

# 100% SUBMITTAL DRAWINGS FOR LINDE FUSRAP PROJECT NO. 07-3210.02, TASK NO.2 - UTILITY REPLACEMENT PROJECT TONAWANDA, NEW YORK

DRAWING LIST		
DRAWING No	TITLE	REFERENCE
	<b>GENERAL</b>	<b>CONSULTANT</b>
DWG-10060-001	PROJECT COVER SHEET AND DRAWING INDEX	RJR ENGINEERING
DWG-10060-010	SITE PLAN - GENERAL ARRANGEMENT	RJR ENGINEERING
	<b>EXCAVATION DRAWINGS</b>	<b>CONSULTANT</b>
DWG-10060-100	EXCAVATION DETAILS - JUNCTION BOX 7A - LOOKING EAST	RJR ENGINEERING
DWG-10060-101	EXCAVATION DETAILS - JUNCTION BOX 7A - LOOKING NORTH	RJR ENGINEERING
DWG-10060-102	EXCAVATION DETAILS - JUNCTION BOX 8A - LOOKING EAST	RJR ENGINEERING
DWG-10060-103	EXCAVATION DETAILS - JUNCTION BOX 8A - LOOKING NORTH	RJR ENGINEERING
DWG-10060-104	EXCAVATION DETAILS - JUNCTION BOX 9A - LOOKING EAST	RJR ENGINEERING
DWG-10060-105	EXCAVATION DETAILS - JUNCTION BOX 9A - LOOKING NORTH	RJR ENGINEERING
	<b>STRUCTURAL DRAWINGS</b>	<b>CONSULTANT</b>
DWG-10058-000	SPECIFICATIONS	RJR ENGINEERING
DWG-10058-002	LOCATION PLAN	RJR ENGINEERING
DWG-10058-003	JUNCTION BOX 9A PLAN AND SECTIONS	RJR ENGINEERING
DWG-10058-004	JUNCTION BOX 9A SECTIONS AND DETAILS	RJR ENGINEERING
DWG-10058-005	JUNCTION BOX 7A PLAN, SECTIONS, AND DETAILS	RJR ENGINEERING
DWG-10058-006	JUNCTION BOX 8A PLAN AND SECTIONS	RJR ENGINEERING
DWG-10058-007	JUNCTION BOX 8A SECTIONS AND DETAILS	RJR ENGINEERING
DWG-10058-008	EXISTING CABLE VAULT DEMOLITION	RJR ENGINEERING
DWG-10058-009	CABLE VAULT EXTENSION PLAN AND SECTIONS	RJR ENGINEERING
DWG-10058-011	CABLE VAULT EXTENSION DETAILS	RJR ENGINEERING

DRAWING LIST		
DRAWING No	TITLE	REFERENCE
	<b>MECHANICAL DRAWINGS</b>	<b>CONSULTANT</b>
DWG-10060-200	MECHANICAL UTILITIES - GENERAL NOTES AND SPECIFICATIONS	RJR ENGINEERING
DWG-10060-205	MECHANICAL UTILITIES - PIPING SCHEDULE	RJR ENGINEERING
DWG-10060-210	MECHANICAL UTILITIES - PROPOSED ROUTING PLAN	RJR ENGINEERING
DWG-10060-211	MECHANICAL UTILITIES - NORTH-SOUTH TRENCH DETAILS	RJR ENGINEERING
DWG-10060-212	MECHANICAL UTILITIES - EAST-WEST TRENCH DETAILS	RJR ENGINEERING
DWG-10060-214	MECHANICAL UTILITIES - NORTH-SOUTH TRENCH @ 10'-0" FROM 8A	RJR ENGINEERING
DWG-10060-215	MECHANICAL UTILITIES - NORTH-SOUTH TRENCH @ 1/2 POINT FROM 8A	RJR ENGINEERING
DWG-10060-216	MECHANICAL UTILITIES - NORTH-SOUTH TRENCH @ 10'-0" FROM 7A	RJR ENGINEERING
DWG-10060-217	MECHANICAL UTILITIES - EAST-WEST TRENCH @ 10'-0" FROM 9A	RJR ENGINEERING
DWG-10060-218	MECHANICAL UTILITIES - EAST-WEST TRENCH @ 1/2 POINT FROM 9A	RJR ENGINEERING
DWG-10060-219	MECHANICAL UTILITIES - EAST-WEST TRENCH @ 10'-0" FROM 7A	RJR ENGINEERING
DWG-10060-220	MECHANICAL UTILITIES - JUNCTION BOX 7A PLAN	RJR ENGINEERING
DWG-10060-221	MECHANICAL UTILITIES - JUNCTION BOX 7A EAST AND NORTH ELEVATIONS	RJR ENGINEERING
DWG-10060-222	MECHANICAL UTILITIES - JUNCTION BOX 7A WEST AND SOUTH ELEVATIONS	RJR ENGINEERING
DWG-10060-223	MECHANICAL UTILITIES - JUNCTION BOX 7A ISOMETRIC DETAILS 1 OF 2	RJR ENGINEERING
DWG-10060-224	MECHANICAL UTILITIES - JUNCTION BOX 7A ISOMETRIC DETAILS 2 OF 2	RJR ENGINEERING
DWG-10060-226	MECHANICAL UTILITIES - JUNCTION BOX 7A ELECTRICAL ROOM EAST AND NORTH ELEVATIONS	RJR ENGINEERING
DWG-10060-227	MECHANICAL UTILITIES - JUNCTION BOX 7A ELECTRICAL ROOM WEST AND SOUTH ELEVATIONS	RJR ENGINEERING
DWG-10060-230	MECHANICAL UTILITIES - JUNCTION BOX 8A PLAN	RJR ENGINEERING
DWG-10060-231	MECHANICAL UTILITIES - JUNCTION BOX 8A EAST AND NORTH ELEVATIONS	RJR ENGINEERING
DWG-10060-232	MECHANICAL UTILITIES - JUNCTION BOX 8A WEST AND SOUTH ELEVATIONS	RJR ENGINEERING
DWG-10060-233	MECHANICAL UTILITIES - JUNCTION BOX 8A ISOMETRIC DETAILS 1 OF 2	RJR ENGINEERING
DWG-10060-234	MECHANICAL UTILITIES - JUNCTION BOX 8A ISOMETRIC DETAILS 2 OF 2	RJR ENGINEERING
DWG-10060-240	MECHANICAL UTILITIES - JUNCTION BOX 9A PLAN	RJR ENGINEERING
DWG-10060-241	MECHANICAL UTILITIES - JUNCTION BOX 9A EAST AND NORTH ELEVATIONS	RJR ENGINEERING
DWG-10060-242	MECHANICAL UTILITIES - JUNCTION BOX 9A WEST AND SOUTH ELEVATIONS	RJR ENGINEERING
DWG-10060-243	MECHANICAL UTILITIES - JUNCTION BOX 9A ISOMETRIC DETAILS 1 OF 2	RJR ENGINEERING
DWG-10060-244	MECHANICAL UTILITIES - JUNCTION BOX 9A ISOMETRIC DETAILS 2 OF 2	RJR ENGINEERING
DWG-10060-250	JUNCTION BOX 7A TO JUNCTION BOX 7 - TEMPORARY BYPASS DETAILS	RJR ENGINEERING

DRAWING LIST		
DRAWING No	TITLE	REFERENCE
	<b>ELECTRICAL DRAWINGS</b>	<b>CONSULTANT</b>
E000	ELECTRICAL SYMBOL LIST AND DETAILS	M/E ENGINEERING
E100	ELECTRICAL SITE PLAN	M/E ENGINEERING
E500	DETAILS	M/E ENGINEERING
E700	ELECTRICAL SPECIFICATIONS	M/E ENGINEERING
DWG-10068-001	CIRCUIT D10 & 6" WATER LINE - TEMPORARY RELOCATION	RJR ENGINEERING
	<b>VENDOR DRAWINGS</b>	<b>VENDOR</b>
31720-01-0	PRAXAIR UTILITY TUNNEL SITE DIMENSION DRAWING	THERMACOR PROCESS, L.P.
	<b>REFERENCE DRAWINGS</b>	<b>OWNER/ ORIGINATOR</b>
E-1	ONE-LINE DISTRIBUTION DIAGRAM	FERGUSON ELECTRIC
F1391-2A	LOCATION 4160V POWER DISTRIBUTION FEEDERS, SWITCHES AND TRANSFORMERS	PRAXAIR
130038-T1, SHEET T-1	TITLE SHEET	SHAW
130038-D1, SHEET C-1	PAVEMENT AND CONCRETE RESTORATION AREAS (AS-BUILT)	SHAW
130038-D2, SHEET C-2	STORM SEWER RESTORATION - PLAN (AS-BUILT)	SHAW
130038-D3, SHEET C-3	SANITARY SEWER RESTORATION - PLAN (AS-BUILT)	SHAW
130038-D4, SHEET P-1	DOMESTIC AND FIREWATER SUPPLY RESTORATION - PLAN (AS-BUILT)	SHAW
130038-D5, SHEET P-2	CHILLED WATER SUPPLY RESTORATION - PLAN (AS-BUILT)	SHAW
130038-D6, SHEET P-3	LAWN WATER SUPPLY RESTORATION - PLAN (AS-BUILT)	SHAW
130038-D7, SHEET P-4	STEAM SUPPLY RESTORATION - PLAN (AS-BUILT)	SHAW
130038-D8, SHEET P-5	CONDENSATE RETURN RESTORATION - PLAN (AS-BUILT)	SHAW
130038-D9, SHEET P-6	NATURAL GAS SUPPLY RESTORATION - PLAN (AS-BUILT)	SHAW
130038-D10, SHEET P-7	COMPRESSED AIR SUPPLY RESTORATION - PLAN (AS-BUILT)	SHAW
130038-D11, SHEET P-8	OXYGEN SUPPLY RESTORATION - PLAN (AS-BUILT)	SHAW
130038-D12, SHEET P-9	HYDROGEN AND NITROGEN SUPPLY - PLAN	SHAW
130038-D13, SHEET E-1	ELECTRICAL 4160 VOLT RESTORATION - PLAN (AS-BUILT)	SHAW
130038-D14, SHEET E-2	PARKING LOT LIGHTING RESTORATION - PLAN (AS-BUILT)	SHAW
130038-D15, SHEET E-3	FIRE ALARM SCHEMATIC - PLAN	SHAW
130038-D16, SHEET E-4	TELEPHONE SYSTEM RESTORATION - PLAN (AS-BUILT)	SHAW
130038-D17, SHEET E-5	FIBRE OPTIC RESTORATION - PLAN (AS-BUILT)	SHAW

REVISIONS			
REV	DESCRIPTION	DATE	INIT
0	FOR REVIEW	06/02/11	MEK
1	FOR REVIEW	10/04/11	ELK
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK

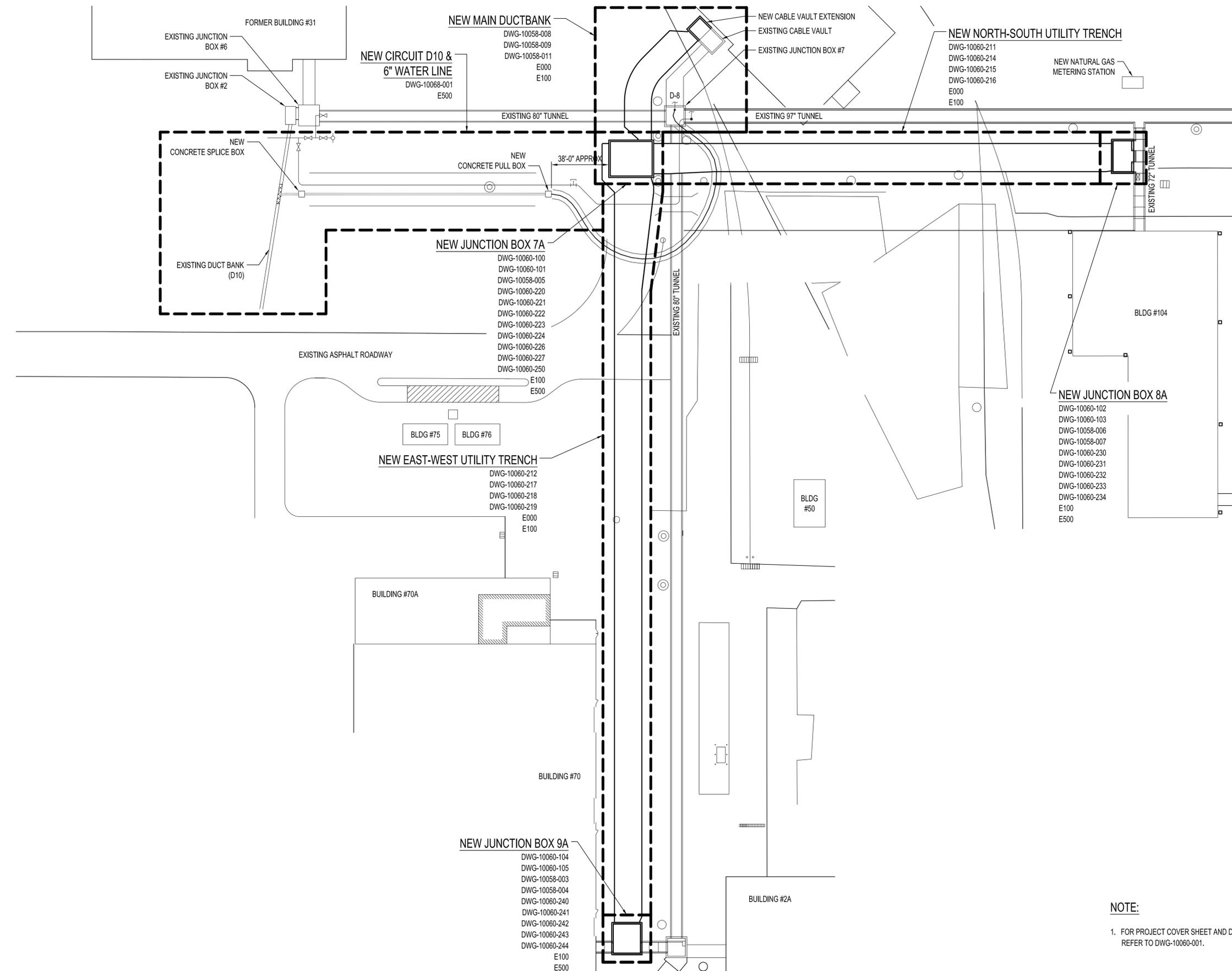
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UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES  
 MACHINED SURFACES  
 FLATNESS .003 12/  
 FINISH  
 TOLERANCES  
 FRACTION: 1/8 2 PLACE: ±.01  
 3 PLACE: ±.005 ANGLE: 0°/30°  
 SEE ENGINEERING REVIEW AND RELEASE FORM (RFI) FOR DRAWING APPROVAL SIGNATURES

DRAWER: MEK  
 CHECKER: XXX  
 ENGINEER: CRD  
 PROJECT #: 10060

MOLLENBERG-BETZ INC  
 300 SCOTT STREET  
 BUFFALO, NY 14204  
 LINDE FUSRAP UTILITY REPLACEMENT PROJECT  
 PROJECT COVER SHEET AND DRAWING INDEX

**RJR** RJR ENGINEERING, P.C.  
 PROFESSIONAL ENGINEERS  
 23 Mechanic Street - P.O. Box 344  
 Springville, New York 14141-0344  
 PH. (716)-592-3580 FAX. (716)-592-4216  
 DWG NO. DWG-10060-001  
 DWG SCALE: SEE DRAWING REV: 2  
 DWG SIZE: D 200.le  
 Linde.01.04.0052.a



**NOTE:**  
 1. FOR PROJECT COVER SHEET AND DRAWING INDEX, REFER TO DWG-10060-001.

REVISIONS			
REV	DESCRIPTION	DATE	INIT
0	FOR REVIEW	06/02/11	MEK
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK

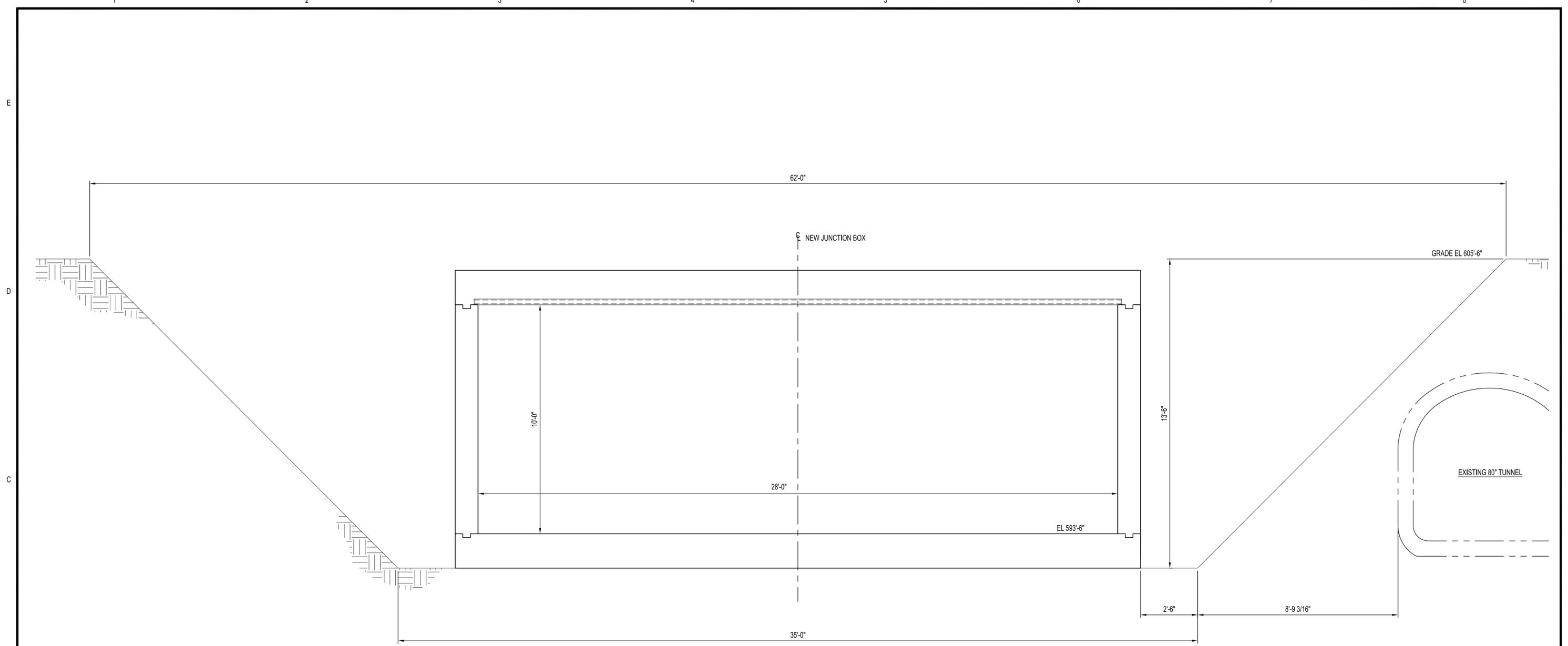
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UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES  
 MACHINED SURFACES FLATNESS .003 FINISH 12/30  
 TOLERANCES FRACTION: 1/8 2 PLACE: ±.01 3 PLACE: ±.005 ANGLE: 0°30'  
 SEE ENGINEERING REVIEW AND RELEASE FORM (RR) FOR DRAWING APPROVAL SIGNATURES

DRAWER: MEK  
 CHECKER: XXX  
 ENGINEER: CRD  
 PROJECT #: 10060

MOLLENBERG-BETZ INC  
 300 SCOTT STREET  
 BUFFALO, NY 14204  
 LINDE FUSRAP UTILITY REPLACEMENT PROJECT  
 SITE PLAN  
 GENERAL ARRANGEMENT

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 DWG NO. DWG-10060-010  
 DWG SCALE: 1/32" = 1'-0" REV: 2  
 DWG SIZE: D



**JUNCTION BOX 7A - LOOKING EAST**  
SCALE: 1/2" = 1'-0"

- NOTE:**
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  - ALL DIMENSIONS ARE FOR REFERENCE ONLY. AS BUILT DIMENSIONS TO BE RECORDED AFTER CONSTRUCTION.

REVISIONS			
REV	DESCRIPTION	DATE	INIT
0	FOR REVIEW	06/02/11	MEK
1	FOR REVIEW	10/04/11	ELK
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK

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UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES

MACHINED SURFACES  
FLATNESS: .003 12/  
FINISH

TOLERANCES  
FRACTION: 1/8 2 PLACE: ±.01  
3 PLACE: ±.005 ANGLE: 0°/30°

SEE ENGINEERING REVIEW AND RELEASE FORM (RR) FOR DRAWING APPROVAL SIGNATURES

DRAWER: MEK  
CHECKER: XXX  
ENGINEER: XXX

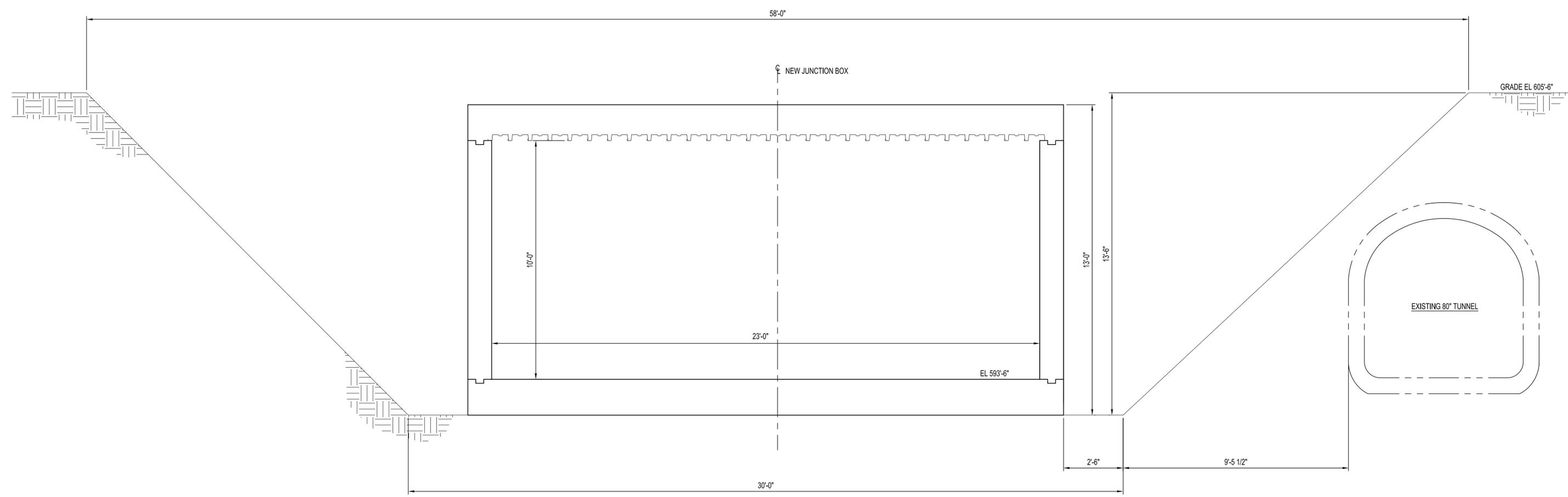
PROJECT #: 10060

MOLLENBERG-BETZ INC  
300 SCOTT STREET  
BUFFALO, NY 14204

LINDE FUSRAP UTILITY REPLACEMENT PROJECT  
EXCAVATION DETAILS  
JUNCTION BOX 7A - LOOKING EAST

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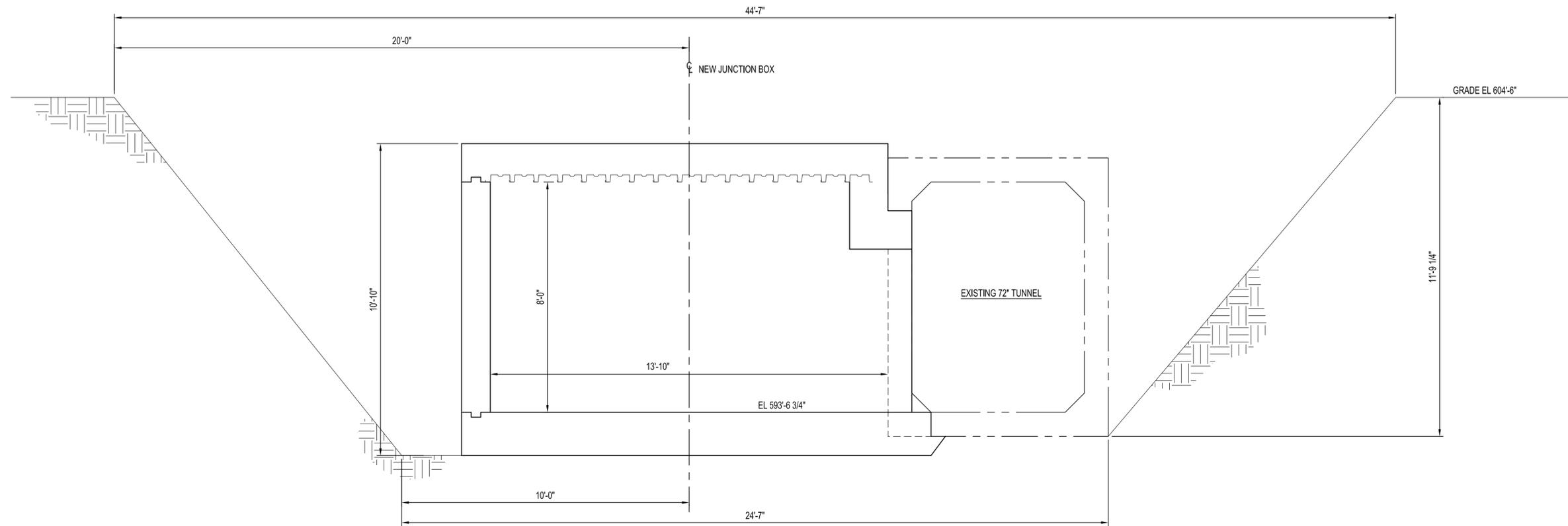
DWG NO. DWG-10060-100  
DWG SCALE: SEE DRAWING REV: 2  
DWG SIZE: D



**JUNCTION BOX 7A - LOOKING NORTH**  
SCALE: 1/2" = 1'-0"

- NOTE:**
- FOR PROJECT COVER SHEET AND DRAWING INDEX, REFER TO DWG-10060-001.
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REV	DESCRIPTION	DATE	INIT		MACHINED SURFACES FLATNESS: .003 12/	FRACTION: 1/8 2 PLACE: ±.01 3 PLACE: ±.005 ANGLE: 0°/30°		www.rjrc.com		DWG NO. DWG-10060-101	
0	FOR REVIEW	06/02/11	MEK		TOLERANCES	DRAWER: MEK		LINDE FUSRAP UTILITY REPLACEMENT PROJECT		DWG SCALE: SEE DRAWING	
1	FOR REVIEW	10/04/11	ELK		SEE ENGINEERING REVIEW AND RELEASE FORM (RFI) FOR DRAWING APPROVAL SIGNATURES	CHECKER: XXX		EXCAVATION DETAILS		REV: 2	
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK		ENGINEER: XXX		JUNCTION BOX 7A - LOOKING NORTH		DWG SIZE: D		
					PROJECT #: 10060						



**JUNCTION BOX 8A - LOOKING EAST**  
SCALE: 1/2" = 1'-0"

**NOTE:**

1. FOR PROJECT COVER SHEET AND DRAWING INDEX, REFER TO DWG-10060-001.
2. ALL DIMENSIONS ARE FOR REFERENCE ONLY. AS BUILT DIMENSIONS TO BE RECORDED AFTER CONSTRUCTION.

REVISIONS			
REV	DESCRIPTION	DATE	INIT
0	FOR REVIEW	06/02/11	MEK
1	FOR REVIEW	10/04/11	ELK
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK

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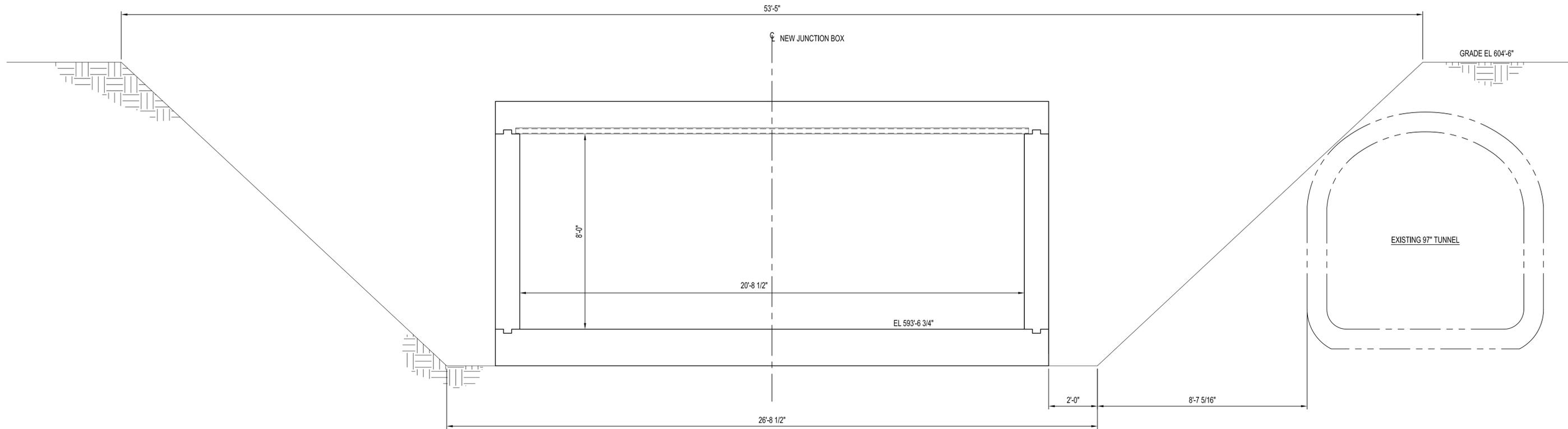
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 MACHINED SURFACES  
 FLATNESS: .003 12/  
 FINISH  
 TOLERANCES  
 FRACTION: 1/8 2 PLACE: ±.01  
 3 PLACE: ±.005 ANGLE: 0°:30'  
 SEE ENGINEERING REVIEW AND RELEASE FORM (RR) FOR DRAWING APPROVAL SIGNATURES

DRAWER: MEK  
 CHECKER: XXX  
 ENGINEER: XXX  
 PROJECT #: 10060

MOLLENBERG-BETZ INC  
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 LINDE FUSRAP UTILITY REPLACEMENT PROJECT  
 EXCAVATION DETAILS  
 JUNCTION BOX 8A - LOOKING EAST

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 DWG NO.: DWG-10060-102  
 DWG SCALE: SEE DRAWING REV: 2  
 DWG SIZE: D

E  
D  
C  
B  
A



**JUNCTION BOX 8A - LOOKING NORTH**  
SCALE: 1/2" = 1'-0"

- NOTE:**
- FOR PROJECT COVER SHEET AND DRAWING INDEX, REFER TO DWG-10060-001.
  - ALL DIMENSIONS ARE FOR REFERENCE ONLY. AS BUILT DIMENSIONS TO BE RECORDED AFTER CONSTRUCTION.

