ISLAMIC REPUBLIC OF AFGHANISTAN
AFGHANISTAN ENGINEERING SUPPORT PROGRAM (AESP)

TARAKHIL POWER PLANT
WATER PIPING SYSTEM

KABUL, AFGHANISTAN
DATE: 19/01/2014

THIS PROJECT WAS MADE POSSIBLE BY THE UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT AND THE GENEROUS SUPPORT OF THE AMERICAN PEOPLE THROUGH USAID GLOBAL ARCHITECTURE AND ENGINEERING IQC CONTRACTS

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TARAKHIL POWER PLANT
WATER PIPING SYSTEM
KABUL AFGHANISTAN
COVER SHEET

SHEET REFERENCE NUMBER:
G-000

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

NOTE: A3 SIZE REDUCED TO HALF SCALE

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DRAWING INDEX

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CIVIL DRAWINGS				
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C-205	TEMPORARY HYDRANT DETAILS	FINAL DESIGN SUBMITTAL	0	19/01/2014
C-301	PERMANENT FIRE WATER SERVICE TRENCH IN PAVED AREA DETAILS	FINAL DESIGN SUBMITTAL	0	19/01/2014
C-302	PERMANENT FIRE WATER SERVICE TRENCH IN UNPAVED AREA DETAILS	FINAL DESIGN SUBMITTAL	0	19/01/2014
C-303	UTILITY TRENCH AND CHANNEL CROSSING DETAILS	FINAL DESIGN SUBMITTAL	0	19/01/2014
C-304	VERTICAL OFFSET AND DEAD END RESTRAINT LENGTH DETAILS	FINAL DESIGN SUBMITTAL	0	19/01/2014
C-305	HORIZONTAL BEND AND TEE RESTRAINT LENGTH DETAILS	FINAL DESIGN SUBMITTAL	0	19/01/2014
C-306	FIRE HYDRANT AND GATE VALVE DETAILS	FINAL DESIGN SUBMITTAL	0	19/01/2014
C-307	POWER HOUSE AND FOAM HOUSE BUILDING CONNECTION DETAILS	FINAL DESIGN SUBMITTAL	0	19/01/2014
C-308	WORKSHOP AND TREATMENT HOUSE BUILDING CONNECTION DETAILS	FINAL DESIGN SUBMITTAL	0	19/01/2014
C-309	ADMINISTRATION AND NLCC BUILDING CONNECTION DETAILS	FINAL DESIGN SUBMITTAL	0	19/01/2014
C-310	PERMANENT PUMP HOUSE BUILDING CONNECTION DETAIL	FINAL DESIGN SUBMITTAL	0	19/01/2014

NOTES:

1. ALL INFORMATION SHOWN IS BASED ON THE BEST AVAILABLE DATA (CONSTRUCTION PLANS) FROM USAID AND BLACK AND VEATCH AND MAY NOT REFLECT THE ACTUAL FIELD CONDITIONS OR LOCATIONS OF UNDERGROUND STRUCTURES OR EXISTING UTILITIES.
2. ALL BENCHMARKS AND CONTOURS ARE SHOWN IN METERS.
3. CONTRACTOR SHALL FIELD VERIFY THE DEPTH AND LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO EXCAVATION.
4. CONTRACTOR TO PROTECT EXISTING INFRASTRUCTURE THROUGHOUT ALL PHASES OF CONSTRUCTION.
5. CONTRACTOR TO COORDINATE WITH DABS FOR THE RELOCATION OF ANY EXISTING STRUCTURES AND/OR FEATURES NECESSARY TO PERFORM CONSTRUCTION.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL OF ANY SEDIMENT OR DEBRIS AS RESULT OF CONSTRUCTION ACTIVITIES FROM THE PROJECT SITE IN ACCORDANCE WITH LOCAL AUTHORIZATION REGULATIONS AND DABS.
7. CONSTRUCTION DEBRIS, INCLUDING BROKEN PAVEMENT, SHALL BE TRANSPORTED TO OFFSITE DISPOSAL AREA IN COORDINATION WITH DABS.
8. CONTRACTOR SHALL REPLACE IN KIND ANY EXISTING ASPHALT OR CONCRETE PAVEMENT DISTURBED DURING CONSTRUCTION ACTIVITIES. ANY DAMAGED PAVEMENT WILL BE REMOVED TO FULL PATH AND DEPTH, AND REPLACED WITH MATERIALS MATCHING THE EXISTING PAVEMENT CROSS SECTION DEPTHS.
9. CONTRACTOR SHALL RESTORE ALL FORCE PROTECTION BARRIERS, FENCE, AND SURFACES DISTURBED BY CONSTRUCTION, UNLESS OTHERWISE NOTED.

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TARAKHIL POWER PLANT
WATER PIPING SYSTEM
KABUL AFGHANISTAN
DRAWING INDEX AND GENERAL NOTES

SHEET REFERENCE NUMBER:
C-100

ISSUED FOR CONSTRUCTION

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

NOTE: A3 SIZE REDUCED TO HALF SCALE

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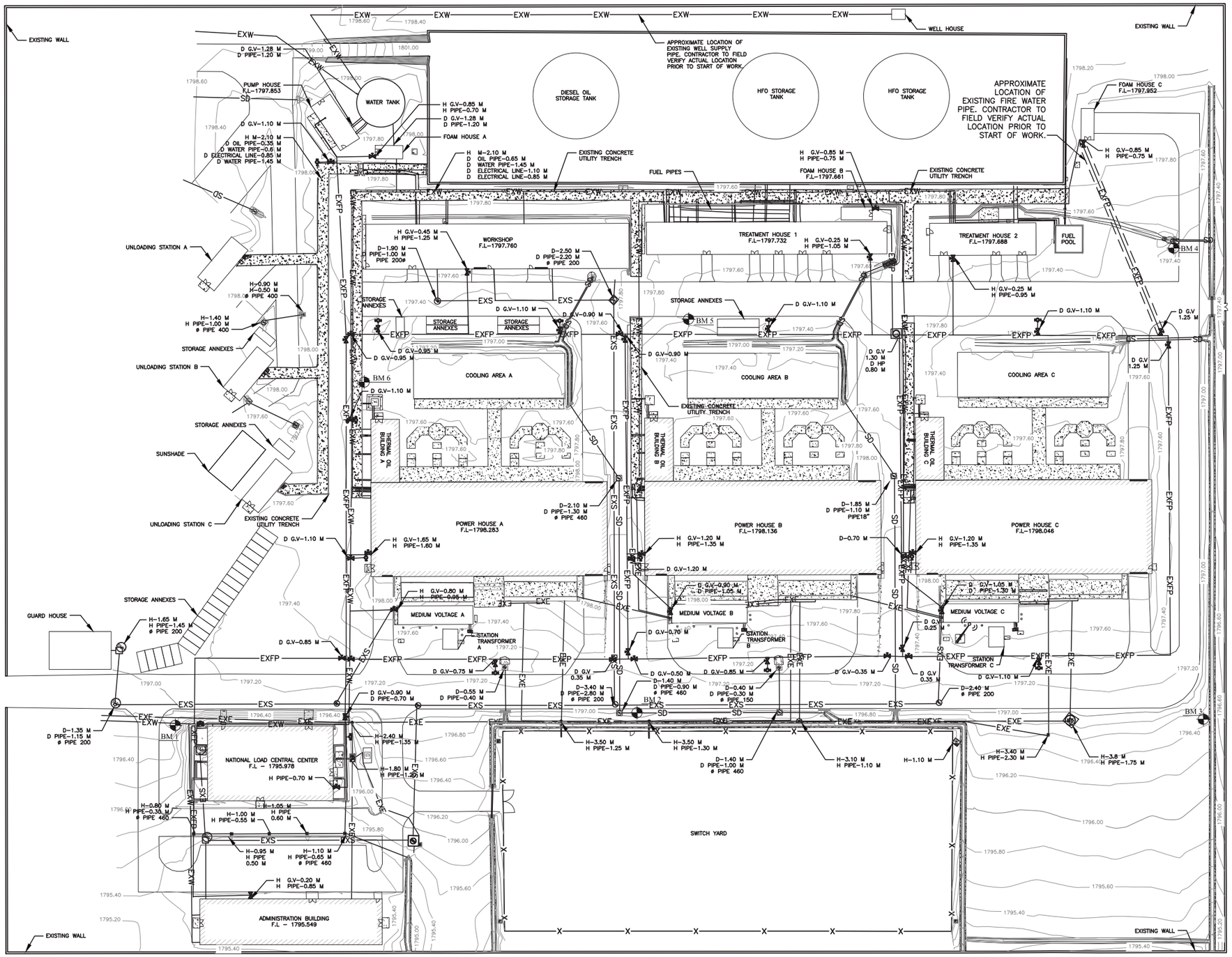

EXISTING CONDITIONS PLAN

SCALE: 1:600

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

ISSUED FOR CONSTRUCTION

N

NOTES:

1. EXISTING CONDITIONS INFORMATION IS BASED ON THE SURVEY PERFORMED BY GEOTECHNIQUE FROM JULY 2, 2013 THROUGH JULY 8, 2013.
2. CONTOUR MAJOR LINES ARE SHOWN AT 1.0 M.
3. CONTOUR MINOR LINES ARE SHOWN AT 0.2 M.
4. THE SURVEY IS BASED ON THE COORDINATE SYSTEM WGS 1984, ZONE 42 NORTH.
5. ALL HEIGHTS AND DEPTHS TAKEN FROM GRADE.

LEGEND

- EXISTING BENCHMANRK
- EXISTING CONCRETE UTILITY TRENCH
- EXISTING ROAD CONCRETE
- EXISTING CONCRETE AREA
- EXISTING OPEN CONCRETE LINED DRAINAGE CHANNEL
- 1796.00 — EXISTING CONTOUR MAJOR
- 1796.60 — EXISTING CONTOUR MINOR
- EXE — EXISTING ELECTRIC LINE
- SD — EXISTING STORM PIPE
- EXFP — EXISTING FIRE WATER PIPE
- EXW — EXISTING DOMESTIC WATER PIPE
- EXS — EXISTING SEWER PIPE
- X — EXISTING FENCE
- ME — EXISITING ELECTRICAL MANHOLE
- EXISTING ELECTRICAL BOX
- G — EXISTING GENERATOR
- MR — EXISTING STORM WATER MANHOLE
- MS — EXISTING SEWER MANHOLE
- MW — EXISTING WATER MANHOLE
- HW — EXISTING WATER HAND HOLE
- MT — EXISTING GROUND WIRE HAND HOLE
- EXISTING FIRE HYDRANT
- EXISTING GATE VALVE
- H.M — HEIGHT OF MANHOLE
- D — DEPTH BELOW GRADE
- H — HEIGHT ABOVE GRADE
- G.V — GATE VALVE
- F.L — FINISH LEVEL
- ø — DIAMETER

SURVEY BENCHMARKS

BENCHMARK #	Easting	Northing	Elevation
BM1	526940.833	3824319.620	1796.888
BM2	527048.508	3824399.612	1797.158
BM3	527184.279	3824492.498	1796.452
BM4	527098.644	3824599.617	1797.458
BM5	526995.151	3824501.778	1797.621
BM6	526928.477	3824432.740	1797.582

0 10 20 30 60m

1:600

NOTE: A3 SIZE REDUCED TO HALF SCALE

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TARAKHIL POWER PLANT
WATER PIPING SYSTEM
KABUL AFGHANISTAN
EXISTING CONDITIONS PLAN

SHEET REFERENCE NUMBER:

C–101

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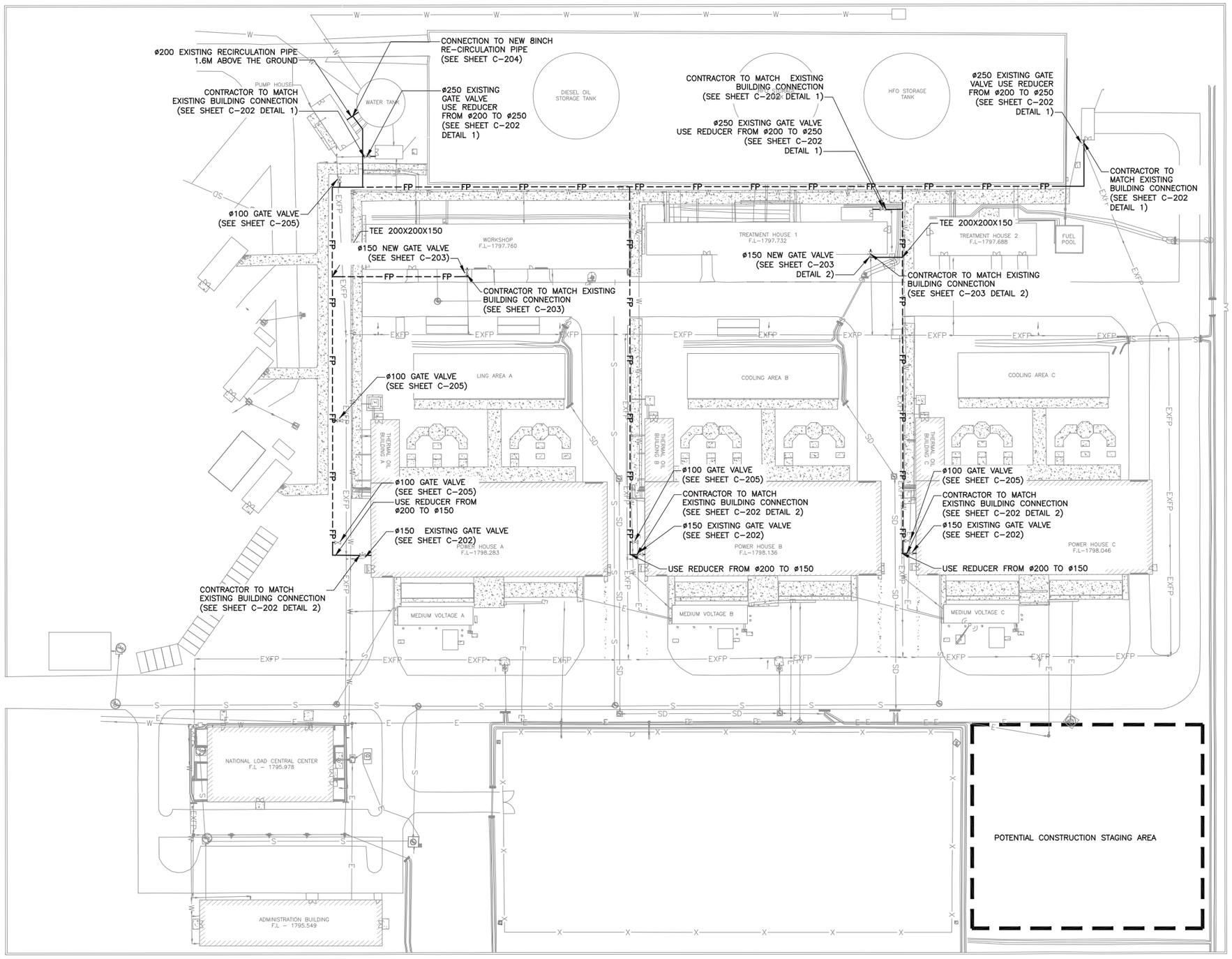

TEMPORARY FIRE WATER PIPE PLAN
SCALE: 1:600

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

0 10 20 30 60m
1:600
NOTE: A3 SIZE REDUCED TO HALF SCALE

ISSUED FOR CONSTRUCTION

N

NOTES:

1. ALL FIRE WATER PIPE TO BE ø200 HDPE PN 16 UNLESS OTHERWISE SPECIFIED.
2. CONTRACTOR TO LAY ALL PROPOSED FIRE WATER PIPE AT EXISTING GRADE.
3. CONTRACTOR TO RESTRAIN ALL FIRE WATER PIPE, CONNECTIONS, BENDS, VALVES, AND APPURTENANCES PER SPECIFICATION 33 11 00.
4. CONTRACTOR TO PROTECT EXPOSED PIPE AT GRADE IN ROADWAYS FROM VEHICLE TRAFFIC.
5. CONTRACTOR TO CONNECT TO EXISTING FIRE HYDRANTS AS SHOWN ON SHEET C-203 DETAIL 1.
6. CONTRACTOR SHALL PROVIDE HORIZONTAL ABOVE GRADE PIPE SUPPORTS PER DETAIL 1 ON SHEET C-201.

LEGEND

ø DIAMETER

FP TEMPORARY FIRE WATER PIPE

TEMPORARY GATE VALVE

TEMPORARY FIRE HYDRANT

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TARAKHIL POWER PLANT
WATER PIPING SYSTEM
KABUL AFGHANISTAN
TEMPORARY FIRE WATER PIPE PLAN

SHEET REFERENCE NUMBER:
C-102

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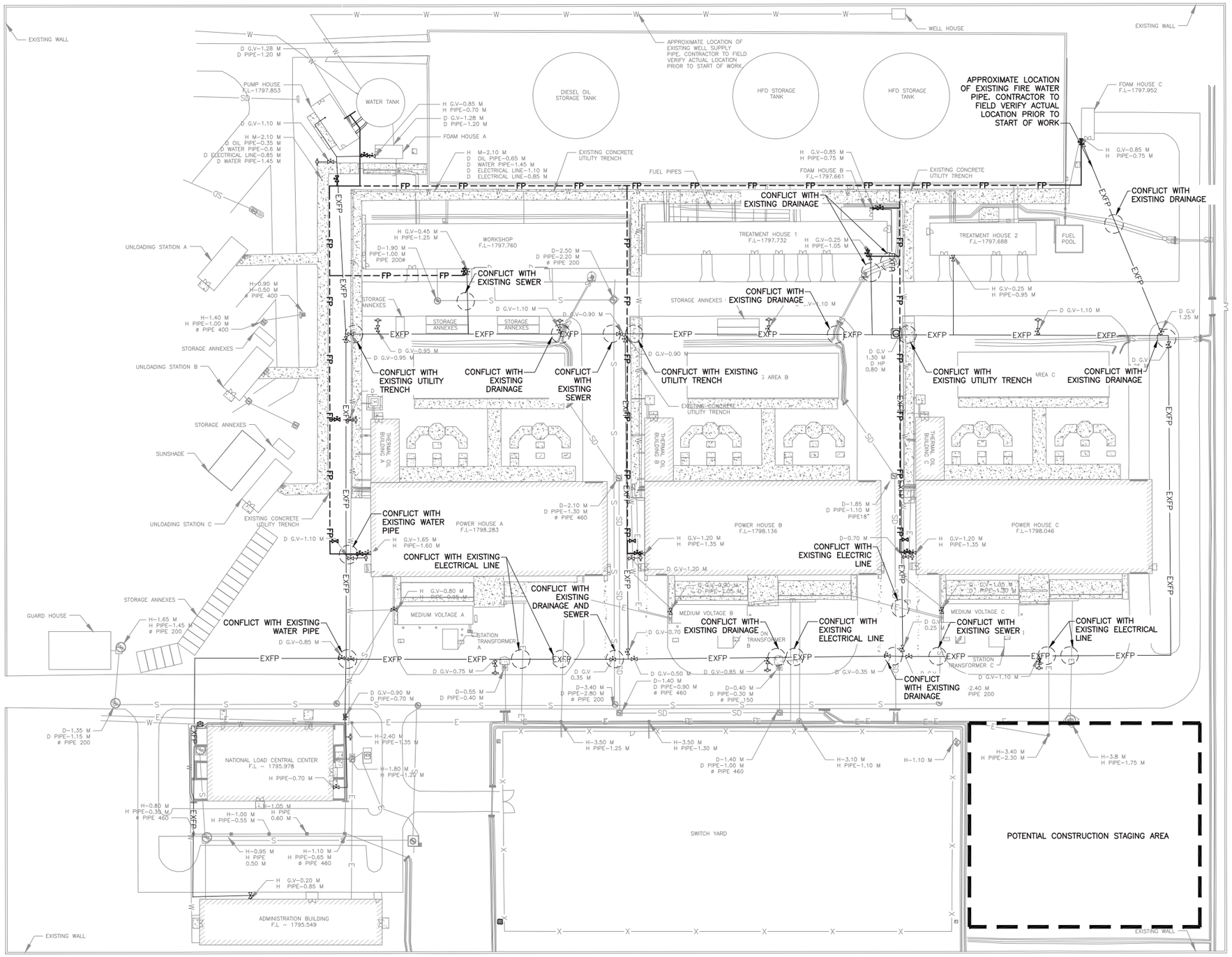

DEMOLITION PLAN
SCALE: 1:600

0 10 20 30 60m
1:600
NOTE: A3 SIZE REDUCED TO HALF SCALE

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

ISSUED FOR CONSTRUCTION

N

NOTES:

1. THE PROPOSED TEMPORARY FIRE WATER PIPE SYSTEM SHALL BE INSTALLED PRIOR TO THE START OF DEMOLITION. SEE SHEET C-102 FOR THE PROPOSED TEMPORARY FIRE WATER PIPE SYSTEM.
2. CONTRACTOR TO REMOVE ALL EXISTING FIRE WATER PIPE, GATE VALVES, FIRE HYDRANTS AND APPURTENANCES UP TO BUILDING CONNECTION UP TO THE POINT WHERE THE EXISTING FIRE WATER PIPE CONNECTED WITH THE PIPE INSIDE THE BUILDING.
3. ALL MAJOR, KNOWN CONFLICTS ARE IDENTIFIED ON THIS DRAWING, OTHER CONFLICTS MAY ALSO EXIST.

