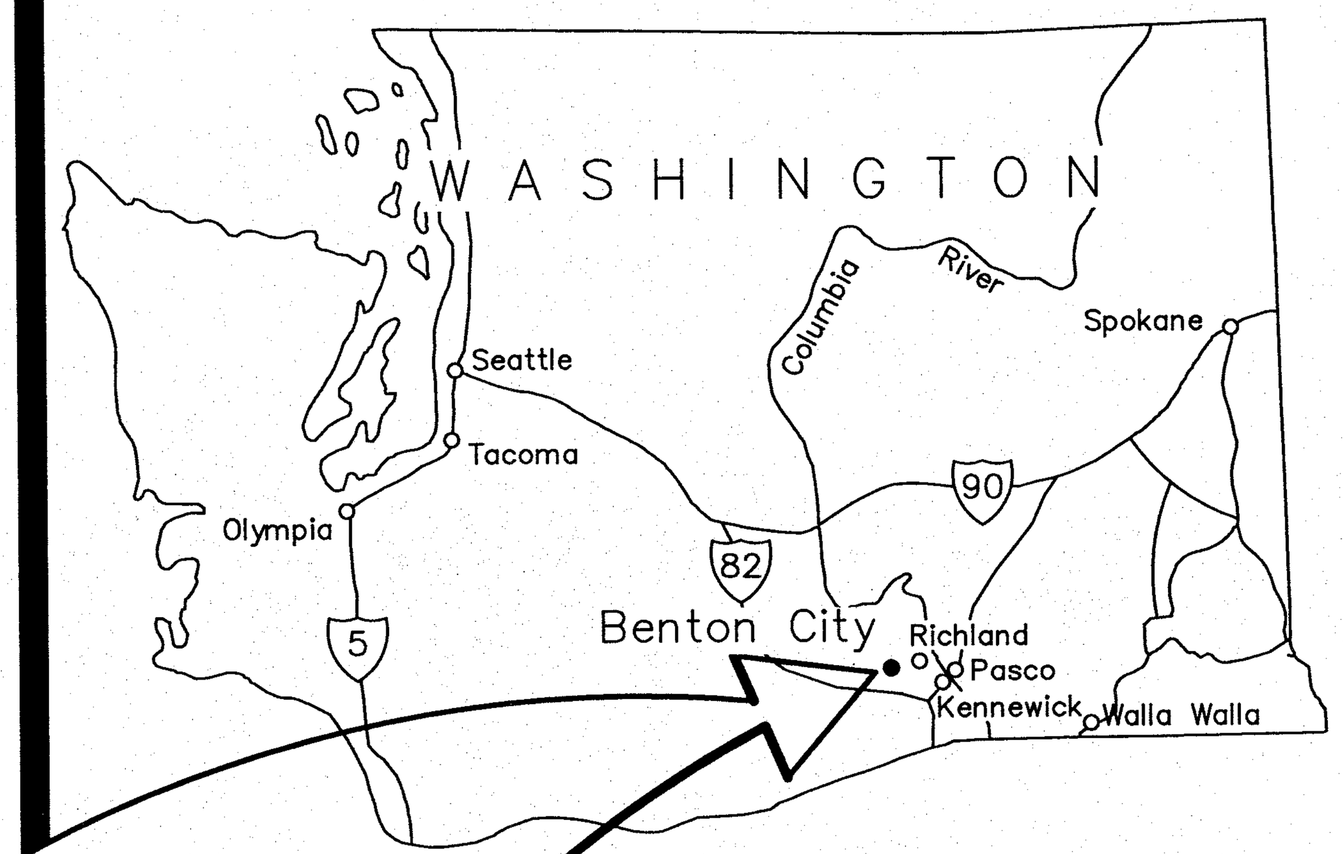
BENTON IRRIGATION DISTRICT

IRRIGATION SYSTEM IMPROVEMENTS
PHASE I
2009



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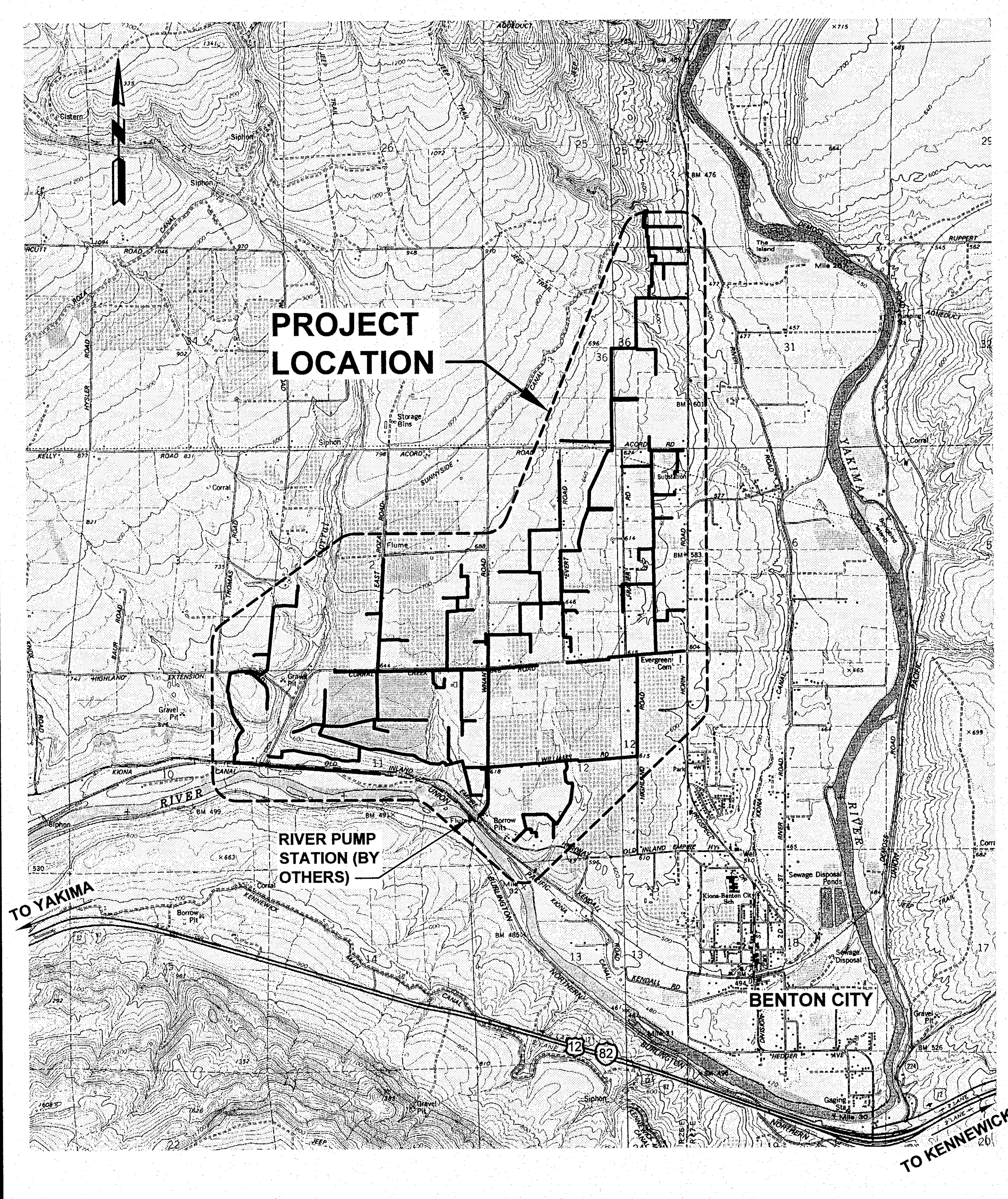

VICINITY MAP
NTS

DISTRICT BOARD OF DIRECTORS

TONYA GARBERG
SHAWN GAY
ROBERT BUOY

RECORD DRAWINGS

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BRETT MOORE
STATE OF WASHINGTON
46026
REGISTERED PROFESSIONAL ENGINEER
SIGNED 06-15-12
RECORD DRAWING

anderson perry & associates, inc.
engineering - surveying - natural resources
1901 N. Fir Street - La Grande, OR 97850 Ph: (541)963-8309 Fax: (541)963-5456
LA GRANDE, OR. WALLA WALLA, WA.

PLAN LEGEND

IRRIGATION

	EXISTING	PROPOSED
IRRIGATION LINE	IRR	6"PVC
VALVE		
CAP		
COUPLING		
REDUCER		
AIR/VAC VALVE		
BLOW OFF ASSEMBLY		
SERVICE		
IRRIGATION CONTROL STRUCTURE	IRR — IRR	
SPRINKLER HEAD		

MISCELLANEOUS UTILITIES

EXISTING

- WATER LINE — W — W —
- BURIED POWER — P — P — P —
- OVERHEAD POWER — OHP — OHP —
- BURIED TELEPHONE — UT —
- FIBER OPTIC — FO —
- GAS SERVICE — G — G —
- SIGNAL CABLE IN CONDUIT — SC —
- UTILITY POLE
- GUY WIRE
- TELEPHONE RISER
- STREET LIGHT

STREET AND CURB

- PAVED STREET — 1ST ST.
- GRAVEL DRIVEWAY/STREET

SITE SURVEY

EXISTING

- INDEX CONTOUR — 750
- INTERMEDIATE CONTOUR — 749
- PROPERTY LINE/ RIGHT-OF-WAY
- CENTERLINE
- EASEMENT
- SECTION LINE
- CULVERT
- BENCH MARK
- MONUMENT
- CONTROL POINT
- TEST PIT (SEE CONTRACT DOCUMENT APPENDIX FOR LOGS) — TEST PIT-14A
- SPOT ELEVATION — 592.3

GENERAL

EXISTING

- FENCE LINE/GATE
- CHAINLINK FENCE
- CREEK/DITCH CENTERLINE
- RIVERBANK/ SHORELINE
- SIGN
- CONIFER TREE
- DECIDUOUS TREE
- SHRUB
- BUILDING

DRAFTING

- SECTION DESIGNATION — A / 2 — SHEET WHERE SECTION WAS TAKEN OR WHERE SECTION IS SHOWN.
- 3 — 3 — SHEET CONTINUATION REFERENCE
- 1 — DRAWING REVISION NUMBER
- Z / 114 — DETAIL DESIGNATION — SHEET WHERE DETAIL IS SHOWN
- NORTH ARROW
- 1.5 — SERVICE LINE SIZE (INCHES)
- 1 — DOLE CONTROL VALVE SIZE (INCHES)
- 3 — DOLE CONTROL VALVE FLOW RATE (GPM)
- 3.03 — CALCULATED REQUIRED FLOW (GPM)
- 1.5 — PRV SIZE (INCHES)

NOTE:
A BLANK CONTROL VALVE SIZE AND FLOW FIELD INDICATES A FLOWMETER USED. A BLANK PRV SIZE FIELD INDICATES NO PRV VALVE REQUIRED.

ESTIMATED QUANTITIES FOR ROCK EXCAVATION

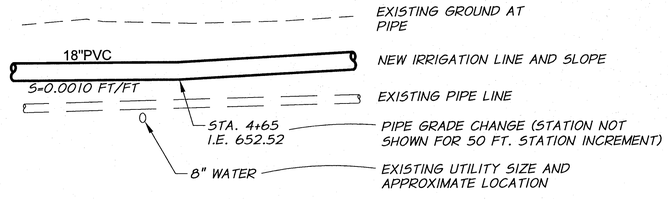
BASE BID:	±650 CUBIC YARDS
ADDITIVE ALTERNATIVE A:	±2,200 CUBIC YARDS
ADDITIVE ALTERNATIVE B:	±2,000 CUBIC YARDS

NOTE:
REFER TO THE SPECIFICATIONS FOR DESCRIPTION OF ROCK EXCAVATION. THE QUANTITIES SHOWN ARE ESTIMATES PREPARED BY THE ENGINEER AND ARE BASED UPON FIELD SURVEY DATA PERFORMED BY THE ENGINEER, AND THE IMPROVEMENTS SHOWN ON THE DRAWINGS. THE CONTRACTOR SHALL MAKE HIS OWN DETERMINATION OF THE ACTUAL QUANTITIES TO COMPLETE THE WORK AS SHOWN ON THE DRAWINGS AND AS SPECIFIED FOR PREPARING HIS BID FOR THE PROJECT. ~~NO MEASUREMENT WILL BE MADE FOR ROCK EXCAVATION. ROCK EXCAVATION WILL BE PAID FOR UNDER A LUMP SUM BID ITEM.~~

TEST PIT NOTES

1. THE TEST PIT LOCATIONS ARE SHOWN ON THE DRAWINGS AND THE TEST PIT LOGS ARE PROVIDED IN THE APPENDIX OF THE SPECIFICATIONS.
2. THE SOIL DATA, ROCK DATA, AND GROUND WATER CONDITIONS WHEN SHOWN ON THE DRAWINGS AND LOGS ARE PROVIDED SOLELY FOR THE CONTRACTOR'S INFORMATION. SUCH DATA IS NOT GUARANTEED AS TO ACCURACY OR COMPLETENESS WITH RESPECT TO THE ACTUAL SUBSURFACE CONDITIONS. INFORMATION SHOWN SHALL NOT RELIEVE THE CONTRACTOR FROM MAKING SUCH ADDITIONAL INVESTIGATIONS AS HE MAY ELECT TO FAMILIARIZE HIMSELF WITH THE ACTUAL CONDITIONS TO BE ENCOUNTERED IN EXECUTING THE WORK AND PREPARING HIS BID FOR THE PROJECT.

PROFILE LEGEND



CONSTRUCTION NOTES

1. ALL ASPHALT RESTORATION REQUIRED OUTSIDE OF AREAS SPECIFIED SHALL BE COMPLETED AT THE CONTRACTOR'S EXPENSE AND AT NO COST TO THE OWNER.
2. REMOVE EXISTING DRAINAGE CULVERTS TO CONSTRUCT IRRIGATION LINE. EXISTING CULVERTS TO BE REINSTALLED AFTER PIPELINE INSTALLATION IS COMPLETED. CULVERTS DAMAGED BY CONSTRUCTION TO BE REPLACED WITH NEW SAME TYPE AND SIZE AT CONTRACTOR'S EXPENSE AND AT NO COST TO THE OWNER UNLESS THE CULVERT AGE AND CONDITION ENSUED THE DAMAGE AS DETERMINED BY THE ENGINEER. THE ENGINEER MAY REQUIRE REPLACEMENT OF CULVERTS DUE TO AGE OF CULVERT AND EXISTING CONDITION. REPLACEMENT REQUIRED BY THE ENGINEER SHALL BE PAID UNDER THE "CULVERT REPLACEMENT" BID ITEM AND MUST HAVE PRIOR APPROVAL BEFORE REPLACEMENT.
3. MAILBOXES, SIGNS, ETC., IN CONFLICT WITH WORK SHALL BE TEMPORARILY RELOCATED, AS REQUIRED BY THE ENGINEER, AND REINSTALLED TO THE ORIGINAL LOCATION AFTER THE IRRIGATION LINE IS CONSTRUCTED, UNLESS OTHERWISE DIRECTED BY THE ENGINEER. DAMAGED MAILBOXES, SIGNS, POSTS, ETC., CAUSED BY THE CONSTRUCTION SHALL BE REPLACED WITH NEW LIKE KIND AS REQUIRED BY THE ENGINEER AT THE CONTRACTOR'S EXPENSE AND AT NO COST TO THE OWNER UNLESS THE AGE AND CONDITION ENSUED THE DAMAGE AS DETERMINED BY THE ENGINEER. THE ENGINEER MAY REQUIRE REPLACEMENT OF POST DUE TO AGE OF POST AND EXISTING CONDITION. REPLACEMENT REQUIRED BY THE ENGINEER SHALL BE PAID UNDER THE "POST REPLACEMENT" BID ITEM.
4. REMOVE EXISTING FENCING TO CONSTRUCT IRRIGATION LINES AS REQUIRED. EXISTING FENCING TO BE REINSTALLED TO THE SATISFACTION OF THE PROPERTY OWNERS AFTER PIPELINE INSTALLATION IS COMPLETED. FENCING DAMAGED BY CONSTRUCTION TO BE REPLACED WITH NEW SAME TYPE AND SIZE TO THE SATISFACTION OF THE PROPERTY OWNERS AT CONTRACTOR'S EXPENSE AND AT NO COST TO THE OWNER.
5. LOCATION FOR ALL SERVICES, AIR/VAC VALVES AND BLOW OFF ASSEMBLIES TO BE FIELD VERIFIED WITH THE ENGINEER PRIOR TO CONSTRUCTION.
6. FOR IRRIGATION LINE CONSTRUCTION DIRECTLY ADJACENT TO ORCHARDS, THE CONTRACTOR SHALL PROTECT ORCHARD LIMBS FROM DAMAGE AS REQUIRED DURING CONSTRUCTION. COMPENSATION FOR DAMAGED TREES AND/OR LIMBS CAUSED BY THE CONTRACTOR SHALL BE AT THE CONTRACTOR'S EXPENSE AND AT NO COST TO THE OWNER. SEE TECHNICAL SPECIFICATION FOR DETAIL.
7. VERIZON UNDERGROUND FIBER OPTIC LINES ARE LOCATED WITHIN THE PROJECT. THE CONTRACTOR SHALL COORDINATE HIS WORK WITH VERIZON PRIOR TO CONSTRUCTION. FOR NEW IRRIGATION LINES THAT WILL CROSS FIBER OPTIC LINES, THE NEW IRRIGATION LINES SHALL BE INSTALLED UNDERNEATH THE FIBER OPTIC LINES, MAINTAINING A MINIMUM OF 12 INCHES CLEARANCE. ADJUSTMENTS TO THE IRRIGATION LINE VERTICAL GRADE MAY BE REQUIRED, INCLUDING FITTINGS AS REQUIRED. THIS ADJUSTMENT SHALL BE INCIDENTAL TO THE WORK.
8. EXISTING GROUND ELEVATIONS SHOWN ON THE PROFILES ARE APPROXIMATE AND MAY VARY FROM ACTUAL EXISTING GROUND ELEVATIONS ENCOUNTERED DURING CONSTRUCTION. THERE SHALL BE NO ADDITIONAL PAYMENT MADE TO THE CONTRACTOR FOR EXCAVATION AND BACKFILL VARIATIONS CAUSED BY ELEVATION OF EXISTING GROUND DIFFERENCES FROM WHAT IS SHOWN ON THE DRAWINGS.
9. BOTH HORIZONTAL DEFLECTIONS AND CHANGES OF VERTICAL GRADE ARE SHOWN ON THE DRAWINGS. IN SOME LOCATIONS FITTINGS ARE CALLED FOR ON THE DRAWINGS AT HORIZONTAL DEFLECTIONS AND CHANGES IN VERTICAL GRADE, BUT NOT AT ALL LOCATIONS THAT MAY REQUIRE FITTINGS. IF PIPE JOINT DEFLECTION OR BENDING THE PIPE AS DESCRIBED AND ALLOWED IN THE TECHNICAL SPECIFICATIONS DOES NOT MAINTAIN ALIGNMENT OR GRADE, FITTINGS SHALL BE USED WITH APPROPRIATE THRUST BLOCKING AND SHALL BE INCIDENTAL TO THE PIPELINE WORK. ADDITIONALLY, THE CONTRACTOR SHALL MAINTAIN THE 2.5-FOOT MINIMUM COVER OVER THE TOP OF PIPE DURING CONSTRUCTION.
10. THE CONTRACTOR SHALL PERFORM EXPLORATORY WORK PRIOR TO CONSTRUCTION INCLUDING POTHOLING OF UTILITIES SUCH AS TELEPHONE, FIBER OPTIC, ELECTRICAL, WATER, ETC., AND IRRIGATION MAINS AND SERVICE LINES THAT LAY ADJACENT TO OR CROSS THE IMPROVEMENTS TO BE CONSTRUCTED. THIS WORK SHALL BE PERFORMED IN ORDER TO ACCURATELY LOCATE AND DETERMINE SIZES OF THE LINES AND TO DETERMINE ANY CONFLICTS THAT MAY EXIST THAT WILL REQUIRE ADJUSTMENT OF UTILITIES, COORDINATION WITH UTILITIES, OR ADJUSTMENT OF IMPROVEMENTS. SEE THE TECHNICAL SPECIFICATIONS FOR ADDITIONAL DETAILS. PAYMENT FOR EXPLORATORY WORK SHALL BE PAID UNDER THE BID ITEM "POTHOLING."
11. THRUST BLOCKING REQUIRED FOR ALL TEES AND ELBOWS 11-1/4 DEGREES OR GREATER FOR PIPE SIZES 3-INCH OR GREATER.
12. INSTALL MARKER POST AT END OF LINE FOR THE BASE BID TO BE CONNECTED TO ADDITIVE ALTERNATIVE A AND END OF LINE FOR ADDITIVE ALTERNATIVE A TO BE CONNECTED TO ADDITIVE ALTERNATIVE B. WORK SHALL BE INCIDENTAL TO THE PIPELINE WORK.
13. THE CONTRACTOR'S WORK SHALL BE LIMITED TO THE WIDTH OF THE IRRIGATION EASEMENT PLUS ANY ADDITIONAL TEMPORARY EASEMENT PROVIDED AND COUNTY ROAD RIGHT-OF-WAY AS SPECIFIED IN THE TECHNICAL SPECIFICATIONS. SEE THE TECHNICAL SPECIFICATIONS FOR DETAILS.
14. SMUDGE POTS ARE TO BE MOVED BY PROPERTY OWNERS.

HERBERT MOORE — STATE OF WASHINGTON — 46028 — REGISTERED PROFESSIONAL ENGINEER
SIGNED 06-15-12
RECORD DRAWING

REVISION	BY	DATE
RECORD DRAWING	E.H.	12/11

DESIGNED BY	R. HARRIS	XREFS: TB-BID.dwg	
DRAWN BY	D. CHRISTMAN		
REVIEWED BY	H. PERRY		

HORZ. SCALE: NONE — VERT. SCALE:
JOB NUMBER: 1199-336 — DATE: 2009
ACAD FILE: LEGEND-ConveySys.dwg

RECORD DRAWINGS
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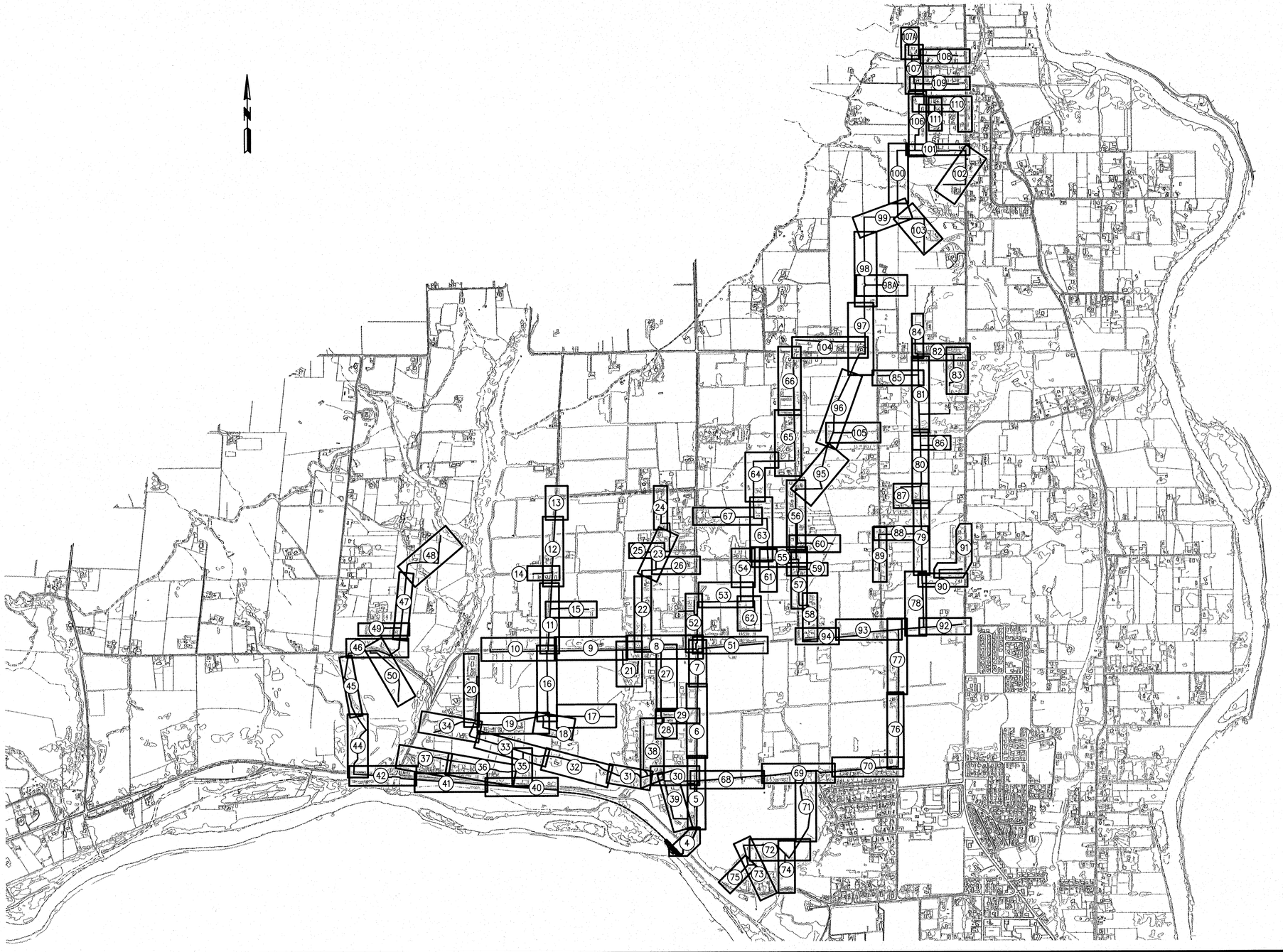
LA GRANDE, OR. WALLA WALLA, WA.

