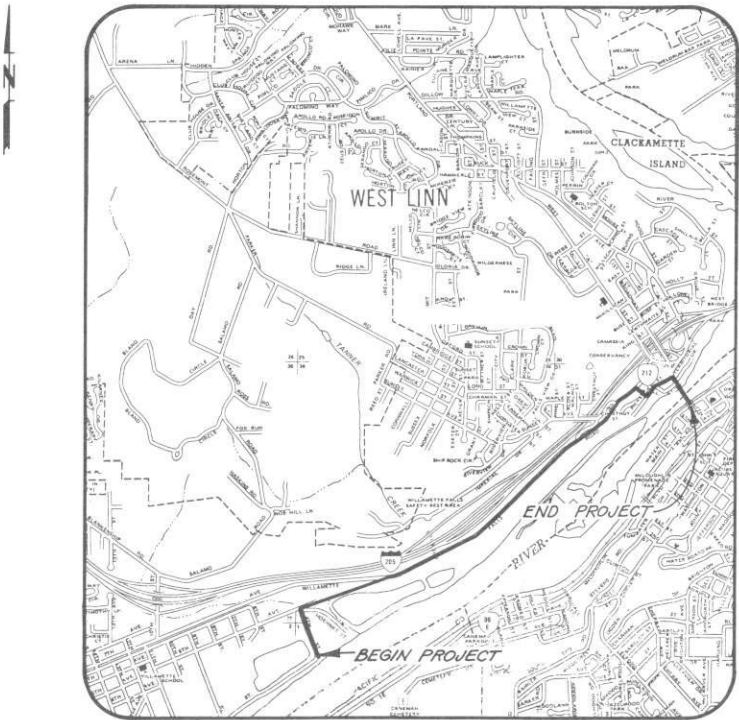


TRI-CITY SERVICE DISTRICT
CLACKAMAS COUNTY, OREGON

WEST LINN FORCE MAIN AND
GRAVITY SEWER

FEBRUARY, 1986



LOCATION MAP
SCALE: 1" = 2000'

SYMBOLS

NEW	EXISTING
CATCH BASIN	—
POWER POLE	—
GUY WIRE	—
FIRE HYDRANT	—
WATER METER	—
TRAVERSE POINT	—
STREET LIGHT	—
CONCRETE BOX CULVERT	—
FENCELINE	—
PROPERTY LINE	—
EDGE OF PAVEMENT	—
EDGE OF DRIVEWAY	—
GAS LINE	—
WATER LINE	—
DRAINAGE CULVERT	—
MANHOLE	—
THRUST BLOCKING	—
SANITARY SEWER	—
SANITARY SEWER FORCE MAIN	—
BACKFILL CLASS	—
BEDDING CLASS	—
FLEXIBLE COUPLING	—
AIR INJECTION POINT	—

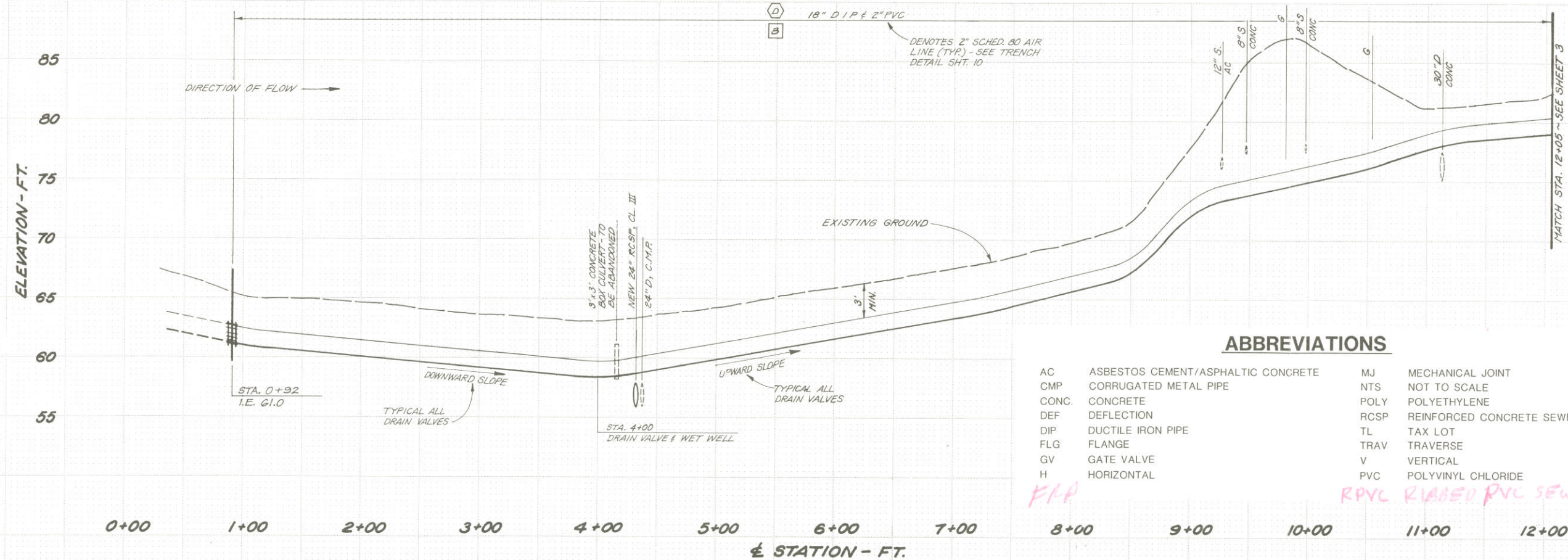
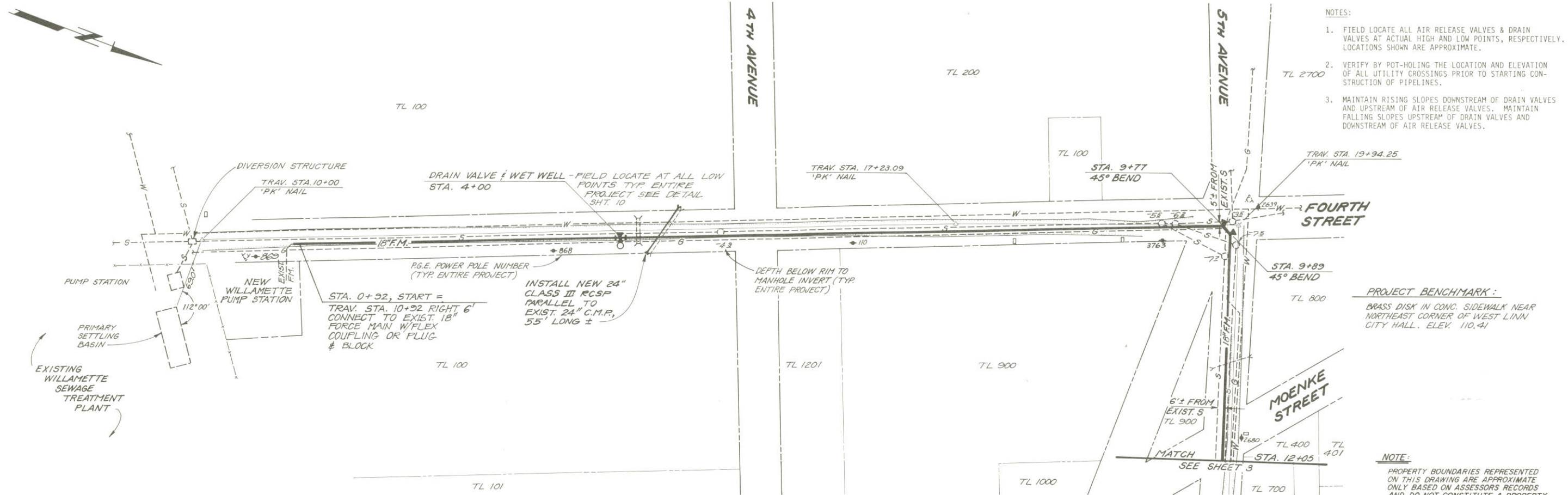
SHEET NO.

- 1
- 2
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- 16
- 17

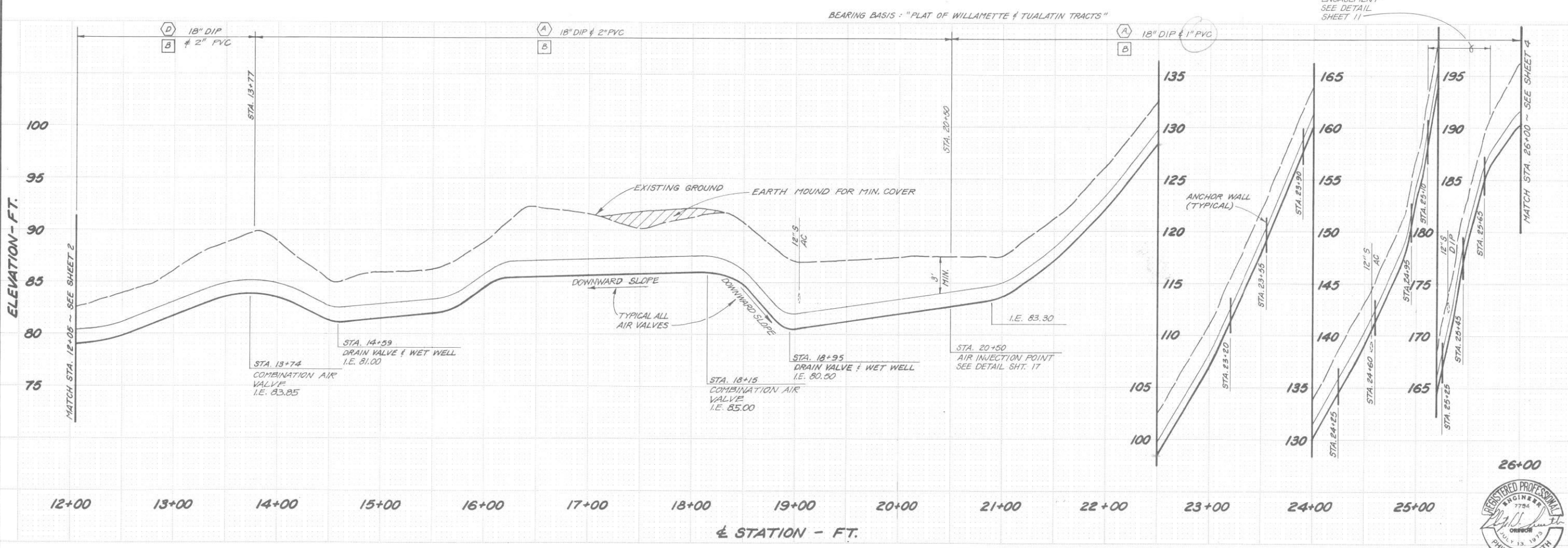
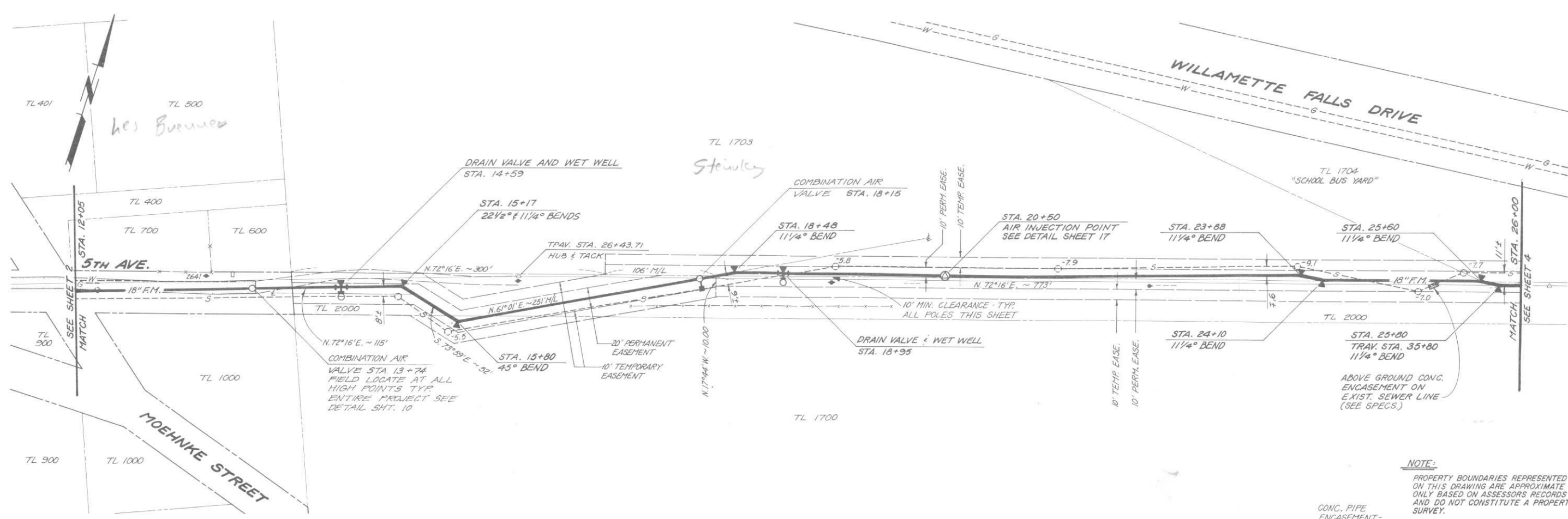
INDEX OF DRAWINGS