LEGEND

- FIRE HYDRANT TO BE REMOVED
- GATE VALVE TO BE REMOVED
- EXFP — FIRE WATER PIPE AND APPURTENANCES TO BE REMOVED
- FP — TEMPORARY FIRE WATER PIPE
- TEMPORARY GATE VALVE
- TEMPORARY FIRE HYDRANT
- CONFLICT WITH EXISTING UTILITY

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TARAKHIL POWER PLANT
WATER PIPING SYSTEM
KABUL AFGHANISTAN
DEMOLITION PLAN

SHEET REFERENCE NUMBER:
C-103

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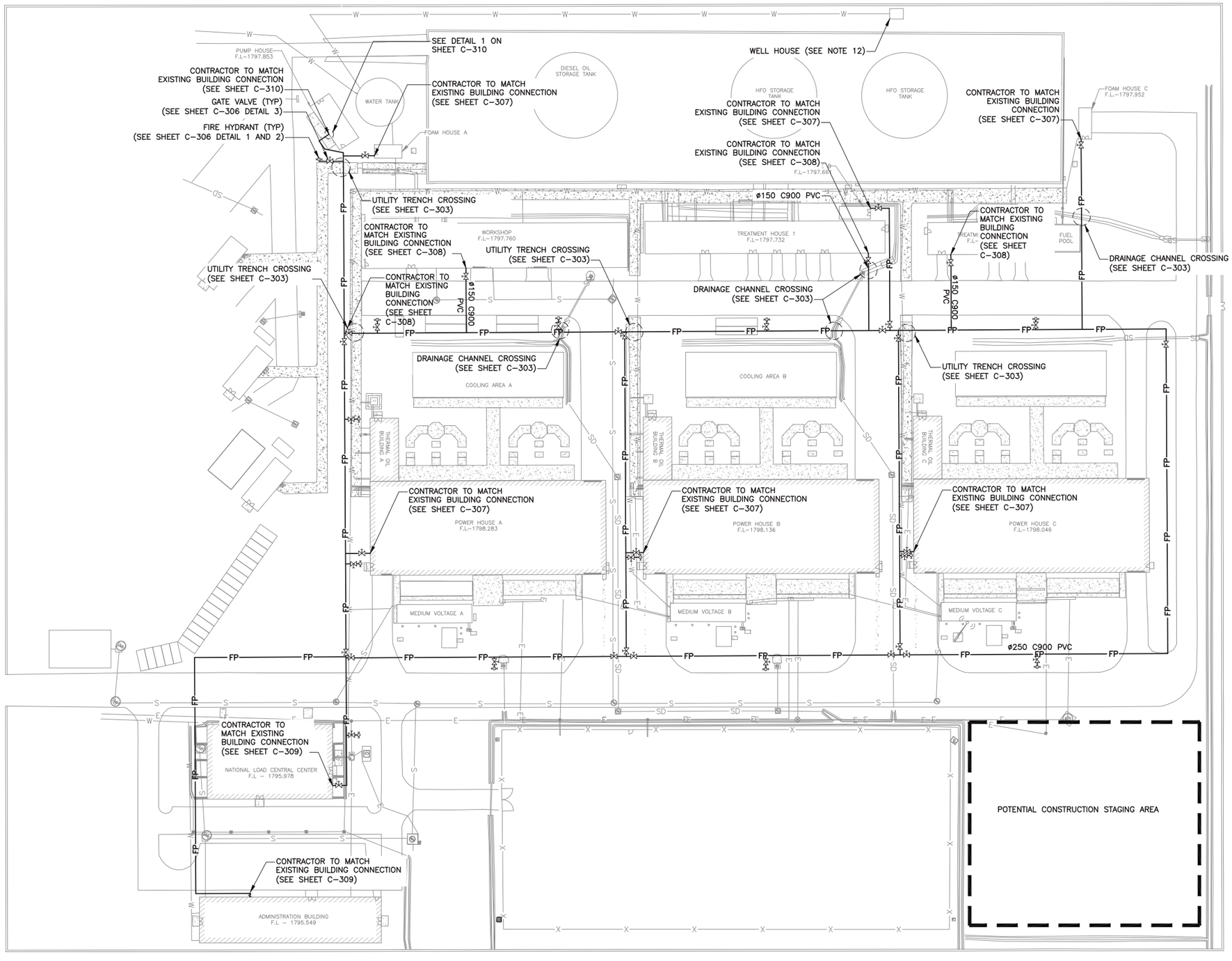

PERMANANET FIRE WATER PIPE PLAN
SCALE: 1:600

ISSUED FOR CONSTRUCTION

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

0 10 20 30 60m
1:600
NOTE: A3 SIZE REDUCED TO HALF SCALE

NOTES:

1. ALL FIRE WATER PIPE SHALL BE ø250 AWWA C900 DR 14 PVC WITH PUSH ON JOINTS UNLESS OTHERWISE NOTED.
2. ALL FIRE WATER PIPE TO BE RESTRAINED PER SPECIFICATION 33 11 00.
3. MINIMUM ALLOWABLE CLEARANCE BETWEEN PIPES AT CONFLICT CROSSINGS SHALL BE 300MM.
4. SEE SHEETS C–301, C–302, AND C–303 FOR TRENCH DETAILS.
5. CONTRACTOR TO INSTALL ALL FIRE HYDRANTS SHOWN ON PLAN AS SOWN ON SHEET C–306, FIRE HYDRANT DETAIL AND FIRE HYDRANT CONNECTION DETAILS.
6. CONTRACTOR TO INSTALL ALL GATE VALVES SHOWN ON PLAN AS SHOWN ON SHEET C–306, GATE VALVE DETAIL.
7. SEE ELECTRICAL SHEET SERIES FOR HEAT TRACING DETAILS AT BUILDING CONNECTIONS AND UTILITY TRENCH CROSSINGS.
8. CONTRACTOR TO INSTALL EXPANSION JOINT AT EACH BUILDING CONNECTION. SEE SPECIFICATION 33 11 00.
9. ALL INSTALLED FIRE WATER PIPE SHALL BE INSPECTED BY THE ENGINEER PRIOR TO BACKFILL. SEE SPECIFICATION 33 11 00.
10. ALL INSTALLED FIRE WATER PIPE SHALL BE HYDROSTATICALLY TESTED IN ACCORDANCE TO SPECIFICATION 33 11 00
11. SEWER LINES CROSSING ABOVE WATER LINES SHALL BE FULLY ENCASED IN CONCRETE FOR A DISTANCE OF 3 METERS MEASURED HORIZONTALLY ON EACH SIDE OF THE CROSSING. IF CONCRETE ENCASEMENT IS USED, THE SEWER LINE SHALL BE ENCASED WITH A MINIMUM OF 150 MM OF COVER ALL THE WAY AROUND THE PIPE.
12. CONTRACTOR TO ATTACH PUMP LIFTING HOIST TO ROOF OF WELL HOUSE, AT THE LOCATION OF EXISTING MANUAL HOIST ABOVE THE WELL.
    CONTRACTOR ALSO TO VERIFY THE STABILITY OF WELL HOUSE ROOF STRUCTURE FOR SUPPORTING THE WELL PUMP, PIPES AND ITSELF LIFTING HOIST.

    LIFTING HOIST SPECIFICATIONS IS BELOW:

    – 250 KG CDO, MDI MINI LIFTING HOIST,
    – HIGH QUALITY CHAN AND MOTOR,
    – CAPACITY 250–32T,
    – LIFTING HEIGHT (6M–30M) (MAX 100M).

LEGEND

- FP — FIRE WATER PIPE
- ø — DIAMETER
- CONFLICT WITH EXISTING UTILITY

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TARAKHIL POWER PLANT
WATER PIPING SYSTEM
KABUL AFGHANISTAN
PERMANENT FIRE WATER PIPE PLAN

SHEET REFERENCE NUMBER:
C–104

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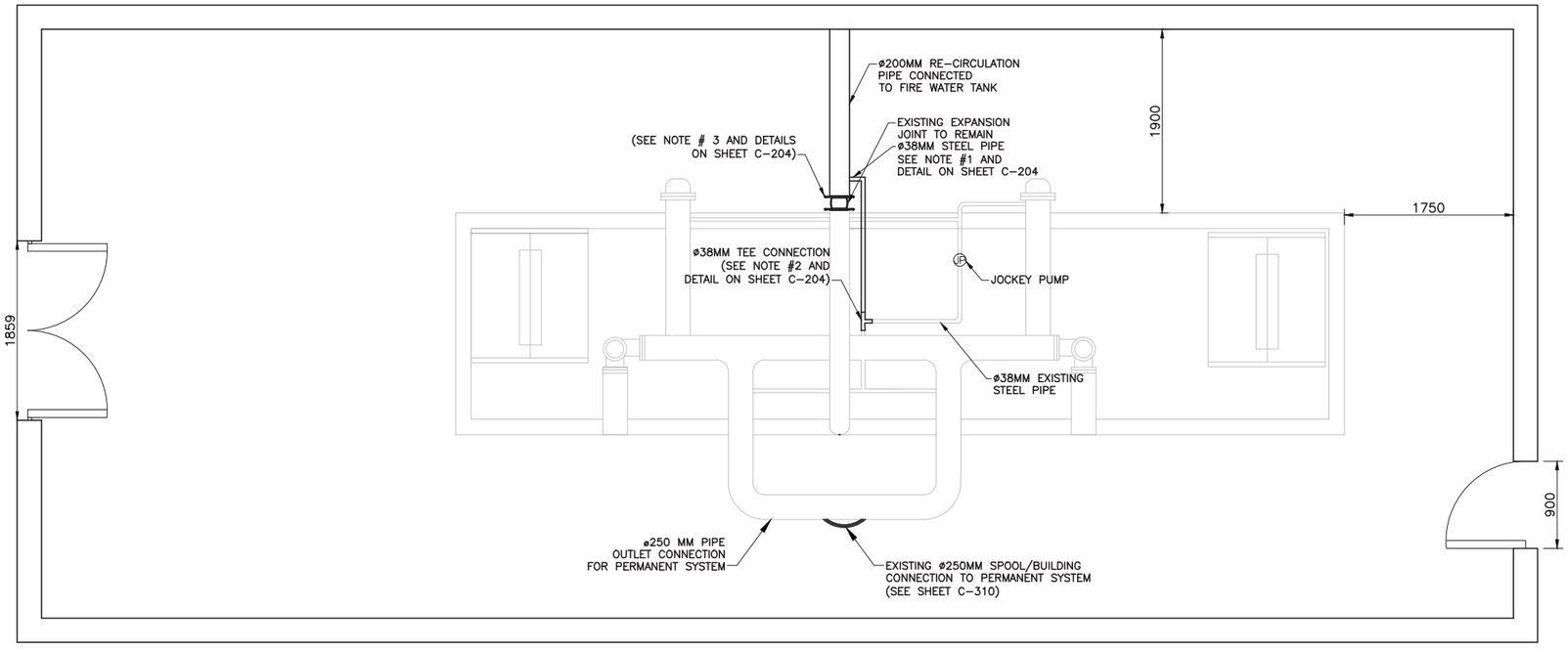

NOTE:

1. CONNECT A NEW ø38MM STEEL PIPE TO THE NEW ø200MM DUCTILE IRON RE-CIRCULATION LINE TO SUPPLY PRESSURIZED WATER TO THE TEMPORARY SYSTEM.
2. REMOVE THE EXISTING ø38MM ELBOW AND REPLACE WITH NEW ø38MM STEEL TEE CONNECTION.
3. UN-BOLT THE EXISTING 4200MM OF THE ø200MM RE-CIRCULATION PIPE IN BETWEEN THE EXISTING EXPANSION JOINT AND THE EXISTING JOINT OUTSIDE THE PUMP HOUSE AND REPLACE IT WITH ø200MM DUCTILE IRON PIPE FOR THE CONNECTION OF THE TEMPORARY SYSTEM.

PUMP HOUSE PLAN
SCALE: 1:30

ISSUED FOR CONSTRUCTION

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

1 .50 0 1 2
1:30
NOTE: A3 SIZE REDUCED TO HALF SCALE

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TARAKHIL POWER PLANT
WATER PIPING SYSTEM
KABUL AFGHANISTAN
PUMP HOUSE PLAN

SHEET REFERENCE NUMBER:
C-105

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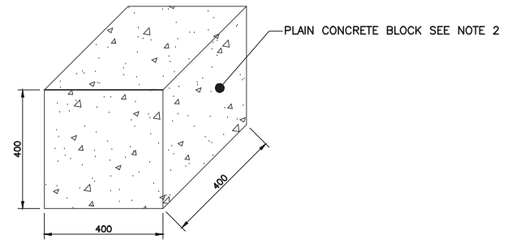
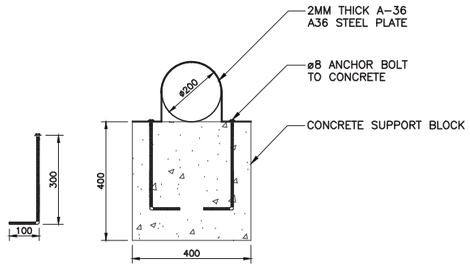
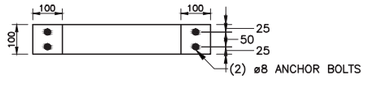


CONCTRETE SUPPORT BLOCK (1)
NOT TO SCALE



TEMPORARY SYSTEM RESTRAINT (2)
NOT TO SCALE



2MM THICK A36 STEEL PLATE (3)
NOT TO SCALE

NOTES:

1. TEMPORARY SYSTEM RESTRAINT SPACING 15M MAX.
2. 28 DAY CONCRETE COMPRESSIVE STRENGTH (F'C) SHALL BE 150KG/CM²(15MPA)

ISSUED FOR CONSTRUCTION

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WATER PIPING SYSTEM
KABUL AFGHANISTAN
TEMPORARY
PIPE RESTRAINT DETAILS

SHEET REFERENCE NUMBER:
C-201

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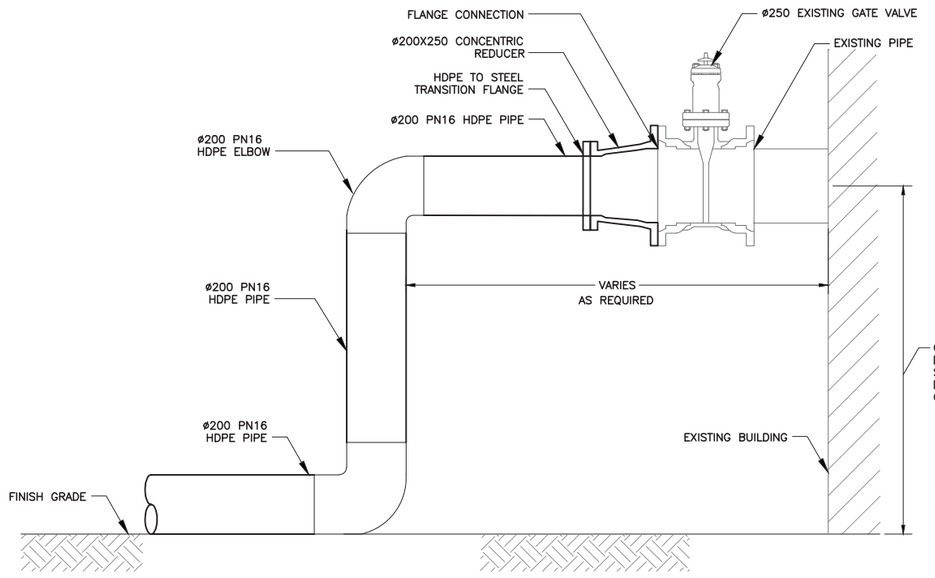
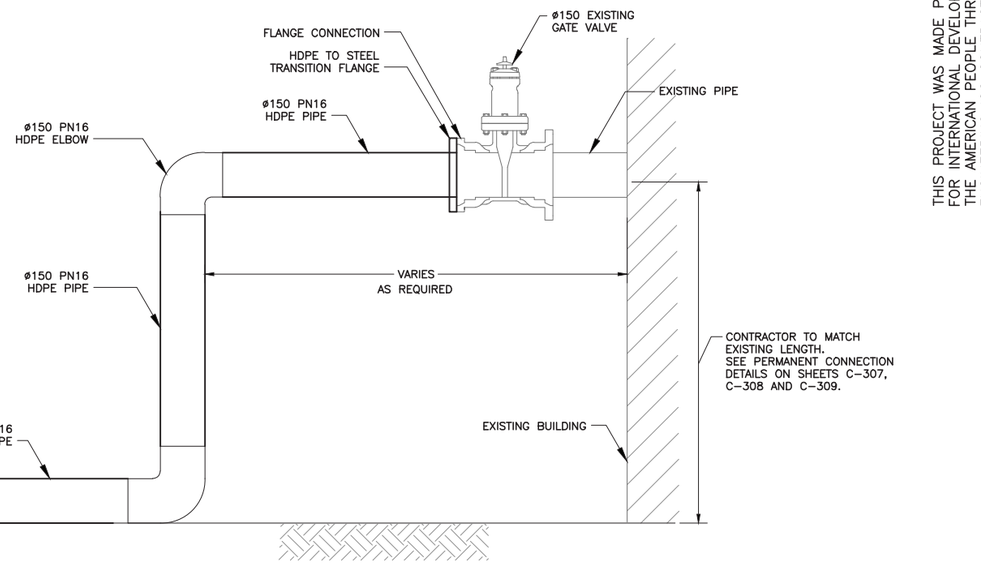


FOAM HOUSE A, B & C
TEMPORARY BUILDING CONNECTION DETAIL 1
SCALE 1:10



POWER HOUSE A, B & C
TEMPORARY BUILDING CONNECTION DETAIL 2
SCALE 1:10

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TARAKHIL POWER PLANT
WATER PIPING SYSTEM
KABUL AFGHANISTAN
TEMPORARY
BUILDING CONNECTION DETAILS

SHEET REFERENCE NUMBER:
C-202

ISSUED FOR CONSTRUCTION

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

0 .50 1.00
1:10
NOTE: A3 SIZE REDUCED TO HALF SCALE

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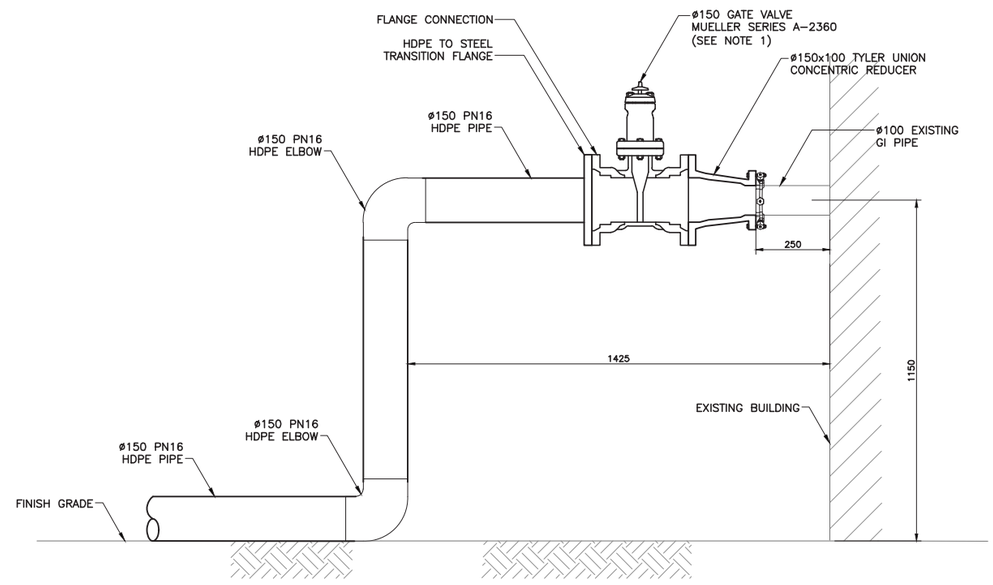
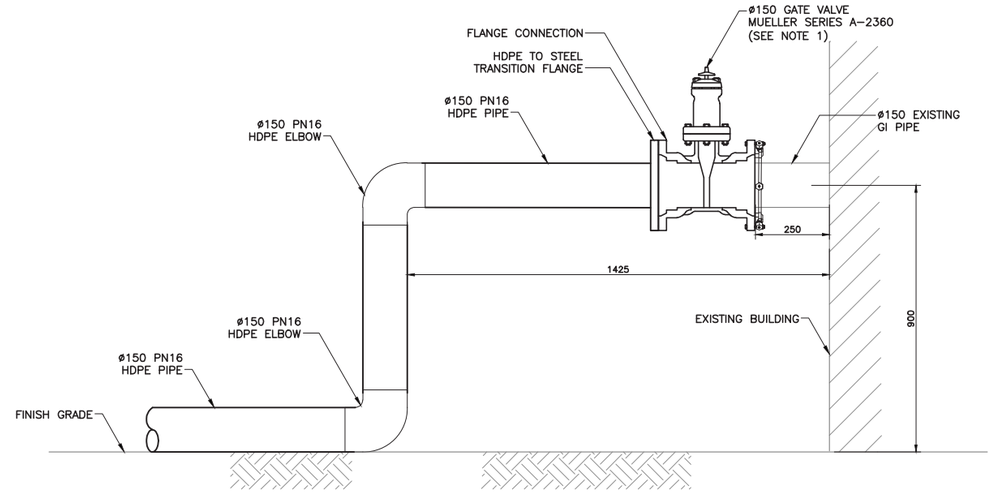


WORKSHOP BUILDING
TEMPORARY BUILDING CONNECTION DETAIL 1
SCALE 1:10



TREATMENT HOUSE 1
TEMPORARY BUILDING CONNECTION DETAIL 2
SCALE 1:10

NOTE:

1. GATE VALVES ARE TO BE INSTALLED FOR USE IN TEMPORARY SYSTEM AND KEPT FOR USE IN PERMANENT SYSTEM

ISSUED FOR CONSTRUCTION

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

0 .50 1.00
1:10
NOTE: A3 SIZE REDUCED TO HALF SCALE

THIS PROJECT WAS MADE POSSIBLE BY THE UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT AND THE GENEROUS SUPPORT OF THE AMERICAN PEOPLE THROUGH USAID GLOBAL ARCHITECTURE AND ENGINEERING IQC CONTRACTS

FINAL DESIGN SUBMITTAL

SYMB	DATE	SUBMITTAL/REVISION DESCRIPTION
A	04/08/13	CONCEPT DESIGN
B	02/12/13	FINAL DESIGN DRAFT
0	19/01/14	FINAL DESIGN, REVISION 0

DESIGNED BY: KF | DATE:
DRAWN BY: HP | SUBMITTED BY: TETRA TECH
CHECKED BY: KF | CAD FILE NAME: C-206

USAID FROM THE AMERICAN PEOPLE

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USAID – OEGI
TARAKHIL POWER PLANT
WATER PIPING SYSTEM
KABUL AFGHANISTAN
TEMPORARY
BUILDING CONNECTION DETAILS

SHEET REFERENCE NUMBER:
C-203

P:\1298\Work Orders\WO-LT\WO-LT-0070 Tarakhil Power Plant Water Piping System\CAD\SheetFiles\Final Design\Civil\C-203-Temporary Building Connection Details.dwg Popalzoi,

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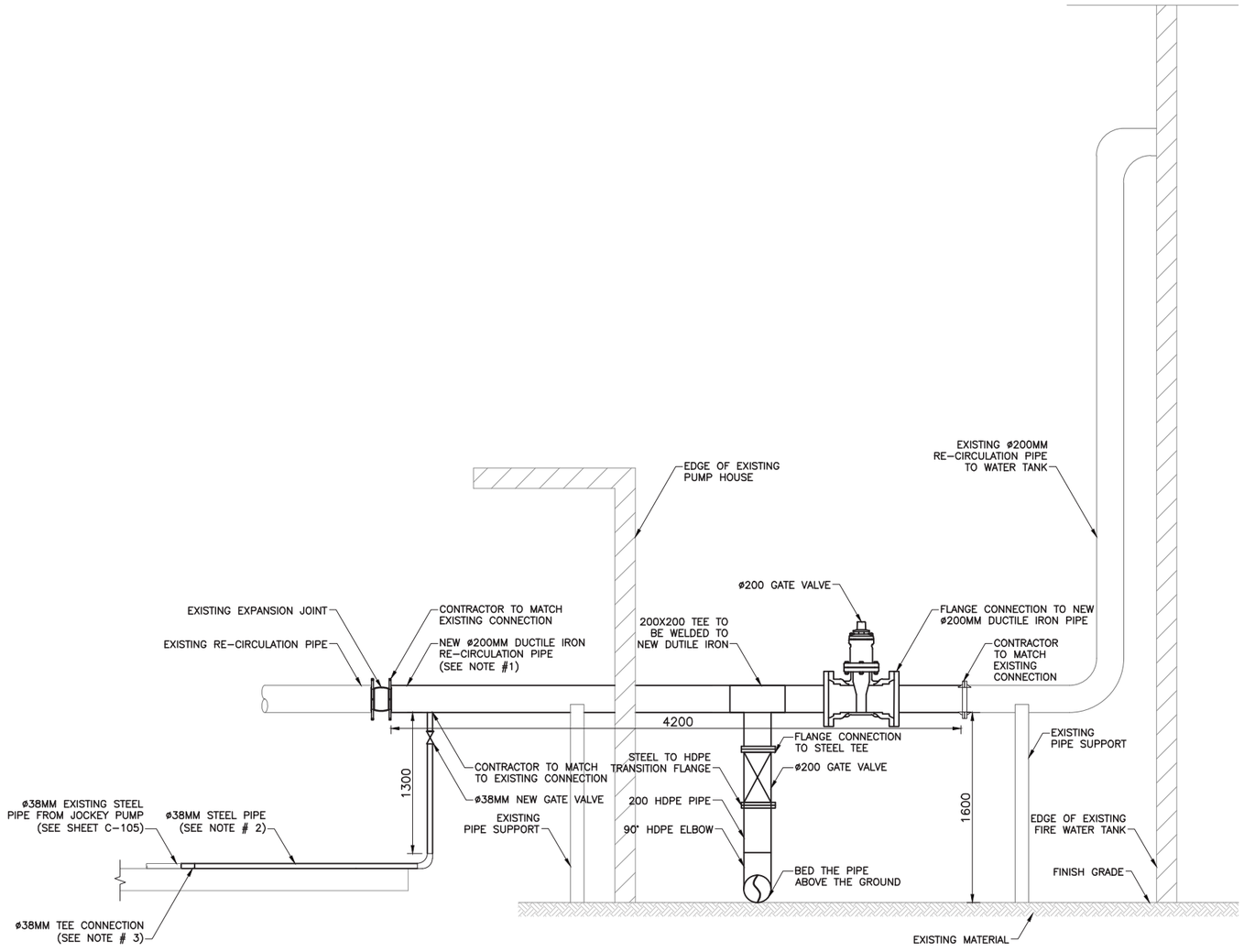

NOTE:

1. UN-BOLT THE EXISTING 4200MM OF THE ø200MM RE-CIRCULATION PIPE IN BETWEEN THE EXISTING EXPANSION JOINT AND THE EXISTING JOINT OUTSIDE THE PUMP HOUSE AND REPLACE IT WITH ø200MM DUCTILE IRON PIPE FOR THE CONNECTION OF THE TEMPORARY SYSTEM.
2. CONNECT A NEW ø38MM STEEL PIPE TO THE NEW ø200MM DUCTILE IRON RE-CIRCULATION PIPE TO PRESSURIZE TEMPORARY SYSTEM.
3. REMOVE THE EXISTING ø38MM ELBOW AND REPLACE WITH THE NEW STEEL TEE CONNECTION
4. AFTER COMPLETION OF PERMANENT SYSTEM, RESTORE THE RE-CIRCULATION PIPE TO THE ORIGINAL STATE.

