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YARD DRAIN

**YARD DRAINS TO BE CONSTRUCTED FROM CONCRETE PIPE, IN ACCORDANCE WITH ASTM C 14 UNLESS OTHERWISE SHOWN ON THE PLANS OR NOTED IN THE SPECIFICATIONS.**

2. **CUTOUT HOLE SIZE EQUAL TO OUTLET PIPE OUTSIDE DIAMETER PLUS YARD DRAIN WALL THICKNESS.**

3. **CONNECTION TO OUTLET PIPE TO BE MORTARED AND MADE FLUSH WITH INSIDE OF THE YARD DRAIN WALL.**

4. **CAST IRON BELL GRATE. FITS INTO BELL RECESS AND EXTENDS FLUSH WITH FACE OF BELL. THE GRATE SHALL HAVE SLOTS (HOLES) THAT CONSTITUTE 50 PERCENT OPEN AREA FOR DRAINAGE. INLET BELL SURFACE SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER.**

5. **CONCRETE 4 IN. MIN.**

6. **12" OR 18".**

7. **CONNECT TO CITY OWNED MAINTAINED SD SYSTEM IN THE STREET.**

8. **UP TO 5 CONNECTIONS PER SERVICE LINE.**

**NOTE:**
SPECIAL CAST YARD DRAIN MAY BE REQUIRED FOR MULTIPLE PIPE CONNECTIONS.

**DETAIL NOTES:**
NOTES:

1. AS AN ACCEPTABLE ALTERNATE TO REBAR, WIRE MESH HAVING A MINIMUM AREA OF 0.12 SQUARE INCHES PER FOOT MAY BE USED. WIRE MESH SHALL NOT BE PLACED IN KNOCKOUTS.

2. THE KNOCKOUT DIAMETER SHALL NOT BE GREATER THAN 20". KNOCKOUTS SHALL HAVE A WALL THICKNESS OF 2" MINIMUM TO 2 1/2" MAXIMUM.

3. THE MAXIMUM DEPTH FROM THE FINISHED GRADE TO THE PIPE INVERT SHALL BE 5'.

4. FRAME AND GRATE MAY BE INSTALLED WITH FLANGE DOWN OR CAST INTO ADJUSTMENT SECTION.

5. THE PRECAST BASE SECTION MAY HAVE A ROUNDED FLOOR AND THE WALLS MAY BE SLOPED AT A RATE OF 1:24 OR STEEPER.

6. OPENING SHALL BE MEASURED AT THE TOP OF THE PRECAST BASE UNIT.

7. THE 6" ADJUSTMENT SECTION SHALL HAVE ONE #3 BAR CENTERED. THE 12" ADJUSTMENT SECTION SHALL HAVE TWO #3 BARS EQUALLY SPACED.

8. GROUT ALL JOINTS INSIDE AND OUTSIDE.
NOTES:

1. As an acceptable alternate to rebar, wire mesh having a minimum area of 0.12 square inches per foot may be used. Wire mesh shall not be placed in knockouts.

2. The knockout diameter shall not be greater than 20”. Knockouts shall have a wall thickness of 2” minimum to 2 1/2” maximum.

3. The maximum depth from the finished grade to the pipe invert shall be 5’.

4. Frame and grate may be installed with flange down or cast into adjustment section.

5. The precast base section may have a rounded floor and the walls may be sloped at a rate of 1:24 or steeper.

6. Opening shall be measured at the top of the precast base unit.

7. The 6” adjustment section shall have one #3 bar centered. The 12” adjustment section shall have two #3 bar equally spaced.

8. Grout all joints inside and outside.
CATCH BASIN

TYPE 2

414

16" MAX

4" MIN

48", 54", 60", 72", OR 96"

STEPS SEE

STD DETAIL 643

1" MIN

2 1/2" MAX

12" MAX

12" (TYP)

12" MAX

REINFORCING

STEEL

MORTAR (TYP)

0" RING

SEPARATE CAST IN PLACE BASE

PRECAST BASE WITH

INTEGRAL RISER

SEPARATE PRECAST BASE

NOTES:

1. NO STEPS ARE REQUIRED WHEN HEIGHT IS 4" OR LESS.

2. THE BOTTOM OF THE PRECAST CATCH BASIN MAY BE ROUNDED.

3. FRAME AND GRATE MAY BE INSTALLED WITH FLANGE DOWN OR CAST INTO ADJUSTMENT SECTION.

4. KNOCKOUTS SHALL HAVE A WALL THICKNESS OF 2" MINIMUM TO 2 1/2" MAXIMUM.

5. GROUT ALL JOINTS INSIDE AND OUTSIDE.

CATCH BASIN DIMENSION TABLE

<table>
<thead>
<tr>
<th>DIA</th>
<th>WALL THICKNESS</th>
<th>BASE THICKNESS</th>
<th>BASE THICKNESS SIZE</th>
<th>MINIMUM DISTANCE BETWEEN KNOCKOUTS</th>
<th>BASE REINFORCING STEEL IN²/FT IN EACH DIRECTION</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>INTEGRAL BASE</td>
</tr>
<tr>
<td>48&quot;</td>
<td>4&quot;</td>
<td>6&quot;</td>
<td>36&quot;</td>
<td>8&quot;</td>
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<tr>
<td>54&quot;</td>
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<tr>
<td>72&quot;</td>
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<td>96&quot;</td>
<td>8&quot;</td>
<td>12&quot;</td>
<td>84&quot;</td>
<td>12&quot;</td>
<td>0.29</td>
</tr>
</tbody>
</table>
NOTES:

1. ANGLES SHALL BE SET SO THAT EACH BEARING BAR ON THE GRATE SHALL HAVE FULL SEATING AT BOTH ENDS. THE FINISHED TOP OF CONCRETE SHALL BE EVEN WITH GRATE SURFACE.

