

**CHAPTER 4**

**DRAINAGE AND EROSION CONTROL  
DESIGN STANDARDS**

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**Public Works / Community Development**

## CHAPTER 4 - STORM DRAINAGE DESIGN STANDARDS

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#### Section 2    Standard Plans

## CHAPTER 4

### STORM DRAINAGE

#### Section 1

#### 4-000 PURPOSE

The purpose of this Chapter is to implement the City of Marysville Municipal Codes Sections related to Stormwater, and to provide supplemental Construction Standards and Specifications to the Washington State Department of Ecology 2012 Stormwater Management Manual for Western Washington as amended in 2014 (the "Stormwater Manual").

It is expressly the purpose of this Chapter to provide for and promote the health, safety, and welfare of the general public through sound development policies and construction procedures which respect and preserve the City's watercourses; to minimize water quality degradation and control of sedimentation of creeks, streams, ponds, lakes, and other water bodies; to preserve and enhance the suitability of waters for contact recreation and fish habitat; to preserve and enhance the aesthetic quality of the waters; to maintain and protect valuable groundwater quantities, locations, and flow patterns; to ensure the safety of City roads and rights-of-way; and to decrease drainage-related damages to public and private property.

The Standards established by this Chapter are intended to represent the **minimum design standards** for the construction of stormwater facilities, erosion control, and stream channel improvements. Additional requirements may be contained in the adopted edition of the Stormwater Manual. Compliance with these Standards does not relieve the designer of the responsibility to apply conservative and sound professional judgment to protect the health, safety, and welfare of the general public. Special site conditions and environmental constraints may require a greater level of protection than would normally be required under these Standards. The designer must apply these Standards bearing in mind these constraints.

#### **4-010 APPLICABILITY**

- A. Stormwater management review and approval by the City is required when any new development, redevelopment, or proposed construction site project meets or exceeds the threshold conditions defined in MMC [14.15.040](#) (e.g., new impervious area, drainage system modifications, redevelopments, etc.) and/or is subject to a City development permit or approval requirement. All the provisions MMC Title 14 are applicable to any project requiring stormwater management review and approval.
- B. All persons taking any of the following actions or applying for any of the following permits and/or approvals, shall, unless otherwise excepted or exempted, be required to submit for approval by the Public Works Director or Designee, a Site Plan with their application and/or request:
1. Creation or alteration of new or additional impervious surfaces
  2. New development
  3. Redevelopment
  4. Building permit
  5. Grading permit
  6. Flood control zone permit
  7. Subdivision approval
  8. Short subdivision approval
  9. Commercial, industrial, or multifamily site plan approval
  10. Planned unit development or Master Plan Development
  11. Conditional use permits
  12. Substantial development permit required under RCW 90.58 (Shoreline Management Act)
  13. Right-of-Way use
  14. Logging, clearing, and other land disturbing activities
  15. Contain, or be adjacent to, a floodplain, stream, lake, wetland or closed depression, or a sensitive area as defined by the Sensitive Areas Ordinance No 1928

Site Plan shall indicate the character of the existing site, topography, natural drainage features on or adjacent to the site, the location and dimensions of all impervious surfaces,

flow arrows indicating the direction of stormwater flows onsite, and any offsite flows entering the site, the proposed method of utilizing the existing drainage system.

- C. Commencement of construction work under any of the nonexempt actions, permits, or applications shall not begin until the Public Works Director or Designee approves a Stormwater Pollution Prevention Plan (SWPPP) pursuant to the requirements of these standards and the Stormwater Manual.
  
- D. Guidance on preparing a Permanent Stormwater Control Plan is contained in the Stormwater Manual.
  
- E. Other agencies such as those listed below may require drainage review for a proposed project's impact on surface and storm waters. The applicant should take care to note that these other agency drainage requirements are separate from, and in addition to, City drainage requirements. The applicant will be responsible to coordinate joint agency drainage review, including resolution of any conflicting requirements between agencies. Agencies requiring drainage review include but are not limited to:

<u>Agency</u>	<u>Permit/Approval</u>
Snohomish County Health District	On-Site Sewage Disposal and Well Permits
Washington State Department of Transportation	Developer/Local Agency Agreement
Washington State Department of Ecology	Short Term Water Quality Modification Approval
Washington State Department of Fish and Wildlife	Hydraulic Project Approval
Washington State Department of Ecology	Dam Safety Permit
United States Army Corps of Engineers	Section 10 Permit
United States Army Corps of Engineers	Section 404 Permit
Washington State Department of Ecology	Industrial Stormwater Permit
Washington State Department of Ecology	Construction Stormwater Permit
Washington State Department of Ecology	Underground Injection Control Permit
Department of Natural Resources	Aquatic Land Use Permit
Washington State Department of Ecology	401 Water Quality Permit
Dept. of Archaeology and Historic Preservation	Section 106 Compliance

Refer to Volume I of the Stormwater Manual for additional permit information.

#### **4-020 EXEMPTIONS**

- A. Stormwater facilities owned and maintained, or development undertaken by the Washington State Department of Transportation in state highway rights-of-way which are regulated by and meet the requirements of Chapter 173-270 WAC, the Puget Sound Highway Runoff Program, are exempted from the requirements of this Chapter.
- B. Forest practices, commercial agriculture, oil and gas field activities or operations, pavement maintenance and underground utility projects are exempt from the minimum technical requirements for new development and redevelopment following the requirements listed in MMC 14.15.030.
- C. Requests for exemption shall be filed in writing with the Public Works Director or Designee, and adequately detail the basis for granting an exemption following the provisions of MMC 14.15.180 Exceptions.

#### **4-030 RESERVED**

#### **4-040 STORMWATER DESIGN STANDARDS**

- A. Stormwater Management Design Manual

The City has adopted the 2012 Stormwater Management Manual for Western Washington, as amended in 2014, by and through its Municipal Code as the City's minimum stormwater regulations, as a technical reference manual and maintenance standard. The Stormwater Manual shall be used for design of all stormwater systems. Unless otherwise provided, it shall be the developer's and property owner's responsibility to design, construct, and maintain a system which complies with these Design Standards, the Marysville Municipal Code, and the adopted Stormwater Manual. Low Impact Development facilities and designs may use the most recent addition of the Low Impact Development Technical Guidance Manual for Puget Sound for additional design criteria and guidelines.

The latest versions of Department of Ecology approved stormwater modeling software shall be used for modeling for all sites and facilities. Digital project files shall be provided to the City for review if requested.

B. Minimum Requirements for New Development and Redevelopment

Stormwater design shall be in accordance with the minimum requirements for new and redeveloped sites as established in Chapter 14.15 MMC and the adopted Stormwater Manual Chapter 2, Volume I Minimum Requirements for New Development and Redevelopment. Total new and or redeveloped impervious surfaces shall be calculated as a total for the development, including areas onsite and within public right of way.

C. Stormwater Site Plans

Minimum Site Plan submittals shall be in accordance with the requirements of the Municipal Code and the Stormwater Manual Chapter 3, Volume I Preparation of Stormwater Site Plans. Offsite analysis and mitigation shall be performed per Chapter 3, Volume I of the Stormwater Manual.

D. BMP and Facility Selection Process

Selection of Facilities and BMPs for Permanent Stormwater Control Plans shall be determined in accordance with the BMP and Facility Selection process per the adopted Stormwater Manual Chapter 4, Volume I BMP and Facility selection process for Permanent Stormwater Control Plans.

E. Construction Stormwater Pollution Prevention.

Construction Stormwater Pollution Prevention Plans (SWPPP) shall be developed and designed in accordance with the standard plans in this Chapter and the adopted Stormwater Manual Chapter 3, Volume II on developing and implementing a Construction SWPPP. Each of the 13 elements must be included in the Construction SWPPP unless an element is determined to be not applicable to the project.

F. Ground Water Analysis

Ground water analysis shall be conducted following Chapter 3, Volume III of the Stormwater Manual. The large or small scale Pilot Infiltration Test (PIT) shall be used to determine the initial saturated hydraulic conductivity. Other testing methods may be approved by the Director or designee if site conditions warrant. In order to determine the seasonal high ground water level testing should occur between December 1 and April 1 and/or include ground water monitoring wells as described in Chapter 3 Volume III of the Stormwater Manual.

G. Special Provisions for Fill Use

If fill or engineered soils are placed under a stormwater facility designed to infiltrate, then the treatment properties and infiltration rate of the fill material shall be equivalent to the properties used to create the stormwater design. If fill with an equivalent infiltration rate is not used, then the lowest infiltration rate shall be used for design purposes. If fill or engineered soils are compacted, the geotechnical engineer shall be required to measure the infiltration rate. Permit holders are responsible for cost of testing and ensuring all facilities meet design standards and specifications.

H. Water Quality Sensitive Areas

Where the Public Works Director or Designee determines that the minimum requirements do not provide adequate protection of water quality sensitive areas, whether on site or within the drainage basin, more stringent controls could be required to protect water quality.

I. Conveyance System Design

Closed drainage systems or culverts on a major stream or creek as determined by the Public Works Director or Designee, shall be designed to convey flows from a one hundred year recurrence storm event. All other closed drainage systems shall be designed to convey flows from a twenty five year recurrence storm event, unless otherwise required by the Public Works Director or Designee.

J. Oil Control Devices

Sites shall evaluate the need for an oil control device in accordance with the thresholds in MMC 14.15 and/or the adopted Stormwater Manual Chapter 2, Volume V Treatment Facility Selection Process.

A Coalescing Plate Separator per standard plan 4-040-017 shall be required for oil/lube shops, vehicle repair, wash bays, car washes, vehicle detailing shops and any other applications deemed necessary by the City Engineer or designee. These water collection areas shall be covered and pretreated waste water from these facilities should be directed to the sanitary sewer following the provisions of MMC 14.20 Wastewater Pretreatment.

For Fueling Stations an Oil Stop Valve (OSV) such as the AFL/Clark OSV or approved equivalent shall be installed in a manhole or other approved structure prior to the Coalescing Plate Separator. The Oil Stop Valve uses a ballasted float set at a specific gravity between that of oil

and water. When an oil spill occurs, the float loses buoyancy as the oil level increases until it finally shuts off the discharge port. The spill will then be confined within the structure and piping for removal and disposal by a hazardous waste hauler.

Tees & Elbows will not be approved as an oil control device. Sites requiring oil control devices per these standards or the Stormwater Manual will be required to install a coalescing plate separator, API (Baffle Type) Separator or Department of Ecology approved emerging technology for oil control and or additional controls deemed necessary by the City Engineer or designee.

K. Debris and trash racks

To be installed on inlet and outlet piping where trash removal is warranted. Construct and install in accordance with Standard Plans 4-040-006 and 4-040-007.

L. Discharge from Roof Drains

Roof drains shall infiltrate or disperse in accordance with the Stormwater Manual, Chapter 3, Volume III Roof Downspout Controls. If full dispersion, rain gardens, bioretention, downspout dispersion systems, or perforated stub out connections are not feasible, runoff from roofs and individual lots may be collected and discharged into the storm drainage system. Refer to Standard Plans 4-040-015 and 4-040-016 for details. Roof drains shall not be connected to the sanitary sewer.

M. Fencing

Detention ponds with side slopes steeper than 3:1 or with a maximum water depth greater than 3 feet shall require a powder or vinyl coated chain link perimeter fence. Side slope averaging shall not be allowed. See Standard Plans 3-501-007 & 008.

During construction of drainage facilities and prior to installation of permanent perimeter fence, contractor shall ensure temporary fencing is in place around open cut facilities while construction activities are not underway on said facility and/or at the end of each day until placement of permanent fencing is complete.

N. Signage

Detention ponds shall have a Pond Identification Sign. Signs are designed and provided by the City and paid for and installed by the Developer.

Stream Crossings shall be signed with "This Stream is in Your Care" signs provided by the City and paid for and installed by the Developer.

#### **4-050 MANDATORY REQUIREMENTS FOR ALL STORM DRAINAGE IMPROVEMENTS**

- A Engineering Plans shall be in compliance with the Stormwater Manual and these EDDS.
  
- B Open retention/detention facilities and infiltration facilities shall not be located in dedicated public road right-of-way areas unless specifically approved by the Public Works Director or Designee, or unless part of a Low Impact Development (LID) using approved LID facilities.
  
- C Emergency overflow provisions shall be installed in such a manner as to direct waters away from all structures without causing failure of those structures. The impact of a system failure should be analyzed both in terms of on-site and off-site effects. The impacts may be to adjacent properties or to elements of the public drainage system or other private systems. Retention/detention and infiltration facility design must take into account overflows which may result from:
  - 1. Higher-intensity or longer-duration storms than the design storm
  - 2. Plugged orifices
  - 3. Inadequate storage due to sediment buildup
  - 4. Debris blockage
  - 5. Other reasons causing system failure
  
- D Maximum allowable release rates from stormwater detention systems shall be based upon the pre-development runoff from the site. The allowable release rate shall be determined as specified in the Stormwater Manual. The allowable release rate may be decreased on a case-by-case basis due to constraints in the drainage system downstream.
  
- E All drainage system elements shall provide for adequate maintenance and accessibility at all times. No storm drainage system elements shall be located within ten feet of or underneath any structure and the system shall be designed to eliminate interference from underground utilities and from conditions which exceed design loads for any pipe or other structural elements.

- F All aspects of public health and safety must be carefully reviewed in every drainage control system plan. Protective measures are often necessary and shall be required whenever deemed appropriate by the Public Works Director or Designee. The protective measures themselves shall be designed so as not to constitute hazards or nuisances.
- G The designer should consider system reliability in terms of layout, specification of materials, methods of installation and the influence of other activities in the area both during and after construction.
- H The frequency and difficulty of future maintenance should be minimized by consideration of possible failures in the system during design and what would be required to correct the problem. Design adjustments to ease maintenance should be a major consideration.
- I The designer should consider multiple use of elements of the drainage system. This multiple use may require compromise, but no adjustments to usual policies or standards will be made which would impact the system to the degree that risk of failure, impact of system failure or exposure of the general public to hazard is increased.
- J The use of the site should be evaluated to determine if hazardous materials or other pollutants are likely to be present, and if extraordinary design considerations are necessary.
- K The visual impact and other potential problems (mosquito breeding, smell, etc.) should be considered. Concerns will vary with the site environment, but aesthetics should always be of concern to the designer.
- L Offsite improvements may be required if on-site controls are insufficient to mitigate impacts due to flooding, erosion, sedimentation, pollution, or habitat degradation.
- M Developer shall meet all applicable federal, state, and local water quality standards prior to discharge to any wetland, stream, river, or lake.
- N Surface water entering the subject property shall be received at the naturally occurring location, and surface water exiting the subject property shall be discharged at the natural

location with adequate energy dissipaters to minimize downstream damage and with no diversion at any of these points.

- Where open ditch construction is used to handle drainage within the subject property, a minimum of 15 feet will be provided between any structures and the top of the bank of the defined channel.
  1. In open channel work, the water surface elevation will be indicated on the plan and profile drawings. The configuration of the finished grades constituting the banks of the open channel will also be shown on the drawings.
  2. Proposed cross-section of the channel will be shown with stable side slopes. Side slopes will be no steeper than 3H:1V unless stabilized in some manner approved by the Public Works Director or Designee.
  3. The 100-year water surface elevation of the design flow will be indicated on the cross-section.
- P Where a closed system is used to handle drainage within the subject property, all structures will be a minimum 10 feet from the closed system.
- Q The proposed measures for controlling runoff during construction shall include a statement indicating the proposed staging of all clearing, grading and building activities.

#### **4-060 LOW IMPACT DEVELOPMENT**

Low Impact Development Best Management Practices (BMPs) are described in the Stormwater Manual and the current Low Impact Development Technical Guidance Manual for Puget Sound, published by the Puget Sound Partnership and Washington State University Extension as amended by MMC 14.15.062 Low Impact Development (LID).

#### **4-070 RESERVED**

## **4-080 CONVEYANCE STRUCTURES**

### A. General

1. Designs: Drainage facilities shall be designed consistent with this Chapter, and the Stormwater Manual, adopted edition. Structures shall be placed and constructed as shown in these Standard Plans.
2. Specifications: Materials, construction, and testing are specified in the current edition of the WSDOT Standard Specifications for Road, Bridge, and Municipal Construction. The City Engineer may amend, delete, or add Specifications or Standard Plans.
3. Conflicts: Where technical conflicts may occur between this document and other Storm Drainage Design Standards, the City Engineer or designee shall decide which document governs.

### B. Storm Sewers and Culverts

1. Minimum pipe size shall be 12-inch diameter. Eight-inch diameter may be permitted on cross street laterals to avoid utility conflict or meet shallow gradient.
2. Driveway culverts shall conform to Standard Plan 3-303-003.
3. The following pipes are allowed: plain and reinforced concrete storm sewer pipe, aluminized Type 2 corrugated steel, steel spiral rib and corrugated steel with asphalt coating Type 1, spiral rib and corrugated aluminum, ductile iron, polyvinyl chloride (PVC), lined corrugated polyethylene (LCPE), smooth wall polyethylene (SWPE), high density polyethylene (HDPE) pipe, or any pipe specifically approved by the Director.
4. LCPE pipe shall have a smooth interior wall meeting or exceeding Type III, Category 4 or 5, Grade P33 or P34, Class C per ASTM D1248, minimum cell Class ASTM D3350, 324420C. LCPE shall also meet or exceed the requirements of AASHTO M294, Type S. Pipe shall be placed in accordance with City Specifications.

5. SWPE pipe with maximum SDR of 32.5, minimum cell Class ASTM D3350, 334434C and meeting City Specifications for ductile iron pipe with restrained mechanical joints may be used for outfalls on steep slopes.
6. PVC pipe shall require the use of bedding material for flexible pipe specified in Section 9-03 the of WSDOT Standard Specifications.
7. LCPE and SWPE shall be bedded on gravel backfill for pipe bedding as specified in Section 9-03 of the WSDOT Standard Specifications. Above ground installation of SWPE does not require pipe bedding.
8. When required by the City Engineer, PVC, LCPE and SWPE shall be tested using the deflection test procedure described in Section 7-17.3(2)H of the WSDOT Standard Specifications. Pipe sections failing the mandrel test shall be replaced, except that reshaping SWPE and LCPE sections to meet requirements may be allowed if the original deformation is less than 20 percent.
9. Concrete pipe shall be rubber gasketed and metal pipe shall be gasketed and securely banded.
10. Leak testing shall be conducted if required by the City Engineer or designee.
11. If the depth to the top of pipe exceeds eight feet, the City Engineer shall select the pipe material.
12. Bevel the projecting ends of culverts within the right-of-way per Standard Plans 4-080-004 and 4-080-005.
13. French drains may be installed where it is desirable to intercept the ground water and transfer it off site. See Standard Plan 4-080-006.

### C. Catch Basins and Junctions

1. Catch basins shall be spaced no greater than 150 feet for road grades less than one percent, 200 feet for grades between one and three percent; and 300 feet for grades three percent and greater. Where the width of the tributary road surface exceeds 35 feet, the cross slope exceeds four percent, catch basin spacing analysis is required. The analysis must show the depth of water at the edge of the traveled way does not exceed 0.12 feet or extend more than five feet into the traveled way for the 10-year storm event, using flows generated by the rational formula.
2. New catch basins shall be constructed and installed in conformance with Standard Plans 4-080-007 through 4-080-010, and 4-080-014.
3. With prior approval by the Director, connections to pipe systems may be made without placing a catch basin or manhole on the mainline provided all of the following conditions are met:
  - a. The mainline pipe is 48 inches or greater and at least two times the size of the connecting pipe.
  - b. All connections shall be performed in accordance with the manufacturer's recommendations. Standard shop fabricated tees, wyes and saddles shall be used. Concrete pipe connections shall be constructed in accordance with Standard Plan 4-080-011.
  - c. There shall be a catch basin or manhole on the connecting pipe within two to ten feet of the external wall of the main line. See Standard Plan 4-080-011.
  - d. Offset angle of connecting pipe to mainline, horizontally and vertically, shall be less than 45 degrees. Connections to an existing system shall avoid directing construction runoff through downstream quality/quantity control facilities for treatment purposes.

4. Use Type 2 catch basins where the depth to the invert of the pipe exceeds five feet or the nominal diameter of the pipe is greater than 18 inches.
5. Roof and yard drains, or other concentrated flow from adjacent property shall not discharge over the surface of roadways or sidewalks.
6. Catch basins or manholes are required when joining differing types of pipes.
7. Curb inlets shall be used to collect street runoff when catch basins are not used. See Standard Plan 4-080-015.

D. Frames, Grates, and Covers

Unless otherwise specified, use vaned grates with standard frames in the traveled way, gutter, or shoulder (see Standard Plan 4-080-017). Vaned grates shall not be located within cross walks (see Standard Plan 4-080-016). When vaned grates are impractical, use Standard Grate (see Standard Plan 4-080-017).

1. At sag vertical curves, or before intersections with a grade 3% or greater, use through curb inlet frames. Where through curb inlets cannot be used, three vaned inlets shall be used. One shall be located at the approximate low point and another on either side at 25 foot horizontal spacing, but not greater than 0.1 foot above the low point, (see Standard Plan 4-080-018).
2. New and existing catch basins that do not or no longer collect runoff shall use or be replaced with locking frame and solid covers (See Standard Plans 4-080-022, 4-080-023 and 4-080-024).
3. All storm drain covers and grates shall be locking. Manufacturer as approved by the City Engineer.
4. Where vertical concrete curbs or extruded curbs are used, catch basin frames and grates shall be installed in accordance with Standard Plan 4-080-025.

5. Slit drains may be used when approved by the City Engineer. At a minimum slit drains shall have catch basins at either end unless used as a driveway culvert. The maximum distance between catch basins along a slit drain shall be 50 feet.

#### **4-090 ADDITIONAL INFORMATION REQUIRED**

The requirements of this Chapter may be modified at the discretion of the Public Works Director or Designee when more information is deemed necessary for proper review.

