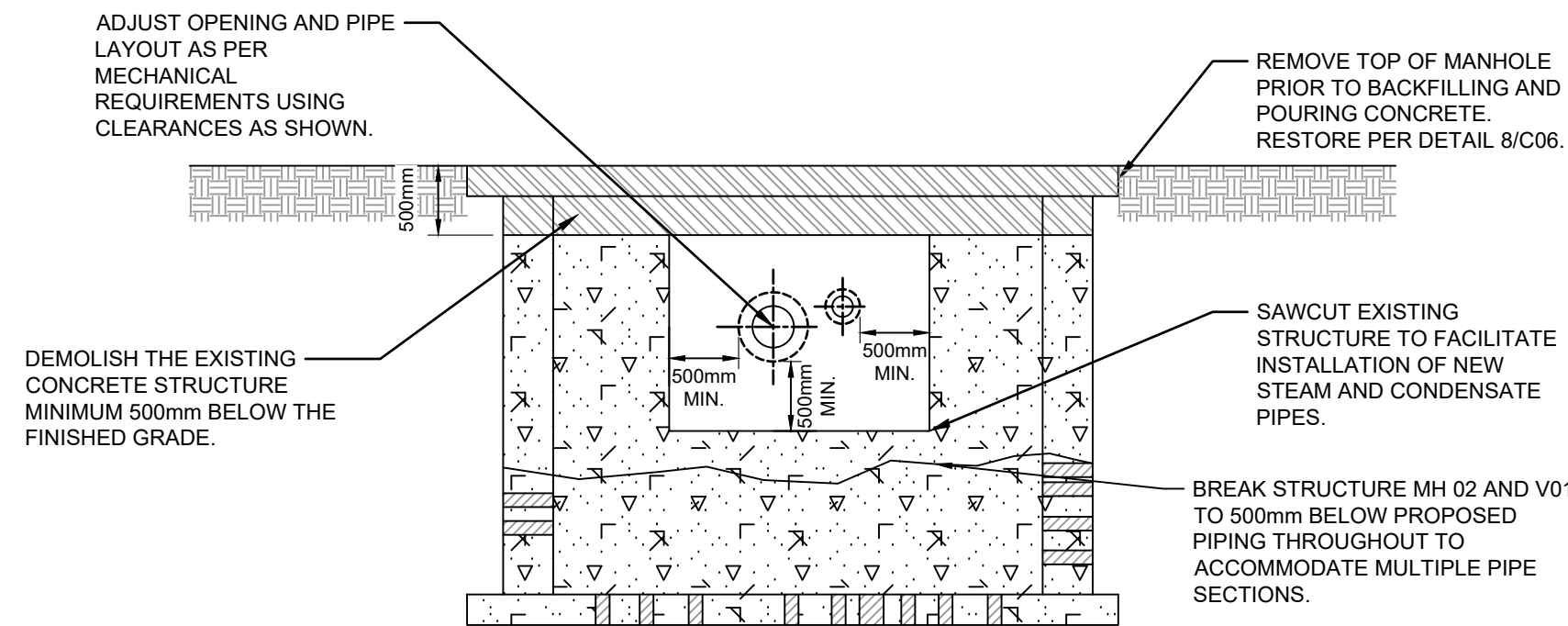
C05

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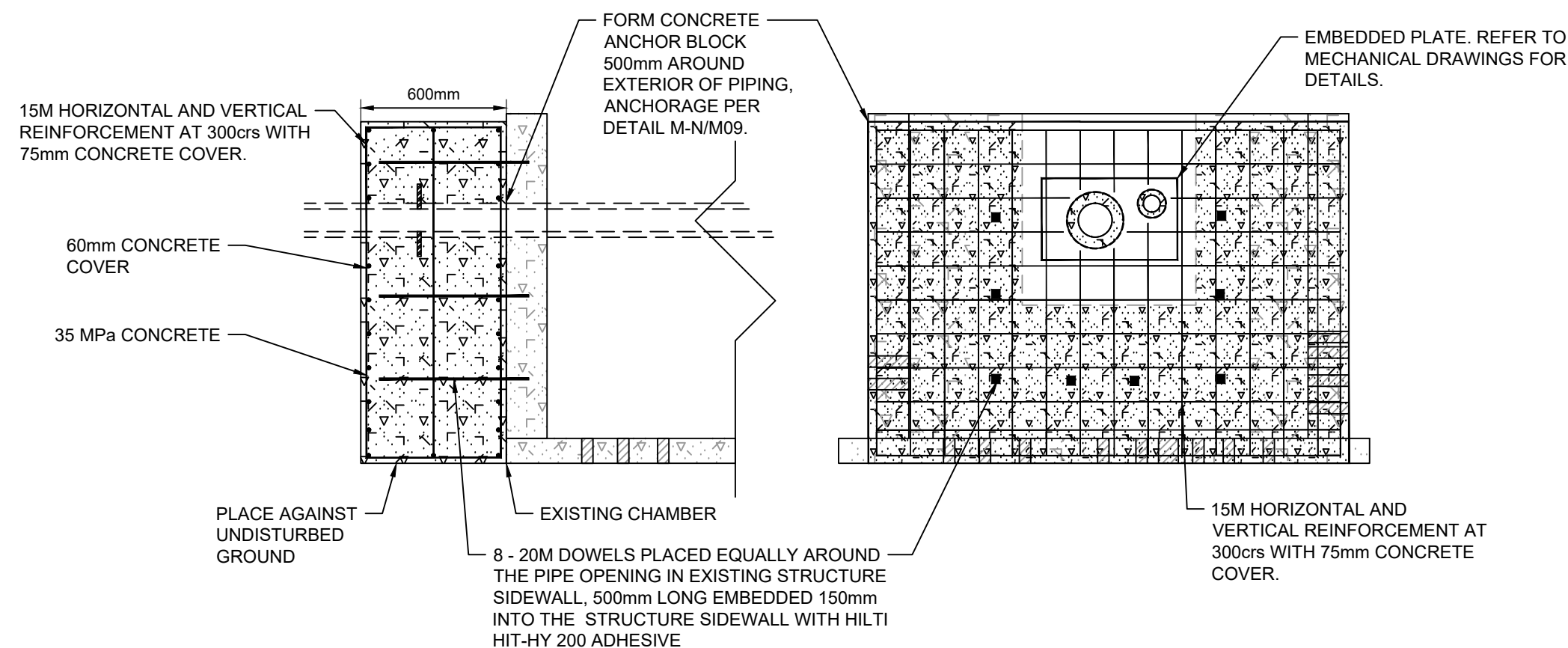
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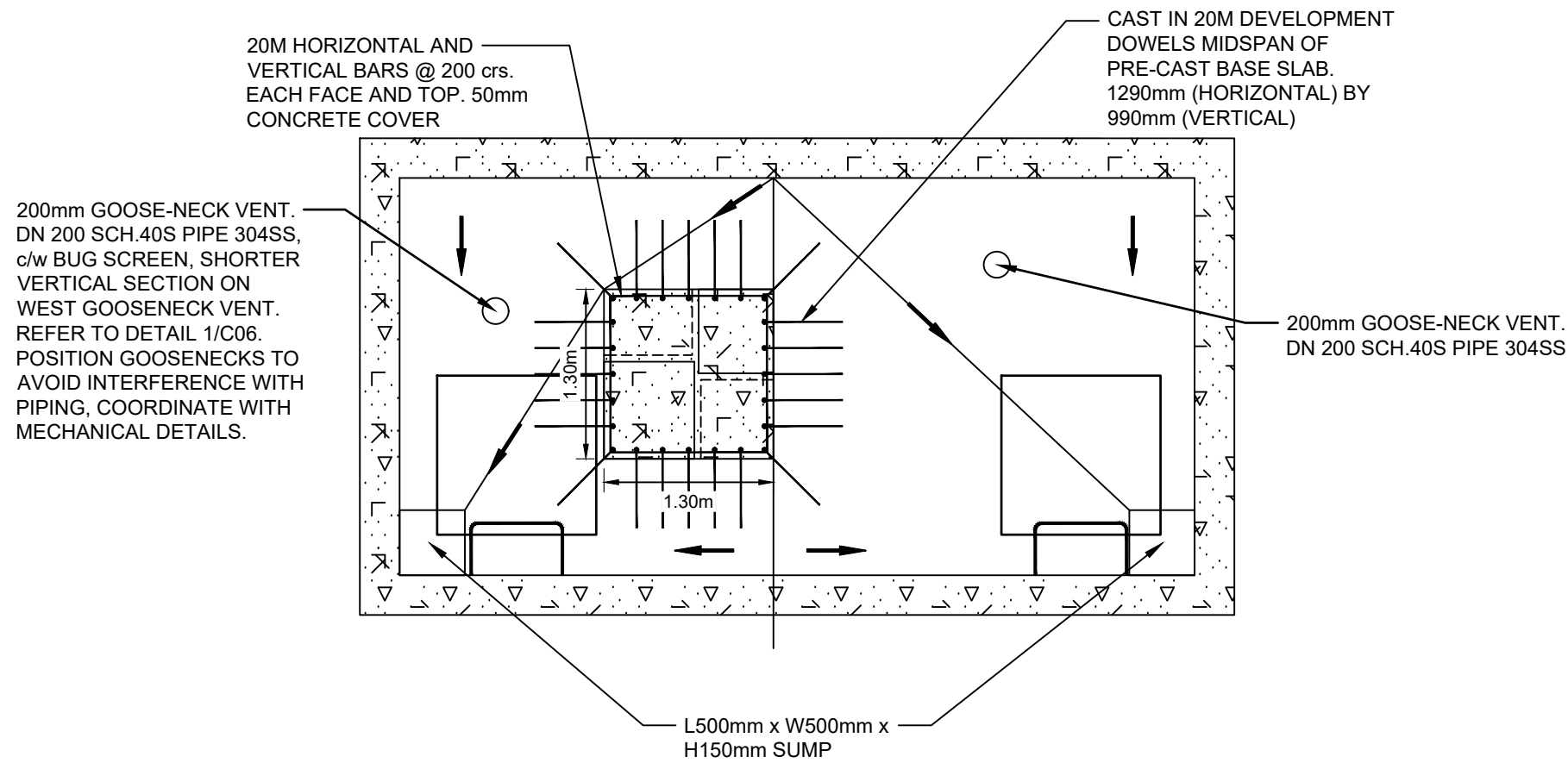
1 PROPOSED STEAM MANHOLE ELEVATION VIEW
C06 SCALE: NTS



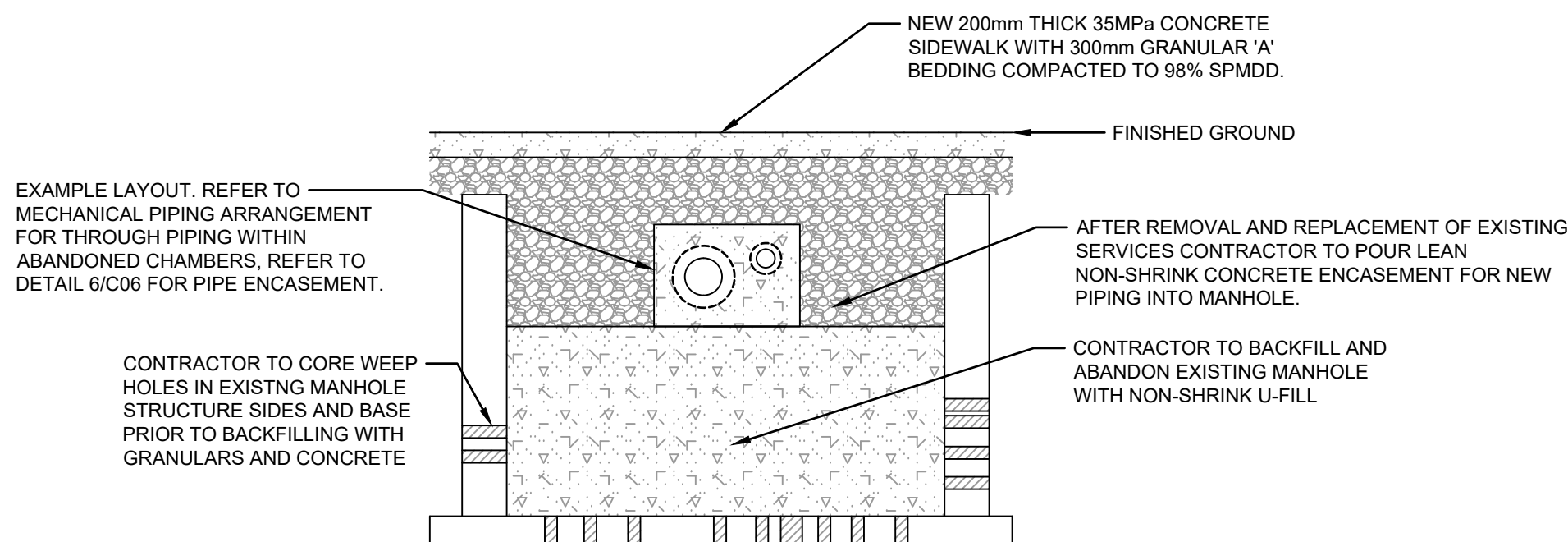
4 TYPICAL EXISTING MANHOLE DECOMMISSIONING
C06 SCALE: NTS



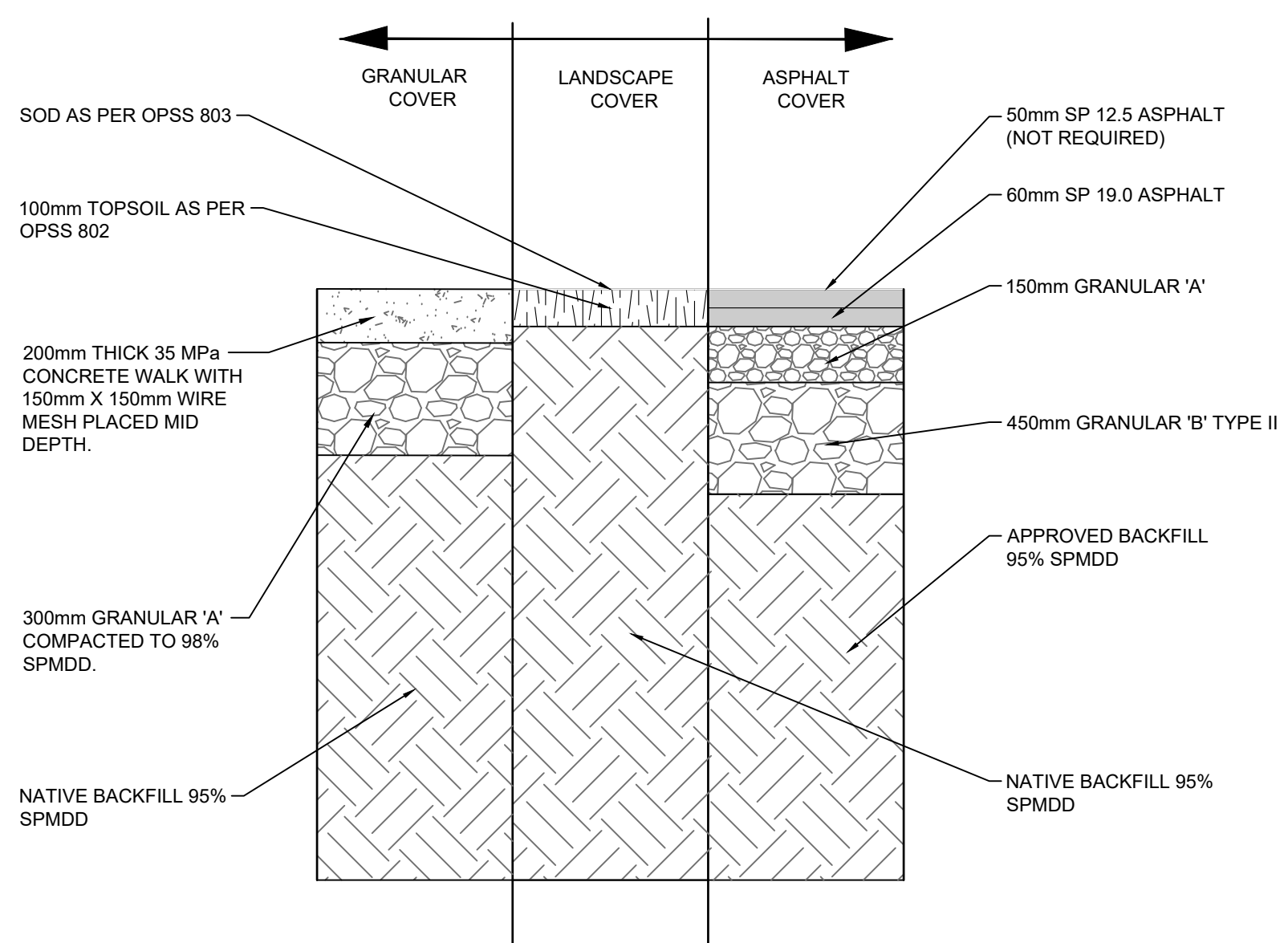
7 CONCRETE ANCHORAGE ON ABANDONED MANHOLE
C06 SCALE: NTS



2 PROPOSED STEAM MANHOLE PLAN VIEW
C06 SCALE: NTS

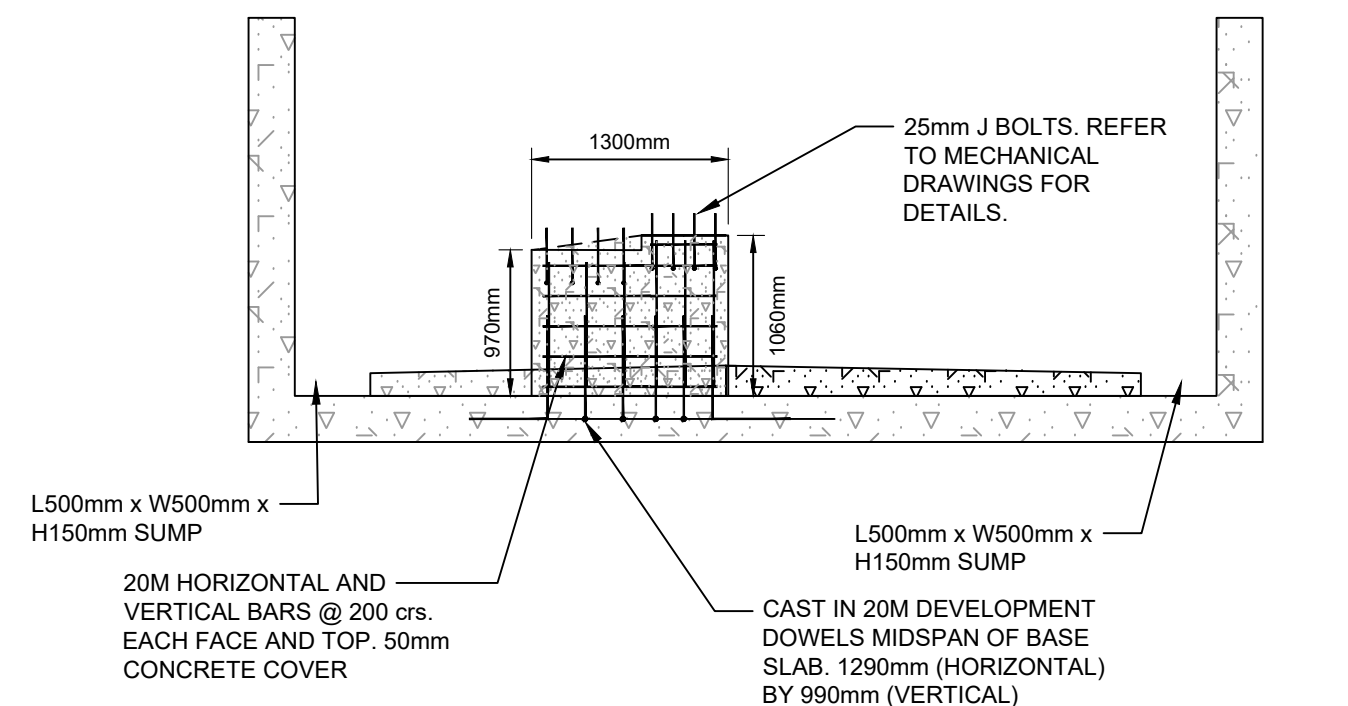


5 ABANDONED MANHOLE WITH THROUGH PIPING
C06 SCALE: NTS

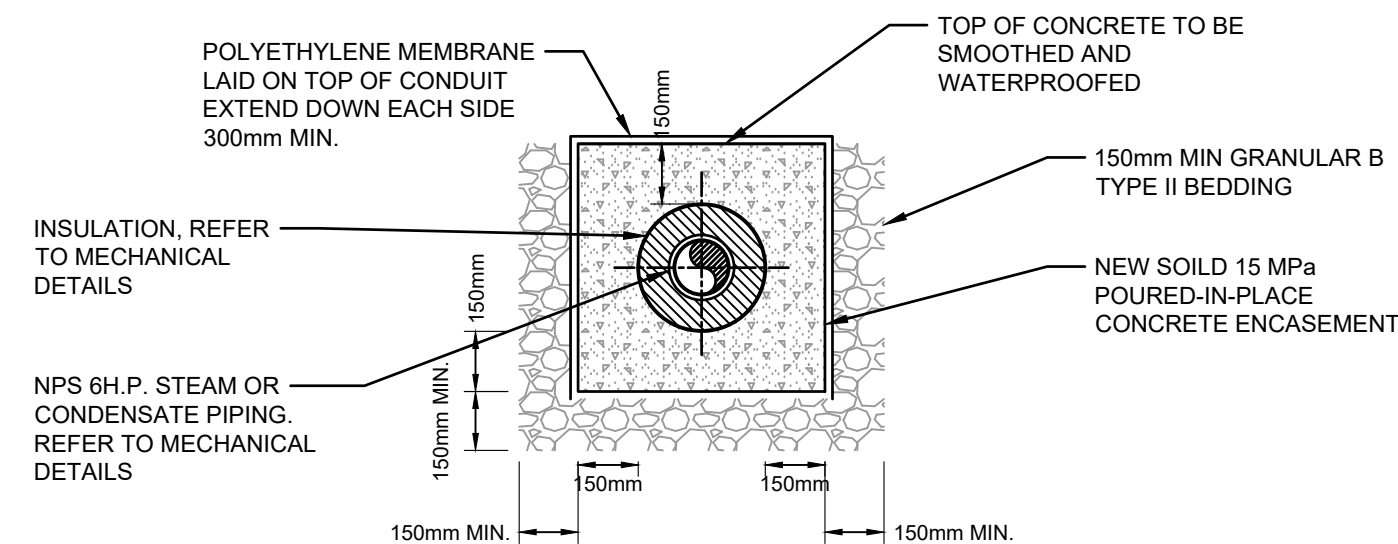


- NOTES:
1. MATERIALS USED FOR FILL PLACED IN MAX 200mm LOOSE LIFTS
 2. COMPACTED TO 100% SPMD BELOW STRUCTURES OR WITHIN ZONE OF INFLUENCE

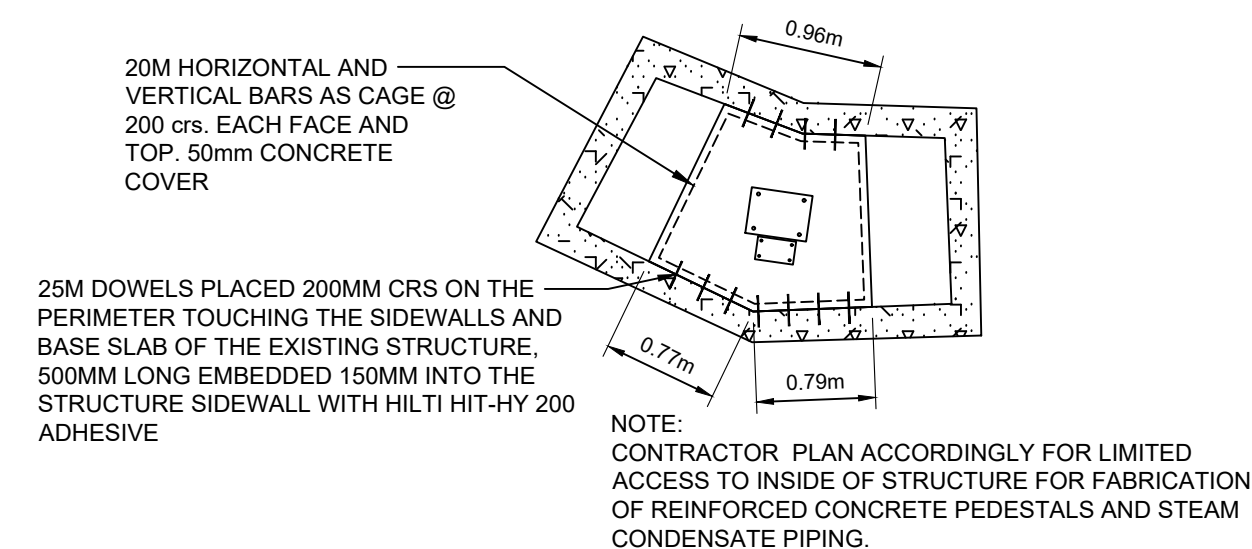
8 SURFACE RESTORATION
C06 SCALE: NTS



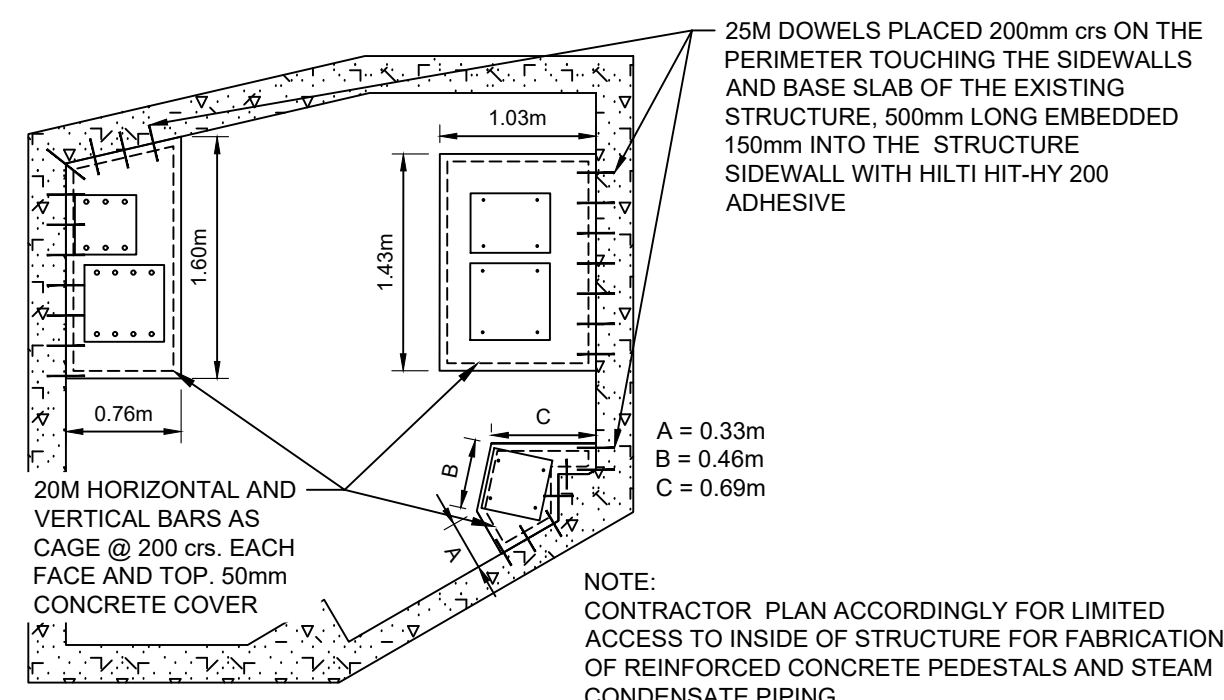
3 PROPOSED STEAM MANHOLE SECTION VIEW
C06 SCALE: NTS



6 TYPICAL CONCRETE PIPING ENCASEMENT SECTION
C06 SCALE: NTS



9 PLAN VIEW - MH-V03
C06 SCALE: NTS



10 PLAN VIEW - MH-03
C06 SCALE: NTS

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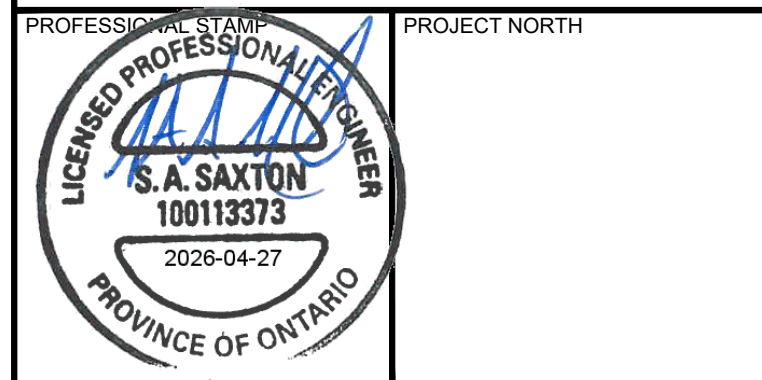
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PROJECT:

QUEEN'S BAN RICH STEAM
MANHOLE REPLACEMENT

BADER LANE, KINGSTON, ONTARIO, K7L 2S8

DRAWING:

DETAILS	
DESIGN: SS	DRAWING #: C06
DRAWN: PSC	
CHECKED: MC	
JLR #: 28079-002	

CONSTRUCTION NOTES

1. UNLESS OTHERWISE NOTED

- ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.
- ALL DIMENSIONS ARE TO BE CHECKED AND VERIFIED ON THE SITE AND ANY DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER.
- THIS DRAWING IS PART OF A SET AND MUST BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS, DETAILS, NOTES, AND WRITTEN SPECIFICATIONS INCLUDED IN THE CONTRACT DOCUMENTS.
- DRAWINGS ARE NOT TO BE SCALED.
- THE TERM "OWNER" REFERS TO QUEEN'S UNIVERSITY OR THEIR ASSIGNED REPRESENTATIVE.
- THE TERM "ENGINEER" REFERS TO THE OWNER'S DESIGN ENGINEER ("J.L. RICHARDS & ASSOCIATES").
- THE TERM "GEOTECHNICAL CONSULTANT" REFERS TO AN INDEPENDENT GEOLOGICAL ENGINEER OR ENGINEERING REPRESENTATIVE THAT IS PROVIDING GEOTECHNICAL SERVICES TO ENSURE COMPLIANT INSTALLATION AND TESTING OF MATERIALS.
- CONTRACTOR MUST WORK WITH THE LATEST REVISION OF THE CONTRACT DRAWINGS, COORDINATE WITH ENGINEER, ALL ENGINEERING DOCUMENTS SHOULD BE ISSUED TO ALL SUBS - ANY DISCREPANCY SHOULD BE REPORTED TO THE ENGINEER.
- ON REQUEST A CAD FILE WILL BE PROVIDED TO THE SUCCESSFUL CONTRACTOR TO ASSIST WITH LAYOUT.

2. GENERAL NOTES

- THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL PERMITS AND THE ASSOCIATED COSTS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL UTILITIES AND SERVICES.
- ALL UTILITIES AND SERVICES SHOWN ON THIS DRAWING SET SHALL BE CONSIDERED APPROXIMATE. LOCATIONS AND DESCRIPTIONS OF THE BURIED UTILITIES ARE SHOWN FOR REFERENCE PURPOSES ONLY. ACTUAL LOCATIONS MUST BE DETERMINED BY CAUTIOUS EXCAVATION AND, WHERE POTENTIAL FOR CONFLICTS OCCUR, HAND DIG AND HYDROVAC TO CONFIRM ACTUAL LOCATIONS. PROTECT LOCATED ITEMS DURING CONSTRUCTION AND COORDINATE WITH OWNER AND LOCAL AUTHORITIES WHERE NECESSARY. ITEMS ENCOUNTERED BELOW GRADE THAT ARE NOT SHOWN ON THE DRAWINGS SHALL BE REPORTED IMMEDIATELY TO THE ENGINEER.
- ALL WORKS SHALL BE IN COMPLIANCE WITH CITY OF KINGSTON STANDARDS AND SPECIFICATIONS, THE ONTARIO PROVINCIAL STANDARDS DRAWINGS (OPSD) AND SPECIFICATIONS (OPSS), AS WELL AS QUEEN'S UNIVERSITY SPECIFICATIONS UNLESS OTHERWISE NOTED.
- THE CONTRACTOR SHALL SUPPLY ALL THE MATERIALS IN NEW CONDITION AND IN LABOUR QUANTITIES SUFFICIENT TO COMPLETE THE WORK SHOWN ON THESE DRAWINGS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR OFF SITE DISPOSAL OF ALL UNWANTED MATERIALS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERTICAL AND HORIZONTAL CONTROL, AND FOR THE LAYOUT OF THE WORK.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REINSTATEMENT OF ALL DISTURBED AREAS TO A CONDITION EQUAL TO OR BETTER THAN EXISTING, TO THE SATISFACTION OF THE OWNER.
- COMPACTION OF ALL MATERIAL SHALL BE AS PER OPSS 501.
- CONTRACTOR SHALL BE RESPONSIBLE FOR EXCAVATION DEWATERING, AND THE CONTROL OF DEWATERING OPERATIONS, IN ACCORDANCE WITH OPSS 517 AND OPSS 518.
- WHERE THE CONTRACTOR WISHES A MODIFICATION OR DEVIATION FROM THE DESIGN REQUIREMENTS OF THE CONTRACT DRAWINGS OR DOCUMENTS, THE CONTRACTOR SHALL SUBMIT A DETAILED REQUEST IN WRITING TO THE ENGINEER FOR APPROVAL PRIOR TO ANY MODIFIED OR DEVIATED WORK BEING PERFORMED. SHOULD THE CONTRACTOR MAKE UNAUTHORIZED CHANGES OR DEVIATIONS TO THE DESIGN REQUIREMENTS WITHOUT THE WRITTEN APPROVAL OF THE ENGINEER, THE CONTRACTOR WILL BE RESPONSIBLE TO PERFORM AND/OR PAY FOR REMEDIES REQUIRED BY THE ENGINEER.
- SHOULD ARCHAEOLOGICAL REMAINS BE FOUND DURING CONSTRUCTION ACTIVITIES, THE MINISTRY OF TOURISM, CULTURE, AND SPORT MUST BE NOTIFIED IMMEDIATELY BY THE CONTRACTOR.
- SHOULD HUMAN REMAINS BE ENCOUNTERED DURING CONSTRUCTION ACTIVITIES, THE CONTRACTOR SHALL IMMEDIATELY CONTACT THE MINISTRY OF TOURISM, CULTURE, AND SPORT; THE REGISTRAR OF CEMETERIES REGULATION UNIT FROM THE MINISTRY OF CUSTOMER SERVICES AT (416) 329-8393 AND THE LOCAL POLICE.

3. TRAFFIC CONTROL AND SITE ACCESS

- THE CONTRACTOR SHALL PROVIDE TRAFFIC CONTROL IN

ACCORDANCE WITH BOOK 7 OF THE ONTARIO HIGHWAY TRAFFIC MANUAL, FOR ALL WORK WITHIN THE MUNICIPAL ROAD ALLOWANCE.

3.2. THE CONTRACTOR, IN COORDINATION WITH THE OWNER, SHALL BE REQUIRED TO MAINTAIN ACCESS TO THE SITE FOR EMERGENCY SERVICE VEHICLES AT ALL TIMES DURING CONSTRUCTION.

3.3. ALL ROAD WORK ON PARKDALE AVENUE IS TO BE COMPLETED BETWEEN 7PM AND 6AM. TRAFFIC CONTROL AND STAGING ARE TO BE APPROVED BY THE CITY'S OPERATIONS DIVISION.

4. SILT MITIGATION

- SILT MITIGATION AND THE CONTROL OF AIRBORNE CONTAMINANTS SHALL FORM A MAJOR COMPONENT OF THIS PROJECT. THE CONTRACTOR SHALL CONSIDER SILT MITIGATION PRIOR TO UNDERTAKING ANY ACTIVITY ON THE SITE AND TAKE ALL REQUIRED MEASURES AND PRECAUTIONS TO PREVENT SILT OR OTHER CONTAMINANTS FROM ENTERING THE NATURAL ENVIRONMENT OR AREAS BEYOND LIMITS OF THE WORK AREA. SILT MITIGATION REQUIREMENTS SHALL BE STRICTLY ENFORCED AS PER OPSS 805.
- PRIOR TO ANY WORK ON THE SITE, THE CONTRACTOR SHALL EVALUATE THE SITE AND IDENTIFY ALL LOCATIONS WHERE SILT MITIGATION IS REQUIRED AND INSTALL SILT MITIGATION FEATURES TO SUIT THE CONDITIONS.
- THE CONTRACTOR SHALL ENSURE NO SILTED OR CONTAMINATED FLOWS ESCAPE FROM THE SITE. PROVIDE MITIGATION MEASURES AS REQUIRED.
- ALL EXISTING AND PROPOSED CATCH BASIN GRATES WITHIN IMMEDIATE VICINITY OF WORK AREA TO BE TREATED WITH A SEDIMENT CAPTURE DEVICE (SCD). THE SCD SHALL BE TERRAFIX GEOSYNTHETICS INC. SILTSACK OR AN APPROVED EQUIVALENT INSTALLED IN ACCORDANCE WITH MANUFACTURERS WRITTEN INSTRUCTIONS. REPLACE AS REQUIRED TO MAINTAIN PERFORMANCE.
- THE FOLLOWING OPSS STANDARD DRAWINGS SHALL BE USED TO IMPLEMENT THE SILT MITIGATION MEASURES. ADDITIONAL MEASURES MAY BE REQUIRED.
 - OPSD 219.110 LIGHT-DUTY SILT FENCE BARRIER
 - OPSD 219.180 STRAW BALE FLOW CHECK DAM
 - OPSD 219.190 SILT FENCE FLOW CHECK DAM
- WHERE STRAW BALES & FILTER FENCING CANNOT BE USED DUE TO BEDROCK, THE CONTRACTOR SHALL INSTALL SAND BAGS AS DETAILED IN OPSS 219.200.
- SILT MITIGATION MEASURES SHALL BE MONITORED ON A REGULAR BASIS AND REPAIRED OR MAINTAINED AS REQUIRED TO ENSURE SILT OR AIRBORNE CONTAMINANTS DO NOT ENTER THE NATURAL ENVIRONMENT.
- ALL SILT MITIGATION MEASURES ARE TO REMAIN IN PLACE UNTIL VEGETATION IS WELL ESTABLISHED. REMOVE SILT MITIGATION ONCE VEGETATION IS WELL ESTABLISHED.
- THE CONTRACTOR SHALL ENSURE MUNICIPAL ROADWAYS ARE KEPT FREE OF MUD OR DIRT AND PROMPTLY CLEAN THE ROADWAY SHOULD THERE BE AN OCCURRENCE.
- THE CONTRACTOR SHALL DISPOSE OF ALL CONSTRUCTION DEBRIS AND SURPLUS OR UNWANTED MATERIAL AT LEGALLY DESIGNATED SITES IN ACCORDANCE WITH APPLICABLE LAW AT THEIR OWN EXPENSE. THE OWNER, IN CONSULTATION WITH THE ENGINEER AND GEOTECHNICAL CONSULTANT, SHALL FIELD DETERMINE MATERIALS SUITABLE FOR USE WITHIN THE PROJECT.

5. SITE PREPARATION AND REMOVALS

- EXCAVATION & GRADING SHALL BE IN ACCORDANCE WITH OPSS 206.
- REMOVALS SHALL BE IN ACCORDANCE WITH OPSS 510.
- THE SUBGRADE SHALL BE FREE OF ORGANICS, SHAPED, PROOF ROLLED AND APPROVED BY THE GEOTECHNICAL CONSULTANT PRIOR TO BACKFILLING. REFER TO SUBMITTALS SECTION FOR GEOTECHNICAL REQUIREMENTS AND LIST OF SUBMITTALS.
- THE MOST SEVERE LOADING CONDITIONS ON THE SUBSOIL COULD OCCUR DURING CONSTRUCTION DUE TO HEAVY TRUCK AND EQUIPMENT TRAFFIC. SPECIAL PROVISIONS TO PROTECT THE SUBGRADE MAY BE REQUIRED BY THE CONTRACTOR SUCH AS ADDITIONAL SUBBASE AND/OR RESTRICTED LOADINGS OR PROVISIONS FOR TEMPORARY ROADS, ETC.
- IF EXCAVATION IS REQUIRED BEYOND THE DEPTHS NOTED ON THE CONTRACT DRAWINGS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN WRITING PRIOR TO EXCAVATING ADDITIONAL DEPTHS. IF EXCAVATION CONTINUES WITHOUT AUTHORIZATION FROM THE ENGINEER IN WRITING, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH ADDITIONAL EXCAVATION AND BACKFILL.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR DUST SUPPRESSION IN ACCORDANCE WITH OPSS 506. WATER OR CALCIUM CHLORIDE SHALL BE PROVIDED AS REQUIRED TO PREVENT DUST.
- THE CONTRACTOR IS RESPONSIBLE TO DETERMINE THE EXACT

LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL SERVICES AND UTILITIES PRIOR TO CONSTRUCTION AND SHALL PROTECT AND ASSURE RESPONSIBILITY FOR ALL UTILITIES WHETHER OR NOT SHOWN ON THIS DRAWING.

5.9. THE CONTRACTOR SHALL BE RESPONSIBLE TO DETERMINE, VIA EXCAVATION, THE EXACT LOCATION AND ELEVATION OF THE EXISTING WATERMANS, SEWERS AND UNDERGROUND STRUCTURES PRIOR TO CONSTRUCTION AND SHALL PROTECT AND ASSURE RESPONSIBILITY FOR ALL UTILITIES WHETHER OR NOT SHOWN ON THE CONTRACT DOCUMENTS.

5.10. ITEMS ENCOUNTERED BELOW GRADE THAT ARE ENCOUNTERED AND NOT SHOWN ON THE DRAWING SHALL BE REPORTED TO THE CONTRACT ADMINISTRATOR.

5.11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OFF SITE DISPOSAL OF ALL UNWANTED MATERIAL.

5.12. SITE SHOULD BE ROUGH GRADED TO DIRECT SURFACE WATER AWAY FROM EXCAVATIONS AND SUBGRADE.

5.13. DISTURBED SOILS SUBJECTED TO ELEVATED MOISTURE CONTENT WILL HAVE SIGNIFICANT STRENGTH LOSS AND MUST BE REMOVED.

6. ASPHALT AND GRANULARS

- ALL MATERIALS MUST CONFORM TO THE ONTARIO PROVINCIAL STANDARDS AND SPECIFICATIONS.
- SPECIFICATIONS FOR SITE WORK SHALL BE READ IN CONJUNCTION WITH THE GEOTECHNICAL REPORT.
- ALL ASPHALT SURFACES TO BE RESTORED WITH ASPHALT DESIGN AS SHOWN ON DRAWINGS AND AS REFERENCED TO THE GEOTECHNICAL REPORT.

7. ASPHALT ROADS AND PARKING

- 60mm BASE COURSE - 18% LBS
- 150mm BASE - OPSS GRANULAR 'A' COMPACTED TO 100% SPMD
- 450mm SUBBASE - OPSS GRANULAR 'B' TYPE II COMPACTED TO 100% SPMD

8. SIGNAGE

- ALL SIGNS ARE NOT NECESSARILY SHOWN ON DRAWINGS. THE CONTRACTOR SHALL REMOVE, SALVAGE AND REINSTALL EXISTING SIGNAGE AS DIRECTED BY THE OWNER.
- POSTS AND SIGNS SHALL BE INSTALLED IN ACCORDANCE WITH OPSS 703 AND OPSS 987.110.

9. GEOTEXTILE

- GEOTEXTILE SHALL BE TERRAFIX 270R IN ACCORDANCE WITH OPSS 1860. CONTRACTOR SHALL INSTALL AS PER MANUFACTURER'S WRITTEN INSTRUCTIONS.

10. LANDSCAPING

- CONTRACTOR SHALL SUPPLY AND INSTALL 100mm TOPSOIL AND SEED IN ACCORDANCE OPSS 802 AND OPSS 803 TO ALL RESTORED AND DISTURBED SURFACES.
- AT THE TIME OF FINAL INSPECTION ALL SEEDED AREAS SHALL BE IN A HEALTHY, VIGOROUSLY GROWING CONDITION, IN FULL ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS.
- EXISTING TREES TO BE RETAINED AND PROTECTED IN ACCORDANCE WITH OPSS 801 WHERE POSSIBLE AND DIRECTED BY THE CONTRACT ADMINISTRATOR.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXCAVATION, BACKFILL, AND REINSTATEMENT OF ALL AREAS DISTURBED DURING CONSTRUCTION AND ALL ASSOCIATED WORKS TO THE SATISFACTION OF THE CONTRACT ADMINISTRATOR AND THE OWNER.

11. BACKFILL

- BACKFILL UNDER PAVED AREAS, SIDEWALKS, OR EXTERIOR SLABS-ON-GRADE SHOULD BE COMPACTED TO 100% SPMD. BACKFILL PLACED AGAINST BURIED STRUCTURES OR FOUNDATION WALLS TO BE MINIMUM 1000 mm GRANULAR 'B' MATERIAL AS PER OPSS MUNI 1010, COMPACTED TO 100% SPMD.

12. FENCING

- EXISTING FENCING ABUTTING THE PROPERTY TO BE PROTECTED. ANY FENCING THAT HAS BEEN DAMAGED AS A PART OF THIS PROJECT TO BE REINSTATE TO MATCH EXISTING CONDITIONS.
- WROUGHT IRON FENCING TO MATCH QUEEN'S UNIVERSITY STANDARD.

13. CONCRETE SIDEWALK

- CONCRETE MATERIAL AS PER OPSS 350, 351, 352, AND 235; 1301, 1302, AND 1350 AND CAN/CSA A23.1/A23.2.
- CONCRETE SIDEWALK TO BE 30 MPa MINIMUM 28 DAY STRENGTH, 19 mm COARSE AGGREGATE NOMINAL MAXIMUM SIZE, 6.0% TO 8.0% AIR, NORMAL PORTLAND TYPE CEMENT AS PER OPSS 1301, 0.45 MAXIMUM WATER CEMENT RATIO, 75 mm MAXIMUM SLUMP, WHITE PIGMENTED CURING COMPOUND AS PER OPSS 1315.
- PLAIN CONCRETE TO BE CLASS C-2, 150 mm THICK, WITH 150 mm GRANULAR 'A' BEDDING COMPACTED TO 100% SPMD.
- ALL CONCRETE SIDEWALKS TO HAVE A MINIMUM 2% CROSSFALL GRADIENT.

14. CAST IN PLACE CONCRETE AND REINFORCEMENT

- ALL CONSTITUENT MATERIALS SHALL CONFORM TO THE REQUIREMENTS OF CAN/CSA-A23.1.
- PIERS, FOUNDATION WALLS, ANCHORS, EQUIPMENT PADS - 35MPa, C-1 EXPOSURE, W/C RATIO 0.45
- LEAN CONCRETE - 15MPa, C-1 EXPOSURE
- EXPOSED FINISHES TO BE BROOMED FOR EXTERIOR SURFACES, SMOOTH FORM FINISH FOR ALL SURFACES EXPOSED IN FINISHED STRUCTURES.
- REINFORCING STEEL FABRICATED IN ACCORDANCE WITH CSA A23.1/A23.2 AND THE RSIC, REINFORCING STEEL MANUAL OF STANDARD PRACTICE.
- SPECIFIED COVER TO REINFORCING STEEL TO AS PER TABLE 17 CAN/CSA-A23.1 OR AS NOTED OTHERWISE ON DRAWINGS.

15. TRENCH BACKFILL

- TRENCHING BACKFILL AND COMPACTING TO BE PERFORMED AS PER OPSS 401.
- FOR SERVICES TRENCHES UNDER PAVED AREAS BACKFILL TO BE PLACED IN MAXIMUM 200 mm THICK LOOSE LIFTS, AND COMPACTED TO 95% SPMD.
- BACKFILL PLACED 300mm BELOW PAVEMENT SUBGRADE TO BE COMPACTED TO 88% SPMD.
- EXCAVATION SIDES MUST HAVE FROST TAPER AS PER OPSS 800 SERIES.
- EXCAVATED SOILS THAT ARE TOO WET (IE. GREATER THEN 5% ABOVE OPTIMUM MOISTURE CONTENT) MUST BE SET ASIDE TO DRY UNDISTRUBED UNTIL ACCEPTABLE LEVELS OF MOISTURE ARE OBTAINED TO BE USED AS BACKFILL.

16. PRECAST CONCRETE STRUCTURES

- PRECAST MANHOLE STRUCTURES TO BE 1200 mm DIAMETER PRECAST CONCRETE AS PER OPSS 701.010, UNLESS NOTED OTHERWISE. FRAME AND COVERS ON CITY PROPERTY TO BE BIBBY ST. CROX SELF-LEVELLING.
- SANITARY MANHOLES TO HAVE FRAME AND COVER AS PER OPSS 401.010 TYPE 'B' (CLOSED COVER).
- MATERIALS FOR PRECAST CONCRETE STRUCTURES AND GRATING AS PER OPSS 1351 AND 1850, RESPECTIVELY.
- MANHOLE AND CATCH-BASIN GRATE ELEVATIONS ARE APPROXIMATE AND MAY BE SUBJECT TO ADJUSTMENT IN THE FIELD. PRECAST ADJUSTMENT UNITS AS PER OPSS 704.010 (MAXIMUM OF 3 UNITS). PARGE INSIDE AND OUTSIDE OF ADJUSTMENT UNITS TO MAKE WATERTIGHT.
- JOINTS BETWEEN PRECAST SECTIONS TO BE MADE WATERTIGHT USING 20 mm BUTYL MASTIC IN ADDITION TO THE STANDARD RUBBER GASKET.
- EXTERIOR JOINTS TO BE COVERED WITH A SELF-ADHERING MEMBRANE IMPERMEABLE TO WATER (i.e., BAKOR BLUESKIN® SA) INSTALLED 300 mm ABOVE AND BELOW EVERY JOINT.
- BENCH TO PROVIDE A SMOOTH U-SHAPED CHANNEL AS PER OPSS 701.021.
- WATERTIGHT CONNECTIONS TO MANHOLES OR EXTERIOR TANKS.
- TRANSITION COUPLINGS WILL BE REQUIRED BETWEEN THE YARD PIPING AND THE STAINLESS STEEL (OR OTHER, DIFFERING PIPE MATERIALS) ON PIPING EXISTING THE TANKS OR BUILDINGS.

17. WILDLIFE AND ENVIRONMENT

- ALL MATERIALS AND EQUIPMENT USED FOR THE PURPOSE OF SITE PREPARATION AND PROJECT COMPLETION SHALL BE OPERATED AND STORED IN A MANNER THAT PREVENTS ANY DELETERIOUS SUBSTANCES (I.E. PETROLEUM PRODUCTS, SILT, ETC.) FROM ENTERING THE RECEIVING STREAM. VEHICLE AND EQUIPMENT RE-FUELLING AND MAINTENANCE SHALL BE CONDUCTED AWAY FROM DRAINAGE CHANNELS. ANY PART OF

EQUIPMENT ENTERING DRAINAGE CHANNELS SHALL BE FREE OF FLUID LEAKS AND EXTERNALLY EXPOSED TO PREVENT ANY DELETERIOUS SUBSTANCES FROM ENTERING THE RECEIVING STREAM.