BENTON IRRIGATION DISTRICT
IRRIGATION SYSTEM IMPROVEMENTS PHASE I
LEGEND, NOTES, AND QUANTITIES

SHEET 1

ARCHIVED



BRETT MOOSE
STATE OF WASHINGTON
46026
REGISTERED
PROFESSIONAL ENGINEER
SIGNED 06-15-12
RECORD DRAWING

REVISION	BY	DATE

DESIGNED BY	R. HARRIS	XREFS: TB-BID.dwg
DRAWN BY	D. CHRISTMAN	
REVIEWED BY	H. PERRY	

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SCALE IN FEET

HORZ. SCALE	1"=1000'	VERT. SCALE	
JOB NUMBER	1199-336	DATE	2009
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BENTON IRRIGATION DISTRICT

IRRIGATION SYSTEM IMPROVEMENTS PHASE I

SHEET INDEX

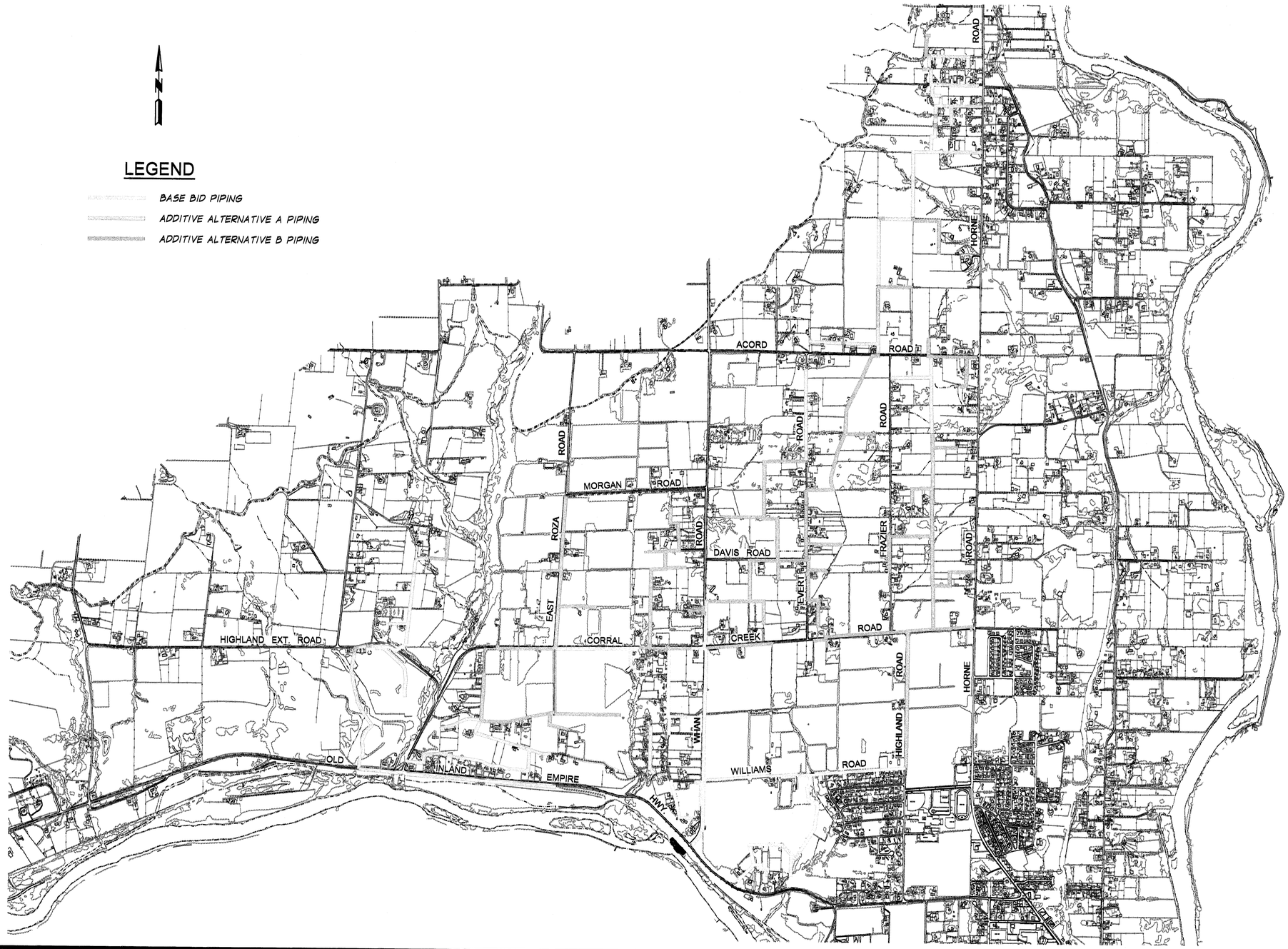
SHEET 2

ARCHIVED

N

LEGEND

- BASE BID PIPING
- ADDITIVE ALTERNATIVE A PIPING
- ADDITIVE ALTERNATIVE B PIPING



BRADY MOORE
STATE OF WASHINGTON
16086
REGISTERED
PROFESSIONAL ENGINEER
SIGNED 08-18-12
RECORD DRAWING

REVISION	BY	DATE	
DESIGNED BY R. HARRIS	XREFS: TB-BID.dwg		
DRAWN BY D. CHRISTMAN			
REVIEWED BY H. PERRY			

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SCALE IN FEET

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JOB NUMBER 1199-336 DATE 2009
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BENTON IRRIGATION DISTRICT
IRRIGATION SYSTEM IMPROVEMENTS PHASE I

BID ALTERNATIVES PLAN

SHEET 3

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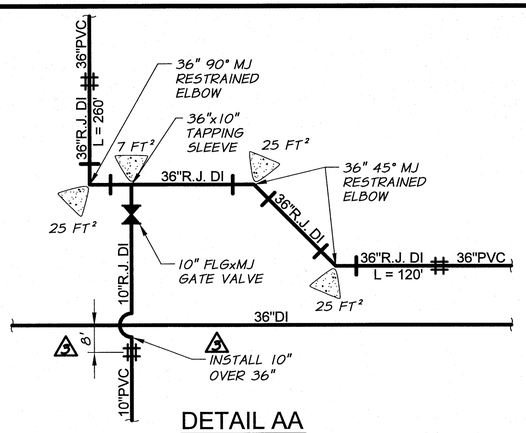

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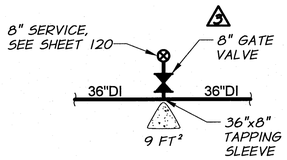

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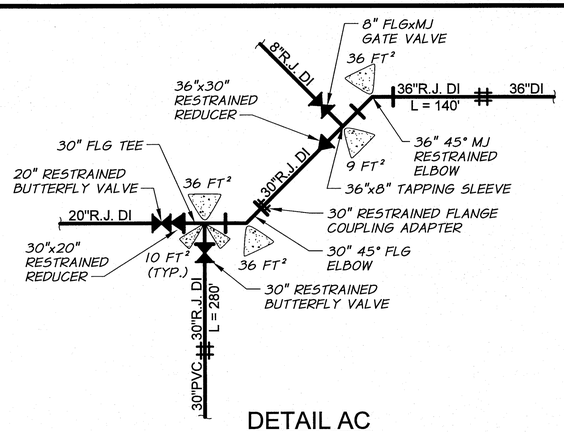

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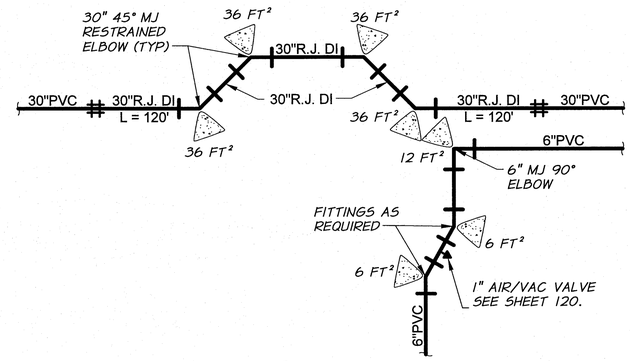

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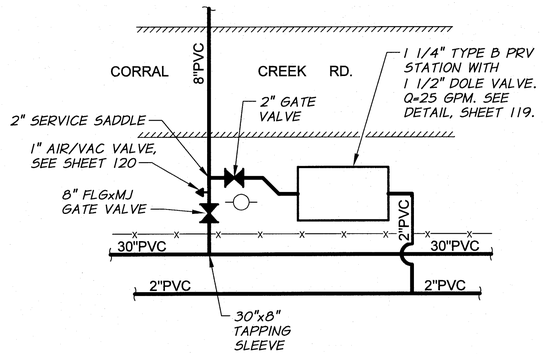

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DETAIL AF

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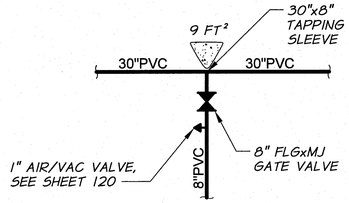

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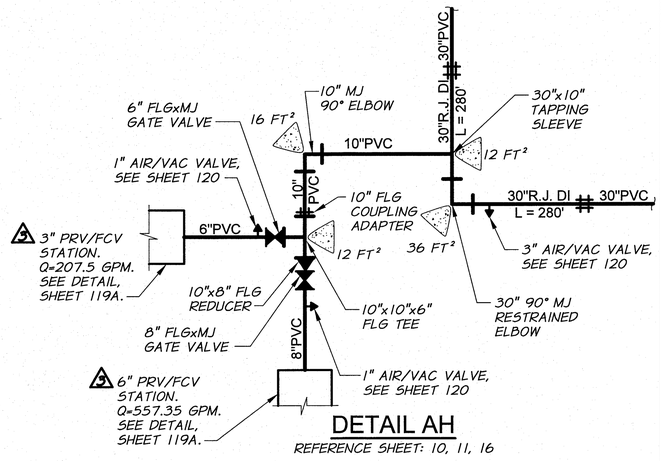

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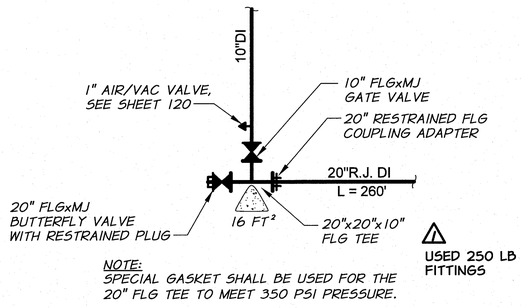

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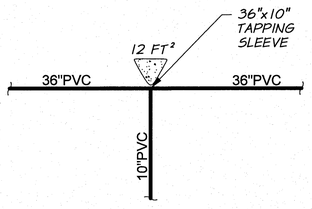

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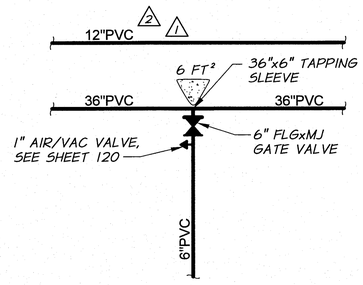

DETAIL AL

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3 RECORD DRAWING	E.H.	12/11	
2 DETAIL REVISION	R.H.	2/10	
1 DETAIL REVISION	R.H.	1/10	
REVISION	BY	DATE	

DESIGNED BY R. HARRIS	XREFS: TB-BID.dwg	HORZ. SCALE NONE	VERT. SCALE
DRAWN BY P. RICHARDSON		JOB NUMBER 1199-336	DATE 2009
REVIEWED BY H. PERRY		ACAD FILE: WATERPIPINGDETS.dwg	

BARRETT MOORE — STATE OF WASHINGTON — 46028 — REGISTERED PROFESSIONAL ENGINEER
SIGNED 06-15-12 RECORD DRAWING

RECORD DRAWINGS

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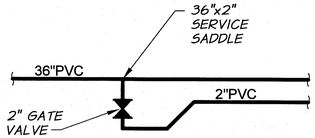
LA GRANDE, OR. WALLA WALLA, WA.

BENTON IRRIGATION DISTRICT
IRRIGATION SYSTEM IMPROVEMENTS PHASE I

PIPE CONNECTION DETAILS I

SHEET 112

ARCHIVED



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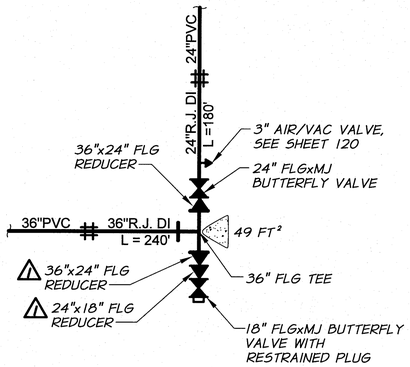

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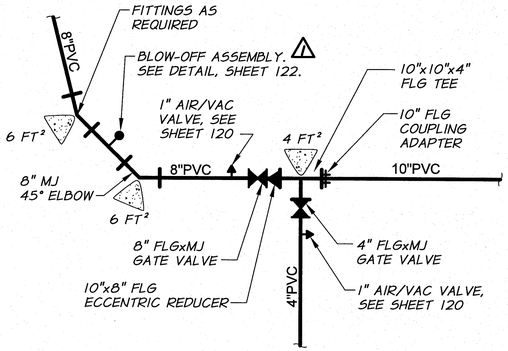

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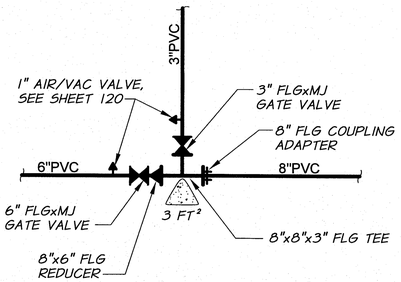

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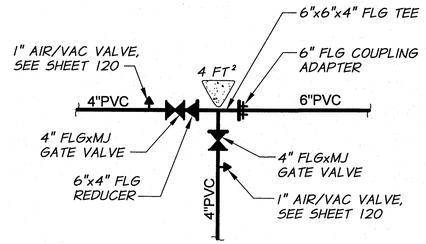

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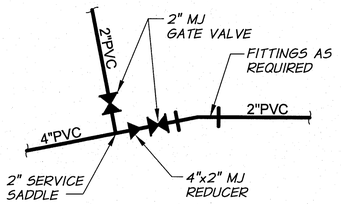

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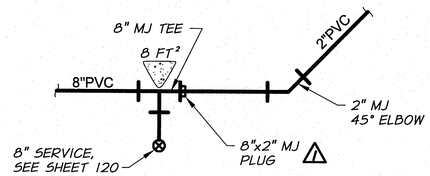

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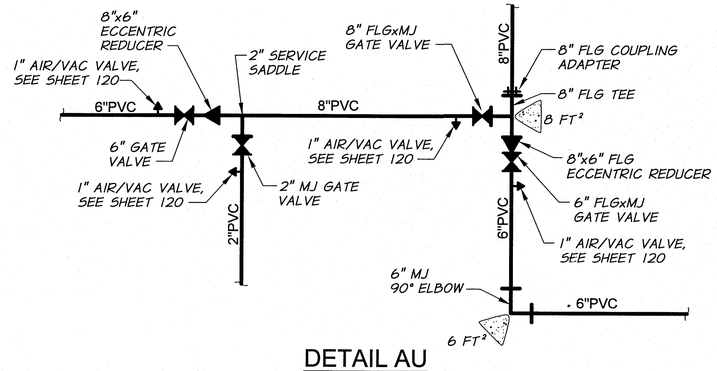

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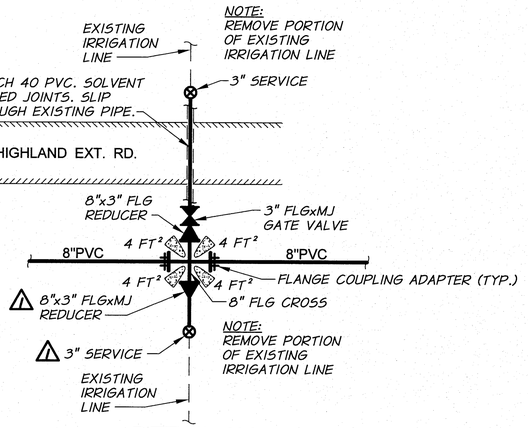

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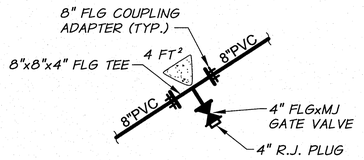

DETAIL AW
REFERENCE SHEET: 46

BRETT MOORE — STATE OF WASHINGTON — 46026 — REGISTERED PROFESSIONAL ENGINEER
SIGNED 06-15-12
RECORD DRAWING

REVISION	BY	DATE
⚠1 RECORD DRAWING	E.H.	12/11

DESIGNED BY	R. HARRIS	XREFS: TB-BID.dwg	
DRAWN BY	E. ARNTZ		
REVIEWED BY	H. PERRY		

HORZ. SCALE: NONE — VERT. SCALE:
JOB NUMBER: 1199-336 — DATE: 2009
ACAD FILE: WATERPIPINGDETS.dwg

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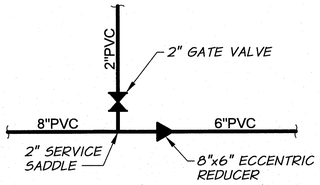
engineering · surveying · natural resources
LA GRANDE, OR. WALLA WALLA, WA.

BENTON IRRIGATION DISTRICT
IRRIGATION SYSTEM IMPROVEMENTS PHASE I

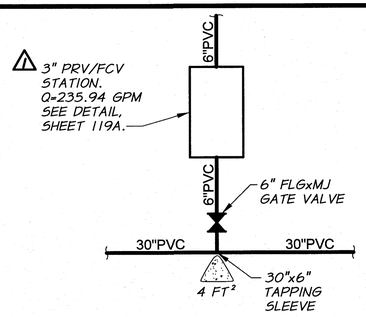
PIPE CONNECTION DETAILS II

SHEET 113



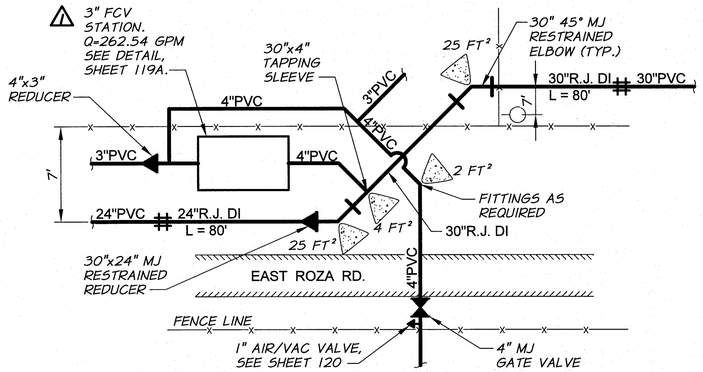
DETAIL AX

REFERENCE SHEET: 47, 49



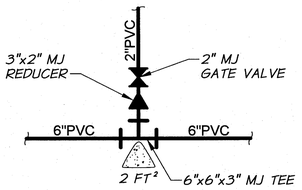
DETAIL AY

REFERENCE SHEET: 11, 15



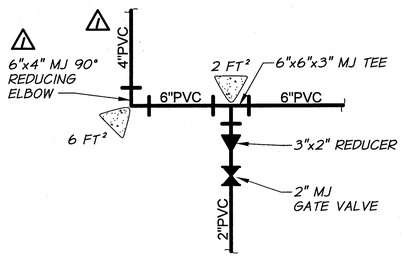
DETAIL AZ

REFERENCE SHEET: 12, 14



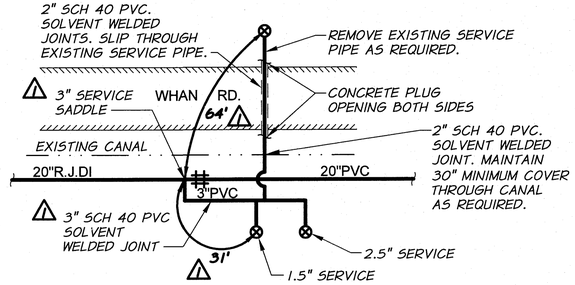
DETAIL BA

REFERENCE SHEET: 23, 26



DETAIL BB

REFERENCE SHEET: 23, 25



DETAIL BC

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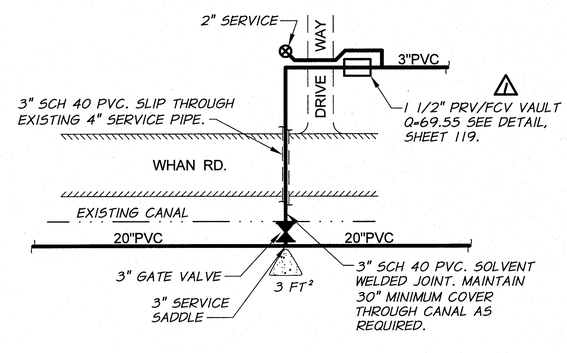
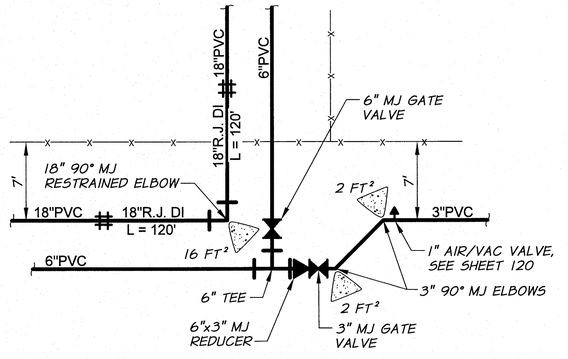


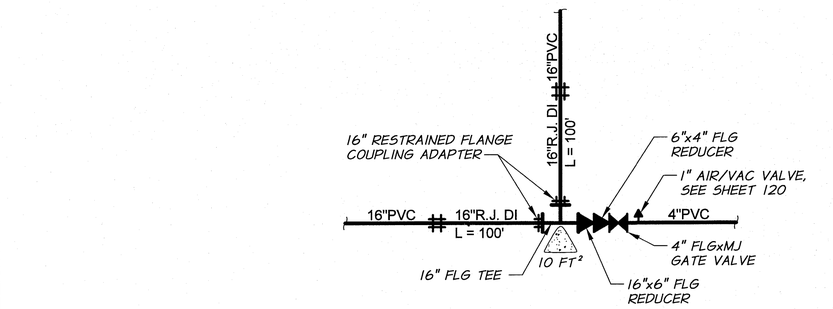
DETAIL BD

REFERENCE SHEET: 52



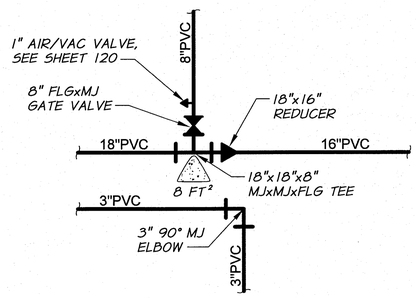
DETAIL BE

REFERENCE SHEET: 53, 62



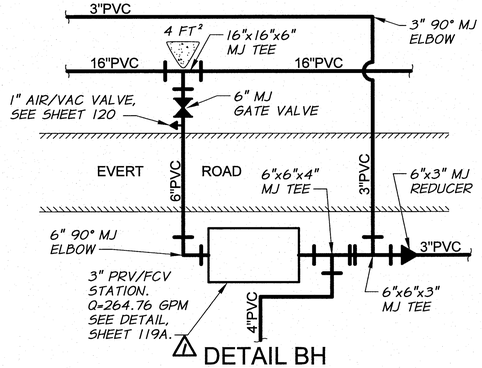
DETAIL BF

REFERENCE SHEET: 55, 57



DETAIL BG

REFERENCE SHEET: 55, 61, 63



DETAIL BH

REFERENCE SHEET: 56, 60

EMERETT MOOSER
STATE OF WASHINGTON
46026
REGISTERED
PROFESSIONAL ENGINEER
SIGNED 06-15-12
RECORD DRAWING

REVISION	BY	DATE
RECORD DRAWING	E.H.	12/11

DESIGNED BY	R. HARRIS
DRAWN BY	E. ARNTZ
REVIEWED BY	H. PERRY
XREFS: TB-BID.dwg	

HORZ. SCALE	NONE	VERT. SCALE	
JOB NUMBER	1199-336	DATE	2009
ACAD FILE:	WATERPIPINGDETS.dwg		

RECORD DRAWINGS

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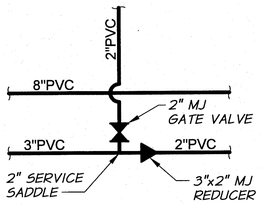
BENTON IRRIGATION DISTRICT