#### **4-100 INSPECTION - CONSTRUCTION**

- A. All activities regulated by this Chapter shall be inspected by the Engineer and/or Construction Inspection Division of Community Development. Projects shall be inspected at various stages of the work to determine that adequate control is being exercised. Stages of work requiring inspection include, but are not limited to: preconstruction, installation of BMP's, land-disturbing activities, installation of utilities, landscaping, retaining walls, and completion of project. When required by the Public Works Director or Designee, special inspection and/or testing shall be performed.
- B. At the time of approval of the Construction Stormwater Pollution Prevention Plan or Stormwater Site Plan for the subject property, a schedule for inspection to ensure proper review of construction and facilities will be established by the Public Works Director or Designee. The following inspections may be required as a minimum:
  1. Initial Inspection. Inspection prior to clearing and construction will apply to sites with a high potential for sediment damage, as identified by the applicant during civil review based on definitions and requirements of Appendix 7 of the Western Washington Phase II Municipal Stormwater permit.
  2. Grading Preparation. Whenever work on the site preparation, grading, excavations, or fill is ready to be commenced, but in all cases prior thereto;
  3. Rough Grading. When all rough grading has been completed;

4. Soils Approval. This inspection/approval applies when engineered soils, bioretention soil mixes, compost amended soils, soils to meet BMP T5.13 Post Construction Soil Quality and Depth from Chapter 5, Volume V of the Stormwater Manual, or other specific soil mixes are used as a design feature of a stormwater facility. The developer must demonstrate that the soil mixes approved on the plans are used for construction.
5. Bury Inspection. Prior to burial of any underground drainage structure;
6. Finish Grading. When all work including installation of all drainage structures and other protective devices has been completed;
7. Planting. When erosion control planting shows active growth.
8. System wide inspections for residential developments will take place after all flow control and water quality treatment facilities are completed during the period of heaviest house construction to identify maintenance needs and enforce compliance with maintenance standards as needed.
9. When Low Impact Development BMP's or permanent Stormwater Treatment and Flow Control BMPs/Facilities are installed that are designed to infiltrate, the City shall require the permit holder to verify proper installation and function. Repair or reconstruction will be required if adequate function is not demonstrated. A licensed geotechnical engineer or other qualified personnel, as approved by the City, shall follow the testing procedures outlined in the City of Marysville EDDS section 3-809. Permit holders are responsible for cost of testing and ensuring all facilities meet design standards and specifications

In some circumstances not all of the above inspections may be necessary. It shall be the discretion of the Public Works Director or Designee to waive or combine any of the above inspections as dictated by conditions.

- C. A final inspection by the City will be required at the end of the 2 year maintenance bond period. The Developer will be responsible for repairing any deficiencies found as a result of the City inspection.

- D. Failure to comply with the provisions of this Chapter may result in enforcement pursuant to MMC Chapter 4.

#### **4-110 MODIFICATION OF FACILITIES DURING CONSTRUCTION**

- A. The City Engineer or designee may require that the construction of drainage facilities and associated project designs be modified or redesigned if conditions occur, or are discovered, which were not considered or known at the time the permit or approval was issued. Such as uncovering unexpected soil and/or water conditions, weather-generated problems, or undue materials shortages. The owner or contractor shall notify the project engineer and the City Engineer when conflicts exist between the plans and field conditions. Conflicts shall be resolved (including plan and profile revisions) and resubmitted for approval prior to proceeding with construction.
- B. Infiltration facility installations shall be directed/overseen by a licensed geotechnical engineer as directed by the City Engineer or designee. The geotechnical engineer shall certify that the underlying soil type and condition (native or fill soil) meets the design specification prior to backfilling. The geotechnical engineer will prescribe corrective action for soil that does not meet the design specification, soil that has been over compacted or for soil that has been contaminated by turbidity.
- C. Performance infiltration testing and verification of a facility shall be conducted by a geotechnical engineer or other qualified person before final construction approval by the City as required by MMC 14.15.120. Performance testing methods for bioretention facilities are described in the Stormwater Manual, methods for permeable pavement are described in EDDS Chapter 3 section 3-809. The contractor shall be responsible for making corrections to ensure the stormwater system functions as designed.
- D. Any modifications made during the construction of drainage control facilities shall be shown on the final approved record drawing plans. All engineered plans, modifications & record drawings are to be on the NAVD 88 Datum.

#### **4-120 DUMPSTER AREA STORMWATER DRAINAGE**

Dumpster areas are classified into one of three (3) groups. Generally, as an introduction, Group 1 is for small containers (not over 1.5 cubic yards) and single family sites, Group 2 is for larger containers (over 1.5 cubic yards) or that have compactors and are not listed in Group 3, and Group 3 is for all sites involving uses listed in the Group 3 Land Uses list, below.

Quite often, the land uses at a site change over time. A development may initially have a Group 1 or Group 2 dumpster area. At a later time, if this site's land use changes and a Group 3 dumpster area becomes appropriate, the City may require an upgrade to the Group 3 specifications. For existing developments which need to add dumpster areas, these guidelines generally apply, but requirements may be adjusted or alternatives accepted by the City Engineer or designee based on the particular characteristics of the existing situation. If compactors are used, the dumpster area is in Group 2 or Group 3 regardless of dumpster capacity. A dumpster area may contain more than one cart or dumpster. To be considered separate areas two (2) dumpster areas need to be separated by at least 25 feet.

**Group 1: Single Family Parcels and Dumpster Areas having Total Dumpster Capacity not over 1.5 Cubic Yards**

Group 1 Dumpster Areas include:

1. All dumpster areas where the volume of the container(s) does not exceed 1.5 cubic yards and compactors are not used.
2. All dumpster areas in single family lots except where certain on-site businesses are conducted. For single-family lots where on-site businesses create additional pollutant potentials in the dumpster area, the dumpster areas may be assigned to Group 2 or Group 3 by the Stormwater Engineer.

No special requirements apply to Group 1 dumpster areas.

**Group 2: Dumpster Areas having Capacities Over 1.5 Cubic Yards and Uses Not Listed in the Group 3 Land Uses list**

Group 2 dumpster areas include areas where the capacity of the dumpster(s) exceed 1.5 cubic yards or dumpsters have compactors and site uses are not included in the Group 3 Land Uses list.

For Group 2 dumpster areas, special requirements apply. Surface drainage from dumpster areas may be connected to the storm drainage system, provided:

1. Dumpster areas are sloped to drain out onto paved, impervious surfaces (such as parking lots).
2. No storm drain inlets are located in the dumpster area.
3. Runoff from the dumpster area flows over the paved surface at least 15 feet prior to entering a catch basin.
4. Catch basins receiving runoff from dumpster areas are Type II, 48 inch diameter minimum, with a "tee" fitting providing floatables separation (and a cleanout port with gasketed cover) but no overflow standpipe.
5. Potential pollutants are not put in the dumpsters on any routine basis. If pollutants are put in the dumpster on any routine basis, the City may require the dumpster area to meet the requirements for Group 3 dumpster areas.

### **Group 3: Dumpster Areas having Capacities Over 1.5 Cubic Yards and Uses Listed in Group 3 Land Uses**

Group 3 dumpster locations include areas where the capacity of dumpster(s) exceeds 1.5 cubic yards or dumpsters have compactors and the site uses include any uses described in the group 3 land uses section. In Group 3 dumpster areas, surface drainage from the dumpster areas may be handled in one of two ways:

#### Preferred Alternative:

Surface drainage from dumpster areas may be connected to the sanitary sewer, provided:

1. The dumpster area is covered.
2. The surface drain from the dumpster area to the sanitary sewer is directed through a City-approved baffle-type oil/water separator.
3. Any issues are resolved with the Fire Department (they may require fire sprinklers) and the Planning Department (regarding aesthetic and site-planning issues).

#### Alternative if the Preferred Alternative is not feasible:

Surface drainage from dumpster areas may be connected to the storm drainage system, provided:

1. No storm drain inlet is located in the dumpster area.
2. Dumpster areas are sloped to drain out onto paved, impervious surfaces (such as parking lots).
3. Runoff from the dumpster area flows over the paved surface at least 15 feet prior to entering a catch basin.
4. Catch basin(s) receiving runoff from dumpster areas are Type I or Type II.
5. Storm drain pipe(s) from catch basins receiving dumpster area runoff convey the runoff through a baffle-type oil/water separator prior to connection to other parts of the storm drainage system. The flow rate for design of the separator shall be the sum of two rates. The first rate is the peak 50-year storm runoff in cubic feet per second that can enter the separator from contributing areas (Rational Method acceptable). The second rate is the capacity of the dumpster(s) in cubic feet, divided by 5 minutes (300 seconds) to yield cubic feet per second.
6. The storm drain pipes that carry flow from the catch basins receiving dumpster area runoff to the separator shall be gasketed pipe that meets the requirements for sanitary sewer pipe.

### **Group 3 Land Uses**

Dumpster areas are in Group 3 if they serve land uses that are normally associated with the following types of waste materials:

- Accumulated food wastes
- Vegetable or animal grease
- Used oil
- Liquid feedstock
- Cleaning chemicals
- Liquid or solid dangerous waste (as defined by the Department of Ecology under WAC Chapter 173-303). The Engineering Services Division may require special handling for any items on this list and not allow their discharge to the storm or sanitary sewer systems.

Additional guidance regarding applicable uses is contained in the Stormwater Manual. Note that multi-family residential uses (including town homes), printing and publishing businesses, restaurants, gas stations, vehicle maintenance facilities, and dry cleaners are examples of common uses that are typically included in Group 3.

#### **4-130 VARIANCES**

- A. Adjustments and Exceptions to the minimum stormwater requirements, detailed in Title 14 and the Stormwater Manual shall be considered per the requirements of MMC 14.15.175 and MMC 14.15.180.
  
- B. The decision of the Public Works Director or Designee may be appealed to the City's Hearing Examiner as provided in MMC 14.15.185.

#### **4-140 ESTABLISHMENT OF REGIONAL FACILITIES**

Regional stormwater facilities shall be established per the provisions of Chapter 14.18 MMC.

#### **4-150 BONDS REQUIRED**

Bonds for stormwater infrastructure will be required per MMC 14.03.430 and MMC 14.15.130.

#### **4-160 OPERATION AND MAINTENANCE REQUIREMENTS**

A. Maintenance Required.

All stormwater facilities shall be inspected and maintained in accordance with the adopted Stormwater Manual, the LID Technical Guidance Manual (for LID Sites), and the provisions in Title 14 MMC.

B. Maintenance of Drainage Ditches.

Maintenance of drainage ditches shall be performed per MMC 14.17.030.

C. Authority.

The Public Works Director or Designee shall have the authority to enforce this Chapter. The Public Works Director or Designee is authorized to develop an inspection program for stormwater facilities in the City of Marysville per MMC 14.17.040. Persons or occupants of the site shall allow any authorized representative of the Public Works Department access at all reasonable times to all parts of the premises for the purpose of inspection, sampling, and record examinations.

D. Maintenance Inspection Program.

Whenever implementing the provisions of the inspection program or whenever there is cause to believe that a violation has been or is being committed, the inspector is authorized to inspect during regular working hours and at other reasonable times all stormwater drainage systems within the City to determine compliance with the provisions of these regulations. Inspection procedures will comply with MMC 4.02.

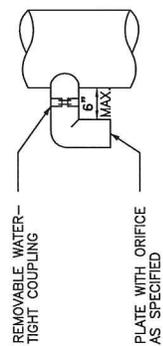
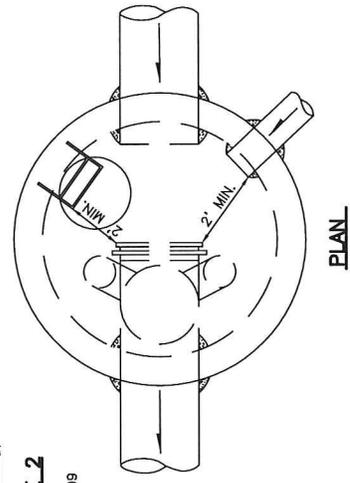
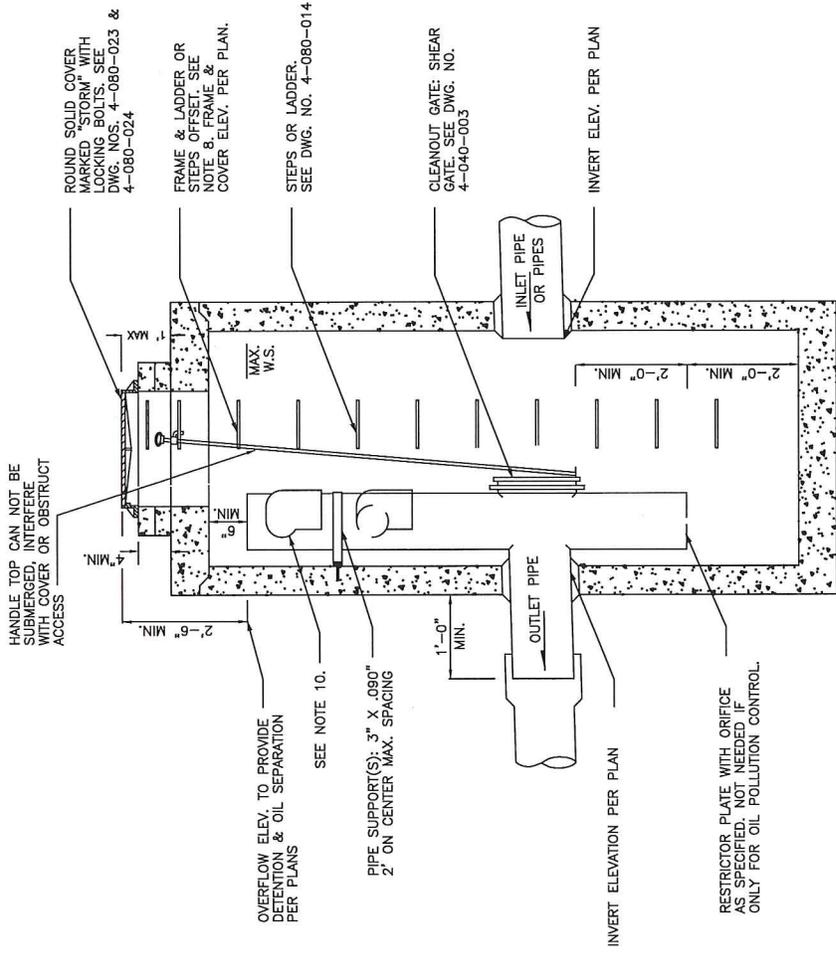
#### **4-170 OPERATION AND MAINTENANCE - ASSUMPTION BY CITY**

The City may assume the operation and maintenance responsibility of retention/detention or other stormwater drainage system features according to City policy after the expiration of the two-year operation and maintenance period following the provisions of MMC 14.15.140.

#### **4-180 ENFORCEMENT AND PENALTIES**

Enforcement action shall be in accordance to Title 4.

## Section 2 Standard Plans

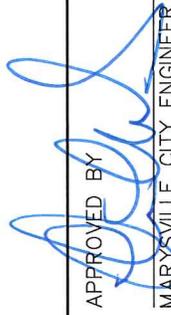


**NOTES:**

1. PIPE SIZES AND SLOPES: PER PLANS.
2. OUTLET CAPACITY: NOT LESS THAN COMBINED INLETS.
3. EXCEPT AS SHOWN OR NOTED, UNITS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS FOR CATCH BASIN TYPE 2, 54" MIN. DIAM.
4. PIPE SUPPORTS AND RESTRICTOR/SEPARATOR SHALL BE OF SAME MATERIAL, AND BE ANCHORED AT 3' MAX. SPACING BY 5/8" DIAM. STAINLESS STEEL EXPANSION BOLTS OR EMBEDDED 2" IN WALL.
5. THE RESTRICTOR/SEPARATOR SHALL BE FABRICATED FROM .060" ALUMINUM, OR .064" ALUMINIZED STEEL, OR .064" GALVANIZED STEEL PIPE; IN ACCORDANCE WITH AASHTO M 36, M 196, M 197 AND M 274. GALVANIZED STEEL SHALL HAVE TREATMENT 1.
6. OUTLET SHALL BE CONNECTED TO CULVERT OR STORM DRAIN WITH A STANDARD COUPLING BAND FOR CORRUGATED METAL PIPE, OR GROUED INTO THE BELL OF CONCRETE PIPE.
7. THE VERTICAL RISER STEM OF THE RESTRICTOR/SEPARATOR SHALL BE THE SAME DIAM. AS THE HORIZONTAL OUTLET PIPE, WITH AN 8" MIN. DIAM.
8. FRAME AND LADDER OR STEPS OFFSET SO THAT:
  - A. CLEANOUT GATE IS VISIBLE FROM TOP.
  - B. CLIMB DOWN SPACE IS CLEAR OF RISER AND CLEANOUT GATE.
  - C. FRAME IS CLEAR OF CURB.
9. IF METAL OUTLET PIPE CONNECTS TO CEMENT CONCRETE PIPE: OUTLET PIPE TO HAVE SMOOTH O.D. EQUAL TO CONCRETE PIPE I.D. LESS 1/4".
10. MULTI-ORIFICE ELBOWS MAY BE LOCATED AS SHOWN OR ALL ON ONE SIDE OF RISER TO ASSURE LADDER CLEARANCE.

**CATCH BASIN TYPE 2**  
DIAM. AS REQUIRED  
SEE DWG. NO. 4-080-009

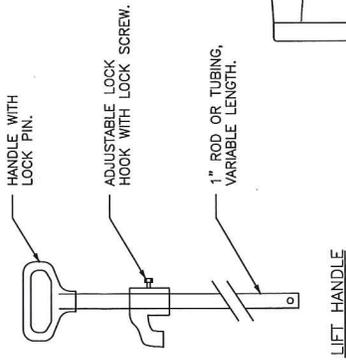
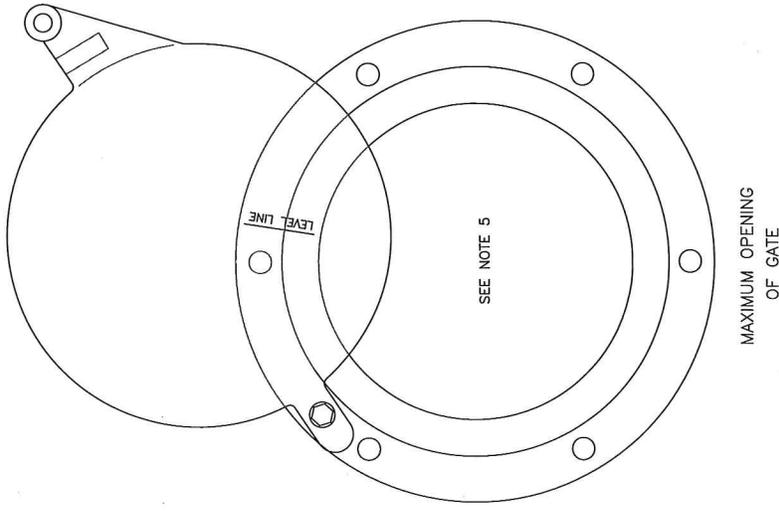
**ELBOW DETAIL**

APPROVED BY  DATE 5/15/15

MARYSVILLE CITY ENGINEER

**FLOW RESTRICTOR/OIL POLLUTION DEBRIS CONTROL DEVICE, TEE TYPE (FROP-T) INSTALLATION**

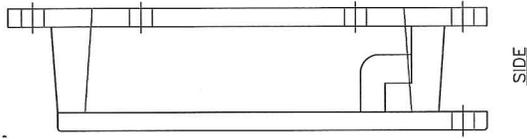




SIX EVENLY SPACED HOLES ON 10 3/8" BOLT CIRCLE FOR BOLTING TO FLANGE CONNECTION.

LEVEL LINE

FRONT



SIDE

LIFT HANDLE SHALL BE ATTACHED PER MANUFACTURER'S RECOMMENDATIONS.

NOTES:

1. SHEAR GATE SHALL BE ALUMINUM ALLOY PER ASTM B-26-ZG-32a OR CAST IRON ASTM A48 CLASS 30B AS REQUIRED.
2. GATE SHALL BE 8" DIAM. UNLESS OTHERWISE SPECIFIED.
3. GATE SHALL BE JOINED TO TEE SECTION BY BOLTING (THROUGH FLANGE), WELDING, OR OTHER SECURE MEANS.
4. LIFT ROD: AS SPECIFIED BY MFR. WITH HANDLE EXTENDING TO WITHIN ONE FOOT OF COVER AND ADJUSTABLE HOOK LOCK FASTENED TO FRAME OR UPPER HANDHOLD.
5. GATE SHALL NOT OPEN BEYOND THE CLEAR OPENING BY LIMITED HINGE MOVEMENT, STOP TAB, OR SOME OTHER DEVICE.
6. NEOPRENE RUBBER GASKET REQUIRED BETWEEN RISER MOUNTING FLANGE AND GATE FLANGE.
7. MATING SURFACES OF LID AND BODY TO BE MACHINED FOR PROPER FIT.
8. FLANGE MOUNTING BOLTS SHALL BE 3/8" DIAM. STAINLESS STEEL.
9. ALTERNATE CLEANOUT/SHEAR GATES TO THE DESIGN SHOWN ARE ACCEPTABLE, PROVIDED THEY MEET THE MATERIAL SPECIFICATIONS ABOVE AND HAVE A SIX BOLT, 10 3/8" BOLT CIRCLE FOR BOLTING TO THE FLANGE CONNECTION.