TEMPORARY PUMP HOUSE BUILDING CONNECTION DETAIL
SCALE: 1:20

ISSUED FOR CONSTRUCTION

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

1 .50 0 1
1:20
NOTE: A3 SIZE REDUCED TO HALF SCALE

THIS PROJECT WAS MADE POSSIBLE BY THE UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT AND THE GENEROUS SUPPORT OF THE AMERICAN PEOPLE THROUGH USAID GLOBAL ARCHITECTURE AND ENGINEERING IQC CONTRACTS

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A	CONCEPT DESIGN	04/08/13	
B	FINAL DESIGN DRAFT	02/12/13	
0	FINAL DESIGN, REVISION 0	19/01/14	

DESIGNED BY: SS | DATE:
DRAWN BY: HP | SUBMITTED BY: TETRA TECH
CHECKED BY: KF | CAD FILE NAME: C-203

USAID FROM THE AMERICAN PEOPLE

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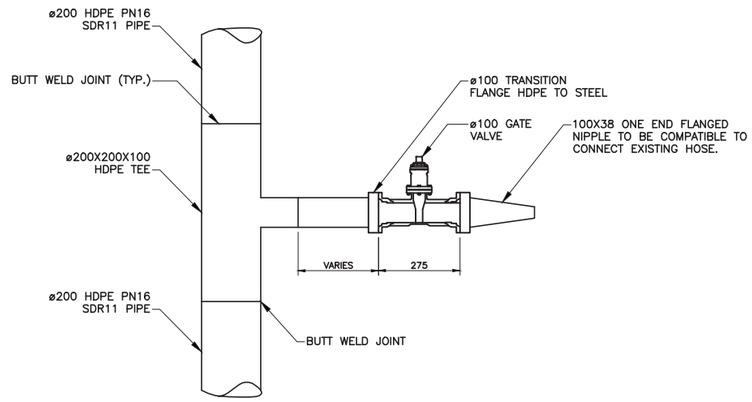
USAID – OEGI
TARAKHIL POWER PLANT
WATER PIPING SYSTEM
KABUL AFGHANISTAN
TEMPORARY PUMP HOUSE
BUILDING CONNECTION DETAIL

SHEET REFERENCE NUMBER:
C-204



ø100 GATE VALVE CONNECTION
FOR EXISTING FIRE HYDRANT HOSE (1)
NOT TO SCALE

ISSUED FOR CONSTRUCTION

UNLESS OTHERWISE NOTED, LINEAR
DIMENSIONS SHOWN ARE IN MILLIMETERS.

0 .50 1.00
1:10
NOTE: A3 SIZE REDUCED TO HALF SCALE

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B	FINAL DESIGN DRAFT	02/12/13	
0	FINAL DESIGN, REVISION 0	19/01/14	

DESIGNED BY: SS
DRAWN BY: HP
CHECKED BY: KF
DATE:
SUBMITTED BY: TETRA TECH
CAD FILE NAME: C-203

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USAID – OEGI
TARAKHIL POWER PLANT
WATER PIPING SYSTEM
KABUL AFGHANISTAN
TEMPORARY HYDRANT DETAIL

SHEET REFERENCE NUMBER:
C–205

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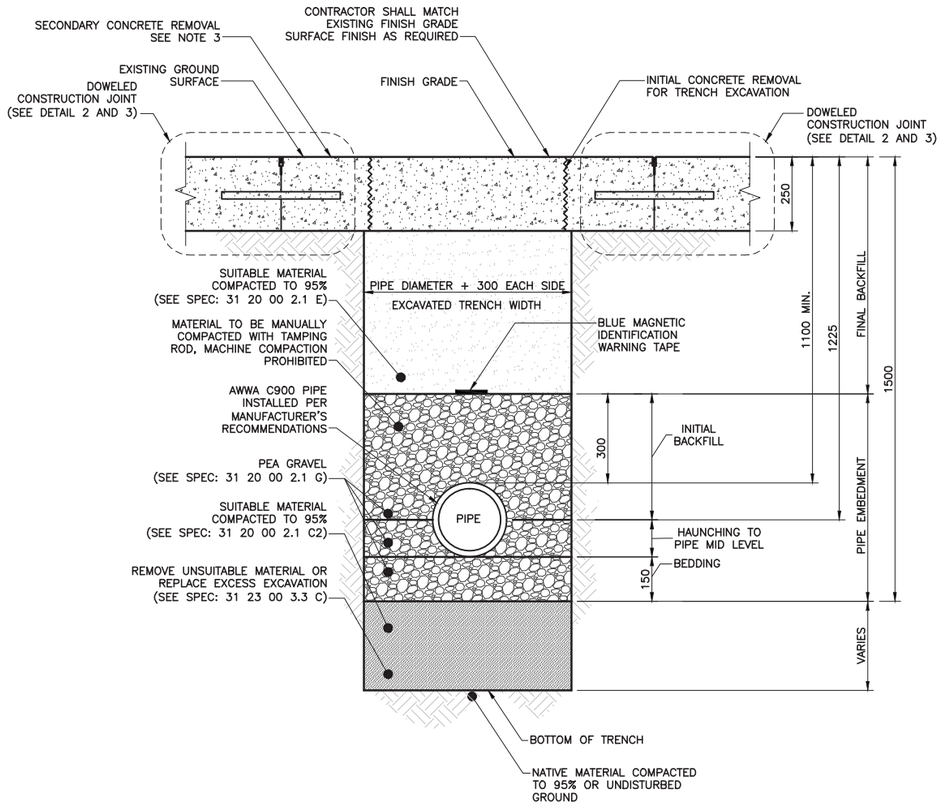
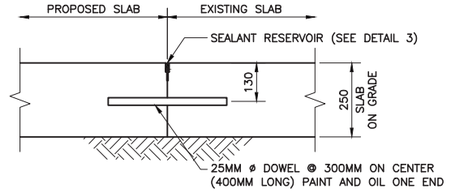


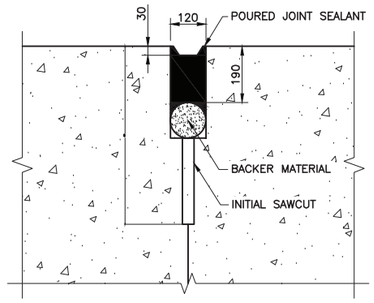
NOTES:

1. ALL BACKFILLING TO BE PERFORMED IN 150 MM LIFTS AND COMPACTED IN ACCORDANCE WITH SPEC 31 23 00.
2. A MINIMUM COVER OF 1100 MM SHALL BE PROVIDED ABOVE ALL PROPOSED PIPE.
3. AFTER BACKFILLING AND COMPACTION OF THE TRENCH, THE CONTRACTOR SHALL PERFORM THE SECONDARY CUT JUST BEFORE CONCRETE POUR TO AVOID LONGER EXPOSURE OF THE CUT EDGES TO THE DIRT.

FIRE WATER SERVICE TRENCH FOR PIPES IN PAVED AREAS — 1
SCALE: 1:10



CONSTRUCTION JOINT DETAIL — 2
SCALE: 1:10



SEALANT RESERVOIR DETAIL — 3
SCALE: 1:1

ISSUED FOR CONSTRUCTION

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

0 .50 1.00
1:10
NOTE: A3 SIZE REDUCED TO HALF SCALE

THIS PROJECT WAS MADE POSSIBLE BY THE UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT AND THE GENEROUS SUPPORT OF THE AMERICAN PEOPLE THROUGH USAID GLOBAL ARCHITECTURE AND ENGINEERING IQC CONTRACTS

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0	FINAL DESIGN, REVISION 0	19/01/14	

DESIGNED BY: TM
DRAWN BY: HP
CHECKED BY: KF
DATE:
SUBMITTED BY: TETRA TECH
CAD FILE NAME: C-301

USAID FROM THE AMERICAN PEOPLE

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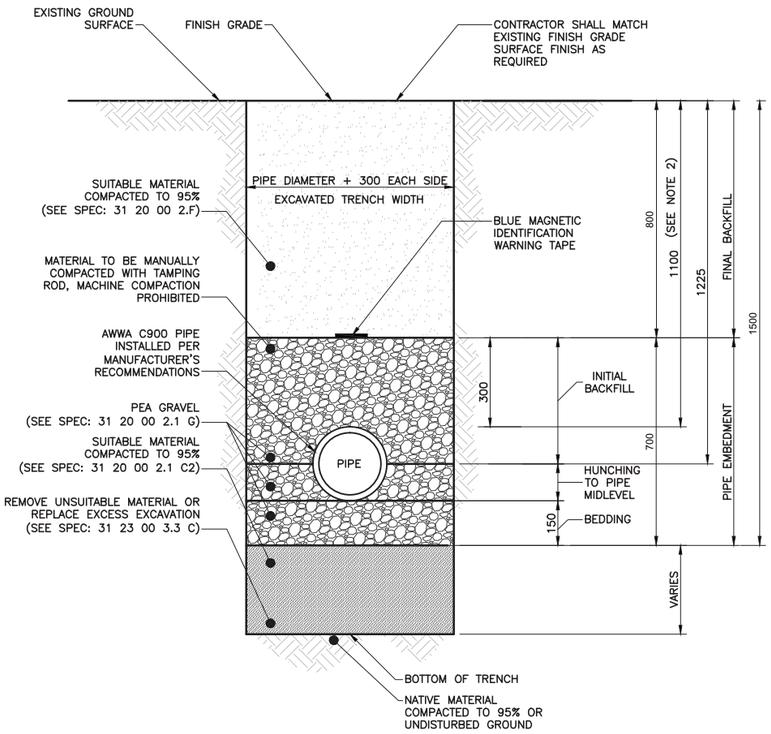
USAID – OEGI
TARAKHIL POWER PLANT
WATER PIPING SYSTEM
KABUL AFGHANISTAN
PERMANENT FIRE WATER SERVICE
TRENCH IN PAVED AREA DETAILS

SHEET REFERENCE NUMBER:
C-301

P:\1298\Work Orders\WO-LT\WO-LT-0070 Tarakhil Power Plant Water Piping System\CAD\SheetFiles\Final Design\Civil\C-301-Trench in Paved Area Detail.dwg Popalzai,



NOTES:

1. ALL BACKFILLING TO BE PERFORMED IN 150 MM LIFTS AND COMPACTED IN ACCORDANCE WITH SPEC 31 23 00.

2. A MINIMUM COVER OF 1100 MM SHALL BE PROVIDED ABOVE ALL PROPOSED PIPE.

FIRE WATER SERVICE TRENCH FOR PIPES IN UNPAVED AREAS (1)
SCALE: 1:10

ISSUED FOR CONSTRUCTION

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

0 .50 1.00
1:10
NOTE: A3 SIZE REDUCED TO HALF SCALE

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B	FINAL DESIGN DRAFT	02/12/13	
0	FINAL DESIGN, REVISION 0	19/01/14	

DESIGNED BY: TM
DRAWN BY: HP
CHECKED BY: KF
DATE:
SUBMITTED BY: TETRA TECH
CAD FILE NAME: C-302

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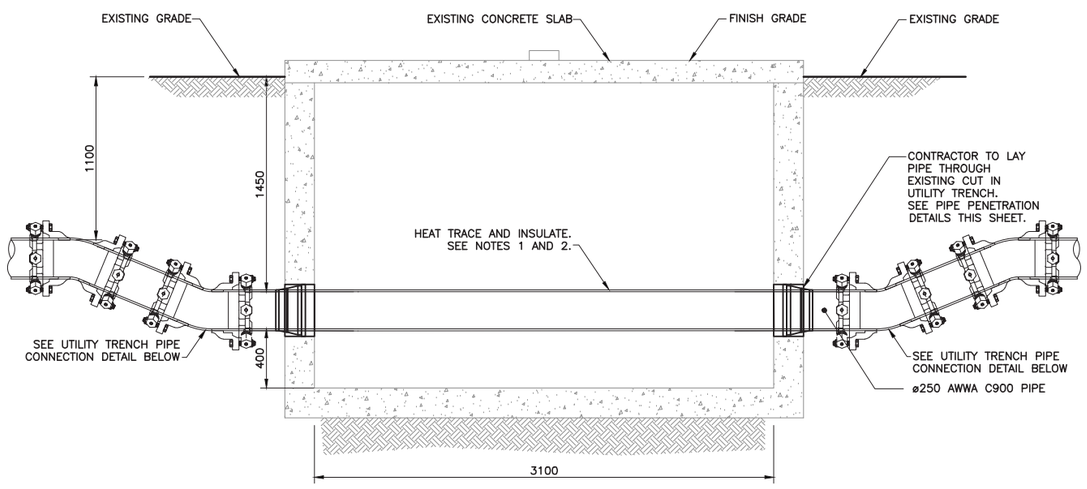
USAID – OEGI
TARAKHIL POWER PLANT
WATER PIPING SYSTEM
KABUL AFGHANISTAN
PERMANENT FIRE WATER SERVICE
TRENCH IN UNPAVED AREA DETAILS

SHEET REFERENCE NUMBER:
C-302

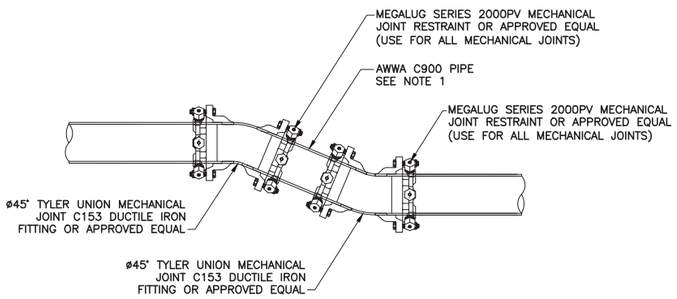
P:\1298\Work Orders\WO-LT\WO-LT-0070 Tarakhil Power Plant Water Piping System\CAD\SheetFiles\Final Design\Civil\C-302-Trench in Unpaved Area Detail.dwg Popalzai,



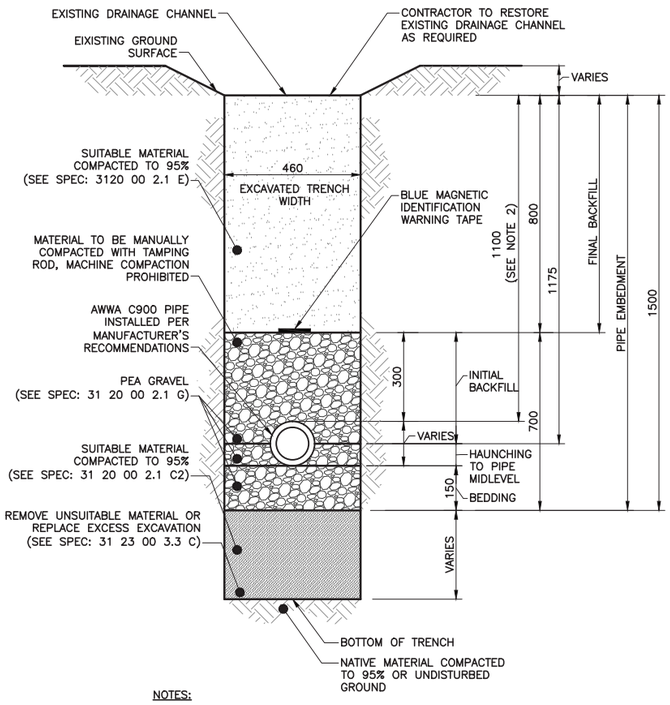
NOTES:

1. CONTRACTOR TO INSULATE FIRE WATER PIPE IN UTILITY TRENCH WITH FOAMED ELASTOMER (ASTM C534). THE MINIMUM INSULATION MATERIAL THICKNESS SHALL BE 50MM. A 0.6MM ALUMINUM JACKET SHALL BE PROVIDED OVER THE INSULATION.
2. CONTRACTOR TO HEAT TRACE PIPE IN UTILITY TRENCH. SEE SHEET E-304.

UTILITY TRENCH CROSSING 1
SCALE: 1:20



UTILITY TRENCH PIPE CONNECTION 2
SCALE: 1:20

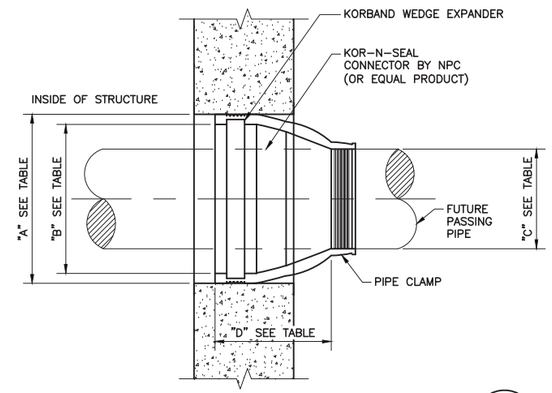


NOTES:

1. CONTRACTOR TO PERFORM ALL BACKFILLING IN 150 MM LIFTS AND COMPACTED IN ACCORDANCE WITH SPEC 31 23 00.
2. MINIMUM COVER OF 1100 MM SHALL BE PROVIDED ABOVE ALL PROPOSED PIPE.

DRAINAGE CHANNEL CROSSING 3
SCALE: 1:10

PIPE SIZE RANGE	HOLE SIZE "A" RANGE	CONNECTOR DIA. "B"	CONNECTOR DIA. "C"	CONNECTOR LENGTH "D"
241 – 286	356 – 361	308	268	203



UTILITY TRENCH PIPE PENETRATION DETAILS 4
SCALE: 1:10

ISSUED FOR CONSTRUCTION

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

1 .50 0 1
1:20
0 .50 1.00
1:10
NOTE: A3 SIZE REDUCED TO HALF SCALE

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B	FINAL DESIGN DRAFT	02/12/13	
0	FINAL DESIGN, REVISION 0	19/01/14	

DESIGNED BY: TM | DATE: | SUBMITTED BY: TETRA TECH
DRAWN BY: HP | CHECKED BY: KF | CAD FILE NAME: C-303

USAID FROM THE AMERICAN PEOPLE

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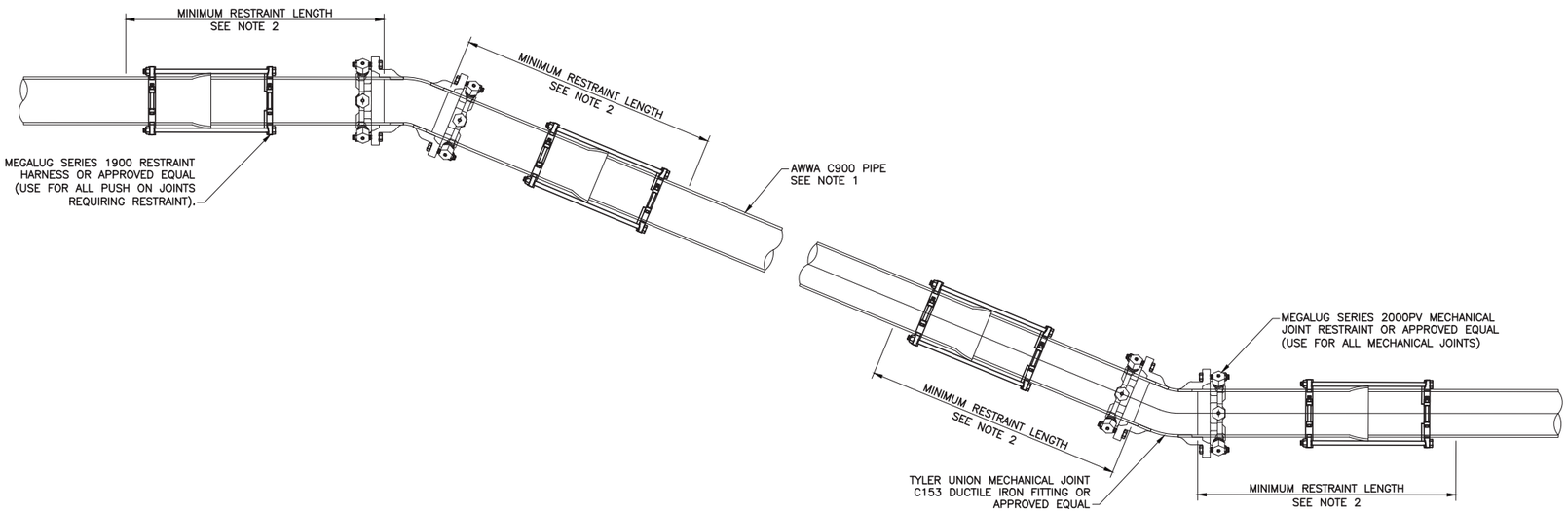
USAID – OEGI
TARAKHIL POWER PLANT
WATER PIPING SYSTEM
KABUL AFGHANISTAN
UTILITY TRENCH AND
CHANNEL CROSSING DETAILS

SHEET REFERENCE NUMBER:
C-303

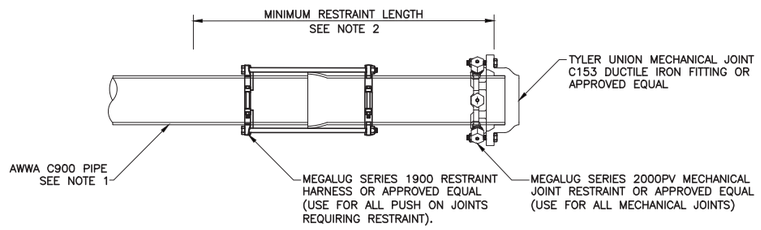
P:\1298\Work Orders\WO-LT\WO-LT-0070 Tarakhil Power Plant Water Piping System\CAD\SheetFiles\Final Design\Civil\C-303-Utility Trench and Channel Crossing Details.dwg Popalzai,



VERTICAL OFFSET RESTRAINT LENGTH (1)
NOT TO SCALE

NOTES:

1. ALL WATER PIPING SHALL CONFORM TO THE AWWA C900 SPECIFICATION AND HAVE A MINIMUM PRESSURE RATING OF 2100KPA (303PSI) (DR 14).
2. ALL PIPES, FITTINGS, AND RESTRAINTS SHALL BE INSTALLED PER THE MANUFACTURER'S RECOMMENDATIONS AND SPECIFICATION 33 11 00.
3. SEGMENTS OF COMPLETED PIPING SHALL BE TESTED TO A HYDROSTATIC PRESSURE OF AT LEAST 1380KPA (200PSI).



