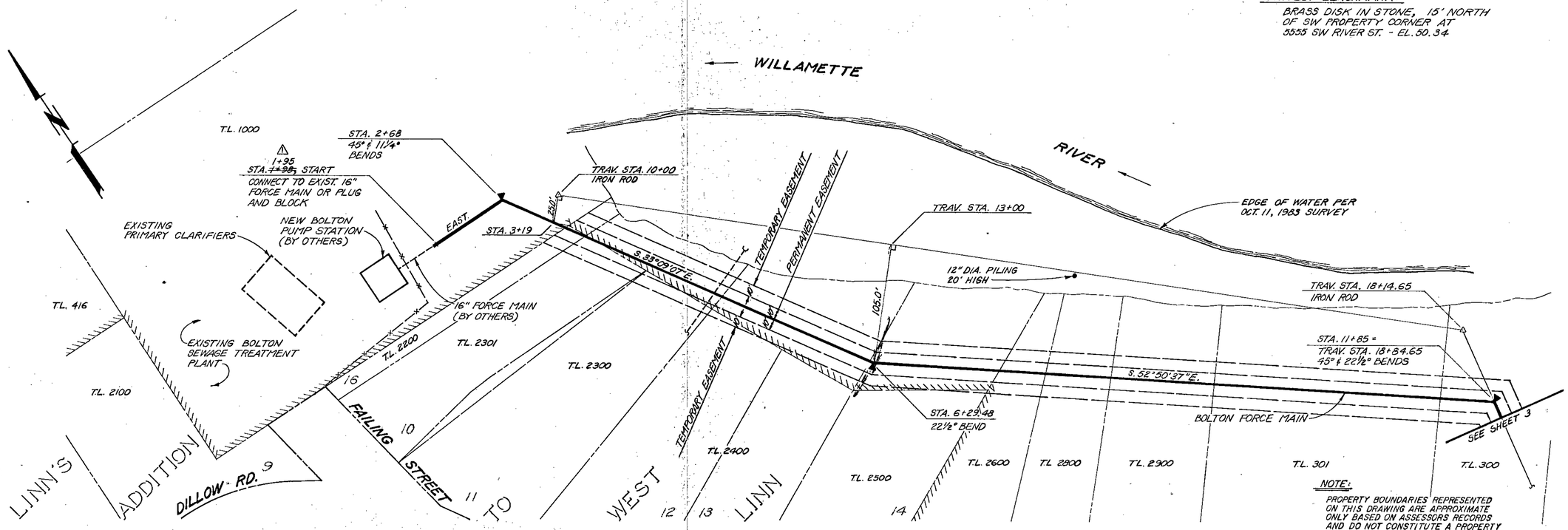
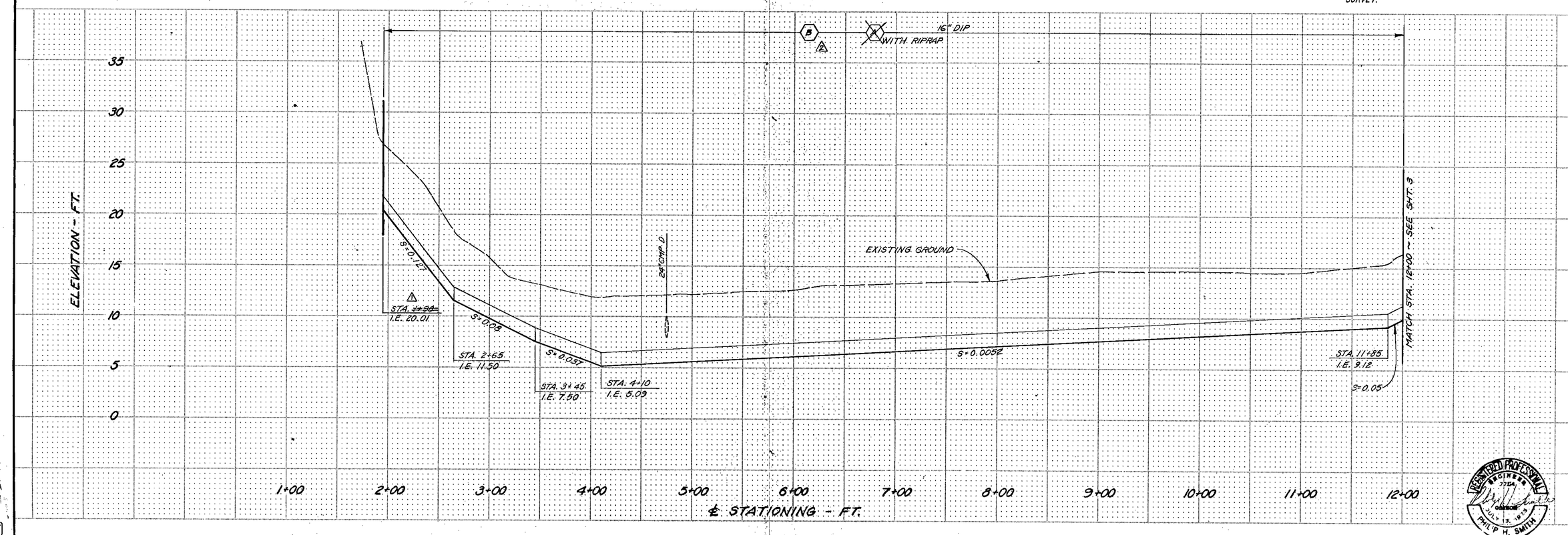
PROJECT BENCHMARK:
BRASS DISK IN STONE, 15' NORTH OF SW PROPERTY CORNER AT 3555 SW RIVER ST. - EL. 50.34