REVISIONS			
REV	DESCRIPTION	DATE	INIT
0	FOR REVIEW	06/02/11	MEK
1	FOR REVIEW	10/04/11	ELK
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK

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UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES  
MACHINED SURFACES  
FLATNESS: .003 12/  
FINISH  
TOLERANCES  
FRACTION: 1/8 2 PLACE: ±.01  
3 PLACE: ±.005 ANGLE: 0°:30'

DRAWER: MEK  
CHECKER: XXX  
ENGINEER: XXX  
PROJECT #: 10060

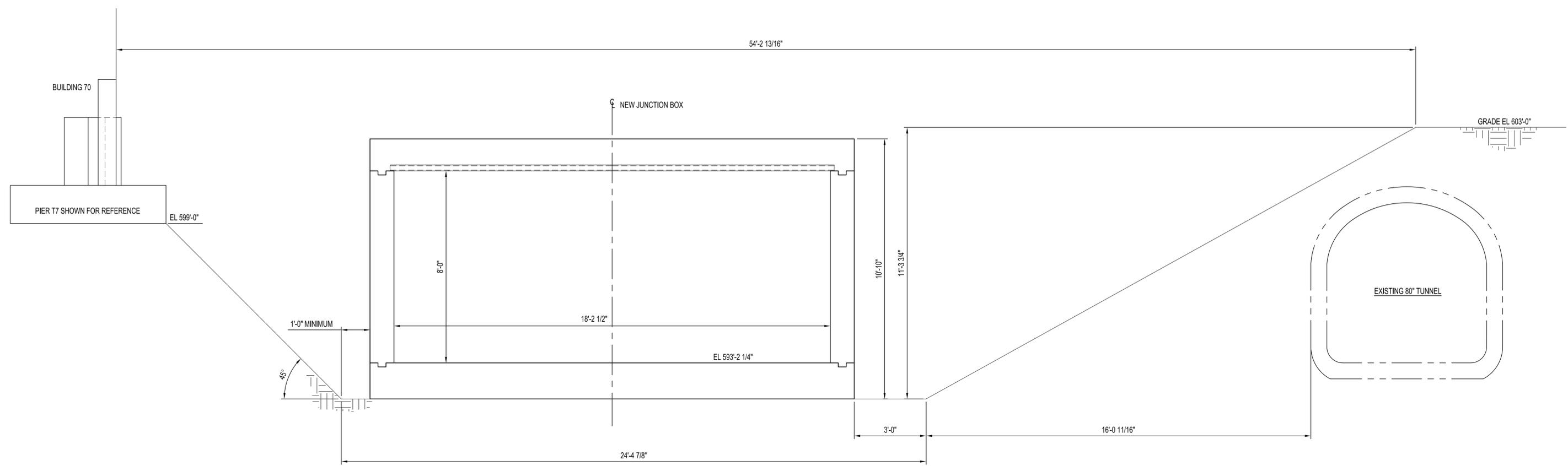
MOLLENBERG-BETZ INC  
300 SCOTT STREET  
BUFFALO, NY 14204  
LINDE FUSRAP UTILITY REPLACEMENT PROJECT  
EXCAVATION DETAILS  
JUNCTION BOX 8A - LOOKING NORTH

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DWG NO. DWG-10060-103  
DWG SCALE: SEE DRAWING  
REV: 2  
DWG SIZE: D

E  
D  
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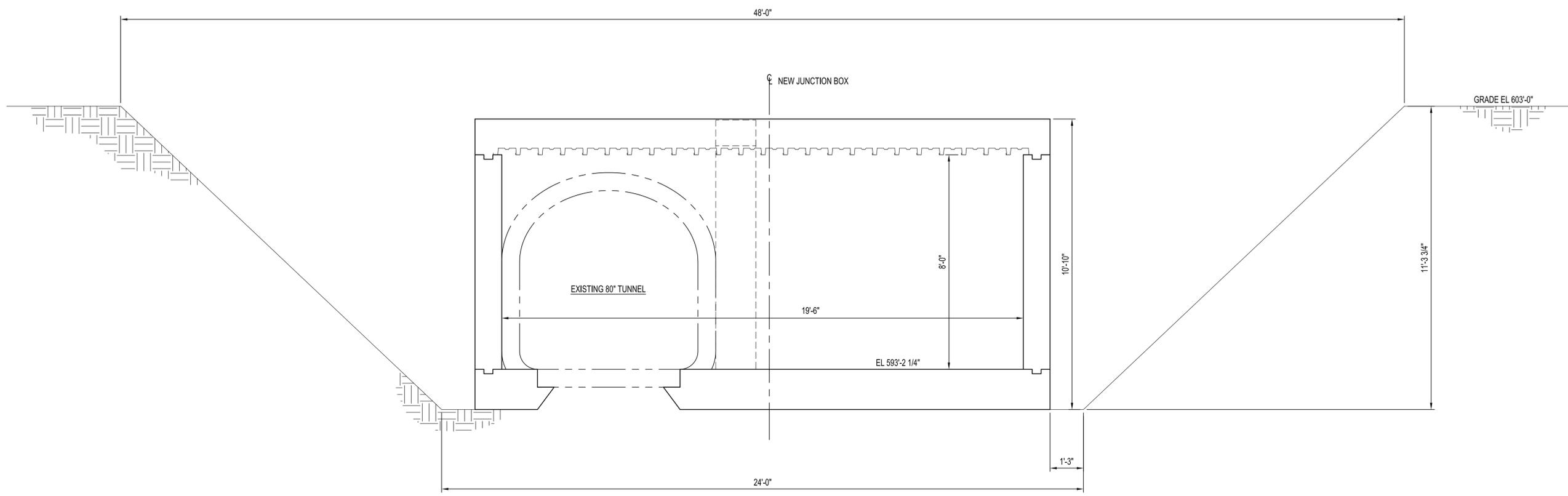
1 2 3 4 5 6 7 8



**JUNCTION BOX 9A - LOOKING EAST**  
SCALE: 1/2" = 1'-0"

- NOTE:**
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REV	DESCRIPTION	DATE	INIT		MACHINED SURFACES FLATNESS: .003 12/	DRAWER: MEK		LINDE FUSRAP UTILITY REPLACEMENT PROJECT		DWG NO. DWG-10060-104	
0	FOR REVIEW	06/02/11	MEK		FINISH	CHECKER: XXX		EXCAVATION DETAILS		DWG SCALE: SEE DRAWING	
1	FOR REVIEW	10/04/11	ELK		TOLERANCES FRACTION: 1/8 2 PLACE: ±.01 3 PLACE: ±.005 ANGLE: 0°/30°	ENGINEER: XXX		JUNCTION BOX 9A - LOOKING EAST		REV: 2	
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK	SEE ENGINEERING REVIEW AND RELEASE FORM (RFI) FOR DRAWING APPROVAL SIGNATURES	PROJECT #: 10060				DWG SIZE: D		



**JUNCTION BOX 9A - LOOKING NORTH**  
SCALE: 1/2" = 1'-0"

- NOTE:**
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REVISIONS			
REV	DESCRIPTION	DATE	INIT
0	FOR REVIEW	06/02/11	MEK
1	FOR REVIEW	10/04/11	ELK
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UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES  
MACHINED SURFACES FLATNESS: .003 FINISH 12/1  
TOLERANCES FRACTION: 1/8 2 PLACE: ±.01 3 PLACE: ±.005 ANGLE: 0°:30'  
SEE ENGINEERING REVIEW AND RELEASE FORM (RFI) FOR DRAWING APPROVAL SIGNATURES

DRAWER: MEK  
CHECKER: XXX  
ENGINEER: XXX  
PROJECT #: 10060

MOLLENBERG-BETZ INC  
300 SCOTT STREET  
BUFFALO, NY 14204  
LINDE FUSRAP UTILITY REPLACEMENT PROJECT  
EXCAVATION DETAILS  
JUNCTION BOX 9A - LOOKING NORTH

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www.rjpec.com

DWG NO. DWG-10060-105  
DWG SCALE: SEE DRAWING  
REV: 2  
DWG SIZE: D

**PIPING**

**GENERAL**

PIPE WELDING QUALIFICATIONS: QUALIFY PROCEDURES AND OPERATORS ACCORDING TO ASME BOILER AND PRESSURE VESSEL CODE.

ASME COMPLIANCE: COMPLY WITH ASME B31.3, "PROCESS PIPING," FOR MATERIALS, PRODUCTS, AND INSTALLATION.

**PIPING INSTALLATIONS**

DRAWING PLANS, SCHEMATICS, AND DIAGRAMS INDICATE GENERAL LOCATION AND ARRANGEMENT OF PIPING SYSTEMS. INDICATE PIPING LOCATIONS AND ARRANGEMENTS IF SUCH WERE USED TO SIZE PIPE AND CALCULATE FRICTION LOSS, EXPANSION, PUMP SIZING, AND OTHER DESIGN CONSIDERATIONS. INSTALL PIPING AS INDICATED UNLESS DEVIATIONS TO LAYOUT ARE APPROVED ON COORDINATION DRAWINGS.

INSTALL PIPING INDICATED TO BE EXPOSED AND PIPING IN EQUIPMENT ROOMS AND SERVICE AREAS AT RIGHT ANGLES OR PARALLEL TO BUILDING WALLS. DIAGONAL RUNS ARE PROHIBITED UNLESS SPECIFICALLY INDICATED OTHERWISE.

INSTALL PIPING TO PERMIT VALVE SERVICING.

INSTALL PIPING AT INDICATED SLOPES.

INSTALL PIPING FREE OF SAGS AND BENDS.

INSTALL FITTINGS FOR CHANGES IN DIRECTION AND BRANCH CONNECTIONS.

INSTALL PIPING TO ALLOW APPLICATION OF INSULATION.

SELECT SYSTEM COMPONENTS WITH PRESSURE RATING EQUAL TO OR GREATER THAN SYSTEM OPERATING PRESSURE.

INSTALL GROUPS OF PIPES PARALLEL TO EACH OTHER, SPACED TO PERMIT APPLYING INSULATION AND SERVICING OF VALVES.

INSTALL DRAINS, CONSISTING OF A TEE FITTING, NPS 3/4 (DN 20) BALL VALVE, AND SHORT NPS 3/4 (DN 20) THREADED NIPPLE WITH CAP, AT LOW POINTS IN PIPING SYSTEM MAINS AND ELSEWHERE AS REQUIRED FOR SYSTEM DRAINAGE.

REDUCE PIPE SIZES USING ECCENTRIC REDUCER FITTING INSTALLED WITH LEVEL SIDE UP.

INSTALL FLANGES IN PIPING, NPS 2-1/2 (DN 65) AND LARGER, AT FINAL CONNECTIONS OF EQUIPMENT AND ELSEWHERE AS INDICATED.

INSTALL EXPANSION LOOPS, EXPANSION JOINTS, AND PIPE ALIGNMENT GUIDES AS REQUIRED.

IDENTIFY PIPING AS SPECIFIED.

FIELD LOCATE AND INSTALL CHECK VALVES IN THE CONDENSATE LINE, INCLUDING PRAXAIR PERSONNEL INPUT.

STEAM AND CONDENSATE TRAP LOCATIONS SHALL BE DETERMINED DURING CONSTRUCTION, INCLUDING PRAXAIR PERSONNEL INPUT.

STEAM AND CONDENSATE PIPING, ANCHOR BOLTS, AND EXPANSION JOINTS SHALL BE PER THERMACOR DRAWING 31720-01-C.

ENCASEMENT AROUND THERMACOR PIPING SHALL BE SAND AND ENCASEMENT AROUND ELECTRICAL CONDUIT SHALL BE CONCRETE.

MAINTAIN A MINIMUM 5' BURY DEPTH FOR ALL WATER PIPING.

**HANGERS AND SUPPORTS**

INSTALL THE FOLLOWING PIPE ATTACHMENTS:

ADJUSTABLE STEEL CLEVIS HANGERS FOR INDIVIDUAL HORIZONTAL PIPING LESS THAN 20 FEET (6 M) LONG.

ADJUSTABLE ROLLER HANGERS AND SPRING HANGERS FOR INDIVIDUAL HORIZONTAL PIPING 20 FEET (6 M) OR LONGER.

PIPE ROLLER: MSS SP-58, TYPE 44 FOR MULTIPLE HORIZONTAL PIPING 20 FEET (6 M) OR LONGER, SUPPORTED ON A TRAPEZE.

SPRING HANGERS TO SUPPORT VERTICAL RUNS.

INSTALL HANGERS FOR STEEL PIPING WITH SPACING AND ROD SIZES TO BE FIELD DETERMINED AS PER STANDARD PIPING PRACTICES.

**FIELD QUALITY CONTROL**

PREPARE PIPING ACCORDING TO ASME B31.3 AND AS FOLLOWS:

LEAVE JOINTS, INCLUDING WELDS, UNINSULATED AND EXPOSED FOR EXAMINATION DURING TEST.

PROVIDE TEMPORARY RESTRAINTS FOR EXPANSION JOINTS THAT CANNOT SUSTAIN REACTIONS DUE TO TEST PRESSURE. IF TEMPORARY RESTRAINTS ARE IMPRACTICAL, ISOLATE EXPANSION JOINTS FROM TESTING.

FLUSH PIPING SYSTEMS WITH CLEAN WATER; THEN REMOVE AND CLEAN OR REPLACE STRAINER SCREENS.

ISOLATE EQUIPMENT FROM PIPING. IF A VALVE IS USED TO ISOLATE EQUIPMENT, ITS CLOSURE SHALL BE CAPABLE OF SEALING AGAINST TEST PRESSURE WITHOUT DAMAGE TO VALVE. INSTALL BLINDS IN FLANGED JOINTS TO ISOLATE EQUIPMENT.

INSTALL SAFETY VALVE, SET AT A PRESSURE NO MORE THAN ONE-THIRD HIGHER THAN TEST PRESSURE, TO PROTECT AGAINST DAMAGE BY EXPANDING LIQUID OR OTHER SOURCE OF OVERPRESSURE DURING TEST.

PERFORM THE FOLLOWING TESTS ON PIPING:

USE AMBIENT TEMPERATURE WATER AS A TESTING MEDIUM UNLESS THERE IS RISK OF DAMAGE DUE TO FREEZING. ANOTHER LIQUID THAT IS SAFE FOR WORKERS AND COMPATIBLE WITH PIPING MAY BE USED.

INSPECT ALL WELDS IN ACCORDANCE WITH PRAXAIR STANDARDS W-41 AND W-42.

WHILE FILLING SYSTEM, USE VENTS INSTALLED AT HIGH POINTS OF SYSTEM TO RELEASE AIR. USE DRAINS INSTALLED AT LOW POINTS FOR COMPLETE DRAINING OF TEST LIQUID.

ISOLATE EXPANSION TANKS AND DETERMINE THAT SYSTEM IS FULL OF WATER.

SUBJECT PIPING SYSTEM TO HYDROSTATIC TEST PRESSURE AS PER THE TABLE ON SHEET 205. VERIFY THAT STRESS DUE TO PRESSURE AT BOTTOM OF VERTICAL RUNS DOES NOT EXCEED 90 PERCENT OF SPECIFIED MINIMUM YIELD STRENGTH OR 1.7 TIMES "SE" VALUE IN APPENDIX A IN ASME B31.3, "PROCESS PIPING."

AFTER HYDROSTATIC TEST PRESSURE HAS BEEN APPLIED FOR AT LEAST 10 MINUTES, EXAMINE PIPING, JOINTS, AND CONNECTIONS FOR LEAKAGE. ELIMINATE LEAKS BY TIGHTENING, REPAIRING, OR REPLACING COMPONENTS, AND REPEAT HYDROSTATIC TEST UNTIL THERE ARE NO LEAKS.

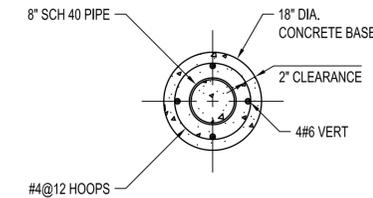
COAT ALL FIELD WELDED JOINTS WITH MINIMUM 5 MIL THICK PRIMER AFTER INSPECTION/TESTING.

VERIFY ALL VALVES HAVE EXTENDED STEMS TO AVOID PINCH POINTS.

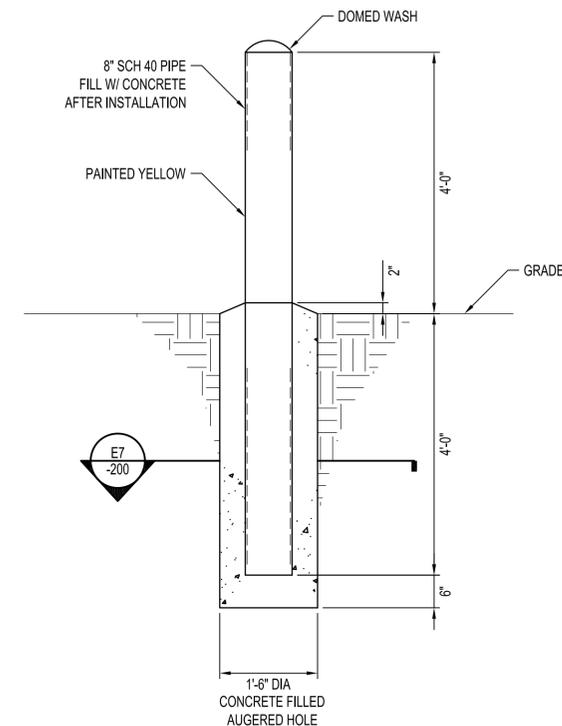
VERIFY THAT ALL INSULATION HAS BEEN APPLIED WITH PROPER VAPOR SEALS.

RECORD ALL AS-BUILT DIMENSIONS, JUNCTION BOX ELEVATIONS, INVERTS, ETC. IN FIELD.

PREPARE WRITTEN REPORT OF TESTING.



**E7 GUARD POST SECTION**  
SCALE: 3/4" = 1'-0"



**B7 GUARD POST DETAIL (TYP)**  
SCALE: 3/4" = 1'-0"

**NOTES:**

- FOR PROJECT COVER SHEET AND DRAWING INDEX, REFER TO DWG-10060-001.

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REV	DESCRIPTION	DATE	INIT		MACHINED SURFACES FLATNESS .003 FINISH 125	TOLERANCES FRACTION: 1/8 2 PLACE: ±.01 3 PLACE: ±.005 ANGLE: 0°/30'		
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1	FOR REVIEW	10/04/11	ELK					
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK					

DRAFTER: MEK CHECKER: XXX ENGINEER: XXX	LINDE FUSRAP UTILITY REPLACEMENT PROJECT MECHANICAL UTILITIES GENERAL NOTES AND SPECIFICATIONS	DWG NO.: DWG-10060-200 DWG SCALE: SEE DRAWING DWG SIZE: D
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# PIPING SCHEDULE

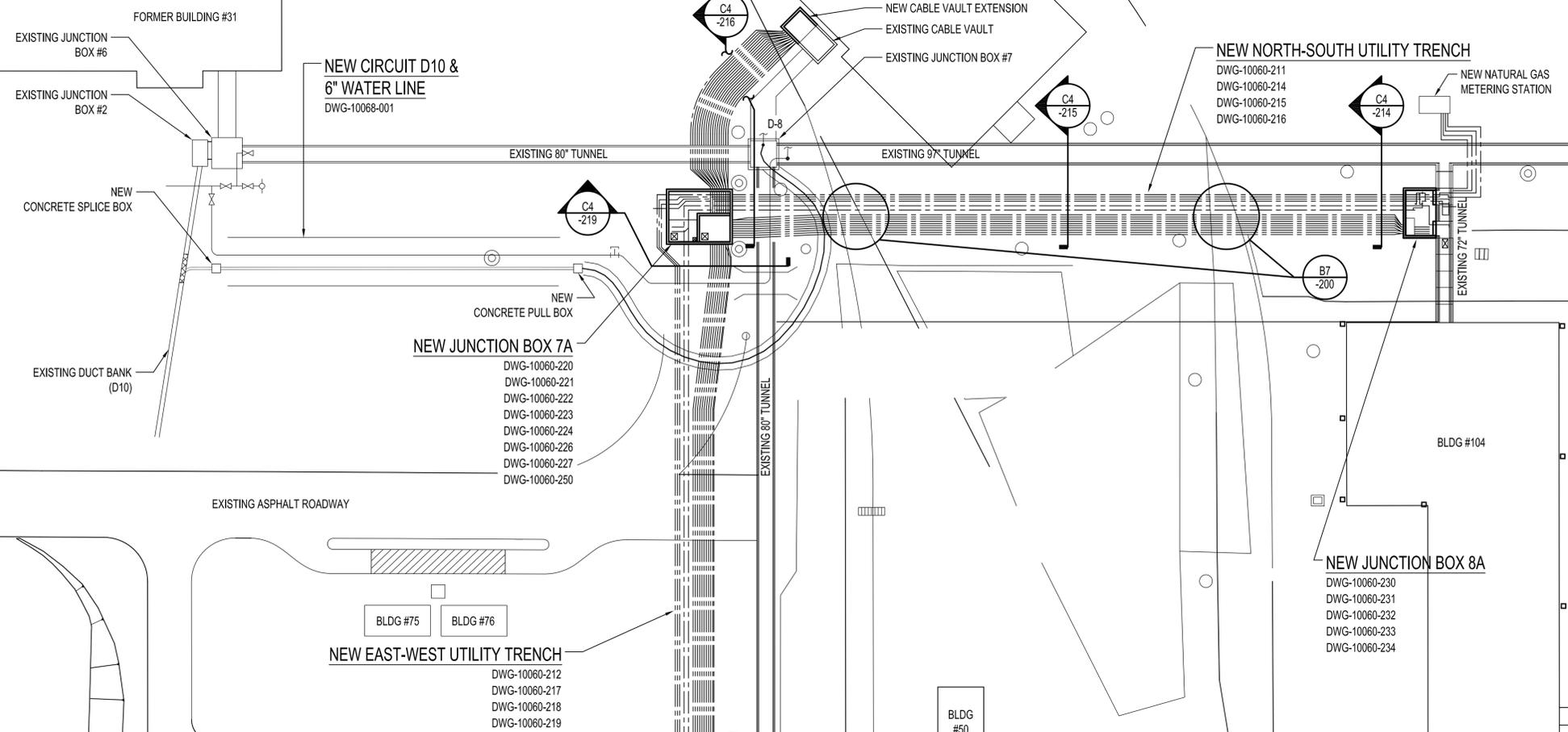
SIZE	SCHEDULE	WEIGHT	LOCATION	SERVICE	DESIGN PRESSURE	OPERATING PRESSURE	MATERIAL	LINING	COATING	INSULATION		TESTING *	
										TYPE	THICKNESS	MEDIUM	PRESSURE
4"	40	STANDARD	INTERIOR	HIGH PRESSURE NATURAL GAS	150 PSI	124 PSI	CARBON STEEL			-	-	AIR	165 PSI
4"	40	STANDARD	EXTERIOR	HIGH PRESSURE NATURAL GAS	150 PSI	124 PSI	POLYETHYLENE			-	-	AIR	165 PSI
4"	40	STANDARD	INTERIOR	LOW PRESSURE NATURAL GAS	15 PSI	8 PSI	CARBON STEEL			-	-	AIR	16.5 PSI
4"	40	STANDARD	EXTERIOR	LOW PRESSURE NATURAL GAS	15 PSI	8 PSI	POLYETHYLENE			-	-	AIR	16.5 PSI
10"	40	STANDARD	INTERIOR/ EXTERIOR	LOW PRESSURE STEAM	15 PSI	15 PSI	THREMACOR	HDPE		RIGID FRP	2"	HYDRO	23 PSI
6"	80	EXTRA STRONG	INTERIOR/ EXTERIOR	LOW PRESSURE CONDENSATE	15 PSI		THREMACOR	HDPE		RIGID FRP	2"	HYDRO	23 PSI
6"	40	STANDARD	INTERIOR	COMPRESSED AIR	125 PSI	123 PSI	CARBON STEEL			-	-	AIR SERVICE	137.5 PSI
6"	40	STANDARD	EXTERIOR	COMPRESSED AIR	125 PSI	123 PSI	POLYETHYLENE			-	-	AIR SERVICE	137.5 PSI
6"	40	STANDARD	INTERIOR	MEDIUM PRESSURE WATER	150 PSI	50 PSI	DUCTILE IRON	CEMENT	BITUMINOUS	KFLEX	1/2"	WATER SERVICE	225 PSI
6"	40	STANDARD	EXTERIOR	MEDIUM PRESSURE WATER	150 PSI	50 PSI	PVC			-	-	WATER SERVICE	225 PSI

\* RELIEF VALVE SHALL BE USED IN TESTING

**NOTES:**

1. FOR PROJECT COVER SHEET AND DRAWING INDEX, REFER TO DWG-10060-001.
2. PNEUMATIC TESTING PRESSURE SHALL BE AT 110% OF DESIGN PRESSURE AND CONFORM TO PRAXAIR TEST STANDARD T-1.
3. HYDROSTATIC TESTING SHALL BE AT 150% OF DESIGN PRESSURE UNLESS OTHERWISE NOTED.

<b>REVISIONS</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>REV</th> <th>DESCRIPTION</th> <th>DATE</th> <th>INIT</th> </tr> <tr> <td>0</td> <td>FOR REVIEW</td> <td>06/02/11</td> <td>MEK</td> </tr> <tr> <td>1</td> <td>FOR REVIEW</td> <td>10/04/11</td> <td>ELK</td> </tr> <tr> <td>2</td> <td>ISSUED FOR CONSTRUCTION</td> <td>10/18/11</td> <td>ELK</td> </tr> </table>	REV	DESCRIPTION	DATE	INIT	0	FOR REVIEW	06/02/11	MEK	1	FOR REVIEW	10/04/11	ELK	2	ISSUED FOR CONSTRUCTION	10/18/11	ELK	Copyright 2011 - RJR Engineering, P.C. all rights reserved. No part of this drawing may be reproduced or copied in any form by any means without the written permission of the engineer. Reproduction of this drawing for use in the production of shop and/or field detail drawings is expressly forbidden. *Unauthorized alteration or addition to any plans, specifications or reports bearing a Licensed Professional Engineer's seal is a violation of Section 7209, subdivision 2, of the New York State Education Law".	UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES MACHINED SURFACES FLATNESS: .003 12/ FINISH TOLERANCES FRACTION: 1/8 2 PLACE: ±.01 3 PLACE: ±.005 ANGLE: 0°/30° SEE ENGINEERING REVIEW AND RELEASE FORM (RFI) FOR DRAWING APPROVAL SIGNATURES	MOLLENBERG-BETZ INC 300 SCOTT STREET BUFFALO, NY 14204	 <b>RJR ENGINEERING, P.C.</b> PROFESSIONAL ENGINEERS 23 Mechanic Street - P.O. Box 344 Springville, New York 14141-0344 PH. (716)-592-3980 FAX. (716)-592-4216 www.rjr.com	<b>PROJECT #:</b> 10060 <b>PROJECT NAME:</b> LINDE FUSRAP UTILITY REPLACEMENT PROJECT <b>MECHANICAL UTILITIES PIPING SCHEDULE</b> DRAFTER: MEK CHECKER: XXX ENGINEER: XXX	DWG NO.: DWG-10060-205 DWG SCALE: SEE DRAWING DWG SIZE: D REV: 2
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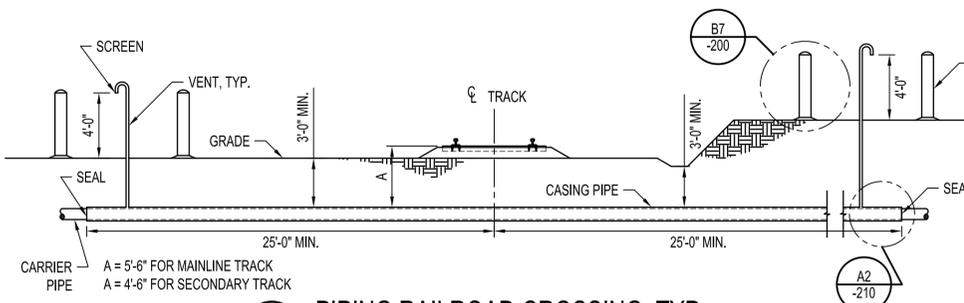
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 DWG-10060-222  
 DWG-10060-223  
 DWG-10060-224  
 DWG-10060-226  
 DWG-10060-227  
 DWG-10060-250

**NEW JUNCTION BOX 8A**  
 DWG-10060-230  
 DWG-10060-231  
 DWG-10060-232  
 DWG-10060-233  
 DWG-10060-234

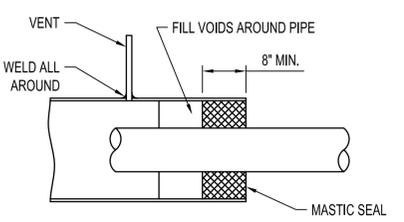
**NEW EAST-WEST UTILITY TRENCH**  
 DWG-10060-212  
 DWG-10060-217  
 DWG-10060-218  
 DWG-10060-219

**NEW NORTH-SOUTH UTILITY TRENCH**  
 DWG-10060-211  
 DWG-10060-214  
 DWG-10060-215  
 DWG-10060-216

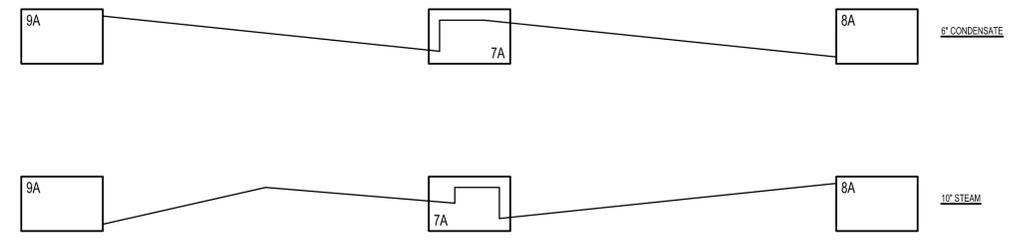
**NEW CIRCUIT D10 & 6\"/>
 DWG-10068-001**



**B2 PIPING RAILROAD CROSSING, TYP**  
 SCALE: 3/16\"/>



**A2 PIPE SEAL DETAIL**  
 SCALE: 3/4\"/>



**PIPING SLOPE ELEVATIONS**

**NOTE:**  
 1. FOR PROJECT COVER SHEET AND DRAWING INDEX, REFER TO DWG-10060-001.

REVISIONS			
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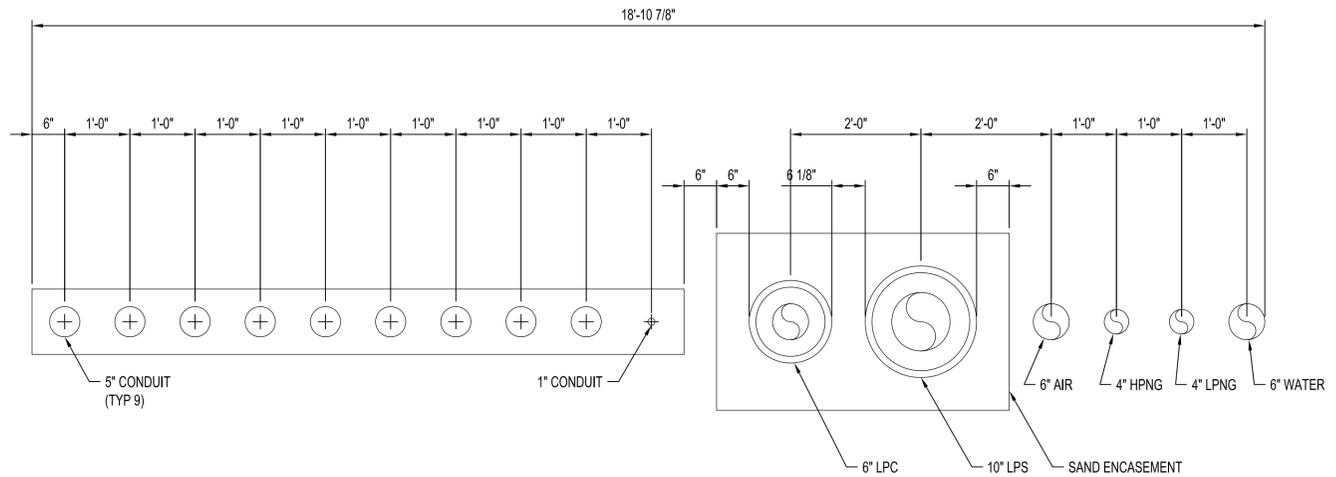
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 PROJECT #: 10060

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**LINDE FUSRAP UTILITY REPLACEMENT PROJECT**  
 MECHANICAL UTILITIES  
 PROPOSED ROUTING PLAN

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 23 Mechanic Street - P.O. Box 344  
 Springville, New York 14141-0344  
 PH. (716)-592-3980 FAX. (716)-592-4216  
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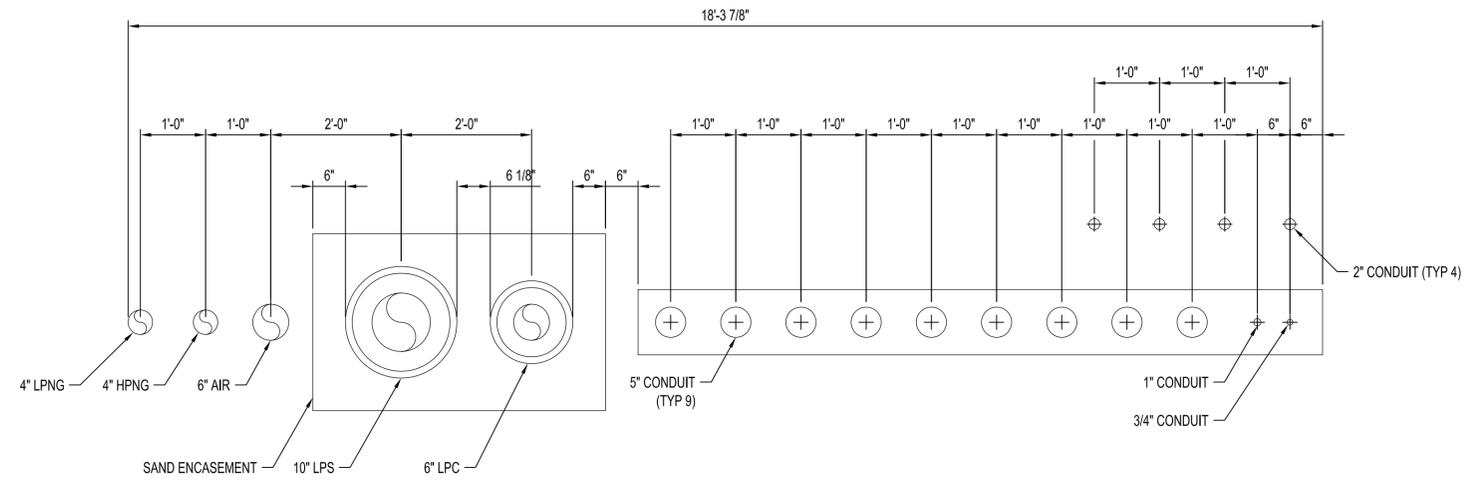


**NORTH-SOUTH TRENCH SPACING DETAILS (LOOKING NORTH)**  
SCALE: 3/4" = 1'-0"

- NOTES:**
- FOR PROJECT COVER SHEET AND DRAWING INDEX, REFER TO DWG-10060-001.
  - ELEVATIONS OF PIPE AND CONDUIT VARY THROUGHOUT ENTIRE TRENCH RUN BETWEEN JUNCTION BOXES 7A AND 8A. REFER TO NORTH - SOUTH TRENCH DETAIL DRAWINGS FOR INFORMATION.

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2	ISSUED FOR CONSTRUCTION	10/18/11	ELK	SEE ENGINEERING REVIEW AND RELEASE FORM (REV) FOR DRAWING APPROVAL SIGNATURES	PROJECT #: 10060				DWG SIZE: D		

E  
D  
C  
B  
A



**EAST-WEST TRENCH SPACING DETAILS (LOOKING EAST)**  
SCALE: 3/4" = 1'-0"

**NOTES:**

- FOR PROJECT COVER SHEET AND DRAWING INDEX, REFER TO DWG-10060-001.
- ELEVATIONS OF PIPE AND CONDUIT VARY THROUGHOUT ENTIRE TRENCH RUN BETWEEN JUNCTION BOXES 7A AND 9A. REFER TO EAST - WEST TRENCH DETAIL DRAWINGS FOR INFORMATION.

REVISIONS			
REV	DESCRIPTION	DATE	INIT
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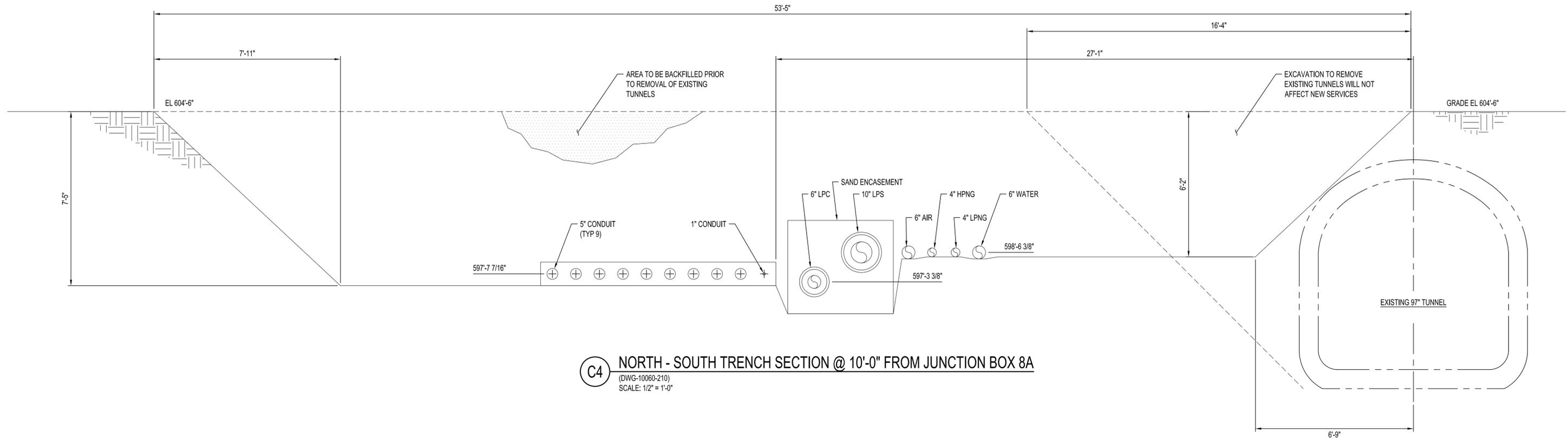
DRAWER: MEK  
CHECKER: XXX  
ENGINEER: XXX  
PROJECT #: 10060

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MECHANICAL UTILITIES  
EAST-WEST TRENCH DETAILS

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DWG SCALE: SEE DRAWING	DWG SIZE: D	

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D  
C  
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A

1 2 3 4 5 6 7 8



**C4** NORTH - SOUTH TRENCH SECTION @ 10'-0" FROM JUNCTION BOX 8A  
(DWG-10060-210)  
SCALE: 1/2" = 1'-0"

**NOTE:**

- FOR PROJECT COVER SHEET AND DRAWING INDEX, REFER TO DWG-10060-001.

