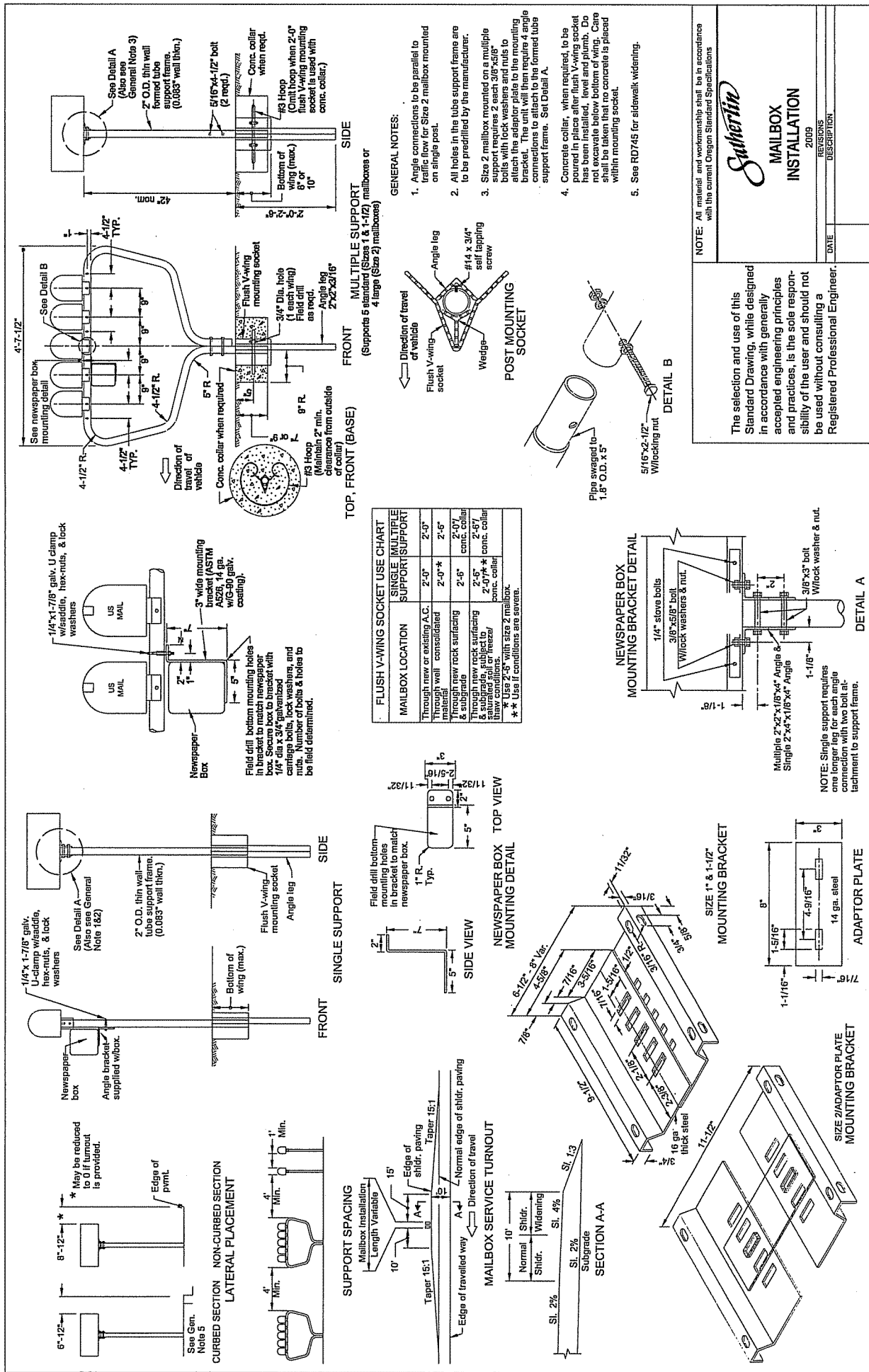
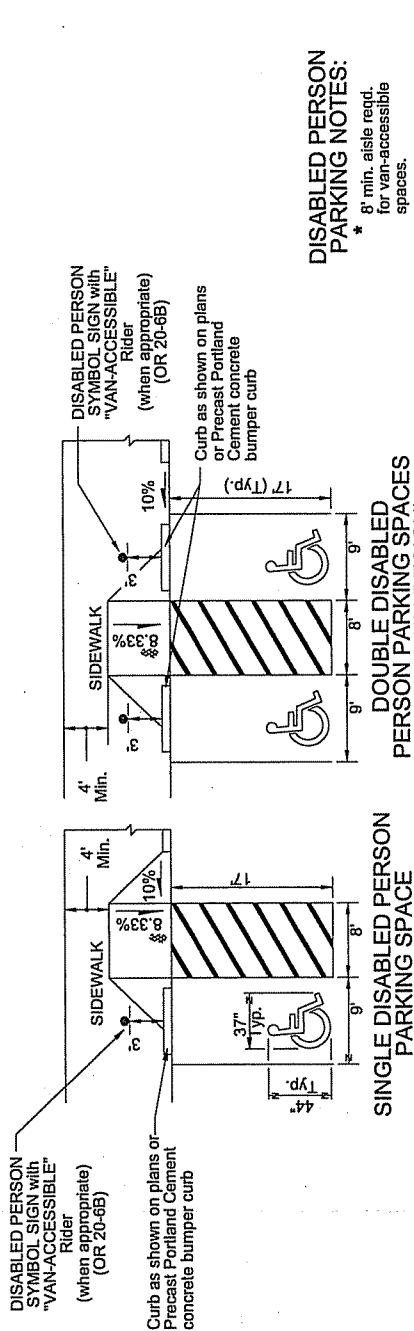
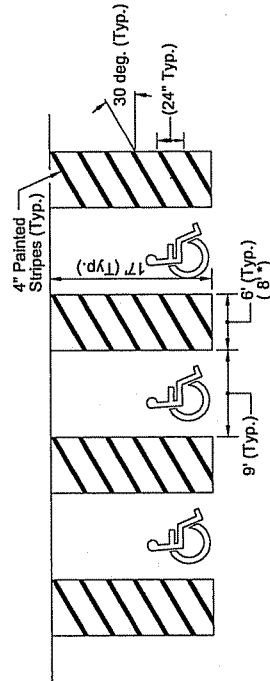




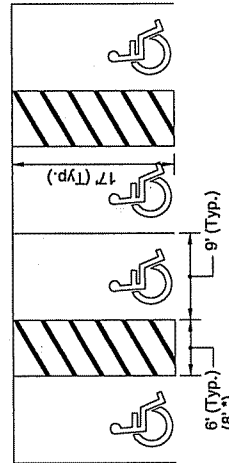


SINGLE DISABLED PERSON PARKING SPACE

DOUBLE DISABLED PERSON PARKING SPACES (MINIMUM DESIGN)



MULTIPLE DISABLED PERSON PARKING SPACES (See above for details not shown)



MULTIPLE DISABLED PERSON PARKING SPACES (MINIMUM DESIGN)
(See above for details not shown)

DISABLED PERSON PARKING NOTES:

- * 8' min. aisle reqd. for van-accessible spaces.
- 1 van-accessible space is reqd. for every 8 disabled person parking spaces or any fraction thereof.
- Locate signing for van-accessible spaces so that the signing is visible when the space is occupied.

GENERAL NOTES:

1. Disabled person parking details are based on ORS 447.233 & The Americans With Disabilities Act of 1990.
2. For details not shown see Standard Drawing Nos. RD735 and RD740.

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

Guthrie

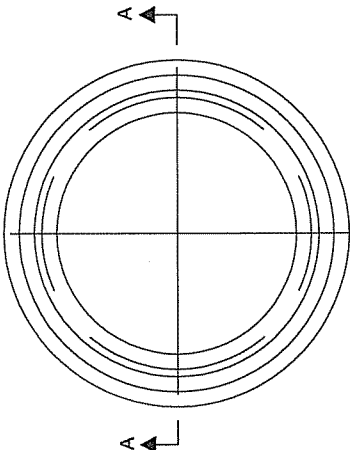
DISABLED PERSON PARKING

2009
REVISION
DESCRIPTION

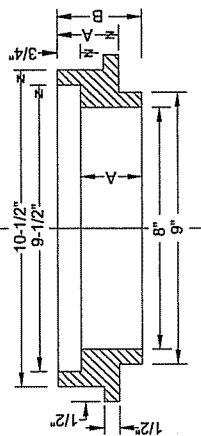
DATE

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

RISER RING



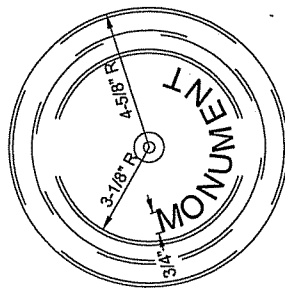
PLAN



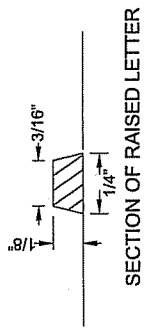
SECTION A-A

RISER RING TABLE

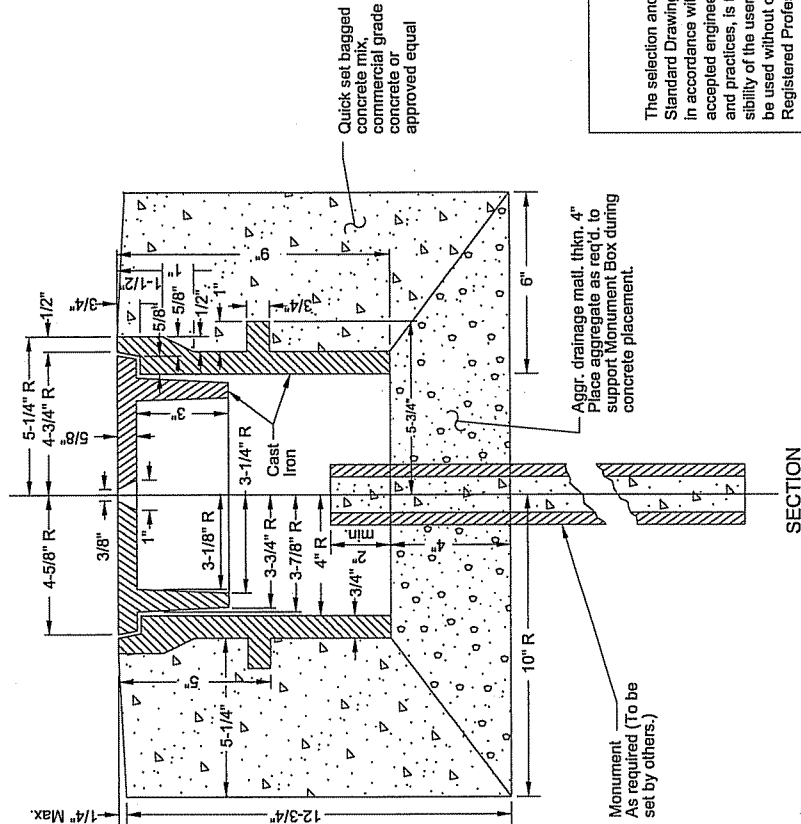
RISER RING	
DIM.	ADJUSTMENT HEIGHT
A	1-1/2" 2" 2-1/2" 3"
B	2-1/4" 2-3/4" 3-1/4" 3-3/4"



PLAN OF COVER



SECTION OF RAISED LETTER



The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

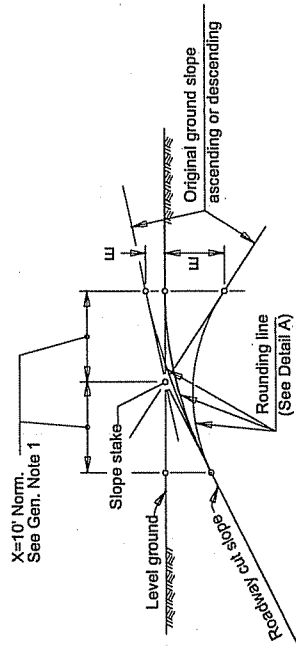
Sutherland

MONUMENT BOX

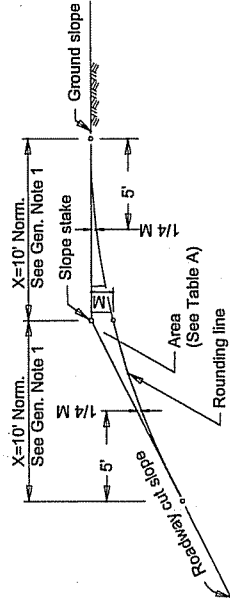
2009
REVISIONS
DESCRIPTION

DATE

ROUNDING OF CUTBANKS



SECTION



DETAIL A

GENERAL NOTES:

1. Extend slope rounding 10' or to right of way line, whichever is less. Use the same X dimension on both sides of slope break point.

TABLE A

E (ft)	CUT SLOPE											
	1:1		1:1.5		1:2		1:3		1:4			
	M	AREA (sq ft)	M	AREA (sq ft)	M	AREA (sq ft)	M	AREA (sq ft)	M	AREA (sq ft)		
6-7	2.25	23										
5-6	2.50	25										
4-5	2.75	28										
3-4	3.00	30	1.75	18								
2-3	3.25	33	2.00	20								
1-2	3.50	35	2.25	23	1.63	16						
0-1	3.75	38	2.50	25	1.88	19						
ASCENDING GROUND												
0-1	4.00	40	2.75	28	2.13	21	1.50	15				
1-2	4.25	43	3.00	30	2.38	24	1.75	18	1.44	14		
2-3	4.50	45	3.25	33	2.63	26	2.00	20	1.69	17		
3-4	4.75	48	3.50	35	2.88	29	2.25	23	1.94	19		
4-5	5.00	50	3.75	38	3.13	31	2.50	25	2.19	22		
5-6	5.25	53	4.00	40	3.38	34	2.75	28	2.44	24		
6-7	5.50	55	4.25	43	3.63	36	3.00	30	2.69	27		
7-8	5.75	58	4.50	45	3.88	39	3.25	33	2.94	29		
8-9	6.00	60	4.75	48	4.13	41	3.50	35	3.19	32		
9-10	6.25	63	5.00	50	4.38	44	3.75	38	3.44	34		
DESCENDING GROUND												

Rounding not required within these limits.

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

Sutherland

SLOPE ROUNDING

2009

REVISIONS

DESCRIPTION

DATE

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

THRUST BLOCKING

CONCRETE THRUST BLOCKING (HORIZONTAL)

PIPE DIA.	Thrust (T) at fittings in Pounds				
	A	B	C	D	E
4"	250	3140	4440	2405	1225
6"	250	7070	9995	5410	2760
8"	250	12565	17770	9620	4905
10"	250	19635	27770	15030	7660
12"	250	28275	39985	21640	11030
14"	250	38485	54425	29455	15015
16"	250	50265	71085	38470	19615

Soil Type	Soil Bearing Capacity (B) in PSI
Muck, peat, etc.	0
Soft Clay	1000
Sand	2000
Sand and gravel	3000
Sand and gravel cemented with clay	4000
Hard shale	10,000

PIPE DIA. in.	DIMENSION TABLE				
	Table Pressure PSI	Bend Angle (deg)	Concrete Volume (cy)	Cube Size (ft)	Stirrup Dia. (in)
4"	250	11.25	0.21	1.8	5/8
6"	250	22.5	0.43	2.3	5/8
8"	250	45	0.77	2.8	5/8
10"	250	11.25	0.48	2.4	5/8
12"	250	22.5	0.95	3.0	5/8
14"	250	45	1.79	3.6	5/8
16"	250	11.25	0.86	2.9	5/8
	250	22.5	1.65	3.5	5/8
	250	45	3.22	4.4	5/8
	250	11.25	1.39	3.3	5/8
	250	22.5	2.62	4.1	5/8
	250	45	4.97	4.1	5/8
	250	11.25	1.94	3.7	5/8
	250	22.5	3.91	4.7	5/8
	250	45	6.89	5.7	5/8
	250	11.25	2.62	4.1	5/8
	250	22.5	5.26	5.2	5/8
	250	45	9.70	6.4	5/8
	250	11.25	3.44	4.5	5/8
	250	22.5	6.89	5.7	5/8
	250	45	12.63	7.0	5/8

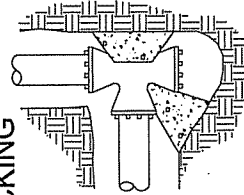
DETERMINATION OF THRUST BLOCK BEARING AREA

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

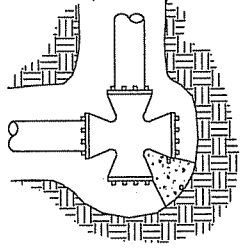
- Determine thrust (T) for type of fitting or joint and size of pipe from Table.
- Determine Design (Test) Pressure from Standard Specifications or Special Provisions.
- Determine Table Pressure from Table.
- Determine Soil Bearing Capacity (B) of soil from Table.
- Determine required bearing area (A) in sq. ft. as follows:

$$A = \left(\frac{T}{B} \right) \left(\frac{\text{Design (Test) Pressure}}{\text{Table Pressure}} \right)$$

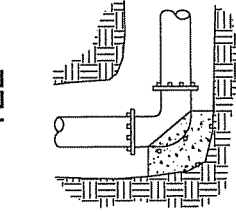
Example: Design (Test) Pressure = 150 PSI
 Pipe = 14"
 Fitting = Tee
 Soil = Sand
 $A = \left(\frac{38485}{2000} \right) \left(\frac{150}{250} \right) = 11.55 \text{ sq ft}$



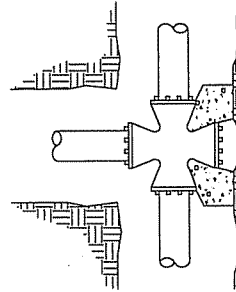
TEE



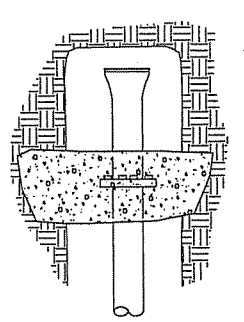
CROSS



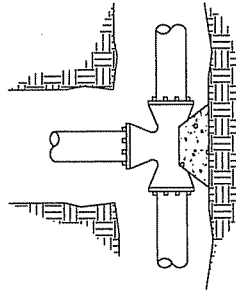
BEND



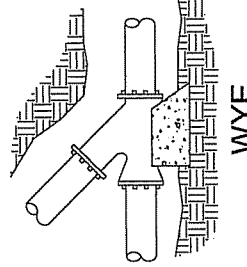
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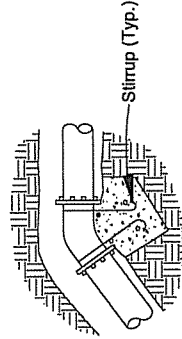
STRADDLE



TEE



WYE



CONVEX VERTICAL BEND

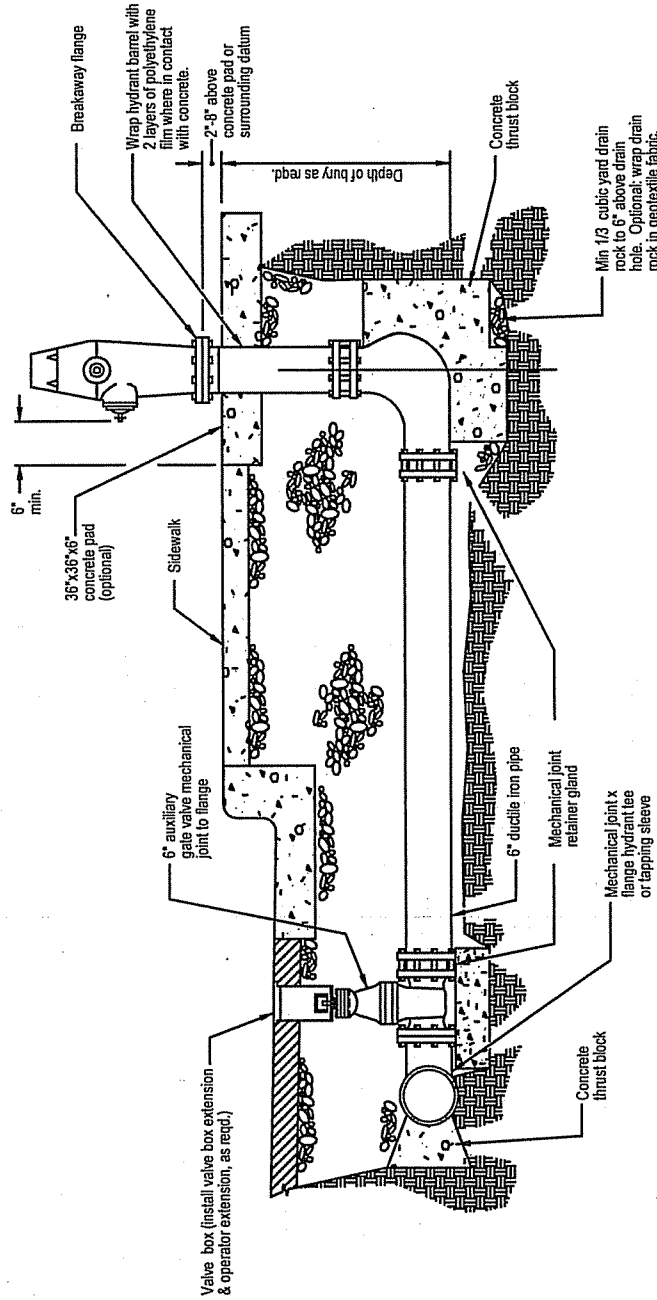
NOTES:

- Contractor to provide blocking adequate to withstand full test pressure.
- Divide thrust by safe bearing load to determine required bearing area (A in sq ft) of concrete to distribute load.
- Adjust bearing areas (A) for other pressure conditions. (See "Determination of Thrust Block Bearing Area" equation).
- Pour concrete blocking against undisturbed earth.
- All concrete to be 2800 PSI minimum.
- Wrap pipe and/or fittings with 2 layers of polyethylene film where in contact with concrete.
- Keep concrete clear of all joints and accessories.
- Stirrups shall be deformed galvanized cold rolled steel AASHTO M31 (ASTM A615), Grade 420. Coat with coal tar epoxy after installation.

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.		<i>Sutherland</i>	
		THRUST BLOCKING	
DATE	REVISIONS	2009	
DESCRIPTION			

HYDRANT ASSEMBLY



NOTES:

1. When pipe is shorter than 18', no joints allowed. Use mechanical joint retainers glands. Two 3/4" galvanized tie rods may be used in lieu of thrust blocks for installations less than 18' long. Coat tie rods with two coats of coal tar epoxy.
2. When pipe is longer than 18' retainers glands not required.
3. There shall be a minimum of 18" horizontal clearance around hydrant.
4. When placed adjacent to curb, hydrant port shall be 24" from face of curb.
5. Concrete thrust blocks shall be constructed as per thrust block standard drawing. Do not block drain holes.
6. Extensions required for hydrant systems shall be installed to the manufacturer's specifications.
7. Hydrants shall be placed to provide a minimum of 5' clearance from driveways, poles, and other obstructions.
8. Hydrant pumper port shall face direction of access.
9. Set hydrant plumb in all directions.

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

Sutherland

HYDRANT INSTALLATION

2009
REVISIONS
DESCRIPTION

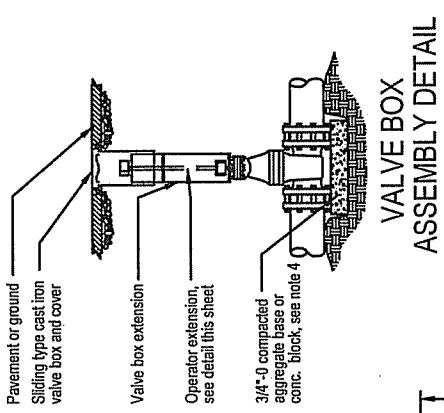
DATE

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

RD254

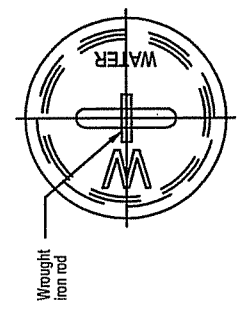
RD254

ne7360a/vstr/pw/rd254.dwt 1-20-99

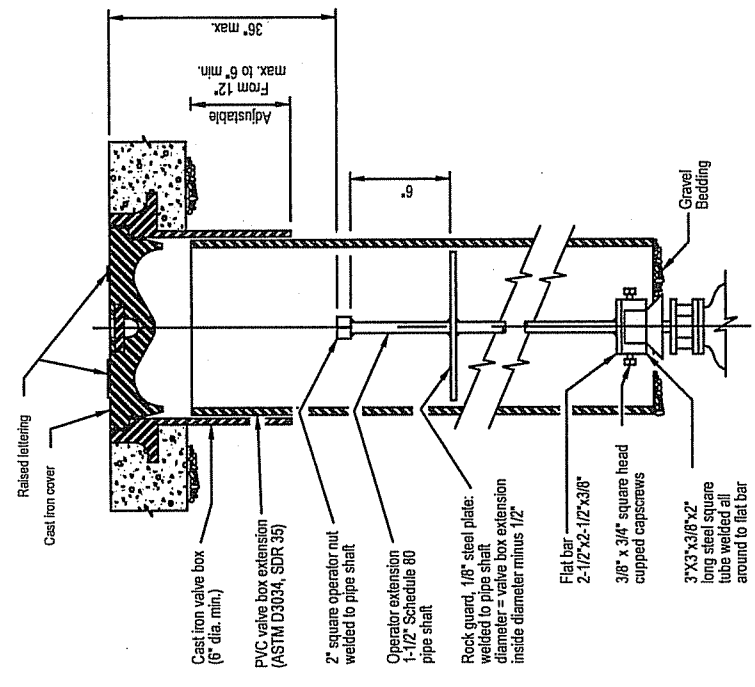


VALVE BOX
ASSEMBLY DETAIL

- Notes:
1. Valve box not to rest on operating assembly.
 2. Operator extension required when valve nut is deeper than 4' from finish grade.
 3. Center valve box on axis of operator nut.
 4. Valves 12" and smaller shall be provide with compacted aggr. base on undisturbed ground. Valves greater than 12" shall be installed on precast concrete block.
 5. Welds shall be minimum 1/4" all around.
 6. Hot dip galvanize operator extension after fabrication.



COVER PLAN



VALVE BOX EXTENSION SECTION

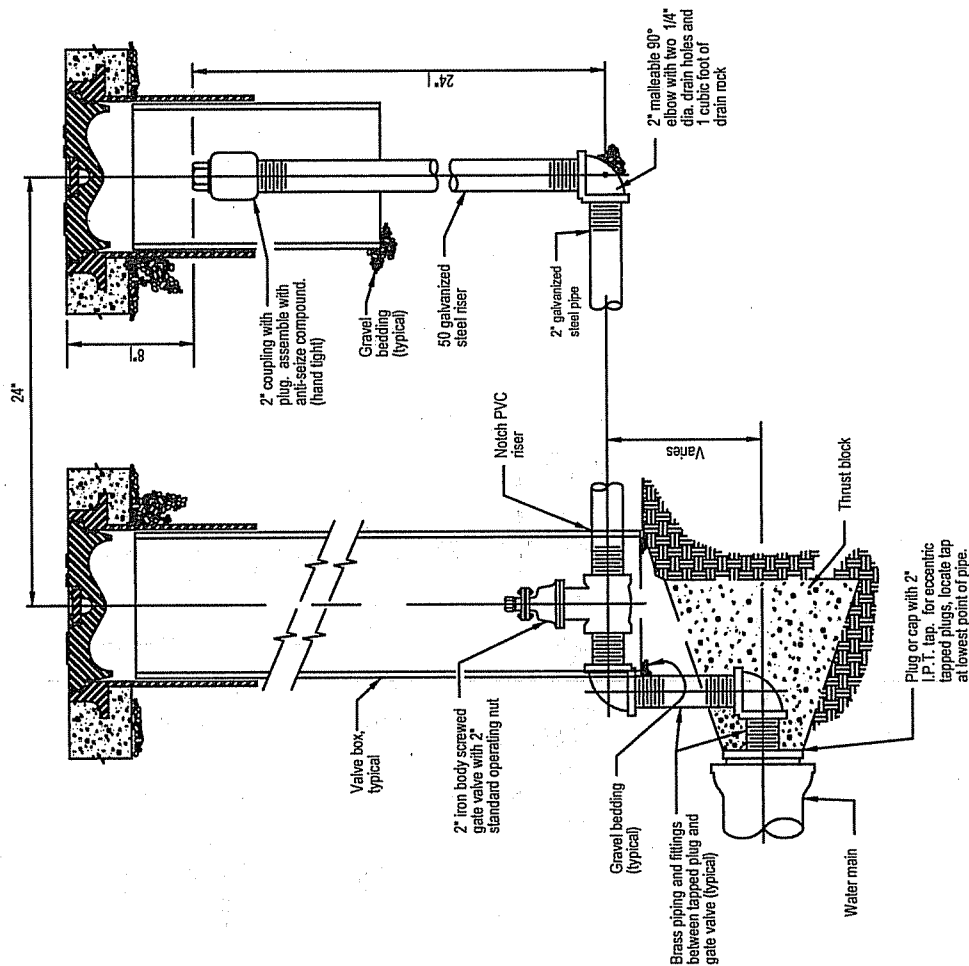
NOTE: All materials and workmanship shall be in accordance with the current Oregon Standard Specifications



VALVE BOX AND OPERATOR
EXTENSION ASSEMBLY

DATE	REVISION	DESCRIPTION
	2009	

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.



NOTES:

1. Wrap main and fittings in thrust block zone with two layers of polyethylene film to facilitate future removal.
2. In lieu of concrete thrust block, restrain pipe or pour concrete straddle block.

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

Sutherland

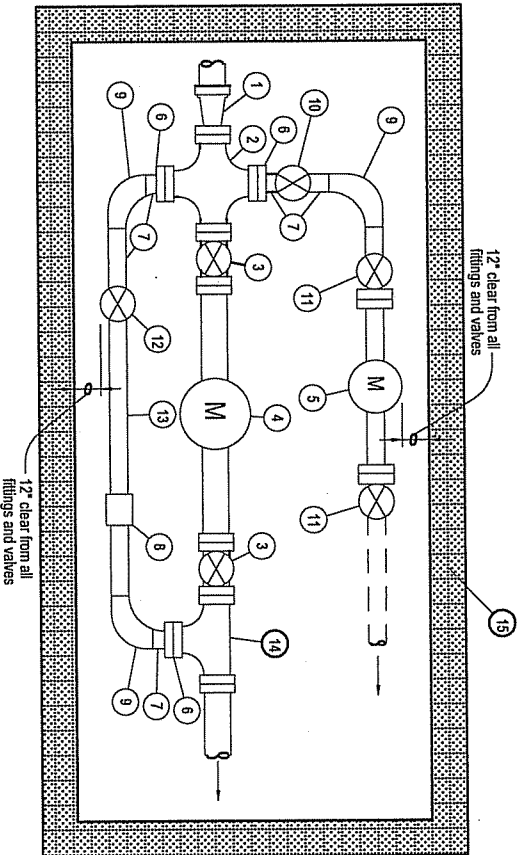
TYPICAL MAIN DEAD-END
BLOWOFF ASSEMBLY

2009

REVISIONS

DESCRIPTION

DATE



NOTES:

1. Vaults shall be sized per specifications and minimum clearances, when required, vaults shall be designed for site specific conditions by a registered professional engineer.
2. All vaults shall be supported with adequate concrete floor and shall be designed to prevent buoyancy from groundwater if groundwater exists at any time during the year. Vaults shall be water-tight.
3. Precast concrete utility vaults may be used in lieu of cast-in-place when sizes are available.
4. Backflow devices to be installed on service and irrigation lines as required.
5. Standard bypass size is 2".
6. Service and irrigation line sizes will vary according to need.
7. Tees and valves shall be supported with conc. blocks, jacks or adjustable pipe supports.
8. Vault depth shall be such that there is a minimum clearance to the vault lid of 10" when the valves are fully open.
9. Provide flexible connections on piping within 18" of vault wall.
10. Provide opening and ladder locations, vault drainage and pipe penetrations in accordance with special provisions and contract drawings.

- 1 Mechanical joint x flange adapter
- 2 All-flange cross
- 3 Flange gate valve
- 4 Meter (domestic)
- 5 Meter (irrigation)
- 6 Companion flange
- 7 Brass nipples
- 8 Mechanical coupling
- 9 I.p. x i.p. brass elbow
- 10 I.p. x i.p. gate valve (optional)
- 11 I.p. x meter flange gate valve
- 12 I.p. x i.p. gate valve
- 13 Brass pipe
- 14 All-flange tee
- 15 Concrete vault

REFERENCE DRAWING ONLY
(NOT FOR CONSTRUCTION)
SEE SPECIAL PROVISIONS FOR
SPECIFIC PROJECT REQUIREMENTS.

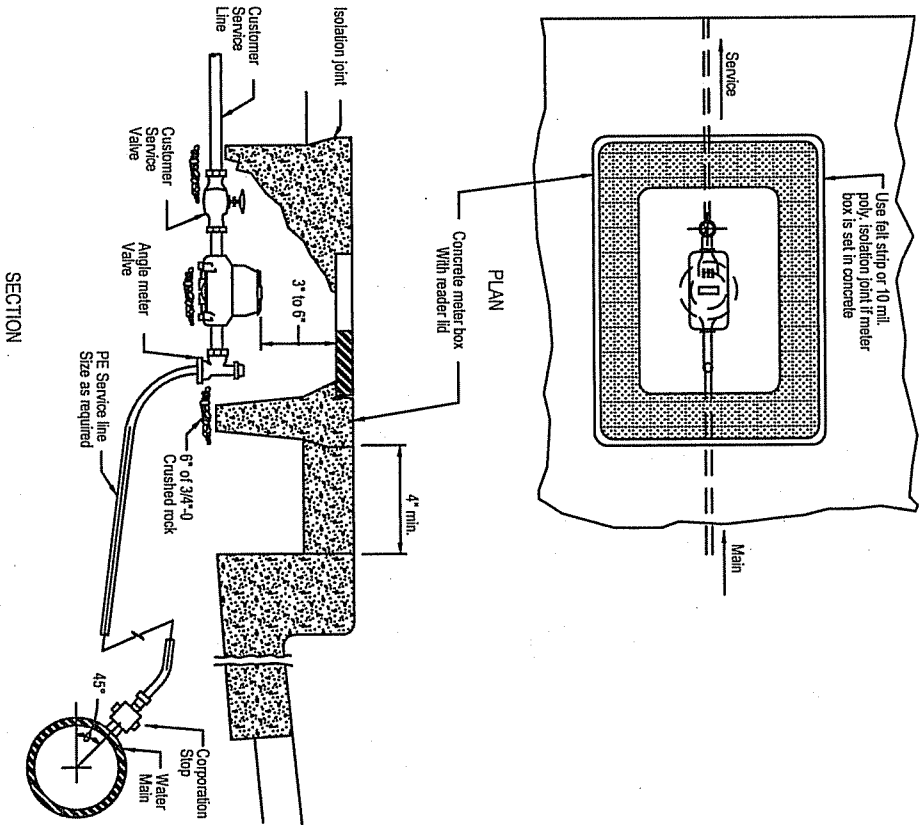
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NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

Sutherland

WATER METER ASSEMBLY
(LARGER THAN 2")
2009

DATE: _____
REVISIONS: _____
DESCRIPTION: _____

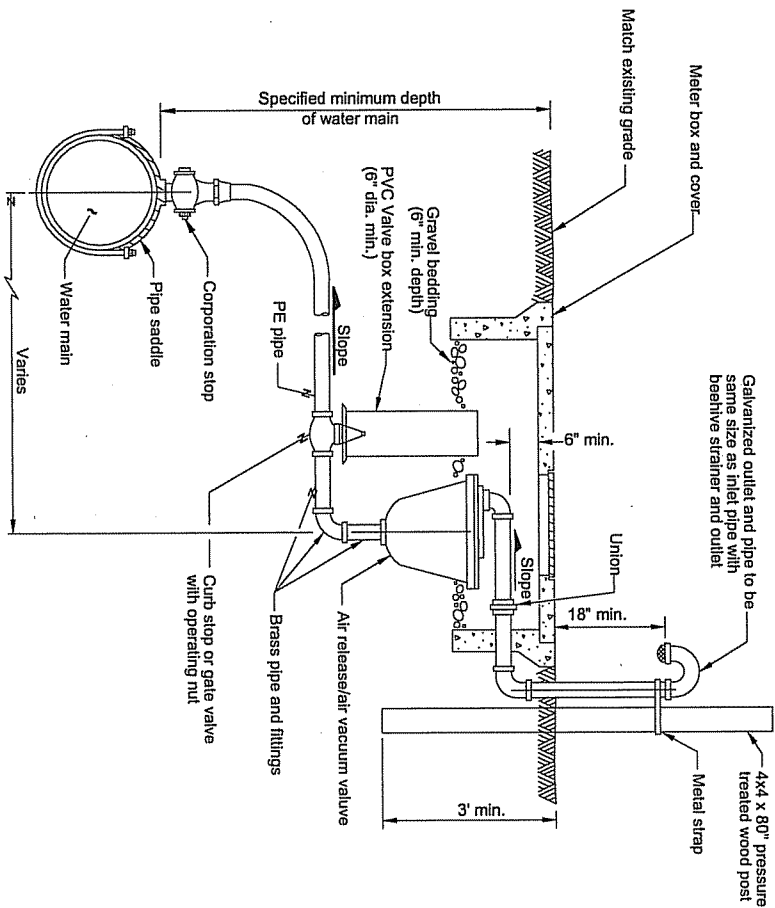


- Notes:
1. Meter to be centered and set plumb inside meter box.
 2. Manufactured meter setter may be used for 1-1/2\" to 2\" services.
 3. Set meter box 4\" minimum behind curb or sidewalk.
 4. Meter boxes set in driveways shall have traffic lids.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

Sutherland	
1\" & 2\" WATER SERVICE CONNECTION	
DATE	DESCRIPTION



- NOTES:
1. Air release/air vacuum valve shall be size specified in Contract. Piping and valves to be same size as combination air release/air vacuum valve.
 2. Locate at high point of main.
 3. Tap top of main.
 4. Provide insulation and additional depth when specified for freeze protection.

o All dimensions are in inches unless otherwise noted.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

Sutherland

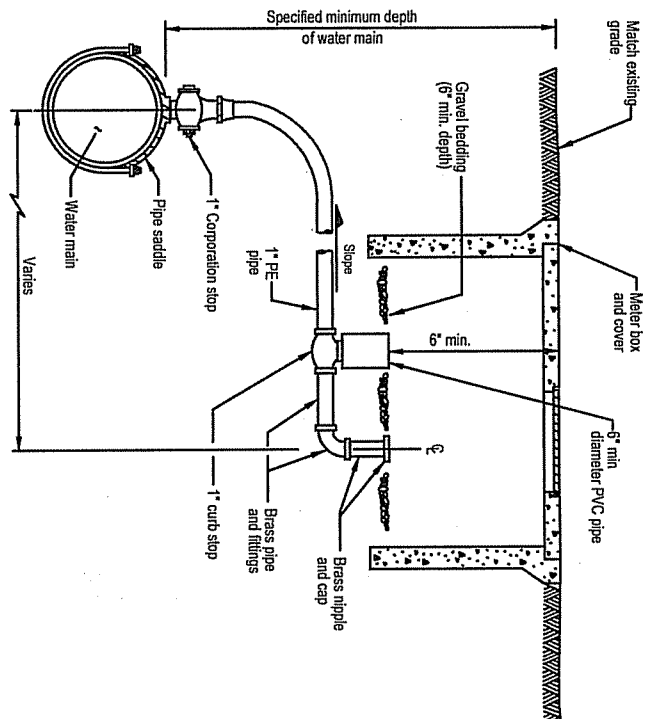
COMBINATION AIR RELEASE AIR VACUUM VALVE ASSEMBLY (2" AND SMALLER)

2008

REVISIONS

DATE

DESCRIPTION



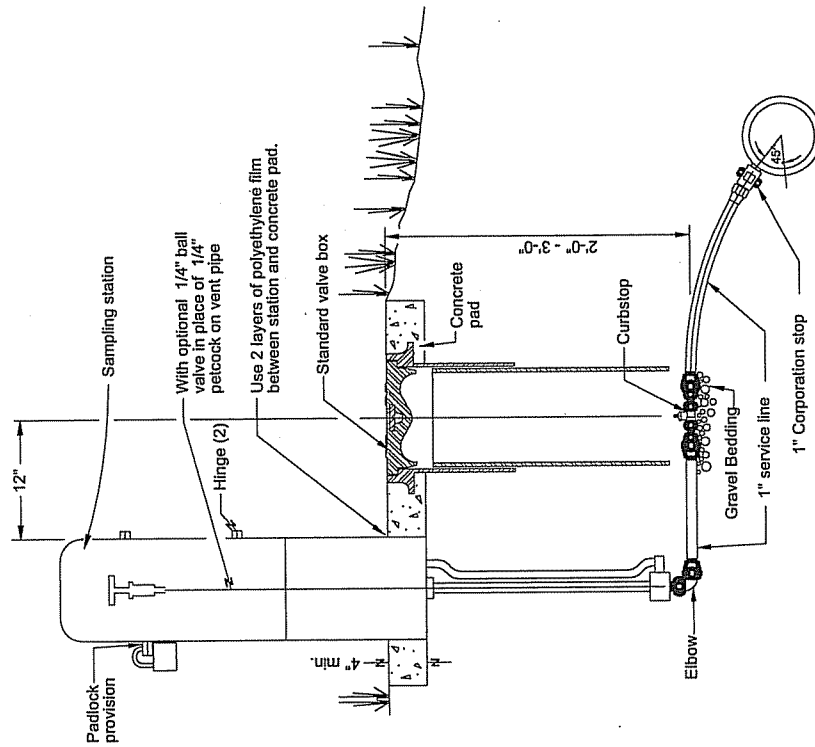
1. Locate at high point of main.
2. Tap top of main.
3. Provide insulation and additional depth when specified for freeze protection.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

Sutherland
MANUAL AIR-RELEASE
ASSEMBLY (1")

* REVISIONS	
DATE	DESCRIPTION



NOTES:
1. Provide insulation and additional depth when specified for freeze protection.

