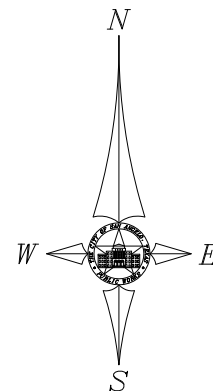


INDEX TO DRAWINGS

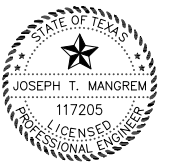
W-792	LAYOUT AND GENERAL NOTES
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PREPARED BY
THE CITY OF SAN ANGELO
DEPARTMENT OF PUBLIC WORKS
ENGINEERING SERVICES DIVISION



CITY OF SAN ANGELO 2015 WATER TREATMENT PLANT IMPROVEMENT PROJECT

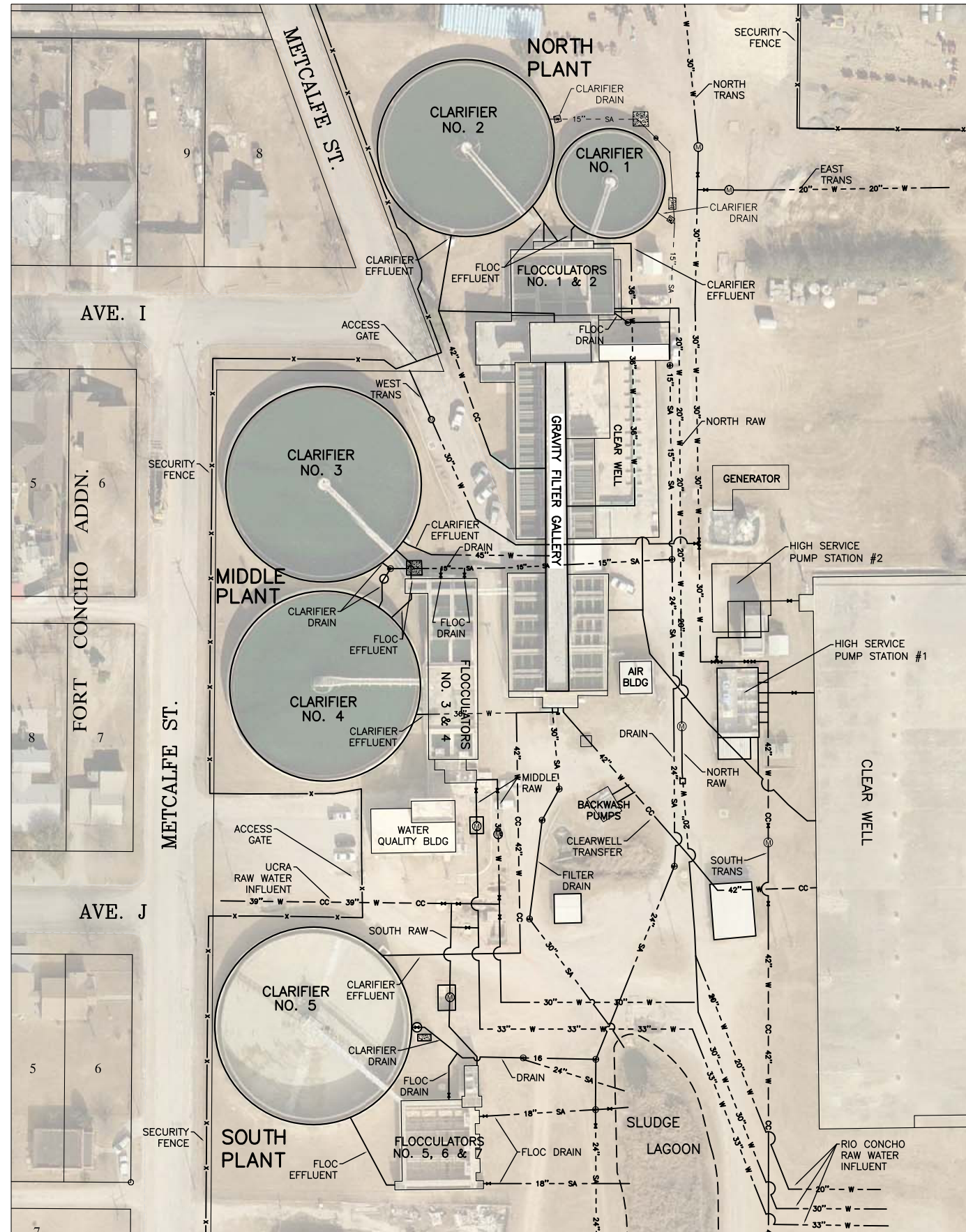
WU-04-15



Joseph T. Mangrem

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 JOSEPH T. MANGREM, P.E. NO.
 117205 ON 04/22/2015

WATER TREATMENT PLANT LAYOUT

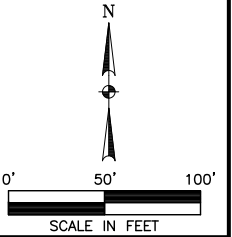


CONSTRUCTION NOTES:

1. Location of existing and proposed utilities shown are merely schematic. The contractor is responsible for location of all utilities prior to commencing construction.
2. Contractor shall verify all dimensions and pipe type, size and class prior to ordering materials.
3. Contractor shall coordinate all activities with the City prior to commencing construction on a daily basis.
4. Construction shall be conducted in such order as to produce minimal disruption to daily plant activities.
5. Electrical improvements shall meet applicable electrical codes.
6. Lines to be abandoned shall be cut a minimum of 2' below grade and the inside filled with a minimum of 2' of concrete.
7. All gaskets, bolts, fittings, etc. removed as part of the Work shall be replaced with new of equal or better quality.
8. Two new and single existing manhole covers shall be replaced with galvanized grating to facilitate viewing of flushed clarifier sludge.
9. Contractor shall be responsible for hauling off and legally disposing of all excavated and demolished materials.

SEQUENCING OF CONSTRUCTION NOTES:

1. Construction activities must be sequenced as to allow City staff to operate the plant in such a way as to provide adequate water to meet maximum expected demands.
2. Sequencing of construction shall be conducted such that at least two plants and 13 filter cells are fully operational at all times. Work can proceed concurrently as approved by the City.
3. Construction activities shall be sequenced as follows, except as approved otherwise in writing:
 - I - Clarifier Improvements
 - i. North Plant
 - a. Clarifier No. 1
 - b. Clarifier No. 2
 - ii. West Plant
 - a. Clarifier No. 3
 - b. Clarifier No. 4
 - iii. South Plant
 - a. Clarifier No. 5
 - II. Gravity Filter Gallery Improvements
 - i. North Filter Gallery
 - a) Filter #1
 - b) Filter #2
 - c) Filter #3
 - d) Filter #4
 - e) Filter #5 (Excluding underdrain caps)
 - f) Filter #13
 - g) Filter #14
 - h) Filter #12
 - ii. South Filter Gallery
 - a) Filter #7
 - b) Filter #8
 - c) Filter #9
 - d) Filter #10
 - e) Filter #11
 - f) Filter #12
 - iii. Filter Effluent Pipe Repair
- III. Alternate Bid Work
 - i. South Filter Gallery Painting
 - ii. North Filter Gallery Painting



JTM	RJP	1"=100'	-	WU-04-15	APRIL 22, 2015
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2015 WATER TREATMENT PLANT
IMPROVEMENT PROJECT