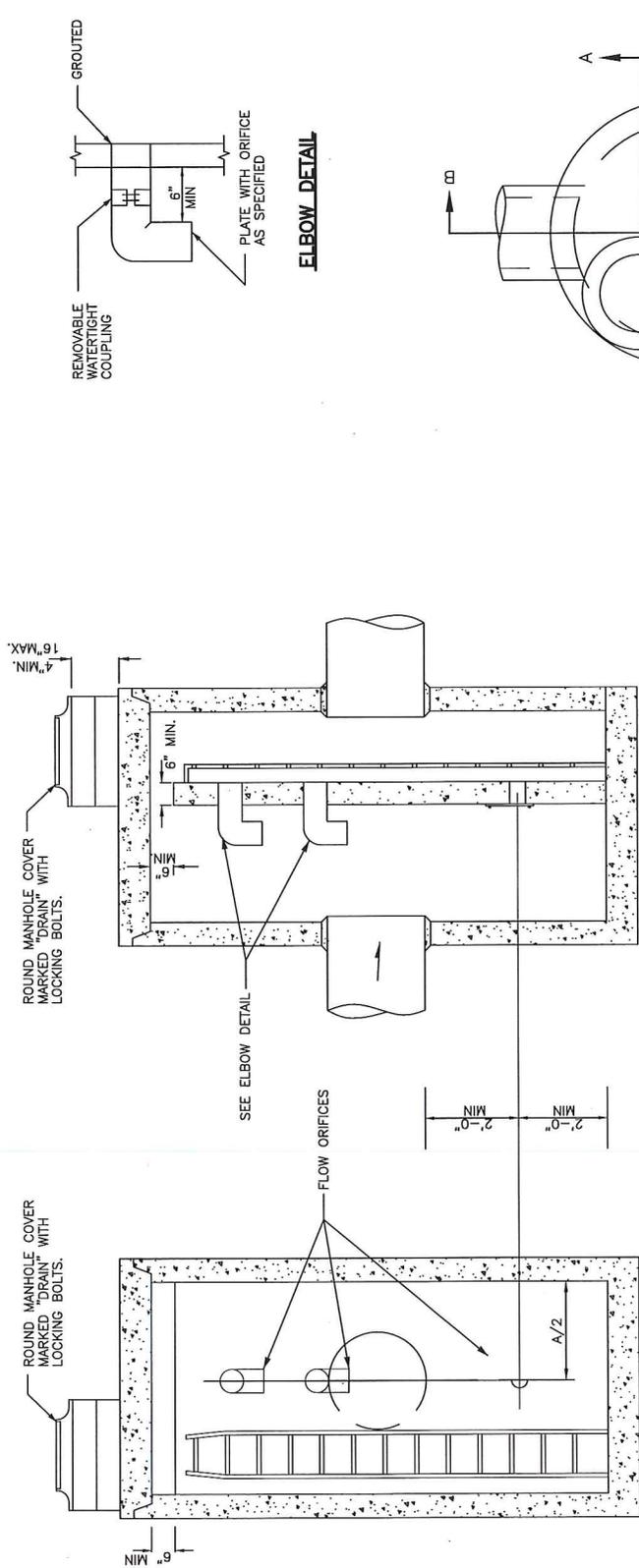
APPROVED BY *[Signature]*  
 MARYSVILLE CITY ENGINEER

DATE

*5/9/01*

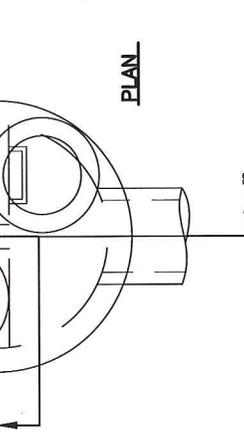
FROP-T SHEAR GATE  
 DETAIL





SECTION A-A

SECTION B-B



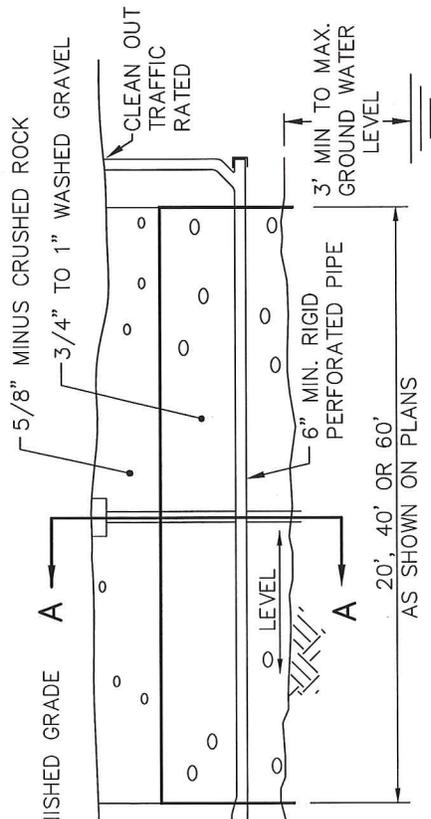
PLAN

NOTES:

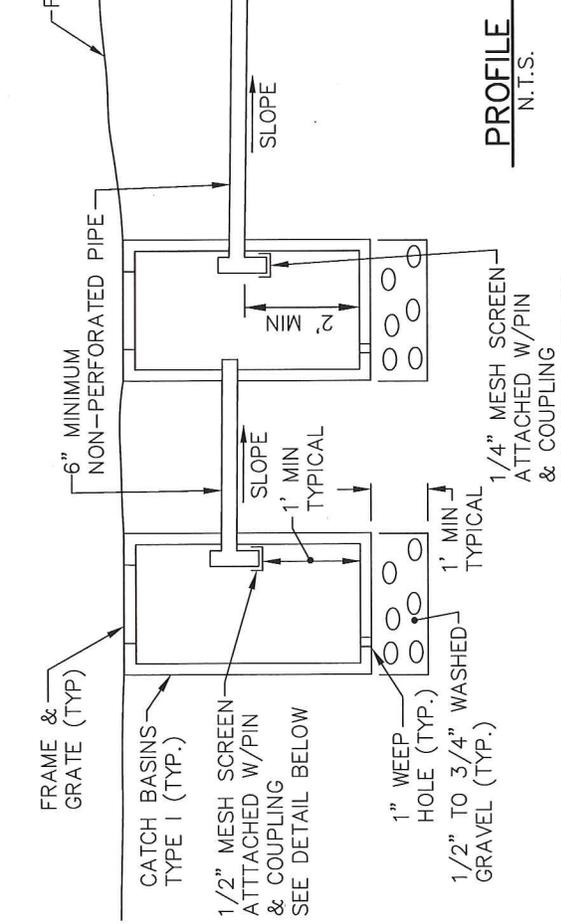
1. PIPE SIZE, SLOPES AND ALL ELEVATIONS: PER PLANS.
2. OUTLET CAPACITY: NOT LESS THAN COMBINED INLETS.
3. CATCH BASIN: TYPE 2, TO BE CONSTRUCTED IN ACCORDANCE WITH DWG. NO. 4-080-009 AND AASHTO M199 UNLESS OTHERWISE SPECIFIED
4. COVERS: ROUND, SOLID MARKED "DRAIN," WITH LOCKING BOLTS
5. ORIFICES: SIZED AND LOCATED AS REQUIRED, WITH LOWEST ORIFICE MINIMUM 2' FROM BASE
6. BAFFLE WALL SHALL HAVE #4 BAR AT 12" SPACING EACH WAY.
7. PRECAST BAFFLE WALL SHALL BE KEYS AND GROUTED IN PLACE.
8. BOTTOM ORIFICE PLATE TO BE 1/4" MIN. GALVANIZED STEEL AND ATTACHED WITH 1/2" STAINLESS STEEL BOLTS. OMIT ORIFICE PLATE IF ONLY FOR OIL SEPARATION.
9. UPPER FLOW ORIFICE SHALL BE ALUMINUM, ALUMINIZED STEEL OR GALVANIZED STEEL. SEE DWG. NO. 4-040-002. GALVANIZED STEEL SHALL HAVE TREATMENT 1.

APPROVED BY *[Signature]* DATE *5/17/97*  
 MARYSVILLE CITY ENGINEER

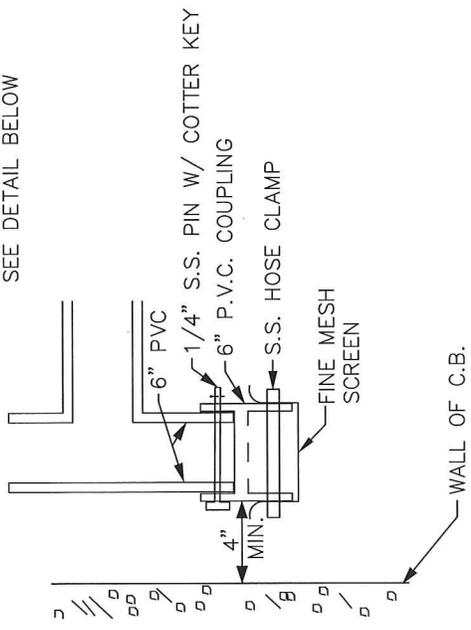
**FLOW RESTRICTOR/DEBRIS  
 POLLUTION CONTROL DEVICE  
 BAFFLE TYPE (FROP-B)**



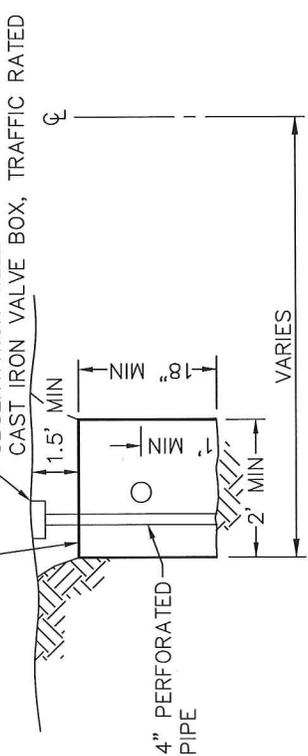
PROFILE  
N.T.S.



SCREEN CONNECTION DETAIL  
N.T.S.



SECTION A-A  
N.T.S.



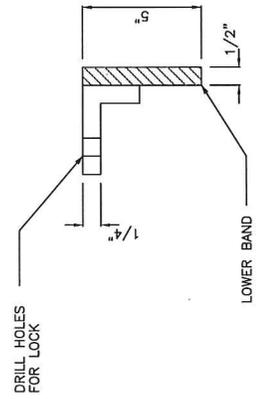
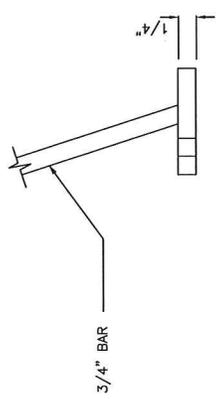
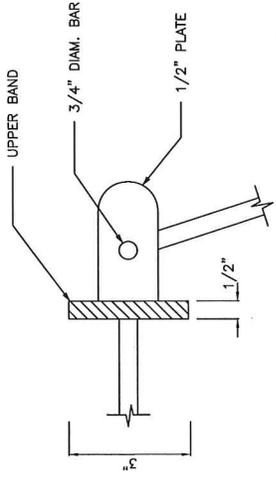
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MARYSVILLE CITY ENGINEER

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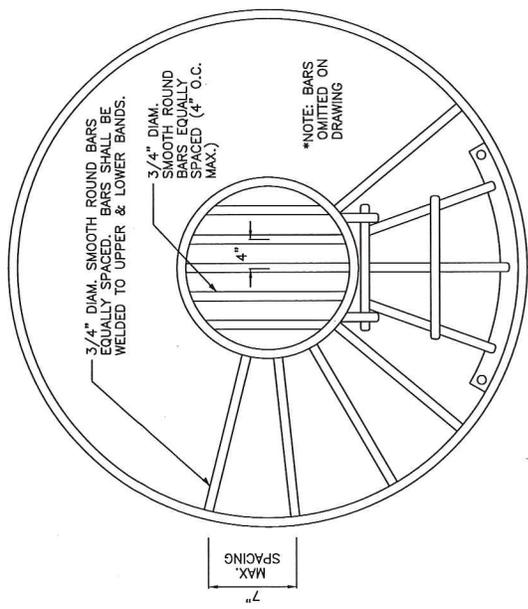
SCREEN CONNECTION DETAIL  
N.T.S.

INFILTRATION SYSTEM  
DETAIL

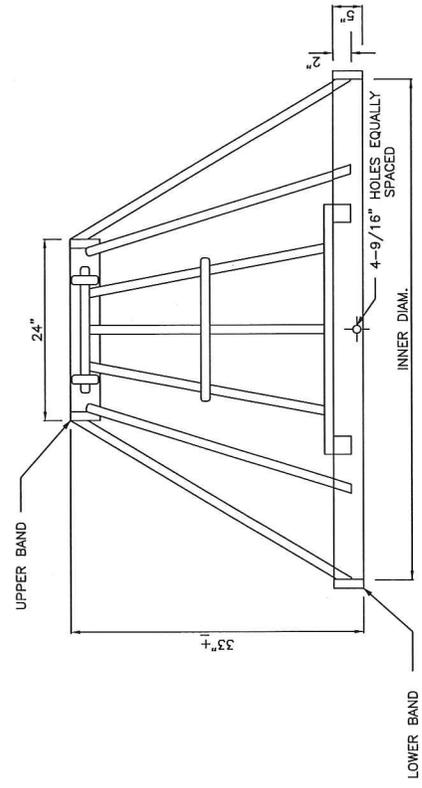




ENTRY GATE DETAIL



PLAN



ELEVATION

- NOTES:
1. ALL STEEL IN PLATES, BARS AND BANDS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A36.
  2. DEBRIS CAGE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM A123 (AASHTO M111).

CB	INNER DIAM.
48"	58"
54"	65"
60"	72"
72"	86"
96"	114"

APPROVED BY  DATE 09/07

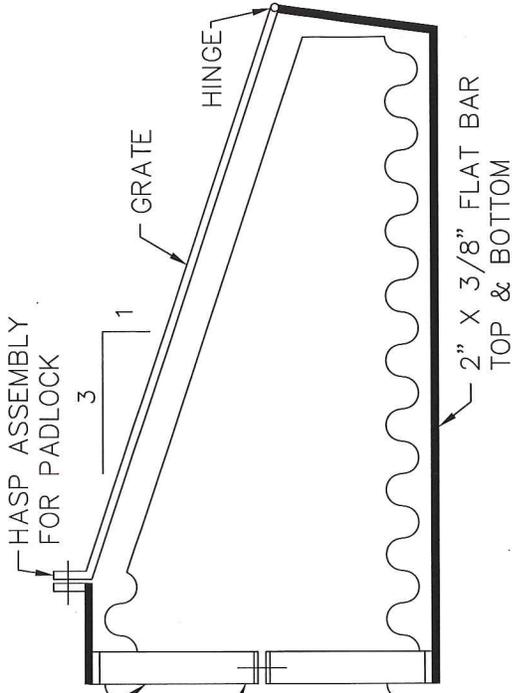
MARYSVILLE CITY ENGINEER

DEBRIS CAGE

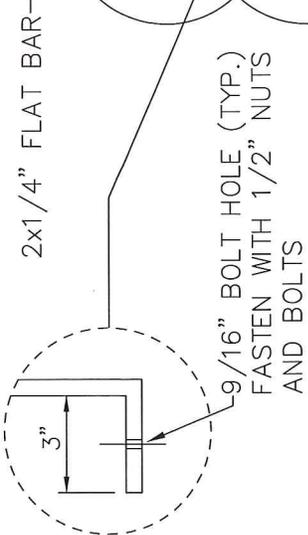


CITY OF  
**Marysville**  
WASHINGTON

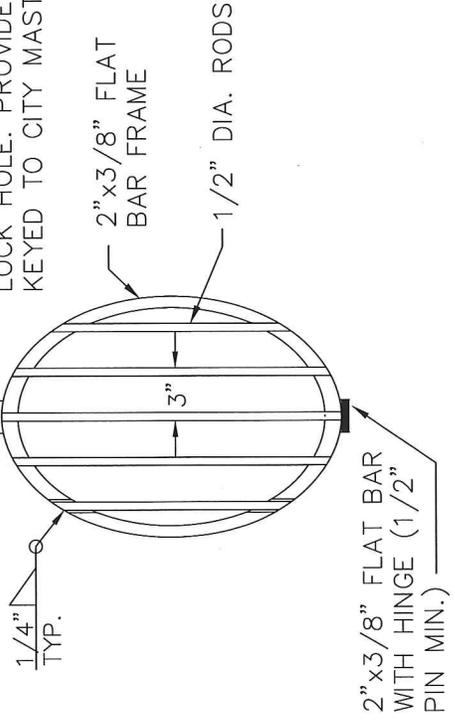
STANDARD PLAN 4-040-006



LONGITUDINAL PROFILE



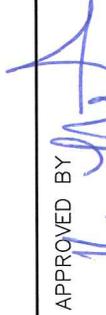
HASP ASSEMBLY. CONSTRUCT OF  
 2"x3/8" FLAT BAR WITH 1/2"  
 LOCK HOLE. PROVIDE PADLOCK  
 KEYED TO CITY MASTER KEY



NOTES:

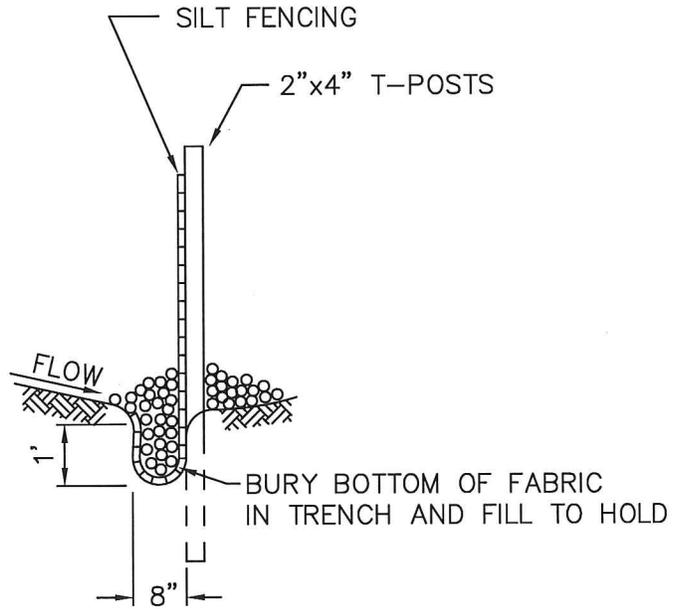
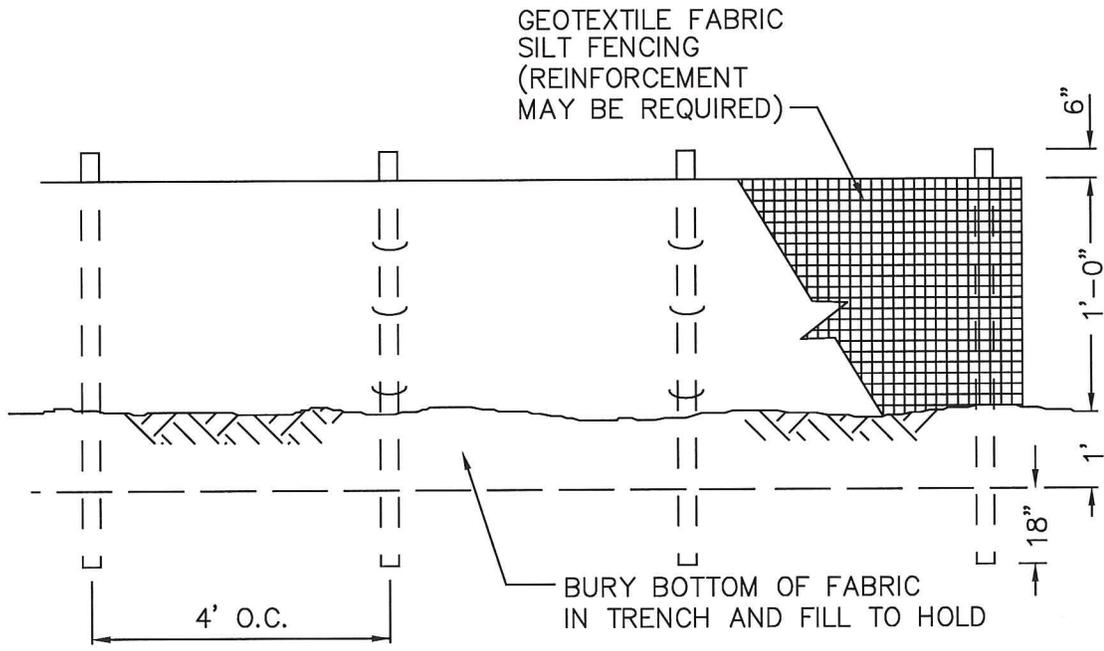
- INSTALL AT INLETS AND OUTLETS OF ALL STORM PIPE 18 INCHES AND GREATER AND AT INLETS OF ALL STORM PIPE SMALLER THAN 18 INCHES.
- CONTRACTOR TO PROVIDE SHOP DRAWINGS PRIOR TO FABRICATION. SHOP FABRICATE.
- CONSTRUCTION SHALL BE ALL STEEL. HOT DIP GALVANIZE AFTER FABRICATION.

END VIEW

APPROVED BY  DATE 5/9/07  
 MARYSVILLE CITY ENGINEER

TRASH RACK



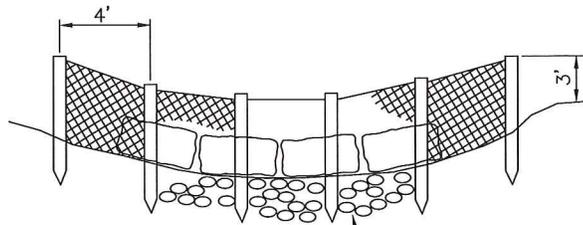


NOTE:  
1. SEE SECTION 4-080E FOR  
FABRIC SPECIFICATIONS

APPROVED BY  
*Kevin Nielson* 5/15/15  
MARYSVILLE CITY ENGINEER DATE

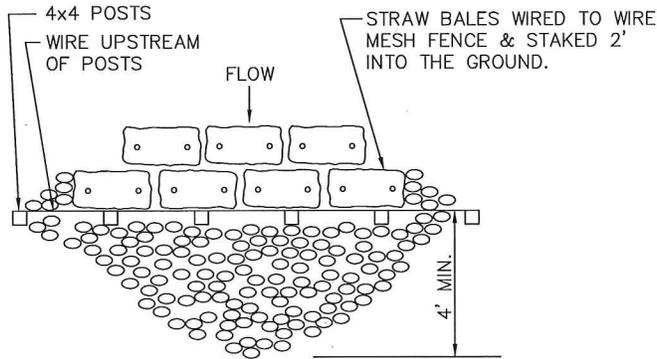
SILT FENCE DETAIL

CITY OF  
**Marysville**  
WASHINGTON



SECTION

HAND PLACE LARGE RIVER ROCK APRON TO PREVENT FORMATION OF SCOUR HOLE



PLAN

STRAW BALE CHECKS

N.T.S.