REVISIONS			
REV	DESCRIPTION	DATE	INIT
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1	FOR REVIEW	10/04/11	ELK
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK

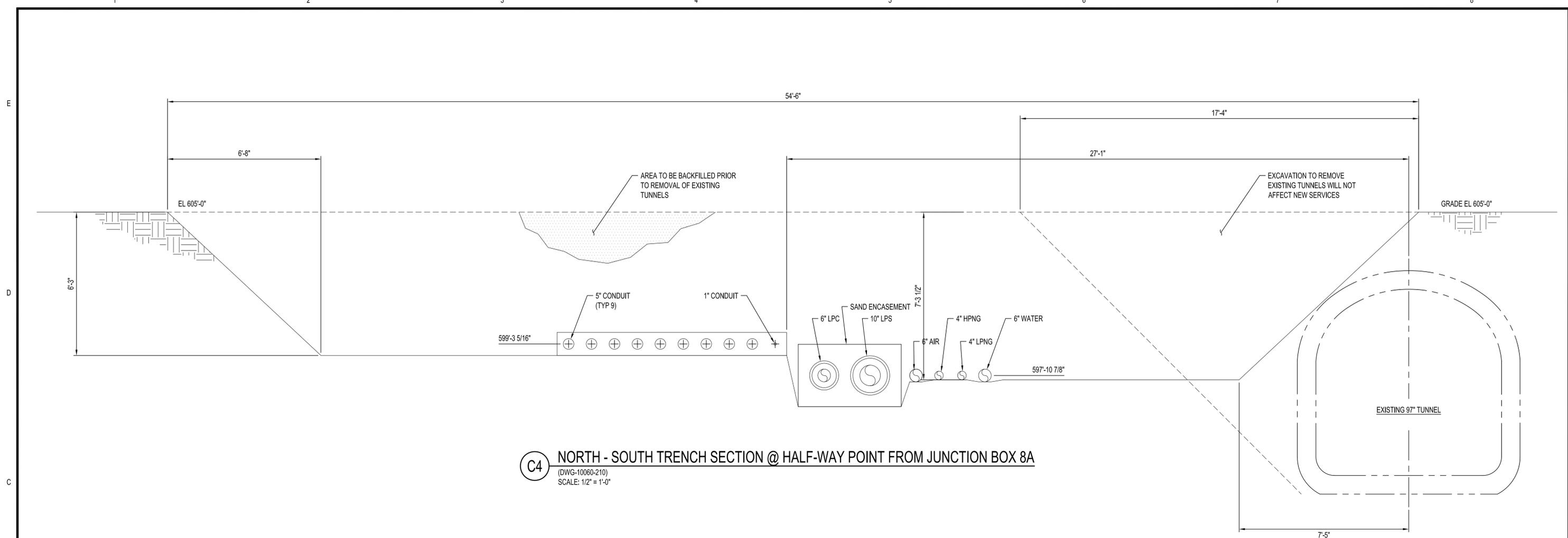
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TOLERANCES FRACTION: 1/8 2 PLACE: ±.01 3 PLACE: ±.005 ANGLE: 0°:30'  
SEE ENGINEERING REVIEW AND RELEASE FORM (RFI) FOR DRAWING APPROVAL SIGNATURES

DRAWER: MEK  
CHECKER: XXX  
ENGINEER: XXX  
PROJECT #: 10060

MOLLENBERG-BETZ INC  
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BUFFALO, NY 14204  
LINDE FUSRAP UTILITY REPLACEMENT PROJECT  
MECHANICAL UTILITIES  
NORTH-SOUTH TRENCH @ 10'-0" FROM 8A

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DWG NO.: DWG-10060-214  
DWG SCALE: SEE DRAWING REV: 2  
DWG SIZE: D



**C4** NORTH - SOUTH TRENCH SECTION @ HALF-WAY POINT FROM JUNCTION BOX 8A  
 (DWG-10060-210)  
 SCALE: 1/2" = 1'-0"

**NOTE:**  
 1. FOR PROJECT COVER SHEET AND DRAWING INDEX,  
 REFER TO DWG-10060-001.

REVISIONS			
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UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES

MACHINED SURFACES  
 FLATNESS: .003 12/  
 FINISH

TOLERANCES  
 FRACTION: 1/8 2 PLACE: ±.01  
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SEE ENGINEERING REVIEW AND RELEASE FORM (RFI) FOR DRAWING APPROVAL SIGNATURES

PROJECT #: 10060

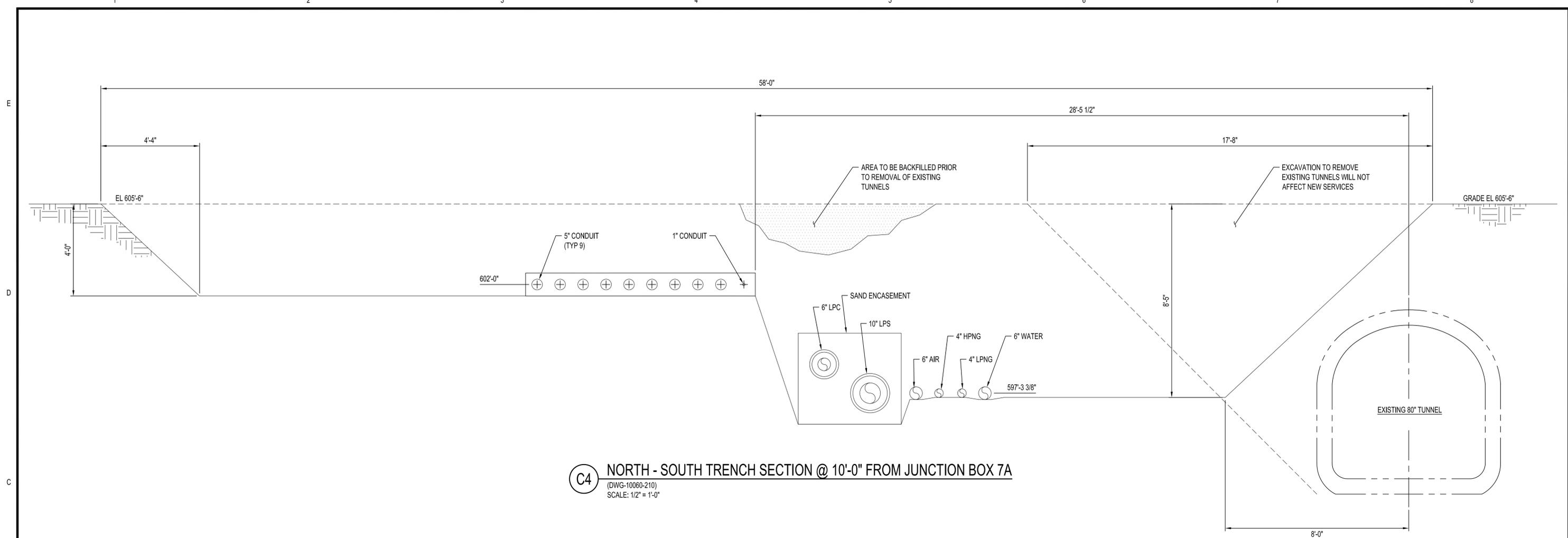
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DRG NO. DWG-10060-215  
 DWG SCALE: SEE DRAWING REV: 2  
 DWG SIZE: D

PROJECT: LINDE FUSRAP UTILITY REPLACEMENT PROJECT  
 MECHANICAL UTILITIES  
 NORTH-SOUTH TRENCH @ 1/2 POINT FROM 8A

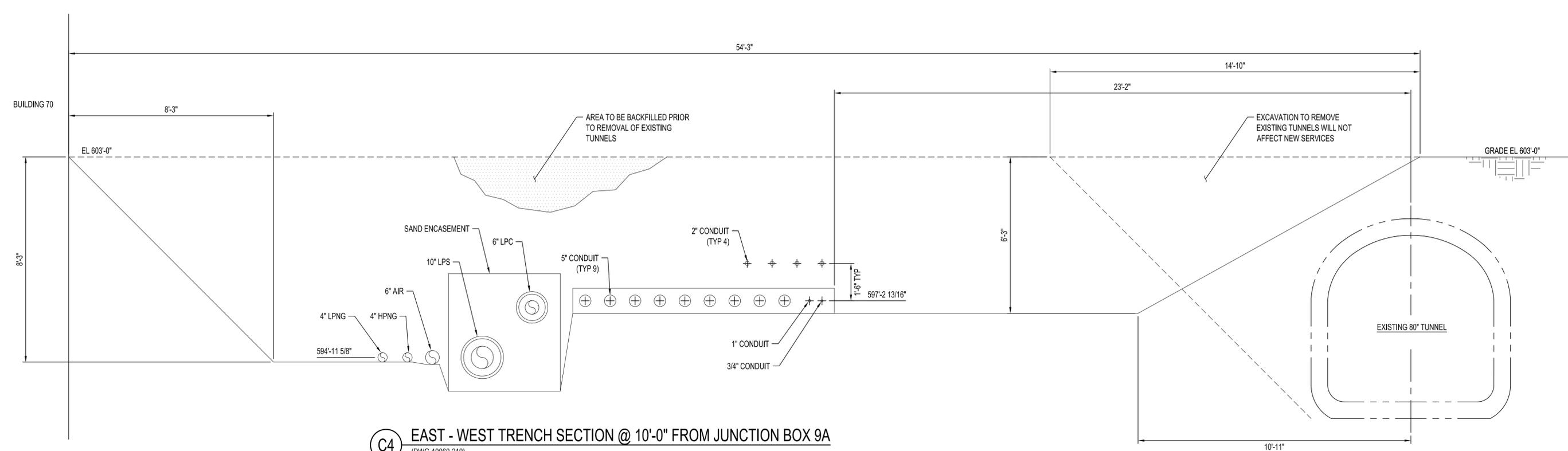


**C4** NORTH - SOUTH TRENCH SECTION @ 10'-0" FROM JUNCTION BOX 7A  
 (DWG-10060-210)  
 SCALE: 1/2" = 1'-0"

**NOTE:**  
 1. FOR PROJECT COVER SHEET AND DRAWING INDEX, REFER TO DWG-10060-001.

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REV	DESCRIPTION	DATE	INIT		MACHINED SURFACES FLATNESS: .003 12/	DRAWER: MEK		LINDE FUSRAP UTILITY REPLACEMENT PROJECT MECHANICAL UTILITIES NORTH-SOUTH TRENCH @ 10'-0" FROM 7A		DWG NO.: DWG-10060-216	
0	FOR REVIEW	06/02/11	MEK		TOLERANCES FRACTION: 1/8 2 PLACE: ±.01	CHECKER: XXX		PROJECT # : 10060		DWG SCALE: SEE DRAWING	
1	FOR REVIEW	10/04/11	ELK		3 PLACE: ±.005 ANGLE: 0°:30'	ENGINEER: XXX				REV: 2	
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK	SEE ENGINEERING REVIEW AND RELEASE FORM (RFI) FOR DRAWING APPROVAL SIGNATURES					DWG SIZE: D		

E  
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A



**C4** EAST - WEST TRENCH SECTION @ 10'-0" FROM JUNCTION BOX 9A  
 (DWG-10060-210)  
 SCALE: 1/2" = 1'-0"

**NOTE:**  
 1. FOR PROJECT COVER SHEET AND DRAWING INDEX,  
 REFER TO DWG-10060-001.

REVISIONS			
REV	DESCRIPTION	DATE	INIT
0	FOR REVIEW	06/02/11	MEK
1	FOR REVIEW	10/04/11	ELK
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK

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UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES

MACHINED SURFACES  
 FLATNESS: .003 12/

FINISH

TOLERANCES  
 FRACTION: 1/8 2 PLACE: ±.01  
 3 PLACE: ±.005 ANGLE: 0°:30'

SEE ENGINEERING REVIEW AND RELEASE FORM (RFI) FOR DRAWING APPROVAL SIGNATURES

PROJECT #: 10060

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DRG NO. DWG-10060-217

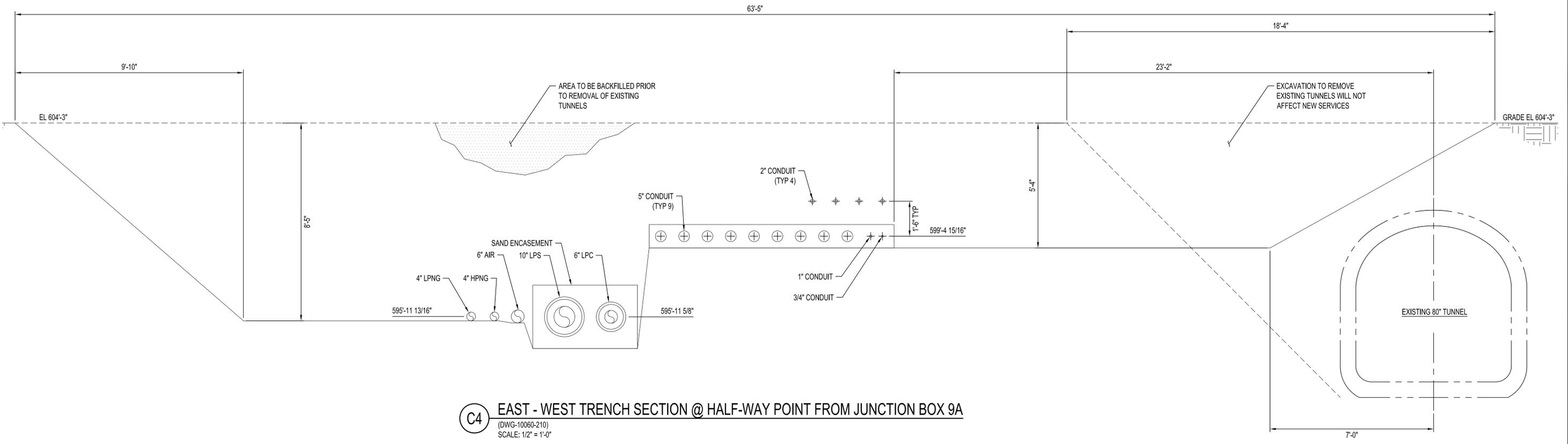
DRG SCALE: SEE DRAWING REV: 2

DRG SIZE: D

PROJECT: LINDE FUSRAP UTILITY REPLACEMENT PROJECT  
 MECHANICAL UTILITIES  
 EAST-WEST TRENCH @ 10'-0" FROM 9A

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C  
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A

1 2 3 4 5 6 7 8



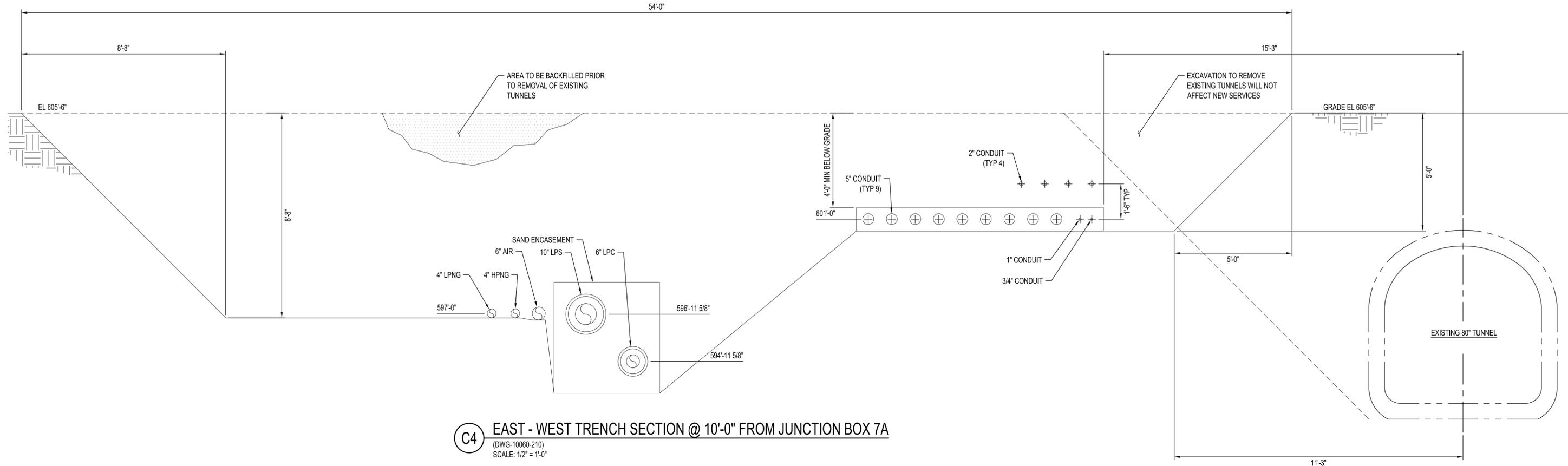
**C4** EAST - WEST TRENCH SECTION @ HALF-WAY POINT FROM JUNCTION BOX 9A  
(DWG-10060-210)  
SCALE: 1/2" = 1'-0"

**NOTE:**  
1. FOR PROJECT COVER SHEET AND DRAWING INDEX, REFER TO DWG-10060-001.

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REV	DESCRIPTION	DATE	INIT		MACHINED SURFACES FLATNESS .003 12/	FRACTION: 1/8 2 PLACE: ±.01		DRAWER: MEK		DWG NO. DWG-10060-218	
0	FOR REVIEW	06/02/11	MEK		TOLERANCES	3 PLACE: ±.005 ANGLE: 0°:30'		CHECKER: XXX		DWG SCALE: SEE DRAWING	
1	FOR REVIEW	10/04/11	ELK		SEE ENGINEERING REVIEW AND RELEASE FORM (RFI) FOR DRAWING APPROVAL SIGNATURES	PROJECT #: 10060		ENGINEER: XXX		REV: 2	
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK						DWG SIZE: D		

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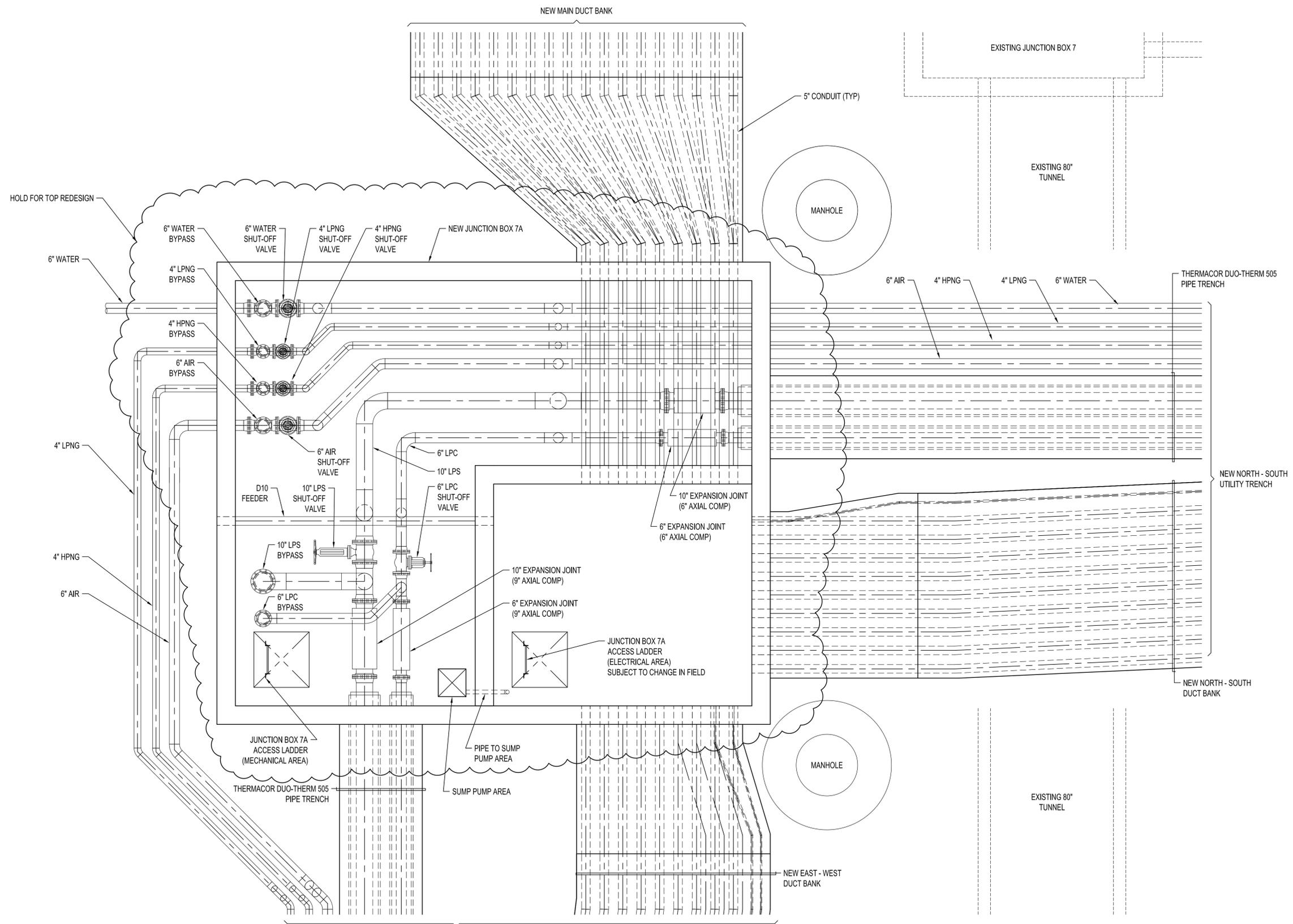
1 2 3 4 5 6 7 8



**C4** EAST - WEST TRENCH SECTION @ 10'-0" FROM JUNCTION BOX 7A  
(DWG-10060-210)  
SCALE: 1/2" = 1'-0"

**NOTE:**  
1. FOR PROJECT COVER SHEET AND DRAWING INDEX,  
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REV	DESCRIPTION	DATE	INIT		MACHINED SURFACES FLATNESS .003 12/	FRACTION: 1/8 2 PLACE: ±.01		DRAWER: MEK		DWG NO. DWG-10060-219	
0	FOR REVIEW	06/02/11	MEK		FINISH	3 PLACE: ±.005 ANGLE: 0°/30°		CHECKER: XXX		DWG SCALE: SEE DRAWING	
1	FOR REVIEW	10/04/11	ELK		TOLERANCES	SEE ENGINEERING REVIEW AND RELEASE FORM (RFI) FOR DRAWING APPROVAL SIGNATURES		ENGINEER: XXX		REV: 2	
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK		PROJECT #: 10060		PROJECT #		DWG SIZE: D		



**JUNCTION BOX 7A - PLAN**  
SCALE: 3/8" = 1'-0"

**NOTES:**

- FOR PROJECT COVER SHEET AND DRAWING INDEX, REFER TO DWG-10060-001.
- DETERMINE PROPER LOCATION OF STEAM AND CONDENSATE TRAPS DURING CONSTRUCTION.

REV	DESCRIPTION	DATE	INIT
0	FOR REVIEW	06/02/11	MEK
1	FOR REVIEW	10/04/11	ELK
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK

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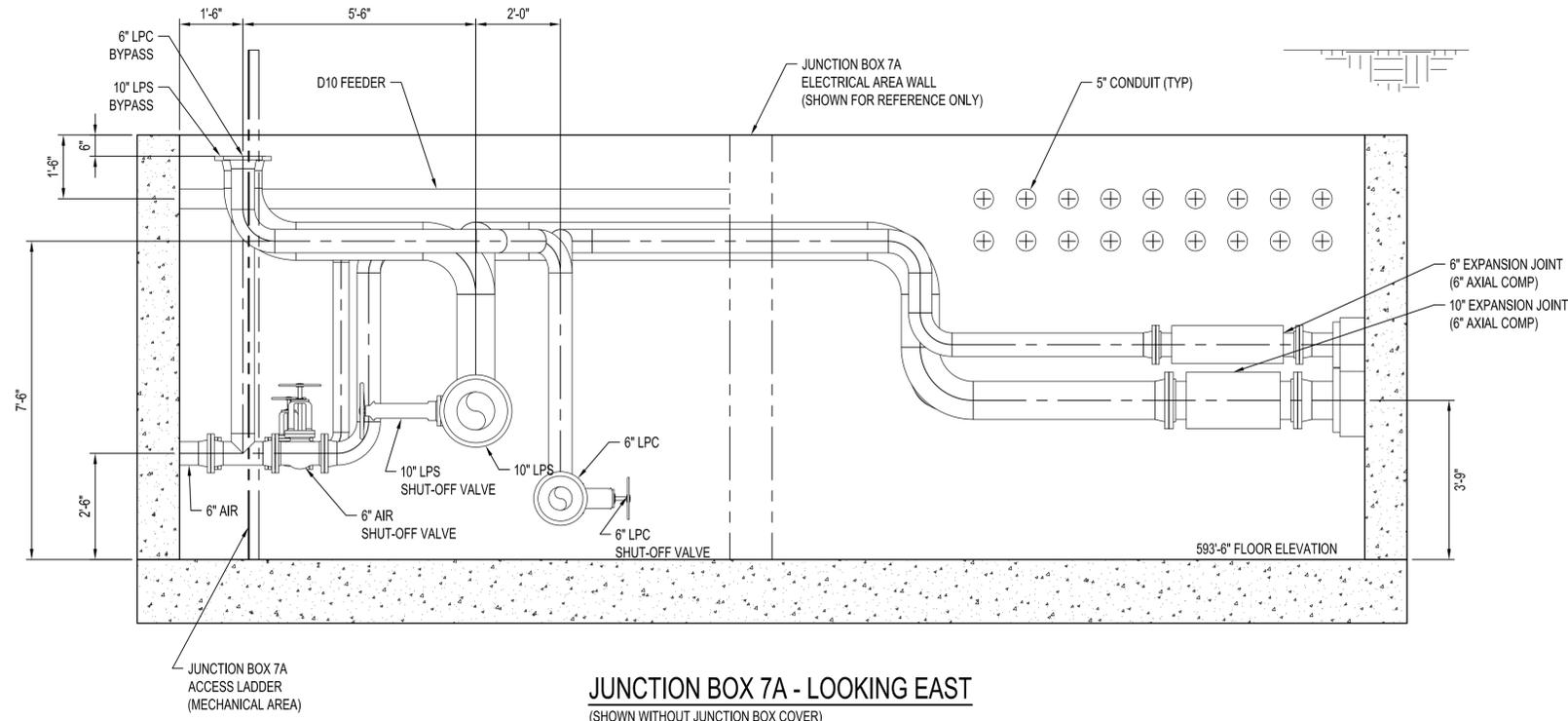
UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES  
MACHINED SURFACES FLATNESS: .003 FINISH  
TOLERANCES  
FRACTION: 1/8 2 PLACE: ±.01  
3 PLACE: ±.005 ANGLE: 0°30'  
SEE ENGINEERING REVIEW AND RELEASE FORM (REV) FOR DRAWING APPROVAL SIGNATURES

DRAWER: MEK  
CHECKER: XXX  
ENGINEER: XXX  
PROJECT #: 10060

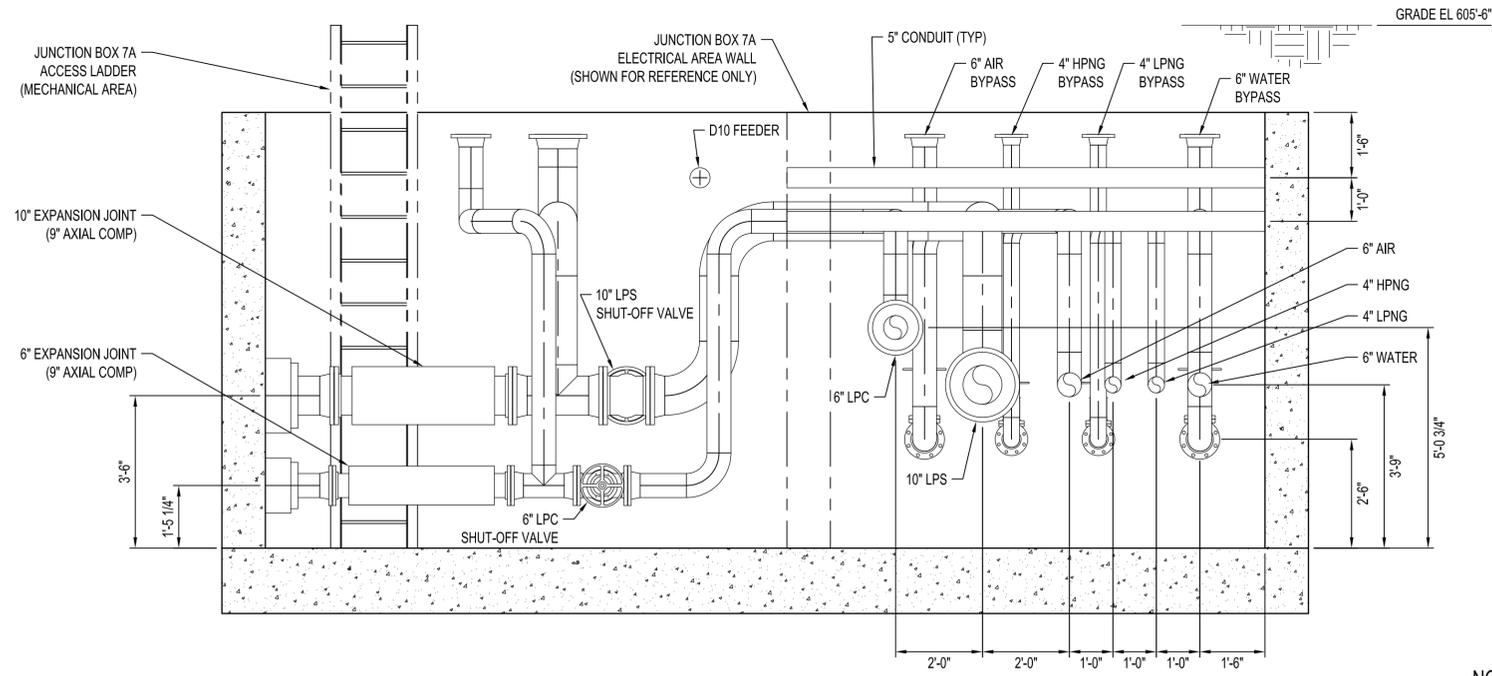
MOLLENBERG-BETZ INC  
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BUFFALO, NY 14204  
**LINDE FUSRAP UTILITY REPLACEMENT PROJECT**  
MECHANICAL UTILITIES  
JUNCTION BOX 7A PLAN

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PH. (716)-592-3980 FAX. (716)-592-4216  
DWG NO. DWG-10060-220  
DWG SCALE: SEE DRAWING REV: 2  
DWG SIZE: D

E  
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**JUNCTION BOX 7A - LOOKING EAST**  
(SHOWN WITHOUT JUNCTION BOX COVER)  
SCALE: 1/2" = 1'-0"



**JUNCTION BOX 7A - LOOKING NORTH**  
(SHOWN WITHOUT JUNCTION BOX COVER)  
SCALE: 1/2" = 1'-0"

**NOTES:**

1. FOR PROJECT COVER SHEET AND DRAWING INDEX, REFER TO DWG-10060-001.
2. DETERMINE PROPER LOCATION OF STEAM AND CONDENSATE TRAPS DURING CONSTRUCTION.
3. ALL LOCATIONS ARE TO BE FIELD VERIFIED PRIOR TO INSTALLATION AS ELEVATIONS MAY CHANGE. AS BUILT DIMENSIONS TO BE RECORDED.