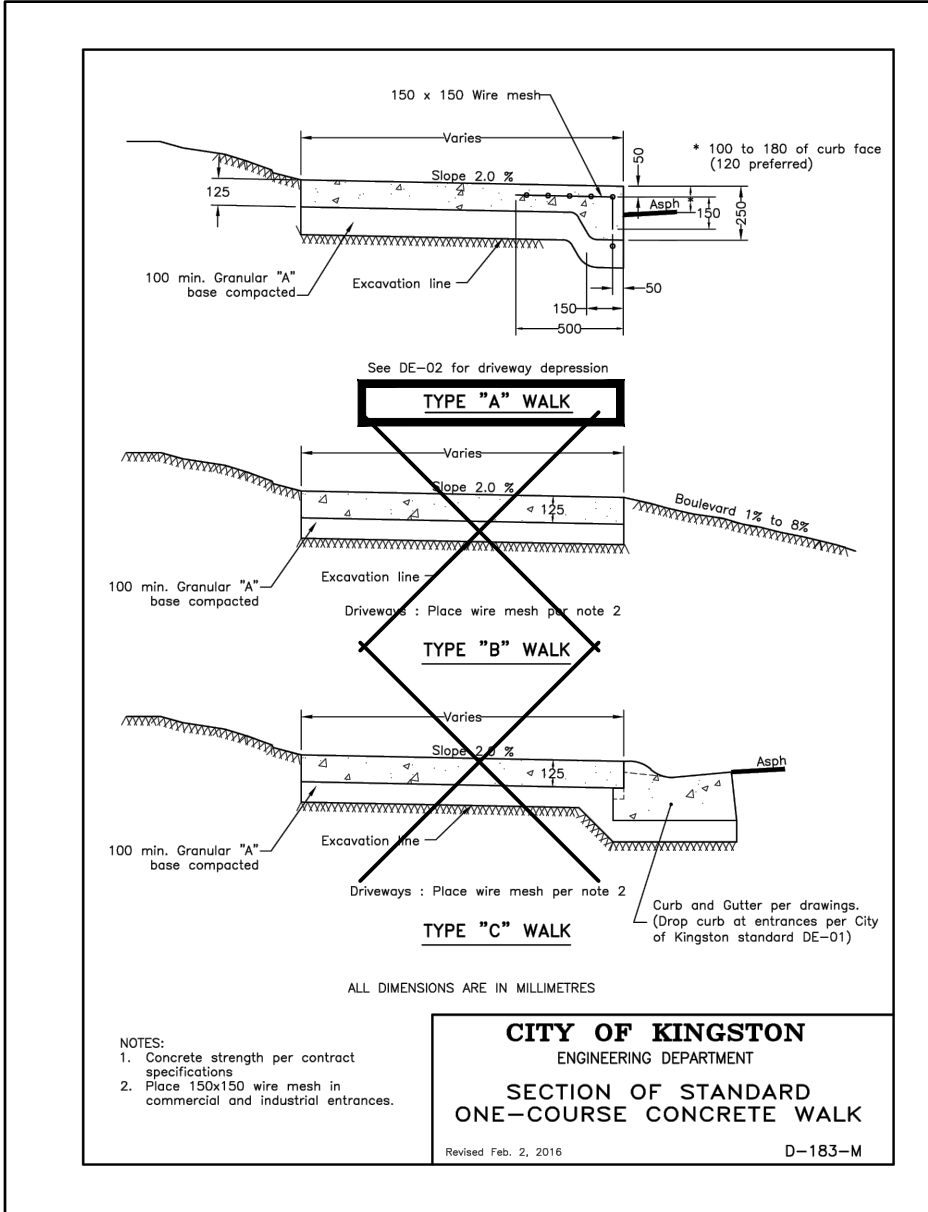
17.2. WHILE UNDERTAKING THE CONSTRUCTION ACTIVITIES THE CONTRACTOR SHALL BE VIGILANT FOR THE POTENTIAL PRESENCE OF UNDERGROUND FUEL TANKS, POTENTIALLY BURIED WASTE, OR ABANDONED WATER WELLS. IF ANY OF THESE ARE ENCOUNTERED OR SUSPECTED THE CONTRACTOR SHALL NOTIFY THE CONTRACT ADMINISTRATOR IMMEDIATELY.

18. TESTING

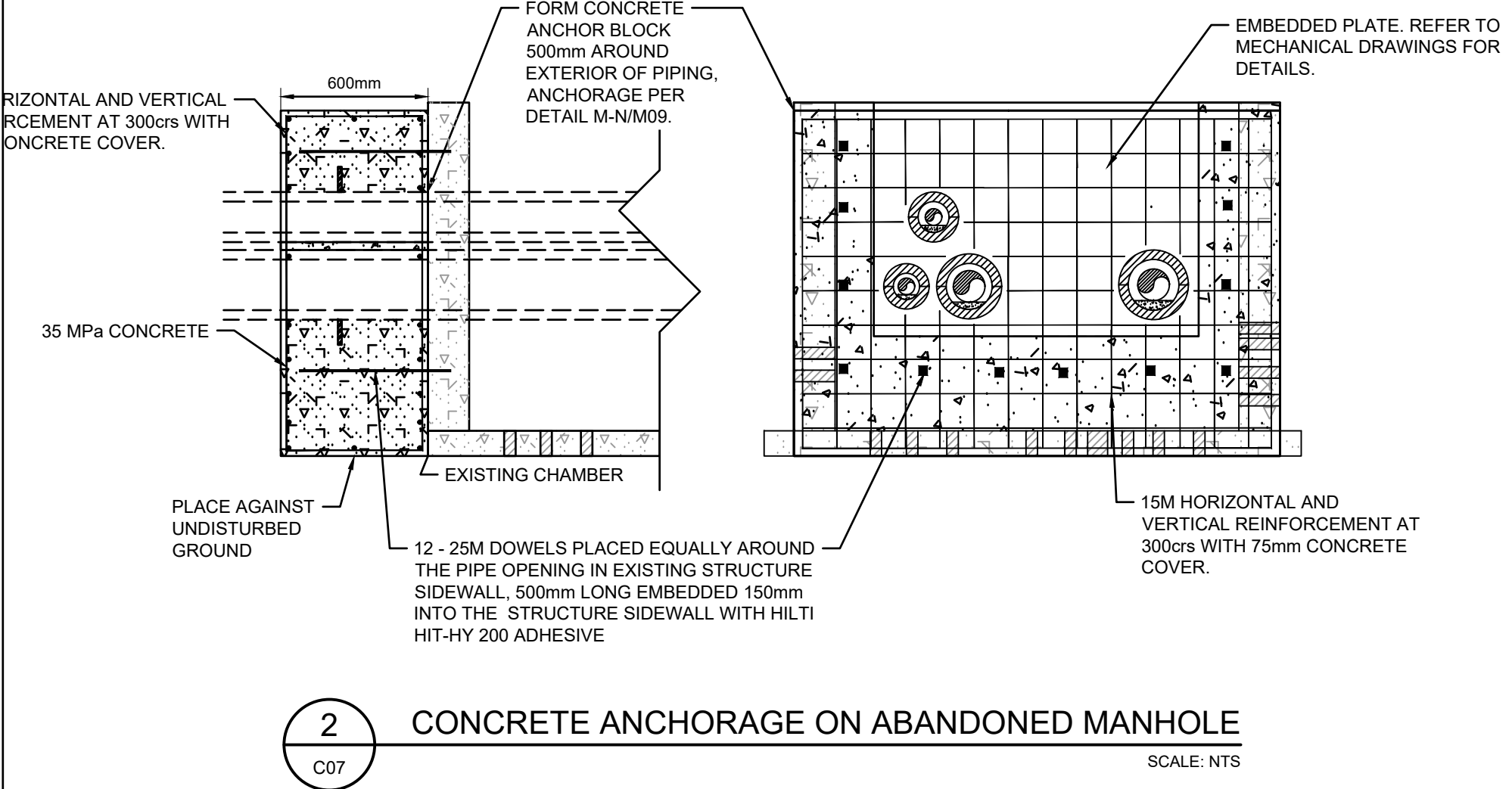
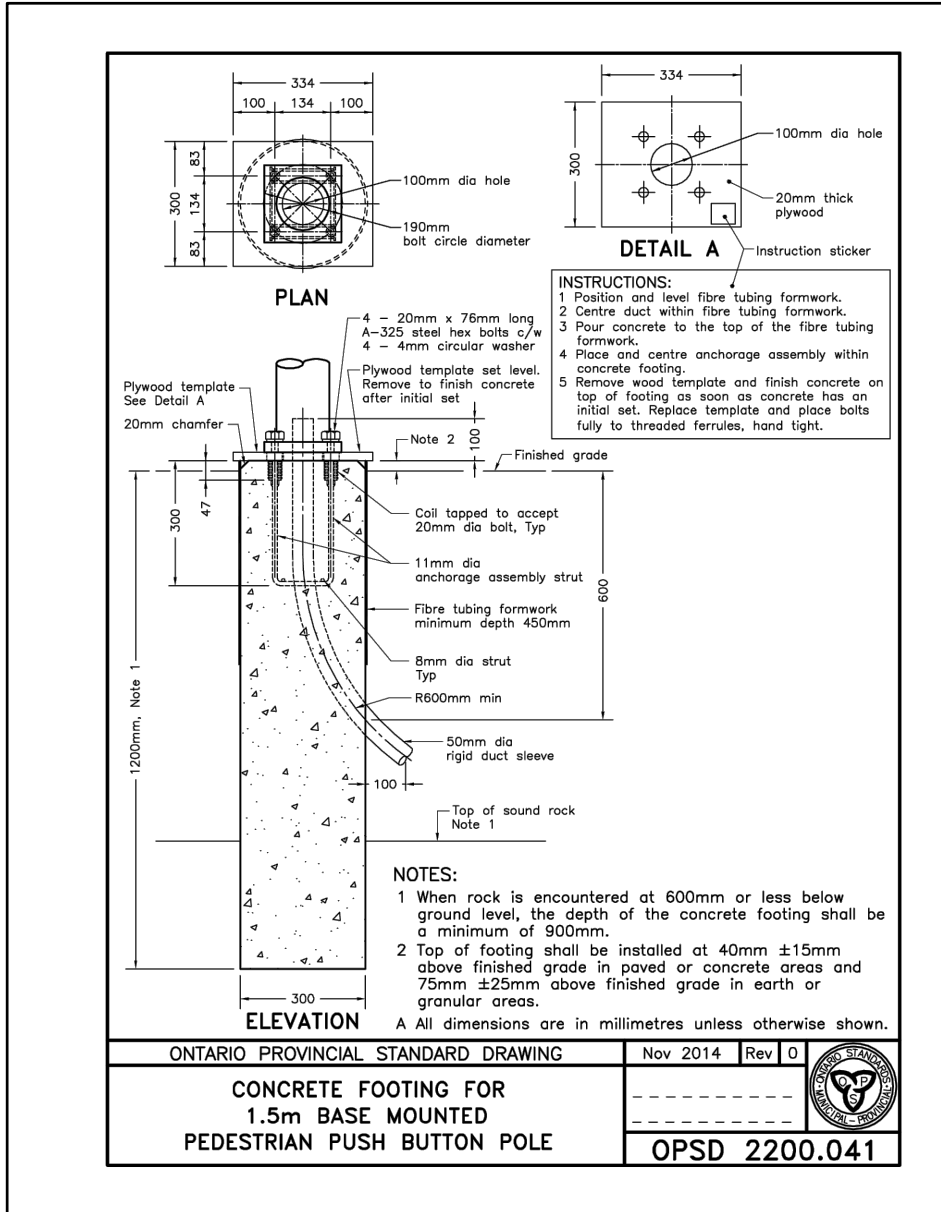
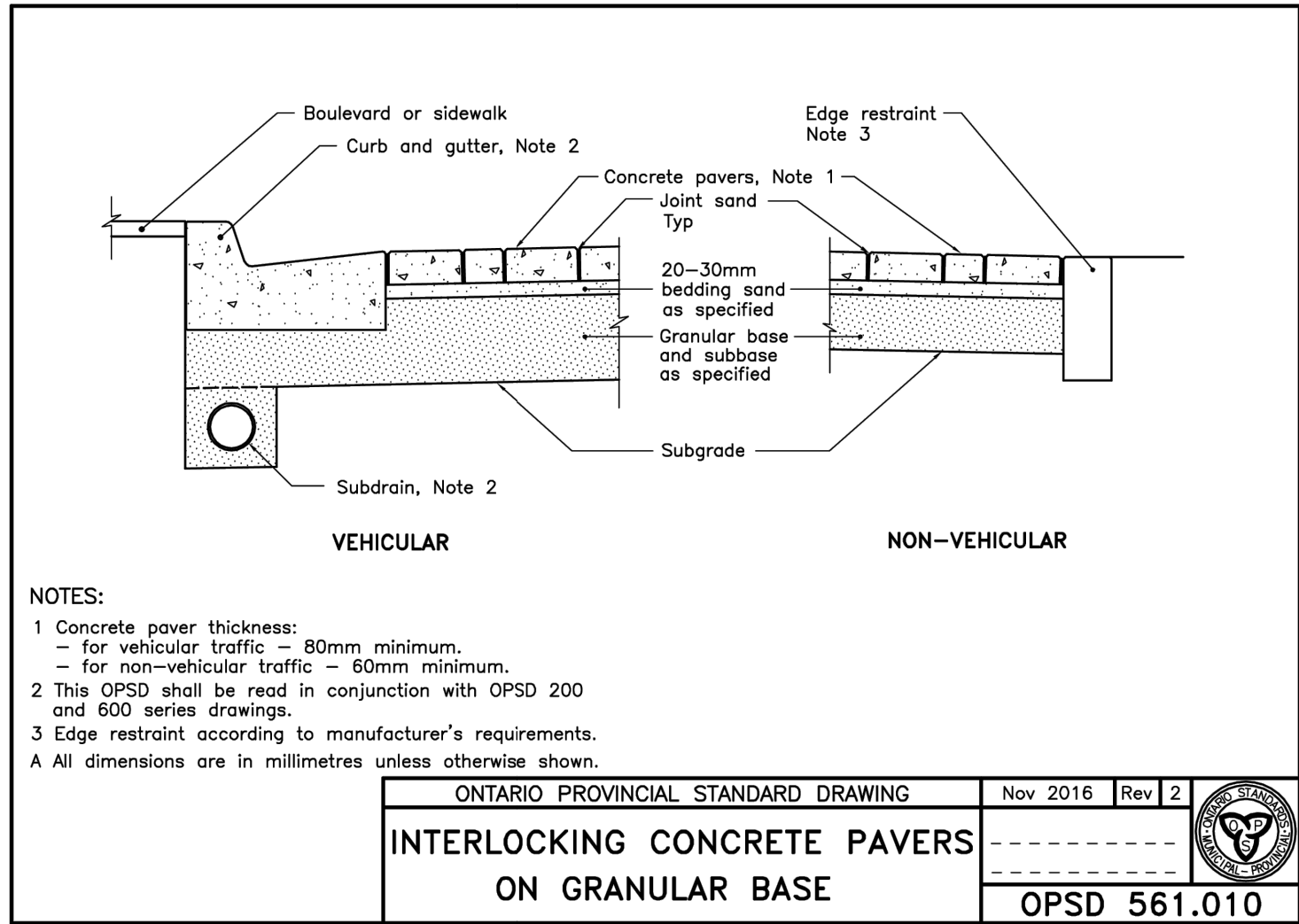
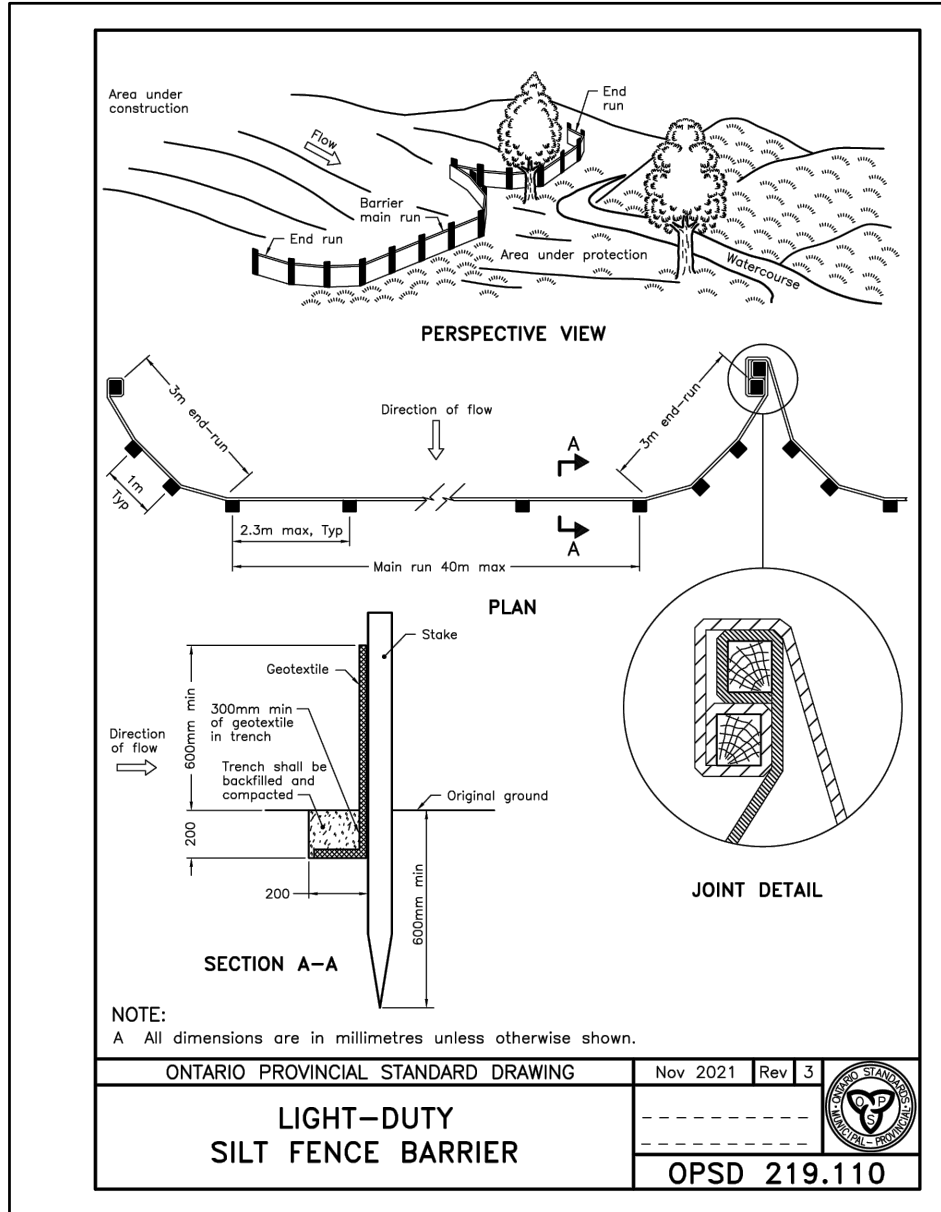
- CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF ALL REQUIRED INDEPENDENT GEOTECHNICAL SAMPLING AND TESTING OF GRANULAR MATERIALS, AND COMPACTION TESTING/REPORTING AS PER APPLICABLE ONTARIO PROVINCIAL STANDARDS AND SPECIFICATIONS. THE INDEPENDENT TESTING COMPANY SHALL BE APPOINTED BY NAV CANADA, AND ALL ASSOCIATED COSTS TO BE BORNE BY THE CONTRACTOR.
- SUBGRADE INSPECTION SHALL BE COMPLETED BY THE GEOTECHNICAL CONSULTANT. PROVIDE THE ENGINEER WITH WRITTEN APPROVAL FROM THE GEOTECHNICAL CONSULTANT PRIOR TO BACKFILLING.
- THE GEOTECHNICAL CONSULTANT SHALL FIELD DETERMINE MATERIALS SUITABLE FOR USE WITHIN THE PROJECT. ALL ITEMS DECLARED SURPLUS OR UNWANTED SHALL BE REMOVED BY THE CONTRACTOR.
- WHERE SAMPLED MATERIAL OR PLACEMENT FAILS TO MEET THE REQUIREMENTS OF THE SPECIFICATIONS, THE ENGINEER MAY, AT THEIR DISCRETION, REJECT THE MATERIAL OR THE CONTRACTOR SHALL REPLACE THE NON-COMPLIANT MATERIAL OR CORRECT NON-COMPLIANT WORK AT THEIR COST.
- ALL ROAD BASE AND GRANULAR PAD LIFTS ARE TO BE TESTED FOR COMPACTION BY THE GEOTECHNICAL CONSULTANT.
- ALL PIPE BEDDING AND BACKFILL LIFTS ARE TO BE TESTED FOR COMPACTION BY THE GEOTECHNICAL CONSULTANT.
- PLATE SAMPLES OF LOOSE HOT MIX ASPHALT ARE TO BE OBTAINED ON EACH PAVING DAY AND TESTED FOR EXTRACTION/GRADATION AND FULL MARSHALL COMPLIANCE BY THE GEOTECHNICAL CONSULTANT.
- CONCRETE TESTING SHALL BE AS PER OPSS 1350.
- ALL WATERMANS, SEWERS, FORCEMAINS AND MAINTENANCE HOLES SHALL BE PRESSURE TESTED.

19. SUBMISSION REQUIREMENTS

- GRANULAR COMPACTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL. THESE REPORTS MUST SHOW COMPLIANT COMPACTION, MATERIAL, AND LIFT THICKNESSES.
- ASPHALT AND CONCRETE DESIGN MIXES TO BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO PLACEMENT.
- COMPLIANT ASPHALT COMPACTION RESULTS ARE TO BE PROVIDED TO THE ENGINEER FOR APPROVAL PRIOR TO PLACEMENT OF THE NEXT LIFT.
- PLATE SAMPLE TEST RESULTS ARE TO BE PROVIDED TO THE ENGINEER FOLLOWING TESTING.
- NOTICE OF CCTV AND PRESSURE TESTING IS TO BE PROVIDED TO THE ENGINEER, IN WRITING, 5 DAYS PRIOR TO TESTING TAKING PLACE.
- CCTV INSPECTION REPORTS ARE TO BE PROVIDED TO THE ENGINEER.
- SUCCESSFUL PRESSURE TEST RESULTS ARE TO BE PROVIDED TO THE ENGINEER IN WRITING FOLLOWING TESTING.



1 CONCRETE SIDEWALK DETAIL
C07 SCALE: NTS



2 CONCRETE ANCHORAGE ON ABANDONED MANHOLE
C07 SCALE: NTS

0	ISSUED FOR TENDER	27/04/26
No.	ISSUE / REVISION	DD/MM/YY

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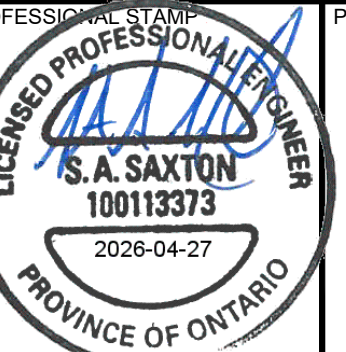
VERIFY SHEET SIZE AND SCALES. THE BAR TO THE RIGHT IS 25MM IF THIS IS A FULL SIZE DRAWING.

SCALE: 0 25mm

CLIENT: 

CONSULTANT:  www.jrichards.ca

CONSULTANT: 

PROFESSIONAL STAMP
PROJECT NORTH

PROVINCE OF ONTARIO

PROJECT: QUEEN'S BAN RIGH STEAM MANHOLE REPLACEMENT

BADER LANE, KINGSTON, ONTARIO, K7L 2S8

DRAWING: DETAILS

DESIGN: SS

DRAWN: PSC

CHECKED: MC

JLR #: 28079-002

DRAWING #: C07

GENERAL NOTES:

- 1) DO NOT SCALE DRAWINGS. USE FIGURE DIMENSIONS ONLY.
- 2) ALL DIMENSIONS IN FEET AND INCHES AND APPROXIMATE. CONTRACTOR TO REVIEW SITE CONDITIONS AND VERIFY AS BUILT LOCATIONS. SOME CUTTING WELDING AND SHIMMING MAY BE REQUIRED TO OBTAIN PROPER FIT.
- 3) SEE COVER SHEET FOR DRAWING LIST AND REFERENCE DRAWINGS.
- 4) DETAILS PROVIDED ON THIS DOCUMENT ARE GENERAL; REFER TO CONTRACT DRAWINGS FOR PROJECT-SPECIFIC DETAILS. SPECIFICATIONS ON CONTRACT DRAWINGS SUPERCEDE THE DETAILS PROVIDED ON THIS SHEET.
- 5) CONTRACTOR TO SUPPLY MATERIAL SPECIFIED WITHIN CONTRACT DRAWINGS. ANY DEVIATIONS OR SUBSTITUTIONS TO BE SUBMITTED TO ENGINEER IN WRITING FOR APPROVAL PRIOR TO FABRICATION OR INSTALLATION.

DRAWING SYMBOL LEGEND:



DWG: REFERS TO THE DRAWING # THE VIEW IS REFERENCED FROM.



DWG: REFERS TO THE DRAWING # THE VIEW WILL BE FOUND.



DWG: REFERS TO THE DRAWING # THE VIEW WILL BE FOUND.



R: REVISION

PIPING AND SUPPORTS:

PIPING

- 6) SYSTEM DESIGN CRITERIA:

DESIGN CODE:

MINIMUM AMBIENT TEMPERATURE ("F ["C]):

MAXIMUM AMBIENT TEMPERATURE ("F ["C]):

CSA B51 & ASME B31.1-2024

50 [10]

95 [35]

HIGH-PRESSURE STEAM AND HIGH PRESSURE DRIP (STM-1):

DESIGN PRESSURE (PSIG [kPa]):

DESIGN TEMPERATURE ("F ["C]):

OPERATING PRESSURE (PSIG [kPa]):

OPERATING TEMPERATURE ("F ["C]):

HYDROSTATIC TEST PRESSURE (PSIG [kPa]):

150 [1035]

366 [186]

125 [862]

353 [178]

225 [1552]

LOW-PRESSURE STEAM (STM-1):

DESIGN PRESSURE (PSIG [kPa]):

DESIGN TEMPERATURE ("F ["C]):

OPERATING PRESSURE (PSIG [kPa]):

OPERATING TEMPERATURE ("F ["C]):

HYDROSTATIC TEST PRESSURE (PSIG [kPa]):

55 [380]

300 [149]

45 [311]

292 [145]

83 [573]

PUMPED CONDENSATE (CND-1):

DESIGN PRESSURE (PSIG [kPa]):

DESIGN TEMPERATURE ("F ["C]):

HYDROSTATIC TEST PRESSURE (PSIG [kPa]):

150 [1035]

366 [186]

225 [1552]

7) WORK THESE DRAWINGS IN CONJUNCTION WITH PIPING SPECIFICATIONS "STM-1" AND "CND-1". ANY NOTES OR SPECIFICATIONS PROVIDED ON THIS OR OTHER SHEETS WITHIN THIS PACKAGE ARE IN ADDITION TO THOSE FOUND ON THE PIPING SPECIFICATIONS.

8) ALL PIPING TO BE IN CONFORMANCE WITH ALL LOCAL/MUNICIPAL, PROVINCIAL, AND NATIONAL CODES. ALL PIPING TO BE REGISTERED AND INSPECTED AS PER THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION. ALL VALVES AND FITTINGS MUST HAVE CRN NUMBERS.

9) THE CONTRACTOR CONSTRUCTING THE WELDED PORTIONS OF THE SYSTEM MUST HOLD, IN GOOD STANDING, A CERTIFICATE OF AUTHORIZATION TO CONSTRUCT PRESSURE PIPING SYSTEMS IN ACCORDANCE WITH ASME B31.1 AND CSA B51 LATEST EDITION FOR FIELD CONSTRUCTION AND ASSEMBLY (AS APPLICABLE). CONTRACTORS PERFORMING WELDING ON PRESSURE PIPING MUST HOLD A CURRENT LICENSE APPROPRIATE FOR THE WORK BEING PERFORMED TO CSA B51 AND ASME SECTION IX.

10) ISOLATE ALL EXPANSION JOINTS, INSTRUMENTS, AND EQUIPMENT DURING PRESSURE TEST OF PIPING. DO NOT REMOVE SHIPPING BLOCKS, STRAPS ON ALL SPRING-TYPE SUPPORTS UNTIL PRESSURE TEST IS COMPLETE.

11) PIPING TO BE SLOPED TO ALLOW POSITIVE DRAINAGE AND CONDENSATE REMOVAL. PROVIDE MANUAL AIR VENTS, DRAINS, AND DIRT POCKETS AS REQUIRED BY SITE CONDITIONS AND AS INDICATED ON CONTRACT DRAWINGS. SOME MINOR ADJUSTMENTS TO ELEVATIONS AND OTHER DIMENSIONS TO BE EXPECTED TO SUIT SITE CONDITIONS.

12) ALL PIPING TO BE SUBJECT TO RADIOGRAPHIC, OR OTHER VOLUMETRIC MEANS, FOR 10% OF ALL WELDS. 3RD PARTY INDEPENDENT INSPECTION AND TESTING CONTRACTOR SHALL BE RETAINED BY AND AT AT THE COST OF THE CONTRACTOR.

13) PROTECT ALL OFFLINE PIPING (NEW AND EXISTING) BY DRYING THOROUGHLY, AND INSTALLING ADEQUATE DESICCANT PACKS. USE 0.75KG OF DESICCANT FOR EACH 1M³ OF PIPE INTERNAL VOLUME. SEAL PIPE ENDS WITH PLASTIC CAPS (INSIDE MANHOLES) OR WELDED STEEL CAPS (3/8" THICK A36 PLATE MINIMUM. CONTRACTOR SHALL BE RESPONSIBLE TO REMEDIABLE ALL PIPING DETERMINED TO BE CORRODED DUE TO IMPROPER PROTECTION

UNDERGROUND STEAM & CONDENSATE PIPING

14) INSTALL STEAM & CONDENSATE PIPING AS SHOWN ON CONTRACT DRAWINGS. PROVIDE TEMPORARY SUPPORTS AS REQUIRED TO MAINTAIN ALIGNMENT DURING INSULATION AND CONCRETE PLACEMENT.

15) INSULATE AND INSTALL ALL BURIED PIPING WITH FOAMGLAS PIPE INSULATION IN ACCORDANCE WITH MANUFACTURER'S LATEST REQUIREMENTS FOR BURIED STEAM SERVICE AND CONCRETE ENCASEMENT APPLICATIONS.

16) AT ELBOWS, BENDS, OFFSETS, AND DIRECTION CHANGES, PROVIDE FACTORY FABRICATED OR FIELD MITERED FOAMGLAS SECTIONS, OVERSIZED AS REQUIRED TO MAINTAIN FULL NOMINAL INSULATION THICKNESS THROUGH THE BEND.

17) PROVIDE OUTER INSULATION PROTECTION AND WATERPROOFING SYSTEM COMPATIBLE WITH PITTWRAF SS JACKETING, INSTALLED IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS FOR DIRECT BURIAL AND CONCRETE ENCASEMENT APPLICATIONS.

18) PROVIDE LOCAL CONCRETE SUPPORT PADS, DUNNAGE, OR CHAIRS AS DETAILED TO SUPPORT PIPE AND INSULATION DURING INSTALLATION. SUPPORTS SHALL BE SHAPED TO AVOID POINT LOADING AND SHALL NOT DAMAGE INSULATION OR OUTER COATING.

19) CONCRETE SUPPORTS SHALL BE INSTALLED AT LOCATIONS AND SPACING SHOWN OR AS REQUIRED TO PREVENT SETTLEMENT OR DISPLACEMENT DURING CONCRETE POUR.

20) PIPE, INSULATION, AND SUPPORT ASSEMBLY SHALL BE SECURED TO PREVENT FLOATATION OR MOVEMENT DURING CONCRETE PLACEMENT.

21) CONCRETE ENCASEMENT SHALL BE PLACED WITHOUT DISPLACING OR DAMAGING INSULATION SYSTEM. VIBRATION SHALL BE CONTROLLED TO AVOID INSULATION DAMAGE.

22) ALL WORK SHALL BE COORDINATED WITH FOAMGLAS MANUFACTURER REQUIREMENTS AND INSTALLER RECOMMENDATIONS FOR CONCRETE ENCASED BURIED STEAM SYSTEMS. FOAMGLAS INSULATION INSTALLATION TRAINING TO BE COMPLETED.

23) ALL CONCRETE WORK TO BE IN STRICT CONFORMANCE WITH ALL NOTES AND SPECIFICATIONS LISTED ON THE CIVIL DRAWINGS.

PIPE SUPPORTS

24) PIPE SUPPORTS MAY BE SHOWN OR DEPICTED DIFFERENTLY IN THE PIPING ARRANGEMENT AND LAYOUT DRAWINGS. REFER TO PIPE SUPPORT LAYOUT AND DETAIL DRAWINGS FOR INSTALLATION SPECIFICS. WHERE SPECIFIC SUPPORT DETAILS ARE NOT PROVIDED, SUPPORT ALL PIPES USING ANVIL PIPE SUPPORTS OR APPROVED EQUALS. MAXIMUM SUPPORT SPACING PER ASME B31.1 TABLE 121.5 - SUGGESTED PIPE SUPPORT SPACING UNLESS SHOWN OTHERWISE. SUPPORT VERTICAL PIPES AT SAME SPACING.

25) PIPE HANGER COMPONENTS TO BE ANVIL BRAND OR EQUAL.

26) PIPE SUPPORT FINISHES SHALL BE SUITABLE FOR CONDITIONS OF AREA OF INSTALLATION. DO NOT PAINT SLIDING OR THREADED SURFACES.

27) ALL THREADED RODS AND U-BOLTS TO USE 2 NUTS AND WASHERS AT EACH CONNECTION. NUT QUANTITIES MAY NOT BE SPECIFIED AT EACH DETAIL.

28) EQUAL ALTERNATIVES FOR ALL MANUFACTURER SPECIFIC ITEMS ACCEPTABLE. SUBMIT SHOP DRAWINGS TO ENGINEER FOR APPROVAL.

29) FINAL DIMENSIONS AND LOCATIONS OF ALL SUPPORTS TO SUIT ACTUAL INSTALLED PIPE LOCATIONS.

30) SUPPORTS TO BE PRIMED IN ACCORDANCE WITH PROJECT STANDARDS. ALL THREADED HANGERS & U-BOLTS TO HAVE EXCESS THREADS TRIMMED.

PIPE INSULATION

31) CONCRETE ENCASED BURIED PIPE INSULATION TO BE FOAMGLAS C/W PITTWRAF SS JACKETING. INSULATION THICKNESS AND PIPE SIZES AS INDICATED BY DRAWINGS.

32) INSULATION WITHIN MANHOLES:

32)1) STEAM - NPS 14, 12, 8 AND 6, 2" THICK FOAMGLAS

32)2) CONDENSATE - NPS 8, 6, 4, AND 3, 1.5" THICK FOAMGLAS

EXPANSION JOINTS

33) EXPANSION JOINTS TO BE FREE ISSUED BY UNIVERSITY FOR INSTALLATION BY CONTRACTOR.

34) INSTALL EXPANSION JOINTS WHERE INDICATED ON CONTRACT DRAWINGS. INSTALL IN ACCORDANCE WITH ALL MANUFACTURER INSTRUCTIONS. EXPANSION JOINT DETAILS CAN BE SEEN IN THE TABLE 1. SHIP PRE-COMPRESSED BY 1". PRE-COMPRESSSION HAS BEEN BASED ON THE ASSUMPTION OF 15°C (60°F) INSTALLATION TEMPERATURE, AND CONSISTENT TEMPERATURE THROUGH THE EXISTING SYSTEM. HIGHER AMBIENT TEMPERATURES AT TIME OF INSTALLATION MAY NECESSITATE INCREASED PRE-COMPRESSSION, TO BE DETERMINED BY ENGINEER AT TIME OF INSTALLATION.

35) EXPANSION JOINTS SHALL BE FURNISHED WITH EXTENSION LIMIT STOPS AND MINIMUM 1" [25] EXTENSION WHEN IN THE COLD POSITION.

STEAM LOADS BY BUILDING

36) THE STEAM LOADS REQUIRED BY THE BUILDINGS EFFECTED BY THE TEMPORARY OUTAGE ARE SHOWN IN THE TABLES 2 & 3. IF A LOAD IS NOT INCLUDED IN THE TABLE, IT IS ASSUMED THAT THE BUILDING DOES NOT REQUIRE STEAM DURING THE SHUTDOWN OR CAN BE SUPPLIED BY ANOTHER FEED. STEAM LOADS PROVIDED BY UNIVERSITY FACILITIES TEAM.

TEMPORARY SERVICE REQUIREMENTS

37) TWO TEMPORARY BOILERS WILL BE INSTALLED TO SUPPLY STEAM TO THE BUILDINGS THAT REQUIRE STEAM DURING THE OUTAGE. TABLE 4 SHOWS THE REQUIRED OUTPUT AND STEAM PRESSURE OF THE BOILERS.

38) CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ASPECTS OF RENTAL BOILER SUPPLY, INSTALLATION, OPERATION, MAINTENANCE, SECURITY, AND REMOVAL.

TABLE 1: EXPANSION JOINT SCHEDULE

TAG	LOCATION	SERVICE	NPS	AXIAL COMPRESSION (IN)	END CONNECTIONS	ANCHOR BASE	ADSCO PART NUMBER
EJ-1	MH-02	STM	12	14	150# RF	NO	RJ1200151S1414AAA
EJ-2	MH-02	COND	6	14	150# RF	NO	RJ0600151S1414AAA
EJ-3	MH-03	STM	12	14	150# RF	NO	RJ1200151S1414AAA
EJ-4	MH-03	COND	6	14	150# RF	NO	RJ0600151S1414AAA
EJ-5	MH-V03	STM	6	12	BW	NO	RJ0600151S1230AAA
EJ-6	MH-V03	STM	6	4	BW	NO	RJ0600151S0430AAA
EJ-7	MH-V03	COND	3	12	BW	NO	RJ0300151S1231AAA
EJ-8	MH-V03	COND	3	4	BW	NO	RJ0300151S0431AAA

TABLE 2: STEAM LOADS BY BUILDING (BAN RIGH)

BUILDING	PRESSURE (PSIG)	MAX LOAD (LB/HR)
115 - BAN RIGH KITCHEN	45	2100
115 - BAN RIGH RESIDENCE	45	615
152 - UNIVERSITY CLUB	45	131
124 - ADELAIDE HALL	45	-
146 - LASALLE BUILDING	45	-
131- CHOWN HALL	45	-
136 STIRLING HALL	45	-
142 - WATSON HALL	45	-
140 - VICTORIA HALL	45	-
135 - AGNES ETHERINGTON ART CENTRE	45	-
165 - HARRISON-LECAIN HALL	45	-

TABLE 3: STEAM LOADS BY BUILDING (MH-03)

BUILDING	PRESSURE (PSIG)	MAX LOAD (LB/HR)
184 - CHERNOFF HALL	125	2725
186 - WATTS HALL	125	920
134 - LEONARD HALL	125	1234
RICWIL	125	-
125 - MCNEILL HOUSE	125	-
198 - BRANT HOUSE	125	617
126 - MORRIS HALL	125	-
139 - GORDON-BROCKIGTON HALL	125	-

TABLE 4: TEMPORARY BOILERS

LOCATION	PRESSURE (PSIG)	LOAD (LB/HR)
MH-03	125	7000
BAN RIGH HALL	45	4000

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VERIFY SHEET SIZE AND SCALES. THE BAR TO THE RIGHT IS 25mm IF THIS IS A FULL SIZE DRAWING. 0 25mm

SCALE: N/A

CLIENT:

CONSULTANT: www.jrichards.ca

CONSULTANT:

PROFESSIONAL STAMP

PROJECT NORTH

PROJECT:

QUEEN'S UNIVERSITY
BAN RIGH STEAM MANHOLE
REPLACEMENT

BADER LANE, KINGSTON, ONTARIO K7L 2S8

DRAWING:

MECHANICAL
GENERAL SPECIFICATIONS

DESIGN: CS	DRAWING #:
DRAWN: CS	MOO
CHECKED: MC	
JLR #:	

28079-002

File Name: 28079-M00&M01&M02&M03.dwg

PLOT DATE: Monday, April 27, 2026 11:46:10 AM

File Name: 28079-M00&M01&M02&M03.dwg

GENERAL NOTES:

- 1) DETAILS PROVIDED ON THIS DOCUMENT ARE GENERAL; REFER TO CONTRACT DRAWINGS FOR PROJECT-SPECIFIC DETAILS. SPECIFICATIONS ON CONTRACT DRAWINGS SUPERCEDE THE DETAILS PROVIDED ON THIS SHEET.
- 2) THIS PIPING SPECIFICATION IS INTENDED TO COVER NEW AND MODIFIED STEAM AND HIGH PRESSURE DRIP (CONDENSATE RETURN) PIPING.
- 3) ALL PIPING TO BE REGISTERED AND INSPECTED PER THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION. ALL VALVES AND FITTINGS MUST HAVE CRNs.

PIPING NOTES:

INSTALLATION OF PIPING

- 4) DO WORK IN ACCORDANCE WITH ASME B31.1. ALL INSPECTION, EXAMINATION AND TESTING TO BE DONE ACCORDING TO CODE.
- 5) PIPING TO BE WELDED THROUGHOUT, EXCEPT WHERE THREADED JOINTS ARE NECESSITATED BY EQUIPMENT CONNECTIONS OR MAINTENANCE REQUIREMENTS (EX. DRAIN CAPS AND AIR VENTS).
- 6) MAINTAIN CLEARANCE BETWEEN PIPES AND STRUCTURES FOR O&M AS INDICATED AND DIRECTED.
- 7) PROVIDE MANUAL AIR VENTS, DRAINS, DRIP LEGS, DIRT POCKETS AS SPECIFIED.
- 8) SEAL PIPING PASSING THROUGH MANHOLE WALLS AS INDICATED.
- 9) PROVIDE FOR PIPE MOVEMENT AS INDICATED.
- 10) UNLESS OTHERWISE NOTED, USE ECCENTRIC REDUCERS IN HORIZONTAL PIPING TO ALLOW FOR DRAINAGE AND TO PREVENT ACCUMULATION OF POCKETS OF AIR OR CONDENSATE.
- 11) UNLESS OTHERWISE NOTED, CONSTRUCT BRANCH TAKE-OFFS AS FOLLOWS:

11)1) USE WELDING TEES

11)2) WHERE REDUCING TEES OF PROPER SIZE ARE UNAVAILABLE, USE AVAILABLE TEES WITH REDUCERS.

11)3) WELDOLETS MAY BE USED PROVIDED RATIO OF OUTLET SIZE TO PIPE SIZE IS 0.5 OR SMALLER.
- 12) CAP OPEN ENDS OF PIPING DURING INSTALLATION. REMOVE FOREIGN MATERIAL FROM INSIDE PIPING.
- 13) REMOVE BURRS FROM PIPING.
- 14) SLOPE NOMINALLY HORIZONTAL PIPING AS INDICATED TO HIGH POINT FOR AIR REMOVAL AND TO LOW POINT FOR DRAINAGE. SLOPE STEAM PIPING 1:240 AND CONDENSATE PIPING 1:72 IN THE DIRECTION OF FLOW.
- 15) FLANGES:

15)1) LUBRICATE ALL THREADS WITH ANTI-SEIZE PRIOR TO ASSEMBLY. ACCEPTABLE PRODUCT: LOCTITE HEAVY DUTY ANTI-SEIZE (No. 51606).

15)2) USE HARDENED WASHERS UNDER BOLT HEADS AND NUTS.

15)3) TORQUE FLANGE BOLTING IN ACCORDANCE WITH GASKET MANUFACTURER'S RECOMMENDEDATIONS FOR GASKET COMPRESSIVE STRESS. USING A CALIBRATED TORQUE WRENCH, TIGHTEN FLANGES IN 3 EVEN PASSES OR 33%, 66%, AND 100% REQUIRED TORQUE VALUE. TIGHTEN FLANGES IN ACCORDANCE WITH PROPER BOLTING SEQUENCE.

15)4) TAG ALL FLANGES WITH TORQUE VALUE AND EMPLOYEE ID AFTER TIGHTENING.
- 16) REVISIONS TO LOCATION OF PIPING REQUIRE WRITTEN APPROVAL OF ENGINEER OF RECORD.
- 17) UNLESS SPECIFICALLY NOTED ON CONTRACT DRAWINGS, DO NOT COLD SPRING OR FORCE PIPING INTO PLACE. WHERE COLD SPRINGING IS SPECIFIED IN CONTRACT DRAWINGS, CONTRACTOR TO SUBMIT A PLAN, INCLUDING METHODS AND MATERIALS, TO ENGINEER FOR REVIEW. ENGINEER TO BE PRESENT TO WITNESS ALL COLD SPRINGING OF PIPING.
- 18) STEAM TRAPS:

18)1) PROVIDE DRIP LEGS AND STEAM TRAP ASSEMBLIES ON STEAM HEADER WHERE INDICATED ON CONTRACT DRAWINGS. ADDITIONAL DRIP LEGS MAY BE REQUIRED DEPENDING ON SITE CONDITIONS. DRIP LEGS TO BE MINIMUM NPS 6, OR MATCH STEAM HEADER SIZE (FOR PIPES SMALLER THAN NPS 6) AND AT LEAST 18" DEEP. SITE CONDITIONS MAY REQUIRE SHORTER DRIP LEGS, TO BE EVALUATED BY ENGINEERING ON AN INDIVIDUAL BASIS.

18)2) INSTALL STEAM TRAPS FOLLOWING ALL MANUFACTURERS INSTRUCTIONS. PROVIDE UNIONS OR OTHER SUITABLE MEANS FOR REMOVAL AND REPLACEMENT OF TRAP ELEMENT.
- 22) SUBMIT SHOP DRAWINGS OF ALL INSULATION ASSEMBLIES FOR REVIEW PRIOR TO ORDERING.



PIPE SUPPORTS

- 19) INSTALL PIPE SUPPORTS AS INDICATED ON CONTRACT DRAWINGS.
- 20) PIPE GUIDES TO BE INSTALLED IN FIELD WITH THE GAPS INDICATED IN DRAWINGS.

LABELLING

- 21) LABEL ALL PIPING IN ACCORDANCE WITH QUEEN'S FACILITY STANDARDS.

QUEEN'S BAN RIGH MANHOLE REPLACEMENT						
Piping Specification: STM-1						
Service:	High Pressure Steam, Low Pressure Steam and High Pressure Drip					
MAWP	150 psig [1035 kPa] (hydrostatic test: leak test and inspection per ASME B31.1)					
Temp. Limits	366°F [186°C]					
Corrosion Allowance:	0.063" [2] for Welded Fittings and Threaded Fittings					
ASME Rating	Class 150					
Material	Carbon Steel					
Design Code	ASME B31.1-2024					
Abbreviations:	PE: Plain Ends, BE: Bevelled Ends, RF: Raised Face, SW: Socket Weld, THD: Thread (s) (ed), WN: Weld Neck Flange, ERW: Electric Resistance Welding					
Item	Size (NPS)	Rating	Type/Connection	Material	Standard	Notes
	½ ≤ 2 SW	Sch. 80	SMLS, PE	ASTM A106 Gr. B	ASME B36.10	
	½ ≤ 2 THD	Sch. 80	SMLS, THD	ASTM A106 Gr. B	ASME B36.10	
	2 ½ ≤ 24	Sch. STD	ERW, BE	ASTM A53 Gr. B	ASME B36.10	
	2 ½ ≤ 24	Sch. 80	ERW, BE	ASTM A53 Gr. B	ASME B36.10	for condensate return
	Notes: 1. Pipe wall thickness specified in this table is minimum and can be greater when required based on results of pipe stress analysis or other FEA modeling.					
Nipple	½ ≤ 2 THD	Sch. 80	SMLS, THD	ASTM A106 Gr. B	ASME B36.10	drains, vents, pressure gauges
Swage nipple	½ ≤ 2 THD	Sch. 80	SMLS, THD	ASTM A106 Gr. B	MSS SP-95	drains, vents, pressure gauges
Fittings	½ ≤ 2	3000 Class	SW or THD	ASTM A105N	ASME B16.11	
	2 ½ ≤ 24	Sch. STD	BW	ASTM A234 Gr. WPB	ASME B16.9	elbows to be L.R.
	2 ½ ≤ 24	Sch. 80	BW	ASTM A234 Gr. WPB	ASME B16.9	for condensate return
Unions	½ ≤ 2	3000 Class	SW	ASTM A105N	MSS SP-83	
Branch Outlet Fittings	½ ≤ 2 run size ½ ≤ 1 ½ branch size	3000 Class	SW	ASTM A105N	MSS SP-97	
Branch Outlet Fittings	2 ½ ≤ 24 run size ½ ≤ 12 branch size	Sch. STD Sch. 80	BW	ASTM A105N ASTM A234 Gr.WPB	MSS SP-97	match pipe schedule
Gaskets	ALL	Class 150		3.2mm (1/8") spiral wound 304SS graphite filled	ASME B16.20	
Flanges	½ ≤ 2	Class 150	RF SW or Blind	ASTM A105N	ASME B16.5	
	2 ½ ≤ 24	Class 150	RF WN or Blind	ASTM A105N	ASME B16.5	bore to match pipe ID (WN preferred, SO acceptable)
Bolting	ALL			Bolts: ASTM A193 Gr. B7 Nuts: ASTM A194 Gr. 2H Washers: ASTM F436	Dimensions: ASME B18.2 Threads: ASME B1.1 Class 2	1, 2, 3
	Notes: 1. Bolting studs meeting specifications listed may be used in place of bolts. 2. Bolts and nuts thread to be coarse series (UNC) for 1" and under, and 8 pitch series (8UN) for 1 1/8" and above. 3. Hardened washers meeting specification listed to be installed under all flange bolting nuts and bolt heads.					
Valves						
Notes	It is the contractors responsibility to ensure that valves are suitable for the service conditions and that flanged connections meet all code requirements.					
Gate	½ ≤ 2	Class 800	SW or THD	ASTM A105N, forged steel, OS&Y		
	2 ½ ≤ 24	Class 150	Flanged	ASTM A216 Gr.WCB, cast steel, wedge gate, OS&Y solid discs		
Butterfly	2 ½ ≤ 24	Class 150	-	High performance, lug-type, approved for steam service		
Valves in external bypass around valves	Valves NPS 8 and under: NPS 3/4 gate in accordance with specifications above Valves NPS 10 and over: NPS 1 gate in accordance with specifications above					
Check valves	½ ≤ 2	Class 800	SW or THD	ASTM A105N, forged steel, lift type		
	2 ½ ≤ 24	Class 150	Flanged	ASTM A216 Gr.WCB, cast steel, type to be specified by engineer		
Drain valves	Gate valves, ¾ to 1 ¼, in accordance with specifications above					
Strainers	½ to 1 ½ class 600, 4 MPa, socket weld or screwed ends, cast carbon steel body to ASTM A216 Gr.WCB, y pattern, sediment separator with 20x20 mesh, type 304 stainless steel screen					
Steam traps	Capacity as indicated; thermostatic: bimetallic type, forged steel body to ASTM A105, screwed ends, thermostatic element field replaceable, externally adjustable (if applicable), fail-open design, corrosion resistant, designed for minimum differential pressure of 15psig and 10 °C sub-cooling					

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VERIFY SHEET SIZE AND SCALES. THE BAR TO THE RIGHT IS 25mm IF THIS IS A FULL SIZE DRAWING. 025mm		
SCALE: N/A		
CLIENT: <div></div>		
CONSULTANT: <div>www.jrichards.ca</div>		
CONSULTANT:		
PROFESSIONAL STAMP	PROJECT NORTH	
PROJECT: <div>QUEEN'S UNIVERSITY BAN RIGH STEAM MANHOLE REPLACEMENT BADER LANE, KINGSTON, ONTARIO K7L 2S8</div>		
DRAWING: <div>GENERAL SPECIFICATIONS HPS, LPS AND HPD SPECIFICATIONS</div>		
DESIGN: CS		
DRAWN: CS	DRAWING #:	
CHECKED: MC	M02	
JLR #: 28079-002		

PLOT DATE: Monday, April 27, 2026 11:47:25 AM

File Name: 28079-M03&M01&M02&M03.dwg

GENERAL NOTES:

- 1) DETAILS PROVIDED ON THIS DOCUMENT ARE GENERAL; REFER TO CONTRACT DRAWINGS FOR PROJECT-SPECIFIC DETAILS. SPECIFICATIONS ON CONTRACT DRAWINGS SUPERCEDE THE DETAILS PROVIDED ON THIS SHEET.

THIS PIPING SPECIFICATION IS INTENDED TO COVER NEW AND MODIFIED PUMPED CONDENSATE (PC OR WCC) PIPING.