NOTE:

STRAW/HAY BALE CHECKS WILL BE TEMPORARILY INSTALLED ACROSS EXISTING DRAINAGEWAYS TO COLLECT AND STORE RUNOFF AND SEDIMENT PRIOR TO DISCHARGE. STRAW/HAY BALE CHECKS WILL BE INSTALLED IN DRAINAGEWAYS, BEFORE ANY UPSLOPE GRADING, OR CONSTRUCTION ACTIVITIES, COMMENCE. STRAW/HAY BALE CHECKS WILL BE CONSTRUCTED TO THE FOLLOWING GENERAL SPECIFICATIONS:

1. STRAW/HAY BALES SHALL BE LAID PERPENDICULAR TO FLOW, TIGHTLY ABUTTED, STACKED SECURELY IN PLACE WITH AT LEAST TWO STAKES PER BALE, AND KEYED INTO THE GROUND 6 TO 8 INCHES.
2. STRAW/HAY BALE CHECKS SHALL BE CONSTRUCTED TO A SUFFICIENT WIDTH TO RETARD RUNOFF AND TRAP SEDIMENT.
3. STRAW/HAY BALE CHECKS SHALL BE LOCATED AT 100 FOOT INTERVALS TO PROVIDE MAXIMUM CAPACITY FOR TRAPPING SEDIMENT, AS WELL AS GREATEST EASE OF CLEANOUT AND DISPOSAL OF TRAPPED SEDIMENTS.
4. STRAW BALE CHECKS SHALL BE MAINTAINED IN SATISFACTORY CONDITION UNTIL SUCH TIME THAT CLEARING AND/OR CONSTRUCTION IS COMPLETED AND PERMANENT DRAINAGE FACILITIES ARE OPERATIONAL.

APPROVED BY

*[Handwritten Signature]*

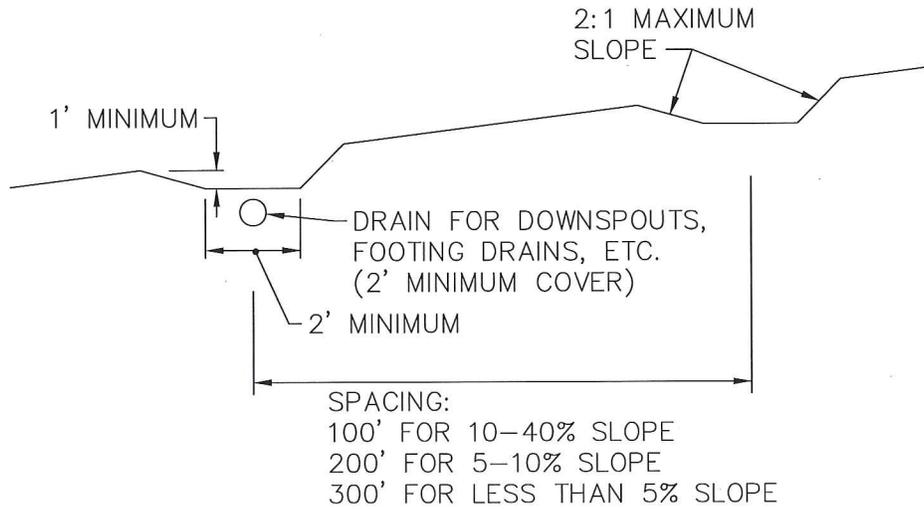
MARYSVILLE CITY ENGINEER

*5/9/07*

DATE



STRAW BALE CHECKS  
DETAIL



MAINTENANCE STANDARDS

1. DAMAGE RESULTING FROM RUNOFF OR CONSTRUCTION ACTIVITY SHALL BE REPAIRED IMMEDIATELY
2. IF THE FACILITIES DO NOT REGULARLY RETAIN STORM RUNOFF, THE CAPACITY AND/OR FREQUENCY OF THE DIKES/ SWALES SHALL BE INCREASED
3. MAINTENANCE TO BE PERFORMED BY PROPERTY OWNER

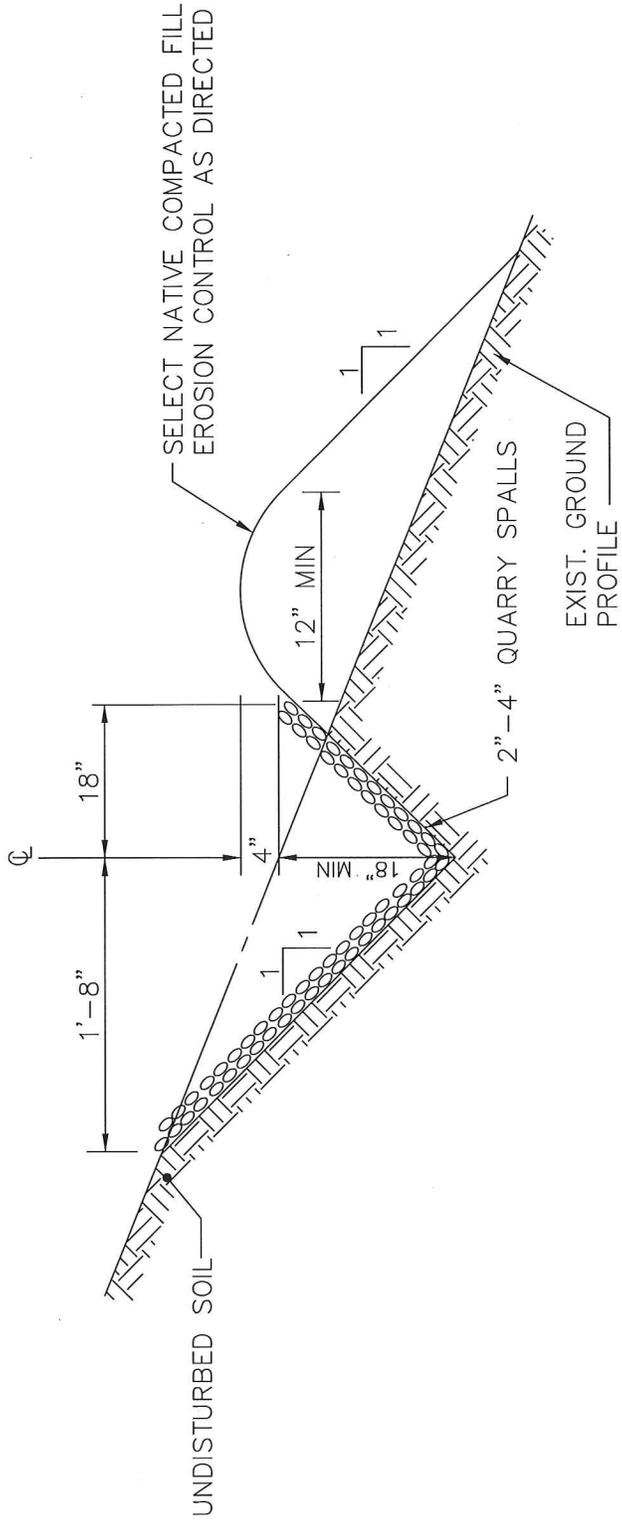
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5/9/07  
DATE



INTERCEPTOR SWALE  
DETAIL

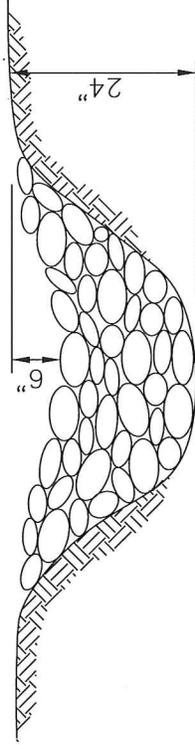


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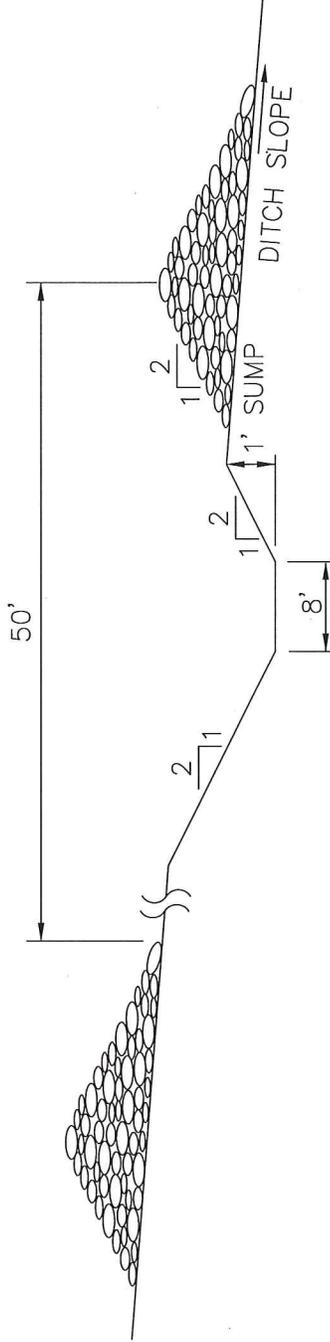
**ROCK LINED  
 DRAINAGE SWALE**

**CITY OF  
 Marysville  
 WASHINGTON**

STANDARD PLAN 4-040-011



ROCK CHECK DAM  
NTS

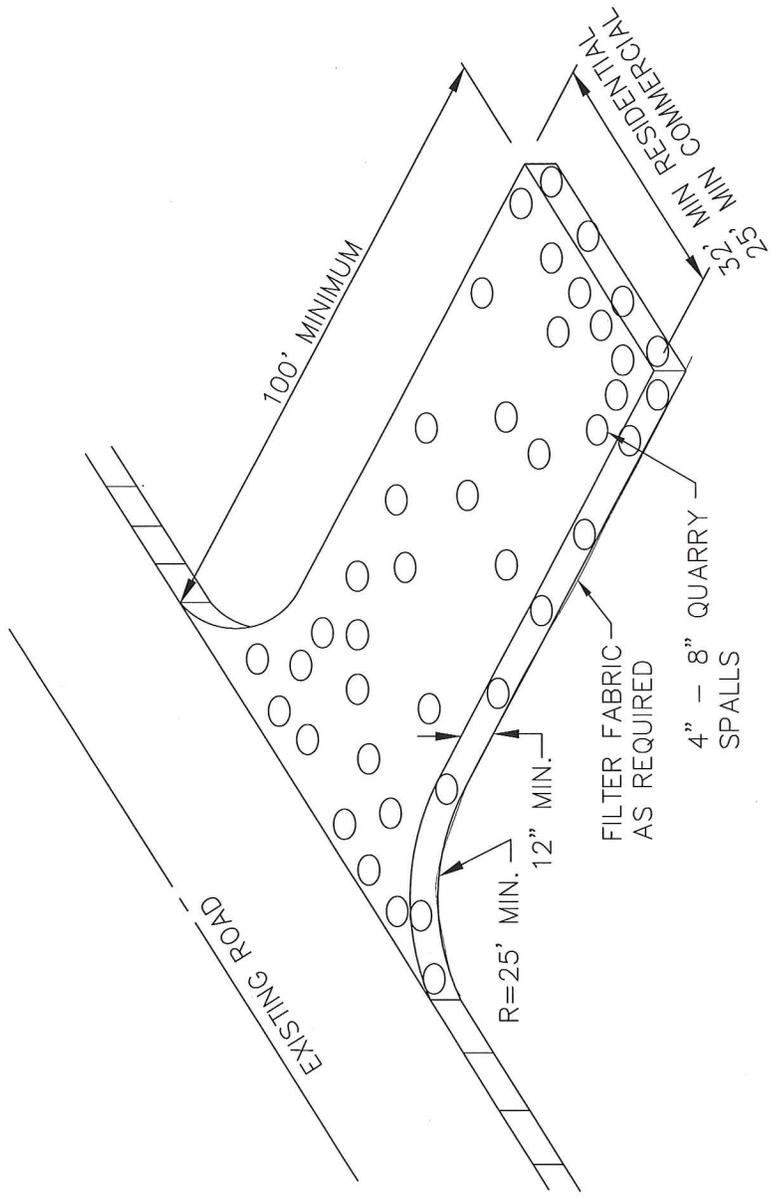


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*[Signature]*  
MARYSVILLE CITY ENGINEER

5/9/07  
DATE

SPACING BETWEEN ROCK  
CHECK DAMS





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 MARYSVILLE CITY ENGINEER

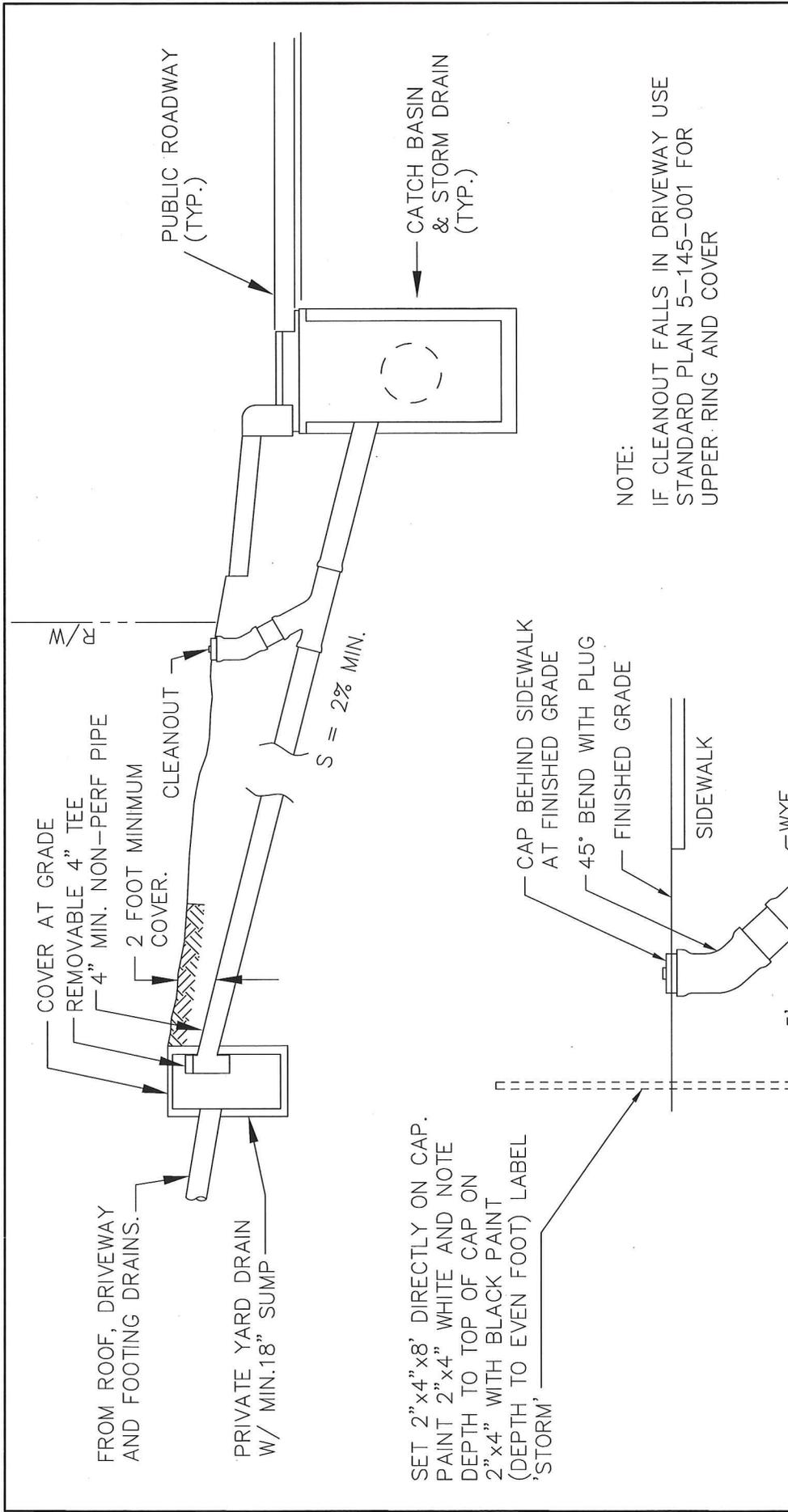
5/9/07  
 DATE

STABILIZED CONSTRUCTION  
 ENTRANCE



STANDARD PLAN 4-040-014

LAST REVISED 07/14/06



FROM ROOF, DRIVEWAY  
AND FOOTING DRAINS.

PRIVATE YARD DRAIN  
W/ MIN. 18" SUMP

COVER AT GRADE

REMOVABLE 4" TEE

4" MIN. NON-PERF PIPE

2 FOOT MINIMUM  
COVER.

CLEANOUT

S = 2% MIN.

PUBLIC ROADWAY  
(TYP.)

CATCH BASIN  
& STORM DRAIN  
(TYP.)

SET 2"x4"x8' DIRECTLY ON CAP.  
PAINT 2"x4" WHITE AND NOTE  
DEPTH TO TOP OF CAP ON  
2"x4" WITH BLACK PAINT  
(DEPTH TO EVEN FOOT) LABEL  
'STORM'

CAP BEHIND SIDEWALK  
AT FINISHED GRADE

45° BEND WITH PLUG

FINISHED GRADE

SIDEWALK

WYE

5'

CAP

PVC PIPE DIAMETER AS  
NOTED ON THE PLANS

ROOF DRAIN CLEANOUT DETAIL

NOTE:

IF CLEANOUT FALLS IN DRIVEWAY USE  
STANDARD PLAN 5-145-001 FOR  
UPPER RING AND COVER

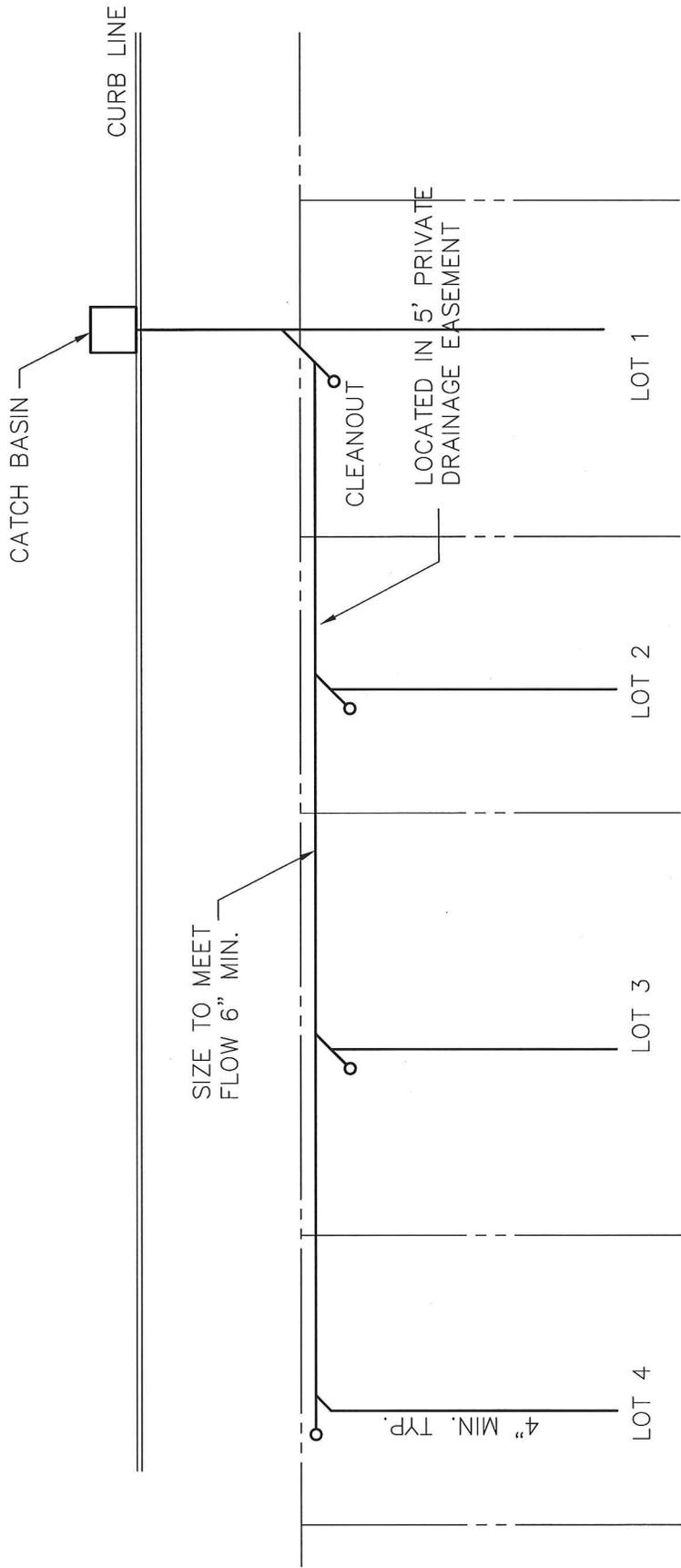
APPROVED BY *[Signature]* DATE *5/9/07*  
MARYSVILLE CITY ENGINEER