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- PLAN & PROFILE STA. 12+05 to 26+00
- PLAN & PROFILE STA. 26+00 to 40+05
- PLAN & PROFILE STA. 40+05 to 54+05
- PLAN & PROFILE STA. 54+05 to 68+05
- PLAN & PROFILE STA. 68+05 to 82+50
- PLAN & PROFILE STA. 82+50 to 96+50
- PLAN & PROFILE STA. 96+50 to 104+66
- DETAILS
- DETAILS
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- PLAN, ELEVATION & DETAILS OF BRIDGE CROSSING
- WEST PIER DETAILS
- EAST PIER DETAILS
- PIPE SUPPORT DETAILS
- PIPE SUPPORT DETAILS



TRI-CITY SERVICE DISTRICT CLACKAMAS COUNTY, OREGON WEST LINN FORCE MAIN AND GRAVITY SEWER		DESIGNED NLV	DRAWN RFD	CHECKED PHS	DATE FEB., 1986	SCALE 1"=50'H, 1"=5' V.	NO.	REVISION	BY	DATE
<p>PLAN & PROFILE</p> <p>STA. 0+00 to 12+05</p>										
<p>MURRAY SMITH & ASSOCIATES, INC. Engineers/Planners Harrison Square 1800 SW First Street Portland, Oregon 97201 503 425-9500</p> <p>MSA</p>										
<p>SHEET</p> <p>2 of 17</p> <p>FILE NO. 83-0066.20</p>										

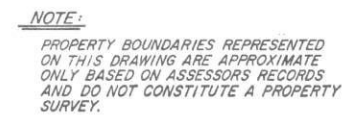


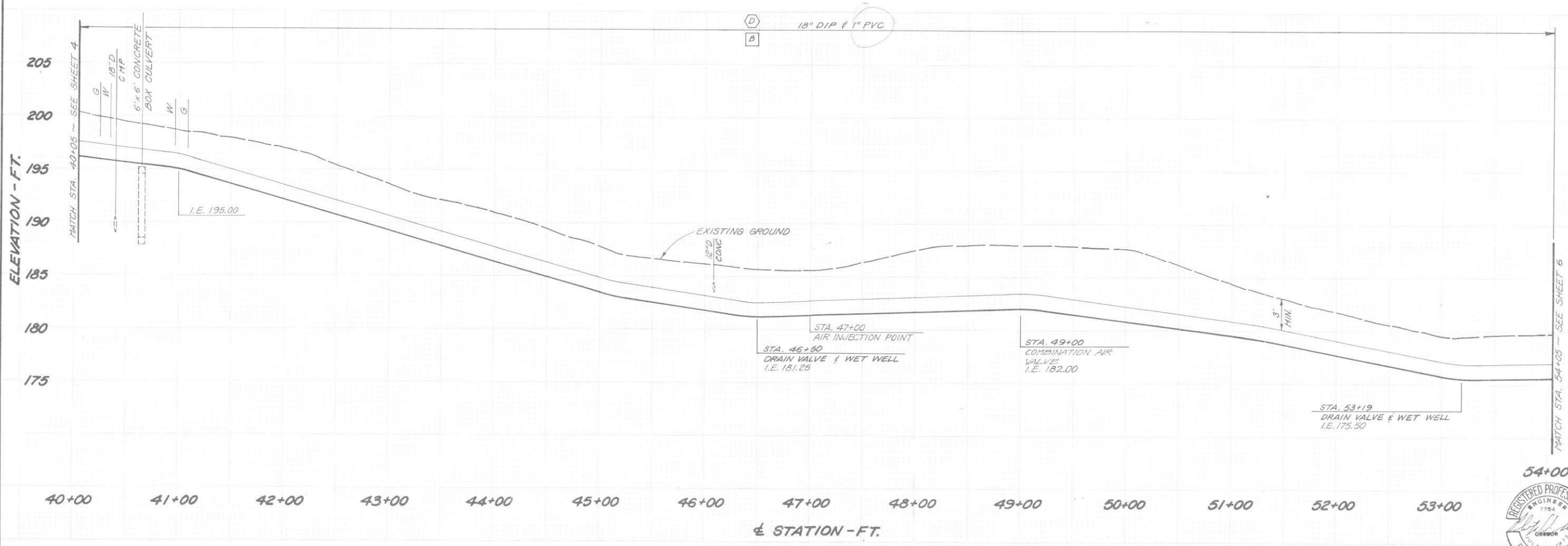
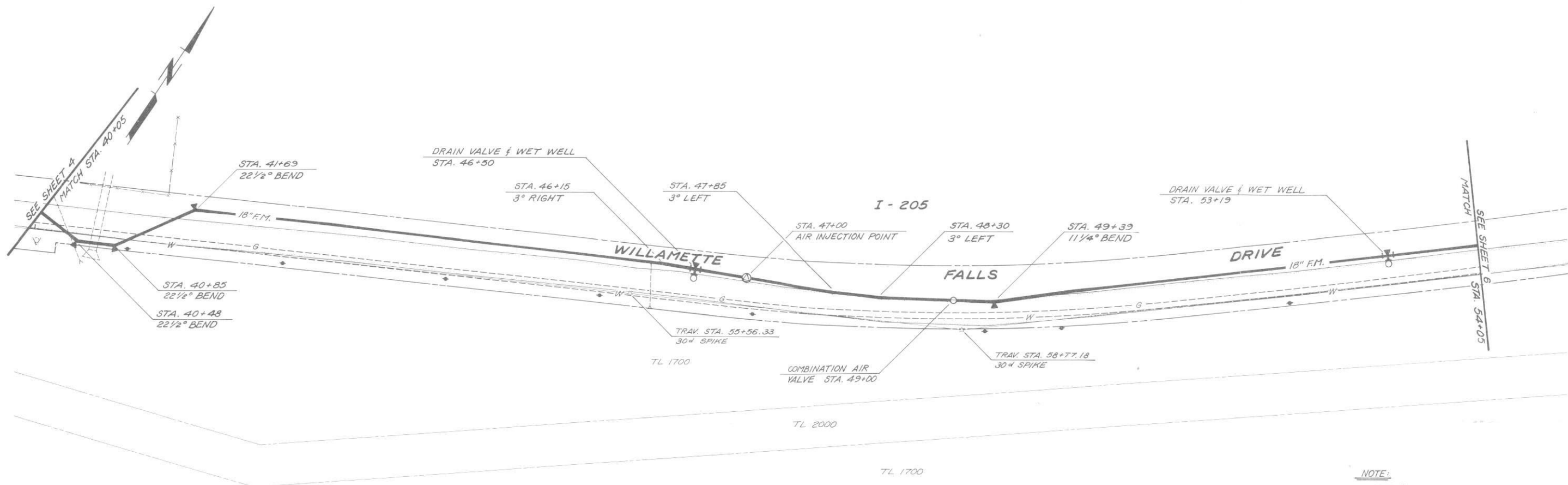
NOTE: PROPERTY BOUNDARIES REPRESENTED ON THIS DRAWING ARE APPROXIMATE ONLY BASED ON ASSESSORS RECORDS AND DO NOT CONSTITUTE A PROPERTY SURVEY.

CONC. PIPE ENCASUREMENT - SEE DETAIL SHEET 11



PLAN & PROFILE STA 12+05 to 26+00	DATE	BY	REVISION	NO.	DATE FEB, 1986
	TRI-CITY SERVICE DISTRICT CLACKAMAS COUNTY, OREGON WEST LINN FORCE MAIN AND GRAVITY SEWER				
	DESIGNED NLV	DRAWN RFD	CHECKED PHS	SCALE 1"=50' H., 1"=5' V. DATE FEB, 1986	
	MURRAY SMITH & ASSOCIATES, Inc. Engineers/Planners Harrison Square 1800 S.W. First Suite 510 Portland, Oregon 97201 503-225-5010				
MSA SHEET 3 of 17 FILE NO. 83-0066.20					

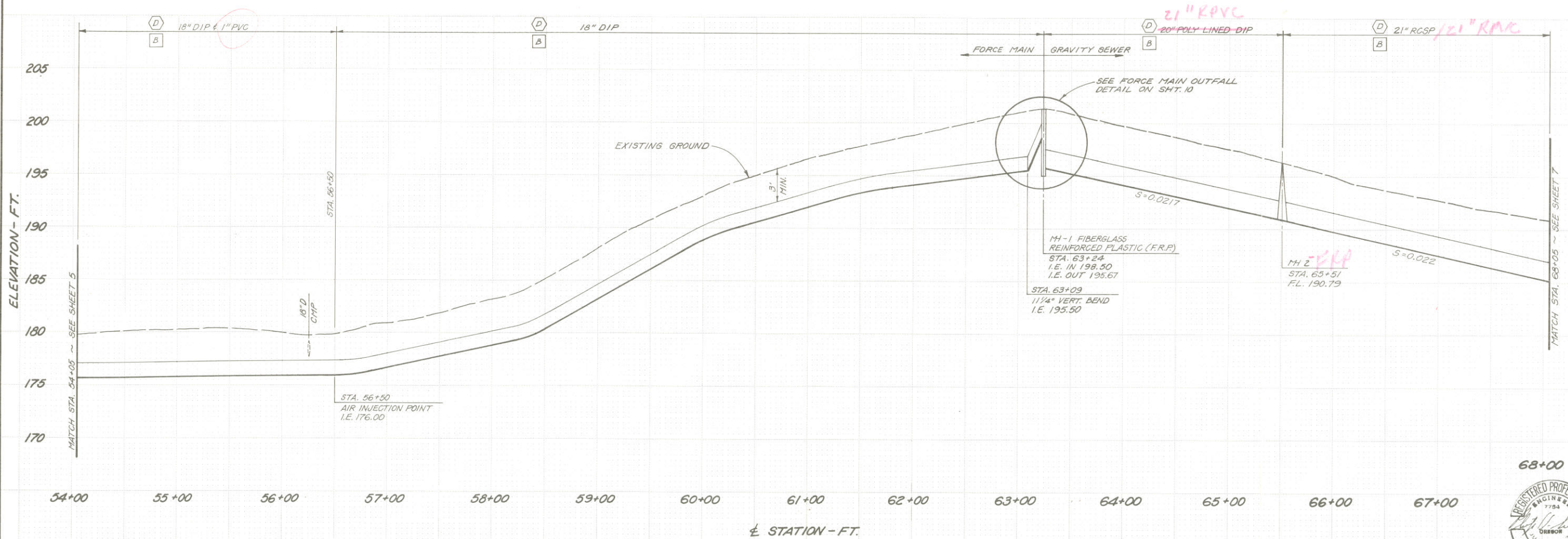
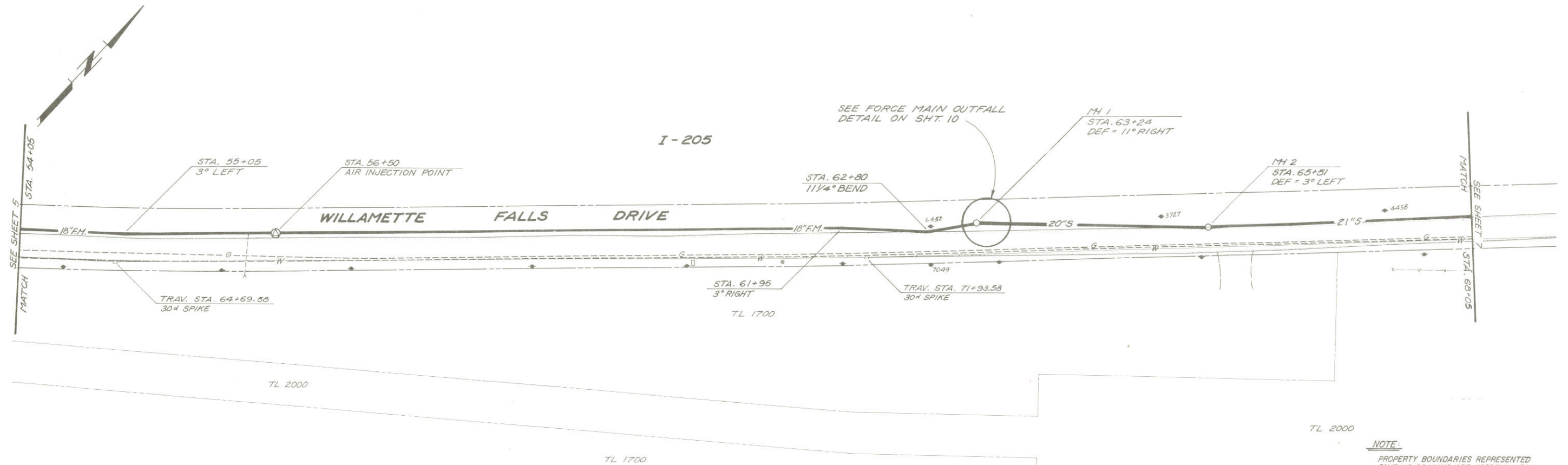




NOTE:
PROPERTY BOUNDARIES REPRESENTED
ON THIS DRAWING ARE APPROXIMATE
ONLY BASED ON ASSESSORS RECORDS
AND DO NOT CONSTITUTE A PROPERTY
SURVEY.