PIPING NOTES:

INSTALLATION OF PIPING

- 2) DO WORK IN ACCORDANCE WITH ASME B31.1. ALL INSPECTION, EXAMINATION AND TESTING TO BE DONE ACCORDING TO CODE.
- 3) PIPING TO BE WELDED THROUGHOUT, EXCEPT WHERE THREADED JOINTS ARE NECESSITATED BY EQUIPMENT CONNECTIONS OR MAINTENANCE REQUIREMENTS (EX. DRAIN CAPS AND AIR VENTS).
- 4) MAINTAIN CLEARANCE BETWEEN PIPES AND STRUCTURES FOR O&M AS INDICATED AND DIRECTED.
- 5) PROVIDE MANUAL AIR VENTS, DRAINS, DRIP LEGS, DIRT POCKETS AS SPECIFIED.
- 6) SEAL PIPING PASSING THROUGH MANHOLE WALLS AS INDICATED.
- 7) PROVIDE FOR PIPE MOVEMENT AS INDICATED.
- 8) UNLESS OTHERWISE NOTED, USE ECCENTRIC REDUCERS IN HORIZONTAL PIPING TO ALLOW FOR DRAINAGE AND TO PREVENT ACCUMULATION OF POCKETS OF AIR OR CONDENSATE.
- 9) WELD COUPLINGS FOR DRAINS INTO PIPING IN ACCORDANCE WITH ASME B31.1.
- 10) UNLESS OTHERWISE NOTED, CONSTRUCT BRANCH TAKE-OFFS AS FOLLOWS:
10)1) USE WELDING TEES
10)2) WHERE REDUCING TEES OF PROPER SIZE ARE UNAVAILABLE, USE AVAILABLE TEES WITH REDUCERS.
10)3) WELDOLETS MAY BE USED AT DRIP LEGS ONLY PROVIDED RATIO OF OUTLET SIZE TO PIPE SIZE IS 0.5 OR SMALLER.
- 11) CAP OPEN ENDS OF PIPING DURING INSTALLATION. REMOVE FOREIGN MATERIAL FROM INSIDE PIPING.
- 12) REMOVE BURRS FROM PIPING.
- 13) GRADE NOMINALLY HORIZONTAL PIPING AS INDICATED TO HIGH POINT FOR AIR REMOVAL AND TO LOW POINT FOR DRAINAGE.
- 14) FLANGES:
14)1) LUBRICATE ALL THREADS WITH ANTI-SEIZE PRIOR TO ASSEMBLY. ACCEPTABLE PRODUCT: LOCTITE HEAVY DUTY ANTI-SEIZE (No. 51606).
14)2) USE HARDENED WASHERS UNDER BOLT HEADS AND NUTS.
14)3) TORQUE FLANGE BOLTING IN ACCORDANCE WITH GASKET MANUFACTURER'S RECOMMENDATIONS FOR GASKET COMPRESSIVE STRESS. USING A CALIBRATED TORQUE WRENCH, TIGHTEN FLANGES IN 3 EVEN PASSES OR 33%, 66%, AND 100% REQUIRED TORQUE VALUE. TIGHTEN FLANGES IN ACCORDANCE WITH PROPER BOLTING SEQUENCE.
14)4) TAG ALL FLANGES WITH TORQUE VALUE AND EMPLOYEE ID AFTER TIGHTENING.
- 15) REVISIONS TO LOCATION OF PIPING REQUIRE WRITTEN APPROVAL OF ENGINEER OF RECORD.
- 16) UNLESS SPECIFICALLY NOTED ON CONTRACT DRAWINGS, DO NOT COLD SPRING OR FORCE PIPING INTO PLACE. WHERE COLD SPRING IS SPECIFIED IN CONTRACT DRAWINGS, CONTRACTOR TO SUBMIT A PLAN, INCLUDING METHODS AND MATERIALS, TO ENGINEER FOR REVIEW. ENGINEER TO BE PRESENT TO WITNESS ALL COLD SPRING OF PIPING.
- PIPE INSULATION
- 17) INSULATION: 1.5" THICK OR AS SPECIFIED
- OWENS CORNING "FOAMGLAS" PRE-FORMED INSULATION
- INSULATION BANDS 1/2" WIDE X 0.019" THICK STAINLESS STEEL
- INSULATION JACKET 0.016" THICK ALUMINUM, SMOOTH FINISH C/W MOISTURE BARRIER
- OUTER COAT ACRYLIC RESIN
- 18) INSULATE EXPANSION JOINTS, VALVES AND OTHER MISCELLANEOUS EQUIPMENT WITH REMOVABLE INSULATING COVERS. INSULATING COVERS ARE TO BE "BLANKET" TYPE, WITH HOOK AND LOOP, DRAWSTRING, OR SIMILAR CLOSURE TYPE. INSULATION THICKNESS SHALL BE SUFFICIENT TO LIMIT SURFACE TEMPERATURE TO 140°F [60°C] MAXIMUM. INSULATING COVERS TO MEET INDUSTRY STANDARD.
- 19) INSULATION FOR CONCRETE ENCASED BURIED SECTIONS
- OWENS CORNING "FOAMGLAS" PRE-FORMED INSULATION C/W PITTWRAP SS JACKETING
- INSULATION THICKNESS AND SIZE AS NOTED ON DRAWINGS
- 20) SUBMIT SHOP DRAWINGS OF ALL INSULATION ASSEMBLIES FOR REVIEW PRIOR TO ORDERING.



PIPE SUPPORTS

- 21) INSTALL PIPE SUPPORTS AS INDICATED ON CONTRACT DRAWINGS.
- 22) PIPE GUIDES TO BE INSTALLED IN FIELD WITH THE GAPS INDICATED IN DRAWINGS.

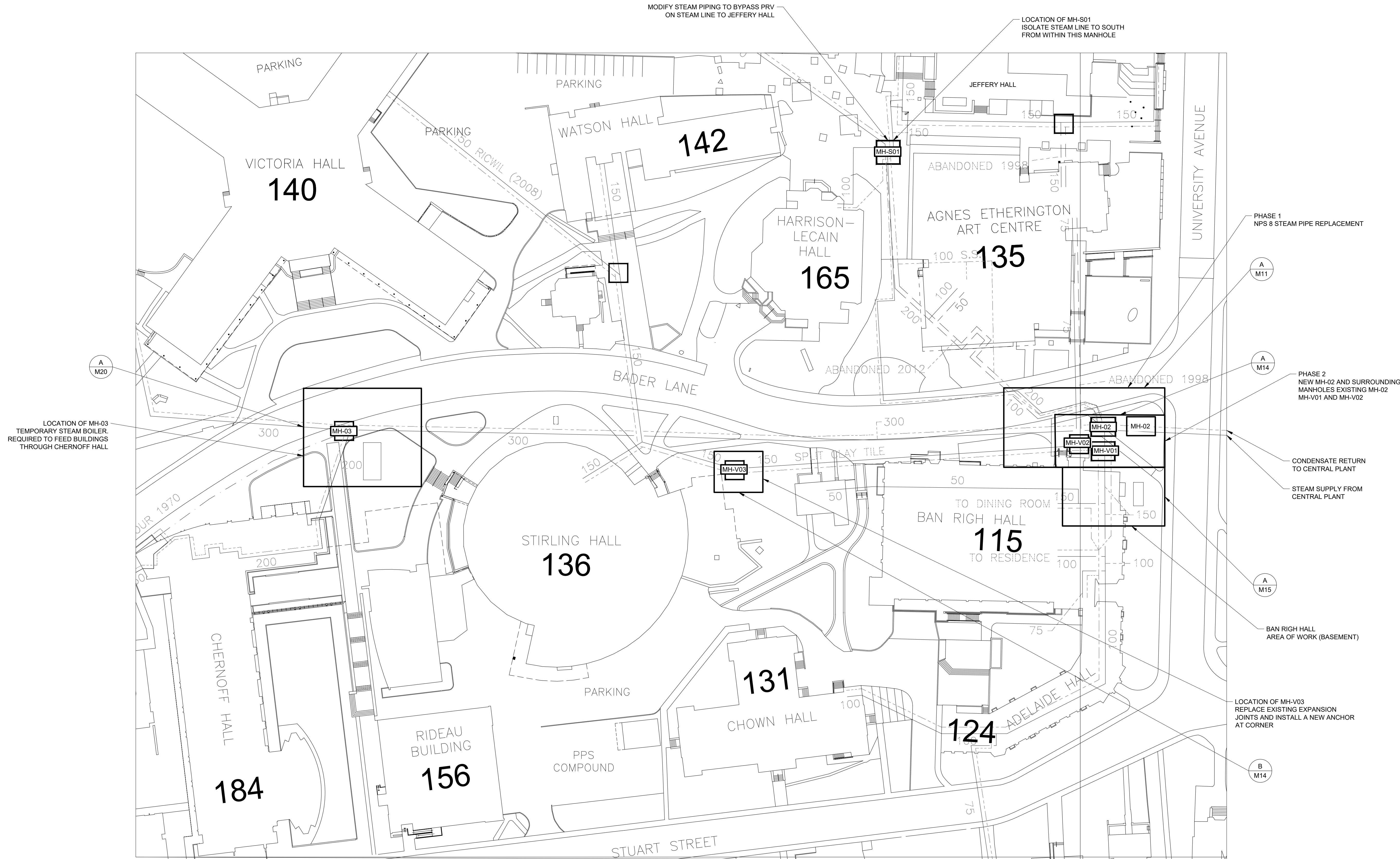
LABELLING

- 23) LABEL ALL PIPING IN ACCORDANCE WITH QUEEN'S FACILITIY STANDARDS.

QUEEN'S BAN RIGH MANHOLE REPLACEMENT						
Piping Specification: CND-1						
Service:	Pumped Condensate					
MAWP	150 psig [1035 kPa] (hydrostatic test: leak test and inspection per ASME B31.1)					
Temp. Limits	366°F [186°C]					
Corrosion Allowance:	0.063" [2] for Welded Fittings and Threaded Fittings					
ASME Rating	Class 150					
Material	Carbon Steel					
Design Code	ASME B31.1-2024					
Abbreviations:	PE: Plain Ends, BE: Bevelled Ends, RF: Raised Face, SW: Socket Weld, THD: Thread (s) (ed), WN: Weld Neck Flange, ERW: Electric Resistance Welding					
Item	Size [NPS]	Rating	Type/Connection	Material	Standard	Notes
	½ ≤ 2 SW	Sch. 80	ERW, PE	ASTM A53 Gr. B	ASME B36.10	
	½ ≤ 2 THD	Sch. 80	SMLS, THD	ASTM A106 Gr. B	ASME B36.10	
	2 ½ ≤ 8	Sch. 80	ERW, BE	ASTM A53 Gr. B	ASME B36.10	
	Notes: 1. ASTM A106 Gr. B can be used instead ASTM A53 Gr. B based on availability.					
Nipple	½ ≤ 2 THD	Sch. 80	SMLS, THD	ASTM A106 Gr. B	ASME B36.10	drains, vents, pressure gauges
Swage nipple	½ ≤ 2 THD	Sch. 80	SMLS, THD	ASTM A106 Gr. B	MSS SP-95	drains, vents, pressure gauges
Fittings	½ ≤ 2	3000 Class	SW or THD	ASTM A105N	ASME B16.11	
	2 ½ ≤ 8	Sch. 80	BW	ASTM A234 Gr. WPB	ASME B16.9	elbows to be L.R.
Unions	½ ≤ 2	3000 Class	SW	ASTM A105N	MSS SP-83	
Branch Outlet Fittings	½ ≤ 2 run size ½ ≤ 1 ½ branch size	3000 Class	SW	ASTM A105N	MSS SP-97	SW half couplings, 3000 Class, are permitted at branch connections
Branch Outlet Fittings	2 ½ ≤ 8 run size ½ ≤ 4 branch size	Sch. 80	BW	ASTM A105N ASTM A234 Gr.WPB	MSS SP-97	
Gaskets	ALL	Class 150		3.2mm (1/8") spiral wound 304SS graphite filled	ASME B16.20	
Flanges	½ ≤ 2	Class 150	RF SW or Blind	ASTM A105N	ASME B16.5	
	2 ½ ≤ 8	Class 150	RF WN or Blind	ASTM A105N	ASME B16.5	bore to match pipe ID (WN preferred, SO acceptable)
Bolting	ALL			Bolts: ASTM A193 Gr. B7 Nuts: ASTM A194 Gr. 2H Washers: ASTM F436	Dimensions: ASME B18.2 Threads: ASME B1.1 Class 2	1, 2, 3
	Notes: 1. Bolting studs meeting specifications listed may be used in place of bolts. 2. Bolts and nuts thread to be coarse series (UNC) for 1" and under, and 8 pitch series (8UN) for 1 1/8" and above. 3. Hardened washers meeting specification listed to be installed under all flange bolting nuts and bolt heads.					
Valves						
Notes	It is the contractors responsibility to ensure that valves are suitable for the service conditions and that flanged connections meet all code requirements.					
Gate	½ ≤ 2	Class 800	SW or THD	ASTM A105N, forged steel, OS&Y		
	2 ½ ≤ 8	Class 150	Flanged	ASTM A216 Gr.WCB, cast steel, wedge gate, OS&Y solid discs		
Butterfly	2 ½ ≤ 8	Class 150	-	High-performance, lug-type, approved for steam service		
Check valves	½ ≤ 2	Class 800	SW or THD	ASTM A105N, forged steel, lift type		
	2 ½ ≤ 8	Class 150	Flanged	ASTM A216 Gr.WCB, cast steel, type specified by engineer		
Drain valves	Gate valves, ¾ to 1 ¼ , in accordance with specifications above					

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VERIFY SHEET SIZE AND SCALES. THE BAR TO THE RIGHT IS 25mm IF THIS IS A FULL SIZE DRAWING. 025mm		
SCALE: N/A		
CLIENT: <div></div>		
CONSULTANT: <div>www.jrichards.ca</div>		
CONSULTANT:		
PROFESSIONAL STAMP	PROJECT NORTH	
PROJECT: <div>QUEEN'S UNIVERSITY BAN RIGH STEAM MANHOLE REPLACEMENT BADER LANE, KINGSTON, ONTARIO K7L 2S8</div>		
DRAWING: <div>GENERAL SPECIFICATIONS CONDENSATE</div>		
DESIGN: CS		
DRAWN: CS	DRAWING #:	
CHECKED: MC	M03	
JLR #: 28079-002		

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0	ISSUED FOR TENDER	27/04/26
No.	ISSUE / REVISION	DD/MM/YY

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VERIFY SHEET SIZE AND SCALES. THE BAR TO THE RIGHT IS 25mm IF THIS IS A FULL SIZE DRAWING. 0 25mm

SCALE:

CLIENT:



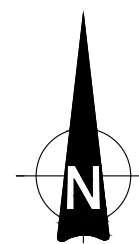
CONSULTANT: www.jrichards.ca



CONSULTANT:

PROFESSIONAL STAMP

PROJECT NORTH



PROJECT:

QUEEN'S UNIVERSITY
BAN RIGH STEAM MANHOLE
REPLACEMENT

BADER LANE, KINGSTON, ONTARIO K7L 2S8

DRAWING:

MECHANICAL
KEY PLAN

DESIGN: CS

DRAWN: CS

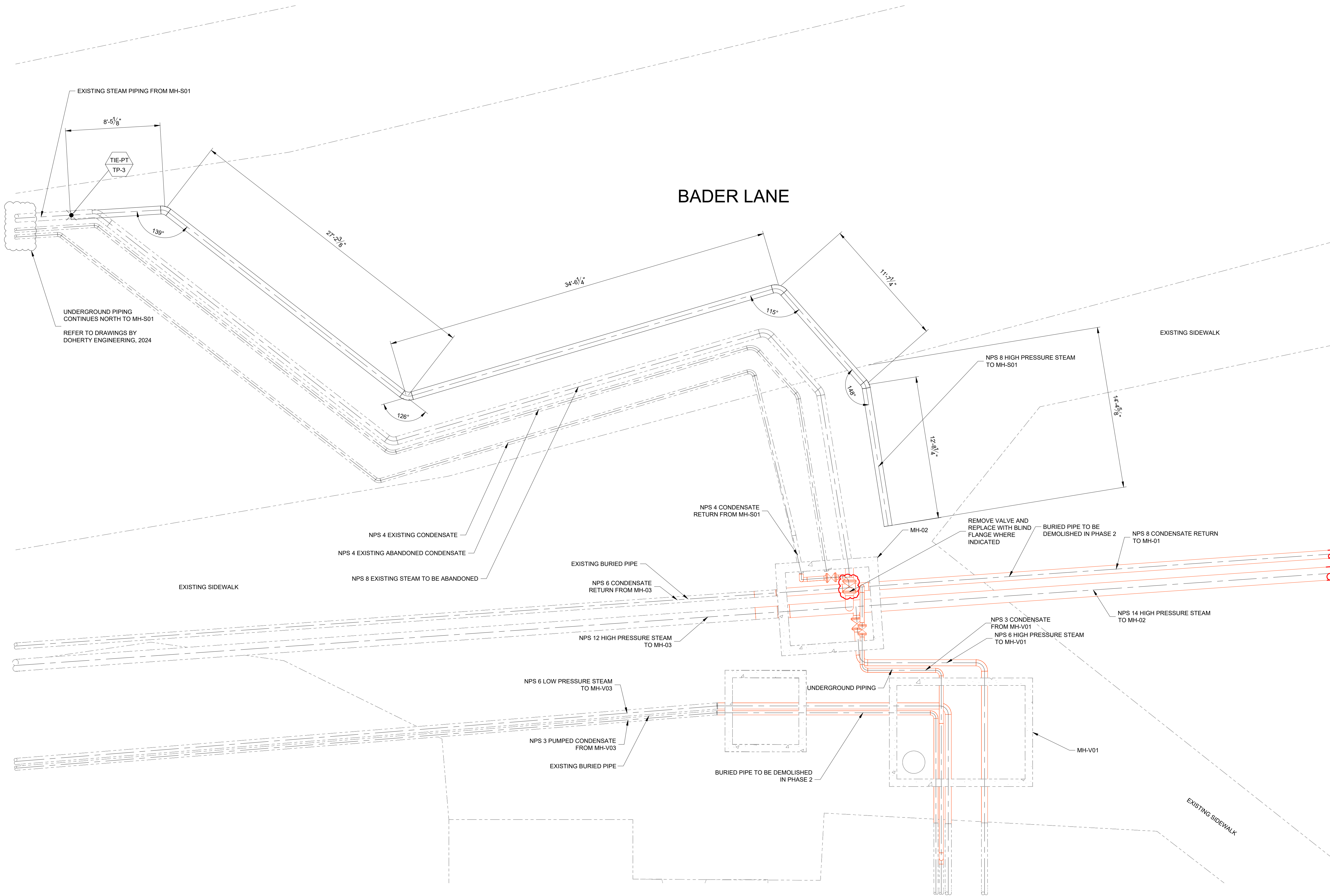
CHECKED: MC

JLR #: 28079-002

DRAWING #:

M10

File Name: 28079-M11 & M12 & M13.dwg



A PLAN VIEW - SECTION NORTH OF MH-02
M11 SCALE: 1/4" = 1'-0"

NOTES:

- SEE DRAWING M00 FOR GENERAL NOTES.
- MAINTAIN SLOPE ON NEW PIPES TO MATCH EXISTING.
- CONTRACTOR TO PROVIDE TEMPORARY SUPPORT FOR ALL EXPOSED EXISTING SERVICE LINES AS REQUIRED.
- ALL UTILITIES AND BURIED INFRASTRUCTURE ARE APPROXIMATE AS SHOWN. CONTRACTOR IS RESPONSIBLE TO DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL SERVICES AND UTILITIES PRIOR TO CONSTRUCTION AND SHALL PROTECT AND ASSUME RESPONSIBILITIES FOR ALL UTILITIES WHETHER OR NOT SHOWN ON THIS DRAWING. SHOULD ANY DISCREPANCIES ARISE THE CONTRACTOR SHALL NOTIFY THE CONTRACT ADMINISTRATOR IMMEDIATELY.
- ALL PIPING DIMENSIONS TO WORK POINTS UNLESS OTHERWISE NOTED.

0	ISSUED FOR TENDER	27/04/26
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No.	ISSUE / REVISION	DD/MM/YY
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VERIFY SHEET SIZE AND SCALES. THE BAR TO THE RIGHT IS 25mm IF THIS IS A FULL SIZE DRAWING. 0 25mm

SCALE: AS NOTED

CLIENT:

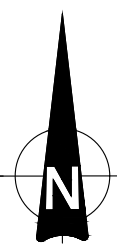


CONSULTANT: www.jrichards.ca



CONSULTANT:

PROFESSIONAL STAMP PROJECT NORTH



PROJECT:

QUEEN'S UNIVERSITY
BAN RIGH STEAM MANHOLE
REPLACEMENT

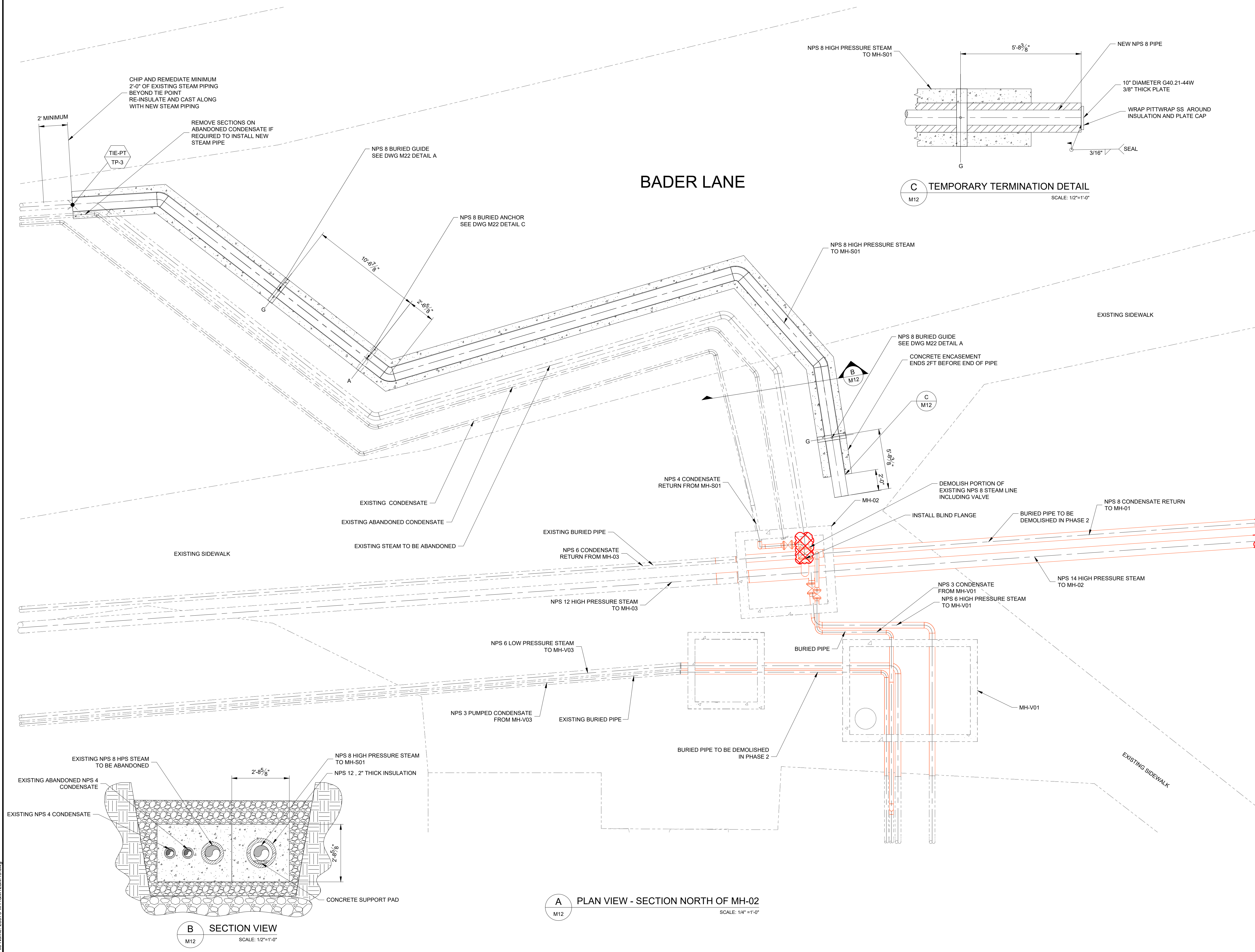
BADER LANE, KINGSTON, ONTARIO K7L 2S8

DRAWING:

MECHANICAL
PHASE 1 STEAM PIPING

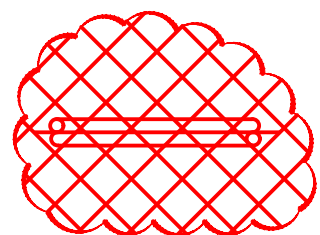
DESIGN: CS	DRAWING #: M11
DRAWN: CS	
CHECKED: MC	
JLR #: 28079-002	

PLOT DATE: Monday, April 27, 2026 11:53:29 AM



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

LEGEND



PIPING TO BE
DEMOLISHED

0	ISSUED FOR TENDER	27/04/26
No.	ISSUE / REVISION	DD/MM/YY

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VERIFY SHEET SIZE AND SCALES. THE BAR TO THE RIGHT IS 25mm IF THIS IS A FULL SIZE DRAWING.

SCALE: AS NOTED

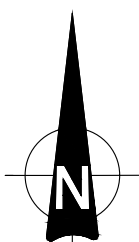
CLIENT:

CONSULTANT: www.jlrichards.com

CONSULTANT:

PROFESSIONAL STAMP

PROJECT NORT



PROJECT:

QUEEN'S UNIVERSITY
BAN HIGH STEAM MANHOLE
REPLACEMENT

BADER LANE, KINGSTON, ONTARIO K7L 2S8

DRAWING:

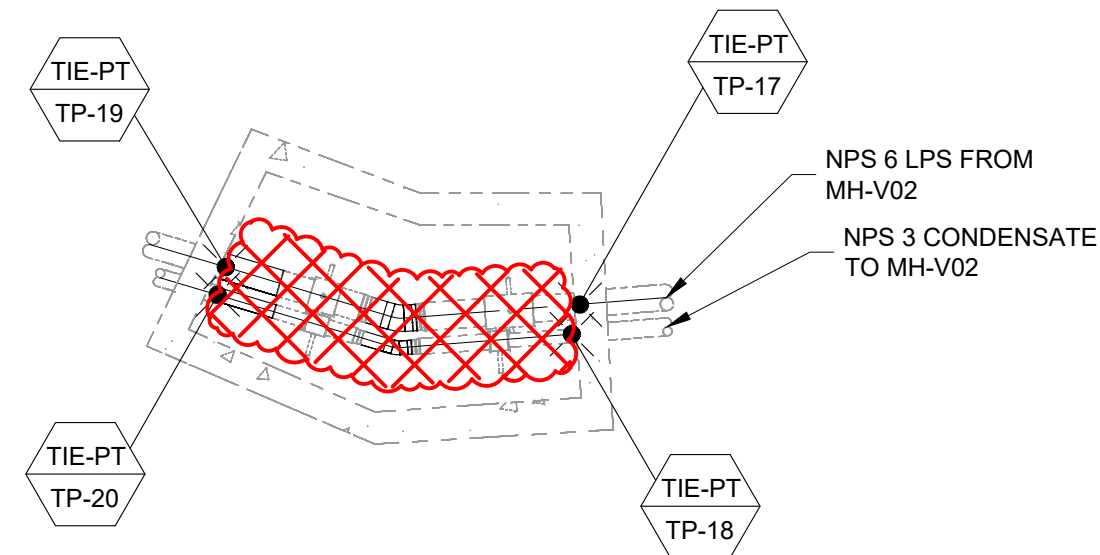
MECHANICAL
PHASE 1 CONCRETE
ENCASEMENT AND SUPPORT

DESIGN:	CS
DRAWN:	CS
CHECKED:	MC
JLR #:	28079-00

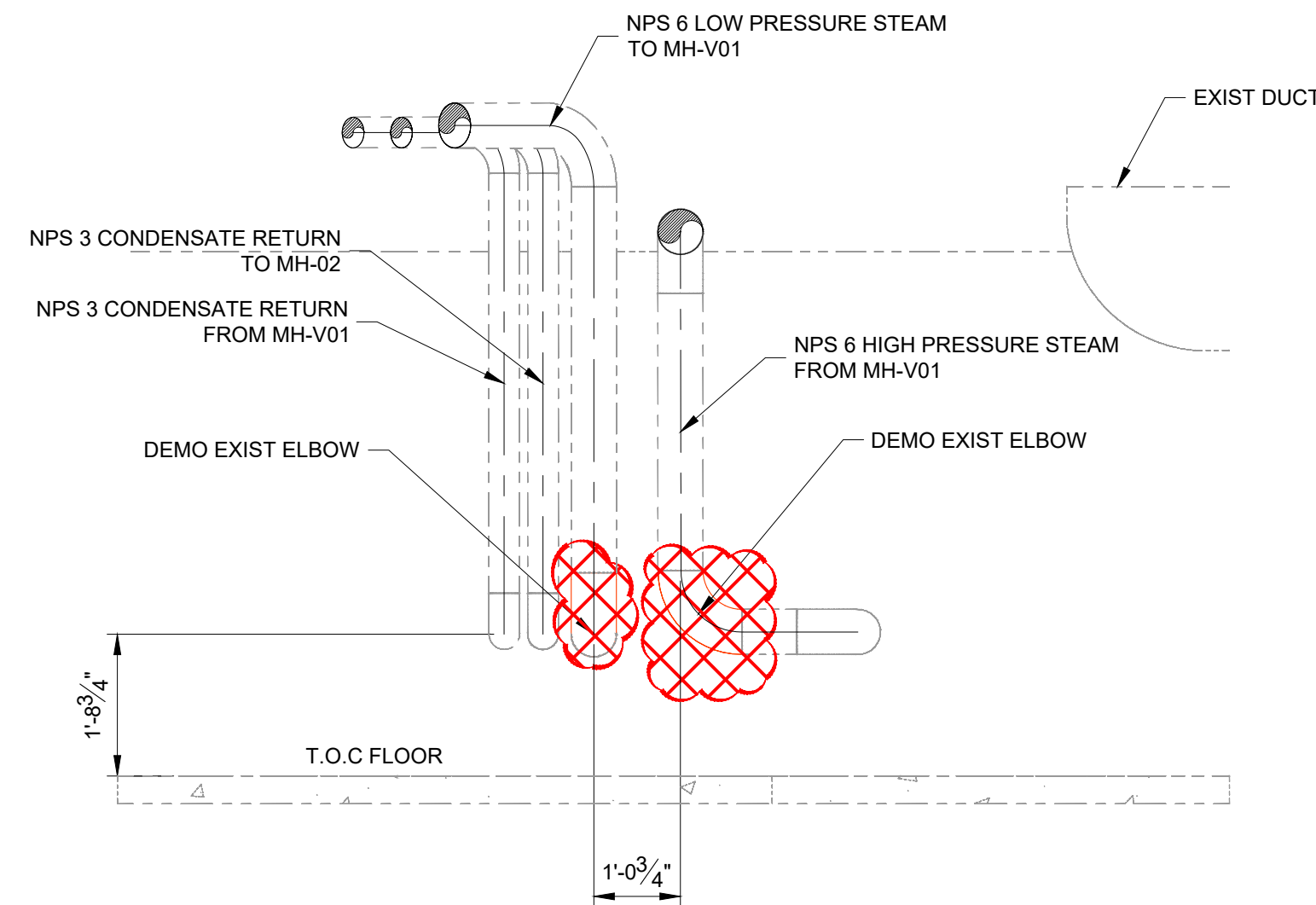
DRAWING #:

M12

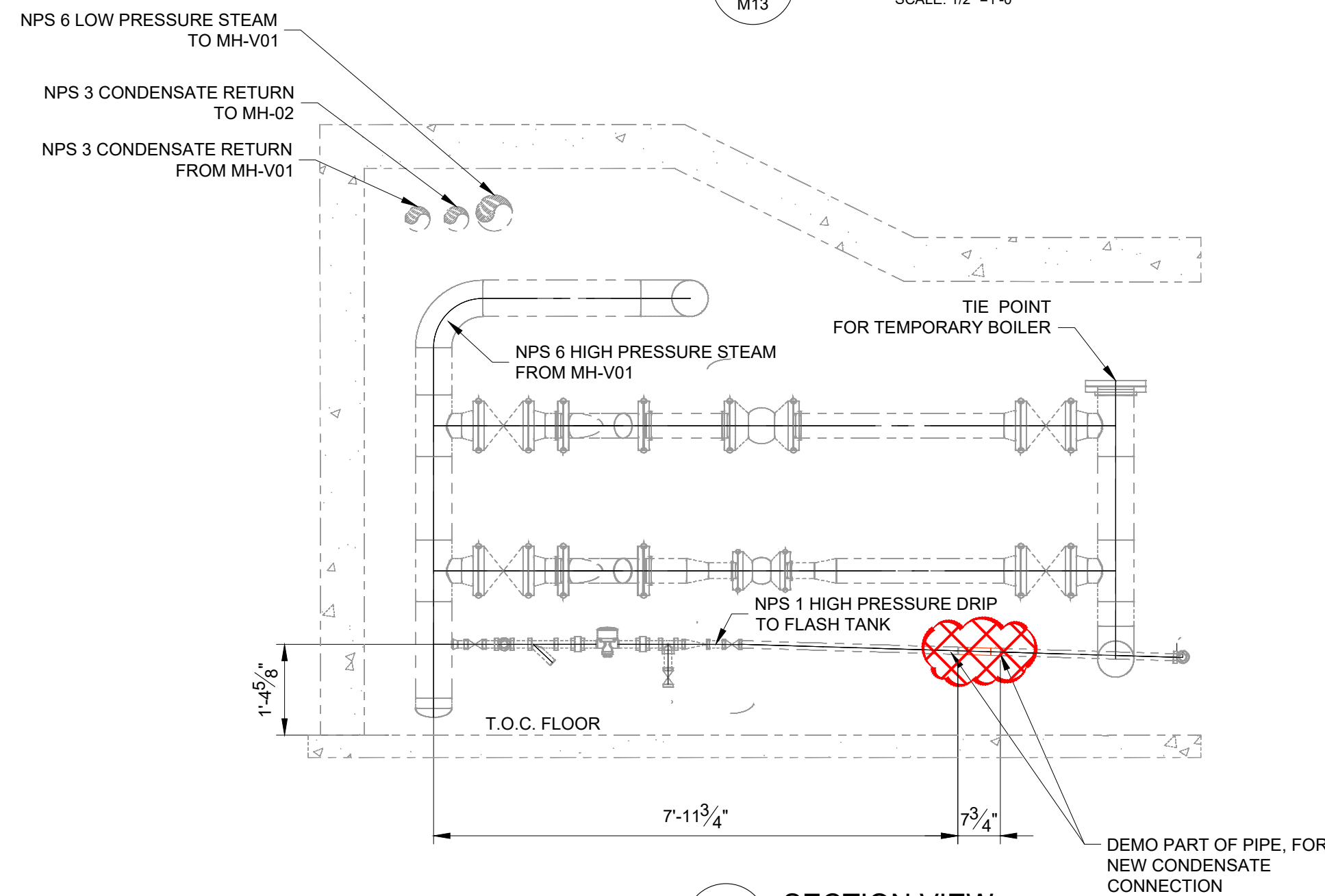
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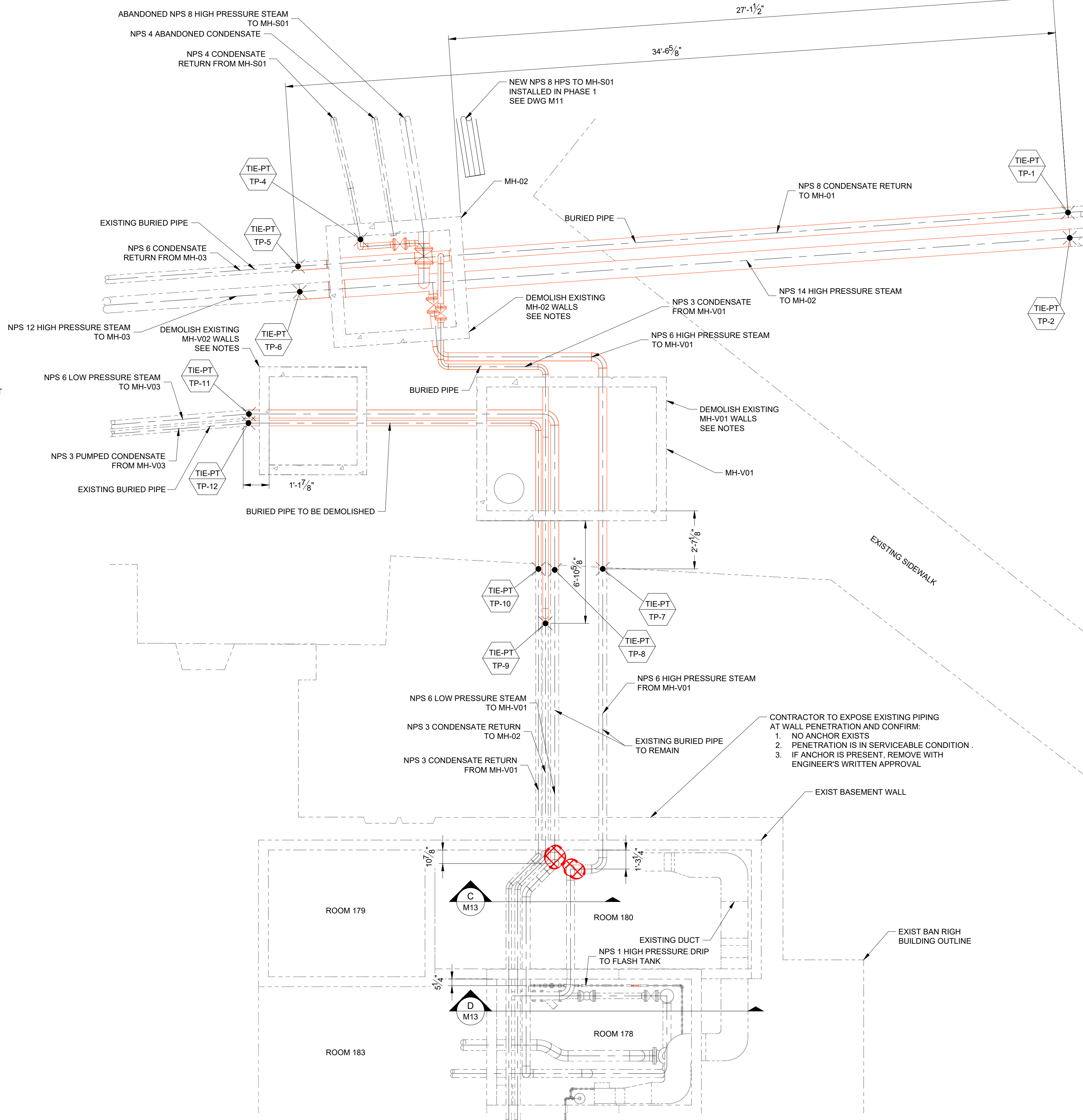
B PLAN VIEW - MH-V03
M13 SCALE: 1/4" = 1'-0"



C SECTION VIEW
M13 SCALE: 1/2" = 1'-0"



D SECTION VIEW
M13 SCALE: 1/2" = 1'-0"

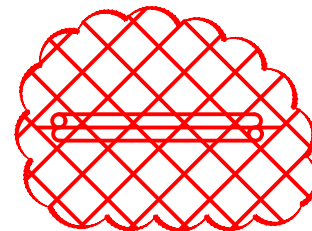


A PLAN VIEW - BAN RIGH HALL
M10 SCALE: 1/4" = 1'-0"

NOTES:

1. CONTRACTOR TO FIELD SURVEY SITE CONDITIONS TO VERIFY ALL DIMENSIONS.
2. CONTRACTOR IS RESPONSIBLE FOR DISPOSAL OF ALL REMOVED PIPING AND VALVES.
3. SCOPE OF DEMOLITION SHOWN WITHOUT CONSIDERATION FOR PHASING.
4. CONTRACTOR SHALL DEMOLISH EXISTING MANHOLE WALLS AT MH-02, MH-V01 AND MH-V02 AS REQUIRED TO FACILITATE NEW PIPING INSTALLATION AND ENCASEMENT.

LEGEND



PIPING TO BE DEMOLISHED

0	ISSUED FOR TENDER	27/04/26
No.	ISSUE / REVISION	DD/MM/YY

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VERIFY SHEET SIZE AND SCALES. THE BAR TO THE RIGHT IS 25mm IF THIS IS A FULL SIZE DRAWING.

SCALE: AS NOTED

CLIENT:



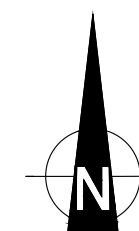
CONSULTANT: www.jlrichards.ca



CONSULTANT:

PROFESSIONAL STAMP

PROJECT NORTH



PROJECT:

QUEEN'S UNIVERSITY
BAN RIGH STEAM MANHOLE
REPLACEMENT

BADER LANE, KINGSTON, ONTARIO K7L 2S8

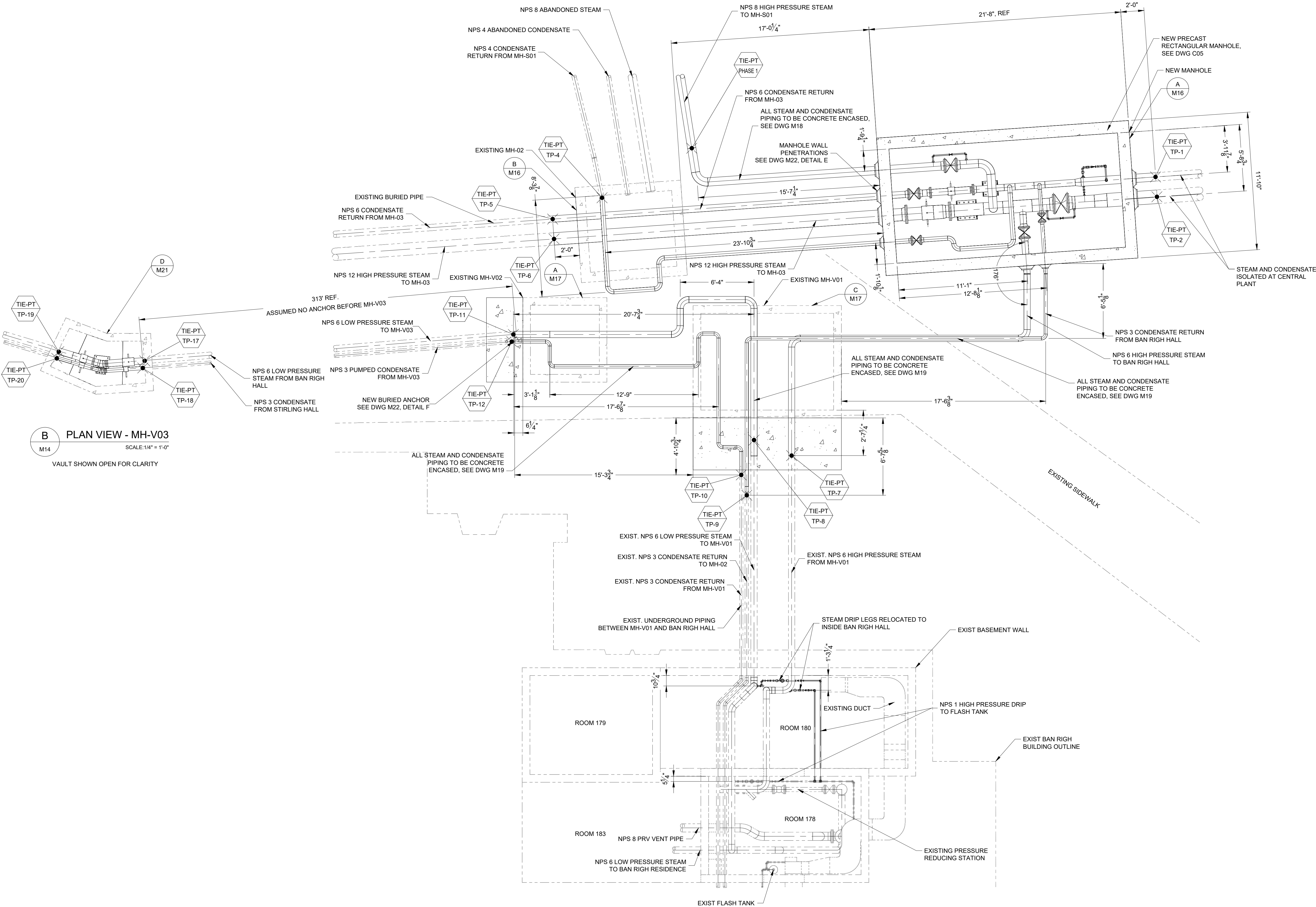
DRAWING:

MECHANICAL
DEMOLITION PHASE 2

DESIGN: RZ
DRAWN: RZ
CHECKED: MC
JLR #: 28079-002

DRAWING #:

M13



NOTES:

- ALL DIMENSIONS ARE APPROXIMATE. CONTRACTOR TO FIELD MEASURE PRIOR TO ANY WORK BEING DONE AND NOTIFY OF ANY DISCREPANCIES. SOME CUTTING, WELDING, AND SHIMMING MAY BE REQUIRED TO OBTAIN PROPER FIT.
- MAINTAIN SLOPE ON NEW PIPES TO MATCH EXISTING.
- CONTRACTOR TO PROVIDE TEMPORARY SUPPORT FOR ALL EXPOSED EXISTING SERVICE LINES AS REQUIRED.
- ALL UTILITIES AND BURIED INFRASTRUCTURE ARE APPROXIMATE AS SHOWN. CONTRACTOR IS RESPONSIBLE TO DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL SERVICES AND UTILITIES PRIOR TO CONSTRUCTION AND SHALL PROTECT AND ASSUME RESPONSIBILITIES FOR ALL UTILITIES WHETHER OR NOT SHOWN ON THIS DRAWING. SHOULD ANY DISCREPANCIES ARISE THE CONTRACTOR SHALL NOTIFY THE CONTRACT ADMINISTRATOR IMMEDIATELY.
- END STATE CONDITION SHOWN. CONTRACTOR TO PHASE INSTALLATION AS REQUIRED AND AS DESCRIBED IN SCOPE OF WORK.

0	ISSUED FOR TENDER	27/04/26
No.	ISSUE / REVISION	DD/MM/YY

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VERIFY SHEET SIZE AND SCALES. THE BAR TO THE RIGHT IS 25mm IF THIS IS A FULL SIZE DRAWING.

SCALE: 1/4"=1'-0"

CLIENT:

CONSULTANT:

CONSULTANT:

PROFESSIONAL STAMP

PROJECT NORTH

PROJECT:

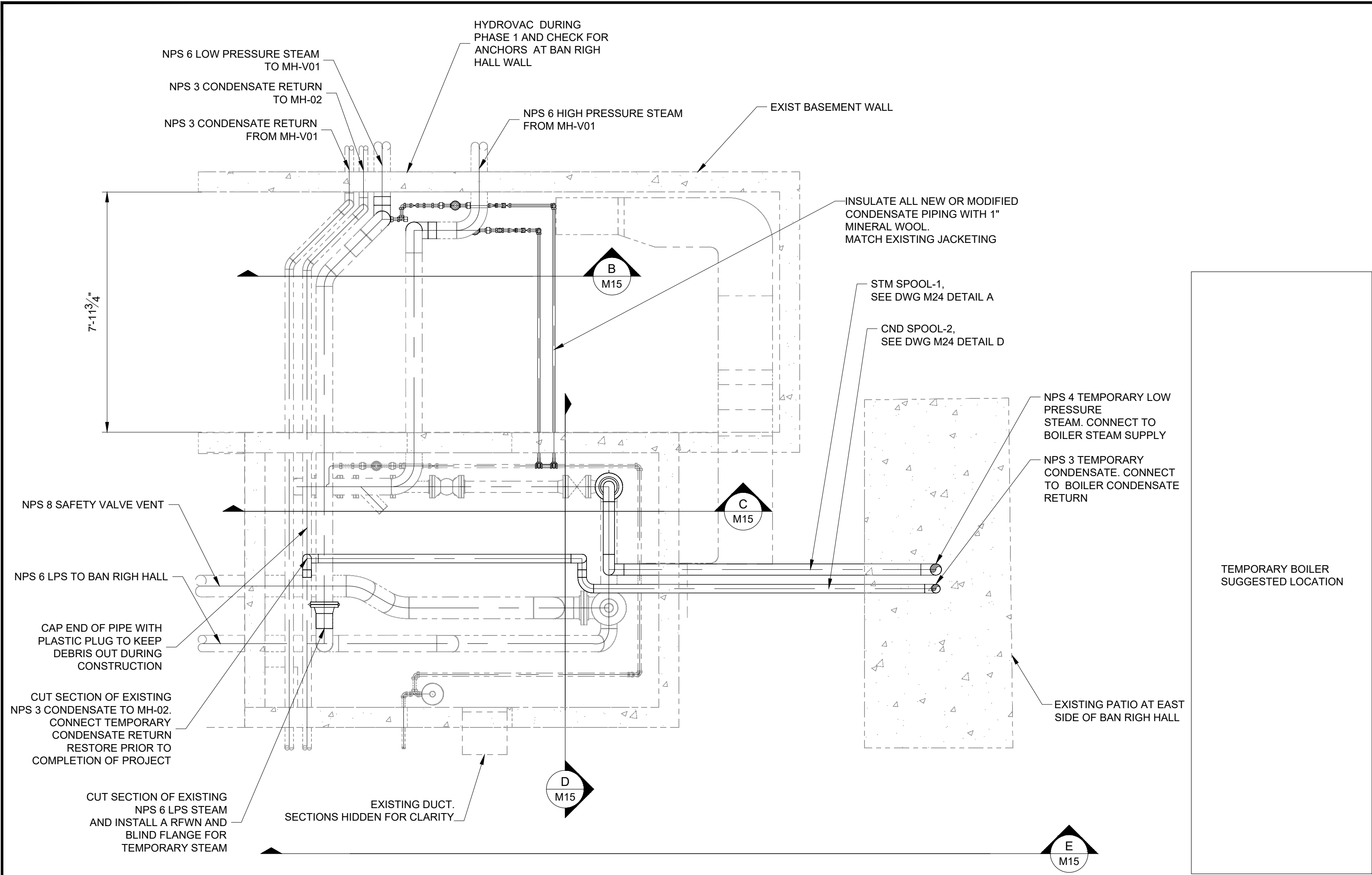
QUEEN'S UNIVERSITY
BAN RIGH STEAM MANHOLE REPLACEMENT
BADER LANE, KINGSTON, ONTARIO K7L 2S8

DRAWING:

