

\$4.40

City of Fife

Storm Water

Design and Construction

STANDARDS

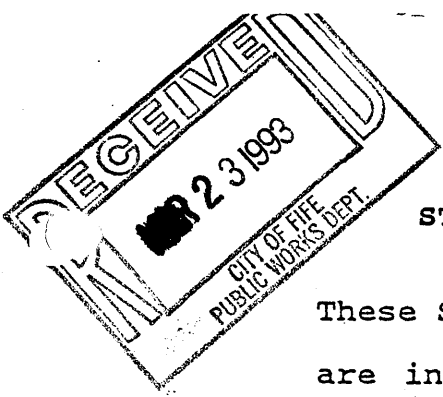
March - 1993

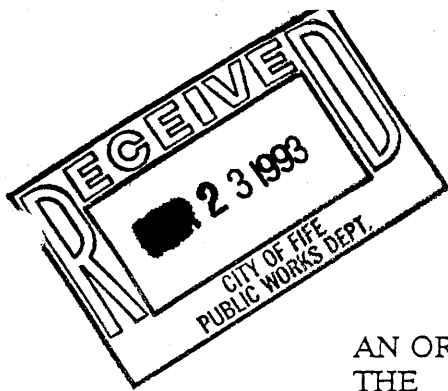
Community Development Department

ORIGINAL

STORM WATER DESIGN AND CONSTRUCTION STANDARDS

These Storm Water Design & Construction Standards are in addition to Fife Municipal Code 15.32, Drainage of Surface Water, Fife Municipal Code 15.36 Land Fill, and any other regulation in the Fife Municipal Code that may control the design and construction of storm water systems. You are advised to contact the City Engineer for additional information and make yourself familiar with the Fife Municipal Code.





ORIGINAL

ORIGINAL

CITY OF FIFE, WASHINGTON

ORDINANCE NO. _____

AN ORDINANCE OF THE FIFE CITY COUNCIL ADOPTING THE STORM WATER DESIGN AND CONSTRUCTION STANDARDS AND ESTABLISHING A NEW FIFE MUNICIPAL CODE CHAPTER 15.34

WHEREAS, the Engineering Division of the Community Development Department has prepared a set of standards for storm water design and construction; and

WHEREAS, the standards are applicable within the City of Fife; and

WHEREAS, the Community Development Director has completed his analysis of the Standards and has found that the public health, safety, and welfare would best be served by the adoption of the March 1993 Storm Water Design and Construction Standards; and

WHEREAS, the Council finds that the public health, safety and welfare of the public would be served by adopting the Community Director's recommendation; now therefore

THE CITY COUNCIL FOR THE CITY OF FIFE DO ORDAIN AS FOLLOWS:

Section 1. There is hereby created a new Chapter 15.34 to the Fife Municipal Code, which shall be entitled Storm Water Design and Construction Standards.

Section 2. There is hereby added a new section 15.34.010 which shall read as follows:

The publication entitled "City of Fife Storm Water Design and Construction Standards", dated March, 1993 is hereby adopted by reference and no storm water system shall be installed within the City unless the equipment, material and installation meet the standards set forth in said publication.

Section 3. A true and correct copy of the City of Fife Storm Water Design and Construction Standards, March, 1993 edition is attached to the original of this ordinance. The City Clerk shall authenticate said copy and file the same, along with the original of this ordinance, in the official City records. The City clerk is further directed to keep at least one copy of said standards in the Clerk's office in order to be available for examination by the public.

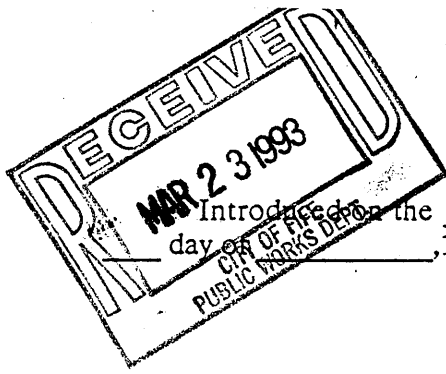
Section 4. If any provision of this Ordinance is held invalid, such invalidity shall not effect any, which can be given effect without the invalid provision or application, and to this end the provisions of this Ordinance are declared to be severable.