REV	DESCRIPTION	DATE	INIT
0	FOR REVIEW	06/02/11	MEK
1	FOR REVIEW	10/04/11	ELK
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK

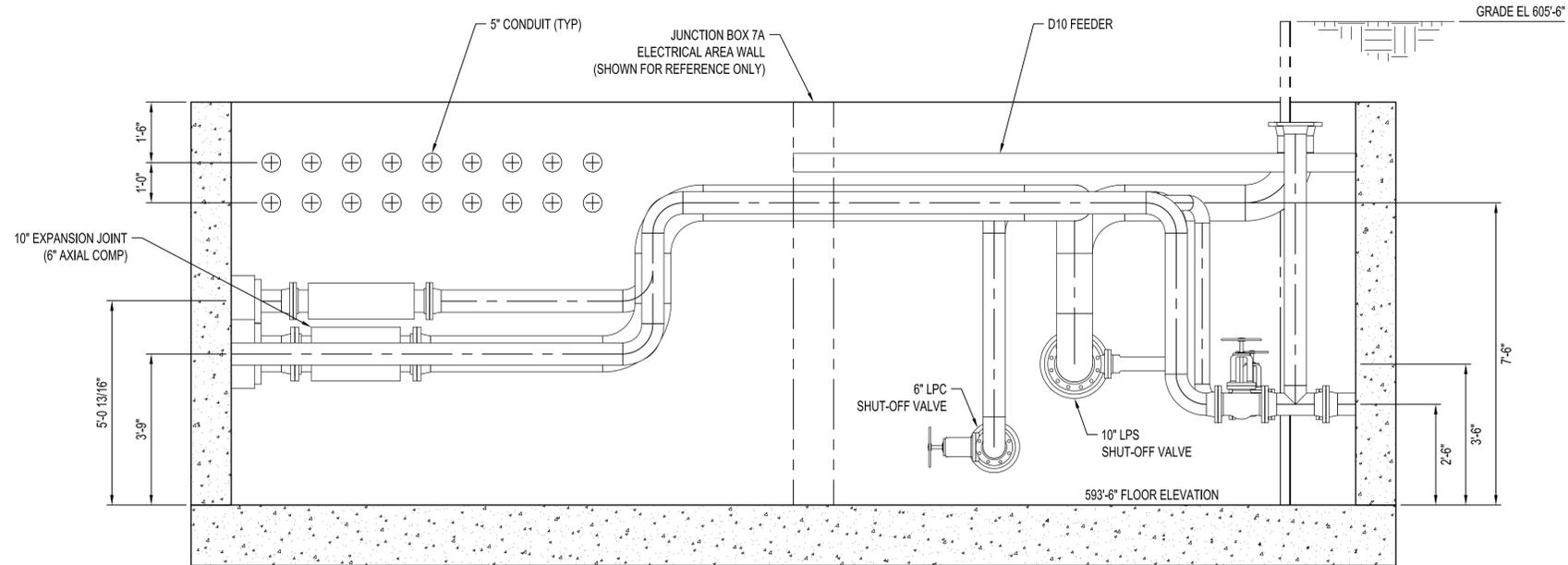
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UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES  
MACHINED SURFACES FLATNESS .003 FINISH 12/31  
TOLERANCES  
FRACTION: 1/8 2 PLACE: ±.01  
3 PLACE: ±.005 ANGLE: 0°/30°  
SEE ENGINEERING REVIEW AND RELEASE FORM (REV) FOR DRAWING APPROVAL SIGNATURES

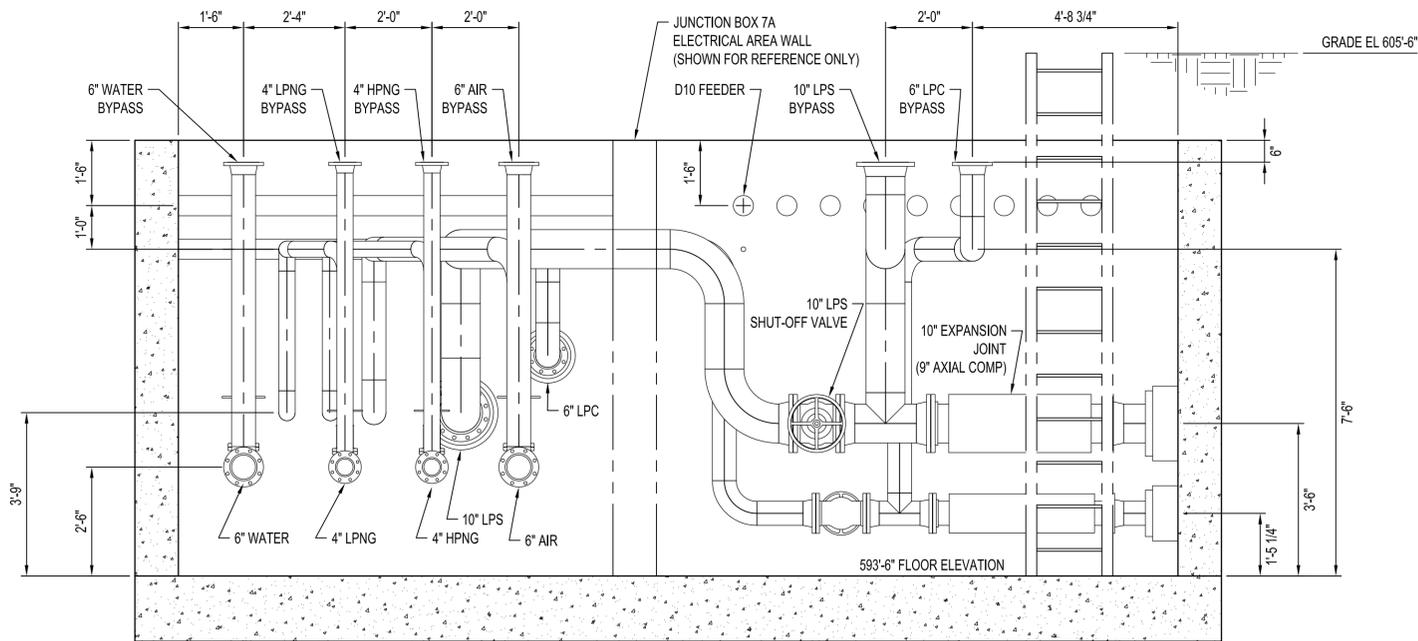
DRAWER: MEK  
CHECKER: XXX  
ENGINEER: XXX  
PROJECT #: 10060

MOLLENBERG-BETZ INC  
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BUFFALO, NY 14204  
LINDE FUSRAP UTILITY REPLACEMENT PROJECT  
MECHANICAL UTILITIES  
JUNCTION BOX 7A EAST AND NORTH ELEV

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DWG NO. DWG-10060-221  
DWG SCALE: SEE DRAWING  
REV: 2  
DWG SIZE: D



**JUNCTION BOX 7A - LOOKING WEST**  
 (SHOWN WITHOUT JUNCTION BOX COVER)  
 SCALE: 1/2" = 1'-0"



**JUNCTION BOX 7A - LOOKING SOUTH**  
 (SHOWN WITHOUT JUNCTION BOX COVER)  
 SCALE: 1/2" = 1'-0"

**NOTES:**

1. FOR PROJECT COVER SHEET AND DRAWING INDEX, REFER TO DWG-10060-001.
2. DETERMINE PROPER LOCATION OF STEAM AND CONDENSATE TRAPS DURING CONSTRUCTION.
3. ALL LOCATIONS ARE TO BE FIELD VERIFIED PRIOR TO INSTALLATION AS ELEVATIONS MAY CHANGE. AS BUILT DIMENSIONS TO BE RECORDED.

REVISIONS			
REV	DESCRIPTION	DATE	INIT
0	FOR REVIEW	06/02/11	MEK
1	FOR REVIEW	10/04/11	ELK
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK

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UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES  
 MACHINED SURFACES  
 FLATNESS: .003 12/1  
 FINISH  
 TOLERANCES  
 FRACTION: 1/8 2 PLACE: ±.01  
 3 PLACE: ±.005 ANGLE: 0°/30°  
 SEE ENGINEERING REVIEW AND RELEASE FORM (REV) FOR DRAWING APPROVAL SIGNATURES

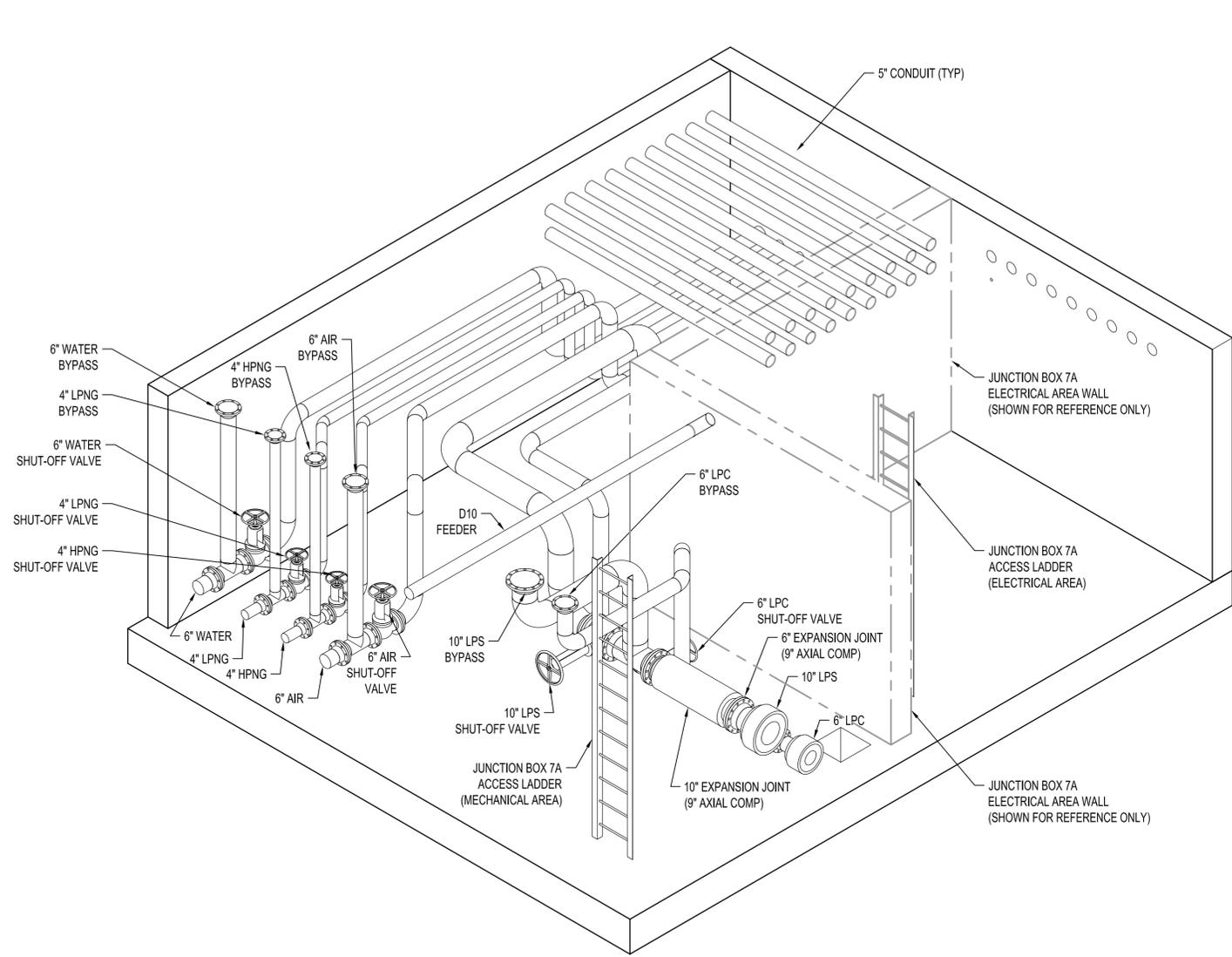
DRAWER: MEK  
 CHECKER: XXX  
 ENGINEER: XXX  
 PROJECT #: 10060

MOLLENBERG-BETZ INC  
 300 SCOTT STREET  
 BUFFALO, NY 14204  
 LINDE FUSRAP UTILITY REPLACEMENT PROJECT  
 MECHANICAL UTILITIES  
 JUNCTION BOX 7A WEST AND SOUTH ELEV

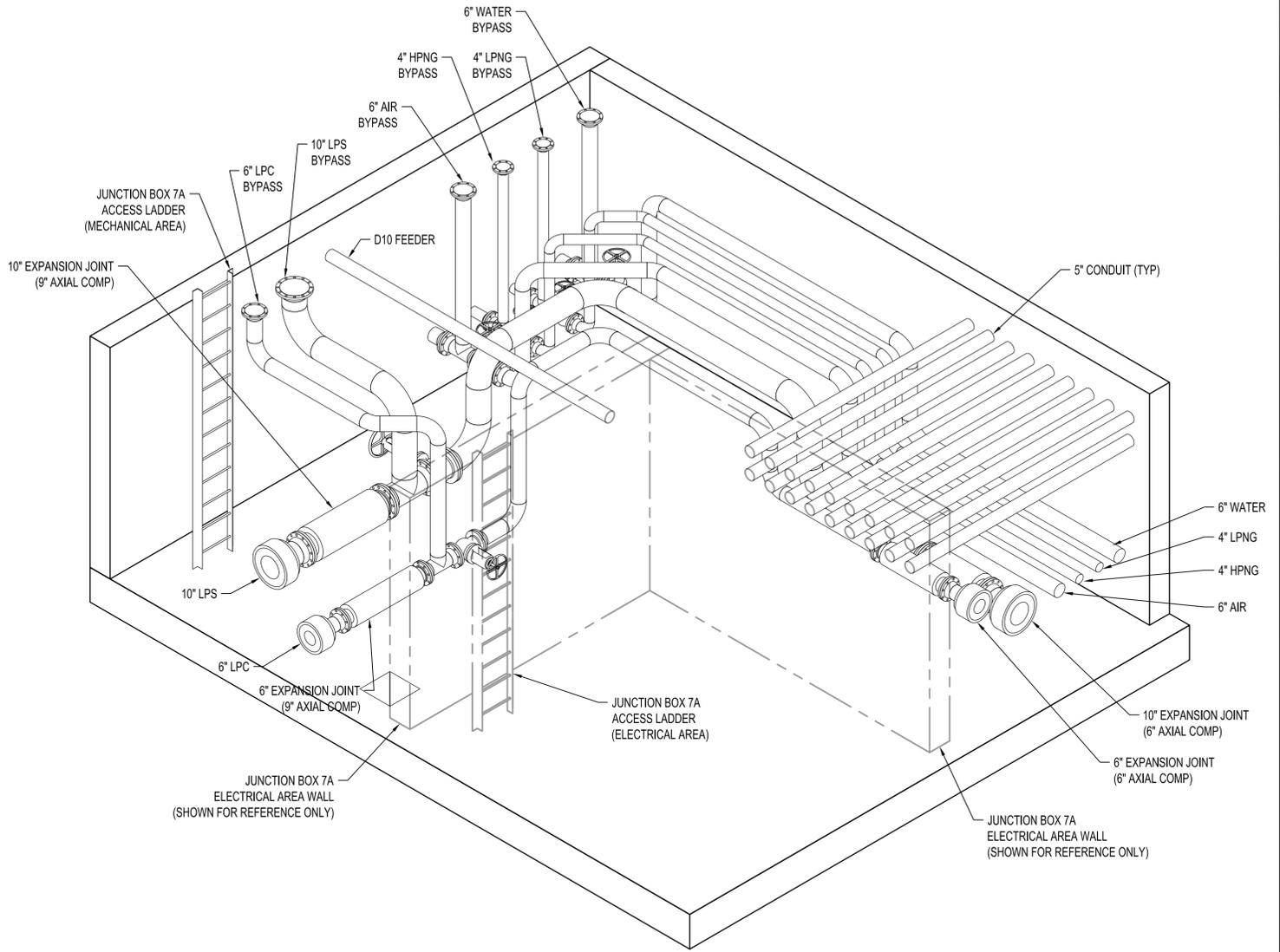
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 PH. (716)-592-3980 FAX. (716)-592-4216  
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 DWG NO. DWG-10060-222  
 DWG SCALE: SEE DRAWING REV: 2  
 DWG SIZE: D

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1 2 3 4 5 6 7 8



**JUNCTION BOX 7A (NORTH & WEST WALL REMOVED)**  
 (SHOWN WITHOUT JUNCTION BOX COVER)  
 SCALE: NONE



**JUNCTION BOX 7A (SOUTH & WEST WALL REMOVED)**  
 (SHOWN WITHOUT JUNCTION BOX COVER)  
 SCALE: NONE

**NOTES:**

1. FOR PROJECT COVER SHEET AND DRAWING INDEX, REFER TO DWG-10060-001.
2. DETERMINE PROPER LOCATION OF STEAM AND CONDENSATE TRAPS DURING CONSTRUCTION.

REVISIONS			
REV	DESCRIPTION	DATE	INIT
0	FOR REVIEW	06/02/11	MEK
1	FOR REVIEW	10/04/11	ELK
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK

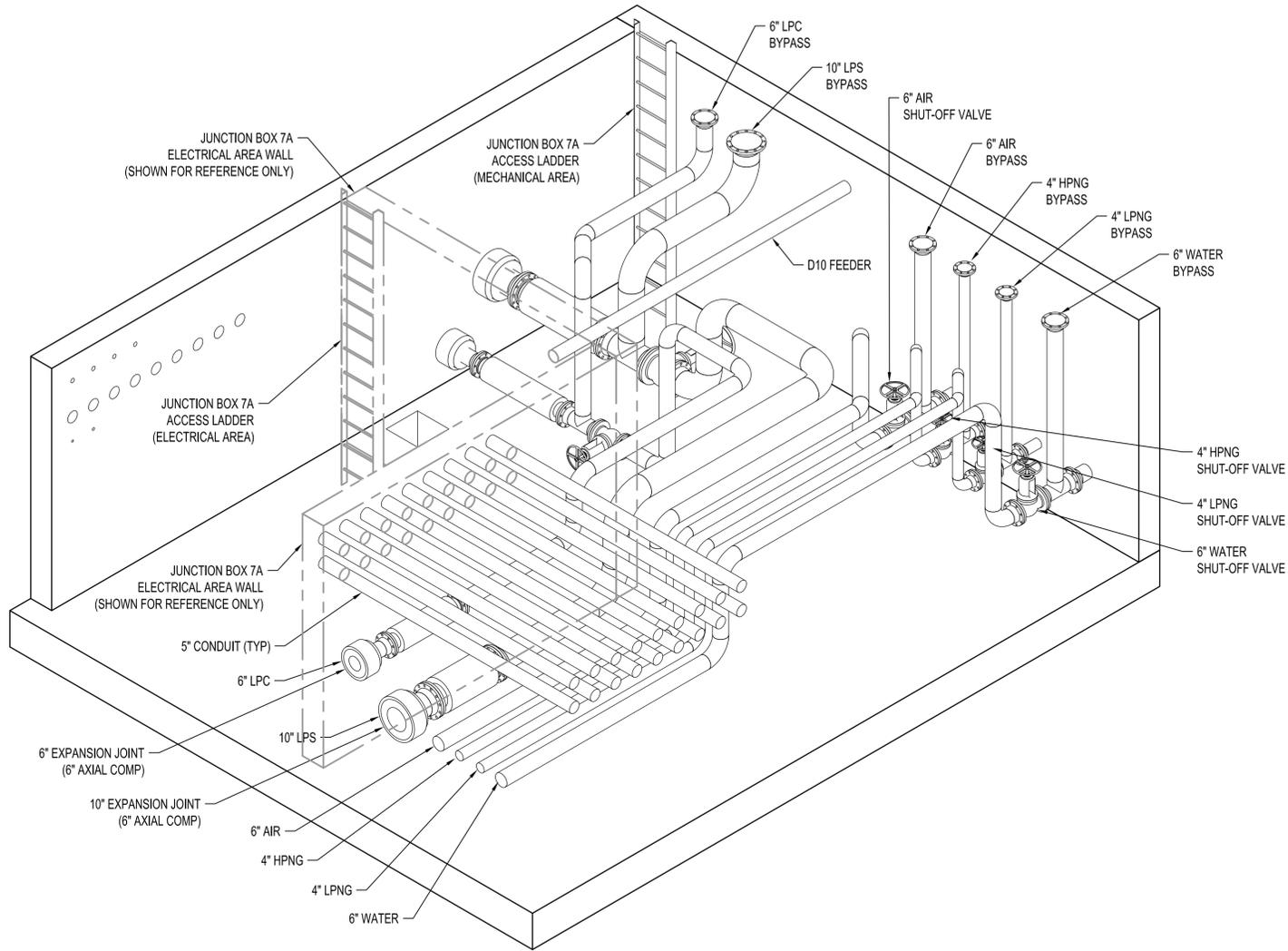
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UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES  
 MACHINED SURFACES  
 FLATNESS: .003 12/  
 FINISH  
 TOLERANCES  
 FRACTION: 1/8 2 PLACE: ±.01  
 3 PLACE: ±.005 ANGLE: 0°/30°  
 SEE ENGINEERING REVIEW AND RELEASE FORM (RFI) FOR DRAWING APPROVAL SIGNATURES

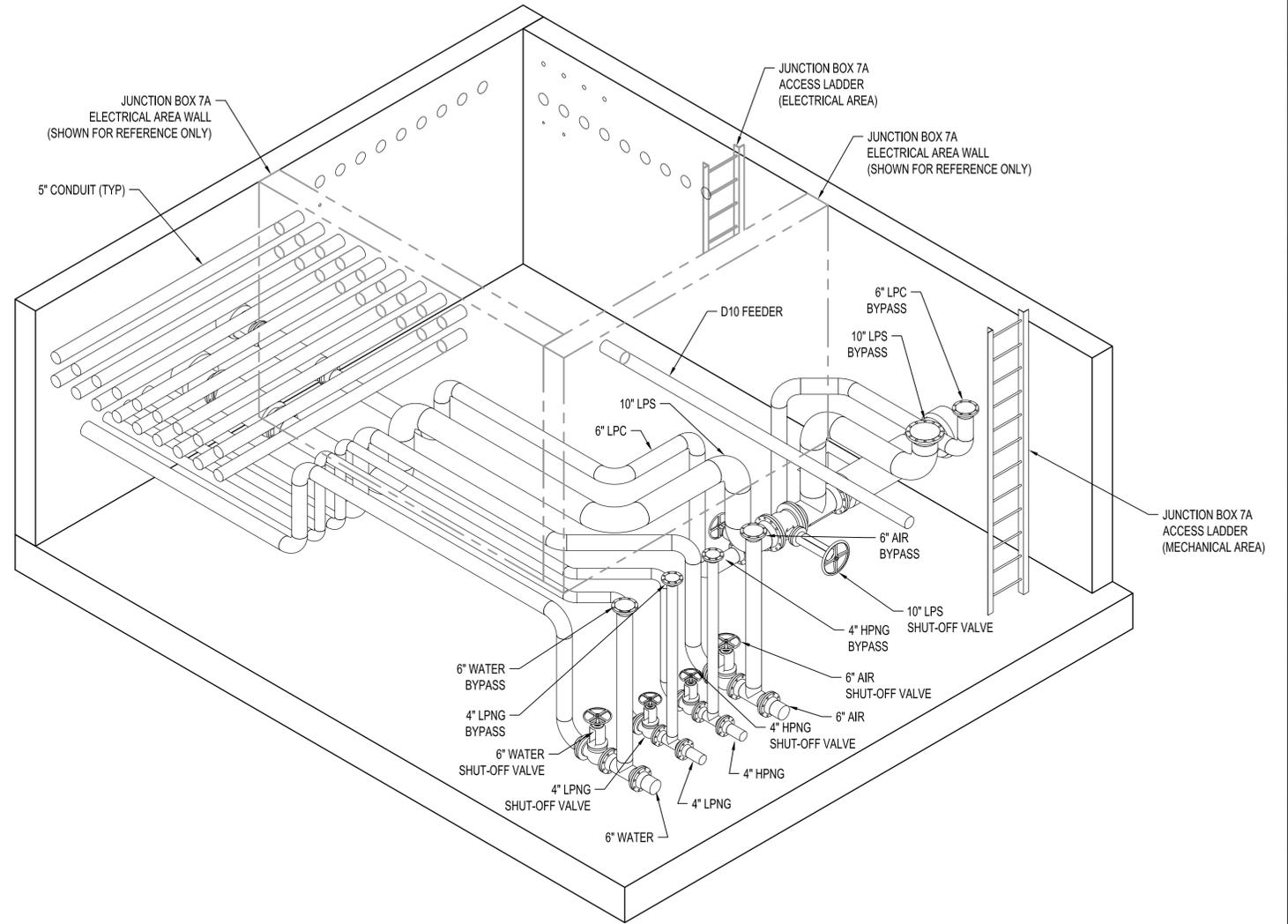
DRAWER: MEK  
 CHECKER: XXX  
 ENGINEER: XXX  
 PROJECT #: 10060

MOLLENBERG-BETZ INC  
 300 SCOTT STREET  
 BUFFALO, NY 14204  
 LINDE FUSRAP UTILITY REPLACEMENT PROJECT  
 MECHANICAL UTILITIES  
 JUNCTION BOX 7A ISO DETAILS 1 OF 2

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	PROJECT #: DWG SIZE: D	



**JUNCTION BOX 7A (SOUTH & EAST WALL REMOVED)**  
 (SHOWN WITHOUT JUNCTION BOX COVER)  
 SCALE: NONE



**JUNCTION BOX 7A (NORTH & EAST WALL REMOVED)**  
 (SHOWN WITHOUT JUNCTION BOX COVER)  
 SCALE: NONE

**NOTES:**

- FOR PROJECT COVER SHEET AND DRAWING INDEX, REFER TO DWG-10060-001.
- DETERMINE PROPER LOCATION OF STEAM AND CONDENSATE TRAPS DURING CONSTRUCTION.

REVISIONS			
REV	DESCRIPTION	DATE	INIT
0	FOR REVIEW	06/02/11	MEK
1	FOR REVIEW	10/04/11	ELK
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK

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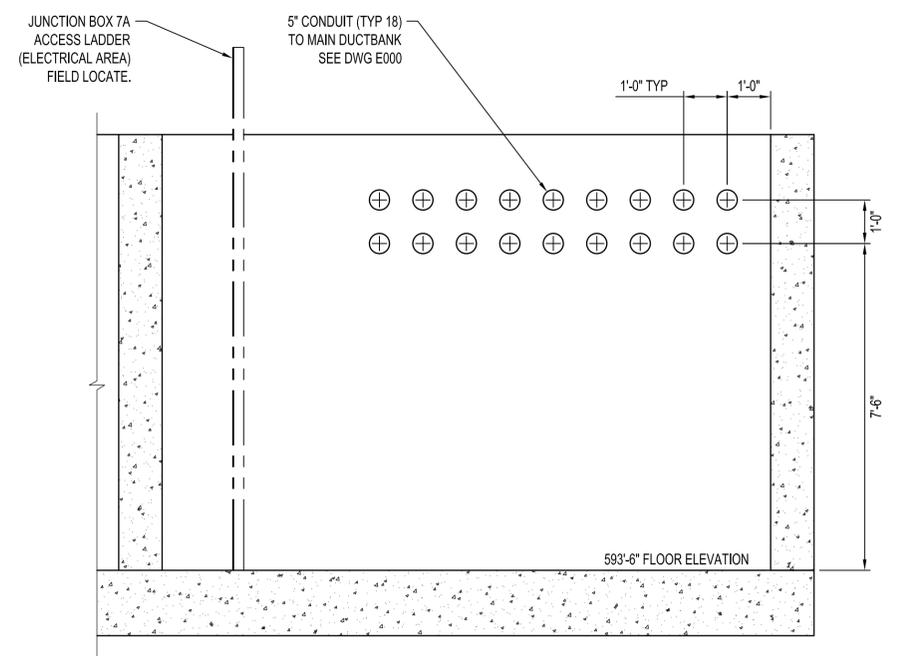
UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES  
 MACHINED SURFACES  
 FLATNESS: .003 12/  
 FINISH  
 TOLERANCES  
 FRACTION: 1/8 2 PLACE: ±.01  
 3 PLACE: ±.005 ANGLE: 0°:30'  
 SEE ENGINEERING REVIEW AND RELEASE FORM (REV) FOR DRAWING APPROVAL SIGNATURES

DRAWER: MEK  
 CHECKER: XXX  
 ENGINEER: XXX  
 PROJECT #: 10060

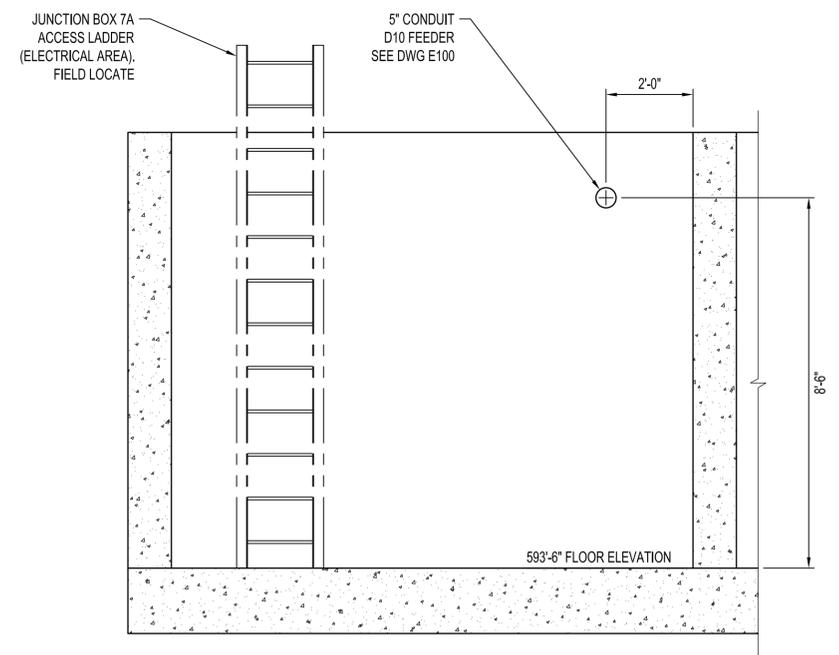
MOLLENBERG-BETZ INC  
 300 SCOTT STREET  
 BUFFALO, NY 14204  
 LINDE FUSRAP UTILITY REPLACEMENT PROJECT  
 MECHANICAL UTILITIES  
 JUNCTION BOX 7A ISO DETAILS 2 OF 2

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 Springville, New York 14141-0344  
 PH. (716)-592-3980 FAX. (716)-592-4216  
 DWG NO.: DWG-10060-224  
 DWG SCALE: SEE DRAWING  
 REV: 2  
 DWG SIZE: D

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**JUNCTION BOX ELECTRICAL ROOM 7A - LOOKING EAST**  
(SHOWN WITHOUT JUNCTION BOX COVER)  
SCALE: 1/2" = 1'-0"

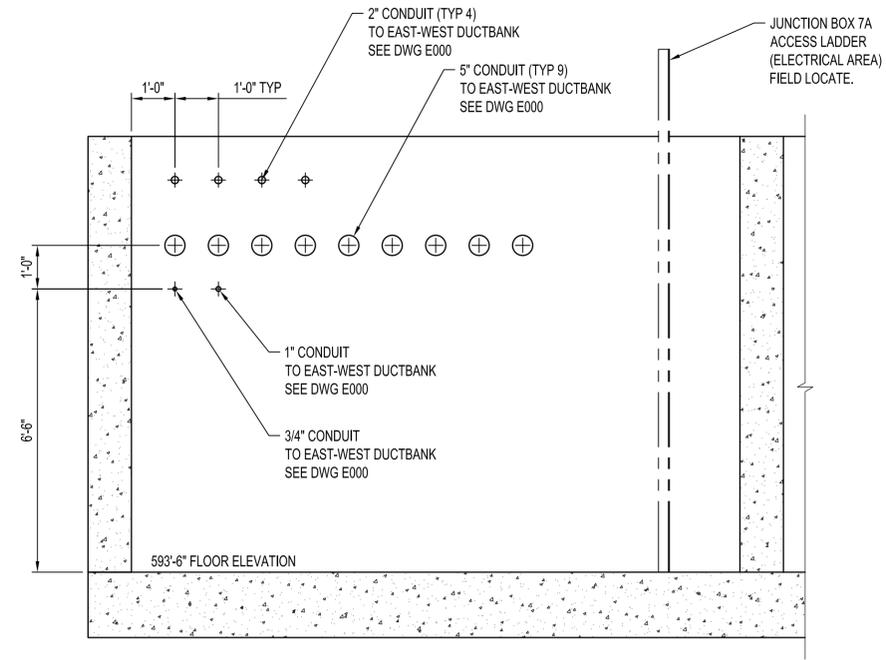


**JUNCTION BOX 7A ELECTRICAL ROOM - LOOKING NORTH**  
(SHOWN WITHOUT JUNCTION BOX COVER)  
SCALE: 1/2" = 1'-0"

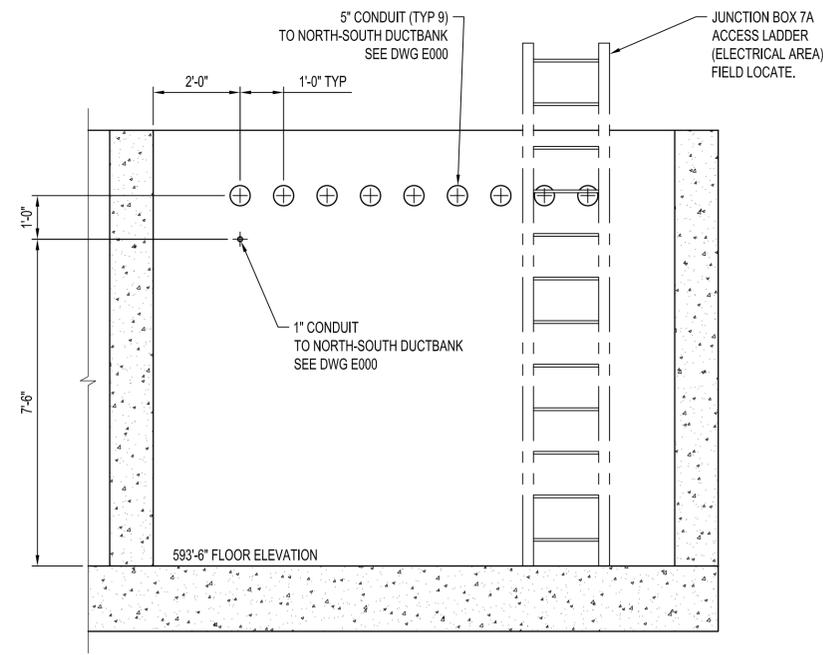
**NOTE:**  
1. FOR PROJECT COVER SHEET AND DRAWING INDEX, REFER TO DWG-10060-001.

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REV	DESCRIPTION	DATE	INIT		MACHINED SURFACES FLATNESS: .003 12/			DRAFTER: MEK CHECKER: XXX ENGINEER: XXX	DWG NO.: DWG-10060-226 DWG SCALE: SEE DRAWING REV: 2
0	FOR REVIEW	06/02/11	MEK		TOLERANCES FRACTION: 1/8 2 PLACE: ±.01 3 PLACE: ±.005 ANGLE: 0°/30°				
1	FOR REVIEW	10/04/11	ELK		SEE ENGINEERING REVIEW AND RELEASE FORM (REV) FOR DRAWING APPROVAL SIGNATURES				
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK						

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**JUNCTION BOX 7A ELECTRICAL ROOM - LOOKING WEST**  
 (SHOWN WITHOUT JUNCTION BOX COVER)  
 SCALE: 1/2" = 1'-0"



**JUNCTION BOX 7A ELECTRICAL ROOM - LOOKING SOUTH**  
 (SHOWN WITHOUT JUNCTION BOX COVER)  
 SCALE: 1/2" = 1'-0"

**NOTE:**

- FOR PROJECT COVER SHEET AND DRAWING INDEX, REFER TO DWG-10060-001.