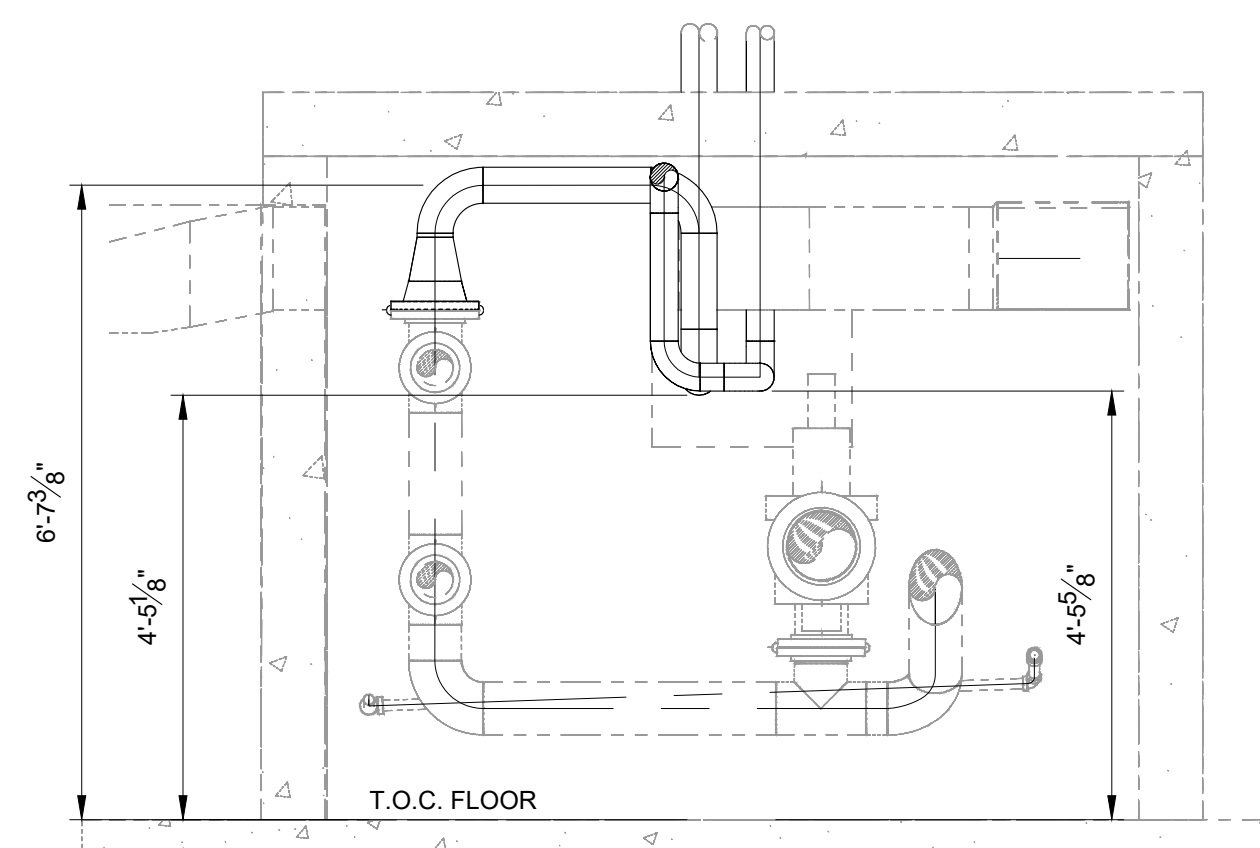
MECHANICAL
GENERAL ARRANGEMENT

DESIGN:	CS	DRAWING #:
DRAWN:	CS	M14
CHECKED:	MC	
JLR #:	28079-002	

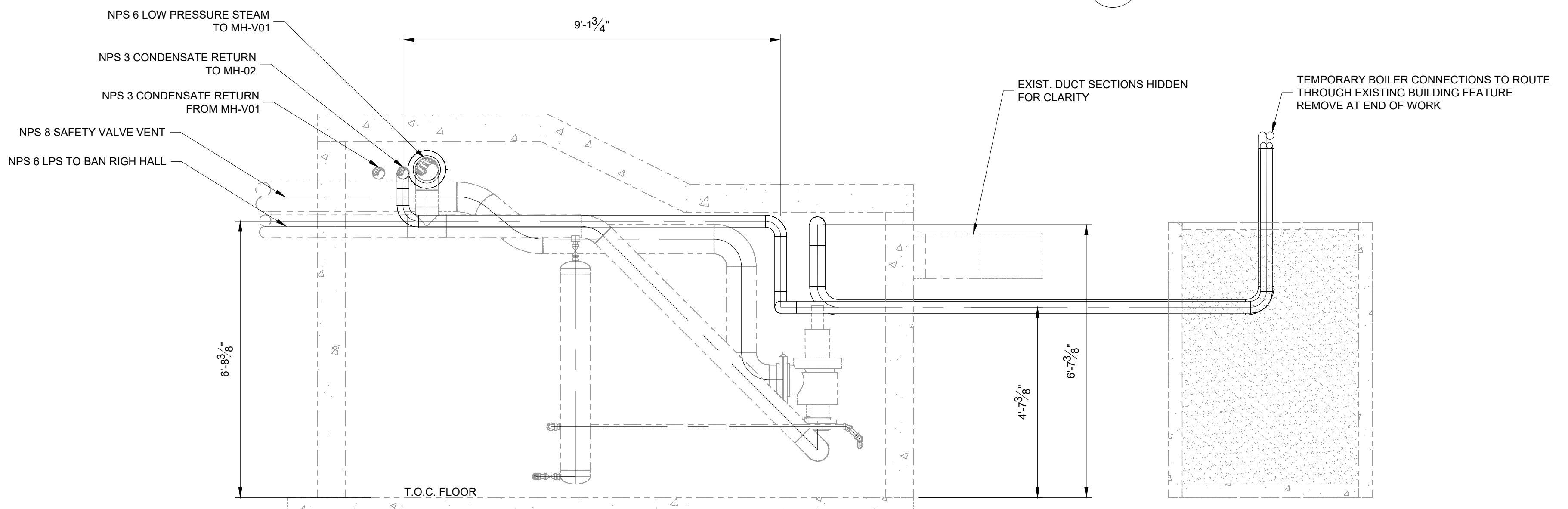
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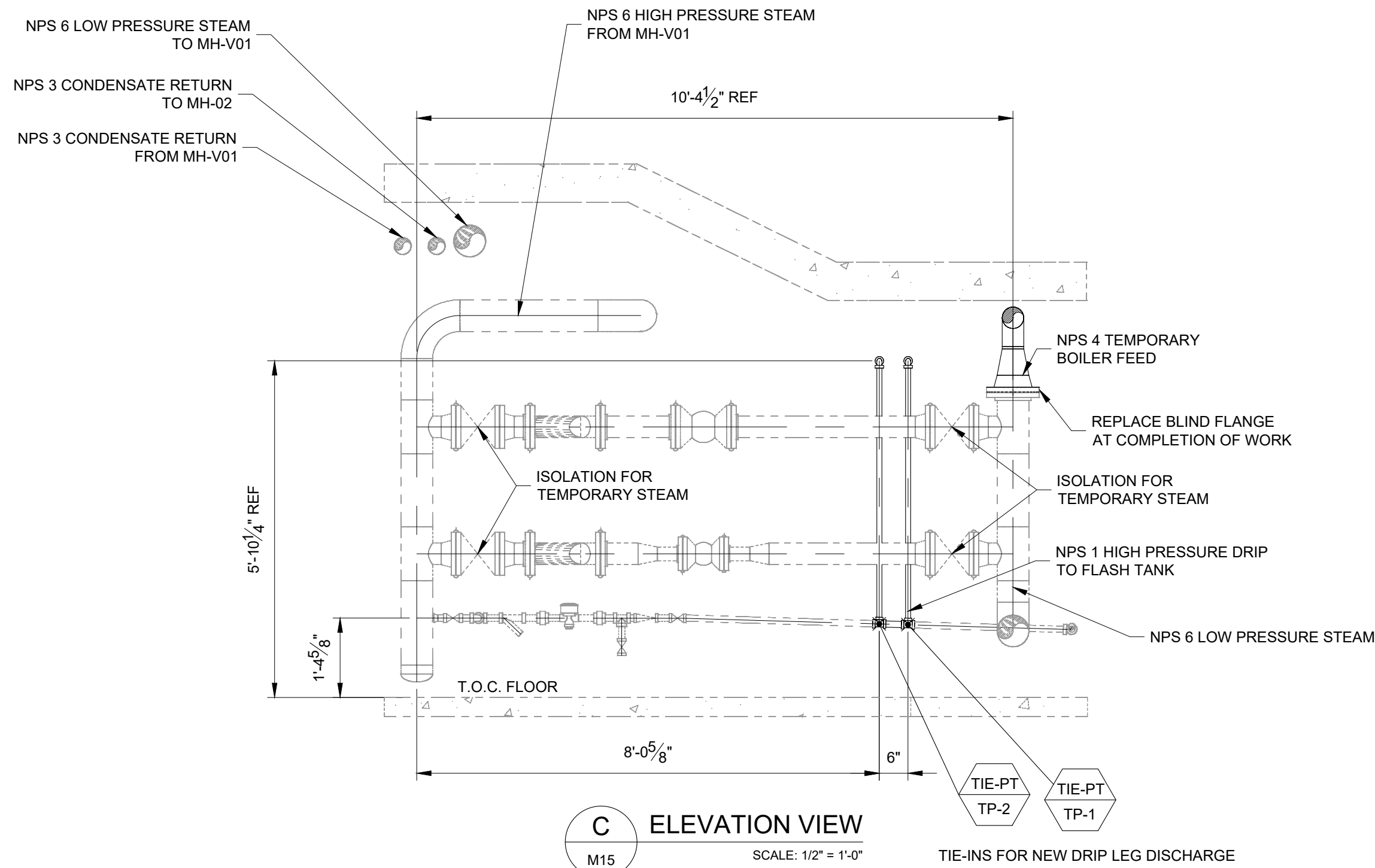
A PLAN VIEW - BAN RIGH BASEMENT
SCALE: 3/8" = 1'-0"



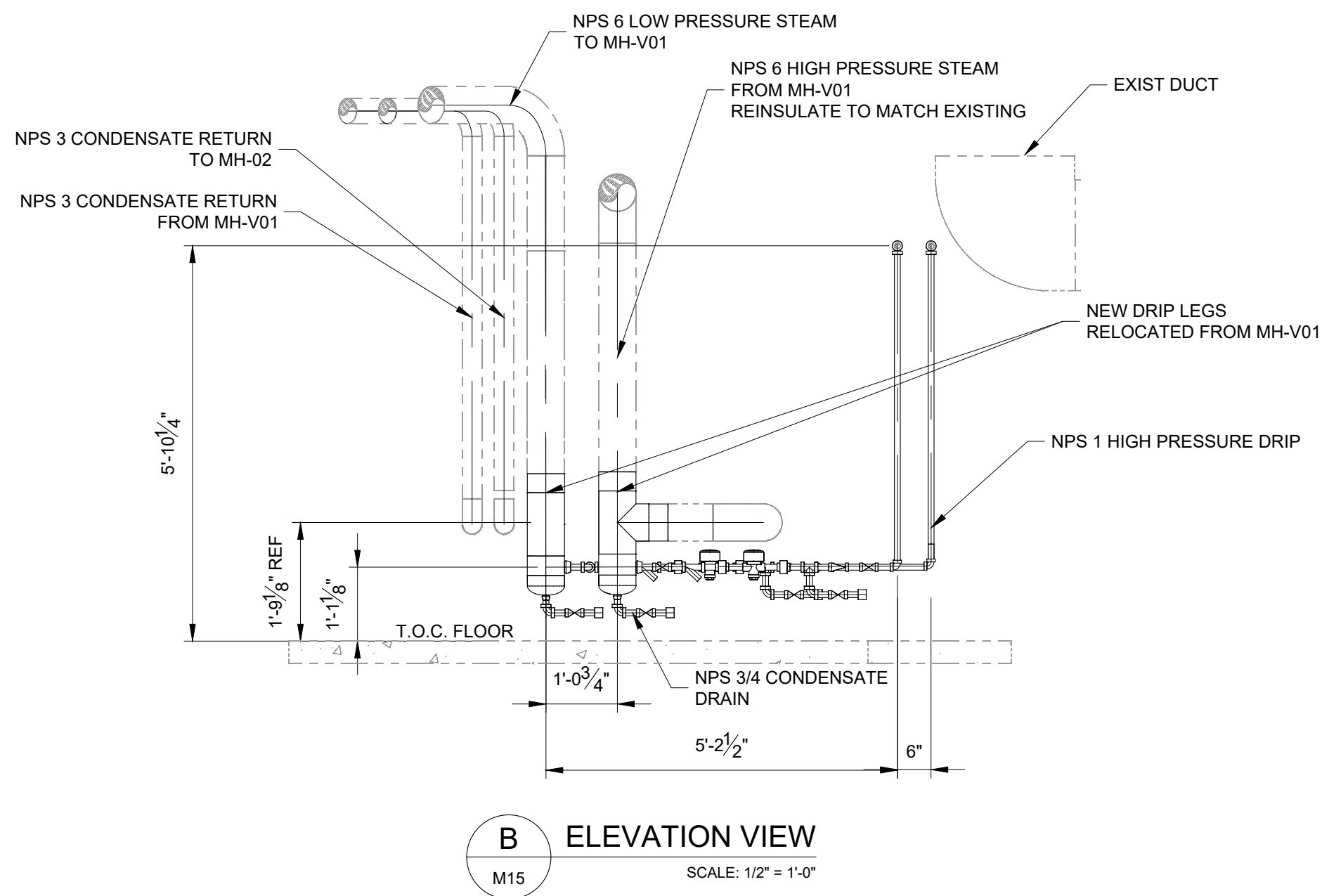
D ELEVATION VIEW
SCALE: 1/2" = 1'-0"



E ELEVATION VIEW
SCALE: 1/2" = 1'-0"



C ELEVATION VIEW
SCALE: 1/2" = 1'-0"



B ELEVATION VIEW
SCALE: 1/2" = 1'-0"

NOTES:

1. DRIP LEG MODIFICATIONS ARE TO BE PERMANENT.
2. REMOVE ALL TEMPORARY MEASURES AND RESTORE TO EXISTING CONFIGURATION (EXCEPT DRIP LEG) PRIOR TO COMPLETION OF PROJECT.
3. RESTORE ALL INSULATION, SUPPORTS, AND OTHER EFFECTED COMPONENTS.

0	ISSUED FOR TENDER	27/04/26
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VERIFY SHEET SIZE AND SCALES. THE BAR TO THE RIGHT IS 25mm IF THIS IS A FULL SIZE DRAWING.

SCALE: AS SHOWN

CLIENT:



CONSULTANT:

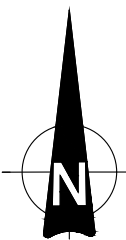
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J.L. Richards
ENGINEERS - ARCHITECTS - PLANNERS

CONSULTANT:

PROFESSIONAL STAMP

PROJECT NORTH



PROJECT:

QUEEN'S UNIVERSITY
BAN RIGH STEAM MANHOLE
REPLACEMENT

BADER LANE, KINGSTON, ONTARIO K7L 2S8

DRAWING:

MECHANICAL
BAN RIGH BASEMENT
MODIFICATIONS

DESIGN: CS

DRAWN: CS

CHECKED: MC

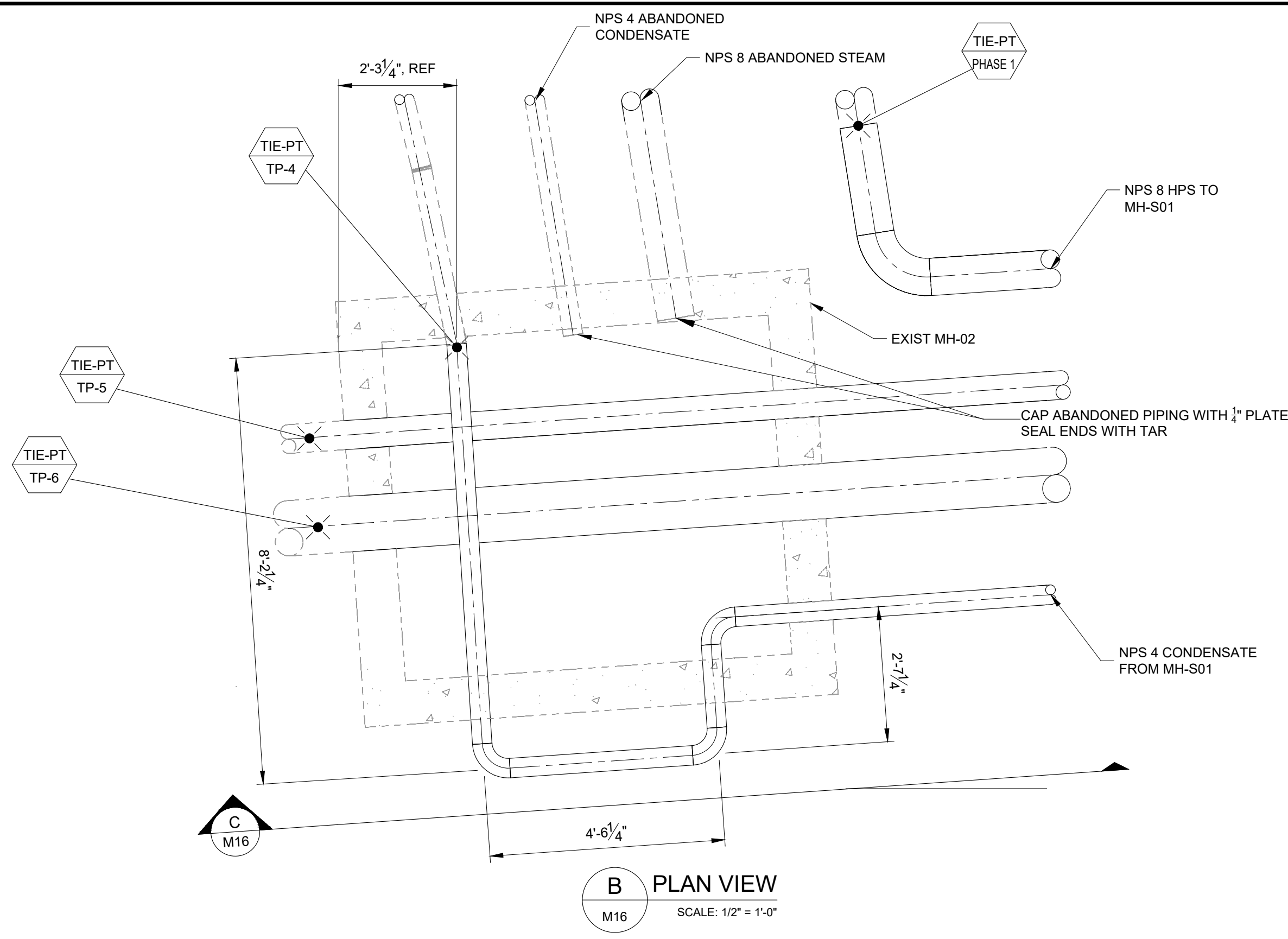
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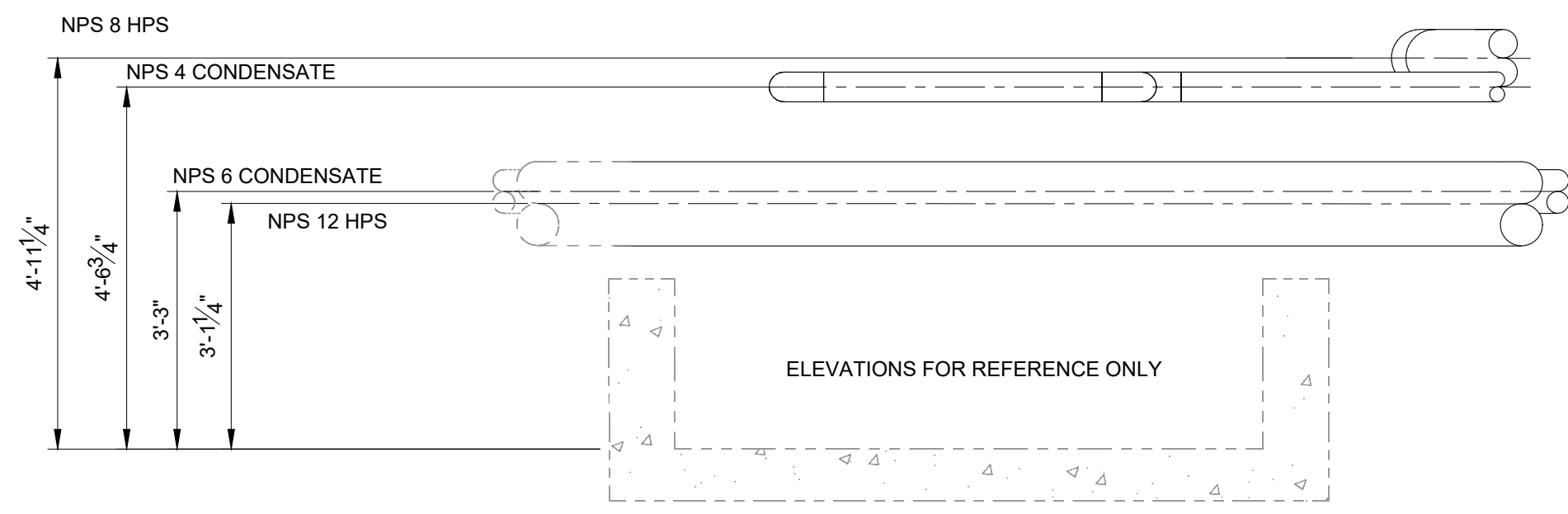
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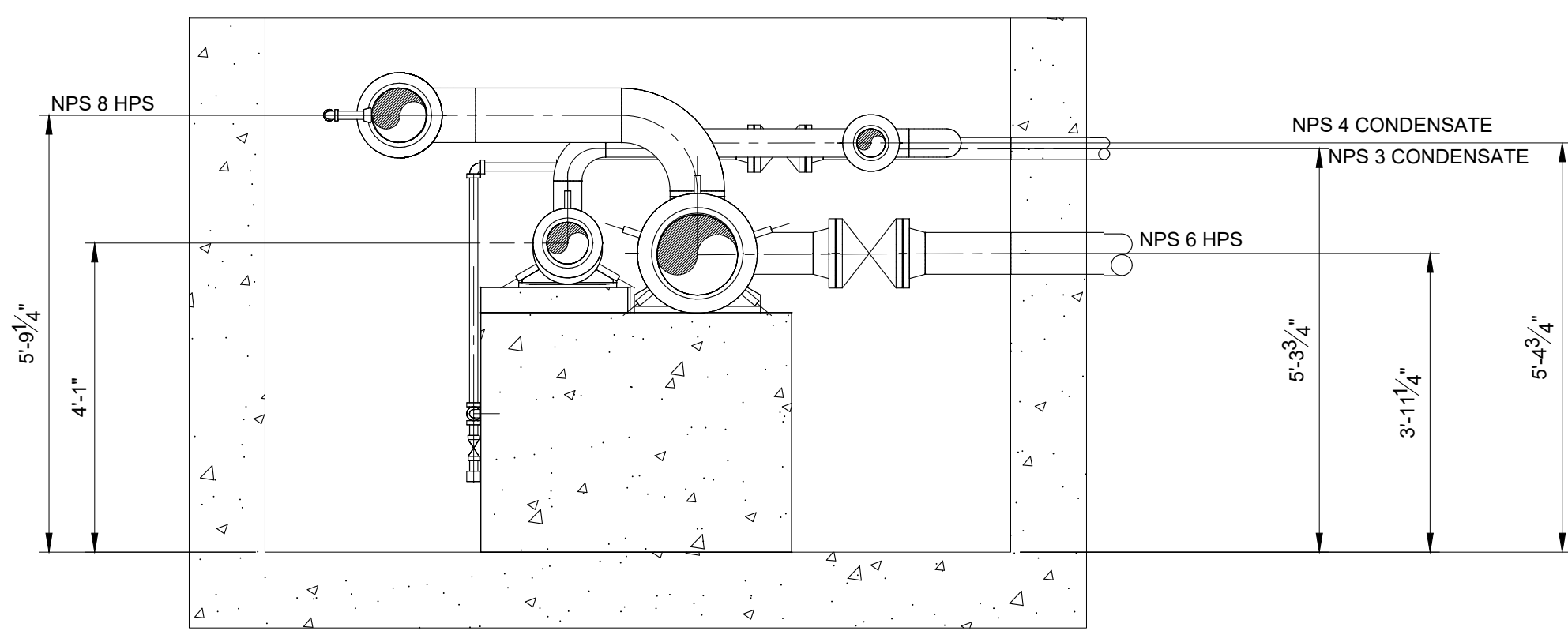
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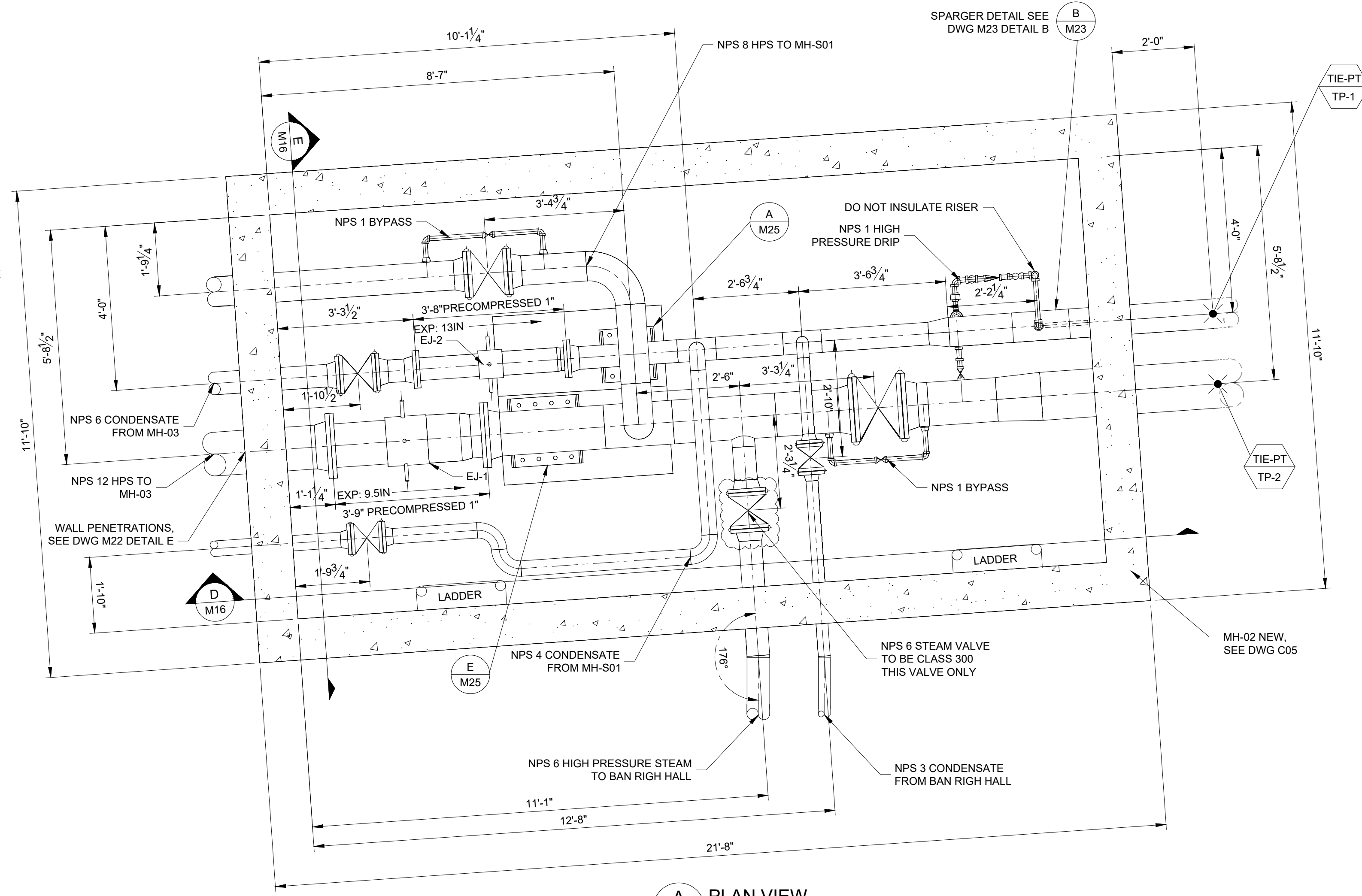
B PLAN VIEW
M16 SCALE: 1/2" = 1'-0"



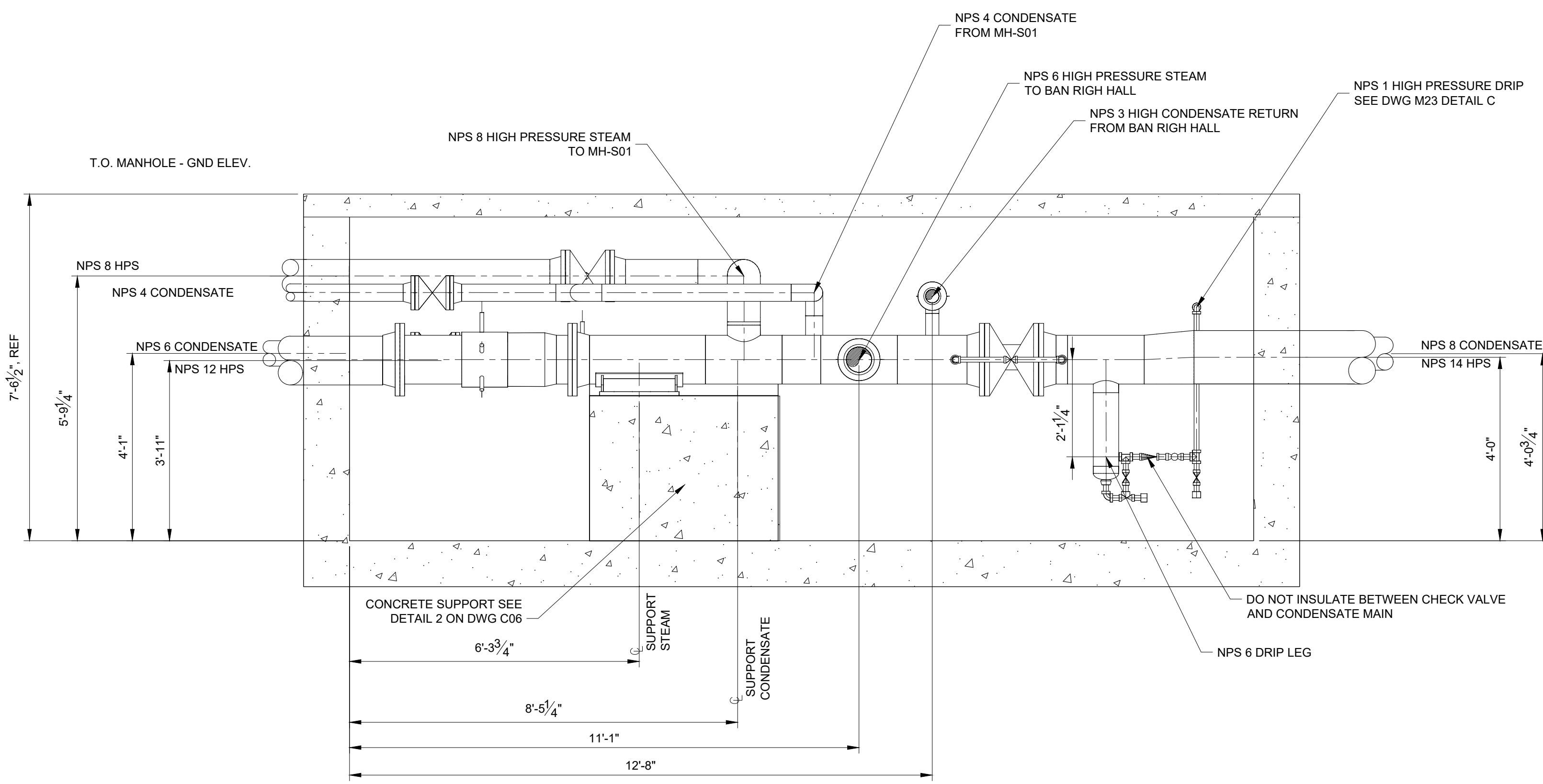
C ELEVATION VIEW
M16 SCALE: 1/2" = 1'-0"



E ELEVATION VIEW
M16 SCALE: 1/2" = 1'-0"



A PLAN VIEW
M14 SCALE: 1/2" = 1'-0"



D ELEVATION VIEW
M16 SCALE: 1/2" = 1'-0"

NOTES:

- CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE.
- SEE DWG M00 FOR NOTES.
- DIMENSIONS SHOWN FOR "COLD" PIPING.
- ELEVATIONS FOR REFERENCE ONLY. CONTRACTOR TO ENSURE ALIGNMENT OF NEW PIPES WITH EXISTING PIPES. STEAM PIPING MUST ALL SLOPE TOWARDS DRIP LEGS, PREFERABLY IN DIRECTION OF STEAM FLOW.

0	ISSUED FOR TENDER	27/04/26
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SCALE: 1/2"=1'-0"

CLIENT:

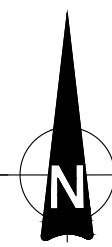


CONSULTANT: www.jrichards.ca

J.L. Richards
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CONSULTANT:

PROFESSIONAL STAMP PROJECT NORTH



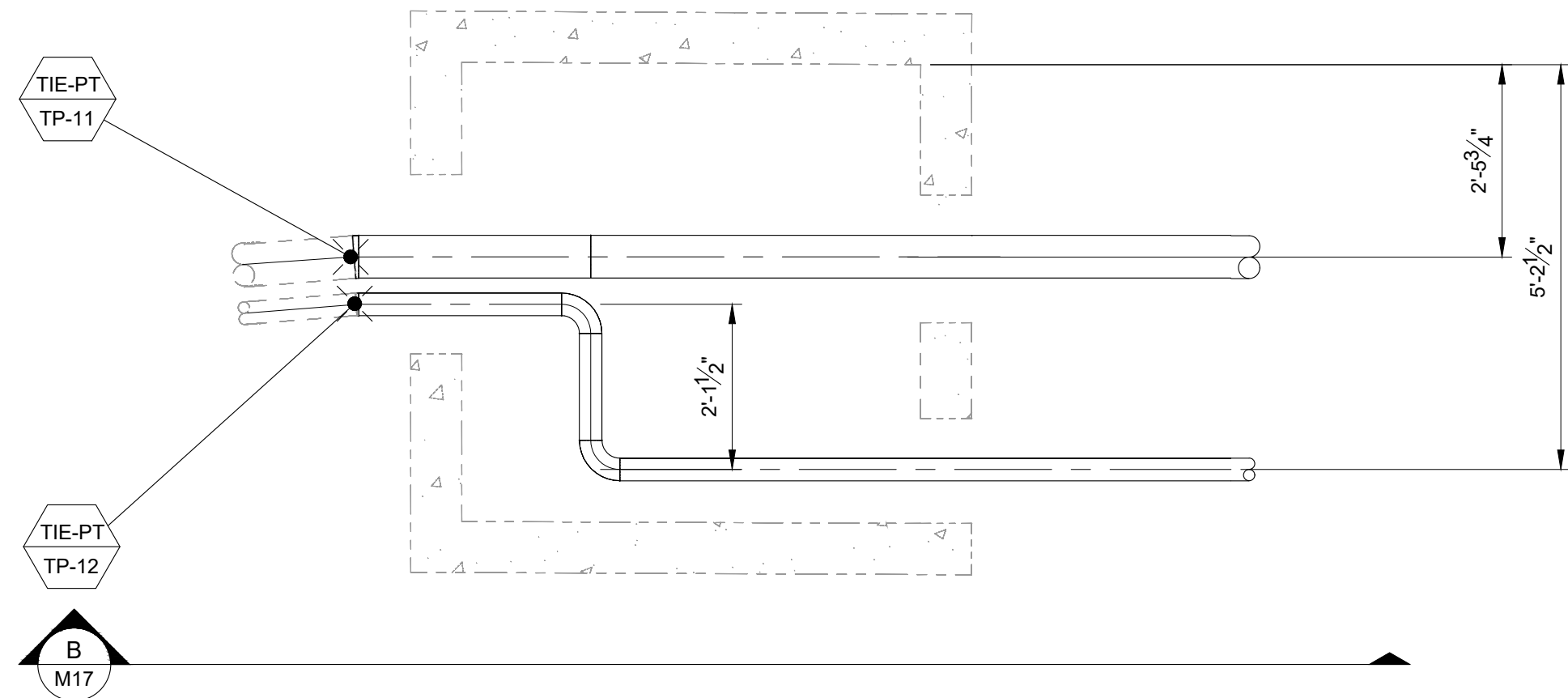
PROJECT:
**QUEEN'S UNIVERSITY
BAN RIGH STEAM MANHOLE
REPLACEMENT**
BADER LANE, KINGSTON, ONTARIO K7L 2S8

DRAWING:
**MECHANICAL
NEW MH-02 AND EXISTING MH-02
PIPING DETAILS**

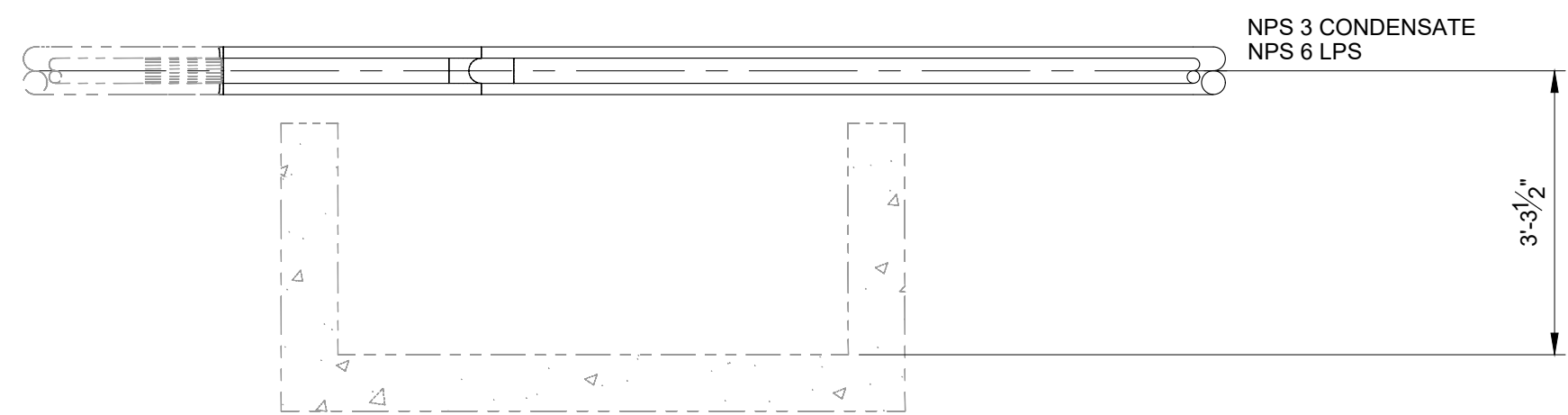
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DRAWN: CS	M16
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JLR #:	28079-002

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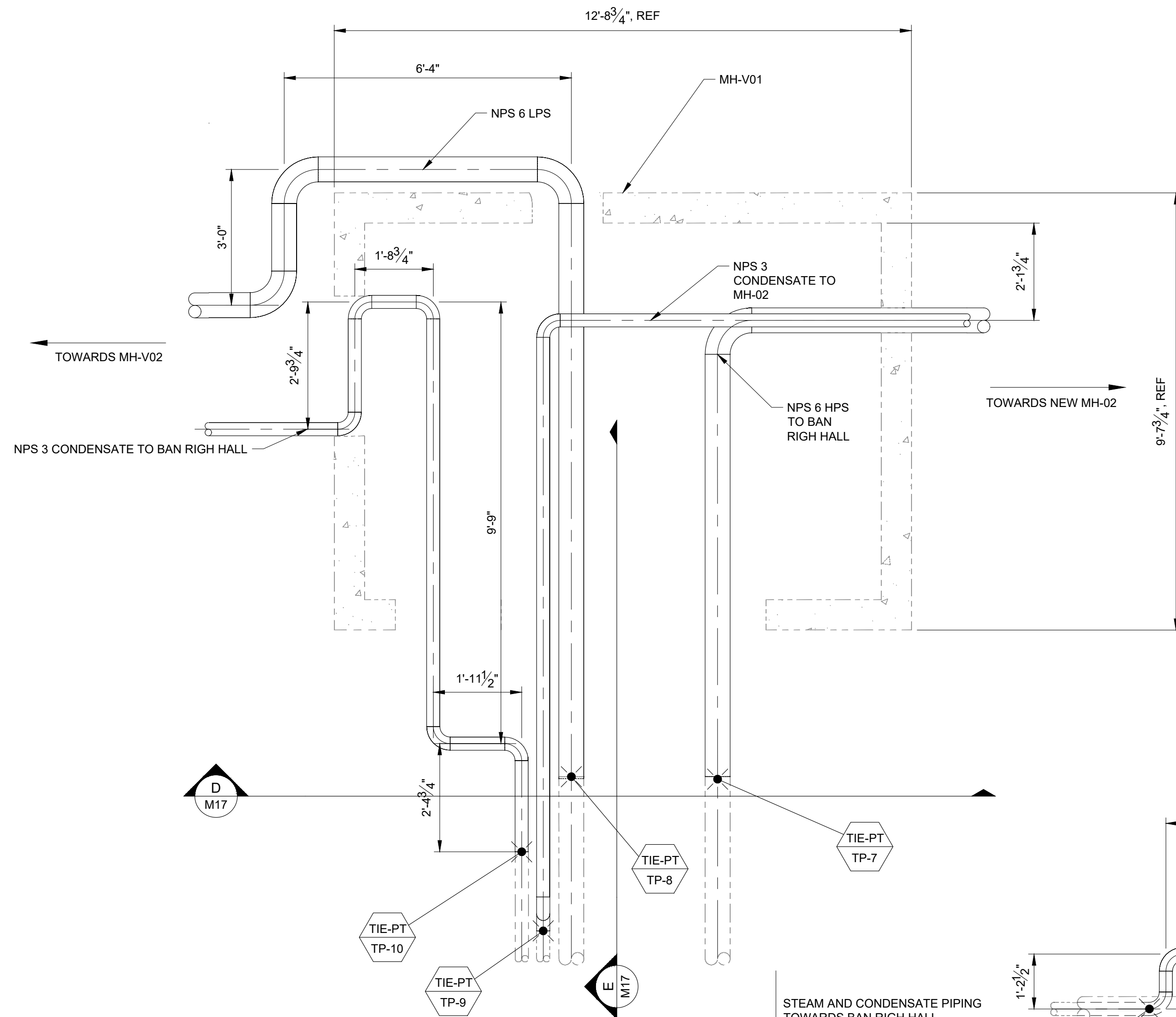
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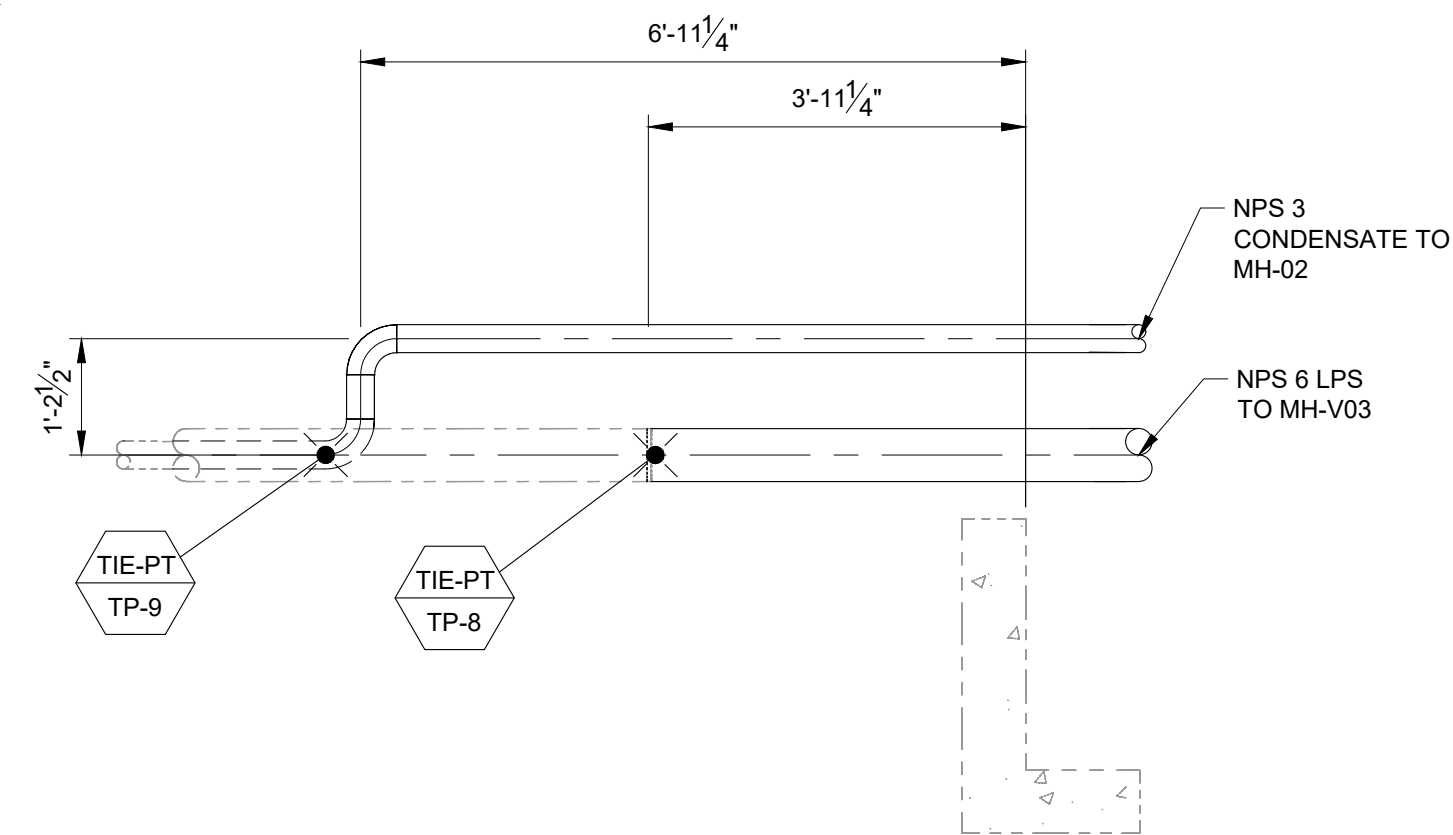
A PLAN VIEW - MH-V02
M17 SCALE: 1/2" = 1'-0"



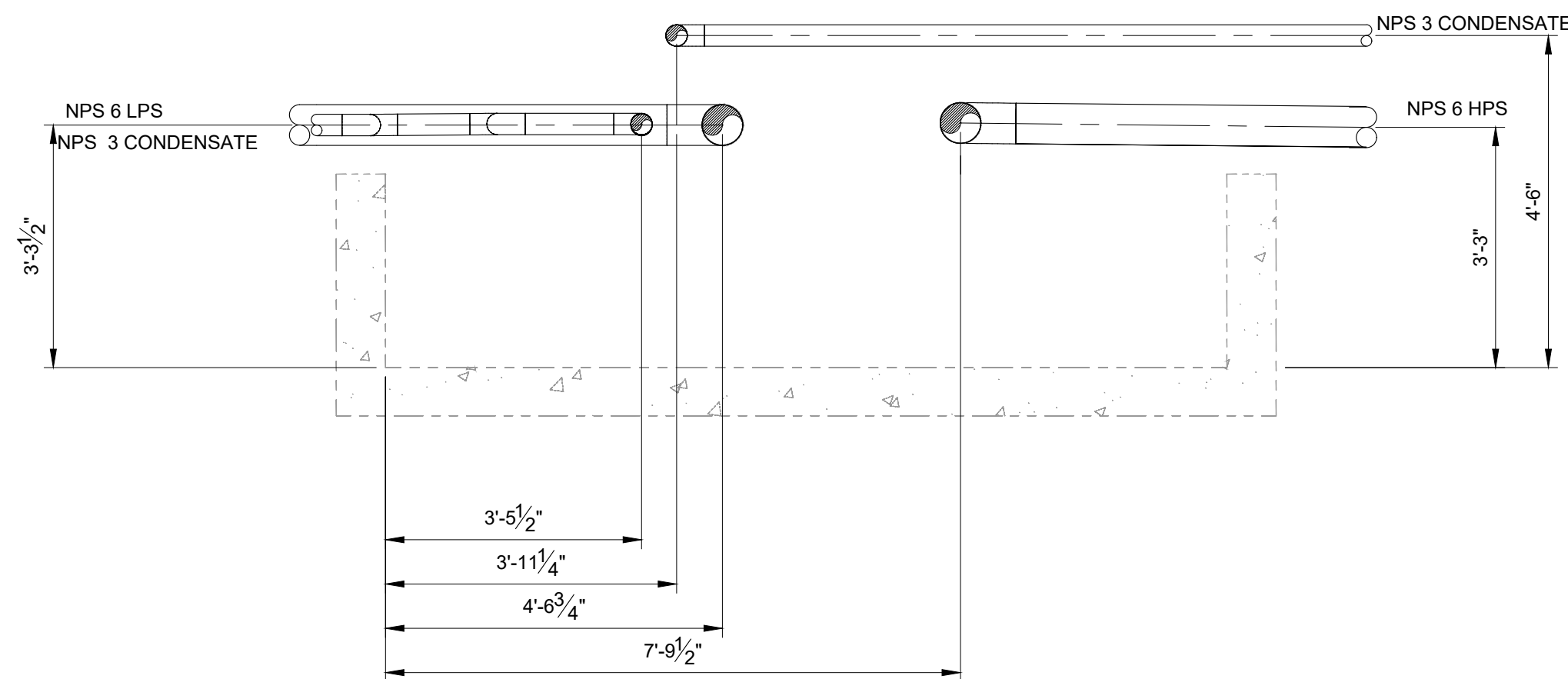
B ELEVATION VIEW - MH-V02
M17 SCALE: 1/2" = 1'-0"



C PLAN VIEW - MH-V01
M17 SCALE: 1/2" = 1'-0"



E ELEVATION VIEW - MH-V01
M17 SCALE: 1/2" = 1'-0"



D ELEVATION VIEW - MH-V01
M17 SCALE: 1/2" = 1'-0"

NOTES:

1. CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE.
2. SEE DWG M00 FOR GENERAL NOTES.

0	ISSUED FOR TENDER	27/04/26
No.	ISSUE / REVISION	DD/MM/YY

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

CLIENT:



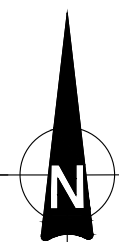
CONSULTANT: www.jrichards.ca

JLR J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

CONSULTANT:

PROFESSIONAL STAMP

PROJECT NORTH



PROJECT:

QUEEN'S UNIVERSITY
BAN RIGH STEAM MANHOLE
REPLACEMENT

BADER LANE, KINGSTON, ONTARIO K7L 2S8

DRAWING:

MECHANICAL
MH-V01 AND MH-V02
PIPING DETAILS

DESIGN: CS

DRAWN: CS

CHECKED: MC

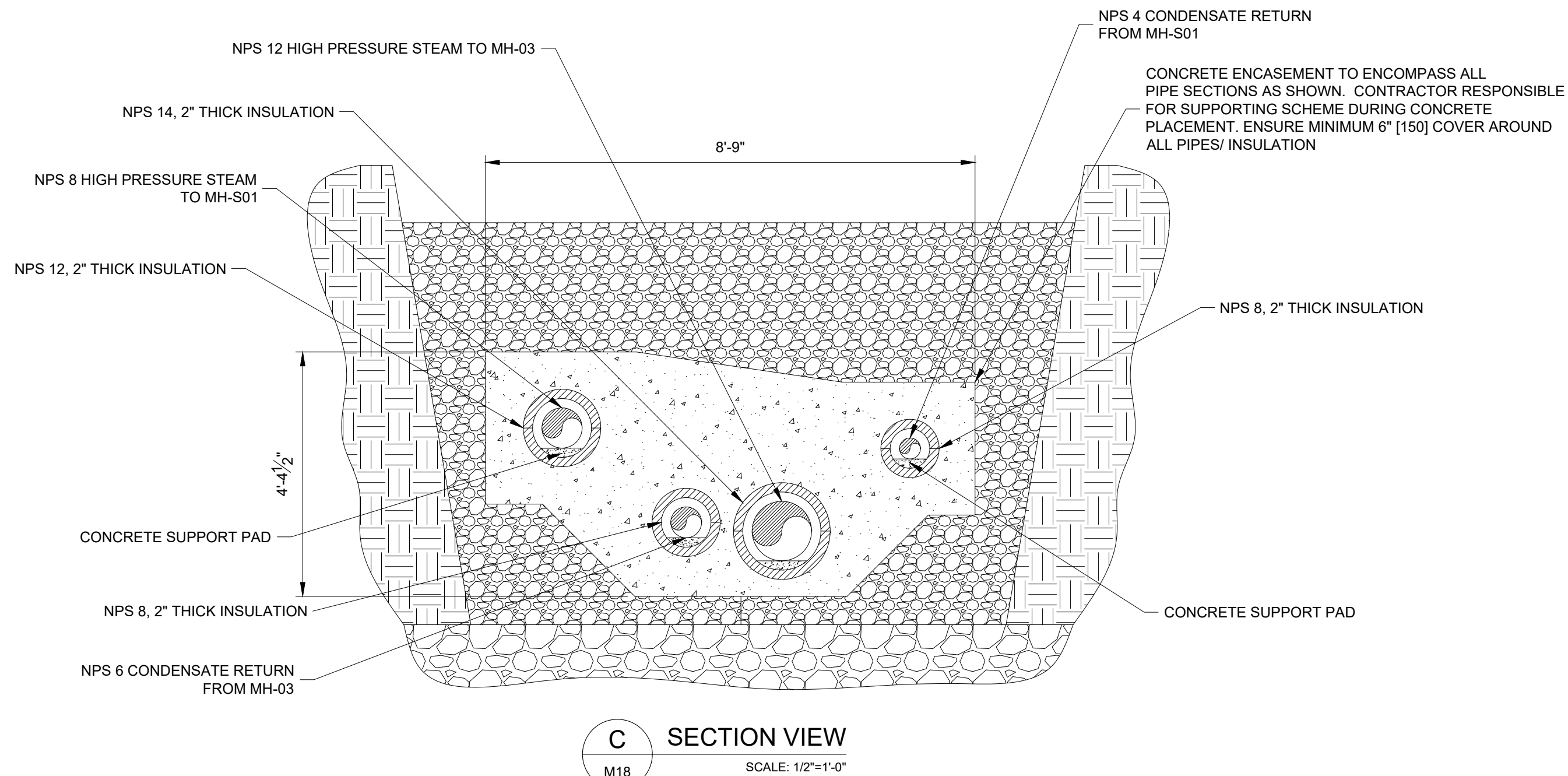
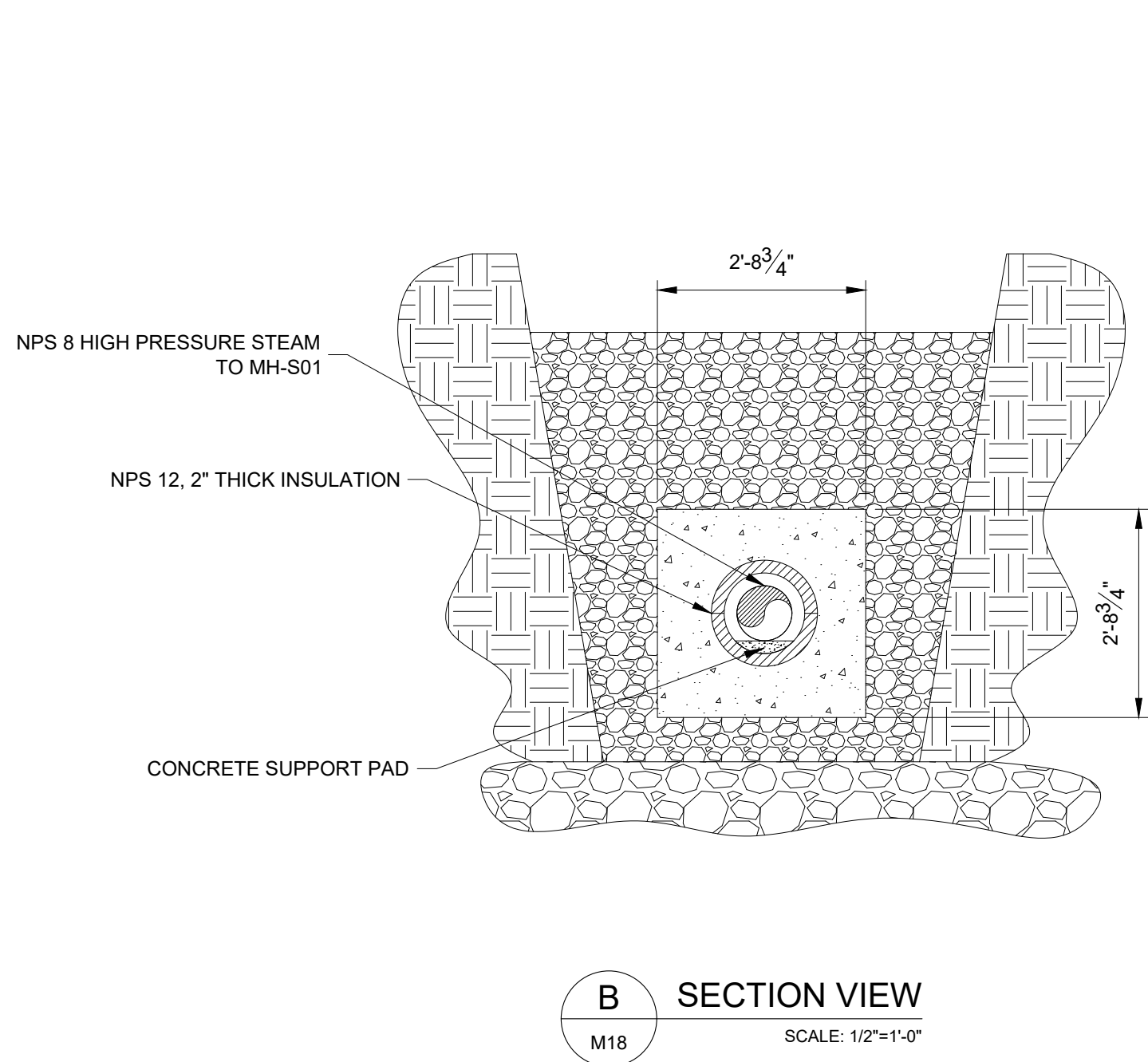
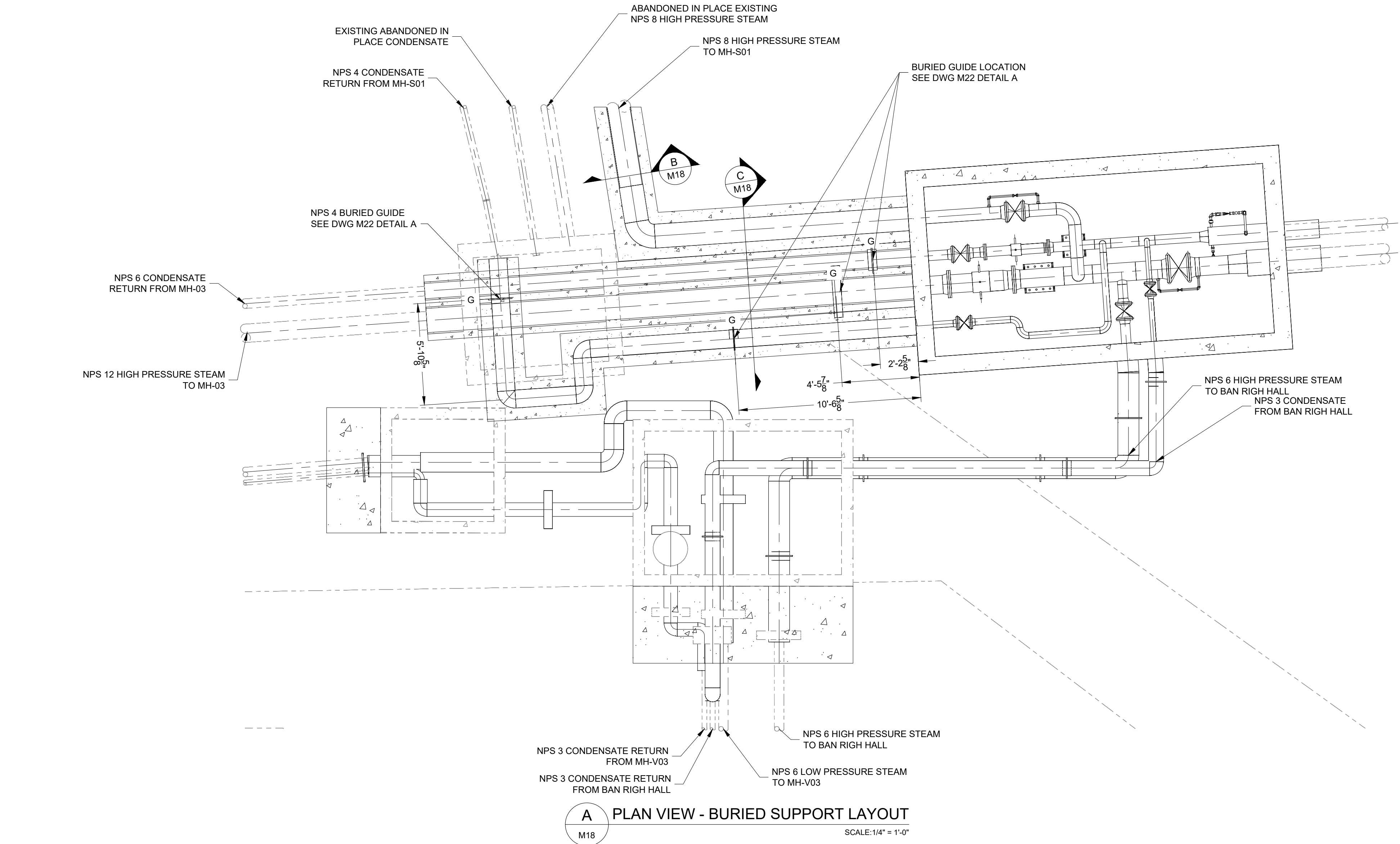
JLR #: 28079-002

DRAWING #:

M17

PLOT DATE: Monday, April 27, 2026 12:06:11 PM

File Name: 28079-M18M19.dwg



NOTES:

- SEE DWG M00 FOR GENERAL NOTES.
- ALL BURIED INSULATION TO BE OWENS CORNING FOAMGLAS C/W PITTWRAP SS JACKETING. FOLLOW ALL MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION.