Section 5. This Ordinance shall be in full force and effect five (5) days after its passage, approval and publication as provided by law. A summary of this Ordinance may be published in lieu of publishing the Ordinance in its entirety.

Ordinance No. _____

Page 1 of 2

ORIGINAL



Introduced by the _____ day of _____, 1993, passed by the City Council on the _____ day of _____, 1993, and approved by the Mayor on the _____ day of _____, 1993.

W. Carl Stegman, Mayor

ATTEST:

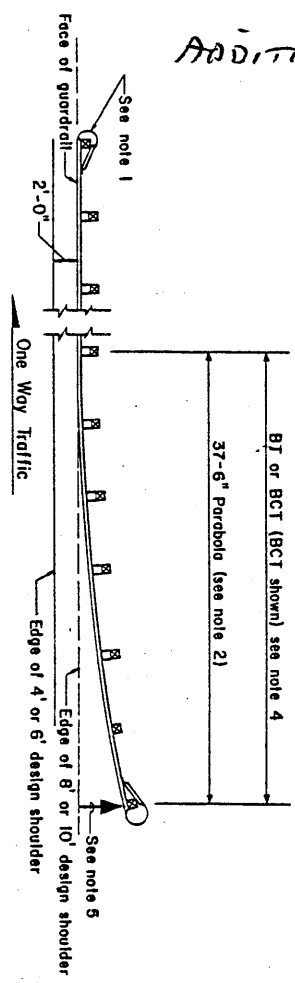
APPROVED AS TO FORM:

Shirlee Kinney
City Clerk

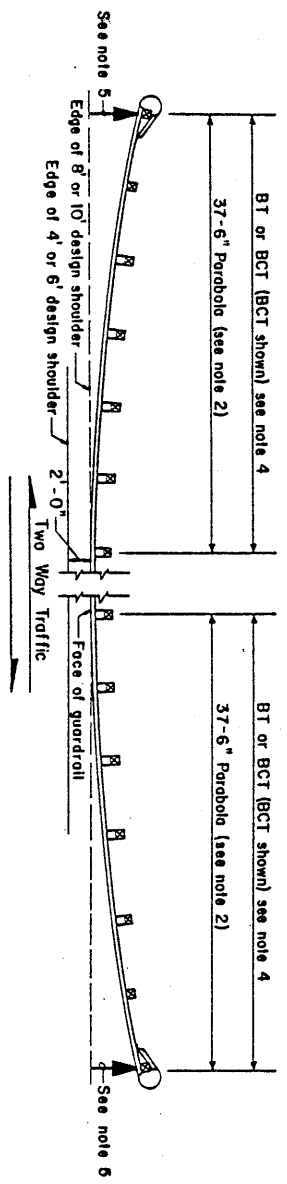
Loren D. Combs
City Attorney

Published: _____

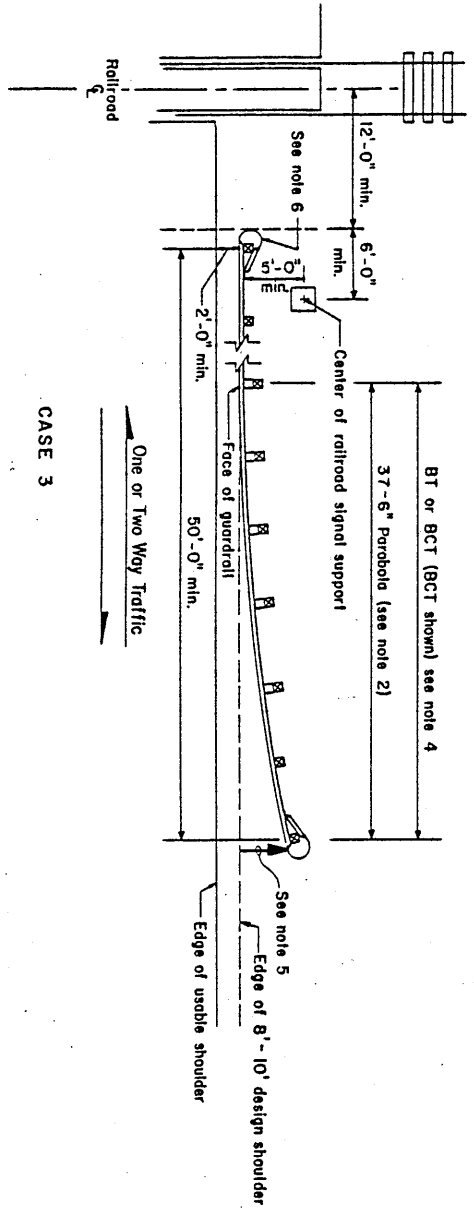
NEW
ADDITION



CASE 1



CASE 2



CASE 3

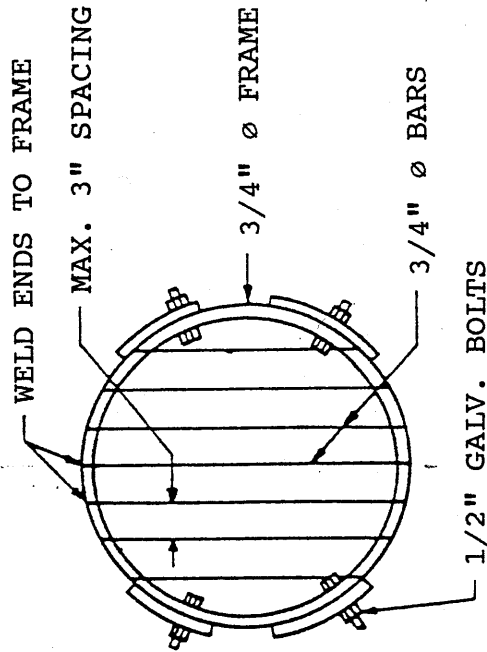
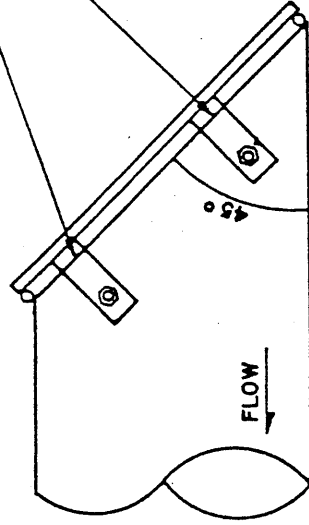
GUARDRAIL PLACEMENT

- NOTES:
1. Type 4 anchor required. For terminal details, see applicable standard plan(s).
 2. For parabola details and offset distances, see applicable standard plan(s)
 3. Post spacing is 6'-3" unless otherwise shown.
 4. For Buried Terminal (BT) or Breakaway Cable Terminal (BCT) details, see applicable standard plan(s). If the Buried Terminal is used a 12:1 flare rate should not be exceeded.
 5. The slope into the face of the guardrail should not exceed 10:1.
 6. For one way traffic use Type 4 anchor. For two way traffic use Type 1 anchor. See applicable standard plan(s) for anchor details.

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4 EA. 1/4" x 2" x 5" STRIPS UNIFORMLY SPACED AND WELDED TO 3/4" Ø FRAME.



18" AND LARGER PIPE

NOTE: ALL STEEL PARTS TO BE GALVANIZED AND ASPHALT COATED (TREATMENT I OR BETTER).

TRASH RACK DETAIL

NOTES:

CATCH BASINS TO BE CONSTRUCTED IN ACCORDANCE WITH ASTM C 478 (AASHTO M 199) & ASTM C 890 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE STANDARD SPECIFICATIONS.

AS AN ACCEPTABLE ALTERNATE TO REBAR, WELDED WIRE FABRIC HAVING A MINIMUM AREA OF 0.12 SQUARE INCHES PER FOOT MAY BE USED. WELDED WIRE FABRIC SHALL COMPLY TO ASTM A 497 (AASHTO M 221). WIRE FABRIC SHALL NOT BE PLACED IN THE KNOCKOUT.

THE BOTTOM OF THE PRECAST BASE SECTION MAY BE ROUNDED.

PRECAST BASES SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE A WALL THICKNESS OF 2" MINIMUM.

KNOCKOUTS MAY BE ON ALL 4 SIDES WITH MAXIMUM DIAMETER OF 28". KNOCKOUTS MAY BE EITHER ROUND OR "D" SHAPE. PIPE TO BE INSTALLED IN FACTORY SUPPLIED KNOCKOUTS.