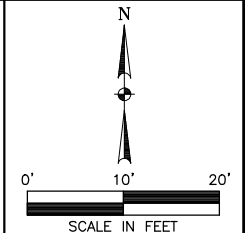
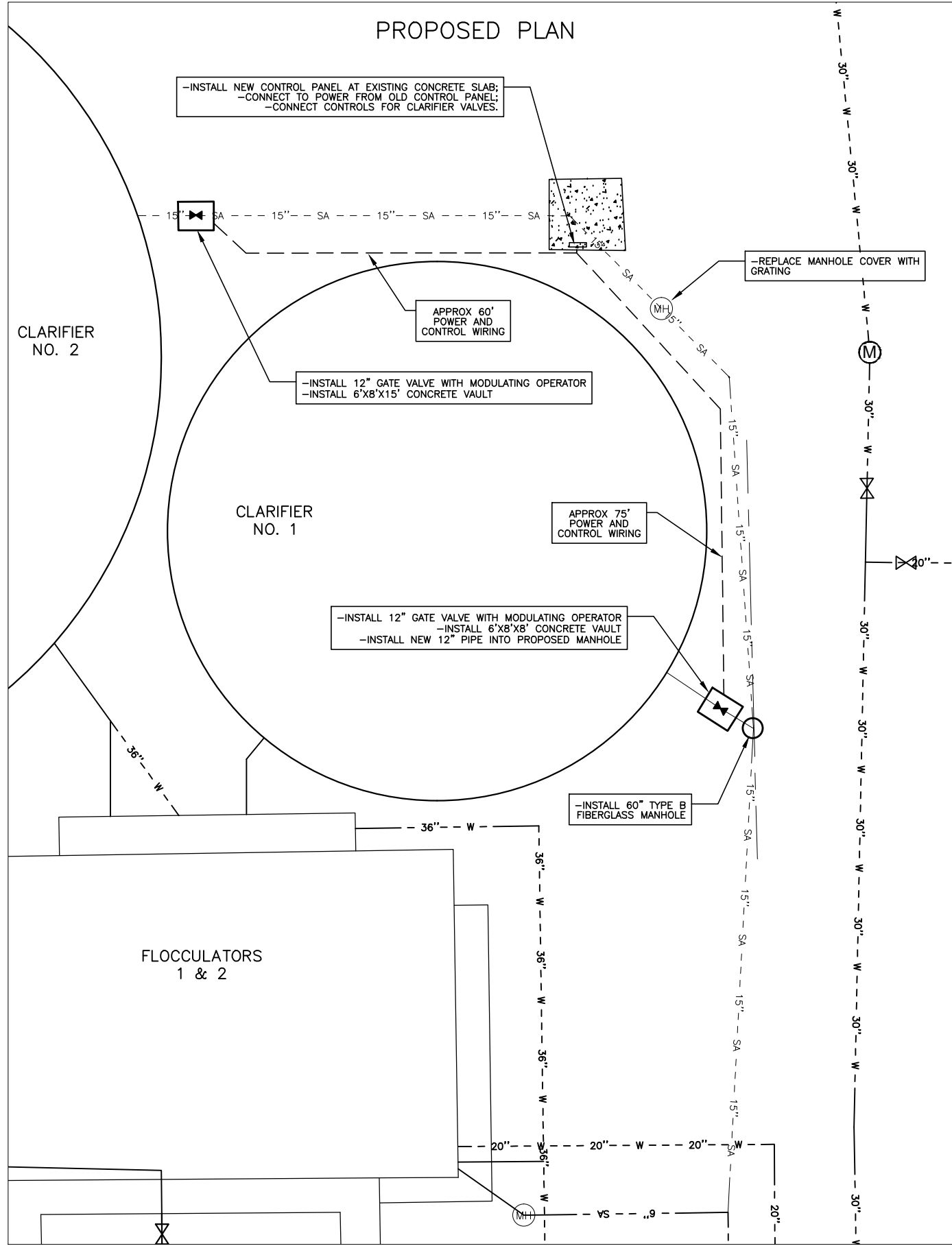
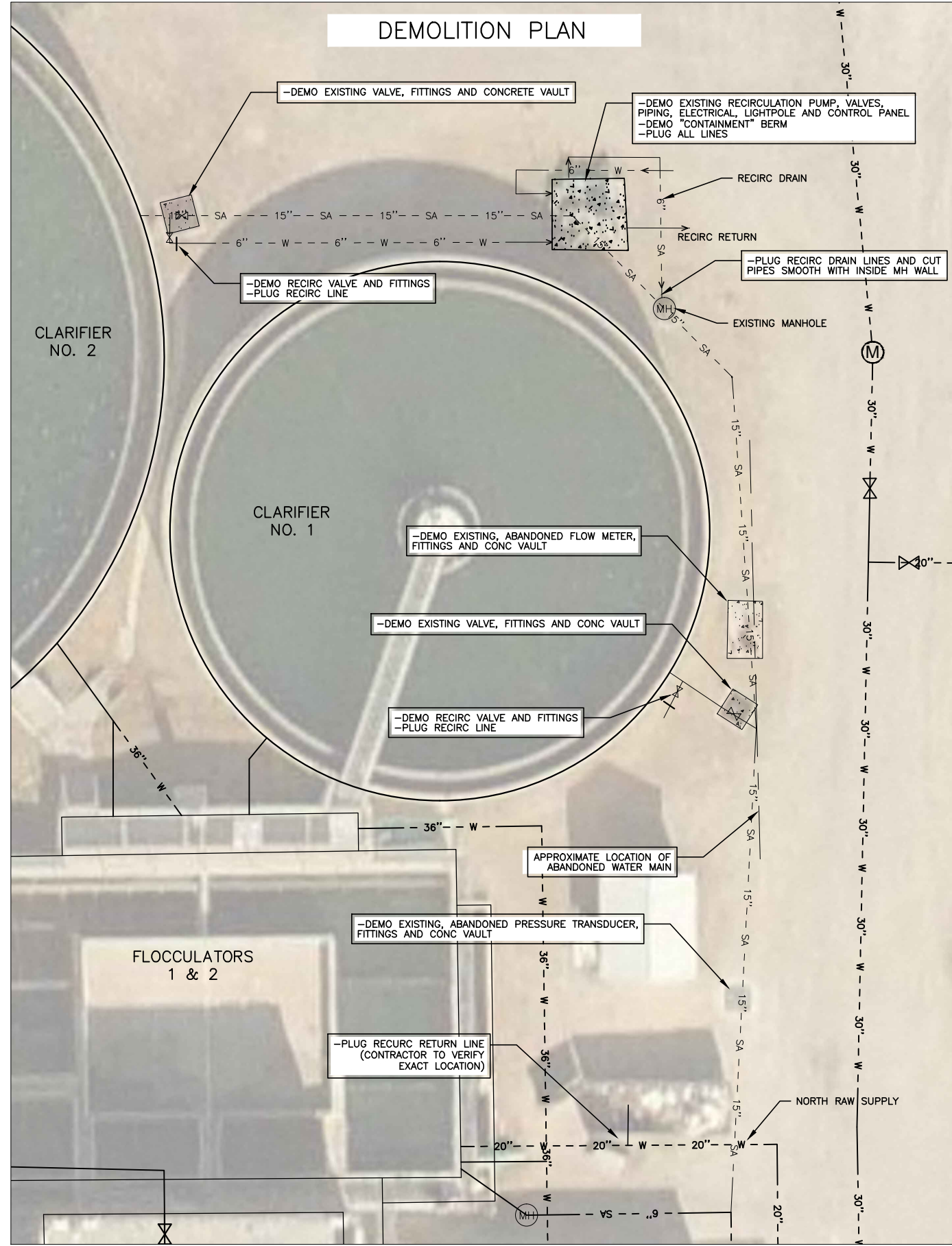
LAYOUT AND GENERAL NOTES



Joseph T. Mangrem
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JOSEPH T. MANGREM, P.E. NO.
117205 ON 04/22/2015

W-792

NORTH PLANT



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CHECKED BY:	RJP
HORIZ. SCALE:	1"=20'
VERT. SCALE:	-
JOB NUMBER:	WU-04-15
DATE:	APRIL 22, 2015

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ENGINEERING
SERVICES DIVISION