INDIVIDUAL LOT &  
ROOF PLAN  
DETAILS



STANDARD PLAN 4-040-015

LAST REVISED 11/01/06



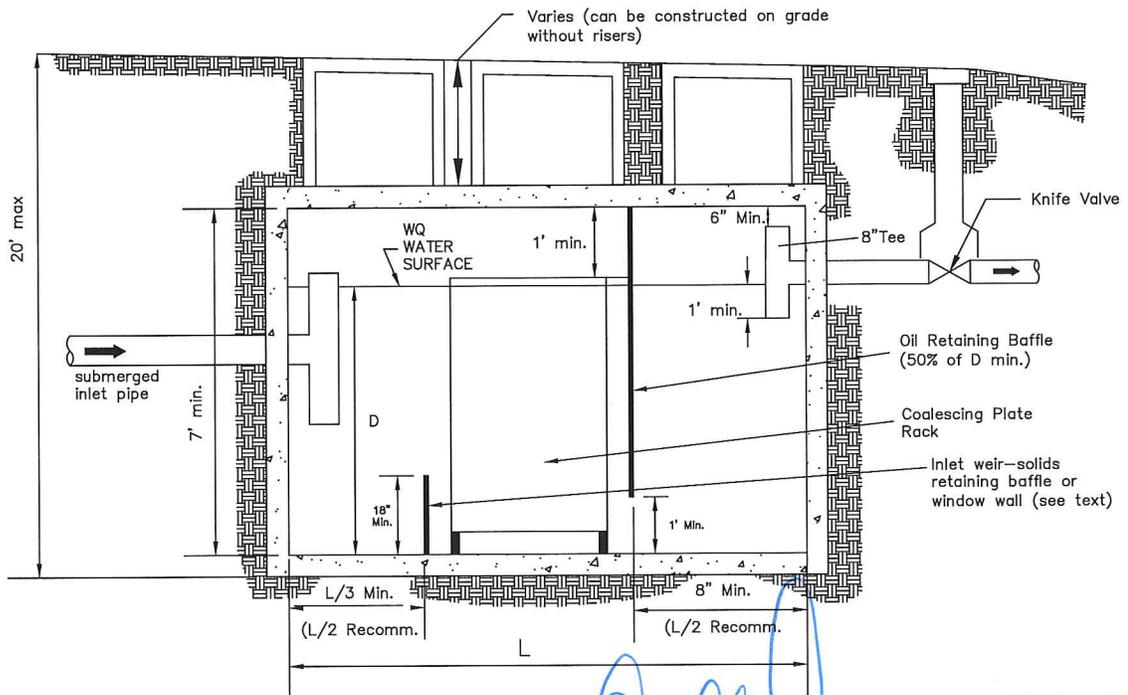
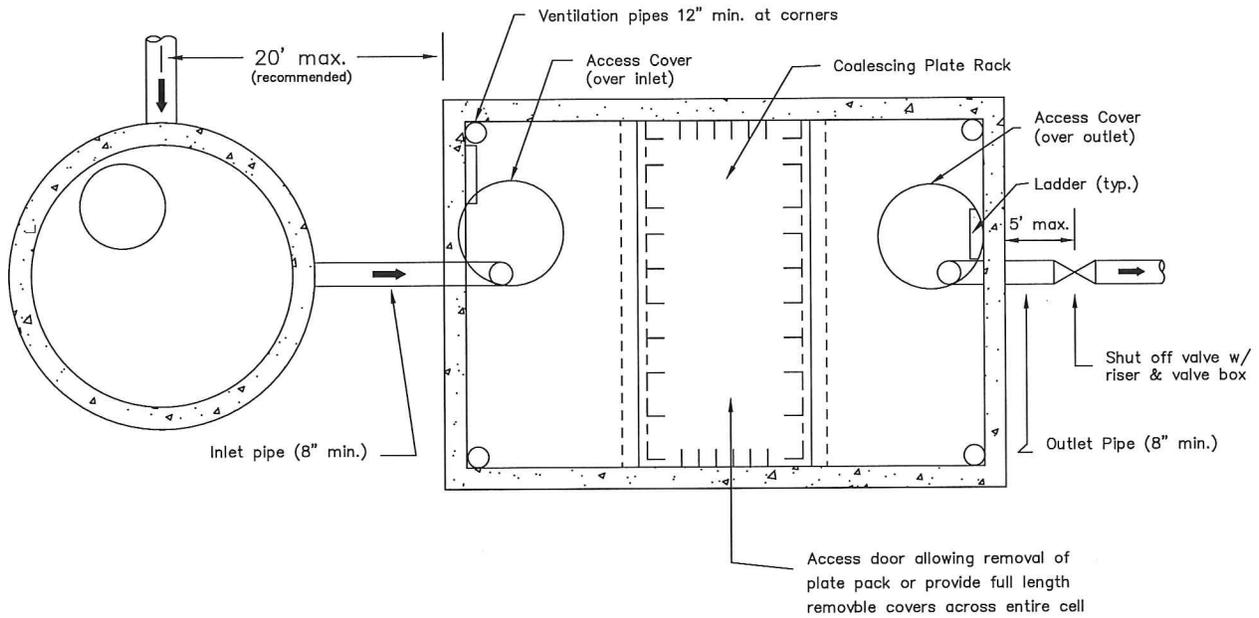
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 MARYSVILLE CITY ENGINEER

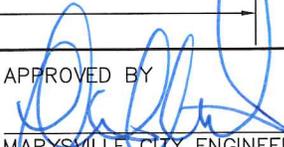
LOT AND ROOF PLAN  
 MULTI-LOTS



NOTE: YARD DRAINS TO BE LOCATED ON THE LOWER ELEVATION OF THE LOT.

PLAN VIEW

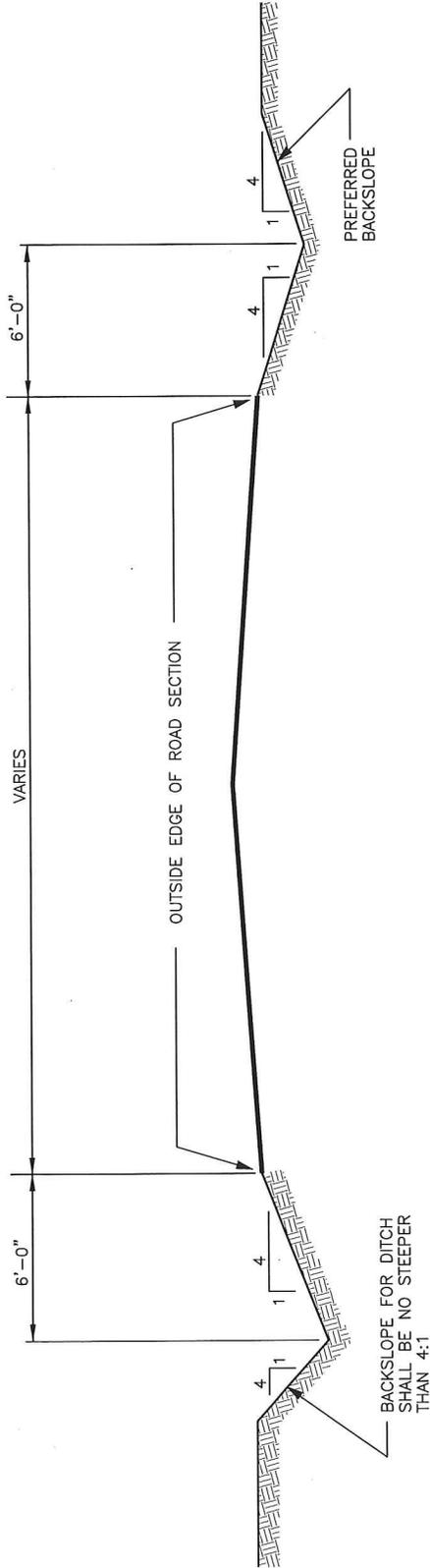


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5/15/15  
 DATE

STANDARD COALESCING  
 PLATE SEPARATOR





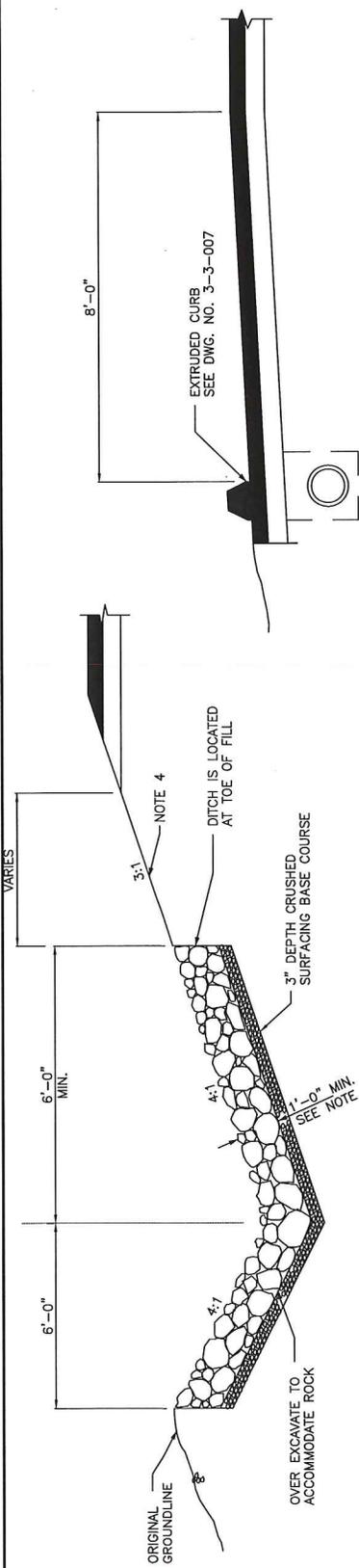
NOTES:

1. ACTUAL ROAD SURFACING DESIGN SHALL BE BASED ON SOILS AND TRAFFIC ANALYSIS PER SECTION 3-3.
2. DITCH SECTION AND/OR LOCATIONS MAY VARY TO MEET REQUIREMENTS OF THE STORMWATER MANAGEMENT MANUAL FOR THE PUGET SOUND BASIN.
3. REFER TO SECTION 3-4 FOR MAIL BOX LOCATIONS.
4. FINISHED ROAD GRADE:  
 MINIMUM 0.50%  
 MAXIMUM 7.0%  
 GREATER THAN 7% SEE STD. PLAN 4-080-002
5. SEE SECTION 3-1 FOR MINIMUM ROAD WIDTH REQUIREMENTS.

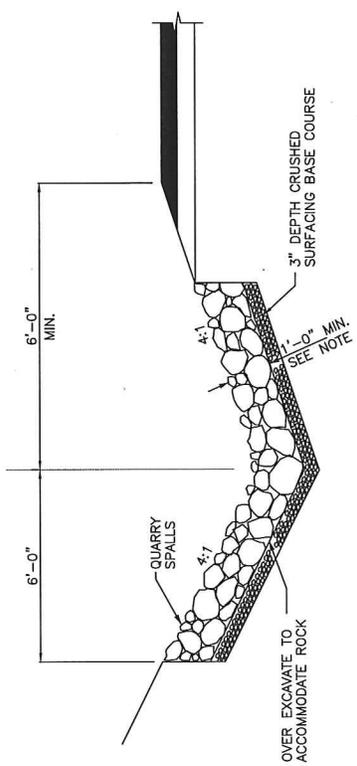
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 MARYSVILLE CITY ENGINEER

DITCH SECTIONS





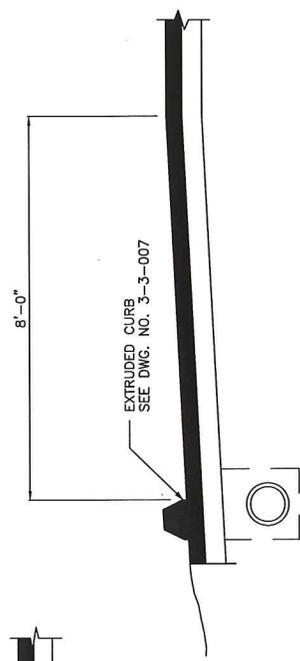
**ROCK-LINED SHOULDER DITCH  
IN FILL SECTION**



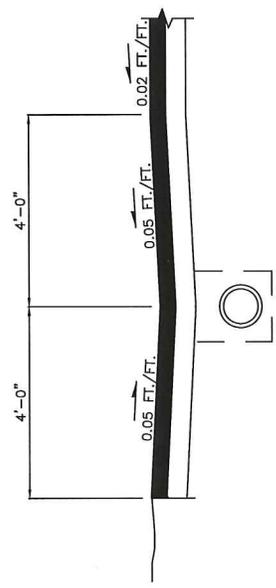
**ROCK-LINED SHOULDER DITCH  
IN CUT SECTION**

NOTES FOR ROCK LINED DITCHES

1. DEEPER ROCK FILL MAY BE SPECIFIED.
2. USE FOR FINISH ROAD GRADES - 0.5% TO 9%
3. FOR SLOPES GREATER THAN 7% PROTECT SLOPE WITH ROCK FOR SLOPES LESS THAN 7% PLACE CRUSHED ROCK OR HYDROSEED.



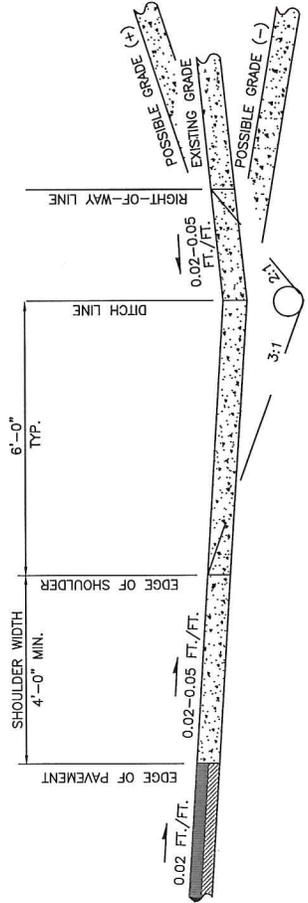
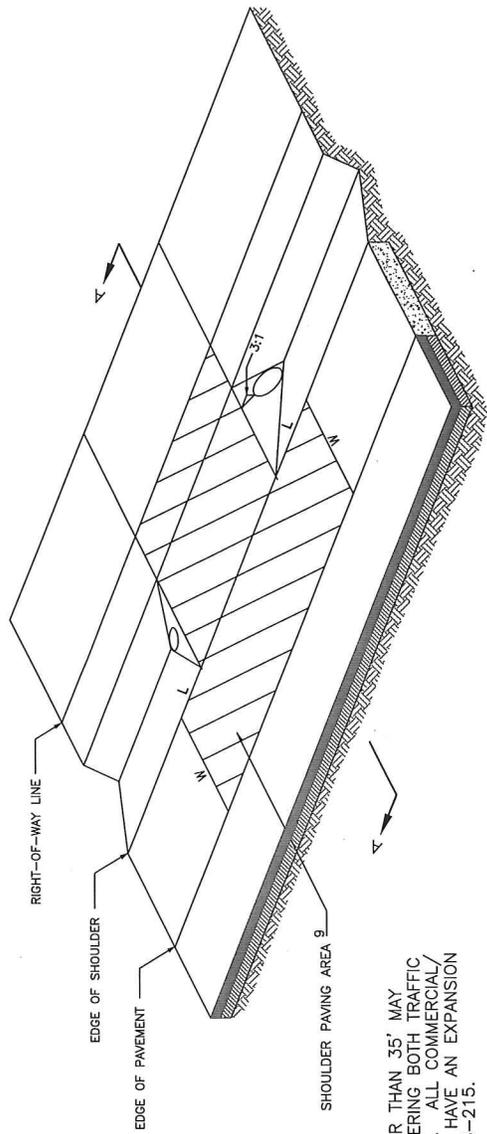
**CURBED SHOULDER**



**TURNPIKE SHOULDER**

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**ROCK LINED SHOULDER  
DITCHES & CURBED OR  
TURNPIKE SHOULDERS**



SECTION A-A

NOTES:

1. COMMERCIAL/INDUSTRIAL DRIVEWAYS WIDER THAN 35' MAY BE APPROVED BY THE ENGINEER CONSIDERING BOTH TRAFFIC SAFETY AND THE ACTIVITY BEING SERVED. ALL COMMERCIAL/INDUSTRIAL CONCRETE DRIVEWAYS SHALL HAVE AN EXPANSION JOINT LOCATED MID-WIDTH. SEE SEC. 3-215.
2. PIPE SHALL BE:
  - A. SIZED TO CONVEY COMPUTED STORM WATER RUNOFF, AND
  - B. MIN. 12" DIAM., AND
  - C. EQUAL TO OR LARGER THAN EXISTING PIPES WITHIN 500' UPSTREAM.
3. EXPOSED PIPE ENDS SHALL BE BEVELED TO MATCH THE SLOPE FACE AND PROJECT NO MORE THAN 2" BEYOND SLOPE SURFACE. PROJECTING HEADWALLS ARE NOT ACCEPTABLE.
4. CONCRETE PIPE SHALL HAVE MIN. COVER OF 6" TO FINISH GRADE. ALL OTHER TYPES OF PIPE SHALL HAVE MIN. 24" COVER.
5. PIPE SHALL BE INSTALLED IN A STRAIGHT UNIFORM ALIGNMENT AT A MIN. 0.5% SLOPE (0.5 FT. PER 100 FT.) WITH THE DOWNSTREAM END LOWER THAN THE UPSTREAM END.
6. PIPE MAY BE OMITTED IF ROADSIDE DITCH DOES NOT EXIST AND DRIVEWAY DOES NOT BLOCK NATURAL FLOW.
7. DRIVEWAY SLOPE SHALL MATCH TO BACK EDGE OF SHOULDER, BUT SHOULDER SLOPE AND EDGE OF SHOULDER SHALL NOT BE ALTERED AS A RESULT OF DRIVEWAY CONSTRUCTION.
8. PAVED DRIVEWAYS SHALL BE PAVED THROUGH RIGHT-OF-WAY WITH A.C. OR B.S.T., BUT NOT P.C.C.
9. GRAVEL DRIVEWAYS SHALL BE PAVED BETWEEN THE EDGE OF PAVEMENT AND R/W WITH A.C. OR B.S.T. ONLY WITH DIMENSIONS L=W.
10. TOTAL DRIVEWAY WIDTHS SHALL BE LIMITED TO 30% OF FRONTAGE UNLESS VARIANCE IS GRANTED.

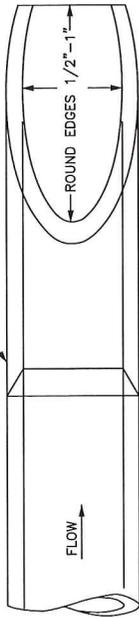
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5/9/07 DATE

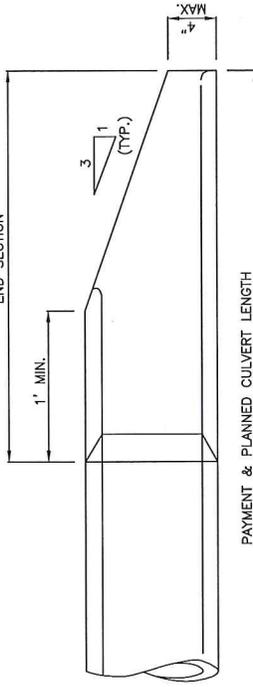
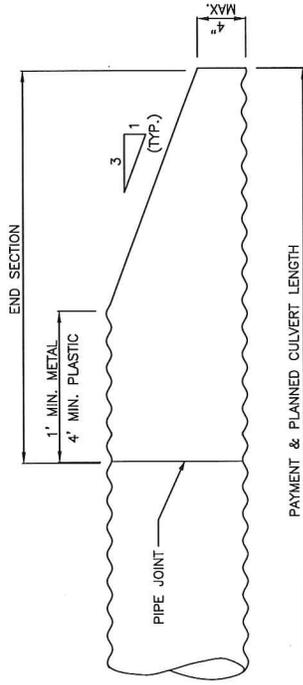
SHOULDER & DITCH SECTION DRIVEWAY



GROOVE END ALWAYS LAID UPGRADE



PLAN



ELEVATION

METAL & PLASTIC PIPE

CONCRETE PIPE

NOTE:  
 SIDE SLOPE SHALL BE WARPED TO MATCH THE BEVELED PIPE END. WHEN CULVERT IS ON SKEW, BEVELED END SHALL BE ROTATED TO CONFORM TO SLOPE. IF SLOPE DIFFERS FROM 3:1, PIPE SHALL BE BEVELED TO MATCH SLOPE.