REVISIONS			
REV	DESCRIPTION	DATE	INIT
0	FOR REVIEW	06/02/11	MEK
1	FOR REVIEW	10/04/11	ELK
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK

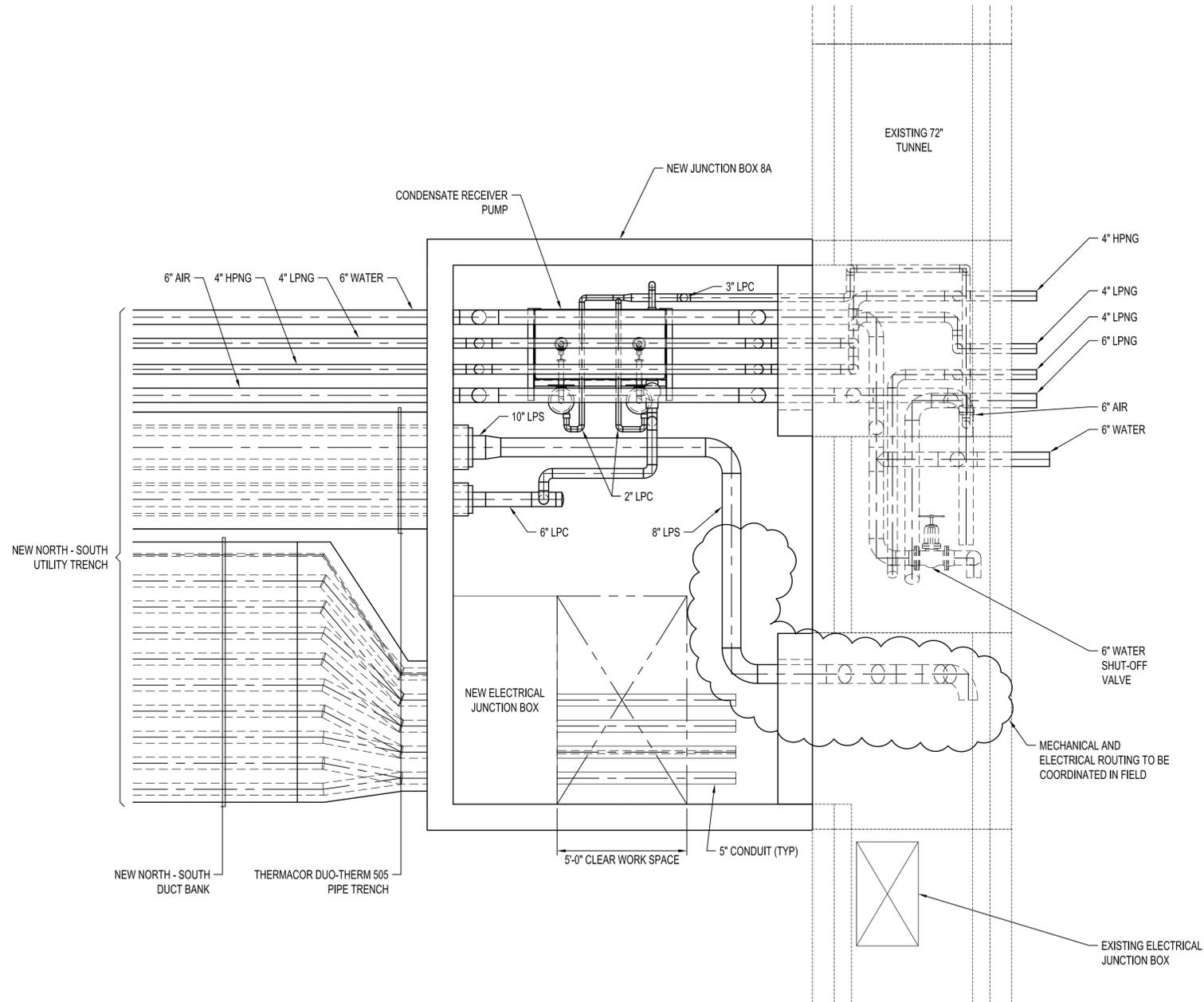
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UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES  
 MACHINED SURFACES  
 FLATNESS: .003 12/1  
 FINISH  
 TOLERANCES  
 FRACTION: 1/8 2 PLACE: ±.01  
 3 PLACE: ±.005 ANGLE: 0°/30°  
 SEE ENGINEERING REVIEW AND RELEASE FORM (RFI) FOR DRAWING APPROVAL SIGNATURES

DRAWER: MEK  
 CHECKER: XXX  
 ENGINEER: XXX  
 PROJECT #: 10060

MOLLENBERG-BETZ INC  
 300 SCOTT STREET  
 BUFFALO, NY 14204  
 LINDE FUSRAP UTILITY REPLACEMENT PROJECT  
 MECHANICAL UTILITIES  
 JB 7A ELEC ROOM WEST AND SOUTH ELEV

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 PH. (716)-592-3980 FAX. (716)-592-4216  
 www.rjr.com  
 DWG NO. DWG-10060-227  
 DWG SCALE: SEE DRAWING  
 REV: 2  
 DWG SIZE: D



**JUNCTION BOX 8A - PLAN**

SCALE: 3/8" = 1'-0"

**NOTES:**

1. FOR PROJECT COVER SHEET AND DRAWING INDEX, REFER TO DWG-10060-001.
2. DETERMINE PROPER LOCATION OF STEAM AND CONDENSATE TRAPS DURING CONSTRUCTION.

REVISIONS			
REV	DESCRIPTION	DATE	INIT
0	FOR REVIEW	06/02/11	MEK
1	FOR REVIEW	10/04/11	ELK
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK

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UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES  
 MACHINED SURFACES FLATNESS .003 FINISH  
 TOLERANCES  
 FRACTION: 1/8 2 PLACE: ±.01  
 3 PLACE: ±.005 ANGLE: 0°/30°  
 SEE ENGINEERING REVIEW AND RELEASE FORM (REV) FOR DRAWING APPROVAL SIGNATURES

DRAWER: MEK  
 CHECKER: XXX  
 ENGINEER: XXX  
 PROJECT #: 10060

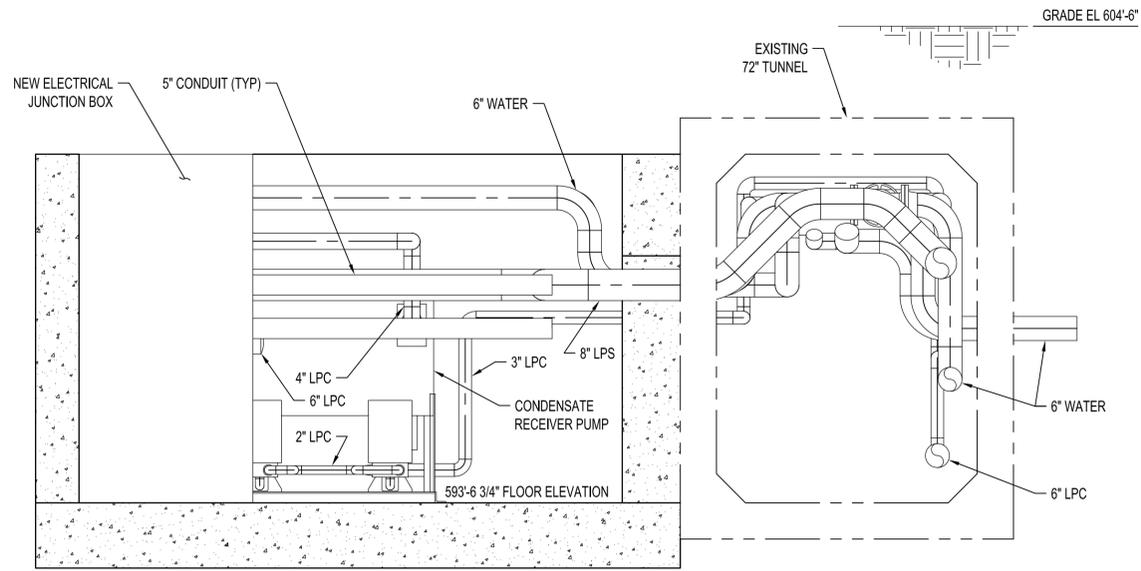
MOLLENBERG-BETZ INC  
 300 SCOTT STREET  
 BUFFALO, NY 14204

LINDE FUSRAP UTILITY REPLACEMENT PROJECT  
 MECHANICAL UTILITIES  
 JUNCTION BOX 8A PLAN

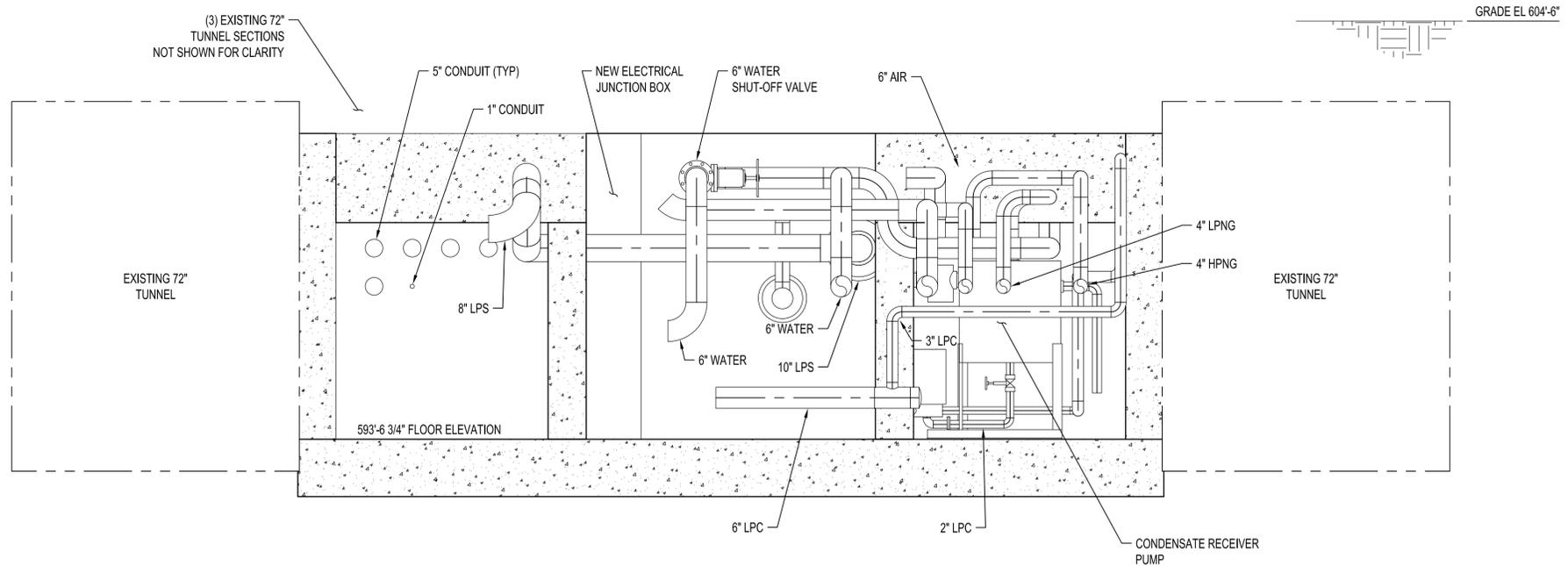
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DWG NO. DWG-10060-230  
 DWG SCALE: SEE DRAWING REV: 2  
 DWG SIZE: D

E  
D  
C  
B  
A



**JUNCTION BOX 8A - LOOKING EAST**  
(SHOWN WITHOUT JUNCTION BOX COVER)  
SCALE: 1/2" = 1'-0"



**JUNCTION BOX 8A - LOOKING NORTH**  
(SHOWN WITHOUT JUNCTION BOX COVER)  
SCALE: 1/2" = 1'-0"

**NOTES:**

1. FOR PROJECT COVER SHEET AND DRAWING INDEX, REFER TO DWG-10060-001.
2. DETERMINE PROPER LOCATION OF STEAM AND CONDENSATE TRAPS DURING CONSTRUCTION.
3. ALL LOCATIONS ARE TO BE FIELD VERIFIED PRIOR TO INSTALLATION AS ELEVATIONS MAY CHANGE. AS BUILT DIMENSIONS TO BE RECORDED.

REVISIONS			
REV	DESCRIPTION	DATE	INIT
0	FOR REVIEW	06/02/11	MEK
1	FOR REVIEW	10/04/11	ELK
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK

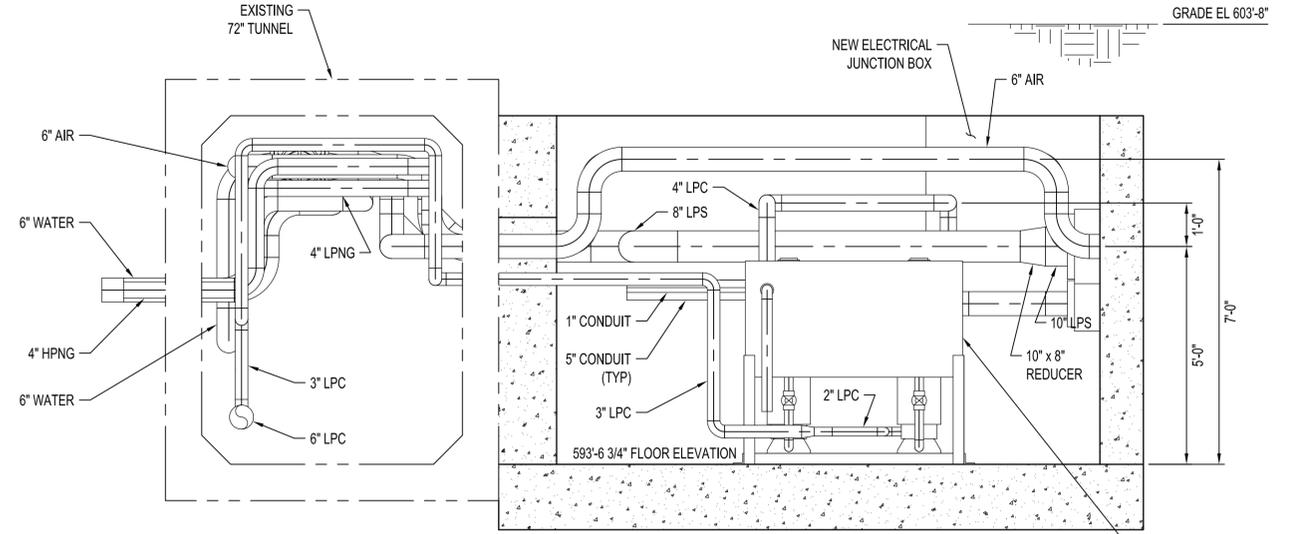
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UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES  
MACHINED SURFACES FLATNESS: .003 FINISH  
TOLERANCES  
FRACTION: 1/8 2 PLACE: ±.01  
3 PLACE: ±.005 ANGLE: 0°/30°  
SEE ENGINEERING REVIEW AND RELEASE FORM (RFI) FOR DRAWING APPROVAL SIGNATURES

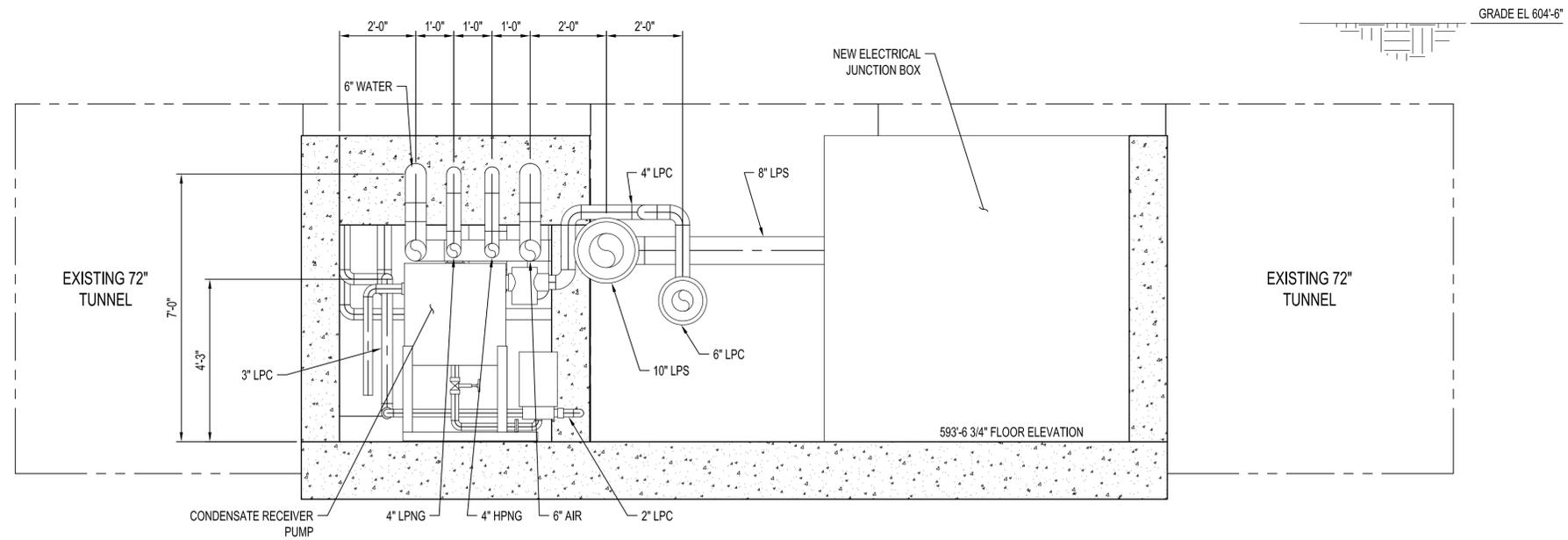
DRAWER: MEK  
CHECKER: XXX  
ENGINEER: XXX  
PROJECT #: 10060

MOLLENBERG-BETZ INC  
300 SCOTT STREET  
BUFFALO, NY 14204  
LINDE FUSRAP UTILITY REPLACEMENT PROJECT  
MECHANICAL UTILITIES  
JUNCTION BOX 8A EAST AND NORTH ELEV

	RJR ENGINEERING, P.C. PROFESSIONAL ENGINEERS 23 Mechanic Street - P.O. Box 344 Springville, New York 14141-0344 PH. (716)-592-3980 FAX. (716)-592-4216	DWG NO.: DWG-10060-231 DWG SCALE: SEE DRAWING REV: 2
	DWG SIZE: D	



**JUNCTION BOX 8A - LOOKING WEST**  
 (SHOWN WITHOUT JUNCTION BOX COVER)  
 SCALE: 1/2" = 1'-0"



**JUNCTION BOX 8A - LOOKING SOUTH**  
 (SHOWN WITHOUT JUNCTION BOX COVER)  
 SCALE: 1/2" = 1'-0"

**NOTES:**

1. FOR PROJECT COVER SHEET AND DRAWING INDEX, REFER TO DWG-10060-001.
2. DETERMINE PROPER LOCATION OF STEAM AND CONDENSATE TRAPS DURING CONSTRUCTION.
3. ALL LOCATIONS ARE TO BE FIELD VERIFIED PRIOR TO INSTALLATION AS ELEVATIONS MAY CHANGE. AS BUILT DIMENSIONS TO BE RECORDED.

REVISIONS			
REV	DESCRIPTION	DATE	INIT
0	FOR REVIEW	06/02/11	MEK
1	FOR REVIEW	10/04/11	ELK
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK

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UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES  
 MACHINED SURFACES  
 FLATNESS: .003 12/1  
 FINISH  
 TOLERANCES  
 FRACTION: 1/8 2 PLACE: ±.01  
 3 PLACE: ±.005 ANGLE: 0°:30'  
 SEE ENGINEERING REVIEW AND RELEASE FORM (RFI) FOR DRAWING APPROVAL SIGNATURES

DRAWER: MEK  
 CHECKER: XXX  
 ENGINEER: XXX  
 PROJECT #: 10060

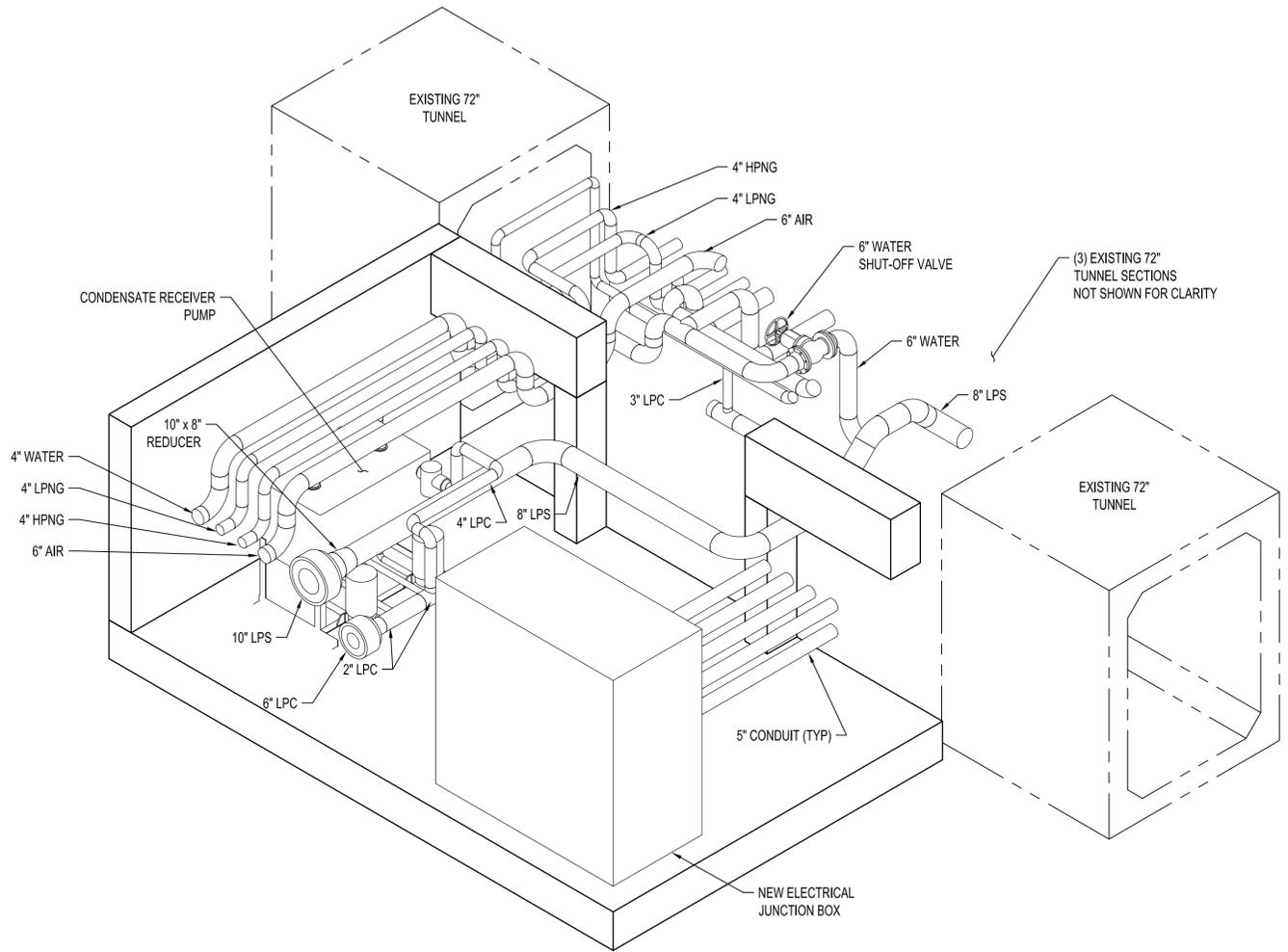
MOLLENBERG-BETZ INC  
 300 SCOTT STREET  
 BUFFALO, NY 14204

LINDE FUSRAP UTILITY REPLACEMENT PROJECT  
 MECHANICAL UTILITIES  
 JUNCTION BOX 8A WEST AND SOUTH ELEV

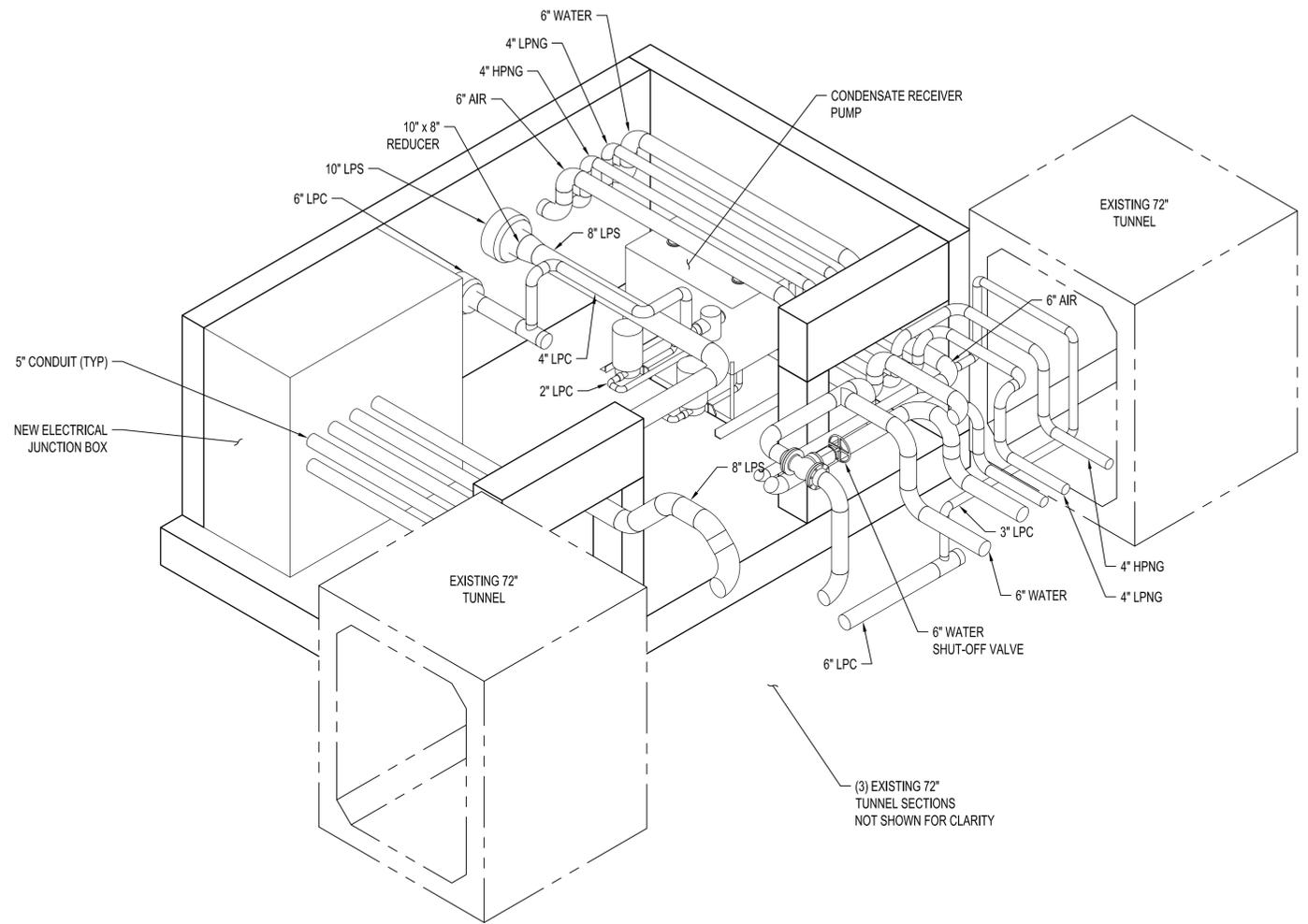
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DWG NO. DWG-10060-232  
 DWG SCALE: SEE DRAWING  
 REV: 2  
 DWG SIZE: D

E  
D  
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**JUNCTION BOX 8A (NORTH & WEST WALL REMOVED)**  
 (SHOWN WITHOUT JUNCTION BOX COVER)  
 SCALE: NONE



**JUNCTION BOX 8A (SOUTH & WEST WALL REMOVED)**  
 (SHOWN WITHOUT JUNCTION BOX COVER)  
 SCALE: NONE

**NOTES:**

- FOR PROJECT COVER SHEET AND DRAWING INDEX, REFER TO DWG-10060-001.
- DETERMINE PROPER LOCATION OF STEAM AND CONDENSATE TRAPS DURING CONSTRUCTION.

REVISIONS			
REV	DESCRIPTION	DATE	INIT
0	FOR REVIEW	06/02/11	MEK
1	FOR REVIEW	10/04/11	ELK
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK

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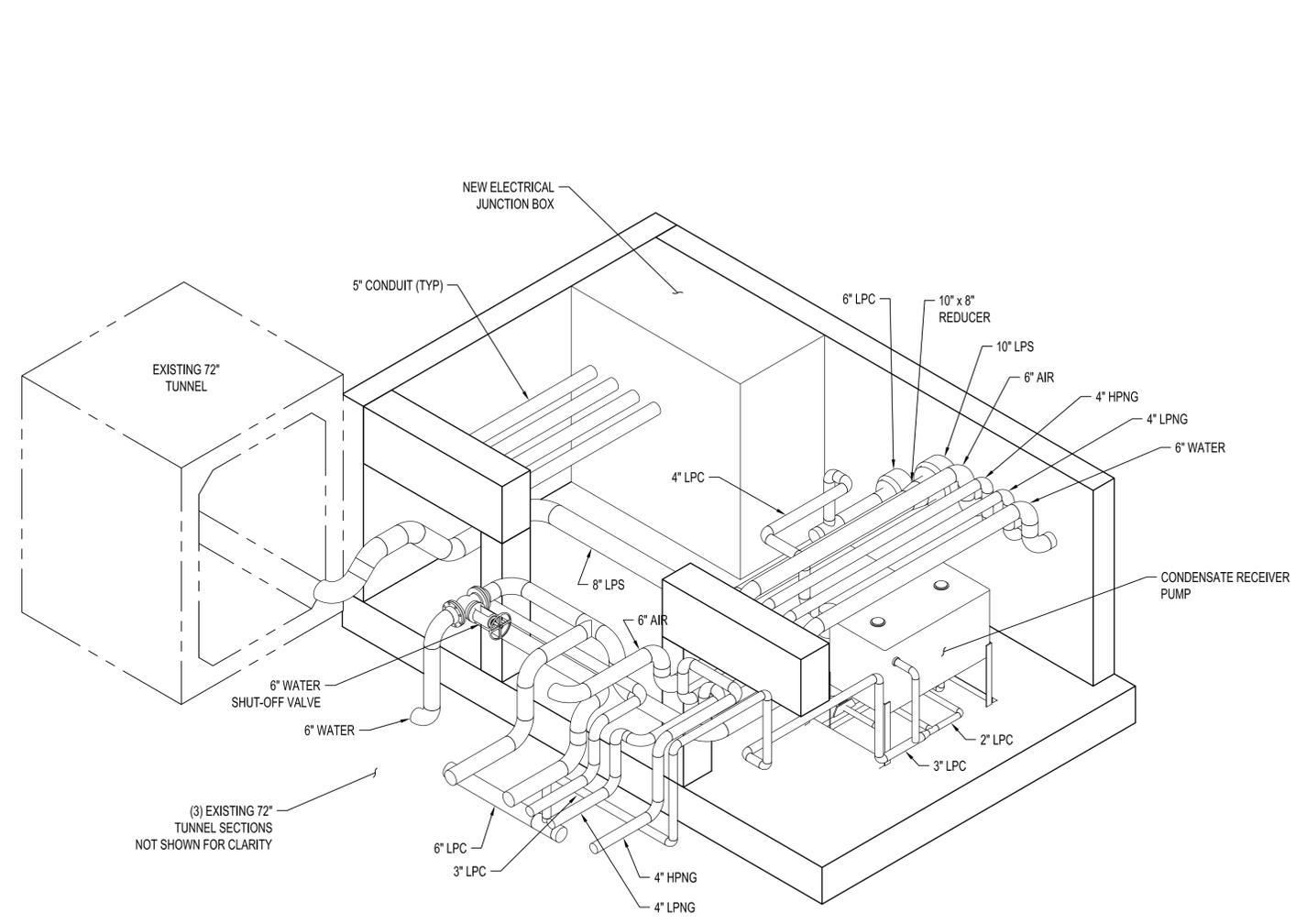
UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES  
 MACHINED SURFACES  
 FLATNESS: .003 12/  
 FINISH  
 TOLERANCES  
 FRACTION: 1/8 2 PLACE: ±.01  
 3 PLACE: ±.005 ANGLE: 0°/30°  
 SEE ENGINEERING REVIEW AND RELEASE FORM (REV) FOR DRAWING APPROVAL SIGNATURES

DRAWER: MEK  
 CHECKER: XXX  
 ENGINEER: XXX  
 PROJECT #: 10060

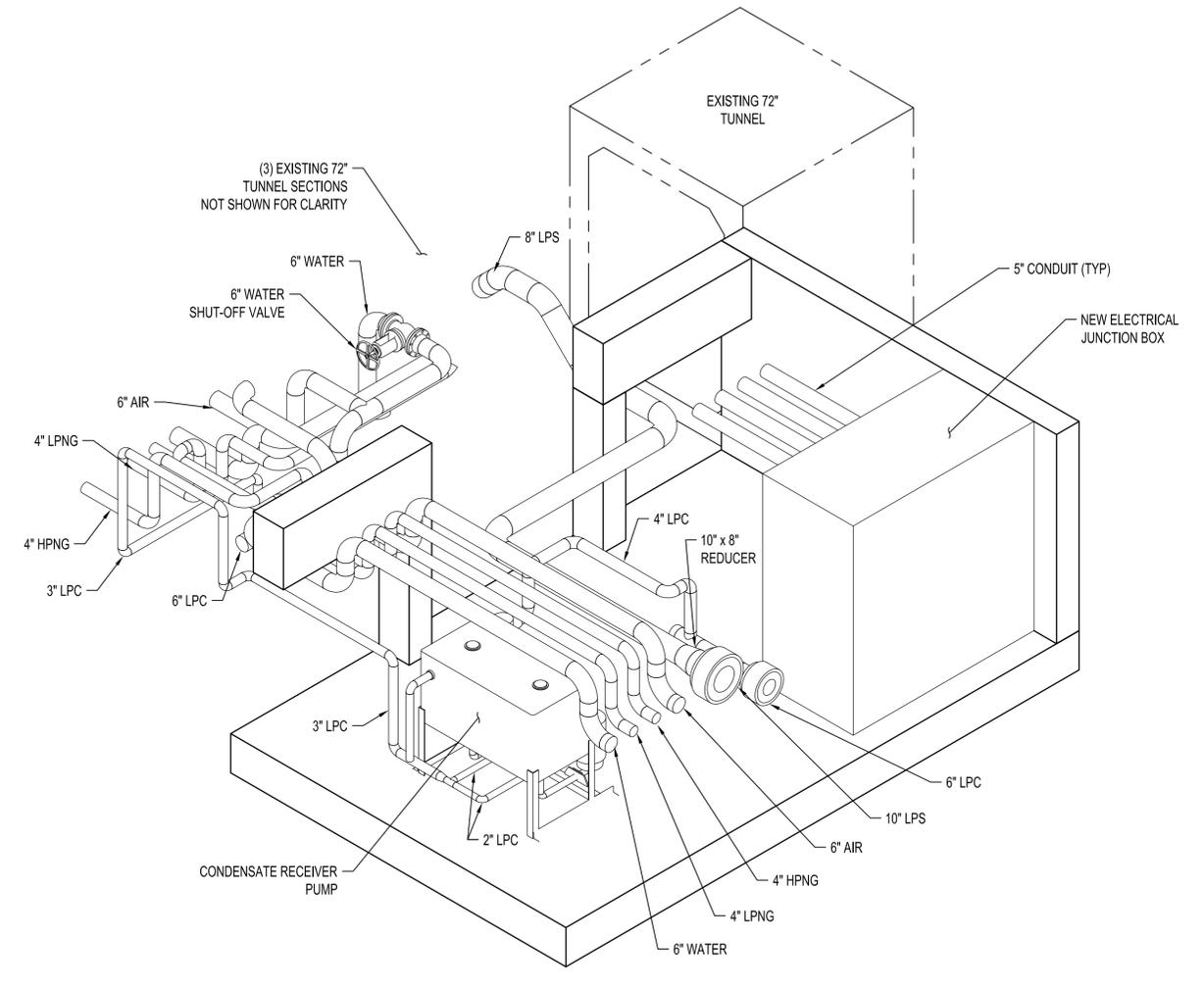
MOLLENBERG-BETZ INC  
 300 SCOTT STREET  
 BUFFALO, NY 14204  
 LINDE FUSRAP UTILITY REPLACEMENT PROJECT  
 MECHANICAL UTILITIES  
 JUNCTION BOX 8A ISO DETAILS 1 OF 2

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 Springville, New York 14141-0344  
 PH. (716)-592-3980 FAX. (716)-592-4216  
 DWG NO.: DWG-10060-233  
 DWG SCALE: SEE DRAWING  
 REV: 2  
 DWG SIZE: D

E  
D  
C  
B  
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**JUNCTION BOX 8A (SOUTH & EAST WALL REMOVED)**  
 (SHOWN WITHOUT JUNCTION BOX COVER)  
 SCALE: NONE



**JUNCTION BOX 8A (NORTH & EAST WALL REMOVED)**  
 (SHOWN WITHOUT JUNCTION BOX COVER)  
 SCALE: NONE

**NOTES:**

1. FOR PROJECT COVER SHEET AND DRAWING INDEX, REFER TO DWG-10060-001.
2. DETERMINE PROPER LOCATION OF STEAM AND CONDENSATE TRAPS DURING CONSTRUCTION.