DEAD END RESTRAINT LENGTH (2)
NOT TO SCALE

ISSUED FOR CONSTRUCTION

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

NOTE: A3 SIZE REDUCED TO HALF SCALE

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0	FINAL DESIGN, REVISION 0	19/01/14	

DESIGNED BY: TM	DATE:	SUBMITTED BY: TETRA TECH	
DRAWN BY: HP			
CHECKED BY: KF		CAD FILE NAME: C-304	

USAID FROM THE AMERICAN PEOPLE

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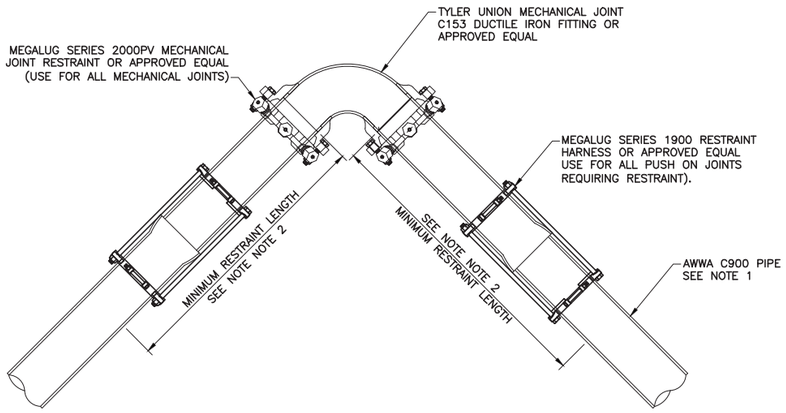
USAID – OEGI
TARAKHIL POWER PLANT
WATER PIPING SYSTEM
KABUL AFGHANISTAN
VERTICAL OFFSET AND DEAD END RESTRAINT LENGTH DETAILS

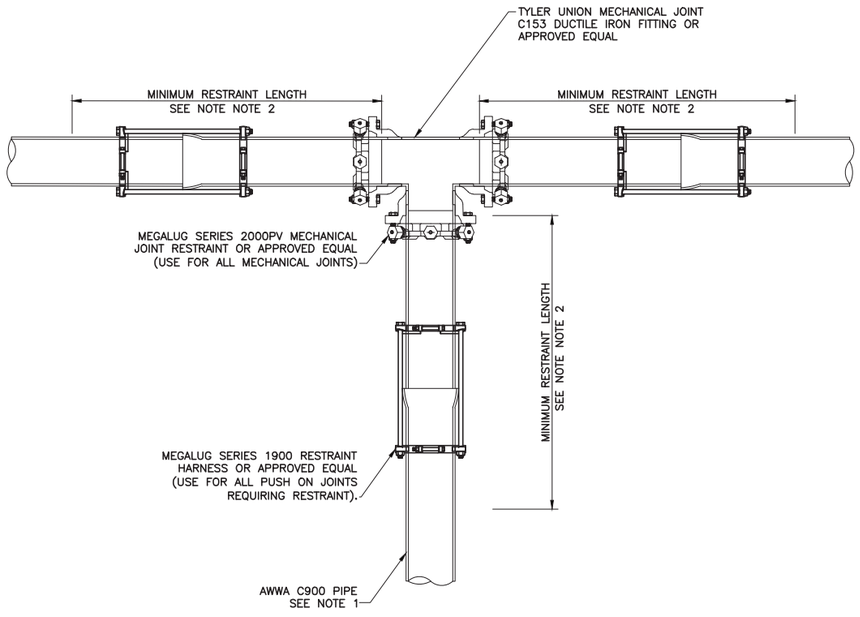
SHEET REFERENCE NUMBER:
C-304

P:\1298\Work Orders\WO-LT\WO-LT-0070 Tarakhil Power Plant Water Piping System\CAD\SheetFiles\Final Design\Civil\C-304-Vertical offset and Dead End Restraint length Details.dwg Popalzai,



HORIZONTAL BEND RESTRAINT LENGTH
NOT TO SCALE

1



TEE RESTRAINT LENGTH
NOT TO SCALE

2

NOTES:

1. ALL WATER PIPING SHALL CONFORM TO THE AWWA C900 SPECIFICATION AND HAVE A MINIMUM PRESSURE RATING OF 2100KPA (305PSI) (DR 14).
2. ALL PIPES, FITTINGS, AND RESTRAINTS SHALL BE INSTALLED PER THE MANUFACTURER'S RECOMMENDATIONS AND SPECIFICATION 33 11 00.
3. SEGMENTS OF COMPLETED PIPING SHALL BE TESTED TO A HYDROSTATIC PRESSURE OF AT LEAST 1380KPA (200PSI).

ISSUED FOR CONSTRUCTION

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

NOTE: A3 SIZE REDUCED TO HALF SCALE

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DESIGNED BY: TM
DRAWN BY: HP
CHECKED BY: KF
DATE:
SUBMITTED BY: TETRA TECH
CAD FILE NAME: C-305

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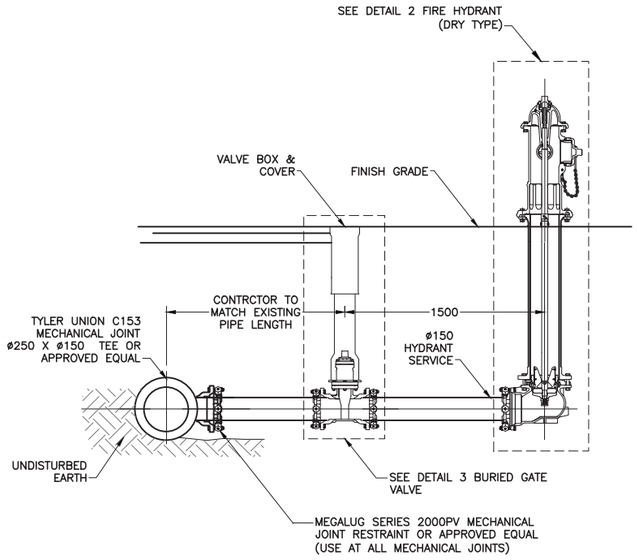
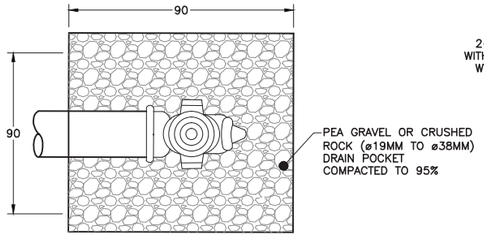
USAID – OEGI
TARAKHIL POWER PLANT
WATER PIPING SYSTEM
KABUL AFGHANISTAN
HORIZONTAL BEND AND TEE RESTRAINT LENGTH DETAILS

SHEET REFERENCE NUMBER:
C-305

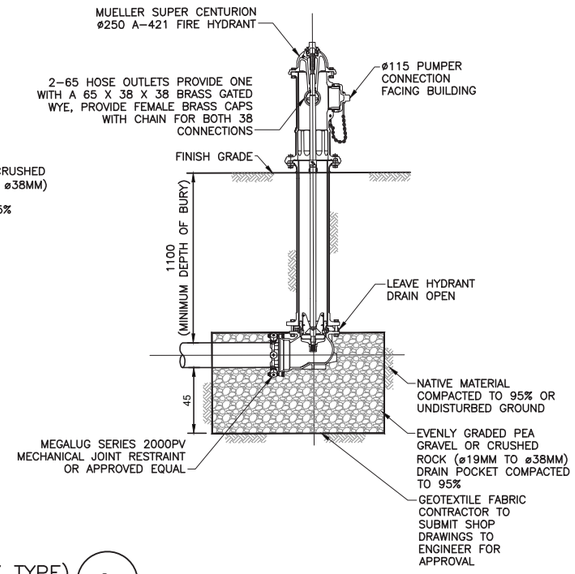
P:\1298\Work Orders\WO-LT\WO-LT-0070 Tarakhil Power Plant Water Piping System\CAD\SheetFiles\Final Design\Civil\C-305-Horizontal Bend and Tee Restraint Length Details.dwg Popalzai,



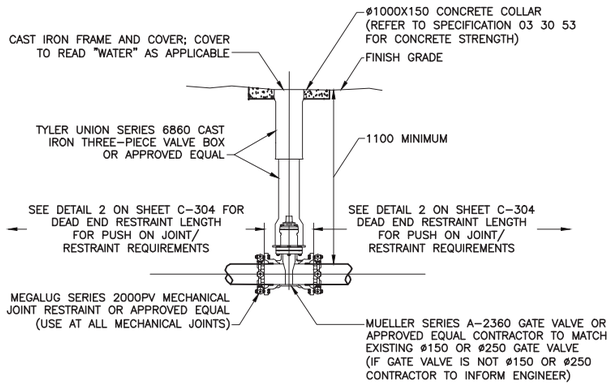
HYDRANT CONNECTION 1
NOT TO SCALE



PLAN



FIRE HYDRANT (DRY TYPE) 2
NOT TO SCALE



BURIED GATE VALVE 3
NOT TO SCALE

THIS PROJECT WAS MADE POSSIBLE BY THE UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT AND THE GENEROUS SUPPORT OF THE AMERICAN PEOPLE THROUGH USAID GLOBAL ARCHITECTURE AND ENGINEERING IQC CONTRACTS

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0	FINAL DESIGN, REVISION 0	19/01/14	

DESIGNED BY: TM
DRAWN BY: HP
CHECKED BY: KF
DATE:
SUBMITTED BY: TETRA TECH
CAD FILE NAME: C-306

USAID FROM THE AMERICAN PEOPLE

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USAID – OEGI
TARAKHIL POWER PLANT
WATER PIPING SYSTEM
KABUL AFGHANISTAN
FIRE HYDRANT AND
GATE VALVE DETAILS

SHEET REFERENCE NUMBER:
C-306

ISSUED FOR CONSTRUCTION

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

NOTE: A3 SIZE REDUCED TO HALF SCALE

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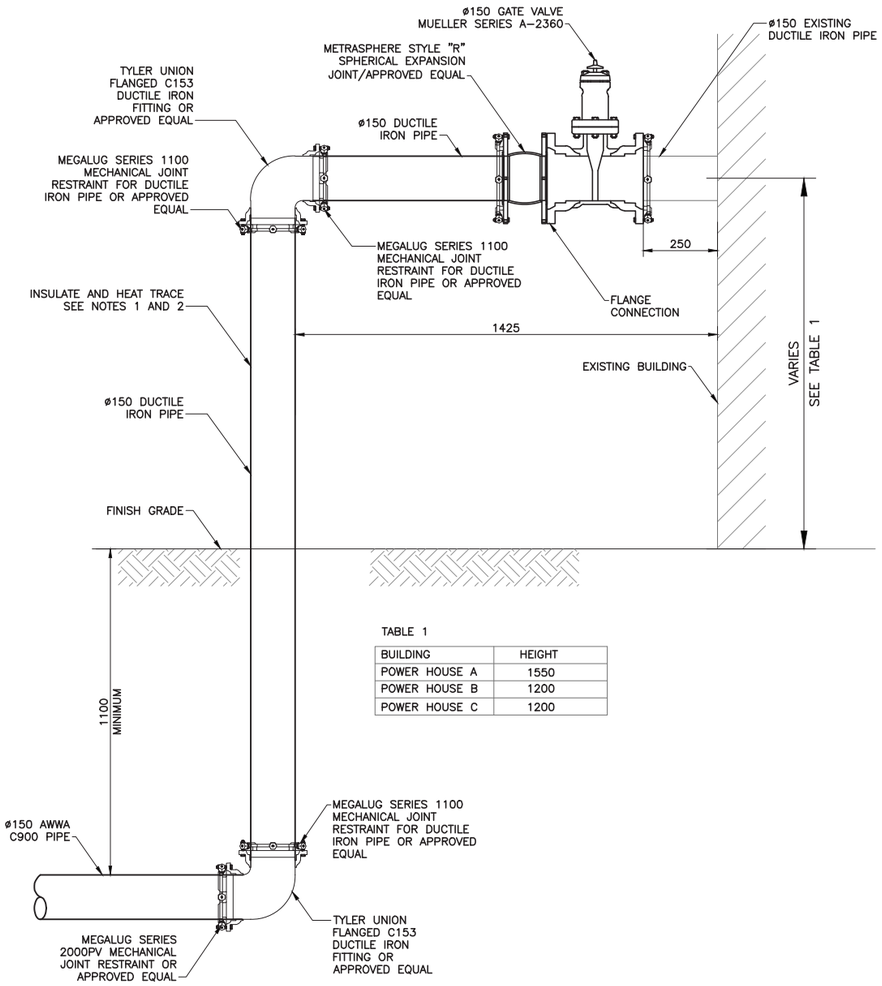
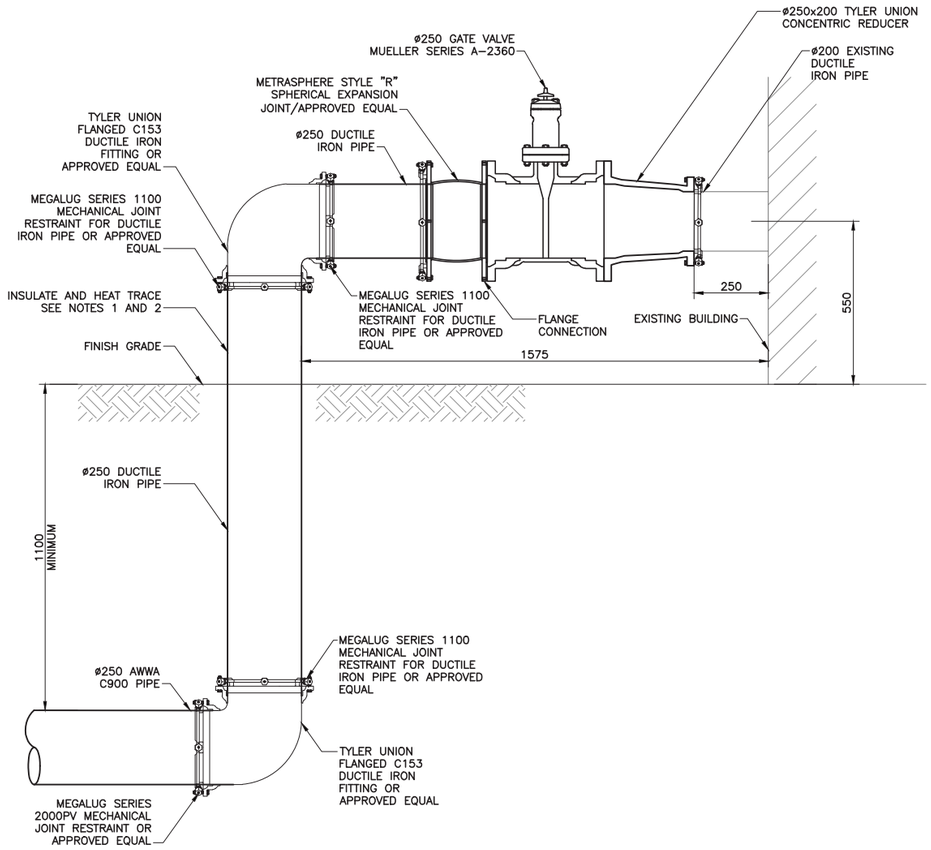


TABLE 1

BUILDING	HEIGHT
POWER HOUSE A	1550
POWER HOUSE B	1200
POWER HOUSE C	1200

POWER HOUSE A, B AND C
BUILDING CONNECTION DETAIL 1
SCALE 1:10



FOAM HOUSE A, B AND C
BUILDING CONNECTION DETAIL 2
SCALE 1:10

NOTES:

1. ALL BUILDING CONNECTION EXPOSED PIPES, FITTINGS AND VALVES TO BE INSULATED UP TO UNDERGROUND ELBOW CONNECTION WITH FOAMED ELASTOMER (ASTM C534) OR EQUIVALENT INSULATION MATERIAL. THE MINIMUM INSULATION THICKNESS SHALL BE 50MM. A 0.6MM ALUMINUM JACKET SHALL BE PROVIDED OVER THE INSULATION.
2. CONTRACTOR TO HEAT TRACE FIRE WATER PIPE. SEE ELECTRICAL SHEETS E-302 AND E-303 FOR DETAILS.
3. THE HORIZONTAL LENGTH OF THE BUILDING CONNECTION PIPE SHOULD BE RESTRICTED AS PER DETAIL UNLESS THE SITE CONDITION REQUIRES AN INCREASE OR DECREASE IN THE LENGTH.

ISSUED FOR CONSTRUCTION

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

0 .50 1.00
1:10
NOTE: A3 SIZE REDUCED TO HALF SCALE

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SYMB	DESCRIPTION	DATE	APR
A	CONCEPT DESIGN	04/08/13	
B	FINAL DESIGN DRAFT	02/12/13	
0	FINAL DESIGN, REVISION 0	19/01/14	

DESIGNED BY: SS
DRAWN BY: HP
CHECKED BY: KF
DATE:
SUBMITTED BY: TETRA TECH
CAD FILE NAME: C-307

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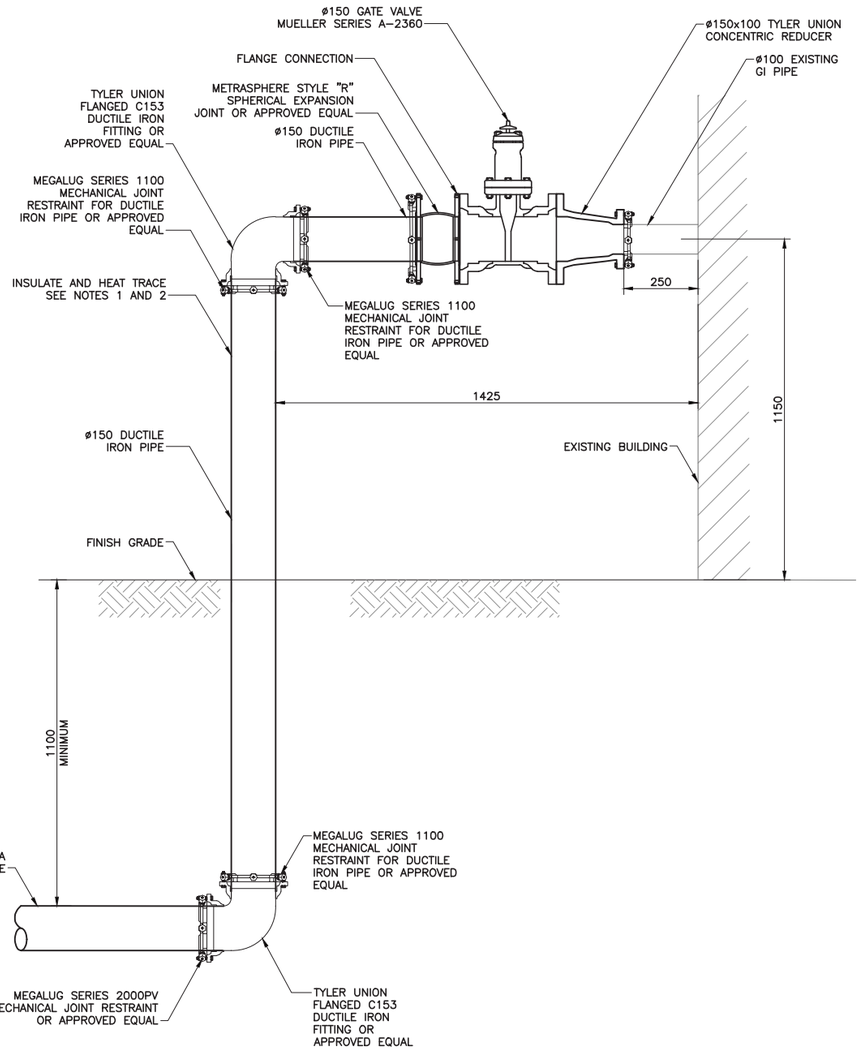
TARAKHIL POWER PLANT
WATER PIPING SYSTEM
KABUL AFGHANISTAN