2. TOP OF INLET SHALL BE PLACED AT GROUND LEVEL TO PRESENT AN UNOBSTRUCTED DITCH OR MEDIAN SECTION.

3. BEVEL OR ROUND EXPOSED CONCRETE EDGES 1/2".

4. PIPE MAY ENTER THROUGH THE KNOCKOUTS AT ANY REASONABLE ANGLE PROVIDED THE OUTSIDE OF THE PIPE CAN BE CONTAINED WITHIN THE KNOCKOUT PROVIDED.

5. THE GRADE LINE OF THE LOWEST INLET PIPE SHALL ENTER THE STRUCTURE AT AN ELEVATION EQUAL TO OR HIGHER THAN THE GRADE LINE OF THE OUTLET PIPE.

6. PRECAST INLET SHALL BE MARKED WITH MANUFACTURER'S IDENTIFICATION INSIDE THE STRUCTURE IN SOME READILY ACCESSIBLE LOCATION.

7. INSIDE WALL TAPER FOR FORM REMOVAL SHALL NOT RESULT IN ANY WALL SECTION THINNER THAN 6" EXCEPT IN PIPE KNOCKOUT AREA.

8. AMOUNT, TYPE AND GRADE OF REINFORCING STEEL IS THE RESPONSIBILITY OF THE MANUFACTURER. THE MANUFACTURER IS RESPONSIBLE FOR THE STRUCTURE UNTIL FINAL ACCEPTANCE IN PLACE WITH ALL REQUIRED KNOCKOUTS REMOVED. FINAL BRIDGE CONSTRUCTION IN ADDITION, STRUCTURES MAY BE REJECTED BECAUSE OF ANY OF THE FOLLOWING:
   A) FRACTURES OR CRACKS THAT EXTEND THROUGH THE ENTIRE WALL FROM ANY OUTSIDE SURFACE TO THE KNOCKOUT OPENING.
   B) ANY CONTINUOUS CRACK HAVING A SURFACE WIDTH OF 0.01" OR MORE AND EXTENDING A LENGTH OF 12" OR MORE.

9. GRATE SUPPORTS SHALL BE GALVANIZED AFTER FABRICATION BY ONE OF THE FOLLOWING METHODS:
   A) HOT-DIPPED 2-OZ ZINC/SQ FT (MIN).
   B) HOT-SPRAYED (PLASMA FLAME APPLIED) 6-MIL (MIN) THICKNESS ZINC COATING.

10. THE STANDARD DROP INLET GRATES SHALL BE FURNISHED AND INSTALLED AS INDICATED ON STD DETAIL 416.
NOTES:

1. ANGLES SHALL BE SET SO THAT EACH BEARING BAR OF PREFABRICATED GRATE SHALL HAVE FULL BEARING ON BOTH ENDS. THE FINISHED TOP OF CONCRETE SHALL BE EVEN WITH THE GRATE SURFACE.

2. TOP OF INLET SHALL BE PLACED AT GROUND LEVEL TO PRESENT AN UNOBSTRACTED DITCH OR MEDIAN SECTION.

3. ALL EXPOSED CONCRETE SHALL BE FINISHED WITH A 1/2" INCH RADIUS.

4. THE GRADE LINE OF THE TOP INSIDE OF ANY PIPE SHALL ENTER AT A POINT NO LOWER THAN THE GRADE LINE OF THE TOP INSIDE OF THE OUTLET PIPE.

5. CULVERT OR SEWER PIPES MAY BE SET AT ANY ANGLE TO THE CENTERLINE OF THE HIGHWAY AND MAY ENTER THE INLET ON ANY SIDE AT ANY REASONABLE ANGLE, PROVIDED THE OUTSIDE OF THE PIPE CAN BE CONTAINED BETWEEN TWO OPPOSITE WALLS.

6. GRADE B WILL BE USED ONLY WHEN SPECIFIED IN THE CONTRACT SPECIAL PROVISIONS.
NOTES:

1. WHEN LAYING CURB, LEAVE 6' OUT FOR PLACING C.B., FRAME AND GRATE.

2. PLACE CURB AROUND C.B. USING CEMENT CONCRETE 3-DAY MIX.

3. AN APPROVED MATERIAL WHICH WILL PREVENT BONDING OF THE CURB TO FRAME, GRATE OR C.B. SHALL BE USED.

4. GROUT ALL JOINTS INSIDE AND OUTSIDE.
THRU-CURB INLET FRAME AND GRATE WITH VERTICAL CURB INSTALLATION

1. SET TO GRADE AND CONSTRUCT ROAD AND GUTTER TO BE FLUSH WITH FRAME.
2. SEE STD DRAWINGS 422, 423, AND 424 FOR TYPES OF GRATE USE.
3. SEE STD DWG 425 FOR FRAME DETAIL.
4. TYPE II STRUCTURE EXPANSION JOINT. THE WIDTH OF STRUCTURE PLUS 2' SQUARE IF IN SIDEWALK.
DETAIL NOTES:

1. FOUNDARY NAME: THIS SIDE TO CURB W/ARROW AND CITY OF BOTHELL (DI) FOR DUCTILE IRON SHALL BE EMBOSSED ON TOP OF THE GRATE WITH 1/16" RECESSED LETTERS.

2. SEATING OF GRATE SHALL BE ACCOMPLISHED BY ONE OF THE FOLLOWING:
   A. 8 INTEGRALLY CAST PADS (1-1/2"X 3/4" X 1/8"
   B. MACHINE BOTTOM SURFACE OUTSIDE A 17" DIA.

3. MATERIAL USED SHALL BE DUCTILE IRON PER ASTM-A536 GRADE 80-55-06. ALL CASTINGS SHALL HAVE A BITUMINOUS COATING.

4. WHEN LOCKING GRATE IS REQUIRED, HOLES WILL BE PROVIDED IN THE CASTING TO ALLOW FOR TWO 5/8" DIA. STAINLESS STEEL SOCKET HEAD CAP SCREWS SO THAT NO PART OF HEAD PROTRUDES ABOVE TOP OF CASTING.
DETAIL NOTES:

1. FOUNDARY NAME, THIS SIDE TO CURB W/ARROW AND CITY OF BOTHELL (DI) FOR DUCTILE IRON SHALL BE EMBOSSED ON TOP OF THE GRATE WITH 1/16" RECESSED LETTERS.