REVISIONS			
REV	DESCRIPTION	DATE	INIT
0	FOR REVIEW	06/02/11	MEK
1	FOR REVIEW	10/04/11	ELK
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK

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UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES  
 MACHINED SURFACES  
 FLATNESS: .003 FINISH 12/1  
 TOLERANCES  
 FRACTION: 1/8 2 PLACE: ±.01  
 3 PLACE: ±.005 ANGLE: 0°/30°  
 SEE ENGINEERING REVIEW AND RELEASE FORM (REV) FOR DRAWING APPROVAL SIGNATURES

DRAWER: MEK  
 CHECKER: XXX  
 ENGINEER: XXX  
 PROJECT #: 10060

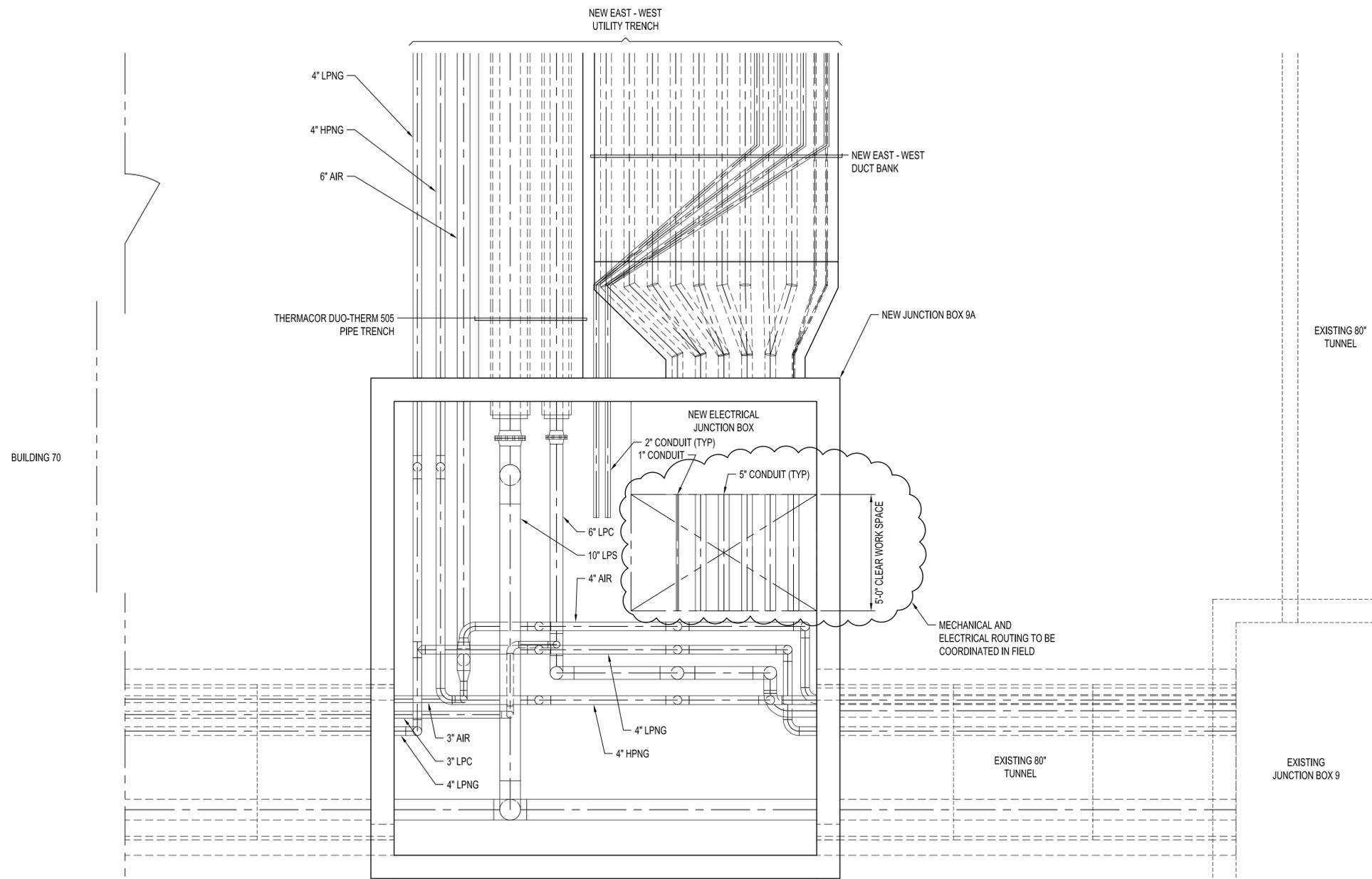
MOLLENBERG-BETZ INC  
 300 SCOTT STREET  
 BUFFALO, NY 14204  
 LINDE FUSRAP UTILITY REPLACEMENT PROJECT  
 MECHANICAL UTILITIES  
 JUNCTION BOX 8A ISO DETAILS 2 OF 2

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 PH. (716)-592-3980 FAX. (716)-592-4216  
 DWG NO.: DWG-10060-234  
 DWG SCALE: SEE DRAWING  
 REV: 2  
 DWG SIZE: D



E  
D  
C  
B  
A

1 2 3 4 5 6 7 8



**JUNCTION BOX 9A - PLAN**  
SCALE: 3/8" = 1'-0"

- NOTES:**
- FOR PROJECT COVER SHEET AND DRAWING INDEX, REFER TO DWG-10060-001.
  - DETERMINE PROPER LOCATION OF STEAM AND CONDENSATE TRAPS DURING CONSTRUCTION.

REVISIONS			
REV	DESCRIPTION	DATE	INIT
0	FOR REVIEW	06/02/11	MEK
1	FOR REVIEW	10/04/11	ELK
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK

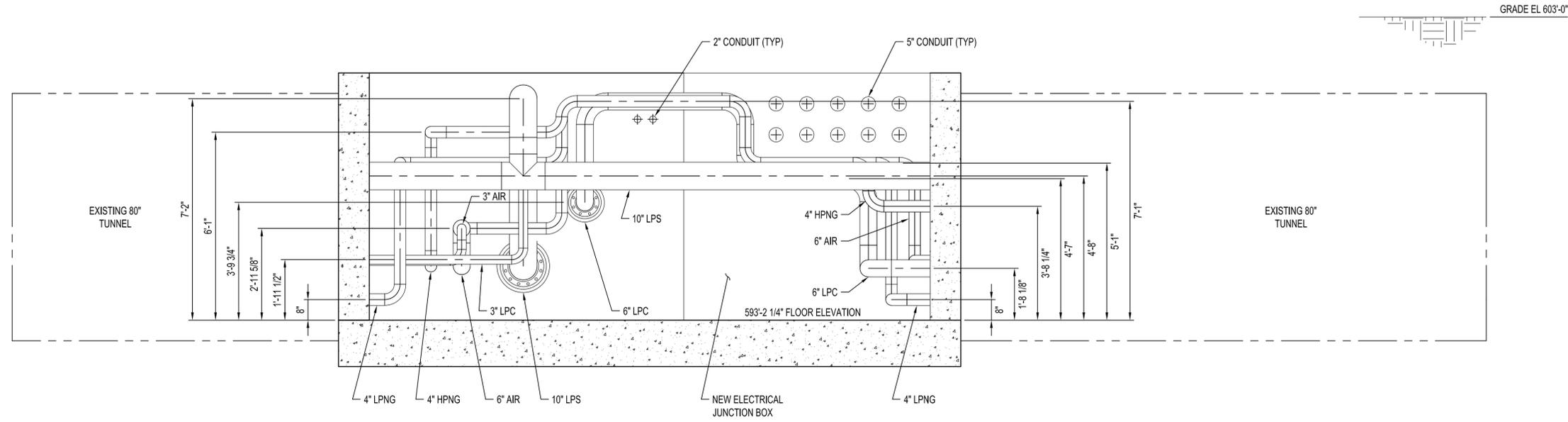
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UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES  
MACHINED SURFACES FLATNESS: .003 FINISH 125  
TOLERANCES FRACTION: 1/8 2 PLACE: ±.01 3 PLACE: ±.005 ANGLE: 0°/30°  
SEE ENGINEERING REVIEW AND RELEASE FORM (RFI) FOR DRAWING APPROVAL SIGNATURES

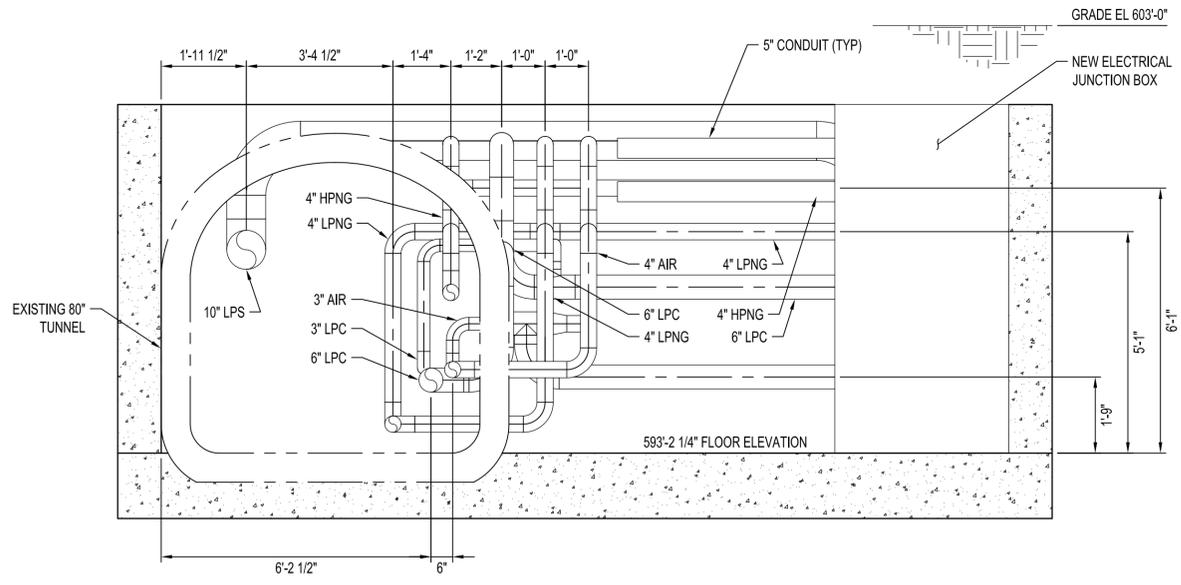
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CHECKER: XXX  
ENGINEER: XXX  
PROJECT #: 10060

MOLLENBERG-BETZ INC  
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MECHANICAL UTILITIES  
JUNCTION BOX 9A PLAN

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DWG NO. DWG-10060-240  
DWG SCALE: SEE DRAWING REV: 2  
DWG SIZE: D



**JUNCTION BOX 9A - LOOKING EAST**  
 (SHOWN WITHOUT JUNCTION BOX COVER)  
 SCALE: 1/2" = 1'-0"



**JUNCTION BOX 9A - LOOKING NORTH**  
 (SHOWN WITHOUT JUNCTION BOX COVER)  
 SCALE: 1/2" = 1'-0"

**NOTES:**

- FOR PROJECT COVER SHEET AND DRAWING INDEX, REFER TO DWG-10060-001.
- DETERMINE PROPER LOCATION OF STEAM AND CONDENSATE TRAPS DURING CONSTRUCTION.
- ALL LOCATIONS ARE TO BE FIELD VERIFIED PRIOR TO INSTALLATION AS ELEVATIONS MAY CHANGE. AS BUILT DIMENSIONS TO BE RECORDED.

REVISIONS			
REV	DESCRIPTION	DATE	INIT
0	FOR REVIEW	06/02/11	MEK
1	FOR REVIEW	10/04/11	ELK
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK

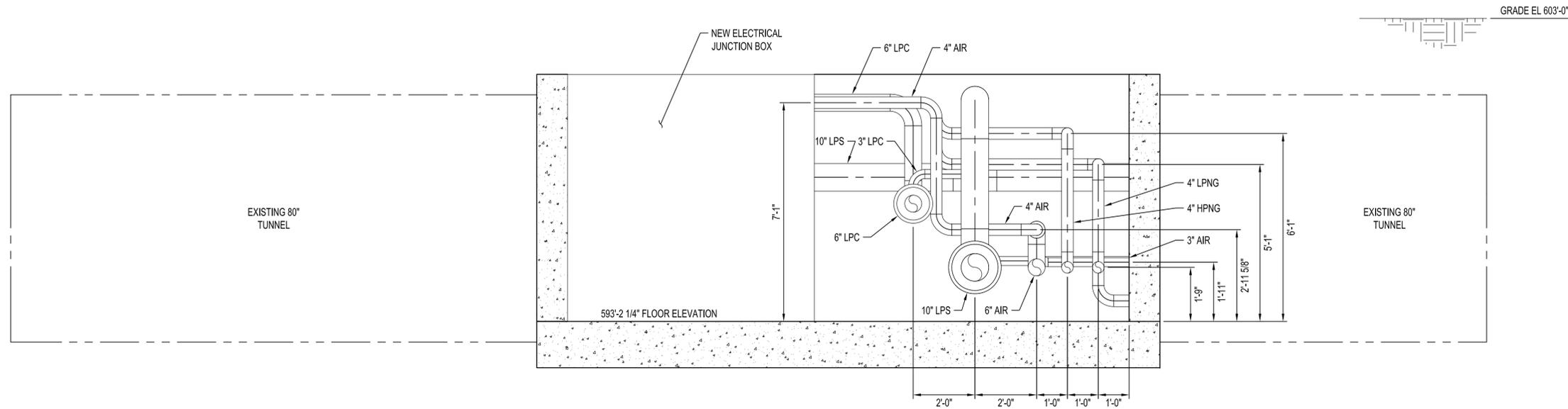
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UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES  
 MACHINED SURFACES  
 FLATNESS: .003 12/  
 FINISH  
 TOLERANCES  
 FRACTION: 1/8 2 PLACE: ±.01  
 3 PLACE: ±.005 ANGLE: 0°/30°  
 SEE ENGINEERING REVIEW AND RELEASE FORM (RFI) FOR DRAWING APPROVAL SIGNATURES

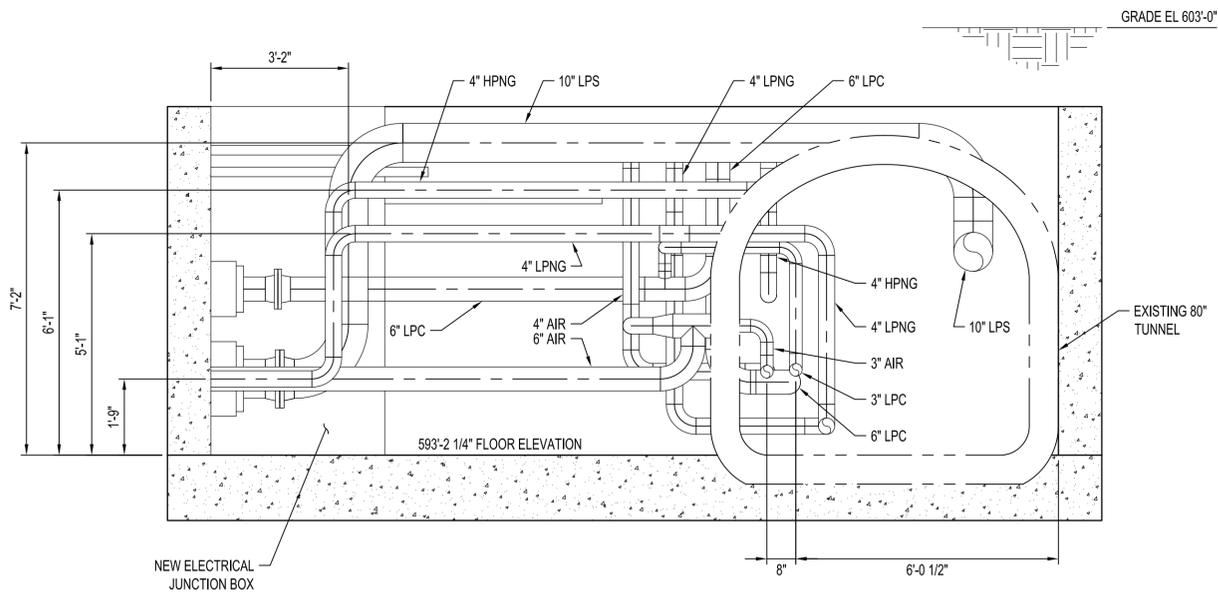
DRAWER: MEK  
 CHECKER: XXX  
 ENGINEER: XXX  
 PROJECT #: 10060

MOLLENBERG-BETZ INC  
 300 SCOTT STREET  
 BUFFALO, NY 14204  
 LINDE FUSRAP UTILITY REPLACEMENT PROJECT  
 MECHANICAL UTILITIES  
 JUNCTION BOX 9A EAST AND NORTH ELEV

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 PROFESSIONAL ENGINEERS  
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 Springville, New York 14141-0344  
 PH. (716)-592-3980 FAX (716)-592-4216  
 DWG NO. DWG-10060-241  
 DWG SCALE: SEE DRAWING REV: 2  
 DWG SIZE: D



**JUNCTION BOX 9A - LOOKING WEST**  
 (SHOWN WITHOUT JUNCTION BOX COVER)  
 SCALE: 1/2" = 1'-0"



**JUNCTION BOX 9A - LOOKING SOUTH**  
 (SHOWN WITHOUT JUNCTION BOX COVER)  
 SCALE: 1/2" = 1'-0"

**NOTES:**

1. FOR PROJECT COVER SHEET AND DRAWING INDEX, REFER TO DWG-10060-001.
2. DETERMINE PROPER LOCATION OF STEAM AND CONDENSATE TRAPS DURING CONSTRUCTION.
3. ALL LOCATIONS ARE TO BE FIELD VERIFIED PRIOR TO INSTALLATION AS ELEVATIONS MAY CHANGE. AS BUILT DIMENSIONS TO BE RECORDED.

REVISIONS			
REV	DESCRIPTION	DATE	INIT
0	FOR REVIEW	06/02/11	MEK
1	FOR REVIEW	10/04/11	ELK
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK

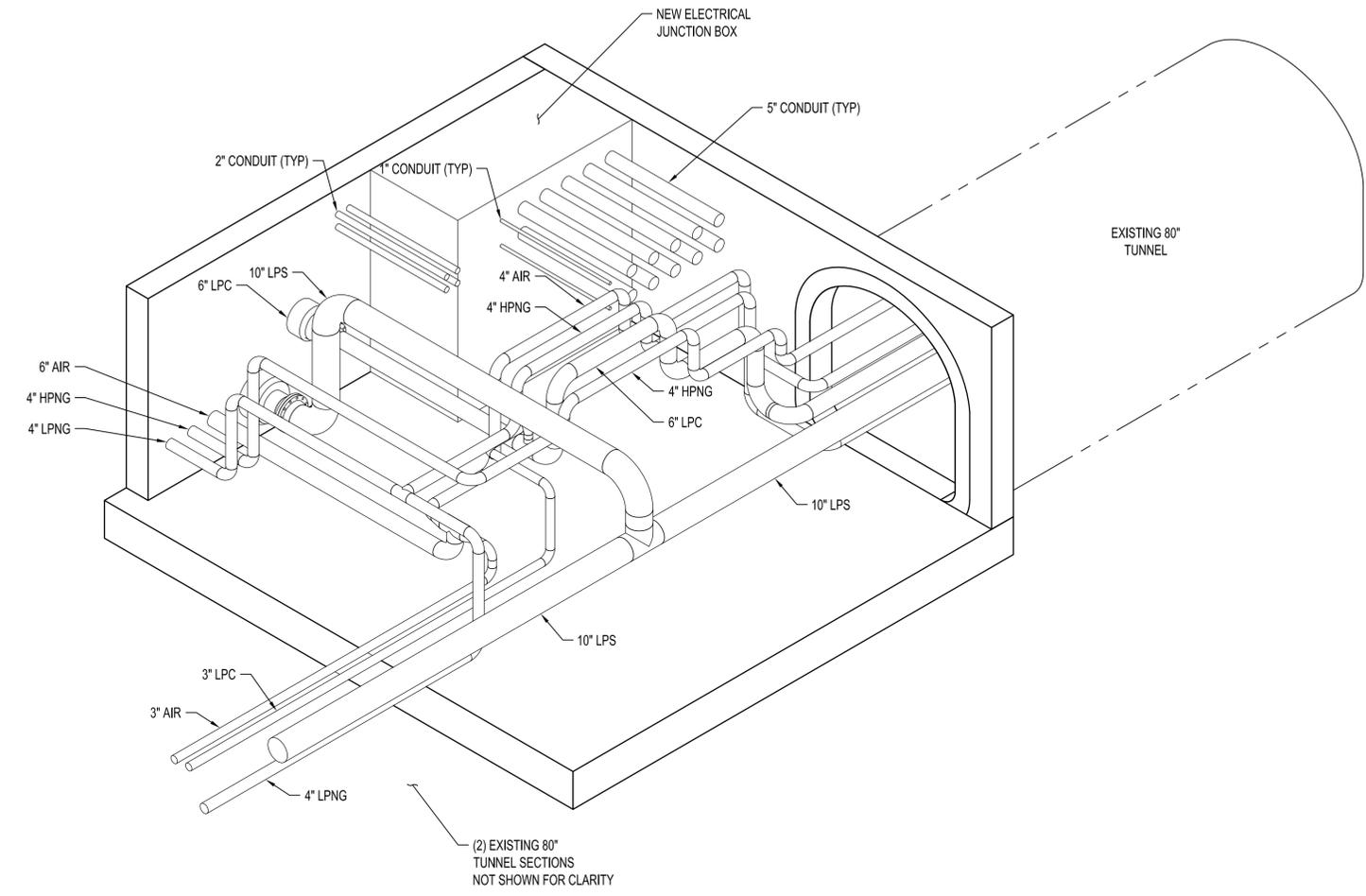
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UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES  
 MACHINED SURFACES FLATNESS: .003 FINISH 12/  
 TOLERANCES  
 FRACTION: 1/8 2 PLACE: ±.01  
 3 PLACE: ±.005 ANGLE: 0°:30'  
 SEE ENGINEERING REVIEW AND RELEASE FORM (RFI) FOR DRAWING APPROVAL SIGNATURES

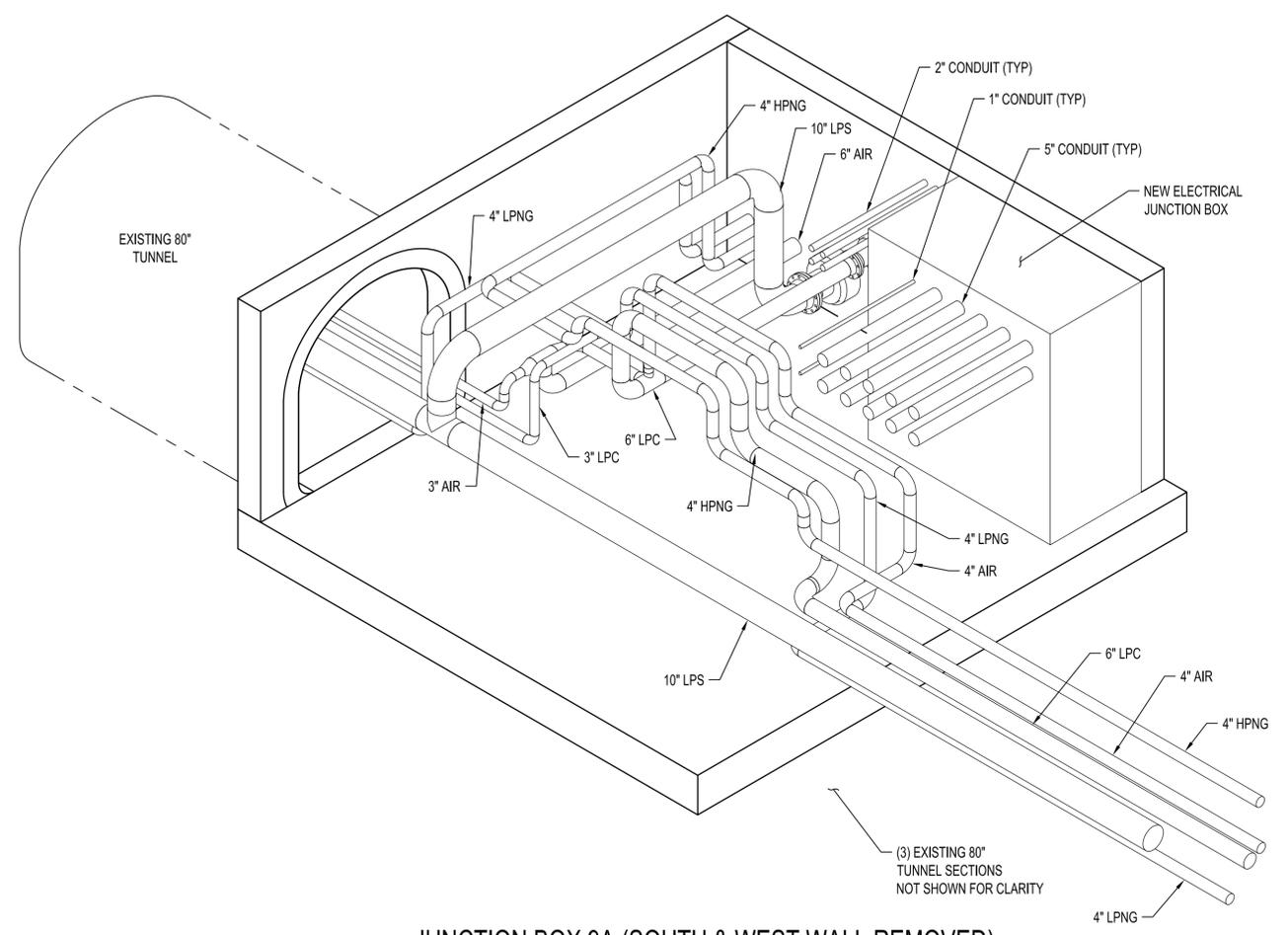
DRAWER: MEK  
 CHECKER: XXX  
 ENGINEER: XXX  
 PROJECT #: 10060

MOLLENBERG-BETZ INC  
 300 SCOTT STREET  
 BUFFALO, NY 14204  
**LINDE FUSRAP UTILITY REPLACEMENT PROJECT**  
**MECHANICAL UTILITIES**  
**JUNCTION BOX 9A WEST AND SOUTH ELEV**

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 PH. (716)-592-3980 FAX. (716)-592-4216  
 DWG NO. DWG-10060-242  
 DWG SCALE: SEE DRAWING REV: 2  
 DWG SIZE: D



**JUNCTION BOX 9A (NORTH & WEST WALL REMOVED)**  
(SHOWN WITHOUT JUNCTION BOX COVER)  
SCALE: NONE



**JUNCTION BOX 9A (SOUTH & WEST WALL REMOVED)**  
(SHOWN WITHOUT JUNCTION BOX COVER)  
SCALE: NONE

**NOTES:**

- FOR PROJECT COVER SHEET AND DRAWING INDEX, REFER TO DWG-10060-001.
- DETERMINE PROPER LOCATION OF STEAM AND CONDENSATE TRAPS DURING CONSTRUCTION.

REVISIONS			
REV	DESCRIPTION	DATE	INIT
0	FOR REVIEW	06/02/11	MEK
1	FOR REVIEW	10/04/11	ELK
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK

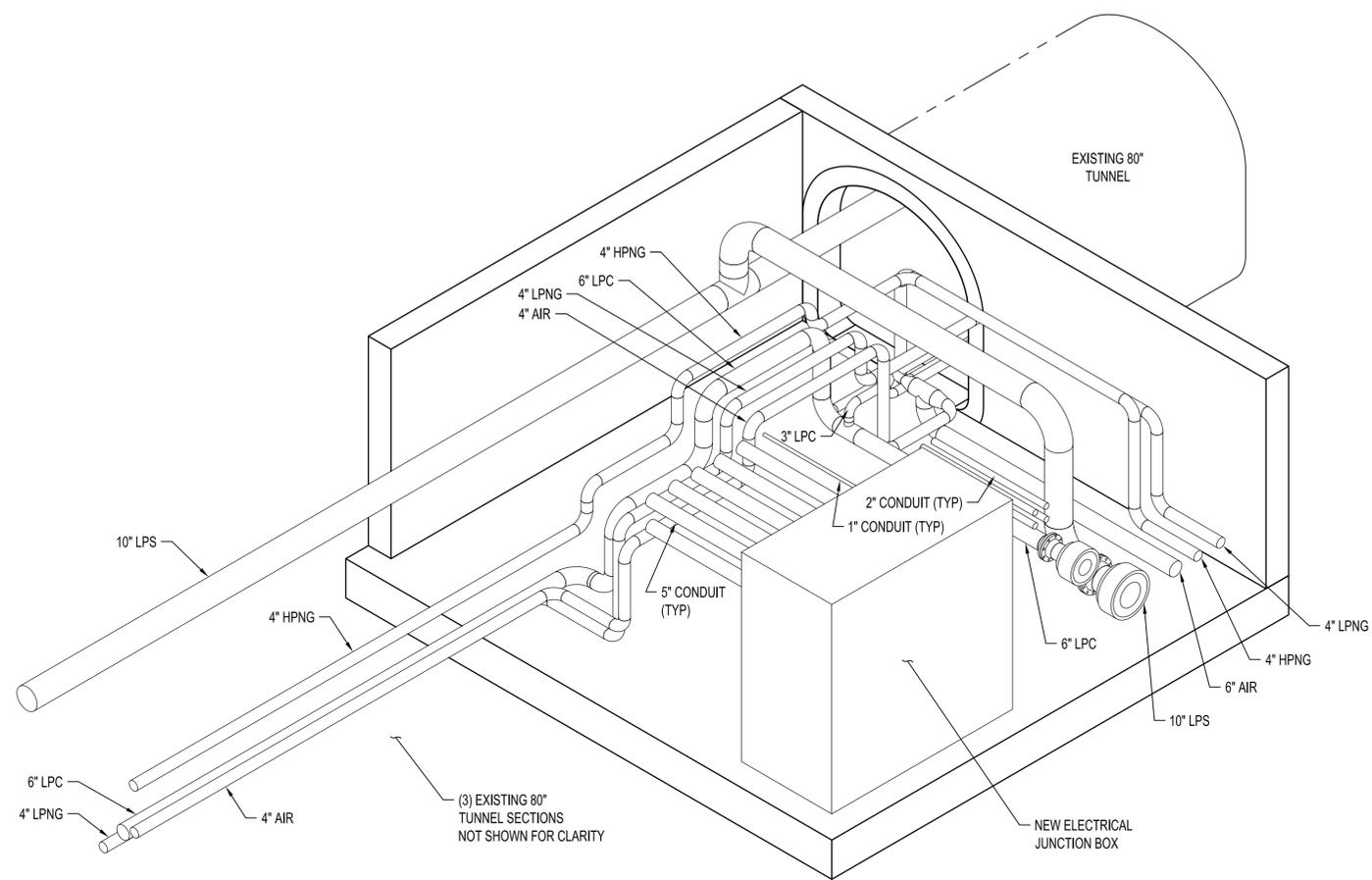
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UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES  
MACHINED SURFACES  
FLATNESS: .003 12/  
FINISH  
TOLERANCES  
FRACTION: 1/8 2 PLACE: ±.01  
3 PLACE: ±.005 ANGLE: 0°/30°  
SEE ENGINEERING REVIEW AND RELEASE FORM (RFI) FOR DRAWING APPROVAL SIGNATURES

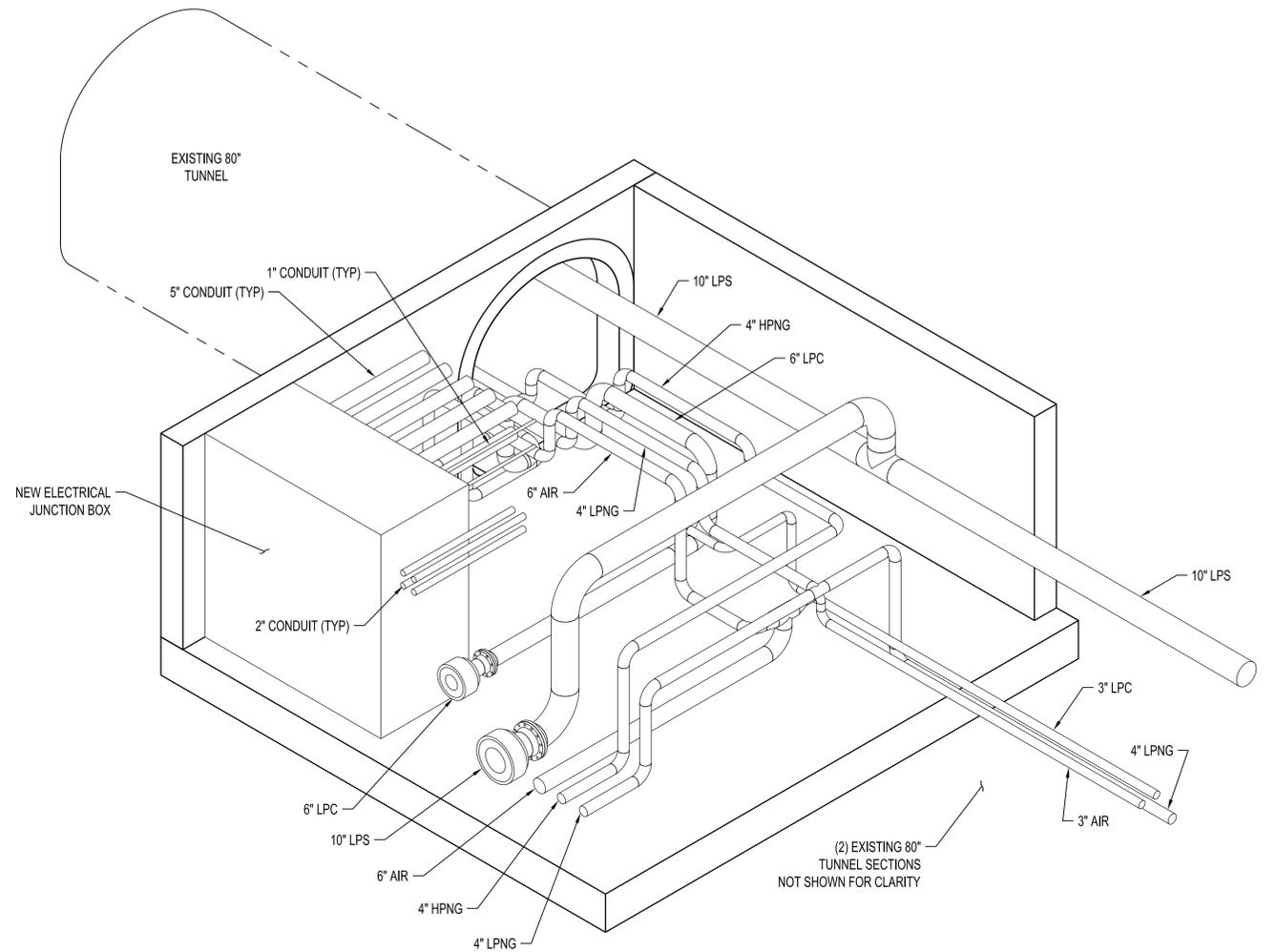
DRAWER: MEK  
CHECKER: XXX  
ENGINEER: XXX  
PROJECT #: 10060

MOLLENBERG-BETZ INC  
300 SCOTT STREET  
BUFFALO, NY 14204  
LINDE FUSRAP UTILITY REPLACEMENT PROJECT  
MECHANICAL UTILITIES  
JUNCTION BOX 9A ISO DETAILS 1 OF 2

**RJR ENGINEERING, P.C.**  
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23 Mechanic Street - P.O. Box 344  
Springville, New York 14141-0344  
PH. (716)-592-3980 FAX. (716)-592-4216  
DWG NO. DWG-10060-243  
DWG SCALE: SEE DRAWING  
REV: 2  
DWG SIZE: D



**JUNCTION BOX 9A (SOUTH & EAST WALL REMOVED)**  
 (SHOWN WITHOUT JUNCTION BOX COVER)  
 SCALE: NONE



**JUNCTION BOX 9A (NORTH & EAST WALL REMOVED)**  
 (SHOWN WITHOUT JUNCTION BOX COVER)  
 SCALE: NONE

**NOTES:**

- FOR PROJECT COVER SHEET AND DRAWING INDEX, REFER TO DWG-10060-001.
- DETERMINE PROPER LOCATION OF STEAM AND CONDENSATE TRAPS DURING CONSTRUCTION.