PLAN & PROFILE STA. 40+05 to 54+05		SCALE: 1" = 50' H., 1" = 5' V. DATE: FEB., 1986	NO. REVISION BY DATE
TRI-CITY SERVICE DISTRICT CLACKAMAS COUNTY, OREGON WEST LINN FORCE MAIN AND GRAVITY SEWER		DESIGNED: NLV DRAWN: RFD CHECKED: PHS	
MURRAY, SMITH & ASSOCIATES, INC. Engineers/Planners 1800 S.W. 5th Ave., Suite 600 Portland, Oregon 97201 503-225-9270		MSA	
SHEET 5 of 17 FILE NO. 83-0066.20			



NOTE:
PROPERTY BOUNDARIES REPRESENTED ON THIS DRAWING ARE APPROXIMATE ONLY BASED ON ASSESSORS RECORDS AND DO NOT CONSTITUTE A PROPERTY SURVEY.

PLAN & PROFILE
STA. 54+05 to 68+05

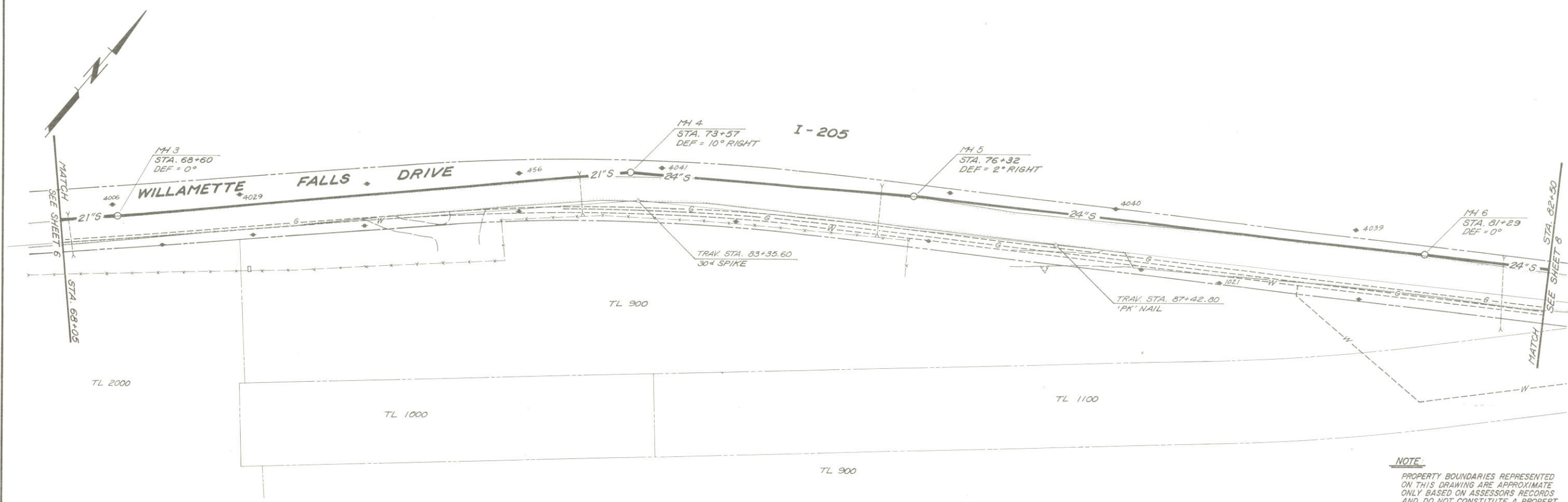
TRI-CITY SERVICE DISTRICT
CLACKAMAS COUNTY, OREGON
**WEST LINN FORCE MAIN
AND GRAVITY SEWER**

MURRAY, SMITH & ASSOCIATES, P.C.
Engineers/Planners
1800 SW Englewood
Portland, Oregon 97201
503-225-5990

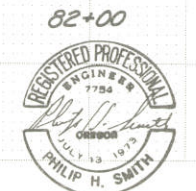
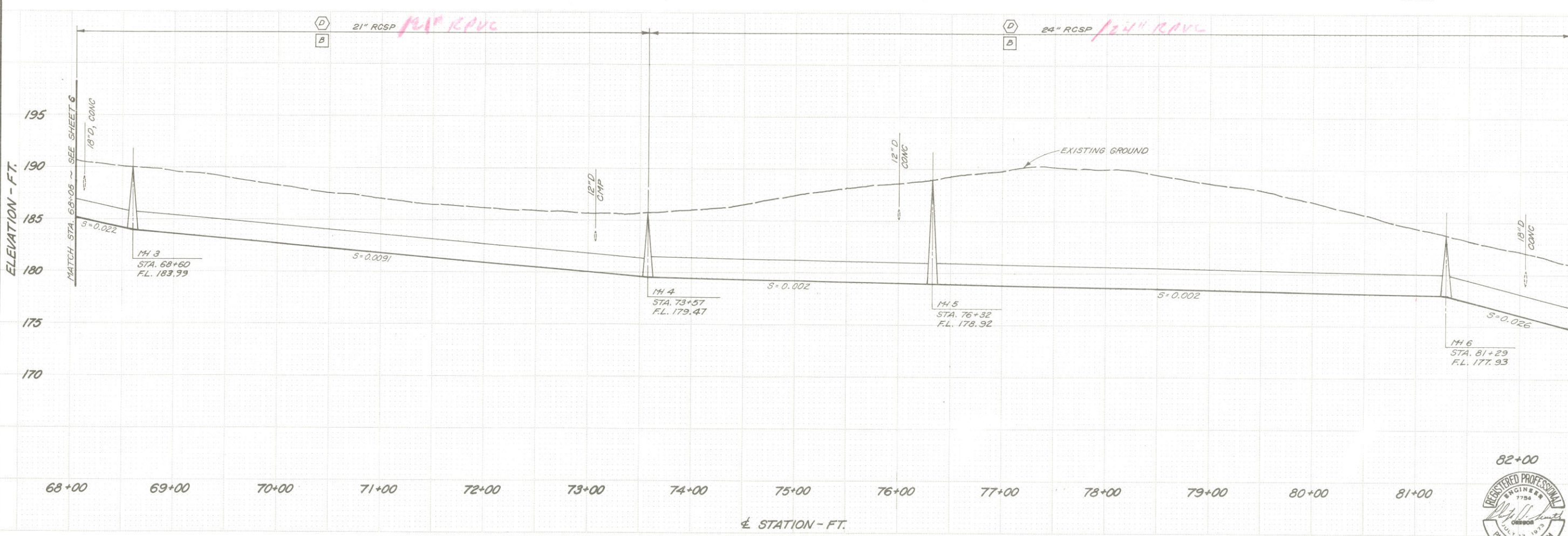


SHEET
6 of 17
FILE NO.
83-0066.20

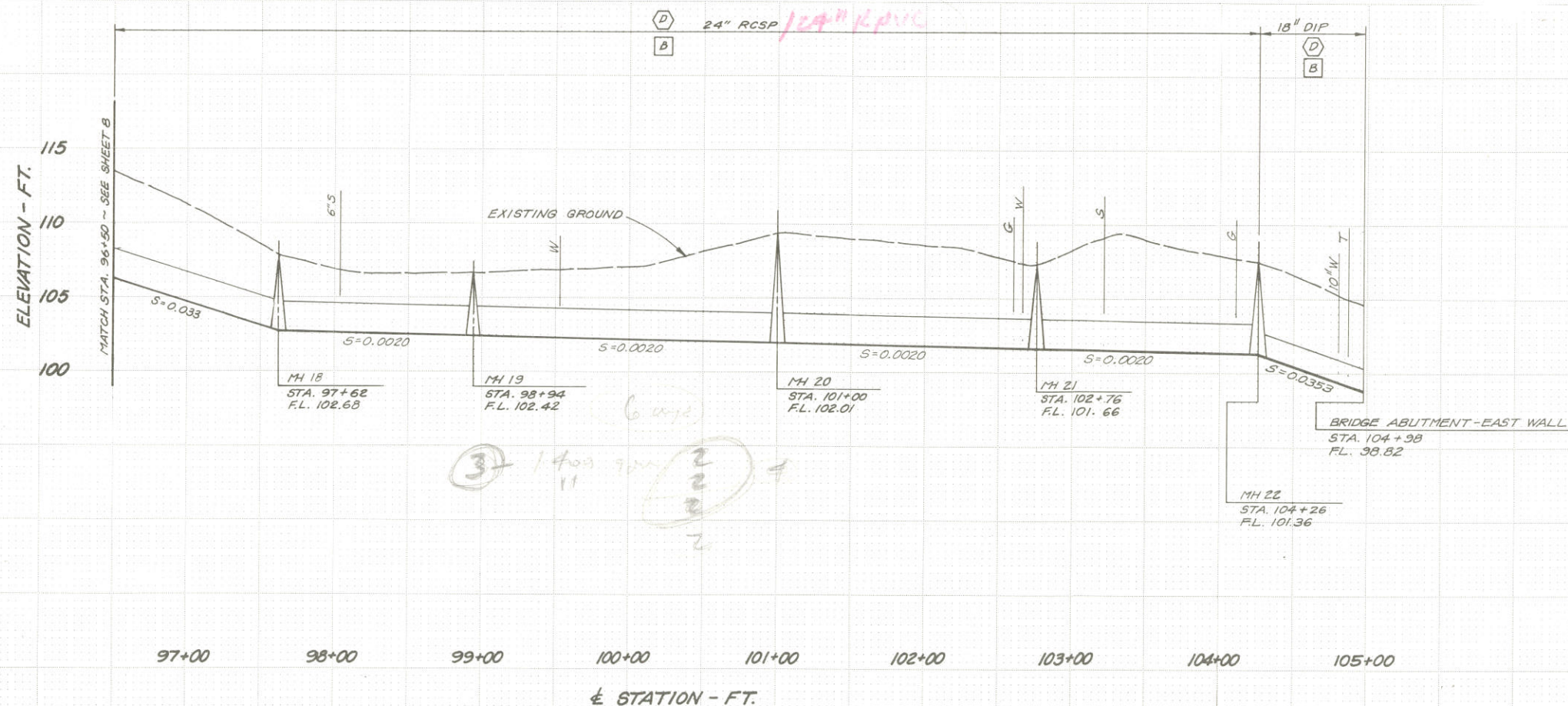
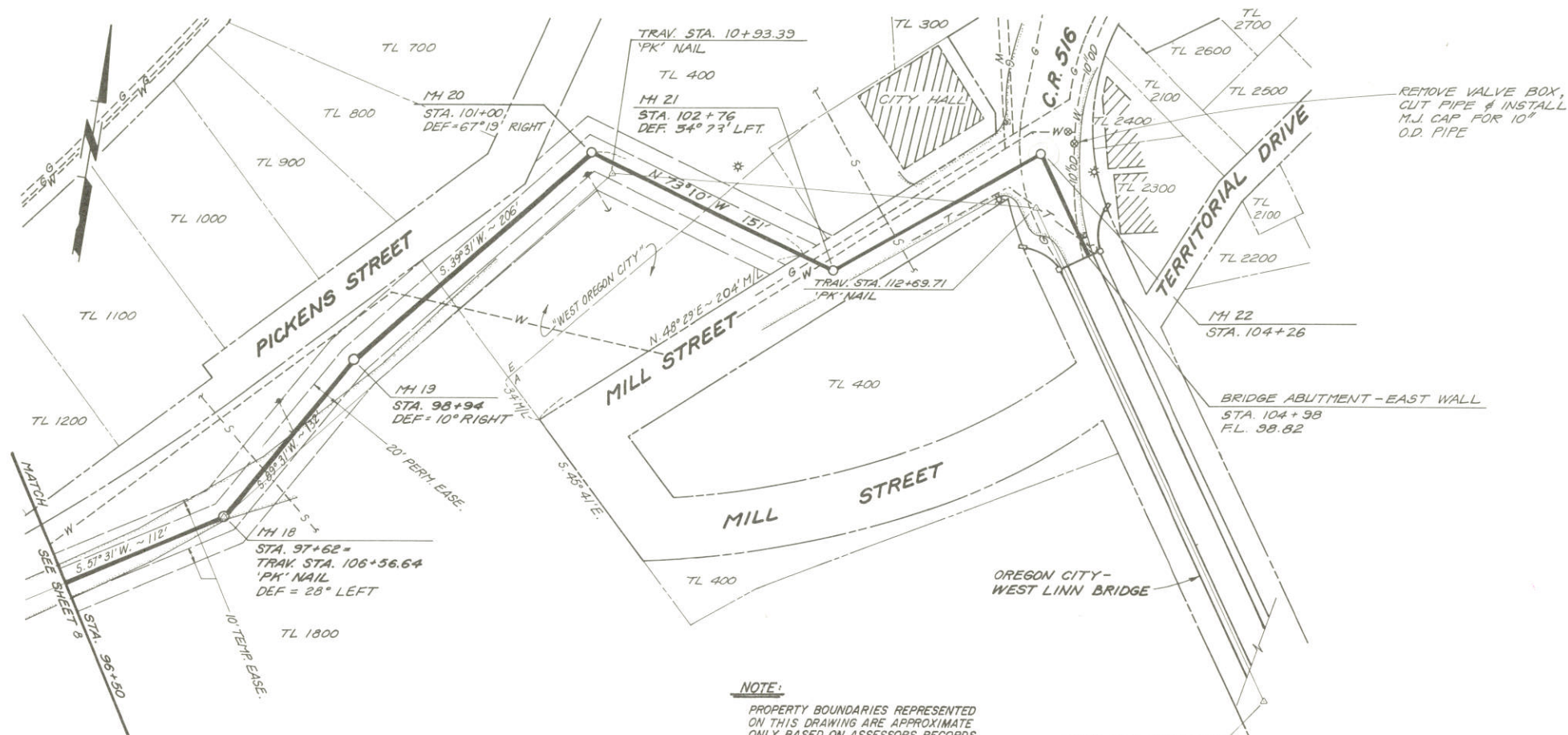




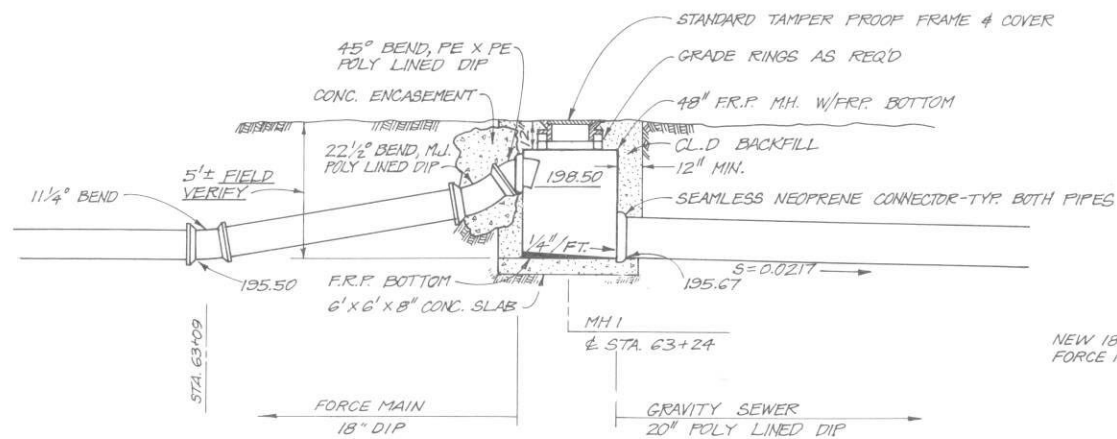
NOTE
PROPERTY BOUNDARIES REPRESENTED ON THIS DRAWING ARE APPROXIMATE ONLY BASED ON ASSESSORS RECORDS AND DO NOT CONSTITUTE A PROPERTY SURVEY.