0	ISSUED FOR TENDER	27/04/26
No.	ISSUE / REVISION	DD/MM/YY

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VERIFY SHEET SIZE AND SCALES. THE BAR TO THE RIGHT IS 25mm IF THIS IS A FULL SIZE DRAWING. 0 25mm

SCALE: 1/4"=1'-0"

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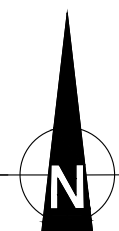
CONSULTANT: www.jrichards.ca

JLR J.L.Richards
ENGINEERS - ARCHITECTS - PLANNERS

CONSULTANT:

PROFESSIONAL STAMP

PROJECT NORTH



PROJECT:

QUEEN'S UNIVERSITY
BAN RIGH STEAM MANHOLE
REPLACEMENT

BADER LANE, KINGSTON, ONTARIO K7L 2S8

DRAWING:

MECHANICAL
BURIED PIPE SUPPORT LAYOUT

DESIGN: CS

DRAWN: CS

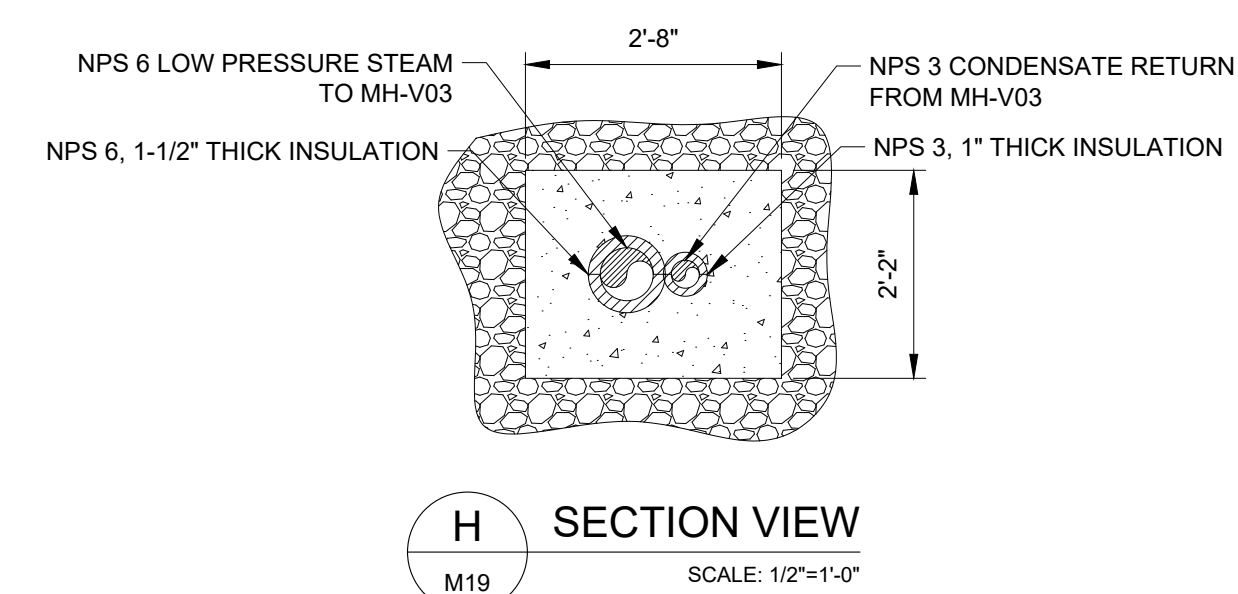
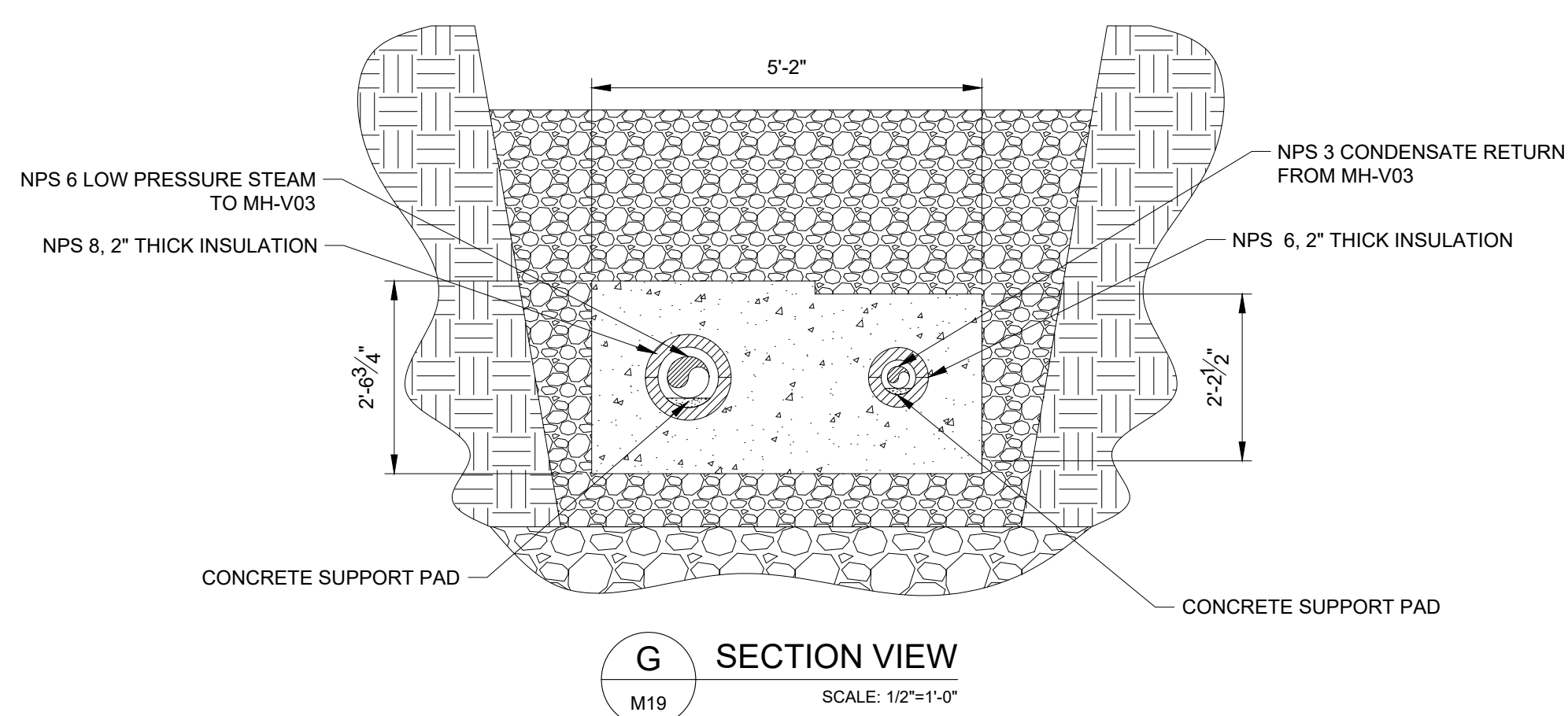
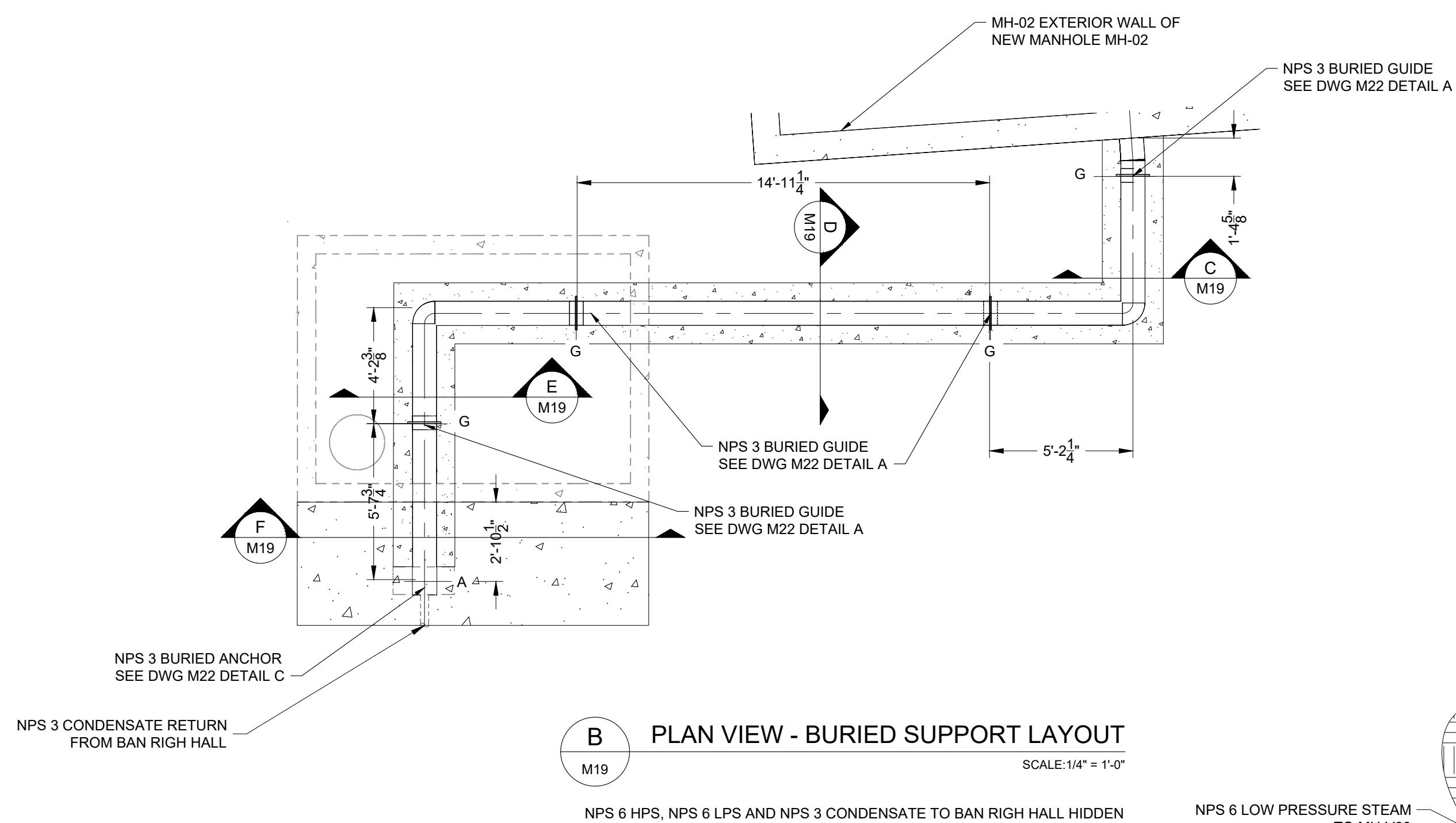
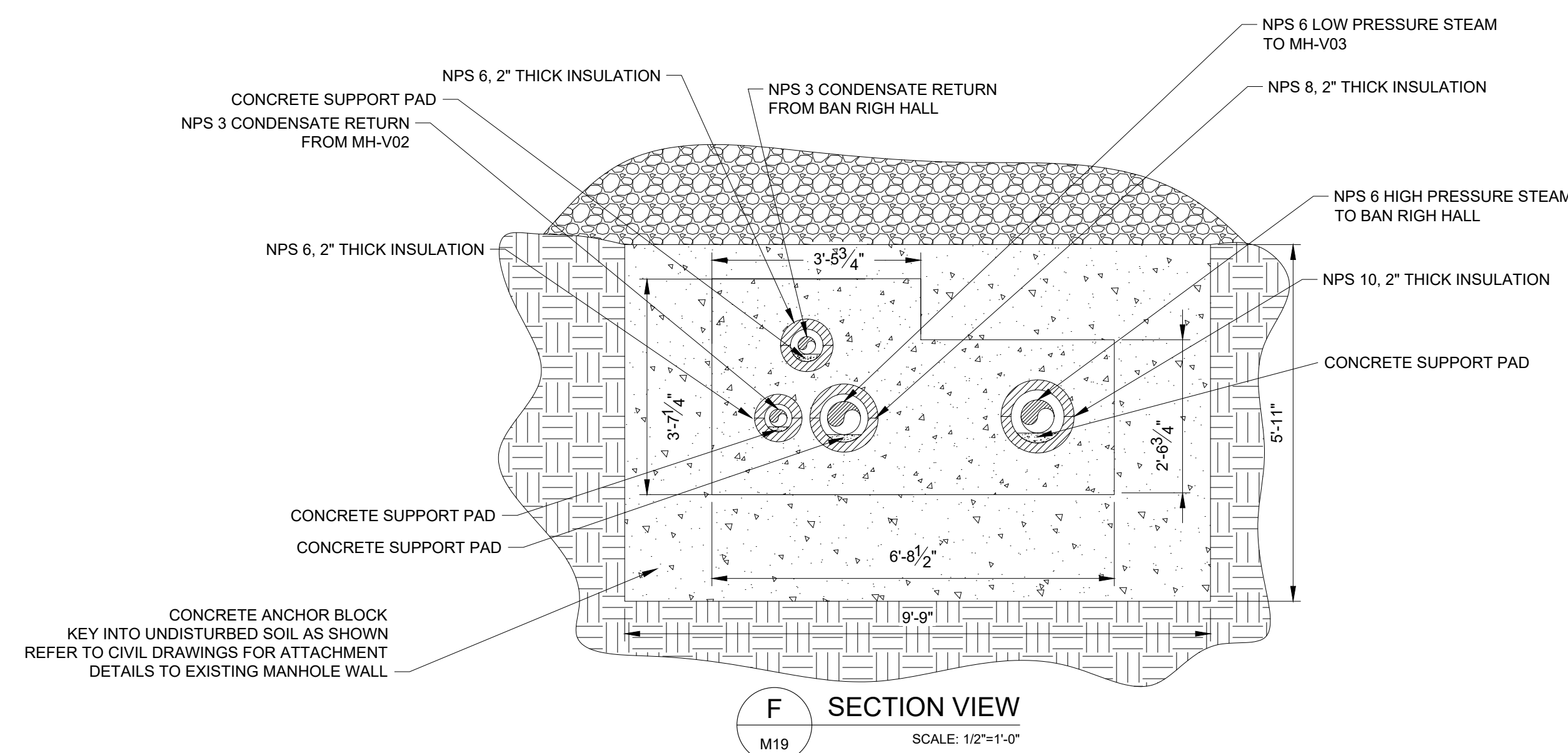
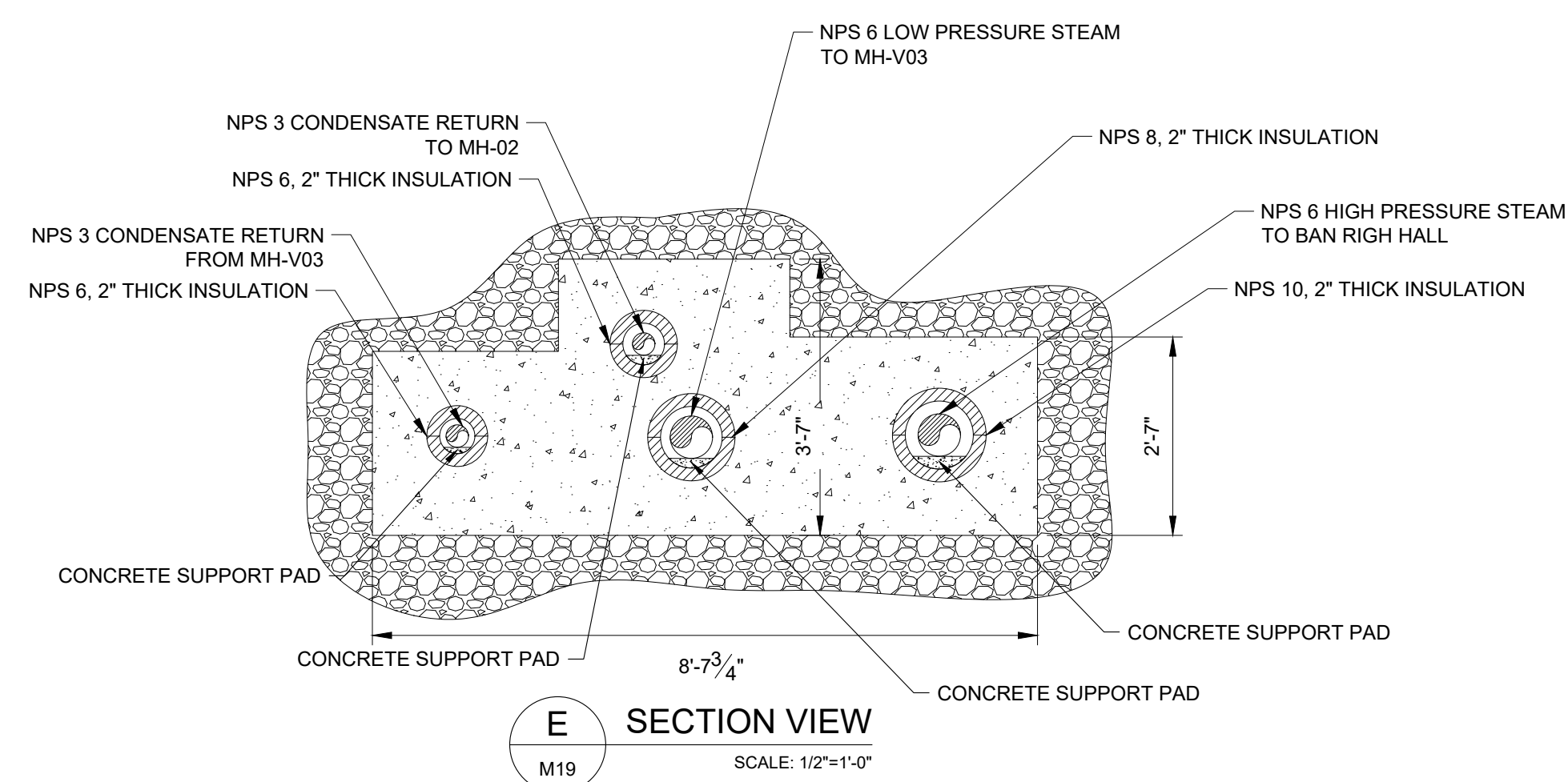
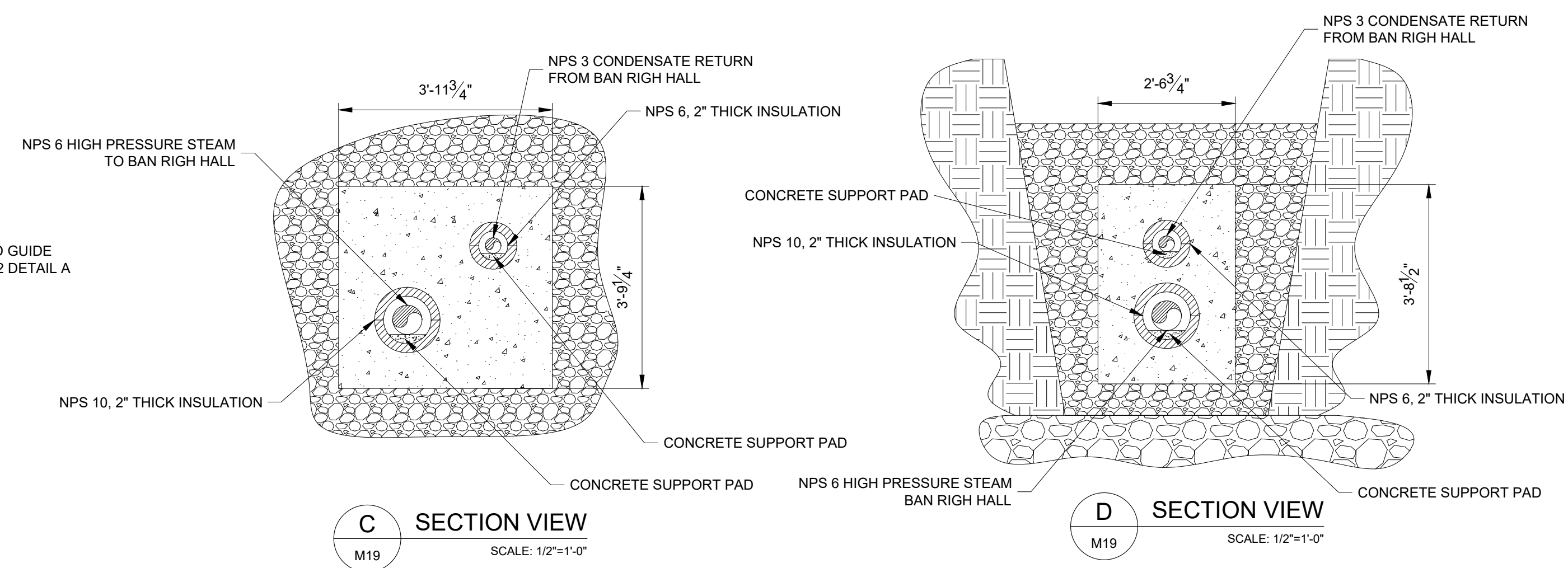
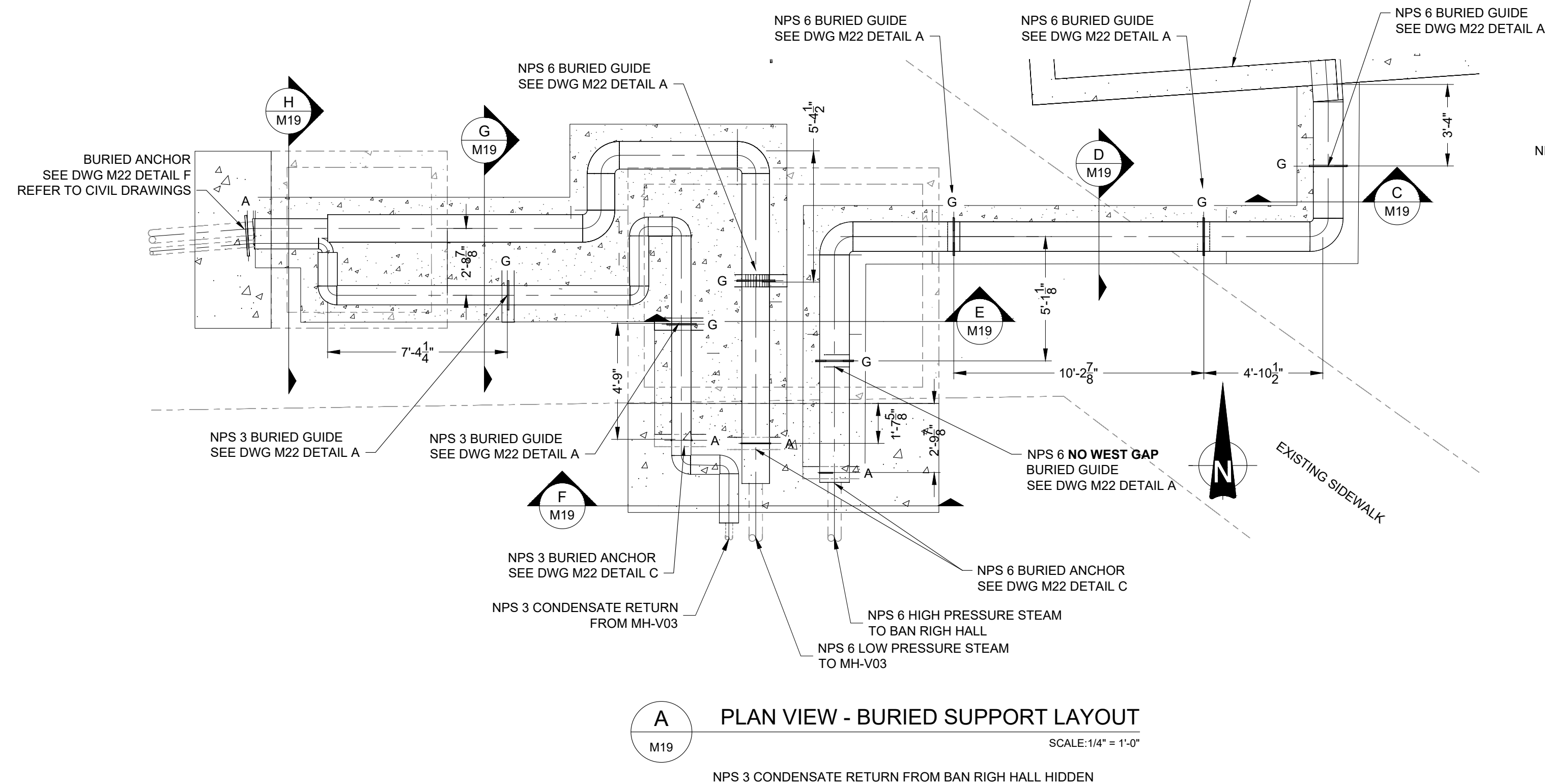
CHECKED: MC

JLR #: 28079-002

DRAWING #:

M18

PLOT DATE: Monday, April 27, 2026 3:17:03 PM



NOTES:

1. SEE DWG M00 FOR GENERAL NOTES.
2. ALL BURIED INSULATION TO BE OWENS CORNING FOAMGLAS C/W PITTWRAP SS JACKETING. FOLLOW ALL MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION.

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SCALE: $1/4" = 1'-0"$

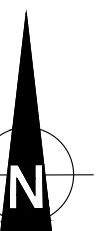
CLIENT:

CONSULTANT: www.jlrichards.ca

CONSULTANT:

PROFESSIONAL STAMP

PROJECT NORTH



PROJECT:

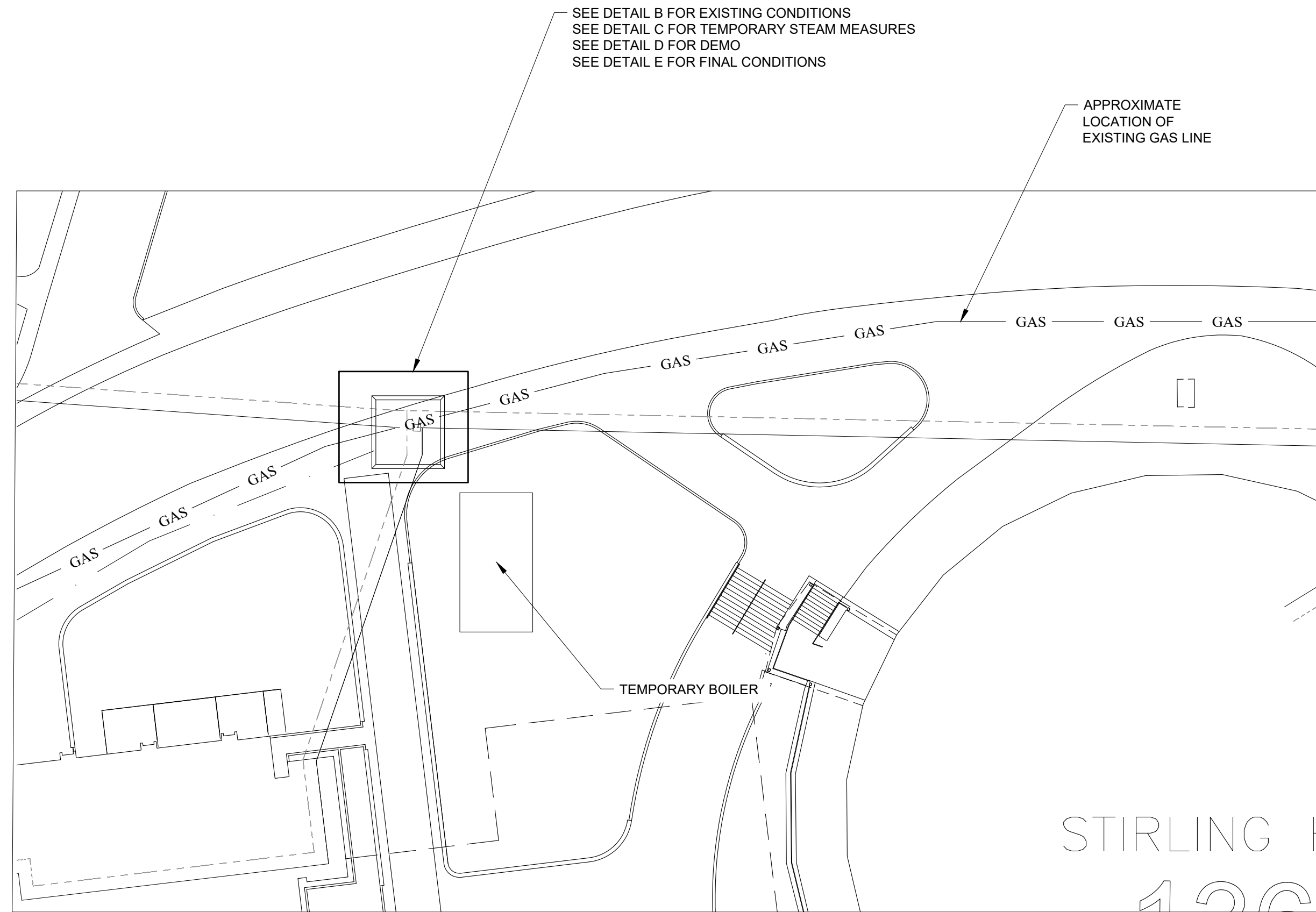
QUEEN'S UNIVERSITY
BAN RIGH STEAM MANHOLE
REPLACEMENT

BADER LANE, KINGSTON, ONTARIO K7L 2S8

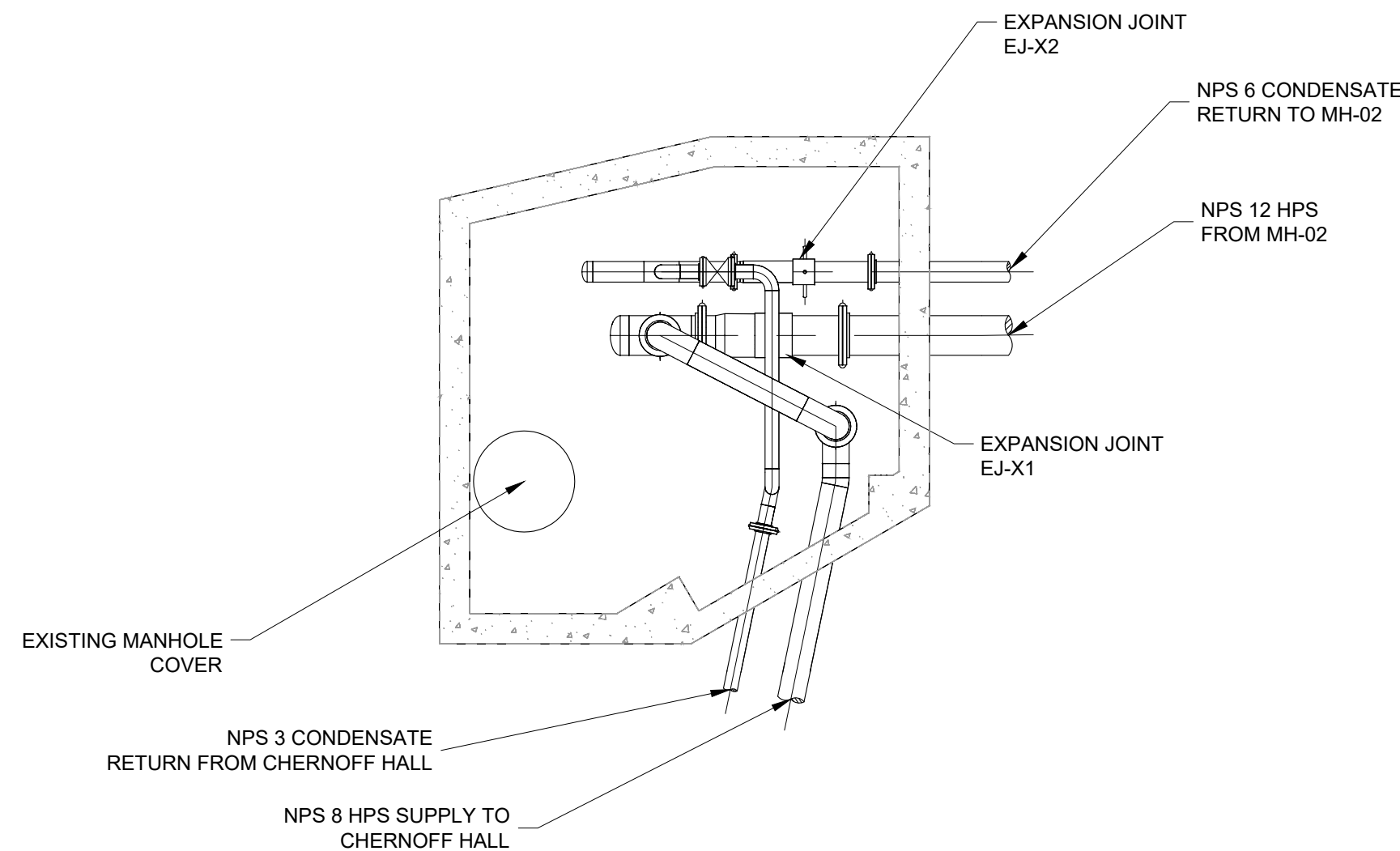
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MECHANICAL BURIED PIPE SUPPORT LAYOUT

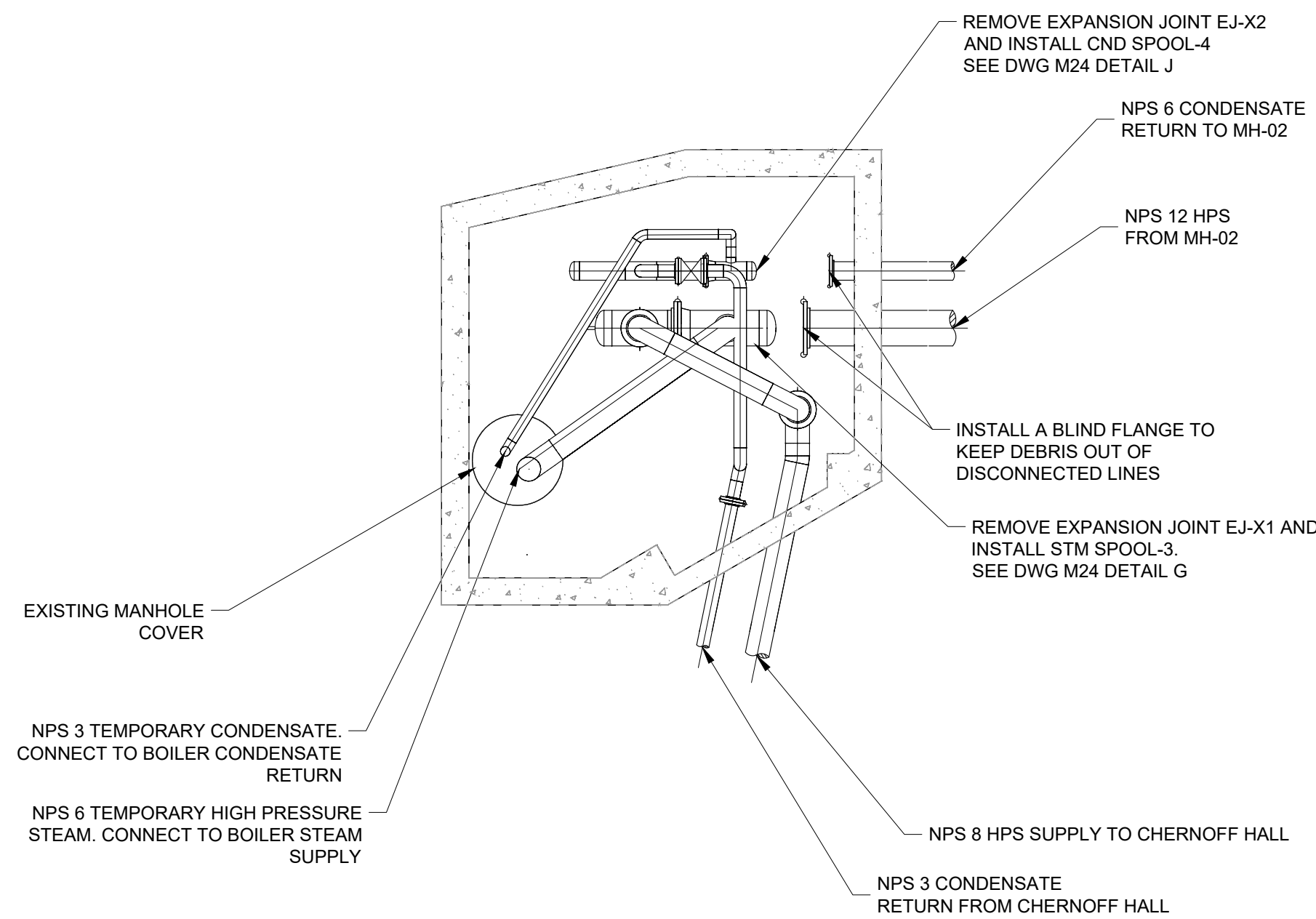
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CHECKED: MC	
JLR #: 28079-002	



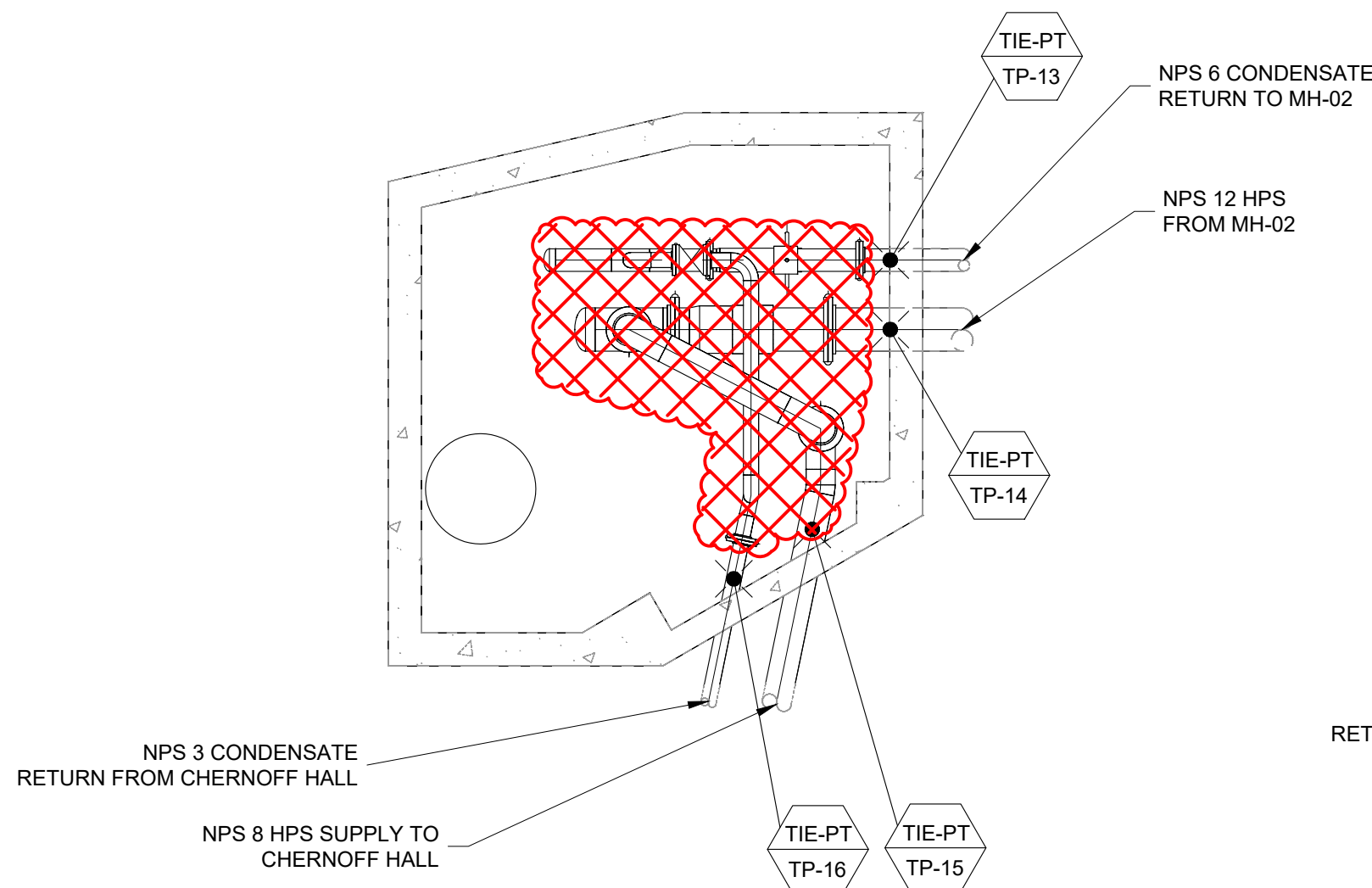
A PLAN VIEW
M10 SCALE: 1/4" = 1'-0"



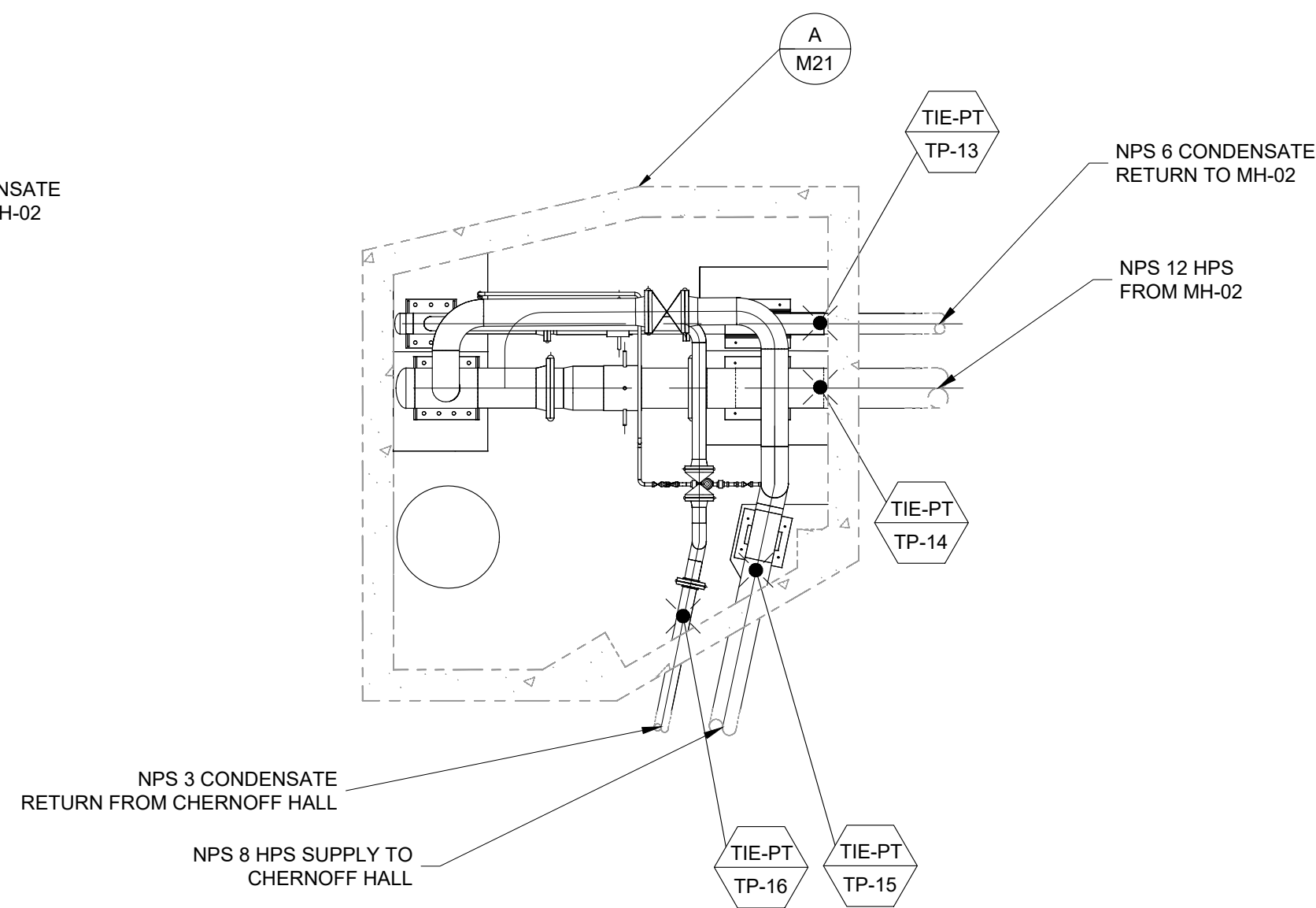
B PLAN VIEW - EXISTING MH-03
M20 SCALE: 1/4" = 1'-0"



C PLAN VIEW - TEMPORARY MH-03
M20 SCALE: 1/4" = 1'-0"

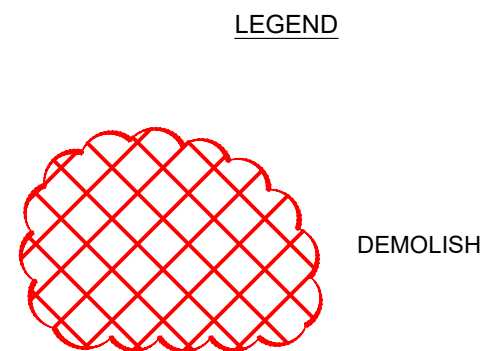


D PLAN VIEW - MH-03 DEMO
M20 SCALE: 1/4" = 1'-0"



E PLAN VIEW - MH-03 FINAL CONDITIONS
M20 SCALE: 1/4" = 1'-0"

Vault shown open for clarity



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SCALE: AS SHOWN

CLIENT:



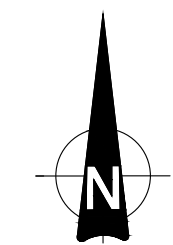
CONSULTANT: www.jlrichards.ca



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PROJECT:

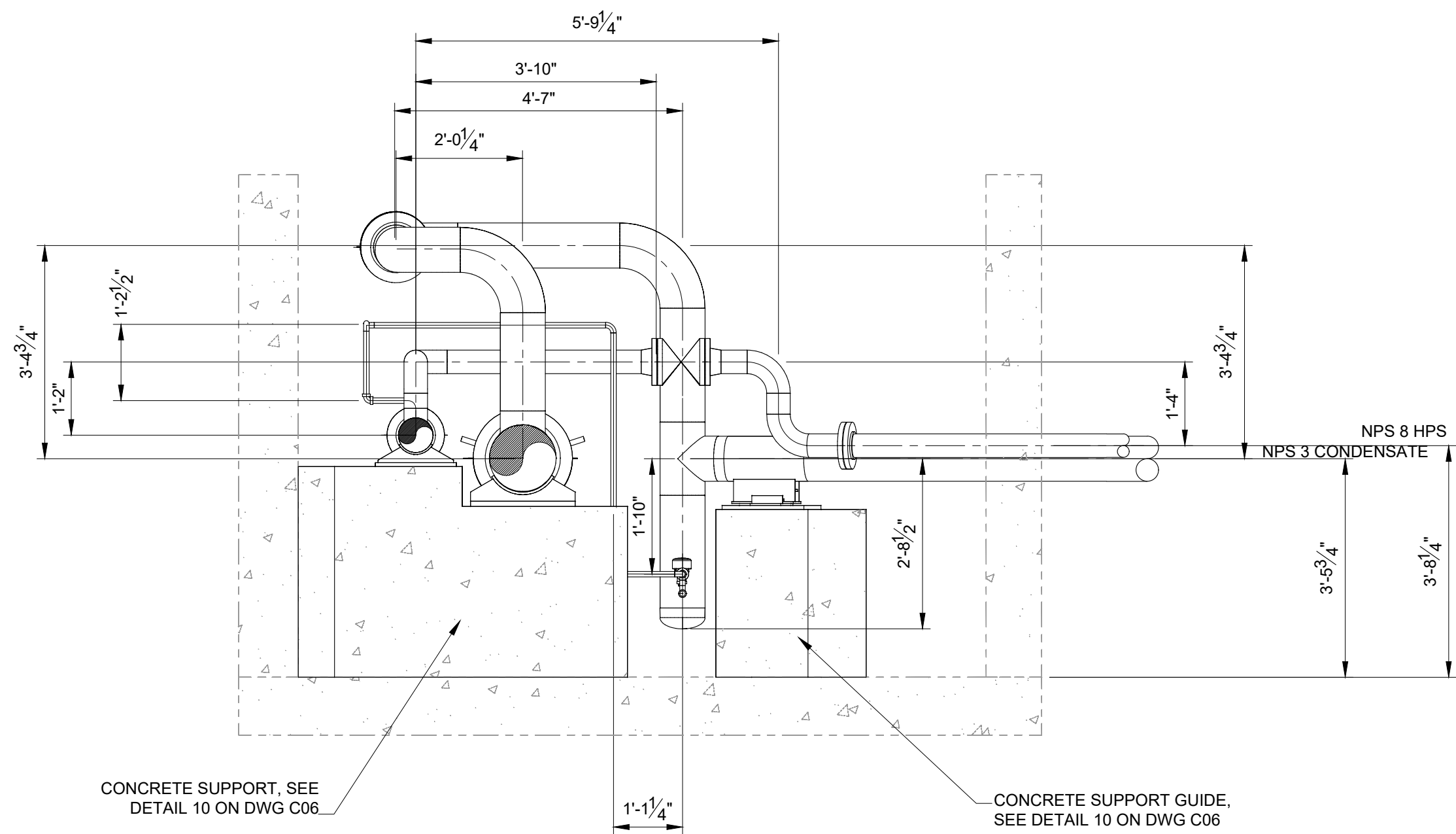
QUEEN'S UNIVERSITY
BAN RIGH STEAM MANHOLE
REPLACEMENT

BADER LANE, KINGSTON, ONTARIO K7L 2S8

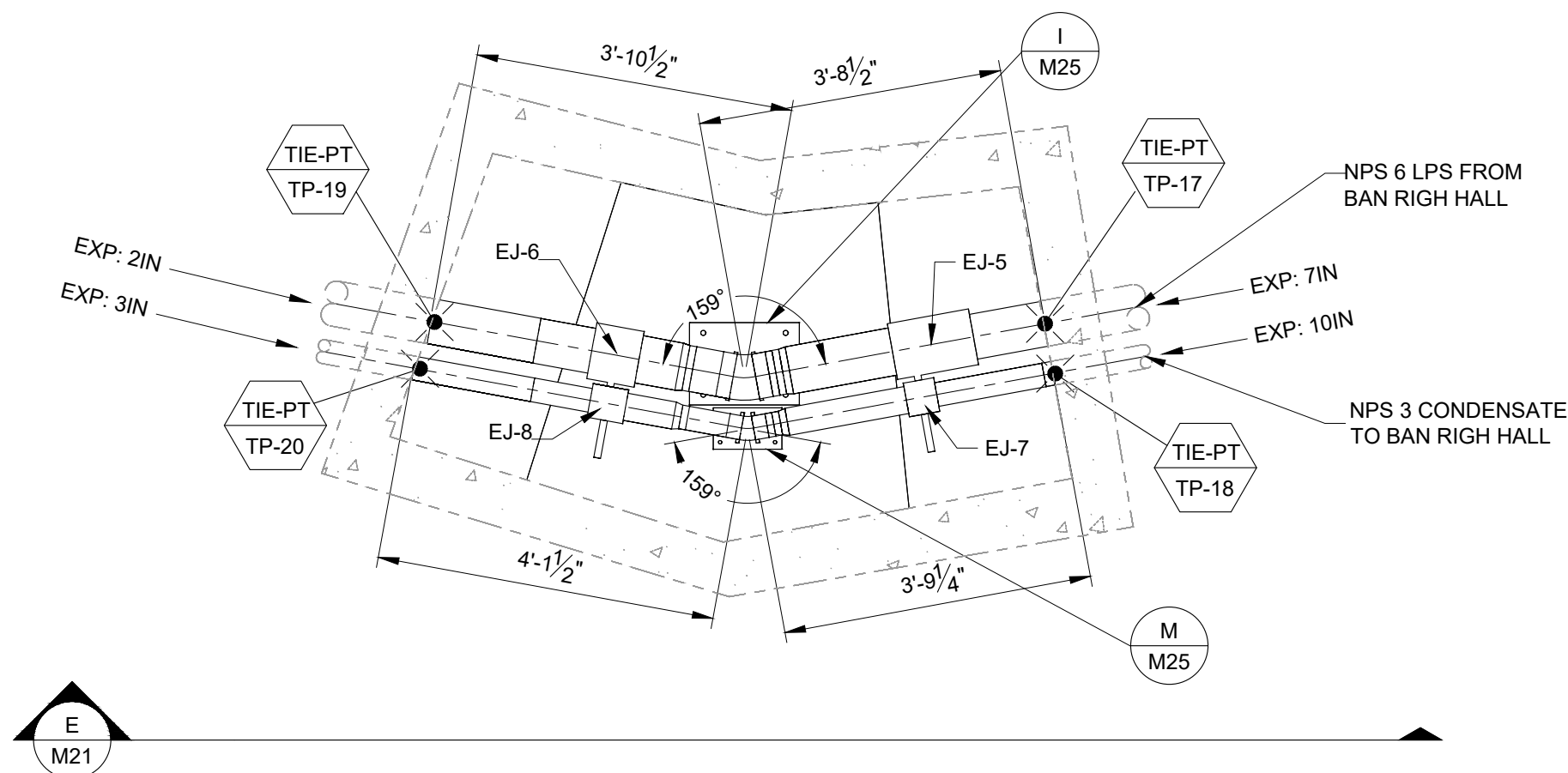
DRAWING:

MECHANICAL
TEMPORARY MEASURES - MH-03

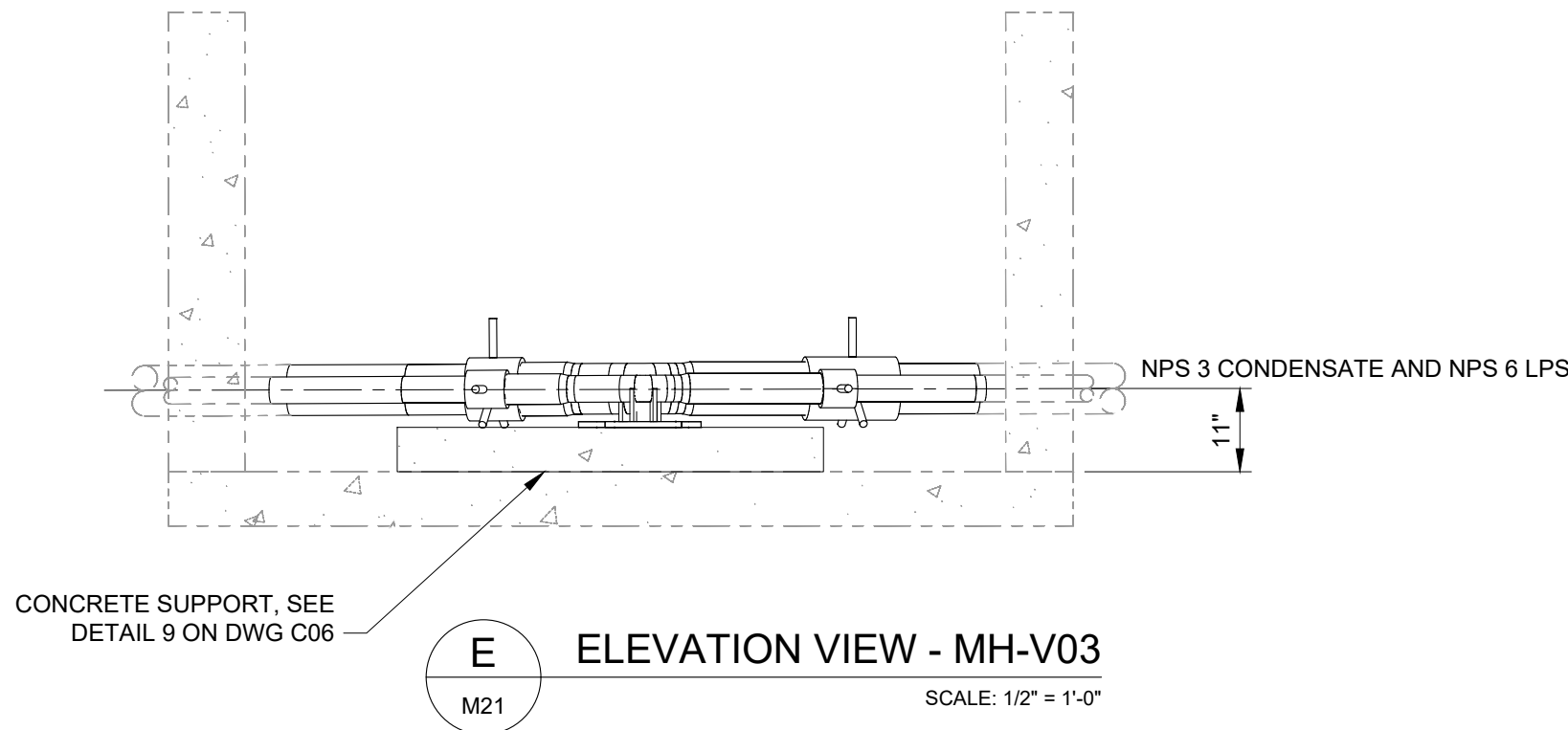
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CHECKED: MC	
JLR #: 28079-002	



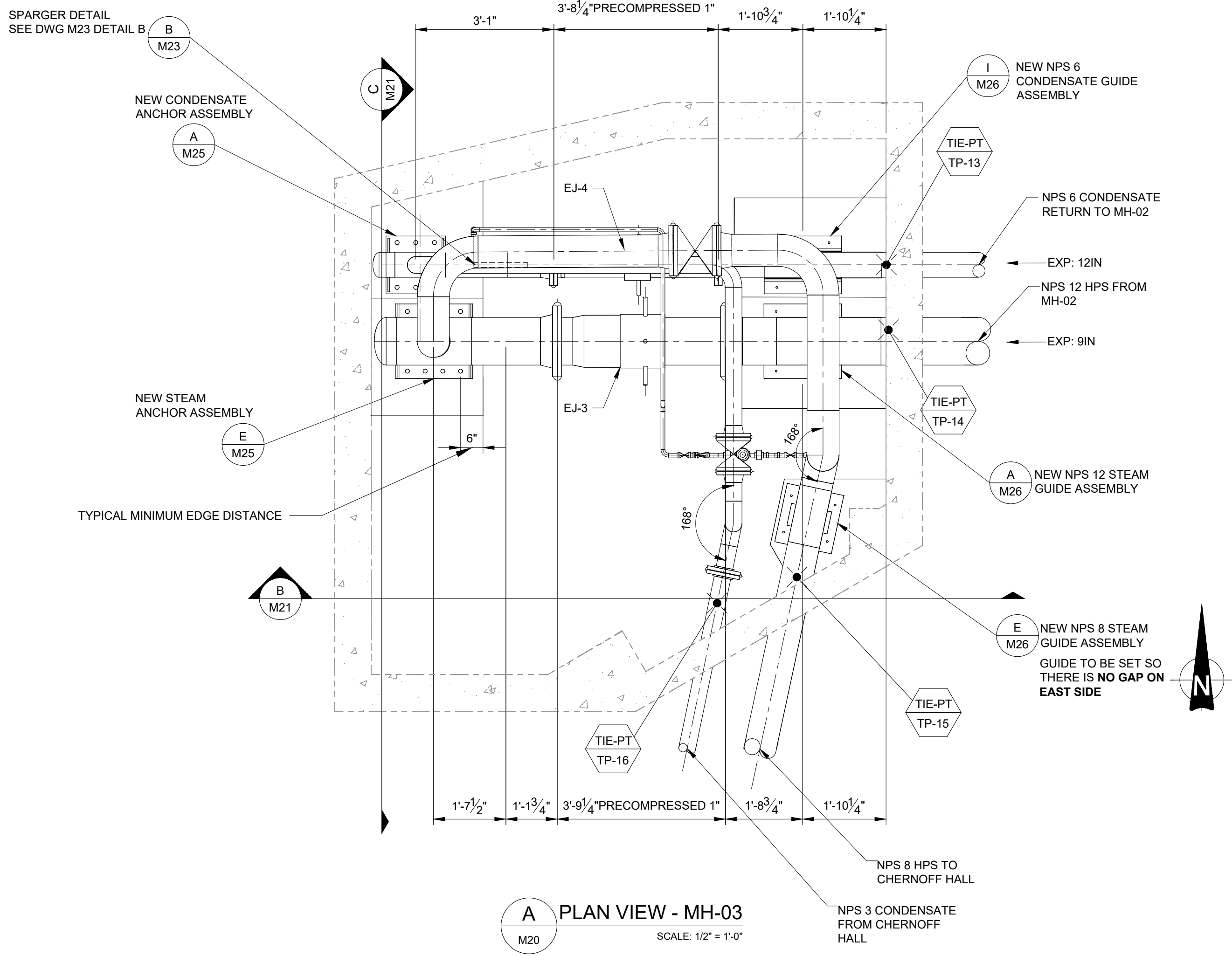
C ELEVATION VIEW - MH-03
SCALE: 1/2" = 1'-0"



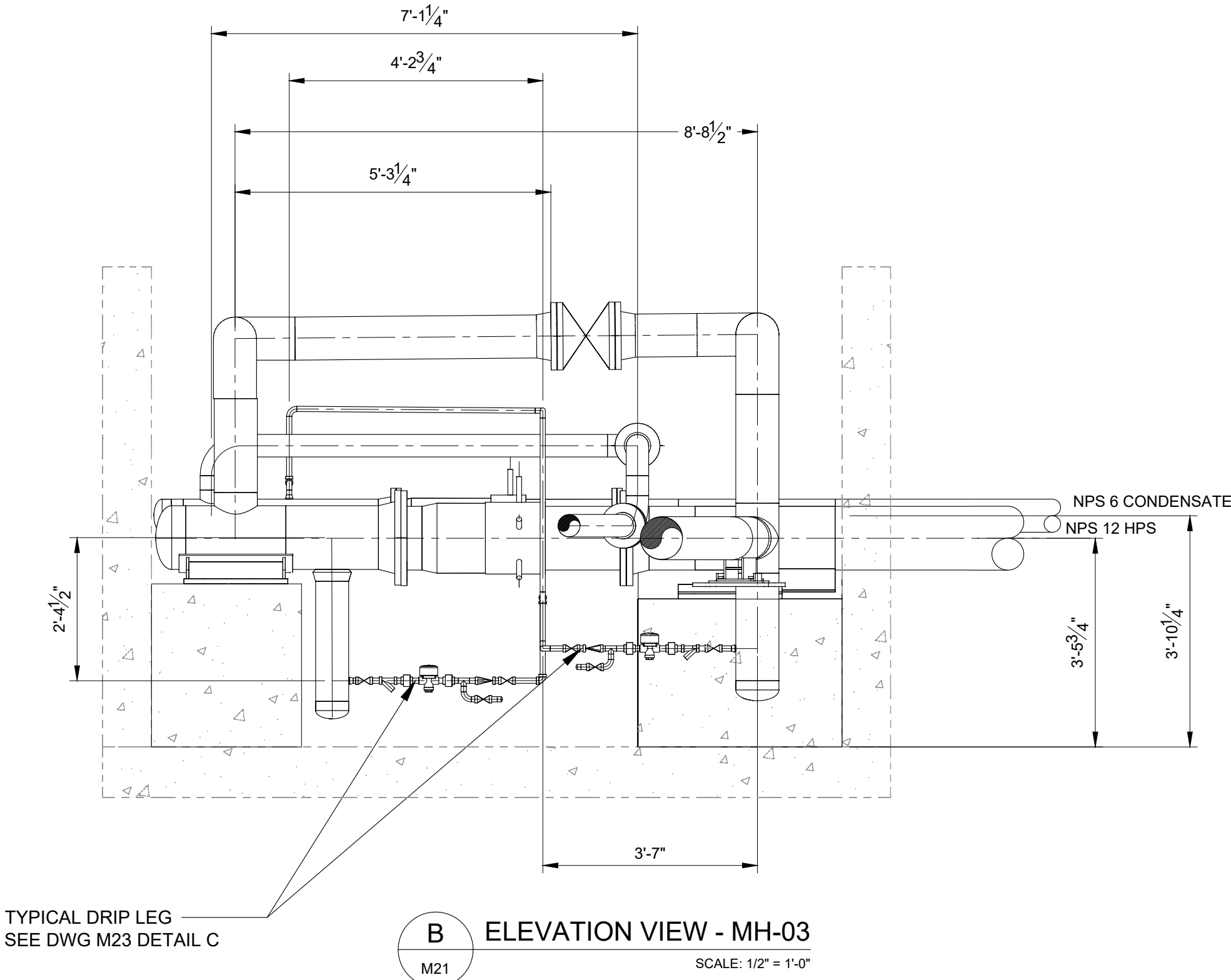
D PLAN VIEW - MH-V03
SCALE: 1/2" = 1'-0"



E ELEVATION VIEW - MH-V03
SCALE: 1/2" = 1'-0"



A PLAN VIEW - MH-03
SCALE: 1/2" = 1'-0"



B ELEVATION VIEW - MH-03
SCALE: 1/2" = 1'-0"

NOTES:

1. CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE.
2. SEE DWG M00 FOR NOTES.
3. DIMENSIONS SHOWN FOR "COLD" PIPING.
4. SLOPE ALL STEAM PIPING TOWARDS DRIP LEGS.

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

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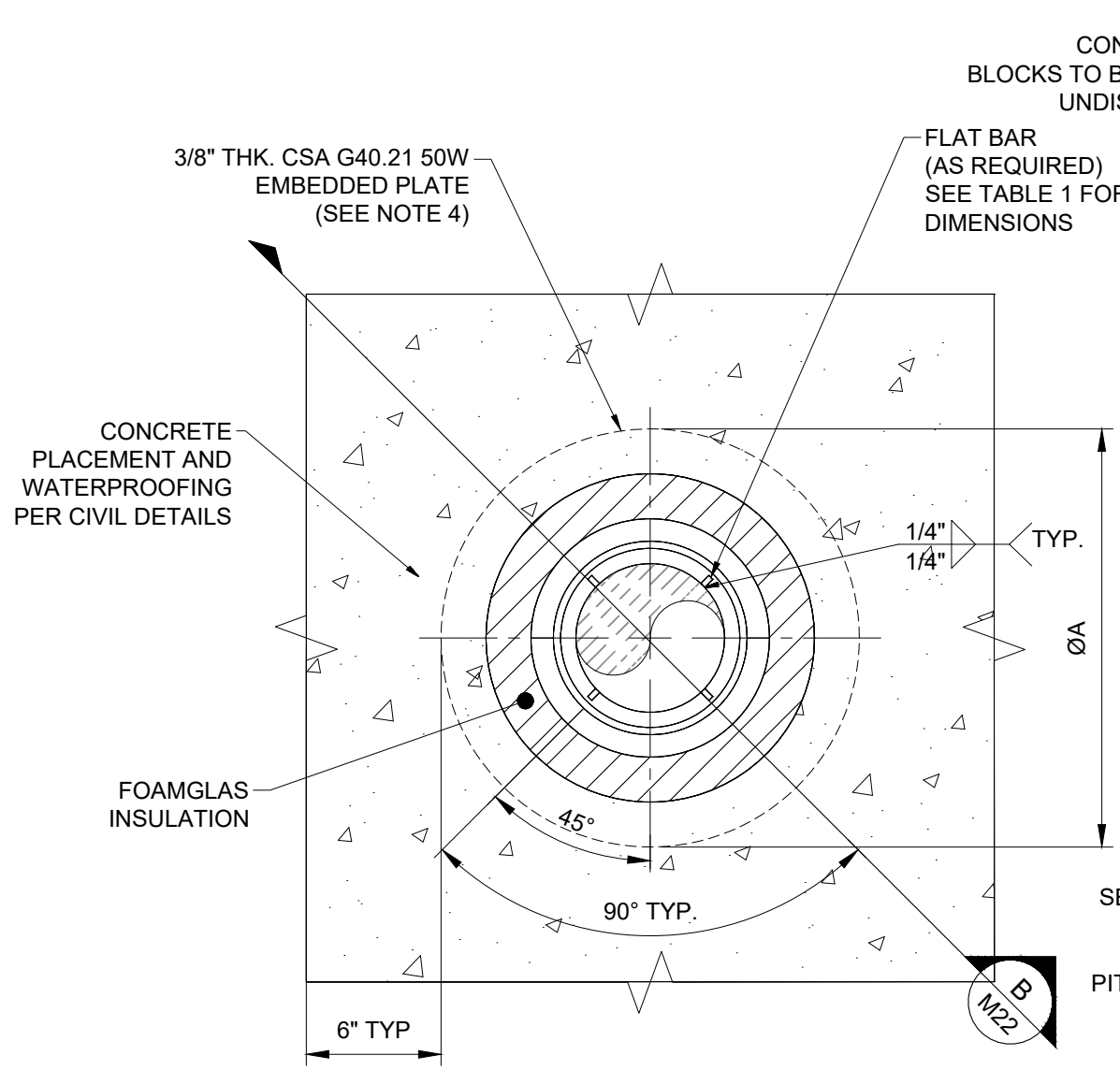
CONSULTANT:
 J.L. Richards
ENGINEERS - ARCHITECTS - PLANNERS

CONSULTANT:
PROFESSIONAL STAMP
PROJECT NORTH

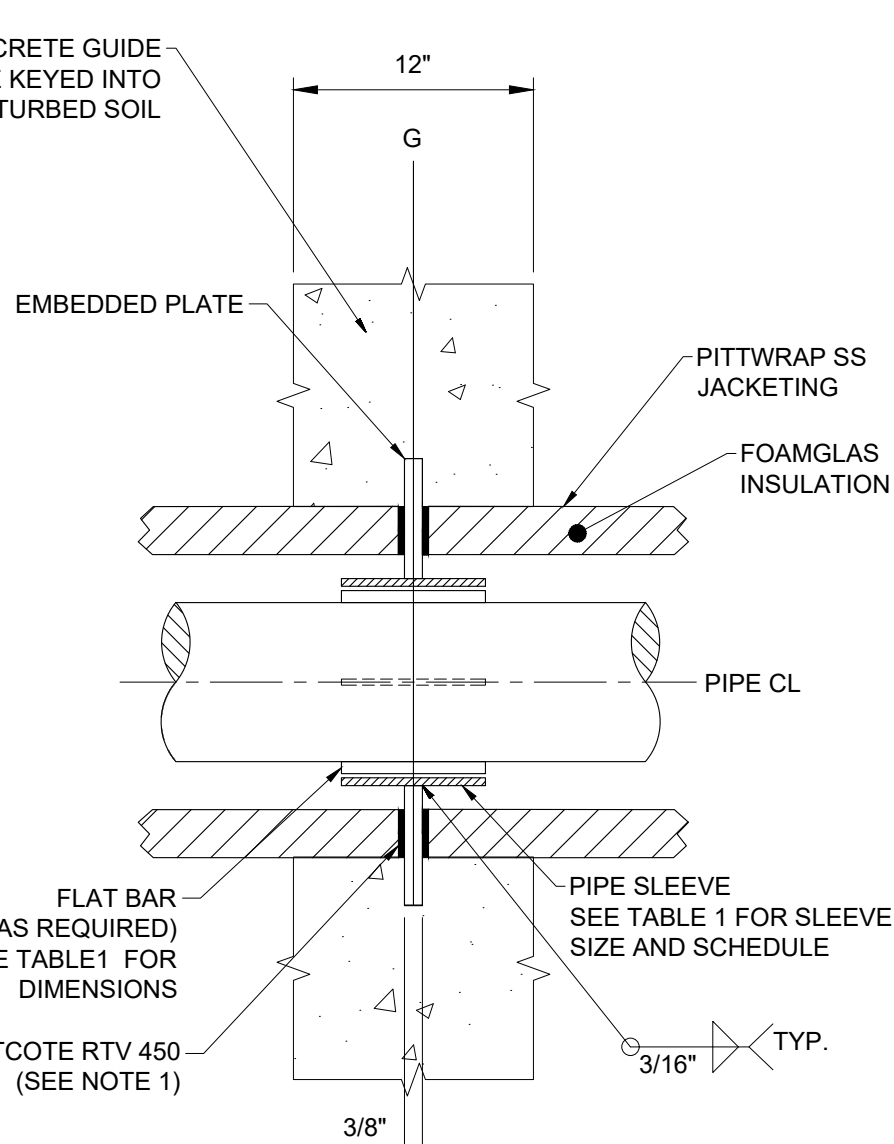

PROJECT:
QUEEN'S UNIVERSITY
BAN RIGH STEAM MANHOLE
REPLACEMENT
BADER LANE, KINGSTON, ONTARIO K7L 2S8

DRAWING:
MECHANICAL
MH-03 AND MH-V03 DETAILS

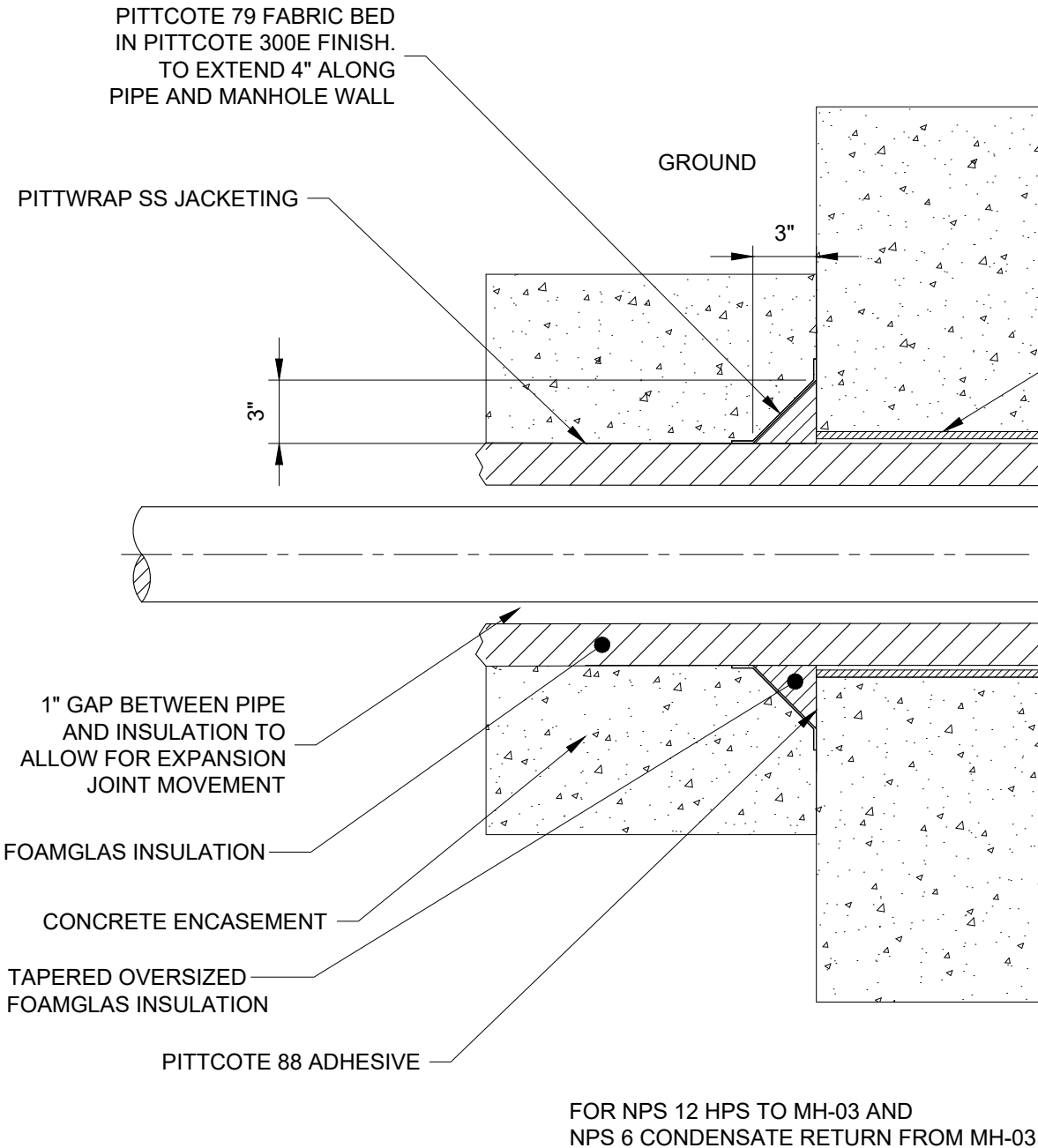
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DRAWN: CS	M21
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JLR #: 28079-002	



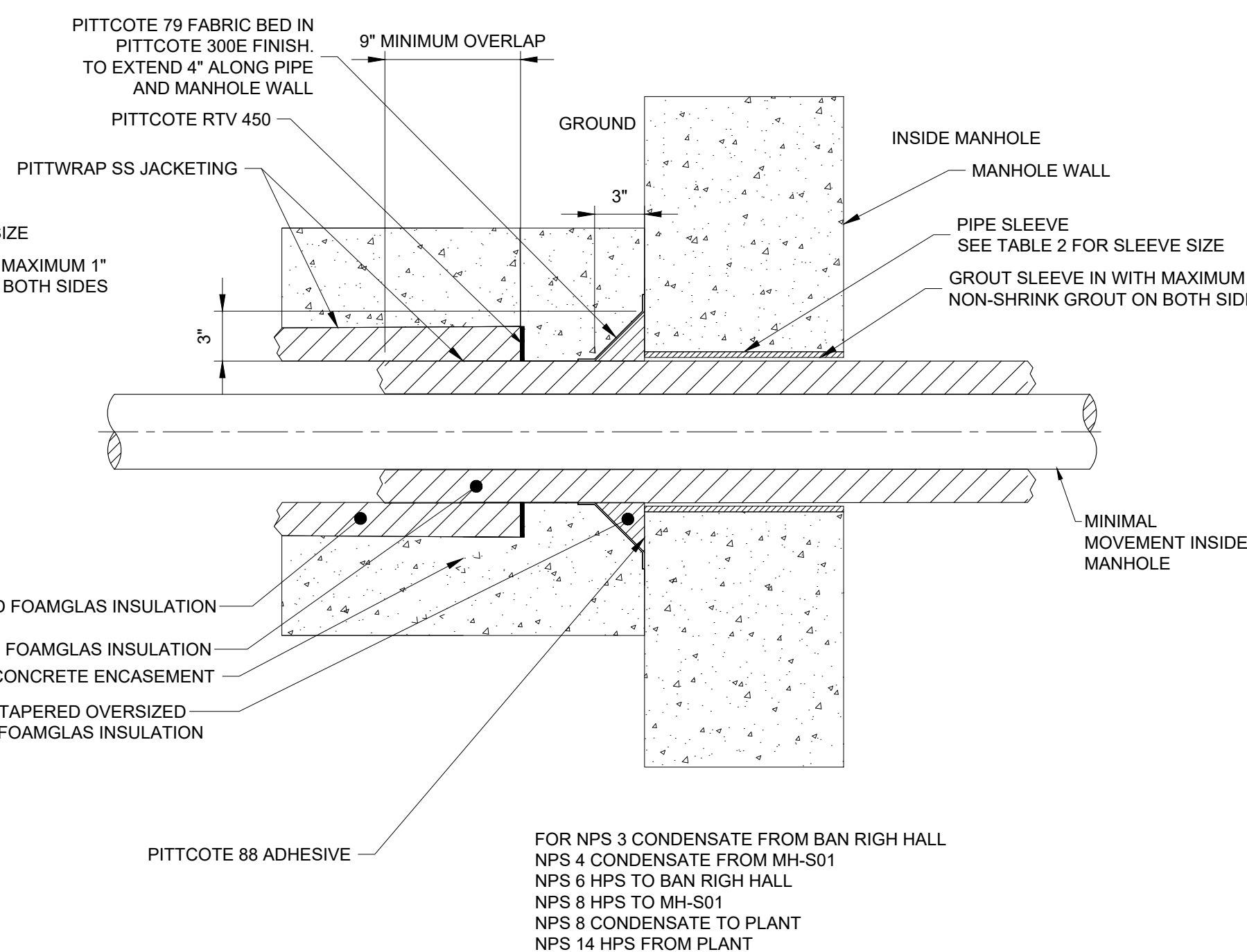
A TYPICAL BURIED GUIDE DETAIL
M22 SCALE: 1-1/2"=1'-0"



B TYPICAL BURIED GUIDE SECTION
M22 SCALE: 1-1/2"=1'-0"



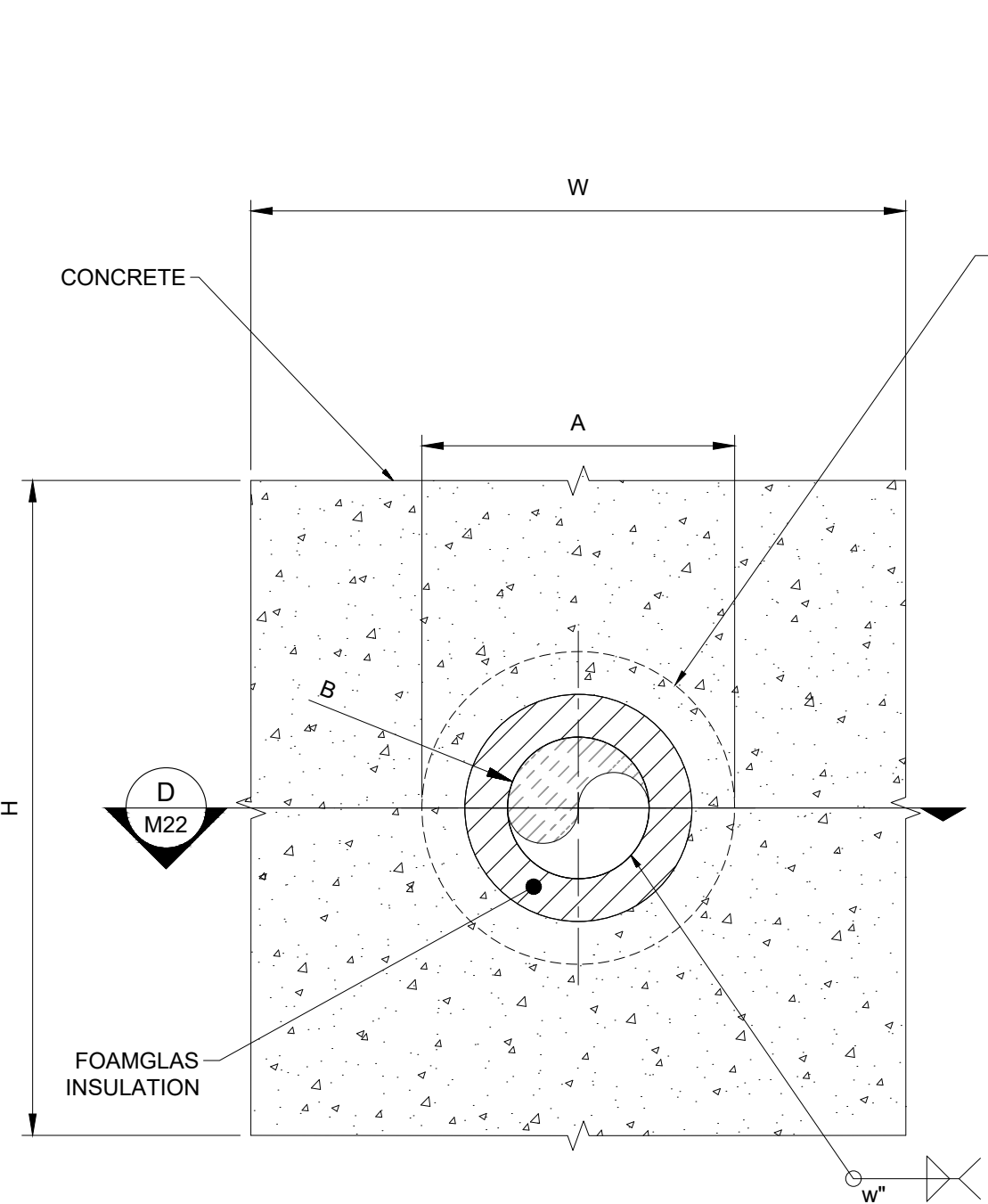
E TYPICAL MANHOLE WALL PENETRATION DETAIL
M22 SCALE: 1"=1'-0"



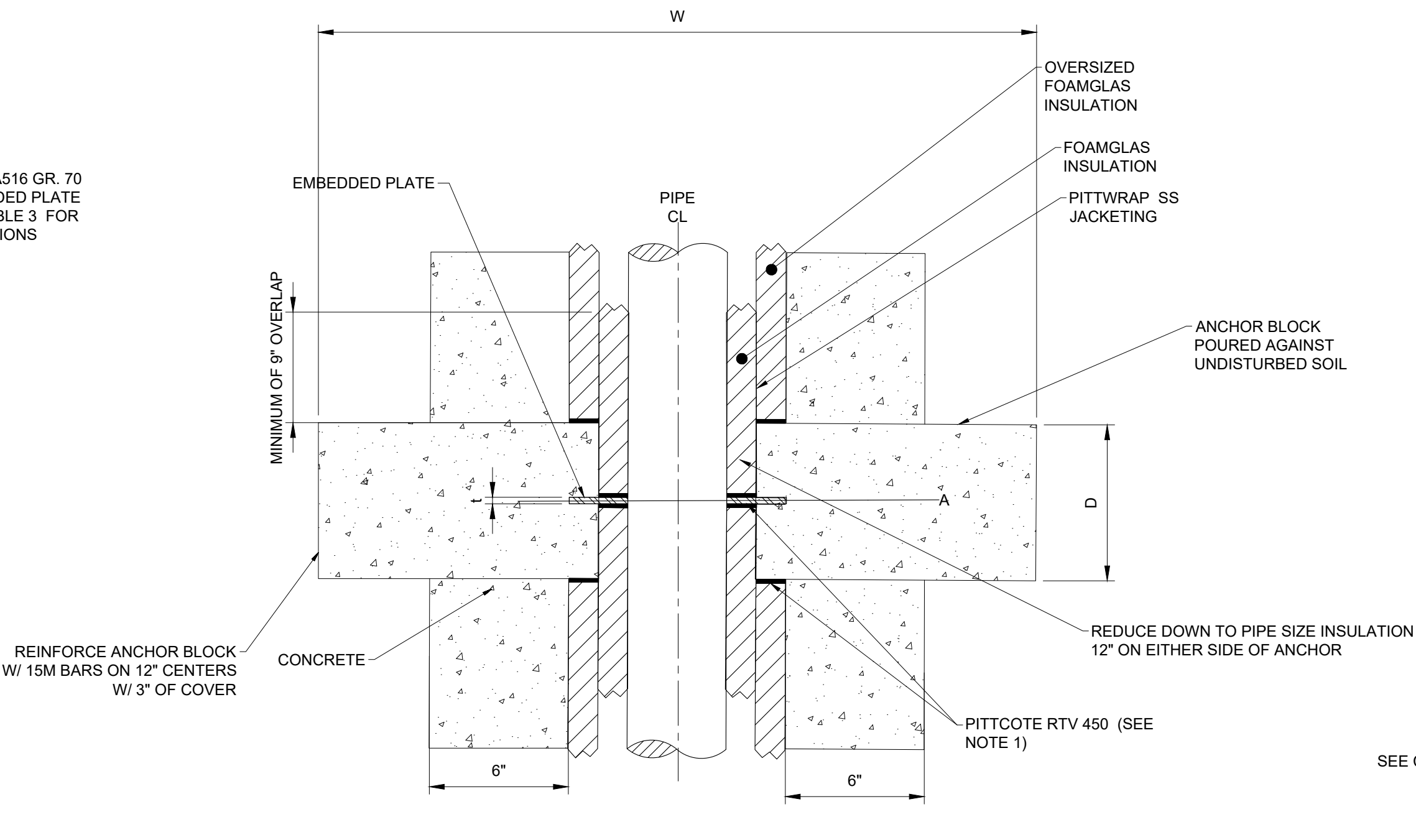
- NOTES:
1. ALL BURIED INSULATION TO BE OWENS CORNING FOAMGLAS C/W PITTWRAF SS JACKETING. FOLLOW ALL MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION.
 2. DIMENSIONS TO INDICATORS FOR GUIDES (G) AND ANCHORS (A) ARE TO CENTERLINE OF PIPE AND CENTER OF ANCHOR/GUIDE PLATE AS SHOWN.
 3. ANCHOR BLOCK SIZES ARE MINIMUMS. WHERE SEPARATE FORMING IS NOT FEASIBLE, CAST AS SINGLE POUR.
 4. BURIED ANCHOR TO BEAR AGAINST OR BE KEYPED INTO UNDISTURBED SOIL. ANCHOR BLOCK DESIGN HAS BEEN COMPLETED BASED ON AN ASSUMED ULS LATERAL GEOTECHNICAL BEARING PRESSURE OF 50kPa. THE CONTRACTORS GEOTECHNICAL ENGINEER TO REVIEW AND CONFIRM THE ULS LATERAL GEOTECHNICAL BEARING PRESSURE PRIOR TO PLACING BACKFILL.
 5. REFER TO CIVIL DRAWINGS FOR CONCRETE SPECIFICATIONS AND ANCHOR BLOCKS POURED AGAINST EXISTING MANHOLE WALLS.

TABLE 1: TYPICAL BURIED GUIDE DETAILS					
PIPE SIZE (NPS)	POSITION	SLEEVE SIZE (NPS)	SLEEVE LENGTH (IN)	DIMENSION A (IN)	FLAT BARS DIMENSIONS
3	TYPICAL	NPS 4 SCH.80	6	14.50	NO FLAT BARS
4	TYPICAL	NPS 6 SCH.STD	6	16.50	4" X 5/8" X 1/4"
6	TYPICAL	NPS 8 SCH.20	8	18.63	4" X 5/8" X 1/4"
6	NO WEST GAP	NPS 8 SCH.20	8	18.63	WEST: 4" X 3/4" X 1/4" EAST: 4" X 5/8" X 1/4"
8	TYPICAL	NPS 10 SCH.20	12	20.63	4" X 11/16" X 1/4"
12	TYPICAL	NPS 14 SCH.80S	12	24.00	NO FLAT BARS

TABLE 2: PIPE SLEEVE SIZES			
LOCATION	NPS	SLEEVE	INSULATION
NPS 3 CONDENSATE FROM BAN RIGH HALL	3	NPS 8 SCH.80S	NPS 3, 1.5IN THICK
NPS 4 CONDENSATE FROM MH-S01	4	ROLLED FROM 1/4" SS PLATE TO Ø8.75 ID	NPS 4, 2IN THICK
NPS 6 HPS TO BAN RIGH HALL	6	NPS 12 SCH.80S	NPS 6, 2IN THICK
NPS 6 CONDENSATE RETURN FROM MH-03	6	NPS 14 SCH.80S	NPS 8, 2IN THICK
NPS 8 HPS TO MH-S01	8	NPS 14 SCH.80S	NPS 8, 2IN THICK
NPS 8 CONDENSATE TO PLANT	8	NPS 14 SCH.80S	NPS 8, 2IN THICK
NPS 12 HPS TO MH-03	12	NPS 20 SCH.80S	NPS 14, 2IN THICK
NPS 14 HPS FROM PLANT	14	NPS 20 SCH.80S	NPS 14, 2IN THICK

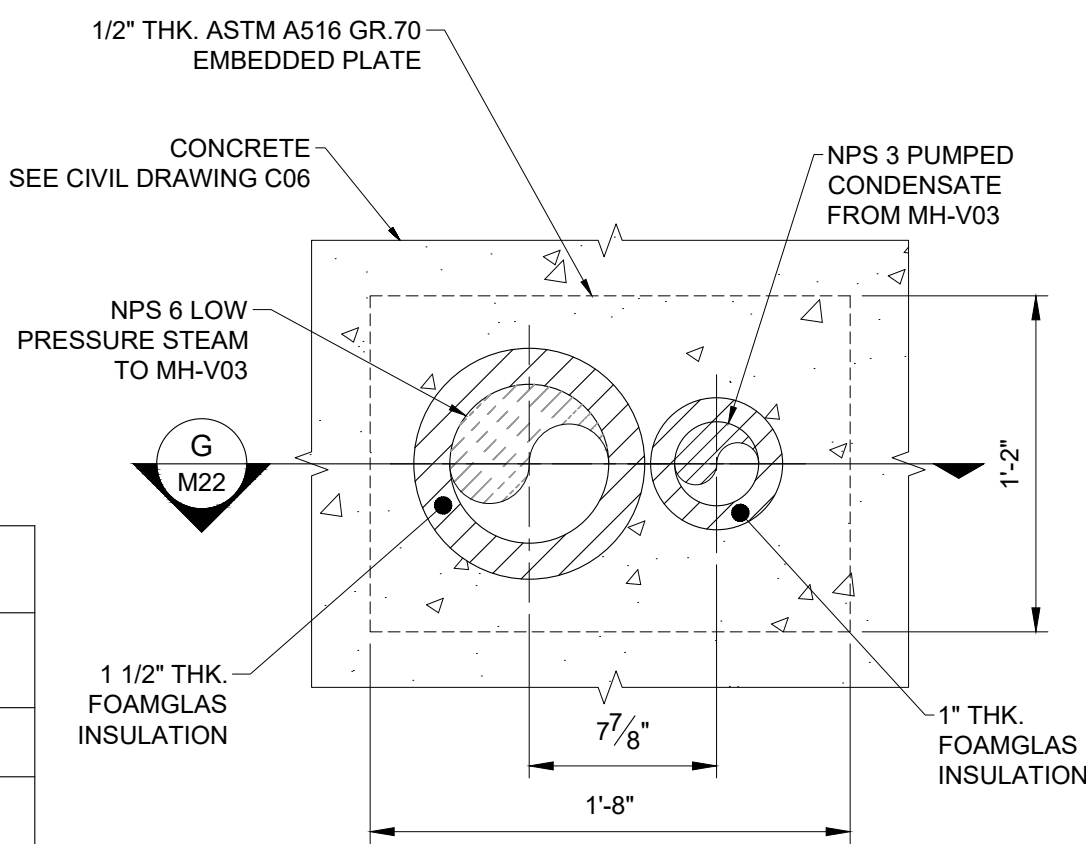


C TYPICAL BURIED ANCHOR DETAIL
M22 SCALE: 1-1/2"=1'-0"

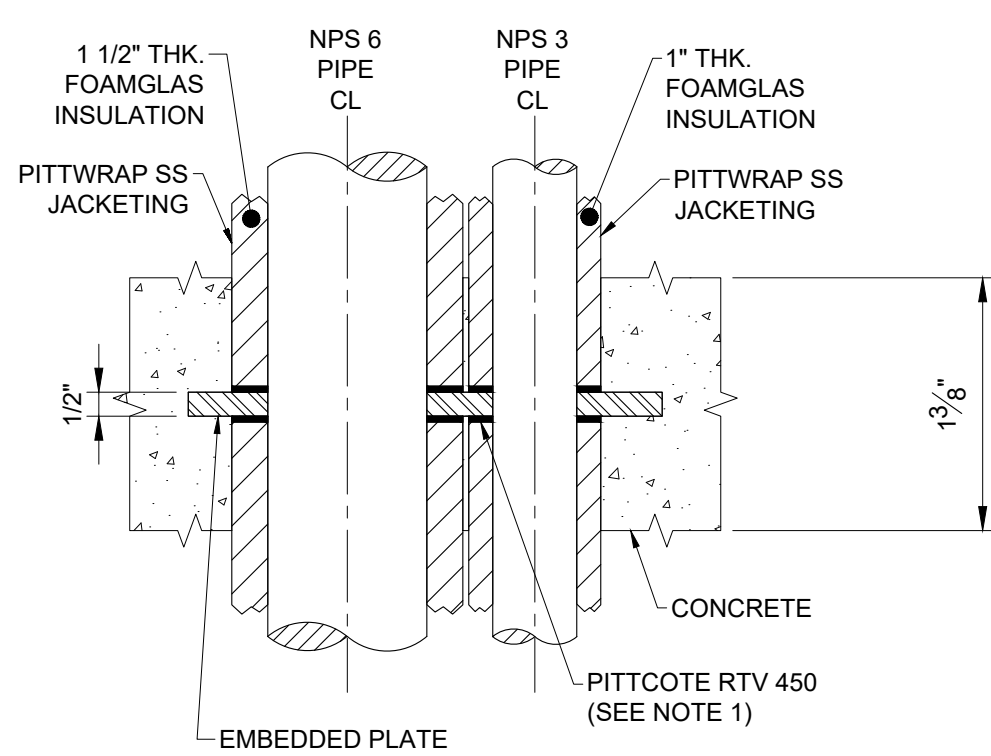


D TYPICAL BURIED ANCHOR SECTION
M22 SCALE: 1-1/2"=1'-0"

TABLE 3: TYPICAL BURIED ANCHOR DETAILS						
PIPE SIZE (NPS)	INSULATION	DIMENSION A (in)	DIMENSION B (in)	THICKNESS (t, in)	WELD (w, in)	W x H x D (in)
3	NPS 3, 1.5IN THICK	10.50	3.50	3/8	1/4	N/A
6	NPS 6, 2IN THICK	14.63	6.63	7/16	5/16	N/A
8	NPS 8, 2IN THICK	16.63	8.63	7/16	5/16	36x36x24



F MH-V02 ANCHOR
M22 SCALE: 1-1/2"=1'-0"



G MH-V02 ANCHOR SECTION VIEW
M22 SCALE: 1-1/2"=1'-0"

DESIGN: CS	DRAWING #:
DRAWN: CS	M22
CHECKED: MC	
JLR #: 28079-002	

1. ALL BURIED INSULATION TO BE OWENS CORNING FOAMGLAS C/W PITTPRAP JACKETING. FOLLOW ALL MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION.
2. CONFIRM STYLE, CAPACITY, AND SPECIFIC MODEL OF STEAM TRAP WITH THE UNIVERSITY PRIOR TO ORDERING.
3. CONSTRUCT ALL PIPING IN ACCORDANCE WITH PROJECT PIPING SPECIFICATIONS.