IRRIGATION SYSTEM IMPROVEMENTS PHASE I

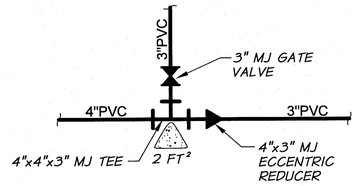
PIPE CONNECTION DETAILS III

SHEET 114



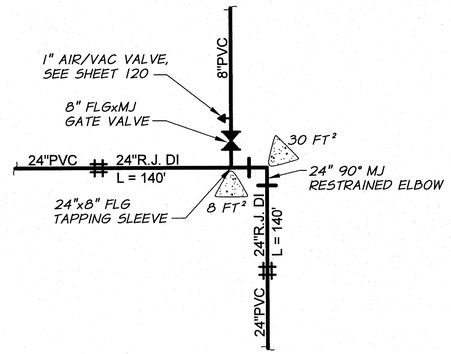
⚠ DETAIL BJ

REFERENCE SHEET: 63, 67



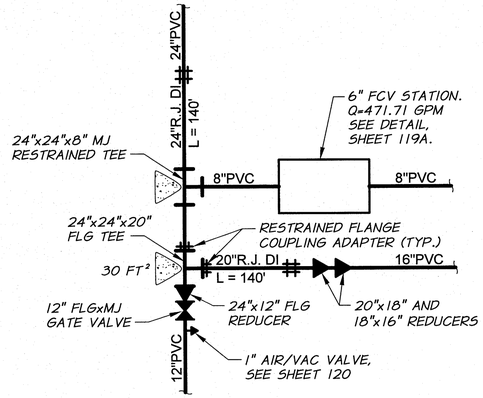
DETAIL BK

REFERENCE SHEET: 57, 59



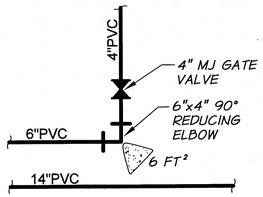
DETAIL BL

REFERENCE SHEET: 77, 93



⚠ DETAIL BM

REFERENCE SHEET: 78, 92



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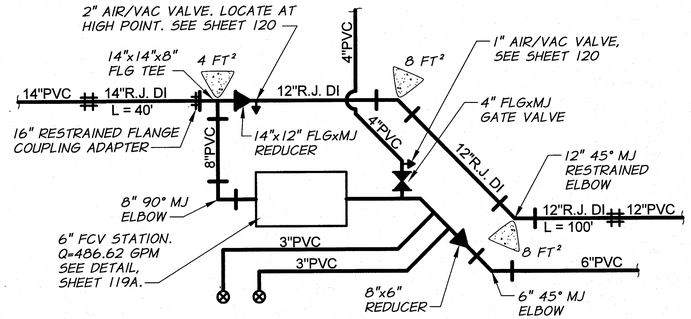
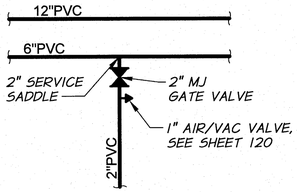
REFERENCE SHEET: 79, 88



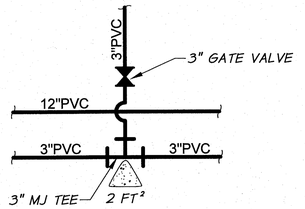
⚠ DETAIL BP

REFERENCE SHEET: 80, 87



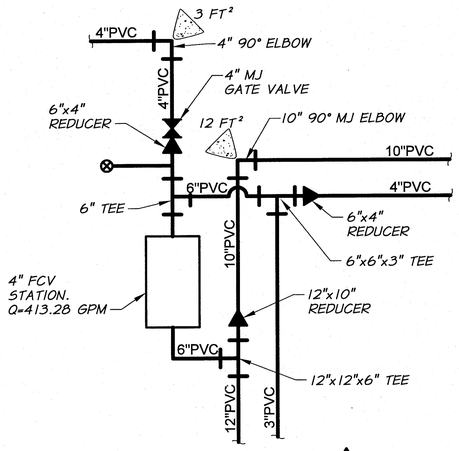
⚠ DETAIL BQ

REFERENCE SHEET: 80, 86



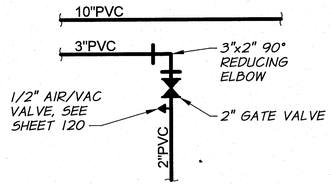
⚠ DETAIL BR

REFERENCE SHEET: 81, 85



⚠ DETAIL BS

REFERENCE SHEET: 82, 84



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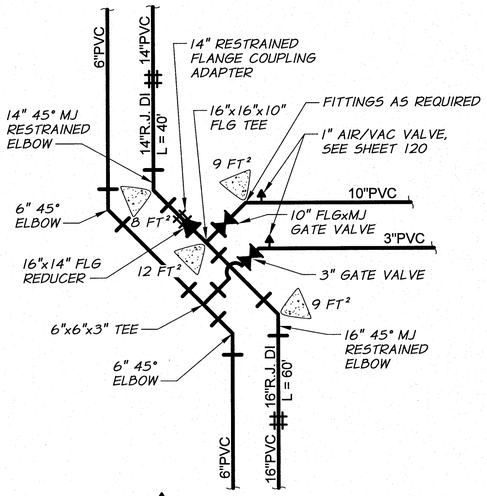
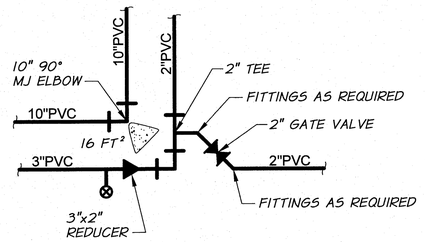
REFERENCE SHEET: 82, 83



⚠ DETAIL BU

REFERENCE SHEET: 78, 90



⚠ DETAIL BV

REFERENCE SHEET: 90

REVISION	BY	DATE
⚠ RECORD DRAWING	E.H.	12/11

DESIGNED BY	R. HARRIS	XREFS: TB-BID.dwg	
DRAWN BY	E. ARNTZ		
REVIEWED BY	H. PERRY		

HORZ. SCALE: NONE — VERT. SCALE:
JOB NUMBER: 1199-336 — DATE: 2009
ACAD FILE: WATERPIPINGDETS.dwg

RECORD DRAWINGS

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BENTON IRRIGATION DISTRICT

IRRIGATION SYSTEM IMPROVEMENTS PHASE I

PIPE CONNECTION DETAILS IV

SHEET 115

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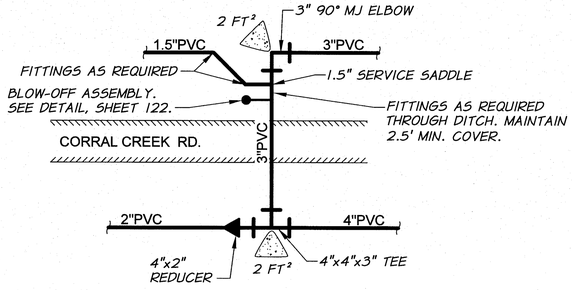
⚠ (DETAIL ELIMINATED)

DETAIL BW
REFERENCE SHEET: 91



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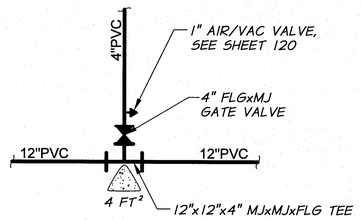
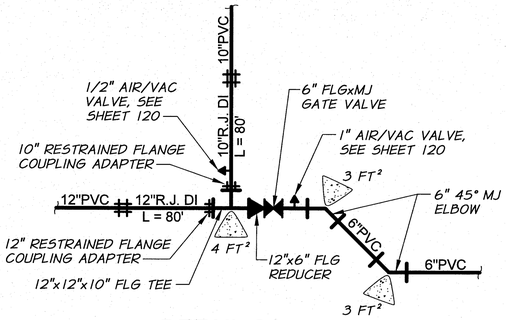
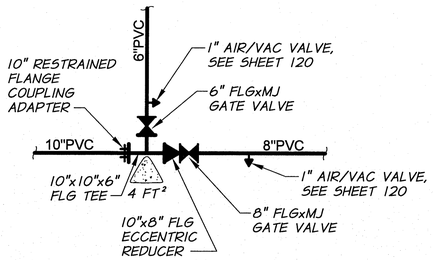


DETAIL BZ
REFERENCE SHEET: 97, 104



DETAIL CA
REFERENCE SHEET: 99, 103



DETAIL CB
REFERENCE SHEET: 101, 106

⚠ (DETAIL ELIMINATED)

DETAIL CC
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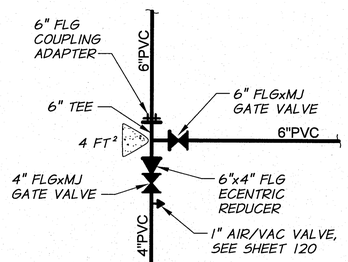

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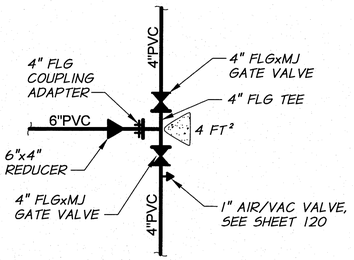
REFERENCE SHEET: 106, 110



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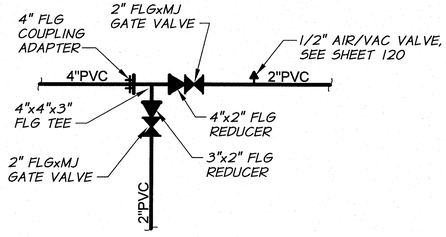
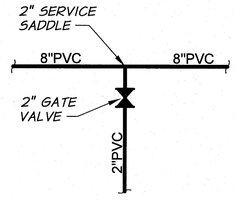
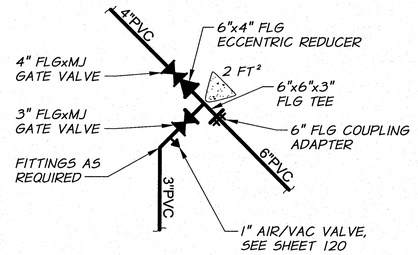


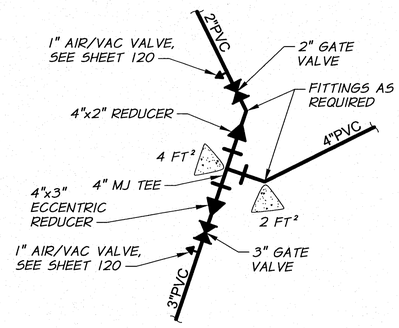
DETAIL CF
REFERENCE SHEET: 110, 111



DETAIL CG
REFERENCE SHEET: 46, 50



DETAIL CH
REFERENCE SHEET: 72, 74



DETAIL CJ
REFERENCE SHEET: 73, 75

BRETT MOORE
STATE OF WASHINGTON
46026
REGISTERED
PROFESSIONAL ENGINEER
SIGNED 06-15-12
RECORD DRAWING

⚠ RECORD DRAWING		E.H.	12/11		
REVISION		BY	DATE	HORZ. SCALE NONE	VERT. SCALE
DESIGNED BY R. HARRIS	XREFS: TB-BID.dwg			JOB NUMBER 1199-336	DATE 2009
DRAWN BY D. CHRISTMAN				ACAD FILE: WATERPIPINGDETS.dwg	
REVIEWED BY H. PERRY				COPYRIGHT 2009 BY ANDERSON-PERRY & ASSOC., INC.	

RECORD DRAWINGS
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anderson perry & associates, inc.
engineering · surveying · natural resources
LA GRANDE, OR. WALLA WALLA, WA.

BENTON IRRIGATION DISTRICT
IRRIGATION SYSTEM IMPROVEMENTS PHASE I

PIPE CONNECTION DETAILS V

SHEET 116

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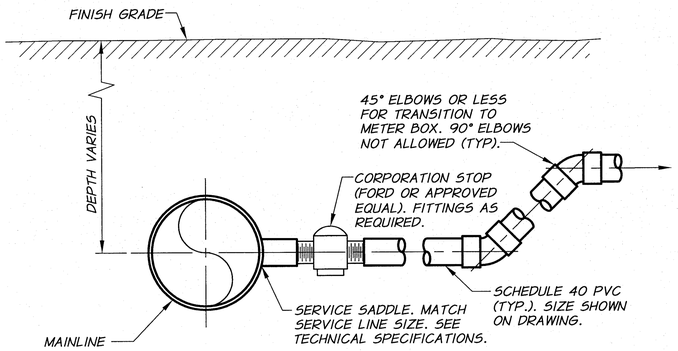
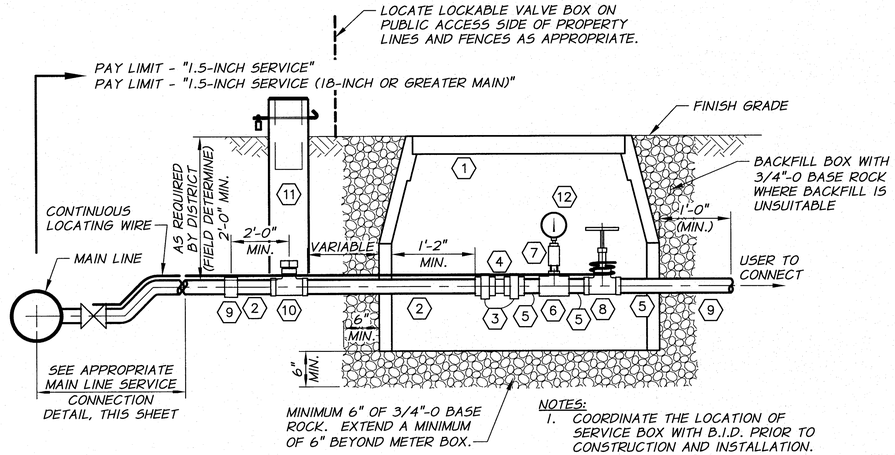
Q:\BENTON I.D\1199_336_PRESSURE_IRR\dwg\WATERPIPINGDETS.dwg, WATDETS V, 6/22/2012 11:23:01 AM



NOTES:
1. SERVICES ON 18" OR LARGER MAIN LINE SHALL BE MADE WITH SERVICE SADDLES MADE SPECIFICALLY FOR THE PIPE SIZE AND TYPE.
2. COORDINATE THE LOCATION OF SERVICE LINE CONNECTION WITH B.I.D. PRIOR TO CONSTRUCTION AND INSTALLATION.

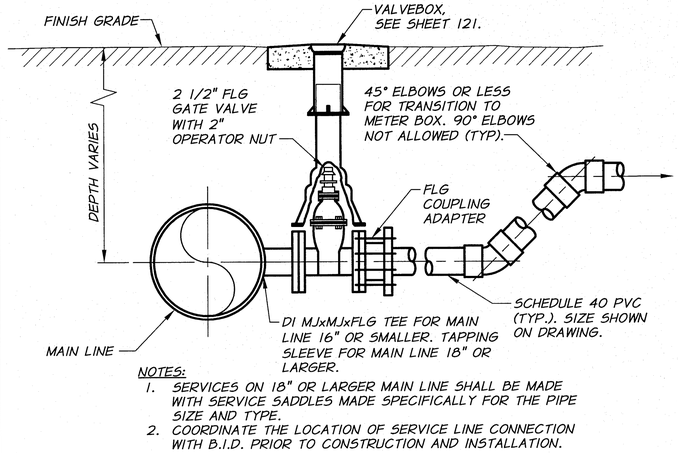
⚠ MAIN LINE SERVICE CONNECTION
FOR 1.5" AND 2" SERVICE
N.T.S.



NOTES:
1. COORDINATE THE LOCATION OF SERVICE BOX WITH B.I.D. PRIOR TO CONSTRUCTION AND INSTALLATION.

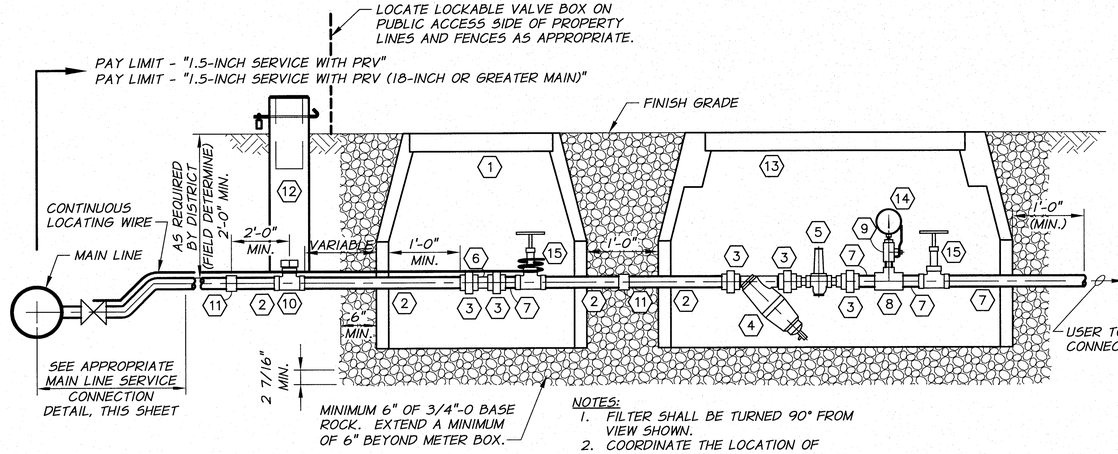
⚠ TYPICAL 1.5" SERVICE DETAIL
WITHOUT PRESSURE REDUCING VALVE
N.T.S.

SERVICE FITTING SCHEDULE
1. CARSON INDUSTRIES MODEL 2436-36 VAULT WITH LID. INSTALL IN NON-TRAFFIC BEARING ZONE.
2. SCH. 40 G.I.P. PIPE
3. G.I.P. UNION
4. DOLE FLOW CONTROL VALVE. SIZE AS SHOWN ON PLANS.
5. THREADED SCH. 40 G.I.P. SPOOL, LENGTH AS REQUIRED.
6. SIZE x 3/4" G.I.P. TEE
7. 3/4" THREADED BRASS BALL VALVE WITH 3/4"x1/4" BUSHING AND BRASS QUICK COUPLING PLUG (UNVALVED)
8. BRASS THREADED GATE VALVE
9. TRANSITION COUPLING AND FITTINGS AS REQ'D
10. CORP STOP WITH 2" OPERATOR NUT FOR 1.5" SERVICE.
11. LOCKABLE VALVE BOX. SEE DETAIL, SHEET 121.
12. DISTRICT PORTABLE GAUGE WITH BRASS QUICK COUPLING SOCKET (UNVALVED).



NOTES:
1. SERVICES ON 18" OR LARGER MAIN LINE SHALL BE MADE WITH SERVICE SADDLES MADE SPECIFICALLY FOR THE PIPE SIZE AND TYPE.
2. COORDINATE THE LOCATION OF SERVICE LINE CONNECTION WITH B.I.D. PRIOR TO CONSTRUCTION AND INSTALLATION.

⚠ MAIN LINE SERVICE CONNECTION
FOR 2.5" SERVICE
N.T.S.



NOTES:
1. FILTER SHALL BE TURNED 90° FROM VIEW SHOWN.
2. COORDINATE THE LOCATION OF SERVICE BOX WITH B.I.D. PRIOR TO CONSTRUCTION AND INSTALLATION.

⚠ TYPICAL 1.5" SERVICE DETAIL
WITH PRESSURE REDUCING VALVE
N.T.S.

SERVICE FITTING SCHEDULE
1. CARSON INDUSTRIES MODEL 2424-36 VAULT WITH LID. INSTALL IN NON-TRAFFIC BEARING ZONE.
2. SCH. 40 G.I.P. PIPE
3. G.I.P. UNION OR G.I.P. REDUCING UNION AS REQUIRED
4. Y-STRAINER WITH 40 MESH FILTER SCREEN. AMIAD FILTER NO. 1-1601 1-1/2" SUPER FILTER
5. CLA-VAL 990 PRESSURE REDUCING VALVE. SIZE AS SHOWN ON PLANS. SEE TECHNICAL SPECIFICATIONS FOR DETAILS.
6. DOLE FLOW CONTROL VALVE. SIZE AS SHOWN ON PLANS.
7. THREADED SCH. 40 G.I.P. SPOOL, LENGTH AS REQUIRED.
8. 1-1/2"x3/4" G.I.P. TEE
9. 3/4" THREADED BRASS BALL VALVE WITH 3/4"x1/4" BUSHING AND BRASS QUICK COUPLING PLUG (UNVALVED).
10. 1-1/2" CORP STOP WITH 2" OPERATOR NUT
11. TRANSITION COUPLING AND FITTINGS AS REQ'D
12. LOCKABLE VALVE BOX. SEE DETAIL, SHEET 121.
13. CARSON INDUSTRIES MODEL 2448-36 VAULT WITH LID. INSTALL IN NON-TRAFFIC BEARING ZONE.
14. DISTRICT PORTABLE GAUGE WITH BRASS QUICK COUPLING SOCKET (UNVALVED).
15. 1-1/2" BRASS THREADED GATE VALVE

BRETT MOORE STATE OF WASHINGTON 46026 REGISTERED PROFESSIONAL ENGINEER
SIGNED 05-15-12
RECORD DRAWING

REVISION	BY	DATE
⚠ RECORD DRAWING	E.H.	12/11

DESIGNED BY R. HARRIS
DRAWN BY D. CHRISTMAN
REVIEWED BY H. PERRY
XREFS: TB-BID.dwg

HORZ. SCALE NONE
VERT. SCALE
JOB NUMBER 1199-336
DATE 2009
ACAD FILE: ServiceDets.dwg

RECORD DRAWINGS
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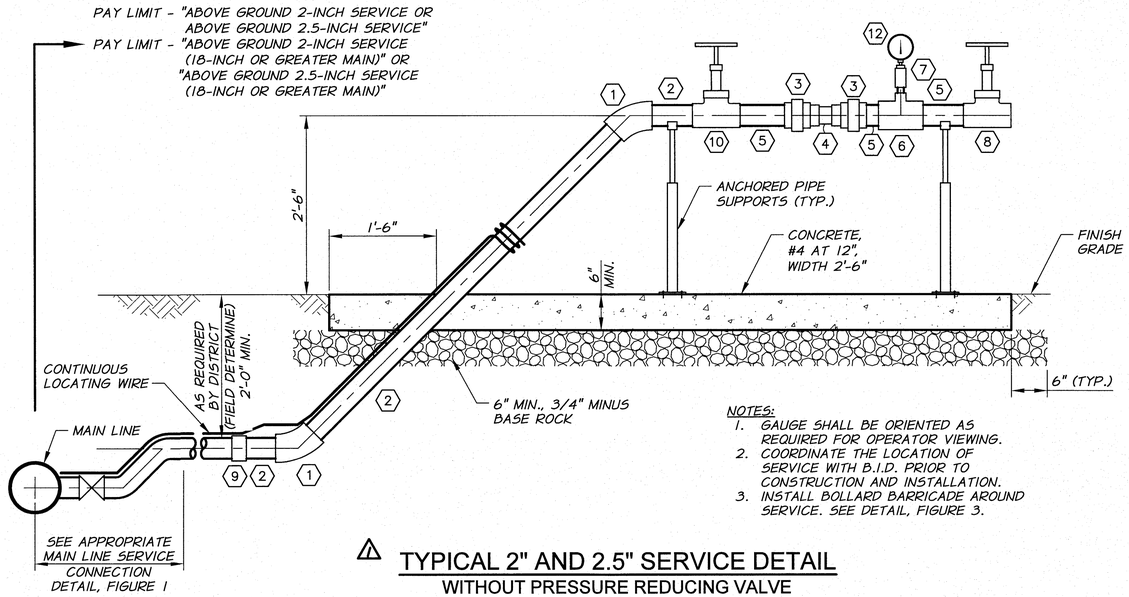
LA GRANDE, OR. WALLA WALLA, WA.