PLAN & PROFILE STA. 68+05 to 82+50		DATE FEB. 1986 NO.	REVISION BY	DATE
TRI-CITY SERVICE DISTRICT CLACKAMAS COUNTY, OREGON WEST LINN FORCE MAIN AND GRAVITY SEWER		SCALE 1" = 50' H., 1" = 5' V. CHECKED PHS DRAWN RFD DESIGNED NLV	MURRAY SMITH & ASSOCIATES, P.C. Engineers/Planners 1800 S.W. East Side Blvd. Portland, Oregon 97201 503-225-5000	
MSA		SHEET 7 of 17 FILE NO. 83-0066.20	THIS DRAWING HAS BEEN REDUCED APPROXIMATELY ONE-HALF SCALE 55	

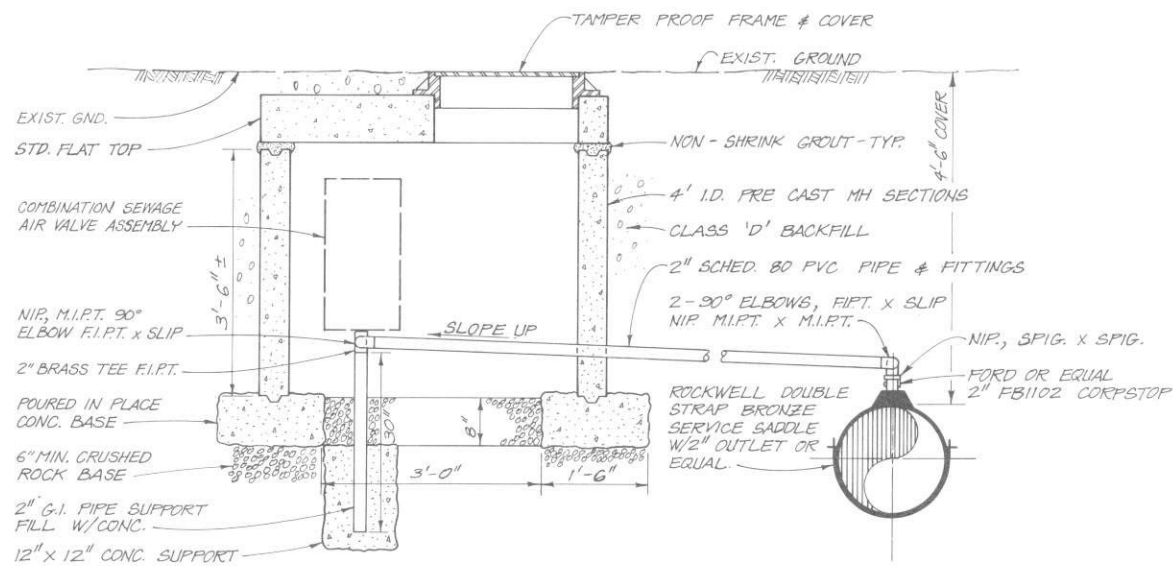


MURRAY, SMITH & ASSOCIATES, INC. Engineers/Planners 1800 S.W. 3rd Avenue Portland, Oregon 97201 503-225-5500	PLAN & PROFILE STA. 96+50 to 104+66			SCALE 1"=50' H., 1"=5' V. DATE FEB., 1986
	TRI-CITY SERVICE DISTRICT CLACKAMAS COUNTY, OREGON WEST LINN FORCE MAIN AND GRAVITY SEWER	DESIGNED NLV DRAWN RFD CHECKED PHS	REVISION NO. BY DATE	



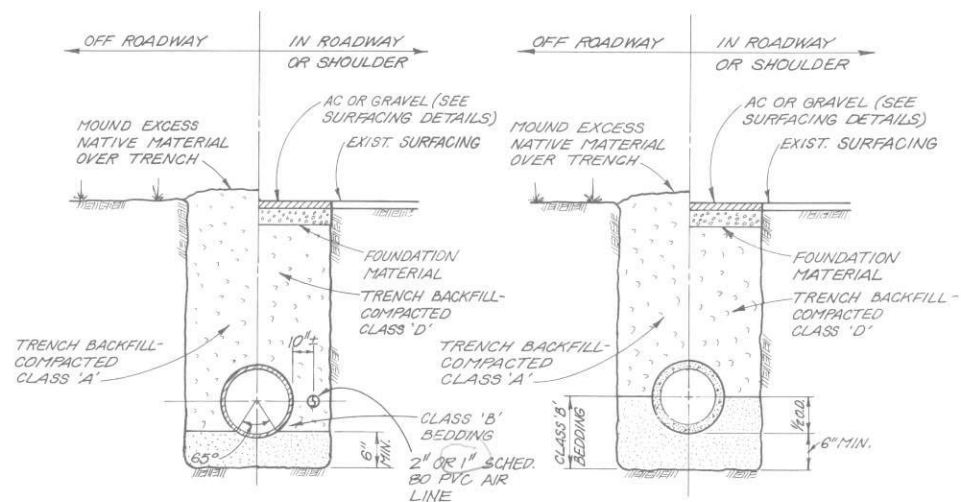
FORCE MAIN OUTFALL DETAIL

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



COMBINATION AIR VALVE DETAIL

N.T.S.

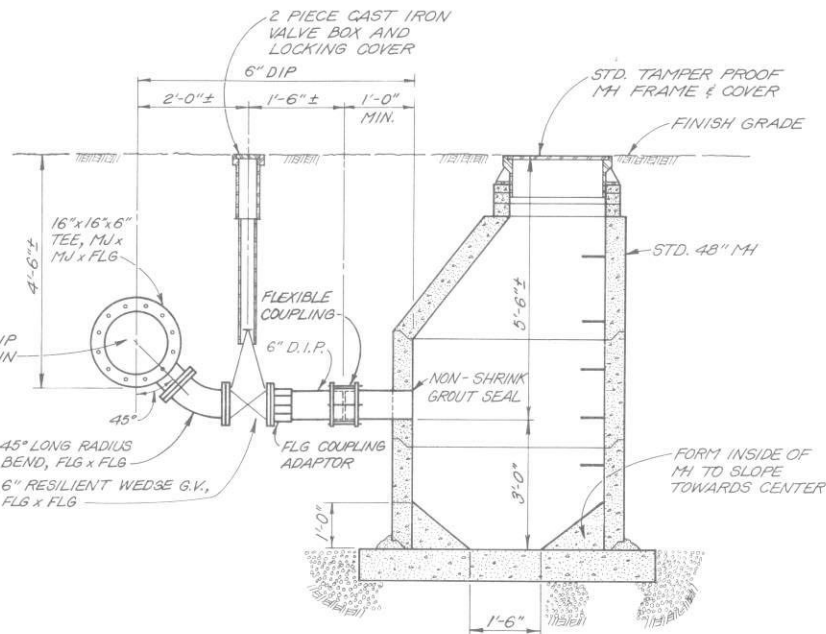


FORCE MAIN

GRAVITY SEWER

TYPICAL TRENCH DETAILS

N.T.S.



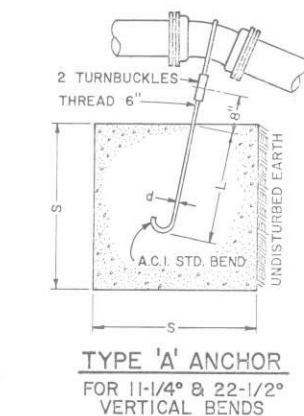
FORCE MAIN DRAIN VALVE AND WET WELL DETAIL

N.T.S.

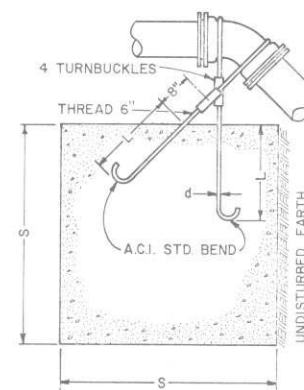
TYPE 'A' ANCHORS *						
PIPE SIZE	(DEG.) V.B.	CU. FT. CONC.	(FT.) S	(IN.) d	(FT.) L	(FT.) L
4	11-1/4	6	1.8	1/2	1.0	1.0
6	22-1/2	12	2.3	1/2	1.5	1.5
8	11-1/4	12	2.3	1/2	1.5	1.5
10	22-1/2	24	2.9	1/2	1.5	1.5
12	11-1/4	21	2.8	1/2	1.5	1.5
14	22-1/2	41	3.4	1/2	1.5	1.5
16	11-1/4	31	3.1	1/2	1.5	1.5
18	22-1/2	62	3.9	5/8	2.0	2.0
20	11-1/4	45	3.6	1/2	1.5	1.5
22	22-1/2	87	4.4	3/4	2.0	2.0
24	11-1/4	60	3.9	5/8	2.0	2.0
26	22-1/2	117	4.9	7/8	2.5	2.5
28	11-1/4	77	4.3	3/4	2.0	2.0
30	22-1/2	152	5.3	7/8	2.5	2.5
32	11-1/4	97	4.6	3/4	2.0	2.0
34	22-1/2	190	5.7	1	3.0	3.0
36	11-1/4	119	4.9	7/8	2.5	2.5
38	22-1/2	234	6.2	1-1/8	3.5	3.5
40	11-1/4	170	5.5	1	2.5	2.5
42	22-1/2	333	6.9	1-3/8	5.5	5.5

TYPE 'B' ANCHORS *					
PIPE SIZE	CU. FT. CONC.	(FT.) S	(IN.) d	(FT.) L	(FT.) L
4	21	2.8	1/2	1.0	1.0
6	44	3.5	1/2	1.5	1.5
8	76	4.2	1/2	1.5	1.5
10	114	4.8	5/8	2.5	2.5
12	161	5.4	3/4	2.5	2.5
14	217	6.0	7/8	3.0	3.0
16	280	6.5	1	3.0	3.0
18	352	7.1	1-1/8	3.5	3.5
20	432	7.6	1-1/8	3.5	3.5
24	616	8.5	1-1/8	5.5	5.5

* BASED ON 150 P.S.I. TEST PRESSURE



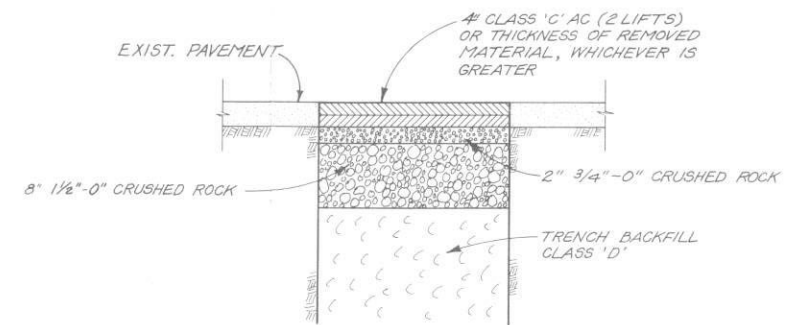
TYPE 'A' ANCHOR FOR 11-1/4° & 22-1/2° VERTICAL BENDS



TYPE 'B' ANCHOR FOR 45° VERTICAL BENDS

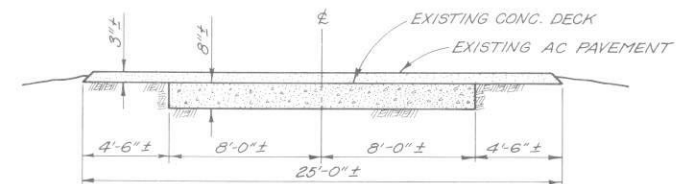
REACTION BLOCKING DETAILS

N.T.S.