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**SECTION A-A**

1. **SECTION B-B**

2. **SECTION C-C**

**DETAIL NOTES:**

1. MATERIALS USED SHALL BE DUCTILE IRON PER ASTM-A536, GRADE 80-55-06, WITH BITUMINOUS COATING.

2. WHEN LOCKING GRATE REQUIRED HOLES WILL BE PROVIDED IN CASTING TO ALLOW FOR TWO 3/8" DIA. STAINLESS STEEL, SOCKET HEAD CAP SCREWS. NO PART OF SCREW WILL PROTRUDE ABOVE GRATE.

3. GRATE SEATING: 8 INTEGRALLY CAST PADS.

4. CAST POCKET LIFT HANDLE

5. NONSKID DIAMOND PATTERN APPROX. 2-1/8" X 1" X 1/8" HIGH
**DIRECTION OF FLOW**

**PLAN VIEW**

**SECTION A-A**

**SECTION B-B**

**SECTION C-C**

**DETAIL NOTES:**

1. MATERIAL USED SHALL BE DUCTILE IRON PER ASTM-A536, GRADE 80-55-06, WITH BITUMINOUS COATING.

2. WHEN LOCKING GRATE REQUIRED HOLES WILL BE PROVIDED IN CASTING TO ALLOW FOR TWO 5/8" DIA STAINLESS STEEL, SOCKET HEAD CAP SCREWS. NO PART OF SCREW WILL PROTRUDE ABOVE GRATE.

3. USE ON SLOPES GREATER THAN 6%.
NOTES:

1. EST. 365#/ USE CAST GRATE IRON ASTM A 48 CL.30.
2. USE VANED GRATE IN DUCTILE IRON AS SHOWN ON STD DETAIL 424.
3. MAKE 3/16" NON-SKID DIAMOND PATTERN ON TOP SURFACE.
4. BOLT, WASHER, AND NUT SHALL BE GALV. OR CORROSION RESISTANT.
TOP OF COVER

FRAME PLAN

COVER SHALL HAVE THE WORD "STORM" IN RAISED LETTERS

INSTALL FRAME AS TO CENTER HINGE OVER CENTER OF LADDER

NOTES:

1. OLYMPIC FOUNDRARY MH38 OR EAST JORDAN ERGO 001043L01 FRAME AND HINGED COVER.
2. COVER AND FRAME SHALL BE MANUFACTURED FROM DUCTILE IRON MEETS ASSHTO H20 OR APPROVED EQUAL.
3. CITY OF BOTHELL LOGO NOT REQUIRED.
4. LID MUST BE COVERED WITH TAR PAPER BEFORE OVERLAY.
5. GASKET CAN BE REPLACED; USED ONLY ORIGINAL REXUS GASKET, AVAILABLE THROUGH AUTHORIZED DEALERS.
6. VERIFIED SLOTTED FRAMES ARE THOROUGHLY FILLED WITH MORTAR FOR EFFICIENT INTERACTION WITH IRON AND STRUCTURE.
7. VERIFY GASKET IS PROPERLY CLAMPED ON ITS FRAME GROOVE ALONG ITS ENTIRE LENGTH.
NOTES:

1. REMOVE PAVEMENT AND BASE MATERIALS FOR A DISTANCE WHICH IS EQUAL TO THE DIAMETER OF THE FRAME PLUS TWO FEET. ADJUST CASTING FRAME TO NEW PAVEMENT SURFACE USING CONCRETE BLOCKS.

2. 2"x4"x8" SOLID BRICK USED FOR FINAL ADJUSTMENT TO GRADE. 6' HIGH MAX.
NOTES:

1. MAX. RIM EL. INV. EL. DIFFERENCE GREATER THAN 5’ SEE STD DTL 431.

2. GROUT ALL JOINTS INSIDE AND OUTSIDE.
FLOATABLE MATERIAL SEPARATOR
12" AND LARGER

1. INSTALL MANHOLE ACCESS SO THAT LIFT GATE IS VISIBLE THROUGH OPENING AND STEPS CLEAR INLET AND RESTRICTOR UNIT.

2. INSTALL STD DETAIL 426 WITH LOCKING COVER OR WHEN IT IS TO BE A CB THEN USE STD DETAIL 420.

3. 1" VENT HOLE.

4. SEPARATOR ASSEMBLY.

5. POLYPROPYLENE PLASTIC STEP SEE STD DETAIL 643.

6. MIN CLEARANCE: 36" FOR OUTLETS OF 24" AND LARGER, 18" FOR OUTLETS OF 18" AND SMALLER.

7. 54" TYPE 2 CB OR LARGER.

8. BAND STRAP WITH GASKET.

9. SEE PLAN AND SPECIFICATIONS FOR SIZE AND TYPE OF PIPE ENTERING AND EXITING CB.

10. SECURE SEPARATOR TO CB WITH 8 GA ALUMINUM STRAP: BOLT TO CB WALL WITH STAINLESS STEEL ANCHOR BOLTS AND TACK WELD TO SEPARATOR UNIT.

11. LIFT HANDLE SEE STD DETAIL 444.

12. INV. EL.: SEE PLANS AND SPECIFICATIONS.

13. CLEAN OUT AT 8" DIA. MIN. 12" FOR 24" DIA. AND LARGER OUTLET PIPE.

14. GROUT ALL JOINTS INSIDE AND OUTSIDE.
NOTES:
VAULT SIZE TO BE DETERMINED BY SITE SPECIFIC CHARACTERISTICS.
NOTES:

1. ABOVE CAPACITIES ARE BASED ON 55° ANGLE OF INCLINATION.
2. LARGER CAPACITIES AVAILABLE.
3. SEE SECTION 6.6.2 OF THE K.C.W.D.M. FOR DESIGN DETAILS.
SUGGESTED CONFIGURATION FOR BYPASS PIPING WITH 25 YEAR CAPACITY (NOT ALLOWED IF FOR SPILL CONTAINMENT ONLY).