THE CITY OF SAN ANGELO, TEXAS

2015 WATER TREATMENT PLANT
IMPROVEMENTS PROJECT

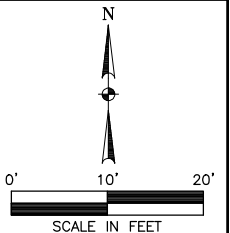
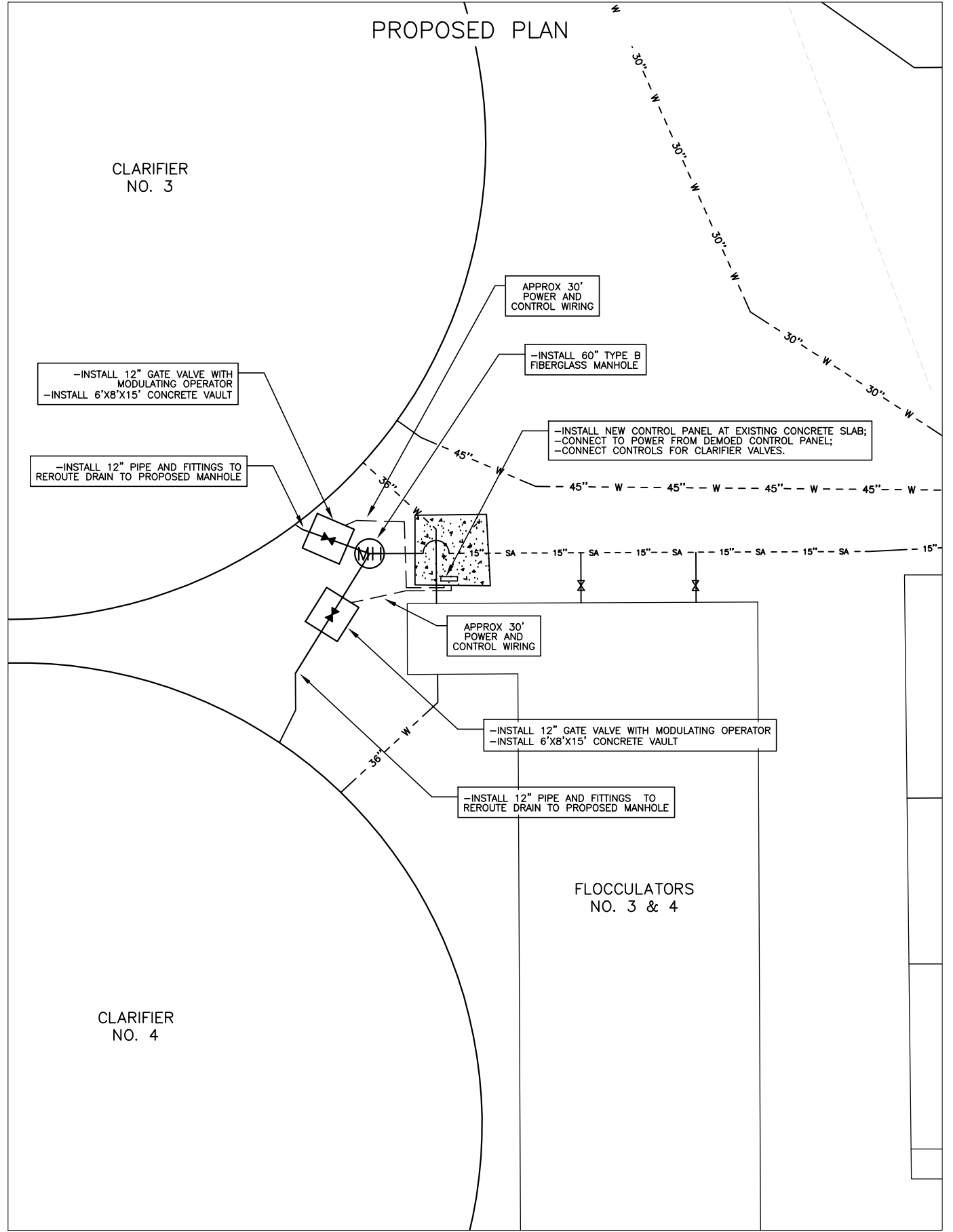
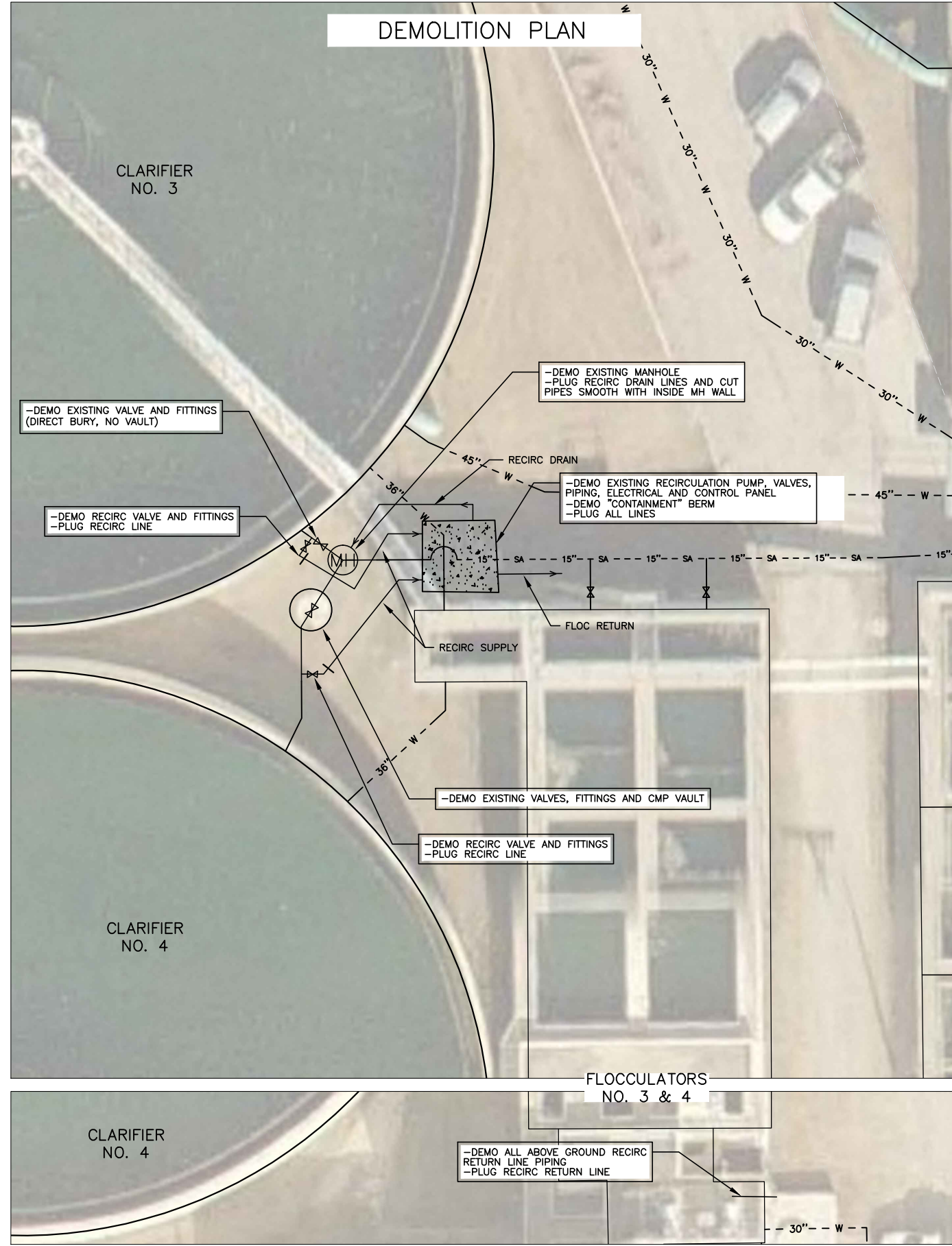
NORTH PLANT
CLARIFIER DRAIN VALVES

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JOSEPH T. MANGREM, P.E. NO.
117205 ON 04/22/2015