BENTON IRRIGATION DISTRICT
IRRIGATION SYSTEM IMPROVEMENTS
PHASE I

SERVICE DETAILS I

SHEET 117

ARCHIVED

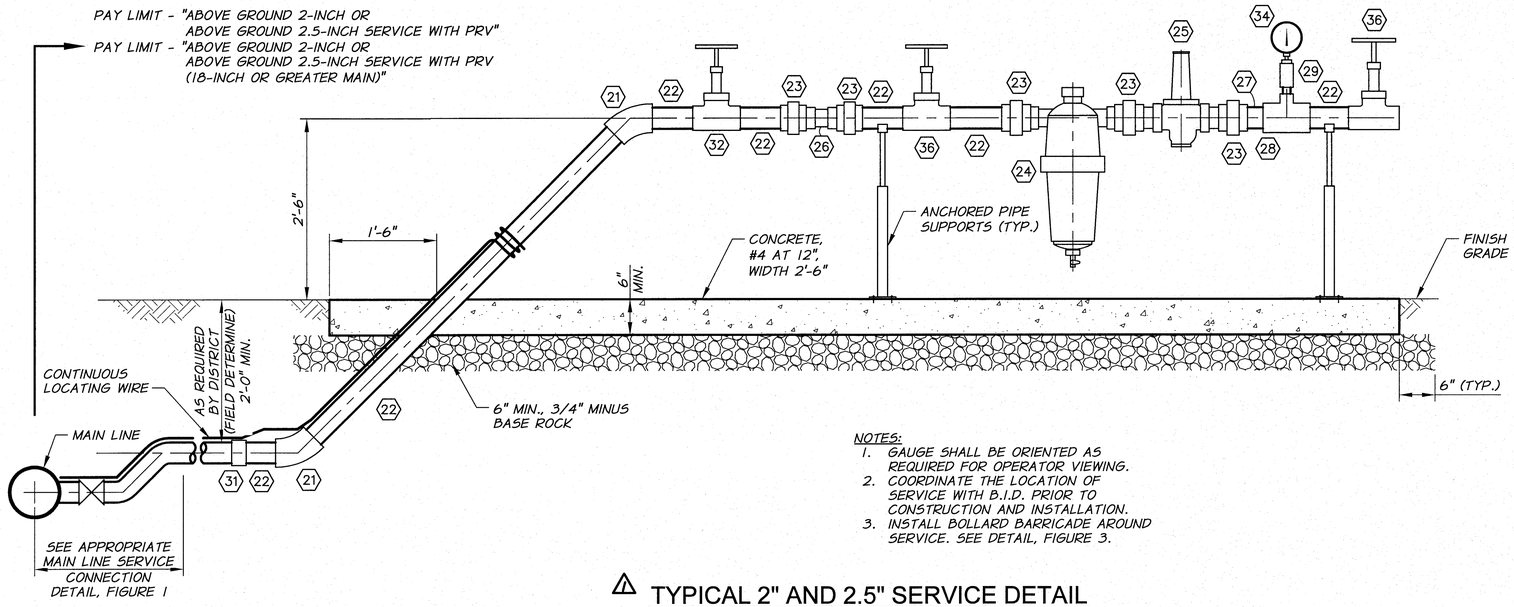


NOTES:
1. GAUGE SHALL BE ORIENTED AS REQUIRED FOR OPERATOR VIEWING.
2. COORDINATE THE LOCATION OF SERVICE WITH B.I.D. PRIOR TO CONSTRUCTION AND INSTALLATION.
3. INSTALL BOLLARD BARRICADE AROUND SERVICE. SEE DETAIL, FIGURE 3.

⚠ TYPICAL 2" AND 2.5" SERVICE DETAIL
WITHOUT PRESSURE REDUCING VALVE
N.T.S.

SERVICE FITTING SCHEDULE

1. G.I.P. 45° ELBOW
2. SCH. 40 G.I.P. PIPE
3. G.I.P. UNION
4. DOLE FLOW CONTROL VALVE. SIZE AS SHOWN ON PLANS.
5. THREADED SCH. 40 G.I.P. SPOOL, LENGTH AS REQUIRED.
6. SIZE x 3/4" G.I.P. TEE
7. 3/4" THREADED BRASS BALL VALVE WITH 3/4"x1/4" BUSHING AND BRASS QUICK COUPLING PLUG (UNVALVED)
8. BRASS THREADED GATE VALVE
9. TRANSITION COUPLING AND FITTINGS AS REQ'D
10. 2" LOCKING THREADED BRASS GATE VALVE WITH 2 1/2"x2" BUSHINGS AS REQ'D
11. RESERVED
12. DISTRICT PORTABLE GAUGE WITH BRASS QUICK COUPLING SOCKET (UNVALVED)



NOTES:
1. GAUGE SHALL BE ORIENTED AS REQUIRED FOR OPERATOR VIEWING.
2. COORDINATE THE LOCATION OF SERVICE WITH B.I.D. PRIOR TO CONSTRUCTION AND INSTALLATION.
3. INSTALL BOLLARD BARRICADE AROUND SERVICE. SEE DETAIL, FIGURE 3.

⚠ TYPICAL 2" AND 2.5" SERVICE DETAIL
WITH PRESSURE REDUCING VALVE
N.T.S.

SERVICE FITTING SCHEDULE

21. G.I.P. 45° ELBOW
22. SCH. 40 G.I.P. PIPE
23. G.I.P. UNION OR G.I.P. REDUCING UNION AS REQUIRED
24. STRAINER WITH 40 MESH FILTER SCREEN. AMIAD FILTER 2" T-SUPER
25. CLA-VAL 990 PRESSURE REDUCING VALVE. SIZE AS SHOWN ON PLANS. SEE TECHNICAL SPECIFICATIONS FOR DETAILS.
26. DOLE FLOW CONTROL VALVE. SIZE AS SHOWN ON PLANS.
27. SCH. 40 G.I.P. SPOOL
28. SIZE x 3/4" G.I.P. TEE
29. 3/4" THREADED BRASS BALL VALVE WITH 3/4"x1/4" BUSHING AND BRASS QUICK COUPLING PLUG (UNVALVED)
30. RESERVED
31. TRANSITION COUPLING AND FITTINGS AS REQ'D
32. 2" LOCKING THREADED BRASS GATE VALVE WITH 2 1/2"x2" BUSHINGS AS REQUIRED
33. RESERVED
34. DISTRICT PORTABLE GAUGE WITH BRASS QUICK COUPLING (UNVALVED)
35. RESERVED
36. BRASS THREADED GATE VALVE

EVERETT MOORE — STATE OF WASHINGTON — 46026 — REGISTERED PROFESSIONAL ENGINEER
SIGNED 06-15-12
RECORD DRAWING

REVISION	BY	DATE
⚠ RECORD DRAWING	E.H.	12/11

DESIGNED BY	R. HARRIS	XREFS: TB-BID.dwg	
DRAWN BY	D. CHRISTMAN		
REVIEWED BY	H. PERRY		

HORZ. SCALE: NONE — VERT. SCALE:
JOB NUMBER: 1199-336 — DATE: 2009
ACAD FILE: ServiceDets.dwg

RECORD DRAWINGS
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BENTON IRRIGATION DISTRICT
IRRIGATION SYSTEM IMPROVEMENTS
PHASE I

SERVICE DETAILS II

SHEET 118

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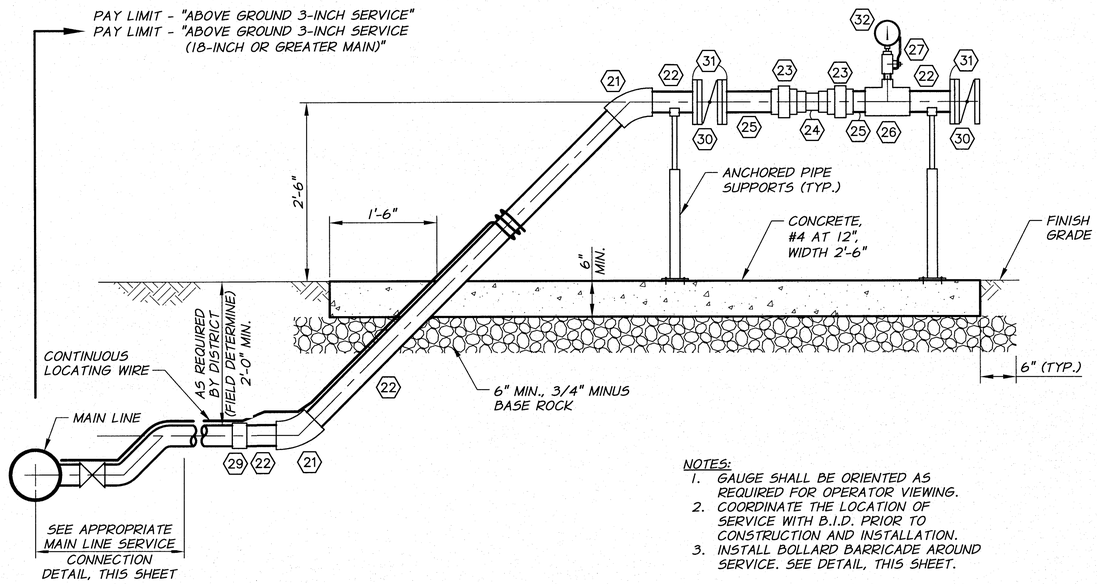
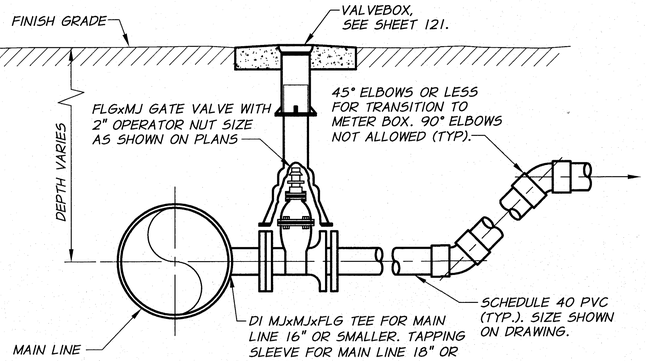


NOTES:
1. GAUGE SHALL BE ORIENTED AS REQUIRED FOR OPERATOR VIEWING.
2. COORDINATE THE LOCATION OF SERVICE WITH B.I.D. PRIOR TO CONSTRUCTION AND INSTALLATION.
3. INSTALL BOLLARD BARRICADE AROUND SERVICE. SEE DETAIL, THIS SHEET.

SERVICE FITTING SCHEDULE

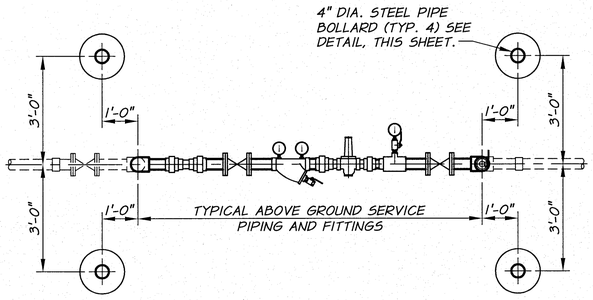
21. G.I.P. ELBOW
22. SCH. 40 G.I.P. PIPE
23. G.I.P. UNION OR G.I.P. REDUCING UNION AS REQUIRED
24. DOLE FLOW CONTROL VALVE. SIZE AS SHOWN ON PLANS.
25. THREADED SCH. 40 G.I.P. SPOOL, LENGTH AS REQUIRED.
26. SIZE x 3/4" G.I.P. TEE
27. 3/4" THREADED BRASS BALL VALVE WITH 3/4"x1/4" BUSHING AND BRASS QUICK COUPLING PLUG (UNVALVED)
28. RESERVED
29. TRANSITION COUPLING AND FITTINGS AS REQ'D
30. 3" BUTTERFLY VALVE WITH WHEEL OPERATOR AND POSITION INDICATOR
31. FLG ADAPTER
32. DISTRICT PORTABLE GAUGE WITH BRASS QUICK COUPLING SOCKET (UNVALVED)

TYPICAL 3" SERVICE DETAIL
WITHOUT PRESSURE REDUCING VALVE
N.T.S.

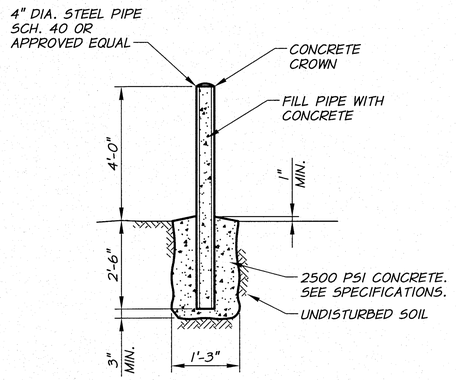


NOTES:
1. SERVICES ON 18" OR LARGER MAIN LINE SHALL BE MADE WITH SERVICE SADDLES MADE SPECIFICALLY FOR THE PIPE SIZE AND TYPE.
2. COORDINATE THE LOCATION OF SERVICE LINE CONNECTION WITH B.I.D. PRIOR TO CONSTRUCTION AND INSTALLATION.

MAIN LINE SERVICE CONNECTION
FOR 3" SERVICE AND LARGER
N.T.S.



ABOVE GROUND SERVICE BARRICADE DETAIL
PLAN
N.T.S.



NOTES:
1. 4" DIA. STEEL PIPE SHALL BE PLUMB.
2. PAINTING SHALL BE DONE ONLY AFTER SURFACE IS FREE OF RUST, OIL, AND GREASE. THE METAL SHALL BE PRIMED AND TWO FINISH COATS APPLIED, YELLOW IN COLOR.

BOLLARD DETAIL
N.T.S.

⚠ SHEET ADDED

EVERETT MOORE
STATE OF WASHINGTON
46028
REGISTERED
PROFESSIONAL ENGINEER
SIGNED 06-15-12
RECORD DRAWING

⚠ RECORD DRAWING		E.H.	12/11		
REVISION		BY	DATE	HORZ. SCALE NONE	VERT. SCALE
DESIGNED BY R. HARRIS	XREFS: TB-BID.dwg			JOB NUMBER 1199-336	DATE 2009
DRAWN BY D. CHRISTMAN				ACAD FILE: ServiceDets.dwg	
REVIEWED BY H. PERRY				COPYRIGHT 2009 BY ANDERSON-PERRY & ASSOC., INC.	

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BENTON IRRIGATION DISTRICT
IRRIGATION SYSTEM IMPROVEMENTS
PHASE I

SERVICE DETAILS III

SHEET 118A

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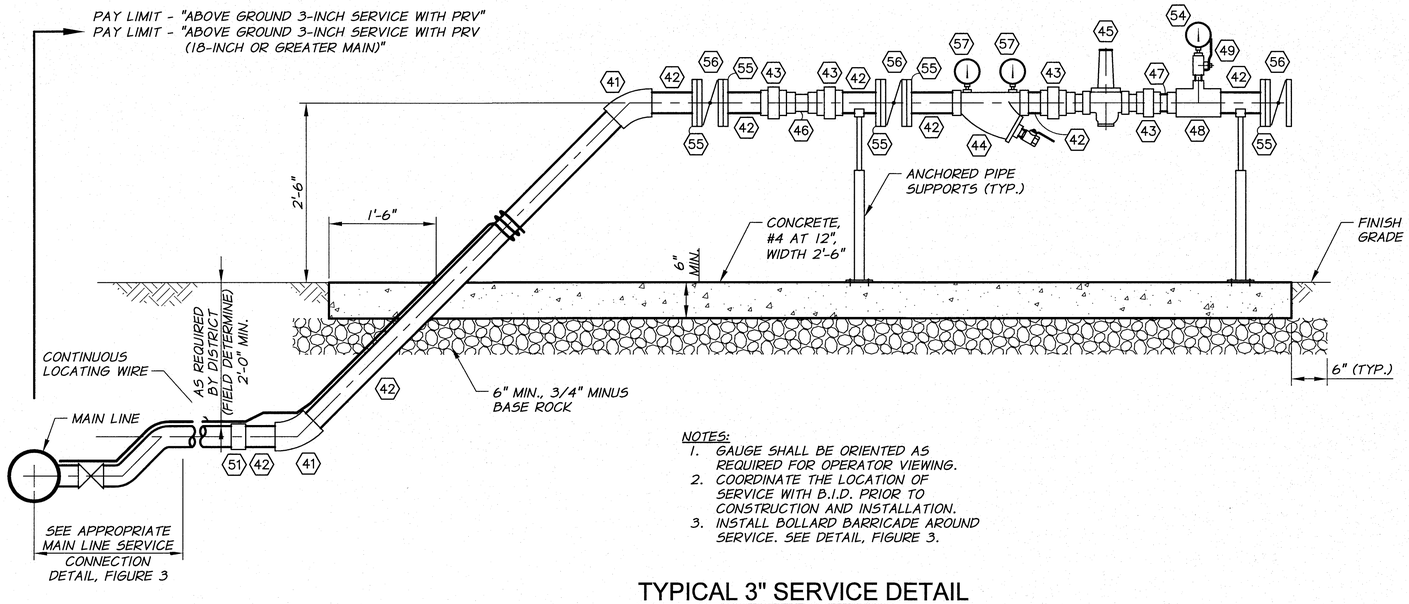

NOTES:
1. GAUGE SHALL BE ORIENTED AS REQUIRED FOR OPERATOR VIEWING.
2. COORDINATE THE LOCATION OF SERVICE WITH B.I.D. PRIOR TO CONSTRUCTION AND INSTALLATION.
3. INSTALL BOLLARD BARRICADE AROUND SERVICE. SEE DETAIL, FIGURE 3.

TYPICAL 3" SERVICE DETAIL
WITH PRESSURE REDUCING VALVE
N.T.S.

SERVICE FITTING SCHEDULE

(41) G.I.P. 45° ELBOW
(42) SCH. 40 G.I.P. PIPE
(43) G.I.P. UNION OR G.I.P. REDUCING UNION AS REQUIRED
(44) 3" SONNTAG ALUMINUM Y-FILTER WITH 40 MESH FILTER SCREEN
(45) CLA-VAL 990 PRESSURE REDUCING VALVE. SIZE AS SHOWN ON PLANS. SEE TECHNICAL SPECIFICATIONS FOR DETAILS.
(46) DOLE FLOW CONTROL VALVE. SIZE AS SHOWN ON PLANS.
(47) SCH. 40 G.I.P. SPOOL
(48) 3"x3/4" G.I.P. TEE
(49) 3/4" THREADED BRASS BALL VALVE WITH 3/4"x1/4" BUSHING AND BRASS QUICK COUPLING PLUG (UNVALVED)
(50) RESERVED
(51) TRANSITION COUPLING AND FITTINGS AS REQ'D
(52) RESERVED
(53) RESERVED
(54) DISTRICT PORTABLE GAUGE WITH BRASS QUICK COUPLING SOCKET (UNVALVED)
(55) FLANGE ADAPTER
(56) 3" FLG BUTTERFLY VALVE WITH WHEEL OPERATOR AND POSITION INDICATOR
(57) 4" 55 GLYCERIN FILLED PRESSURE GAUGE. FITTINGS AS REQUIRED.

⚠ SHEET ADDED

BRETT MOORE STATE OF WASHINGTON 46008 REGISTERED PROFESSIONAL ENGINEER
SIGNED 06-15-12
RECORD DRAWING

REVISION	BY	DATE
⚠ RECORD DRAWING	E.H.	12/11

DESIGNED BY R. HARRIS
DRAWN BY D. CHRISTMAN
REVIEWED BY H. PERRY
XREFS: TB-BID.dwg

HORZ. SCALE NONE
VERT. SCALE
JOB NUMBER 1199-336
DATE 2009
ACAD FILE: ServiceDets.dwg

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BENTON IRRIGATION DISTRICT
IRRIGATION SYSTEM IMPROVEMENTS
PHASE I

SERVICE DETAILS IV

SHEET
118B

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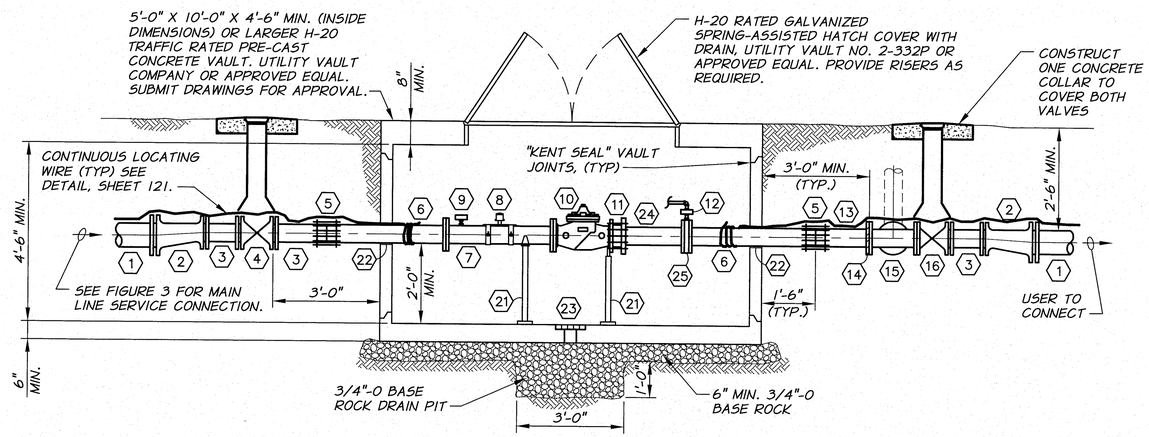
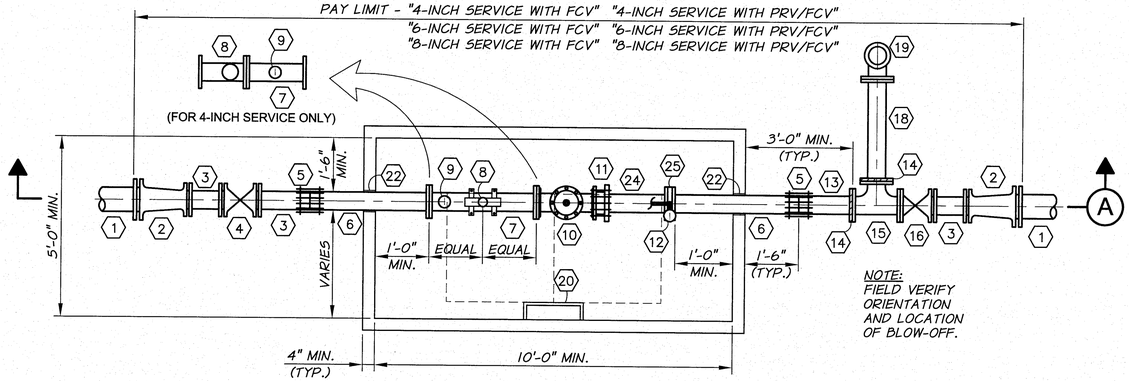
FITTING SCHEDULE

1. SERVICE LINE PVC PIPING
2. MJ ECCENTRIC REDUCER
3. CLASS 200 PVC PIPING
4. MJ GATE VALVE WITH VALVE BOX. SEE DETAIL, SHEET 121.
5. COUPLING
6. FLG X PE D.I. SPOOL, LENGTH AS REQUIRED
7. FLG DI SPOOL x 1'-8" LONG FOR 4" SERVICE. FLG DI SPOOL x 4'-0" LONG FOR 6" SERVICE. FLG DI SPOOL x 4'-0" LONG FOR 8" SERVICE.
8. MICROMETER FLOWMETER MODEL MW500 FOR 3", LP-22 FOR 4-INCH. MODEL LP 32 FOR 6-INCH.
9. FOR PRV/FCV SERVICE ONLY: 3/4" TAPPING SADDLE WITH 3/4" THREADED BRASS BALL VALVE, 3/4"x1/4" BUSHING, AND BRASS QUICK COUPLING PLUG (UNVALVED)
10. CLA-VAL 49-01 FLOW CONTROL OR COMBINATION FLOW CONTROL AND PRESSURE REDUCING VALVE, TYPE AS SHOWN ON PLANS. SEE TABLE 1, THIS SHEET, AND SPECIFICATIONS FOR DETAILS.
11. RESTRAINED FLANGE COUPLING ADAPTER
12. BRASS QUICK COUPLING PLUG (UNVALVED) AND FITTINGS AS REQUIRED ON ORIFICE PILOT PIPING. PROVIDE ADDITIONAL ISOLATION VALVE.
13. PE DI SPOOL LENGTH AS REQUIRED
14. FLANGE COUPLING ADAPTER
15. FLG SIZExSIZExSIZE TEE, BRANCH NOT TO EXCEED 6"
16. FLGxMJ GATE VALVE WITH VALVE BOX. SEE DETAIL, SHEET 121.
17. RESERVED
18. FLGxPE SPOOL, LENGTH AS REQUIRED, FITTINGS AS REQUIRED
19. MAINGUARD BLOW-OFF #7600 (SEE TABLE 1, THIS SHEET). ENCLOSURE TO BE CARSON INDUSTRIES MODEL H2436 TRAFFIC BEARING VAULT AND LID WITH EXTENSIONS AS REQUIRED.
20. OSHA APPROVED GALVANIZED STEEL LADDER WITH 4 FOOT REMOVABLE EXTENSION
21. PIPE SUPPORT. SEE TYPICAL PIPE SUPPORT DETAIL SHEET 122.
22. SEAL PIPE PENETRATIONS WATERTIGHT WITH NON-SHRINK GROUT
23. BRASS GRATED DRAIN WITH KNOCKOUT HOLE FOR DRAIN PIPE
24. FLG x PE DI SPOOL x 2 FT. LONG
25. ORIFICE PLATE

TABLE 1			
SERVICE SIZE	CONTROL VALVE SIZE	BLOW-OFF INLET	BLOW-OFF OUTLET
4-INCH	3"	4"	4"
6-INCH	4"	4"	4"
8-INCH	6"	6"	4"



SECTION A



PLAN

NOTES:
1. PIPING SIZE TO MATCH CONTROL VALVE SIZE UNLESS OTHERWISE NOTED.
2. SET FRAME AND COVER TO GRADE AND PROVIDE GRADE RINGS AS REQUIRED.
3. PIPE SUPPORTS TO BE SIZED APPROPRIATELY FOR PIPE AND INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.
4. ALL WORK SHOWN IN THIS DETAIL, INCLUDING ANY REQUIRED SURFACE RESTORATION, SHALL BE INCLUDED IN THE SERVICE PAY ITEM.