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SCALE: AS NOTED

CLIENT:



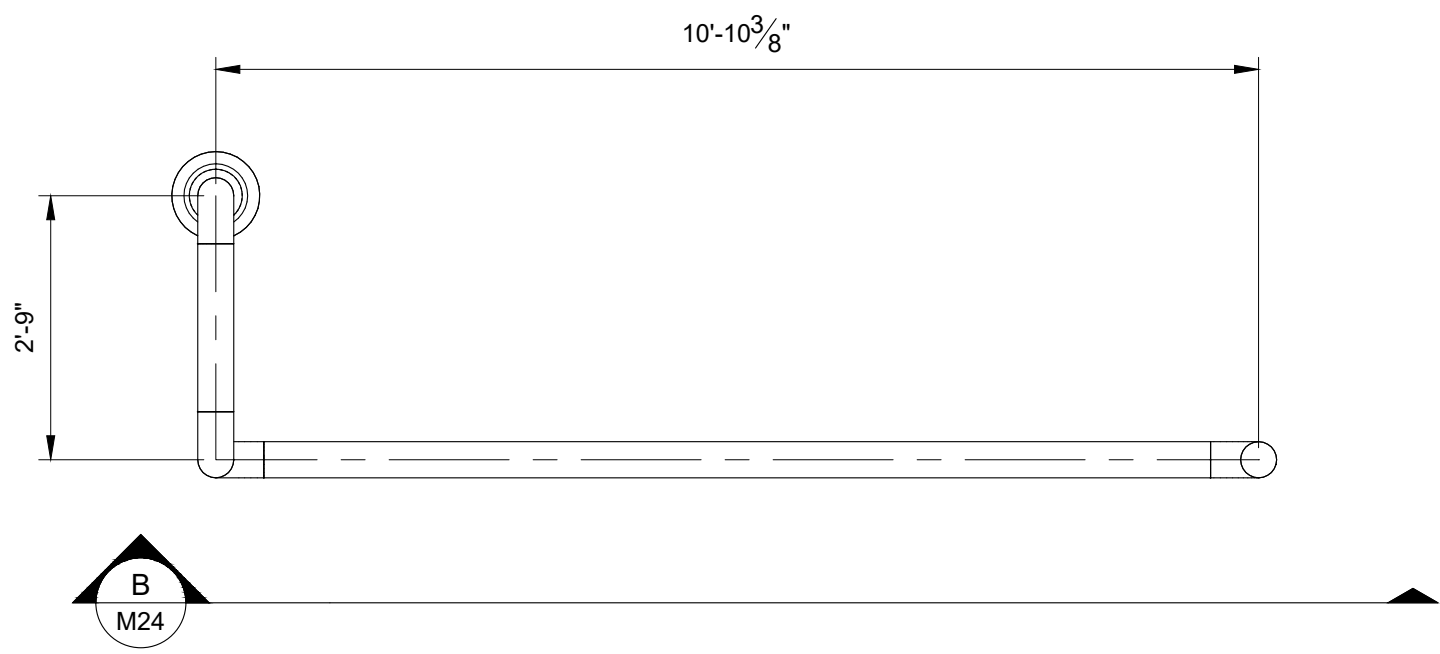
PROFESSIONAL STAMP	PROJECT NORTH
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PROJECT:

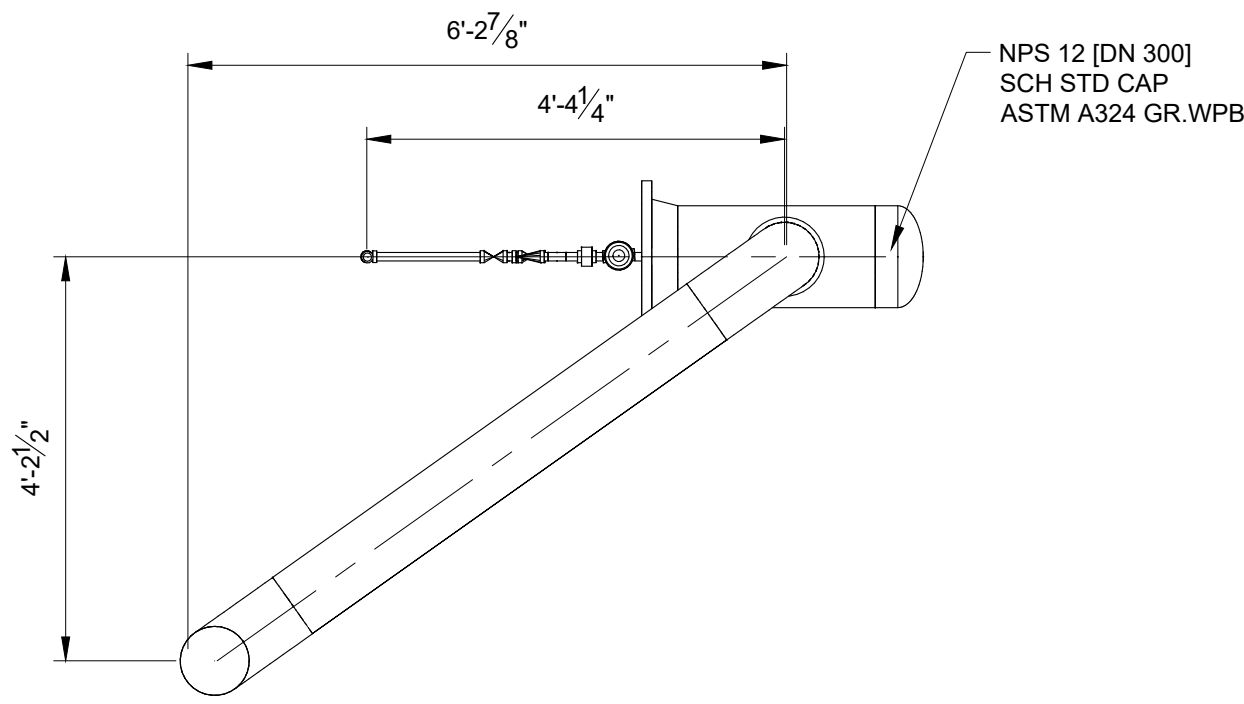
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JLR #: 28079-002	

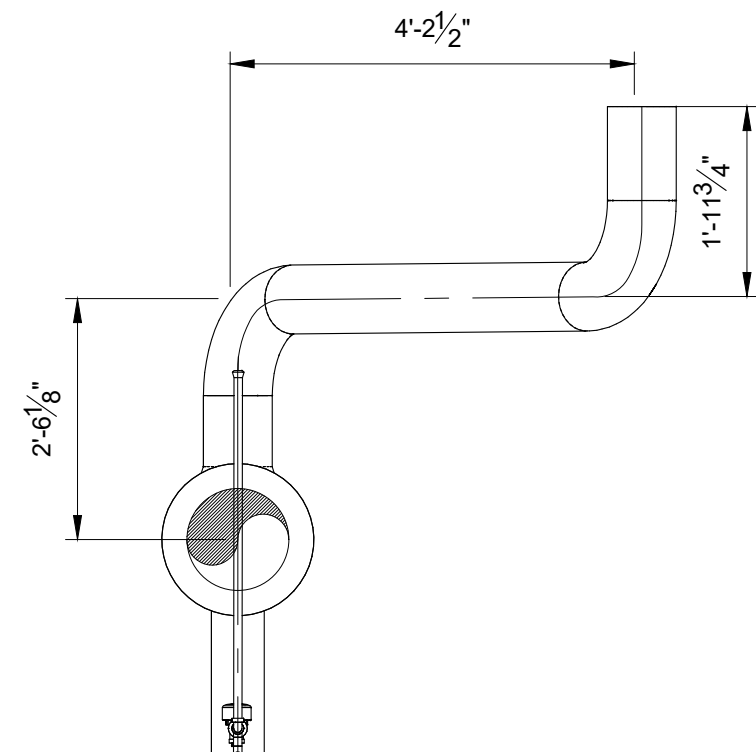




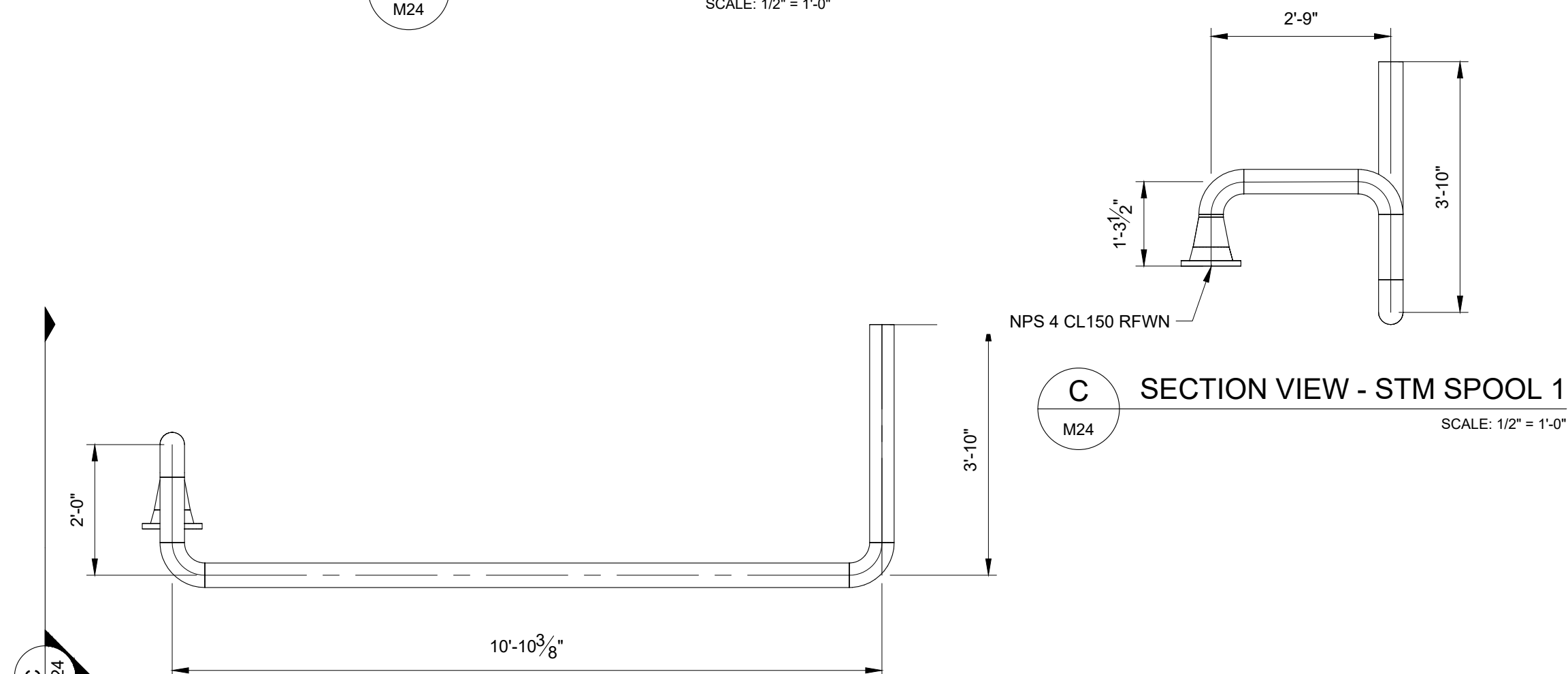
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SCALE: 1/2" = 1'-0"



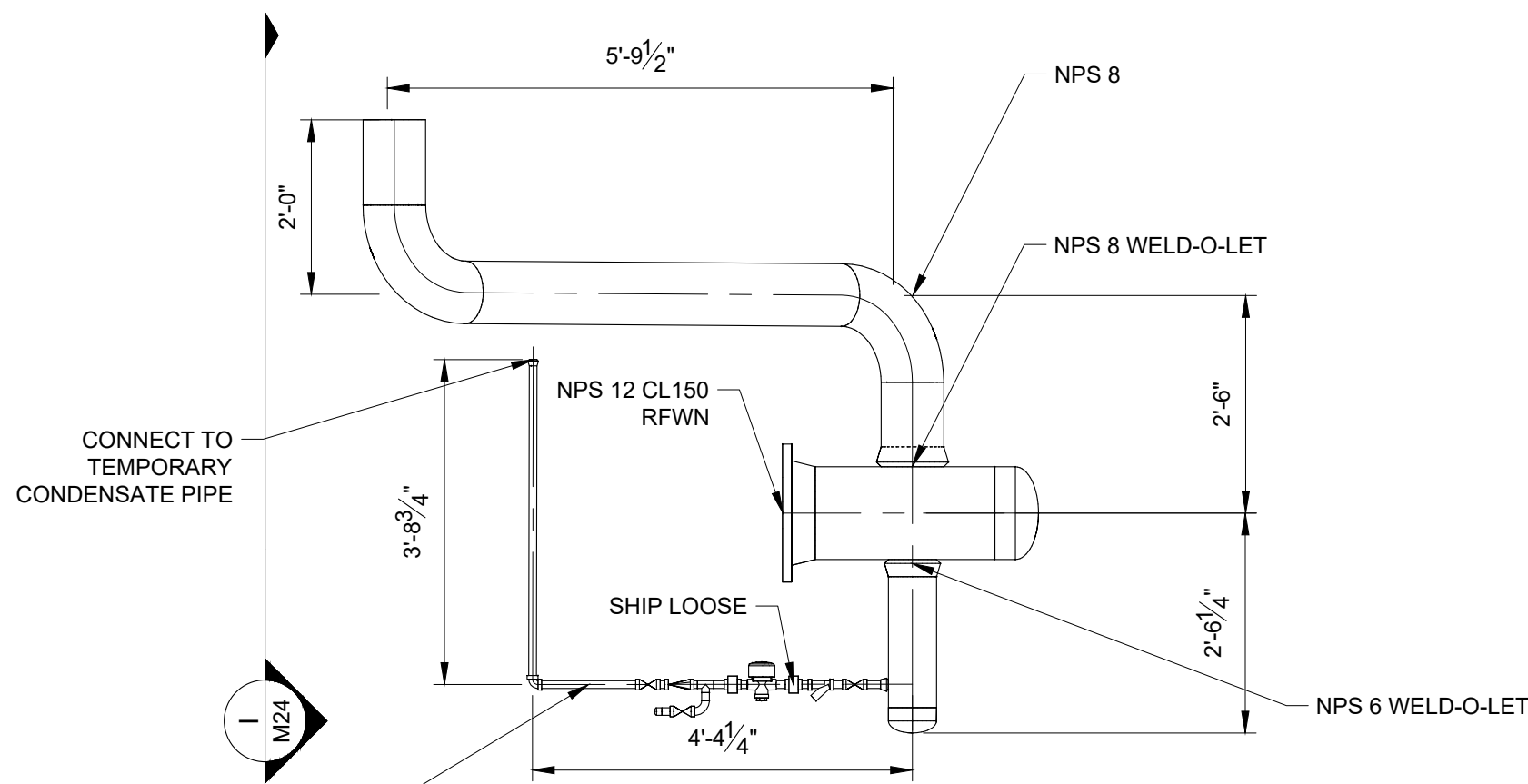
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SCALE: 1/2" = 1'-0"



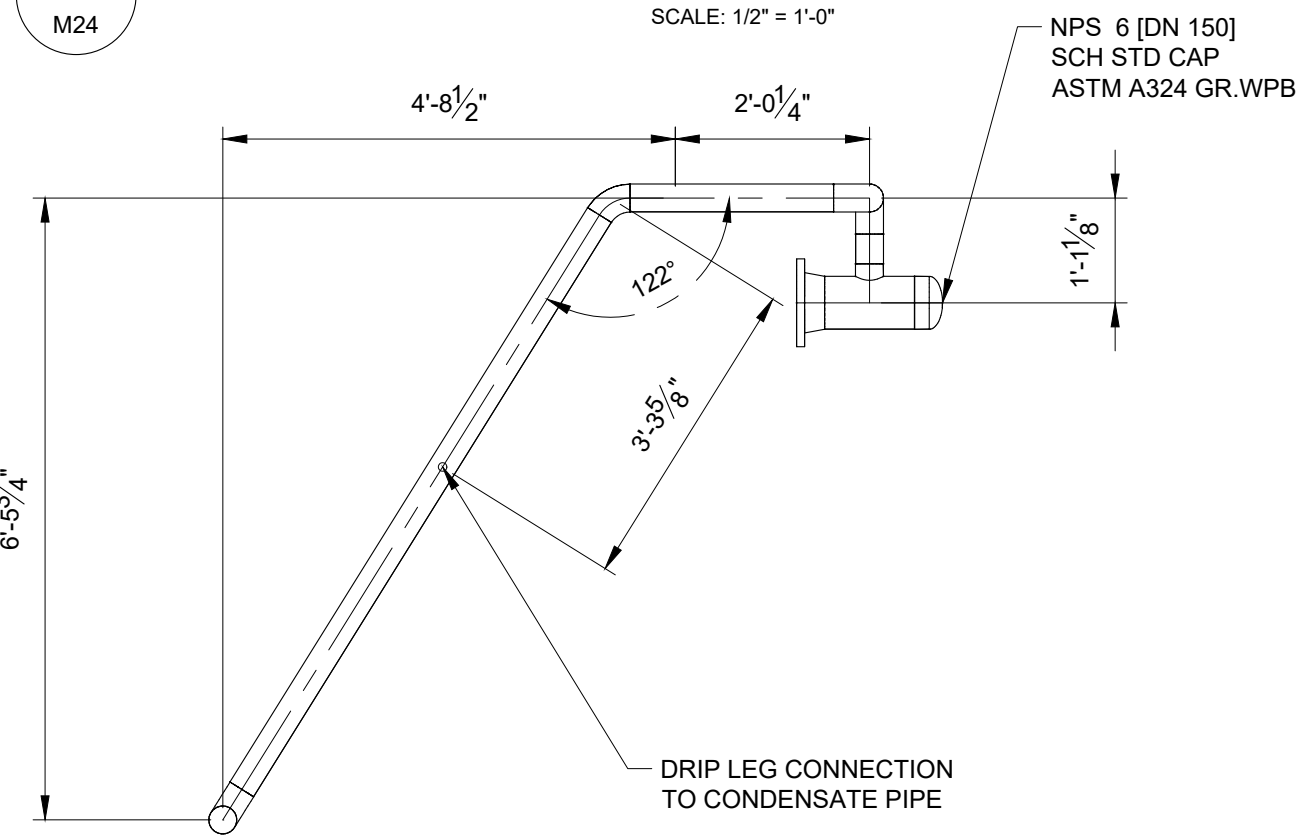
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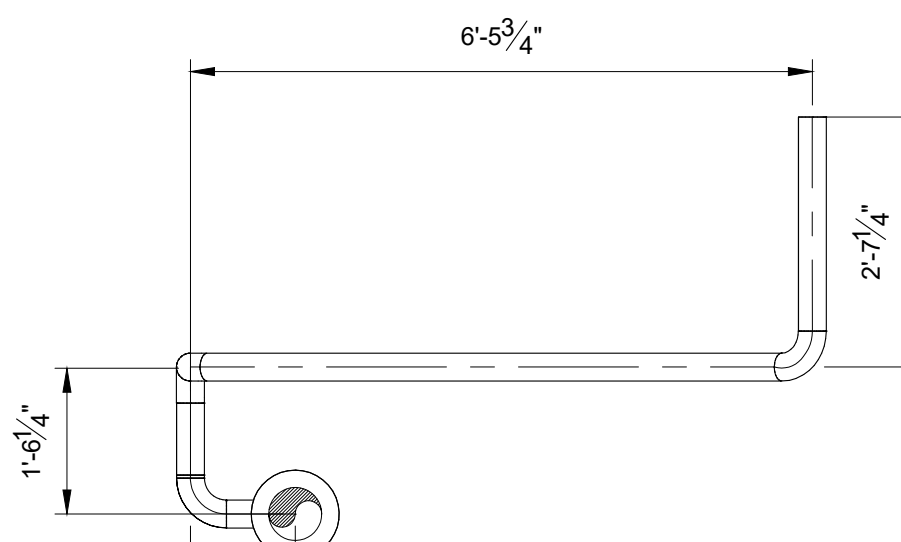
C SECTION VIEW - STM SPOOL 1
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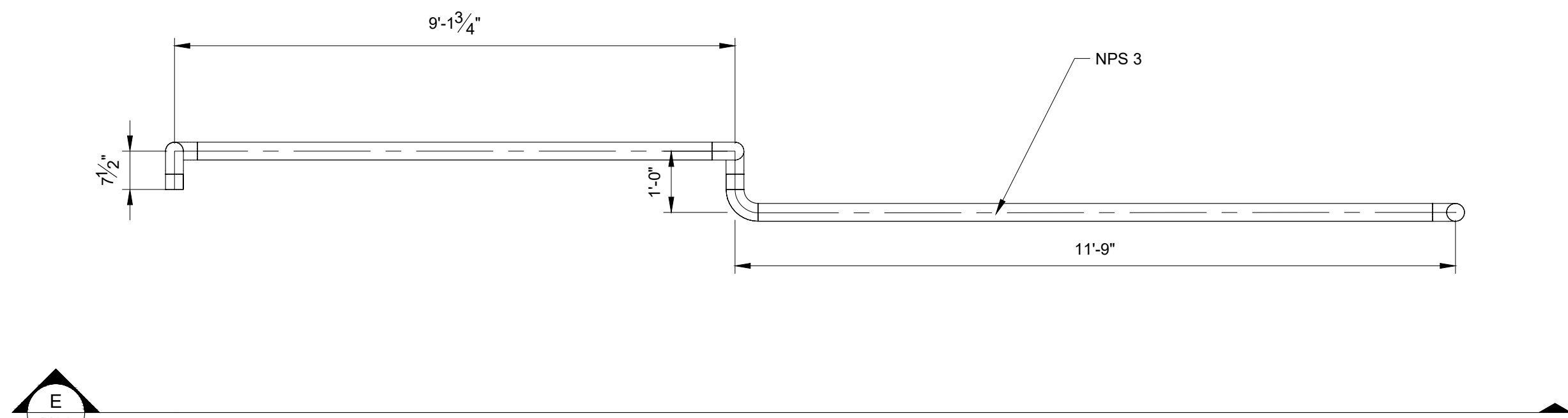
H ELEVATION VIEW - STM SPOOL 3
SCALE: 1/2" = 1'-0"



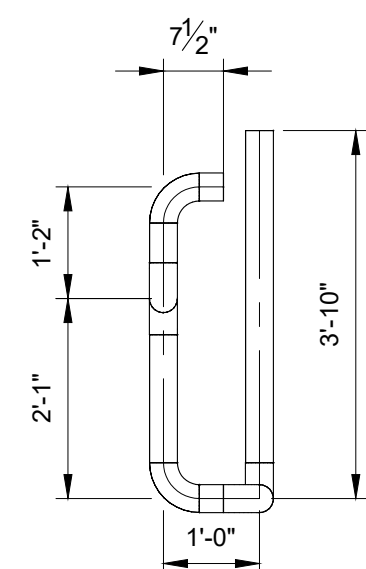
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SCALE: 1/2" = 1'-0"



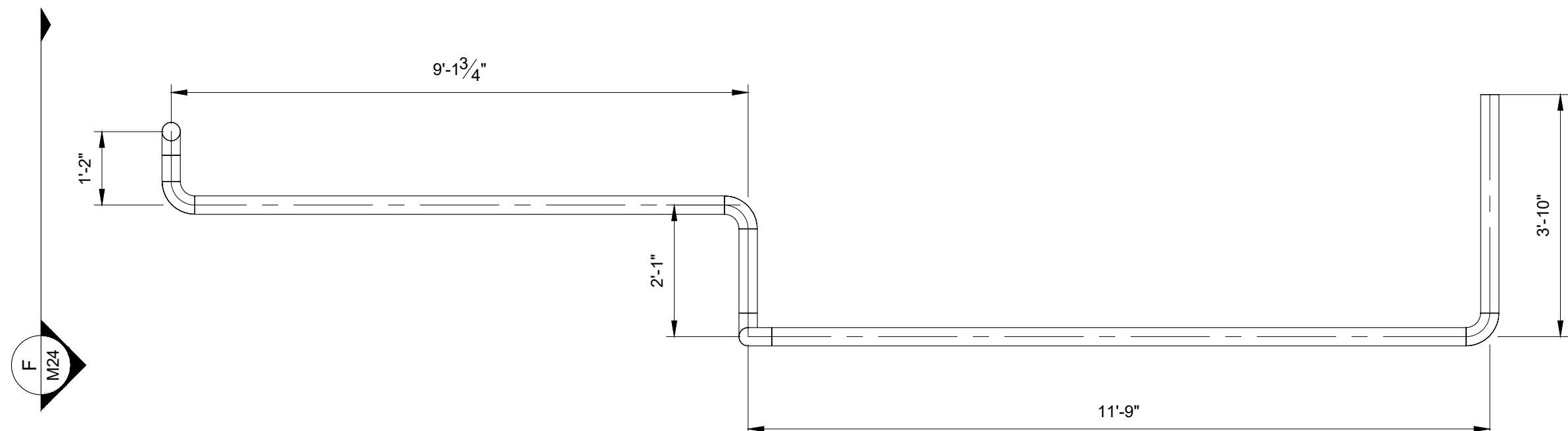
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SCALE: 1/2" = 1'-0"



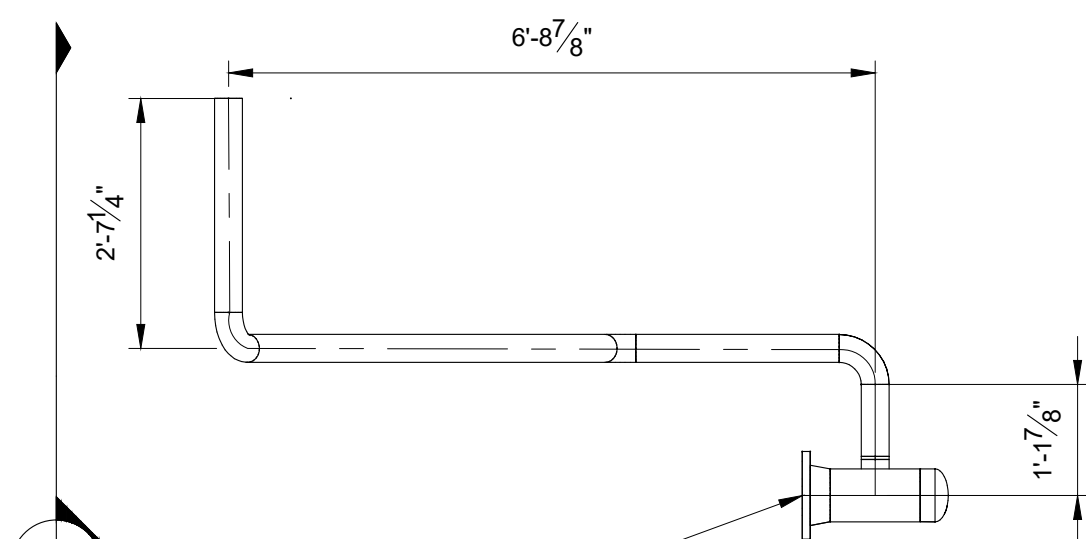
D PLAN VIEW - CND SPOOL 2
SCALE: 1/2" = 1'-0"



F SECTION VIEW - CND SPOOL 2
SCALE: 1/2" = 1'-0"



E ELEVATION VIEW - CND SPOOL 2
SCALE: 1/2" = 1'-0"



K ELEVATION VIEW - CND SPOOL 4
SCALE: 1/2" = 1'-0"

NOTES:

1. SPOOL DIMENSIONS PROVIDED FOR REFERENCE ONLY.

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

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CONSULTANT:

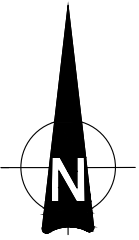
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CONSULTANT:

PROFESSIONAL STAMP

PROJECT NORTH



PROJECT:

QUEEN'S UNIVERSITY
BAN RIGH STEAM MANHOLE
REPLACEMENT

BADER LANE, KINGSTON, ONTARIO K7L 2S8

DRAWING:

MECHANICAL
TEMPORARY STEAM SPOOLS

DESIGN:

CS

DRAWN:

CS

CHECKED:

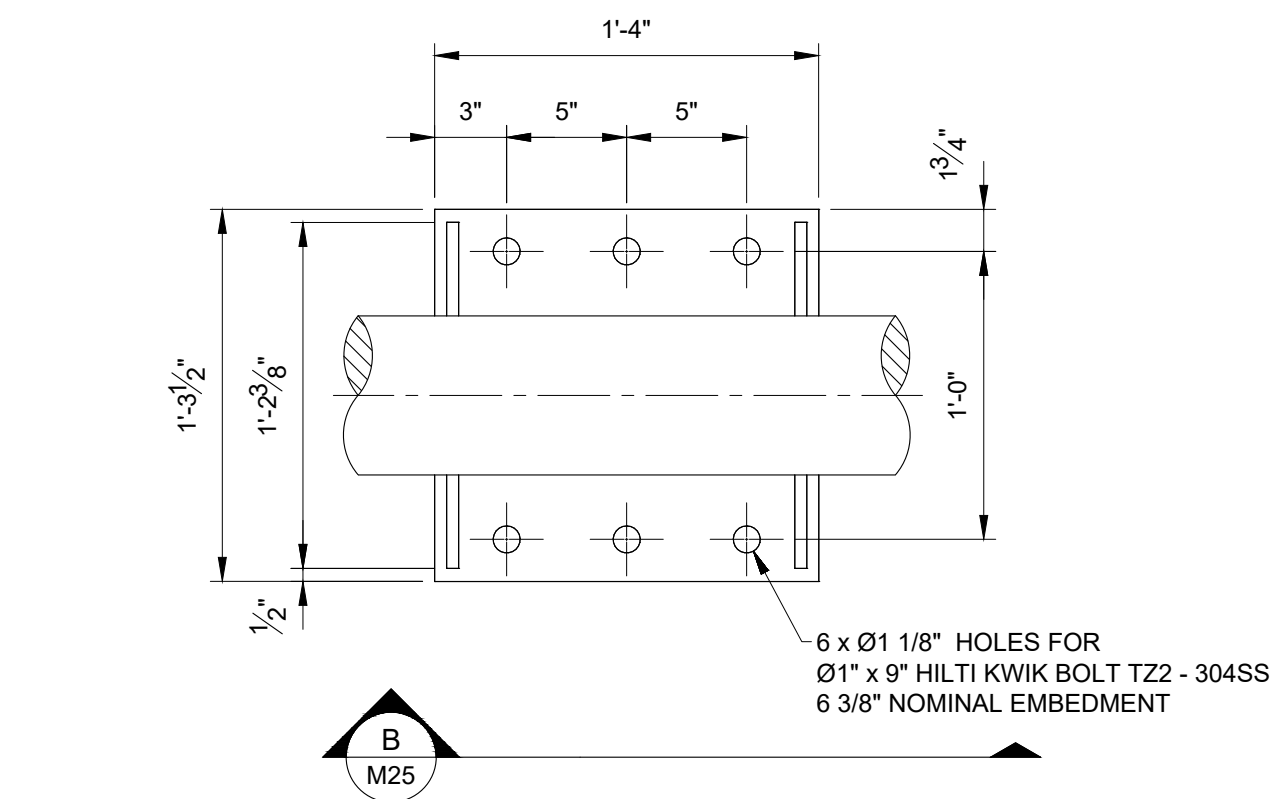
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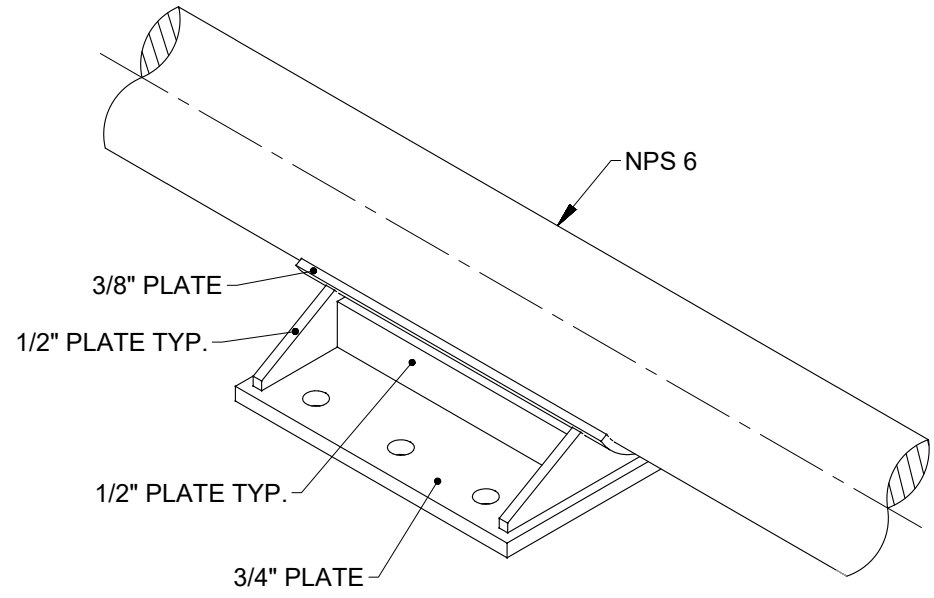
28079-002

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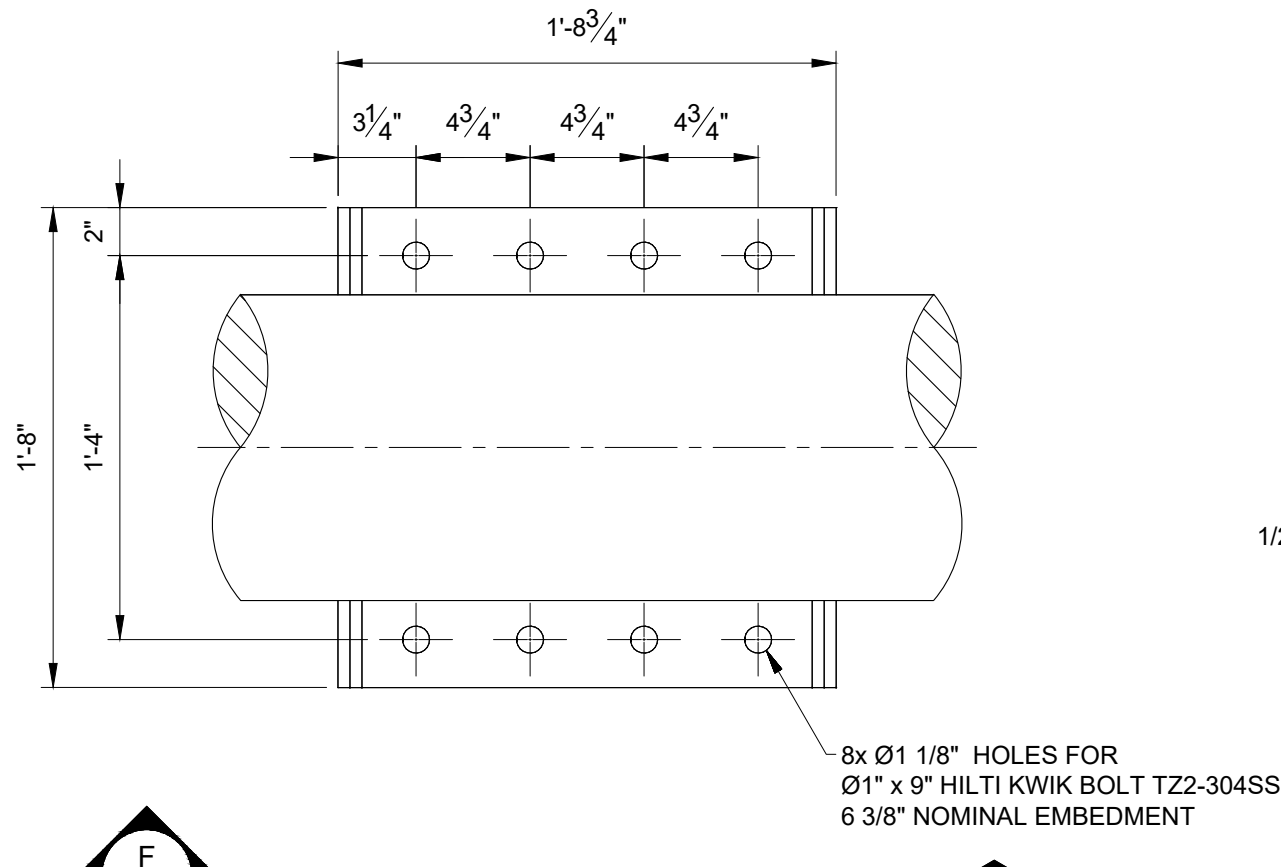
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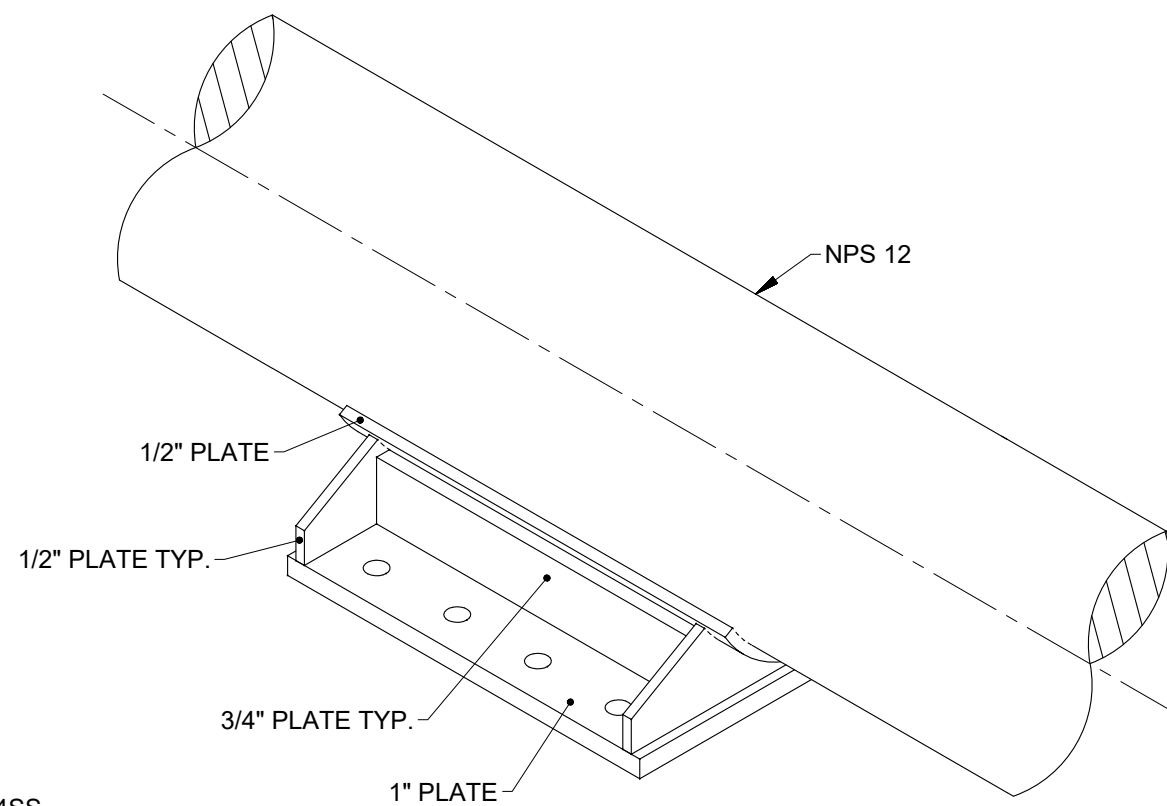
A PLAN VIEW - MH-02 AND MH-03 NPS 6 CND ANCHOR
SCALE: 1-1/2"=1'-0"



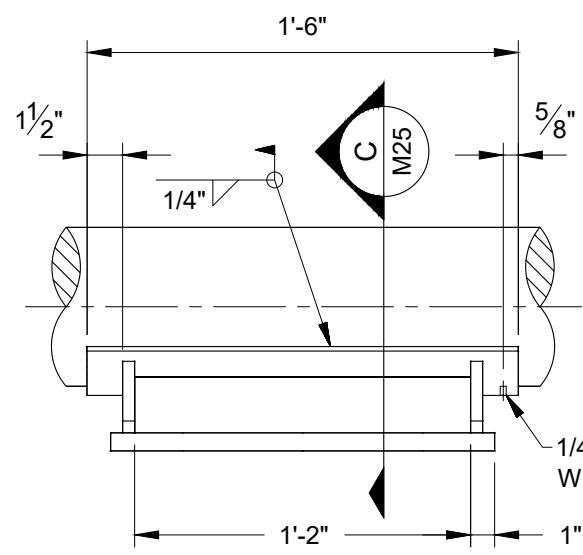
D ISOMETRIC VIEW
SCALE: 1-1/2"=1'-0"



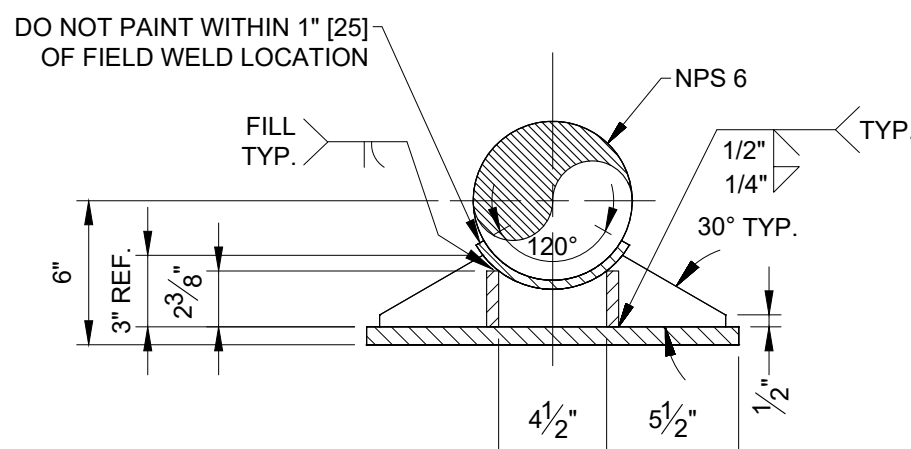
E PLAN VIEW - MH-02 AND MH-03 NPS 12 HPS ANCHOR
SCALE: 1-1/2"=1'-0"



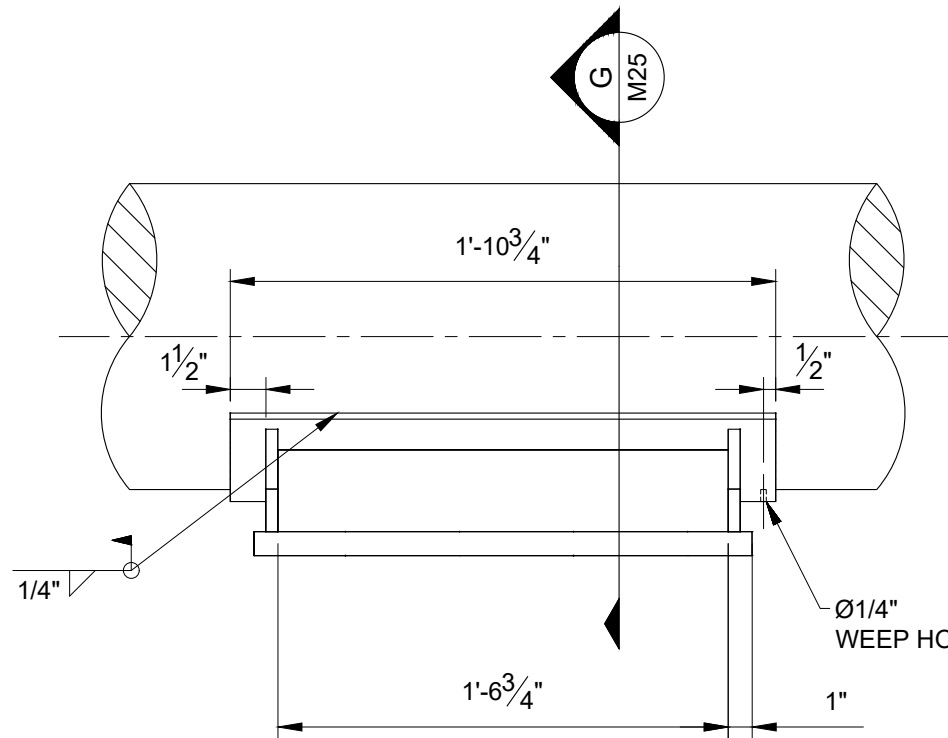
H ISOMETRIC VIEW
SCALE: 1-1/2"=1'-0"



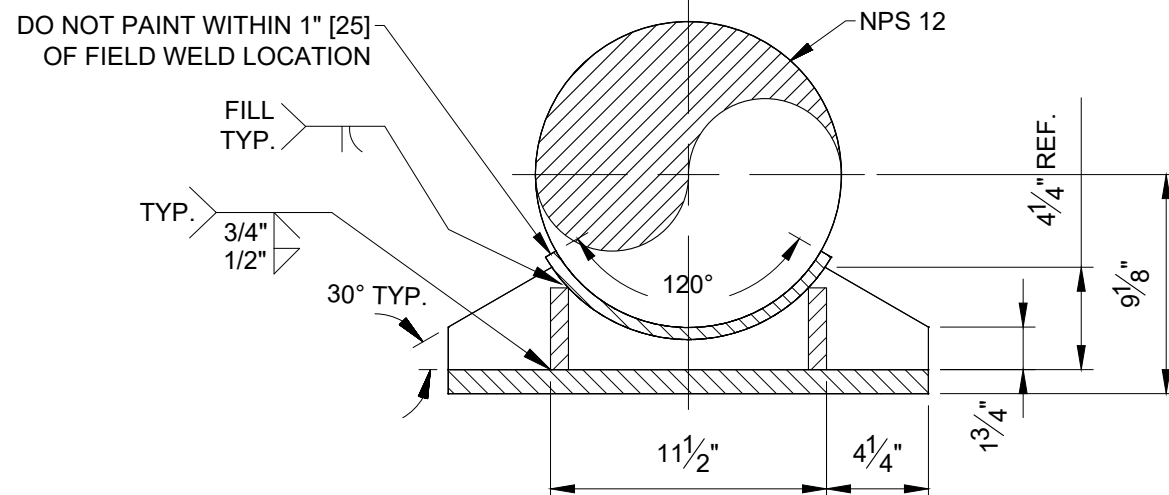
B SECTION VIEW
SCALE: 1-1/2"=1'-0"



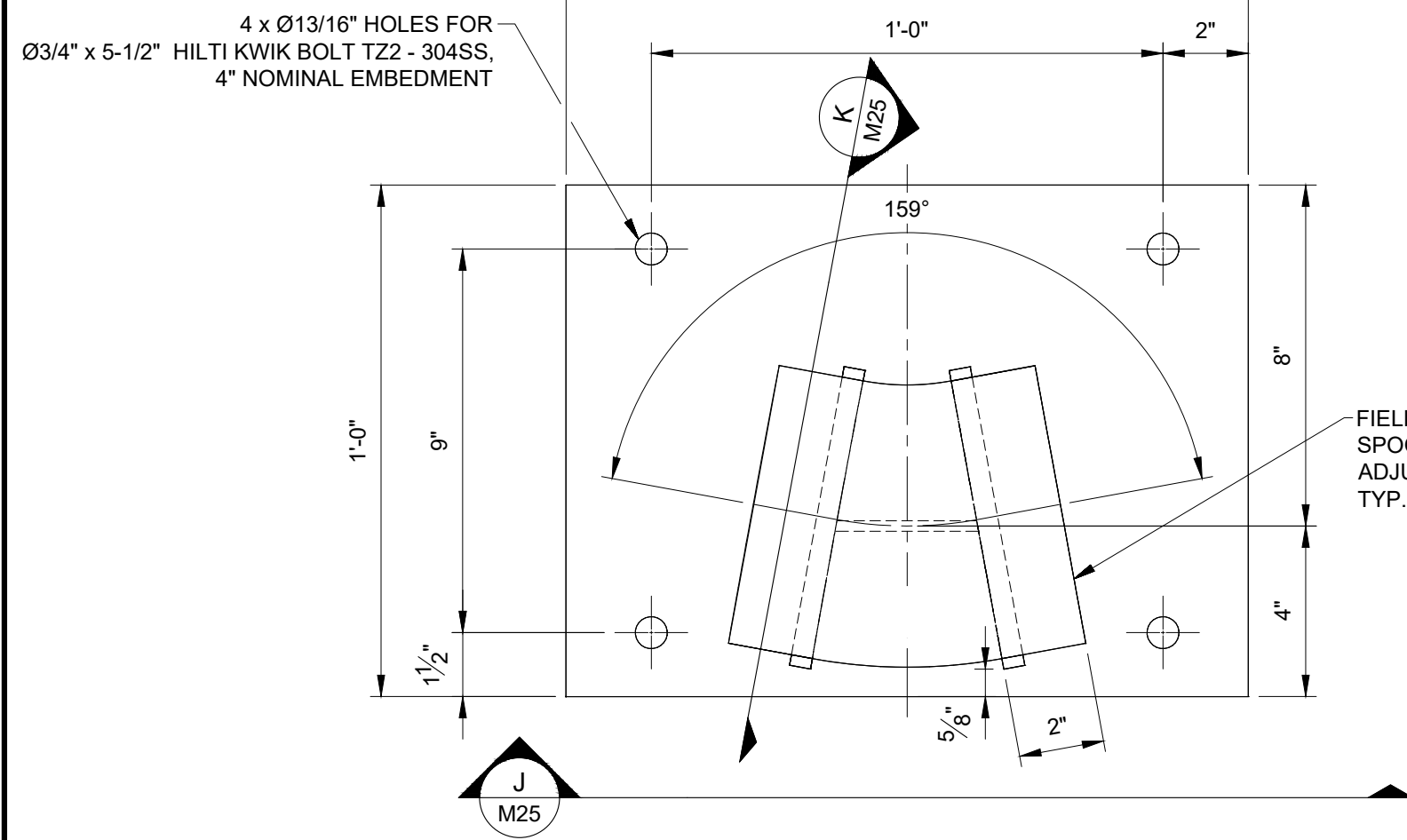
C SECTION VIEW
SCALE: 1-1/2"=1'-0"



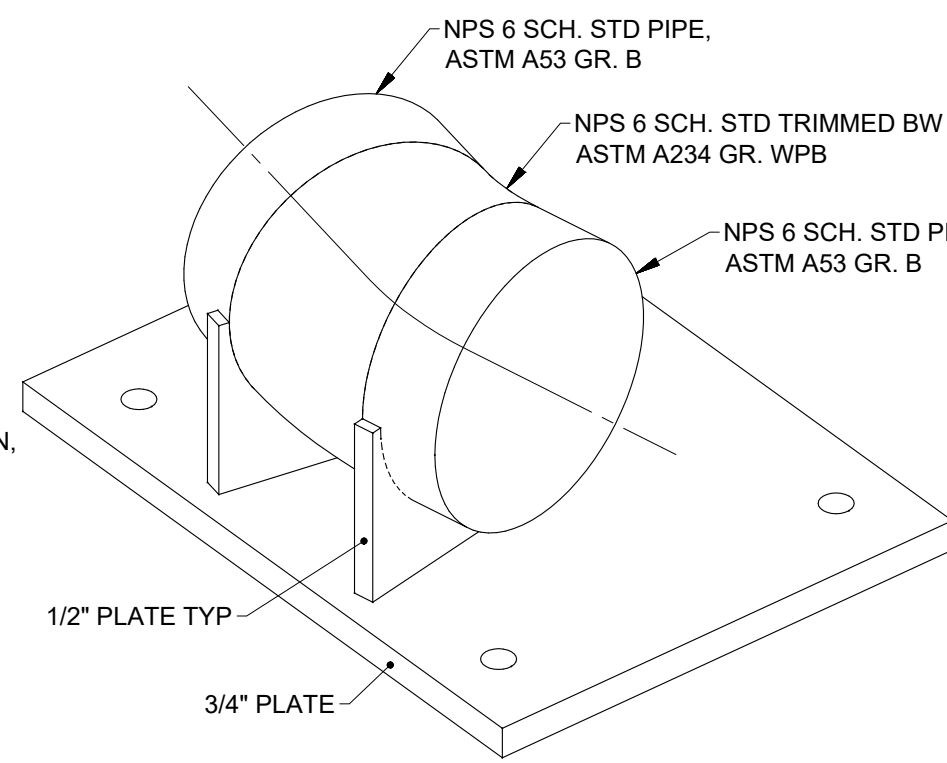
F SECTION VIEW
SCALE: 1-1/2"=1'-0"



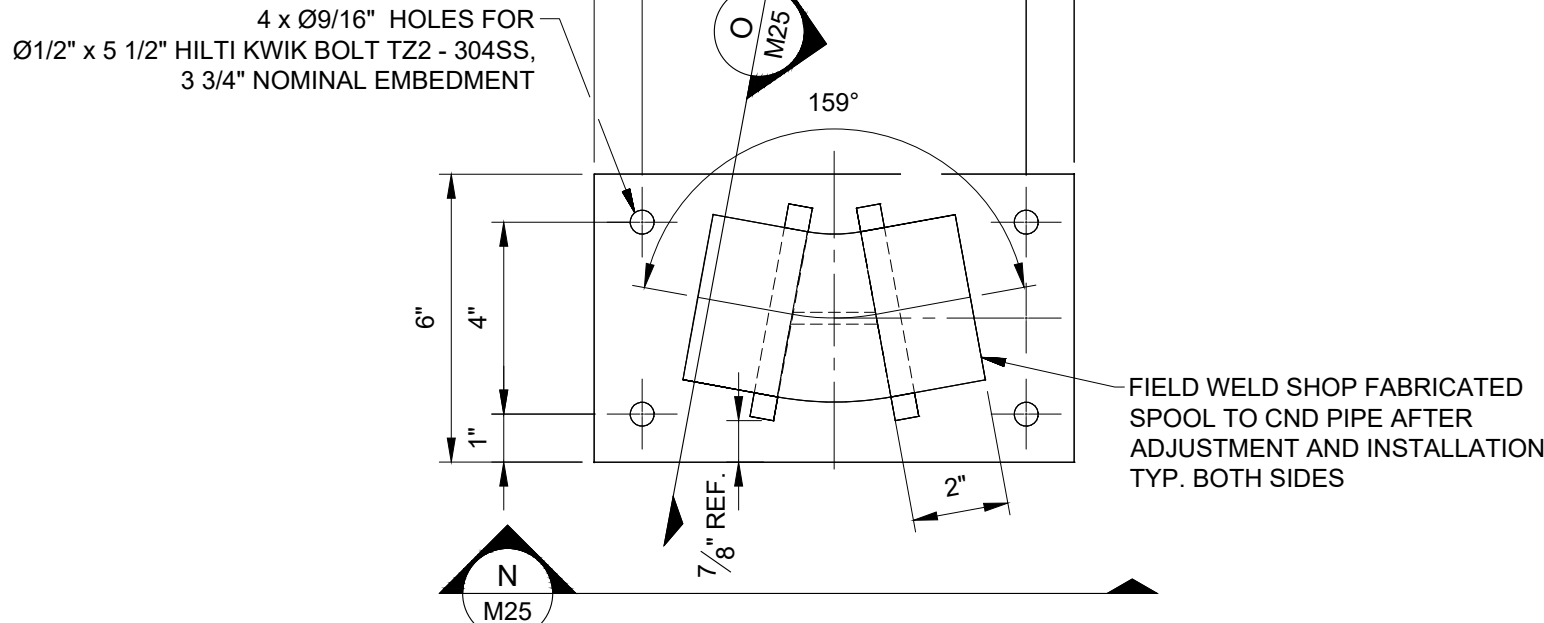
G SECTION VIEW
SCALE: 1-1/2"=1'-0"