W-793

MIDDLE PLANT



DRAWN BY:	JTM
CHECKED BY:	RJP
HORIZ. SCALE:	1"=20'
VERT. SCALE:	-
JOB NUMBER:	WU-04-15
DATE:	APRIL 22, 2015

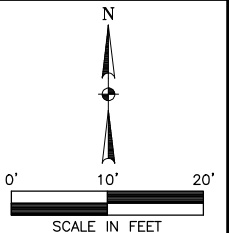
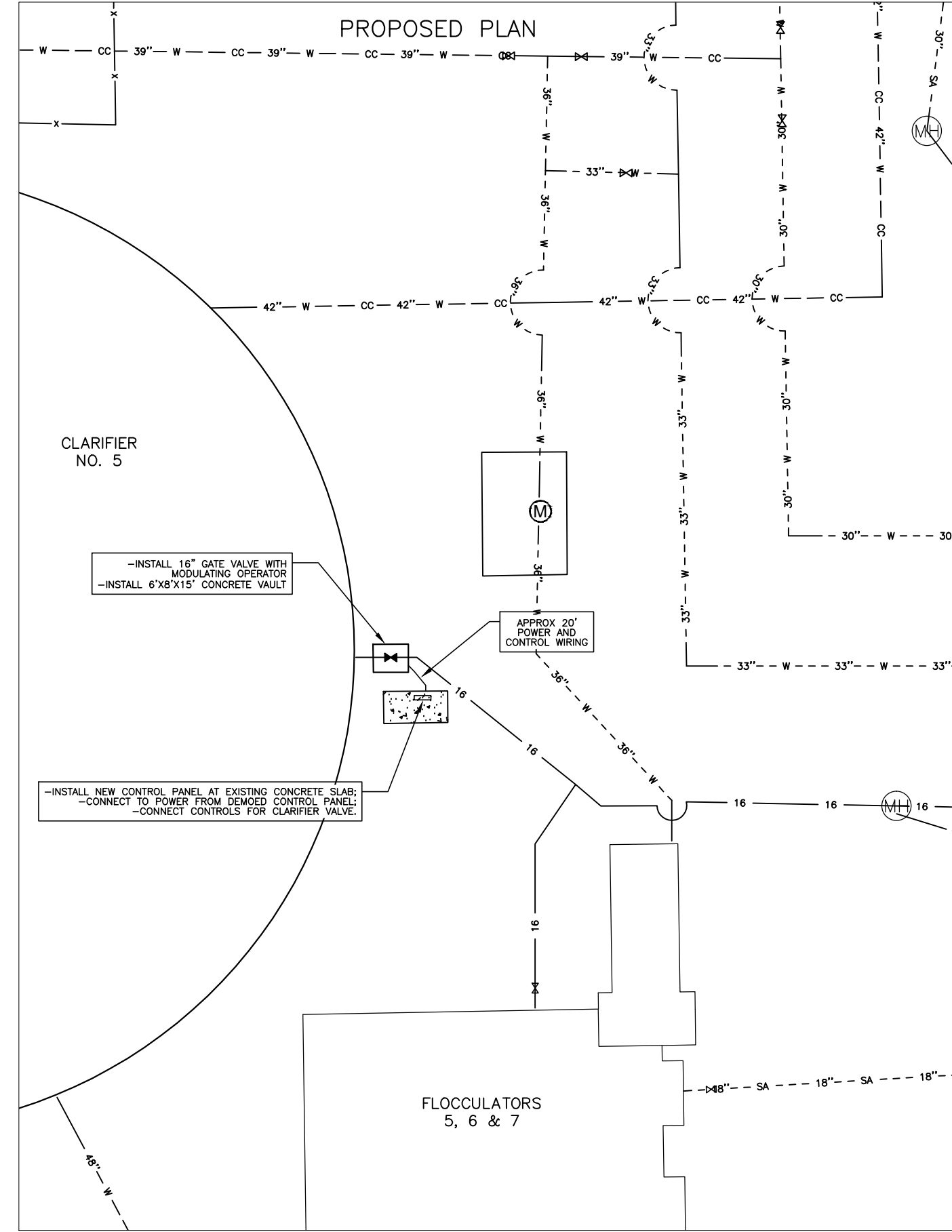
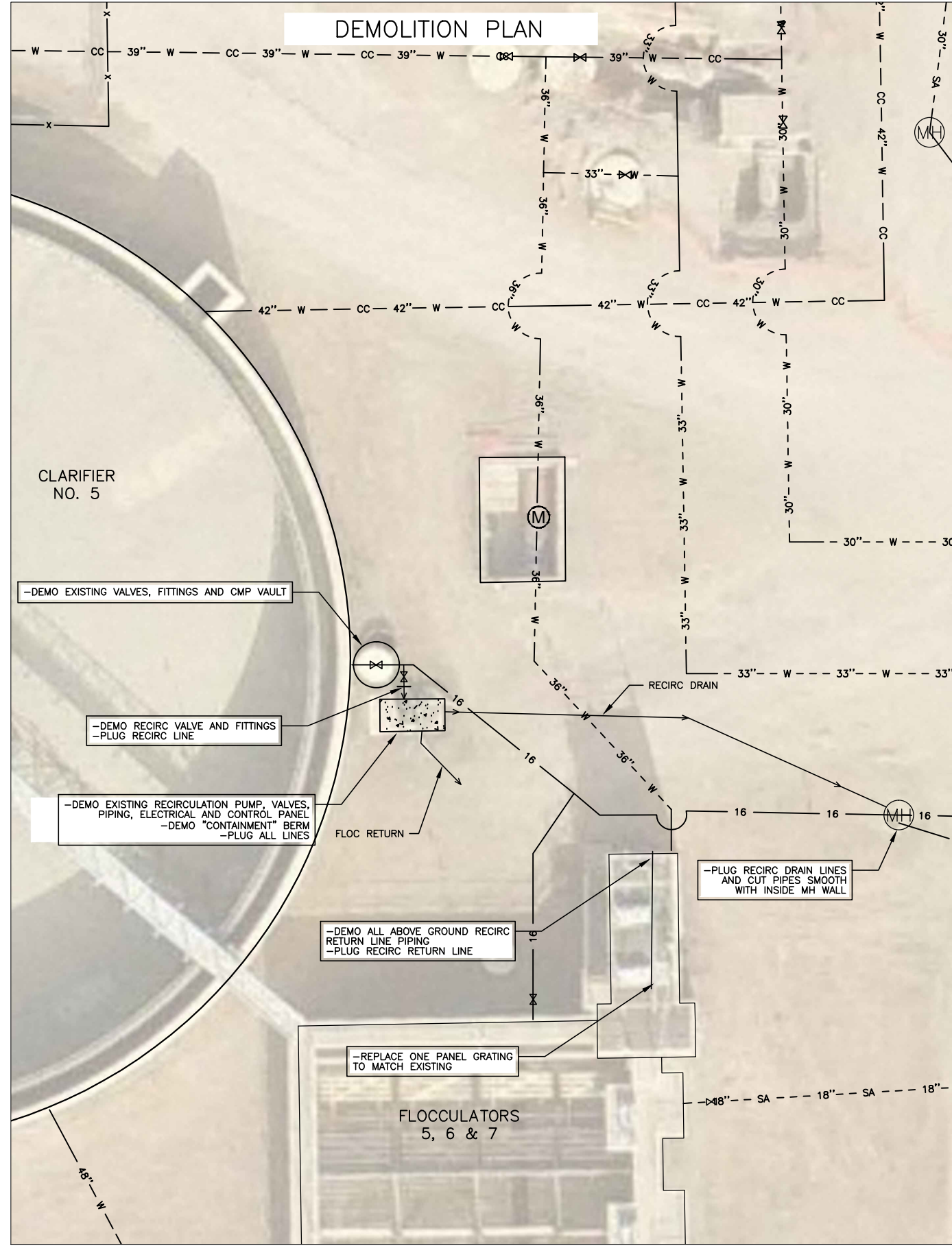
DEPARTMENT OF PUBLIC WORKS
ENGINEERING SERVICES DIVISION