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



REGISTERED PROFESSIONAL ENGINEER 7254 OREGON JULY 13, 1973 PHILIP H. SMITH

NO.	REVISION	BY	DATE
1	AS BUILT RECORD DRAWING	KPM	6-4-86
		RD	10-2-85

PLAN & PROFILE
STA. 1+98, START to 12+00

SCALE 1" = 50' H., 1" = 5' V. | DATE FEBRUARY, 1985

DESIGNED N.L.V. | DRAWN R.F.D. | CHECKED P.H.S.

TRI-CITY SERVICE DISTRICT
CLACKAMAS COUNTY, OREGON
BOLTON AND RIVER STREET FORCE MAINS

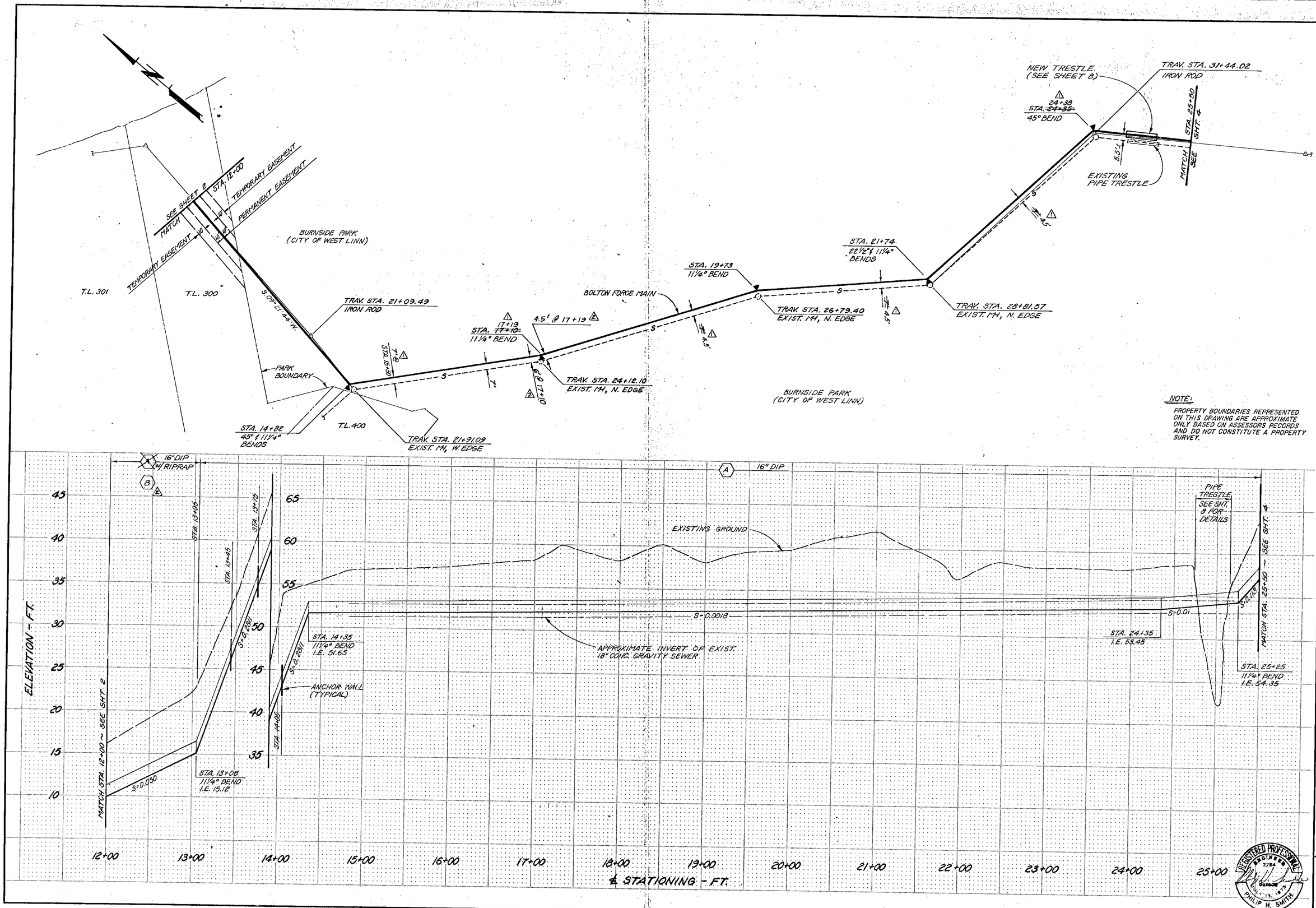
MURRAY, SMITH & ASSOCIATES, INC.
Engineers / Planners
Harrison Square
1600 S.W. First, Suite 510
Portland, Oregon 97201
503-220-1100