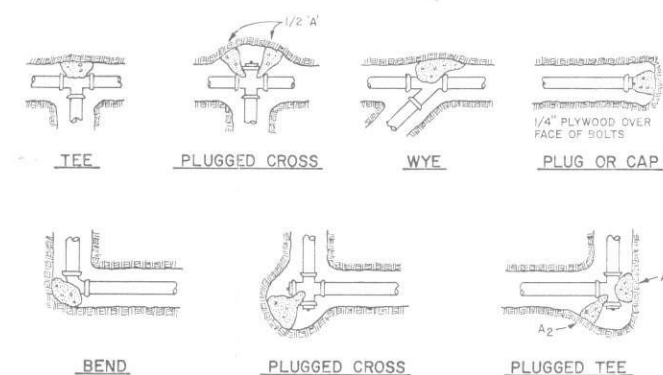
TYPICAL SURFACING DETAIL

N.T.S.



EXIST. WILLAMETTE FALLS DRIVE CONCRETE ROADWAY SECTION

N.T.S.



BEARING AREA, 'A', OF THRUST BLOCKS IN SQ. FT. *							
FITTING SIZE	TEE, WYE, PLUG OR CAP		90° BEND, PLUGGED CROSS		TEE PLUGGED ON RUN		45° BEND
	A	A ₁	A	A ₁	A ₁	A ₂	
4	1.4	1.9	2.7	1.9	1.0	—	—
6	2.8	4.0	5.6	4.0	2.1	1.1	—
8	4.9	6.8	9.5	6.8	3.7	1.9	0.9
10	7.3	10.3	14.5	10.3	5.6	2.8	1.4
12	10.3	14.5	20.4	14.5	7.9	4.0	2.0
14	13.5	18.5	27.5	19.5	10.6	5.4	2.7
16	17.8	25.2	35.5	25.2	13.6	7.0	3.5
18	22.4	31.7	44.7	31.7	17.1	8.7	4.4
20	27.5	38.9	54.8	38.9	21.0	10.7	5.4
24	39.2	55.5	78.3	55.5	30.0	15.3	7.7

* ABOVE BEARING AREAS BASED UPON TEST PRESSURE OF 150 P.S.I. AND AN ALLOWABLE SOIL BEARING STRESS OF 2000 POUNDS PER SQUARE FOOT. TO COMPUTE BEARING AREAS FOR DIFFERENT TEST PRESSURES AND SOIL BEARING STRESSES, USE THE FOLLOWING EQUATION: BEARING AREA = (TEST PRESSURE/150) X (2000/SOIL BEARING STRESS) X (TABLE VALUE).

NOTES:

- CONCRETE THRUST BLOCKING SHALL BE POURED AGAINST UNDISTURBED EARTH.
- KEEP CONCRETE CLEAR OF JOINT AND ACCESSORIES.
- THE REQUIRED THRUST BEARING AREAS FOR SPECIAL CONNECTIONS ARE SHOWN ENCIRCLED ON THE PLANS; e.g. (15) INDICATES 15 SQUARE FEET BEARING AREA REQUIRED.
- IF NOT SHOWN ON PLANS, REQUIRED BEARING AREAS AT FITTING SHALL BE AS INDICATED IN ABOVE TABLE, ADJUSTED IF NECESSARY, TO CONFORM TO THE TEST PRESSURE(S) AND ALLOWABLE SOIL BEARING STRESS(ES) STATED IN THE SPECIFICATIONS.
- BEARING AREAS AND SPECIAL BLOCKING DETAILS SHOWN ON PLANS TAKE PRECEDENCE OVER BEARING AREAS AND BLOCKING DETAILS SHOWN ON THIS DETAIL.

THRUST BLOCKING DETAILS

N.T.S.

DETAILS

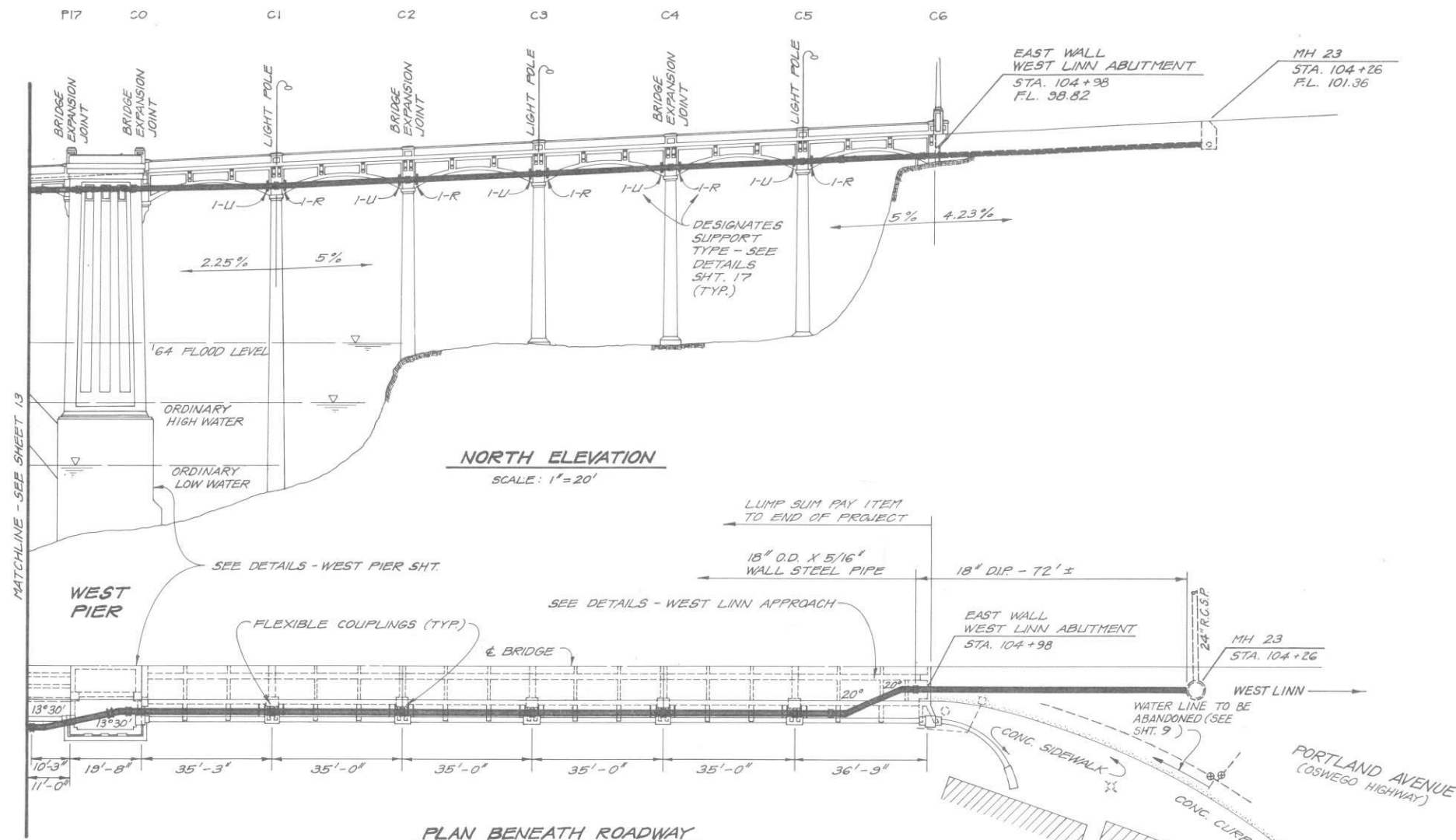
TRI-CITY SERVICE DISTRICT
CLACKAMAS COUNTY, OREGON
WEST LINN FORCE MAIN
AND GRAVITY SEWER

MURRAY SMITH & ASSOCIATES
Engineers/Planners
Harrison Square
1800 S.W. First Street
Portland, Oregon 97201
503-225-9910

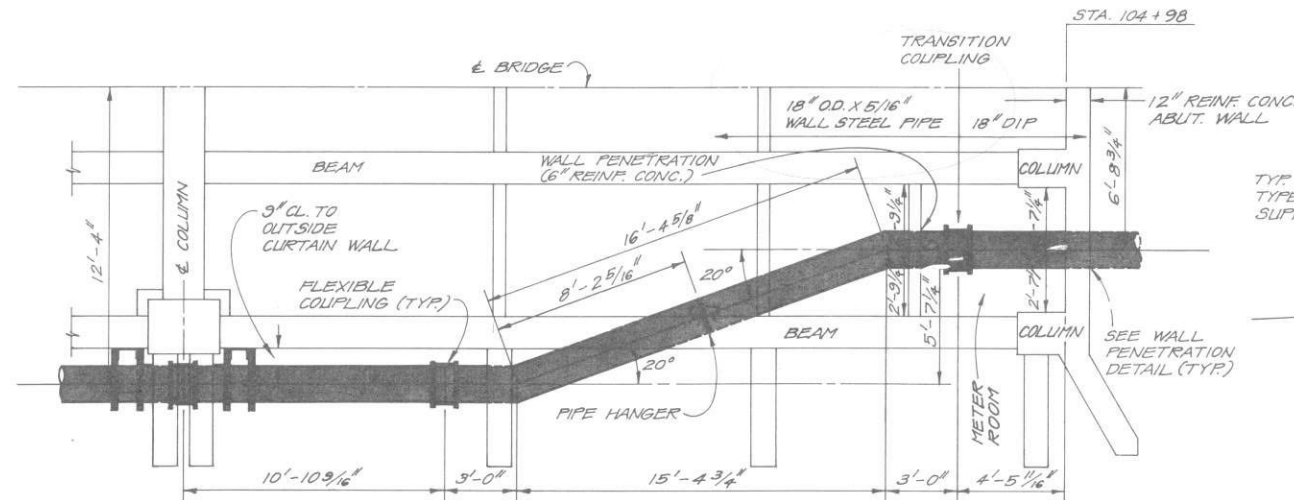
MSA

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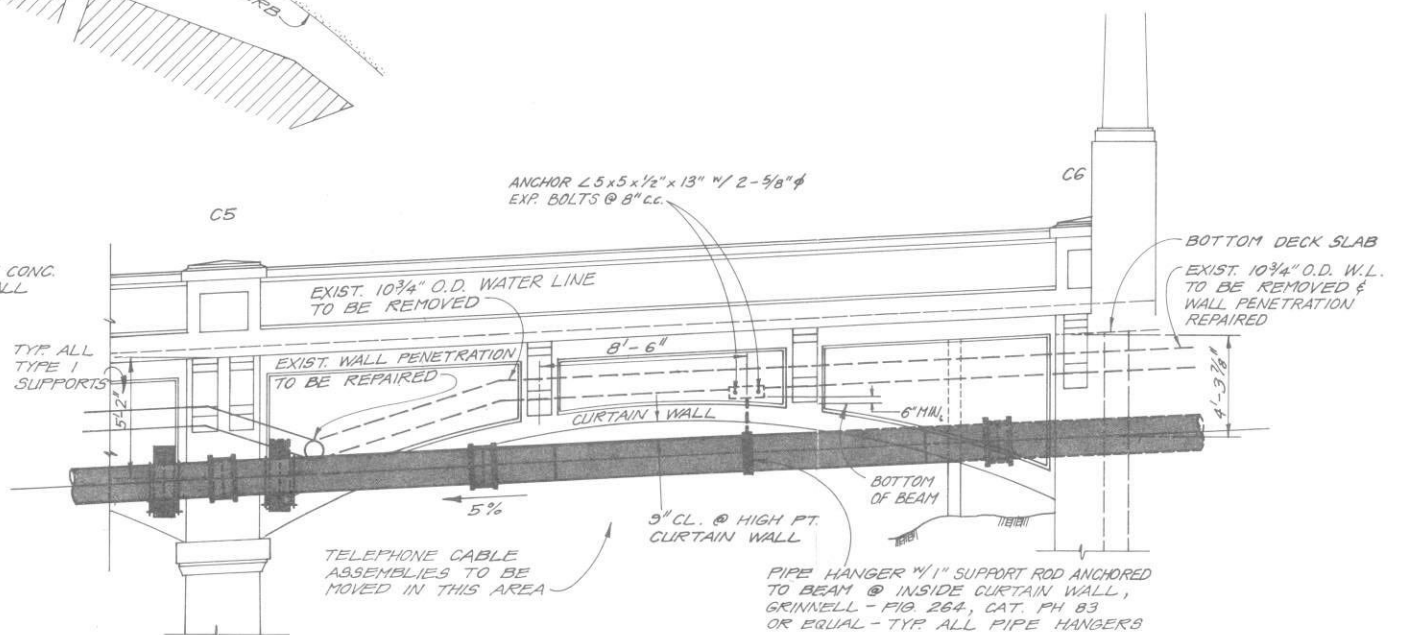
OREGON CITY - WEST LINN BRIDGE



PLAN BENEATH ROADWAY

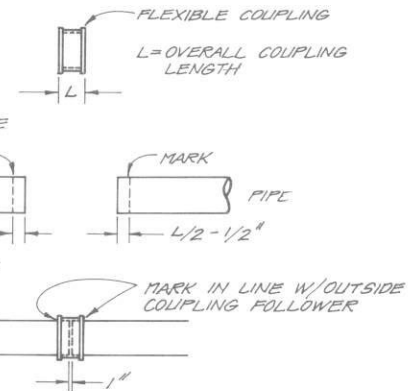
DETAILS - WEST LINN APPROACH

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



NORTH ELEVATION

- NOTES:**
- 1" SEPARATION SHALL BE PROVIDED BETWEEN PIPE ENDS IN ALL FLEXIBLE COUPLINGS - PIPE ENDS SHALL BE CENTERED WITHIN COUPLINGS.
 - COUPLING INSTALLATION SHALL BE AS FOLLOWS:
 1. MEASURE COUPLING
 2. MARK PIPE
 3. ASSEMBLE
 2. CONTRACTOR SHALL VERIFY ALL DIMENSIONS PRIOR TO FABRICATION.