REVISIONS			
REV	DESCRIPTION	DATE	INIT
0	FOR REVIEW	06/02/11	MEK
1	FOR REVIEW	10/04/11	ELK
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK

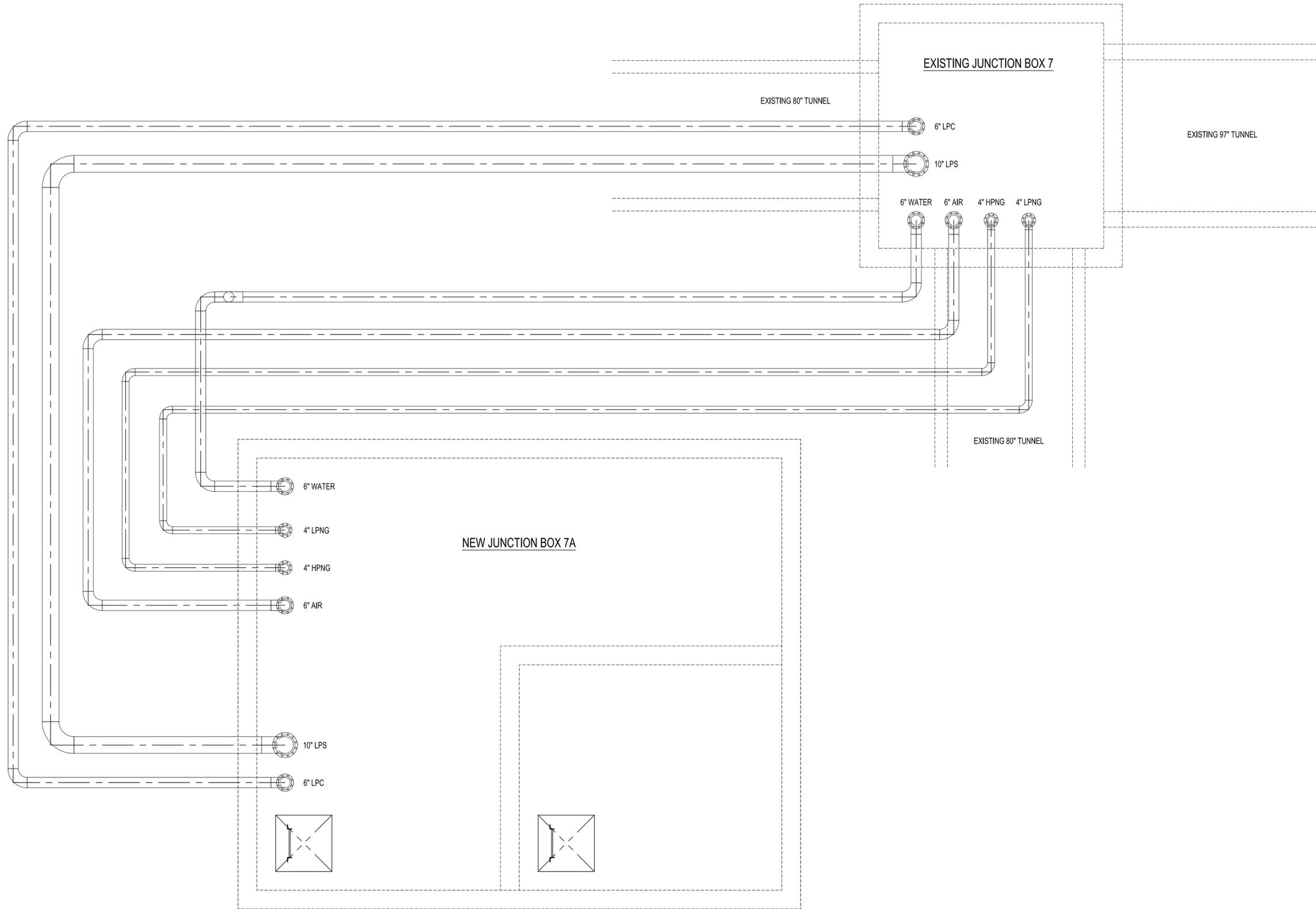
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UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES  
 FINISH  
 MACHINED SURFACES  
 FLATNESS: .003 12/1  
 TOLERANCES  
 FRACTION: 1/8 2 PLACE: ±.01  
 3 PLACE: ±.005 ANGLE: 0°/30°  
 SEE ENGINEERING REVIEW AND RELEASE FORM (RFI) FOR DRAWING APPROVAL SIGNATURES

DRAWER: MEK  
 CHECKER: XXX  
 ENGINEER: XXX  
 PROJECT #: 10060

MOLLENBERG-BETZ INC  
 300 SCOTT STREET  
 BUFFALO, NY 14204  
 LINDE FUSRAP UTILITY REPLACEMENT PROJECT  
 MECHANICAL UTILITIES  
 JUNCTION BOX 9A ISO DETAILS 2 OF 2

**RJR ENGINEERING, P.C.**  
 PROFESSIONAL ENGINEERS  
 23 Mechanic Street - P.O. Box 344  
 Springville, New York 14141-0344  
 PH. (716)-592-3980 FAX. (716)-592-4216  
 DWG NO. DWG-10060-244  
 DWG SCALE: SEE DRAWING  
 REV: 2  
 DWG SIZE: D



**JUNCTION BOX 7A TO JUNCTION BOX 7 - TEMPORARY BYPASS**

SCALE: 3/8" = 1'-0"

**NOTE:**

1. FOR PROJECT COVER SHEET AND DRAWING INDEX, REFER TO DWG-10060-001.
2. FIELD ROUTE BYPASS PIPING AS REQUIRED.

REVISIONS			
REV	DESCRIPTION	DATE	INIT
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1	FOR REVIEW	10/04/11	ELK
2	ISSUED FOR CONSTRUCTION	10/18/11	ELK

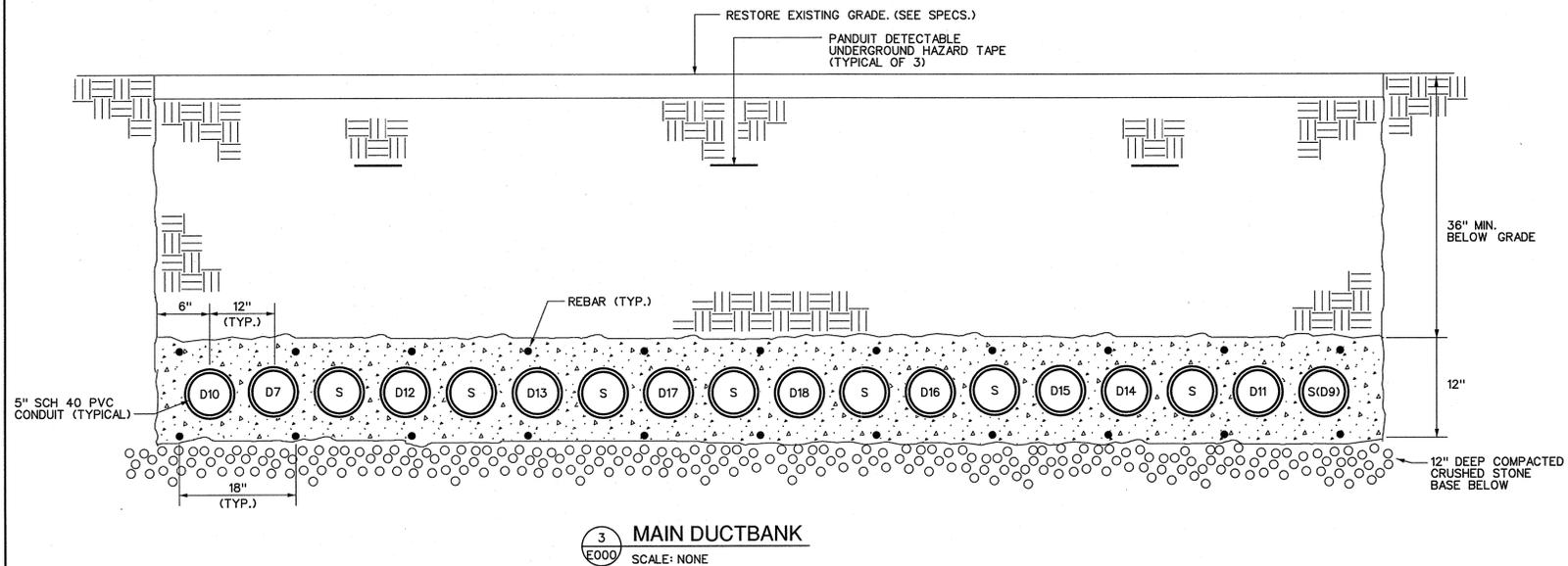
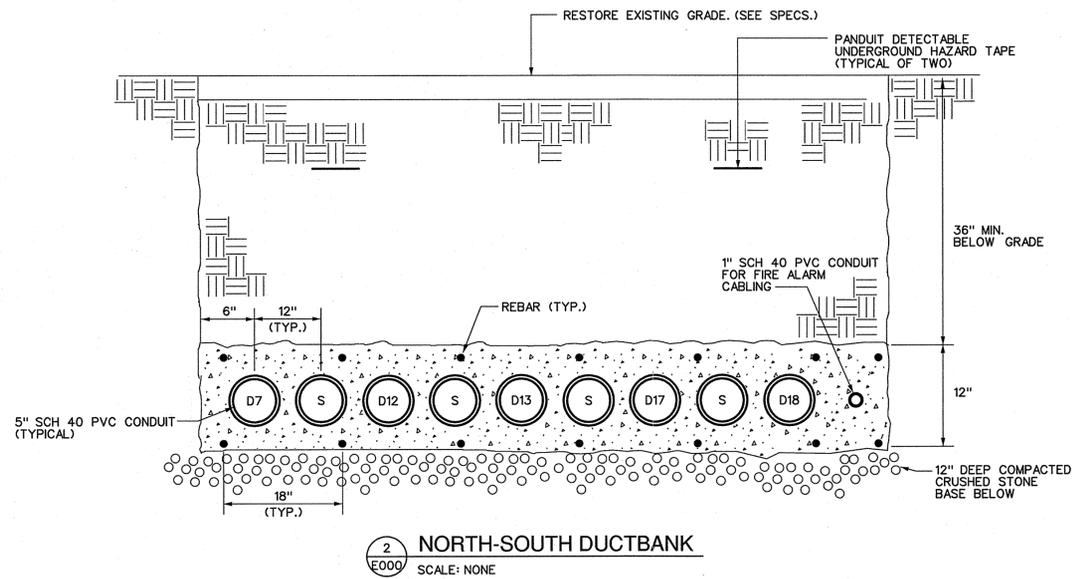
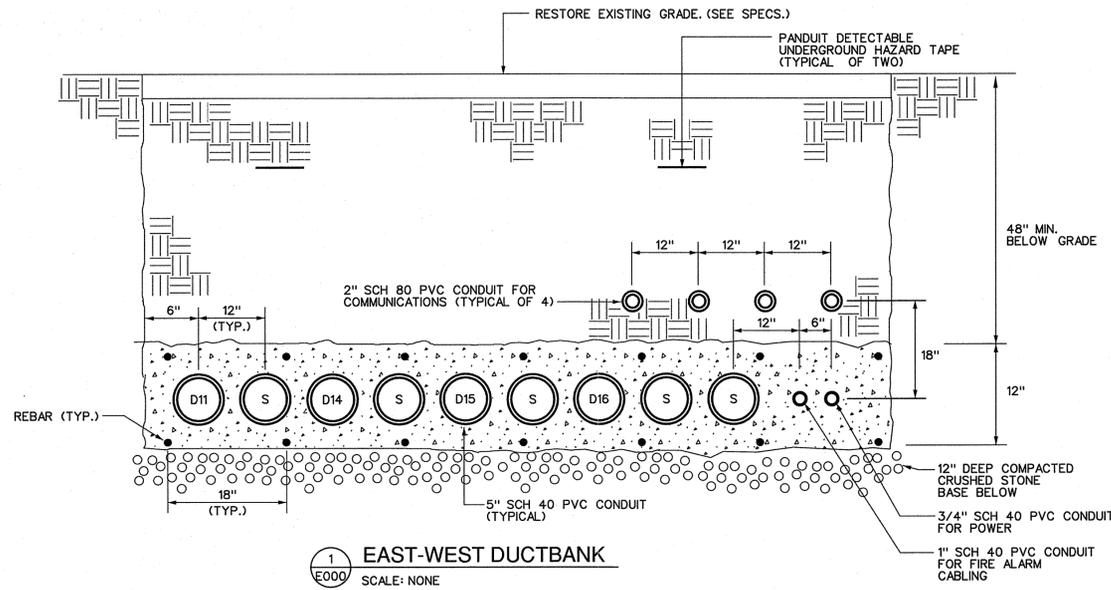
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UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES  
 MACHINED SURFACES  
 FLATNESS: .003 12/  
 FINISH  
 TOLERANCES  
 FRACTION: 1/8 2 PLACE: ±.01  
 3 PLACE: ±.005 ANGLE: 0°:30'  
 SEE ENGINEERING REVIEW AND RELEASE FORM (RR) FOR DRAWING APPROVAL SIGNATURES

DRAWER: MEK  
 CHECKER: XXX  
 ENGINEER: XXX  
 PROJECT #: 10060

MOLLENBERG-BETZ INC  
 300 SCOTT STREET  
 BUFFALO, NY 14204  
 LINDE FUSRAP UTILITY REPLACEMENT PROJECT  
 JUNCTION BOX 7A TO JUNCTION BOX 7  
 TEMPORARY BYPASS DETAILS

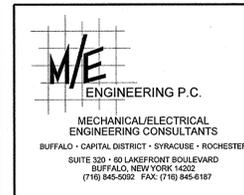
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 23 Mechanic Street - P.O. Box 344  
 Springville, New York 14141-0344  
 PH. (716)-592-3980 FAX. (716)-592-4216  
 www.rjr.com  
 DWG NO.: DWG-10060-250  
 DWG SCALE: SEE DRAWING  
 REV: 2  
 DWG SIZE: D



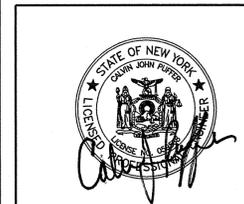
ELECTRICAL SYMBOLS LIST BASIC MATERIALS AND METHODS	
SYMBOL	DESCRIPTION
	HOME RUN TO PANELBOARD, LETTERS/NUMBERS INDICATE PANEL, LETTERS/NUMBERS INDICATE CIRCUITS, NUMBER OF ARROWS EQUALS NUMBER OF CIRCUITS. CIRCUIT SHALL BE 20 AMP 120 VOLT, 2-#12, 1-#12 EG., IN 3/4" C. UNLESS NOTED OTHERWISE. BRANCH CIRCUIT WIRING SIZE AND NUMBER TO MATCH HOMERUN. REFER TO SPEC'S FOR RACEWAY TYPE.
	SOLID HALF ARROW(S) INDICATES 120 VOLT CIRCUIT TO SINGLE POLE CIRCUIT BREAKER(S), UNLESS NOTED OTHERWISE.
	SOLID FULL ARROW INDICATES 208 VOLT CIRCUIT TO MULTI-POLE CIRCUIT BREAKER, UNLESS NOTED OTHERWISE.
	OPEN HALF ARROW(S) INDICATES 277 VOLT CIRCUIT TO SINGLE POLE CIRCUIT BREAKER(S), UNLESS NOTED OTHERWISE.
	OPEN FULL ARROW INDICATES 480 VOLT CIRCUIT TO MULTI-POLE CIRCUIT BREAKER, UNLESS NOTED OTHERWISE.
	JUNCTION BOX FOR BRANCH CIRCUIT POWER
(E)	EXISTING TO REMAIN - MAINTAIN EXISTING ELECTRICAL CONNECTIONS UNLESS OTHERWISE NOTED.
	EXISTING ELECTRICAL OR EQUIPMENT OR DEVICE, DASHED LIGHT IS EXISTING TO BE REMOVED.
	EXISTING WIRING OR EQUIPMENT, SOLID LIGHT IS EXISTING TO REMAIN OR EXISTING TO BE RELOCATED.
	HEAVY SOLID IS NEW
	CONDUIT RUN BELOW SLAB

POWER DISTRIBUTION AND CONTROL	
SYMBOL	DESCRIPTION
	DISCONNECT SWITCH AMP RATING AS INDICATED ON ELECTRIC EQUIPMENT AND CONTROL SCHEDULE
	FUSED DISCONNECT SWITCH AMP RATING AS INDICATED ON ELECTRIC EQUIPMENT AND CONTROL SCHEDULE
	COMBINATION FUSED DISCONNECT SWITCH AND MAGNETIC STARTER AMP RATING AS INDICATED ON ELECTRIC EQUIPMENT AND CONTROL SCHEDULE
	MOTOR CONNECTION
	SINGLE POINT ELECTRICAL CONNECTION
	PULL OR SPLICE BOX
	ENCLOSED CIRCUIT BREAKER
	MANUAL MOTOR STARTER (THERMAL SWITCH)

GENERAL SYMBOLS	
SYMBOL	DESCRIPTION
	REFERENCE TO DRAWING NOTE
	REFERENCE TO DEMOLITION NOTE
	DETAIL/ENLARGED PLAN NUMBER DETAIL (SIMILAR) SHEET WHERE DETAIL IS DRAWN
	SECTION NUMBER SECTION CUT SHEET WHERE DETAIL IS DRAWN



Linde FUSRAP Utility Replacement Project  
 Linde FUSRAP Project No. 07-3210.02  
 Task No. 2 - Utility Replacement Project



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REVISIONS			
No.	Date	By	Description
0	10/12/2011		CONSTRUCTION DOCUMENTS

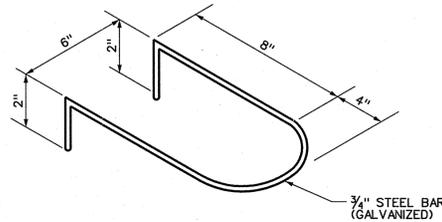
**DRAWING TITLE**

**ELECTRICAL  
SYMBOL LIST  
AND DETAILS**

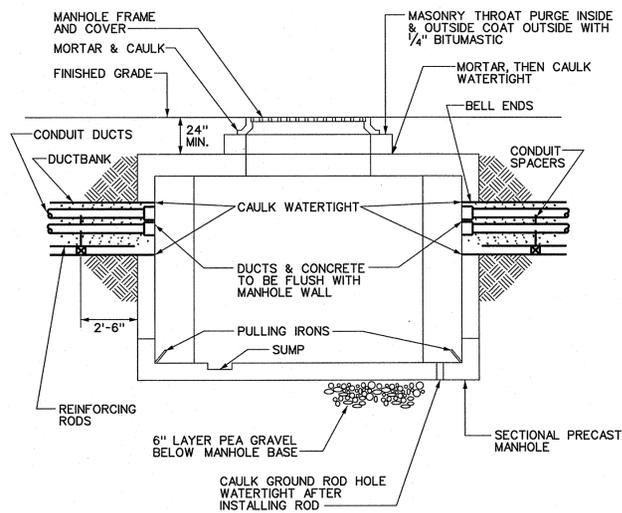
<b>DRAWING NO.</b>	Drawn By: KDK
<b>E000</b>	Checked By: RKS
	Project Mgr: RKS
	Date: 10/12/2011
	Prospect No: 101248

**ISSUE DATE**  
10/12/2011



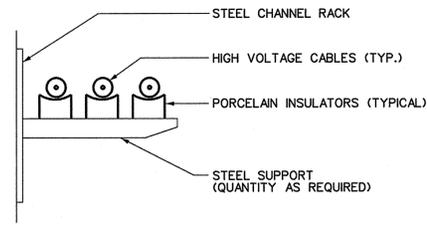


6 PULLING IRON DETAIL  
SCALE: NONE



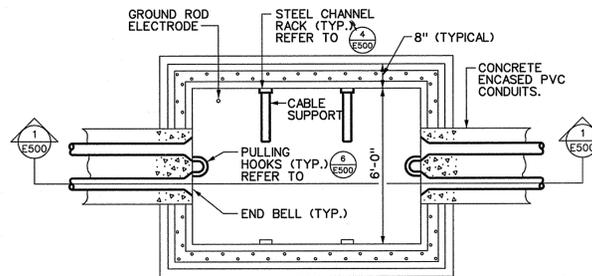
- DETAIL NOTES:
- REFER TO CONTRACT DOCUMENTS FOR ADDITIONAL WEATHERPROOFING REQUIREMENTS.
  - GROUND ALL METAL SUPPORTS, CABLE RACKS AND CABLE SHIELDS WHERE PRESENT TO GROUND ROD, REFER TO CONTRACT DOCUMENTS FOR ADDITIONAL REQUIREMENTS.
  - DUCT QUANTITY, MANHOLE SIZES AS SHOWN ON CONTRACT DOCUMENTS.
  - SEAL ALL JOINTS COMPLETELY WATERTIGHT, COAT SIDES AND TOP WITH 1/4" BITUMASTIC BEFORE BACKFILLING.

7 TYPICAL ELECTRICAL VAULT DETAIL  
SCALE: NONE



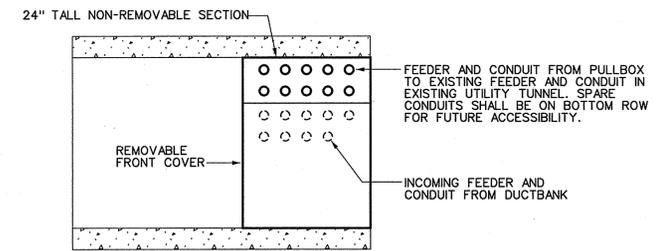
- DETAIL NOTES:
- FROM 18" BELOW GRADE, PITCH CONDUITS A MINIMUM OF 12" / 100' BETWEEN MANHOLES OR FROM CENTER OF RUN TO ADJACENT MANHOLES.
  - PITCH CONDUITS 12" / 100' AWAY FROM BUILDINGS TO MANHOLES.
  - IF AN ALTERNATE LOCATION FOR DUCTS IS USED, INSTALL CABLE PULLING HOOK ON OPPOSITE WALL.
  - FOR NUMBER AND SIZE OF CONDUITS ENTERING AND LEAVING MANHOLES, SEE ELECTRICAL DISTRIBUTION SITE PLAN.
  - BOND MANHOLE COVER FRAME AND CHANNEL RACKS TO ROD ELECTRODE WITH NO. 6 AWG. BARE COPPER GROUND CONDUCTOR.

4 VAULT CABLE SUPPORT ASSEMBLY  
SCALE: NONE

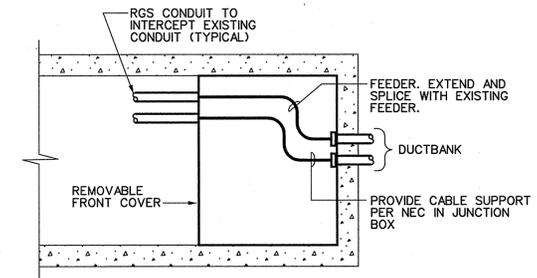


- DETAIL NOTES:
- OR KISTNER CONCRETE NO. PM 610 6' x 10' x 7" DEEP PRECAST CONCRETE OR APPROVED EQUAL.

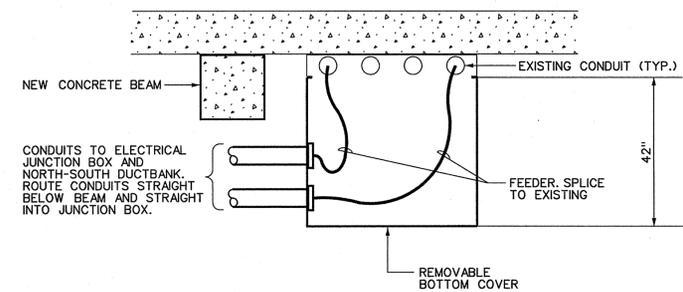
5 TYPICAL ELECTRICAL VAULT DETAIL (TOP VIEW)  
SCALE: NONE



1 ELECTRICAL JUNCTION BOX 8A/9A ELEVATION  
SCALE: 1/4" = 1'-0"



2 ELECTRICAL JUNCTION BOX 8A/9A SECTION  
SCALE: 1/4" = 1'-0"



3 EXISTING ELECTRICAL JUNCTION BOX EXTENSION  
SCALE: 1/2" = 1'-0"

Linde FUSRAP Utility Replacement Project  
 Linde FUSRAP Project No. 07-3210.02  
 Task No. 2 - Utility Replacement Project



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REVISIONS			
No.	Date	By	Description
0	10/12/2011		CONSTRUCTION DOCUMENTS

DRAWING TITLE  
**DETAILS**

DRAWING NO.	Drawn By:	KDK
<b>E500</b>	Checked By:	RKS
	Project Mgr:	RKS
	Date:	10/12/2011
	Prospect No:	101248

ISSUE DATE  
10/12/2011

SECTION 16100 - BASIC MATERIALS AND METHODS

A. DESCRIPTION

- THE DRAWINGS ARE DIAGRAMMATIC UNLESS DETAILED DIMENSIONED DRAWINGS ARE INCLUDED AND SHOW ONLY APPROXIMATE LOCATIONS OF CONDUITS AND JUNCTION BOXES. EXACT LOCATIONS ARE SUBJECT TO THE APPROVAL OF THE OWNER'S REPRESENTATIVE. THE GENERAL RUN OF ELECTRICAL FEEDERS AND CONDUITS, WITH CONCRETE OR GROUT, IS NOT INTENDED TO BE THE EXACT ROUTING. EXACT ROUTINGS OF CONDUITS SHALL SUIT THE JOB CONDITIONS.
- MAKE MEASUREMENTS AT THE SITE DURING CONSTRUCTION FOR ALL SYSTEMS INSTALLED AS WORK PROGRESSES IN SUCH A MANNER THAT THE EQUIPMENT, PIPING, VENTS, DUCTS, CONDUIT, AND BOXES WILL FIT IN THE SPACE AVAILABLE. MAINTAIN HEADROOM, BE AS NEATLY INSTALLED, AS OBSCURE AND "OUT-OF-THE-WAY" AS PHYSICALLY POSSIBLE. WHERE MORE THAN ONE (1) TRADE IS INVOLVED IN AN AREA, SPACE OR CHASE, ALL SHALL COOPERATE AND INSTALL THEIR OWN WORK TO UTILIZE THE SPACE EQUALLY BETWEEN THEM IN PROPORTION TO THEIR INDIVIDUAL REQUIREMENTS. IF, AFTER INSTALLATION OF ANY EQUIPMENT, PIPING, DUCTS, CONDUIT, AND BOXES, IT IS DETERMINED THAT AMPLE MAINTENANCE AND PASSAGE SPACE HAS NOT BEEN PROVIDED, REARRANGE WORK AND/OR FURNISH OTHER EQUIPMENT AS REQUIRED FOR AMPLE MAINTENANCE SPACE.
- ANY CHANGES IN THE SIZE OR LOCATION OF THE MATERIAL OR EQUIPMENT SUPPLIED, WHICH MAY BE NECESSARY IN ORDER TO MEET FIELD CONDITIONS OR IN ORDER TO AVOID CONFLICTS BETWEEN TRADES, SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE OWNER'S REPRESENTATIVE AND APPROVAL RECEIVED BEFORE SUCH ALTERATIONS ARE MADE.

B. QUALITY ASSURANCE

- ELECTRIC FEEDERS SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. ALL METHODS OF CONSTRUCTION AND DETAILS OF WORKMANSHIP THAT ARE NOT SPECIFICALLY INDICATED IN THE CONTRACT DOCUMENTS SHALL BE SUBJECT TO THE CONTROL AND APPROVAL OF THE OWNER'S REPRESENTATIVE.
- MATERIALS SHALL BE OF THE QUALITY AND MANUFACTURE INDICATED IN THEIR RESPECTIVE SECTIONS OF THE SPECIFICATIONS. THE EQUIPMENT SPECIFIED IS BASED UPON THE ACCEPTABLE MANUFACTURERS LISTED. EQUIPMENT TYPES, DIMENSIONS, ETC. CORRESPOND TO THE NOMENCLATURE DICTATED BY THOSE MANUFACTURERS, WHERE "OR EQUAL" IS STATED, EQUIPMENT SHALL BE EQUIVALENT IN EVERY WAY TO THAT OF THE EQUIPMENT SPECIFIED AND SUBJECT TO APPROVAL. ALL EQUIPMENT SHALL BE TESTED AT THE FACTORY. UNLESS SPECIFIED ELSEWHERE, STANDARD FACTORY INSPECTION AND OPERATIONAL TESTS WILL BE ACCEPTABLE.