MSA

SHEET 2 of 8

FILE NO. 83-0064/65.20

42



NO.	REVISION	BY	DATE
1	AS BUILT RECORD DRAWING	KPH	6-4-86
2		RD	10-2-85

PLAN & PROFILE
STA. 12+00 to 25+50

SCALE 1" = 50' H., 1" = 5' V. | DATE FEBRUARY, 1985

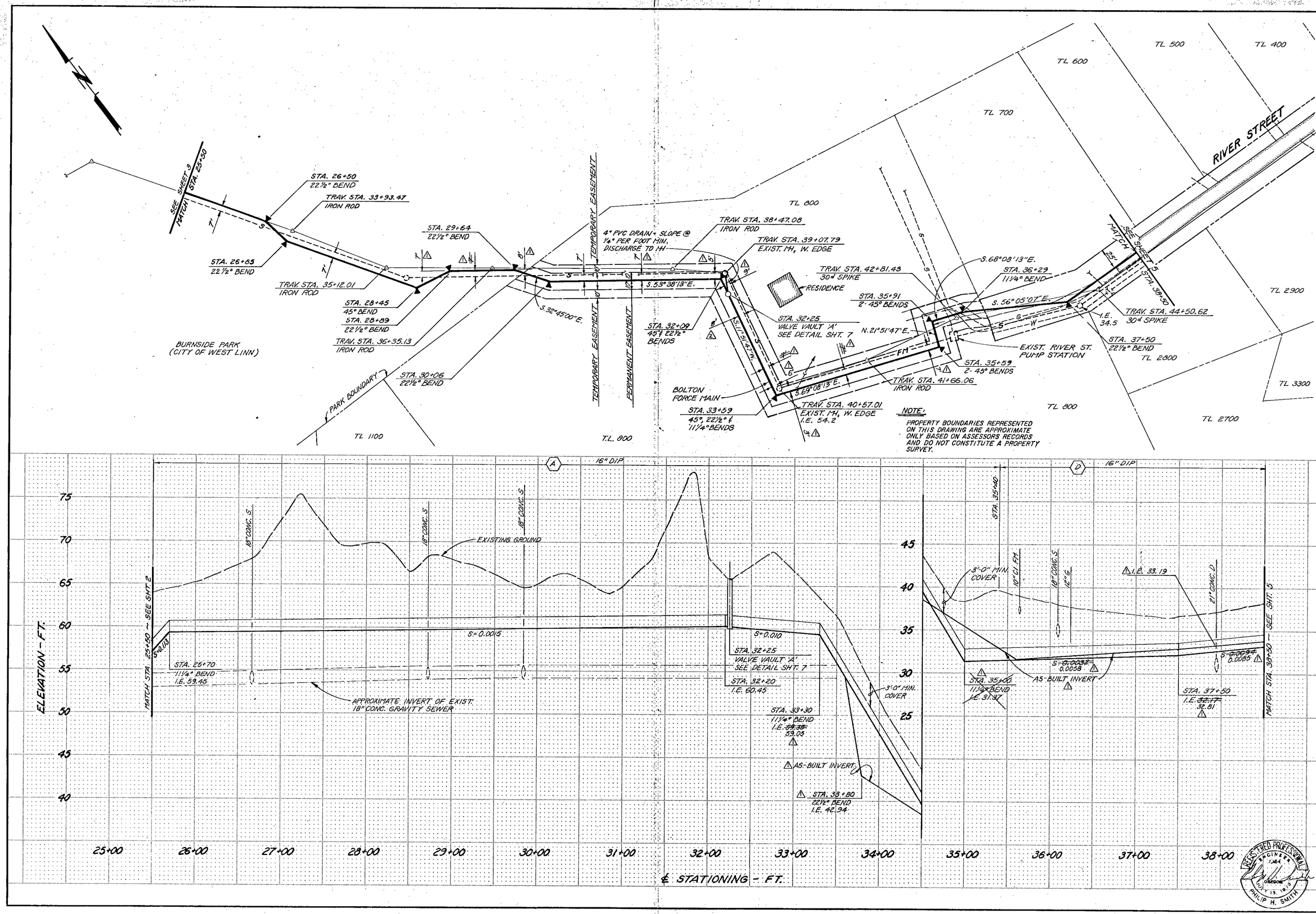
TRI-CITY SERVICE DISTRICT
CLACKAMAS COUNTY, OREGON
BOLTON AND RIVER STREET FORCE MAINS