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

Sutherland

WATER SAMPLING STATION

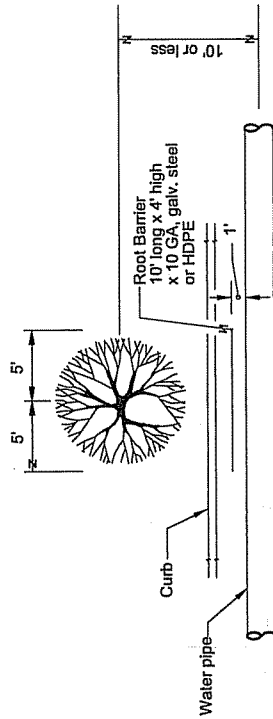
2009

REVISIONS
DESCRIPTION

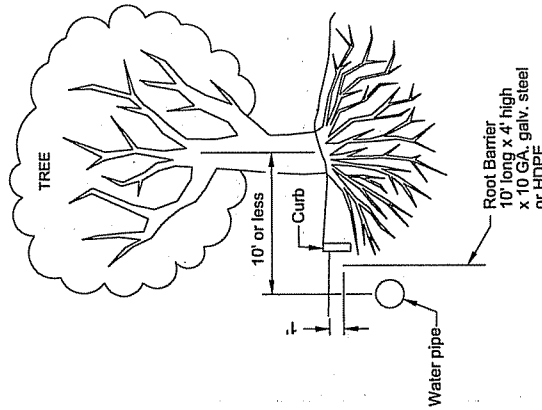
DATE

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

RD282



PLAN



SECTION

NOTES:

1. Where existing pathway trees have been root pruned, install continuous, linear root barrier adjacent to the pipe.
2. Root sealer shall be applied to all cut root areas which are larger than 2" in diameter. The sealer shall be applied as soon as practical after the cuts have been made. Root sealer shall be approved by the engineer at least 48 hours in advance of the pruning operation.
3. Root barriers shall be fabricated from a high density, high impact plastic or hot dipped galvanized steel.

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

Sutherland

ROOT BARRIER

2009

REVISIONS

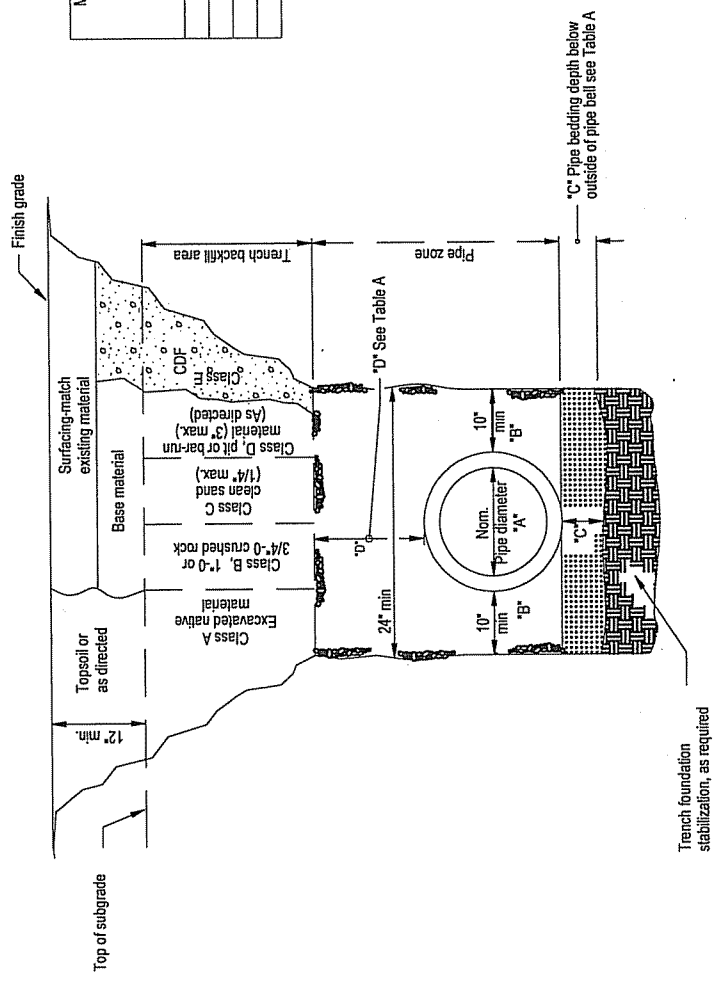
DESCRIPTION

DATE

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

TABLE A

"A" (in)	"B" (in)	"C" (in)	"D" (in)
4	10	4	8
6	10	4	8
8	10	6	10
10	10	6	10
12	12	6	10
15	12	6	10
18	16	6	12
21	16	6	12
24	18	6	12
30	18	6	12
36	24	6	14
42	24	6	14
48	24	6	14
54	24	6	14
60	24	6	14
66	24	6	14
72	24	6	14



MULTIPLE INSTALLATIONS (All Shapes)		
	Diameter	Min. Space Between Pipe
Up to 48"		24"
48" to 72"		One Half (1/2) Dia. of Pipe
72" to 180"		36"

- Note:
1. Surfacing of paved areas shall comply with street cut standard drawing (RD302).
 2. For pipes $\geq 36"$ dia., when placed in an embankment, increase dimension "B" to actual diameter.

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

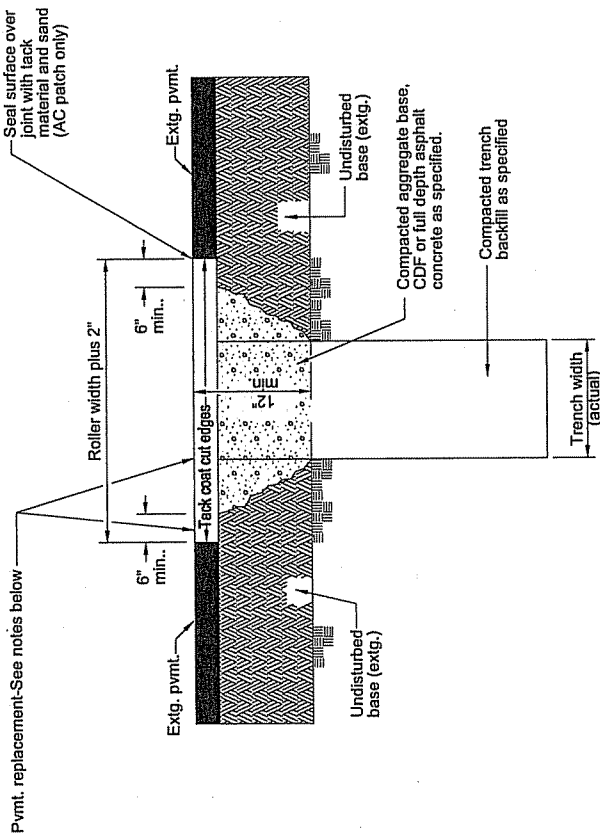


TRENCH BACKFILL, BEDDING, PIPE ZONE AND MULTIPLE INSTALLATIONS

2009
REVISIONS
DESCRIPTION

DATE

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.



Notes:

1. All existing AC or PCC pavement shall be sawcut prior to repaving.
2. Concrete pavement shall be replaced with concrete to a minimum thickness of 6" or to the thickness of removed pavement, whichever is greater.
3. Place AC mix minimum thkn. of 4" or the thkn. of the removed pavement, whichever is greater. Compact as specified

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

Sutherland

STREET CUT

2009
REVISIONS
DESCRIPTION

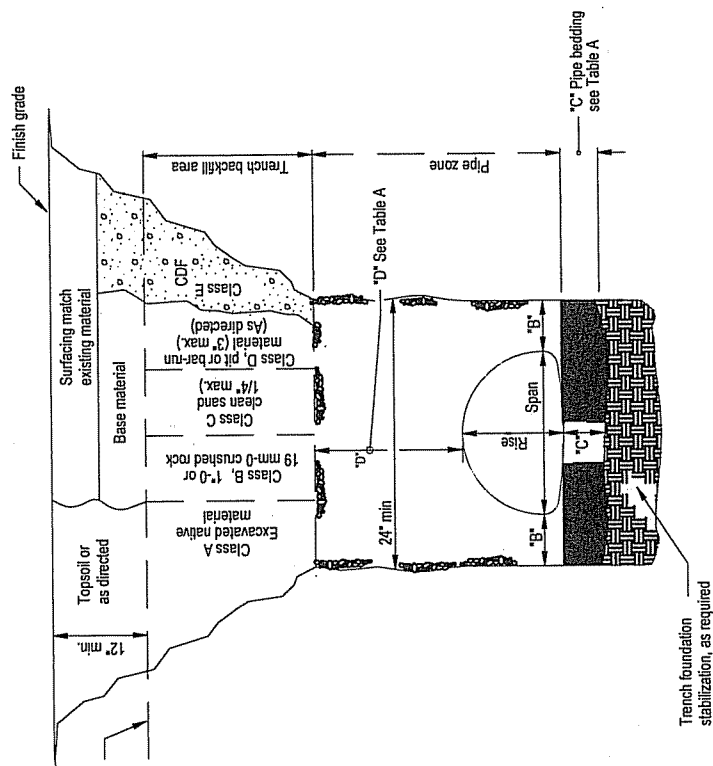
DATE

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

RD302

TABLE A

"A"	EQUIV. ROUND	"B" (in)	"C" (in)	"D" (in)
17x13	15	12	6	10
21x15	18	16	6	12
24x18	21	16	6	12
28x20	24	18	6	12
35x24	30	18	6	12
40x31	36	24	6	14
42x29				
46x36	42	24	6	14
49x33				
53x41	48	24	6	14
57x38				
60x46	54	24	6	14
64x43				
66x51	60	24	6	14
71x47				
73x55	66	24	6	14
77x52				
81x59	72	24	6	14
83x57				



Note:

- Note:**
1. Surfacing of paved areas shall comply with street cut standard drawing (RD302).
 2. For pipes $\geq 36"$ equivalent round dia., when placed in an embankment, increase dimension "B" to actual span.

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

Sutherland

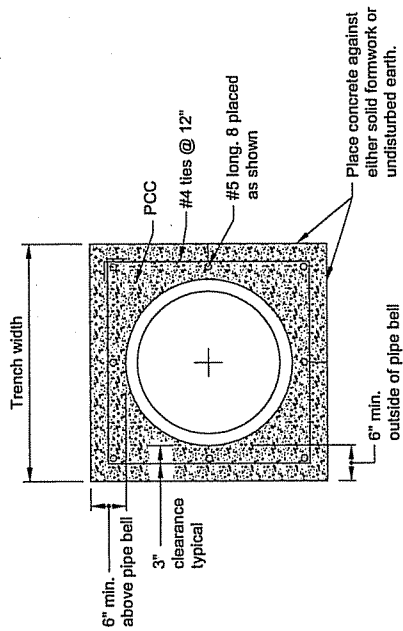
ARCH PIPE BACKFILL/COMPACTION

2009

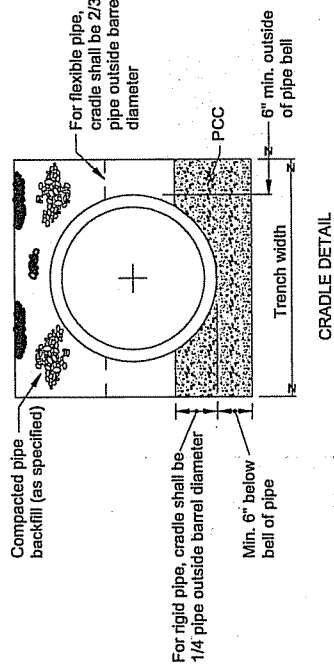
REVISIONS

DESCRIPTION

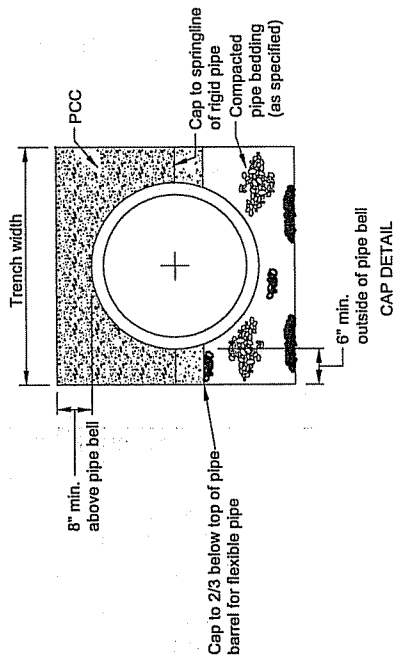
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.



CONCRETE ENCASEMENT DETAIL



CRADLE DETAIL



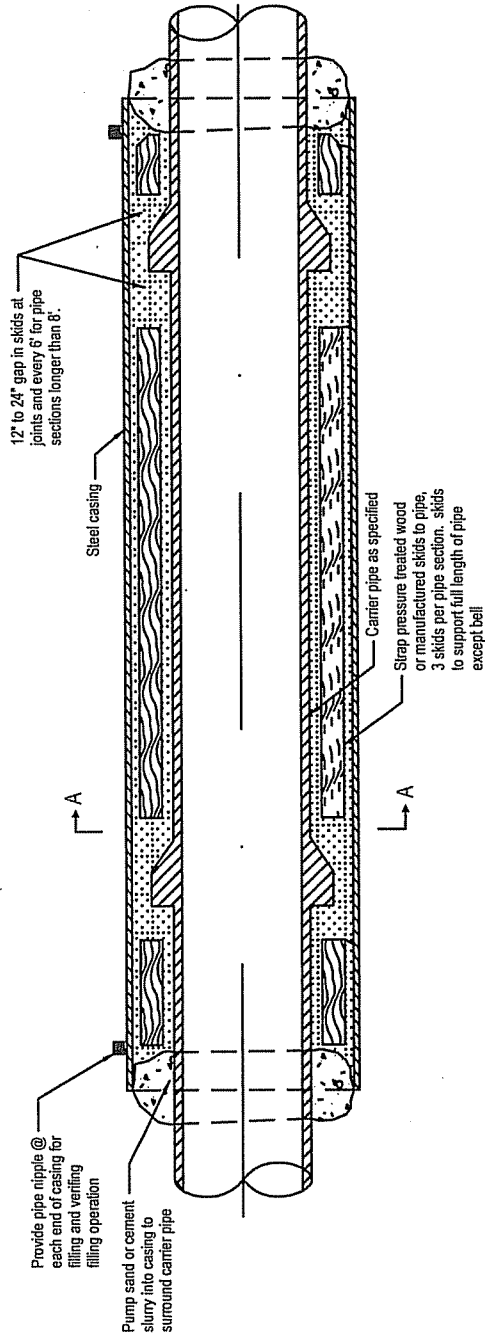
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

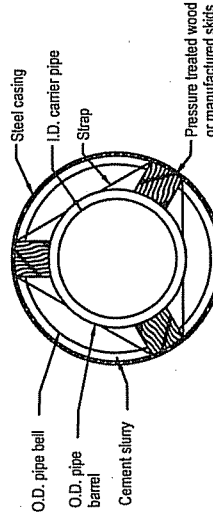
Sutherland

CONCRETE ENCASEMENT,
CRADLE, AND CAP DETAILS

2009
REVISIONS
DATE DESCRIPTION



PLAN



SECTION A-A

Note:

1. Plug ends of casing with concrete.
2. Block carrier pipe down or flood to resist floatation when filling annular space

NOTE: All material and workmanship shall be in accordance with the current Oregon Standards Specifications

Sutherland

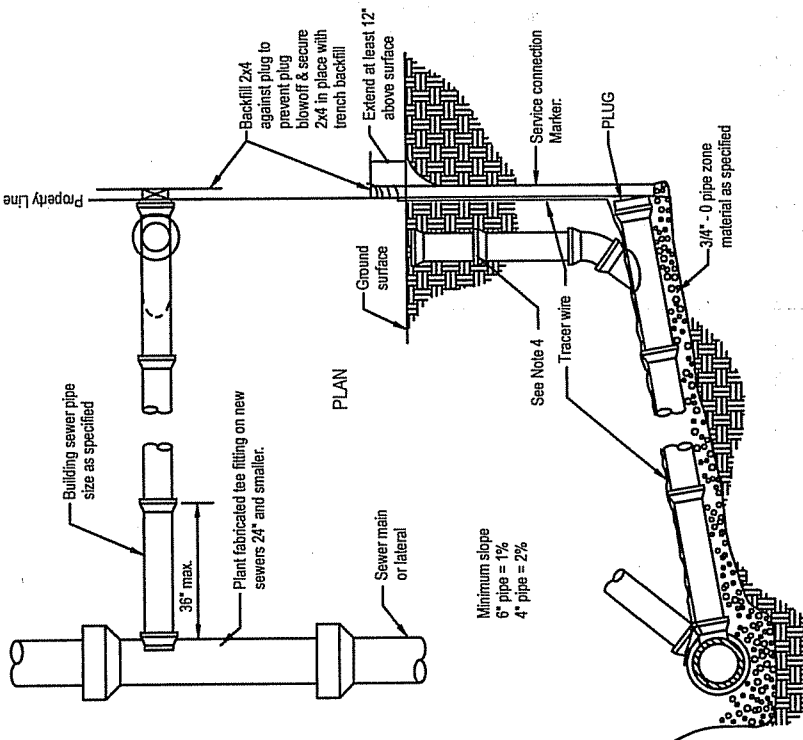
BORE CASING DETAIL

2009
REVISIONS
DESCRIPTION

DATE

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SHALLOW TRENCH SERVICE

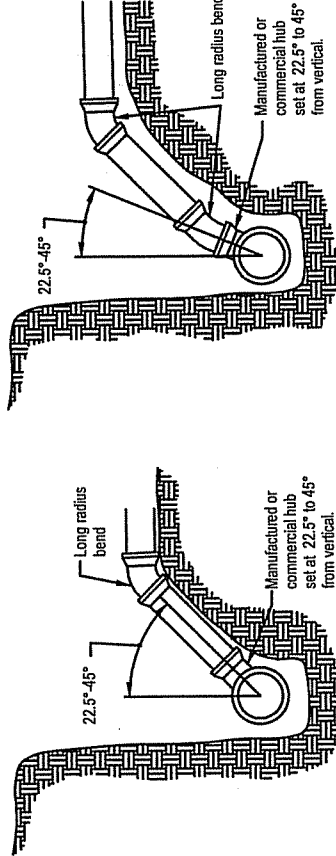


ELEVATION

Notes:

1. Pipe and fittings shall be compatible. Only manufactured fittings shall be used.
2. Minimum depth at right of way or easement line shall be 4'.
3. Marker posts and blocking shall be treated wood. Post shall be 2x4 fir. Post to extend 12\"/>
- 4. When required, a cleanout shall be installed where directed.
- 5. Lay building sewer at max. 45° from horizontal to achieve required depth at property line when minimum slope results in excessive depth.
- 6. For bedding and backfill see RD300.

DEEP TRENCH SERVICE



Notes:

1. Pipe and fittings shall be compatible. Only manufactured fittings shall be used.
2. For details not shown see shallow trench service connection drawing.
3. Vertical trench walls are required. If it is not possible to maintain vertical trench walls, use alternate connection method to maintain 6\"/>
- 4. Where deep connection is at an angle less than 45° from vertical, ductile iron pipe and fittings should be used.
- 5. For bedding and backfill see RD300.

NOTE: All material and workmanship shall be in accordance with the Current Oregon Standard Specifications

Guthrie

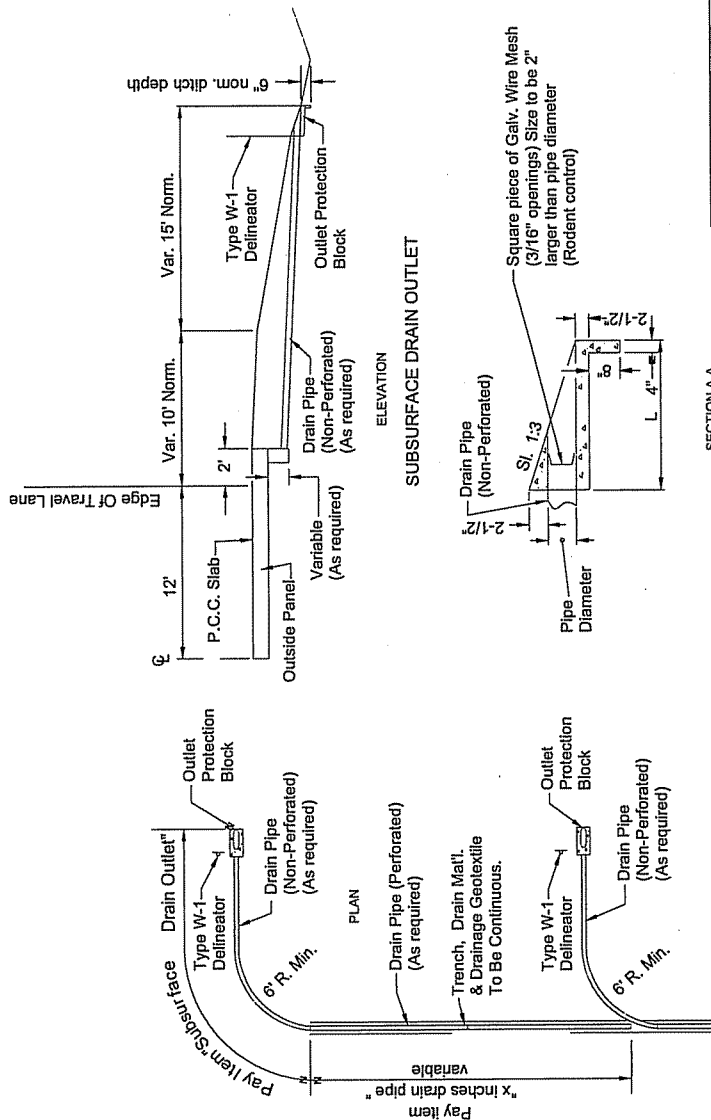
SHALLOW/DEEP TRENCH SERVICE
CONNECTION, BLOCKING AND MARKERS

2009

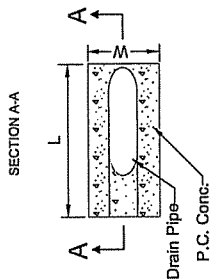
REVISIONS
DESCRIPTION

DATE

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PIPE DIA. (in)	L NOM. (in)	W NOM. (in)
3	24	12
4	24	12
6	33	14
8	42	16



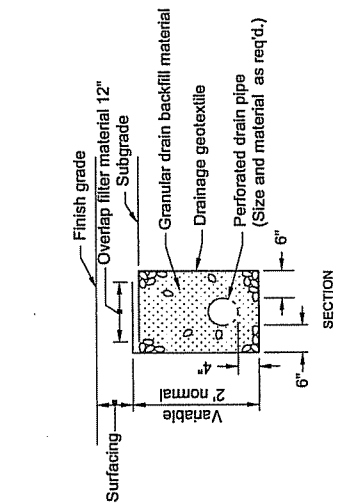
PLAN

OUTLET PROTECTION BLOCK

TYPE 1 SUBSURFACE DRAIN INSTALLATION

NOTES:

1. In guard rail areas extend outlet protection block to back of guard rail post min.



SUBSURFACE DRAIN DETAIL

NOTE: All materials and workmanship shall be in accordance with the current Oregon Standard Specifications

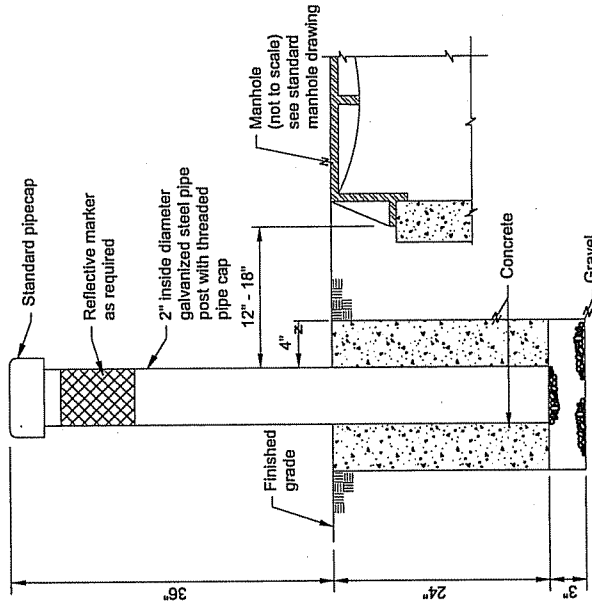
Guthrie

SUBSURFACE DRAIN

2009
REVISIONS
DESCRIPTION

DATE

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.



MARKER POST AT MANHOLE OR CLEANOUT

Notes:

1. As directed the post shall be located on the straight side of manhole cone.
2. Posts shall be set in concrete.
3. As an alternative, a 4" concrete filled PVC pipe post may be used, if approved.
4. Posts shall be painted color as directed.

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications.

Sutherland

LOCATOR POST

2009

REVISIONS
DESCRIPTION

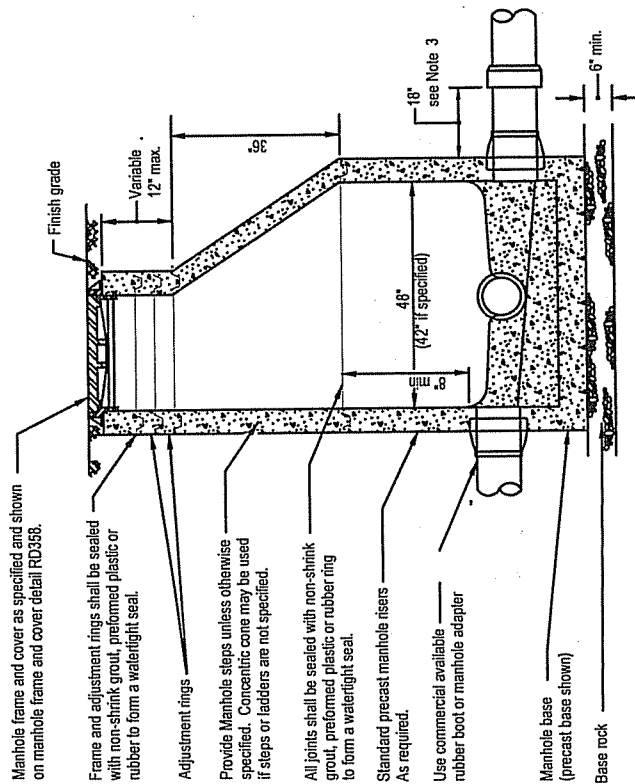
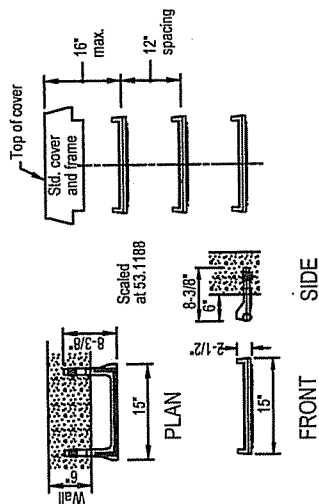
DATE

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

RD334

STEPS

See Current Qualified Products List (QPL)
For Acceptable Alternate Manhole Steps



Notes:

1. All precast sections shall conform to requirements of ASTM C478M.
2. Standard precast manhole section diameter shall be 48". Use 42" if specified by the Engineer. Maximum pipe diameter 24".
3. All connecting pipes shall have a flexible joint within 18" of manhole wall.
4. See Manhole Base Section drawing RD350 for base details.

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

Sutherland

STANDARD STORM
SEWER MANHOLE
2009

REVISIONS
DATE DESCRIPTION

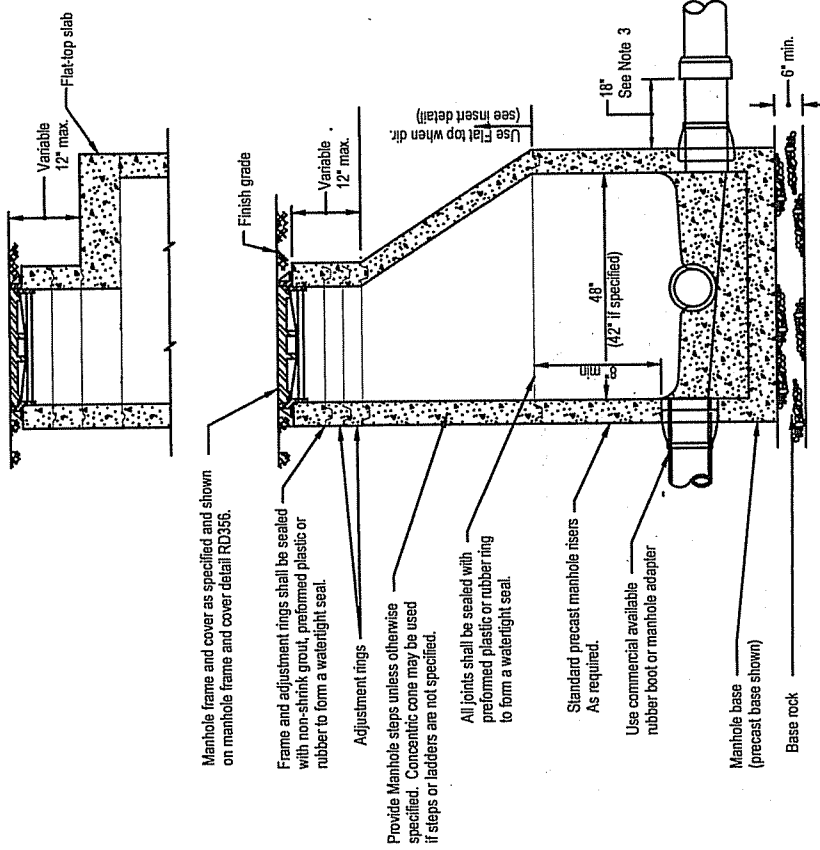
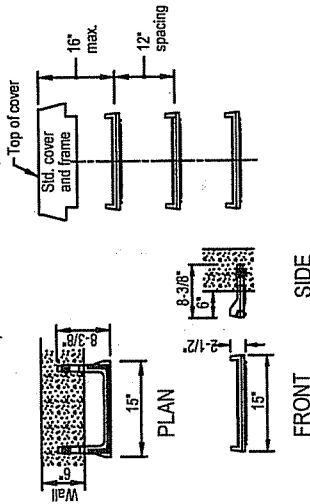
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

RD336

RD336

STEPS

See Current Qualified Products List (QPL)
For Acceptable Alternate Manhole Steps



Notes:

1. All precast sections shall conform to requirements of ASTM C478M.
2. Standard precast manhole section diameter shall be 48". Use 42" if specified by engineer. Maximum pipe diameter 24".
3. All connecting pipes shall have a flexible joint within 18" of manhole wall.
4. See Manhole Base Section drawing RD350 for base details.
5. This detail limited to interior drop of 24". See drop manhole detail for drops in excess of 24".
6. Use flat top for shallow manhole where directed. (See RD342)

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

Sutherland

**STANDARD SANITARY
SEWER MANHOLE**

2009

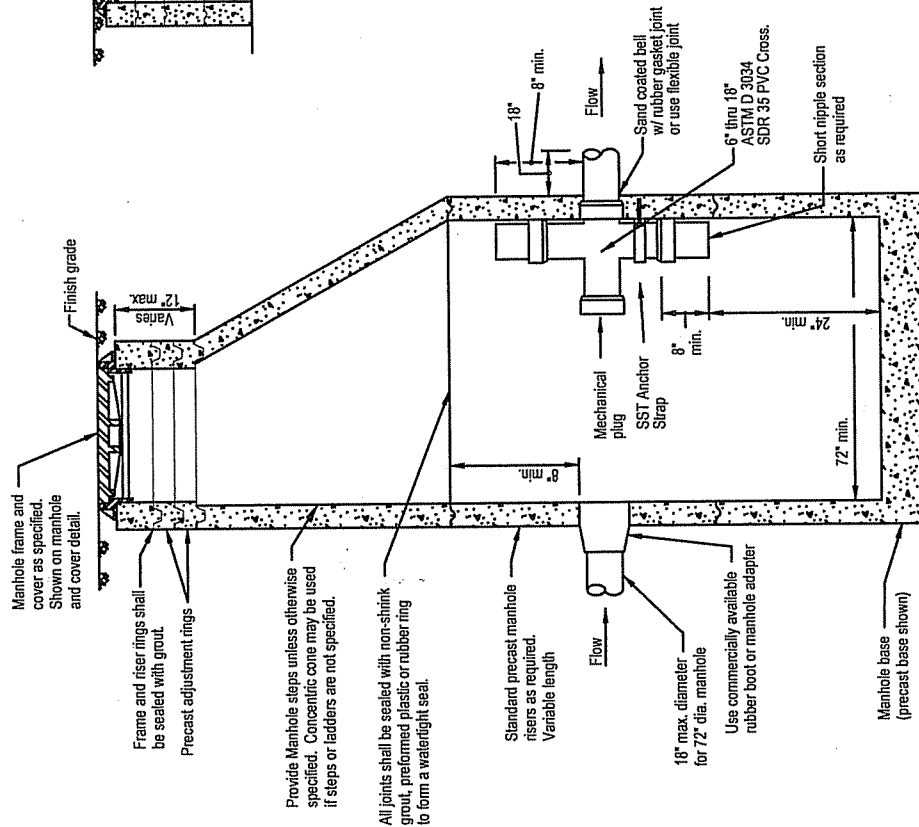
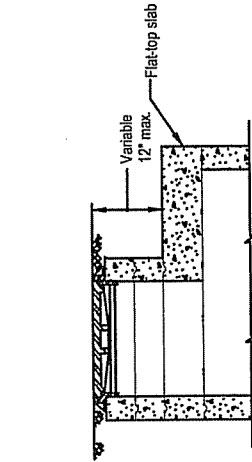
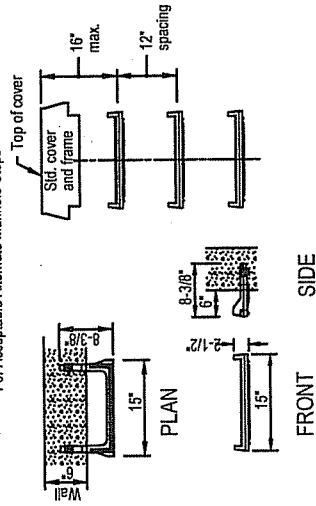
REVISION
DESCRIPTION

DATE

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STEPS

See Current Qualified Products List (QPL)
For Acceptable Alternate Manhole Steps



Notes:

1. All precast sections shall conform to requirements of ASTM C478M.
2. Standard precast manhole section diameter shall be 60". Maximum pipe diameter 12".
3. All connecting pipes shall have a flexible joint within 18" of manhole wall.
4. See Manhole Base Section drawing RD350 for base details.