FLOW DIVERSION STRUCTURE SEE STD DETAILS 468 OR 469.

NOTES:
SIZED FOR 2 YEAR 24 HOUR DESIGN STORM EVENT.

PROVIDE GRAVITY DRAIN TO DRAIN FACILITY IN ONE HOUR FOR MAINTENANCE.
DETAIL NOTES:

1. INSTALL 1-18" AND 1-24" DIA. MH. ACCESS PER STD DWG 426. SO THAT THE LIFT GATE IS VISIBLE AND THE STEPS ARE CLEAR AND DIRECTLY ACCESSIBLE. THE OTHER IS OVER THE 12" RESTRICTOR.

2. OVERFLOW ELEVATION - SEE PLANS.

3. RESTRICTOR UNIT - SEE STD DETAIL 441.

4. POLYPROPYLENE PLASTIC STEP SEE STD DETAIL 643.

5. MIN CLEARANCE: 36" FOR OUTLETS OF 24" AND LARGER. 18" FOR OUTLETS OF 18" AND SMALLER.

6. 54" TYPE 2 CB OR LARGER.

7. BAND STRAP WITH GASKET.

8. SEE PLAN AND SPECIFICATIONS FOR SIZE AND TYPE OF PIPE ENTERING AND EXITING CB.

9. SECURE RESTRICTOR TO CB WITH 8 GA ALUMINUM STRAPS BOLT TO CB WALL WITH STAINLESS STEEL ANCHOR BOLTS. ONE STRAP ABOVE AND BELOW OUTLET REQUIRED, INTERMEDIATE STRAPS REQUIRED FOR RESTRICTOR RISERS GREATER THAN 12" ABOVE OUTLET.

10. LIFT HANDLE CONNECTOR-SEE STD DETAIL 444.

11. INVERT ELEVATION: SEE PLANS AND SPECIFICATIONS.

12. SHEAR GATE - SEE STD DETAIL 444.

13. FOR POND APPLICATIONS EXPAND THE STRUCTURE HIGHER AND PROVIDE A FRAMED OVERFLOW DEBRIS GRADED OPENING ABOVE THE RESTRICTOR UNIT.

14. I.D. PLATE PER BOTHELL SURFACE WATER DESIGN MANUAL CORE REQ. #1.2.6

15. CLEAN OUT TO INSPECT STRUCTURE
**DETAIL NOTES:**

1. INSTALL 1-18" AND 1-24" DIA. MH. ACCESS PER STD DETAIL 426. ONE SO THAT THE LIFT GATE IS VISIBLE AND THE STEPS ARE CLEAR AND DIRECTLY ACCESSIBLE. THE OTHER IS OVER THE RESTRICTOR UNIT.

2. OVERFLOW ELEVATION - SEE PLANS.

3. RESTRICTOR UNIT - SEE STD DETAIL 441.

4. POLYPROPYLENE PLASTIC STEP SEE STD DETAIL 643.

5. MIN CLEARANCE:
   - 36" FOR OUTLETS OF 24" AND LARGER
   - 18" FOR OUTLETS OF 18" AND SMALLER

6. 72" TYPE 2 CB OR LARGER.

7. BAND STRAP WITH GASKET

8. SEE PLAN AND SPECIFICATIONS FOR SIZE AND TYPE OF PIPE ENTERING AND EXITING CB.

9. SECURE RESTRICTOR TO CB WITH 8 GA ALUMINUM STRAPS BOLT TO CB WALL WITH STAINLESS STEEL ANCHOR BOLTS. ONE STRAP ABOVE AND BELOW OUTLET REQUIRED. INTERMEDIATE STRAPS REQUIRED FOR RESTRICTOR RISERS GREATER THAN 12" ABOVE OUTLET.

10. LIFT HANDLE CONNECTOR-SEE STD DETAIL 444.

11. INVERT ELEVATION: SEE PLANS AND SPECIFICATIONS.

12. SHEAR GATE - SEE STD DETAIL 444.

13. FOR POND APPLICATIONS EXPAND THE STRUCTURE HIGHER AND PROVIDE A FRAMED OVERFLOW DEBRIS GRATED OPENING ABOVE THE RESTRICTOR UNIT.

14. I.D. PLATE PER BOTHELL SURFACE WATER DESIGN MANUAL CORE REQ. #1.2.6

15. CLEAN OUT TO INSPECT STRUCTURE
NOTES:

1. RESTRICTOR UNIT SHALL BE CONSTRUCTED OF CORRUGATED POLYETHYLENE PIPE AASHTO M294 TYPE S, POLYVINYL CHLORIDE (PVC) ASTM D-3034 SCHEDULE 40, OR ALUMINIZED CMP.

2. FOR PVC APPLICATIONS, ALL CONNECTIONS SHALL BE MADE USING STANDARD FITTINGS, NO WELDING SHALL BE USED.

3. FOR COMBINED WET/DETENTION PONDS, DELETE ORIFICE AT 1

DETAIL NOTES:

1. FOR HDPE APPLICATIONS
   3/8” HDPE PLATE WELDED ALL AROUND - ORIFICE OPENING SIZE ACCORDING TO PLANS.

2. OUTLET PIPE MAY BE ADS N12 SMOOTH HDPE OR TAPERED SMOOTH HDPE - TYPE, LENGTH AND SIZE AS SHOWN ON PLANS.
DETAIL NOTES:

1/2" THICK BOLT FLANGE TAPPED FOR (3) 1/2" DIAMETER NYLON BOLTS—INCLUDE A NEOPRENE GASKET (ELEVATION PER PLANS).

WELDED 90 DEG. BEND (SIZE PER PLANS) WITH 1/2" THICK BOLT FLANGE DRILLED FOR 1/2" DIAMETER NYLON BOLTS.