DESIGNED NLV | DRAWN RFD | CHECKED PHS

MSA
MURRAY, SMITH & ASSOCIATES, P.C.
Engineers / Planners
Harrison Square
1800 S.W. First, Suite 510
Portland, Oregon 97201
503/226-1560

SHEET
3 of 8

FILE NO.
83-0064/65.20



NO.	REVISION	BY	DATE
1	AS BUILT RECORD DRAWING	KPM	6-4-86
2		RD	10-2-85

PLAN & PROFILE
STA. 25+50 to 38+50

SCALE 1" = 50' H., 1" = 5' V. | DATE FEBRUARY, 1985

TRI-CITY SERVICE DISTRICT
CLACKAMAS COUNTY, OREGON
BOLTON AND RIVER STREET FORCE MAINS

DESIGNED N.L.V. | DRAWN R.F.D. | CHECKED P.H.S.

MURRAY, SMITH & ASSOCIATES, P.C.
Engineers / Planners
Harrison Square
6600 S.W. First, Suite 250
Portland, Oregon 97201
503-225-9010

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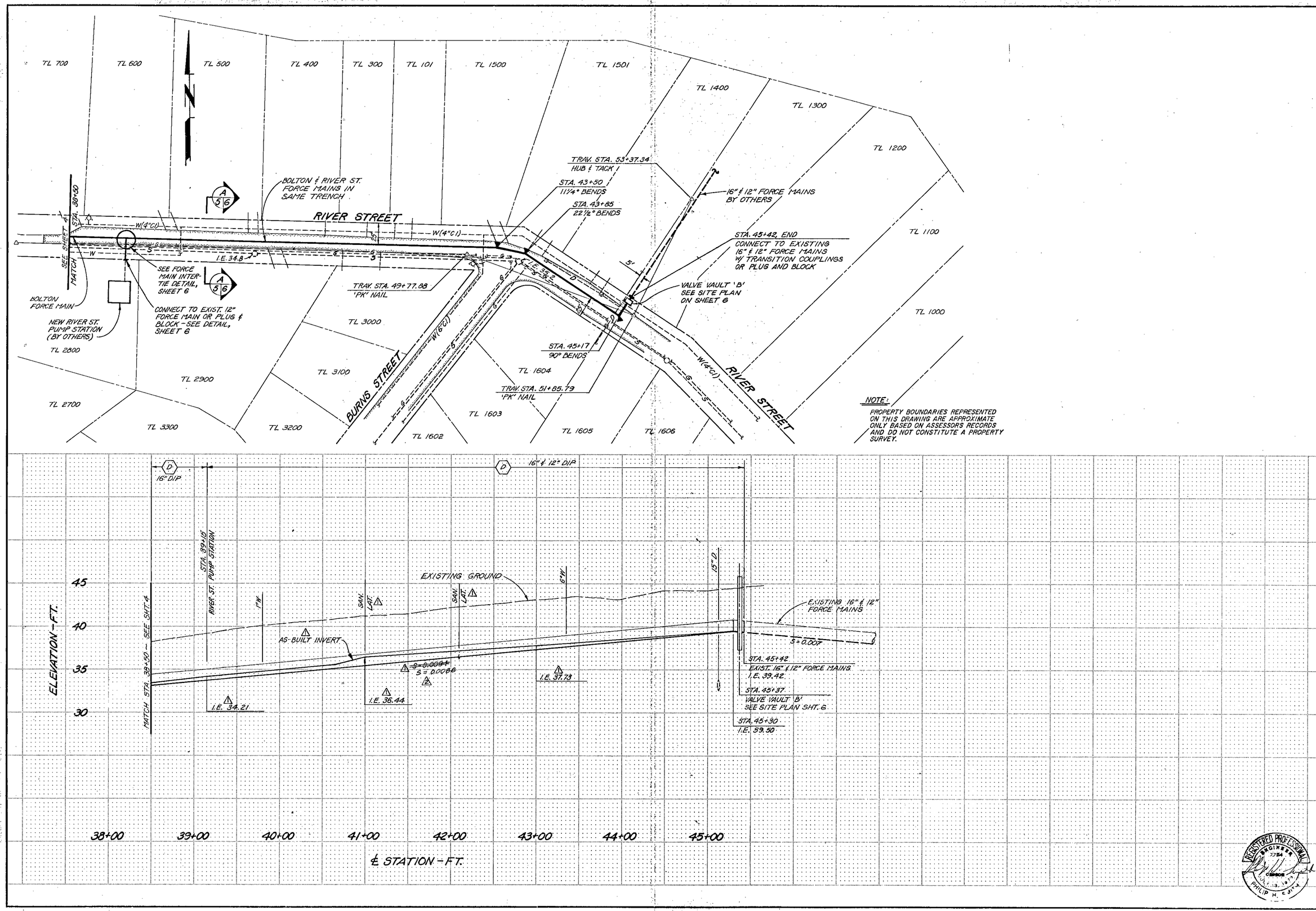
REGISTERED PROFESSIONAL ENGINEER
OREGON
JANUARY 15, 1985
PHILIP H. SMITH

SHEET 4 of 8

FILE NO. 83-0064/65.20

44



NO.	REVISION	BY	DATE
2	AS BUILT	KPM	6-4-86
1	RECORD DRAWING	RD	10-2-85

PLAN & PROFILE
STA. 38+50 to END

SCALE 1"=50' H, 1"=5' V. | DATE FEBRUARY, 1985

TRI-CITY SERVICE DISTRICT
CLACKAMAS COUNTY, OREGON
BOLTON AND RIVER STREET
FORCE MAINS

DESIGNED NLV | DRAWN RFD | CHECKED PHS

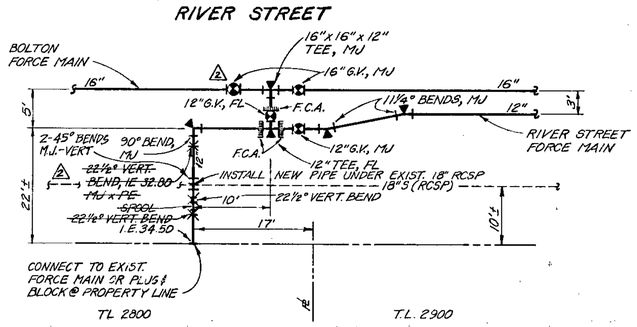
MURRAY, SMITH & ASSOCIATES
Engineers / Planners
Harrison Square
1800 S.W. First Suite 500
Portland, Oregon 97201
503-225-9010