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

Guthrie

STORM SEWER POLLUTION
CONTROL MANHOLE

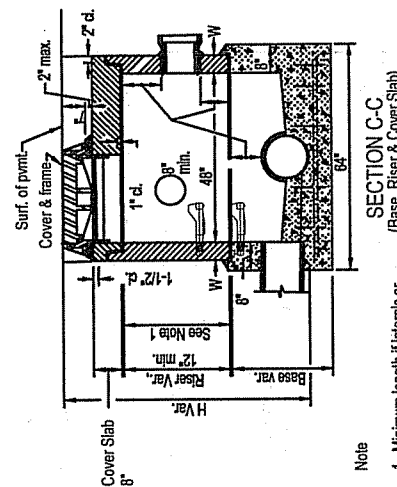
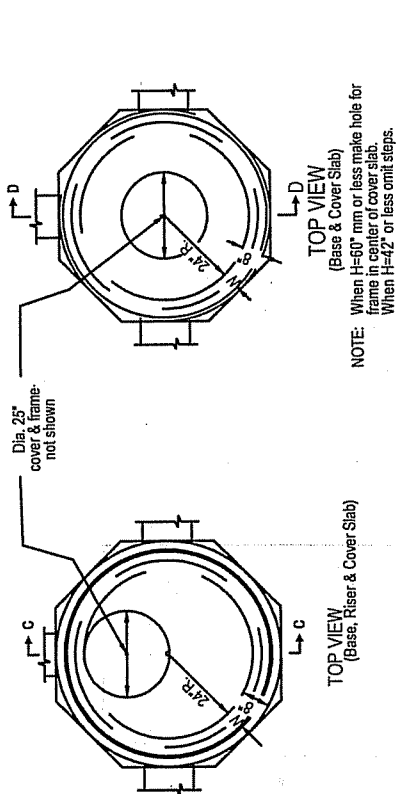
2009
REVISIONS
DESCRIPTION

DATE

RD340

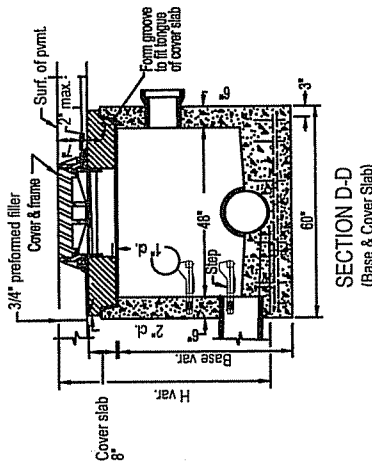
RD340

ne7360a/ur/apw/rd340.dwt 12-15-99



Section C-C

(Base, Riser & Cover Slab)



Section D-D

(Base & Cover Slab)

- LEGEND**
- Cast-in-Place concrete
 - Precast concrete
 - 1: 2 cement mortar
 - Sewer pipe
 - W 4" min.
 - (For tolerance see AASHTO M199)

Note

1. Minimum length if laterals or connections are inserted: outside outside diameter of pipe + 17'.
2. Use Section D-D when length of riser becomes less than minimum shown.
3. Base may be precast or cast-in-place Reinforcing shown.
4. The risers, cones and cover slabs shall meet the requirements of the current AASHTO Standard Specification M199.

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

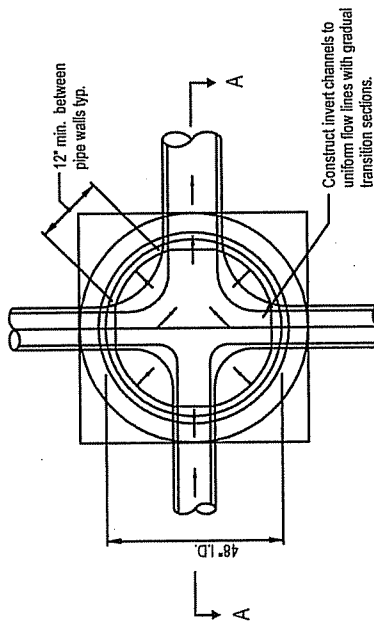
Sutherland

SHALLOW MANHOLES

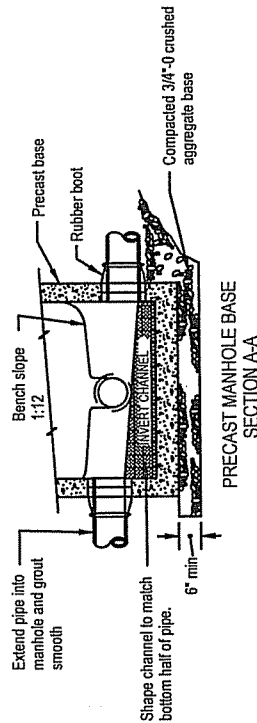
2009
REVISION
DESCRIPTION

DATE

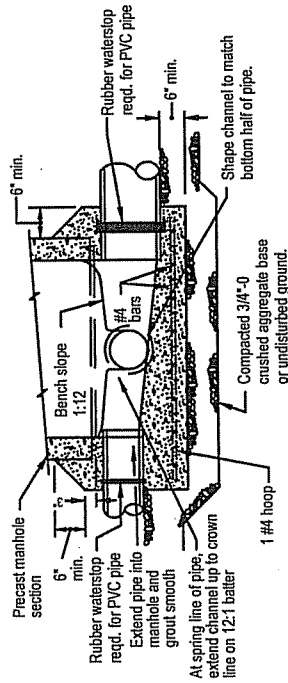
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PLAN



PRECAST MANHOLE BASE
SECTION A-A



CAST-IN-PLACE MANHOLE BASE
SECTION A-A

Notes:

1. Concrete shall be class Commercial Grade Concrete
2. Channels shall be constructed to provide smooth slopes and radii to outlet pipe.
3. Bases may be precast or cast in place.
4. This manhole base section shall be used for pipe sizes up to 24\".

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

Sutherland

STANDARD 48\"/>

2009

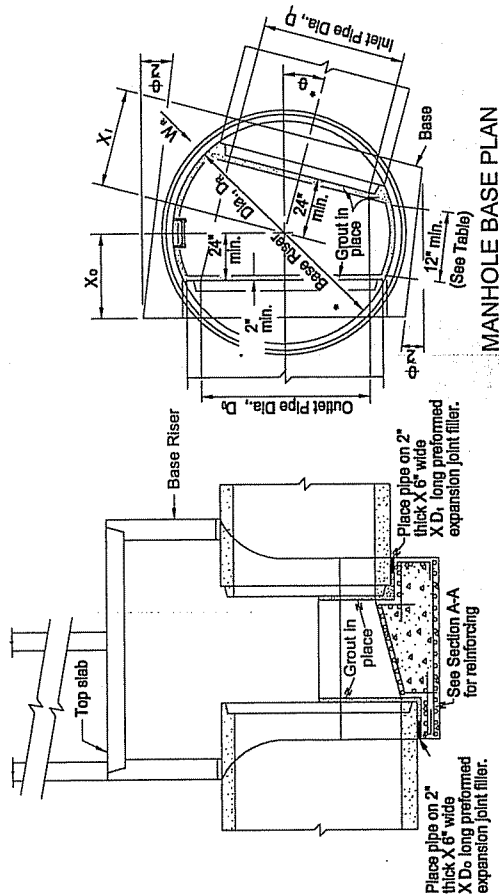
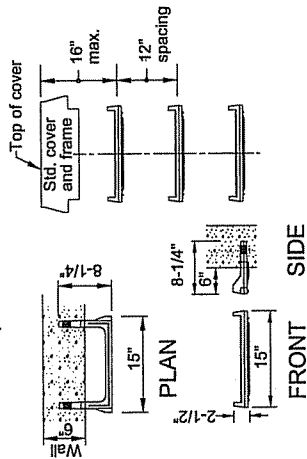
REVISIONS
DESCRIPTION

DATE

Registered Professional Engineer.

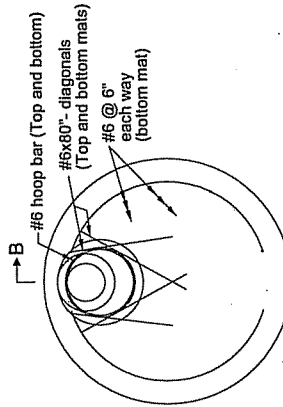
STEPS

See Current Qualified Products List (QPL)
For Acceptable Alternate Manhole Steps

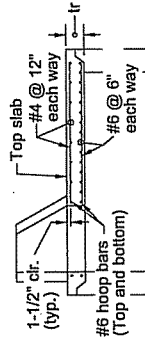


DEVELOPED SECTION ALONG PIPE CENTERLINE

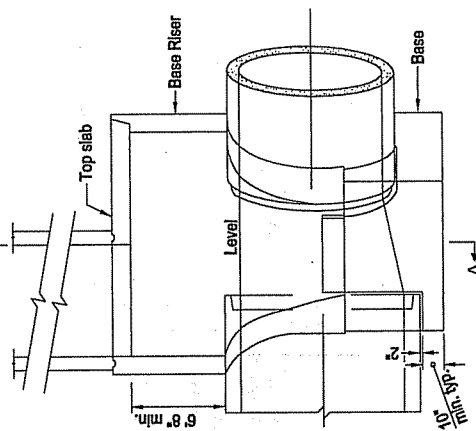
MANHOLE BASE PLAN



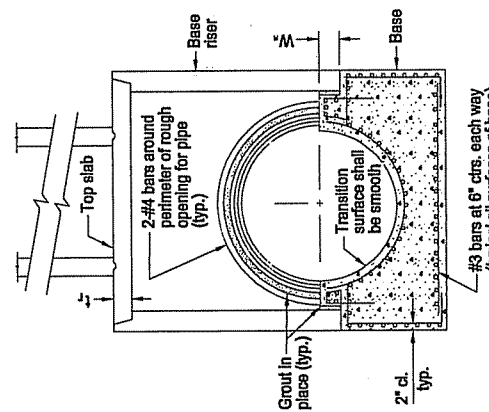
MANHOLE TOP SLAB PLAN (Bottom Reinf. mat shown) (Manhole I.D. > 4', < 10' 6")



Section B-B



MANHOLE BASE ELEVATION



SECTION A-A

Base Riser	Outlet pipe dia Do	Inlet pipe dia Di	Base X0 max when Di = Do	Base X1 when Di < Do	Base X2 when Di > Do
60"	10"	30"	29"	32"	33"
72"	10"	36"	33"	36"	37-3/4"
84"	10"	42"	36"	39"	40-3/4"
96"	10"	48"	39"	42"	43-7/8"
108"	10"	54"	42"	45"	47-1/8"
120"	10"	60"	45"	48"	51-1/2"
120"	11"	84"	34"	44"	51-3/4"
120"	11"	96"	30"	44"	51-3/4"
120"	11-1/2"	12"	96"	45"	51"
120"	11-1/2"	12"	96"	45"	51"

* A special design using a larger Base Riser diameter D may be required to obtain specified 12" min. dimension where angle exceeds max.

GENERAL NOTES:

All concrete shall be Class 4000

All reinforcing steel shall conform to ASTM Specification A706 or AASHTO M31 (ASTM A615), Grade 420. The following splice lengths shall be used (unless shown otherwise):

Bar Size	4	5	6
Uncoated	16"	20"	24"

All bars shall be placed 2" clear of the nearest face of the concrete unless shown otherwise.

Eccentric reducing cones or eccentric reducing flat slabs designed in accordance with AASHTO M193 shall be placed on top of the base riser as required by the contract plans. Eccentric reducing flat slabs shall be designed to support a load of 120 klf in addition to the dead load of the slab, the risers above the slab, and the earth overburden above the slab.

Base riser to be pre-cast unless otherwise shown on the plans.

See drawing RD338 for details not shown.

Cast-In-Place Concrete

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

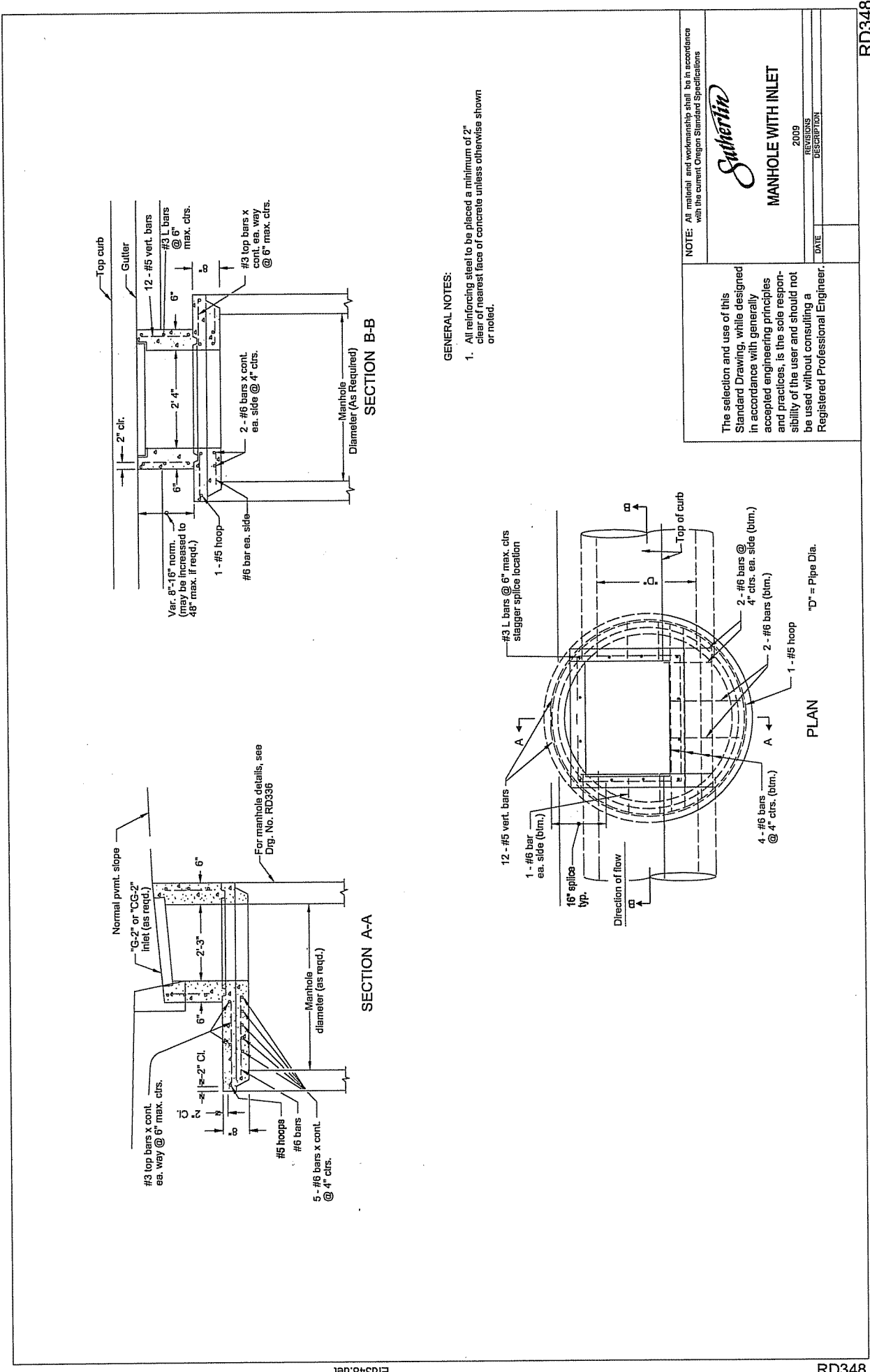
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LARGE PRECAST MANHOLE

2009
REVISIONS
DESCRIPTION

DATE



GENERAL NOTES:

- 1. All reinforcing steel to be placed a minimum of 2" clear of nearest face of concrete unless otherwise shown or noted.

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

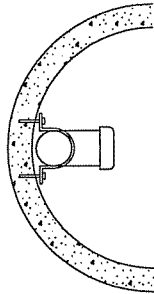
Guthrie

MANHOLE WITH INLET

2009

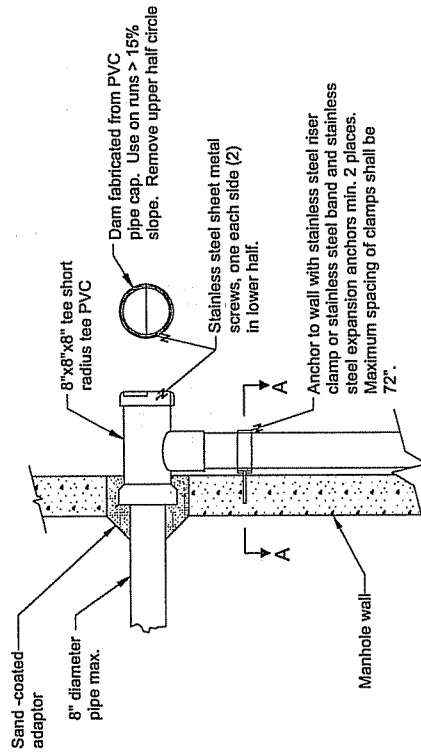
REVISIONS	DESCRIPTION
DATE	

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.



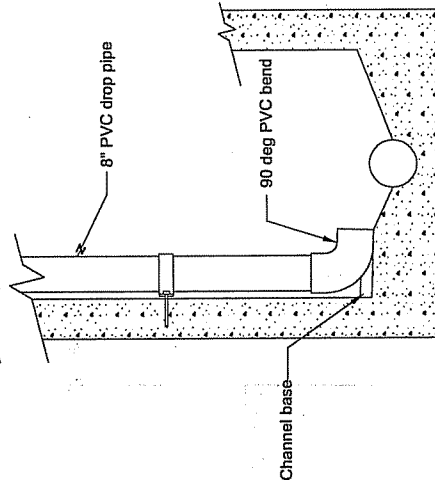
SECTION A-A
CLAMP DETAIL

scaled 50x



NOTE:

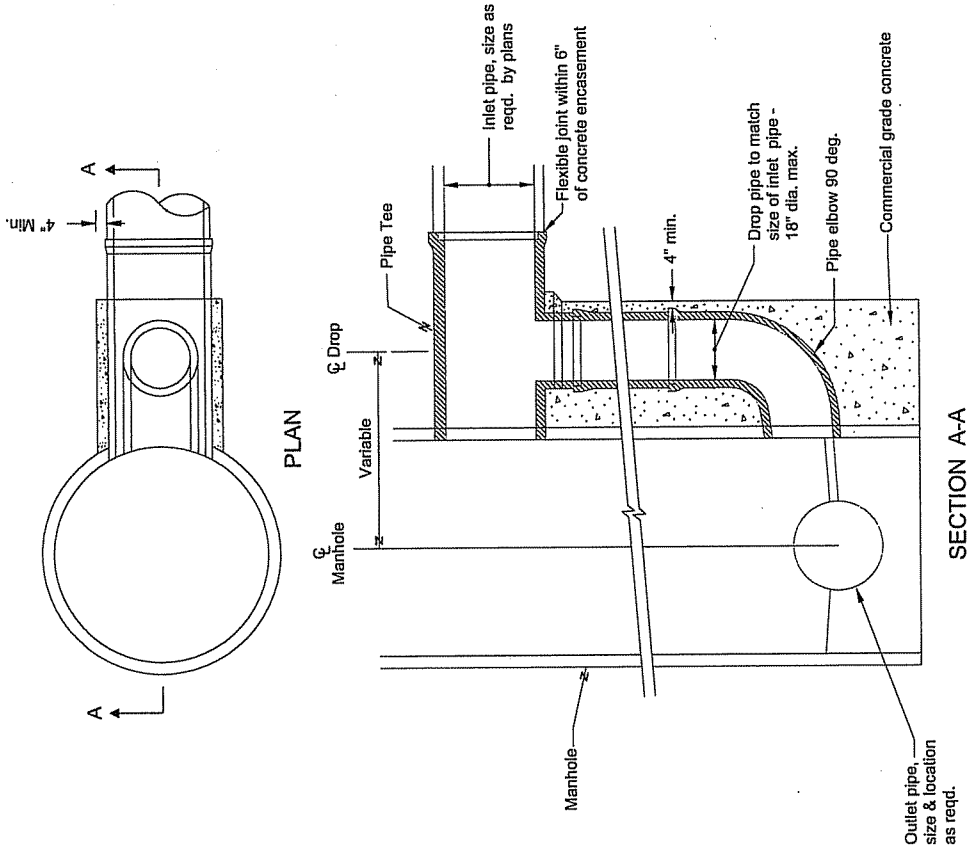
1. Only one inside drop per 48" manhole.
2. PVC shall be ASTM D3034 SDR35



The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

<i>Sutherland</i> SANITARY SEWER PIPED INSIDE DROP CONNECTION FOR MANHOLES 2009	
REVISIONS	DESCRIPTION
DATE	



- o All dimensions are in inches unless otherwise noted.

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

Sutherland

OUTSIDE DROP MANHOLES

2009

REVISIONS

DESCRIPTION

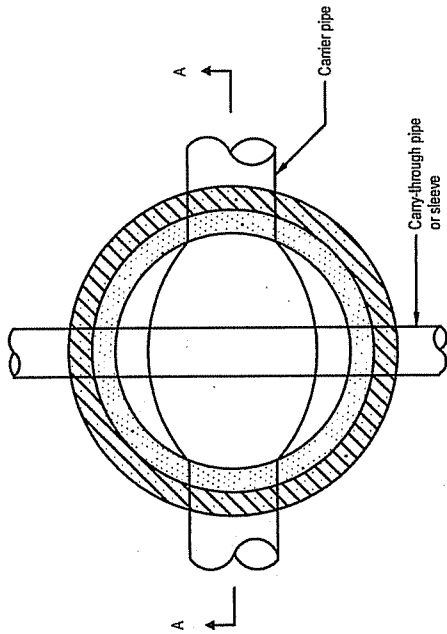
DATE

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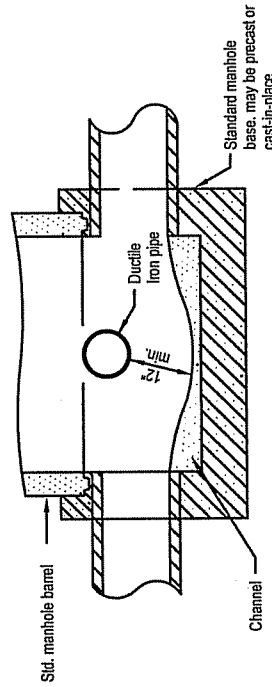
RD352

RD352

Erd352.dwt



PLAN VIEW



SECTION A-A

Note:

1. Carry-through pipe sleeve shall be ductile iron, class as specified.
2. This manhole design shall be used only as directed by the engineer to mitigate unavoidable grade conflicts.

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

Sutherland

CARRY THROUGH
MANHOLE - STORM

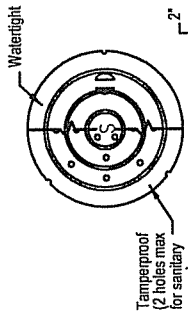
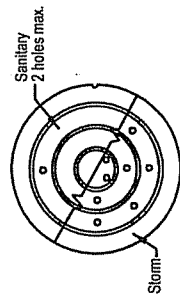
2009

REVISIONS
DESCRIPTION

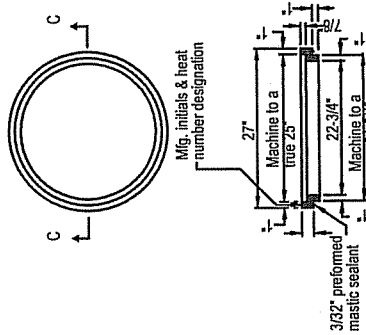
DATE

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STANDARD MANHOLE COVER & FRAME

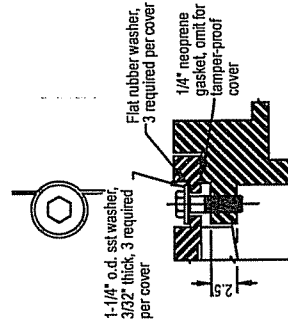
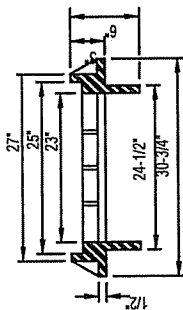


MANHOLE ADJUSTMENT RING



CAST IRON SUBURBAN FRAME

For use on local streets only, as specified (approx. wt. - 300 lb)



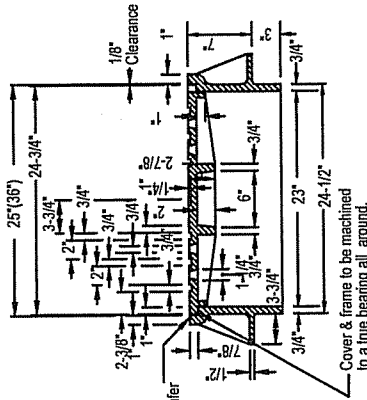
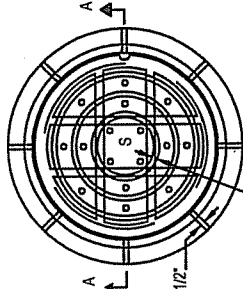
Note: 3 reqd., 1/2" x 1-1/4" pentagonal or hexagonal head, bronze or stainless steel. Install frame so that one bolt boss is located over the manhole ladder.

BOLT-DOWN DETAIL

(FOR TAMPERPROOF AND WATERTIGHT)

STANDARD MANHOLE COVER & FRAME

Approximate weight
Cover 140 lb
Frame 240 lb



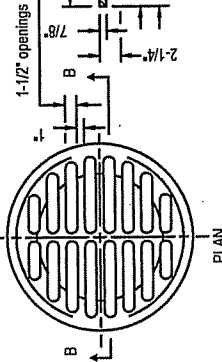
SECTION A-A

Cover & frame to be machined to a true bearing all around.

35" min. diameter cover is reqd. for manholes with depths of 20' or greater. (See Gen. Note 4)

PLAN

MANHOLE GRATE FOR USE WITH STANDARD MANHOLE FRAME



- Notes:
1. Tamperproof covers reqd. on sanitary or storm drain manhole where located in pedestrian ways or easement areas. Covers for sanitary manholes shall have 2 holes maximum.
 2. Watertight covers required if located where cover may be submerged. (no holes)
 3. Frames and covers shall be stamped with manufacturer's initials, heat number and point of origin.
 4. Ladder with notched safety rail and removable extension is reqd. for manholes with depths of 24' or greater.

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

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MANHOLE COVERS AND FRAMES

2009

REVISIONS
DESCRIPTION

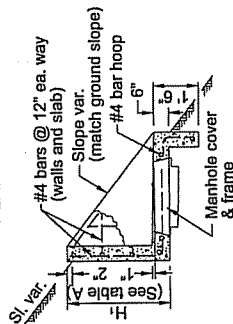
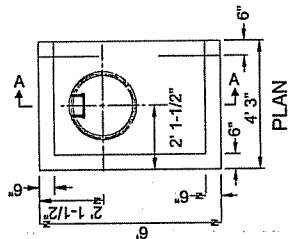
DATE

RD356

RD356

CONCRETE SLOPE PROTECTOR

- Note:
1. All reinforcing steel shall be placed 2" clear of nearest face of conc. unless shown or noted otherwise.
 2. All bar splices to be 20 dia.

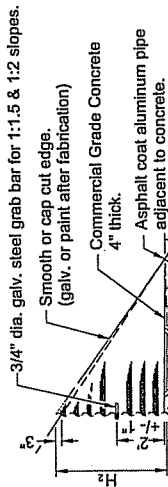
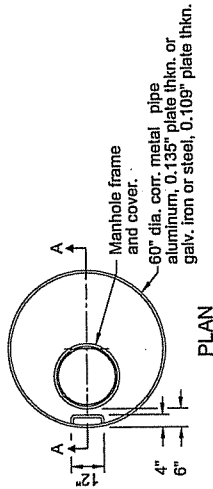


SECTION A-A

TABLE A

SLOPE	H ₁ (ft)	CONC. (cu yd)	STEEL (lb)
1:1.5	3' 0"	1.00	88
1:2	2' 4-1/2"	0.89	75
1:3	1' 9"	0.78	70
1:4	1' 5-1/4"	0.72	63
1:6	1' 1-1/2"	0.66	60

METAL PIPE SLOPE PROTECTOR



SLOPE	H ₂
1:1.5	3' 8"
1:2	2' 9"
1:3	2' 0"
1:4	1' 6"
1:6	1' 1"

SECTION A-A

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications.

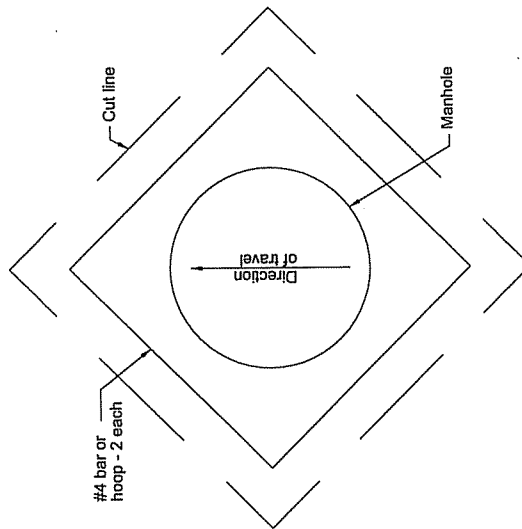
Guthrie

MANHOLE SLOPE PROTECTORS

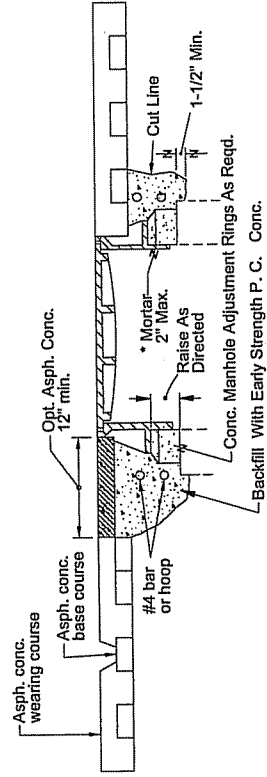
2009
REVISIONS
DESCRIPTION

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

DATE



* Use epoxy for synthetic grade rings



MANHOLE FRAME ADJUSTMENT

NOTES:

1. Cover manhole with building paper and const. asph. conc. base course and wearing courses.
2. Saw square or circular excavation around manhole 12" min. from M.H. frame.
3. Raise manhole frame and cover to finish grade by installing conc. rings and leveling mortar.
4. Backfill with early strength P.C. Conc. to finish grade.
5. Protect from traffic loading until conc. has cured to 3625 psi.
6. Apply tack coat to edges of existing pavement before installing patch.
7. Finish joint with asphalt seal and sand.

PLAN

SECTION

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

Sutherland

MANHOLE FRAME ADJUSTMENT

2009

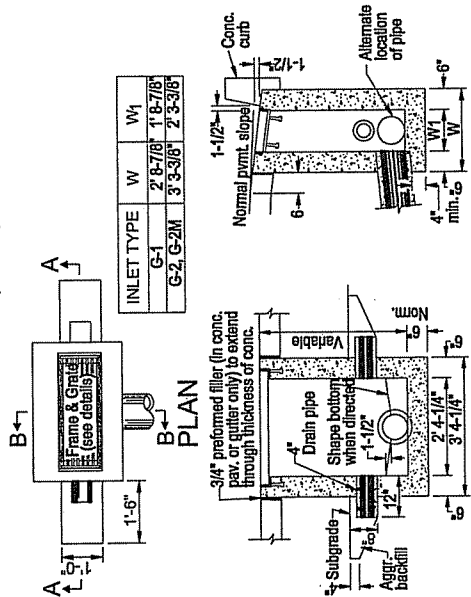
REVISIONS
DESCRIPTION

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

DATE

RD360

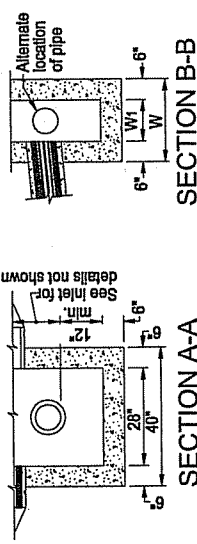
TYPES G-1, G-2, G-2M



SECTION A-A

BASIN FOR INLETS

(Where called for on plans)



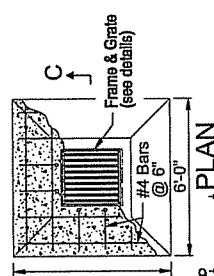
SECTION B-B

CURB INLET

NOTE: All bars to be placed 2" clear of nearest face of concrete unless shown or noted otherwise.

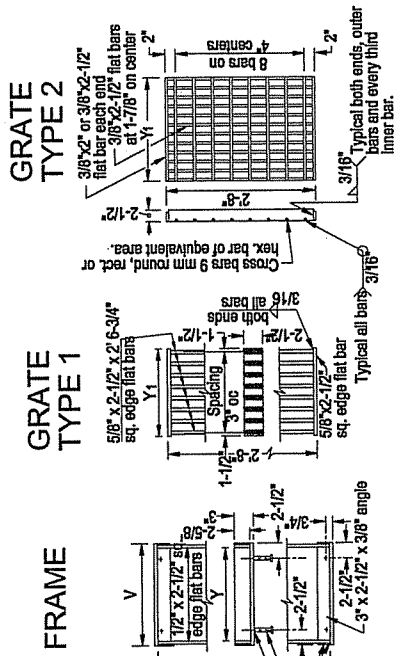
For details not shown, see inlets G-2 or G-2M (upper left)

TYPE G-2MA



SECTION C-C

For details not shown, see inlets G-2 or G-2M (upper left)



NOTE:

3/8" cross bars shall be flush with the grate surface and may be fillet welded, resistance welded or electroforged to bearing bars.

INLET TYPE	V	Y	Y1	NO. OF TYPE REMARKS
G-1	1'-10-3/4"	9-3/8"	9"	12 2
G-2	2'-4-3/4"	2'-3-3/8"	1'-1/2"	8 2
G-2M, G-2MA	2'-4-3/4"	2'-3-3/8"	3'-6-2"	9 1

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

Guthrie

CONCRETE INLETS

TYPES G-1, G-2 & G-2M

2009

REVISIONS

DESCRIPTION

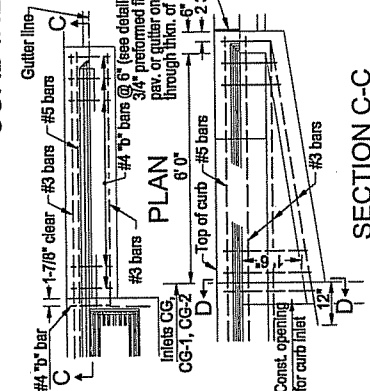
DATE

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

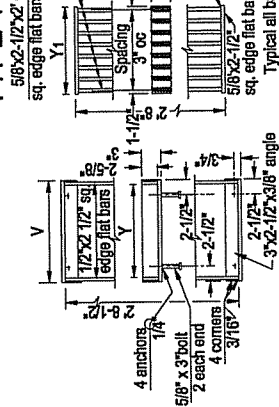
CURB INLET CHANNEL

NOTES:

- #4 "b" bar replaces #3 "a" bar of type CG-1 and CG-2 inlets.
- #4 & #3 "b" bars to be placed during curb construction.
- All bars to be placed 1-1/2" clear of nearest face of concrete unless shown or noted otherwise.
- All bar splices shall be 20 dia.



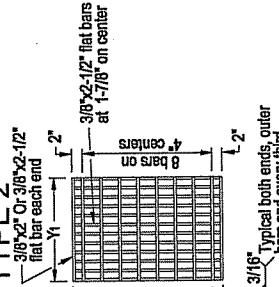
GRATE TYPE 1



INLET TYPE	FRAME	GRATE	NO. OF TYPE	REMARKS
CG-1	1' 10-3/4" x 9-3/8" 9"	12	2	2
CG-2	2' 4-3/4" x 3-3/8" 1-1/2"	8	2	2

NOTE: 3/8" cross bars shall be flush with the grate surface and may be fillet welded, resistance welded or electroforged to bearing bars.

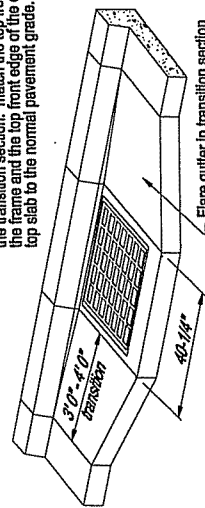
GRATE TYPE 2



NOTE: 3/8" cross bars shall be flush with the grate surface and may be fillet welded, resistance welded or electroforged to bearing bars.

GUTTER TRANSITION SECTION

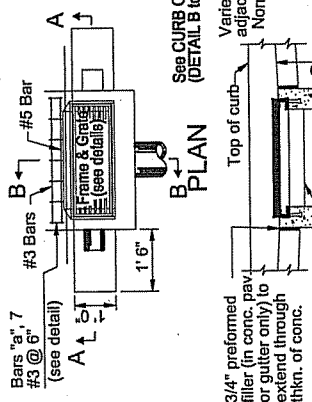
Note: Precast top slab shown with gutter transition flange. If the top slab is cast-in-place, no flange is required in the transition section. Match the top front edge of the frame and the top front edge of the cast-in-place top slab to the normal pavement grade.