ALL PARTS TO BE HDPE OR PVC OR ALUMINUM EXCEPT AS NOTED
SHEAR GATE

FRONT

LIFT HANDLE

MAXIMUM OPENING OF GATE

SIDE

FINISHED GRADE

HANDLE WITH LOCK PIN

ADJUSTABLE LOCK HOOK WITH LOCK SCREW

1" ROD OR TUBING, VARIABLE LENGTH, WITH HANDLE WITHIN REACH FROM SURFACE LEVEL OF STRUCTURE

LEVEL LINE

LIFT HANDLE SHALL BE ATTACHED PER MANUFACTURER'S RECOMMENDATIONS.

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

LEVEL LINE
NOTES:

1. ANNUAL INSPECTIONS AND CLEANING REQUIRED BY OWNER TO INSURE PROPER OPERATION OF DETENTION SYSTEM.

2. \( W = \text{MAXIMUM WIDTH OF TRENCH FOR PIPES 15" OR LESS IN DIA.} \ W = 40" \). FOR PIPES 18" OR GREATER \( W = 1 \frac{1}{2}" \times \text{I.D.} + 18". \)

3. COMPACT IN 8" LIFTS TO 90% MAX. DENSITY.
NOTES:
FOR WET PONDS, OR COMBINED DETENTION/WET PONDS:
1. INCREASE DEAD STORAGE TO 4' MIN., 6' MAX.
2. INSTALL A GATE VALVE @ BASE OF OUTFLOW STRUCTURE TO ALLOW FOR DRAINAGE OF THE POND.
3. FOR WET POND, DELETE RESTRICTION RISER.

FRAME/GRATE FOR CONTROLLED POND OVERFLOW PROVIDE VERTICAL BARS IN FRAME AT 4" O.C. (OTHER FLOW SYSTEMS ACCEPTABLE IF APPROVED BY THE CITY ENGINEER).

EMERGENCY OVERFLOW WATER SURFACE
(SEE FIG. 5.3.1.E OF KING COUNTY SWDM)
SWALE CROSS SECTION

SEE KING COUNTY SWDM APPENDIX D.4.2.4 (*) FOR RECOMMENDED SEED MIXED

4" TOP SOIL

1' MAX

3

1' MIN. OR GREATER AS REQUIRED FOR PEAK FLOW CONVEYANCE WITH HALF FOOT OF FREEBOARD.

* KING COUNTY SURFACE WATER DESIGN MANUAL
PIPE OUTFALL
QUARRY SPALLS

PUBLIC WORKS DEPARTMENT
City of Bothell

Revision Date
Feb, 2012

REQUIRED DIMENSIONS

<table>
<thead>
<tr>
<th>A+B</th>
</tr>
</thead>
<tbody>
<tr>
<td>8' FOR ROCK LINING</td>
</tr>
<tr>
<td>12' FOR RIP RAP</td>
</tr>
</tbody>
</table>

SEE TABLE 4.2.2.A IN KING COUNTY SWDM

PLAN VIEW

SECTION A-A

PLACE ROCK 1' ABOVE CROWN BOTH SIDES CHANNEL FOR 'A' ≤ 8' ONE SIDE CHANNEL FOR 'A' ≥ 8'

FILTER FABRIC LINER UNDER ROCK

1' OR 2' ROCK THICKNESS
SEE TABLE 4.2.2.A IN KING COUNTY SWDM

DISCHARGE PIPE
PIPE OUTFALL
GABION TYPE

**PLAN VIEW**

- **SD PIPE**
- **RIP RAP**
- **GABIONS (TYP.)** (SIZE AS REQ'D.)

**SECTION C-C**

- SLEEVE OF NEXT LARGER SIZE DIA.
- PIPE FOR THERMAL EXPANSION AND CONTRACTION
- PLACE FILTER FABRIC BETWEEN GABIONS AT SOIL BEDDING
- PIPE ANCHOR
- EXIST. GROUND LINE
- RIP RAP

**SECTION A-A**

**SECTION B-B**

**Revision Date**
Feb, 2012
DO NOT MORTAR QUARRY SPALLS IF THE MAT FALLS WITHIN THE ANNUAL HIGH WATER MARK OF ANY STREAM.
NOTES:

1. UNDERDRAINS OF THIS TYPE SHALL BE CONSTRUCTED AFTER THE GRAVEL BASE AND/OR BALLAST IS IN PLACE.

2. THE SPACING (S) SHALL BE AS REQUIRED FOR THE PARTICULAR PROJECT BUT NOT MORE THAN 500 FEET ON GRADES IN EXCESS OF 2.5%.

3. THE PATTERN MAY HAVE TO BE VARIED IN CASE OF A SPECIAL DESIGN FOR SPRINGS OR FREE WATER IN THE SUBGRADE.

4. THE ANGLE (A) SHALL VARY TO PROVIDE A MINIMUM QUADRANT ON THE DRAIN OF 0.5%.

5. DIRECTIONAL ROADWAYS OF MULTILANE HIGHWAYS SHALL BE DRAINED INDEPENDENTLY OF ONE ANOTHER. DRAINAGE FLOW, PREFERABLY, SHOULD BE AWAY FROM THE MEDIAN.


7. THE PIPE SHALL BE A 6" DIAMETER UNDERDRAIN PIPE.
NOTES:

1. CMP END-SECTION SHOWN. FOR CONCRETE PIPE BEVELED END-SECTION, SEE KING COUNTY ROAD STANDARDS FIG. 7-001.

2. ALL PARTS MUST BE ALUMINUM OR STAINLESS STEEL.
HOCK CLAMPS (4) PLACES EVENLY SPACED SEE DETAIL BELOW.

PROVIDE MAINT. ACCESS BY WELDING (4) CROSS BARS TO (4) VERTICAL BARS AS SHOWN. HINGE UPPER ENDS WITH FLANGES/BOLT AND PROVIDE LOCKING MECHANISM (WITH PADOCK) ON LOWER END. LOCATE LADDER STEPS DIRECTLY BELOW.

LOWER STEEL BAND
3/4" THICK X 4" WIDE
FORMED TO FIT IN GROOVE OF CB RISER.