PLAN, ELEVATION AND DETAILS OF BRIDGE CROSSING

TRI-CITY SERVICE DISTRICT
CLACKAMAS COUNTY, OREGON
WEST LINN FORCE MAIN
AND GRAVITY SEWER

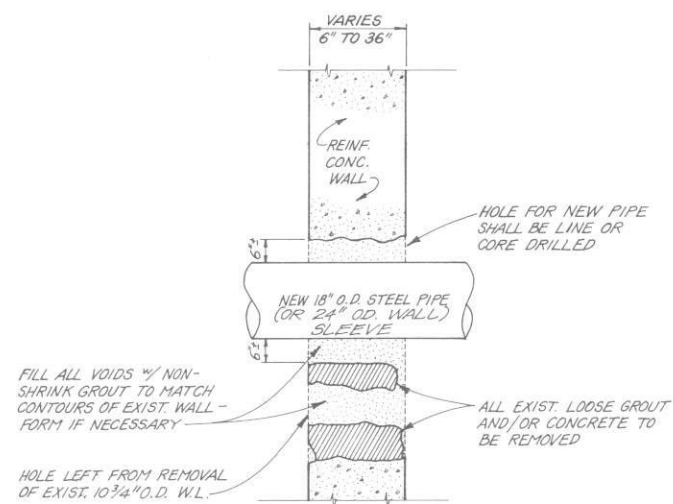
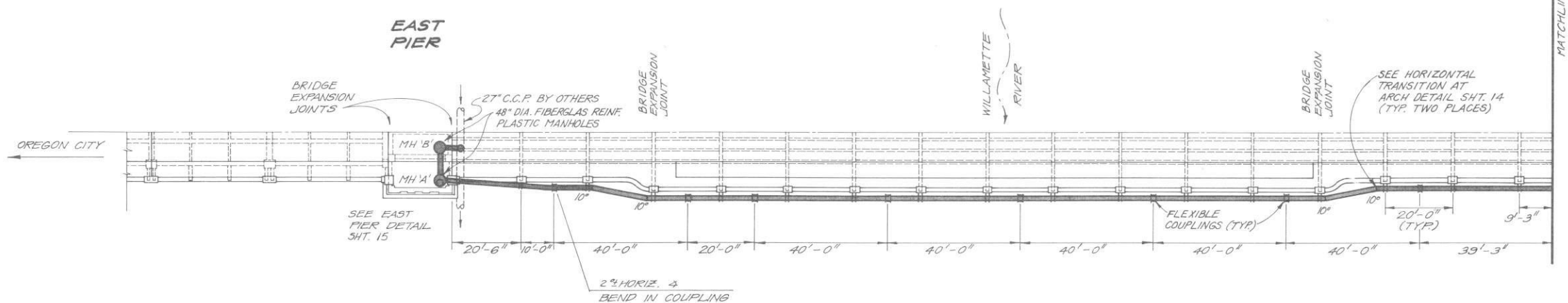
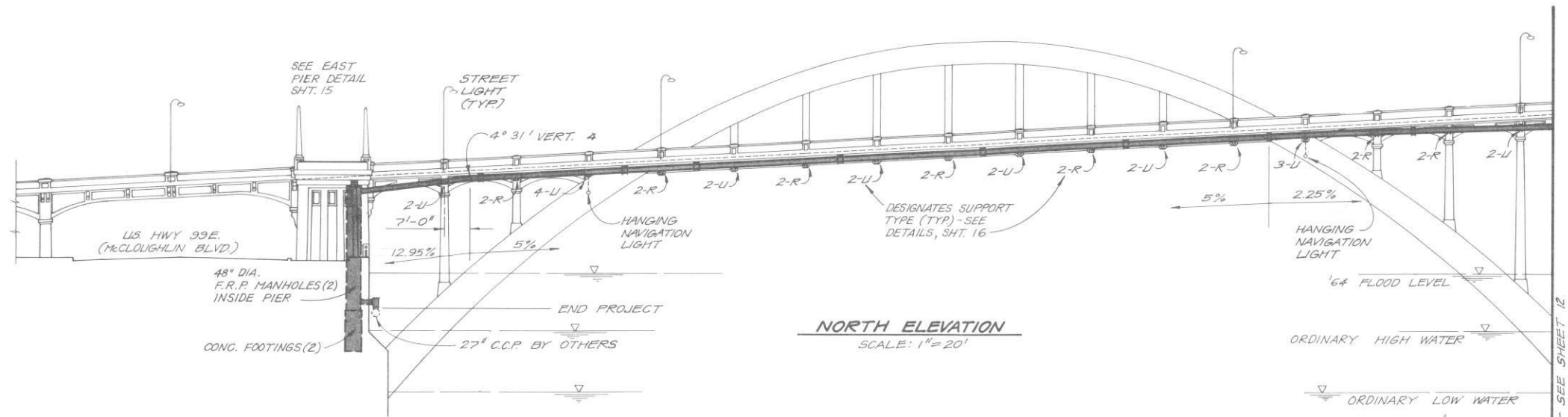
MURRAY, SMITH & ASSOCIATES
Engineers/Planners
Harrison Square
1800 S.W. First Avenue
Portland, Oregon 97201
503-225-9010

NSA

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P0 P1 P2 P3 P4 P5 P6 P7 P8 P9 P10 P11 P12 P13 P14 P15 P16



WALL PENETRATION DETAIL

N.T.S.

OREGON CITY - WEST LINN BRIDGE

PLAN, ELEVATION
AND DETAILS OF
BRIDGE CROSSING

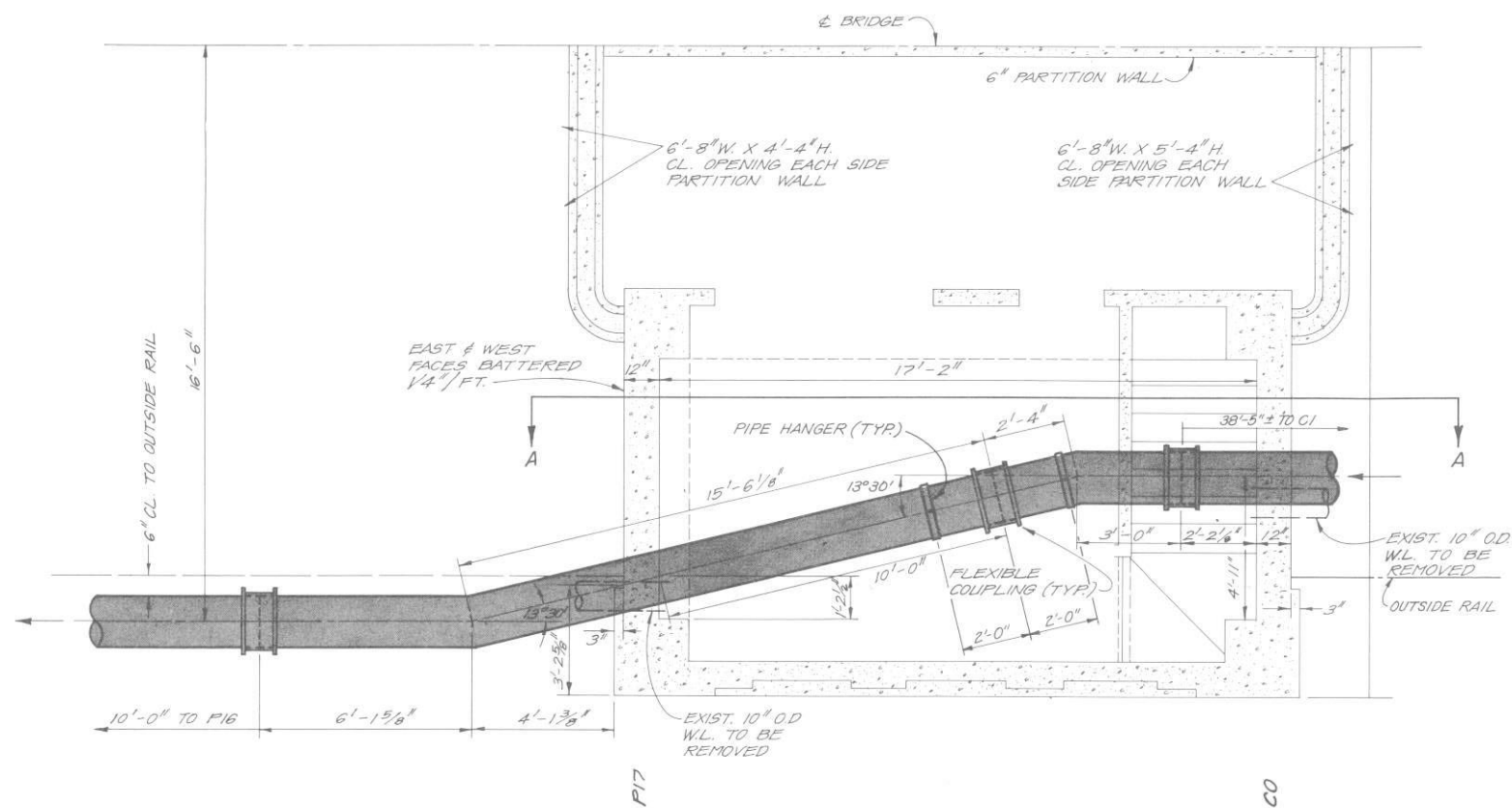
TRI-CITY SERVICE DISTRICT
CLACKAMAS COUNTY, OREGON
WEST LINN FORCE MAIN
AND GRAVITY SEWER

MURRAY SMITH & ASSOCIATES, P.C.
Engineers/Planners
1800 S.W. First Suite 500
Portland, Oregon 97201
503-225-9000

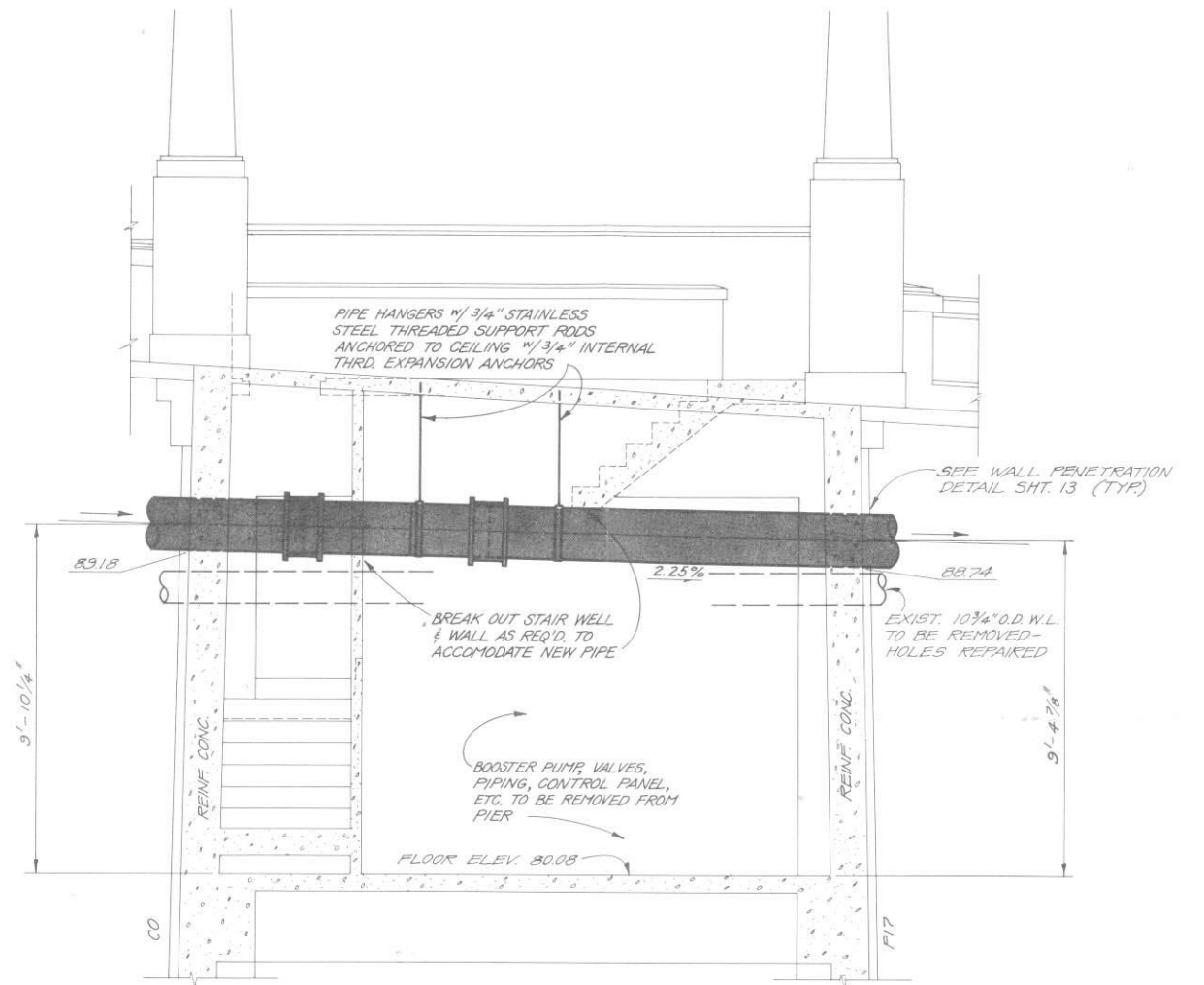
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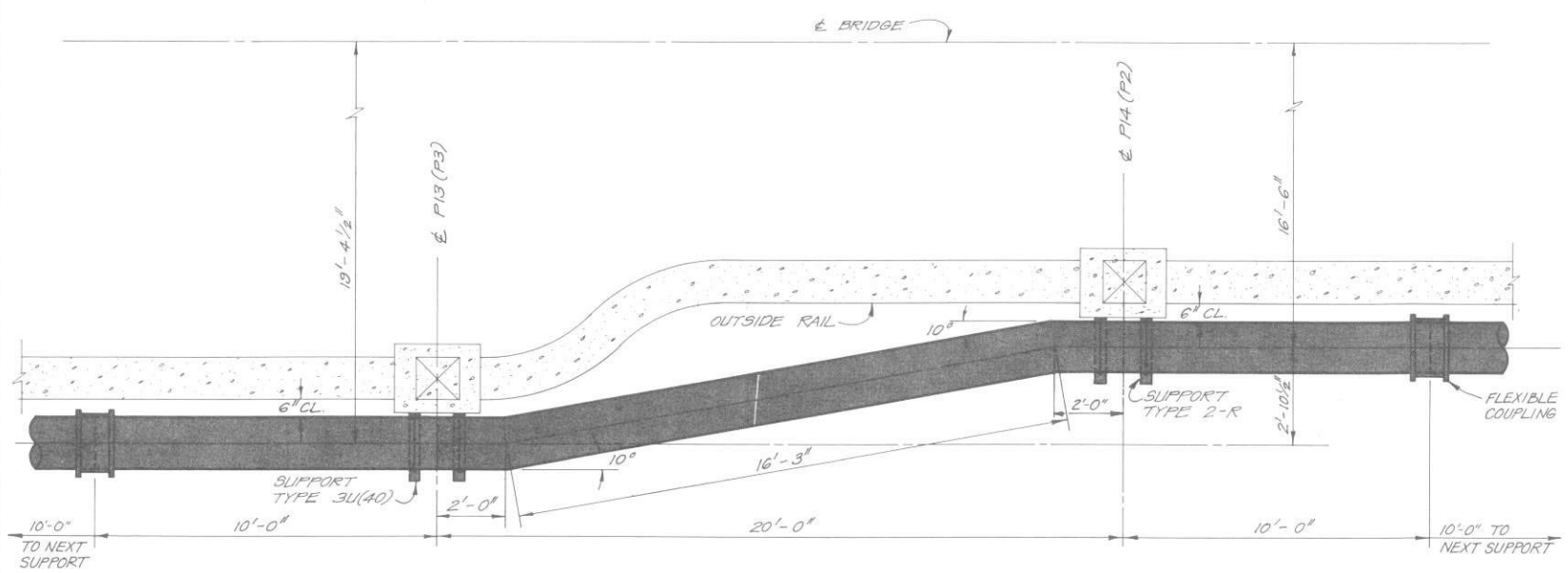