2015 WATER TREATMENT PLANT IMPROVEMENTS PROJECT
MIDDLE PLANT
CLARIFIER DRAIN VALVES

JOSEPH T. MANGREM
117205
LICENSED PROFESSIONAL ENGINEER
Joseph T. Mangrem

W-794

SOUTH PLANT



DRAWN BY:	JTM
CHECKED BY:	RJP
HORIZ. SCALE:	1"=20'
VERT. SCALE:	-
JOB NUMBER:	WU-04-15
DATE:	APRIL 22, 2015

DEPARTMENT OF
PUBLIC WORKS
ENGINEERING
SERVICES DIVISION

2015 WATER TREATMENT PLANT
IMPROVEMENT PROJECT

SOUTH PLANT
CLARIFIER DRAIN VALVES

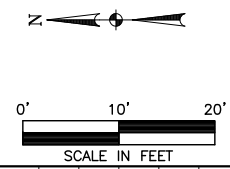
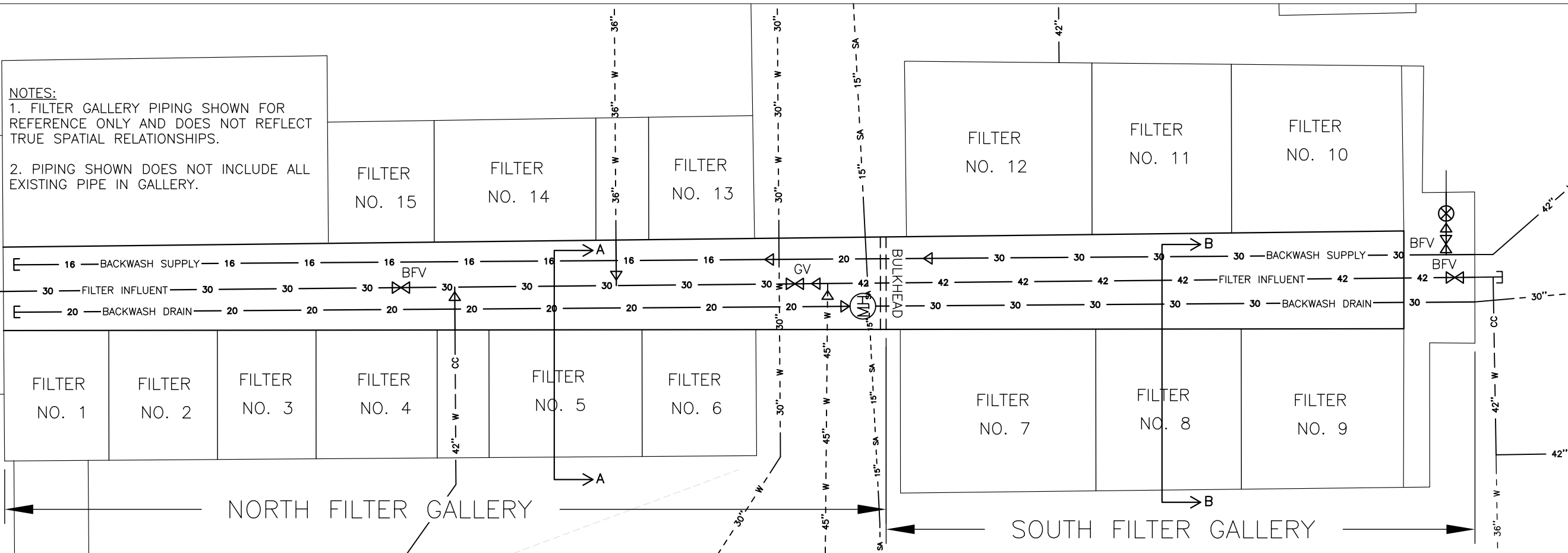
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117205 ON 04/22/2015

W-795

NOTES:

1. FILTER GALLERY PIPING SHOWN FOR REFERENCE ONLY AND DOES NOT REFLECT TRUE SPATIAL RELATIONSHIPS.

2. PIPING SHOWN DOES NOT INCLUDE ALL EXISTING PIPE IN GALLERY.



JTM	RJP	1"=100'	1"=10'	WU-04-15	APRIL 22, 2015
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DEPARTMENT OF PUBLIC WORKS
ENGINEERING SERVICES DIVISION

FILTER DATA

FILTER NUMBER	BACKWATER DRAIN VALVE DIAMETER (IN)	FILTER CELL DIMENSION (FT)	FILTER AREA (SQ FT)
1	20	19 x 18	342.00
2	20	19 x 18	342.00
3	20	19 x 18	342.00
4	20	19 x 18	342.00
5	20	27 x 19	513.00
6	20	19 x 18	342.00
7*	24	27 x 13.25	357.75
8*	24	27 x 13.25	357.75
9*	24	27 x 13.25	357.75
10*	24	27 x 13.25	357.75
11*	24	27 x 13.25	357.75
12*	24	27 x 13.25	357.75
13	20	19 x 18	342.00
14	20	27 x 19	513.00
15	20	19 x 18	342.00
TOTAL:			7,713

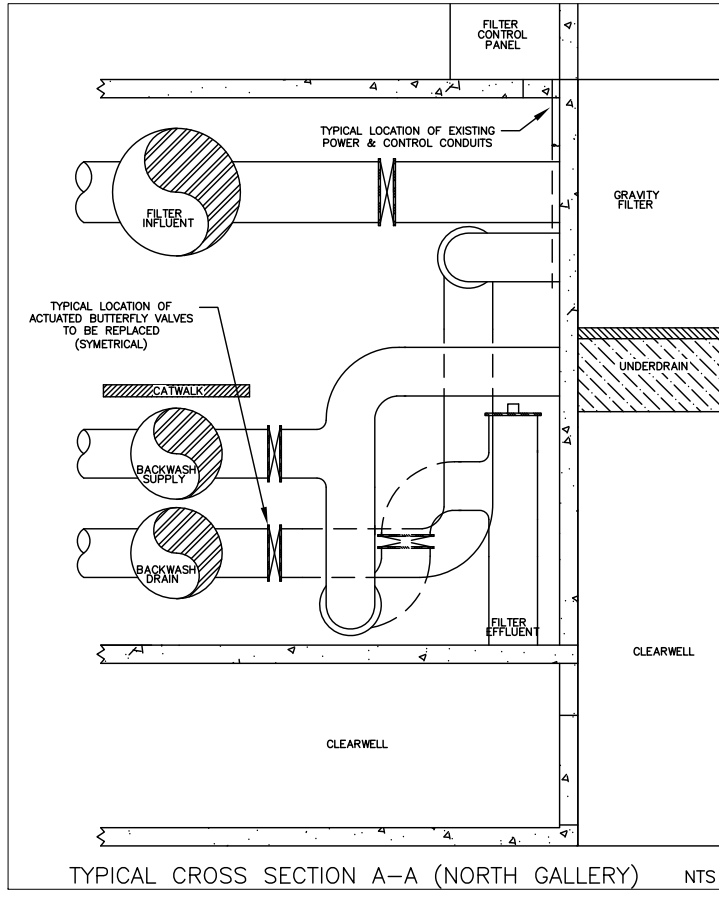
* DUAL CELL FILTERS

NOTES:

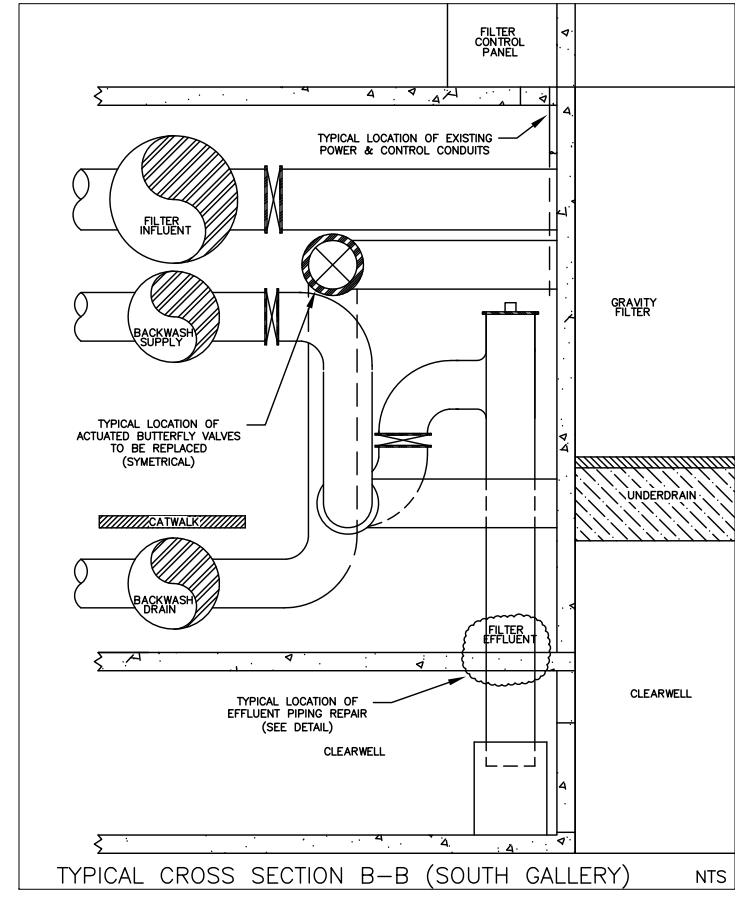
1. PIPE AND CATWALK SUPPORTS NOT SHOWN.
2. CONTRACTOR SHALL HOSE DOWN AND POWER WASH EACH FILTER PRIOR TO REMOVING MEDIA AND AS NECESSARY PRIOR TO REPLACING MEDIA AND START-UP.
3. CONTRACTOR SHALL CLEAN ENTIRE PIPE GALLERY, INCLUDING SWEEPING, WASHING AND WIPING DOWN ALL PIPING, SURFACES, SPIDER-WEBS, ETC. THIS SHALL BE COMPLETED REGARDLESS IF PAINTING WILL BE PERFORMED.