MSA

REGISTERED PROFESSIONAL ENGINEER 7754 OREGON PHILIP H. SMITH

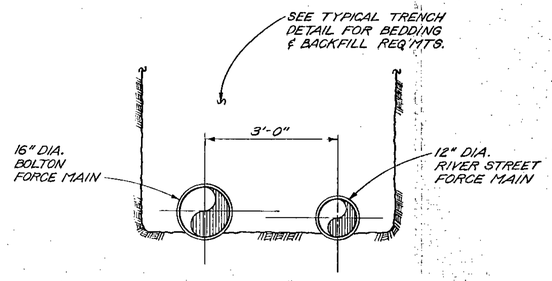
SHEET 5 of 8

FILE NO. 83-0064/65.20



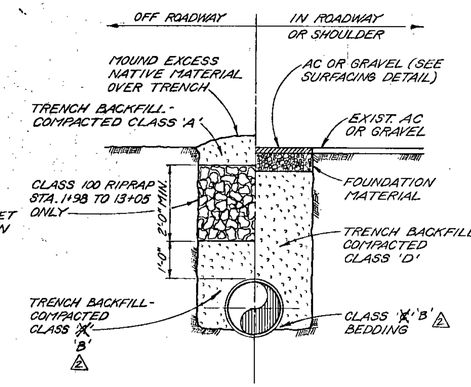
FORCE MAIN INTERTIE DETAIL

N.T.S.



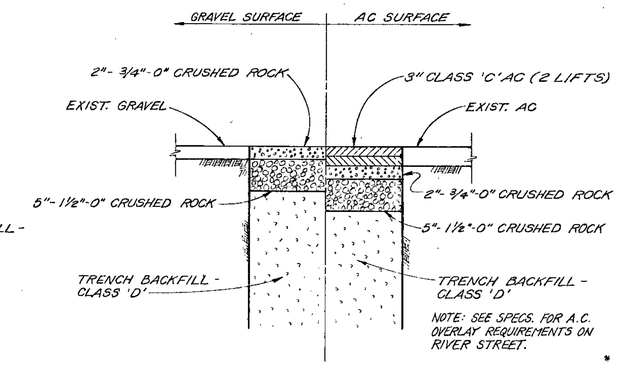
SECTION A/5 6

N.T.S.



TYPICAL TRENCH DETAIL

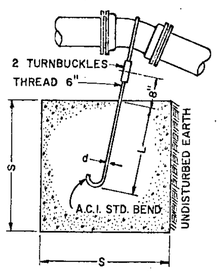
N.T.S.



TYPICAL SURFACING DETAIL

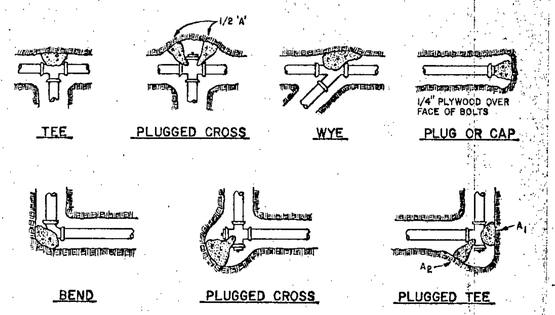
N.T.S.

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



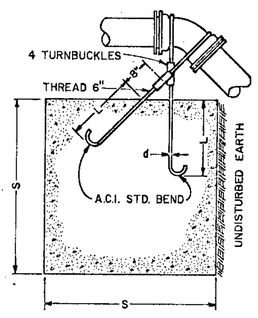
TYPE 'A' ANCHOR

FOR 11-1/4° & 22-1/2° VERTICAL BENDS



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

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



TYPE 'B' ANCHOR

FOR 45° VERTICAL BENDS

REACTION BLOCKING DETAIL

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	22 1/2° BEND	11 1/4° BEND
	A	A	A_1	A_2	A	A	A
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	4.8	6.8	9.6	6.8	3.7	1.8	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	13.8	19.5	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