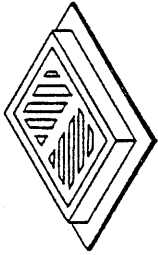
KNOCKOUT FOR CUTOUT HOLE SIZE IS EQUAL TO PIPE OUTER DIAMETER PLUS CATCH BASIN WALL THICKNESS.

THE TAPER ON THE SIDES OF THE PRECAST BASE SECTION AND RISER SECTION SHALL NOT EXCEED 1/2" PER FOOT.

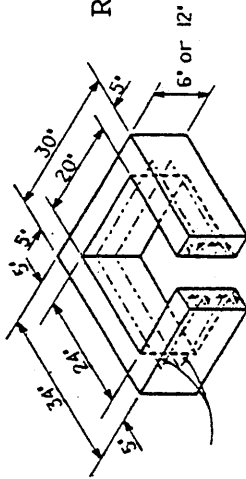
CATCH BASIN FRAME AND GRATE SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS AND SHALL MEET THE STRENGTH REQUIREMENTS OF FEDERAL SPECIFICATION RR-F-621D. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT.

FRAME AND GRATE MAY BE INSTALLED WITH FLANGE DOWN OR CAST INTO RISER.

FRAME AND GRATE
(SEE STANDARD PLAN FOR DETAILS)

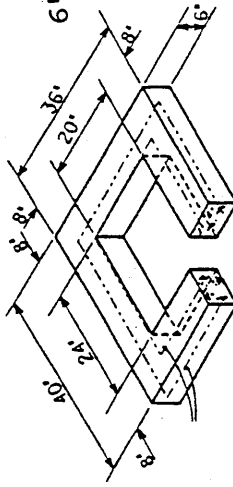


RISER SECTION



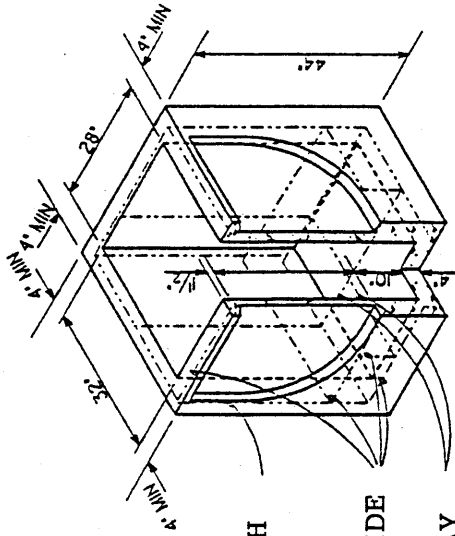
- 1 - #3 BAR HOOP FOR 6"
- 2 - #3 BAR HOOP FOR 12"

6" REDUCING SECTION



- 2 - #3 BAR HOOP

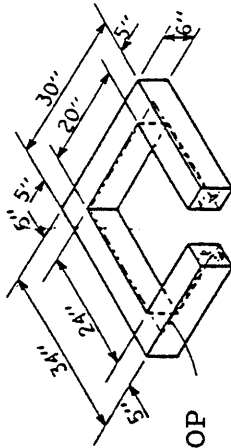
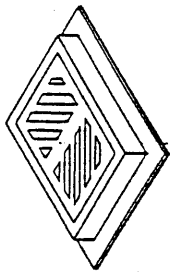
PRECAST BASE SECTION
(MEASUREMENT AT THE TOP OF THE BASE)



- #3 BAR EACH CORNER
- #3 BAR EACH SIDE
- #3 BAR EACH WAY

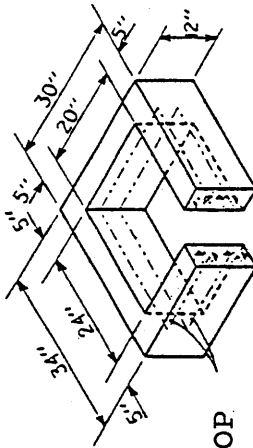
CATCH BASIN TYPE II

FRAME AND GRATE
(SEE STANDARD PLAN FOR DETAILS)