4", 6", AND 8" SERVICE WITH PRV/FCV OR FCV DETAIL

N.T.S.

SHEET ADDED

BRETT MOORE — STATE OF WASHINGTON — 46026 — REGISTERED PROFESSIONAL ENGINEER
SIGNED 06-15-12
RECORD DRAWING

RECORD DRAWING	E.H.	12/11	
REVISION	BY	DATE	
DESIGNED BY R. HARRIS	XREFS: TB-BID.dwg	JOB NUMBER 1199-336	DATE 2009
DRAWN BY D. CHRISTMAN		ACAD FILE: ServiceDets.dwg	
REVIEWED BY H. PERRY		COPYRIGHT 2009 BY ANDERSON-PERRY & ASSOC., INC.	

HORZ. SCALE NONE — VERT. SCALE

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BENTON IRRIGATION DISTRICT
IRRIGATION SYSTEM IMPROVEMENTS PHASE I

SERVICE DETAILS V

SHEET 118C

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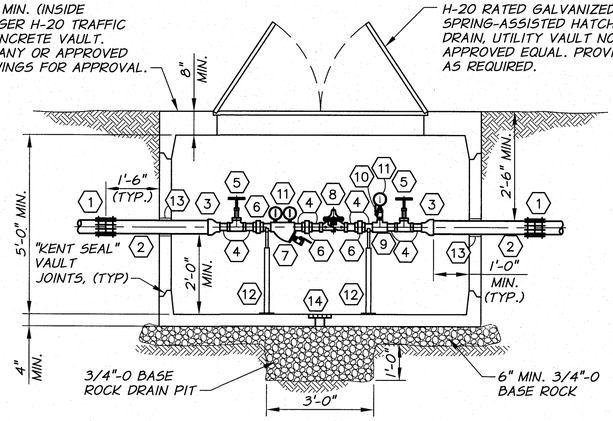
⚠ 4'-6" X 8'-6" X 5'-0" MIN. (INSIDE DIMENSIONS) OR LARGER H-20 TRAFFIC RATED PRE-CAST CONCRETE VAULT. UTILITY VAULT COMPANY OR APPROVED EQUAL. SUBMIT DRAWINGS FOR APPROVAL.

H-20 RATED GALVANIZED SPRING-ASSISTED HATCH COVER WITH DRAIN, UTILITY VAULT NO. 2-332P OR APPROVED EQUAL. PROVIDE RISERS AS REQUIRED.

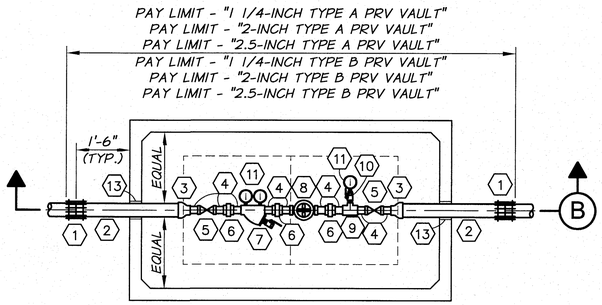


SECTION B

FITTING SCHEDULE

1. TRANSITION COUPLING
2. GIP, SIZE AS SHOWN ON PLANS
3. THREADED GIP REDUCER WHERE REQUIRED
4. 1 1/4", 2", OR 2 1/2" THREADED GIP
5. BRASS THREADED GATE VALVE
6. GIP UNION
7. SONNTAG ALUMINUM Y FILTER WITH 50 MESH SCREEN
8. 1 1/4", 2", OR 2 1/2" THREADED PRESSURE REDUCING VALVE, CLA-VAL 90-01 FOR TYPE A. 1 1/4", 2", OR 2 1/2" THREADED PRESSURE REDUCING VALVE, CLA-VAL 990 FOR TYPE B.
9. SIZE x 3/4" THREADED GIP TEE
10. 3/4" THREADED BRASS BALL VALVE WITH 3/4"x1/4" NPT BUSHING AND QUICK COUPLING
11. 4" SS GLYCERIN FILLED PRESSURE GAUGE WITH FITTINGS AS REQUIRED
12. PIPE SUPPORT. SEE DETAIL, SHEET 122
13. SEAL PIPE PENETRATIONS WATERTIGHT WITH NON-SHRINK GROUT
14. BRASS GRATED DRAIN WITH KNOCKOUT HOLE FOR DRAIN PIPE

PAY LIMIT - "1 1/4-INCH TYPE A PRV VAULT"
PAY LIMIT - "2-INCH TYPE A PRV VAULT"
PAY LIMIT - "2.5-INCH TYPE A PRV VAULT"
PAY LIMIT - "1 1/4-INCH TYPE B PRV VAULT"
PAY LIMIT - "2-INCH TYPE B PRV VAULT"
PAY LIMIT - "2.5-INCH TYPE B PRV VAULT"



PLAN

NOTES:
1. SET FRAME AND COVER TO GRADE AND PROVIDE GRADE RINGS AS REQUIRED.
2. PIPE SUPPORTS TO BE SIZED APPROPRIATELY FOR PIPE AND INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.
3. ALL WORK SHOWN IN THIS DETAIL, INCLUDING ANY REQUIRED SURFACE RESTORATION, SHALL BE INCLUDED IN THE "2-INCH TYPE A OR B PRESSURE REDUCING VALVE" OR "2.5-INCH TYPE A OR B PRESSURE REDUCING VALVE" PAY ITEM.

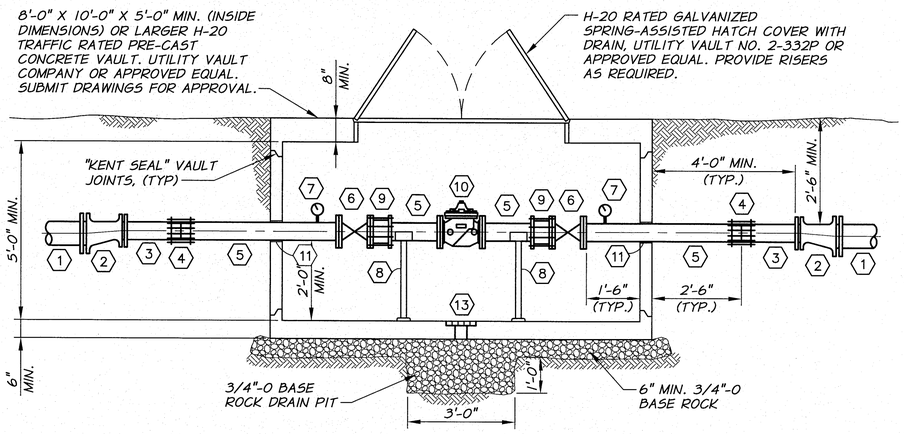
1 1/4", 2", AND 2.5" PRESSURE REDUCING VALVE VAULT DETAIL

TYPE A OR TYPE B

1/2"=1'-0"

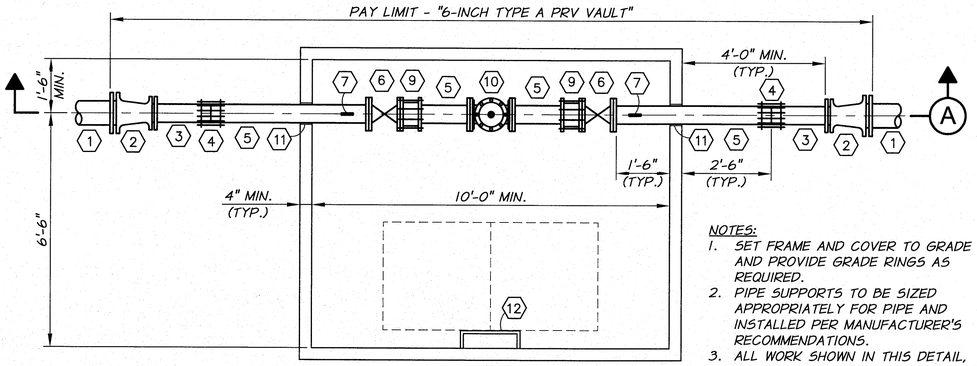
8'-0" X 10'-0" X 5'-0" MIN. (INSIDE DIMENSIONS) OR LARGER H-20 TRAFFIC RATED PRE-CAST CONCRETE VAULT. UTILITY VAULT COMPANY OR APPROVED EQUAL. SUBMIT DRAWINGS FOR APPROVAL.

H-20 RATED GALVANIZED SPRING-ASSISTED HATCH COVER WITH DRAIN, UTILITY VAULT NO. 2-332P OR APPROVED EQUAL. PROVIDE RISERS AS REQUIRED.



SECTION A

PAY LIMIT - "6-INCH TYPE A PRV VAULT"



PLAN

NOTES:
1. SET FRAME AND COVER TO GRADE AND PROVIDE GRADE RINGS AS REQUIRED.
2. PIPE SUPPORTS TO BE SIZED APPROPRIATELY FOR PIPE AND INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.
3. ALL WORK SHOWN IN THIS DETAIL, INCLUDING ANY REQUIRED SURFACE RESTORATION, SHALL BE INCLUDED IN THE "6-INCH PRESSURE REDUCING VALVE" PAY ITEM.

FITTING SCHEDULE

1. 8" PVC PIPING
2. 8" X 6" MJ ECCENTRIC REDUCER
3. 6" PE D.I. SPOOL, LENGTH AS REQUIRED
4. 6" COUPLING
5. 6" FLG X PE D.I. SPOOL, LENGTH AS REQUIRED
6. 6" FLG GATE VALVE WITH HANDWHEEL OPERATOR
7. 4" S.S. PRESSURE GAUGE, GLYCERIN FILLED, 0-150 P.S.I. WITH 2 P.S.I. GRADUATIONS, PRESSURE SNUBBER, ISOLATION VALVE AND FITTINGS AS REQUIRED. TAP D.I. PIPE AS REQUIRED.
8. PIPE SUPPORT. SEE TYPICAL PIPE SUPPORT DETAIL SHEET 122.
9. 6" RESTRAINED FLANGE COUPLING ADAPTER
10. 6" FLG PRESSURE REDUCING VALVE, CLA-VAL MODEL 90-01 OR APPROVED EQUAL ⚠
11. SEAL PIPE PENETRATIONS WATERTIGHT WITH NON-SHRINK GROUT
12. OSHA APPROVED GALVANIZED STEEL LADDER WITH 4 FOOT REMOVABLE EXTENSION
13. BRASS GRATED DRAIN WITH KNOCKOUT HOLE FOR DRAIN PIPE

6" TYPE A PRESSURE REDUCING VALVE VAULT DETAIL

1/2"=1'-0"

EBERT T. MOORE — STATE OF WASHINGTON — 46026 — REGISTERED PROFESSIONAL ENGINEER
SIGNED 06-15-12
RECORD DRAWING

REVISION	BY	DATE
⚠ RECORD DRAWING	E.H.	12/11

SCALE IN FEET: 2 0 2 4 6

DESIGNED BY	R. HARRIS	XREFS: TB-BID.dwg	
DRAWN BY	D. CHRISTMAN		
REVIEWED BY	H. PERRY		
HORZ. SCALE	1/2"=1'-0"	VERT. SCALE	
JOB NUMBER	1199-336	DATE	2009
ACAD FILE:	IrrgDets-1.dwg		

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BENTON IRRIGATION DISTRICT
IRRIGATION SYSTEM IMPROVEMENTS PHASE I
PRESSURE REDUCER VAULT DETAILS

SHEET 119

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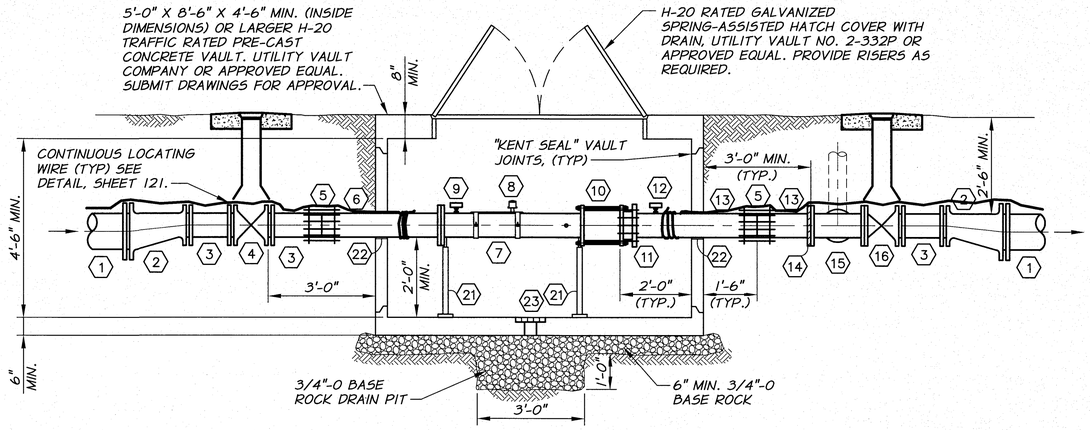
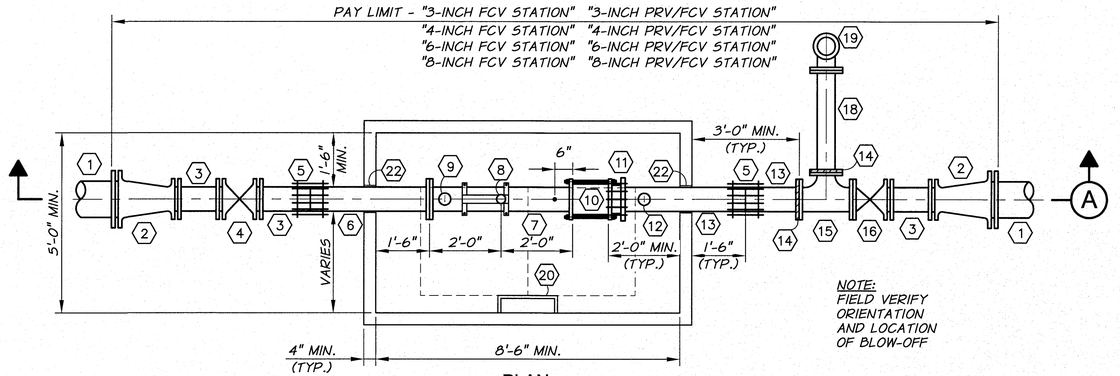


SECTION A



PLAN

NOTE: FIELD VERIFY ORIENTATION AND LOCATION OF BLOW-OFF

NOTES:
1. PIPING SIZE TO MATCH CONTROL VALVE SIZE UNLESS OTHERWISE NOTED.
2. SET FRAME AND COVER TO GRADE AND PROVIDE GRADE RINGS AS REQUIRED.
3. PIPE SUPPORTS TO BE SIZED APPROPRIATELY FOR PIPE AND INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.
4. ALL WORK SHOWN IN THIS DETAIL, INCLUDING ANY REQUIRED SURFACE RESTORATION, SHALL BE INCLUDED IN THE "_-INCH FCV STATION" OR THE "_-INCH PRV/FCV STATION" PAY ITEM.

TABLE 1

CONTROL VALVE SIZE	BLOW-OFF TYPE	INLET	OUTLET
3-INCH	ECLIPSE NO. 85 BLOW-OFF HYDRANT	3"	2 1/2 NST
4-INCH	MAINGUARD BLOW-OFF #7600	4"	4"
6-INCH	MAINGUARD BLOW-OFF #7600	4"	4"
8-INCH	MAINGUARD BLOW-OFF #7600	6"	4"

FITTING SCHEDULE

1. PVC PIPING, SIZE PER MAIN LINE
2. MJ ECCENTRIC REDUCER
3. PVC PIPING
4. MJ GATE VALVE WITH VALVE BOX. SEE DETAIL, SHEET 121.
5. COUPLING
6. FLG X PE D.I. SPOOL, LENGTH AS REQUIRED
7. FLG DI SPOOL x 2'-8" LONG FOR 3" STATION. FLG GIP SPOOL x 4'-0" LONG FOR 4" STATION. FLG DI SPOOL x 4'-0" LONG FOR 6" AND 8" STATIONS.
8. MICROMETER FLOWMETER MODEL MW500 FOR 3", LP-22 FOR 4-INCH. MODEL LP 32 FOR PIPE SIZE GREATER THAN 4-INCH.
9. FOR PRV/FCV STATIONS ONLY: 3/4" TAPPING SADDLE WITH 3/4" THREADED BRASS BALL VALVE, 3/4"x1/4" BUSHING, AND BRASS QUICK COUPLING PLUG (UNVALVED)
10. WAFER STYLE 800 SERIES NELSON CONTROL VALVE. TYPE AS SHOWN ON PLANS, PRV/FCV OR FCV. SEE SPECIFICATIONS FOR DETAILS. PROVIDE LONG BOLTS FOR FLANGES AS REQUIRED. LOCATE PADDLE 6" UPSTREAM OF VALVE. 1-INCH TAPPING SADDLE REQUIRED.
11. RESTRAINED FLANGE COUPLING ADAPTER
12. SAME AS ITEM 9, REQUIRED FOR BOTH TYPES OF CONTROL VALVES.
13. PE DI SPOOL LENGTH AS REQUIRED
14. FLANGE COUPLING ADAPTER
15. FLG SIZExSIZExSIZE TEE, BRANCH NOT TO EXCEED 6"
16. FLGxMJ GATE VALVE WITH VALVE BOX. SEE DETAIL, SHEET 121.
17. RESERVED
18. FLGxPE SPOOL, LENGTH AS REQUIRED, FITTINGS AS REQUIRED
19. MAINGUARD BLOW-OFF #7600 FOR 4-INCH, 6-INCH AND 8-INCH CONTROL VALVE STATIONS. ECLIPSE NO. 85 BLOW-OFF HYDRANT FOR 3-INCH CONTROL VALVE STATIONS (SEE TABLE 1, THIS SHEET). ENCLOSURE TO BE CARSON INDUSTRIES MODEL H2436 TRAFFIC BEARING VAULT AND LID WITH EXTENSIONS AS REQUIRED.
20. OSHA APPROVED GALVANIZED STEEL LADDER WITH 4 FOOT REMOVABLE EXTENSION
21. PIPE SUPPORT. SEE TYPICAL PIPE SUPPORT DETAIL SHEET 122.
22. SEAL PIPE PENETRATIONS WATERTIGHT WITH NON-SHRINK GROUT
23. BRASS GRATED DRAIN WITH KNOCKOUT HOLE FOR DRAIN PIPE

3", 4", 6" AND 8" PRV/FCV AND FCV STATION DETAIL

N.T.S.

⚠ SHEET ADDED

ROBERT MOORE STATE OF WASHINGTON 46008 REGISTERED PROFESSIONAL ENGINEER
SIGNED 06-15-12 RECORD DRAWING

⚠ RECORD DRAWING		E.H.	12/11		
REVISION		BY	DATE	HORZ. SCALE NONE	VERT. SCALE
DESIGNED BY R. HARRIS	XREFS: TB-BID.dwg			JOB NUMBER 1199-336	DATE 2009
DRAWN BY D. CHRISTMAN				ACAD FILE: IrrgDets-1.dwg	
REVIEWED BY H. PERRY				COPYRIGHT 2009 BY ANDERSON-PERRY & ASSOC., INC.	

RECORD DRAWINGS
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BENTON IRRIGATION DISTRICT
IRRIGATION SYSTEM IMPROVEMENTS PHASE I

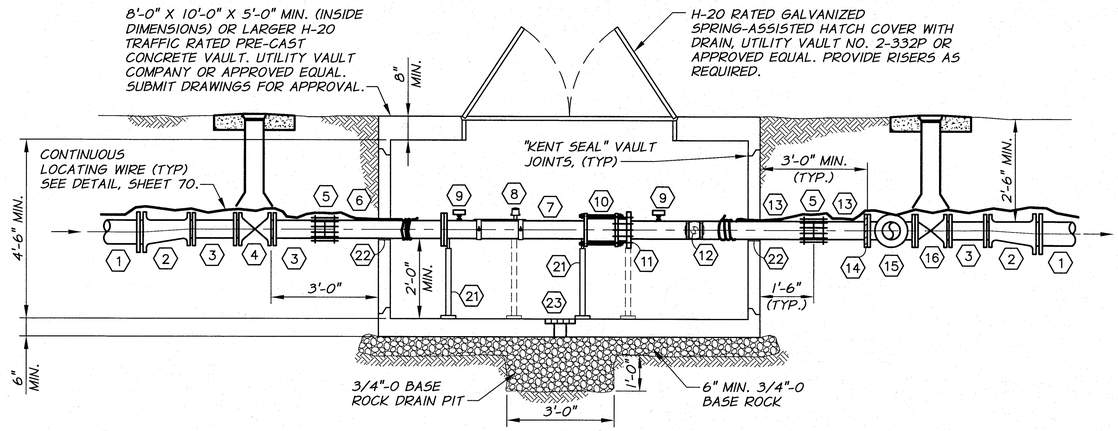
PRV/FCV AND FCV STATIONS

SHEET 119A

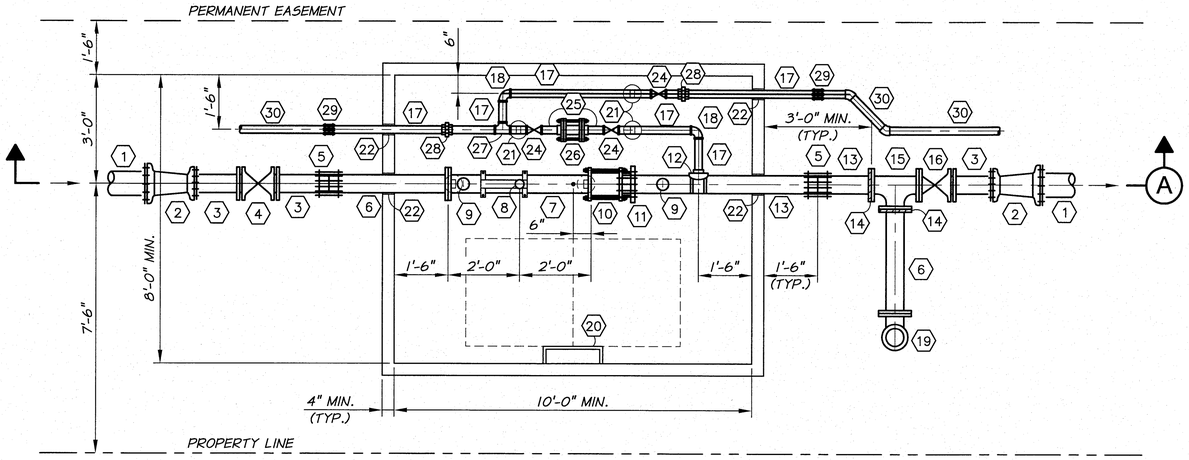
ARCHIVED

FITTING SCHEDULE

1. 8" PVC PIPING
2. 8"x6" MJ ECCENTRIC REDUCER
3. 6" PVC PIPING
4. 6" MJ GATE VALVE WITH VALVE BOX. SEE DETAIL, SHEET 121.
5. 6" COUPLING ADAPTER
6. 6" FLGxPE D.I. SPOOL, LENGTH AS REQUIRED
7. 6" FLG DI SPOOL x 4'-0" LONG
8. MICROMETER FLOWMETER MODEL LP 32
9. 3/4" TAPPING SADDLE WITH 3/4" THREADED BRASS BALL VALVE, 3/4"x1/4" BUSHING, AND BRASS QUICK COUPLING PLUG (UNVALVED)
10. WAFER STYLE 800 SERIES NELSON CONTROL VALVE, PRV/FCV. PROVIDE LONG BOLTS FOR FLANGES AS REQUIRED. LOCATE PADDLE 6" UPSTREAM OF VALVE. 1-INCH TAPPING SADDLE REQUIRED.
11. 6" RESTRAINED FLANGE COUPLING ADAPTER
12. 2 1/2" SERVICE SADDLE
13. 6" PE DI SPOOL LENGTH AS REQUIRED
14. 6" FLANGE COUPLING ADAPTER
15. 6" FLG TEE
16. 6" FLGxMJ GATE VALVE WITH VALVE BOX. SEE DETAIL, SHEET 121.
17. 2 1/2" GIP, LENGTH AS REQUIRED
18. 2 1/2" GIP 90° ELBOW
19. MAINGUARD BLOW-OFF #7600. ENCLOSURE TO BE CARSON INDUSTRIES MODEL H2436 TRAFFIC BEARING VAULT AND LID WITH EXTENSIONS AS REQUIRED.
20. OSHA APPROVED GALVANIZED STEEL LADDER WITH 4 FOOT REMOVABLE EXTENSION
21. PIPE SUPPORT. SEE TYPICAL PIPE SUPPORT DETAIL SHEET 122.
22. SEAL PIPE PENETRATIONS WATERTIGHT WITH NON-SHRINK GROUT
23. BRASS GRATED DRAIN WITH KNOCKOUT HOLE FOR DRAIN PIPE
24. 2 1/2" BRASS THREADED GATE VALVE
25. 3" RAISED FACE FLANGE WITH REDUCING BUSHING AND 2 1/2" GIP NIPPLE
26. 3" DOLE FLOW CONTROL VALVE WITH 3" RAISED FACE FLANGE EACH END
27. 2 1/2" GIP TEE
28. 2 1/2" GIP UNION
29. 2 1/2" COUPLING ADAPTER
30. 2 1/2" PVC PIPING AND FITTINGS AS REQUIRED



SECTION A



PLAN

NOTES:
1. SET FRAME AND COVER TO GRADE AND PROVIDE GRADE RINGS AS REQUIRED.
2. PIPE SUPPORTS TO BE SIZED APPROPRIATELY FOR PIPE AND INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.
3. ALL WORK SHOWN IN THIS DETAIL, INCLUDING ANY REQUIRED SURFACE RESTORATION, SHALL BE INCLUDED IN THE "6-INCH PRV/FCV STATION" PAY ITEM.