APPROXIMATE SURFACE AREA TO BE PAINTED

FILTER GALLERY	SURFACE AREA (SQ FT)
NORTH	4,500
SOUTH	3,750



TYPICAL CROSS SECTION A-A (NORTH GALLERY) NTS



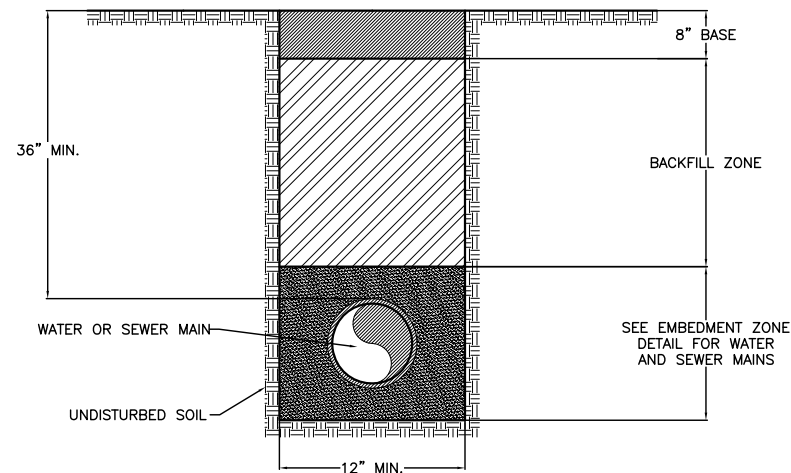
TYPICAL CROSS SECTION B-B (SOUTH GALLERY) NTS

2015 WATER TREATMENT PLANT IMPROVEMENT PROJECT
FILTER GALLERY

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UTILITY TRENCH SECTION

UNPAVED STREETS, ALLEYS & DRIVEWAYS

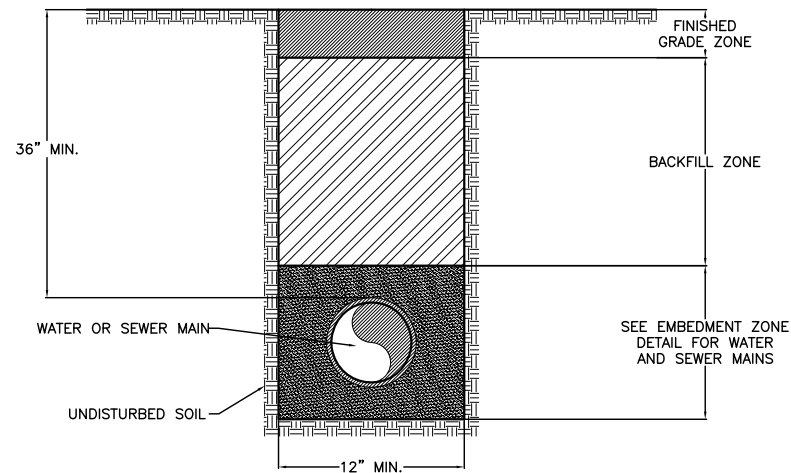


BASE: FLEXIBLE BASE PER CITY OF SAN ANGELO SPECIFICATIONS. THICKNESS PER CITY OF SAN ANGELO STANDARD STREET SPECIFICATIONS COMPACTED IN 6" LAYERS. MINIMUM DENSITY 95% MODIFIED PROCTOR.

BACKFILL ZONE: WHERE PULVERIZED OR GRANULAR MATERIAL IS AVAILABLE FROM EXCAVATION WHICH IS FREE OF SHARP EDGED STONES, OR STONES LARGER THAN 3" IN DIAMETER, CLAY, ORGANIC MATTER, OR OTHER UNSUITABLE SUBSTANCES, HAS A $P_i < 20$ AND $LL < 40$, AND MEETS THE APPROVAL OF THE CITY. SUCH MATERIAL MAY BE USED FOR BACKFILL MATERIAL AS INSTRUCTED BY THE OWNER.

UTILITY TRENCH SECTION

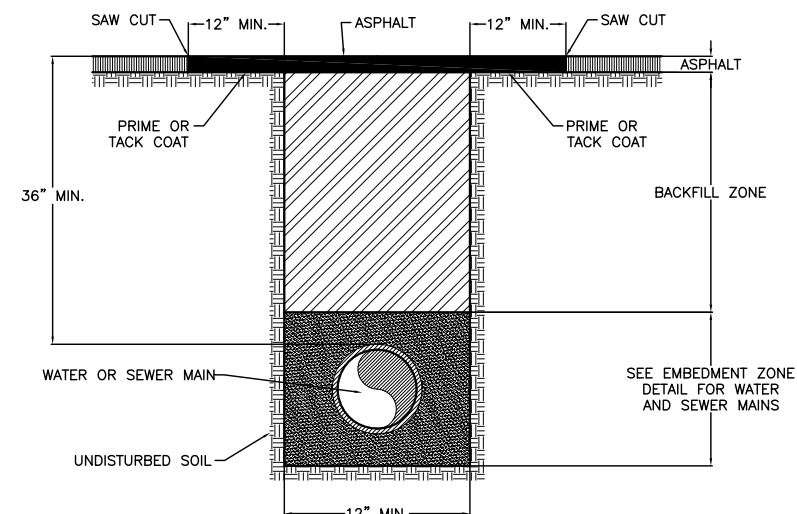
OTHER UNPAVED AREAS



BACKFILL ZONE:
OPTION #1: WHERE PULVERIZED OR GRANULAR MATERIAL IS AVAILABLE FROM EXCAVATION WHICH IS FREE OF SHARP EDGED STONES, OR STONES LARGER THAN 3" IN DIAMETER, CLAY, ORGANIC MATTER, OR OTHER UNSUITABLE SUBSTANCES, HAS A $P_i < 20$ AND $LL < 40$, AND MEETS THE APPROVAL OF THE CITY SUCH MATERIAL MAY BE USED FOR BACKFILL MATERIAL AS INSTRUCTED BY THE OWNER. BACKFILL SHALL BE COMPACTED TO DENSITIES EQUAL TO OR GREATER THAN THAT OF SURROUNDING SOIL.
OPTION #2: FLEXIBLE BASE PER CITY OF SAN ANGELO SPECIFICATIONS COMPACTED IN 6" HORIZONTAL LAYERS TO MINIMUM DENSITY OF 95% MODIFIED PROCTOR.
FINISHED GRADE ZONE: BACKFILL SHALL MATCH EXISTING GROUND CONDITIONS (SEE OPTIONS BELOW) OR AS DIRECTED BY THE OWNER. PAYMENT SHALL BE PER BID ITEMS.
OPTION A: UTILIZE BACKFILL ZONE MATERIAL FROM OPTION #1
OPTION B: 6" TOP SOIL
OPTION C: 8" FLEXIBLE BASE

UTILITY TRENCH SECTION

ASPHALT PAVEMENT



ASPHALT: 2" LAYER
 TYPE D, TXDOT HOT MIX OR
 TYPE D, TXDOT HOT MIX - COLD LAID
 (MUST HAVE PRIOR CITY APPROVAL)

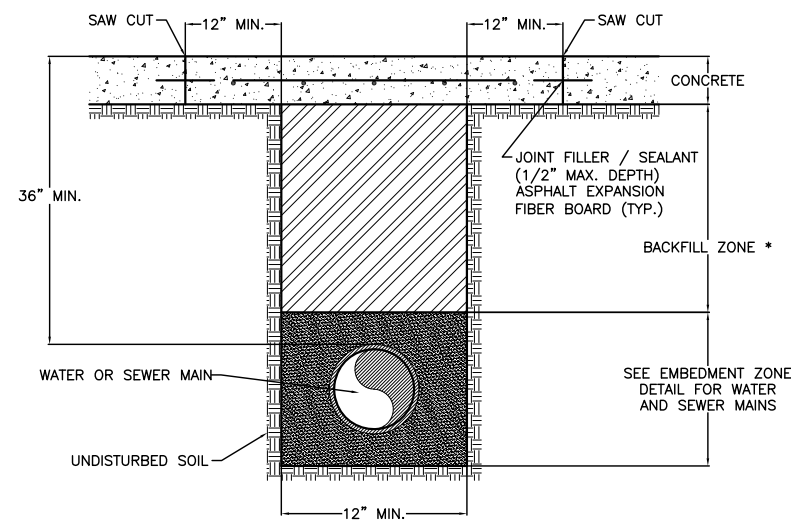
PRIME COAT: TXDOT MC-30 ASPHALT AT THE RATE OF 0.25 TO 0.35 GALLON PER SQUARE YARD OF SURFACE

TACK COAT: SHALL MEET THE REQUIREMENTS OF TXDOT ITEM 300 "ASPHALTS, OILS, AND EMULSIONS".