TYPES CG-1, CG-2

NOTES:

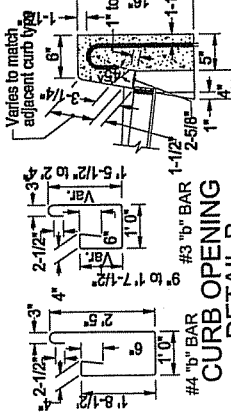
- #3 "a" bars to be placed during curb construction (see note 1 for curb inlet).
- All bars to be placed 1-1/2" clear of nearest face of concrete unless shown or noted otherwise.
- All bar splices shall be 20 dia.



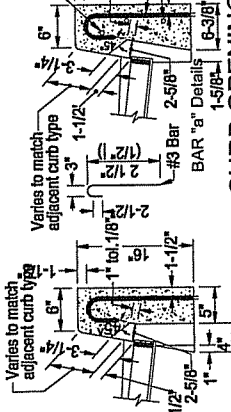
GENERAL NOTES:

- Where precast inlets are used as an alternate to cast-in-place inlets, a 4" compacted leveling bed of sand or 1/4"-0 crushed aggregate shall be provided.

SECTION A-A



SECTION B-B



CURB OPENING DETAIL B



CURB OPENING DETAIL A



INLET TYPE	W	W1
CG-1	2' 8-7/8"	8-7/8"
CG-2	3' 3-3/8"	3-3/8"

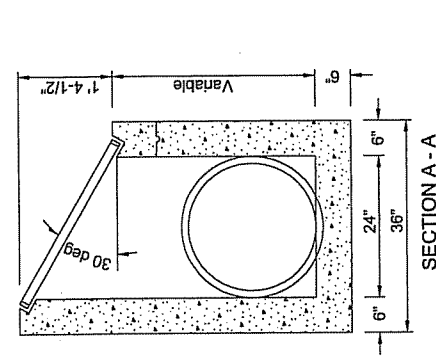
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

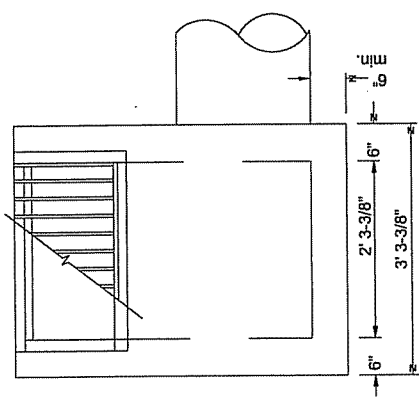
Sutherland

CONCRETE INLETS TYPE CG-1, CG-2 AND CURB INLET CHANNEL

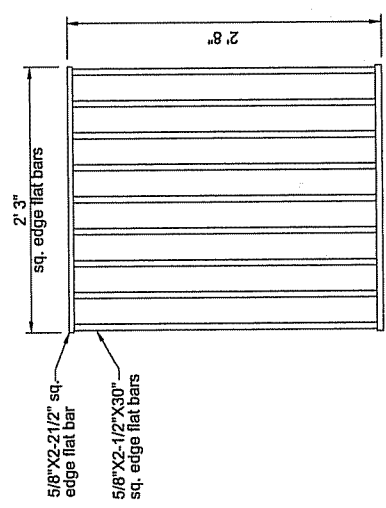
REVISIONS	DATE	DESCRIPTION
2009		



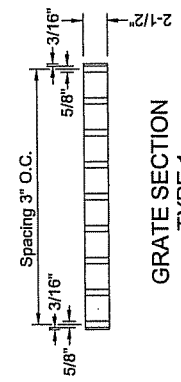
SECTION A - A



SECTION B - B

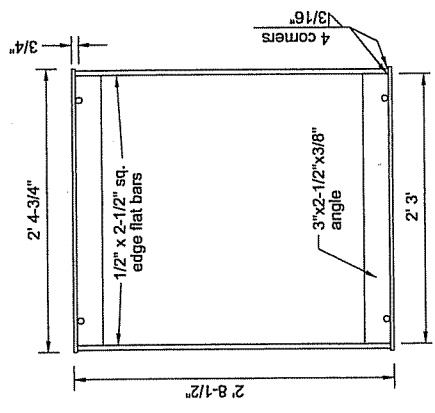


PLAN

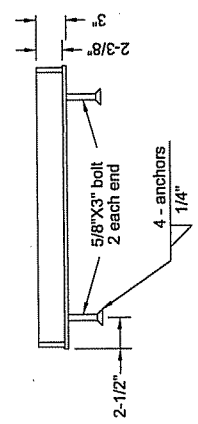


GRATE SECTION
TYPE 1

FRAME PLAN



FRAME SECTION



Note:

3/8" cross bars shall be flush with the grate surface and may be fillet welded, resistance welded or electroforged to bearing bars.

Notes:

1. Concrete strength shall be Commercial Grade Concrete.
2. G-2 grates may be used if approved by the engineer.
3. Catch basin, frame, and grates shall meet H20 loading.
4. Inside frame dimensions: 2' 3-3/8" X 2' 8-1/2".

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

DITCH INLET TYPE "D"

2009

REVISIONS

DESCRIPTION

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

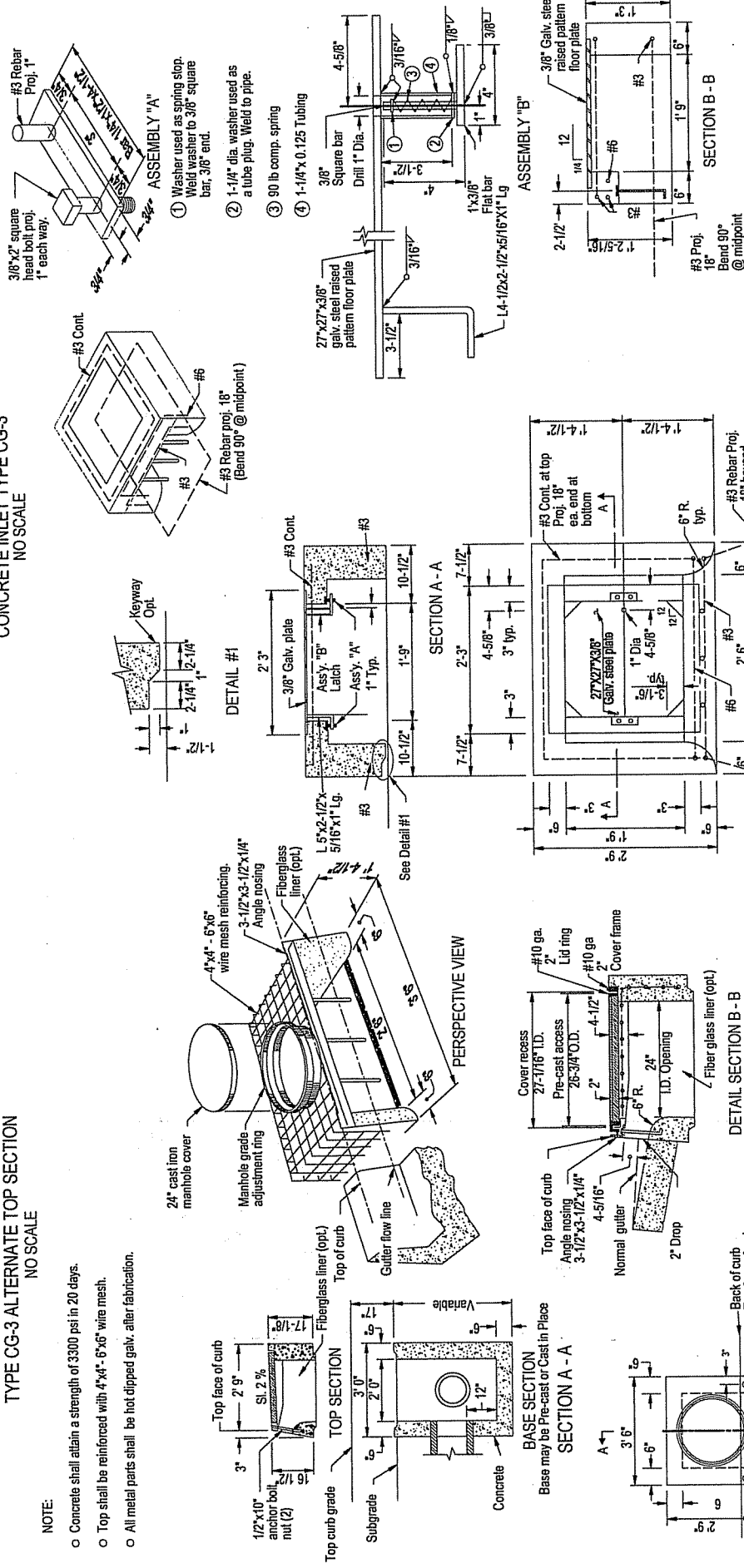
DATE

CONCRETE INLET TYPE CG-3 NO SCALE

TYPE CG-3 ALTERNATE TOP SECTION NO SCALE

NOTE:

- Concrete shall attain a strength of 3300 psi in 20 days.
- Top shall be reinforced with 4"x4" - 6"x6" wire mesh.
- All metal parts shall be hot dipped galv. after fabrication.



NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

Sutherland
CONCRETE INLETS
TYPE CG-3

REVISIONS
DESCRIPTION

DATE

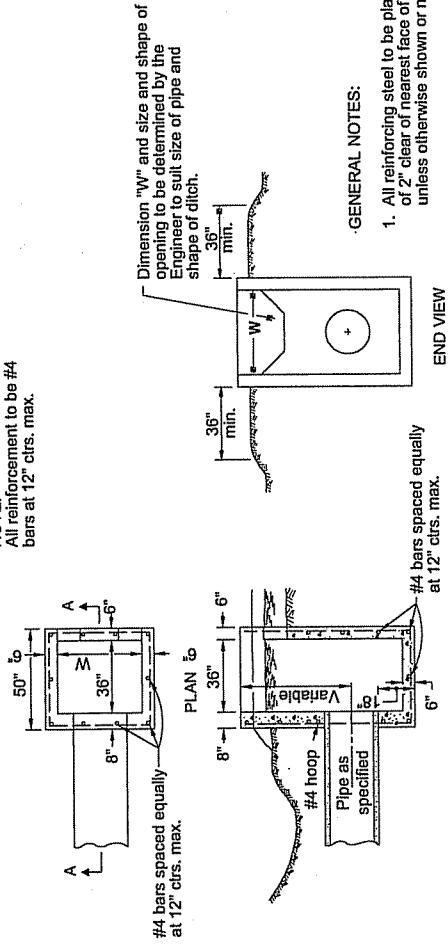
RD372

RD372

RD374

SIPHON BOX AND COVER

NOTE:
All reinforcement to be #4
bars at 12" cfs. max.



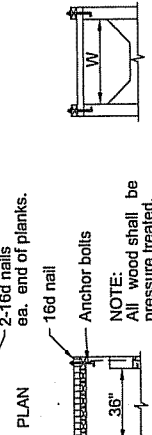
GENERAL NOTES:

1. All reinforcing steel to be placed a minimum of 2" clear of nearest face of concrete unless otherwise shown or noted.

SIPHON BOX

SECTION A-A

4 - 1/2x12" galv. anchor bolts.
Do not countersink into planks.



SIPHON BOX COVER

SECTION A-A

If metal frame and grate is reqd. conform to details for Type 1 grate. Size frame and grate to match dimensions of siphon box used. See Std. Drg. No. RD366.

Guthrie

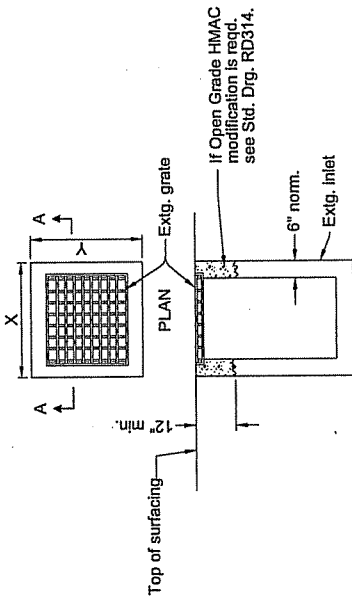
MISCELLANEOUS DRAINAGE STRUCTURES
SIPHON BOX & INLET ADJ. CAP

2009
REVISIONS
DESCRIPTION

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

RD376

NOTE:
X & Y Dimensions To Be Determined
By Field Measurements.

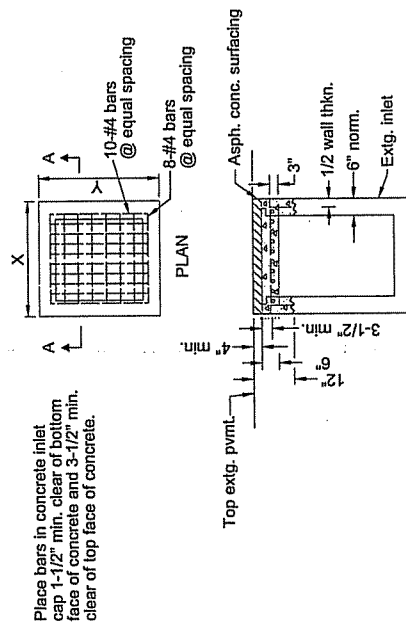


SECTION A-A

(For Details Not Shown, See Drg. No. RD366)

ADJUST EXISTING INLET

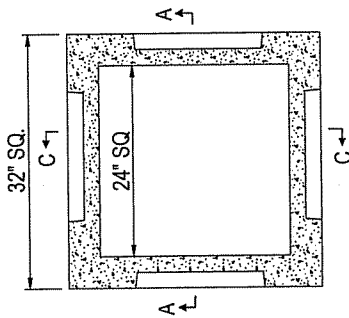
NOTE:
X & Y Dimensions To Be Determined
By Field Measurements.



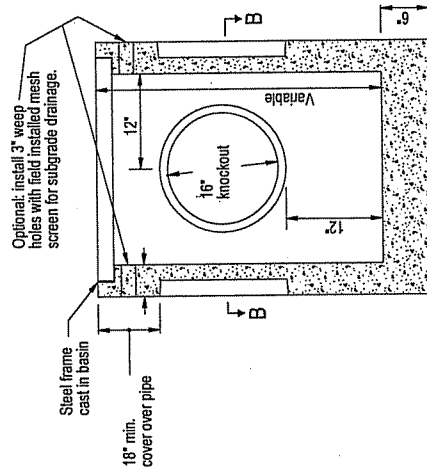
SECTION A-A

CONCRETE INLET CAP

RD376



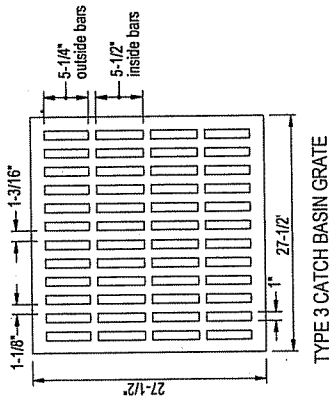
SECTION B-B



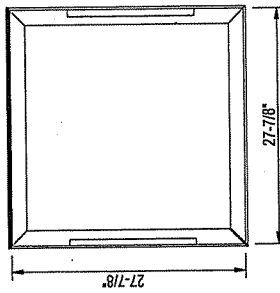
SECTION A-A

Notes:

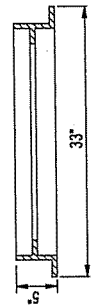
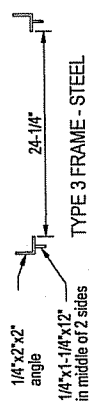
1. Catch basin & grate shall meet M18 loading
2. Concrete strength shall be Commercial Grade Concrete.
3. Precast walls shall be a minimum of 4" thick
4. For use by local agencies as directed
5. Depress gutter flowline and transition gutter as shown in Dwg. RD367 perspective view.



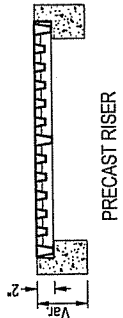
TYPE 3 CATCH BASIN GRATE



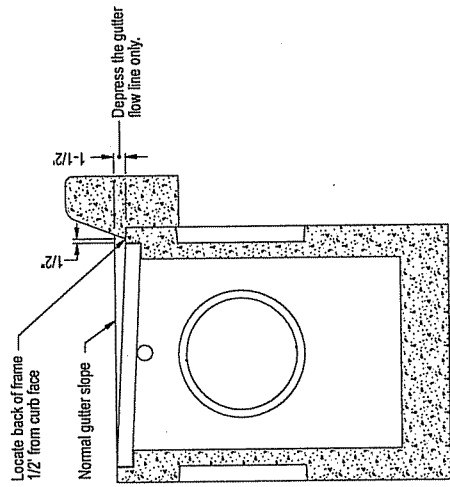
TYPE 3 FRAME - STEEL



OPTIONAL CAST IRON FRAME
FOR A MORTAR-ON TYPE 3 CATCH BASIN



PRECAST RISER



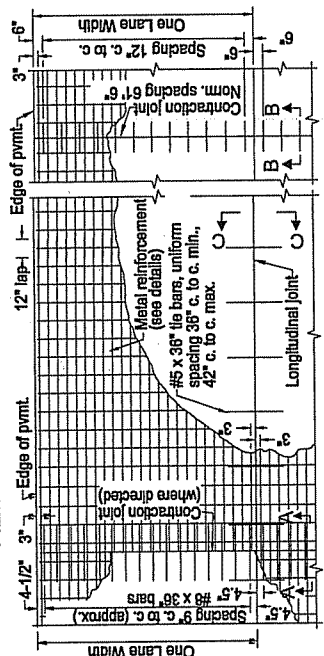
SECTION C-C

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

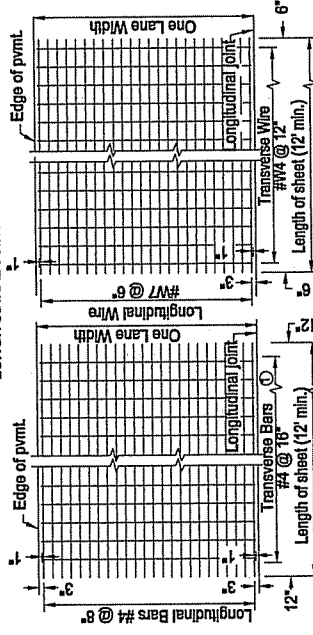
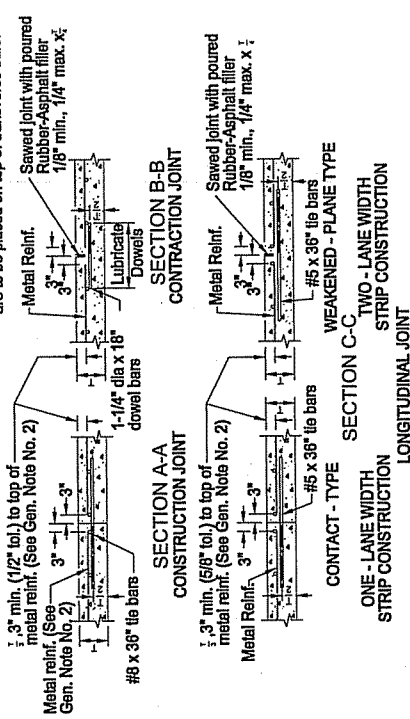
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

Guthrie TYPE "3" CATCH BASIN, FRAME AND GRATE 2009	
DATE	DESCRIPTION

REINFORCED CONCRETE PAVEMENT



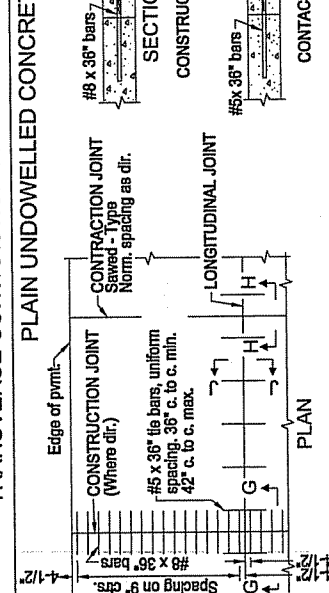
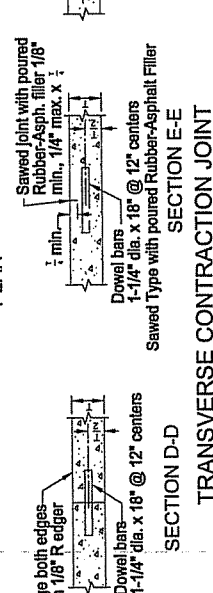
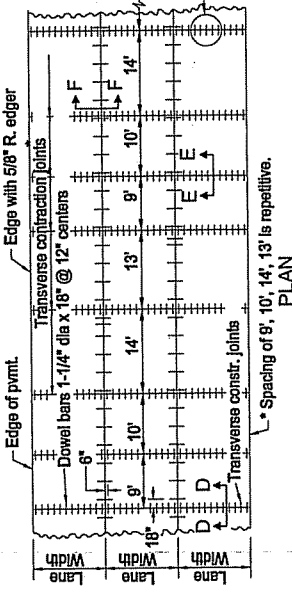
- NOTE:**
1. Embedment depth of metal reinforcement is to top of longitudinal steel.
 2. Longitudinal bars of the metal reinforcement are to be placed on top of transverse bars.



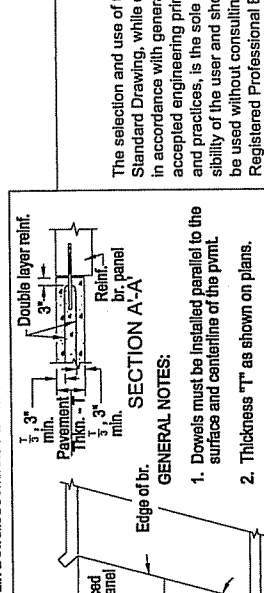
METAL REINFORCEMENT

© 6"x12"-W7W4

PLAIN DOWELLED CONCRETE PAVEMENT



PLAIN UNDOWELLED CONCRETE PAVEMENT

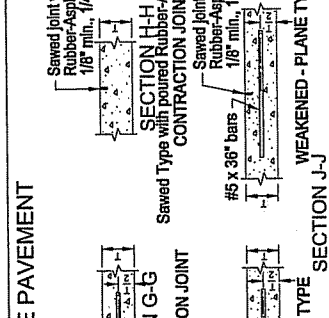
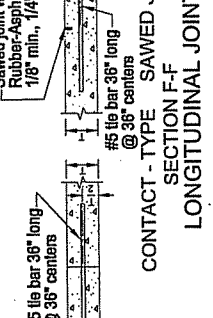
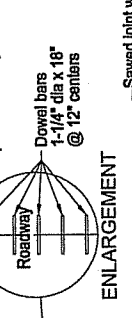


REINFORCEMENT AT SKEWED BRIDGE END

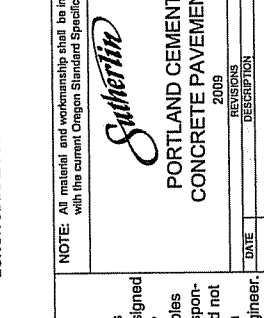
(For skew angles over 10 deg)

- Join adjacent slabs of Plain Dowelled Conc. Pmnt. and Plain Undowelled Conc. Pmnt. as shown in Section F-F.
- Build construction joints when Plain Dowelled Conc. Pmnt. is adjacent to Plain Undowelled Conc. Pmnt. as shown in Section D-D.

NOTE:
All dowel bars are to be placed parallel to row.



WEAKENED - PLANE TYPE



PORTLAND CEMENT CONCRETE PAVEMENT

2009

REVISIONS

DESCRIPTION

DATE

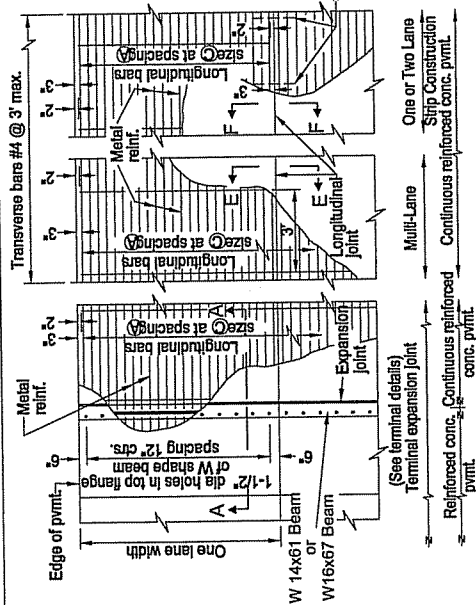
NOTES

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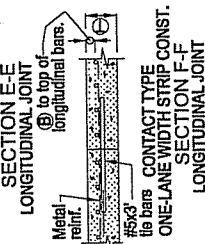
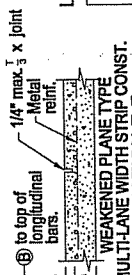
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

Sutherland

RD600



CONSTRUCTION METHODS - PLAN



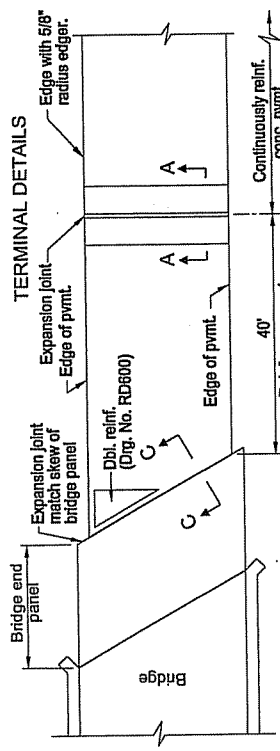
SPACING FOR LONGITUDINAL STEEL

Pvtmt. Thkn. (in)	(A)	(B)	(C)
	(in)	(in)	bar size

(A) = Max spacing
 Note: Spacing for Longitudinal Steel Table to be completed specifically for each project.

GENERAL NOTES:

1. Adjacent slabs of any combination of one or two-lane width strip construction, including shldr. when of plain, reinf. or continuously reinf. conc., will be joined by contact-type longitudinal joint shown under Section F-F.
2. The bars for contact type joint in strip construction shall be installed by drilling and grouting. - See the specifications.
3. Expansion joint dowels must be installed parallel to the surface and centerline of pvtmt.
4. A terminal expansion joint will be used at the transition to an asphaltic conc. pvtmt. The reinforced conc. pvtmt. will be terminated at the end of the Sleeper Slab. Also include a 6 mil polyethylene bond breaker under the reinf. conc. pvtmt.
5. All reinforcing steel shall conform to ASTM A706 or AASHTO 31 (ASTM A615) Grade 420. All bars shall be full length as shown and shall be placed 1-1/2" clear of the nearest face of conc. unless shown otherwise.



PLAN

ELEVATION

SECTION A-A

SECTION C-C

SECTION E-E

SECTION F-F

SECTION G-G

SECTION H-H

SECTION I-I

SECTION J-J

SECTION K-K

SECTION L-L

SECTION M-M

SECTION N-N

SECTION O-O

SECTION P-P

SECTION Q-Q

SECTION R-R

SECTION S-S

SECTION T-T

SECTION U-U

SECTION V-V

SECTION W-W

SECTION X-X

SECTION Y-Y

SECTION Z-Z

SECTION AA

SECTION BB

SECTION CC

SECTION DD

SECTION EE

SECTION FF

SECTION GG

SECTION HH

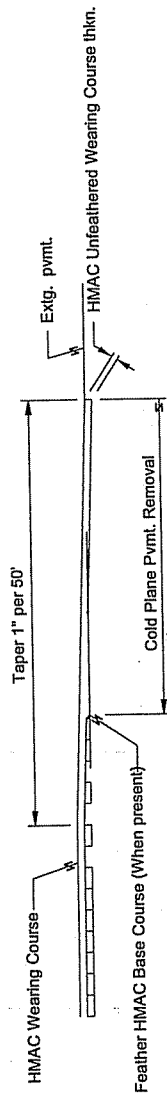
SECTION II

- a) W 16x67 Steel Beam (AASHTO M183) [For 11" & 12" or W14x81 Steel Beam (AASHTO 183) [For 8", 9" & 10"] Galv. after fabrication (AASHTO M111)
- b) 1-1/2" dia. holes 12" o.c., begin 6" from beam anchor.
- c) Drill and tap high end of beam for 5/16"x3/4" stainless steel flat trim head machine screws for end cover attachment.
- d) Flange bottom and inside of end cover to be painted with Asph. base paint.
- e) 2" of poly foam compression seal. Use material as approved on the current Qualified Products Listing.
- f) Expansion groove - 1" thick Fill with hot poured joint sealer - AASHTO M 173
- g) 1" dia. holes through web @ 8" o.c.
- h) 1/8" Tempered Hardboard
- i) Set beam 1/8" below finish grade.
- j) All bars shall be placed 2" clear of nearest face of conc. unless shown or noted otherwise.
- k) Lap all bars 24" at splices.
- l) 1-3/4" for T=10"; 2-3/4" for T=9"; 3-3/4" for T=8" (W14x81) 3-1/4" for T=11"; 2-1/4" for T=12" (W16x67)
- m) 2" min. Radius (2-1/2" max. Radius)

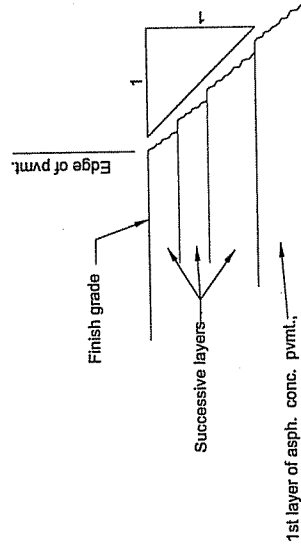
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.	
DATE	DESCRIPTION
	REVISIONS
	2009
	CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

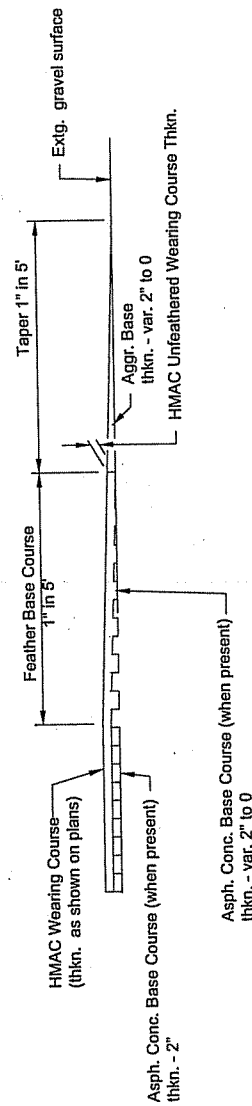
Guthrie



AC PAVEMENT MATCH AT PROJECT ENDS
OR BRIDGE ENDS WHEN NOT OVERLAYING THE BRIDGE



MULTI-LAYER PAVEMENT CONSTRUCTION



METHOD OF FEATHERING AC PAVEMENT
AT GRAVEL APPROACHES

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.	
<i>Sutherland</i>	
ASPHALT PAVEMENT DETAILS	
2009	DATE
REVISION	DESCRIPTION

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

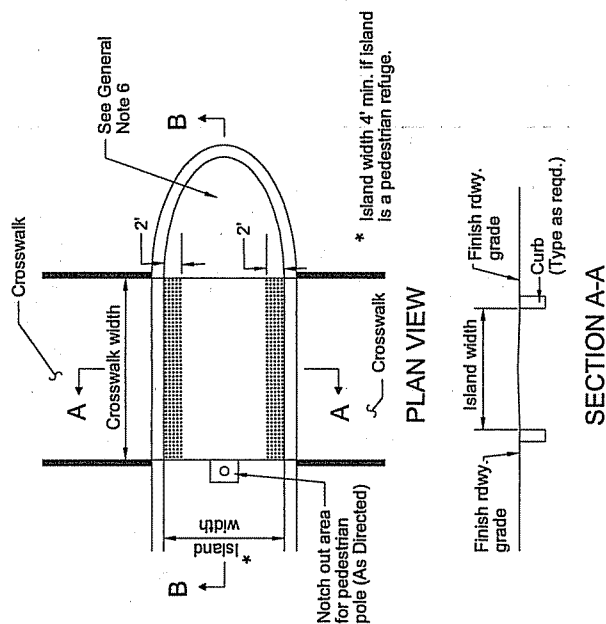
Sutherland

ASPHALT PAVEMENT SECTION
(RESIDENTIAL STREET)

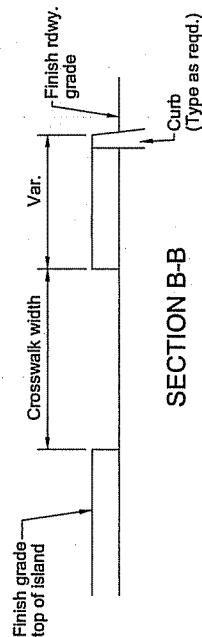
2009

DATE	REVISIONS	DESCRIPTION

ERD700

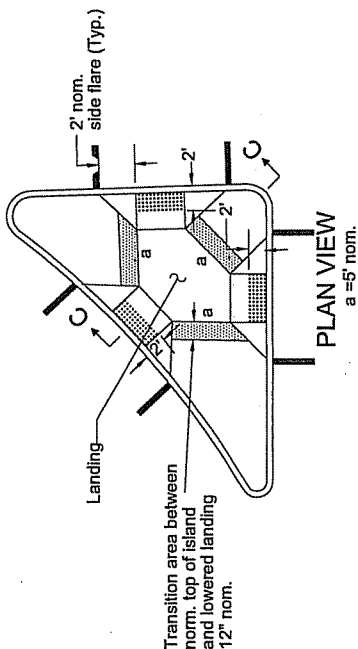
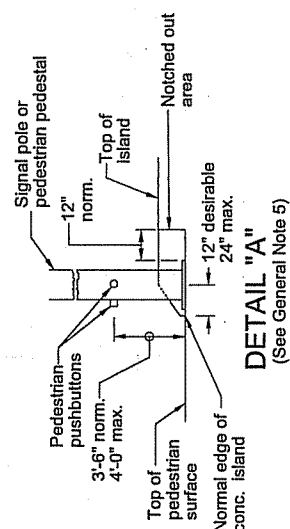


SECTION A-A

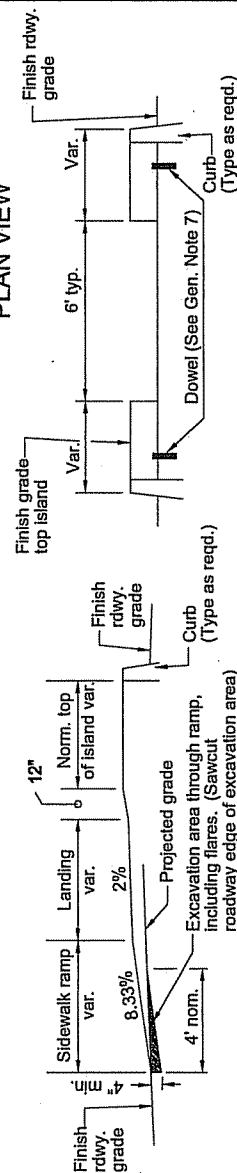


SECTION B-B

RAISED MEDIAN ISLAND DETAIL



PLAN VIEW



SECTION C-C

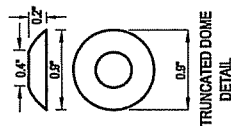
LOWERED ISLAND DETAIL

CUT THROUGH ISLAND DETAIL

LAND DETAIL

RAISED RIGHT TURN CHANNELIZATION ISLAND

SECTION D-D



**TRUNCATED
DETAIL**

RAMP TEXTURE PATTERN DETAIL

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

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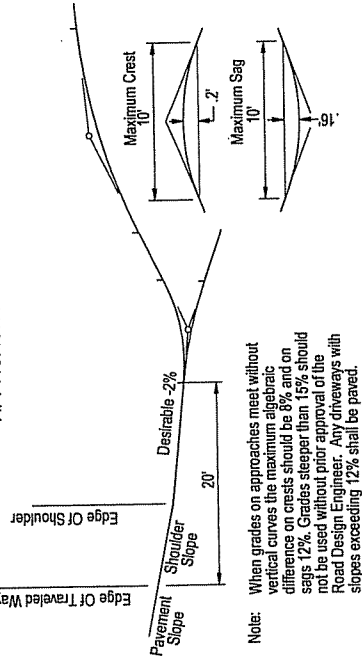
ACCESSIBLE ROUTE ISLANDS

DATE	REVISIONS	DESCRIPTION

2002

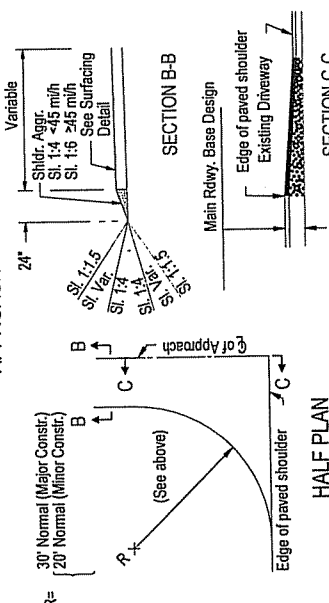
ERD710

APPROACH PROFILE



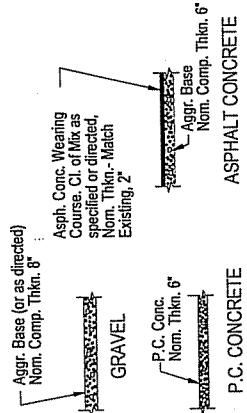
Note: When grades on approaches meet without vertical curves the maximum algebraic difference on crests should be 8% and on sags 12%. Grades steeper than 15% should not be used without prior approval of the Road Design Engineer. Any driveways with slopes exceeding 12% shall be paved.

APPROACH



Note: Normal paving limits to extend 20' from the edge of pavement or to the end of the radius, whichever is greater. Approach surfacing and width to then match existing approach.
• 30' for Public Road connections.