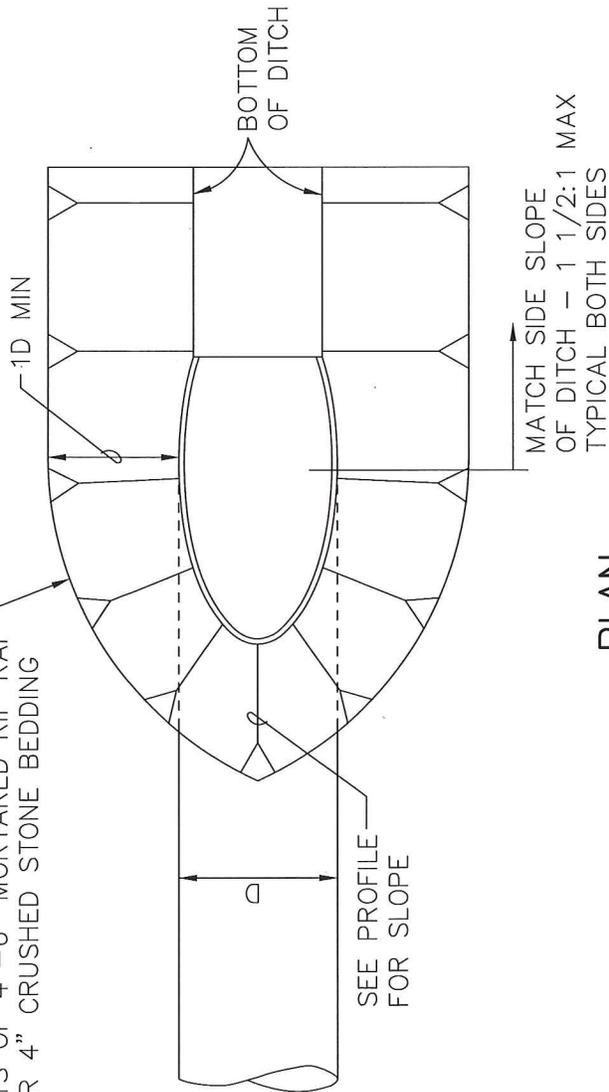
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5/9/07  
 DATE

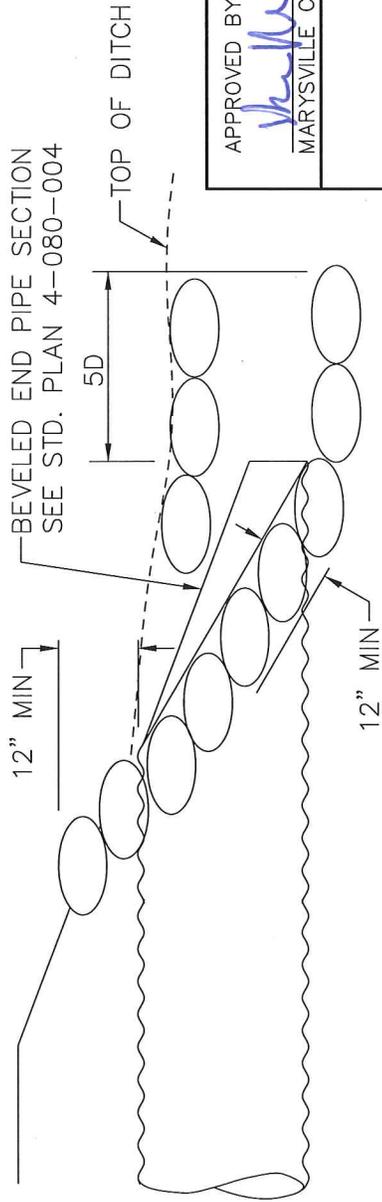
BEVELED END PIPE SECTION



LIMITS OF 4" - 6" MORTARED RIP RAP  
OVER 4" CRUSHED STONE BEDDING



PLAN



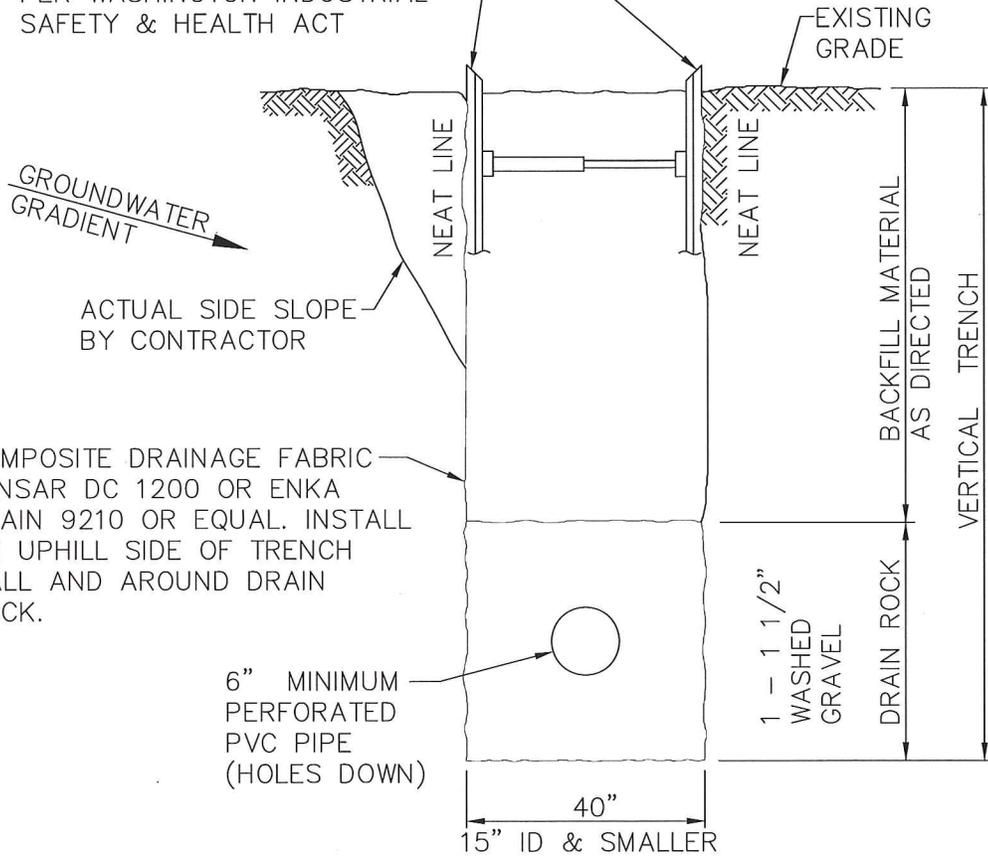
PROFILE

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ROCK HEADWALL  
DETAIL



CRIBBING & SHEETING AS  
 REQUIRED FOR TRENCH  
 DEPTH EXCEEDING 4'-0".  
 PER WASHINGTON INDUSTRIAL  
 SAFETY & HEALTH ACT



COMPOSITE DRAINAGE FABRIC  
 TENSAR DC 1200 OR ENKA  
 DRAIN 9210 OR EQUAL. INSTALL  
 ON UPHILL SIDE OF TRENCH  
 WALL AND AROUND DRAIN  
 ROCK.

6" MINIMUM  
 PERFORATED  
 PVC PIPE  
 (HOLES DOWN)

1 - 1 1/2"  
 WASHED  
 GRAVEL

BACKFILL MATERIAL  
 AS DIRECTED  
 VERTICAL TRENCH

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 DATE

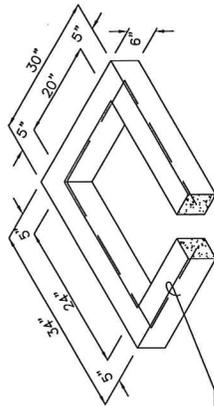
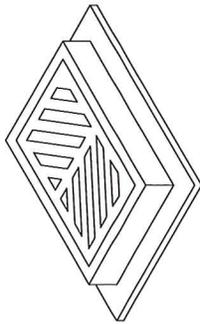


FRENCH DRAIN

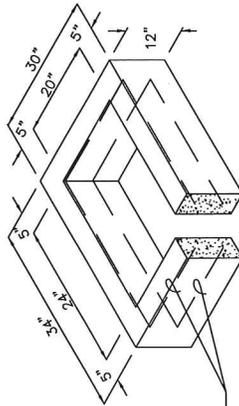
NOTES:

1. CATCH BASINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH ASTM C478 (AASHTO M 199) & C890 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE WSDOT/APWA STANDARD SPECIFICATIONS.
2. AS AN ACCEPTABLE ALTERNATIVE TO REBAR, WELDED WIRE FABRIC HAVING A MIN. AREA OF 0.12 SQUARE INCHES PER FOOT MAY BE USED. WELDED WIRE FABRIC SHALL COMPLY TO ASTM A497 (AASHTO M 221). WIRE FABRIC SHALL NOT BE PLACED IN KNOCKOUTS.
3. ALL REINFORCED CAST-IN-PLACE CONCRETE SHALL BE CLASS 4000.
4. PRECAST BASES SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE A WALL THICKNESS OF 2" MIN. ALL PIPE SHALL BE INSTALLED IN FACTORY PROVIDED KNOCKOUTS. UNUSED KNOCKOUTS NEED NOT BE GROUTED IF WALL IS LEFT INTACT.
5. KNOCKOUT OR CUTOUT HOLE SIZE IS EQUAL TO PIPE OUTER DIAM. PLUS CATCH BASIN WALL THICKNESS.
6. ROUND KNOCKOUTS MAY BE ON ALL 4 SIDES, WITH MAX. DIAM. OF 20". KNOCKOUTS MAY BE EITHER ROUND OR "D" SHAPE.
7. THE MAX. DEPTH FROM THE FINISHED GRADE TO THE PIPE INVERT IS 5'-0".
8. THE TAPER ON THE SIDES OF THE PRECAST BASE SECTION AND RISER SECTION SHALL NOT EXCEED 1/2"/FT.
9. CATCH BASIN FRAME AND GRATE SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS AND MEET THE STRENGTH REQUIREMENTS OF FEDERAL SPECIFICATION RR-F-62ID. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
10. FRAME AND GRATE MAY BE INSTALLED WITH FLANGE DOWN OR CAST INTO RISER.
11. FOR CATCH BASINS IN PARKING LOTS REFER TO WSDOT/APWA STANDARD DWG. B1-b.
12. EDGE OF RISER OR BRICK SHALL NOT BE MORE THAN 2" FROM VERTICAL EDGE OF CATCH BASIN WALL.
13. MINIMUM 4" ADJUSTMENT SECTION BETWEEN BOTTOM OF GRATE AND TOP OF BASE SECTION.

FRAME AND GRATE  
SEE SEC. 4-080E AND  
APPLICABLE DWGS.

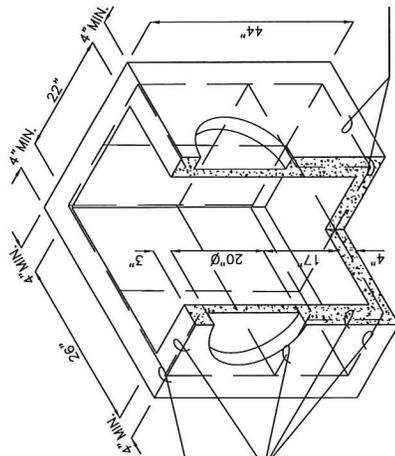


6" RISER SECTION



12" RISER SECTION

PRECAST BASE SECTION  
(MEASUREMENT AT THE TOP  
OF THE BASE)



#3 BAR EACH CORNER

#3 BAR EACH SIDE

#3 BAR EACH WAY

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*[Signature]*

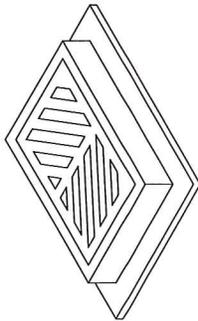
MARYSVILLE CITY ENGINEER

DATE

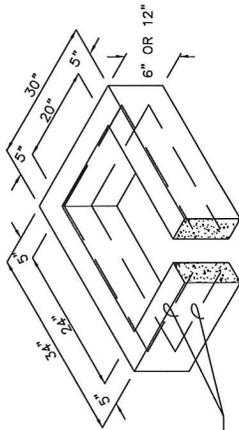
5/9/07

CATCH BASIN  
TYPE 1  
(18" MAX. DIA.)



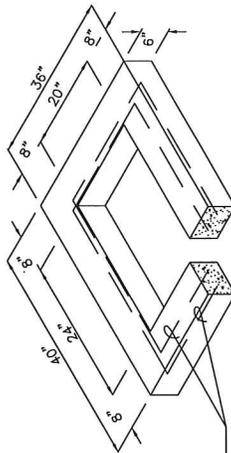


FRAME AND GRATE  
SEE SEC. 4-080E AND  
APPLICABLE DWGS.



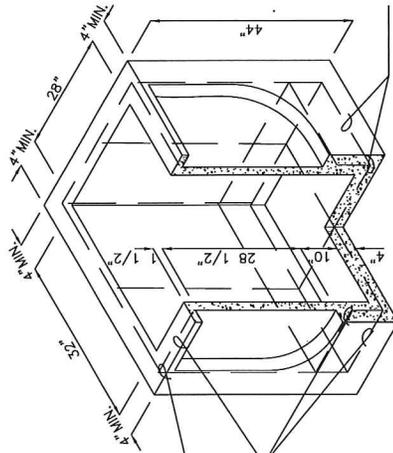
RISER SECTION

- 1 #3 BAR HOOP FOR 6"
- 2 #3 BAR HOOP FOR 12"



6" REDUCING SECTION

- 2 #3 BAR HOOP



PRECAST BASE SECTION  
(MEASUREMENT AT THE TOP  
OF THE BASE)

- #3 BAR EACH CORNER

- #3 BAR EACH SIDE

- #3 BAR EACH WAY

NOTES:

1. CATCH BASINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH ASTM C478 (AASHTO M 199) & C890 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE WSDOT/APWA STANDARD SPECIFICATIONS.
2. AS AN ACCEPTABLE ALTERNATIVE TO REBAR, WELDED WIRE FABRIC HAVING A MIN. AREA OF 0.12 SQUARE INCHES PER FOOT MAY BE USED. WELDED WIRE FABRIC SHALL COMPLY TO ASTM A497 (AASHTO M 221). WIRE FABRIC SHALL NOT BE PLACED IN KNOCKOUTS.
3. ALL REINFORCED CAST-IN-PLACE CONCRETE SHALL BE CLASS 4000.
4. PRECAST BASES SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE A WALL THICKNESS OF 2" MIN. ALL PIPE SHALL BE INSTALLED IN FACTORY PROVIDED KNOCKOUTS. UNUSED KNOCKOUTS NEED NOT BE GROUTED IF WALL IS LEFT INTACT.
5. KNOCKOUT OR CUTOUT HOLE SIZE IS EQUAL TO PIPE OUTER DIAM. PLUS CATCH BASIN WALL THICKNESS.
6. KNOCKOUTS MAY BE ON ALL 4 SIDES WITH MAX. DIAM. OF 28". KNOCKOUTS MAY BE EITHER ROUND OR "D" SHAPE.
7. THE TAPER ON THE SIDES OF THE PRECAST BASE SECTION AND RISER SECTION SHALL NOT EXCEED 1/2"/FT.
8. CATCH BASIN FRAME AND GRATE SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS AND MEET THE STRENGTH REQUIREMENTS OF FEDERAL SPECIFICATION RR-F-62ID. FINISH SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
9. FRAME AND GRATE MAY BE INSTALLED WITH FLANGE DOWN OR CAST INTO RISER.
10. MAX. DEPTH FROM FINISHED GRADE TO PIPE INVERT SHALL BE 5'-0".
11. EDGE OF REDUCING SECTION OR BRICK SHALL NOT BE MORE THAN 2" FROM VERTICAL EDGE OF CATCH BASIN WALL.
12. MINIMUM 4" ADJUSTMENT SECTION BETWEEN BOTTOM OF GRATE AND TOP OF BASE SECTION.

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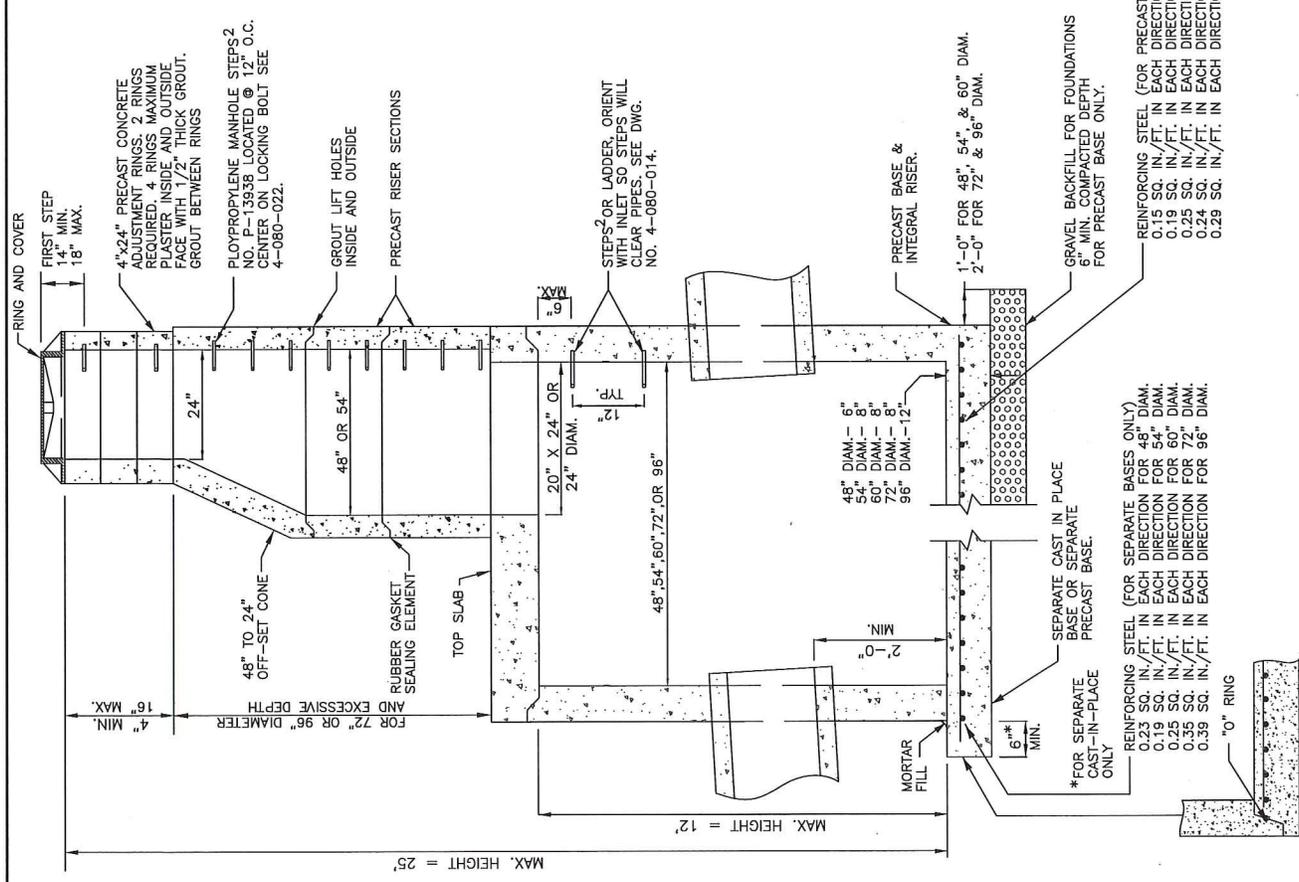
*K. K. K.*  
MARYSVILLE CITY ENGINEER

DATE

5/9/07

CATCH BASIN  
TYPE 1-L  
(18"-28" DIA.)





NOTES:

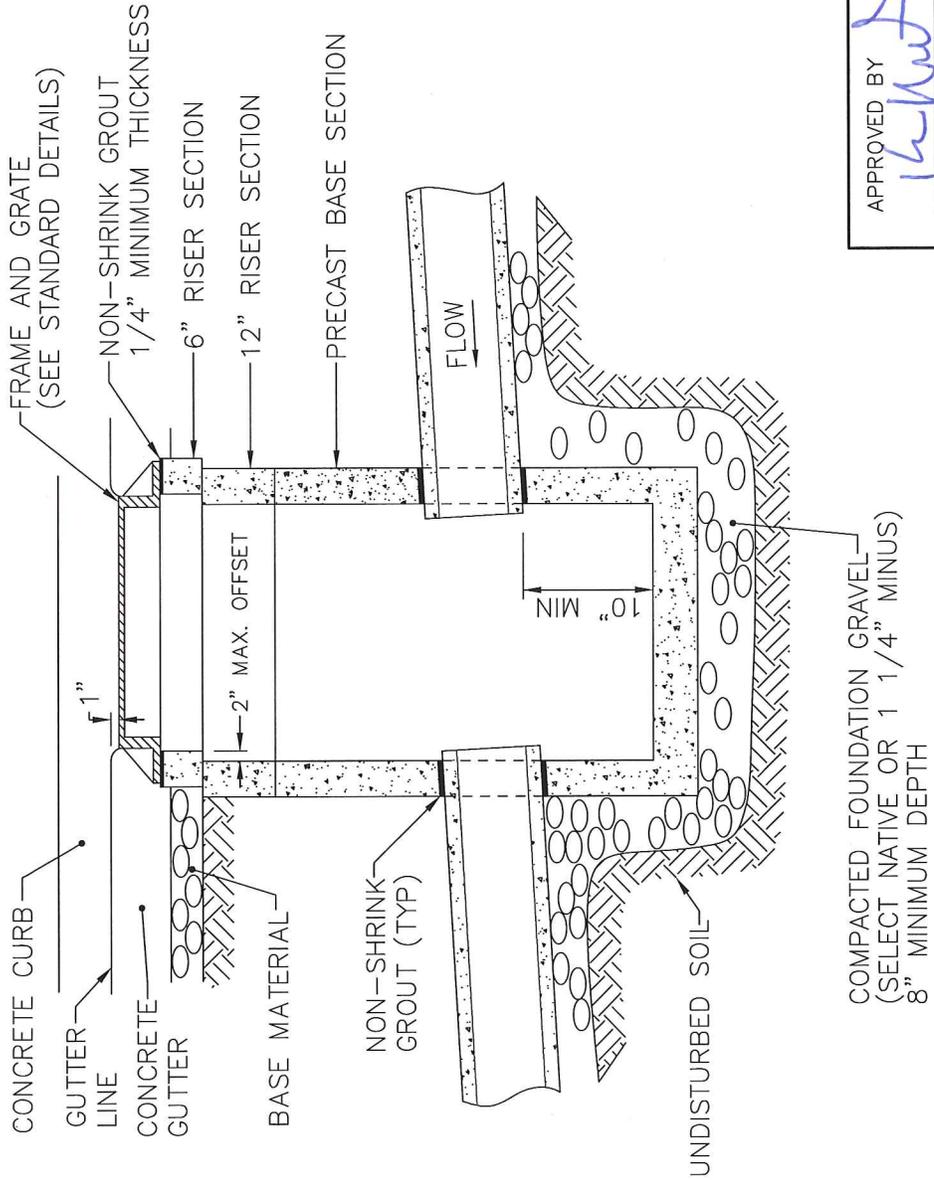
1. CATCH BASINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH ASTM C478 (AASHTO M199) AND ASTM C890 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE WSDOT/APWA STANDARD SPECIFICATIONS.
2. HANDHOLDS IN ADJUSTMENT SECTION SHALL HAVE 3" MIN. CLEARANCE. STEPS IN CATCH BASIN SHALL HAVE 6" MIN. CLEARANCE. SEE DWG. NO. 4-080-014, CATCH BASIN DETAILS. HANDHOLDS SHALL BE PLACED IN ALTERNATING GRADE RINGS OR LEVELING BRICK COURSE WITH A MIN. OF ONE HANDHOLD BETWEEN THE LAST STEP AND TOP OF THE MANHOLE.
3. ALL REINFORCED CAST-IN-PLACE CONCRETE SHALL BE CLASS 4000. ALL PRECAST CONCRETE SHALL BE CLASS 4000.
4. PRECAST BASES SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE WALL THICKNESS OF 2" MIN. UNUSED KNOCKOUTS NEED NOT BE GROUTED IF WALL IS LEFT INTACT. PIPES SHALL BE INSTALLED ONLY IN FACTORY KNOCKOUTS UNLESS OTHERWISE APPROVED BY THE ENGINEER.
5. KNOCKOUT OR CUTOUT HOLE SIZE SHALL EQUAL PIPE OUTER DIAM. PLUS CATCH BASIN WALL THICKNESS. MAX. HOLE SIZE SHALL BE 36" FOR 48" CATCH BASIN, 42" FOR 54" C.B., 48" FOR 60" C.B., 60" FOR 72" C.B., 84" FOR 96" C.B. MIN. DISTANCE BETWEEN HOLES SHALL BE 8" FOR 48", 54", AND 60" C.B.; 12" FOR 72" AND 96" C.B.
6. CATCH BASIN FRAMES AND GRATES OR COVERS SHALL BE IN ACCORDANCE WITH SEC. 4-080(D) AND MEET THE STRENGTH REQUIREMENTS OF FEDERAL SPECIFICATION RR-F-621D. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
7. ALL BASE REINFORCING STEEL SHALL HAVE A MIN. YIELD STRENGTH OF 60,000 PSI AND BE PLACED IN THE UPPER HALF OF THE BASE WITH 1" MIN. CLEARANCE.
8. MIN. SOIL BEARING VALUE SHALL EQUAL 3,300 POUNDS PER SQUARE FOOT.
9. FOR DETAILS SHOWING LADDER, STEPS, HANDRAILS AND TOP SLABS, SEE DWG. NO. 4-080-014.
10. SEE THE WSDOT/APWA STANDARD SPECIFICATIONS SEC. 7-05.3 FOR JOINT REQUIREMENTS.