6" PRV/FCV STATION DETAIL

N.T.S.

⚠ SHEET ADDED

BRETT MOORE — STATE OF WASHINGTON — 48008 — REGISTERED PROFESSIONAL ENGINEER
SIGNED 06-15-12
RECORD DRAWING

⚠ RECORD DRAWING	E.H.	12/11	
REVISION	BY	DATE	
DESIGNED BY R. HARRIS	XREFS: TB-BID.dwg		
DRAWN BY D. CHRISTMAN			
REVIEWED BY H. PERRY			

HORZ. SCALE NONE — VERT. SCALE
JOB NUMBER 1199-336 — DATE 2009
ACAD FILE: IrrgDets-1.dwg

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BENTON IRRIGATION DISTRICT
IRRIGATION SYSTEM IMPROVEMENTS
PHASE I

PRV/FCV STATION DETAIL

SHEET 119B

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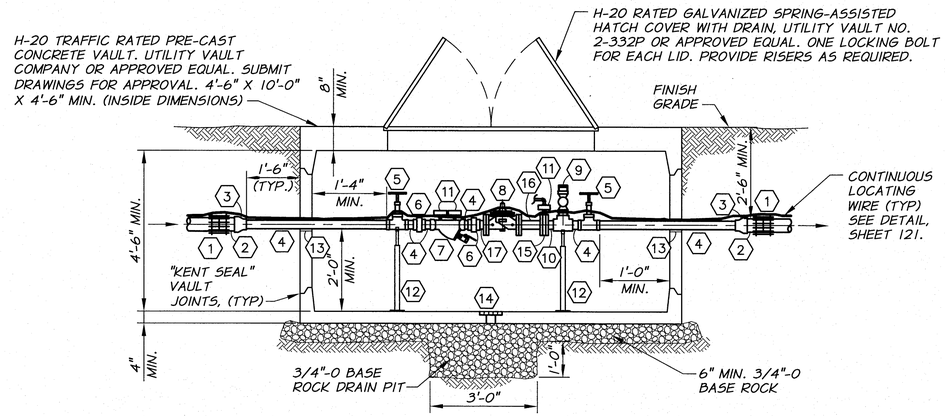
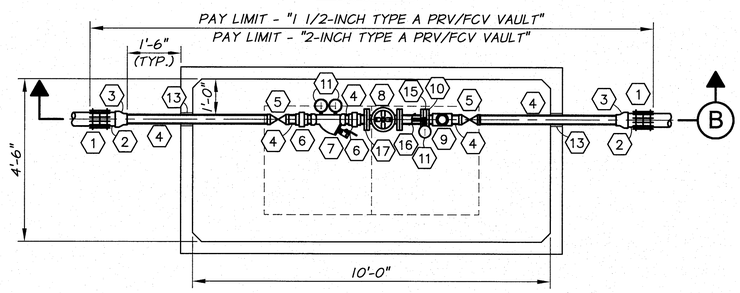


SECTION B



PLAN

NOTES:
1. PIPING SIZE TO MATCH CONTROL VALVE SIZE UNLESS OTHERWISE NOTED
2. SET FRAME AND COVER TO GRADE AND PROVIDE GRADE RINGS AS REQUIRED.
3. PIPE SUPPORTS TO BE SIZED APPROPRIATELY FOR PIPE AND INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.
4. ALL WORK SHOWN IN THIS DETAIL, INCLUDING ANY REQUIRED SURFACE RESTORATION, SHALL BE INCLUDED IN THE PAY ITEM.

FITTING SCHEDULE

1. TRANSITION COUPLING
2. GIP, SIZE AS SHOWN ON PLANS
3. THREADED GIP REDUCER WHERE REQUIRED
4. THREADED GIP
5. BRASS THREADED GATE VALVE
6. GIP UNION AND BUSHINGS AS REQUIRED
7. SONNTAG ALUMINUM Y FILTER WITH 3/32 SCREEN, FITTINGS AS REQUIRED
8. FLANGED PRESSURE REDUCING/FLOW CONTROL VALVE, CLA-VAL MODEL 49G-01AB.
9. THREADED GIP TEE WITH BALL VALVE, GIP, AND CAM-LOCK ADAPTER AND CAP
10. RAISED FACE FLANGE X THREADED GIP SPOOL
11. 4" SS GLYCERIN FILLED PRESSURE GAUGE AND ISOLATION VALVE WITH FITTINGS AS REQUIRED ON ORIFICE PILOT PIPING. ORIENT GAUGE SO THAT FACE IS CLEARLY VISIBLE FROM VAULT ACCESS OPENING.
12. PIPE SUPPORT. SEE DETAIL, SHEET 122.
13. SEAL PIPE PENETRATIONS WATERTIGHT WITH NON-SHRINK GROUT
14. BRASS GRATED DRAIN WITH KNOCKOUT HOLE FOR DRAIN PIPE. DO NOT PROVIDE DRAIN IN HIGH GROUND WATER AREA.
15. ORIFICE PLATE
16. FLG X RAISED FACE FLG GIP SPOOL X 8" LG.
17. FLG X THREADED GIP SPOOL

1 1/2" AND 2" TYPE A PRV/FCV AND FCV VAULT DETAIL

N.T.S.

⚠ SHEET ADDED

BRETT MOORE STATE OF WASHINGTON 46026 REGISTERED PROFESSIONAL ENGINEER
SIGNED 06-15-12
RECORD DRAWING

⚠ RECORD DRAWING		E.H.	12/11		
REVISION		BY	DATE	HORZ. SCALE NONE	VERT. SCALE
DESIGNED BY R. HARRIS	XREFS: TB-BID.dwg			JOB NUMBER 1199-336	DATE 2009
DRAWN BY D. CHRISTMAN				ACAD FILE: IrrgDets-1.dwg	
REVIEWED BY H. PERRY				COPYRIGHT 2009 BY ANDERSON-PERRY & ASSOC., INC.	

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BENTON IRRIGATION DISTRICT
IRRIGATION SYSTEM IMPROVEMENTS PHASE I
PRV/FCV VAULT DETAIL

SHEET 119C

ARCHIVED

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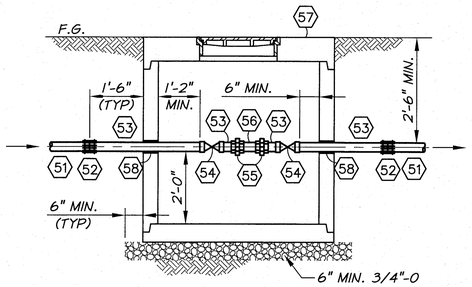
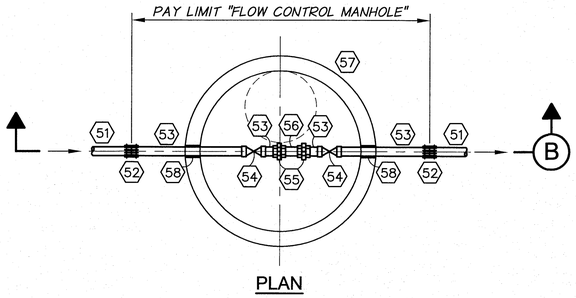
FITTING SCHEDULE

51. PVC MAIN PIPING
52. COUPLING ADAPTER
53. GIP, SIZE OF MAIN
54. BRASS THREADED GATE VALVE
55. GIP UNION
56. DOLE FLOW CONTROL VALVE, SIZE SPECIFIED ON DRAWINGS
57. 54" PRECAST MANHOLE WITH H20 TRAFFIC RATED FLAT TOP AND 24" MANHOLE COVER WITH FRAME CAST INTO SLAB
58. SEAL PIPE PENETRATIONS WATERTIGHT WITH NON-SHRINK GROUT



SECTION B



PLAN

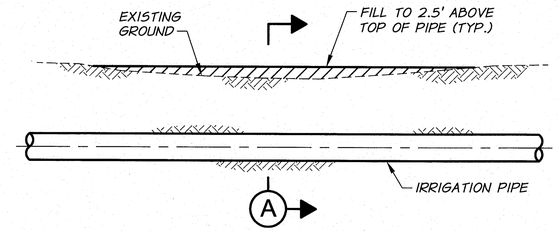
⚠ FLOW CONTROL MANHOLE DETAIL

N.T.S.

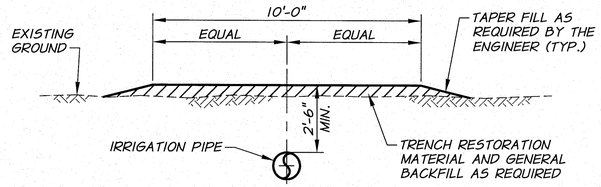
⚠ DETAIL ELIMINATED

TYPICAL 4" AND LARGER SERVICE DETAIL

N.T.S.



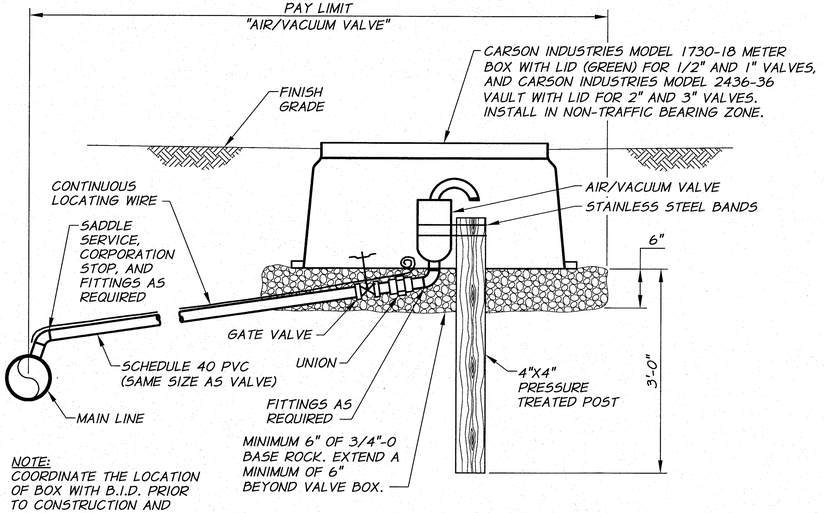
PROFILE



SECTION A

TYPICAL PIPELINE LOW AREA BACKFILL DETAIL

N.T.S.



NOTE:
COORDINATE THE LOCATION OF BOX WITH B.I.D. PRIOR TO CONSTRUCTION AND INSTALLATION.

AIR / VACUUM VALVE

N.T.S.

BRETT MOORE
STATE OF WASHINGTON
46028
REGISTERED PROFESSIONAL ENGINEER
SIGNED 06-15-12
RECORD DRAWING

REVISION	BY	DATE
⚠ RECORD DRAWING	E.H.	12/11

DESIGNED BY	R. HARRIS	XREFS: TB-BID.dwg	
DRAWN BY	D. CHRISTMAN		
REVIEWED BY	H. PERRY		

HORZ. SCALE NONE — VERT. SCALE
JOB NUMBER 1199-336 — DATE 2009
ACAD FILE: IrrgDets-1.dwg

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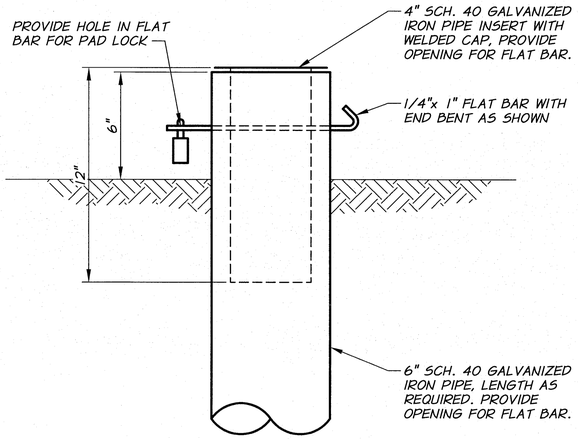
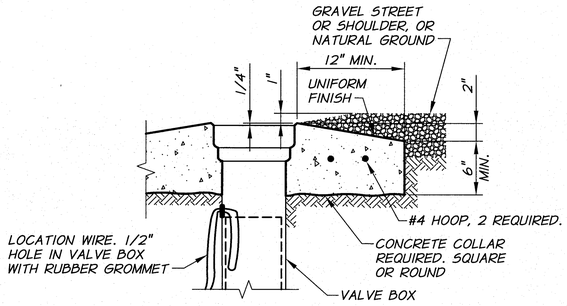
BENTON IRRIGATION DISTRICT
IRRIGATION SYSTEM IMPROVEMENTS PHASE I

MISCELLANEOUS DETAILS I

SHEET 120



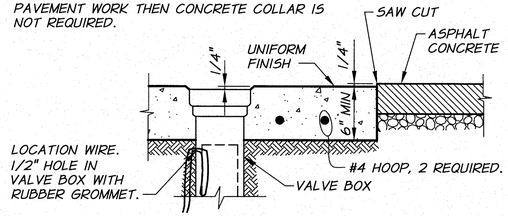
LOCKABLE VALVE BOX DETAIL
N.T.S



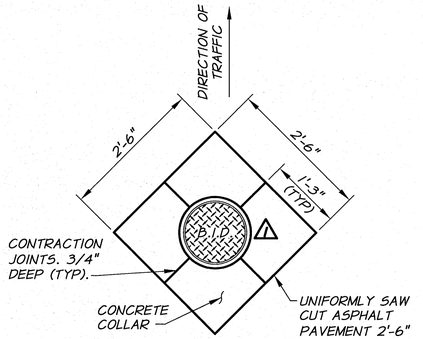
REQUIREMENTS FOR CONCRETE COLLARS:
1. CONCRETE : 3/4", 7 SACK, 4000 PSI AT 28 DAYS, 2" TO 4" SLUMP, 4-7% AIR.
2. COLLAR TO BE FORMED AND UNIFORMLY ROUND.
3. SMOOTH BROOMED FINISH REQUIRED.
4. APPLY CONCRETE CURING COMPOUND.
5. PROTECT FROM TRAFFIC FOR 4 DAYS MIN.

CONCRETE COLLAR DETAIL
IN GRAVEL STREETS OR NATURAL GROUND
N.T.S.

NOTE:
CONCRETE COLLAR REQUIRED IF VALVE BOX GRADE IS ADJUSTED AFTER ASPHALT PAVEMENT WORK IS PERFORMED. IF GRADE ADJUSTMENT OCCURS PRIOR TO ASPHALT PAVEMENT WORK THEN CONCRETE COLLAR IS NOT REQUIRED.



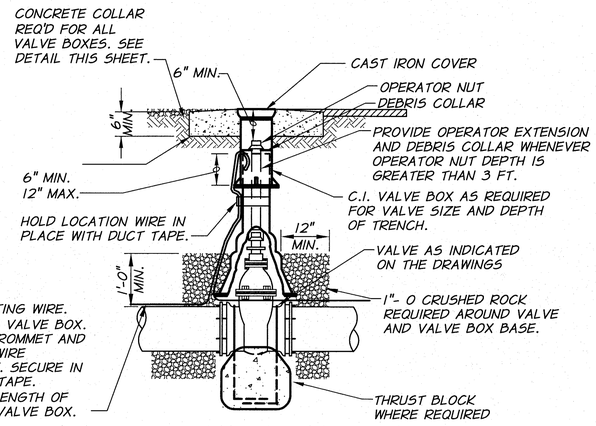
TYPICAL SECTION



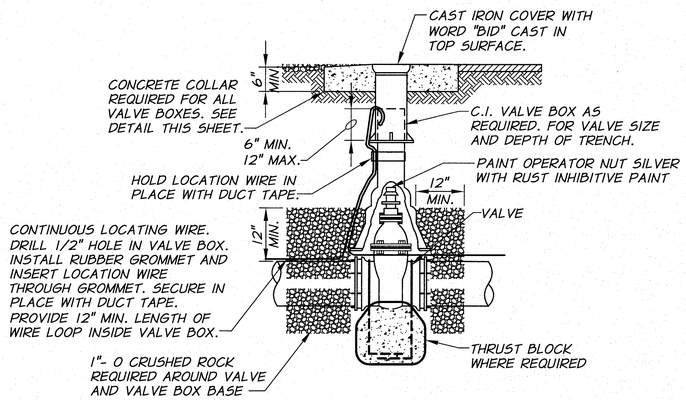
PLAN

REQUIREMENTS FOR CONCRETE COLLARS:
1. CONCRETE: 3/4", 7 SACK, 4000 PSI AT 28 DAYS, 2" TO 4" SLUMP, 4-7% AIR.
2. SMOOTH BROOMED FINISH REQUIRED.
3. APPLY CONCRETE CURING COMPOUND.
4. PROTECT FROM TRAFFIC FOR 4 DAYS MINIMUM.

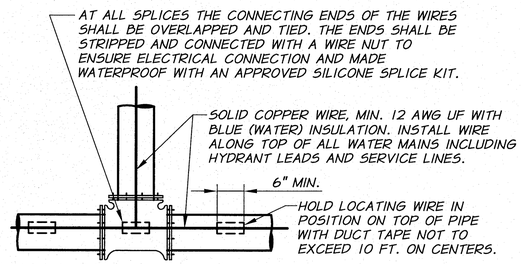
VALVE BOX CONCRETE COLLAR DETAIL
IN ASPHALT PAVEMENT
N.T.S.



VALVE BOX EXTENSION DETAIL
N.T.S.



VALVE BOX DETAIL
N.T.S.



CONTINUOUS LOCATING WIRE DETAIL
N.T.S.

BRETT MOORE
STATE OF WASHINGTON
48028
REGISTERED
PROFESSIONAL ENGINEER
SIGNED 06-15-12
RECORD DRAWING

⚠ RECORD DRAWING		E.H.	12/11	
REVISION		BY	DATE	HORZ. SCALE NONE / VERT. SCALE
DESIGNED BY R. HARRIS	XREFS: TB-BID.dwg			JOB NUMBER 1199-336 / DATE 2009
DRAWN BY D. CHRISTMAN				ACAD FILE: IrrgDets-II.dwg
REVIEWED BY H. PERRY				COPYRIGHT 2009 BY ANDERSON-PERRY & ASSOC., INC.

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BENTON IRRIGATION DISTRICT
IRRIGATION SYSTEM IMPROVEMENTS PHASE I
MISCELLANEOUS DETAILS II

SHEET 121

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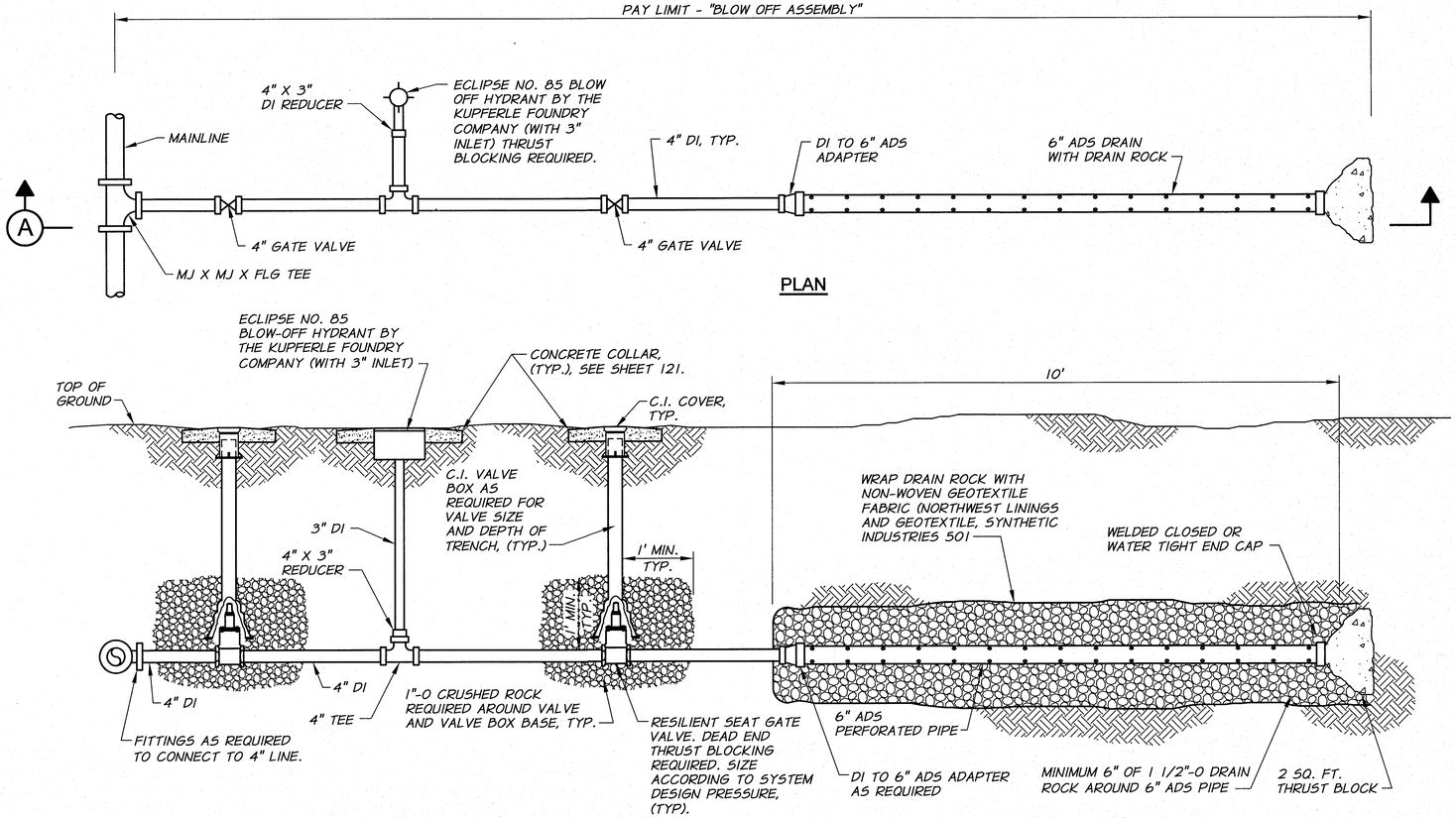
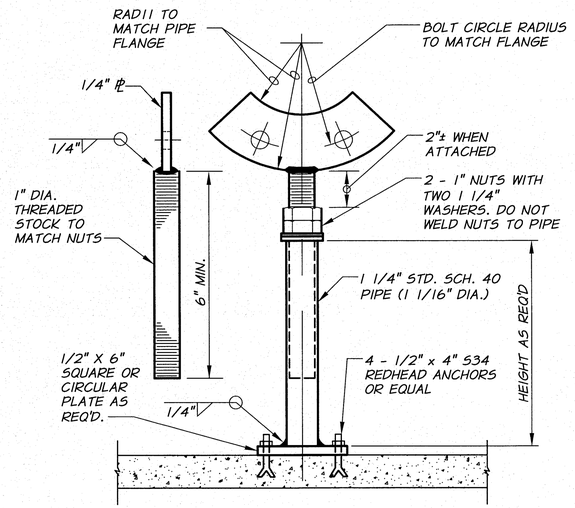


BLOW-OFF ASSEMBLY DETAIL

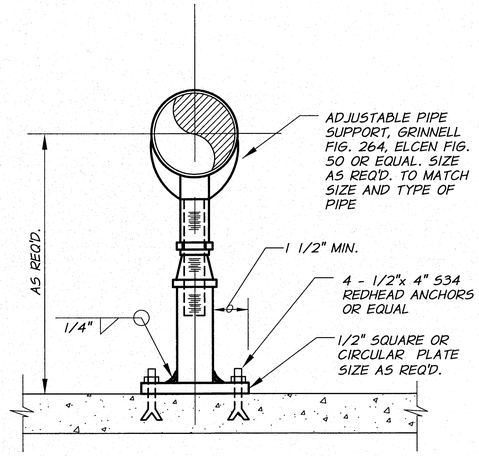
N.T.S

NOTE:
FOR MAIN LINE SIZE LESS THAN 4-INCHES, REDUCE PIPE SIZES TO MATCH MAIN LINE EXCEPT FOR ADS PERFORATED PIPE. PROVIDE FITTINGS AS REQUIRED.