BACKFILL ZONE: FLEXIBLE BASE PER CITY OF SAN ANGELO SPECIFICATIONS COMPACTED IN 6" HORIZONTAL LAYERS. MINIMUM DENSITY 95% MODIFIED PROCTOR. (UNLESS NOTED OTHERWISE IN WRITING).

UTILITY TRENCH SECTION

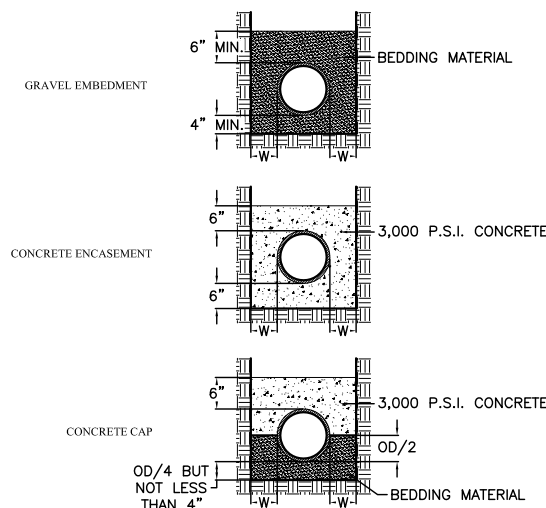
RIGID PAVEMENT



CONCRETE: CLASS P, 3500 P.S.I. COMPRESSIVE; 555 P.S.I. FLEXURAL. BEND EXISTING REBAR INTO CENTER OF NEW CONCRETE. REPLACE AS NECESSARY WITH #4 REBAR ON 18" CENTERS EACH WAY AND DOWEL IN #4 REBAR 9" DEEP WITH 24" LAP SPLICE, OR 36 POUNDS OF NOVAMESH 850 PER CUBIC YARD WITH #4 REBAR DOWELS 9" DEEP AND 9" INTO THE TRENCH ON 18" CENTERS.

BACKFILL ZONE: FLEXIBLE BASE PER CITY OF SAN ANGELO SPECIFICATIONS COMPACTED IN 6" HORIZONTAL LAYERS. MINIMUM DENSITY 95% MODIFIED PROCTOR. (UNLESS APPROVED OTHERWISE IN WRITING).

EMBEDMENT ZONE

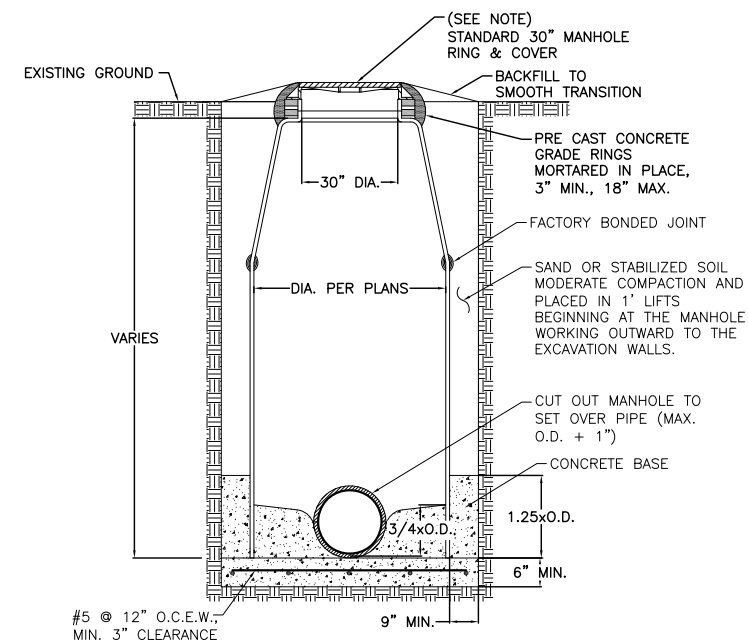


PIPE SIZE	W
16" OR LESS	6"
GREATER THAN 16"	AS SPECIFIED BY PIPE MFG. & APPROVED BY OWNER

BEDDING MATERIAL:
 BEDDING MATERIAL FOR THE INSTALLATION OF WATER AND SEWER MAINS SHALL BE CRUSHED STONE OR PEA GRAVEL THAT WILL REMAIN FIRM AND NOT PERMIT DISPLACEMENT OF THE PIPE EITHER DURING PIPE LAYING OR BACKFILLING OR FOLLOWING COMPLETION OF CONSTRUCTION. BEDDING MATERIAL SHALL BE FROM AN APPROVED BEDDING MATERIAL SOURCE PER THE LIST OF APPROVED BEDDING MATERIAL SUPPLIERS OR MEET THE GRADATION TEST AS SPECIFIED IN THE TECHNICAL SPECIFICATIONS WHEN TESTED IN ACCORDANCE WITH TXDOT DESIGNATION: TEX-200-F, PART 1, AND BE APPROVED BY THE CITY ENGINEER.

* TRENCH SPOILS ARE NOT ACCEPTABLE FOR "EMBEDMENT ZONE MATERIAL"

MANHOLE - TYPE B



- NOTES**
1. CONCRETE BASE TO BE POURED IN PLACE IN TRENCH.
 2. MANHOLE CUTOUT TO BE MADE AT TIME OF INSTALLATION.
 3. MANHOLE TO BE INSTALLED BY INSERTING INTO WET CONCRETE BASE.
 4. FLOW LINE INVERT MAY BE CHANNEL FORMED IN CONCRETE FLOOR OR PIPE SECTION WITH TOP CUT OUT.
 5. SEAL CONCRETE TO PIPE WITH ELASTOMERIC GASKET SEAL.
 6. CONTRACTOR SHALL VERIFY MANHOLE DEPTHS, INLET AND OUTLET ELEVATIONS.
 7. CONCRETE SHALL BE PLACED A MINIMUM OF 6" BEYOND ALL CONNECTIONS.

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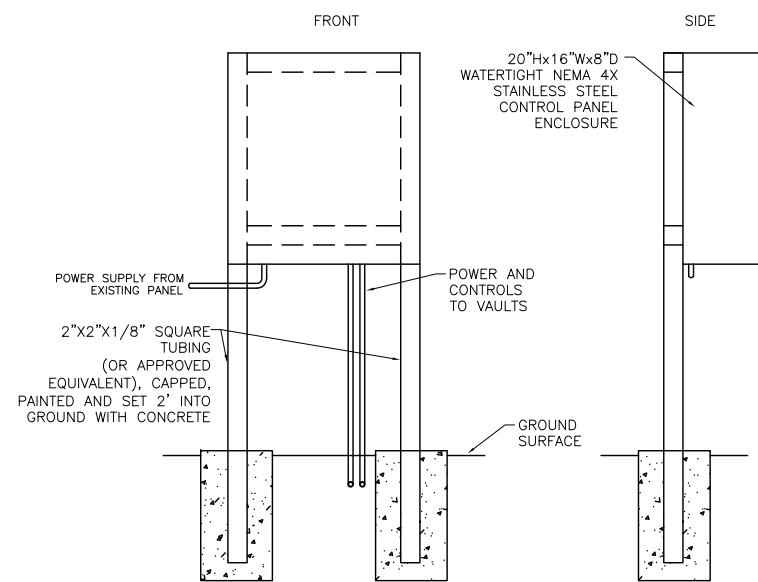
2015 WATER TREATMENT PLANT IMPROVEMENT PROJECT