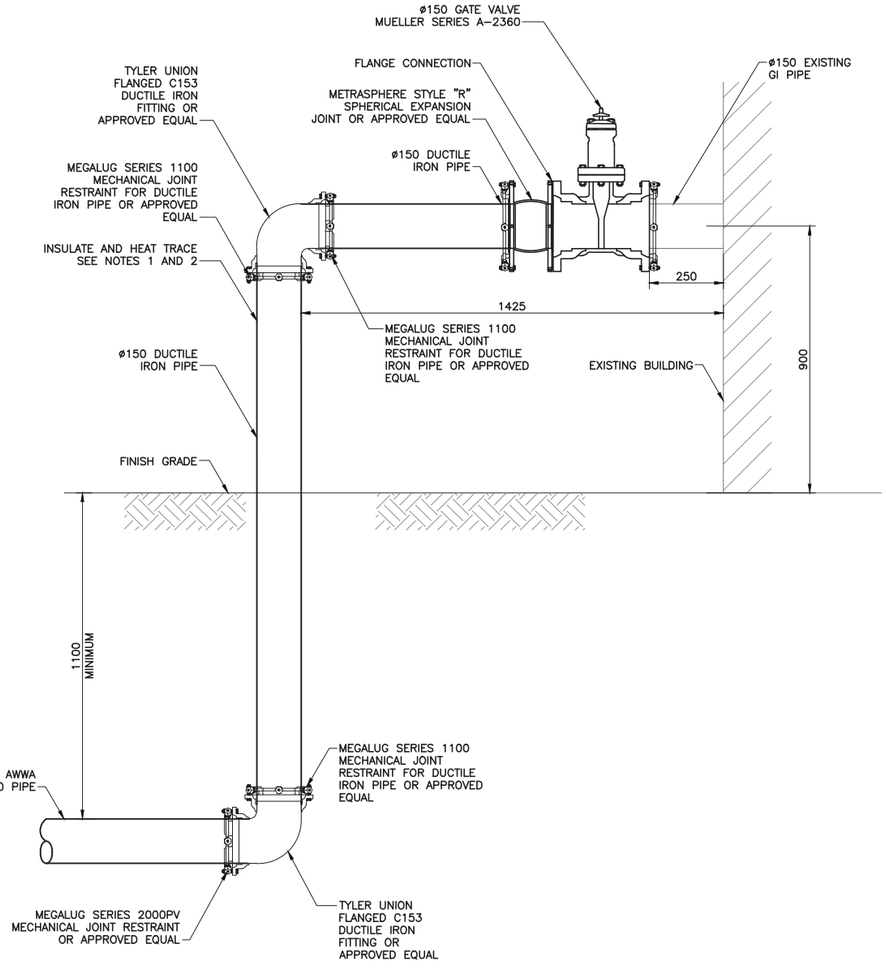
POWER HOUSE AND FOAM HOUSE
BUILDING CONNECTION DETAILS

SHEET REFERENCE NUMBER:
C-307

P:\1298\Work Orders\WO-LT\WO-LT-0070 Tarakhil Power Plant Water Piping System\CAD\SheetFiles\Final Design\Civil\C-307-Power House and Foam House Building Connection Details.dwg Popalzai,



WORKSHOP BUILDING
BUILDING CONNECTION DETAIL (1)
SCALE 1:10



TREATMENT HOUSE 1 & 2
BUILDING CONNECTION DETAIL (2)
SCALE 1:10

NOTES:

1. ALL BUILDING CONNECTION EXPOSED PIPES, FITTINGS AND VALVES TO BE INSULATED UP TO UNDERGROUND ELBOW CONNECTION WITH FOAMED ELASTOMER (ASTM C534) OR EQUIVALENT INSULATION MATERIAL. THE MINIMUM INSULATION THICKNESS SHALL BE 50MM. A 0.6MM ALUMINUM JACKET SHALL BE PROVIDED OVER THE INSULATION.
2. CONTRACTOR TO HEAT TRACE FIRE WATER PIPE. SEE ELECTRICAL SHEETS E-302 AND E-304 FOR DETAILS.
3. THE HORIZONTAL LENGTH OF THE BUILDING CONNECTION PIPE SHOULD BE RESTRICTED AS PER DETAIL UNLESS THE SITE CONDITION REQUIRES AN INCREASE OR DECREASE IN THE LENGTH.

ISSUED FOR CONSTRUCTION

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

0 .50 1.00
1:10
NOTE: A3 SIZE REDUCED TO HALF SCALE

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DATE:
SUBMITTED BY: TETRA TECH
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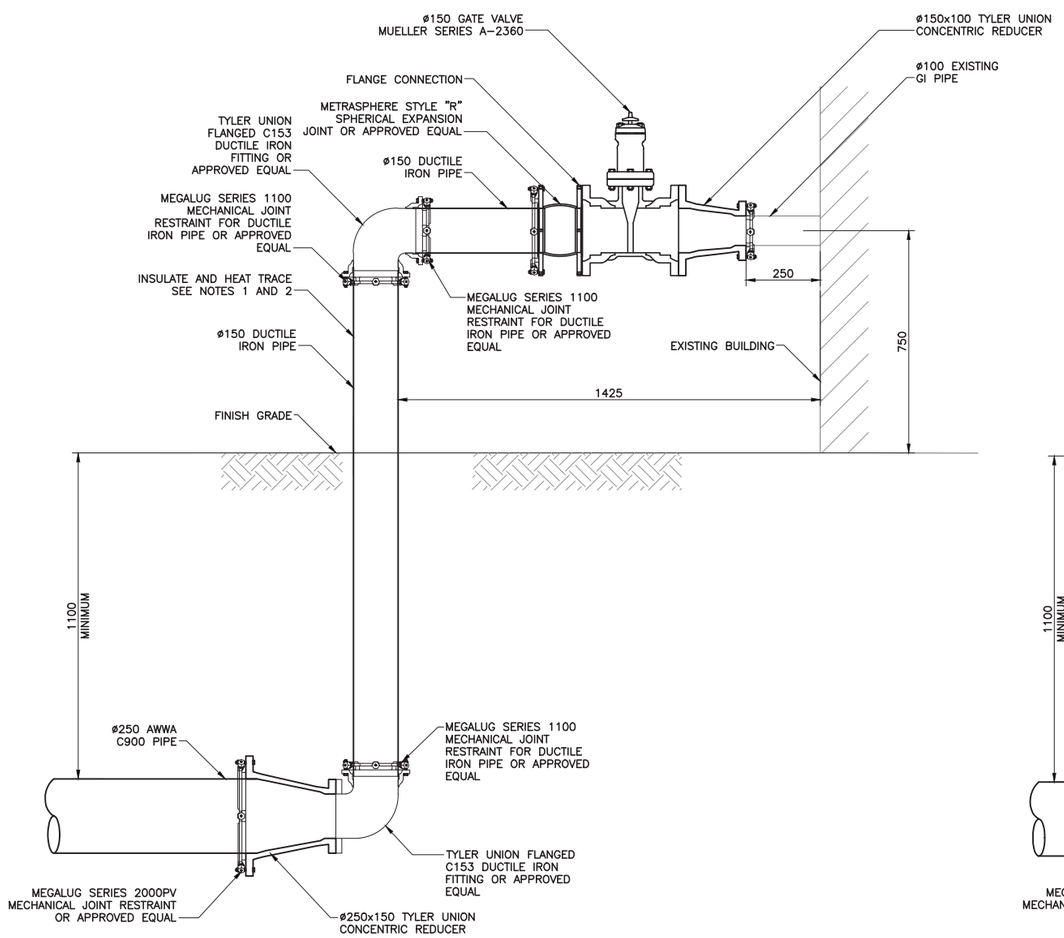
WATER PIPING SYSTEM
KABUL AFGHANISTAN
WORKSHOP AND TREATMENT HOUSE
BUILDING CONNECTION DETAILS

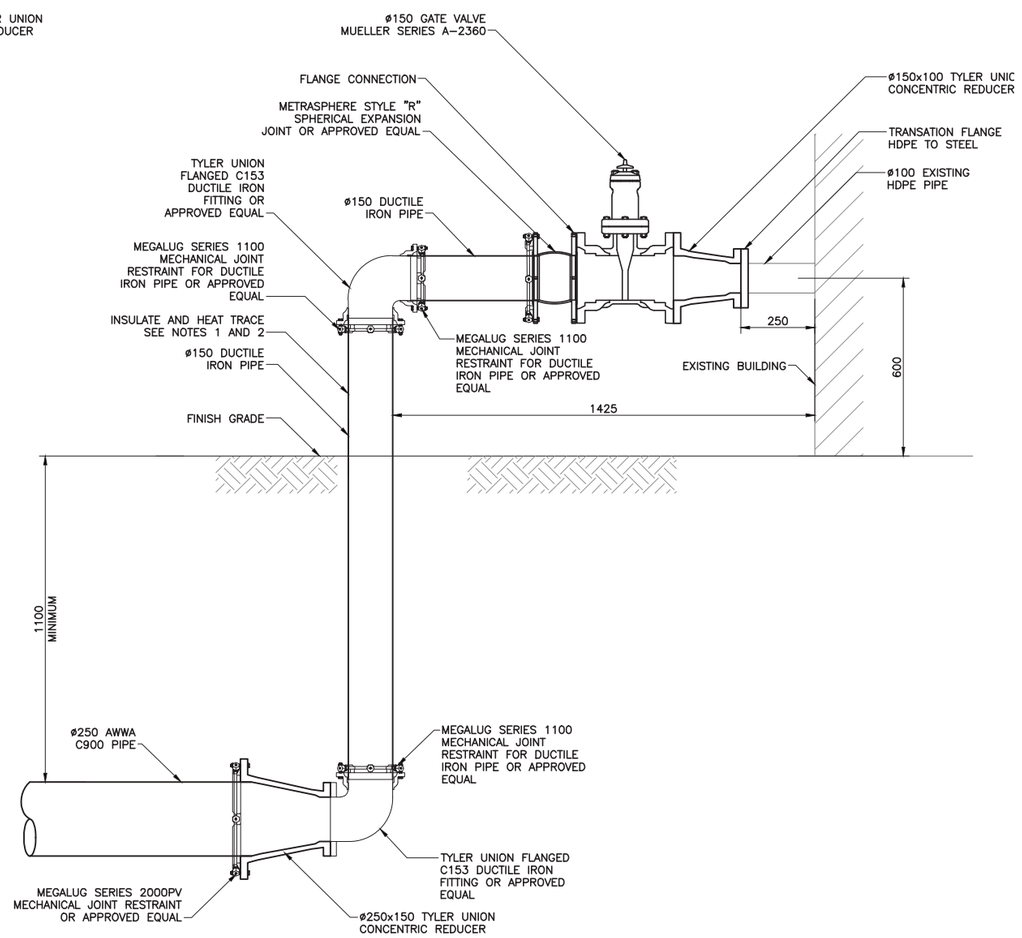
SHEET REFERENCE NUMBER:
C-308

P:\1298\Work Orders\WO-LT\WO-LT-0070 Tarakhil Power Plant Water Piping System\CAD\SheetFiles\Final Design\Civil\C-308-Workshop and Treatment House Building Connection Details.dwg Popalzoi,



ADMINISTRATION BUILDING
BUILDING CONNECTION DETAIL
SCALE 1:10

1



NLCC BUILDING
BUILDING CONNECTION DETAIL
SCALE 1:10

2

NOTES:

1. ALL BUILDING CONNECTION EXPOSED PIPES, FITTINGS AND VALVES TO BE INSULATED UP TO UNDERGROUND ELBOW CONNECTION WITH FOAMED ELASTOMER (ASTM C534) OR EQUIVALENT INSULATION MATERIAL. THE MINIMUM INSULATION THICKNESS SHALL BE 50MM. A 0.6MM ALUMINUM JACKET SHALL BE PROVIDED OVER THE INSULATION.
2. CONTRACTOR TO HEAT TRACE FIRE WATER PIPE. SEE ELECTRICAL SHEET E-301 FOR DETAILS.
3. THE HORIZONTAL LENGTH OF THE BUILDING CONNECTION PIPE SHOULD BE RESTRICTED AS PER DETAIL UNLESS THE SITE CONDITION REQUIRES AN INCREASE OR DECREASE IN THE LENGTH.

ISSUED FOR CONSTRUCTION

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0 .50 1.00
1:10
NOTE: A3 SIZE REDUCED TO HALF SCALE

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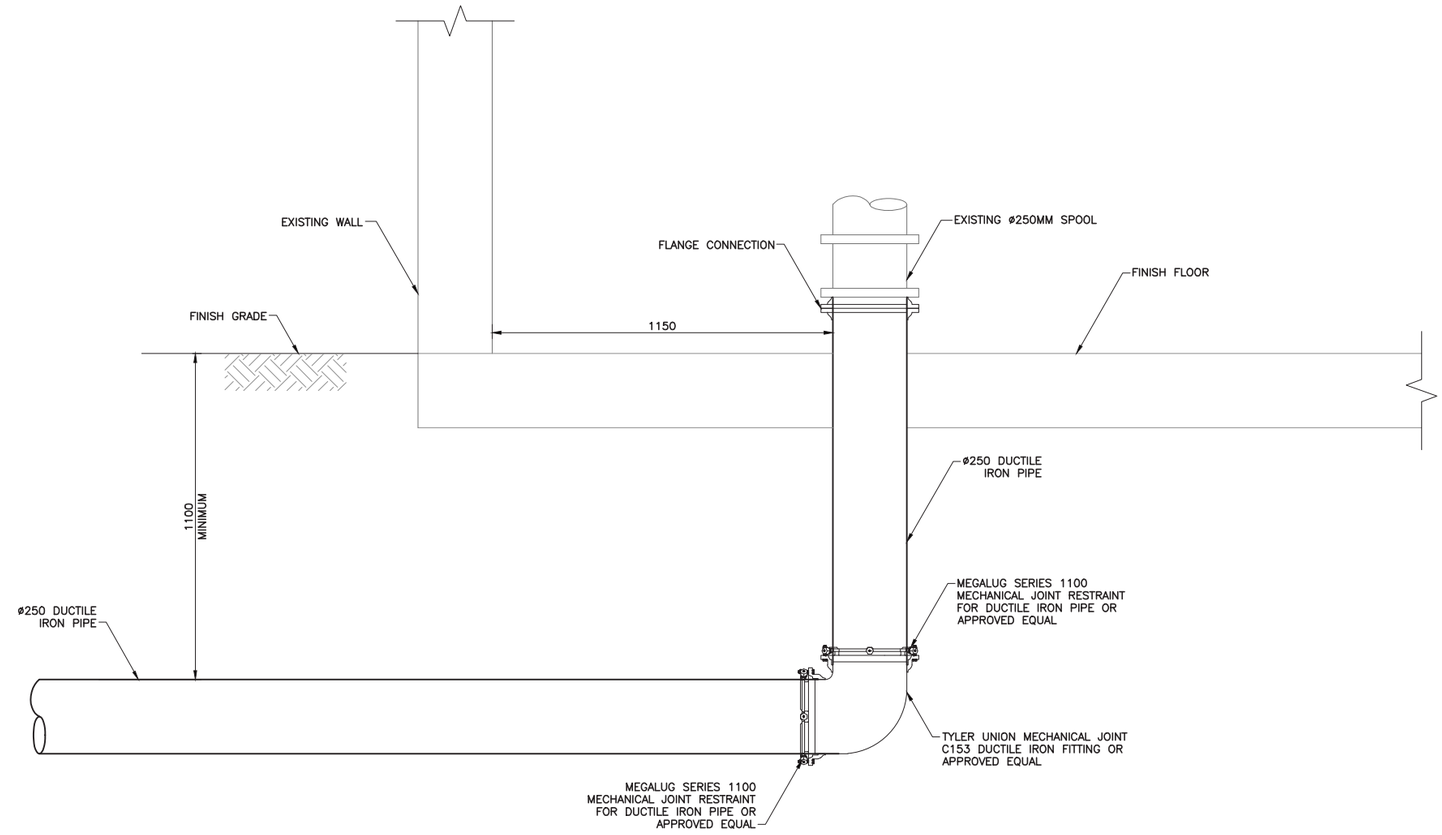
WATER PIPING SYSTEM
KABUL AFGHANISTAN
ADMINISTRATION AND NLCC
BUILDING CONNECTION DETAILS

SHEET REFERENCE NUMBER:
C-309

P:\1298\Work Orders\WO-LT\WO-LT-0070 Tarakhil Power Plant Water Piping System\CAD\SheetFiles\Final Design\Civil\C-309-Administraton and NLCC Building Connection Details.dwg Popalzai,



PERMANENT PUMP HOUSE
BUILDING CONNECTION DETAIL
SCALE 1:10

1

ISSUED FOR CONSTRUCTION

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DIMENSIONS SHOWN ARE IN MILLIMETERS.

0 .50 1.00
1:10
NOTE: A3 SIZE REDUCED TO HALF SCALE

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DESIGN
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DATE:
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CAD FILE NAME: C-311

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WATER PIPING SYSTEM
KABUL AFGHANISTAN
PERMANENT PUMP HOUSE
BUILDING CONNECTION DETAIL

SHEET
REFERENCE
NUMBER:
C-310

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DRAWING INDEX

SHEET REFERENCE NUMBER	DRAWING TITLE	ISSUE STATUS	REVISION	DATE OF REVISION
ELECTRICAL DRAWINGS				
E–100	DRAWING INDEX, GENERAL NOTES, AND LEGEND	FINAL DESIGN SUBMITTAL	0	19/01/2014
E–201	ADMINISTRATION AND NLCC BUILDINGS LAYOUT PLAN	FINAL DESIGN SUBMITTAL	0	19/01/2014
E–202	POWER HOUSE A, B, AND C AND WORKSHOP BUILDINGS LAYOUT PLAN	FINAL DESIGN SUBMITTAL	0	19/01/2014
E–203	TREATMENT HOUSE 1 AND 2 LAYOUT PLAN	FINAL DESIGN SUBMITTAL	0	19/01/2014
E–204	WELL HOUSE AND FOAM HOUSE A LAYOUT PLAN	FINAL DESIGN SUBMITTAL	0	19/01/2014
E–205	FOAM HOUSE B AND C LAYOUT PLAN	FINAL DESIGN SUBMITTAL	0	19/01/2014
E–206	UTILITY TRENCH NEAR POWER HOUSES LAYOUT PLAN	FINAL DESIGN SUBMITTAL	0	19/01/2014
E–207	UTILITY TRENCH NEAR FOAM HOUSE A LAYOUT PLAN	FINAL DESIGN SUBMITTAL	0	19/01/2014
E–301	ADMINISTRATION AND NLCC BUILDING HEAT TRACING DETAILS	FINAL DESIGN SUBMITTAL	0	19/01/2014
E–302	POWER HOUSE A, B AND C AND WORKSHOP HEAT TRACING DETAILS	FINAL DESIGN SUBMITTAL	0	19/01/2014
E–303	WELL HOUSE AND FOAM HOUSE A, B AND C HEAT TRACING DETAILS	FINAL DESIGN SUBMITTAL	0	19/01/2014
E–304	UTILITY TRENCH AND TREATMENT HOUSE 1 & 2 HEAT TRACING DETAILS.	FINAL DESIGN SUBMITTAL	0	19/01/2014
E–401	PANEL BOARD DETAILS	FINAL DESIGN SUBMITTAL	0	19/01/2014
E–402	PANEL BOARD DETAILS	FINAL DESIGN SUBMITTAL	0	19/01/2014
E–403	PUMP CONTROL DETAILS	FINAL DESIGN SUBMITTAL	0	19/01/2014

LEGEND

- J — JUNCTION BOX
- H–J — ELECTRICAL HEAT TRACE BOX
- ELECTRICAL 400Y/230V PANEL BOX
- <ER> — EXISTING TO REMAIN
- EMT CONDUIT
- CABLE TRAY
- HEAT TRACING CABLE
- CABLE TIE
- END SEAL
- GATE VALVE

ABBREVIATION

EMT	ELECTRIC METALLIC TUBING
UL	UNDERWRITERS LABORATORIES
LFMC	LIQUIDTIGHT FLEXIBLE METAL CONDUIT
MA	MILLI AMPERE
DC	DIRECT CURRENT
AFF	ABOVE FINISH FLOOR

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

NOTE: A3 SIZE REDUCED TO HALF SCALE

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SUBMITTED BY: TETRA TECH
CAD FILE NAME: E–100

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WATER PIPING SYSTEM
KABUL AFGHANISTAN
DRAWING INDEX, GENERAL NOTES, AND LEGEND

SHEET REFERENCE NUMBER:
E–100

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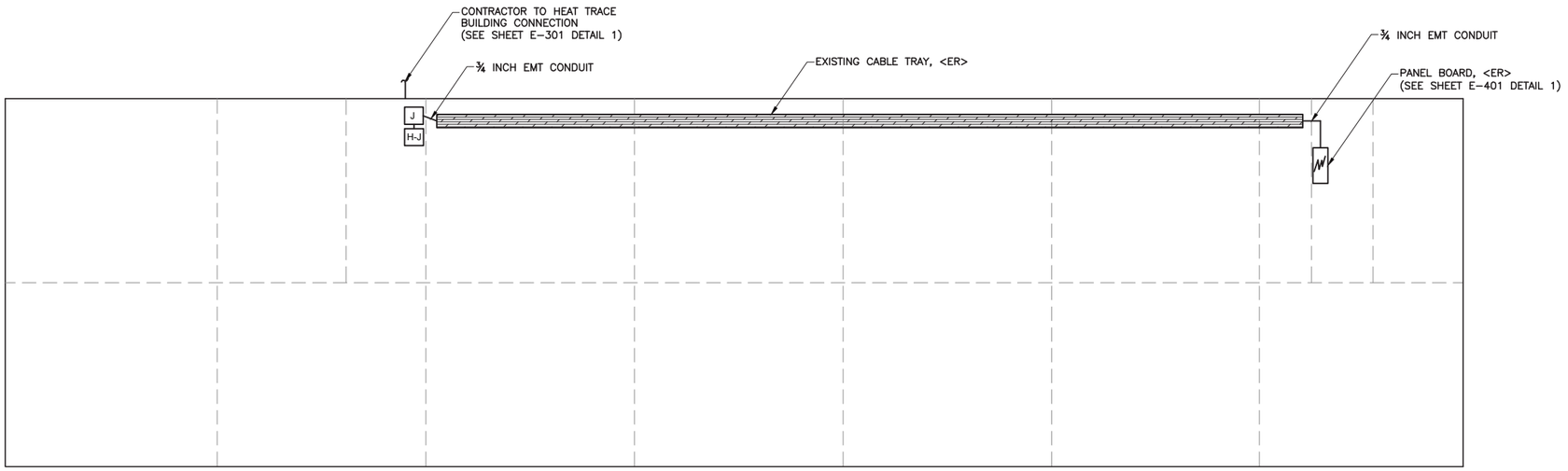
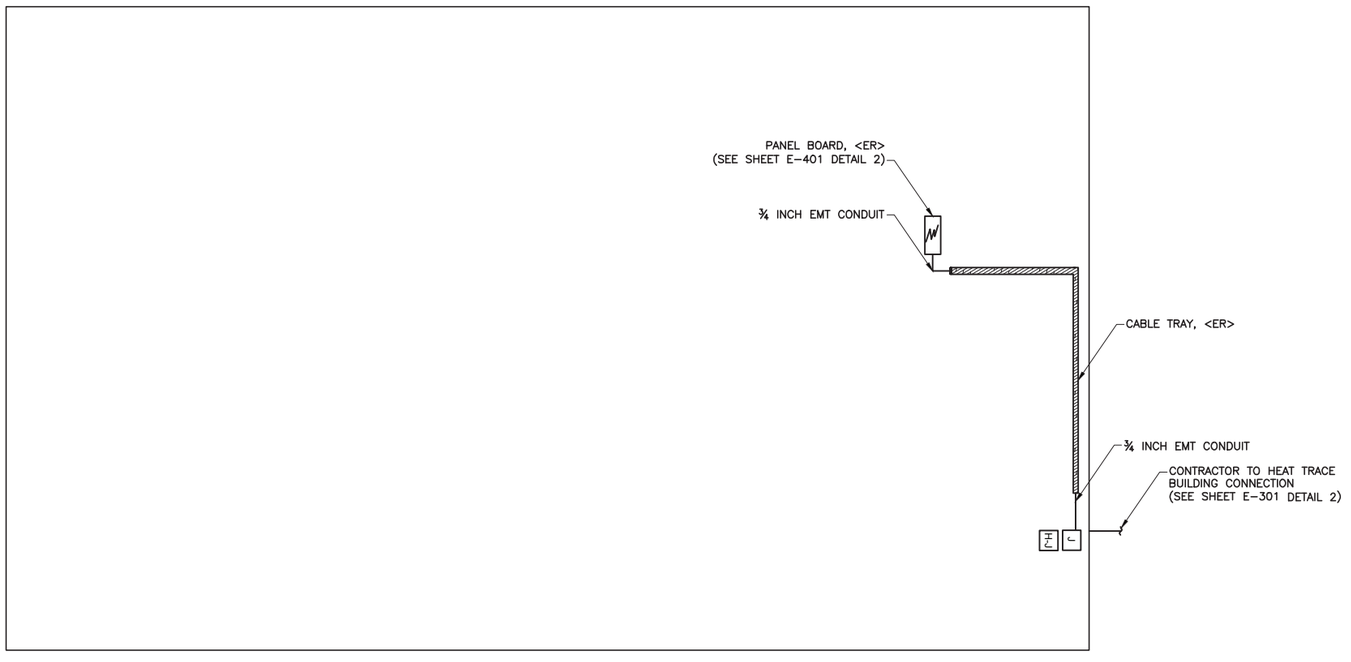