PIPE SUPPORT DETAIL

N.T.S.



PIPE SUPPORT DETAIL

N.T.S.

BRETT MOORE
STATE OF WASHINGTON
46026
REGISTERED
PROFESSIONAL ENGINEER
SIGNED 08-15-12
RECORD DRAWING

REVISION	BY	DATE

DESIGNED BY	R. HARRIS	XREFS: TB-BID.dwg	
DRAWN BY	D. CHRISTMAN		
REVIEWED BY	H. PERRY		

HORZ. SCALE NONE — VERT. SCALE

JOB NUMBER 1199-336 — DATE 2009

ACAD FILE: IrrgDets-II.dwg

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BENTON IRRIGATION DISTRICT
IRRIGATION SYSTEM IMPROVEMENTS
PHASE I

MISCELLANEOUS DETAILS III

SHEET
122

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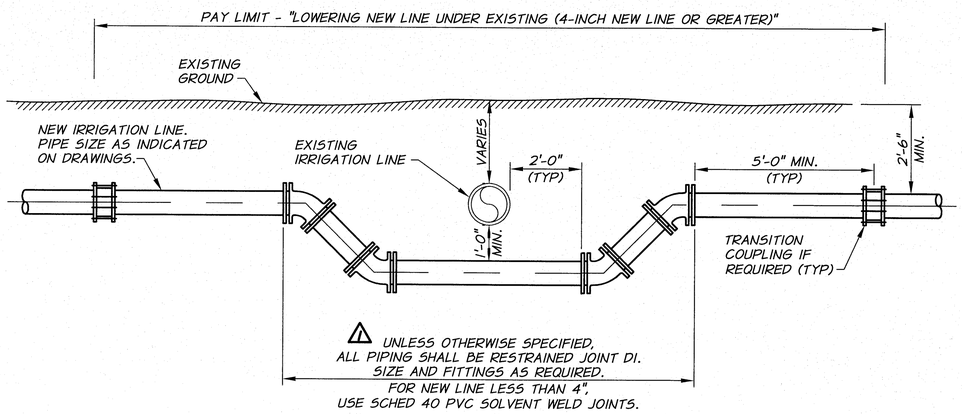
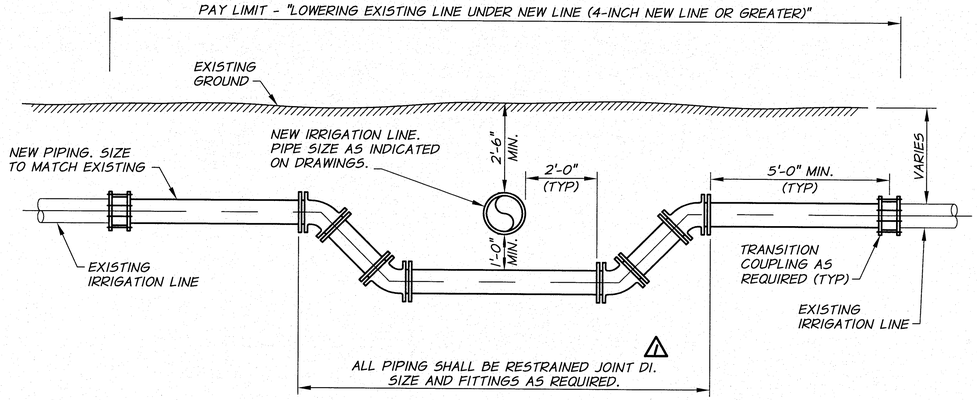


LOWERING NEW IRRIGATION LINE UNDER EXISTING

SECTION

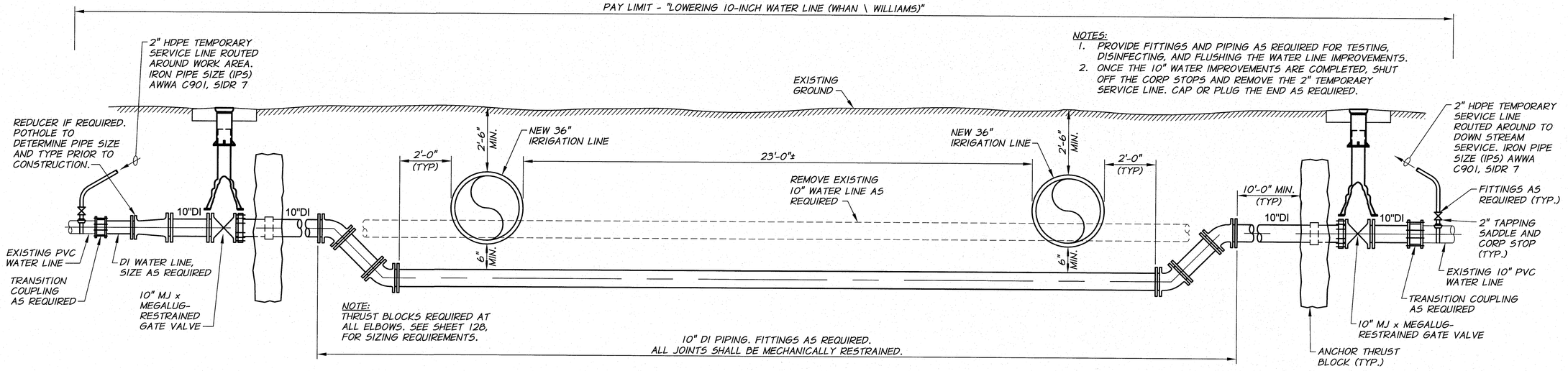
N.T.S.



LOWERING EXISTING IRRIGATION LINE UNDER NEW

SECTION

N.T.S.



EXISTING 10" WATER LINE UNDER NEW IRRIGATION PIPING

WHAN / WILLIAMS ROAD

N.T.S.

BRETT MORRIS — STATE OF WASHINGTON — 46026 — REGISTERED PROFESSIONAL ENGINEER

SIGNED 06-15-12
RECORD DRAWING

⚠ RECORD DRAWING	E.H.	12/11			
REVISION	BY	DATE	HORZ. SCALE NONE	VERT. SCALE	
DESIGNED BY R. HARRIS	XREFS: TB-BID.dwg		JOB NUMBER 1199-336	DATE 2009	
DRAWN BY D. CHRISTMAN			ACAD FILE: IrrgDets-II.dwg		
REVIEWED BY H. PERRY			COPYRIGHT 2009 BY ANDERSON-PERRY & ASSOC., INC.		

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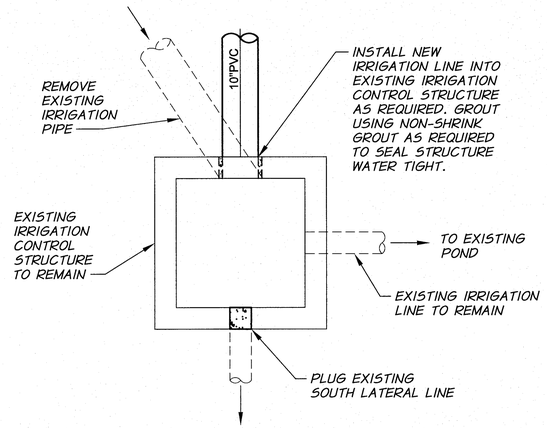
BENTON IRRIGATION DISTRICT
IRRIGATION SYSTEM IMPROVEMENTS PHASE I

MISCELLANEOUS DETAILS IV

SHEET 123

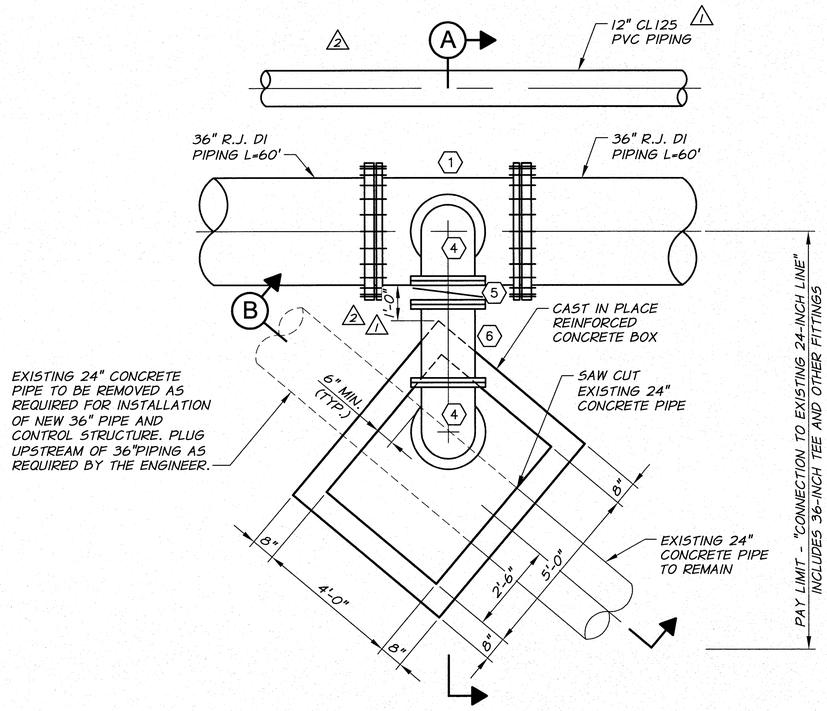
ARCHIVED



10" SERVICE CONNECTION
INTO EXISTING STRUCTURE

N.T.S.

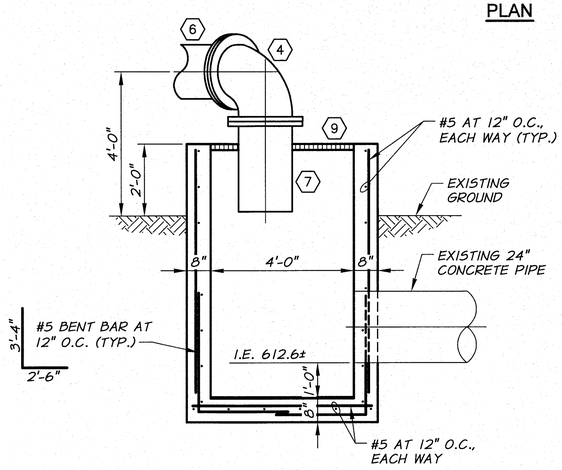
(REF. SHEET 68)



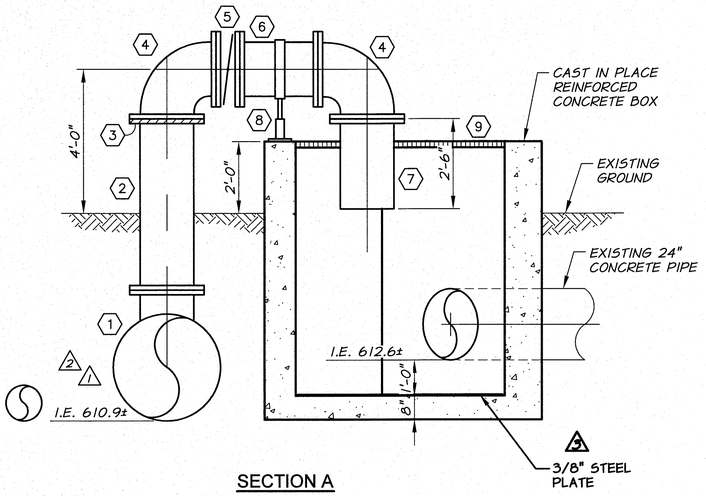
PLAN

EQUIPMENT SCHEDULE

- 2/1 (1) 36"x36"x18" MJ TEE. MJ CONNECTIONS TO BE RESTRAINED.
- 2/1 (2) 18" DI SPOOL, LENGTH AS REQUIRED.
- (3) 18" KWIK FLANGE WITH TWO S.S. TIE RODS.
- (4) 18" FLG 90° ELBOW
- (5) 18" FLG BUTTERFLY VALVE
- (6) 18" FLG DI SPOOL, LENGTH AS REQUIRED.
- (7) 18" FLGxPE DI SPOOL x 2'-6" LONG.
- (8) PIPE SUPPORT. SEE DETAIL, SHEET 122.
- (9) INSTALL EXPANDED METAL GRATING WITH ANGLE IRON FRAME SUPPORT AS REQUIRED BY THE ENGINEER.



SECTION B



SECTION A

2/1 CONNECTION DETAIL
CONNECTION TO EXISTING 24" IRRIGATION LINE

1/2"=1'-0"

(REF. SHEET 69)

BRENT MOORE — STATE OF WASHINGTON — 46028 — REGISTERED PROFESSIONAL ENGINEER

SIGNED 06-15-12
RECORD DRAWING

REVISION	BY	DATE
3 RECORD DRAWING	E.H.	12/11
2 DETAIL REVISION	R.H.	2/10
1 DETAIL REVISION	R.H.	1/10

SCALE IN FEET: 2 0 2 4 6

DESIGNED BY	R. HARRIS	XREFS: TB-BID.dwg	
DRAWN BY	D. CHRISTMAN		
REVIEWED BY	H. PERRY		
HORZ. SCALE	AS NOTED	VERT. SCALE	
JOB NUMBER	1199-336	DATE	2009
ACAD FILE:	IrrgDets-II.dwg		

RECORD DRAWINGS

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BENTON IRRIGATION DISTRICT
IRRIGATION SYSTEM IMPROVEMENTS PHASE I

MISCELLANEOUS DETAILS V

SHEET 124

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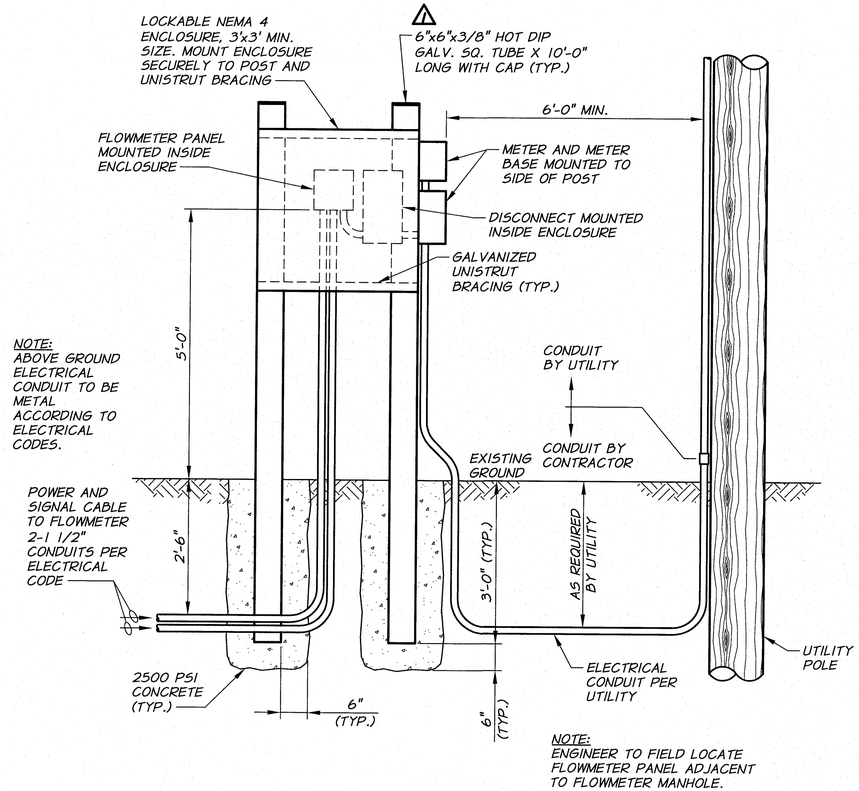
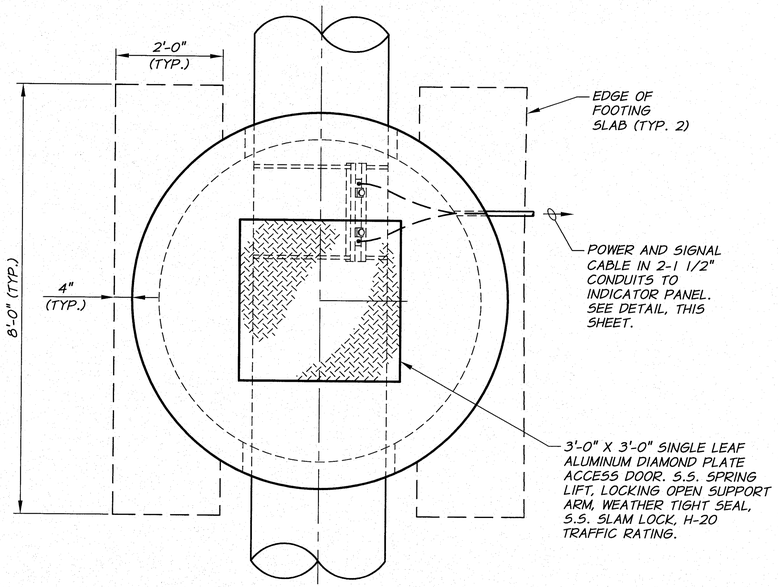
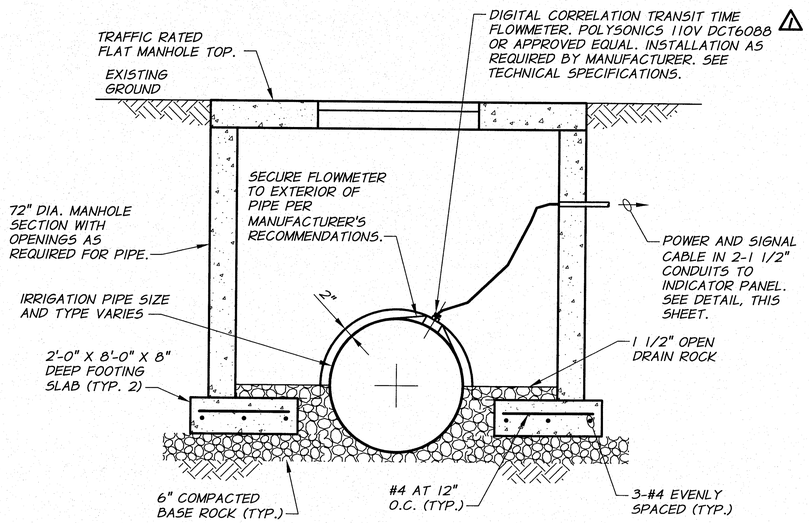
⚠ METER LOCATION	DISTANCE TO UTILITY POLE
WILLIAMS ROAD 2+00	30 FT. EAST
CORRAL CK. ROAD 1+50	115 FT. EAST
WHAN ROAD 8+40	10 FT. SOUTH



FLOWMETER PANEL DETAIL

3/4"=1'-0"





MAIN LINE FLOWMETER DETAIL

3/4"=1'-0"

ALL WORK THIS SHEET UNDER PAY LIMIT - "MAIN LINE FLOWMETER"

BRENT MOORE STATE OF WASHINGTON 46028 REGISTERED PROFESSIONAL ENGINEER
SIGNED 06-15-12
RECORD DRAWING

REVISION	BY	DATE
⚠ RECORD DRAWING	E.H.	12/11

1 0 1 2 3 4
3/4" = 1'-0"

DESIGNED BY	R. HARRIS	XREFS: TB-BID.dwg	
DRAWN BY	D. CHRISTMAN	HORZ. SCALE AS NOTED	VERT. SCALE
REVIEWED BY	H. PERRY	JOB NUMBER 1199-336	DATE 2009
		ACAD FILE: FlowmeterDets.dwg	

RECORD DRAWINGS

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BENTON IRRIGATION DISTRICT
IRRIGATION SYSTEM IMPROVEMENTS PHASE I

FLOWMETER DETAILS

SHEET 125

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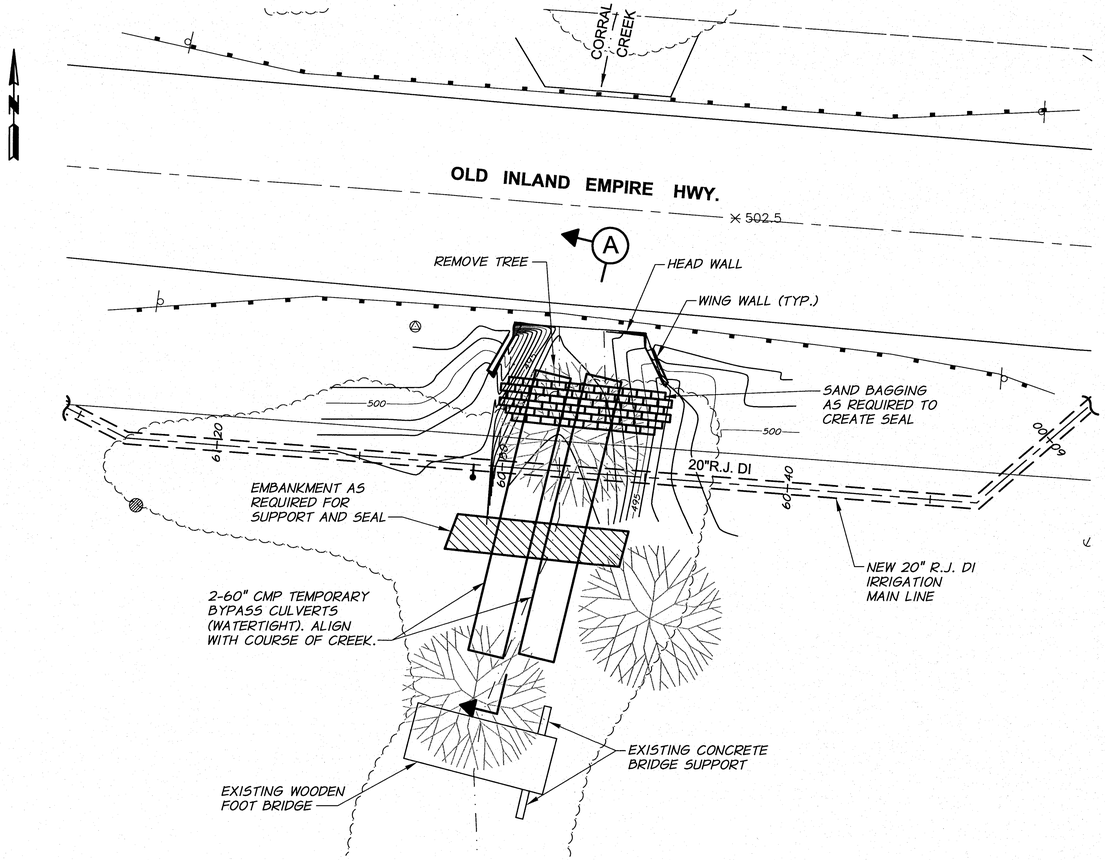
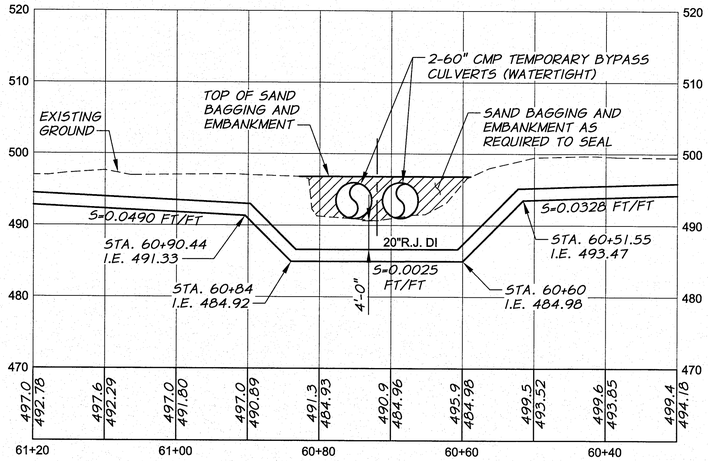