APPROACH AND DRIVEWAY CONNECTION SURFACING



NON-SIDEWALK DRIVEWAYS

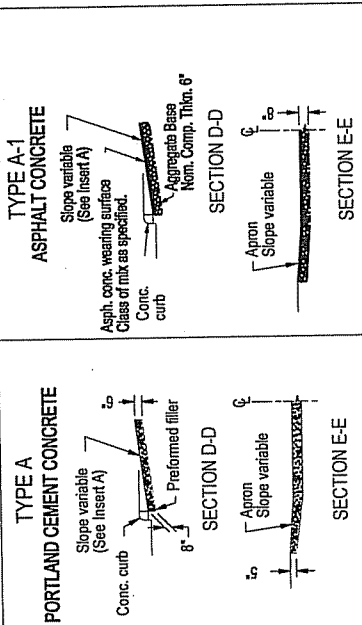
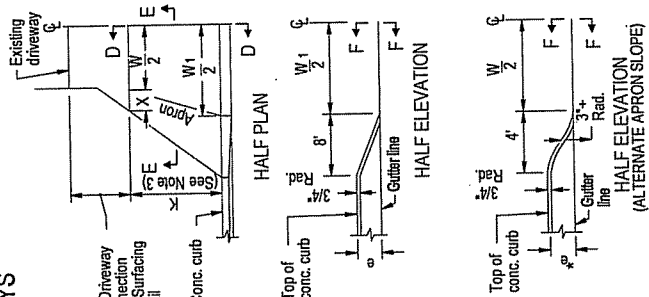


TABLE A

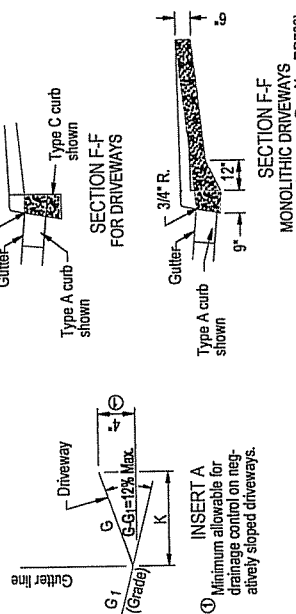
W	X	ft	K in feet	W1 in feet
12	5	8	10	15
14	6	10	15	17
16	7	12	17	19
18	8	14	19	21
20	9	16	21	23
22	10	18	23	25
24	11	20	25	27
26	12	22	27	29
28	13	24	29	31
30	14	26	31	33
32	15	28	33	35
34	16	30	35	37
36	17	32	37	39
38	18	34	39	41
40	19	36	41	43
42	20	38	43	45
44	21	40	45	47
46	22	42	47	49
48	23	44	49	51
50	24	46	51	53

Where a travel lane is constructed adjacent to the curb line, use 16' W min. for residence and 30' W min. for light commercial, add 5' to W1 for both. Do not add the 5' to W1 when 4' min. shldr. or bikeway is included in the typical.

* Curb exposure "e" = 7" normal. vary as shown on plans or as directed.



NOTE: See "Table A" for dimensions not shown



NOTE: See "Table A" for dimensions not shown

GENERAL NOTES

1. Driveway details shown on this drawing are to be used on roadways where there are no existing or planned sidewalks in driveway vicinity. For driveways located in a sidewalk see Sid. Dwg. No. RD720, RD725 and/or RD730
2. Width of driveway (W) as shown on plans or as directed.
3. X is the distance from back of curb to back of driveway (10' max.)
4. Where existing driveway is in good condition, construct only as much as required for satisfactory connection with new work.
5. "Alternate Apron Slope" used only where plans designate. Alternate Apron Slope may also be used at local jurisdiction's request when approved by the Project Manager.
6. Increase thickness of asphalt concrete and stone base where shown on plans.

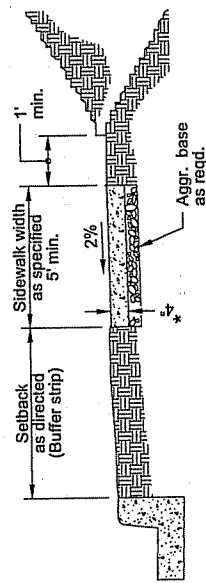
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

Sutherland
APPROACHES AND
NON-SIDEWALK DRIVEWAYS
2009

REVISIONS

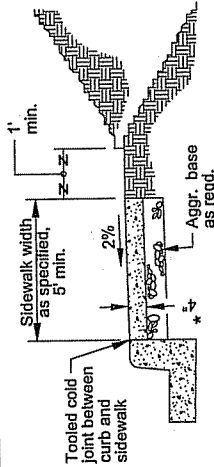
DATE

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

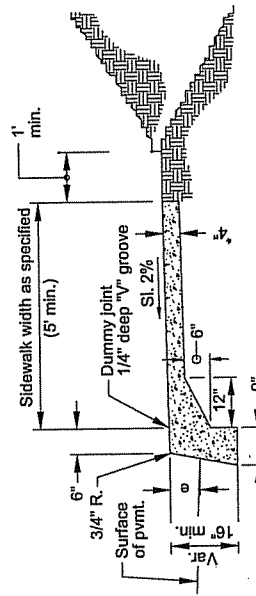


TYPICAL SETBACK SIDEWALK CROSS SECTION

* As specified in plans. Minimum 4" sidewalk is a portion of a driveway or mountable curb is used minimum thickness 6".

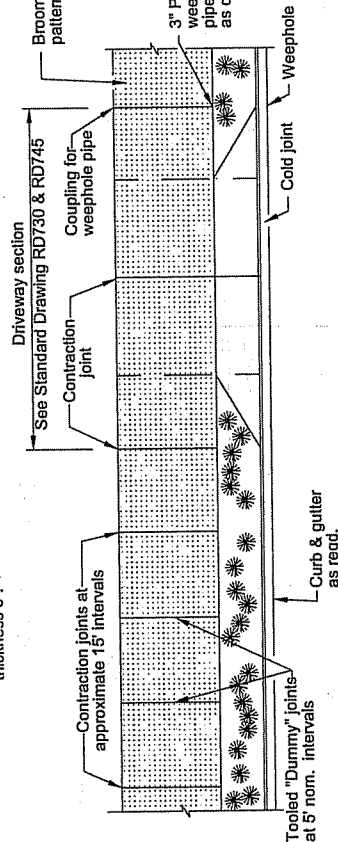


TYPICAL CURB SIDEWALK CROSS SECTION

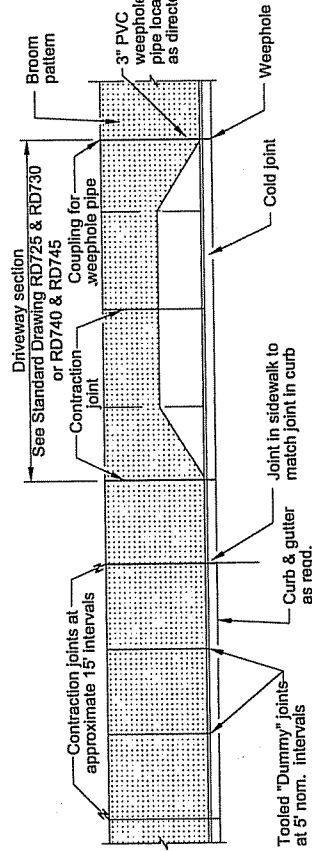


MONOLITHIC CURB & SIDEWALK

e = curb exposure, (as directed, 6" typical)



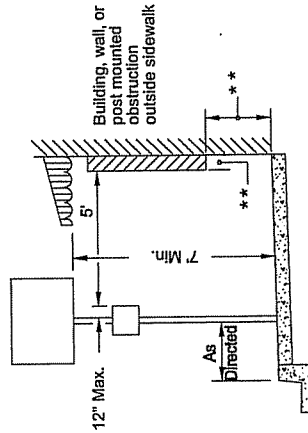
TYPICAL PLAN VIEW - SETBACK SIDEWALK



TYPICAL PLAN VIEW - CURB SIDEWALK

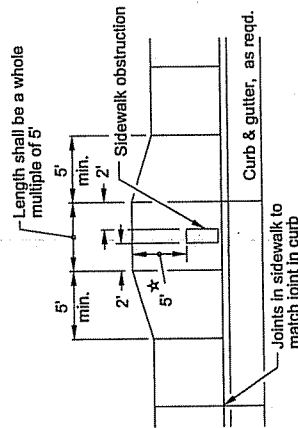
General notes:

1. Include additional paved or unpaved 2' clearance to vertical faces higher than 5' such as retaining walls, sound walls, fences and buildings.
2. On sidewalks 8' and wider, provide a longitudinal joint at the midpoint.
3. Install 3" pvc weephole pipes in sidewalks in locations as directed by engineer. Place contraction joint over top of pipe.



CLEAR CIRCULATION PATH

** Objects with base below 2' 4" may protrude any distance as long as the 5' circulation path is maintained. When an object with a base higher than 2' 4" protrudes further than 4", provide a curb below protrusion to delineate edge.

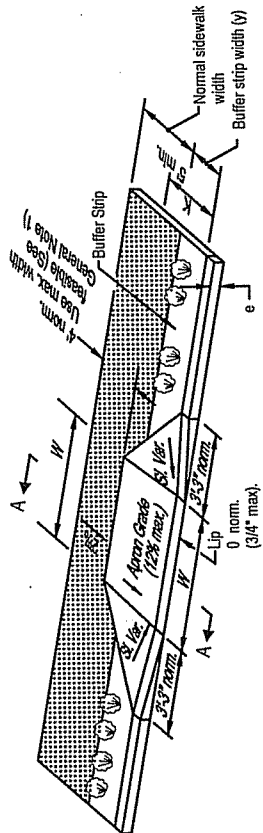
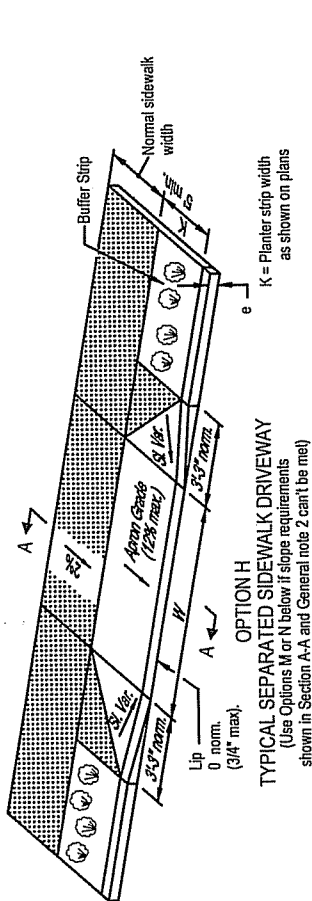


REQUIRED SIDEWALK WIDENING AROUND OBSTRUCTIONS

* When site constraints prohibit a 5' passage, the Engineer may direct this to be reduced, but no less than 3'.

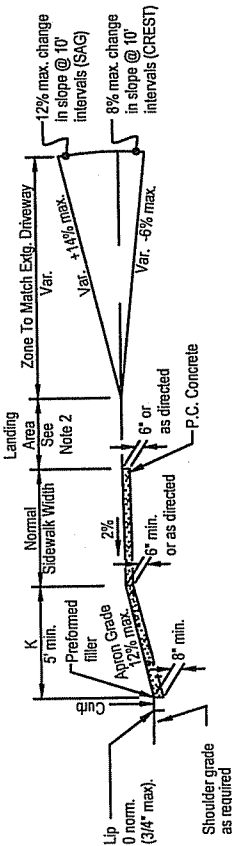
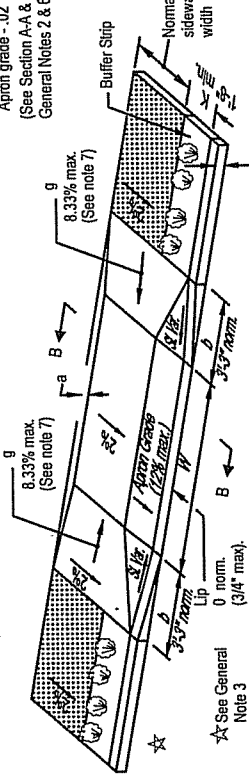
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

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<i>Sutherland</i>	
SIDEWALKS	
2009	
REVISIONS	DESCRIPTION
DATE	



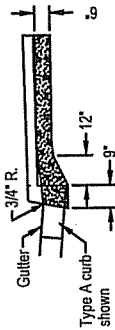
W = Width of driveway as exists behind sidewalk

$$K = \frac{(e - Lip) \cdot 0.02}{\text{Apron grade} - 0.02}$$
 (See Section A-A & General Notes 2 & 6)



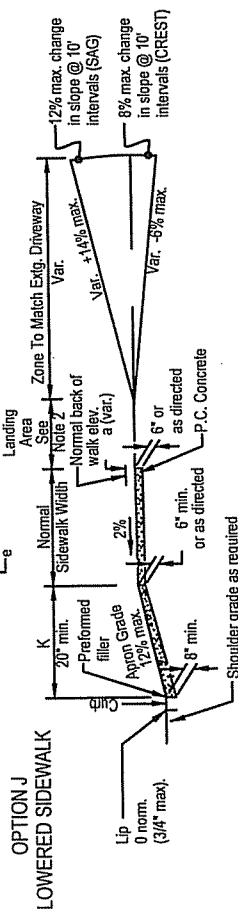
GENERAL NOTES:

- 4' sidewalk width with slope of 2% is required through driveways. 3'-4" min. width is acceptable where full sidewalk width is less than 6'
- Width of driveway (W) and length of landing area shall be as shown on plans or as directed.
- Where existing driveway is in good condition and meets slope requirements, construct only as much as required for satisfactory connection with new work.
- Check the gutter flow depth at driveway locations to assure that the design flood does not overlap the back of sidewalk at driveway. If overlapping occurs place an inlet at upstream side of driveway or perform other approved design mitigation.
- Equations may be calculated using either feet or inches. Use same unit throughout equation.
- Tooled joints are required at all driveway slope break lines.
- Longitudinal slopes shown are relative to the running slope of the sidewalk.
- Any dimensions except those of General Note 1 may be amended by local agencies for their use.
- At least 10' of the driveway behind the sidewalk should be surfaced to prevent tracking of gravel onto the sidewalk.



NOTE:
 This drawing is to be used by local agencies to assist them in the design of driveways on their facilities.

NOTE:
 Dimensions a & b are nominal. Construct driveways to meet required slopes.



K = Planter strip width as shown on plans
 a = e - Lip - K(Apron Grade - 0.02)
 b = a/g

OPTION J LOWERED SIDEWALK

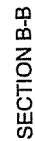
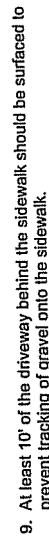
☆ See General Note 3

☆ See General Note 3

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NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

SEPARATED SIDEWALK DRIVEWAYS OR ALLEYS (OPTIONS H, I & J) LOCAL JURISDICTIONS 2009	
DATE	DESCRIPTION



NOTE: All material and workmanship shall be in accordance with the General Contract Standard Specifications.

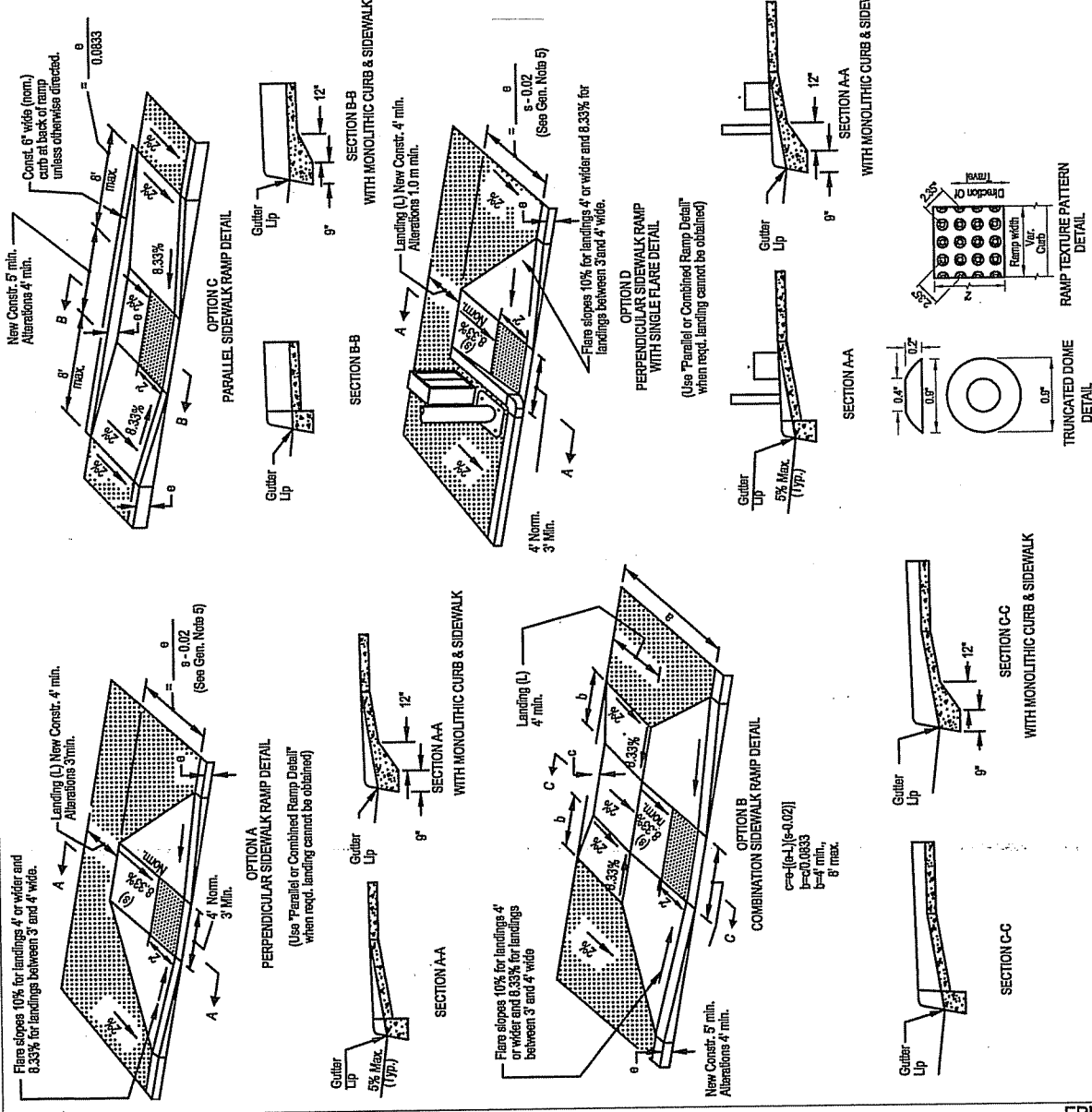
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

Sutherland

2009		REVISIONS	DESCRIPTION
DATE			

GENERAL NOTES:

1. Place truncated dome detectable warning texture in the lower 2' of throat of ramp only. Arrange domes using in-line pattern as shown in detail below. Color of texture to be safety yellow. For const. of sidewalk ramps outside of public right-of-way, check State Building Codes requirements.
2. Sidewalk curb ramp slopes shown are relative to the true level horizon (zero bubble).
3. In alterations curb ramp slope(s) may be 10% for a max. rise of 6' or 12.5% for a max rise of 3'. Curb ramps, in alterations, need not exceed 6' in length.
4. Side flares that are not part of the path of travel may be any slope. See RD750 General Note 4.
5. Ramps for paths intersecting a roadway should be full width of path. When a ramp is used to provide bicycle access from a roadway to a sidewalk, the ramp should be 8' wide with no texture.
6. Sidewalk ramp details are based on ORS 447.310 and the proposed ADAAG Section 14, June 20, 1994.
7. When 2 curb ramps are immediately adjacent as in Options A,B,C and F on RD750, the curb exposure (e) between the adjacent side flares may range between 3' and full design exposure.
8. For the purpose of this drawing, a curb ramp is considered "perpendicular" if the angle between the longitudinal axis of the ramp and a tangent to the curb at the ramp center is 75° or greater.
9. Tooled joints are required at all sidewalk ramp slope break lines.
10. Sidewalk flare is not necessary where the ramp is protected from pedestrian cross-travel.



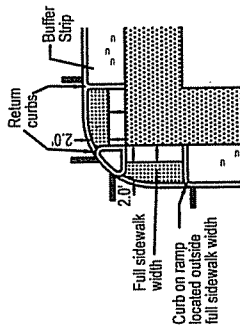
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

Sutherland

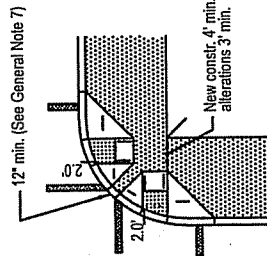
SIDEWALK RAMP DETAILS

DATE	DESCRIPTION
2009	REVISED
	ADDED TRUNCATED DOMES AND REVISED GENERAL NOTES

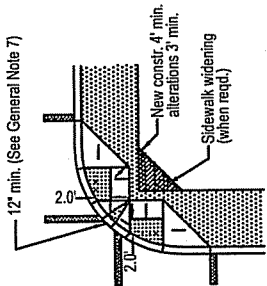
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.



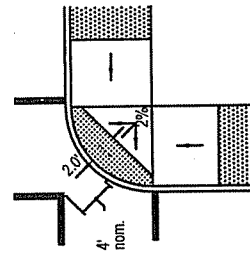
OPTION A
RAMPS WITH BUFFER STRIP



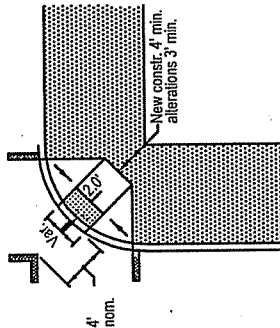
OPTION B



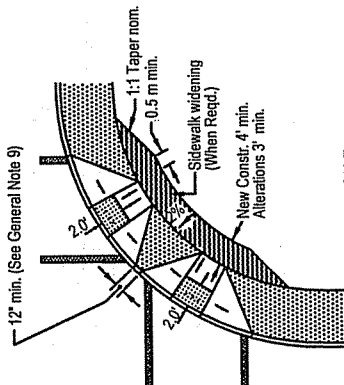
OPTION C



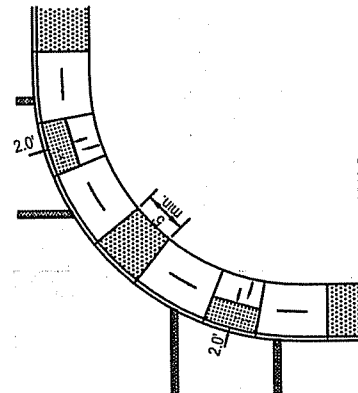
OPTION E
SINGLE PARALLEL RAMP
Use in alterations only and when site constraints prohibit installing two ramps



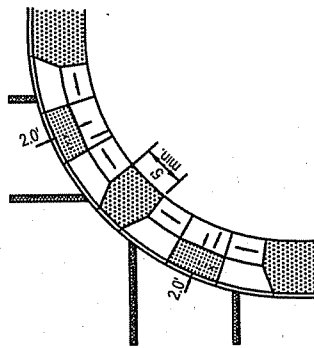
OPTION D
SINGLE DIAGONAL RAMP
Use in alterations only and when site constraints prohibit installing two ramps



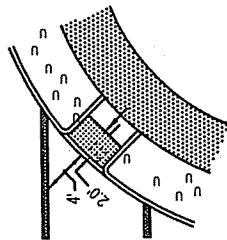
OPTION F
PERPENDICULAR RAMPS



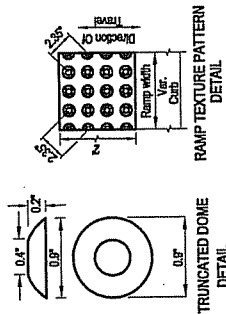
OPTION G
PARALLEL RAMPS



OPTION H
COMBINATION RAMPS



OPTION I
RAMP WITH
BUFFER STRIP



TRUNCATED DOME
DETAIL

Marked or intended
crossing location

General Notes

1. Place truncated dome delectable warning texture in the lower 2' of throat of ramp only. Arrange domes using in-line pattern only as shown in detail right. Color of texture to be safety yellow. For construction of sidewalk ramps outside of public right-of-way, check with State Building Codes for requirements regarding texturing of flares.
2. Sidewalk curb ramp slopes shown are relative to the true level horizon (zero bubble).
3. In alterations curb ramp slope(s) may be 10% for a max. rise of 6' or 12.5% for a max. rise of 3/4". Curb ramps, in alterations, need not exceed 6' in length.
4. Side flares, if used in Option A and I, that are not part of the path of travel may be of any slope.
5. Do not slope landing more than 2% in any direction.

See RD755 for additional requirements and details not shown.

6. Ramps for paths intersecting a roadway should be full width of path. When a ramp is used to provide bicycle access from a roadway to a sidewalk, the ramp should be 8' wide, with no texturing.
7. Sidewalk ramp details are based on ORS 447.310 and proposed ADAAG Section 14, June 20, 1994.
8. When 2 curb ramps are immediately adjacent, as in Options A, B, C and F, the curb exposure (e) between the adjacent side flares may range between 3" and full design exposure.
9. For the purposes of this drawing, a curb ramp is considered "perpendicular" if the angle between the longitudinal axis of the ramp and a line tangent to the curb at the ramp center is 75° or greater.

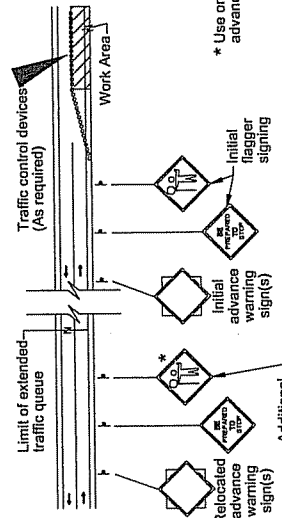
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

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Guthrie	
2009	
DATE	REVISION
06/01	06/01
ADDED TRUNCATED DOME AND REVISED GENERAL NOTES	
SIDWALK RAMP PLACEMENT	

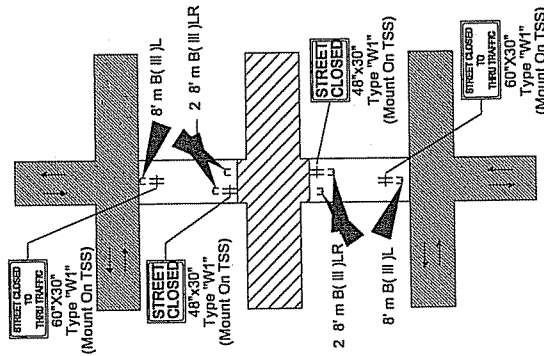
BUFFER LENGTH TABLE		
POSTED SPEED	MINIMUM BUFFER LENGTHS	"B"
mph	km/h	ft
25	40	40
30	48	60
35	56	85
40	64	125
45	72	175
50	80	220
55	88	285
60	96	340
65	104	420
70	112	460

TAPER LENGTHS TABLE				
W = Width of Lane or Shoulder being closed (feet)				
POSTED SPEED	MINIMUM TAPER LENGTHS (L) in feet	W = 10	W = 12	W = 14
mph	km/h	ft	ft	ft
25	40	95	115	135
30	48	150	180	210
35	56	180	215	250
40	64	250	305	355
45	72	305	355	400
50	80	445	535	620
55	88	475	570	665
60	96	535	640	745
65	104	595	710	830
70	112	650	785	910

Sign sizes and spacings as required by plans and/or Special Provisions.
Place an additional advance flagger to slow traffic (As required)

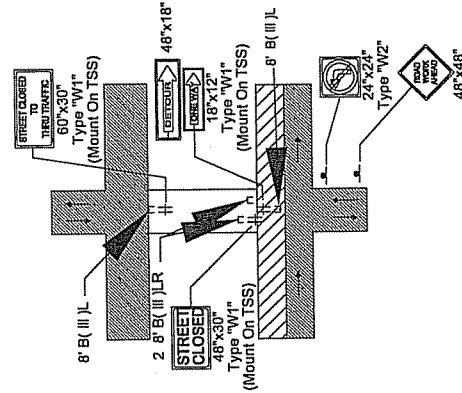


EXTENDED TRAFFIC QUEUES DETAIL



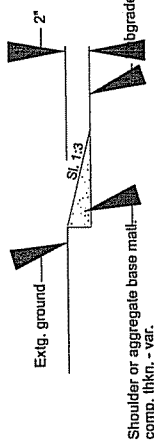
TYPICAL STREET CLOSURE

(Place "Detour" signing as directed)



TYPICAL PARTIAL STREET CLOSURE

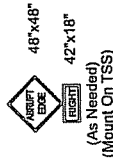
(Place "DO NOT ENTER" and additional "DETOUR" signing as directed)



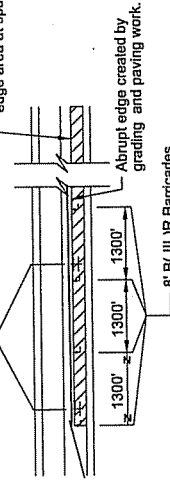
ABRUPT PAVEMENT EDGE DETAIL

(Use when abrupt edge is 2' or greater)

NOTE:
For speeds 35 MPH (55KPH) or less use
28" Tubular Markers on 25' max. spacings.



Continue signing and other traffic control devices throughout abrupt edge area at spacings shown.



When the abrupt edge is located on traffic's left side, replace the 8' B (III) JLR barricades with 8' B (III) JLR barricades and replace the "RIGHT" riders with "LEFT" (36"x18") riders.

TYPICAL ABRUPT EDGE SIGNING DETAIL

GENERAL NOTES:

- All signs to be Type "OO" unless otherwise noted.
- Signs and other traffic control devices (TCD) shown are the minimum required.
- TSS - Temporary Sign Support (See Standard Drawing RD945)

28" Tubular Markers on 25' max spacings.

28" Tubular Markers on 50' max spacings.

UNDER TRAFFIC

UNDER CONSTRUCTION

To be accompanied by Dwg. Nos. RD945, RD92' & TM100
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

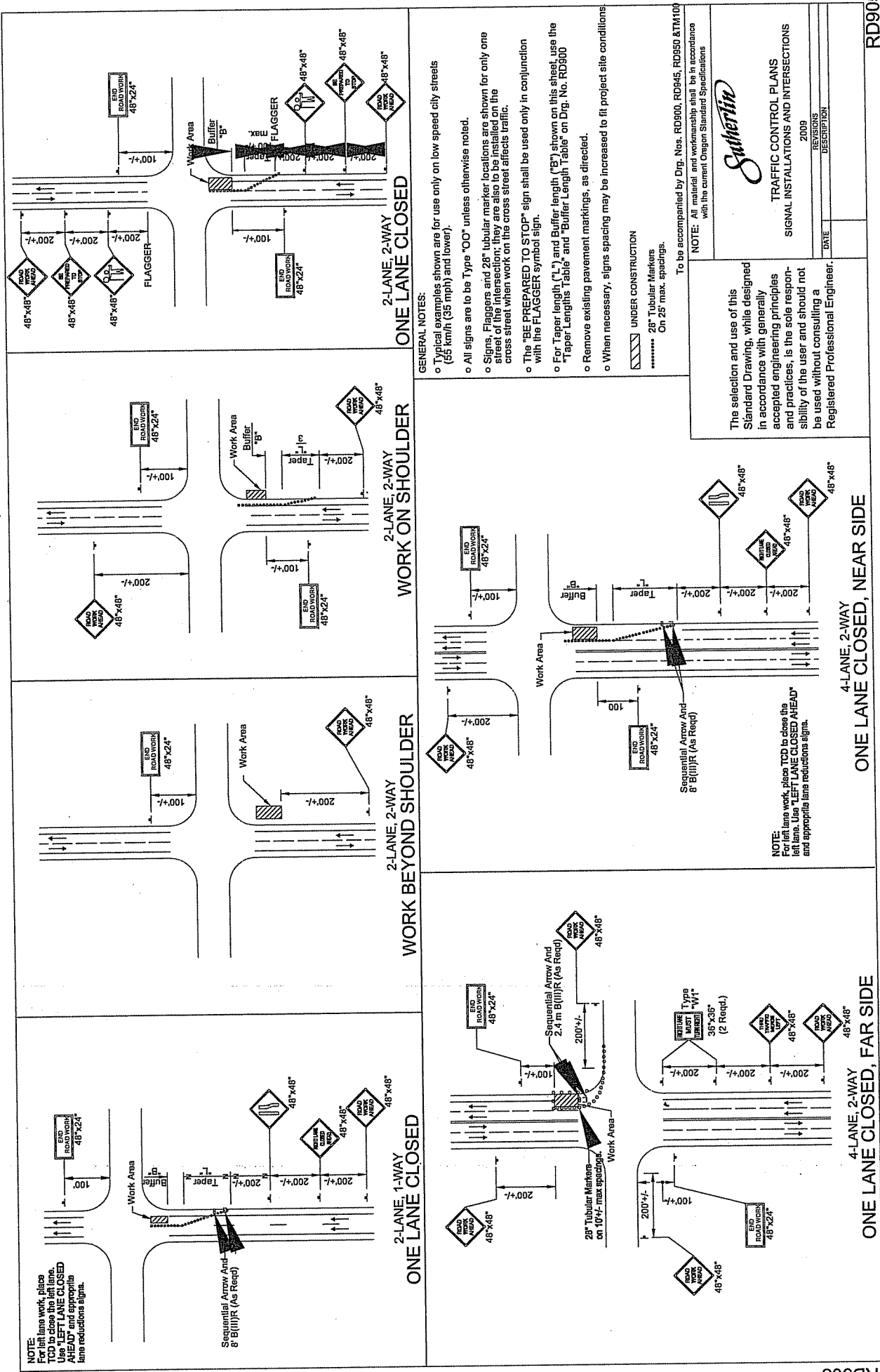
Sutherland

TRAFFIC CONTROL PLANS

2009
REVISION
DESCRIPTION

DATE

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.



NOTE:
For left lane work, place
"BE PREPARED TO STOP" sign
in left lane. Use "LEFT LANE CLOSED
AHEAD" and appropriate
lane reduction signs.

NOTE:
For left lane work, place TCD to close the
left lane. Use "LEFT LANE CLOSED AHEAD"
and appropriate lane reduction signs.

- GENERAL NOTES:
- Typical examples shown are for use only on low speed city streets (55 km/h (35 mph) and lower).
 - All signs are to be Type "OO" unless otherwise noted.
 - Signs, Flaggers and 28" tubular marker locations are shown for only one street of the intersection; they are also to be installed on the cross street when work on the cross street affects traffic.
 - The "BE PREPARED TO STOP" sign shall be used only in conjunction with the FLAGGER symbol sign.
 - For Taper length ("L") and Buffer length ("B") shown on this sheet, use the "Taper Lengths Table" and "Buffer Length Table" on Drg. No. RD900.
 - Remove existing pavement markings, as directed.
 - When necessary, signs spacing may be increased to fit project site conditions.

UNDER CONSTRUCTION
28" Tubular Markers
On 25' max. spacings.