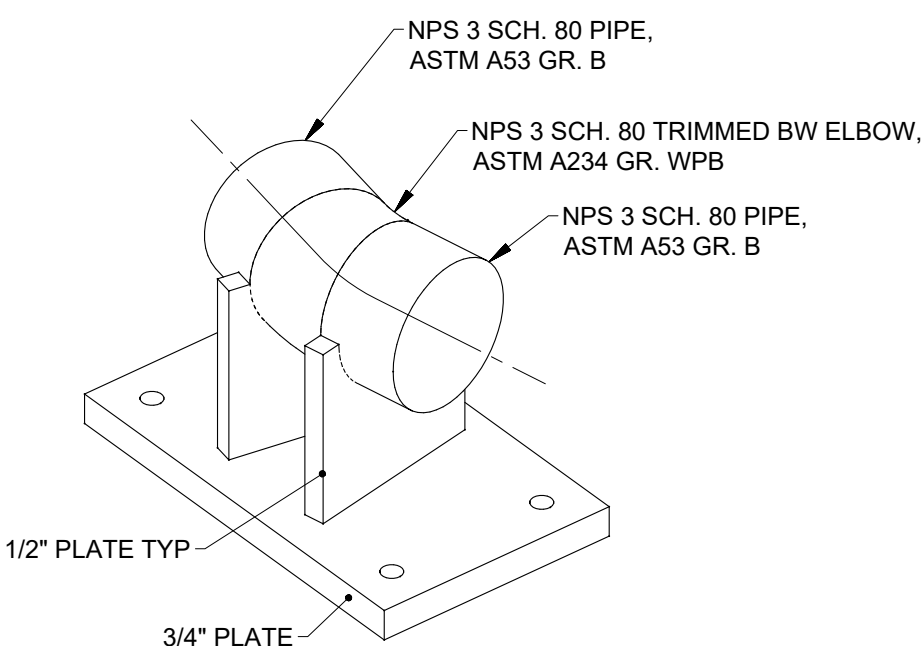
I PLAN VIEW - MH-V03 NPS 6 LPS ANCHOR
SCALE: 3"=1'-0"



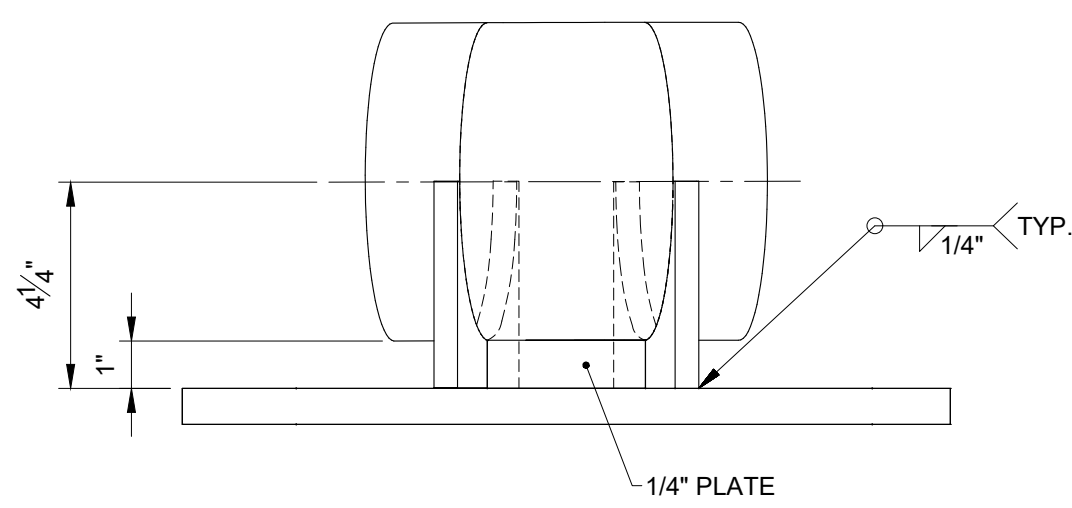
L ISOMETRIC VIEW
SCALE: 3"=1'-0"



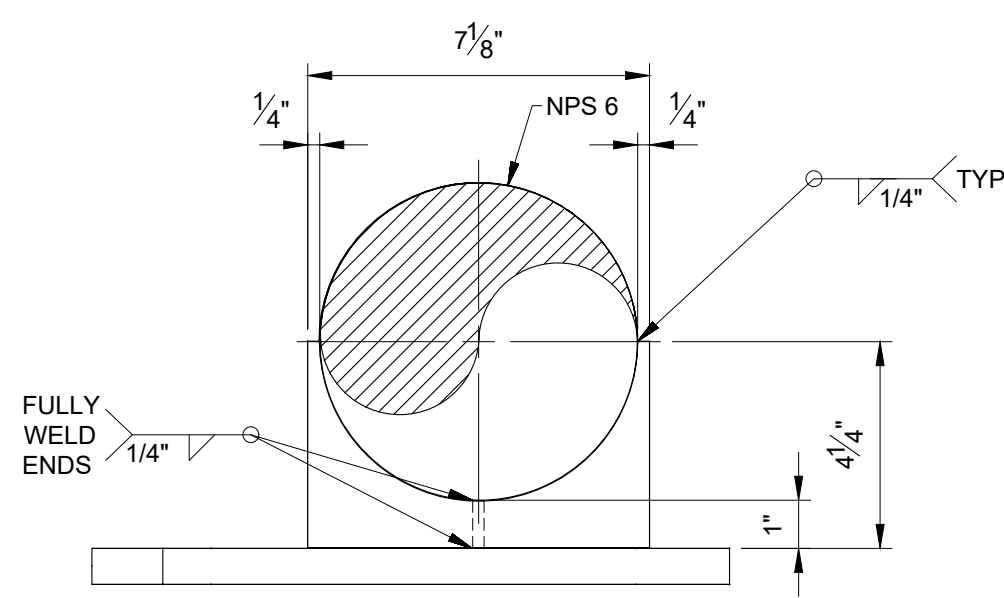
M PLAN VIEW - MH-V03 NPS 3 CND ANCHOR
SCALE: 3"=1'-0"



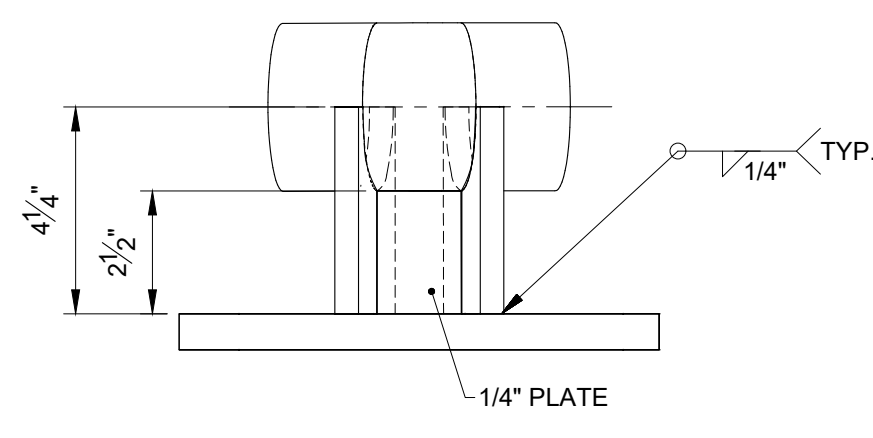
P ISOMETRIC VIEW
SCALE: 3"=1'-0"



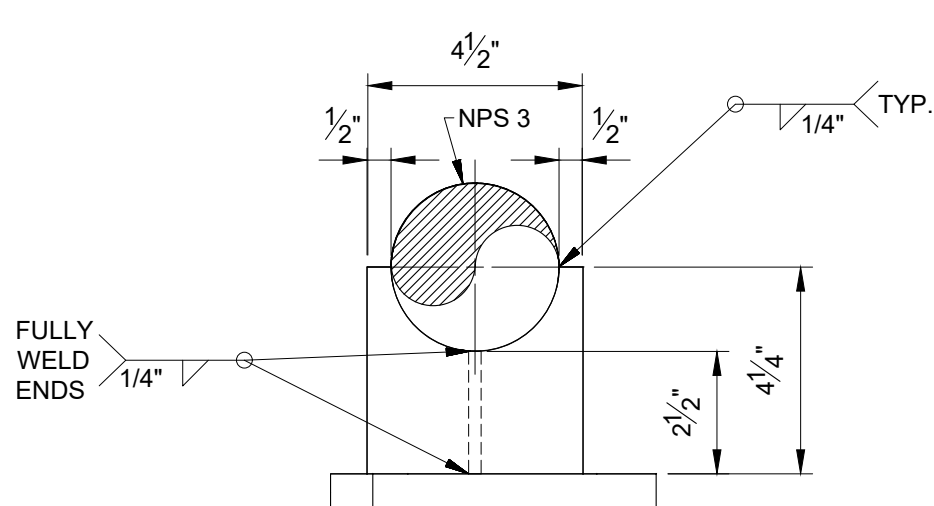
J SECTION VIEW
SCALE: 3"=1'-0"



K SECTION VIEW
SCALE: 3"=1'-0"



N SECTION VIEW
SCALE: 3"=1'-0"



O SECTION VIEW
SCALE: 3"=1'-0"

NOTES:

1. SEE DWG M00 FOR GENERAL NOTES.
2. PRIME AND PAINT WELDED ASSEMBLY AS REQUIRED, EXCEPT WHERE NOTED.
3. ALL MATERIAL TO BE CSA G40.21-50W STEEL UNLESS OTHERWISE SPECIFIED.
4. UNLESS NOTED OTHERWISE, ASSEMBLY TO BE FULLY WELDED WITH 1/4" FILLET OR GROOVE WELDS.

0	ISSUED FOR TENDER	27/04/26
No.	ISSUE / REVISION	DD/MM/YY

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SCALE: AS NOTED

CLIENT:



CONSULTANT: www.jrichards.ca

J.L. Richards
ENGINEERS - ARCHITECTS - PLANNERS

CONSULTANT:

PROFESSIONAL STAMP

PROJECT NORTH

PROJECT:

**QUEEN'S UNIVERSITY
BAN RIGH STEAM MANHOLE
REPLACEMENT**

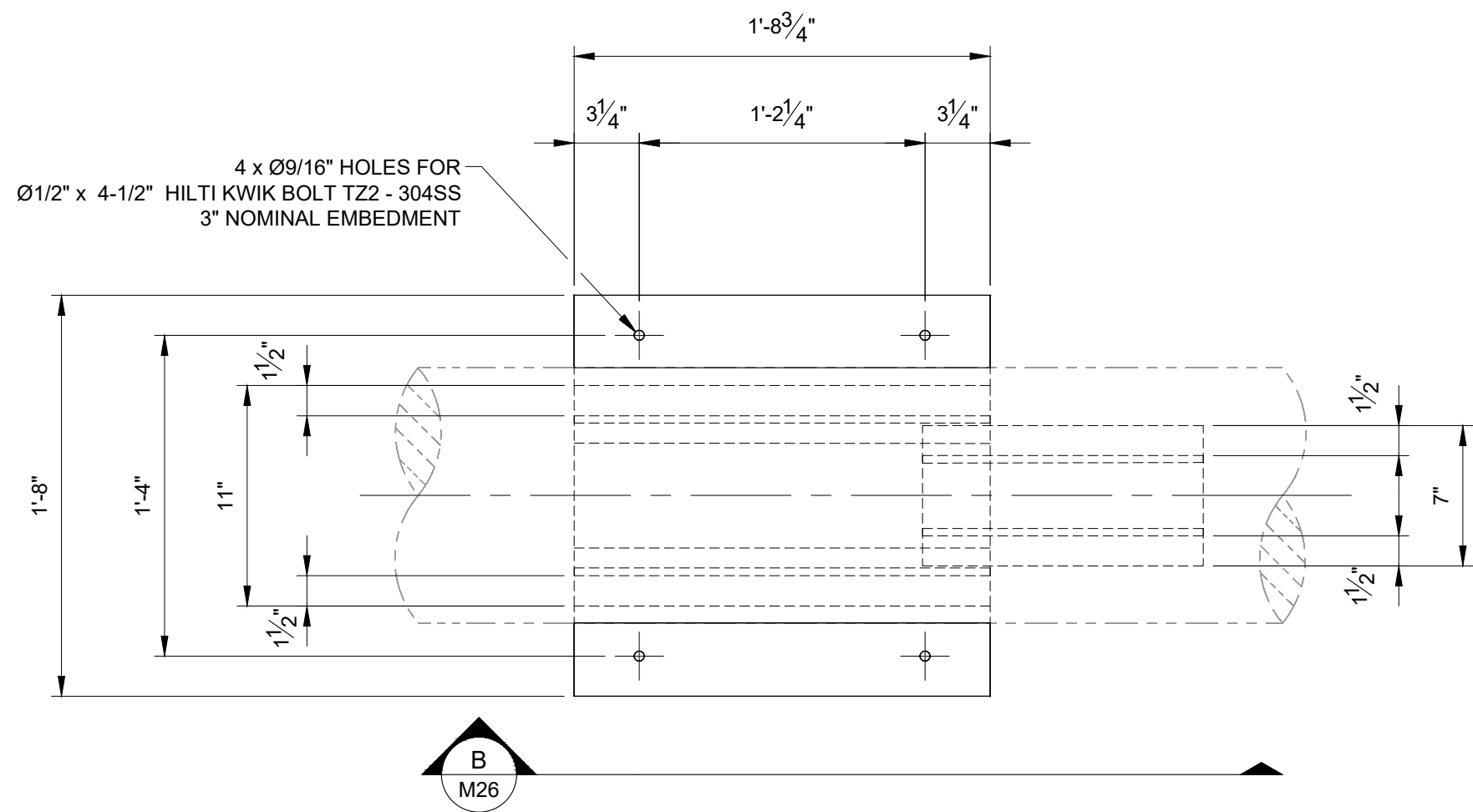
BADER LANE, KINGSTON, ONTARIO K7L 2S8

DRAWING:

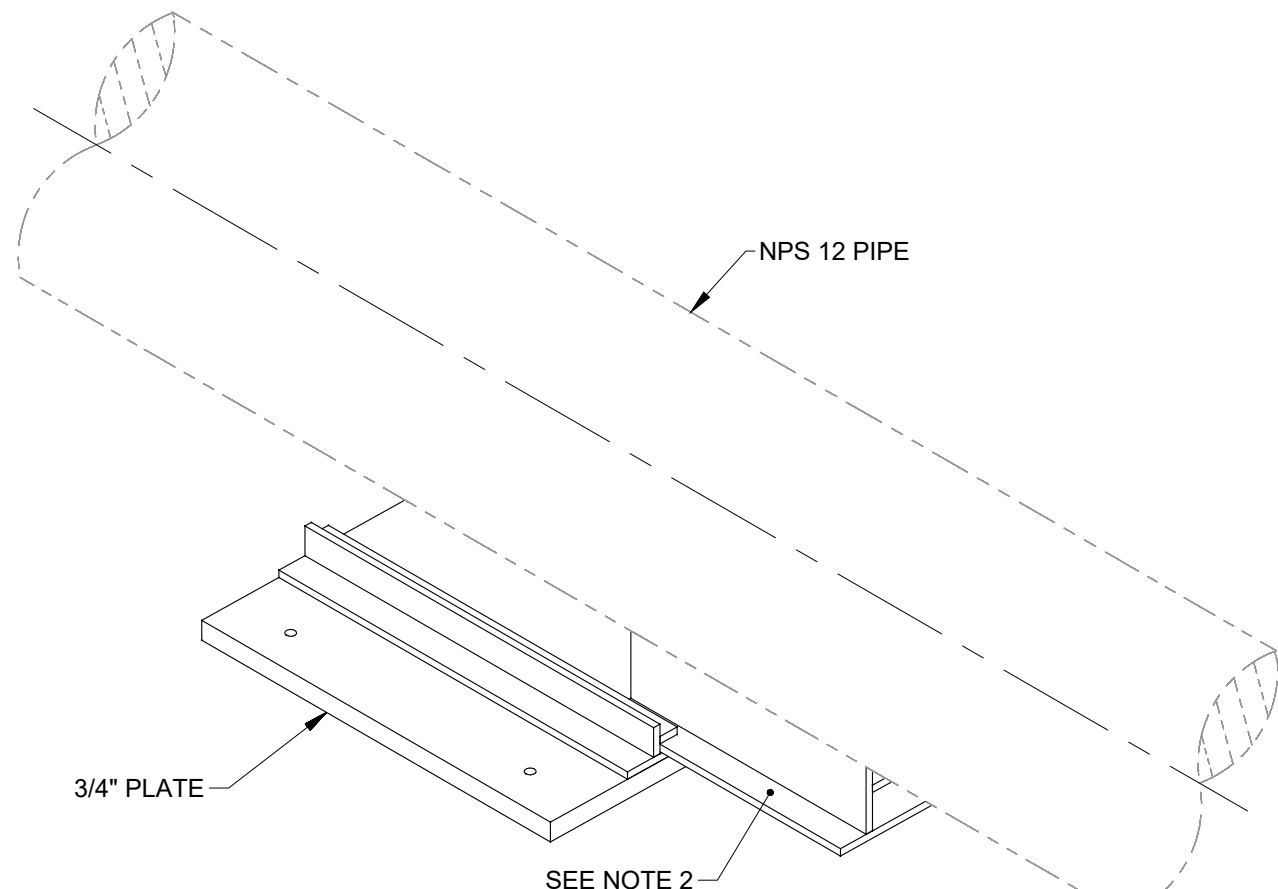
**MECHANICAL
ANCHOR DETAILS**

DESIGN: CS	DRAWING #:
DRAWN: CS	M25
CHECKED: MC	
JLR #: 28079-002	

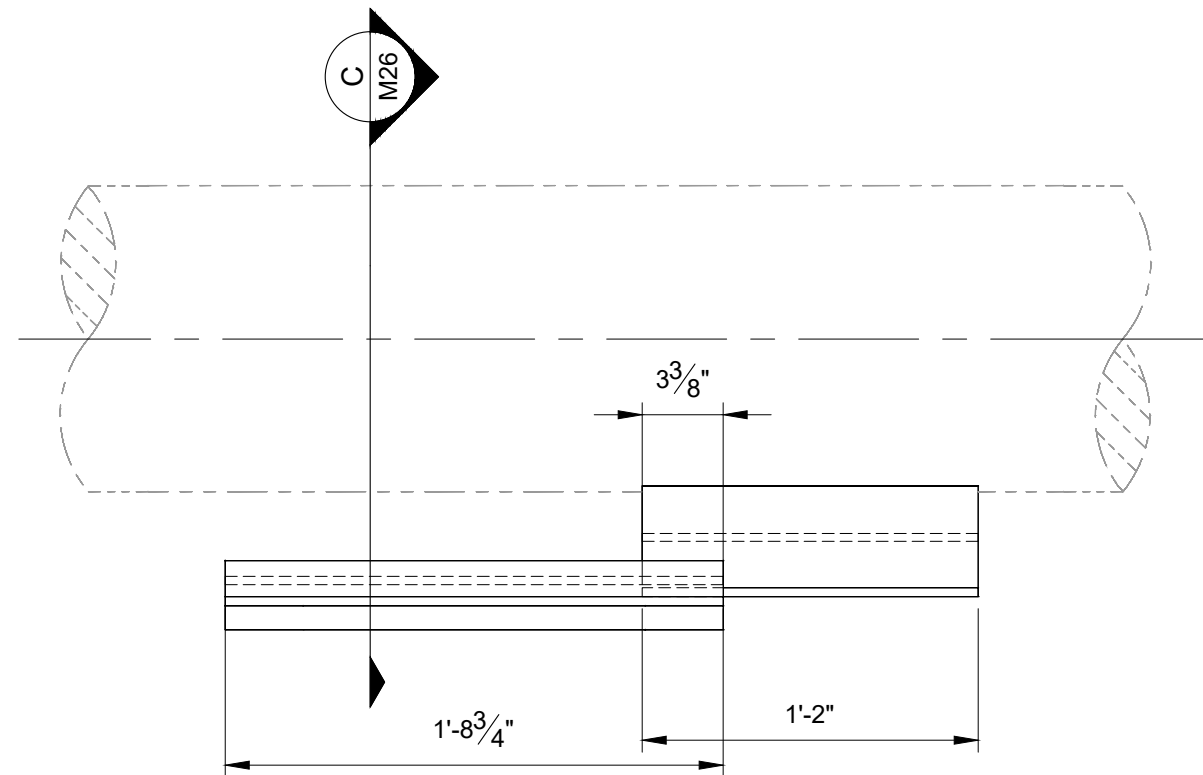
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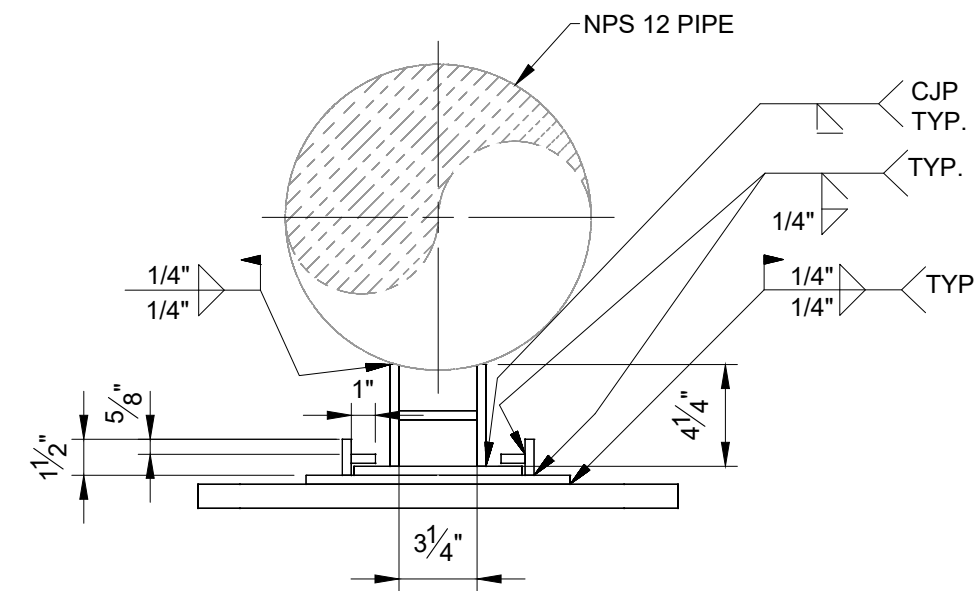
A PLAN VIEW - NPS 12 GUIDE
M21 SCALE: 1-1/2"=1'-0"



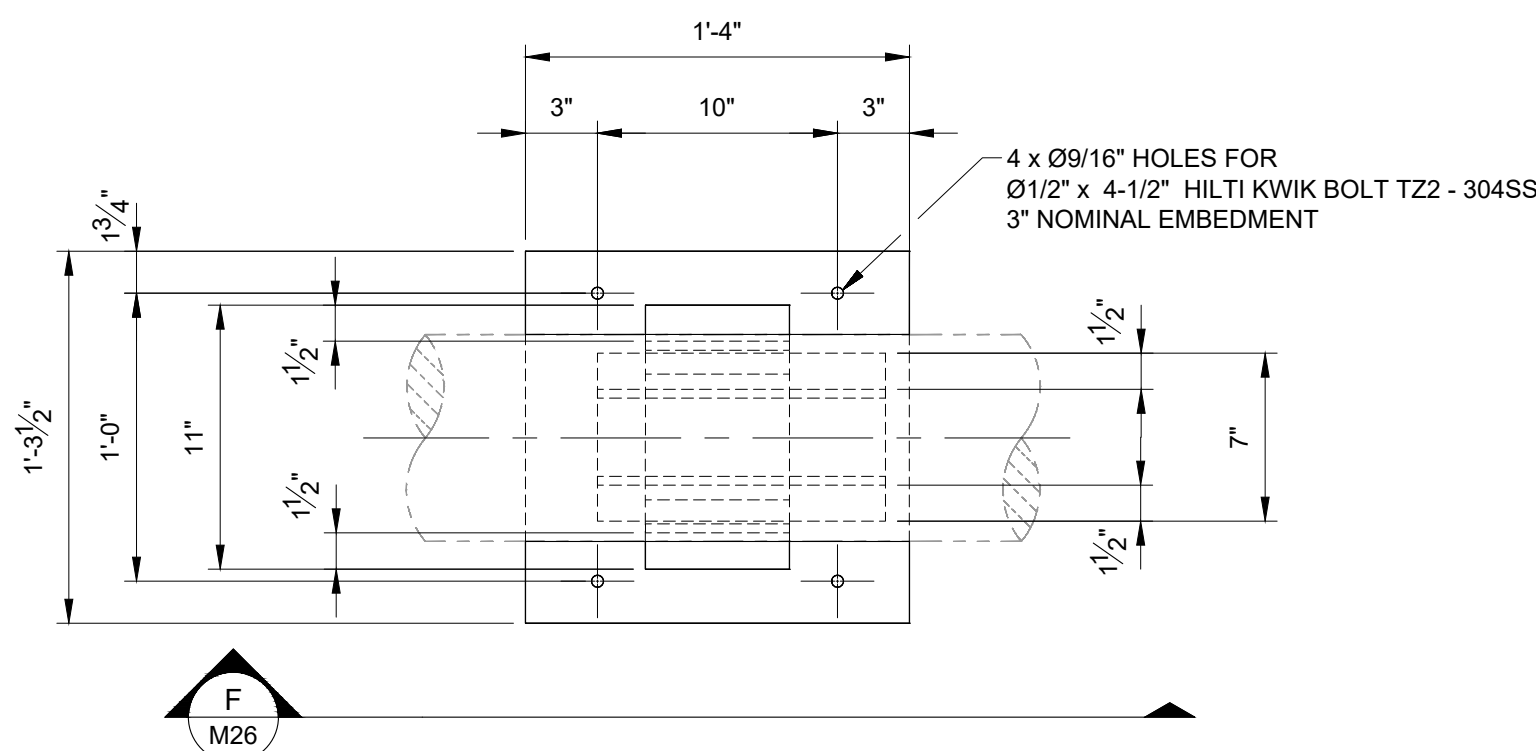
D ISOMETRIC VIEW - NPS 12 GUIDE
M26 SCALE: 1-1/2"=1'-0"



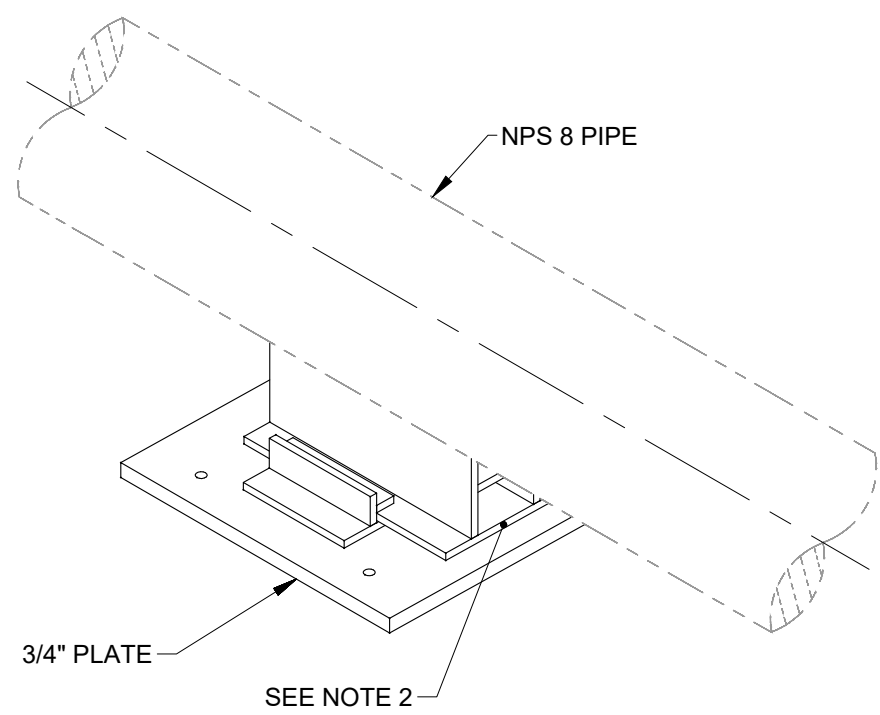
B SECTION VIEW - NPS 12 GUIDE
M26 SCALE: 1-1/2"=1'-0"



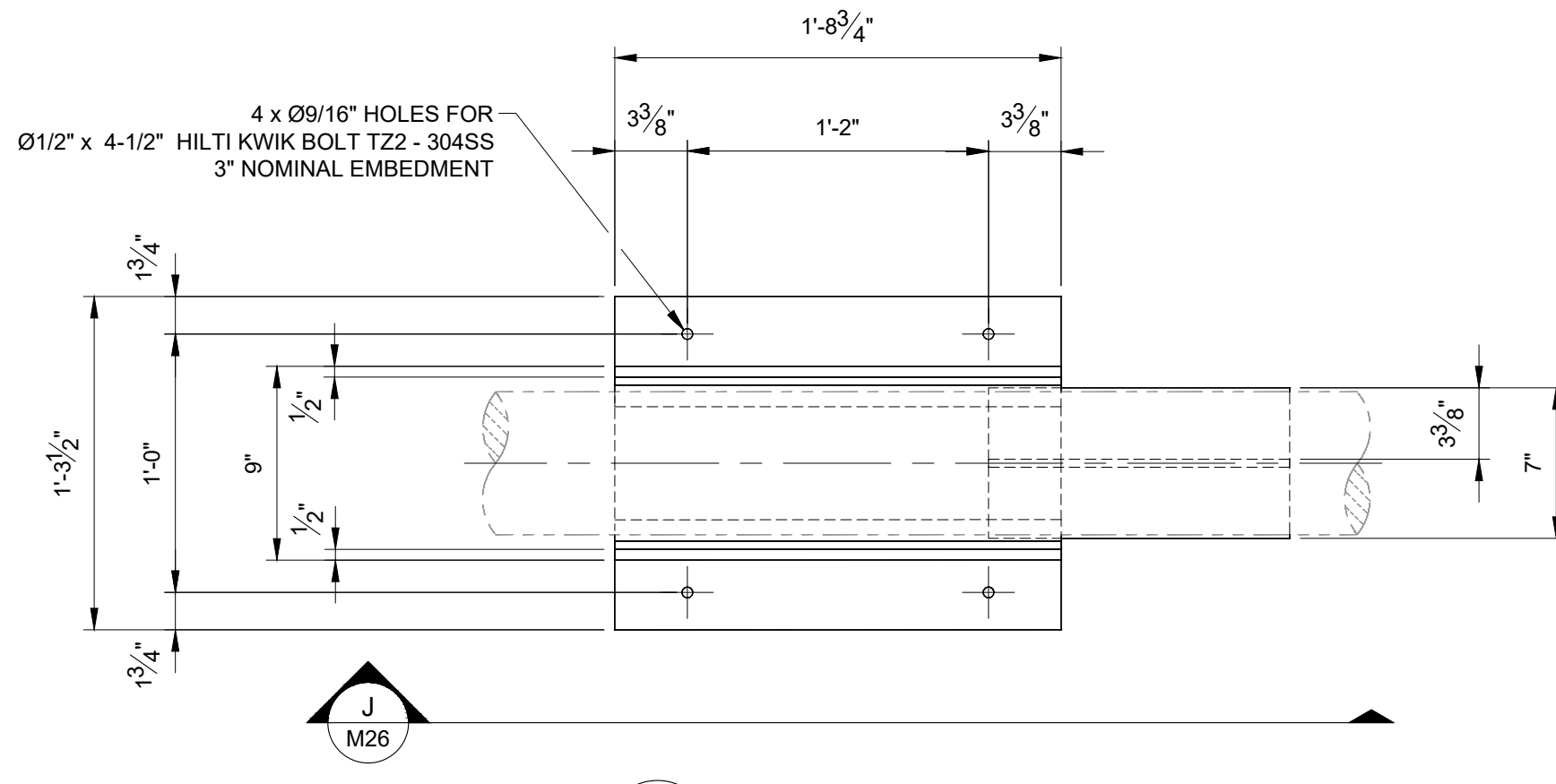
C SECTION VIEW - NPS 12 GUIDE
M26 SCALE: 1-1/2"=1'-0"



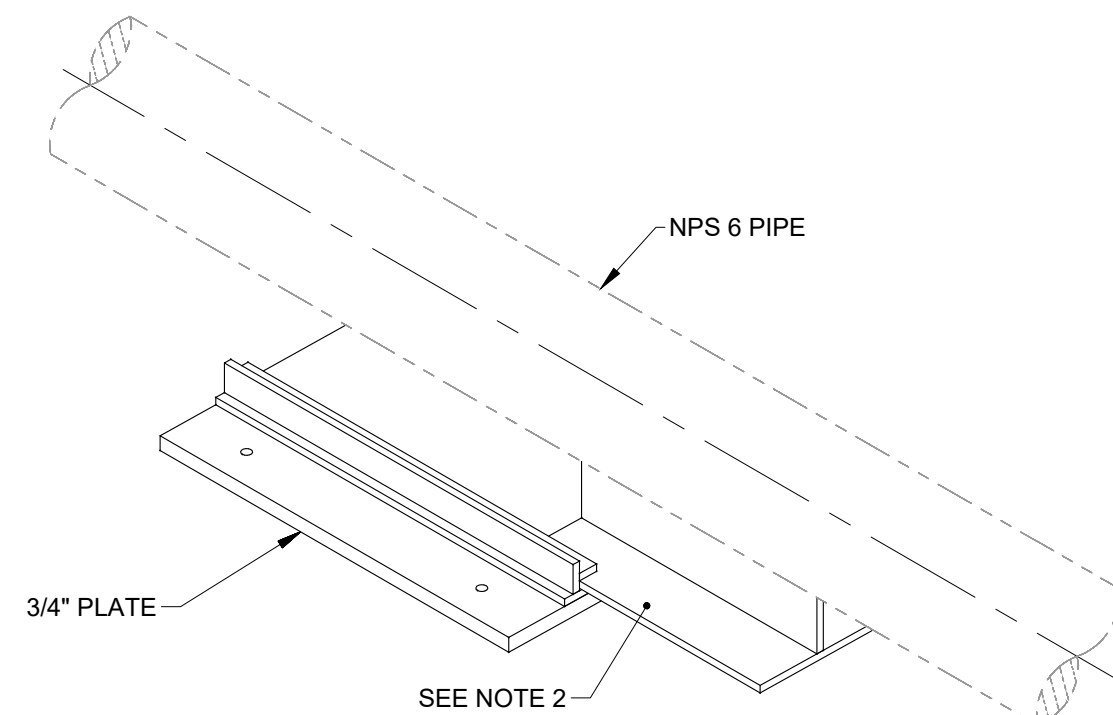
E PLAN VIEW - NPS 8 GUIDE
M21 SCALE: 1-1/2"=1'-0"



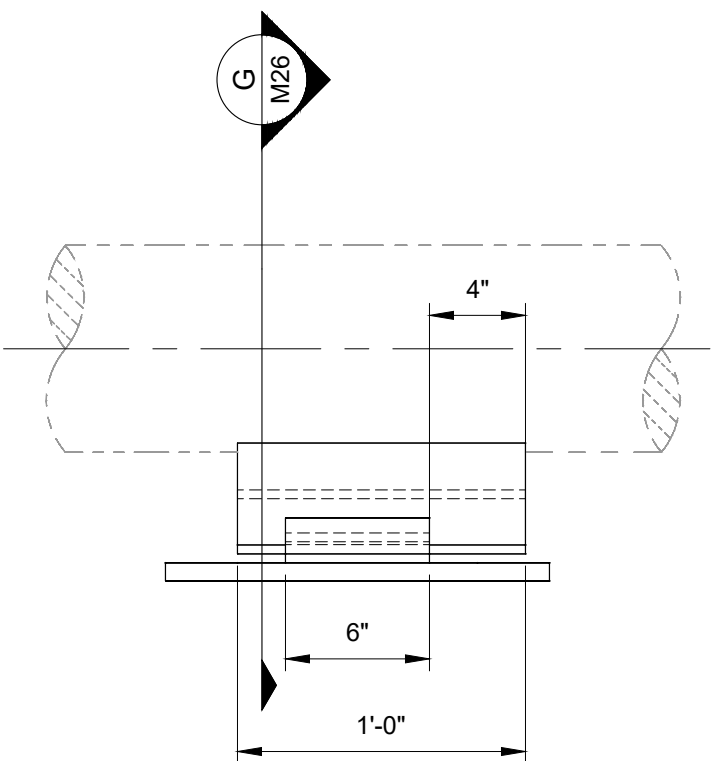
H ISOMETRIC VIEW - NPS 8 GUIDE
M26 SCALE: 1-1/2"=1'-0"



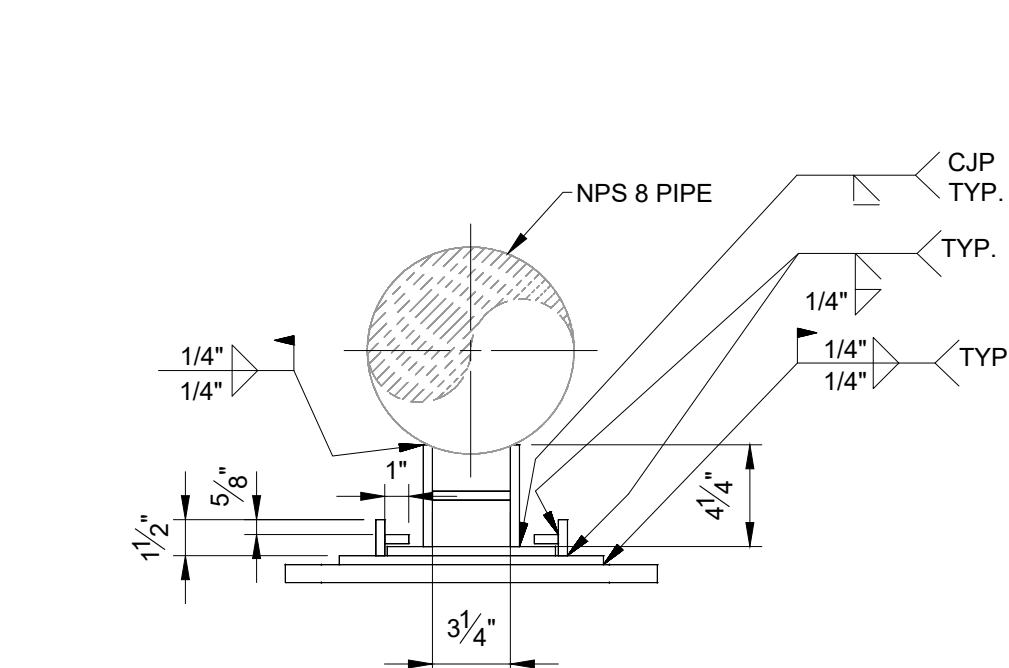
I PLAN VIEW - NPS 6 GUIDE
M21 SCALE: 1-1/2"=1'-0"



L ISOMETRIC VIEW - NPS 6 GUIDE
M26 SCALE: 1-1/2"=1'-0"

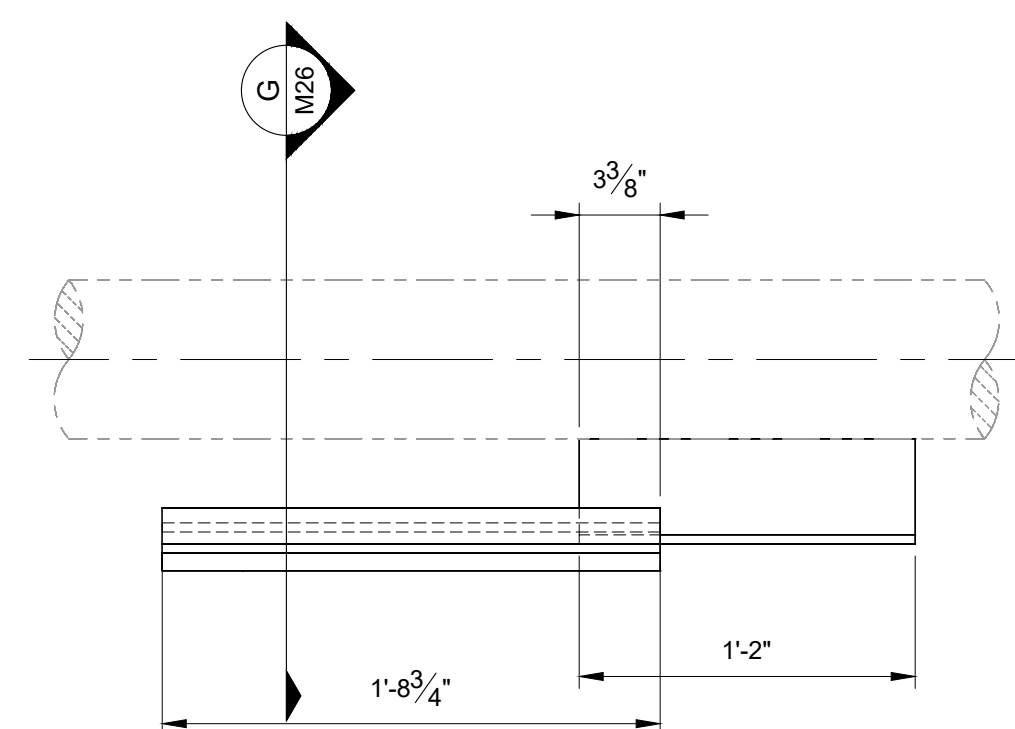


F SECTION VIEW - NPS 8 GUIDE
M26 SCALE: 1-1/2"=1'-0"

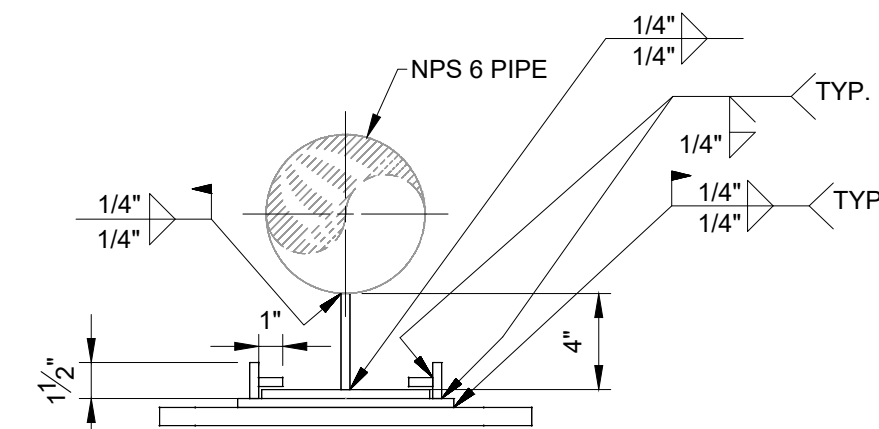


G SECTION VIEW - NPS 8 GUIDE
M26 SCALE: 1-1/2"=1'-0"

GUIDE TO BE SET SO THERE IS NO GAP ON EAST SIDE



J SECTION VIEW - NPS 6 GUIDE
M26 SCALE: 1-1/2"=1'-0"



K SECTION VIEW - NPS 6 GUIDE
M26 SCALE: 1-1/2"=1'-0"

NOTES:

1. SEE DWG M00 FOR GENERAL NOTES.
2. ALL PLATE IS 3/8" THK. CSA G40.21 44W UNLESS OTHERWISE NOTED.

0	ISSUED FOR TENDER	27/04/26
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No.	ISSUE / REVISION	DD/MM/YY
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CLIENT:



CONSULTANT: www.jrichards.ca



CONSULTANT:

PROFESSIONAL STAMP PROJECT NORTH

PROJECT: QUEEN'S UNIVERSITY
BAN RIGH STEAM MANHOLE
REPLACEMENT
BADER LANE, KINGSTON, ONTARIO K7L 2S8

DRAWING:

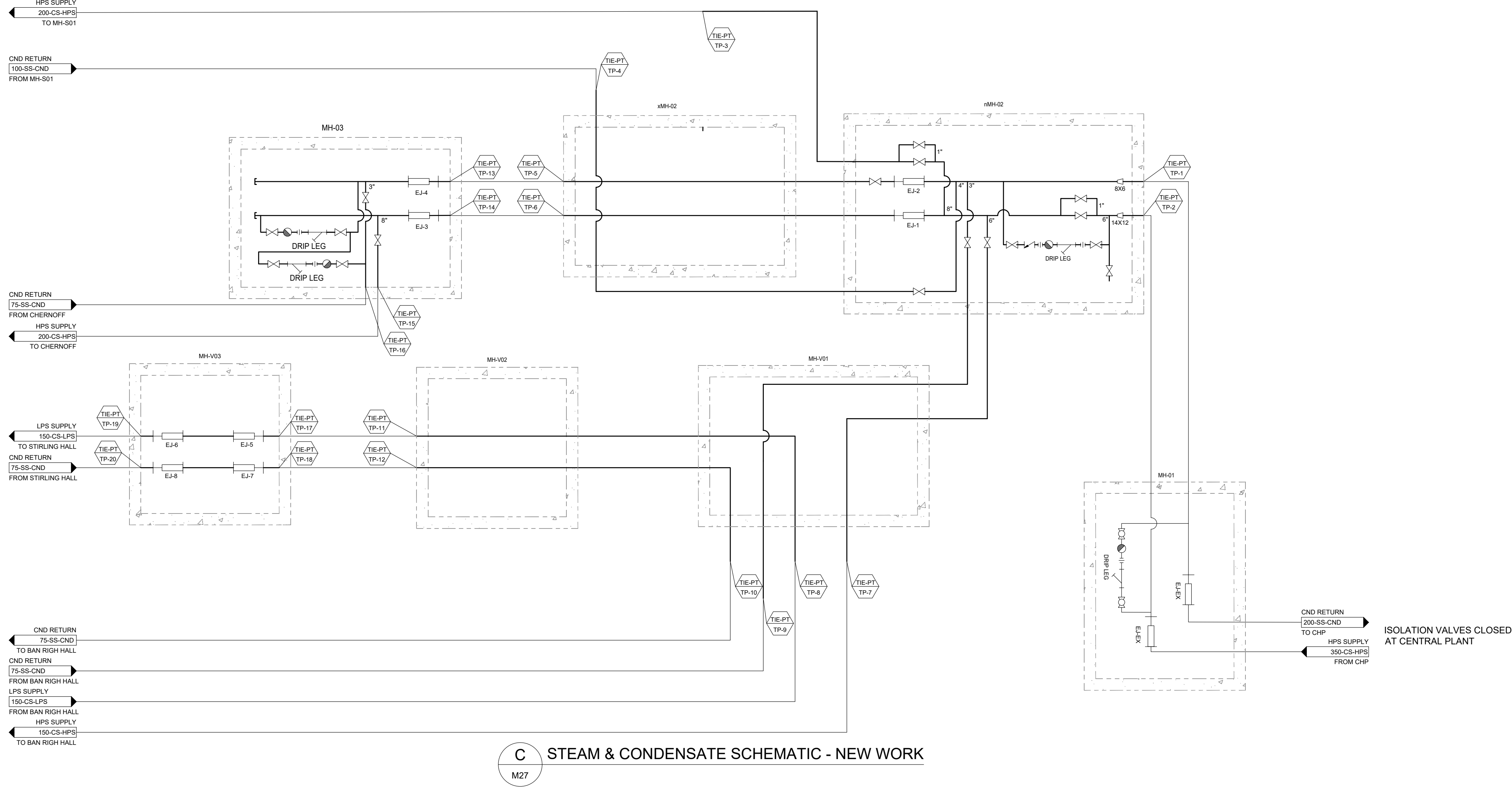
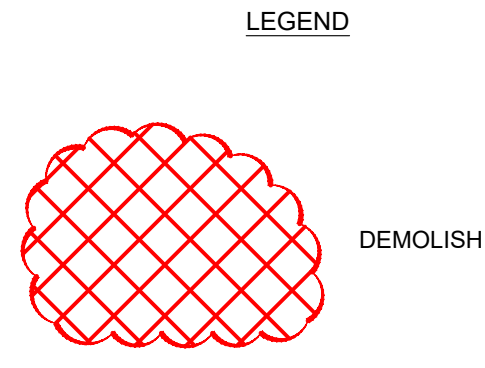
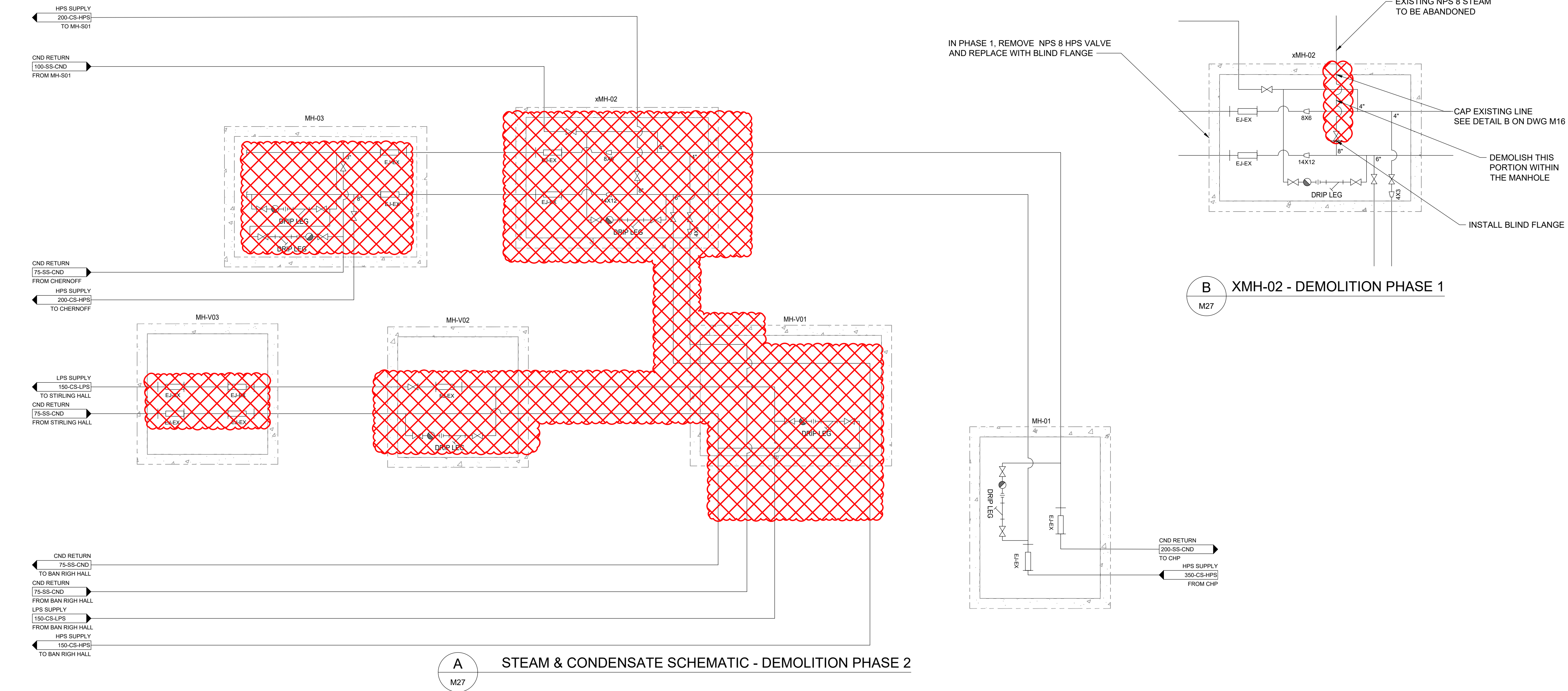
MECHANICAL
GUIDE DETAILS

DESIGN: CS
DRAWN: CS
CHECKED: MC
JLR #: 28079-002

DRAWING #:
M26

PLOT DATE: Monday, April 27, 2026 2:53:21 PM

File Name: 28079-M27.dwg



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PROJECT:

QUEEN'S UNIVERSITY
BAN RIGH STEAM MANHOLE
REPLACEMENT

BADER LANE, KINGSTON, ONTARIO K7L 2S8

DRAWING:

PROCESS MECHANICAL
SCHEMATICS

DESIGN: CS
DRAWN: CS
CHECKED: MC
JLR #: 28079-002

DRAWING #:
M27

PLOT DATE: Monday, April 27, 2026 2:35:57 PM