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**CATCH BASIN TYPE 2**  
**48", 54", 72", 96"**



STANDARD PLAN 4-080-009



CONCRETE CURB  
 GUTTER LINE  
 CONCRETE GUTTER  
 BASE MATERIAL  
 NON-SHRINK GROUT (TYP)  
 UNDISTURBED SOIL  
 COMPACTED FOUNDATION GRAVEL  
 (SELECT NATIVE OR 1 1/4" MINUS)  
 8" MINIMUM DEPTH

FRAME AND GRATE  
 (SEE STANDARD DETAILS)  
 NON-SHRINK GROUT  
 1/4" MINIMUM THICKNESS  
 6" RISER SECTION  
 12" RISER SECTION  
 PRECAST BASE SECTION

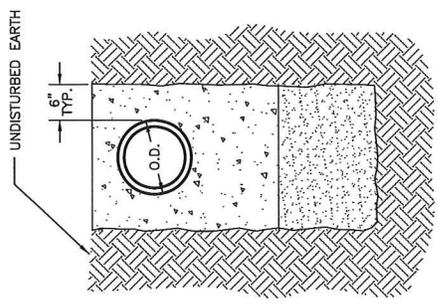
10" MIN  
 2" MAX. OFFSET  
 FLOW

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 MARYSVILLE CITY ENGINEER DATE

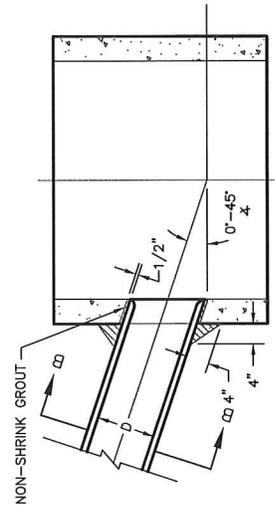
CATCH BASIN  
 INSTALLATION DETAIL  
 TYPE 1 & 1L



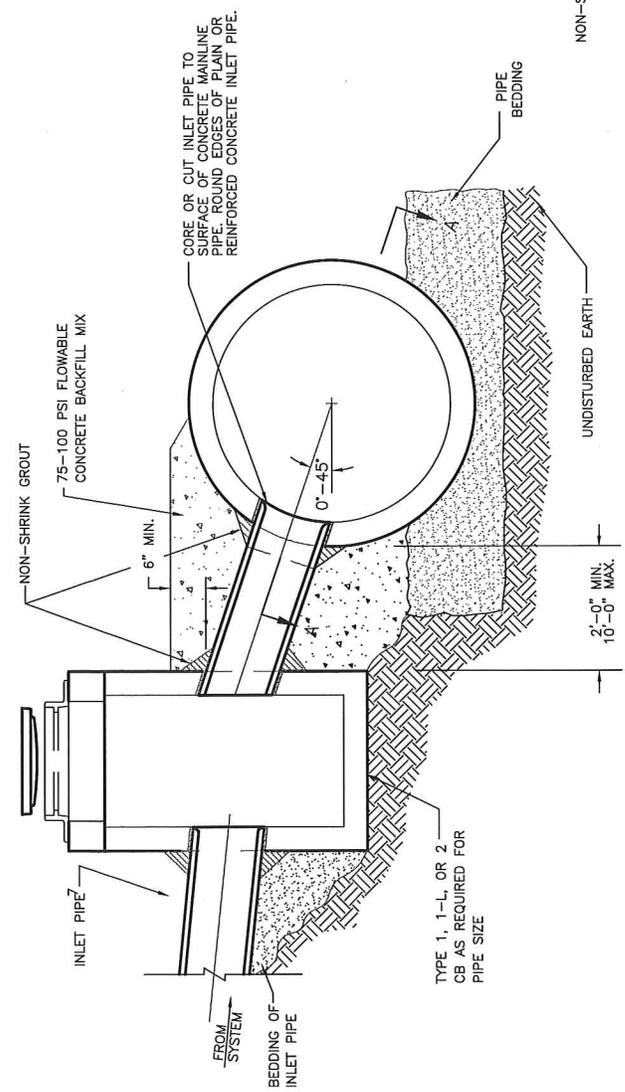
STANDARD PLAN 4-080-010



SECTION B-B



SECTION A-A



TYPE 1, 1-L, OR 2  
CB AS REQUIRED FOR  
PIPE SIZE

NOTES:

1. "D", THE INSIDE DIAM. OF THE INLET PIPE, SHALL BE 24" OR LESS. FOR LARGER VALUES OF "D", USE AN APPROVED STRUCTURE.
2. IN NO CASE SHALL THE OUTSIDE DIAM. OF THE INLET PIPE EXCEED ONE-HALF THE INSIDE DIAM. OF THE MAIN STORM SEWER.
3. C. OF INLET PIPE SHALL BE ON RADIUS OF MAIN STORM DRAIN.
4. THE MIN. OPENING INTO THE EXISTING STORM DRAIN SHALL BE THE OUTSIDE DIAM. OF THE INLET PIPE PLUS 1 IN.
5. IF  $\alpha$  IS GREATER THAN 45° FIELD TAPPING IS NOT ALLOWED.
6. SEE SEC. 4-080(C).
7. SEE SEC. 4-080(B) FOR ALLOWED INLET PIPE TYPE.

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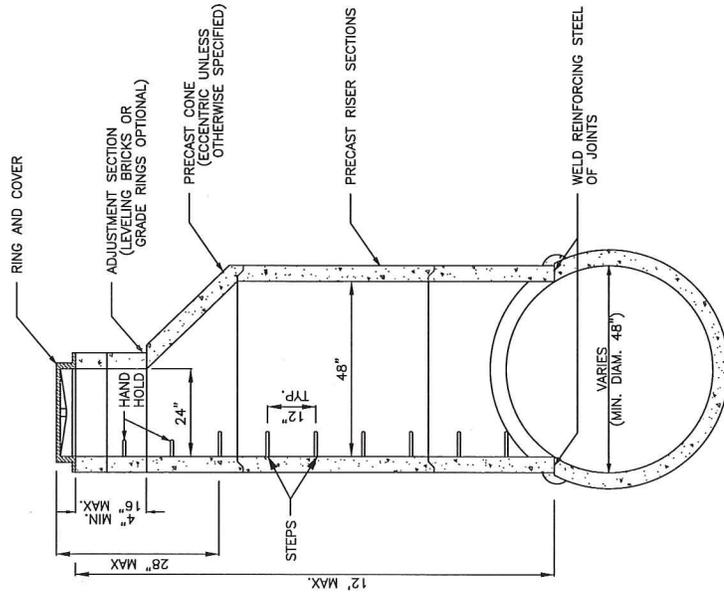
**FIELD TAPPING  
OF CONCRETE PIPE**



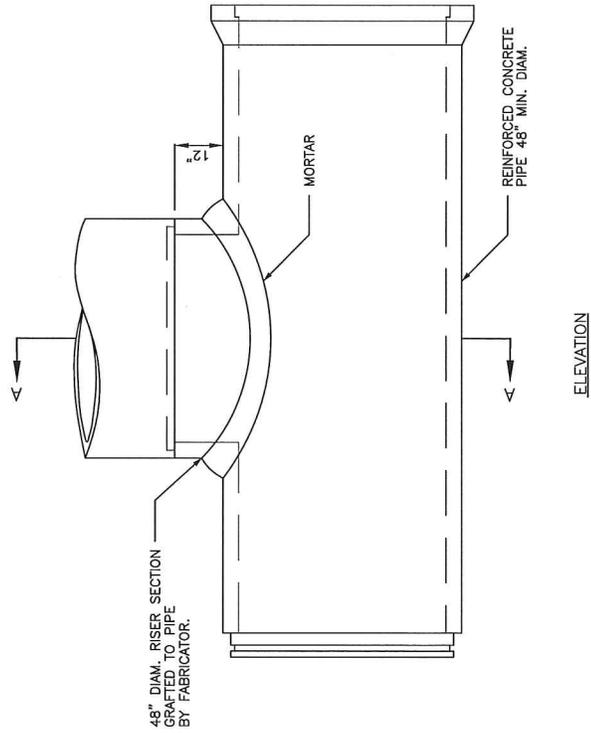
STANDARD PLAN 4-080-011

NOTES:

1. MANHOLES SHALL BE CONSTRUCTED IN ACCORDANCE WITH AASHTO M199 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE WSDOT/APWA STANDARD SPECIFICATIONS.
2. HANDHOLDS IN ADJUSTMENT SECTION SHALL HAVE 3" MIN. CLEARANCE. STEPS IN MANHOLE SHALL HAVE 6" MIN. CLEARANCE. SEE DWG. NO. 4-080-014, "MANHOLE DETAILS."
3. MANHOLE RINGS AND COVERS SHALL BE IN ACCORDANCE WITH SEC. 4-080(D) AND MEET THE STRENGTH REQUIREMENTS OF FEDERAL SPECIFICATION RR-F-621D. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
4. ALL PRECAST CONCRETE SHALL BE CLASS 4000.
5. FOR DETAILS SHOWING GRADE RING, LADDER, STEPS, HANDHOLDS, AND TOP SLABS, SEE DWG. NO. 4-080-014, "MANHOLE DETAILS".
6. NOT FOR USE IN TRAFFIC BEARING AREAS.



SECTION A-A



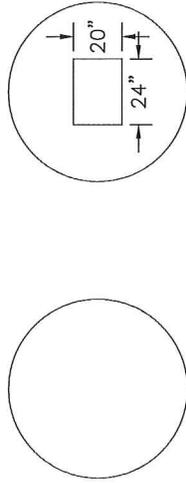
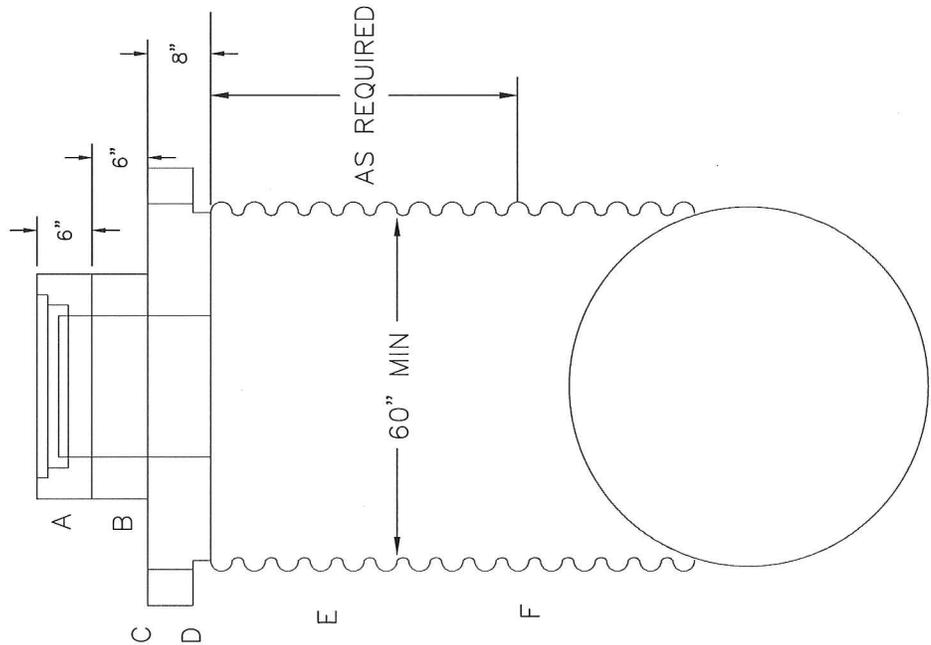
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MANHOLE TYPE 4

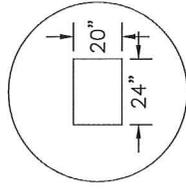


- A. CONCRETE TOP SLAB: SHORT ADJUSTMENT SECTION WITH DUCTILE IRON FRAME AND GRATE, PER STDS.
- B. CONCRETE 6" ADJUSTMENT SECTION AS REQUIRED.
- C. CONCRETE REDUCING FLAT SLAB: UNITS "M", "N", "P", OR "R", AS REQUIRED BY PLANS.
- D. OPTIONAL STEEL LID FOR HS20 LOAD.
- E. RISER: 10 GAUGE 54" HELICAL OR ANULAR CORRUGATED PIPE IN HEIGHTS AS REQUIRED. FOR HEIGHTS GREATER THAN 4' USE PRE FABRICATED LADDER PER APWA STANDARD PLAN B-13.
- F. CORRUGATED PIPE 60" AND GREATER IN DIAMETER WITH GAUGE AND SIZE AS REQUIRED ON PLAN.

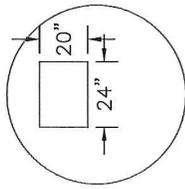
NOTE: ALL METAL PARTS AND SURFACES MUST BE MADE OF CORROSION RESISTANT MATERIAL OR ASPHALT COATED GALVANIZED, TREATMENT #1 OR BETTER; COMPLETE CORROSION PROTECTION MUST BE ASSURED.



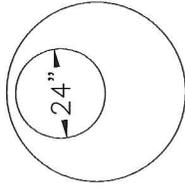
UNIT "M"



UNIT "N"



UNIT "P"



UNIT "R"

NOTE:  
NOT FOR PUBLIC  
ROADWAY CONSTRUCTION

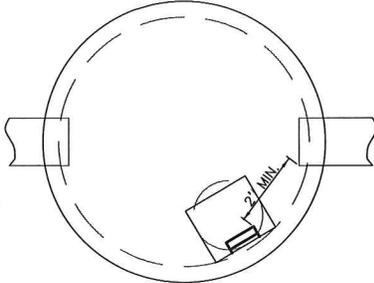
APPROVED BY [Signature] DATE 5/9/07  
MARYSVILLE CITY ENGINEER

OFFSET CORRUGATED  
MANHOLE

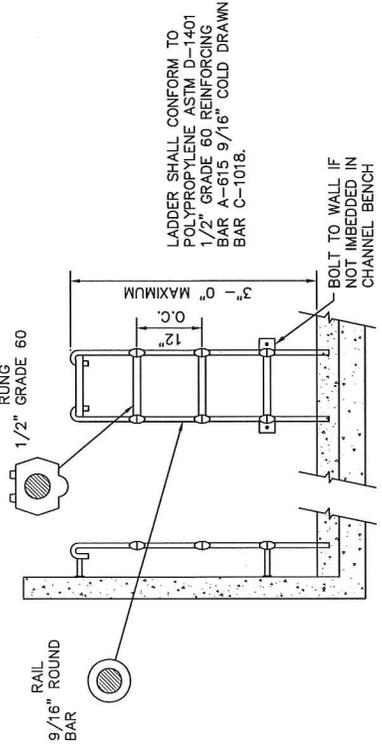
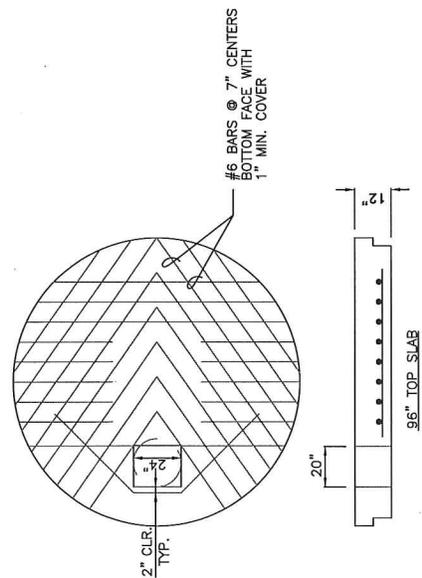
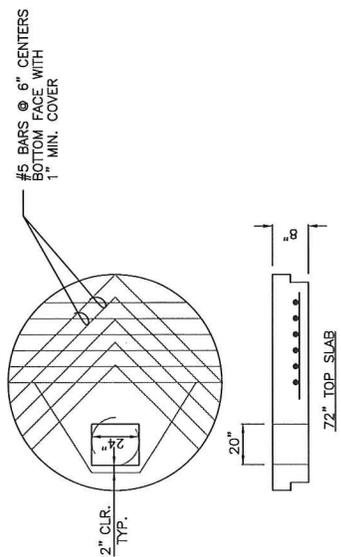
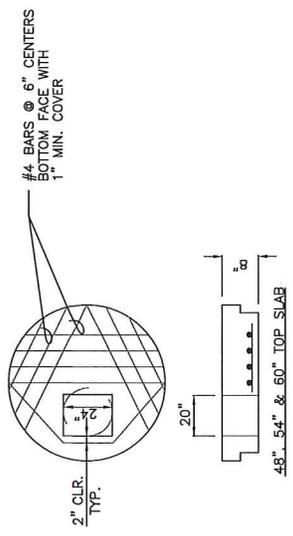


NOTES:

1. PROPRIETARY CATCH BASIN HANDHOLDS AND STEPS ARE ACCEPTABLE, PROVIDED THAT THEY CONFORM TO SEC. R, ASTM C478, AASHTO M-199 AND MEET ALL WISHA REQUIREMENTS.
2. CATCH BASIN STEP/HANDHOLD LEGS SHALL BE PARALLEL OR APPROXIMATELY RADIAL AT THE OPTION OF THE MANUFACTURER, EXCEPT THAT ALL STEPS IN ANY CATCH BASIN SHALL BE SIMILAR. PENETRATION OF OUTER WALL BY A LEG IS PROHIBITED.
3. SLAB OPENING MAY BE 24" X 20" OR 24" DIAM.
4. AS AN ACCEPTABLE ALTERNATIVE TO REBAR, WELDED WIRE FABRIC HAVING A MIN. AREA OF 0.12 SQUARE INCHES PER FOOT MAY BE USED. WELDED WIRE FABRIC SHALL COMPLY TO ASTM A497.
5. LADDERS OR STEPS SHALL EXTEND TO WITHIN 16" OF BOTTOM OF CATCH BASIN.
6. HANGING LADDERS SHALL BE PERMANENTLY FASTENED AT TOP BY HANGING ON STEP AND BY BOLTING OR EMBEDDING IN CONCRETE. EACH SHALL BE EMBEDDED AT BOTTOM IN BASE.
7. ADDITIONAL SAFETY FEATURES MAY BE REQUIRED IN VERY DEEP OR UNUSUAL STRUCTURES.



TYPICAL ORIENTATION FOR ACCESS AND STEPS

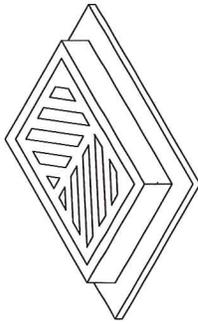


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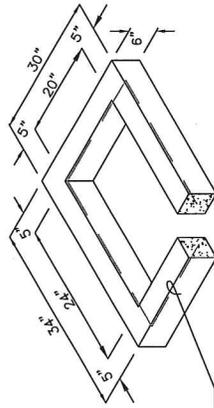
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CATCH BASIN & MANHOLE DETAILS

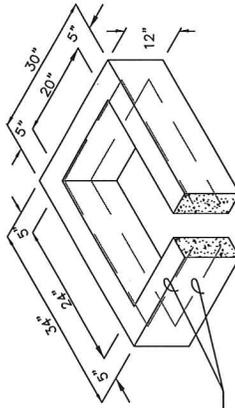




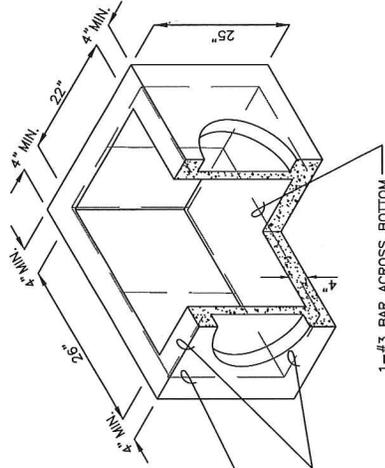
FRAME AND GRATE  
SEE SEC. 4-080E AND  
APPLICABLE DWGS.