ADMINISTRATION BUILDING LAYOUT PLAN
SCALE: 1:100

NOTES:

1. CONTRACTOR TO REMOVE AND DISPOSE OF EXISTING HEAT TRACE SYSTEM IN ADMINISTRATION BUILDING.
2. CONTRACTOR TO PROVIDE NEW CIRCUIT CONNECTION FROM PANEL BOARD TO HEAT TRACE LOCATIONS IN BOTH ADMINISTRATION AND NLCC BUILDINGS.
3. CONTRACTOR TO PROVIDE AND INSTALL THE FOLLOWING, AS NECESSARY:
   - RAYCHEM 5XTV2-CT HEAT TRACE CABLE, (SEE SPECIFICATION 26 05 19. 00 10)
   - 3/4 INCH UL EMT CONDUIT, (SEE SPECIFICATION 26 05 00. 00 40)
   - 2.5 SQUARE MM, SINGLE CORE CONDUCTOR WITH CABLE TRAY RATED WIRE, (SEE SPECIFICATION 26 05 19. 00 10)
   - 75X50X50 EMT ELECTRICAL JUNCTION BOX, (SEE SPECIFICATION 26 05 00. 00 40)
   - 16A WITH 30MA GFI CIRCUIT BREAKER IN EXISTING PANEL BOARDS. (SEE SPECIFICATION 26 05 71. 00 40)



NATIONAL LOAD CENTRAL CENTER BUILDING LAYOUT PLAN
SCALE: 1:100

1 0 1 2 3 4 5 6 7 8 9
1:100

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DESIGNED BY: MQ
DRAWN BY: MQ
CHECKED BY: KF
DATE:
SUBMITTED BY: TETRA TECH
CAD FILE NAME: E-201

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WATER PIPING SYSTEM
KABUL AFGHANISTAN
ADMINISTRATION AND NLCC BUILDINGS
LAYOUT PLAN

SHEET REFERENCE NUMBER:
E-201

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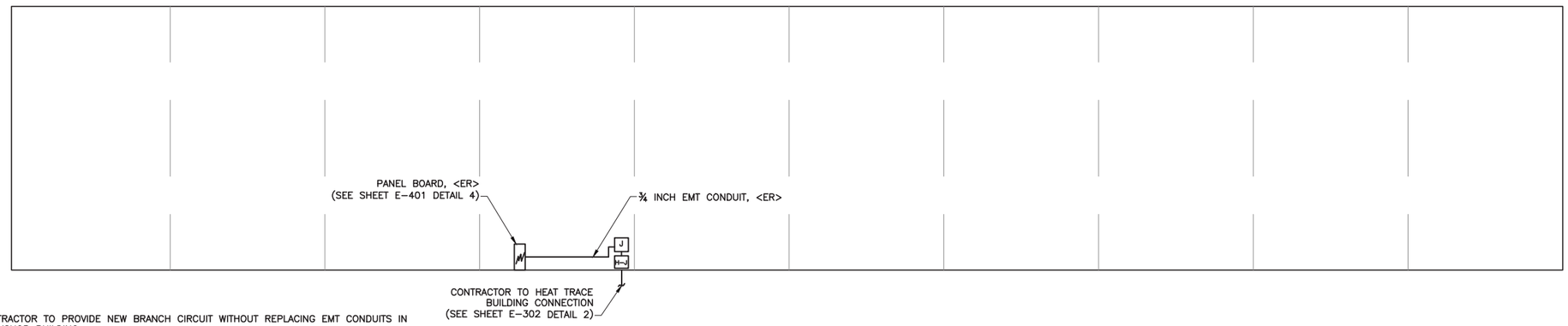
POWER HOUSE A, B, AND C LAYOUT PLAN
SCALE: 1:125



WORKSHOP LAYOUT PLAN
SCALE: 1:125

NOTES:

1. CONTRACTOR TO PROVIDE NEW BRANCH CIRCUIT WITHOUT REPLACING EMT CONDUITS IN WORKSHOP BUILDING.
2. CONTRACTOR TO PROVIDE NEW CIRCUIT CONNECTION FROM PANEL BOARD TO HEAT TRACE LOCATION IN POWER HOUSE BUILDINGS.
3. CONTRACTOR TO PROVIDE AND INSTALL THE FOLLOWING, AS NECESSARY:
   - RAYCHEM 5XTV2-CT HEAT TRACE CABLE, (SEE SPECIFICATION 26 05 19. 00 10)
   - 3/4 INCH UL EMT CONDUIT, (SEE SPECIFICATION 26 05 00. 00 40)
   - 2.5 SQUARE MM, SINGLE CORE CONDUCTOR, (SEE SPECIFICATION 26 05 19. 00 10)
   - 75X50X50 EMT ELECTRICAL JUNCTION BOX, (SEE SPECIFICATION 26 05 00. 00 40)
   - 16A WITH 30MA GFI CIRCUIT BREAKER IN EXISTING PANEL BOARD. (SEE SPECIFICATION 26 05 00. 00 40)

1 0 1 2 3 4 5 10 11.5
1:125

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NOTE: A3 SIZE REDUCED TO HALF SCALE

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DESIGNED BY: MQ	DATE:	SUBMITTED BY: TETRA TECH	CAD FILE NAME: E-202
DRAWN BY: MQ			
CHECKED BY: KF			

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WATER PIPING SYSTEM
KABUL AFGHANISTAN
POWER HOUSE A, B, AND C AND WORKSHOP BUILDING LAYOUT PLAN

SHEET REFERENCE NUMBER:
E-202

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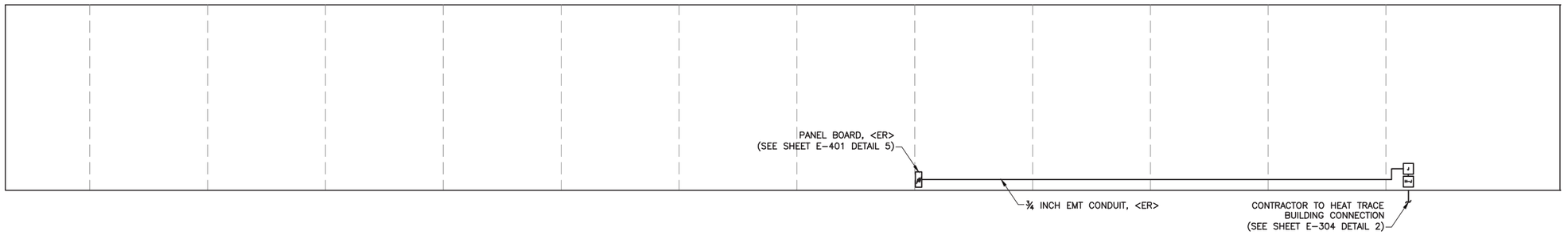
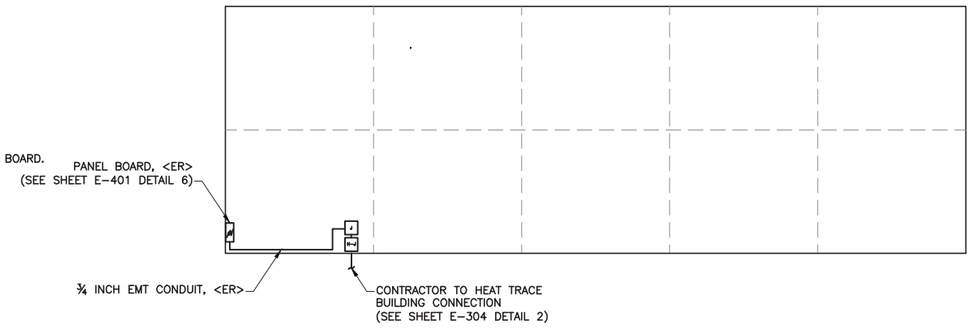


TREATMENT HOUSE 1 LAYOUT PLAN
SCALE: 1:100

NOTES:

1. CONTRACTOR TO PROVIDE NEW BRANCH CIRCUIT WITHOUT REPLACING EMT CONDUITS.
2. CONTRACTOR TO CONNECT HEAT TRACING JUNCTION BOX TO EXISTING CONDUIT.
3. CONTRACTOR TO PROVIDE AND INSTALL THE FOLLOWING, AS NECESSARY:
   - RAYCHEM 5XTV2-CT HEAT TRACE CABLE, (SEE SPECIFICATION 26 05 19. 00 10)
   - 3/4 INCH UL EMT CONDUIT, (SEE SPECIFICATION 26 05 00. 00 40)
   - 2.5 SQUARE MM, SINGLE CORE CONDUCTOR, (SEE SPECIFICATION 26 05 19. 00 10)
   - 75X50X50 EMT ELECTRICAL JUNCTION BOX, (SEE SPECIFICATION 26 05 00. 00 40)
   - 16A WITH 30MA GFI CIRCUIT BREAKER IN EXISTING PANEL BOARD. (SEE SPECIFICATION 26 05 71. 00 40)



TREATMENT HOUSE 2 LAYOUT PLAN
SCALE: 1:100

1 0 1 2 3 4 5 6 7 8 9
1:100

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

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CHECKED BY: KF
DATE:
SUBMITTED BY: TETRA TECH
CAD FILE NAME: E-203

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WATER PIPING SYSTEM
KABUL AFGHANISTAN
TREATMENT HOUSE 1 AND 2
LAYOUT PLAN

SHEET REFERENCE NUMBER:
E-203

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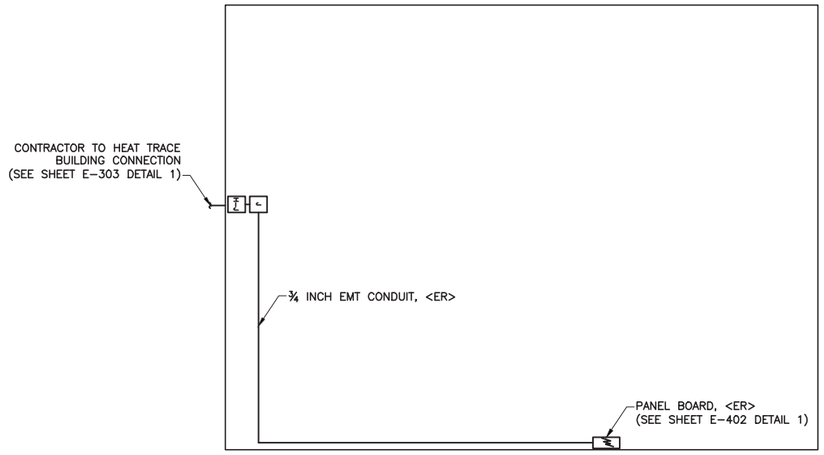
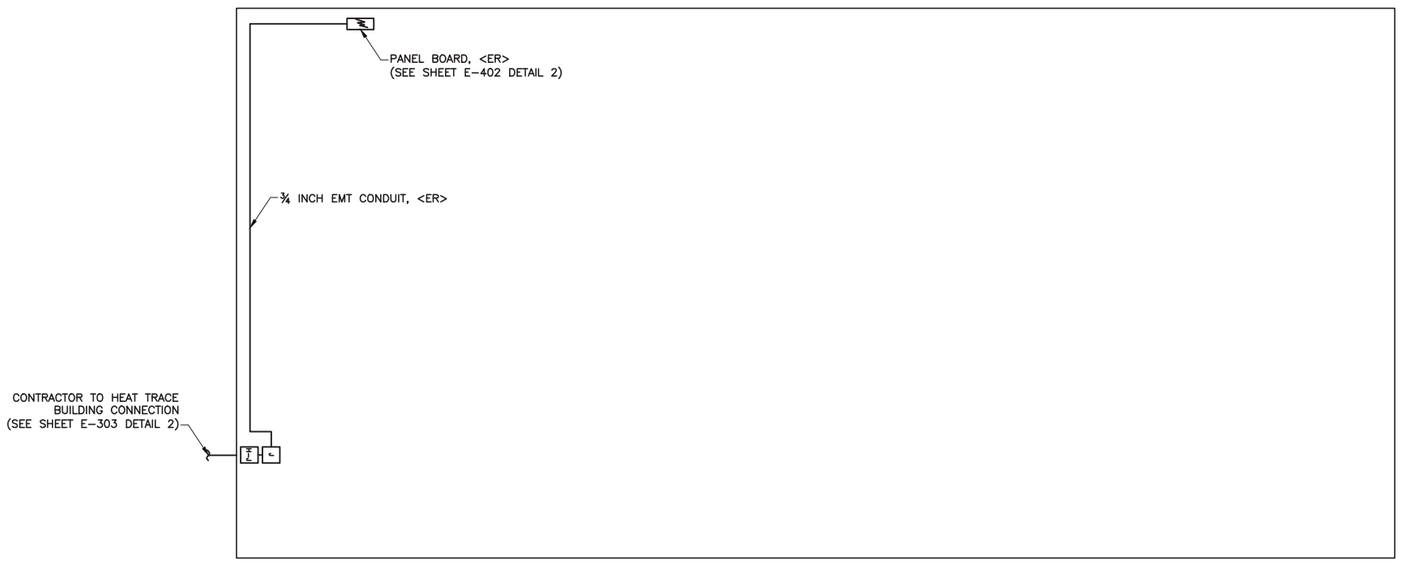
NOTES:

1. CONTRACTOR TO PROVIDE NEW BRANCH CIRCUIT WITHOUT REPLACING EMT CONDUITS IN FOAM HOUSE A BUILDING.
2. CONTRACTOR TO PROVIDE NEW CIRCUIT CONNECTION FROM PANEL BOARD TO HEAT TRACE LOCATION IN WELL HOUSE BUILDING.
3. CONTRACTOR TO PROVIDE AND INSTALL THE FOLLOWING, AS NECESSARY:
   - RAYCHEM 5XTV2-CT HEAT TRACE CABLE, (SEE SPECIFICATION 26 05 19. 00 10)
   - 3/4 INCH UL EMT CONDUIT, (SEE SPECIFICATION 26 05 00. 00 40)
   - 2.5 SQUARE MM, SINGLE CORE CONDUCTOR, (SEE SPECIFICATION 26 05 19. 00 10)
   - 75X50X50 EMT ELECTRICAL JUNCTION BOX, (SEE SPECIFICATION 26 05 00. 00 40)
   - 16A WITH 30MA GFI CIRCUIT BREAKER IN EXISTING PANEL BOARD. (SEE SPECIFICATION 26 05 71. 00 40)



WELL HOUSE LAYOUT PLAN
SCALE: 1:20



FOAM HOUSE A LAYOUT PLAN
SCALE: 1:20

1 .50 0 1
1:20

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CHECKED BY: KF
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SUBMITTED BY: TETRA TECH
CAD FILE NAME: E-204

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WATER PIPING SYSTEM
KABUL AFGHANISTAN
WELL HOUSE AND FOAM HOUSE A LAYOUT PLAN

SHEET REFERENCE NUMBER:
E-204

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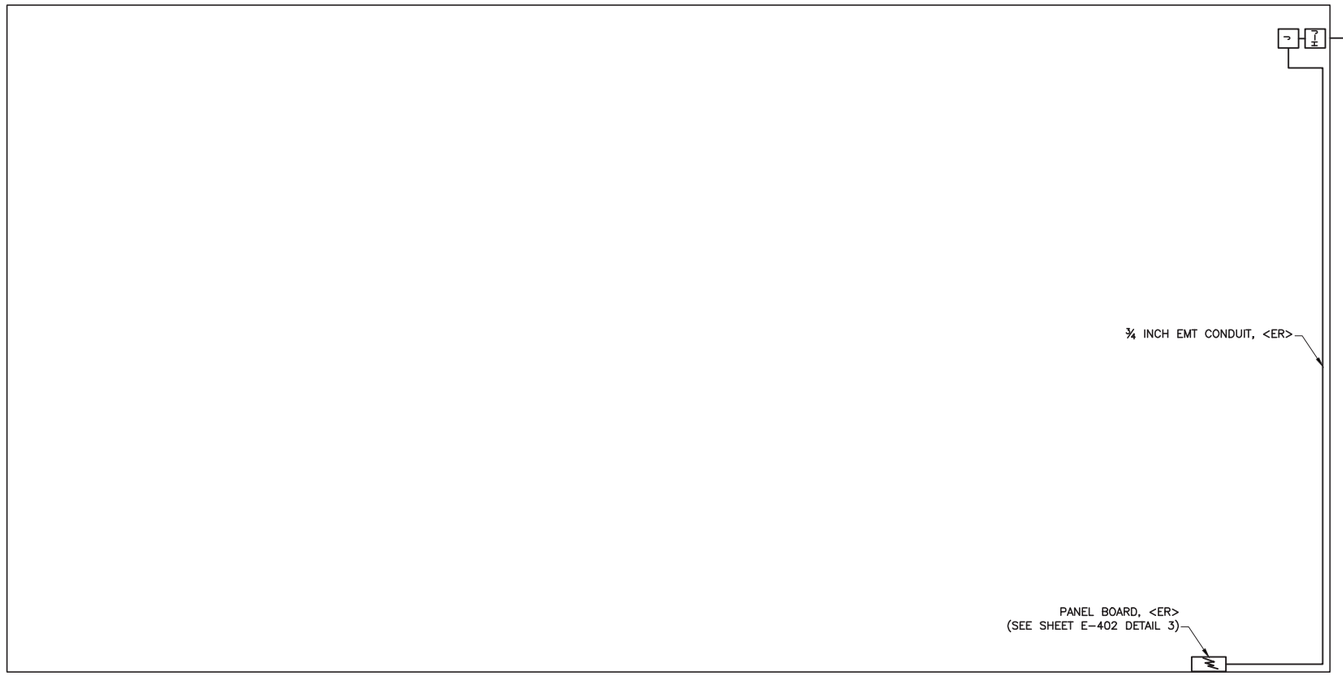

FOAM HOUSE B LAYOUT PLAN
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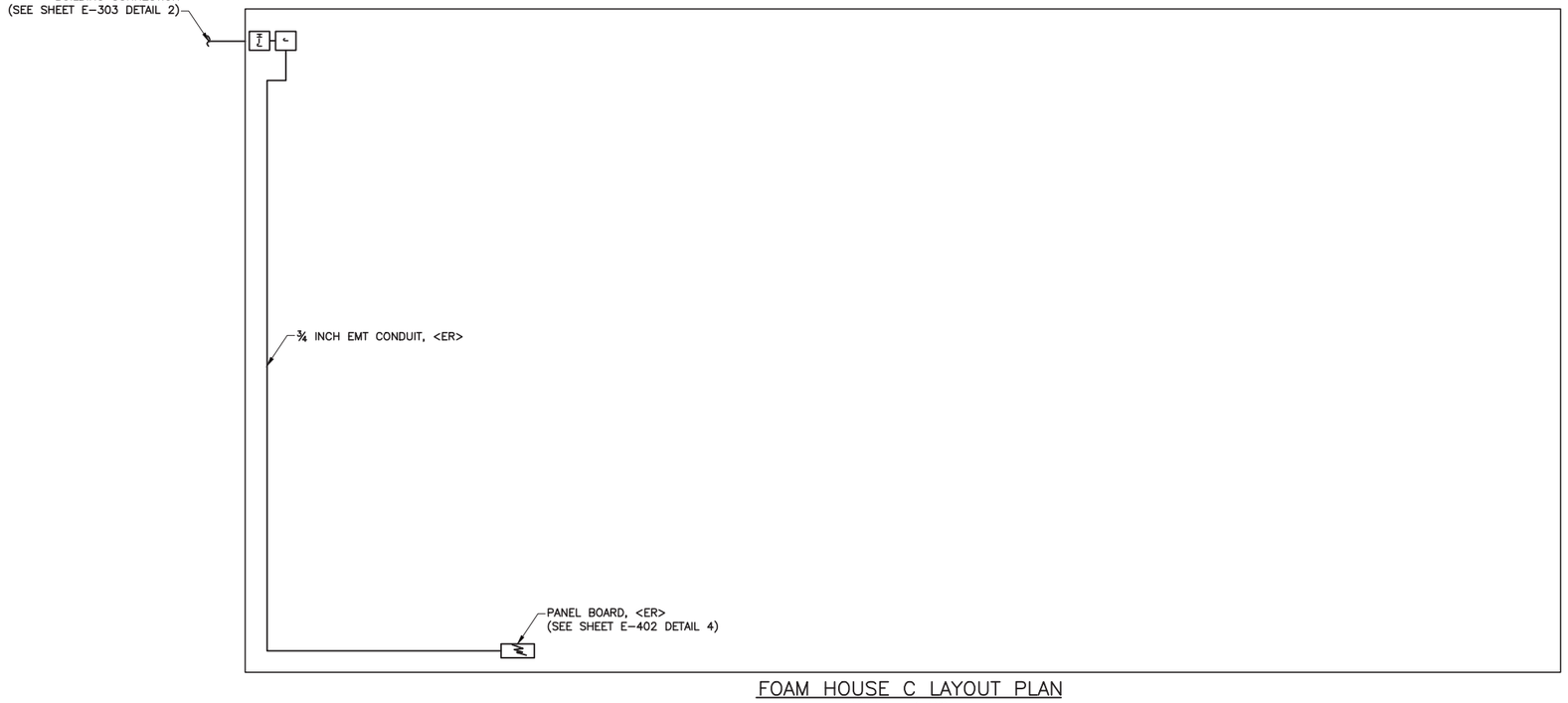