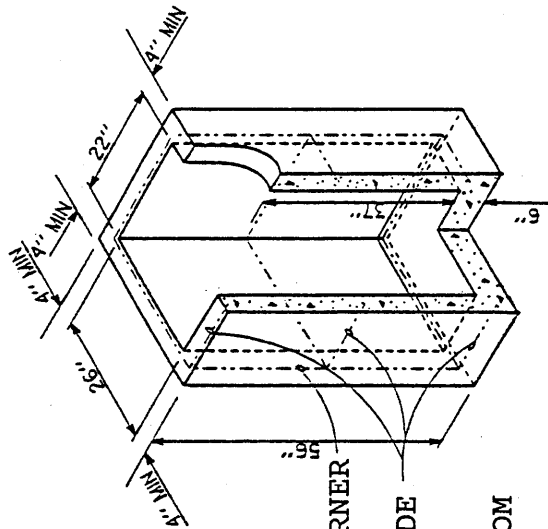
1 - #3 BAR HOOP

6" RISER SECTION



2 - #3 BAR HOOP

12" RISER SECTION



#3 BAR EACH CORNER

#3 BAR EACH SIDE

#3 BAR IN BOTTOM

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

NOTES:

CATCH BASINS TO BE CONSTRUCTED IN ACCORDANCE WITH ASTM C 478 (AASHTO M 199) & ASTM C 890 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE STANDARD SPECIFICATIONS.

AS AN ACCEPTABLE ALTERNATE TO REBAR, WELDED WIRE FABRIC HAVING A MINIMUM AREA OF 0.12 SQUARE INCHES PER FOOT MAY BE USED. WELDED WIRE FABRIC SHALL COMPLY TO ASTM A 497 (AASHTO M 221). WIRE FABRIC SHALL NOT BE PLACED IN THE CUTOUTS.

THE BOTTOM OF THE PRECAST BASE SECTION MAY BE ROUNDED.

CUTOUTS MAY BE ON ALL 4 SIDES WITH MAXIMUM DIAMETER OF 14". CUTOUTS MAY BE EITHER ROUND OR "D" SHAPE. PIPE TO BE INSTALLED IN FACTORY SUPPLIED CUTOUTS.

THE TAPER ON THE SIDES OF THE PRECAST BASE SECTION AND RISER SECTION SHALL NOT EXCEED 1/2" PER FOOT.

CATCH BASIN FRAME AND GRATE 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.

FRAME AND GRATE MAY BE INSTALLED WITH FLANGE DOWN OR CAST INTO RISER.

CATCH BASIN TYPE 1P
PARKING LOT C.B.

CATCH BASIN TYPE 2 72" & 96"

NOTES:

CATCH BASINS TO BE INSTALLED IN ACCORDANCE WITH ASTM C 478 (AASHTO M 199), & ASTM C 890 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE STANDARD SPECIFICATIONS.

HANDHOLDS IN RISER OR ADJUSTMENT SECTION SHALL HAVE 3" MINIMUM CLEARANCE. STEPS IN CATCH BASIN SHALL HAVE 6" MINIMUM CLEARANCE. NO STEPS ARE REQUIRED WHEN "B" IS 4' OR LESS.

ALL REINFORCED CAST IN PLACE CONCRETE SHALL BE CLASS A. ALL PRECAST CONCRETE SHALL OBTAIN 4000 PSI @ 28 DAYS.

PRECAST BASES SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE A WALL THICKNESS OF 2" MINIMUM.

KNOCKOUT OR CUTOUT HOLE SIZE IS EQUAL TO PIPE OUTER DIAMETER PLUS CATCH BASIN WALL THICKNESS. MAXIMUM HOLE SIZE IS 60" FOR 72" CATCH BASIN. 84" FOR 96" CATCH BASIN. MINIMUM DISTANCE BETWEEN HOLES IS 12".