TYPICAL SECTIONS & DETAILS 1

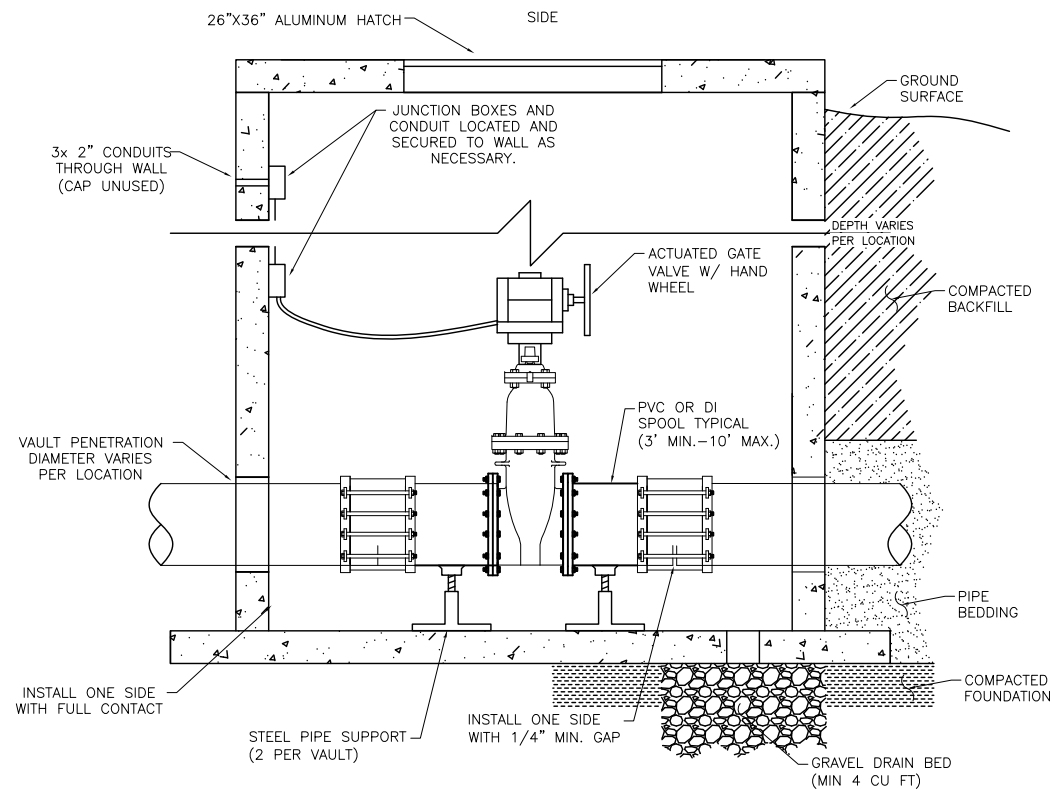
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M-903

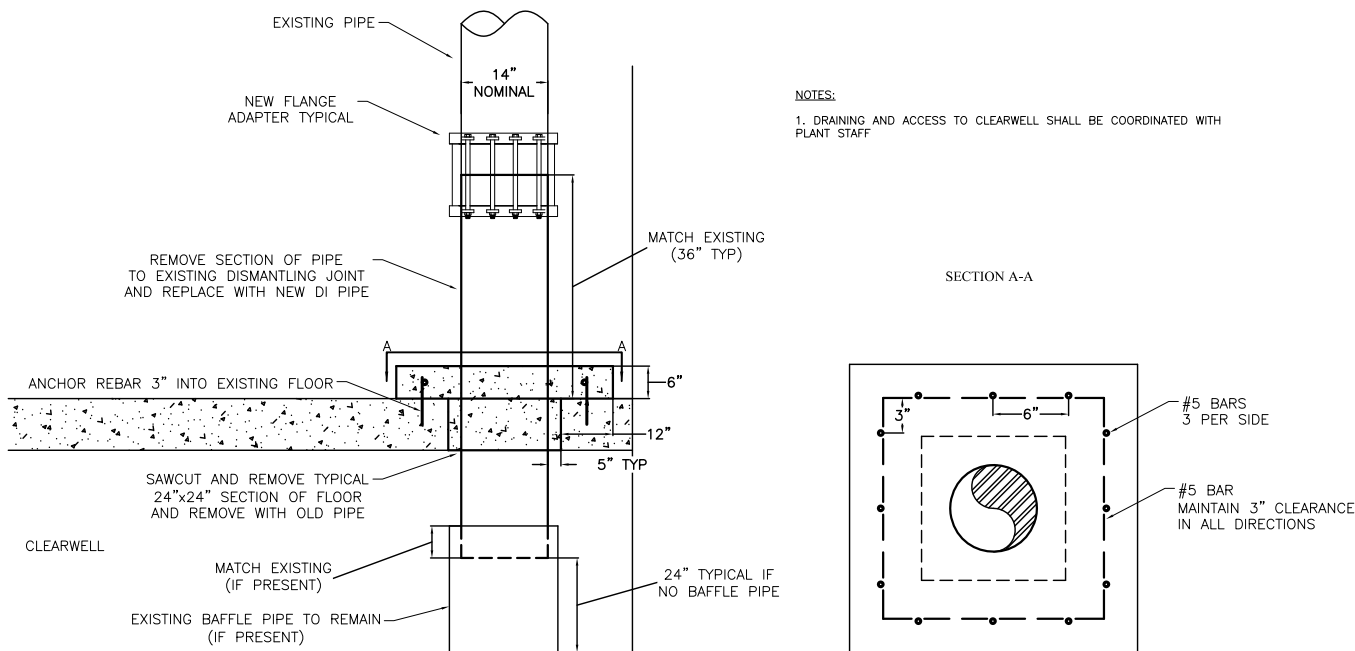
CLARIFIER DRAIN VALVE CONTROL PANEL



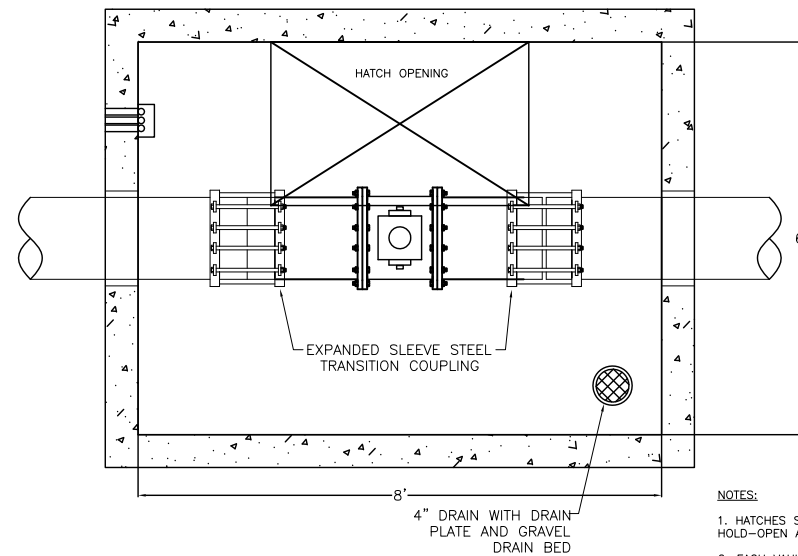
VALVE VAULT



PIPE GALLERY EFFLUENT PENETRATION REPAIR



TOP



- NOTES:
- HATCHES SHALL BE ALUMINUM HS20 LOADED WITH HOLD-OPEN ARMS AND LIFT ASSIST.
 - EACH VAULT SHALL HAVE A STAINLESS-STEEL LADDER WITH TELESCOPING EXTENSION AT HATCH OPENING.
 - VAULTS SHALL HAVE PASSIVE VENTILATION, CONSISTING OF 4" SCHEDULE 40 STAINLESS-STEELVENTS, WITH 90 DEGREE TURN-DOWNS AND BUG SCREENS. TWO VENTS PER VAULT REQUIRED.
 - THE FLOOR OF EACH VAULT SHALL BE SLOPED TOWARDS FLOOR DRAIN.
 - CONTRACTOR TO VERIFY VAULT DEPTH AT EACH LOCATION.
 - TWO STEEL PIPE SUPPORTS SHALL BE PROVIDED FOR EACH VAULT.
 - WALL THICKNESS PER MANUFACTURER'S RECOMMENDATION.
 - ALL ELECTRICAL SHALL MEET CURRENT ELECTRICAL CODES.

N

JTM	RJP	-	-	WE-04-15	APRIL 22, 2015
DRAWN BY:	CHECKED BY:	HORIZ. SCALE:	VERT. SCALE:	JOB NUMBER:	DATE:



2015 WATER TREATMENT PLANT IMPROVEMENT PROJECT
TYPICAL SECTIONS & DETAILS 2