To be accompanied by Drg. Nos. RD900, RD945, RD950 & TM100
with the current Oregon Standard Specifications

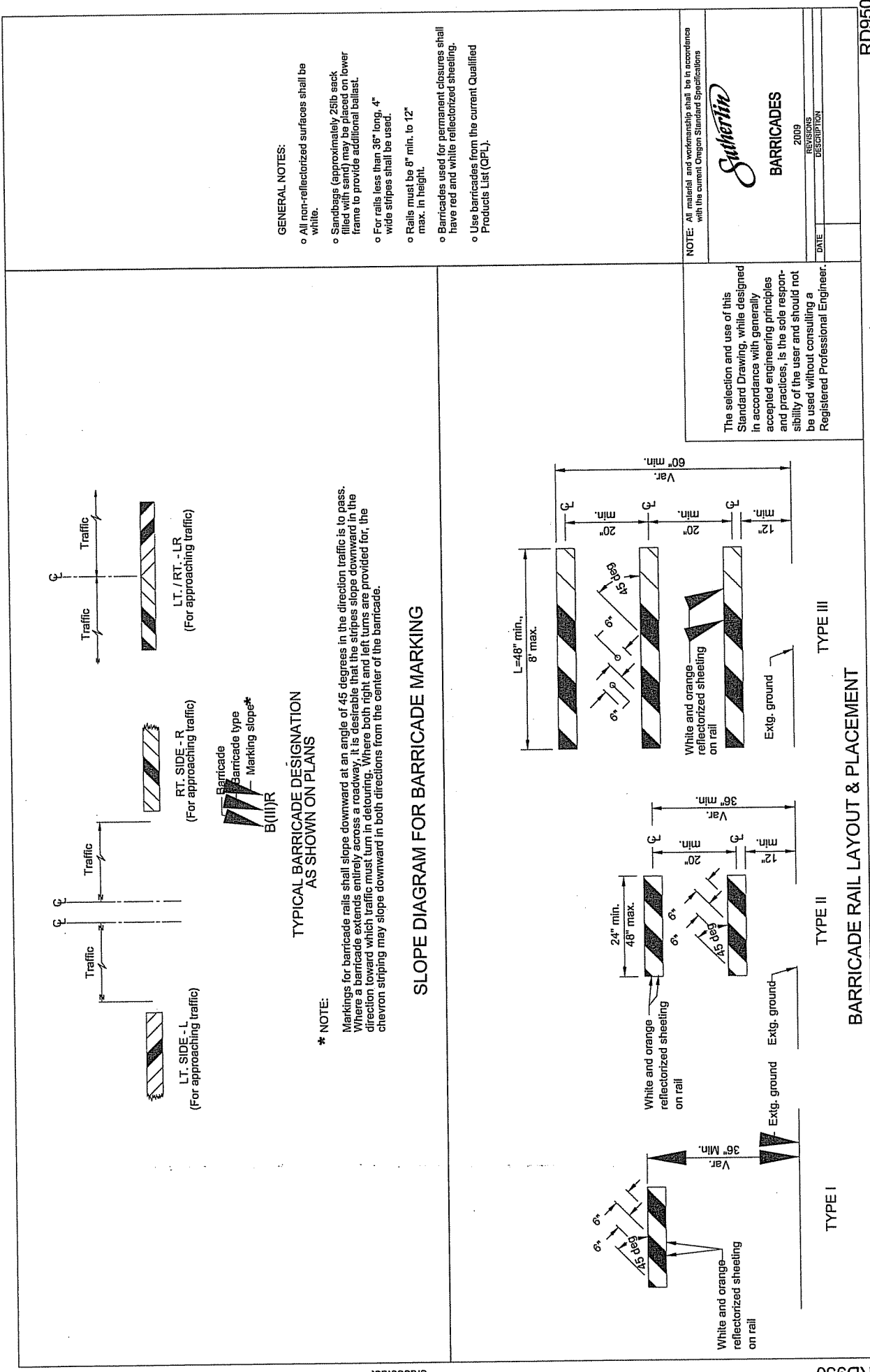
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

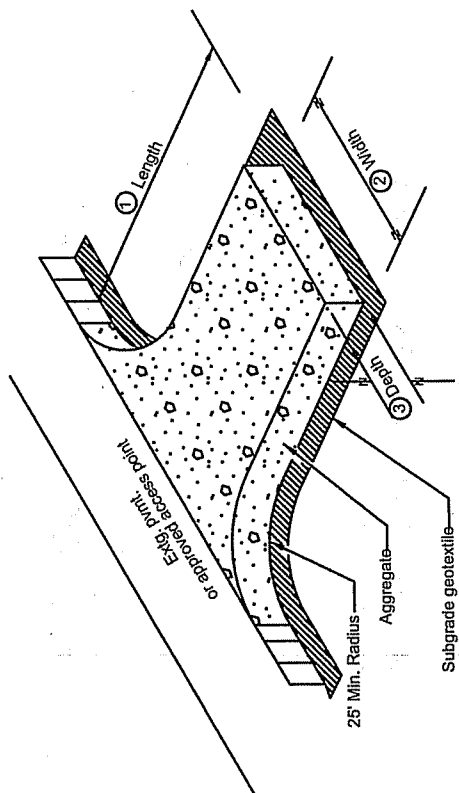
Guthrie

TRAFFIC CONTROL PLANS
SIGNAL INSTALLATIONS AND INTERSECTIONS

DATE: 2009
REVISIONS: DESCRIPTION

TEMPORARY SIGN SUPPORT ON
CONCRETE MEDIAN BARRIER DETAIL



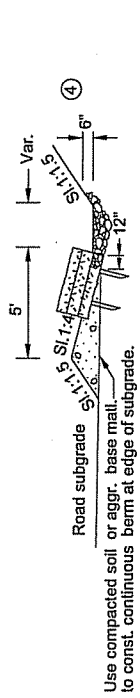


Notes:

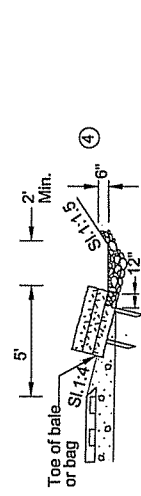
- ① Length: 50' min. - for less than 1 acre exposed soil
100' min. - for greater than 1 acre exposed soil
- ② Width: 20' - or width of extg. approach, whichever is greater.
- ③ Depth: 8' min

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

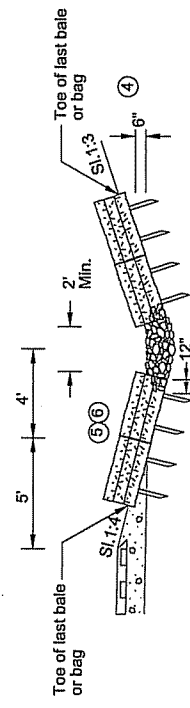
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.		<i>Guthrie</i>	
		CONSTRUCTION ENTRANCES	
2009		REVISIONS	
DATE		DESCRIPTION	



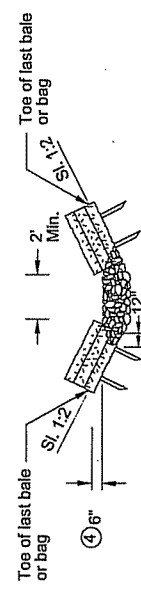
SUBGRADE SECTION



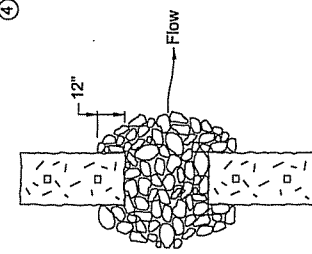
STEEP BACKSLOPE SECTION



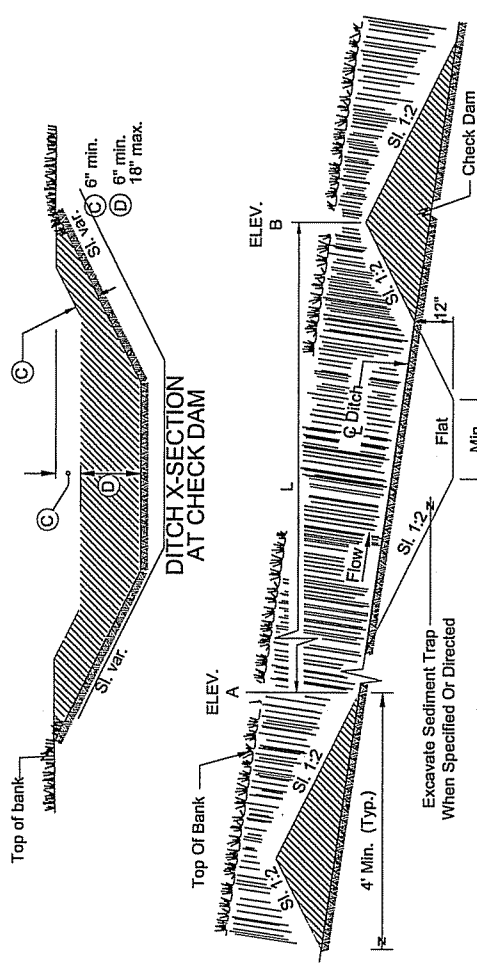
VARIABLE BACKSLOPE SECTION - 1:3 TO 1:6



FLAT BOTTOM DITCH SECTION
CHECK DAM
TYPE 2, 3 & 4



TOP VIEW
TYPE 2, 3 & 4



DITCH X-SECTION AT CHECK DAM

DITCH PROFILE SECTION
CHECK DAM
Typical

Note: When bid item is "Check Dams" the following materials may be used, as appropriate to meet the functional requirements of the control.

Type 1: aggregate
Type 2: straw bales with aggregate weir
Type 3: biofilter bags
Type 4: sand bags
Type 5: prelab. check dam system

Notes:

- 1) Type 2 only -----
Entrench bales and aggr. a min. of 4" into the soil. Toe of last bale is highest water control point.
- 2) Type 2 only -----
Place bales so wire/twine binding mail. is not in contact with the soil.
- 3) Type 2 or 3 -----
Drive 2 stakes min. per bale or bag flush with top and into undisturbed ground a min. of 4". Stakes may be omitted if placed over paved surfaces.
- 4) Type 2, 3 or 4 -----
Const. top of aggr. a min. of 6" lower than the toe of last bale or bag.
- 5) Type 2 or 4 -----
Tightly abut or overlap ends of bales or bags at each joint.
- 6) Type 3 -----
Overlap bags 6" min. at each joint.

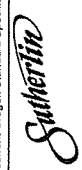
Construct all Check Dams as shown for typical. Use alternate mail. as appropriate for type of Check Dam selected.

CHECK DAM
Approximate Spacing

Ditch Grade	D = Dimension	18"
6%	6"	12'
5%	15' O.C.	25' O.C.
4%	20'	30'
3%	25'	40'
2%	30'	50'
	50'	80'

** Not Allowed

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

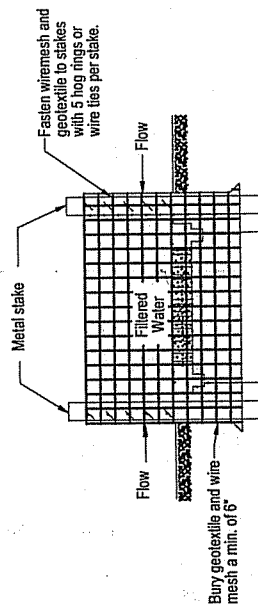
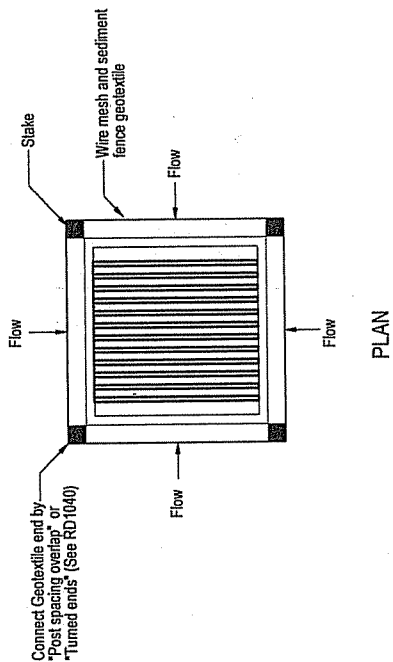


CHECK DAMS

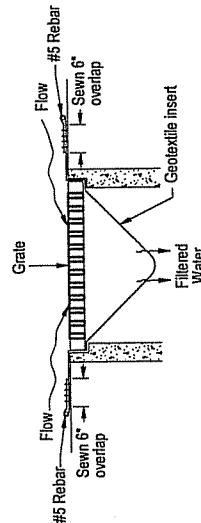
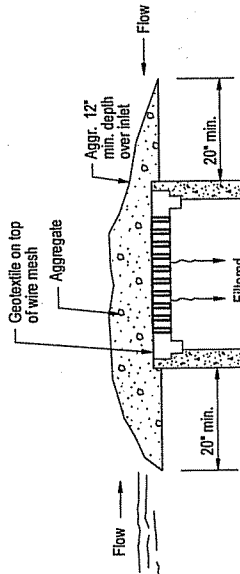
2009
REVISIONS
DESCRIPTION

DATE

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.



- Note:
- Type 1 Sediment Fence
 - Type 2 Geotextile/wire mesh/aggregate
 - Type 3 Prefabricated filter insert
 - Type 4 Biofilter bags
 - Type 5 Masonry/aggregate
 - Type 6 Sod



INLET PROTECTION						
Site Conditions Where Types Are Appropriate	TYPE					
	1	2	3	4	5	6
Area Drain, Soil	Y	Y	Y	Y	Y	Y
Area Drain, Pavement	N	Y	Y	Y	Y	N
Ditch Inlet, Soil	Y	N	Y	Y	N	Y
Ditch Inlet, Pavement	N	N	Y	Y	N	N
Grate Inlet Along Curb, Soil	N	Y	Y	Y	Y	Y
Grate Inlet Along Curb, Pavement	N	Y	Y	Y	Y	N
Curb Opening Inlet, Soil	N	N	N	Y	Y	Y
Curb Opening Inlet, Pavement	N	N	N	Y	Y	N

For Inlet Protection Types 4 and 5 see RD1015 and RD1020.

PREFABRICATED FILTER INSERT

TYPE 3

ELEVATION SEDIMENT FENCE TYPE 1

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

Guthrie

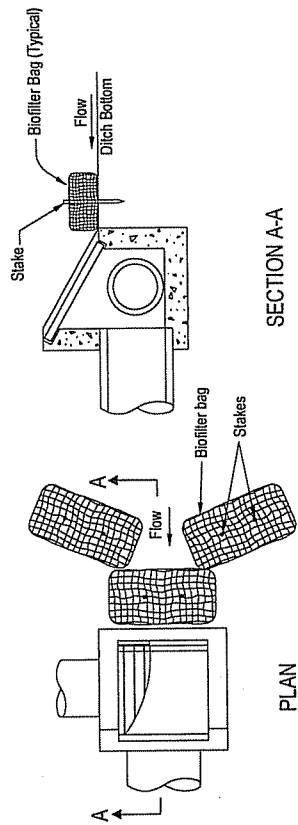
INLET PROTECTION
(TYPE 1, 2, & 3)

2009
REVISION
DESCRIPTION

DATE

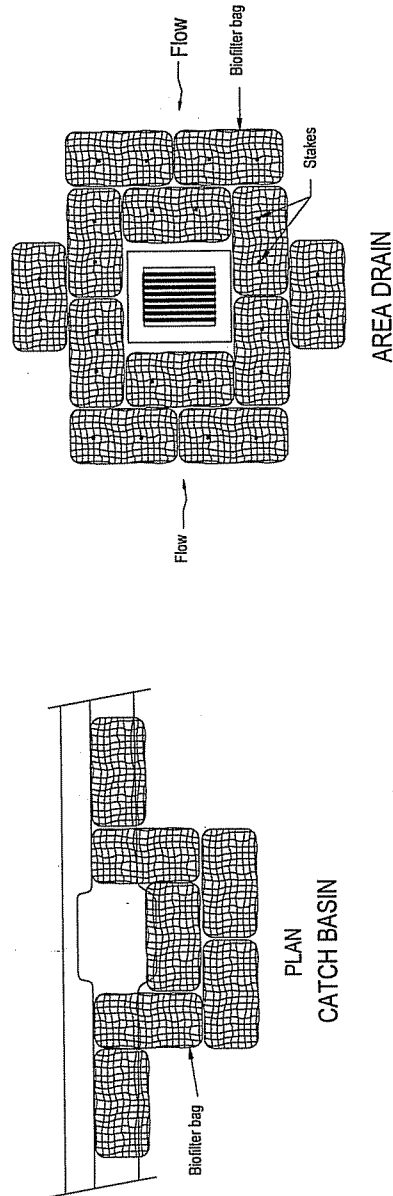
RD1010

RD1010

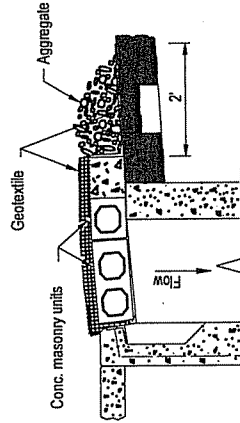
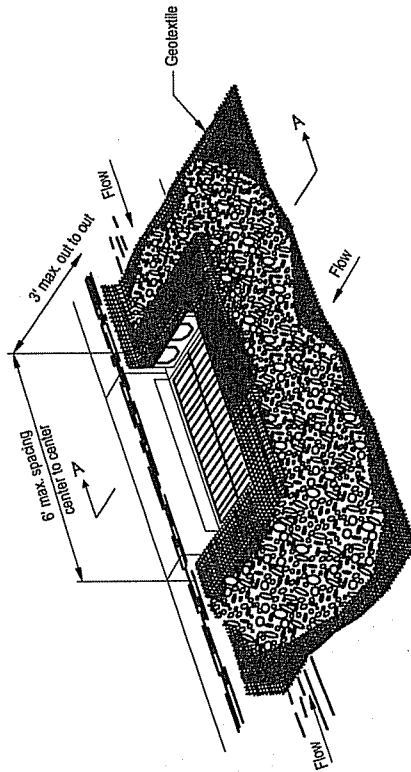


DITCH INLET

- Note:
1. Use 2 stakes per bag. Stakes may be omitted if bags are placed on pavement surface.
 2. Overlap all bag joints 6".

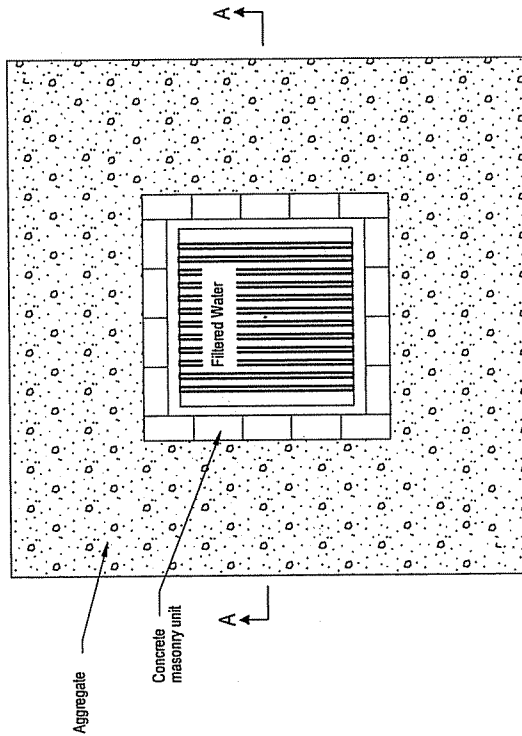


The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.		NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications	
Sutherland		INLET PROTECTION (TYPE 4) BIOFILTER BAGS 2009	
DATE	REVISIONS	DESCRIPTION	

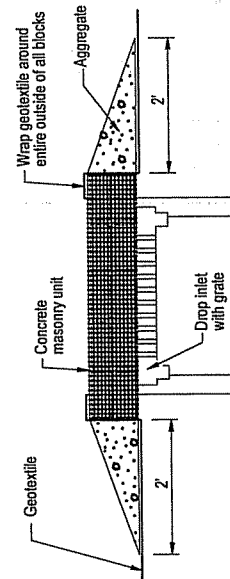


SECTION A-A
CURB PROTECTION

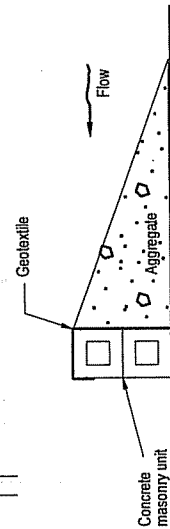
- Notes:
1. Tightly abut ends of masonry units.
 2. Overlap geotextile seams 10" min.



Plan



SECTION A-A
AREA DRAIN

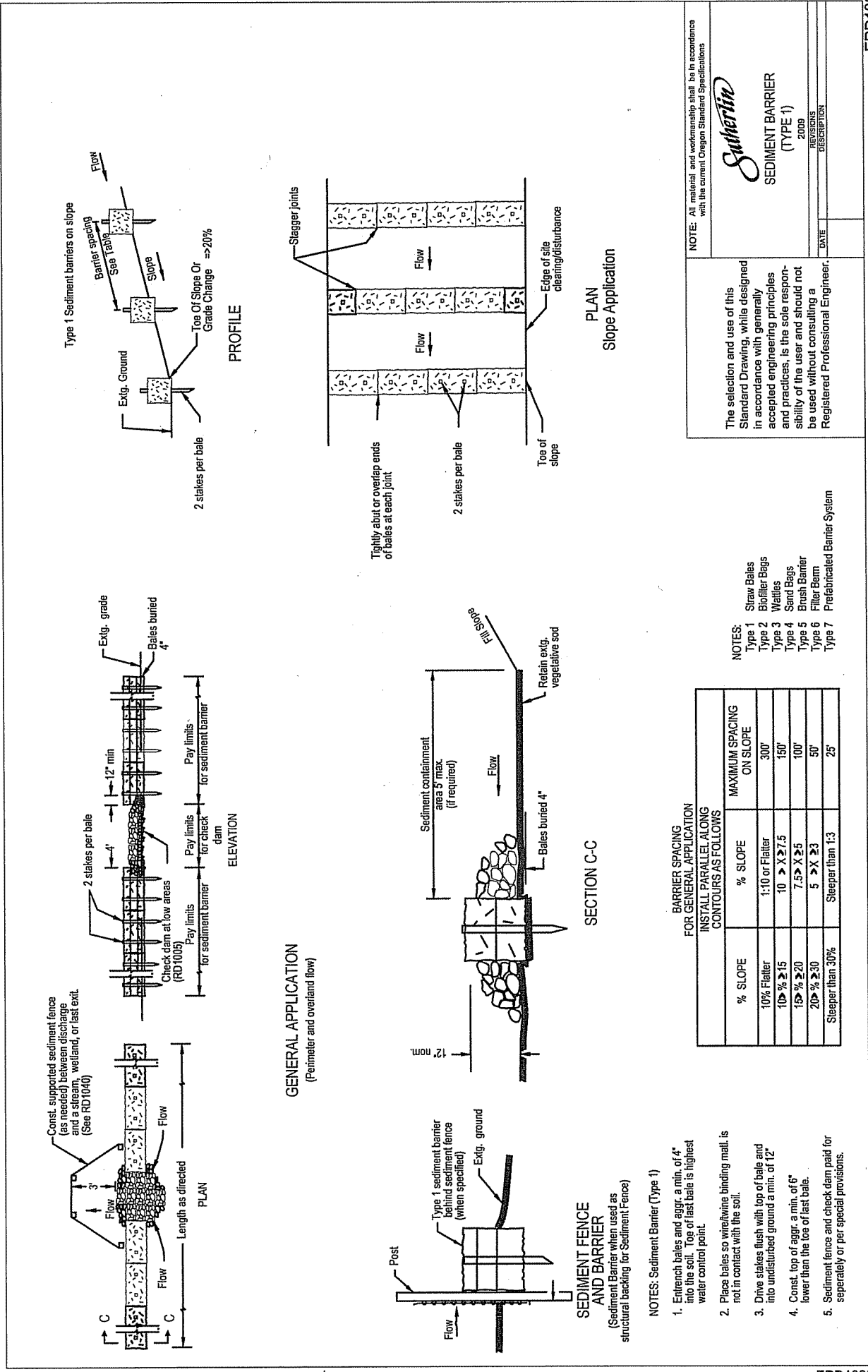


SECTION A-A
AREA DRAIN

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications.

<i>Sutherland</i> INLET PROTECTION (TYPE 5) MASONRY/AGGREGATE 2009	
REVISIONS	DESCRIPTION
DATE	

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.



GENERAL APPLICATION
(Perimeter and overland flow)

SEDIMENT FENCE AND BARRIER
(Sediment Barrier when used as structural backing for Sediment Fence)

NOTES: Sediment Barrier (Type 1)

1. Entrench bales and aggr. a min. of 4" into the soil. Top of last bale is highest water control point.
2. Place bales so wiretwine binding mat. is not in contact with the soil.
3. Drive stakes flush with top of bale and into undisturbed ground a min. of 12".
4. Const. top of aggr. a min. of 6" lower than the toe of last bale.
5. Sediment fence and check dam paid for separately or per special provisions.

BARRIER SPACING
FOR GENERAL APPLICATION
INSTALL PARALLEL ALONG
CONTOURS AS FOLLOWS

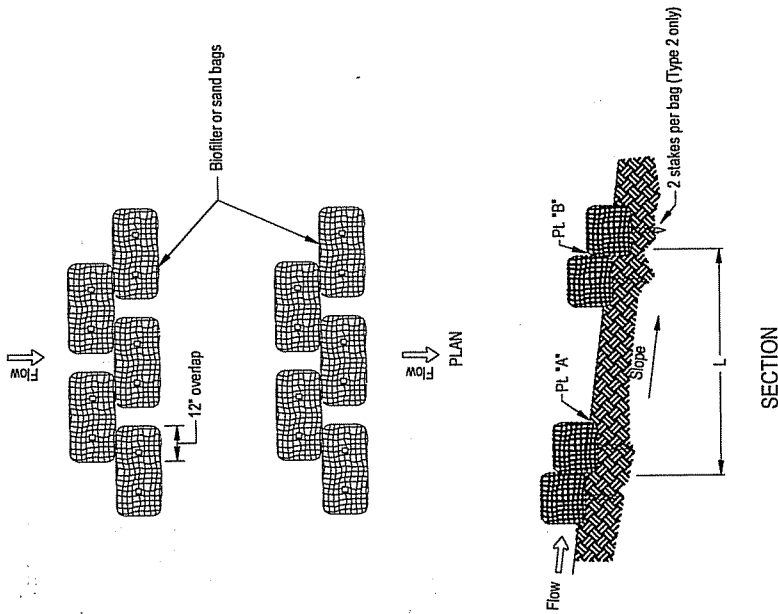
% SLOPE	% SLOPE	MAXIMUM SPACING ON SLOPE
10% Flatter	1:10 or Flatter	300'
10% > 15%	10 > X ≥ 7.5	150'
15% > 20%	7.5 > X ≥ 5	100'
20% > 30%	5 > X ≥ 3	50'
Steeper than 30%	Steeper than 1:3	25'

- NOTES:
- Type 1 Straw Bales
 - Type 2 Biodegradable Bales
 - Type 3 Walles
 - Type 4 Sand Bags
 - Type 5 Brush Barrier
 - Type 6 Filter Berm
 - Type 7 Prefabricated Barrier System

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

Sutherland
SEDIMENT BARRIER
(TYPE 1)
2009
REVISION
DESCRIPTION



- Notes:
1. Drive stakes flush with top of bag and into undisturbed ground a min. of 12". (Type 2 only). Stake may be omitted if bags are placed on paved surface.
 2. Space bags (L) so Points "A" and "B" are of equal elevation.
 3. Type 2 uses Biofilter Bags
Type 4 uses Sandbags

BARRIER SPACING
FOR GENERAL APPLICATION
INSTALL PARALLEL ALONG
CONTOURS AS FOLLOWS

% SLOPE	% SLOPE	MAXIMUM SPACING ON SLOPE
10% Flatter	1:10 or Flatter	300'
10% ≥ 15	10 $\geq$ X ≥ 7.5	150'
15% ≥ 20	7.5 $\geq$ X ≥ 5	100'
20% ≥ 30	5 $\geq$ X ≥ 3	50'
Sleeper than 30%	Sleeper than 1:3	25'

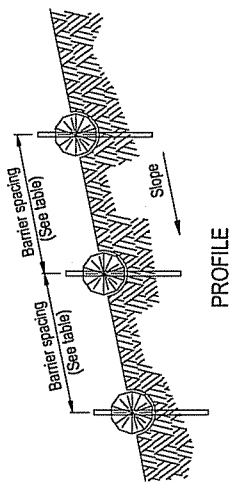
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

Guthrie

SEDIMENT BARRIER (TYPE 2 & 4)
BIOFILTER OR SANDBAGS

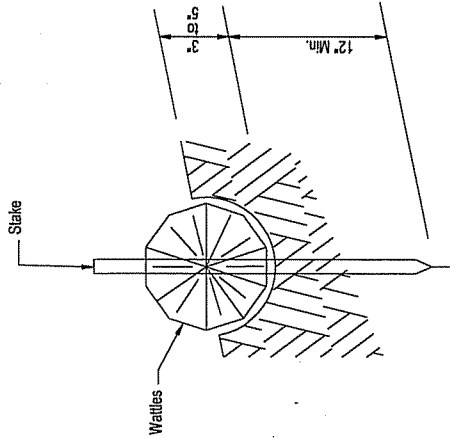
2009

REVISIONS	DESCRIPTION
DATE	

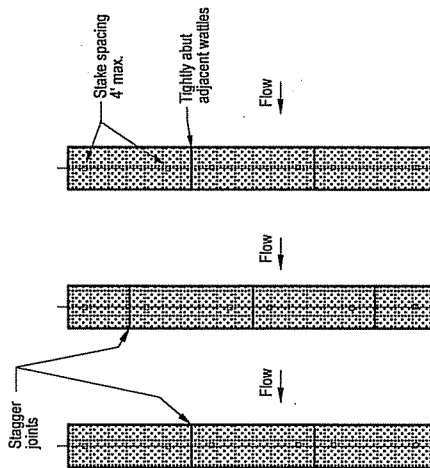


PROFILE

Place wattles along slope contours.



SECTION



PLAN

BARRIER SPACING
FOR GENERAL APPLICATION
INSTALL PARALLEL ALONG
CONTOURS AS FOLLOWS

% SLOPE	% SLOPE	MAXIMUM SPACING ON SLOPE
10% Flatter	1:10 or Flatter	300'
10% $\geq$ 15	10 $\geq$ X $\geq$ 7.5	150'
15% $\geq$ 20	7.5 $\geq$ X $\geq$ 5	100'
20% $\geq$ 30	5 $\geq$ X $\geq$ 3	50'
Sleeper than 30%	Sleeper than 1:3	25'

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

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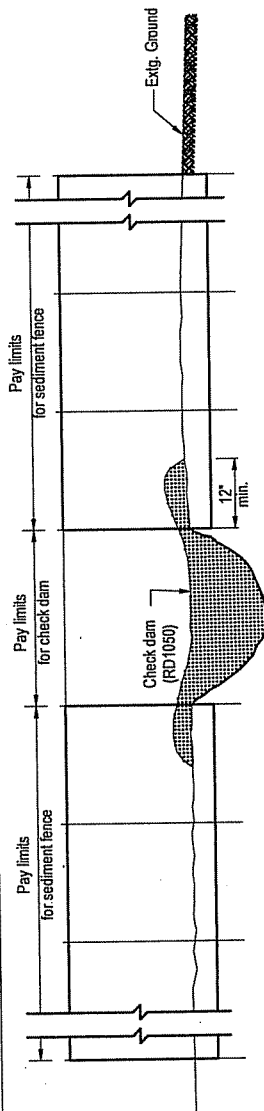
Guthrie

SEDIMENT BARRIER
(TYPE 3)

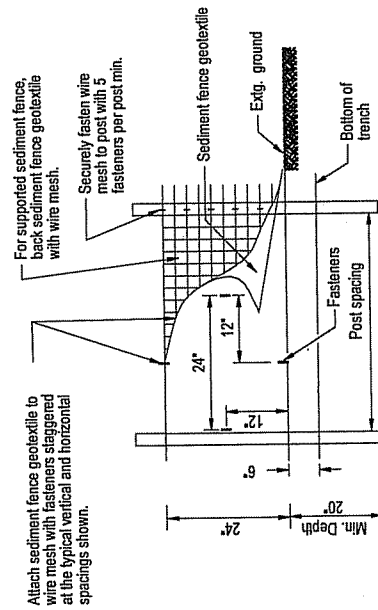
2009

REVISIONS
DESCRIPTION

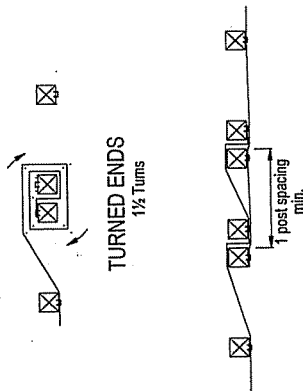
DATE



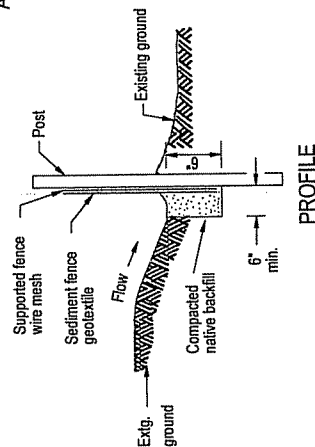
AT DITCH SECTION
OR LOW AREAS



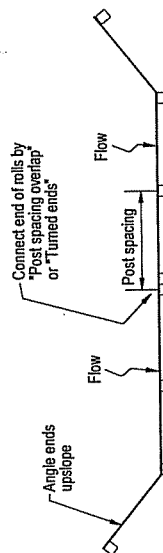
ELEVATION



POST SPACING OVERLAP
GEOTEXTILE END CONNECTIONS



PROFILE

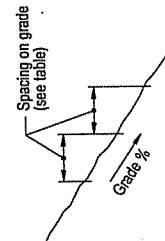


PLAN

FENCE SPACING
FOR GENERAL APPLICATION

GRADE	MAXIMUM SPACING ON GRADE
Grade $\leq$ 10%	300'
10% $\leq$ Grade $\leq$ 15%	150'
15% $\leq$ Grade $\leq$ 20%	100'
20% $\leq$ Grade $\leq$ 30%	50'
30% $\leq$ Grade	25'

POST SPACING	
4'	Supported Sediment Fence
4'	Unsupported Sediment Fence with Geotextile elongation $\geq$ 50%
6'	Unsupported Sediment Fence with Geotextile elongation $\geq$ 50%



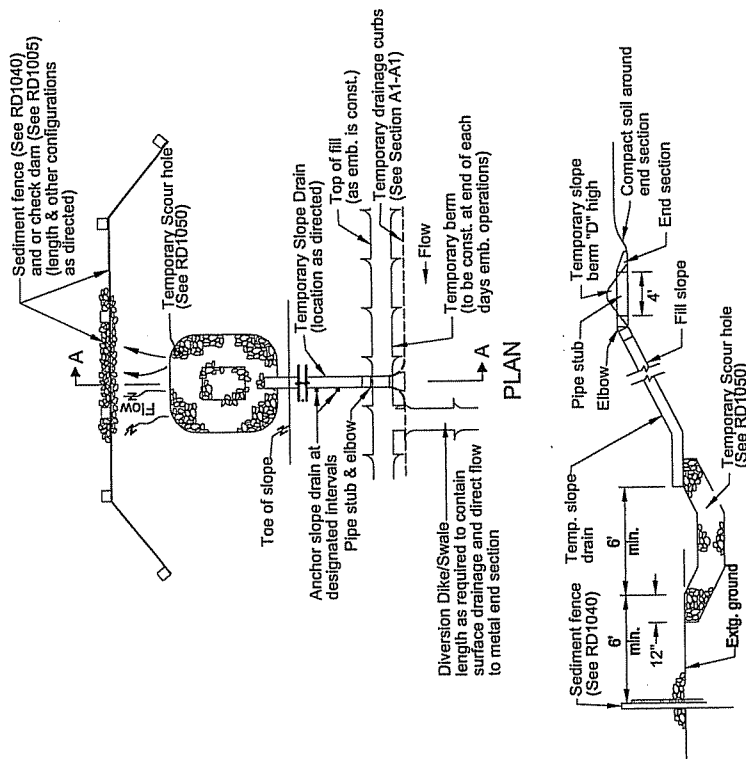
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

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SEDIMENT FENCE, SUPPORTED
SEDIMENT FENCE, UNSUPPORTED

DATE _____
REVISIONS _____
DESCRIPTION _____



Notes:

1. Temporary Slope Drains shall be used at the top of fill slopes as the embankment is constructed to prevent erosion
2. Temporary Drainage Curbs shall be used in conjunction with Temporary Slope Drains to prevent erosion on completed slopes.
3. All dimensions not indicated will be as directed.

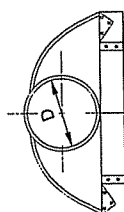
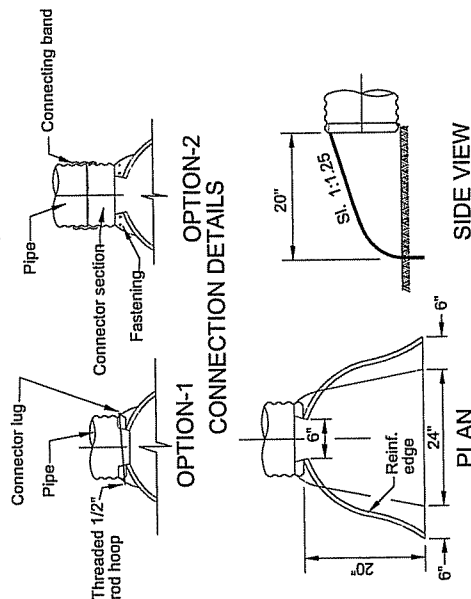
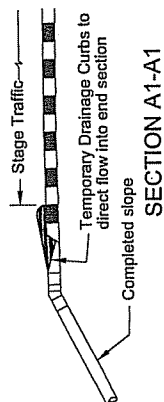
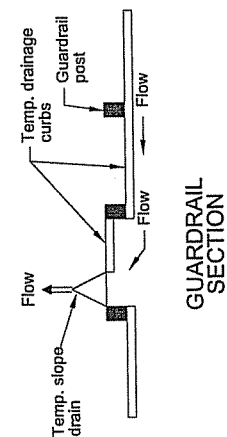


TABLE FOR PIPE SIZE		
PIPE Slope (min.)	PIPE D in. (min.)	CONTRIBUTING AREA TO SLOPE DRAIN (sqft)
3.8%	6	A < 200
2.5%	8	200 ≤ A < 500
1.9%	10	500 ≤ A < 850
1.5%	12	850 ≤ A < 1400
-	SPECIAL DESIGN REQ.	1400 ≤ A

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

Sutherland

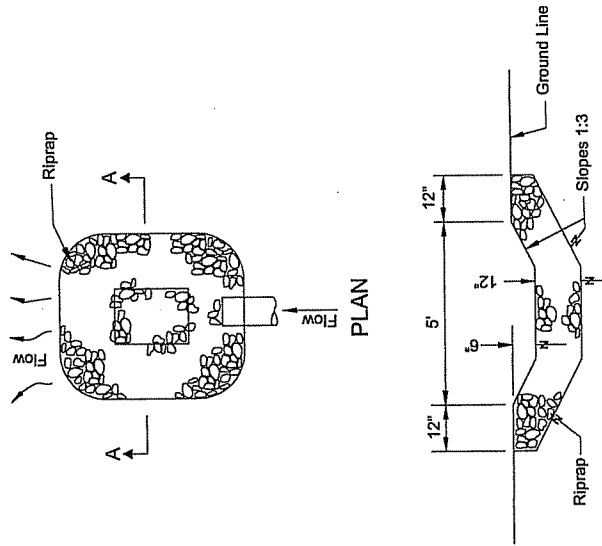
TEMPORARY SLOPE DRAINS

2009
REVISIONS
DESCRIPTION

DATE

RD1045

RD1045



SECTION A-A

NOTES:
All dimensions not indicated
will be as directed.

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

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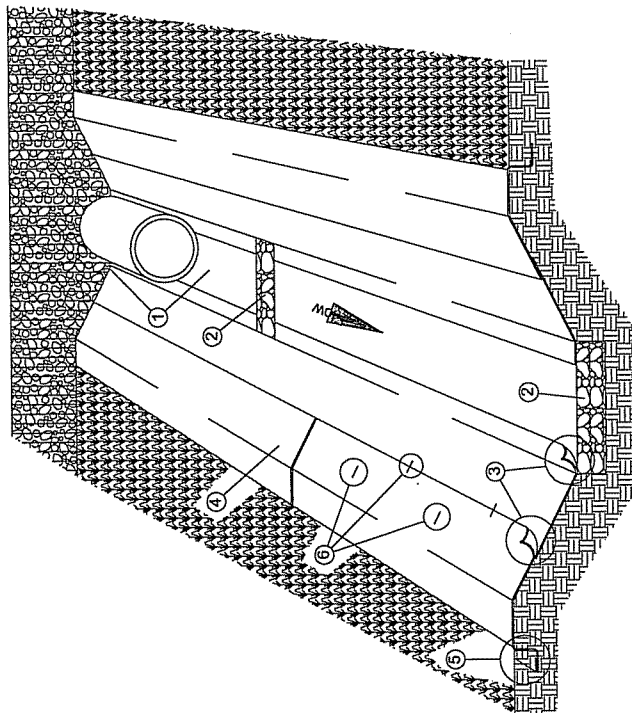
Guthrie

TEMPORARY SCOUR HOLE

2009
REVISION
DESCRIPTION

DATE

RD1050



CHANNEL APPLICATION

All applications

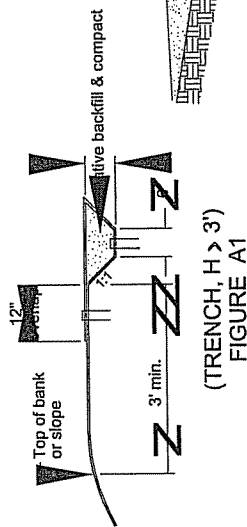
All information shown is minimum criteria for mating installation. All manufacturer's recommendations which are more stringent must be applied.