PLAN

1"=10'

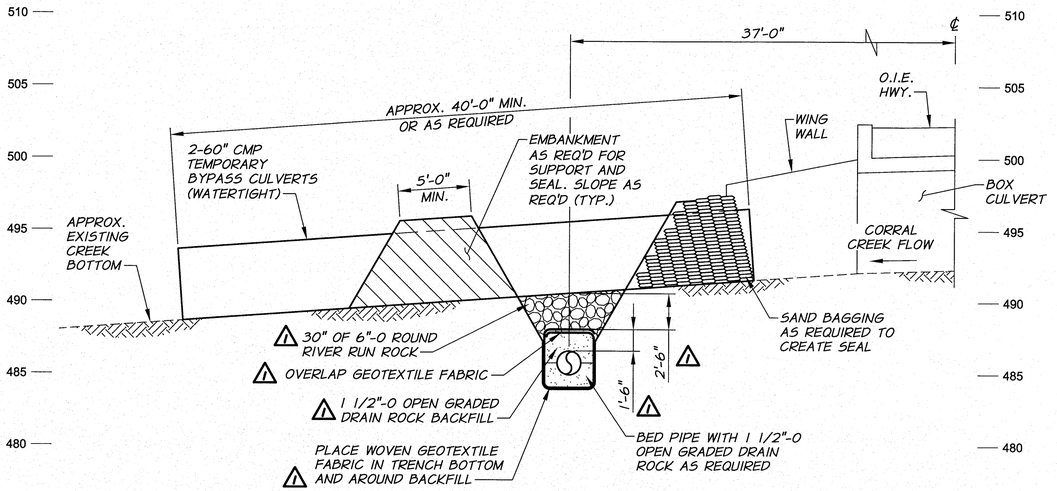


20" R.J. DI PIPE PROFILE

1"=10'

GENERAL CONSTRUCTION SEQUENCE

1. PERFORM CROSSING OF CORRAL CREEK DURING AUGUST / SEPTEMBER.
2. CLEAR AND GRUB PRIOR TO INSTALLING CULVERTS, SAND BAGGING, AND EMBANKMENT.
3. PLACE 2-60" CMP CULVERTS AND SAND BAGGING TO DIRECT CREEK FLOW INTO THE CULVERTS AND TO SEAL THE CREEK FLOW FROM THE AREA OF EXCAVATION. PROVIDE EMBANKMENT FOR ADDITIONAL SEAL AND SUPPORT.
4. EXCAVATE TRENCH AND PROVIDE DEWATERING OF THE TRENCH AS REQUIRED. WATER FROM DEWATERING SHALL BE FILTERED THROUGH A GEOTEXTILE FILTER BAG PRIOR TO DISCHARGING INTO THE CREEK.
5. PLACE GEOTEXTILE FABRIC AND DRAIN ROCK PIPE BEDDING.
6. INSTALL RESTRAINED JOINT PIPE AND BACKFILL WITH DRAIN ROCK.
7. OVERLAP GEOTEXTILE FABRIC TO ENCASE BACKFILLED PIPE.
8. PLACE 30" OF 6"-0 RIVER RUN ROCK.
9. REMOVE TEMPORARY BYPASS AND RESTORE THE SITE AS REQUIRED BY THE ENGINEER.
10. HYDROSEED DISTURBED CREEK BANKS AND DISTURBED AREAS OUTSIDE OF BANKS.
11. RE-VEGETATION OF CORRAL CREEK BY OTHERS.



SECTION A

CORRAL CREEK TEMPORARY BYPASS

1"=5'

ADDITIVE ALTERNATIVE A

BRETT MOORE — STATE OF WASHINGTON — 46026 — REGISTERED PROFESSIONAL ENGINEER
SIGNED 06-15-12
RECORD DRAWING

⚠1 RECORD DRAWING	E.H.	12/11	
REVISION	BY	DATE	
DESIGNED BY R. HARRIS	XREFS: TB-BID.dwg		
DRAWN BY D. CHRISTMAN			
REVIEWED BY H. PERRY			

10 0 10 20 30 — 1"=10'
5 0 5 10 15 — 1"=5'

HORZ. SCALE AS NOTED — VERT. SCALE
JOB NUMBER 1199-336 — DATE 2009
ACAD FILE: OIE-CulvertDetail.dwg

RECORD DRAWINGS

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BENTON IRRIGATION DISTRICT
IRRIGATION SYSTEM IMPROVEMENTS PHASE I

CORRAL CREEK CROSSING DETAILS

SHEET 126

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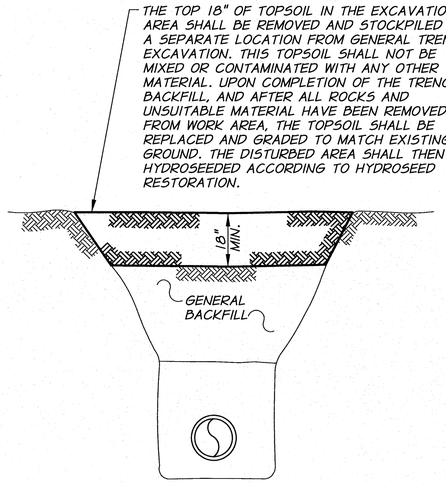
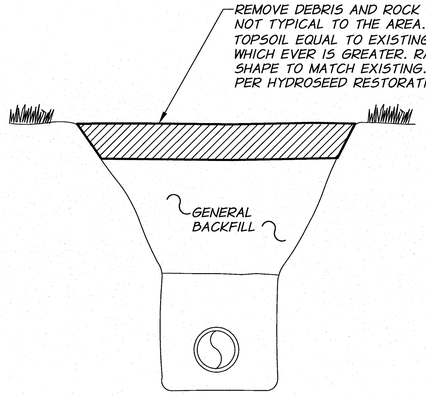


TRENCH RESTORATION
AGRICULTURAL AREAS
NTS



TRENCH RESTORATION
LAWNS & LANDSCAPED AREAS
NTS

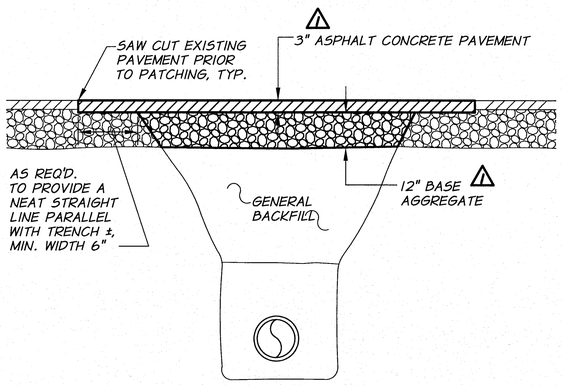
MULTIPLE INSTALLATIONS (ALL SHAPES)	
DIAMETER	MIN. SPACE BETWEEN PIPE
UP TO 36"	24"

NOTES
1. SURFACING OF PAVED AREAS SHALL COMPLY WITH STREET CUT STANDARD DRAWING.

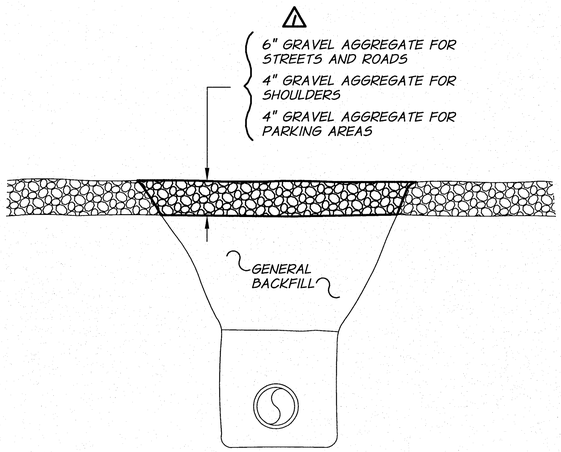
TRENCH BACKFILL AND BEDDING TABLE

	ASPHALT SURFACE RESTORATION	GRAVEL STREETS, ROADWAYS, SHOULDERS AND PARKING AREAS	HYDROSEED RESTORATION AND NATURAL AREAS
SURFACE	SURFACING MATCHING EXISTING	3/4"-0 GRAVEL AGGREGATE (FOR THICKNESS SEE DETAIL THIS SHEET)	TOPSOIL OR AS DIRECTED
BASE MATERIAL UNDER SURFACE	3/4"-0 BASE ROCK	GENERAL BACKFILL	TOPSOIL OR AS DIRECTED
GENERAL BACKFILL	3/4"-0 BASE ROCK	GENERAL BACKFILL	GENERAL BACKFILL
SELECT BACKFILL	3/4"-0 BASE ROCK	*3/4"-0 BASE ROCK OR NATIVE	*3/4"-0 BASE ROCK OR NATIVE
BEDDING	3/4"-0 BASE ROCK	*3/4"-0 BASE ROCK OR NATIVE	*3/4"-0 BASE ROCK OR NATIVE

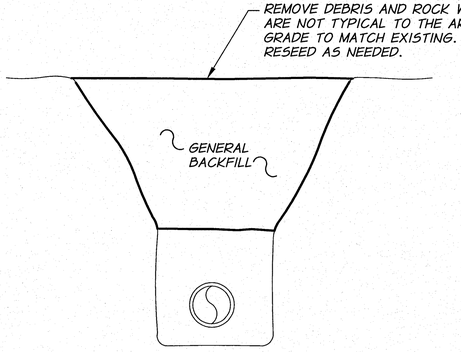
*SEE THE SPECIFICATION FOR USE OF NATIVE SOILS IN LUE OF 3/4"-0 BASE ROCK



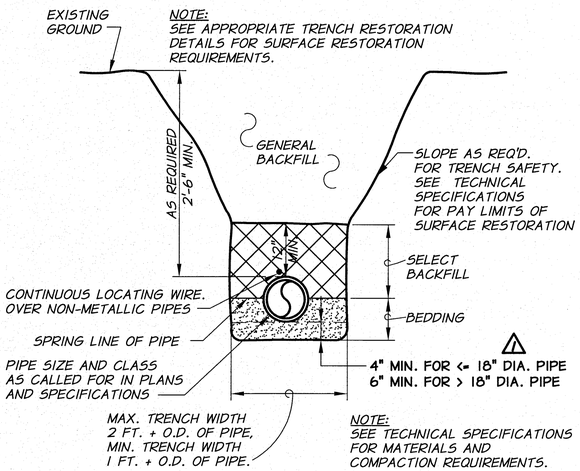
TRENCH RESTORATION
PAVED STREETS AND ROADWAYS
("ASPHALT SURFACE RESTORATION" PAY ITEM)



TRENCH RESTORATION
GRAVEL STREETS, ROADWAYS, SHOULDERS, AND PARKING AREAS
("GRAVEL SURFACE RESTORATION" PAY ITEM)
N.T.S.



TRENCH RESTORATION
NATURAL AREAS
N.T.S.



TRENCH EXCAVATION AND BACKFILL
N.T.S.

BRETT MOORE — STATE OF WASHINGTON — 46026 — REGISTERED PROFESSIONAL ENGINEER
SIGNED 06-15-12
RECORD DRAWING

REVISION	BY	DATE
1 RECORD DRAWING	E.H.	12/11

DESIGNED BY	R. HARRIS	XREFS: TB-BID.dwg	
DRAWN BY	D. CHRISTMAN		
REVIEWED BY	H. PERRY		

HORZ. SCALE NONE — VERT. SCALE
JOB NUMBER 1199-336 — DATE 2009
ACAD FILE: TrenchDets.dwg

RECORD DRAWINGS
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BENTON IRRIGATION DISTRICT
IRRIGATION SYSTEM IMPROVEMENTS PHASE I
TRENCH DETAILS

SHEET 127

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THRUST BLOCK NOTES

1. THRUST BLOCKS SHALL BE REQUIRED AT THE FOLLOWING LOCATIONS:
   A. ALL CHANGES IN DIRECTION.
   B. ALL DEAD-ENDS.
   C. ALL VALVES 8-INCHES AND LARGER SHALL BE SIZE FOR CLOSED CONDITION EXCEPTIONS:
      (1) WHEN RESTRAINED JOINT PIPE IS USED ON BOTH SIDES OF VALVE.
      (2) WHEN VALVE IS RESTRAINED JOINT CONNECTED TO A FITTING WHICH HAS APPROPRATE THRUST BLOCKING.
   D. AT LOCATIONS SPECIFICALLY CALLED OUT ON THE DRAWINGS.
   E. AT TEMPORARY DEAD ENDS DURING PIPE INSTALLATIONS AS REQUIRED FOR TEMPORARY PRESSURE TESTING.
   F. AT OTHER LOCATIONS REQUIRED BY THE ENGINEER.
2. THRUST BLOCKS SHALL BE SIZED AS REQUIRED BY SOIL CONDITIONS AND DESIGN PRESSURE.
3. PLACE CONCRETE AGAINST UNDISTURBED TRENCH WALL.
4. CONCRETE SHALL BE 2,500 PSI MINIMUM.
5. ALL CONCRETE SHALL BE PLACED SO THAT PIPE, FITTING JOINTS, BOLTS AND NUTS, ETC., WILL BE ACCESSIBLE FOR REPAIRS.
6. PLACE ONE LAYER OF VISQUEEN BETWEEN FITTING AND CONCRETE TO FACILITATE FUTURE REMOVAL OF THRUST BLOCK IF REQUIRED.
7. ANCHOR RODS SHALL BE 3/4" DIAMETER GALVANIZED STEEL RODS OR #6 EPOXY COATED REINFORCEMENT BAR, AASHTO M284, HAVING AN 18" MINIMUM EMBEDMENT IN CONCRETE.
8. IF THE REQUIRED BEARING AREA IS LESS THAN 1 SQUARE FOOT, A THRUST BLOCK SHALL NOT BE REQUIRED.
9. ALL THRUST BLOCKS SHALL BE SIZED PER THE FOLLOWING PRESSURES UNLESS OTHERWISE NOTED:

PVC CL 125 PIPE	=	125 PSI
PVC CL 160/165 PIPE	=	160 PSI
16" AND SMALLER DI PIPE	=	160 PSI

DETERMINATION OF THRUST BLOCK BEARING AREA

NOTE:
WHEN THRUST BLOCK BEARING AREA IS NOT SPECIFIED ON THE PLANS OR DETERMINED BY THE ENGINEER, THE FOLLOWING PROCEDURE SHALL BE USED TO DETERMINE REQUIRED BEARING AREA.

1. DETERMINE THRUST (T) FOR TYPE OF FITTING OR JOINT AND SIZE OF PIPE FROM TABLE NO. 1 OR TABLE NO. 3.
2. DETERMINE BEARING CAPACITY (B) OF SOIL FROM TABLE NO. 2.
3. DETERMINE REQUIRED BEARING AREA (A) AS FOLLOWS:

$A = T - B$

EXAMPLE: DESIGN PRESSURE = 175 PSI
PIPE = 12"
FITTING = TEE
SOIL - SANDY GRAVEL
FROM TABLE NO. 1: T = 15,050 LB.
FROM TABLE NO. 2: B = 3000 LB/SQ.FT.

$A = \frac{15{,}050 \times 1.75}{3{,}000} = 8.8$ SQ.FT. = 9 SQ.FT. (ROUND UP TO NEAREST WHOLE SQ.FT.)

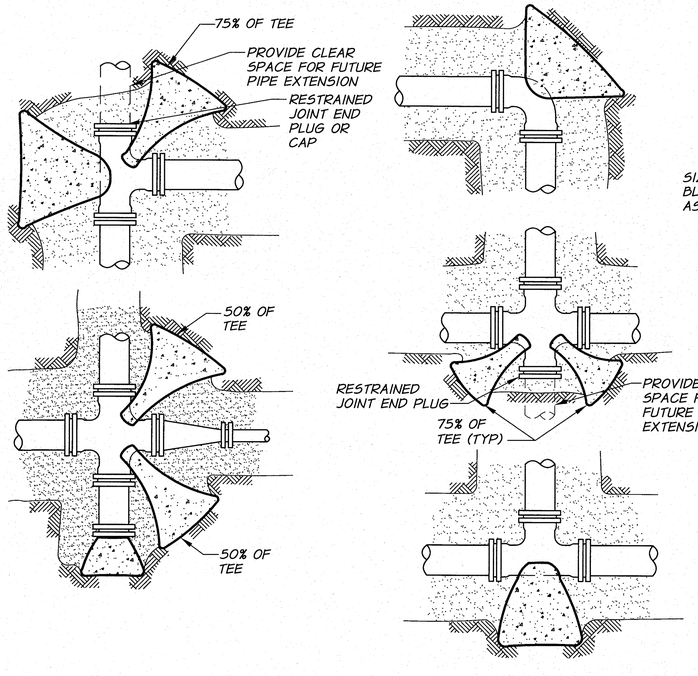
TABLE NO. 1
THRUST AT FITTINGS IN POUNDS AT 100 PSI OF PRESSURE

PIPE SIZE	TEES AND DEAD ENDS	90° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND
4"	1,680	2,310	1,290	660	340
6"	3,770	5,320	2,890	1,480	750
8"	6,690	9,460	5,120	2,620	1,320
10"	10,440	14,780	8,010	4,090	2,050
12"	15,050	21,280	11,520	5,880	2,960
14"	20,490	28,960	15,680	8,000	4,020
16"	26,750	37,830	20,470	10,440	5,260
18"	33,850	47,870	25,910	13,210	6,640
20"	41,790	59,090	31,980	16,310	8,190
24"	60,170	85,100	46,060	23,490	11,800

NOTE:
FOR WATER PRESSURES DIFFERENT THAN 100 PSI, MULTIPLY THRUST FOUND IN TABLE NO. 1 BY REQUIRED PROPORTION.
EXAMPLE: DESIGN PRESSURE = 175 PSI.
MULTIPLY VALUE IN TABLE BY 1.75

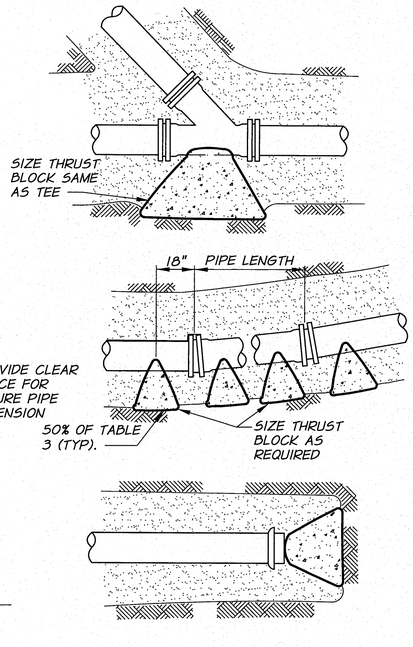
TABLE NO. 2

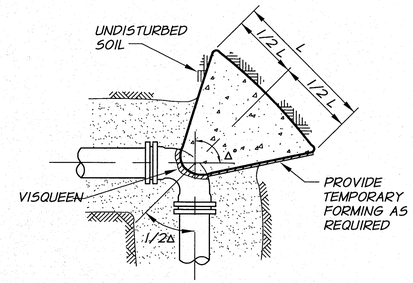
SOIL	SAFE BEARING LOAD LB/SQ.FT.
SOFT CLAY	500
SILT	1,000
SAND	2,000
SAND AND GRAVEL	3,000
SAND AND GRAVEL CEMENTED WITH CLAY	4,000
HARD CLAY	4,000



TYPICAL THRUST BLOCK LOCATIONS

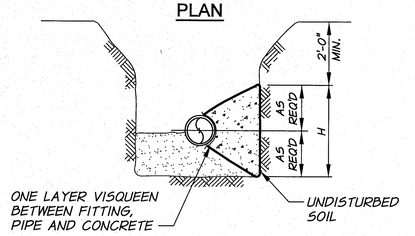
PLAN VIEWS





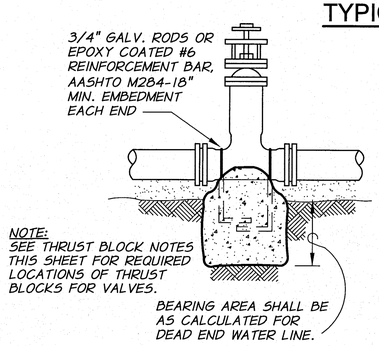
BEARING AREA (A) = HEIGHT (H) x LENGTH (L)
$A = H \times L$

PLAN



SECTION

TYPICAL THRUST BLOCK DETAILS



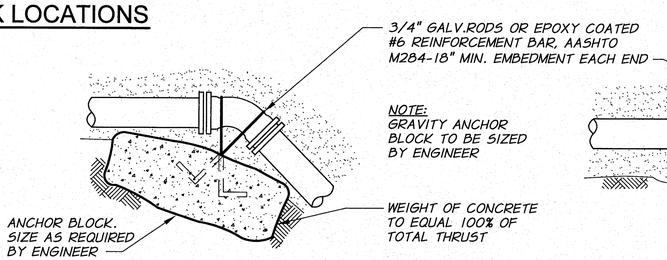
TYPICAL VALVE THRUST BLOCK

NOTE: NOT REQUIRED FOR VALVES WITH FLANGED CONNECTION TO TEE WITH THRUST BLOCK.

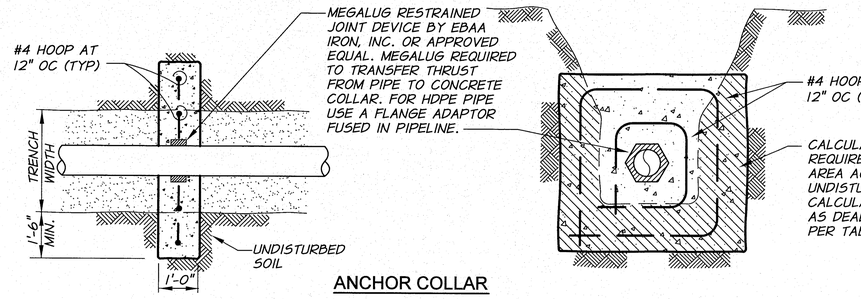
TABLE NO. 3

SIDE THRUST PER 100 LB./SQ.IN. PRESSURE PER DEGREE OF DEFLECTION			
PIPE SIZE	SIDE THRUST-LB	PIPE SIZE	SIDE THRUST-LB
4"	N/A	14"	360
6"	N/A	16"	470
8"	N/A	18"	600
10"	190	20"	730
12"	270	24"	1,050

MULTIPLY THRUST BY DEGREE OF DEFLECTION TO OBTAIN TOTAL THRUST



SECTIONS



ANCHOR COLLAR

TYPICAL ANCHOR BLOCKS

BRETT MOORE
STATE OF WASHINGTON
48028
REGISTERED PROFESSIONAL ENGINEER
SIGNED 06-15-12
RECORD DRAWING

REVISION	BY	DATE

DESIGNED BY R. HARRIS
DRAWN BY D. CHRISTMAN
REVIEWED BY H. PERRY
XREFS: TB-BID.dwg

HORZ. SCALE NONE | VERT. SCALE
JOB NUMBER 1199-336 | DATE 2009
ACAD FILE: Thrust-ConveySys.dwg

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IRRIGATION SYSTEM IMPROVEMENTS
PHASE I

THRUST BLOCK DETAILS

SHEET
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