PLAN AT PIPE ELEVATION
SCALE: 3/8" = 1'-0"

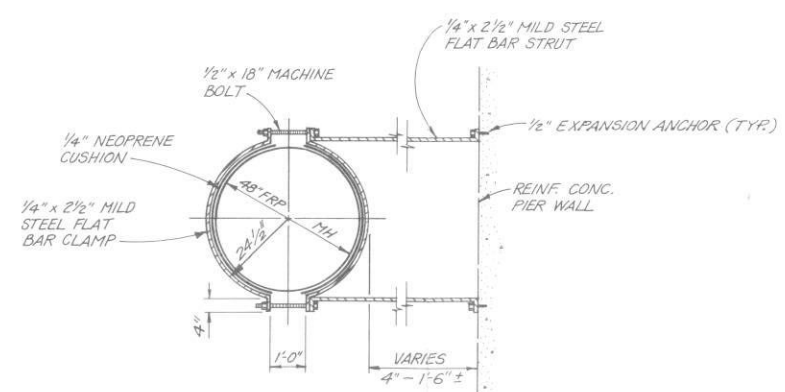


SECTION A-A
SCALE: 3/8" = 1'-0"

DETAILS - WEST PIER



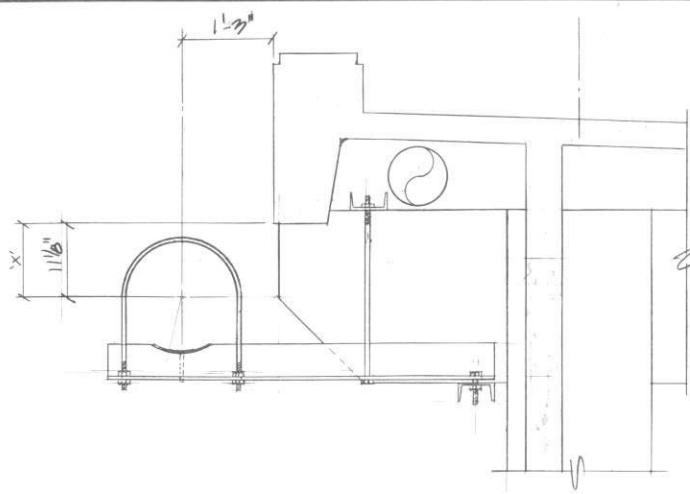
DETAIL - HORIZONTAL TRANSITION AT ARCH
SCALE: 3/8" = 1'-0"



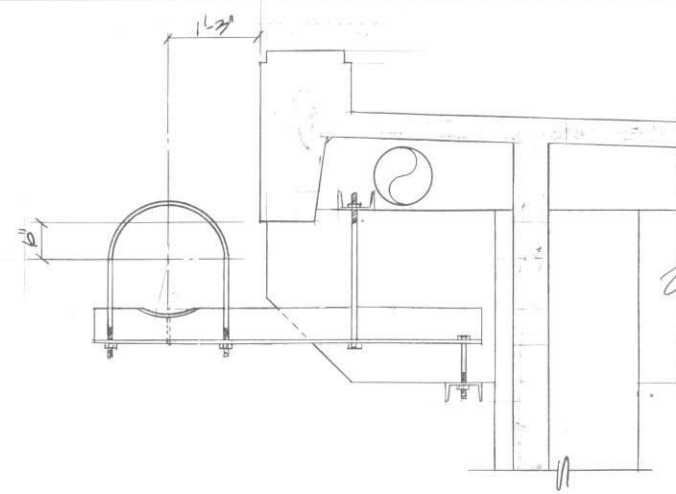
MANHOLE RESTRAINT DETAIL
SCALE: 3/8" = 1'-0"



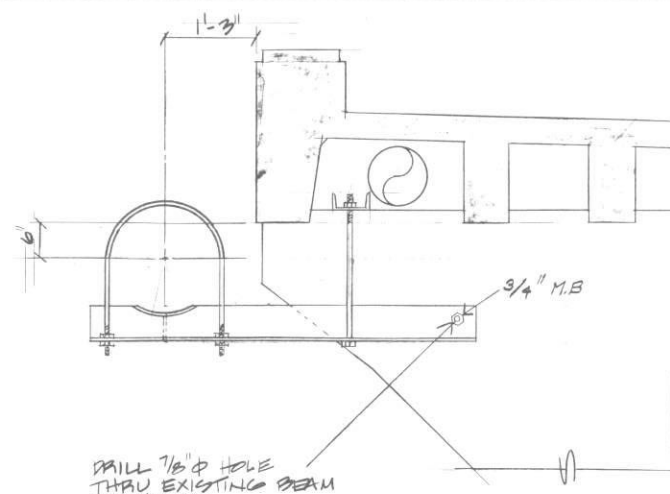
<div><div>MURRAY, SMITH & ASSOCIATES² Engineers / Planners Harrison Square 1800 S.W. First Suite 500 Portland, Oregon 97201 503-225-9000</div></div>	SHEET	14 of 17	FILE NO. 83-0066.20	TRI-CITY SERVICE DISTRICT CLACKAMAS COUNTY, OREGON		WEST PIER DETAILS											
				WEST LINN FORCE MAIN AND GRAVITY SEWER		SCALE AS SHOWN		DATE FEB, 1986		NO.		REVISION		BY		DATE	
				DESIGNED	NLV	DRAWN	KPM	CHECKED	PHS								



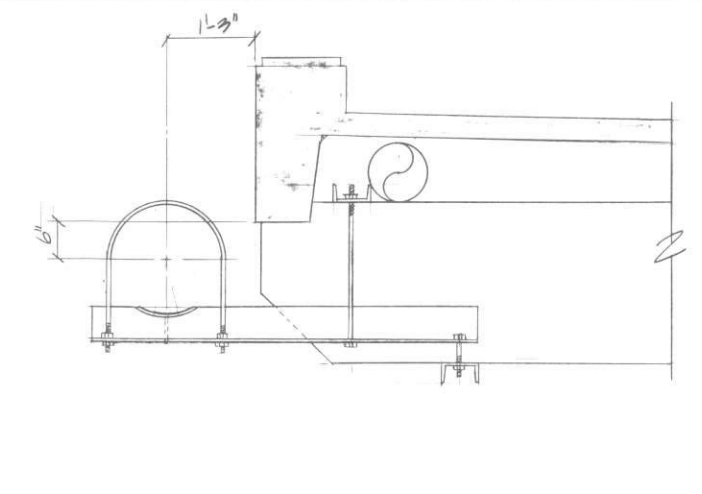
BRACKET 2-U AT P1
3/4" = 1'-0"



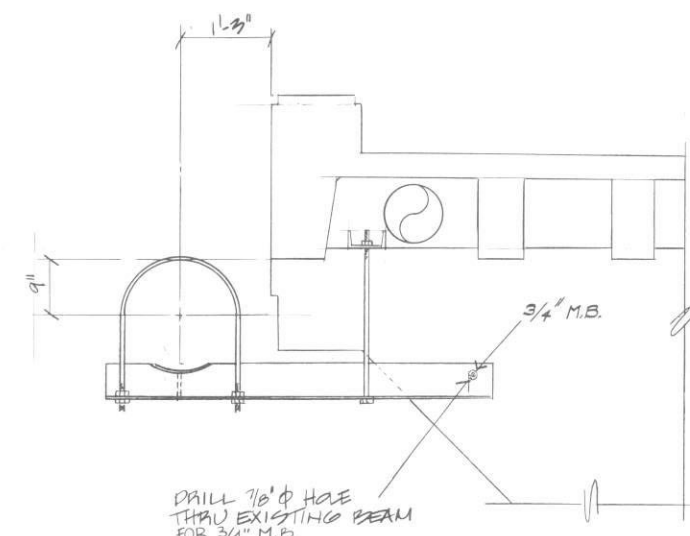
BRACKET 2-R AT P2
3/4" = 1'-0"



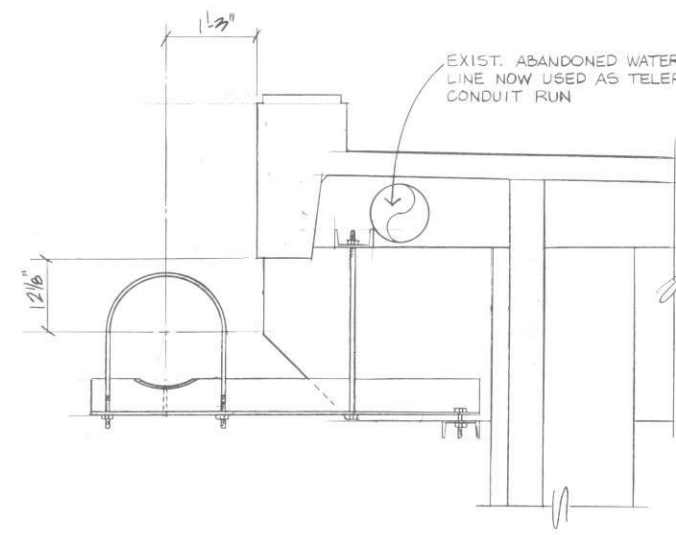
BRACKET 4-U AT P3
3/4" = 1'-0"



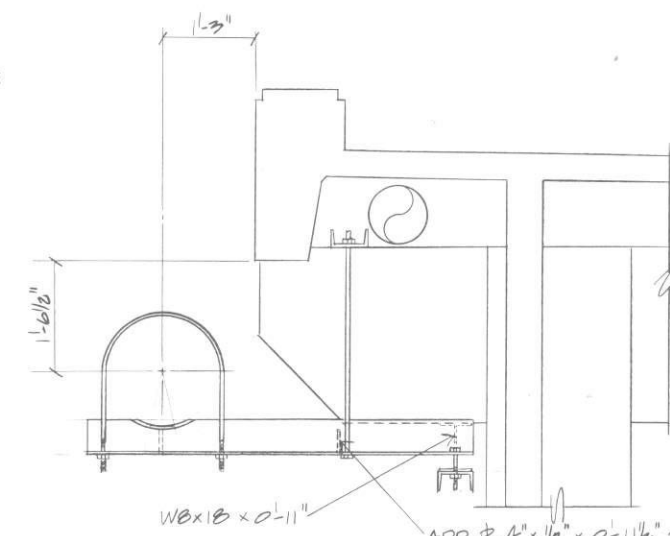
BRACKETS 2-R & 2-U AT P4 THRU P12
3/4" = 1'-0"