UPPER STEEL BAND
3/4" X 4" WIDE
LONG SMOOTH BARS WELDED TO UPPER AND LOWER BANDS (24 BARS EVENLY SPACED SEE NOTE 1.)

SECTION A-A

NOTES:

1. DIMENSIONS ARE FOR INSTALLATION ON 54" DIA. CB FOR DIFFERENT DIA. CB'S ADJUST DIMENSIONS TO MAINTAIN 45" ANGLE ON "VERTICAL" BARS AND 7" O.C. MAX. SPACING OF BARS AROUND LOWER STEEL BAND.

2. METAL PARTS CORROSION RESISTANT, STEEL PARTS GALVANIZED.

3. THIS DEBRIS BARRIER IS ALSO RECOMMENDED FOR USE ON THE INLET TO ROADWAY CROSS-CULVERTS WITH HIGH POTENTIAL FOR DEBRIS COLLECTION (EXCEPT ON TYPE 2 STREAMS).
CONCRETE BLOCK ANCHOR

STRAP-FOOTING ANCHOR

SECTION A-A

SECTION B-B

NOTES:

FOR HDPE, PIPE MUST BE FREE TO SLIDE INSIDE A 4' LONG SECTION OF PIPE ONE SIZE DIAMETER LARGER.

CONCRETE BLOCK KEYED INTO UNDISTURBED SOIL AS SHOWN.

CONCRETE FOOTING KEYED INTO UNDISTURBED SOIL AS SHOWN.

1" MIN. DIA. STEEL ROD (STRAP) CLAMPED SECURELY TO PIPE.

6" MIN. (TYP.)

1' MIN.

6" MIN.

6" MIN.

2 X PIPE DIA MIN
NOTES:

1. THE WATER QUALITY DISCHARGE PIPE MAY REQUIRE AN ORIFICE PLATE BE INSTALLED ON THE OUTLET TO CONTROL THE HEIGHT OF THE DESIGN WATER SURFACE (WEIR HEIGHT). THE DESIGN WATER SURFACE SHOULD BE SET TO PROVIDE A MINIMUM HEADWATER/ DIAMETER RATIO OF 2.0 ON THE OUTLET PIPE.

2. GROUT ALL JOINTS INSIDE AND OUTSIDE.
NOTE:
GROUT ALL JOINTS INSIDE AND OUTSIDE.
NOTES:

1. BEDDING - IN RIGHT-OF-WAY, DRIVEWAY, PARKING LOTS, PAVED AREAS.
2. FOR PATCHING SEE STD DETAIL 317.
3. BEDDING WITH PEA GRAVEL 6” MIN UNDER PIPE TO TOP OF PIPE.

<table>
<thead>
<tr>
<th>NOMINAL PIPE DIAMETER</th>
<th>MINIMUM EARTH</th>
<th>MINIMUM ROCK</th>
<th>MAXIMUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>18</td>
<td>24</td>
<td>36</td>
</tr>
<tr>
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<tr>
<td>12</td>
<td>28</td>
<td>28</td>
<td>40</td>
</tr>
</tbody>
</table>

(IN INCHES)
NOTE:

1. BEDDING MATERIAL FOR PIPE - 6" MIN. UNDER PIPE TO TOP OF PIPE - PEA GRAVEL, 5/8" MINUS CRUSHED ROCK, OR SAND APPROVED BY CITY ENGINEER.

### TRENCH WIDTHS

<table>
<thead>
<tr>
<th>NOMINAL PIPE DIAMETER</th>
<th>MINIMUM EARTH</th>
<th>MINIMUM ROCK</th>
<th>MAXIMUM</th>
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<tbody>
<tr>
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<td>21</td>
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<td>8</td>
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<tr>
<td>12</td>
<td>28</td>
<td>28</td>
<td>40</td>
</tr>
</tbody>
</table>

(IN INCHES)
Help protect and care for this area.

**NOTES:**

1. THE SIGN SHALL BE POSTED AT THE BOUNDARY BETWEEN THE SENSITIVE AREA BUFFER, SETBACK AREA OR SETBACK TRACT AND THE BUILDING SETBACK AREA. 

2. SIGN SHALL BE STATIONED IN A PROMINENT LOCATION, i.e., AT THE CLOSEST POINT TO THE PROPOSED DEVELOPMENT. SIGN MAY ALSO BE ATTACHED TO FENCES.
The wetland sign shall be posted at the boundary between the sensitive area buffer, setback area or setback tract and the building setback area. Sign shall be stationed in a prominent location, i.e., at the closest point to the proposed development. Sign may also be attached to fences.

NOTES:

1. THE WETLAND SIGN SHALL BE POSTED AT THE BOUNDARY BETWEEN THE SENSITIVE AREA BUFFER, SETBACK AREA OR SETBACK TRACT AND THE BUILDING SETBACK AREA.

2. SIGN SHALL BE STATIONED IN A PROMINENT LOCATION, I.E., AT THE CLOSEST POINT TO THE PROPOSED DEVELOPMENT. SIGN MAY ALSO BE ATTACHED TO FENCES.
THE STREAM SIGN SHALL BE POSTED AT THE BOUNDARY BETWEEN THE SENSITIVE AREA BUFFER, SETBACK AREA OR SETBACK TRACT AND THE BUILDING SETBACK AREA. SIGN SHALL BE STATIONED IN A PROMINENT LOCATION, i.e., AT THE CLOSEST POINT TO THE PROPOSED DEVELOPMENT. SIGN MAY ALSO BE ATTACHED TO FENCES.

SIGN SIZE: 24"X36"
ATTACH SIGN TO POST WITH DRIVE RIVET PER STD DETAIL 384

NOTES:

1. THE STREAM SIGN SHALL BE POSTED AT THE BOUNDARY BETWEEN THE SENSITIVE AREA BUFFER, SETBACK AREA OR SETBACK TRACT AND THE BUILDING SETBACK AREA.