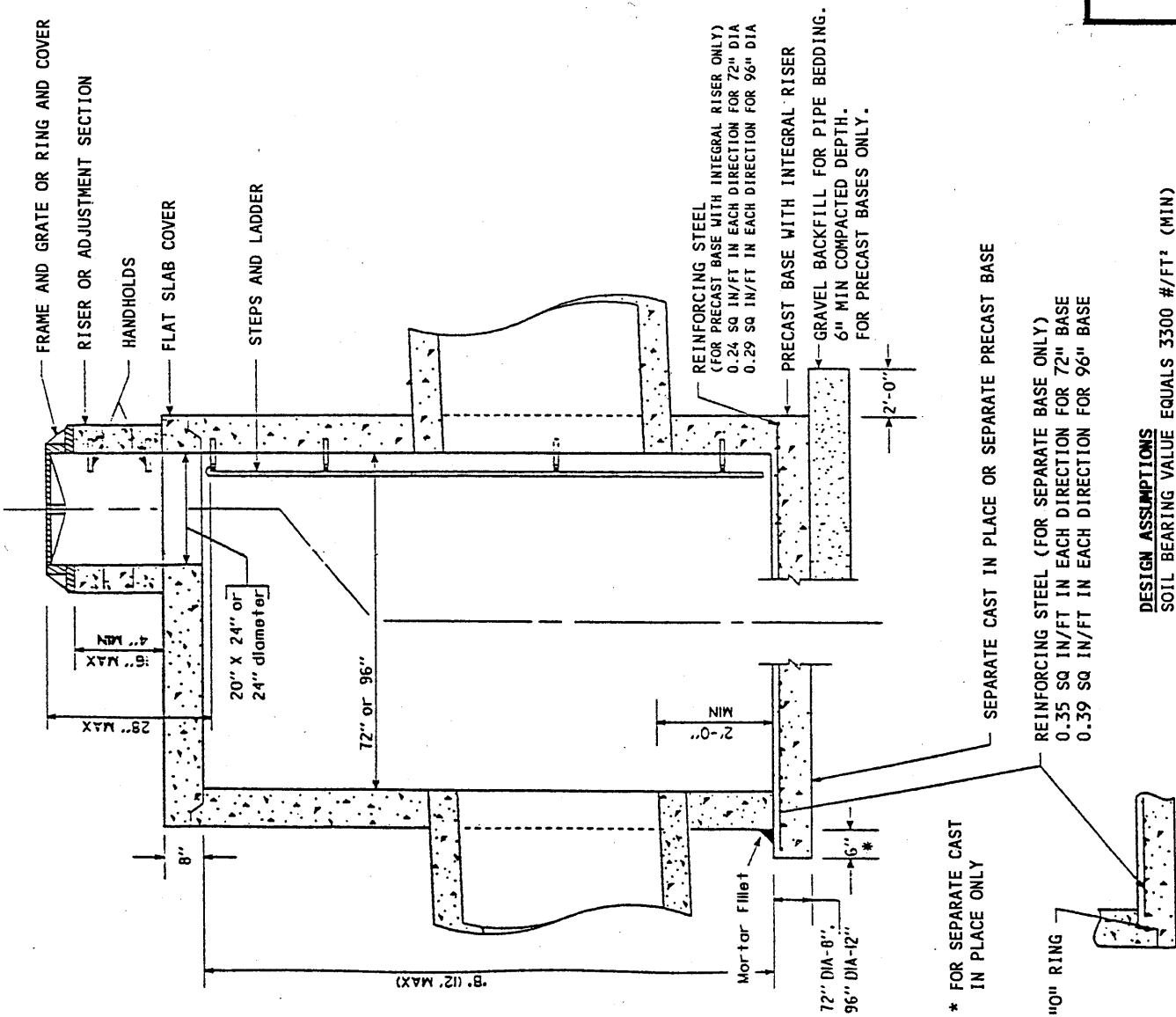
FRAME AND GRATE OR RING AND COVER SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS AND MEET THE STRENGTH REQUIREMENTS OF FEDERAL SPECIFICATION RR-F-621D. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT.

ALL BASE REINFORCING STEEL SHALL HAVE A MINIMUM YIELD STRENGTH OF 60,000 PSI AND BE PLACED IN THE UPPER HALF OF THE BASE WITH 1" MINIMUM CLEARANCE.

THE BOTTOM OF THE PRECAST CATCH BASIN MAY BE ROUNDED. FOR DETAILS SHOWING FRAME AND GRATE, RING AND COVER SEE STANDARD PLAN "METAL FRAME AND GRATE FOR CATCH BASIN INLET".

FOR DETAILS SHOWING LADDER, STEPS, HANDRAIL AND TOP SLAB SEE STANDARD PLAN "MISCELLANEOUS CATCH BASIN DETAILS".

FRAME AND GRATE MAY BE INSTALLED WITH FLANGE DOWN OR CAST INTO RISER.