FOAM HOUSE C LAYOUT PLAN
SCALE: 1:20

NOTES:

1. CONTRACTOR TO PROVIDE NEW BRANCH CIRCUIT WITHOUT REPLACING EMT CONDUITS.
2. CONTRACTOR TO PROVIDE AND INSTALL THE FOLLOWING, AS NECESSARY:

- RAYCHEM 10XTV2-CT HEAT TRACE CABLE, (SEE SPECIFICATION 26 05 19. 00 10)
- 3/4 INCH UL EMT CONDUIT, (SEE SPECIFICATION 26 05 00. 00 40)
- 2.5 SQUARE MM, SINGLE CORE CONDUCTOR, (SEE SPECIFICATION 26 05 19. 00 10)
- 75X50X50 EMT ELECTRICAL JUNCTION BOX, (SEE SPECIFICATION 26 05 00. 00 40)
- 16A WITH 30MA GFI CIRCUIT BREAKER IN EXISTING PANEL BOARD. (SEE SPECIFICATION 26 05 71. 00 40)

1 .50 0 1
1:20

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

NOTE: A3 SIZE REDUCED TO HALF SCALE

THIS PROJECT WAS MADE POSSIBLE BY THE UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT AND THE GENEROUS SUPPORT OF THE AMERICAN PEOPLE THROUGH USAID GLOBAL ARCHITECTURE AND ENGINEERING IQC CONTRACTS

FINAL DESIGN SUBMITTAL

SYMB	SUBMITTAL/REVISION DESCRIPTION	DATE	APR
A	CONCEPT DESIGN	04/08/13	
B	FINAL DESIGN DRAFT	02/12/13	
0	FINAL DESIGN, REVISION 0	19/01/14	

DESIGNED BY: MQ
DRAWN BY: MQ
CHECKED BY: KF
DATE:
SUBMITTED BY: TETRA TECH
CAD FILE NAME: E-205

USAID FROM THE AMERICAN PEOPLE

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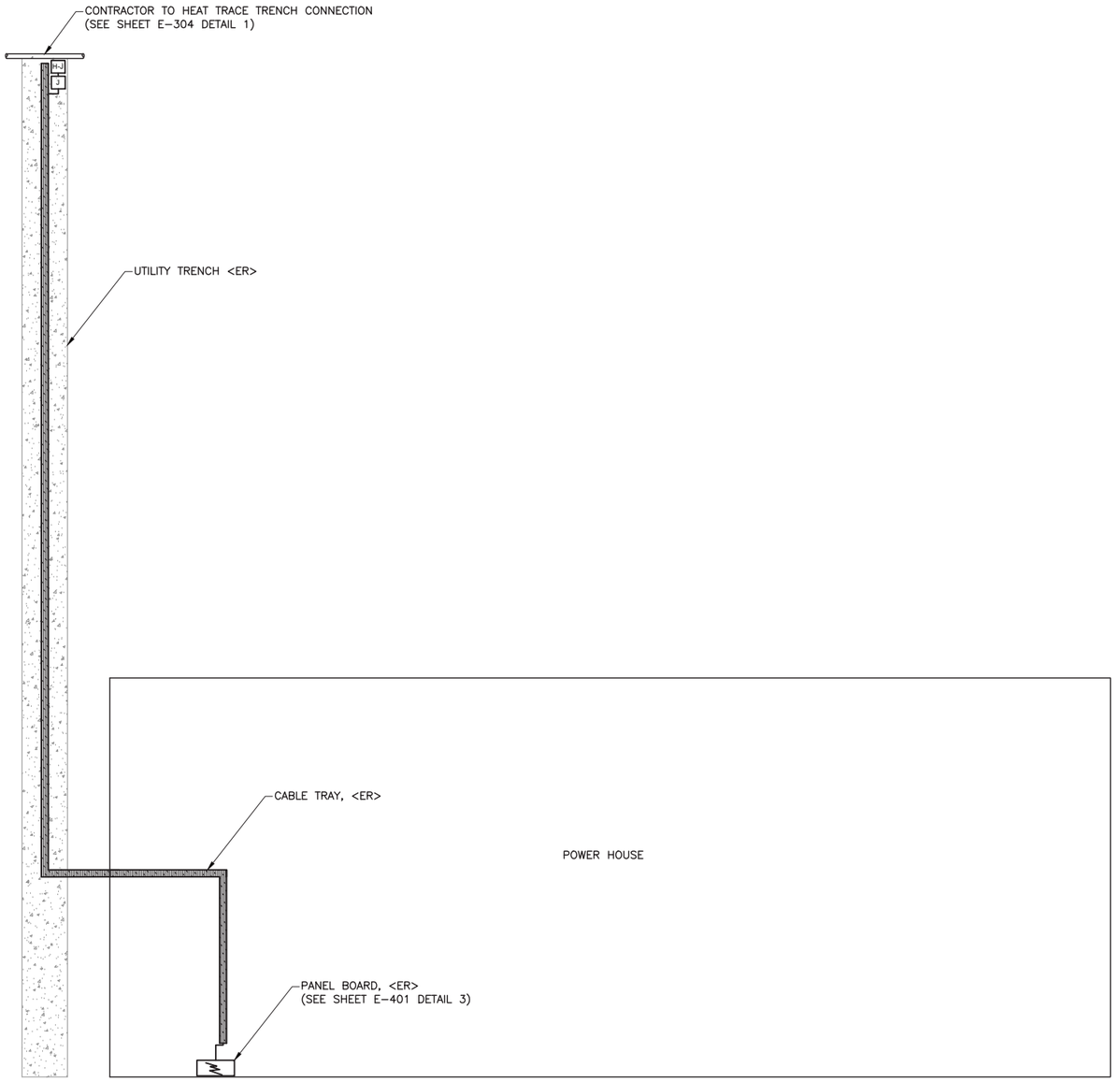
USAID – OEGI
TARAKHIL POWER PLANT
WATER PIPING SYSTEM
KABUL AFGHANISTAN
FOAM HOUSE B AND C
LAYOUT PLAN

SHEET REFERENCE NUMBER:
E-205

P:\1298\Work Orders\WO-LT\WO-LT-0070 Tarakhil Power Plant Water Piping System\CAD\SheetFiles\Final Design\Electrical\E-205-Foam House B and C Building Plan.dwg Popalzai,



NOTES:

1. CONTRACTOR TO USE POWER HOUSE A, B, C BUILDINGS PANEL BOARDS TO FEED UTILITY HEAT TRACE SYSTEM.
2. CONTRACTOR TO PROVIDE AND INSTALL THE FOLLOWING, AS NECESSARY:
   - RAYCHEM 10BTV2-CT HEAT TRACE CABLE. (SEE SPECIFICATION 26 05 19. 00 10)
   - 3/4 INCH UL EMT CONDUIT, (SEE SPECIFICATION 26 05 00. 00 40)
   - 2.5 SQUARE MM, SINGLE CORE CONDUCTOR, CABLE TRAY RATED, (SEE SPECIFICATION 26 05 19. 00 10)
   - 75X50X50 WATERPROOF EMT ELECTRICAL JUNCTION BOX, (SEE SPECIFICATION 26 05 00. 00 40)
   - 16A WITH 30MA GFI CIRCUIT BREAKER IN EXISTING POWER HOUSE A PANEL BOARD. (SEE SPECIFICATION 26 05 71. 00 40)

UTILITY TRENCH NEAR POWER HOUSES LAYOUT PLAN

SCALE: 1:200

5 0 5 10 15
1:200

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

NOTE: A3 SIZE REDUCED TO HALF SCALE

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FINAL DESIGN SUBMITTAL

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B	FINAL DESIGN DRAFT	02/12/13	
0	FINAL DESIGN, REVISION 0	19/01/14	

DESIGNED BY: MQ	DATE:	
DRAWN BY: MQ	SUBMITTED BY: TETRA TECH	
CHECKED BY: KF	CAD FILE NAME: E-206	

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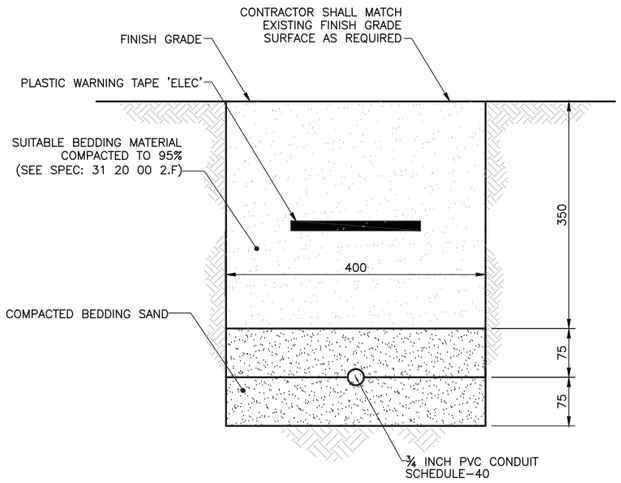
TARAKHIL POWER PLANT
WATER PIPING SYSTEM
KABUL AFGHANISTAN
UTILITY TRENCH NEAR POWER HOUSES LAYOUT PLAN

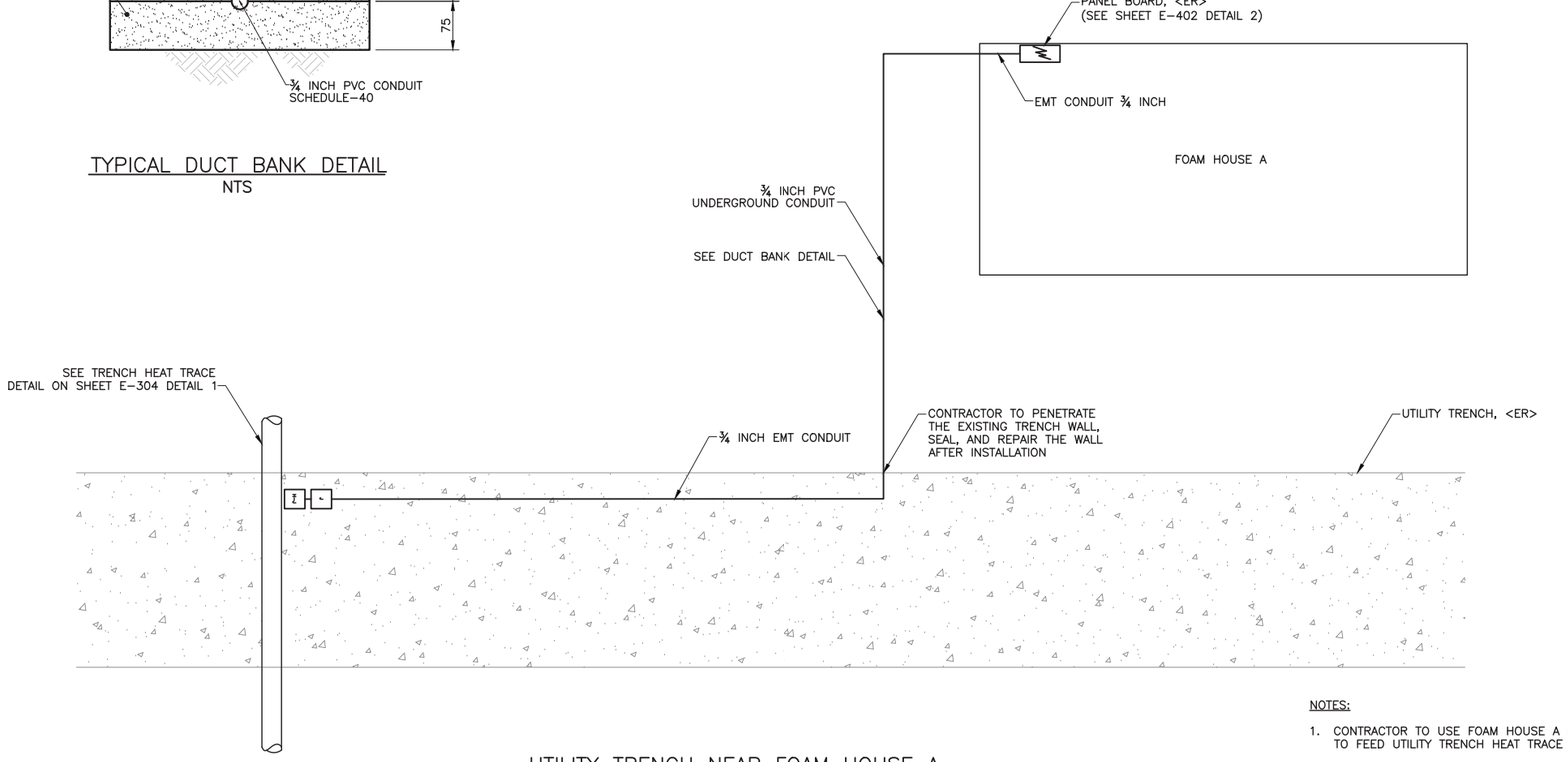
SHEET REFERENCE NUMBER:

E-206

P:\1298\Work Orders\WO-LT\WO-LT-0070 Tarakhil Power Plant Water Piping System\CAD\SheetFiles\Final Design\Electrical\E-206-Power Houses Utility Trench Plan.dwg Popalzai,



TYPICAL DUCT BANK DETAIL
NTS



UTILITY TRENCH NEAR FOAM HOUSE A
LAYOUT PLAN
SCALE: 1:50

NOTES:

1. CONTRACTOR TO USE FOAM HOUSE A BUILDING PANEL BOARD TO FEED UTILITY TRENCH HEAT TRACE SYSTEM.
2. CONTRACTOR TO PROVIDE AND INSTALL THE FOLLOWING, AS NECESSARY:
   - RAYCHEM 10BTV2-CT HEAT TRACE CABLE, (SEE SPECIFICATION 26 05 19. 00 10)
   - 3/4 INCH UL EMT CONDUIT, (SEE SPECIFICATION 26 05 00. 00 40)
   - 2.5 SQUARE MM, SINGLE CORE CONDUCTOR, (SEE SPECIFICATION 26 05 19. 00 10)
   - 75X50X50 WATERPROOF EMT ELECTRICAL JUNCTION BOX, (SEE SPECIFICATION 26 05 00. 00 40)
   - 16A WITH 30MA GFI CIRCUIT BREAKER IN EXISTING FOAM HOUSE A PANEL BOARD. (SEE SPECIFICATION 26 05 71. 00 40)

1 0 1 2 3 4
1:50

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

NOTE: A3 SIZE REDUCED TO HALF SCALE

THIS PROJECT WAS MADE POSSIBLE BY THE UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT AND THE GENEROUS SUPPORT OF THE AMERICAN PEOPLE THROUGH USAID GLOBAL ARCHITECTURE AND ENGINEERING IQC CONTRACTS

FINAL DESIGN SUBMITTAL

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0	FINAL DESIGN, REVISION 0	19/01/14	

DESIGNED BY: MQ	DATE:	
DRAWN BY: MQ	SUBMITTED BY: TETRA TECH	
CHECKED BY: KF	CAD FILE NAME: E-207	

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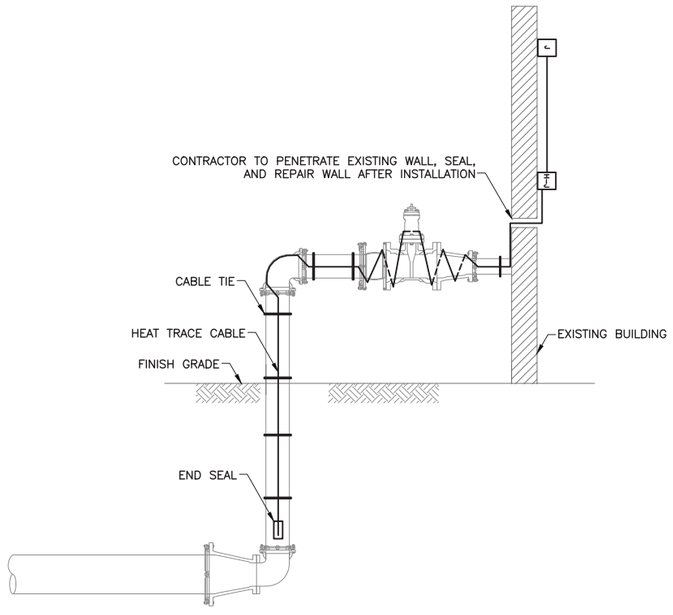
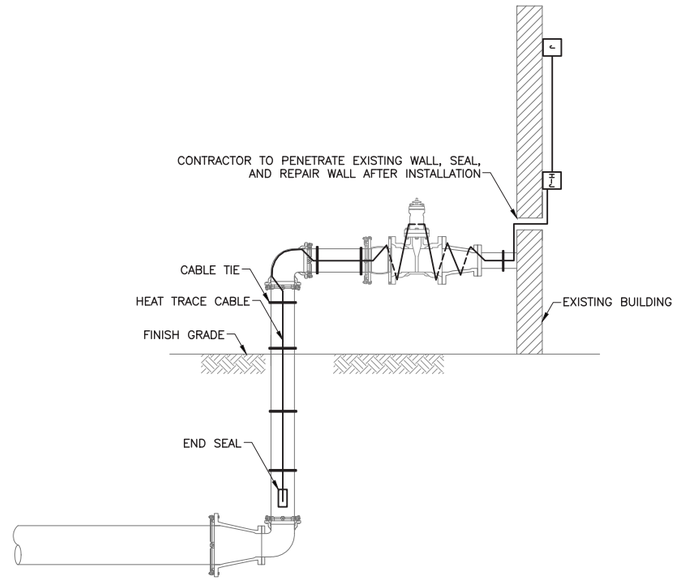
TARAKHIL POWER PLANT
WATER PIPING SYSTEM
KABUL AFGHANISTAN
UTILITY TRENCH NEAR FOAM HOUSE A
LAYOUT PLAN

SHEET REFERENCE NUMBER:
E-207

P:\1298\Work Orders\WO-LT\WO-LT-0070 Tarakhil Power Plant Water Piping System\CAD\SheetFiles\Final Design\Electrical\E-207-Electrical Foam House A Utility Trench Plan.dwg Popalzai,



ADMINISTRATION BUILDING
HEAT TRACE SYSTEM DETAIL 1
SCALE 1:20



NLCC BUILDING
HEAT TRACE SYSTEM DETAIL 2
SCALE 1:20

NOTES:

1. ALL BUILDING CONNECTION EXPOSED PIPES, FITTINGS AND VALVES TO BE HEAT TRACED UP TO UNDERGROUND ELBOW CONNECTION WITH SELF-REGULATING HEATING CABLE SYSTEM. HEAT TRACING CABLE SHALL BE RAYCHEM 5XTV2-CT OR EQUAL. (SEE SPECIFICATION 26 05 19. 00 10)
2. HEAT TRACING SYSTEM SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATION.

1 .50 0 1
1:20

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

NOTE: A3 SIZE REDUCED TO HALF SCALE

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B	FINAL DESIGN DRAFT	02/12/13	
0	FINAL DESIGN, REVISION 0	19/01/14	

DESIGNED BY: MQ	DATE:	SUBMITTED BY: TETRA TECH	
DRAWN BY: MQ		CAD FILE NAME: E-301	
CHECKED BY: KF			

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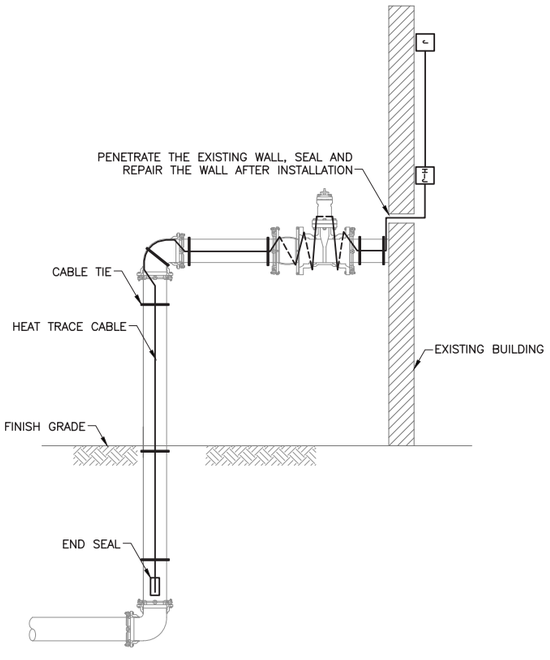
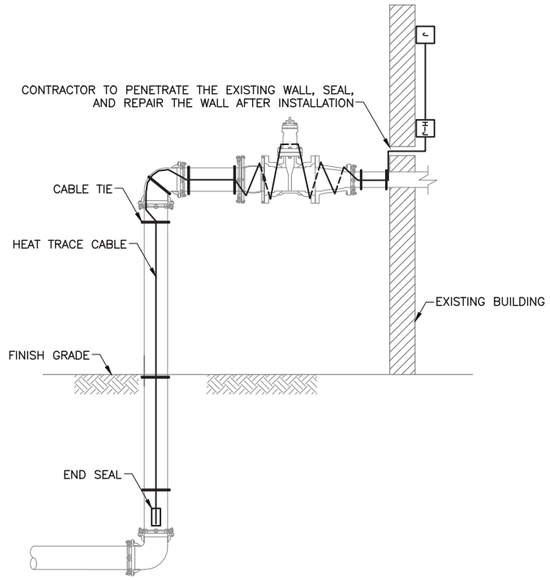
TARAKHIL POWER PLANT
WATER PIPING SYSTEM
KABUL AFGHANISTAN
AMINISTRATION AND NLCC BUILDING
HEAT TRACING DETAILS

SHEET REFERENCE NUMBER:
E-301

P:\1298\Work Orders\WO-LT\WO-LT-0070 Tarakhil Power Plant Water Piping System\CAD\SheetFiles\Final Design\Electrical\E-301-Administration and NLCC Heat Tracing.dwg Popalzai,



POWER HOUSE A, B AND C
BUILDINGS HEAT TRACE SYSTEM DETAIL 1
SCALE 1:20



WORKSHOP BUILDING
HEAT TRACE SYSTEM DETAIL 2
SCALE 1:20

NOTES:

1. ALL BUILDING CONNECTION EXPOSED PIPES, FITTINGS AND VALVES TO BE HEAT TRACED UP TO UNDERGROUND ELBOW CONNECTION WITH SELF-REGULATING HEATING CABLE SYSTEM. HEAT TRACING CABLE SHALL BE RAYCHEM 5XTV2-CT OR EQUAL.
   (SEE SPECIFICATION 26 05 19. 00 10)
2. HEAT TRACING SYSTEM SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATION.