6" RISER SECTION



12" RISER SECTION



PRECAST BASE SECTION  
(MEASUREMENT AT THE TOP  
OF THE BASE)

NOTES:

1. CURB INLET TO BE CONSTRUCTED IN ACCORDANCE WITH ASTM C478 & C890 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE STANDARD SPECIFICATIONS.
2. AS AN ACCEPTABLE ALTERNATIVE TO REBAR, WELDED WIRE FABRIC HAVING A MIN. AREA OF 0.12 SQUARE INCHES PER FOOT MAY BE USED. WELDED WIRE FABRIC SHALL COMPLY TO ASTM A497. WIRE FABRIC SHALL NOT BE PLACED IN KNOCKOUTS.
3. ALL REINFORCED CAST-IN-PLACE CONCRETE SHALL BE CLASS 4000.
4. PRECAST BASES SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE A WALL THICKNESS OF 2" MIN. ALL PIPE SHALL BE INSTALLED IN FACTORY PROVIDED KNOCKOUTS. UNUSED KNOCKOUTS NEED NOT BE GROUTED IF WALL IS LEFT INTACT.
5. KNOCKOUT OR CUTOUT HOLE SIZE IS EQUAL TO PIPE OUTER DIAM. PLUS CURB INLET WALL THICKNESS.
6. ROUND KNOCKOUTS MAY BE ON ALL 4 SIDES WITH MAX. DIAM. OF 17".
7. THE MAX. DEPTH FROM THE FINISHED GRADE TO THE PIPE INVERT IS 5'-0".
8. THE TAPER ON THE SIDES OF THE PRECAST BASE SECTION AND RISER SECTION SHALL NOT EXCEED 1/2"/FT.
9. CONCRETE INLET FRAME AND GRATES SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS AND MEET THE STRENGTH REQUIREMENTS OF FEDERAL SPECIFICATION RR-F-621D. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY OTHER COVER POSITION.
10. FRAME AND GRATE MAY BE INSTALLED WITH FLANGE DOWN OR CAST INTO RISER.
11. MAXIMUM DIAMETER OUTLET 8", MUST BE DIRECTLY CONNECTED TO CATCH BASIN.

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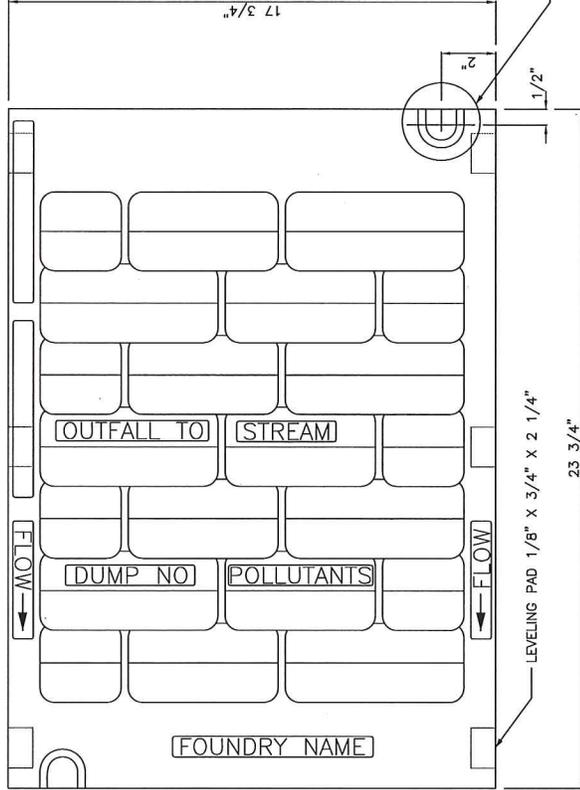
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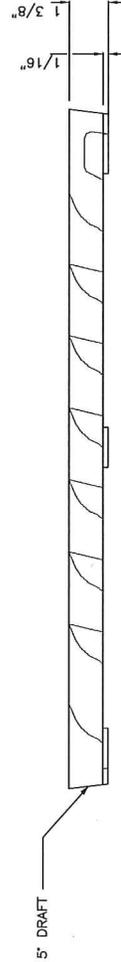
CURB INLET





FOR SLOT DETAIL SEE  
DWG. NO. 4-080-010

PLAN



ELEVATION

NOTES:

1. SELF-LOCK VANED GRATE MANUFACTURER SUBJECT TO APPROVAL BY ENGINEER.
2. USE WITH TWO LOCKING BOLTS 5/8"-11 NC STAINLESS TYPE 304 STEEL SOCKET HEAD (ALLEN HEAD) CAP SCREWS 2" LONG. NOTE SLOT DETAIL.
3. MATERIAL IS DUCTILE IRON ASTM A536 GRADE 80-55-06.
4. "OUTFALL TO STREAM DUMP NO POLLUTANTS" MAY BE LOCATED ON BORDER AREA.
5. SEE SEC. 4-080(D).
6. SEE STANDARD PLAN 4-080-025 FOR FRAME.
7. SHALL BE USED ON ALL ROADS WITH SLOPES EQUAL TO OR GREATER THAN 3%.

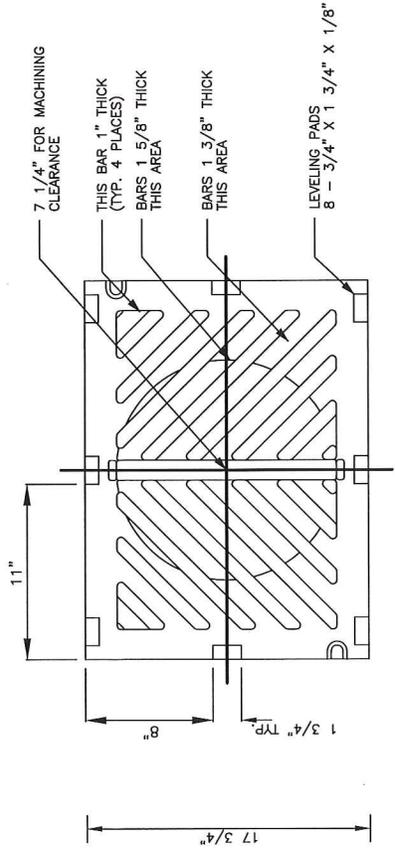
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DATE

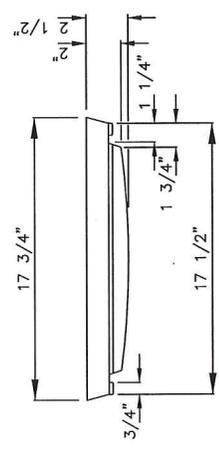
VANED GRATE



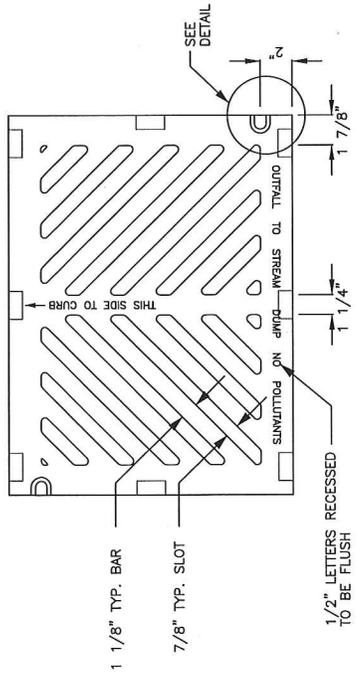
STANDARD PLAN 4-080-016



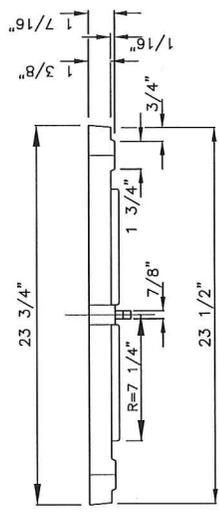
**BOTTOM VIEW**



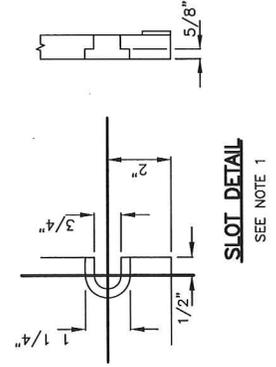
**END VIEW**



**TOP VIEW**



**SIDE VIEW**



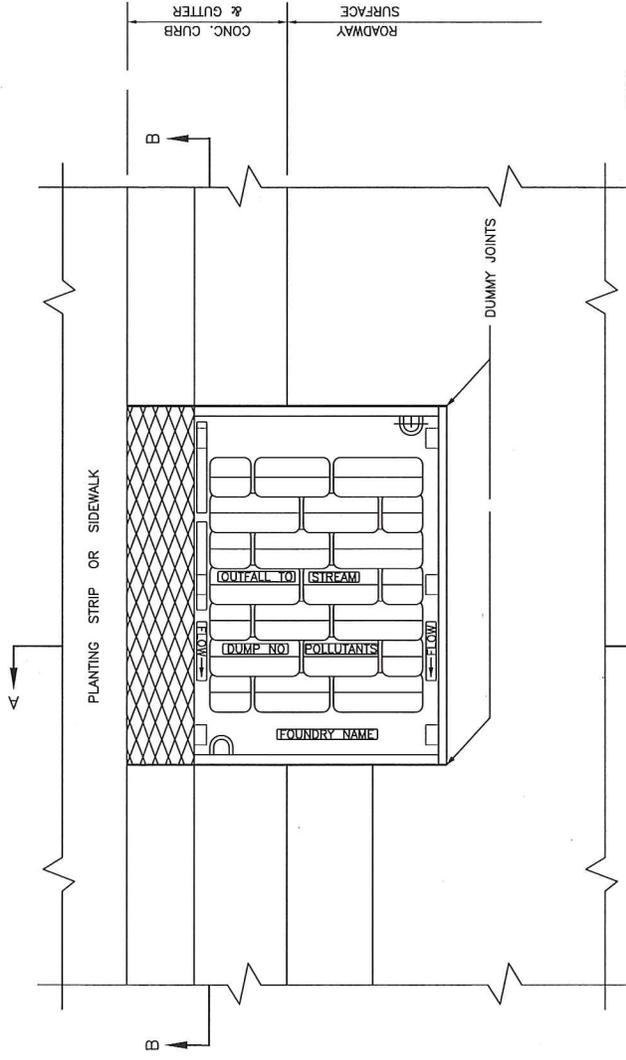
**SLOT DETAIL**  
SEE NOTE 1

- NOTES:
1. SLOT FORMED AND RECESSED FOR 5/8"-11 NC X 2" SOCKET HEAD (ALLEN HEAD) CAP SCREW. PROVIDE ON ALL GRATES.
  2. GRATE SHALL BE CAST IRON PER ASTM A48 CLASS 30 UNLESS OTHERWISE SPECIFIED.
  3. SEE SEC. 4-080(D).

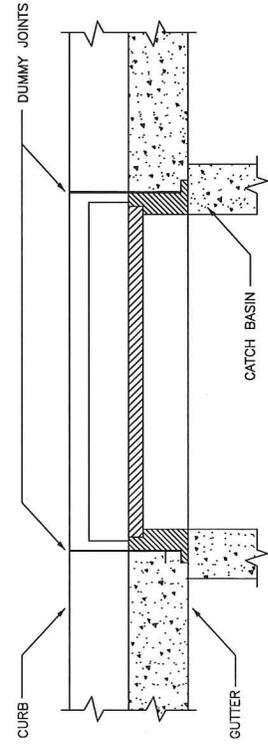
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 MARYSVILLE CITY ENGINEER



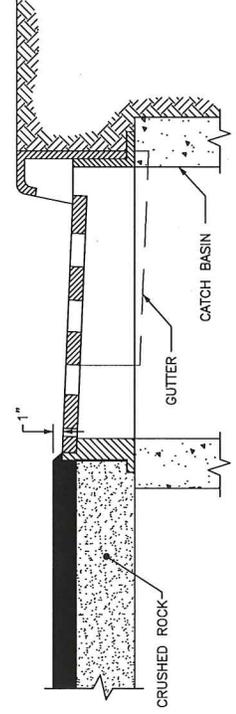
**STANDARD GRATE**



PLAN



SECTION B-B



SECTION A-A

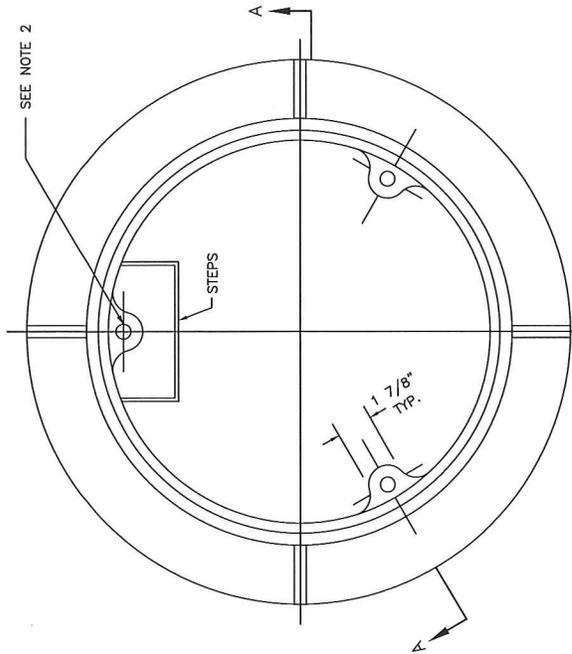
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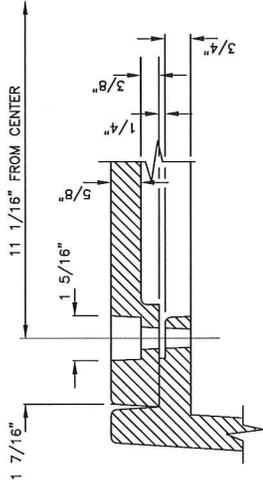
THRU-CURB INLET FRAME  
 & GRATE W/ VERTICAL  
 CURB INSTALLATION



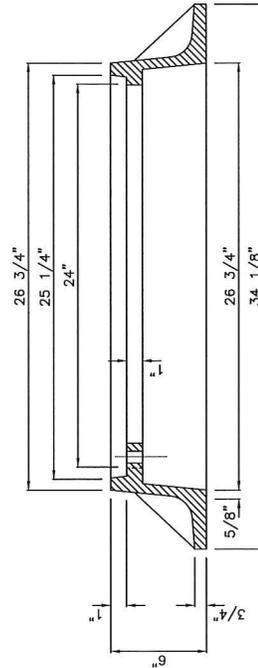
- NOTES:
1. SET TO GRADE AND CONSTRUCT ROAD AND GUTTER TO BE FLUSH WITH FRAME.
  2. SEE EXPANSION JOINT REQUIREMENTS, CHAPTER 3.



PLAN



BOLT-DOWN DETAIL



SECTION A-A

NOTES:

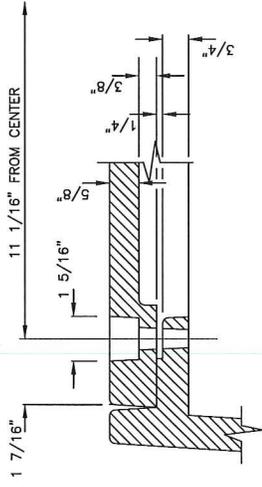
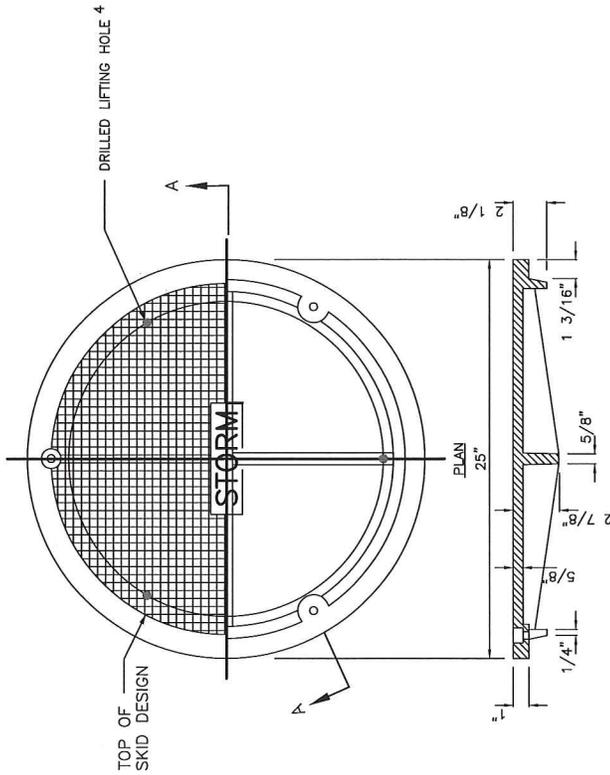
1. MATERIAL IS CAST IRON ASTM A48 CLASS 30.
2. DRILL AND TAP THREE 5/8"-11 NC HOLES THROUGH FRAME AT 120° AND 11 1/16" RADIUS.
3. SEE SEC. 4-080(D)
4. FOR INSTALLATION SEE 4-080-009

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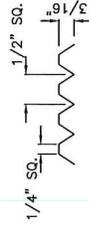
MARYSVILLE CITY ENGINEER

LOCKING  
MANHOLE FRAME  
DETAIL





**BOLT-DOWN DETAIL**



**COVER SKID DESIGN DETAIL**

**SECTION A-A**

**NOTES:**

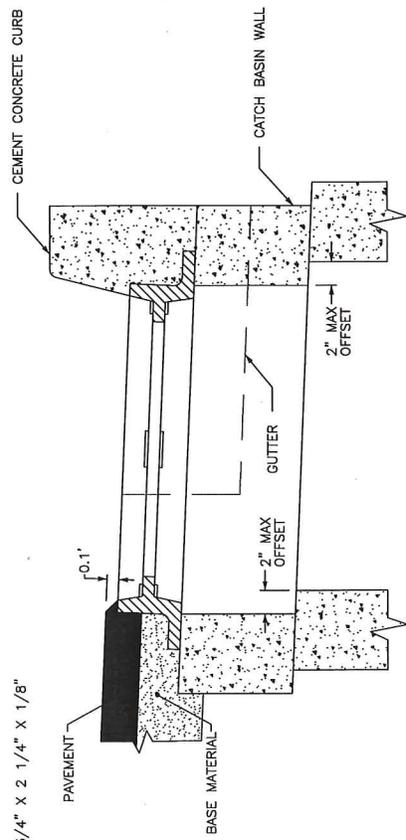
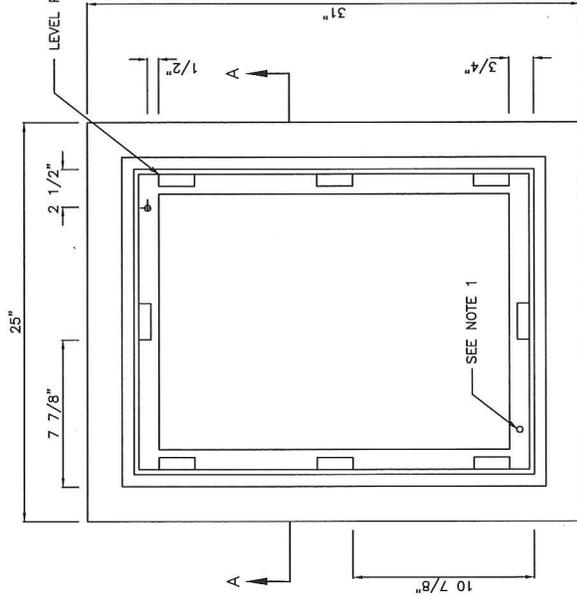
1. USE WITH THREE LOCKING BOLTS 5/8"-11 NC STAINLESS TYPE 304 STEEL SOCKET HEAD (ALLEN HEAD) CAP SCREWS 2" LONG. DRILL HOLES SPACED 120° AT 11 1/16" RADIUS.
2. MATERIAL IS DUCTILE IRON ASTM A536 GRADE 80-55-06
3. SEE SEC. 4-080(D).
4. DRILL THREE 1 INCH HOLES SPACED AT 120° AND 9 1/2" RADIUS.
5. FOR INSTALLATION SEE 4-080-009

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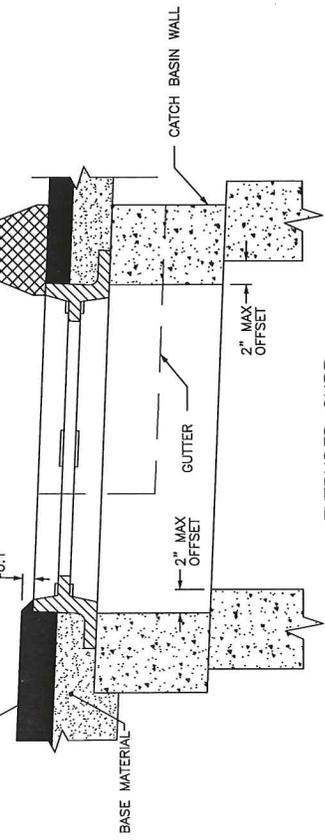
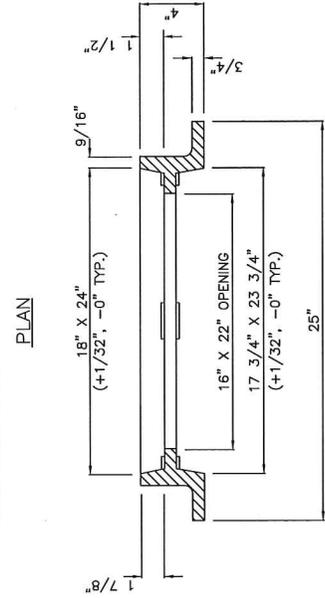
**LOCKING MANHOLE COVER DETAIL**







VERTICAL CURB  
SEE NOTE 4



EXTRUDED CURB  
SEE NOTE 4

SECTION A-A

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 MARYSVILLE CITY ENGINEER

STANDARD FRAME W/  
 VERTICAL OR EXTRUDED  
 CURB INSTALLATION

- NOTES:
1. DRILL AND TAP FOR, AND PROVIDE, TWO LOCKING BOLTS 5/8"-11 NC STAINLESS TYPE 304 STEEL SOCKET HEAD (ALLEN HEAD) CAP SCREWS 2" LONG WHEN USED WITH SOLID COVER (DWG. NO. 4-080-024).
  2. FRAME MATERIAL IS CAST IRON PER ASTM A48 CLASS 30.
  3. SET FRAME TO GRADE AND CONSTRUCT ROAD AND GUTTER TO BE FLUSH WITH FRAME.
  4. SEE SEC. 4-080(0).