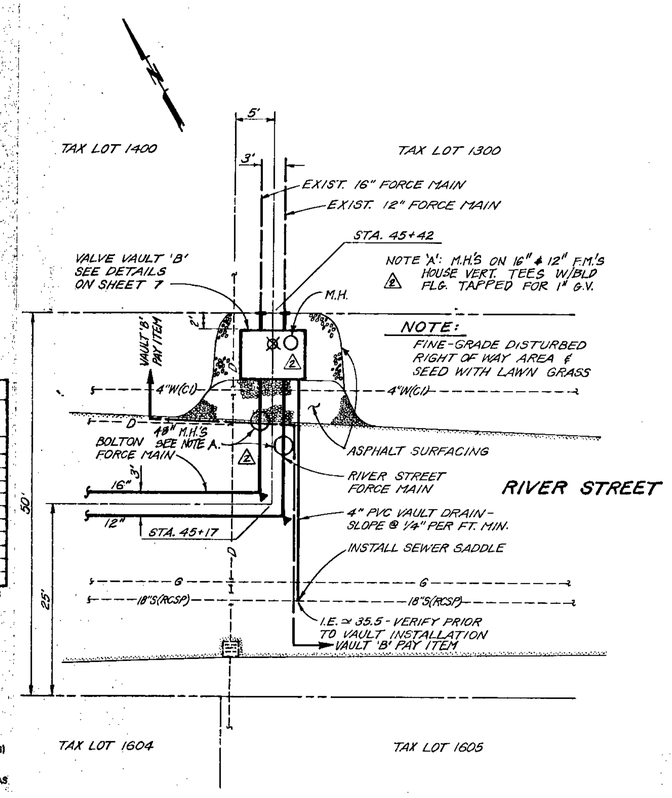
*ABOVE BEARING AREAS BASED UPON TEST PRESSURE OF 150 P.S.I. AND AN ALLOWABLE SOIL BEARING STRESS OF 2000 POUNDS PER SQUARE FOOT. TO COMPUTE BEARING AREAS FOR DIFFERENT TEST PRESSURES AND SOIL BEARING STRESSES, USE THE FOLLOWING EQUATION: BEARING AREA = (TEST PRESSURE/150) X (2000/SOIL BEARING STRESS)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

NOTES:

1. CONCRETE THRUST BLOCKING SHALL BE POURED AGAINST UNDISTURBED EARTH.
2. KEEP CONCRETE CLEAR OF JOINT AND ACCESSORIES.
3. THE REQUIRED THRUST BEARING AREAS FOR SPECIAL CONNECTIONS ARE SHOWN ENCIRCLED ON THE PLANS; e.g. (15) INDICATES 15 SQUARE FEET BEARING AREA REQUIRED.
4. 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.
5. BEARING AREAS AND SPECIAL BLOCKING DETAILS SHOWN ON PLANS TAKE PRECEDENCE OVER BEARING AREAS AND BLOCKING DETAILS SHOWN ON THIS DETAIL.

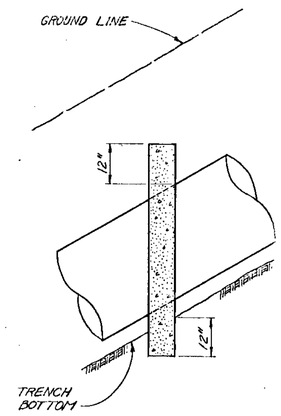
THRUST BLOCKING DETAIL

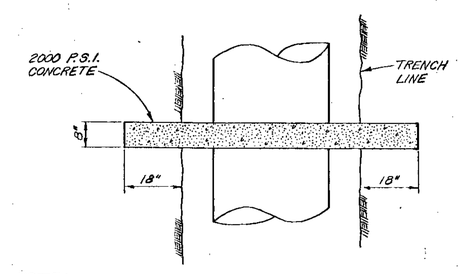
N.T.S.



VAULT 'B' SITE PLAN

SCALE: 1" = 10'





NOTE:

PROVIDE ANCHOR WALLS ON ALL PIPE WITH SLOPE GREATER THAN 20% @ LOCATIONS SHOWN ON PROFILE.

ANCHOR WALL DETAIL

N.T.S.

NO.	REVISION	BY	DATE
4	AS BUILT RECORD DRAWING	KPM	6-4-86
		RD	10-2-85

DETAILS

DATE FEBRUARY, 1985

SCALE AS SHOWN

TRI-CITY SERVICE DISTRICT
CLACKAMAS COUNTY, OREGON
BOLTON AND RIVER STREET FORCE MAINS

DESIGNED N.L.V. DRAWN R.F.D. CHECKED P.H.S.

MURRAY, SMITH & ASSOCIATES, INC.
Engineers/Planners
Horizon Square
800 SW 5th, Suite 2350
Portland, Oregon 97201
503 223-5000

MSA

REGISTERED PROFESSIONAL ENGINEER 7786 OREGON JULY 19, 1979 PHILIP H. SMITH

SHEET 6 of 8

FILE NO. 83-0064/65.20