* FOR SEPARATE CAST IN PLACE ONLY

"O" RING



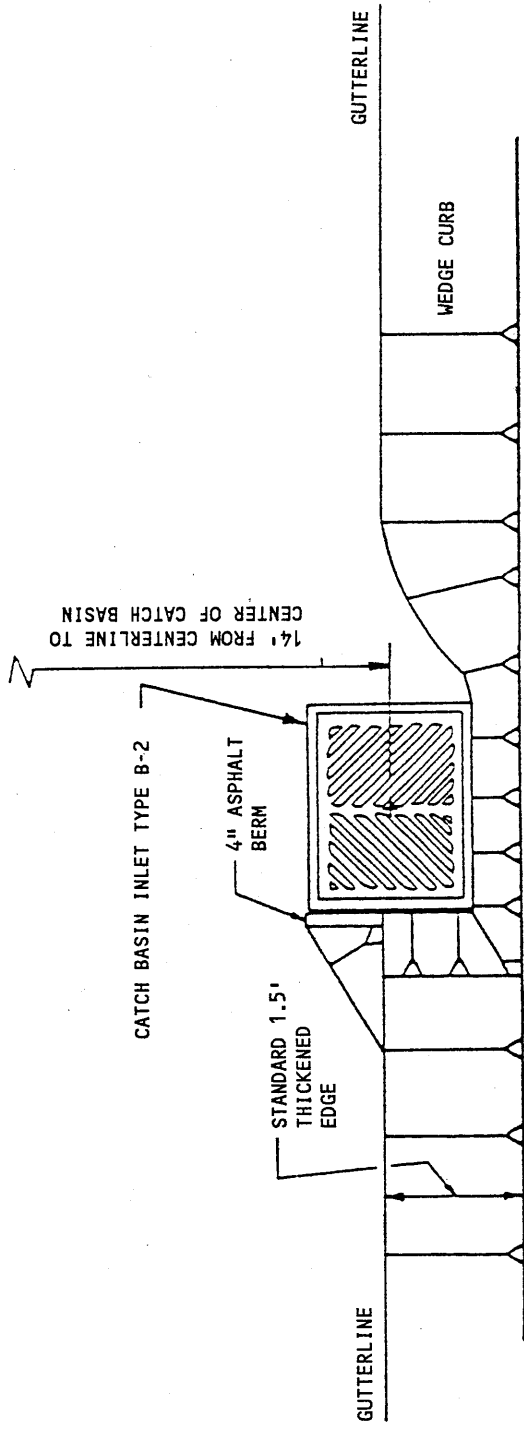
PRECAST BASE JOINT

SEPARATE CAST IN PLACE OR SEPARATE PRECAST BASE

REINFORCING STEEL (FOR SEPARATE BASE ONLY)
0.35 SQ IN/FT IN EACH DIRECTION FOR 72" BASE
0.39 SQ IN/FT IN EACH DIRECTION FOR 96" BASE

DESIGN ASSUMPTIONS
SOIL BEARING VALUE EQUALS 3300 #/FT² (MIN)

THIS DETAIL TO BE SHOWN AND CONSTRUCTED
WHEN PROFILE GRADE EQUALS OR EXCEEDS 6%.



CONCRETE CURB INLET

CATCH BASIN
INLET DETAIL

FRAME AND LADDER OR
FRAME OFFSET, SEE
NOTE 4. FRAME AND
GRATE ELEVATION
PER PLANS

OVERFLOW
ELEVATION
TO PROVIDE
DETENTION
AND OIL
SEPARATION.
ELEV. =

PIPE SUPPORT

OUTLET
PIPE

INVERT EL. =

RESTRICTOR PLATE
WITH ORFICE AS
SPECIFIED. NOT
NEEDED IF ONLY
FOR OIL POLLUTION
CONTROL.

ROUND SOLID COVER MARKED
"DRAIN" WITH LOCKING BOLTS
UNLESS OTHERWISE APPROVED
BY ENGINEER.