C. SUBMITTALS

- SUBMIT THE FOLLOWING EQUIPMENT, MATERIALS AND PRODUCTS, INCLUDING ALL FITTINGS AND ACCESSORIES:
  - CONDUIT
  - CHANNEL SUPPORT SYSTEMS
  - 5 KV CABLE
  - CABLE TERMINATION AND SPLICE KITS
  - UNDERGROUND PULL BOXES (HANDHOLES) AND COVERS
  - MANHOLES AND COVERS
  - WATERPROOFING SEALS

D. MATERIALS

- CONDUIT, RACEWAY AND TUBING:
  - RIGID METAL CONDUIT SHALL BE HOT-DIPPED GALVANIZED OR ELECTRO-GALVANIZED STEEL, UL LISTED "RIGID METAL CONDUIT".
    - ACCEPTABLE MANUFACTURERS:
      - REPUBLIC CONDUIT
      - ALLIED TUBE AND CONDUIT
      - WHEATLAND TUBE COMPANY
      - APPROVED EQUIVALENT
  - RIGID NONMETALLIC CONDUIT (SCHEDULE 40 FOR CONCRETE ENCASEMENT, SCHEDULE 80 FOR DIRECT BURIAL OR WHERE EXPOSED) SHALL BE UL LISTED "RIGID NONMETALLIC CONDUIT" FOR APPLICATION IN UNDERGROUND, ENCASED, AND EXPOSED APPLICATIONS IN ACCORDANCE WITH ARTICLE 352 OF THE NATIONAL ELECTRICAL CODE. THE CONDUIT SHALL BE MADE FROM POLYVINYL CHLORIDE (PVC) AND SHALL BE RATED FOR 90 DEG. C CONDUCTORS. CONDUIT AND FITTINGS SHALL BE TESTED IN ACCORDANCE WITH THE TESTING REQUIREMENTS DEFINED IN NEMA TC-2, NEMA TC-3, UL-651 AND UL-514.
    - ACCEPTABLE MANUFACTURERS:
      - CARLON
      - THOMAS & BETTS
      - CERTAINTED

- CONDUIT FITTINGS:
  - FITTINGS FOR RIGID METAL CONDUIT SHALL BE FULLY THREADED AND SHALL BE OF THE SAME MATERIAL AS THE RESPECTIVE RACEWAY SYSTEM. FITTINGS FOR ELECTRICAL METALLIC TUBING SHALL BE INTERLOCKING COMPRESSION TYPE OF CADMIUM OR ZINC-COATED STEEL OR STAINLESS STEEL. CONNECTORS OF 1-1/4 IN. AND LARGER, PROVIDE PLASTIC INSULATING BUSHING. DIE-CAST, PRESSURE CAST FITTINGS SHALL NOT BE USED. FITTINGS FOR RIGID NONMETALLIC CONDUIT SHALL BE SOLVENT CEMENTED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
    - ACCEPTABLE MANUFACTURERS:
      - O.Z. GEDNEY
      - STEEL CITY
      - THOMAS & BETTS
      - CROUSE-HINDS
      - CARLON
  - EXPANSION FITTINGS SHALL BE WATERTIGHT, COMBINATION EXPANSION AND DEFLECTION TYPE DESIGNED TO COMPENSATE FOR MOVEMENT IN ANY DIRECTION. FITTINGS SHALL HAVE FLEXIBLE COPPER BRAD BONDING JUMPERS, NEOPRENE SLEEVE AND STAINLESS STEEL BANDS; USE ALUMINUM BODY FITTINGS FOR RIGID ALUMINUM CONDUIT.
    - ACCEPTABLE MANUFACTURERS:
      - CROUSE-HINDS, TYPE "DX"
      - O.Z. GEDNEY, TYPE "D"
      - APPROVED EQUIVALENT

3. CHANNEL SUPPORT SYSTEMS:

- CHANNEL SUPPORT SYSTEMS SHALL BE PROVIDED FOR RACKING UP CONDUIT, TRAPEZE SUSPENSIONS, CABLE RACKS AND PANEL RACKS. PROVIDE POURED-IN-PLACE INSERTS OR SUPPORTING CHANNELS AT POURED CONCRETE WALLS AND CEILINGS. PROVIDE NECESSARY ACCESSORIES SUCH AS BOLTS, SCREWS, ANCHORS, CONNECTION PLATES, AND STRAPS AS REQUIRED TO PERFORM THE NECESSARY FUNCTIONS.
  - ACCEPTABLE MANUFACTURERS:
    - UNISTRUT
    - GLOBE
    - KINDORF
    - B-LINE

4. CONDUCTORS AND CABLES:

- 5 KV CABLE SHALL CONSIST OF SINGLE-CONDUCTOR, SHIELDED, ETHYLENE PROPYLENE RUBBER (EPR) INSULATED POLYVINYL CHLORIDE (PVC) JACKETED, RATED FOR 5,000 VOLTS, 133% INSULATION LEVEL SERVICE. CONDUCTOR SHALL BE CLASS B STRANDING, COMPRESS-STRAND COPPER, SIZE AS CALLED FOR. THE CONDUCTOR SHALL BE COVERED WITH A LAYER OF SEMICONDUCTING TAPE COMPLETELY COVERING THE CONDUCTOR AND FIRMLY BONDED TO THE EPR INSULATION. SHIELDING SHALL CONSIST OF A SEMICONDUCTING INSULATING SHIELD APPLIED OVER THE EPR INSULATION AND A 5 MILS THICK BARE COPPER TAPE WITH A MINIMUM 20% OVERLAP APPLIED OVER THIS SHIELD, A NON-HYGROSCOPIC POLYESTER FILM TAPE SHALL SEPARATE THE SHIELDING FROM THE CABLE JACKET. A MINIMUM .060 IN. PVC JACKET SHALL BE APPLIED OVERALL. ALL CABLE SHALL COMPLY WITH THE FOLLOWING STANDARDS: ASTM B-496, IEC 60227-1, IEC 60227-2, IEC 60227-3, IEC 60227-4, IEC 60227-5, IEC 60227-6, IEC 60227-7, IEC 60227-8, IEC 60227-9, IEC 60227-10, IEC 60227-11, IEC 60227-12, IEC 60227-13, IEC 60227-14, IEC 60227-15, IEC 60227-16, IEC 60227-17, IEC 60227-18, IEC 60227-19, IEC 60227-20, IEC 60227-21, IEC 60227-22, IEC 60227-23, IEC 60227-24, IEC 60227-25, IEC 60227-26, IEC 60227-27, IEC 60227-28, IEC 60227-29, IEC 60227-30, IEC 60227-31, IEC 60227-32, IEC 60227-33, IEC 60227-34, IEC 60227-35, IEC 60227-36, IEC 60227-37, IEC 60227-38, IEC 60227-39, IEC 60227-40, IEC 60227-41, IEC 60227-42, IEC 60227-43, IEC 60227-44, IEC 60227-45, IEC 60227-46, IEC 60227-47, IEC 60227-48, IEC 60227-49, IEC 60227-50, IEC 60227-51, IEC 60227-52, IEC 60227-53, IEC 60227-54, IEC 60227-55, IEC 60227-56, IEC 60227-57, IEC 60227-58, IEC 60227-59, IEC 60227-60, IEC 60227-61, IEC 60227-62, IEC 60227-63, IEC 60227-64, IEC 60227-65, IEC 60227-66, IEC 60227-67, IEC 60227-68, IEC 60227-69, IEC 60227-70, IEC 60227-71, IEC 60227-72, IEC 60227-73, IEC 60227-74, IEC 60227-75, IEC 60227-76, IEC 60227-77, IEC 60227-78, IEC 60227-79, IEC 60227-80, IEC 60227-81, IEC 60227-82, IEC 60227-83, IEC 60227-84, IEC 60227-85, IEC 60227-86, IEC 60227-87, IEC 60227-88, IEC 60227-89, IEC 60227-90, IEC 60227-91, IEC 60227-92, IEC 60227-93, IEC 60227-94, IEC 60227-95, IEC 60227-96, IEC 60227-97, IEC 60227-98, IEC 60227-99, IEC 60227-100.

- DESIGN MAKE: KERITE
- ACCEPTABLE MANUFACTURERS:
  - KERITE
  - GENERAL CABLE
  - OKONITE
  - SOUTHWIRE

5. CABLE TERMINATION KITS, 5 KV:

- THE SHIELDED POWER CABLE TERMINATION SHALL BE CAPABLE OF OPERATING AT THE RATED VOLTAGE OF THE CABLE. IT IS TO BE USED ON, UP TO 25 KV. IT MUST BE RATED FOR CONTINUOUS OPERATION AT 90 DEG. C, WITH AN EMERGENCY OVERLOAD TEMPERATURE RATING OF 130 DEG. C. THE TERMINATION SHALL MEET THE REQUIREMENTS OF IEEE STANDARD 48 FOR A CLASS 1 TERMINATION. IT SHALL BE A ONE (1) PIECE DESIGN, WHERE HIGH-DIELECTRIC CONSTANT (CAPACITIVE) STRESS CONTROL IS INTEGRATED WITHIN A SKIRTED AREA FOR MADE OF SILICONE RUBBER. MINUS GRAY IN COLOR. THE TERMINATION SHALL NOT REQUIRE HEAT OR FLAME FOR INSTALLATION. THE TERMINATION KIT MUST CONTAIN ALL OF THE NECESSARY MATERIALS REQUIRED TO MAKE THREE (3) TERMINATIONS (EXCEPT FOR THE LUGS). IN ADDITION TO THE LOCATIONS, THE TERMINATION MUST BE DESIGNED FOR CONTAMINATED INDOOR AND OUTDOOR LOCATIONS.

b. ACCEPTABLE MANUFACTURERS:

- 3M BRAND 5630K SERIES
- ELASTIMOLD PCT-1 OR PCT-2
- RAYCHEM
- APPROVED EQUIVALENT

6. PERMANENT SPLICES, 5 KV:

- THE SHIELDED POWER CABLE SPLICE MUST MEET THE REQUIREMENTS OF ANSI/IEEE 404-1986 FOR A 25 KV VOLTAGE RATING. IT MUST BE RATED FOR CONTINUOUS OPERATION AT 90 DEG. C, WITH AN EMERGENCY OVERLOAD RATING OF 130 DEG. C. THE SPLICE KIT MUST CONTAIN ALL OF THE NECESSARY MATERIALS REQUIRED TO MAKE ONE (1) INLINE SPLICE (EXCEPT FOR THE ENDS, CAPS, BASE SPACERS AND INTERMEDIATE MECHANICAL GROUND JUMPER). THE SPLICE SHALL BE DESIGNED FOR SPLICING TAPE SHIELDED, WIRE SHIELDED, AND UNSHIELDED CABLES WITHOUT THE REQUIREMENT OF ADDITIONAL ADAPTERS. IT SHALL BE RATED FOR INDOOR, OUTDOOR AND DIRECT BURIAL APPLICATIONS.

b. ACCEPTABLE MANUFACTURERS:

- 3M BRAND 5550 SERIES (5-8 KV)
- ELASTIMOLD PCJ SERIES
- RAYCHEM

7. ARC PROOFING TAPE:

- 5 KV CABLES IN ALL MANHOLES SHALL BE WRAPPED WITH A FIRE RETARDANT ARC-PROOFING TAPE.
- MAKE: 3M 7700 SECURED WITH SCOTCH 69 GLASS CLOTH ELECTRICAL TAPE.

8. BOXES:

- PULL AND JUNCTION BOXES SHALL BE CONSTRUCTED OF NOT LESS THAN 12 GAUGE STEEL WITH GPM FLANG OR SURFACE MOUNTING IN ACCORDANCE WITH THE LOCATION TO BE INSTALLED. PROVIDE SCREW-ON TYPE COVERS. BOXES INSTALLED IN DAMP OR WET LOCATIONS SHALL BE OF RAIN-TIGHT CONSTRUCTION WITH GASKETED COVER AND THREADED CONDUIT HUBS. IN NO CASE SHALL BOXES BE SIZED SMALLER THAN AS INDICATED IN ARTICLE 314 OF THE NATIONAL ELECTRICAL CODE FOR CONDUIT AND CONDUCTOR SIZES INSTALLED. BOXES SHALL BE APPROVED FOR THE ENVIRONMENTAL CONDITION OF THE LOCATION WHERE THEY WILL BE INSTALLED.

b. ACCEPTABLE MANUFACTURERS:

- HOFFMAN
- KEYSTONE
- APPROVED EQUIVALENT

9. DUCTBANKS:

- DUCTBANKS SHALL BE RIGID NONMETALLIC CONDUIT ENCASED IN A 3000 PSI CONCRETE SYSTEM WITH TOP RED DYE. PROVIDE ALL SLEEVE JOINTS, COUPLINGS, BEND SECTIONS, BENDS, ELBOWS, OFFSETS, ANGLE COUPLINGS, BEND ENDS, CAPS, BASE SPACERS AND INTERMEDIATE SPACERS AS REQUIRED TO MEET FIELD CONDITIONS. ALL BENDS, STUB-UPS AND WALL, SLAB OR FLOOR-BUILDING PENETRATIONS SHALL BE RIGID STEEL CONDUIT WITHOUT EXCEPTION.

10. WATERPROOFING SEALS:

- PROVIDE EXPANDING LINK TYPE SEAL FOR INSTALLATION BETWEEN DUCT/CONDUIT AND SLEEVE OR CORE-DRILLED HOLE IN CONCRETE.
- MAKE: LINK SEAL, MANUFACTURED BY THUNDERLINE CORP., OR APPROVED EQUAL.

E. INSTALLATION

- UNLESS OTHERWISE NOTED, WIRING FOR ALL SYSTEMS INDICATED IN THE CONTRACT DOCUMENTS SHALL CONSIST OF INSULATED CONDUCTORS INSTALLED IN RACEWAYS. RACEWAYS SHALL BE CONTINUOUS FROM OUTLET BOX TO OUTLET BOX AND FROM OUTLET BOX TO CABINET, JUNCTION OR PULL BOX. SECURE AND BOND RACEWAYS TO ALL BOXES AND CABINETS SO THAT EACH SYSTEM OF RACEWAYS IS ELECTRICALLY CONTINUOUS THROUGHOUT. UNLESS OTHERWISE INDICATED ON THE DRAWINGS, INSTALL ALL WIRING IN THE FOLLOWING RACEWAY SYSTEM:
  - WIRING ABOVE 600 VOLTS IN INDOOR DRY LOCATIONS OR OUTDOORS, ABOVE GRADE LOCATIONS: RIGID METAL CONDUIT.
  - WIRING ABOVE 600 VOLTS, BELOW GRADE: RIGID NONMETALLIC CONDUIT ENCASED IN CONCRETE WITH RIGID METAL CONDUIT ELBOWS AND PENETRATIONS THROUGH BUILDING FLOORS AND WALLS.

2. RACEWAYS:

- SIZED AS INDICATED ON THE DRAWINGS. WHERE SIZES ARE NOT INDICATED, RACEWAYS SHALL BE SIZED AS REQUIRED BY THE NATIONAL ELECTRICAL CODE IN ACCORDANCE WITH THE QUANTITY, SIZE, AND TYPE OF INSULATION CONDUCTORS TO BE INSTALLED. RACEWAYS SHALL BE MINIMUM 5 IN. TRADE SIZE.
- CUT SQUARE, FREE OF BURRS DUE TO FIELD CUTTING OR MANUFACTURE, AND BUSHED WHERE NECESSARY.
- INSTALLED WITH EXTERIOR SURFACES NOT LESS THAN 6 IN. FROM ANY SURFACE WITH NORMAL OPERATING TEMPERATURE OF 200 DEG. C OR HIGHER.
- PLUGGED AT THE ENDS OF EACH ROUGHED-IN RACEWAY WITH AN APPROVED CAP OR DISC TO PREVENT THE ENTRANCE OF FOREIGN MATERIALS DURING CONSTRUCTION.
- INSTALLED PARALLEL OR PERPENDICULAR TO FLOORS, WALLS AND CEILINGS WHERE EXPOSED WIRING IS PERMITTED.
- INSTALLED WITH A MINIMUM OF BENDS AND OFFSETS. ALL BENDS SHALL BE MADE WITHOUT KINKING OR DESTROYING THE CROSS SECTION CONTOUR OF THE RACEWAY. FACTORY MADE BENDS ARE ACCEPTABLE AND SHOULD BE CONSIDERED FOR RACEWAYS LARGER THAN 2 IN.
- INSTALLED WITH UL APPROVED RAIN-TIGHT AND CONCRETE-TIGHT COUPLINGS AND CONNECTORS.
- FIRMLY FASTENED WITHIN 3 FT. OF EACH OUTLET BOX, JUNCTION BOX, CABINET OR FITTING. RACEWAYS SHALL NOT BE ATTACHED TO OR SUPPORTED BY WOODEN ANCHORS OR SUPPORTS UNLESS SUPPORTED FROM MECHANICAL WORK SUCH AS DUCTWORK, PIPING, ETC.
- INSTALLED WITH TWO (2) #14 AWG FISH WIRES IN ALL "SPARE" OR "EMPTY" CONDUIT RUNS TO FACILITATE FUTURE INSTALLATION OF CONDUCTORS.
- INSTALLED WITH EXPANSION FITTINGS AT ALL BUILDING EXPANSION JOINTS SUCH THAT NO UNDUE STRESS IS PLACED ON ANY ELECTRICAL RACEWAY DUE TO THE PROPER FUNCTIONING OF EXPANSION JOINTS.
- ARRANGED IN A NEAT MANNER FOR ACCESS TO ALLOW FOR ACCESS TO WORK INSTALLED BY OTHER TRADES.
- BECOME FAMILIAR WITH THE GENERAL CONSTRUCTION OF THE DUCTBANK AND JUNCTION BOXES AND PLACE SLEEVES, INSERTS, ETC. AS REQUIRED. ALL RACEWAYS SHALL BE SUPPORTED ADEQUATELY BY MALLEABLE IRON PIPE CLAMPS OR OTHER APPROVED METHODS. IN EXTERIOR OR WET LOCATIONS, SUPPORTS SHALL ALLOW NOT LESS THAN 1/4 IN. AIR SPACE BETWEEN RACEWAY AND WALL. FIRMLY FASTEN RACEWAY WITHIN 3 FT. OF EACH OUTLET BOX, JUNCTION BOX, CABINET OR FITTING. THE FOLLOWING TABLE LISTS MAXIMUM SPACING BETWEEN CONDITIONS, STRENGTH OF SUPPORTING MEMBERS, ETC.
- FURNISH AND INSTALL SUCH SUPPORTS AT NO ADDITIONAL COST TO OWNER.

CONDUIT TRADE SIZE	TYPE OF RUN	HORIZONTAL SPACING IN FEET	VERTICAL SPACING IN FEET
1-1/2 IN. AND LARGER	EXPOSED	10	10

- PROVIDE A BUSHING AT EACH CONDUIT TERMINATION UNLESS FITTING AT BOX WHERE CONDUIT TERMINATES HAS HUBS DESIGNED IN SUCH A MANNER TO AFFORD EQUIVALENT PROTECTION TO CONDUCTORS. PROVIDE GROUNDING TYPE INSULATED BUSHINGS ON ALL CONDUIT SIZES 1-1/4 IN. TRADE SIZE AND LARGER AND ON ALL FEEDER RACEWAYS REGARDLESS OF SIZE. PROVIDE STANDARD BUSHINGS FOR CONDUITS 1 IN. AND SMALLER UNLESS OTHERWISE STATED.

3. UNDERGROUND RACEWAYS AND DUCTBANKS:

- ENCASE ALL UNDERGROUND RACEWAYS IN CONCRETE ENVELOPES. WHERE CONCRETE IS CALLED FOR, FORM CONCRETE ENVELOPE AROUND RACEWAYS, 3 IN. MINIMUM THICKNESS CONCRETE AT TOP, BOTTOM AND SIDES OF RACEWAYS, CONDUITS ON 7-1/2 IN. CENTERS BOTH DIRECTIONS WITH CONCRETE ENCASEMENT. TOP OF CONCRETE ENVELOPE SHALL BE FINISHED NOT LESS THAN 30 IN. BELOW FINISHED GRADE. OPEN TRENCH FOR ITS COMPLETE LENGTH BEFORE CONCRETE IS POURED; IF ANY OBSTRUCTIONS ARE ENCOUNTERED TO THE PROVISIONS TO BE MADE, PROVIDE SUPPORT RACEWAYS MINIMUM 3 IN. ABOVE BOTTOM OF TRENCH BEFORE POURING. FURNISH AND INSTALL PRECAST CONCRETE, PLASTIC OR FIBER SPACERS, STAGGERED COUPLINGS, WHEN CONCRETE IS SPECIFIED, SECURELY THE RACEWAYS IN PLACE TO PREVENT FLOATING. POUR CONCRETE AS SOON AS POSSIBLE AFTER PLACING AND SECURING OF RACEWAYS. REINFORCING SHALL BE CONTINUOUS RUNS OF #4 DEFORMED RODS LOCATED IN ALL FOUR (4) CORNERS AS WELL AS TOP AND BOTTOM OF ENVELOPE 18 IN. ON CENTER. IN LOCATIONS WHERE NONMETALLIC RACEWAYS ARE USED, CHANGE TO HEAVY WALL METALLIC CONDUIT OF SAME INTERNAL DIAMETER BEFORE RISING OUT OF GROUND; PROVIDE METALLIC CONDUIT ELBOWS AT CONDUIT RISE. CARRY CONCRETE ENVELOPE TO A MINIMUM 12 IN. MINIMUM THICKNESS CONCRETE AT RISE POINT IF ALLOWED BY SITE CONDITIONS AND EQUIPMENT TO BE INSTALLED. SLOPE TOP OF CONCRETE AWAY FROM RACEWAY, CHAMFER EDGES. WHERE CONCRETE TERMINATES, CONDUIT SEALING BUSHING ON EACH RACEWAY OR PROVIDE DUCT SEAL TO FILL ALL VOIDS AROUND CONDUIT AND CABLES. CAP ALL EMPTY CONDUITS WATERTIGHT. PLACE CONDUIT THROUGH WALLS, CEILING AND FLOOR. PROVIDE METALLIC ALL DUCT JOINTS, THEN COMPLETE CONCRETE ENCASEMENT. PLACE DIRECT-BURY CONDUIT TIE-BY-TIE METHOD, BACKFILLING EACH LAYER TO ACHIEVE PROPER SPACING. ELBOWS SHALL HAVE A MINIMUM RADIUS OF 42 IN. FOLLOW PROPER LOW TEMPERATURE INSTALLATION PROCEDURES AS RECOMMENDED BY PVC CONDUIT VENDOR. PROVIDE THERMAL TAPE IN NEEL ABOVE ALL DUCTBANKS, BOND AND LACE CONDUCTORS OF EACH FEEDER TOGETHER. FOR PARALLEL SETS OF CONDUCTORS, MATCH LENGTHS OF CONDUCTORS AS NEAR EQUAL AS POSSIBLE.

4. WIRING METHODS:

- CONDUCTORS SHALL NOT BE INSTALLED UNTIL RACEWAY SYSTEM IS COMPLETED. VERIFY THAT ALL WORK OF OTHER TRADES, WHICH MAY CAUSE CONDUCTOR DAMAGE, IS COMPLETED. USE ONLY UL APPROVED CABLE LUBRICANTS WHEN NECESSARY.
- IN GENERAL, CONDUCTORS SHALL BE THE SAME SIZE FROM THE LAST PROTECTIVE DEVICE TO THE LOAD.
- FOR SPLICES AND TAPS, #8 AND LARGER, USE SOLDERLESS "SPLIT BOLT" TYPE CONNECTIONS.
- USE CAST CONNECTIONS FOR GROUND CONDUCTORS.
- MAKE ALL SPLICES AND CONNECTIONS IN ACCESSIBLE BOXES AND CABINETS ONLY.
- COVER UNSHIELDED SPLICES, JOINTS, AND FREE ENDS OF CONDUCTOR WITH RUBBER AND FRICTION TAPE OF PVC ELECTRICAL TAPE. PLASTIC INSULATING CAPS MAY SERVE AS INSULATION. HEAT SHRINK SLEEVES SHALL BE ACCEPTABLE FOR CRIMP TYPE SPLICES.
- FEEDER CONDUCTORS SHALL BE CONTINUOUS FROM POINT OF ORIGIN/SPLICE TO SPLICE TO EXISTING FEEDER WITHOUT ADDITIONAL SPLICES. IF THIS IS NOT PRACTICAL, CONTACT THE OWNER'S REPRESENTATIVE AND RECEIVE WRITTEN APPROVAL FOR SPLICING PRIOR TO INSTALLATION OF FEEDERS). WHERE FEEDER CONDUCTORS PASS THROUGH JUNCTION BOXES, BOND AND LACE CONDUCTORS OF EACH FEEDER TOGETHER. FOR PARALLEL SETS OF CONDUCTORS, MATCH LENGTHS OF CONDUCTORS AS NEAR EQUAL AS POSSIBLE.

5. JUNCTION AND PULL BOXES:

- INSTALL JUNCTION AND PULL BOXES IN READILY ACCESSIBLE LOCATIONS. ACCESS TO BOXES SHALL NOT BE BLOCKED BY EQUIPMENT, PIPING, DUCTS AND THE LIKE. PROVIDE ALL NECESSARY JUNCTION OR PULL BOXES REQUIRED DUE TO FIELD CONDITIONS AND SIZE AS REQUIRE BY THE NATIONAL ELECTRICAL CODE.

6. HANGERS AND SUPPORTS:

- PROVIDE STEEL ANGLES, CHANNELS AND OTHER MATERIALS NECESSARY FOR THE PROPER SUPPORT AND ERECTION OF MOTOR STARTERS, DISTRIBUTION PANELBOARDS, LARGE CIRCUIT BREAKERS, PENDANT MOUNTED LIGHTING FIXTURES, ETC.
- PANELBOARDS, DISCONNECT SWITCHES, CIRCUIT BREAKERS, CABINETS, LARGE PULL BOXES AND TAP BOXES SHALL BE SECURED TO CEILING AND FLOOR SLAB AND NOT SUPPORTED FROM CONDUITS. SMALL PANELBOARDS, ETC., AS APPROVED BY OWNER'S REPRESENTATIVE, MAY BE SUPPORTED BY WALLS. RACKS OR SUPPORT OF CONDUITS AND HEAVY ELECTRICAL EQUIPMENT SHALL BE SECURED TO BUILDING CONSTRUCTION BY SUBSTANTIAL STRUCTURAL SUPPORTS.

F. TESTS

1. REFERENCES

- TESTS SHALL BE IN COMPLIANCE WITH NETA STANDARDS FOR HIGH VOLTAGE CABLES.
- PERFORMANCE REQUIREMENTS
  - ACCEPTANCE OF ELECTRICAL EQUIPMENT AND CABLES COVERED BY TEST PROCEDURES IS CONTINGENT UPON PROPER EXECUTION OF REQUIRED TESTS AND ACCEPTABLE TEST RESULTS.
  - ACCEPTANCE OF ELECTRICAL EQUIPMENT IS DEPENDENT UPON EQUIPMENT SATISFACTORY PERFORMANCE UNDER FIELD CONDITIONS. CABRERA REPRESENTATIVE MAY, AT HIS DISCRETION, PREPARE AND ISSUE AN ACCEPTANCE REPORT FOR ANY ACCEPTED PIECE OF EQUIPMENT OR SYSTEM. ORIGINAL COPY IS RETAINED BY THE CABRERA REPRESENTATIVE.

3. PREPARATION

- PERFORM AND SUPERVISE TESTS UNLESS OTHERWISE NOTED. FURNISH TEST EQUIPMENT REQUIRED FOR TESTS PERFORMED. PROVIDE SAFETY MEASURES REQUIRED FOR EACH TEST.
- SCHEDULE TESTING WITH CABRERA. PERFORM NO TESTING WITHOUT CABRERA'S SITE REPRESENTATIVE APPROVAL.
- NOTIFY INVOLVED PARTIES PRIOR TO TEST ADVISING THEM OF TEST TO BE PERFORMED AND SCHEDULE DATE AND TIME.
- GIVE MANUFACTURERS SUFFICIENT NOTICE TO ALLOW NECESSARY ARRANGEMENTS TO BE MADE AND TO HAVE THEIR ENGINEER OR REPRESENTATIVE PRESENT AT TESTS WHERE THEIR PRESENCE IS REQUIRED. WHERE THE MANUFACTURER'S RESPONSIBILITY INCLUDES BOTH ELECTRICAL AND MECHANICAL PERFORMANCE, COORDINATE TESTS WITH OTHERS INVOLVED.
- FOR TEST INSTRUMENTS TO BE ACCEPTABLE FOR USE, THEY MUST BEAR A LABEL DOCUMENTING THE FACT THAT EQUIPMENT HAS BEEN CALIBRATED DURING PREVIOUS 12 MONTHS. LABEL MUST SHOW INSTRUMENT SERIAL NUMBER, DATE OF CALIBRATION, AND NAME OF FIRM OR LABORATORY PERFORMING CALIBRATION.
- CABRERA REPRESENTATIVE WILL EXAMINE TEST EQUIPMENT PRIOR TO USE AND MAY, AT HIS DISCRETION, REQUIRE EQUIPMENT BE SUBMITTED TO THE FACILITIES MANAGER FOR CALIBRATION CHECK. EQUIPMENT THAT FAILS TO BE WITHIN ACCEPTABLE PERFORMANCE LIMITS MUST BE SUBMITTED TO AN APPROVED TESTING LABORATORY FOR PROPER CALIBRATION. AFTER EQUIPMENT IS RETURNED FROM TESTING LABORATORY, SUBMIT EVIDENCE OF PROPER CALIBRATION TO CABRERA REPRESENTATIVE.

4. FOR ALL FEEDER WIRING RATED ABOVE 600 VOLTS, PROVIDE HIGH POTENTIAL TEST AS FOLLOWS:

- DISCONNECT CABLE TO BE TESTED FROM SWITCHGEAR, TRANSFORMERS, ETC. AT EACH END SO THAT VOLTAGE IS APPLIED ONLY TO THE CABLE BEING TESTED.
- TEST CABLE WITH 500-VOLT MEGGER TO INSURE CABLE IS CLEAR OF ANY GROUNDS AND PERFORM A POLARIZATION INDEX (PI) TIME RESISTANCE TEST AS FOLLOWS:
  - CONNECT 5,000 VOLT MEGGER TO CABLE AND GROUND.
  - SUBJECT CABLE TO 5,000 VOLTS FOR 10 MINUTES.
  - TAKE READINGS AT ONE (1) MINUTE AND 10 MINUTES AND TAKE THE RATIO OF THE 10 MINUTE READING TO THE ONE (1) MINUTE READING AND COMPARE THE RESULTS TO THE FOLLOWING TABLE. IF THE CABLE INSULATION COMPARES TO THE OKAY OF GOOD CATEGORIES, CONTINUE TO THE HYPOT TEST. IF THE RESULTS ARE LESS THAN FAVORABLE, INVESTIGATE AND CORRECT BEFORE CONTINUING.

INSULATION CONDITION	PI RESULT
QUESTIONABLE	1 - 2
OK	2 - 4
GOOD	> 4

c. CONNECT HYPOT TESTER TO WELL REGULATED 110 VOLT, AC SOURCE. IF FACILITY SOURCE IS NOT SUITABLE OR AVAILABLE, PROVIDE REGULATOR OR PORTABLE GENERATOR WITH REGULATOR, AS REQUIRED.

- SET SENSITIVITY AT MINIMUM.
- CONNECT HIGH VOLTAGE OUTPUT LEAD TO CONDUCTOR AND GROUND LEAD TO CABLE SHIELD GROUND CONDUCTOR.
- TURN ON HYPOT UNIT.
- OBSTRUCTORS ARE ENCOUNTERED TO THE PROVISIONS TO BE MADE, PROVIDE SUPPORT RACEWAYS MINIMUM 3 IN. ABOVE BOTTOM OF TRENCH BEFORE POURING. FURNISH AND INSTALL PRECAST CONCRETE, PLASTIC OR FIBER SPACERS, STAGGERED COUPLINGS, WHEN CONCRETE IS SPECIFIED, SECURELY THE RACEWAYS IN PLACE TO PREVENT FLOATING. POUR CONCRETE AS SOON AS POSSIBLE AFTER PLACING AND SECURING OF RACEWAYS. REINFORCING SHALL BE CONTINUOUS RUNS OF #4 DEFORMED RODS LOCATED IN ALL FOUR (4) CORNERS AS WELL AS TOP AND BOTTOM OF ENVELOPE 18 IN. ON CENTER. IN LOCATIONS WHERE NONMETALLIC RACEWAYS ARE USED, CHANGE TO HEAVY WALL METALLIC CONDUIT OF SAME INTERNAL DIAMETER BEFORE RISING OUT OF GROUND; PROVIDE METALLIC CONDUIT ELBOWS AT CONDUIT RISE. CARRY CONCRETE ENVELOPE TO A MINIMUM 12 IN. MINIMUM THICKNESS CONCRETE AT RISE POINT IF ALLOWED BY SITE CONDITIONS AND EQUIPMENT TO BE INSTALLED. SLOPE TOP OF CONCRETE AWAY FROM RACEWAY, CHAMFER EDGES. WHERE CONCRETE TERMINATES, CONDUIT SEALING BUSHING ON EACH RACEWAY OR PROVIDE DUCT SEAL TO FILL ALL VOIDS AROUND CONDUIT AND CABLES. CAP ALL EMPTY CONDUITS WATERTIGHT. PLACE CONDUIT THROUGH WALLS, CEILING AND FLOOR. PROVIDE METALLIC ALL DUCT JOINTS, THEN COMPLETE CONCRETE ENCASEMENT. PLACE DIRECT-BURY CONDUIT TIE-BY-TIE METHOD, BACKFILLING EACH LAYER TO ACHIEVE PROPER SPACING. ELBOWS SHALL HAVE A MINIMUM RADIUS OF 42 IN. FOLLOW PROPER LOW TEMPERATURE INSTALLATION PROCEDURES AS RECOMMENDED BY PVC CONDUIT VENDOR. PROVIDE THERMAL TAPE IN NEEL ABOVE ALL DUCTBANKS, BOND AND LACE CONDUCTORS OF EACH FEEDER TOGETHER. FOR PARALLEL SETS OF CONDUCTORS, MATCH LENGTHS OF CONDUCTORS AS NEAR EQUAL AS POSSIBLE.

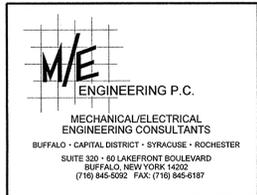
CABLE VOLTAGE (KV)	NEW INSTALL	FIRST 5 YEARS
	DC (KV)	DC (KV)
5	35	25

- RECORD THE LEAKAGE CURRENT FOR EACH VOLTAGE STEP AND PLOT CURRENT VERSUS VOLTAGE; SEPARATE CURVE FOR EACH CABLE.
- USE CABLE MANUFACTURER'S RECOMMENDED DC PROVE TEST VOLTAGE FOR NEW CABLES AS MAXIMUM TEST VOLTAGE.
- LEAKAGE CURRENT SHOULD PLOT AS A RELATIVELY FLAT CURVE. IF A MAJOR CHANGE APPEARS IN THE SLOPE OF THE CURVE, REDUCE VOLTAGE BY 2 KV FOR 5 KV CABLE, AND THEN BRING THE VOLTAGE BACK UP IN 500-VOLT INCREMENTS TO THE PREVIOUS LEVEL.
- IF AN UNACCEPTABLE BEND IS FOUND AND/OR TESTER TRIPS, PLACE CONDUIT UNDER TENSION AND REPEAT THE TEST. IF TEST RESULT IS NOT IMPROVED, A PROBLEM IN THE CABLE PORTION OF THE CIRCUIT EXISTS.
- IF CABLE TESTS TO THE MAXIMUM VOLTAGE REQUIRED, HOLD CABLE AT THIS VOLTAGE FOR 15 MINUTES AND PLOT LEAKAGE CURRENT VERSUS TIME. TAKE READINGS AT 0, 15, 30, 45, 60 SECONDS AND THEN AT ONE (1) MINUTE INTERVALS FOR THE NEXT 15 MINUTES. GROUND CONDUCTOR PRIOR TO DISCONNECTING LEADS AS RECOMMENDED IN HYPOT TESTER'S MANUAL.

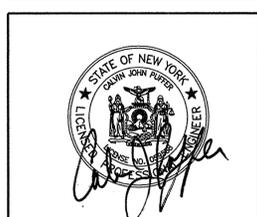
- REPLACE ALL NEW CABLE, TERMINATIONS, SPLICES FOUND FAULTY, AS PART OF THE CONTRACT.
- DOCUMENT TEST RESULTS AND SUBMIT TO ENGINEERS FOR APPROVAL PRIOR TO ENERGIZING CABLES.

5. TEST REPORTS

- CABRERA REPRESENTATIVE WILL ASCERTAIN THAT ALL TESTS SPECIFIED ARE PERFORMED OR WAIVED. TEST REPORTS OR WAIVERS ARE RETAINED IN CABRERA SITE REPRESENTATIVE'S FILE.
- PREPARE TEST REPORTS UTILIZING THE STANDARDS FOR DC HIGH POTENTIAL TESTING LISTED BELOW UNLESS ALTERNATE LIMITS ARE APPROVED BY THE CABRERA SITE REPRESENTATIVE OR REQUIRED BY SPECIFIC TEST PROCEDURES.
- COMPLETE TEST REPORT UPON COMPLETION OF EACH TEST OR SERIES OF SIMILAR TESTS.



Linde FUSRAP Utility Replacement Project  
 Linde FUSRAP Project No. 07-3210.02  
 Task No. 2 - Utility Replacement Project



THESE DOCUMENTS AND ALL THE IDEAS, ARRANGEMENTS, DESIGNS AND REVISIONS INDICATED THEREON OR REPRESENTED THEREON ARE OWNED BY AND REMAIN THE PROPERTY OF M/E ENGINEERING AND NO PART THEREOF SHALL BE UTILIZED BY ANY PERSON, FIRM OR CORPORATION FOR ANY PURPOSE WHATSOEVER EXCEPT WITH THE SPECIFIC WRITTEN PERMISSION OF M/E ENGINEERING, P.C.

REVISIONS		
No.	Date	Description
0	10/12/2011	CONSTRUCTION DOCUMENTS