Channel application:

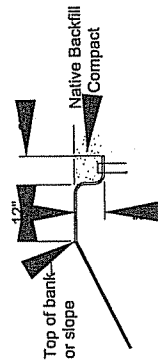
- ① Install mat in center of channel, in the direction of water flow. Anchor upstream end of mat with check slot (Fig. B1 & A4). Backfill check slot with rock. For culvert outfalls, place mat under pipe 12" minimum upstream from pipe outlet.
- ② Construct check slots across channel bottom at 50' spacings and at the end of each mat (Fig. A4). Fasten mat at bottom of check slot (Fig. A4 & B1). Backfill check slot with rock.
- ③ Overlap side channel mat edges 6" over the center channel mat and fasten edges 12" O.C. (Fig. B2). Continue overlap and stapling pattern for each additional side mat.
- ④ Lap upstream mat end 12" over beginning edge of downstream mat. fasten 12' O.C. (Fig. B3).
- ⑤ Anchor top edge of side channel mats in trench and fasten 12' O.C. (Fig. A2 & B1)
- ⑥ Fasten mat interior at 24" O.C. staggered spacing.

Slope application:

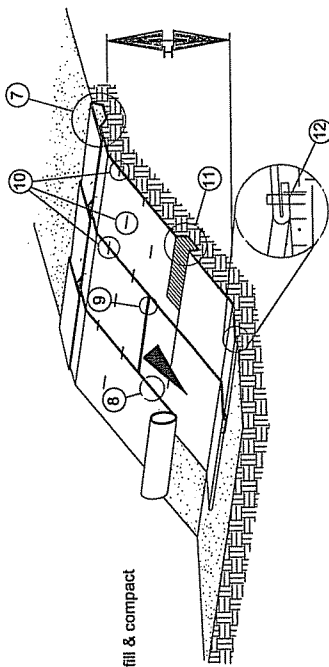
- ⑦ Anchor matting at top of slope (Fig. A1 & A2). Fasten in trench and at overlap 12" O.C. (Fig. B1)
- ⑧ Overlap mat edges 6", and fasten (Fig. B2). Install matting so edge overlaps are shingled away from prevailing winds. Fasten edges 24" O.C.
- ⑨ Overlap mat ends 12", upper mat over lower mat, and fasten (Fig. B3).
- ⑩ Stagger alternate rows of fasteners placed at 24" O.C.
- ⑪ Construct check slot when specified or as recommended by the manufacturer (Fig A3). Fasten mat in bottom of check slot (Fig. A3 & B1)
- ⑫ Extend mat 24" beyond toe of slope; fold mat back under 4" and fasten (Fig. B1)



(TRENCH, H > 3')
FIGURE A1



(TRENCH, $H \leq 3'$)
FIGURE A2



SLOPE APPLICATION

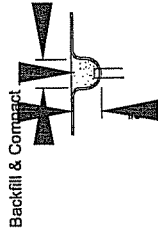
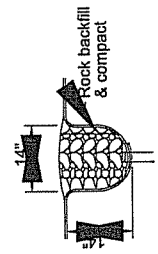
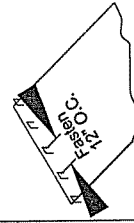
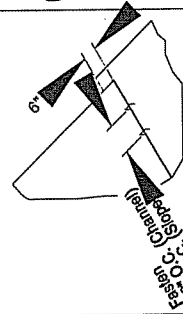
(CHECK SLOT, SL
FIGURE A3

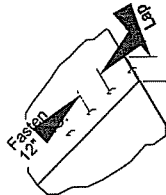
FIGURE A4
K SLOT, CHANNEL)



(BEGINNING EDGE)
FIGURE B1



(EDGE LAPS)
FIGURE B2



(END LAPS)
FIGURE B3

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

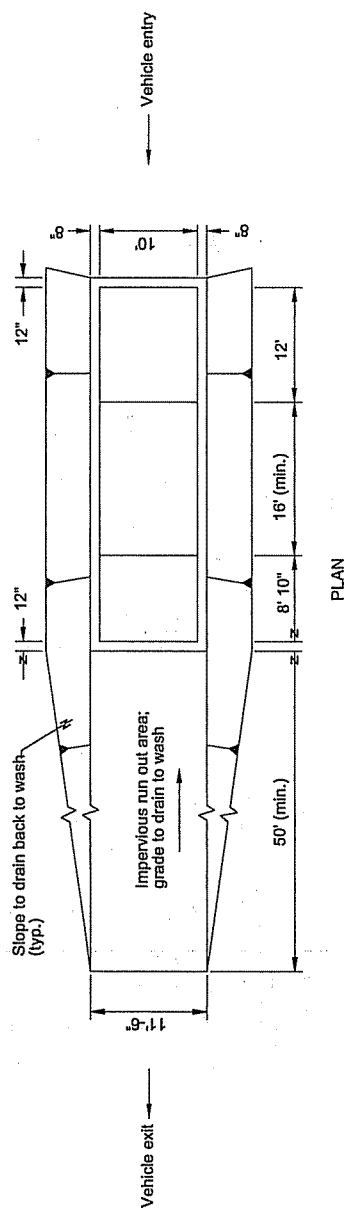
Sutherland

MATTING

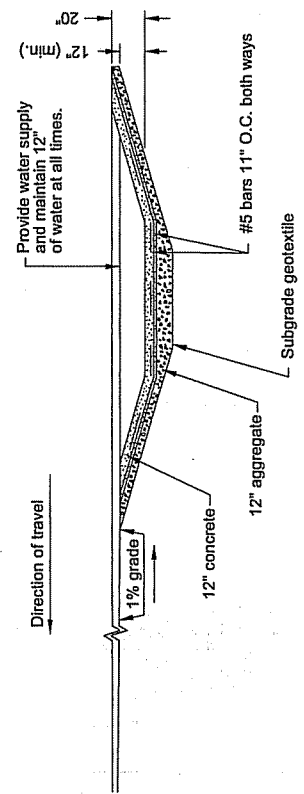
200

REVISIONS	DESCRIPTION
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The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.



PLAN



SECTION

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

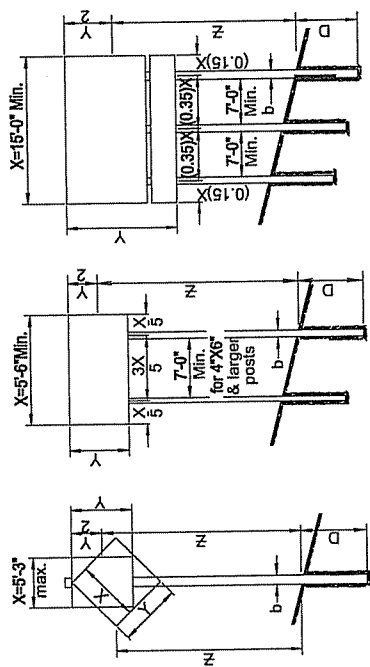
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

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TIRE WASH FACILITY (TYPE 1)

2009

REVISIONS	DESCRIPTION	DATE

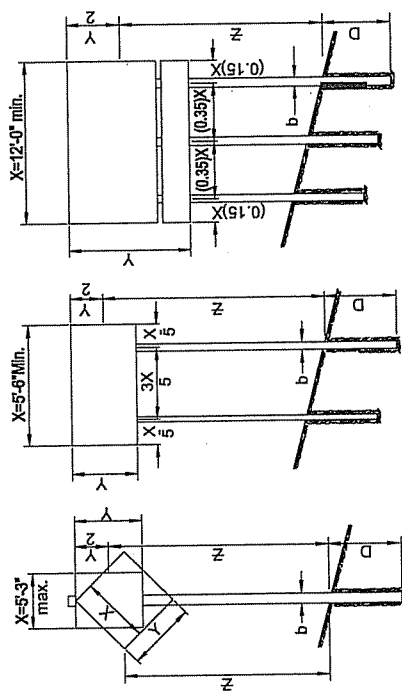


X and Y are the dimensions of the rectangle enclosing all the signs.
Z is the height from groundline to the midpoint of the sign rectangle at the longest post.
D is the minimum post imbedment depth.
b is the smaller dimension of the post.
For horizontal and vertical clearances refer to T.M.S. Dwg. No. TM200.

1. 4" x 6" Posts shall have 1-1/2" diameter transverse holes drilled through them at 4" and 18" above ground level.
For Multi-post installations, drill additional 1-1/2" diameter transverse holes in each post at 4" and 18" below the bottom edge of the sign.
2. 6" x 6" Posts shall have 2" diameter transverse holes drilled through them at 4" and 18" above ground level.
For Multi-post installations, drill additional 2" diameter transverse holes in each post at 4" and 18" below the bottom edge of the sign.
3. 6" x 8" Posts shall have 3" diameter transverse holes drilled through them at 4" and 18" above ground level.
For Multi-post installations, drill additional 3" diameter transverse holes in each post at 4" and 18" below the bottom edge of the sign.

PERMANENT SIGNS

POST SIZE AND MOUNTING HEIGHT FOR SIGNS NOT PROTECTED BY BARRIER OR GUARDRAIL DOUGLAS FIR, WEST COAST HEMLOCK, OR UNTREATED PORT ORFORD CEDAR



X and Y are the dimensions of the rectangle enclosing all the signs.
Z is the height from groundline to the midpoint of the sign rectangle at the longest post.
D is the minimum post imbedment depth.
b is the smaller dimension of the post.
For horizontal and vertical clearances refer to T.M.S. Dwg. No. TM200.

PERMANENT SIGNS

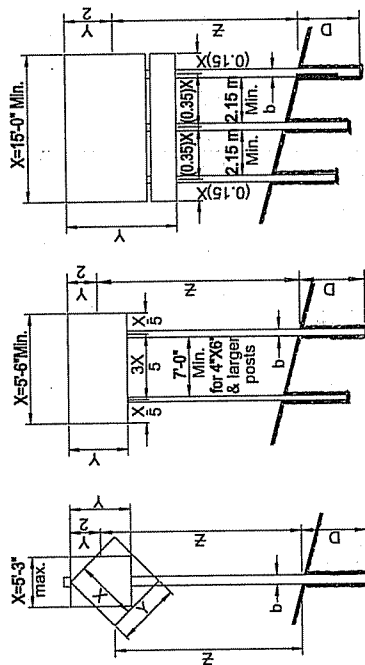
POST SIZE AND MOUNTING HEIGHT FOR SIGNS LOCATED BEHIND BARRIER OR GUARDRAIL DOUGLAS FIR, WEST COAST HEMLOCK, OR UNTREATED PORT ORFORD CEDAR

Note: 4" x 4" posts should not be used in snow plow areas.

Wood Posts Are Available In The Following Commercial Lengths: 12', 14', 16', 18', 20', 22', 24', 26'

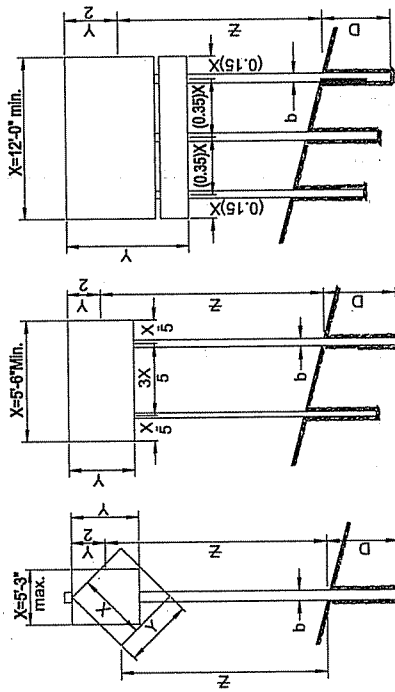
(X x Y) in FT ²		1		2		3		D	
POST SIZE	NO. OF POSTS	4" x 4"		4" x 6"		6" x 6"		6" x 8"	
		1	2	1	2	1	2	1	2
		80	160	240	480	270	540	360	720
		140	280	420	840	410	820	560	1120
		205	410	615	1230	615	1230	820	1640
		270	540	810	1620	810	1620	1080	2160
		335	670	1005	2010	1005	2010	1340	2680
		400	800	1200	2400	1200	2400	1600	3200
		465	930	1395	2790	1395	2790	1860	3720
		530	1060	1590	3180	1590	3180	2120	4240
		595	1190	1795	3590	1795	3590	2380	4760
		660	1320	1995	3990	1995	3990	2640	5280
		725	1450	2195	4390	2195	4390	2900	5800
		790	1580	2395	4790	2395	4790	3160	6320
		855	1710	2595	5190	2595	5190	3420	6840
		920	1840	2795	5590	2795	5590	3680	7360
		985	1970	2995	5990	2995	5990	3940	7880
		1050	2100	3195	6390	3195	6390	4200	8400
		1115	2230	3395	6790	3395	6790	4460	8920
		1180	2360	3595	7190	3595	7190	4720	9440
		1245	2490	3795	7590	3795	7590	4980	9960
		1310	2620	3995	7990	3995	7990	5240	10480
		1375	2750	4195	8390	4195	8390	5500	11000
		1440	2880	4395	8790	4395	8790	5760	11520
		1505	3010	4595	9190	4595	9190	6020	12040
		1570	3140	4795	9590	4795	9590	6280	12560
		1635	3270	4995	9990	4995	9990	6540	13080
		1700	3400	5195	10390	5195	10390	6800	13600
		1765	3530	5395	10790	5395	10790	7060	14120
		1830	3660	5595	11190	5595	11190	7320	14640
		1895	3790	5795	11590	5795	11590	7580	15160
		1960	3920	5995	11990	5995	11990	7840	15680
		2025	4050	6195	12390	6195	12390	8100	16200
		2090	4180	6395	12790	6395	12790	8360	16720
		2155	4310	6595	13190	6595	13190	8620	17240
		2220	4440	6795	13590	6795	13590	8880	17760
		2285	4570	6995	13990	6995	13990	9140	18280
		2350	4700	7195	14390	7195	14390	9400	18800
		2415	4830	7395	14790	7395	14790	9660	19320
		2480	4960	7595	15190	7595	15190	9920	19840
		2545	5090	7795	15590	7795	15590	10180	20360
		2610	5220	7995	15990	7995	15990	10440	20880
		2675	5350	8195	16390	8195	16390	10700	21400
		2740	5480	8395	16790	8395	16790	10960	21920
		2805	5610	8595	17190	8595	17190	11220	22440
		2870	5740	8795	17590	8795	17590	11480	22960
		2935	5870	8995	17990	8995	17990	11740	23480
		3000	6000	9195	18390	9195	18390	12000	24000
		3065	6130	9395	18790	9395	18790	12260	24520
		3130	6260	9595	19190	9595	19190	12520	25040
		3195	6390	9795	19590	9795	19590	12780	25560
		3260	6520	9995	19990	9995	19990	13040	26080
		3325	6650	10195	20390	10195	20390	13300	26600
		3390	6780	10395	20790	10395	20790	13560	27120
		3455	6910	10595	21190	10595	21190	13820	27640
		3520	7040	10795	21590	10795	21590	14080	28160
		3585	7170	10995	21990	10995	21990	14340	28680
		3650	7300	11195	22390	11195	22390	14600	29200
		3715	7430	11395	22790	11395	22790	14860	29720
		3780	7560	11595	23190	11595	23190	15120	30240
		3845	7690	11795	23590	11795	23590	15380	30760
		3910	7820	11995	23990	11995	23990	15640	31280
		3975	7950	12195	24390	12195	24390	15900	31800
		4040	8080	12395	24790	12395	24790	16160	32320
		4105	8210	12595	25190	12595	25190	16420	32840
		4170	8340	12795	25590	12795	25590	16680	33360
		4235	8470	12995	25990	12995	25990	16940	33880
		4300	8600	13195	26390	13195	26390	17200	34400
		4365	8730	13395	26790	13395	26790	17460	34920
		4430	8860	13595	27190	13595	27190	17720	35440
		4495	8990	13795	27590	13795	27590	17980	35960
		4560	9120	13995	27990	13995	27990	18240	36480
		4625	9250	14195	28390	14195	28390	18500	37000
		4690	9380	14395	28790	14395	28790	18760	37520
		4755	9510	14595	29190	14595	29190	19020	38040
		4820	9640	14795	29590	14795	29590	19280	38560
		4885	9770	14995	29990	14995	29990	19540	39080
		4950	9900	15195	30390	15195	30390	19800	39600
		5015	10030	15395	30790	15395	30790	20060	40120
		5080	10160	15595	31190	15595	31190	20320	40640
		5145	10290	15795	31590	15795	31590	20580	41160
		5210	10420	15995	31990	15995	31990	20840	41680
		5275	10550	16195	32390	16195	32390	21100	42200
		5340	10680	16395	32790	16395	32790	21360	42720
		5405	10810	16595	33190	16595	33190	21620	43240
		5470	10940	16795	33590	16795	33590	21880	43760
		5535	11070	16995	33990	16995	33990	22140	44280
		5600	11200	17195	34390	17195	34390	22400	44800
		5665	11330	17395	34790	17395	34790	22660	45320
		5730	11460	17595	35190	17595	35190	22920	45840
		5795	11590	17795	35590	17795	35590	23180	46360
		5860	11720	17995	35990	17995	35990	23440	46880
		5925	11850	18195	36390	18195	36390	23700	47400
		5990	11980	18395	36790	18395	36790	23960	47920
		6055	12110	18595	37190	18595	37190	24220	48440
		6120	12240	18795	37590	18795	37590	24480	48960
		6185	12370	18995	37990	18995	37990	24740	49480
		6250	12500	19195	38390	19195	38390	25000	50000
		6315	12630	19395	38790	19395	38790	25260	50520
		6380	12760	19595	39190	19595	39190	25520	51040
		6445	12890	19795	39590	19795	39590	25780	51560
		6510	13020	19995	39990	19995	39990	26040	52080
		6575	13150	20195	40390	20195	40390	26300	52600
		6640	13280	20395	40790	20395	40790	26560	53120
		6705	13410	20595	41190	20595	41190	26820	53640
		6770	13540	20795	41590	20795	41590	27080	54160
		6835	13670	20995	41990	20995	41990	27340	54680
		6900	13800	21195	42390	21195	42390	27600	55200
		6965	13930	21395	42790	21395	42790	27860	55720
		7030	14060	21595	43190	21595	43190	28120	56240
		7095	14190	21795	43590	21795	43590	28380	56760
		7160	14320	21995	43990	21995	43990	28640	57280
		7225	14450	22195	44390	22195	44390	28900	57800
		7290	14580	22395	44790	22395	44790	29160	58320
		7355	14710	22595	45190	22595	45190	29420	58840
		7420	14840	22795	45590	22795	45590	29680	59360
		7485	14970	22995	45990	22995	45990	29940	59880
		7550	15100	23195	46390	23195	46390	30200	60400
		7615	15230	23395	46790	23395	46790	30460	60920
		7680	15360	23595	47190	23595	47190	30720	61440
		7745	15490	23795	47590	23795	47590	30980	61960
		7810	15620	23995	47990	23995	47990	31240	62480
		7875	15750	24195					

X and Y are the dimensions of the rectangle enclosing all the signs.
Z is the height from groundline to the midpoint of the sign rectangle at the longest post.
D is the minimum post imbedment depth, b is the smaller dimension of the post.
For horizontal and vertical clearances refer to T.M.S. Dwg. No. TM200.



1. 4" x 6" Posts shall have 1-1/2" diameter transverse holes drilled through them at 4" and 18" above ground level.
For Multi-post installations, drill additional 1-1/2" diameter transverse holes in each post at 4" and 18" below the bottom edge of the sign.
2. 6"x6" Posts shall have 2" diameter transverse holes drilled through them at 4" and 18" above ground level.
For Multi-post installations, drill additional 2" diameter transverse holes in each post at 4" and 18" below the bottom edge of the sign.
3. 6"x8" Posts shall have 3" diameter transverse holes drilled through them at 4" and 18" above ground level.
For Multi-post installations, drill additional 3" diameter transverse holes in each post at 4" and 18" below the bottom edge of the sign.

PERMANENT SIGNS POST SIZE AND MOUNTING HEIGHT FOR SIGNS NOT PROTECTED BY BARRIER OR GUARDRAIL UNTREATED WESTERN CEDAR



X and Y are the dimensions of the rectangle enclosing all the signs.
Z is the height from groundline to the midpoint of the sign rectangle at the longest post.
D is the minimum post imbedment depth.
b is the smaller dimension of the post.
For horizontal and vertical clearances refer to T.M.S. Dwg. No. TM200.

NO. OF POSTS		(X-Y-Z) in FT ³			
		1	2	3	D
4"x4"	45	90	135	4-0"	
4"x6"	110	220	330	5-0"	
6"x6"	170	340	510	5-0"	
6"x8"	310	620	930	5-0"	
BSP	BSP	BSP	BSP	BSP	BSP

POST SELECTION

Given a sign 8 ft. wide and 4 ft. high mounted 10 ft. above the ground.
X=8, Y=4, Z=12; (X) (Y) (Z) =384
Use two 6"x6" posts.
Values shown in the table for the product X-Y-Z are the maximum permitted.
BSP = Breakaway Sign Posts; see Bridge Dwg. Nos. BR900, BR903, and BR906 for details.

NO. OF POSTS		(X-Y-Z) in FT ³			
		1	2	3	D
4"x4"	45	90	135	4-0"	
4"x6"	115	230	345	5-0"	
6"x6"	180	360	540	5-0"	
6"x8"	330	660	990	5-0"	
BSP	BSP	BSP	BSP	BSP	BSP

POST SELECTION

Given a sign 6 ft. wide and 3 ft. high mounted 10.5 ft. above the ground.
X=6, Y=3, Z=12; (X) (Y) (Z) = 216
Use two 4"x6" posts.
Values shown in the table for the product X-Y-Z are the maximum permitted.
BSP = Breakaway Sign Posts; see Bridge Dwg. Nos. BR900, BR903, and BR906 for details.

PERMANENT SIGNS POST SIZE AND MOUNTING HEIGHT FOR SIGNS LOCATED BEHIND BARRIER OR GUARDRAIL UNTREATED WESTERN CEDAR

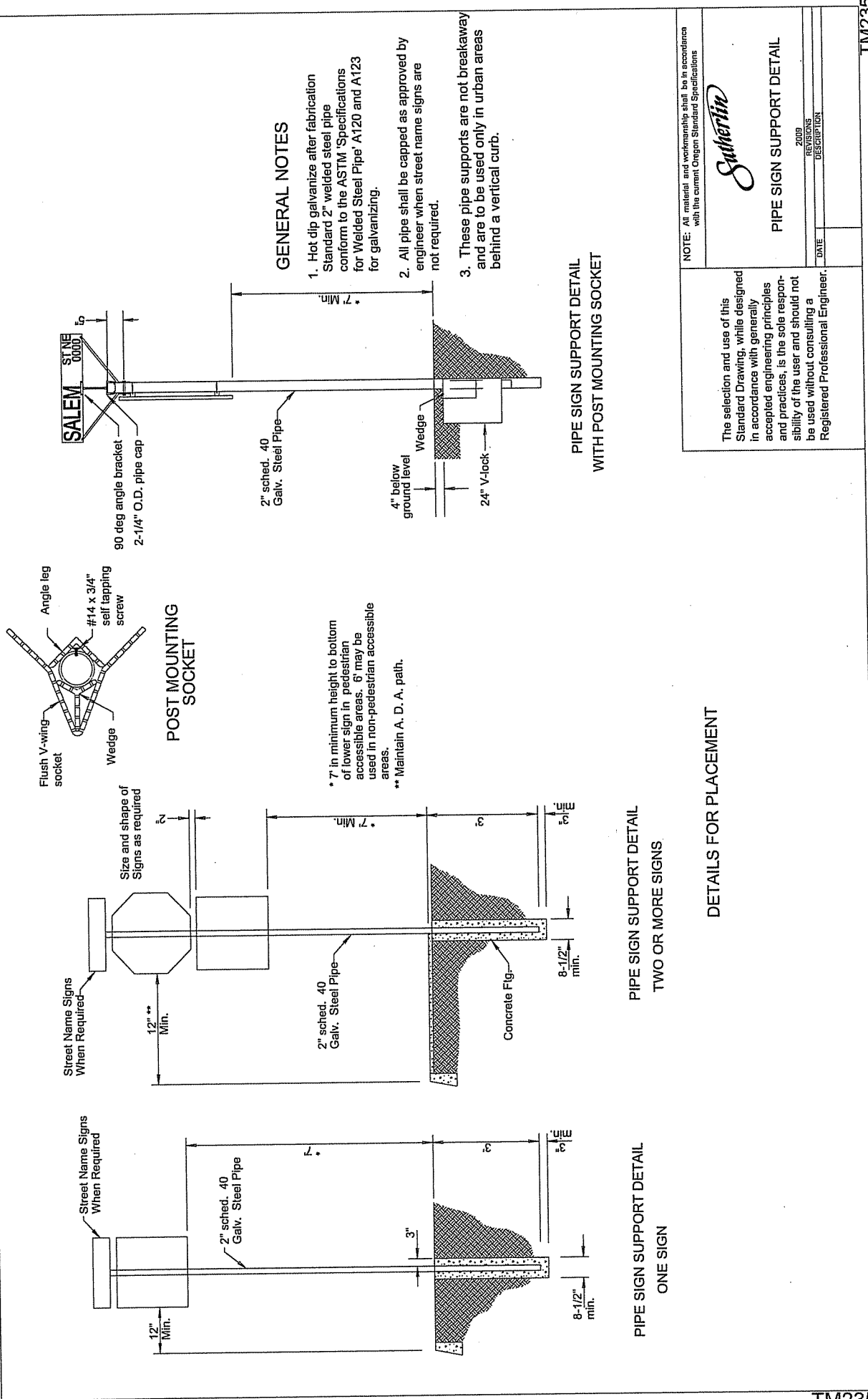
Note: 4" x 4" posts should not be used in snow plow areas.
Wood Posts Are Available In The Following Commercial Lengths: 12', 14', 16', 18', 20', 22', 24', 26'

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

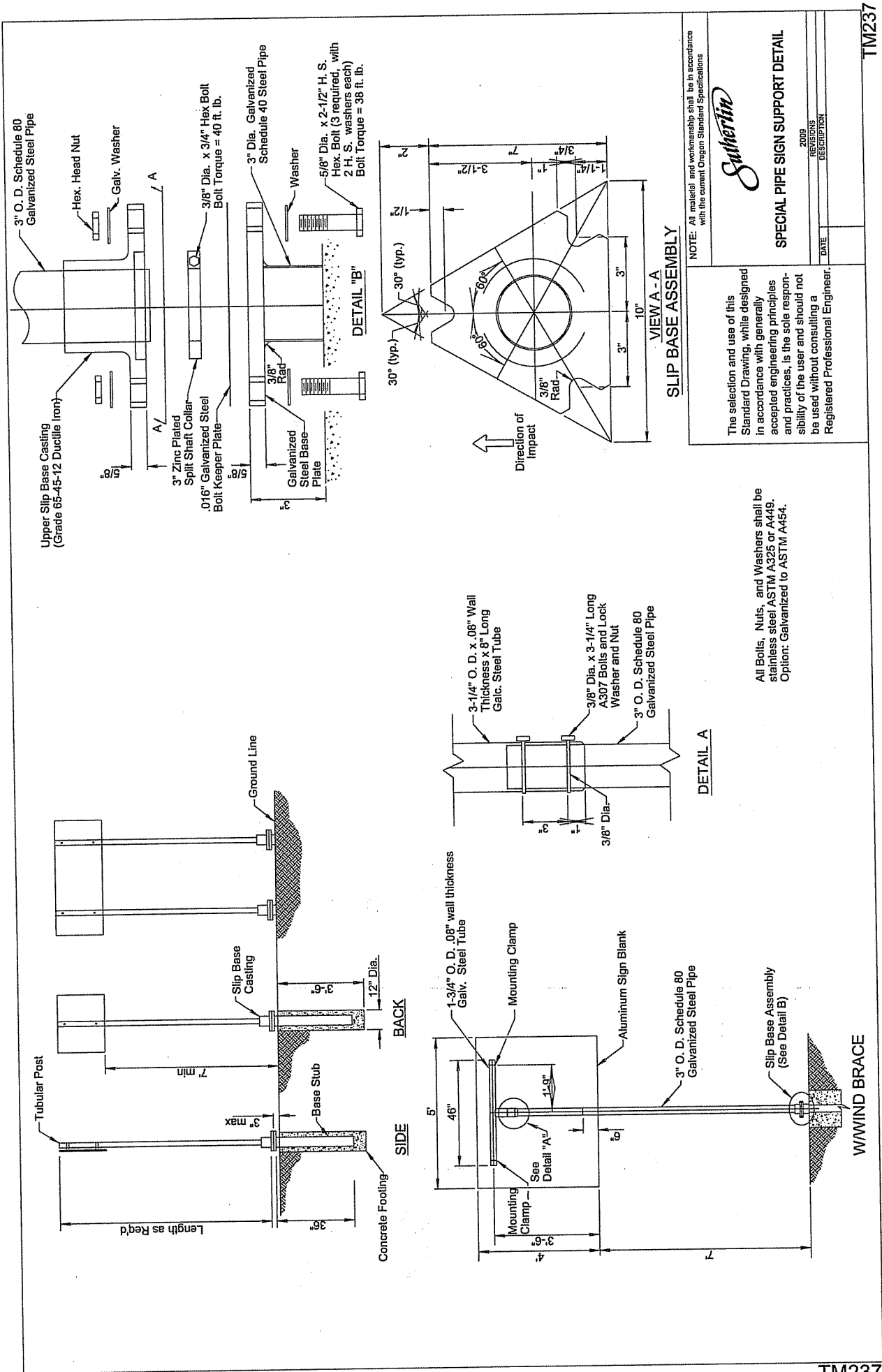
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

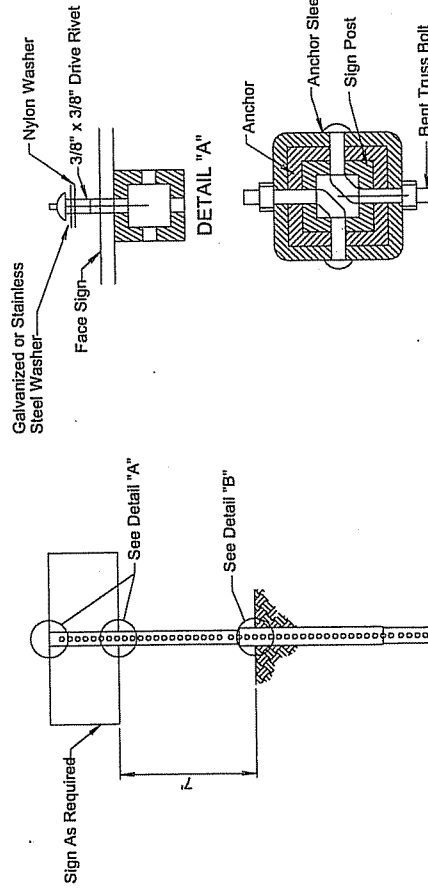
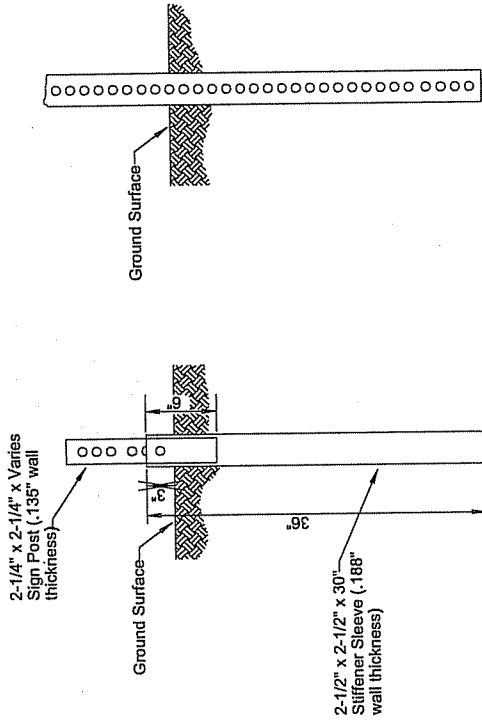
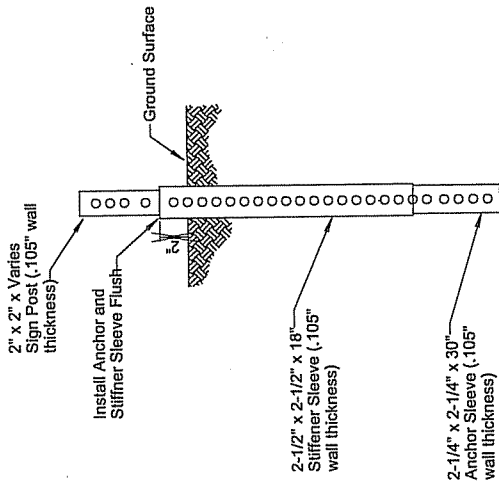
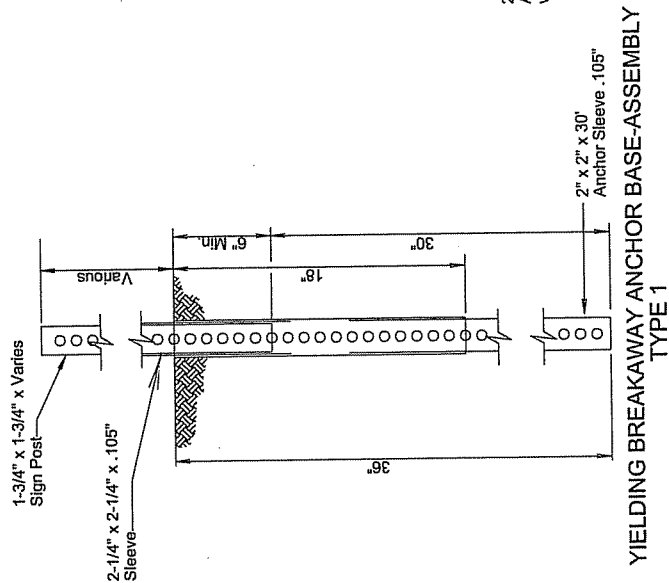
Guthrie
WOOD POST SIZING CHARTS
WESTERN CEDAR

TM215.DGN
2009
REVISIONS
DESCRIPTION



NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications	
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.	
<i>Sutherland</i>	
PIPE SIGN SUPPORT DETAIL	
DATE	2009
REVISIONS	DESCRIPTION





The gauge of posts and anchors may vary, check plans and specifications for each project.