2. SIGN SHALL BE STATIONED IN A PROMINENT LOCATION, i.e., AT THE CLOSEST POINT TO THE PROPOSED DEVELOPMENT. SIGN MAY ALSO BE ATTACHED TO FENCES.
NOTES:

1. IF THIS DISTANCE IS 50' OR LESS, THE DITCH MUST BE TIGHT LINED. ADDITIONAL CATCH BASINS MAY BE REQUIRED BASED ON SITE CONDITIONS.

2. INSTALL YARD DRAIN PER STD DETAIL 410 AT CONNECTION POINT OF FOOTING DRAIN AND DOWNSPOUT PIPES.
EX. CULVERT
D/W
TOP OF BANK
2' MIN.
A.C. PAVING
CSTC
EX. DRIVEWAY
NEW A.C.
NEW SD FROM SMALL DRAINAGE AREA
FILL DITCH TO TOP OF BANK
TRIM EXISTING SD PIPE FLUSH WITH CATCH BASIN WALL
MATCH CROWN'S
C.B. TYPE I
STD DETAIL 412
FLOW
OUTFALL TO DITCH SMALL PROJECTS
NOTES

1. FOOTING DRAIN MUST TIE INTO SITE STORM SYSTEM BY GRAVITY FLOW.

2. ROOF DRAIN SHALL RUN INDEPENDENT OF FOOTING DRAIN UNTIL POINT OF CONNECTION TO CITY STORM WATER FACILITY OR ON SITE DETENTION FACILITY.

3. FOOTING DRAIN MUST PROVIDE AT LEAST 6" OF CLEARANCE BETWEEN CRAWLSPACE FINISHED GRADE OR BOTTOM OF SLAB-ON-GRADE, AND TOP OF FOOTING DRAIN.
NOTE:

1. CLEANOUT PIPE AND FITTINGS SHALL BE PVC.

2. A SANITARY TEE OR SWEEP MAY BE INSTALLED IN LIEU OF A WYE AS SHOWN. STRAIGHT TEES ARE NOT ACCEPTABLE.

3. FOR NEW PLATS THE VERTICAL RISER PORTION OF THE CLEANOUT WILL BE CONSTRUCTED AT TIME OF CONNECTION TO BUILDING TO MINIMIZE DAMAGE, THE 6" WYE AND 6' PVC PIPE WITH MECHANICAL PLUG WILL BE INSTALLED PRIOR TO BUILDING CONNECTION.

4. STORM PIPE STUB WILL BE EXTENDED 10' BEYOND PROPERTY LINE TO PREVENT DAMAGE TO CLEANOUT AND MINIMIZE CONFLICTS WITH OTHER UTILITIES WHEN SERVICE TO BUILDING IS ACCOMPLISHED.
DETAIL NOTES:

1. CONSTRUCTION ENTRANCE - SEE STD DETAIL T404
2. SEDIMENT BASIN OUTLET STRUCTURE AND DAM - SEE STD DETAIL T401
3. IN CRITICAL AREAS, INSTALL A SILT FENCE IN THE SEDIMENT BASIN.
4. CLEARING LIMITS
   PRIOR TO ANY SITE CLEARING OR GRADING, THOSE AREAS THAT ARE TO REMAIN UNDISTURBED DURING PROJECT CONSTRUCTION SHALL BE DELINEATED.
   MEASURES TO USE: IN MOST CIRCUMSTANCES, MARK CLEARING LIMITS BY DELINEATING THE SITE WITH A CONTINUOUS LENGTH OF ORANGE BARRIER FENCE.
NOTES:

1. SHAPE OF SEDIMENTATION POND MAY VARY TO FIT DRAINAGE AREA AND TERRAIN. MODIFY AS NECESSARY TO ENSURE SATISFACTORY TRAPPING OF SEDIMENT.

2. USE THE KING COUNTY SWDM TO DETERMINE THE TRAP GEOMETRY - SEE SEC. 5.3.1

3. TO AID IN DETERMINING SEDIMENT DEPTH, ALL TRAPS SHALL HAVE A STAFF GAUGE WITH A PROMINENT MARK 1 FOOT ABOVE THE BOTTOM OF THE TRAP. CONTRACTOR SHALL RESTORE THE TRAP BACK TO ORIGINAL DEPTH AND SIZE WHEN THE SEDIMENT REACHES THIS LEVEL.

4. FOR USE ON SITES LESS THAN 3 ACRES IN SIZE.

5. TRAP MAY BE BERM OR BY PARTIAL OR COMPLETE EXCAVATION.
FILTER FABRIC COVER WITH WIRE FASTENER (COVER TOP AND HOLES)

3" DIA. HOLES, 6" O.C. IN THE UPPER 24" 30 HOLES MIN.

TOP OF BERM

FASTENER

18" RISER PIPE

GRATE RISER CONE

FINISHED GRADE

ORIGINAL GRADE

P.V.C. SIZE FOR QDEV-25 YR. STORM (12" MIN)

STORM CATCH BASIN TYPE 1

CONNECT TO CITY STORM DRAIN SYSTEM

FILL WITH CONCRETE OR CRUSH SURFACE BASE COURSE TO FLOW LINE OF OUTLET PIPE

SECTION

12" MIN

6" MIN.

18X18X12 TEE

TOP OF BERM

FINISHED GRADE

COVER TOP AND HOLES

FILTER FABRIC COVER WITH WIRE FASTENER (COVER TOP AND HOLES)

3" DIA. HOLES, 6" O.C. IN THE UPPER 24" 30 HOLES MIN.

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FASTENER

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P.V.C. SIZE FOR QDEV-25 YR. STORM (12" MIN)

STORM CATCH BASIN TYPE 1

CONNECT TO CITY STORM DRAIN SYSTEM

FILL WITH CONCRETE OR CRUSH SURFACE BASE COURSE TO FLOW LINE OF OUTLET PIPE

SECTION
NOTES:

1. TO AIDE IN DETERMINING SEDIMENT DEPTH, ONE-FOOT INTERVALS SHALL BE PROMINENTLY MARKED ON THE RISER. THE CONTRACTOR SHALL REMOVE THE SEDIMENT WHEN IT REACHES 1 FOOT IN DEPTH.