1 .50 0 1
1:20

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

NOTE: A3 SIZE REDUCED TO HALF SCALE

THIS PROJECT WAS MADE POSSIBLE BY THE UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT AND THE GENEROUS SUPPORT OF THE AMERICAN PEOPLE THROUGH USAID GLOBAL ARCHITECTURE AND ENGINEERING IQC CONTRACTS

FINAL DESIGN SUBMITTAL

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B	FINAL DESIGN DRAFT	02/12/13	
0	FINAL DESIGN, REVISION 0	19/01/14	

DESIGNED BY: MQ	DRAWN BY: MQ	CHECKED BY: KF
DATE:	SUBMITTED BY: TETRA TECH	CAD FILE NAME: E-302

USAID FROM THE AMERICAN PEOPLE

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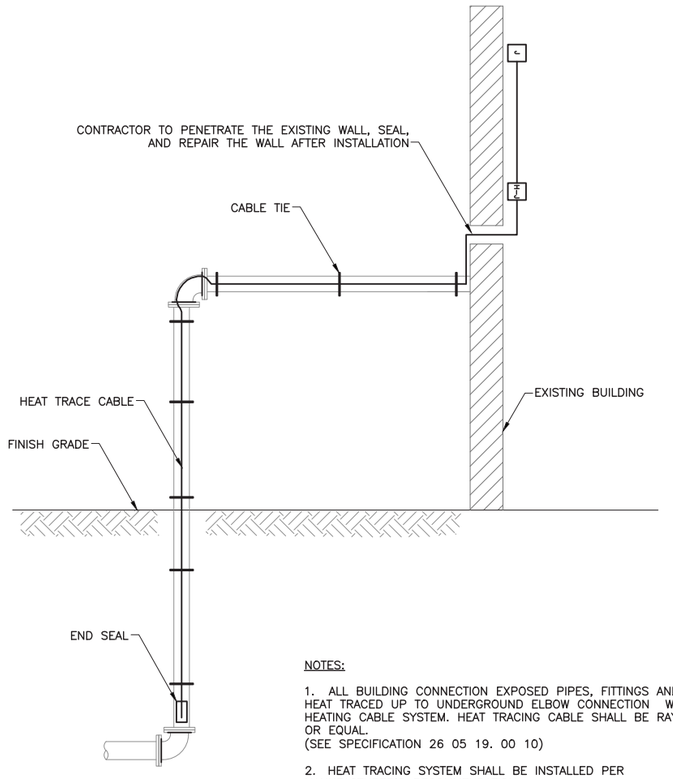
USAID – OEGI
TARAKHIL POWER PLANT
WATER PIPING SYSTEM
KABUL AFGHANISTAN

POWER HOUSES A, B AND C AND WORKSHOP HEAT TRACING DETAILS

SHEET REFERENCE NUMBER:

E-302

P:\1298\Work Orders\WO-LT\WO-LT-0070 Tarakhil Power Plant Water Piping System\CAD\SheetFiles\Final Design\Electrical\E-302-Power Houses and Workshop Heat Tracing.dwg Popalzoi,



NOTES:

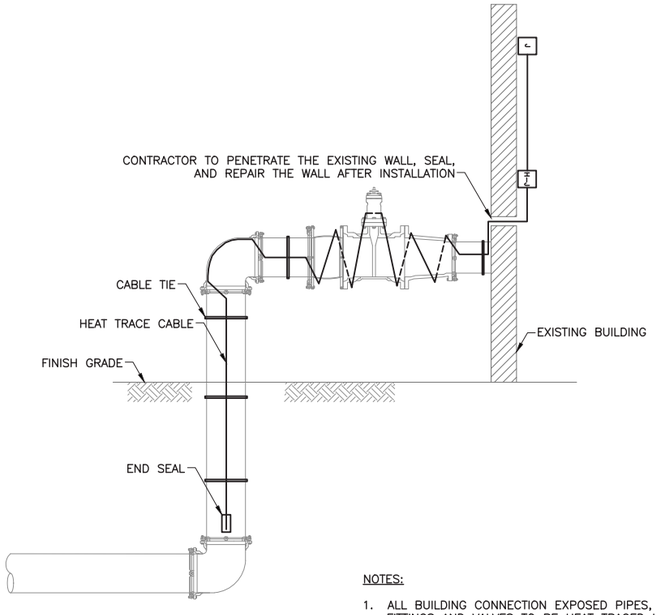
1. ALL BUILDING CONNECTION EXPOSED PIPES, FITTINGS AND VALVES TO BE HEAT TRACED UP TO UNDERGROUND ELBOW CONNECTION WITH SELF-REGULATING HEATING CABLE SYSTEM. HEAT TRACING CABLE SHALL BE RAYCHEM 5XTV2-CT OR EQUAL.
(SEE SPECIFICATION 26 05 19. 00 10)

2. HEAT TRACING SYSTEM SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATION.

3. EXISTING GROUND SHOULD BE RETURNED TO ORIGINAL CONDITIONS.

WELL HOUSE BUILDING
HEAT TRACE SYSTEM DETAIL (1)
SCALE: 1:10

0 .50 1.00
1:10



NOTES:

1. ALL BUILDING CONNECTION EXPOSED PIPES, FITTINGS AND VALVES TO BE HEAT TRACED UP TO UNDERGROUND ELBOW CONNECTION WITH SELF-REGULATING HEATING CABLE SYSTEM. HEAT TRACING CABLE SHALL BE RAYCHEM 10XTV2-CT OR EQUAL.
(SEE SPECIFICATION 26 05 19. 00 10)

2. HEAT TRACING SYSTEM SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATION.

FOAM HOUSE A, B AND C
BUILDINGS HEAT TRACE SYSTEM DETAIL (2)
SCALE 1:20

1 .50 0 1
1:20

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

NOTE: A3 SIZE REDUCED TO HALF SCALE

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0	FINAL DESIGN, REVISION 0	19/01/14	

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DRAWN BY: MQ
CHECKED BY: KF
DATE:
SUBMITTED BY: TETRA TECH
CAD FILE NAME: E-304

USAID FROM THE AMERICAN PEOPLE

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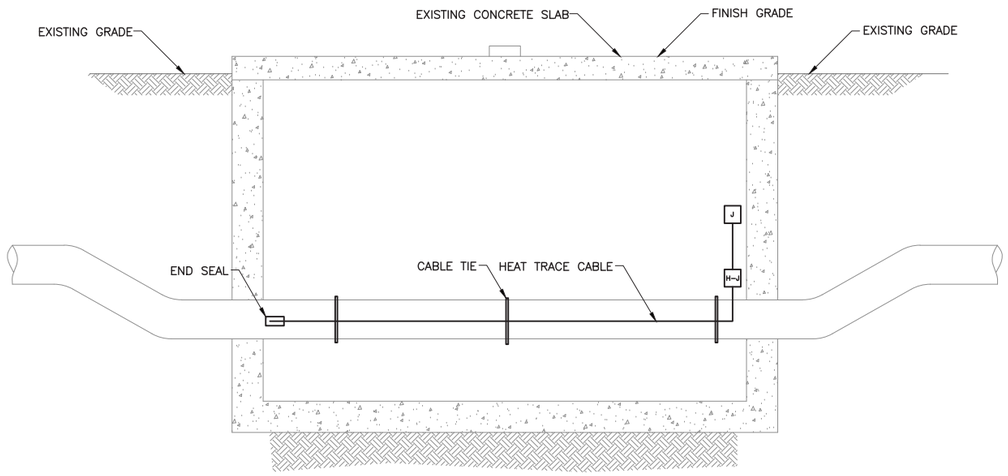
USAID – OEGI
TARAKHIL POWER PLANT
WATER PIPING SYSTEM
KABUL AFGHANISTAN
WELL AND FOAM HOUSE A, B AND C HEAT TRACING DETAILS

SHEET REFERENCE NUMBER:
E-303

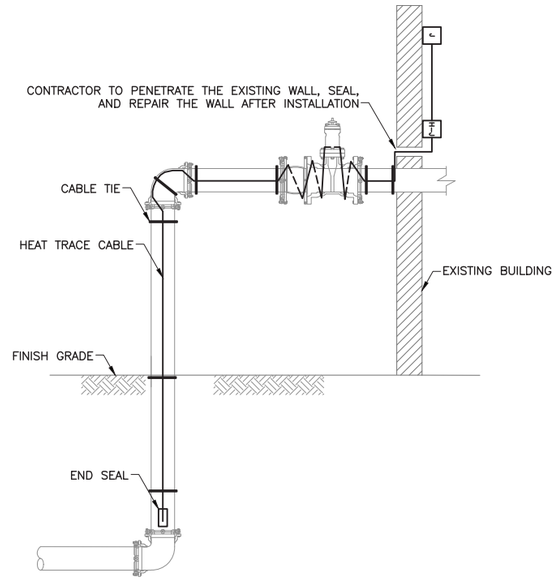
P:\1298\Work Orders\WO-LT\WO-LT-0070 Tarakhil Power Plant Water Piping System\CAD\SheetFiles\Final Design\Electrical\E-303-Well and Foam Houses Heat Tracing.dwg Popalzai,



NOTES:

1. INSIDE OF UTILITY TRENCHES'S PIPE SHOULD BE HEAT TRACED WITH SELF REGULATING HEATING CABLE SYSTEM. HEAT TRACING CABLE SHALL BE RAYCHEM 10BTV2-CT OR EQUAL. (SEE SPECIFICATIONS SECTION 26 05 19. 00 10)
2. HEAT TRACING SYSTEM SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATION.
3. JUNCTION BOX AND HEAT TRACE POWER CONNECTION BOX SHOULD BE WATERPROOF.

UTILITY TRENCH
HEAT TRACE SYSTEM DETAILS 1
SCALE: 1:20



NOTES:

1. ALL BUILDING CONNECTION EXPOSED PIPES, FITTINGS AND VALVES TO BE HEAT TRACED UP TO UNDERGROUND ELBOW CONNECTION WITH SELF-REGULATING HEATING CABLE SYSTEM. HEAT TRACING CABLE SHALL BE RAYCHEM 5XTV2-CT OR EQUAL. (SEE SPECIFICATIONS SECTION 26 05 19. 00 10)
2. HEAT TRACING SYSTEM SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATION.

TREATMENT HOUSE 1 & 2
BUILDINGS HEAT TRACE SYSTEM DETAIL 2
SCALE 1:20

1 .50 0 1
1:20

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

NOTE: A3 SIZE REDUCED TO HALF SCALE

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0	FINAL DESIGN, REVISION 0	19/01/14	

DESIGNED BY: MQ
DRAWN BY: MQ
CHECKED BY: KF
DATE:
SUBMITTED BY: TETRA TECH
CAD FILE NAME: E-303

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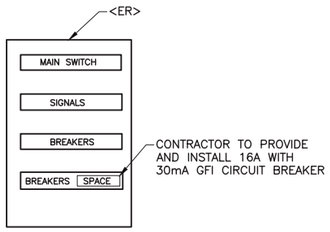
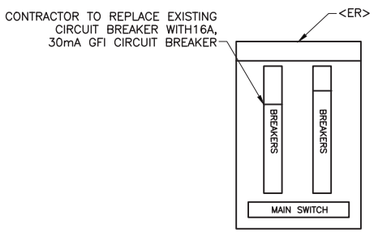
TARAKHIL POWER PLANT
WATER PIPING SYSTEM
KABUL AFGHANISTAN
UTILITY TRENCH AND TREATMENT HOUSE 1 & 2 HEAT TRACING DETAILS

SHEET REFERENCE NUMBER:
E-304

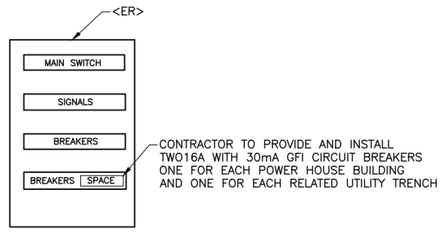
P:\1298\Work Orders\WO-LT\WO-LT-0070 Tarakhil Power Plant Water Piping System\CAD\SheetFiles\Final Design\Electrical\E-304-Treatment Houses and Utility Trench Heat Tracing.dwg Popalzai,



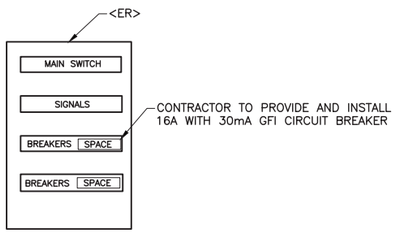
ADMINISTRATION BUILDING PANEL BOARD DETAIL 1
NOT TO SCALE



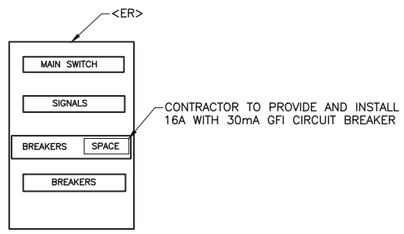
NATIONAL LOAD CENTRAL CENTER BUILDING PANEL BOARD DETAIL 2
NOT TO SCALE



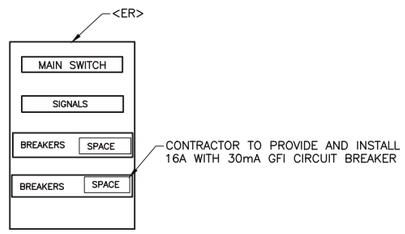
POWER HOUSES (A, B AND C) BUILDINGS PANEL BOARD DETAIL 3
NOT TO SCALE



WORKSHOP BUILDING PANEL BOARD DETAIL 4
NOT TO SCALE



TREATMENT HOUSE 1 BUILDING PANEL BOARD DETAIL 5
NOT TO SCALE



TREATMENT HOUSE 2 BUILDING PANEL BOARD DETAIL 6
NOT TO SCALE

THIS PROJECT WAS MADE POSSIBLE BY THE UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT AND THE GENEROUS SUPPORT OF THE AMERICAN PEOPLE THROUGH USAID GLOBAL ARCHITECTURE AND ENGINEERING IQC CONTRACTS

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0	FINAL DESIGN, REVISION 0	19/01/14	
B	FINAL DESIGN DRAFT	02/12/13	
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CHECKED BY: KF
DATE:
SUBMITTED BY: TETRA TECH
CAD FILE NAME: E-401

USAID FROM THE AMERICAN PEOPLE

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USAID – OEGI
TARAKHIL POWER PLANT
WATER PIPING SYSTEM
KABUL AFGHANISTAN
PANEL BOARD DETAILS

SHEET REFERENCE NUMBER:
E-401

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

NOTE: A3 SIZE REDUCED TO HALF SCALE

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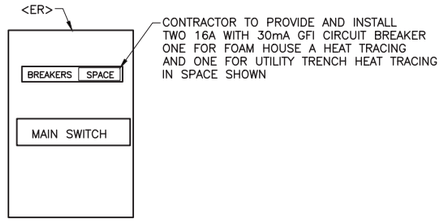
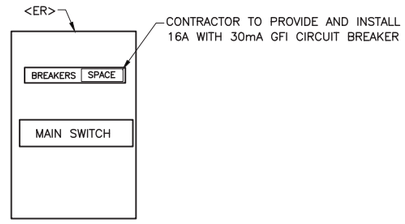
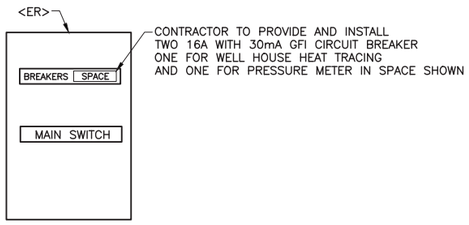


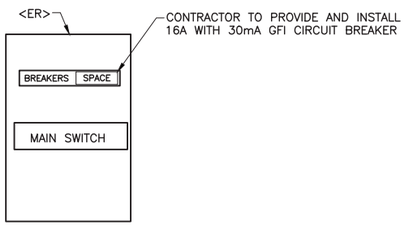
FOAM HOUSE (A)
BUILDING PANEL BOARD DETAIL
NOT TO SCALE
2



FOAM HOUSE (B)
BUILDING PANEL BOARD DETAIL
NOT TO SCALE
3



WELL HOUSE
BUILDING PANEL BOARD DETAIL
NOT TO SCALE
1



FOAM HOUSE (C)
BUILDING PANEL BOARD DETAIL
NOT TO SCALE
4

UNLESS OTHERWISE NOTED, LINEAR
DIMENSIONS SHOWN ARE IN MILLIMETERS.

NOTE: A3 SIZE REDUCED TO HALF SCALE

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FINAL
DESIGN
SUBMITTAL

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0	FINAL DESIGN, REVISION 0	19/01/14	

DESIGNED BY: MQ	DATE:	
DRAWN BY: MQ	SUBMITTED BY: TETRA TECH	
CHECKED BY: KF	CAD FILE NAME: E-402	

USAID
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USAID – OEGI
TARAKHIL POWER PLANT
WATER PIPING SYSTEM
KABUL AFGHANISTAN
PANEL BOARD DETAILS

SHEET
REFERENCE
NUMBER:

E-402

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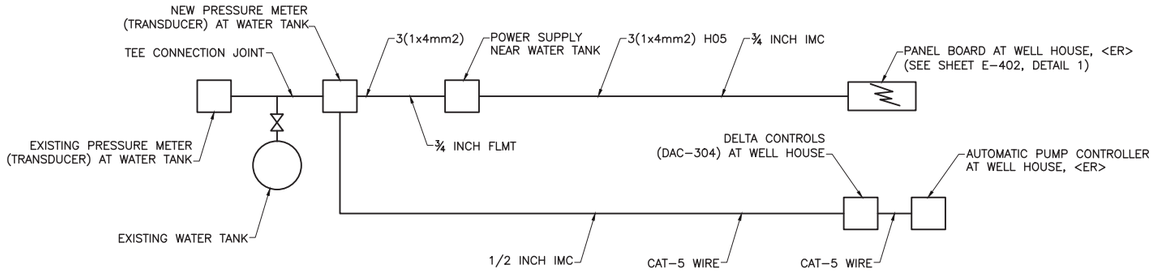
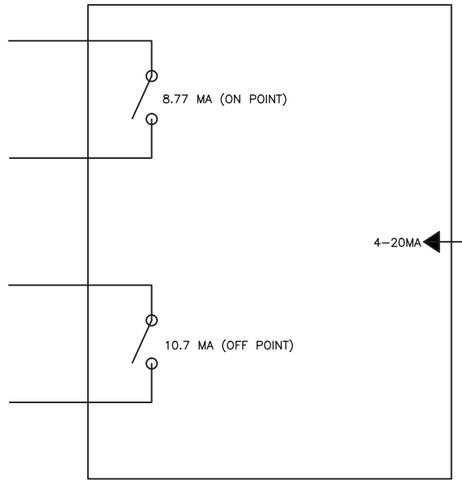
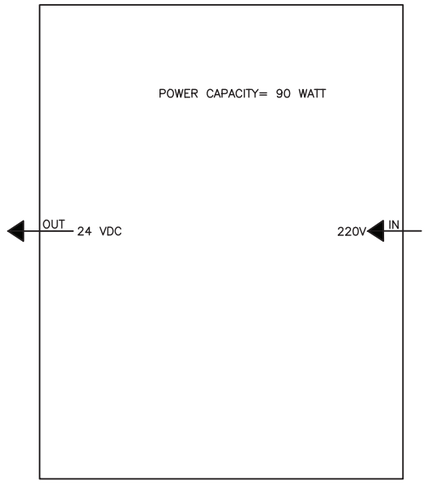


WATER PUMP CONTROL SYSTEM ONE LINE DIAGRAM 1
NOT TO SCALE



DELTA CONTROLS (DAC-304 DETAIL) 2
NOT TO SCALE



POWER SUPPLY DETAIL 3
NOT TO SCALE

NOTES:

1. CONTRACTOR TO PROVIDE AND INSTALL A TEE CONNECTION JOINT AFTER GATE VALVE AT WATER TANK.
   - CONTRACTOR TO PROVIDE AND INSTALL A NEW PRESSURE METER (TRANSDUCER) IN TEE CONNECTION.
   - CONTRACTOR TO REINSTALL THE EXISTING PRESSURE METER (TRANSDUCER) IN TEE CONNECTION.
2. CONTRACTOR TO FEED NEW PRESSURE METER FROM EXISTING PANEL BOARD AT WELL HOUSE BUILDING.
3. CONTRACTOR TO PROVIDE AND INSTALL THE FOLLOWING AS NECESSARY:
   - (3) (1X4MM2) SINGLE CORE CONDUCTOR FROM PANEL BOARD TO PRESSURE METER, (SEE SPECIFICATION 26 05 19. 00 10)
   - 16A WITH 30MA GFI CIRCUIT BREAKER IN WELL HOUSE'S PANEL BOARD, (SEE SPECIFICATION 26 05 71. 00 40)
   - 3/4 INCH UL OR EQUAL IMC CONDUIT, (SEE SPECIFICATION 26 05 00. 00 40)
   - ½ INCH UL OR EQUAL IMC CONDUIT (SEE SPECIFICATION 26 05 00. 00 40)
   - DELTA PROGRAMMABLE DEVICE (DAC-304), PROGRAMMED TO SWITCH ON FOR 8.77 MA AND OFF FOR 10.7 MA. (SEE SPECIFICATION 26 00 00. 00 20)
   - POWER SUPPLY FOR PRESSURE METER WITH CAPACITY OF 90 WATTS, INPUT OF 220 VOLTS, AND OUTPUT OF 24 VOLT DC, (SEE SPECIFICATION 26 00 00. 00 20)
   - A WEATHERPROOF ENCLOSURE FOR POWER SUPPLY ON EASTERN SIDE OF WATER TANK ON STONE WALL.

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

NOTE: A3 SIZE REDUCED TO HALF SCALE

THIS PROJECT WAS MADE POSSIBLE BY THE UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT AND THE GENEROUS SUPPORT OF THE AMERICAN PEOPLE THROUGH USAID GLOBAL ARCHITECTURE AND ENGINEERING IQC CONTRACTS

FINAL DESIGN SUBMITTAL

SYMB	SUBMITTAL/REVISION DESCRIPTION	DATE	APR
0	FINAL DESIGN, REVISION 0	19/01/14	
B	FINAL DESIGN DRAFT	02/12/13	
A	CONCEPT DESIGN	04/08/13	

DESIGNED BY: MQ
DRAWN BY: MQ
CHECKED BY: KF
DATE:
SUBMITTED BY: TETRA TECH
CAD FILE NAME: E-403

USAID FROM THE AMERICAN PEOPLE

AESP

USAID – OEGI
TARAKHIL POWER PLANT
WATER PIPING SYSTEM
KABUL AFGHANISTAN
PUMP CONTROL DETAILS

SHEET REFERENCE NUMBER:
E-403

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