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

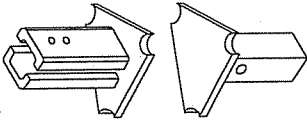
Guthrie

SQUARE TUBE SIGN SUPPORT

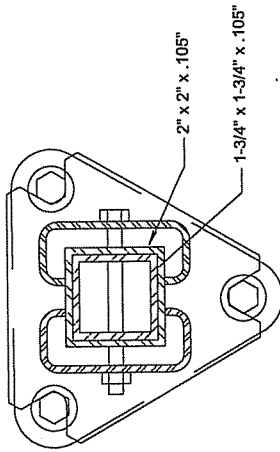
DATE	REVISIONS	DESCRIPTION
	2009	TM239.DGN

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

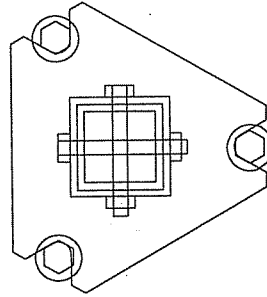
Top Subassembly



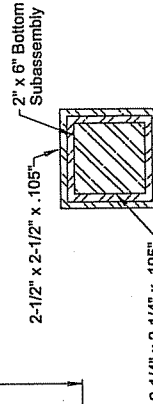
Bottom Subassembly
SLIP BASE ANCHOR



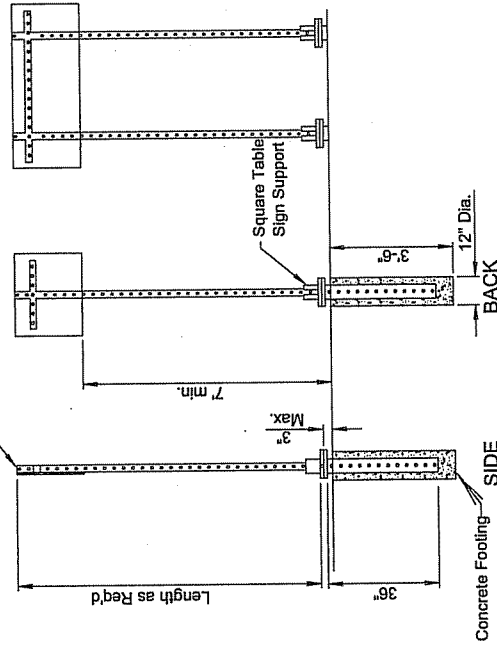
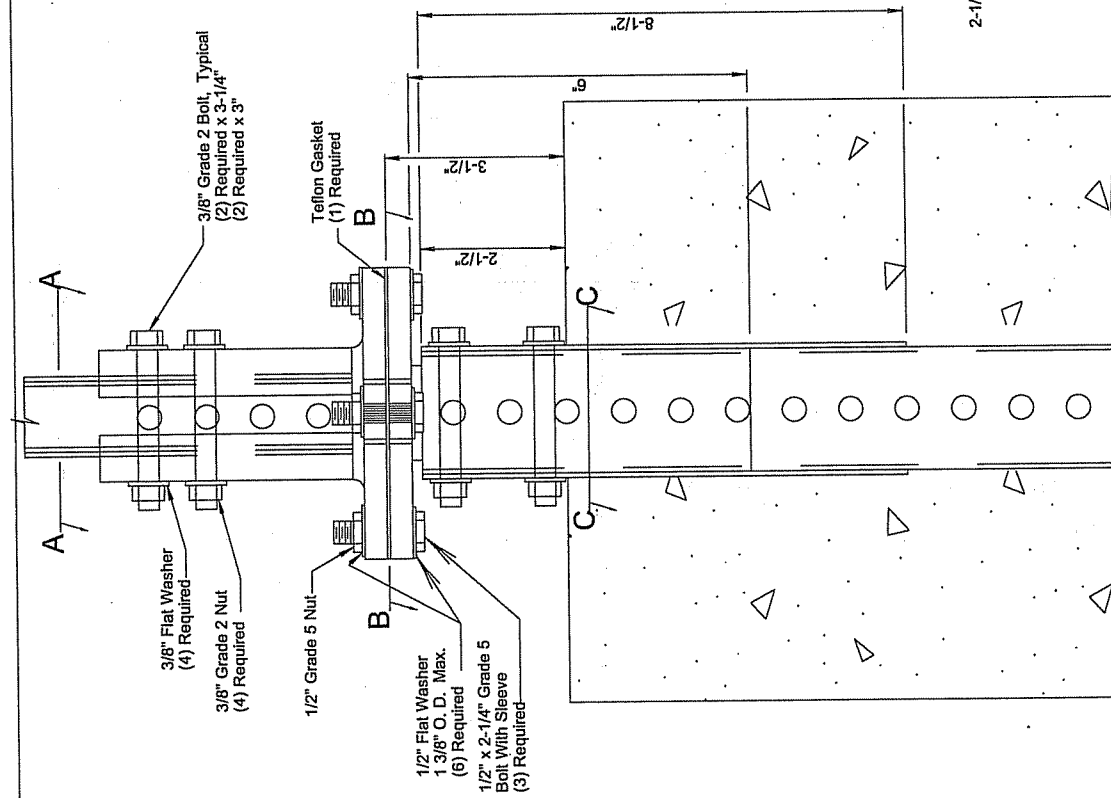
Section A - A



Section B - B



Section C - C



NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

Guthrie

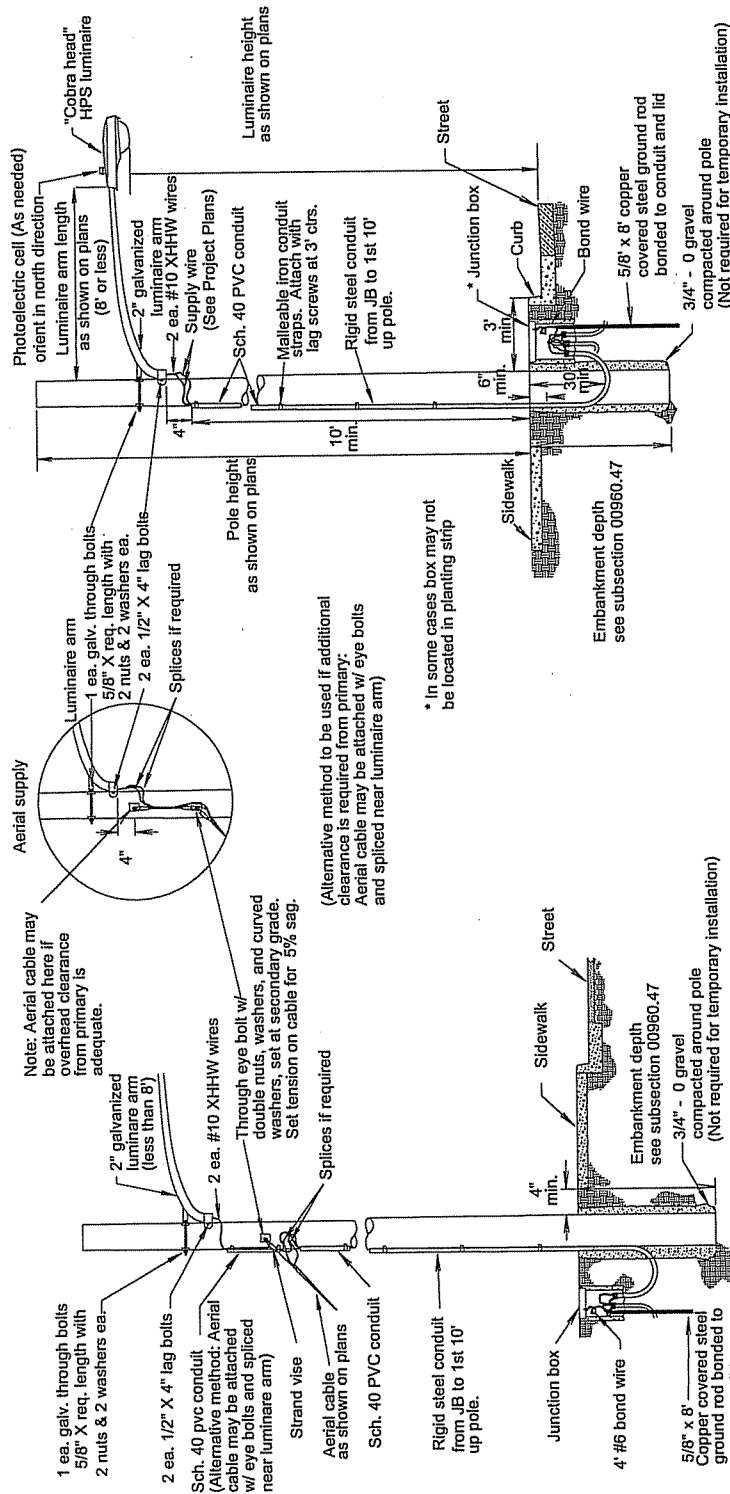
SQUARE TUBE SIGN SUPPORT WITH TRIANGULAR BASE BREAKAWAY

2009

REVISIONS

DESCRIPTION

DATE



TYPICAL CURB-SIDE SIDEWALK LOCATION
(UNDERGROUND TO AERIAL TRANSITION)

TYPICAL SETBACK SIDEWALK LOCATION
(UNDERGROUND SERVICE)

BRACKET ARMS 8' OR LESS (AS REQUIRED)

ARM LENGTH	LUM. MAX. WT.	MAX. PROJ. AREA
5' thru 20'	65 lb	2' 2

Note: Luminaire supports shall be designed in accordance with AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.

- The design wind velocity shall be 100 mph unless shown otherwise on the plans or in the Special Provisions for the project.
- Bolts shall conform to ASTM Specification A307.
- Steel sheet and plate shall be Merchant quality.
- All structural steel including washers and nuts shall be hot dip galvanized after fabrication unless noted otherwise.
- Wind rods required for arms over 8'.

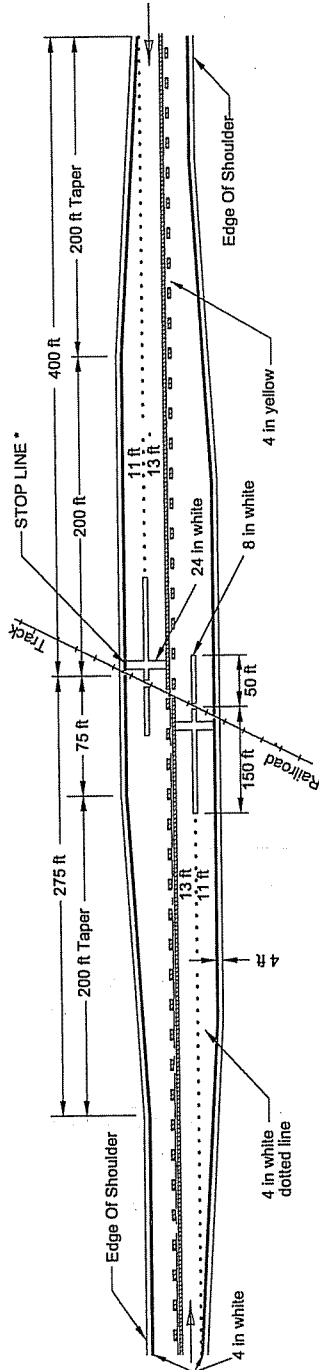
Note: Details are not meant to reflect any manufacturer's product. Other designs may be acceptable, but must be submitted for approval.

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

Sutherland

LUMINAIRE INSTALLATION ON WOOD POLES

DATE	REVISIONS	DESCRIPTION
	2009	

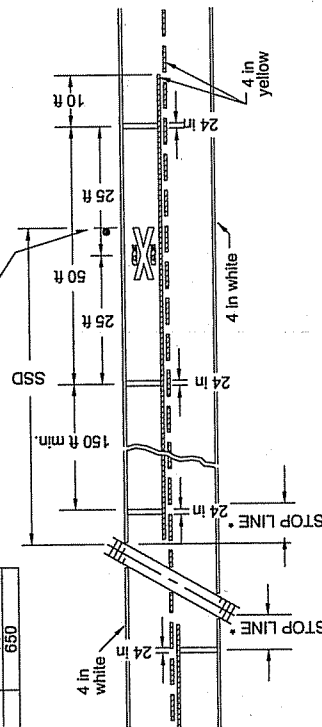


STANDARD PAVEMENT MARKINGS AT RAILROAD CROSSINGS WITH TRUCK AND BUS STOP LINES

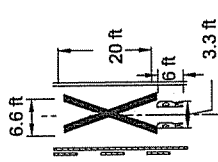
*** STOP LINE:**
Stop line 8 ft minimum from nearest rail or 12 inches in advance of location where gate arm crosses the roadway. Line should be either perpendicular to roadway or parallel to gate, if present.

Posted Speed (mph)	Safe Stopping Distance SSD (ft)
30	100
35	150
40	225
45	300
50	375
55	450
60	550
65	650

Advance Warning Pavement Markers (AWPM):
On multi-lane roads the transverse lines shall extend across all approach lanes and individual RXR symbols should be used on each approach lane.

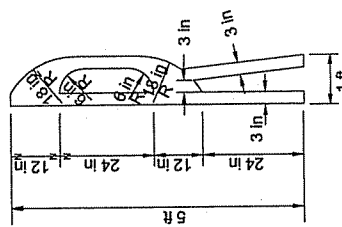
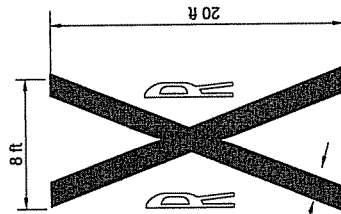
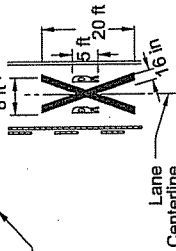


TYPICAL RAILROAD GRADE CROSSING MARKINGS



Alternative Narrow Pavement Markings

Width may vary according to lane width



PAVEMENT MARKINGS FOR R/R CROSSING

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

LEGEND

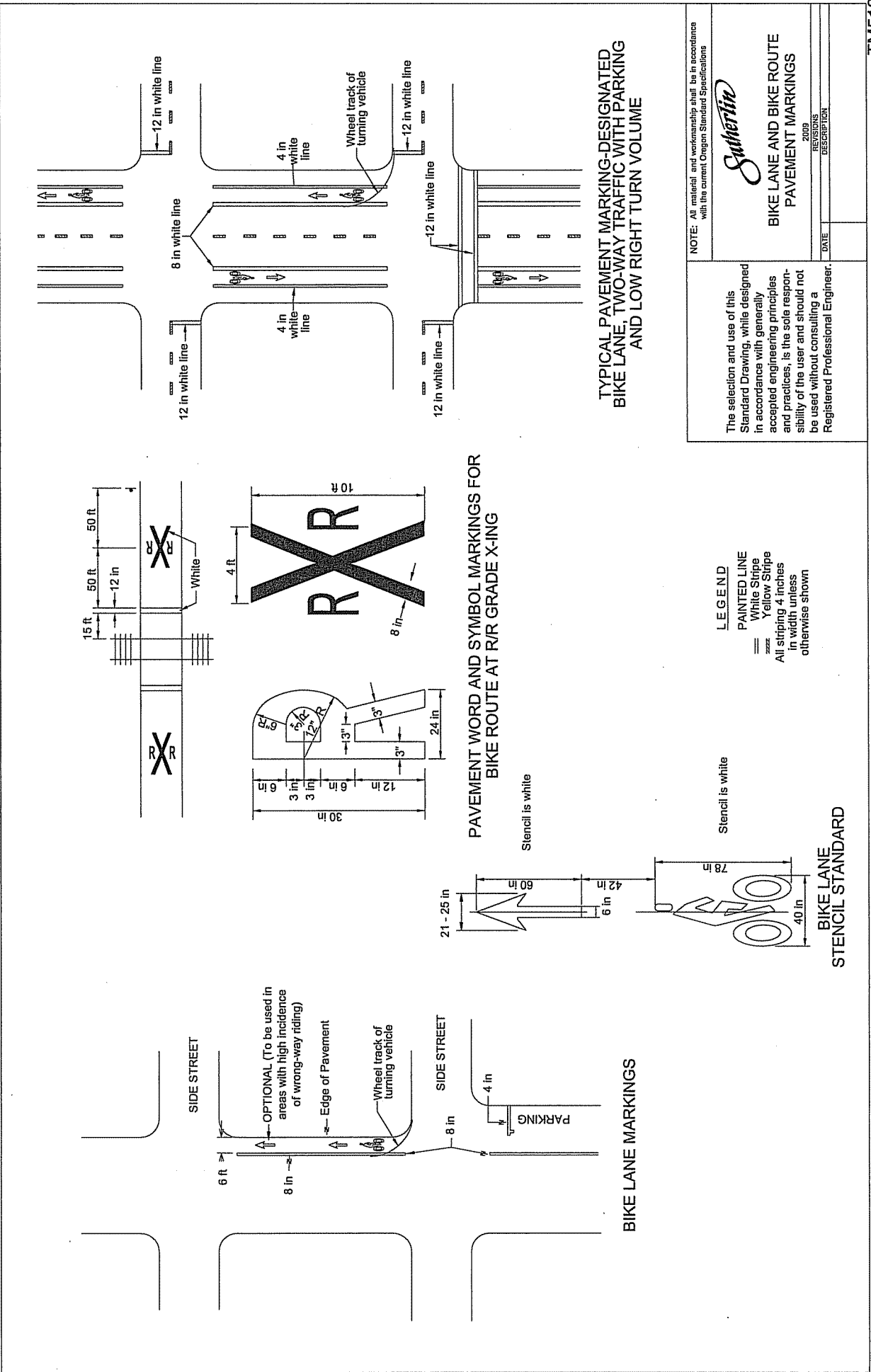
- White stripe
- Yellow stripe
- Direction of Travel

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

Sutherland

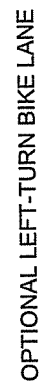
ROADWAY RAIL CROSSING PAVEMENT MARKINGS

2009
REVISION
DESCRIPTION



TYPICAL PAVEMENT MARKING-DESIGNATED BIKE LANE, TWO-WAY TRAFFIC WITH PARKING AND LOW RIGHT TURN VOLUME

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications	
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.	
BIKE LANE AND BIKE ROUTE PAVEMENT MARKINGS	
DATE	2009
DESIGNED	
DESCRIPTION	



PAINTED LINE

== White Stripe
 zzzz Yellow Stripe
 All striping 4 inches in width
 unless otherwise shown
 ← Direction of travel

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

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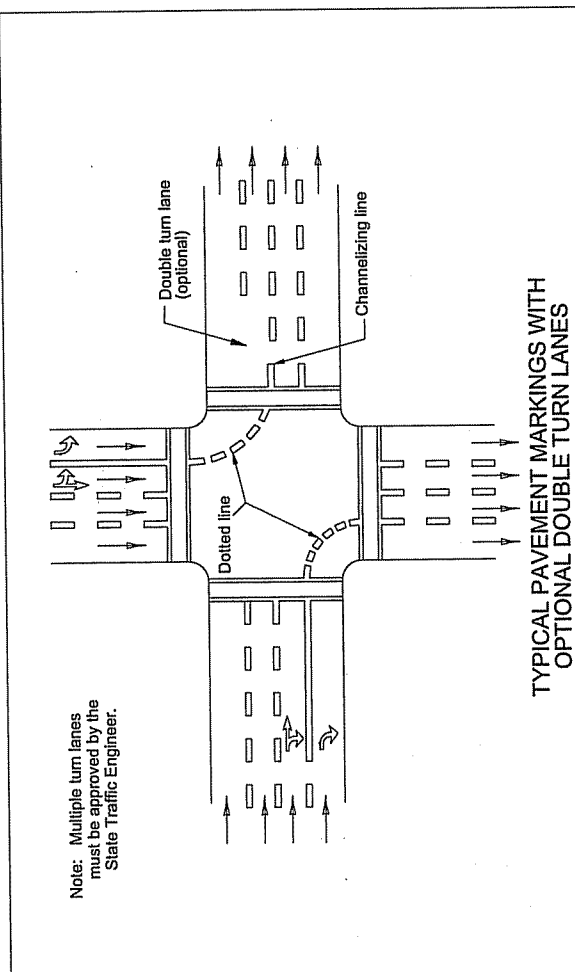
INTERSECTION PAVEMENT MARKINGS -
DESIGNATED BIKE LANE

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

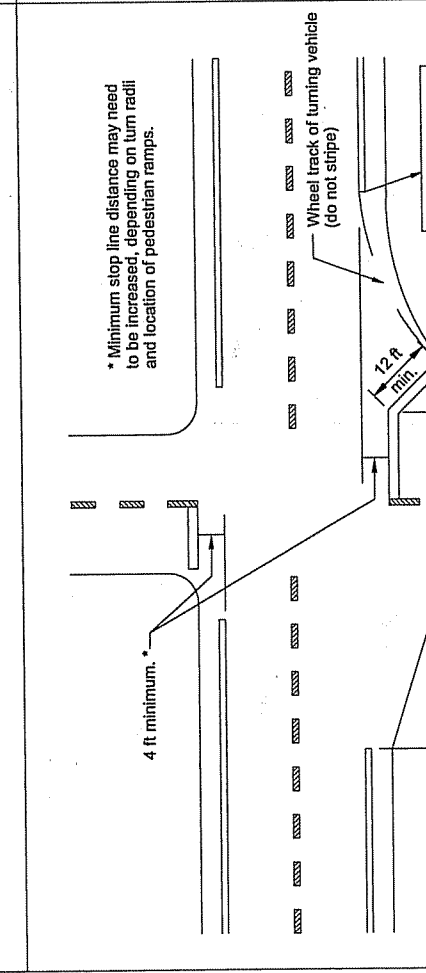
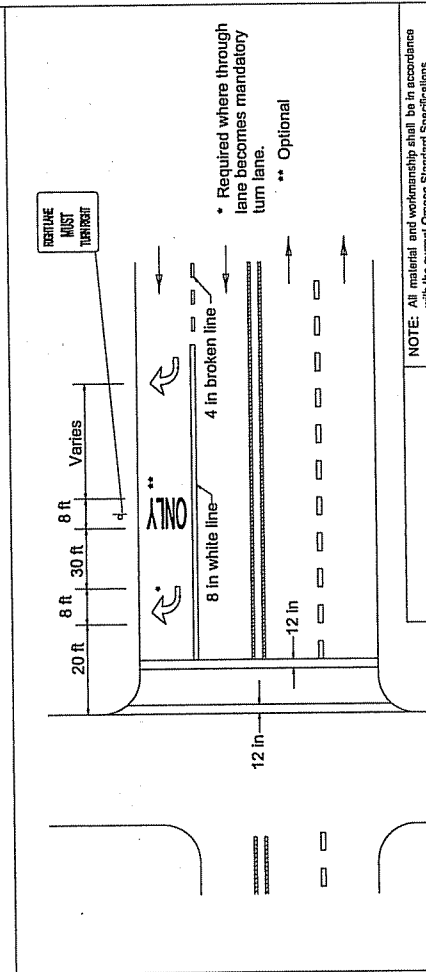
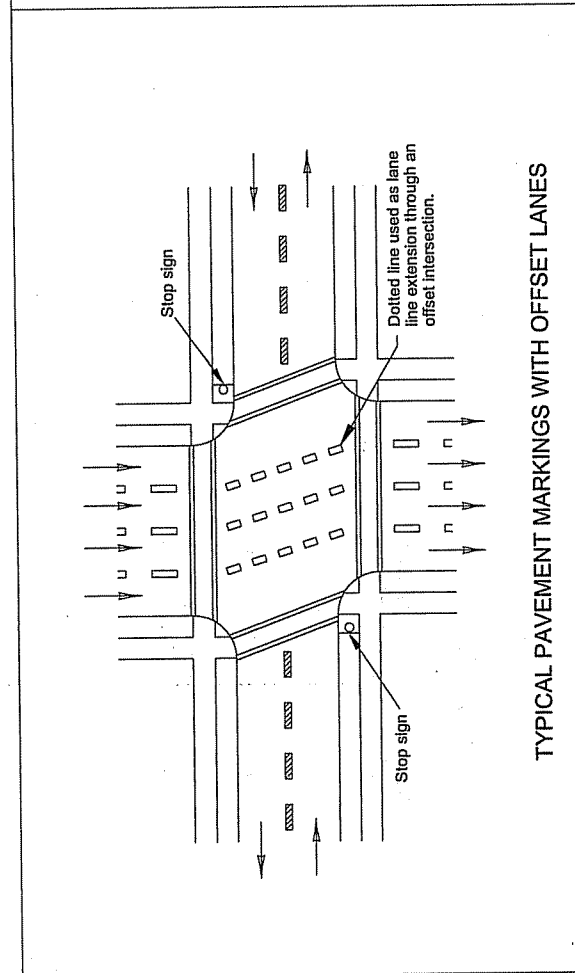
2009	REVISIONS	DESCRIPTION
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ATE

715



TYPICAL PAVEMENT MARKINGS WITH OFFSET LANES



NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

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INTERSECTION PAVEMENT MARKINGS

2009

REVISIONS

DATE

DESCRIPTION

Legend:

- White
- Yellow
- Direction of travel

4 ft minimum.

* Minimum stop line distance may need to be increased, depending on turn radii and location of pedestrian ramps.

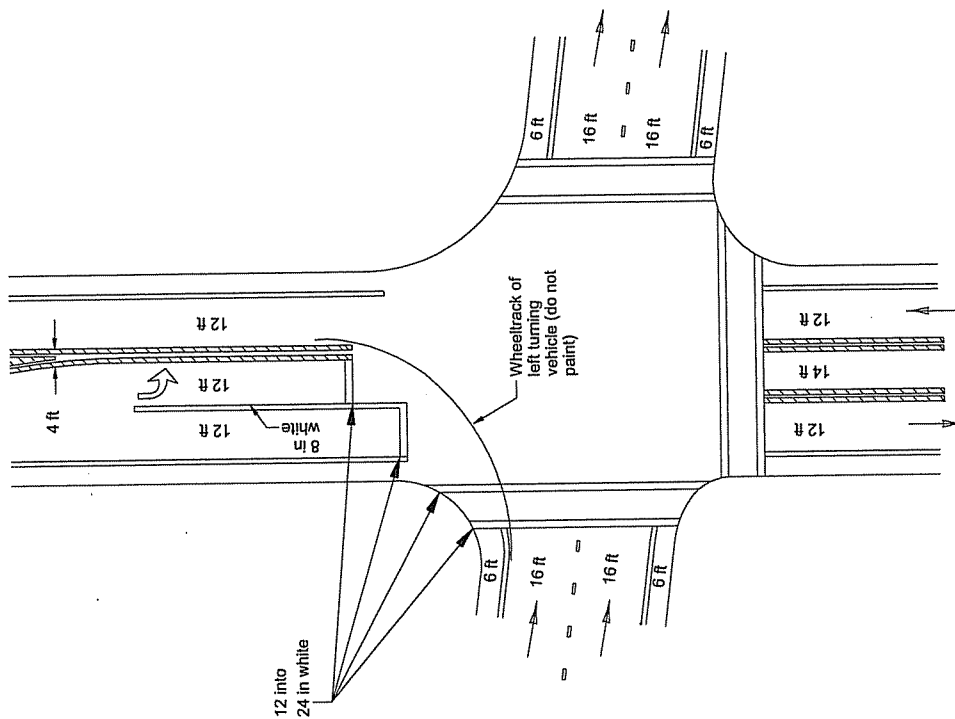
Wheel track of turning vehicle (do not stripe)

Fog line termination if shoulder width is 8 ft or more

12 ft min.

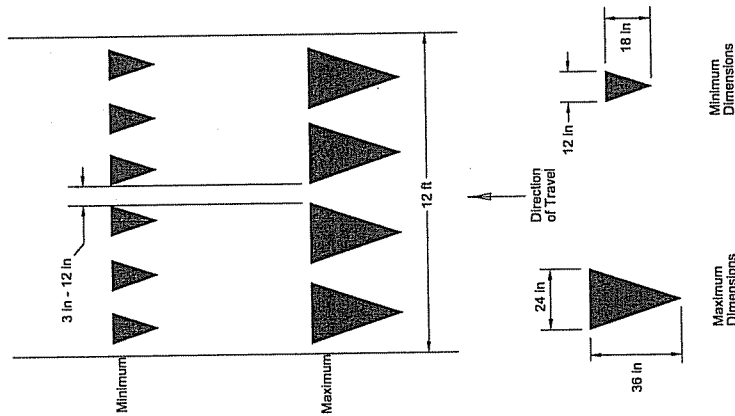
16 ft min.

Deceleration lane see standard drawing #RD225 for details

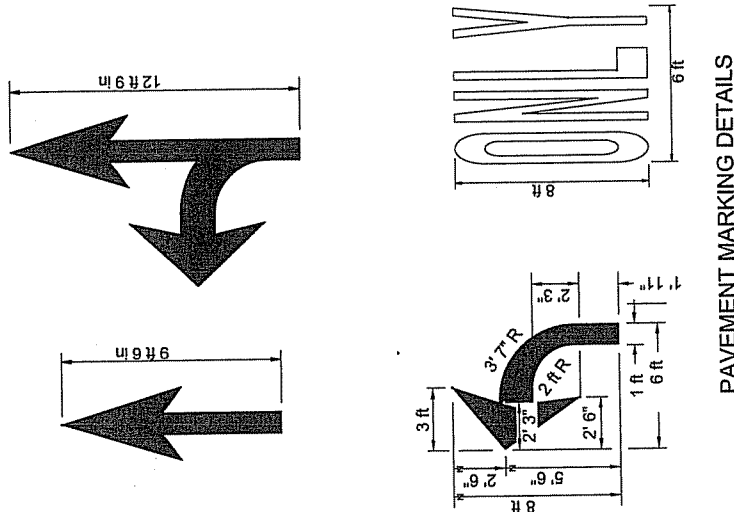


OFFSET STOP LINE

White stripe
 Yellow stripe
 Direction of travel



YIELD LINE LAYOUT

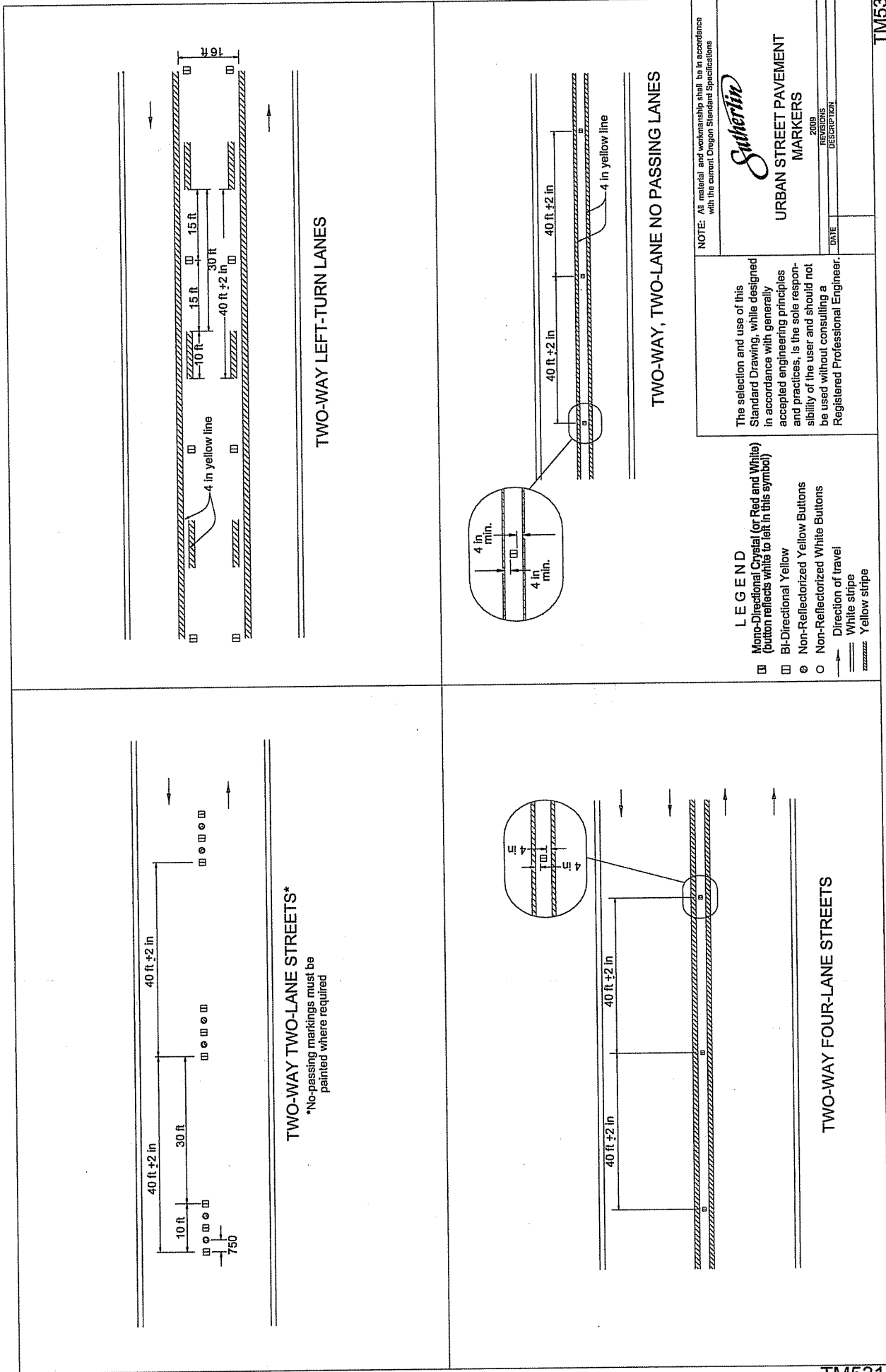


PAVEMENT MARKING DETAILS

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

URBAN INTERSECTION PAVEMENT MARKINGS	
DATE	REVISIONS
	DESCRIPTION
	2009
	TM530.DGN

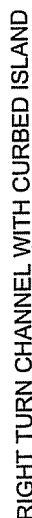
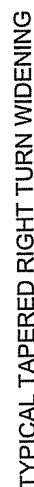
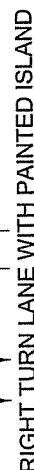
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.





*40 ft spacing may be used when distance between Left Turn Refuges exceeds 200 ft

"ONLY" and 2nd arrow marking are optional



Note Lane and shoulder widths shown are typical for new construction. Dimensions may need to be adjusted to conform with other roadway designs.

 White
 Yellow
 Direction of travel

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

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CHANNELIZED INTERSECTION PAVEMENT MARKINGS

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

2009	REVISIONS	DESCRIPTION

LEGEND

- White Stripe
- Yellow Stripe
- All striping 4 inches in width unless otherwise shown
- Direction of travel

DATA TABLE

Design Speed (mph)	Taper Rate	R (ft)	T (ft)	S (ft)	L _{min} (ft)	X (ft)	M
35	35:1	213	98	148	98	14	2
40	40:1	282	115	164	98	14	2
45	45:1	361	131	230	148	16	4
50	50:1	459	148	295	148	16	4
55	55:1	574	164	377	148	16	4
60	60:1	689	180	459	148	16	4
65	65:1	889	210	541	148	16	4

W = Intersection Width, 66 ft minimum for 4-leg, 90° intersections. Shall be large enough to accommodate appropriate design vehicle.

R = Radius of reversing curve.

T = Distance required to achieve a 12 ft offset using reversing curve of radius "R".

S = Deceleration distance for initial speed (10 mph less than design speed).

L = Storage length to be provided by an analysis.

X = Median Width

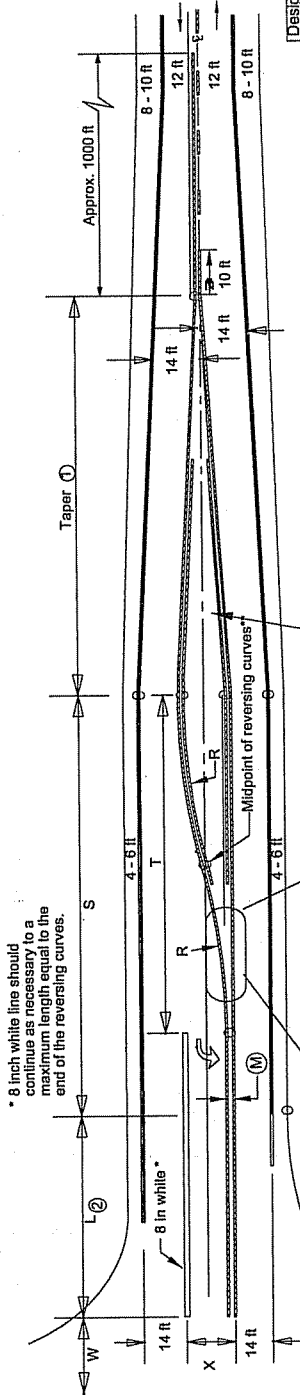
M = Double yellow line separation

① Transition taper is a function of the highway design speed. Design Speed, i.e. 45 mph, = 45:1 taper. See "Data Table" for Taper Rates.

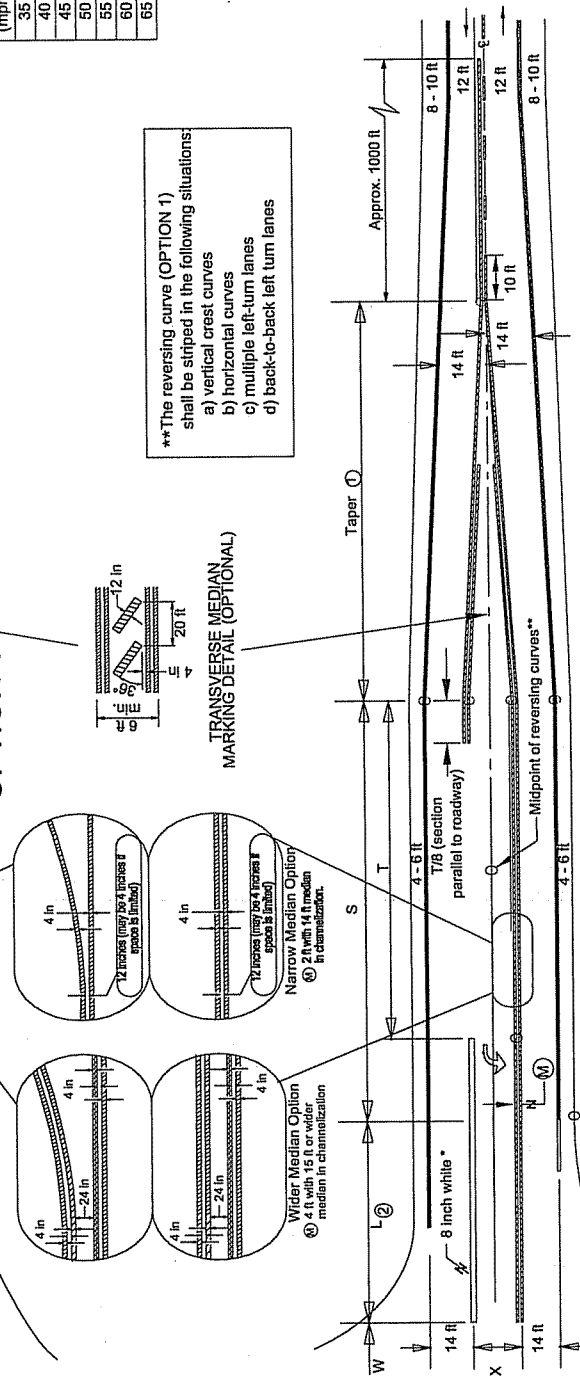
② A storage analysis should be made to determine "L". For minimum length See "Data Table".

NOTE: For details on shoulders at channelized intersections, curbed islands, skewed intersections and public road intersections w/o medians see Std. Drg. No. RD215

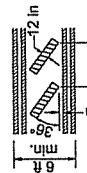
OPTION 1



OPTION 2



TRANSVERSE MEDIAN MARKING DETAIL (OPTIONAL)



Wider Median Option

② 4 ft with 15 ft or wider median in channelization

Narrow Median Option

② 2 ft with 14 ft median in channelization

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

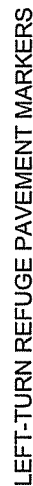
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

Guthrie

LEFT TURN LANE PAVEMENT MARKINGS FOR NEW CONSTRUCTION

2009
REVISIONS
DESCRIPTION

DATE



LEGEND

- White Stripe
Yellow Stripe

All striping 4 in. in width
 unless otherwise shown
 Direction of travel

**□ Mono-Directional Crystal (or Red and White)
(button reflects white to left in this symbol)**

☐ Bi-Directional Yellow

- ☐ Non-Reflectorized Yellow Buttons
- ☐ Non-Reflectorized White Buttons

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

Sutherland

LEFT TURN LANE PAVEMENT MARKINGS

2009
REVISIONS

REVISIONS

REVISIONS	DESCRIPTION
1	Initial release
2	Added new features
3	Fixed bugs
4	Updated documentation
5	Added new features
6	Fixed bugs
7	Updated documentation
8	Added new features
9	Fixed bugs
10	Updated documentation

REVISIONS	DESCRIPTION
1	Initial release
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