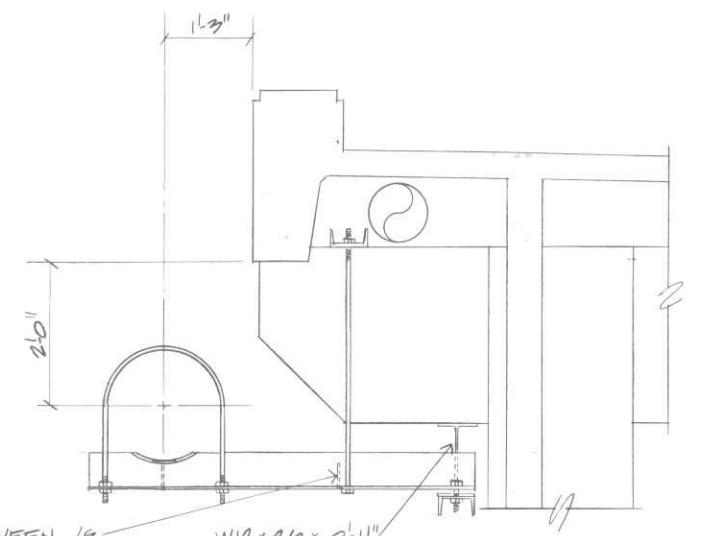
BRACKET 3-U AT P13
3/4" = 1'-0"



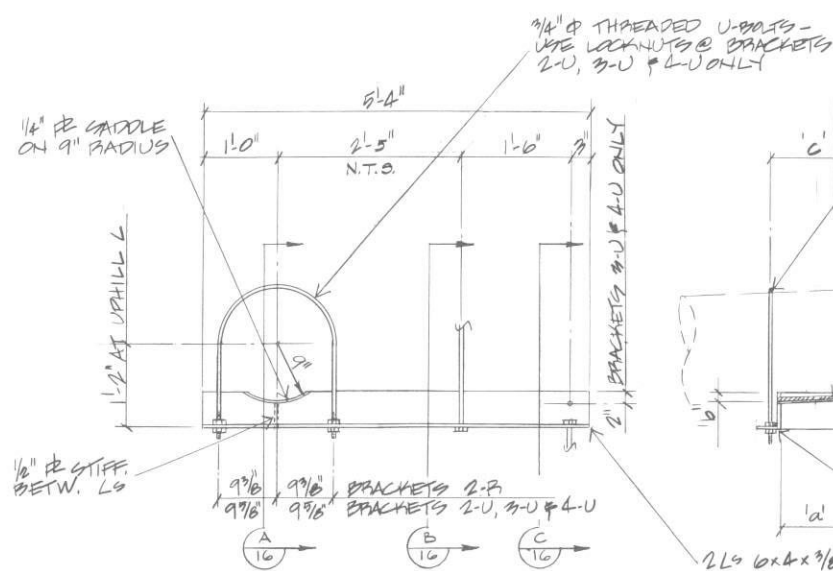
BRACKET 2-R AT P14
3/4" = 1'-0"



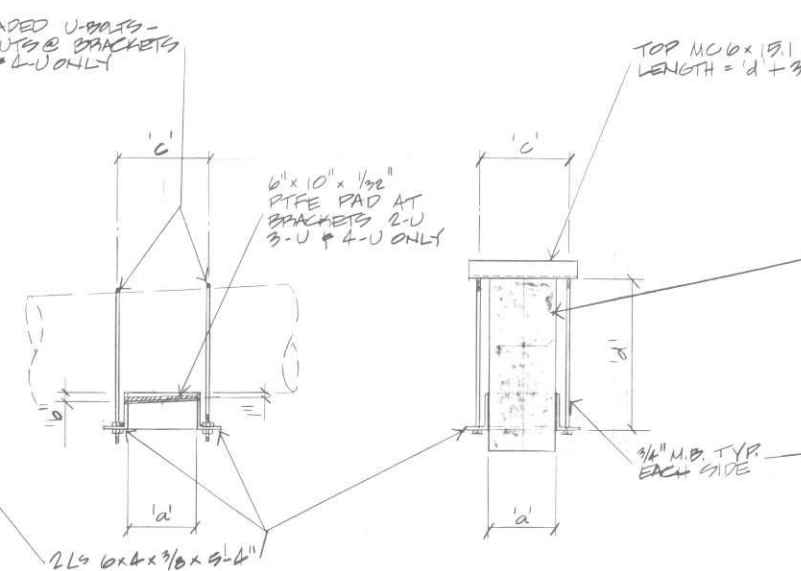
BRACKET 2-R AT P15
3/4" = 1'-0"



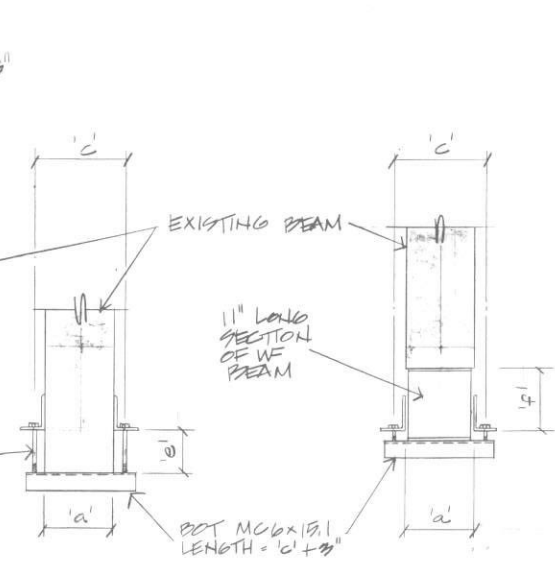
BRACKET 2-U AT P16
3/4" = 1'-0"



TYPICAL BRACKET
3/4" = 1'-0"



SECTION A-A
3/4" = 1'-0"

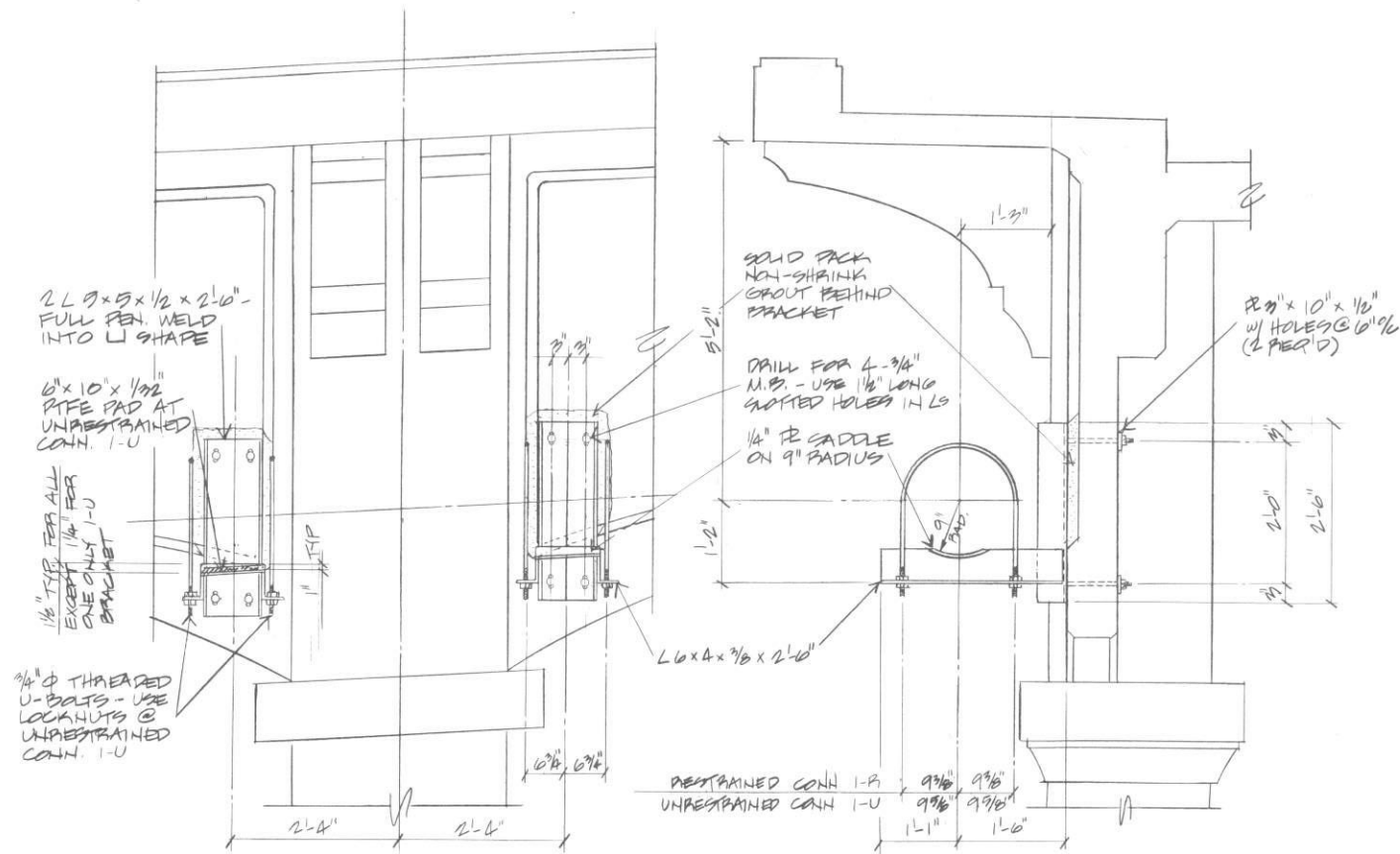


SECTION B-B
3/4" = 1'-0"

NO.	GRADE	x'	a'	b'	c'	d'	e'	f'	REMARKS
P1	2-U	12.95	11 1/2"	11 1/2"	2 9/16"	15"	27 3/8"	15 1/2"	
P2	2-R	3.0	6"	11 1/2"	15 1/2"	15"	22"	7"	
P3	4-U			11 1/2"	15 1/2"	15"			
P4	2-R			11 1/2"	15 1/2"	15"			
P5	2-U			11 1/2"	15 1/2"	15"			
P6	2-R			11 1/2"	15 1/2"	15"			
P7	2-U			11 1/2"	15 1/2"	15"			
P8	2-R			11 1/2"	15 1/2"	15"			
P9	2-U			11 1/2"	15 1/2"	15"			
P10	2-R			11 1/2"	15 1/2"	15"			
P11	2-U			11 1/2"	15 1/2"	15"			
P12	2-R	9.0	6"	11 1/2"	15 1/2"	15"	22"	5"	
P13	3-U	2.25	9"	12 1/2"	15 1/2"	15"	20 1/2"	7 1/2"	
P14	2-R		12 1/2"	11 1/2"	15 1/2"	15"			
P15	2-R		12 1/2"	11 1/2"	15 1/2"	15"			
P16	2-U	2.25	12 1/2"	11 1/2"	15 1/2"	15"			
C1	1-U	2.25	5 1/2"	10"	11 1/2"	13 1/2"			
C2	1-R	3.0	5 1/2"	10"	11 1/2"	13 1/2"			
C3	1-U								
C4	1-R								
C5	1-U	9.0	5 1/2"	10"	11 1/2"	13 1/2"			
C6	1-R								

NOTE THAT DIMENSIONS 'd', 'e' AND 'f' ARE APPROXIMATE





PIPE SUPPORT BRACKETS 1-R AND 1-U (5 EACH REQ'D)
 $\frac{3}{4}" = 1'-0"$

GENERAL NOTES

1. STRUCTURAL STEEL shall conform to ASTM A36. All joints are to be full penetration welded with E70XX electrodes.
2. BOLTS AND THREADED PARTS shall conform to ASTM A36 or A307. Provide a minimum of 8" of thread on both ends of all U-bolts. On bracket connection bolts, provide 8" of thread or, for the shorter bolts, thread for the bolt length less 1".
3. UNRESTRAINED BRACKET SADDLES are to be installed with slide bearing pad seats. PTFE (polytrichloroflouroethylene) slide bearings conforming to ASTM D1457 are manufactured by Alert Manufacturing Co. of Norridge, Illinois. (Local representative is Dalton Associates, Inc. at 503/636-5643.) Install the 6" x 10" x 1/32" thick pad bearings with epoxy adhesive in accordance with the manufacturer's recommendations. Prior to the installation of the steel pipe, place a bearing sheet of 7" x 11" x 0.062" stainless steel on each PTFE pad. The sheets are to be preformed to a 9" radius and may be taped into position centered on the PTFE pad. Apply Alert #420 adhesive to the sheet back just prior to placing the pipe section into the bracket. U-bolts at unrestrained joints to be lock-nutted with 1/4-inch clear between pipe and bolts.

PIPE SUPPORT DETAILS

TRI-CITY SERVICE DISTRICT
 CLACKAMAS COUNTY, OREGON
 WEST LINN FORCE MAIN
 AND GRAVITY SEWER

MURRAY, SMITH & ASSOCIATES
 Engineers/Planners
 1800 SW Jefferson Square
 Portland, Oregon 97201
 503-225-5900



charles
 gary
 peterson

consulting engineer
 503/292-3521
 9999 S.W. Wilshire Street
 Portland, Oregon 97225

SHEET
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 FILE NO.
 83-0066.20