2. ANY DAMAGE TO THE POND EMBANKMENTS OR SLOPES SHALL BE REPAIRED.

3. DESIGN PER SECTION 5.3.1 OF THE KING COUNTY SWDM.

DETAIL NOTES:

1. CORRUGATED METAL RISER (PRINCIPAL SPILLWAY) OPEN AT TOP WITH CONE TRASH RACK.

2. DEWATERING DEVICE - PERFORATED POLYETHYLENE DRAINAGE TUBING, DIAMETER MINIMUM 2" LARGER THAN DEWATERING ORIFICE. TUBING SHALL COMPLY WITH ASTM F667 AND AASHTO M294. CONNECTION TO DEWATERING ORIFICE WATER TIGHT COUPLING.

3. WIRE BACKED SILT FENCE, STACKED HAYBALES WRAPPED WITH FILTER FABRIC, OR EQUIVALENT DIVIDER.

4. DEWATERING ORIFICE - SCHEDULE 40 STEEL STUB MIN. TACK WELDED TO THE RISER PIPE, DIAMETER AS PER CALCULATIONS.

5. CONCRETE BASE - 18" HIGH (MIN.) BY 2X RISER DIA. (MIN.) WIDE. ALTERNATIVELY, METAL STAKES AND WIRE MAY BE USED TO PREVENT FLOTATION.

6. EMBANKMENT COMPACTED 95%. PERVIOUS MATERIALS SUCH AS GRAVEL OR CLEAN SAND SHALL NOT BE USED.

7. PROVIDE ADEQUATE STRAPPING.
DETAIL NOTES:

1. 4" TO 8" QUARRY SPALLS AS SPECIFIED IN SECTION 9-13.6 OF THE WSDOT/APWA STANDARD SPECIFICATIONS.

2. THE MINIMUM LENGTH SHALL BE LENGTHENED AS NECESSARY TO ENSURE MATERIAL IS NOT TRACKED INTO THE PUBLIC RIGHT-OF-WAY. ALTERNATE CONSTRUCTION ENTRANCES WILL BE ALLOWED WITH APPROVAL OF THE DIRECTOR ON A CASE BY CASE BASIS, WHERE PHYSICAL SITE CONDITIONS AND SIZE DICTATE.

3. ATB DRIVEWAY RAMP, OR SITE ACCESS ROAD 20' WIDE MIN. SEE TABLE ABOVE FOR REQUIRED LENGTH.

4. INSTALL ORANGE BARRIER FENCE TO DIRECT TRAFFIC ONTO CONSTRUCTION ENTRANCE

NOTES:

1. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE IF PIPING IS IMPRACTICAL. A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.

2. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHT-OF-WAY MUST BE REMOVED IMMEDIATELY.

3. WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY. WHEN WASHING IS USED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.

4. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

5. TRUCK TIRE WASH REQUIRED.

<table>
<thead>
<tr>
<th>PROJECT SIZE</th>
<th>LENGTH OF QUARRY SPALLS</th>
<th>ATB</th>
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</thead>
<tbody>
<tr>
<td>&lt; 1/4 ACRE</td>
<td>30</td>
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</tr>
<tr>
<td>&lt; 1 ACRE</td>
<td>50</td>
<td>0</td>
</tr>
<tr>
<td>&lt; 3 ACRE</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>&gt; 3 ACRE</td>
<td>100</td>
<td>50</td>
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(SEE NOTE 2)
DETAIL NOTES:

1. DAM SPACING
2. SEDIMENT TRAP LENGTH
3. LINE THE BOTTOM OF THE SWALE WITH 4" C.S.T.C CRUSH SURFACE TO COURSE.

NOTE:

1. SUMP BEHIND ROCK CHECK DAM SHALL BE INSPECTED DAILY, AND CLEANED WHEN COLLECTED DEBRIS EXCEEDS 1/2 OF ITS DEPTH.

TABLE A

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</tr>
<tr>
<td>1:5</td>
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</tr>
</tbody>
</table>
PIPE SLOPE DRAIN

**PLAN VIEW**

- Interceptor Swale/Dike
- Existing Ground
- Anchor Pins as required

**SECTION A-A**

- Flexible Drain Pipe (or Approved Equal) Slope Anchors Required for Slope Greater Than 20%.
- Standard Metal or High Density Polyethylene End Section with Holding Straps and Anchor Pins (Typ Top and Bottom)
- Use Std Details 461 or 462 or 463 for Pipe Outfall

**ISOMETRIC**

- Interceptor Swale/Dike
- Existing or Graded Slope
STORM INLET PROTECTION

NOTES:

1. ANY ACCUMULATED SEDIMENT ON OR AROUND THE FILTER FABRIC PROTECTION SHALL BE REMOVED IMMEDIATELY. SEDIMENT SHALL NOT BE REMOVED WITH WATER, AND ALL SEDIMENT MUST BE DISPOSED OF AS FILL ON-SITE OR HAULED OFF-SITE.

2. ANY SEDIMENT IN THE CATCH BASIN INSERT SHALL BE REMOVED WHEN THE SEDIMENT HAS FILLED ONE-THIRD OF THE AVAILABLE STORAGE. THE FILTER MEDIA FOR THE INSERT SHALL BE CLEANED OR REPLACED AT LEAST MONTHLY.

3. REGULAR MAINTENANCE IS CRITICAL FOR BOTH FORMS OF CATCH BASIN PROTECTION. UNLIKE MANY FORMS OF PROTECTION THAT FAIL GRADUALLY, CATCH BASIN PROTECTION WILL FAIL SUDDENLY AND COMPLETELY IF NOT MAINTAINED PROPERLY.

4. ALL CATCH BASIN PROTECTION SHALL BE REMOVED WHEN WORK IS COMPLETE.
NOTE:
INSTALL THE SILT FENCE FIRST. AFTER THE SILT FENCE HAS BEEN INSTALLED, CONSTRUCT BERM AND TRENCH.