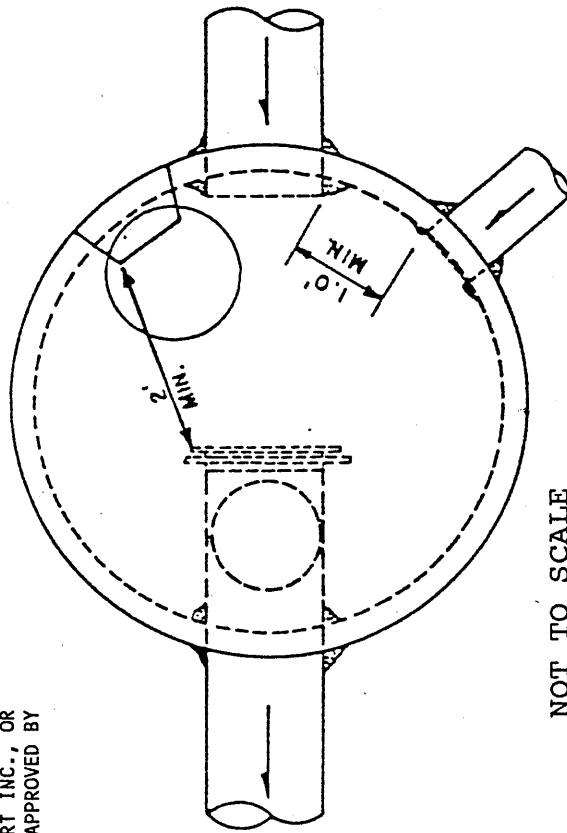
CHAIN - 200# CAPACITY
SLACK WHEN GATE IS DOWN.
FASTEN CHAIN TO FRAME.

STANDARD GALVANIZED STEEL
OR ALUMINUM LADDER/STEPS.

WATERTIGHT CLEANOUT GATE:
A. SHEAR GATE, IRON BODY
BRONZE MTD. OLYMPIC FDY.
STD. OR,
B. LIFT GATE, NO. C/C/1-LG,
CASCADE CULVERT INC., OR
C. OTHER DEVICE APPROVED BY
ENGINEER.

INVERT EL. =

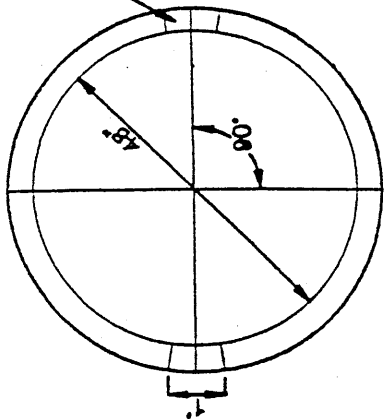
- NOTES:
1. PIPE SIZES AND SLOPES, PER PLANS.
 2. OUTLET CAPACITY NOT LESS THAN COMBINED INLETS.
 3. METAL PARTS:
 - A. CORROSION RESISTANT, GALVANIZED, OR ALUMINUM TYPE 2.
 - B. IF GALVANIZED STEEL PIPE, HAVE ASPHALT TREATMENT 1.
 4. FRAME AND LADDER OR STEPS OFFSET SO:
 - A. CLEANOUT GATE IS VISIBLE FROM TOP.
 - B. CLIMBDOWN SPACE IS CLEAR OF RISER AND CLEANOUT GATE.
 5. STRUCTURE SHALL BE A TYPE 2 CATCH BASIN, 54" DIAMETER MINIMUM.



NOT TO SCALE

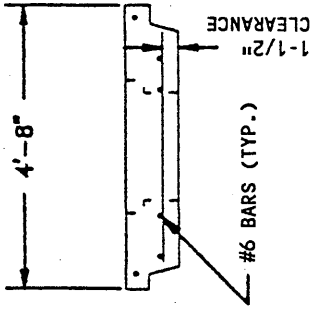
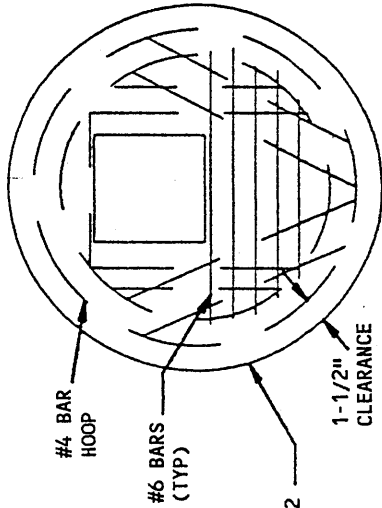
FLOW RESTRICTOR/ OIL POLLUTION CONTROL DEVICE

REMOVE 1' SECTION OF JOINT ON EACH RING AT FOUR LOCATIONS AS SHOWN (SEE JOINT DETAIL).

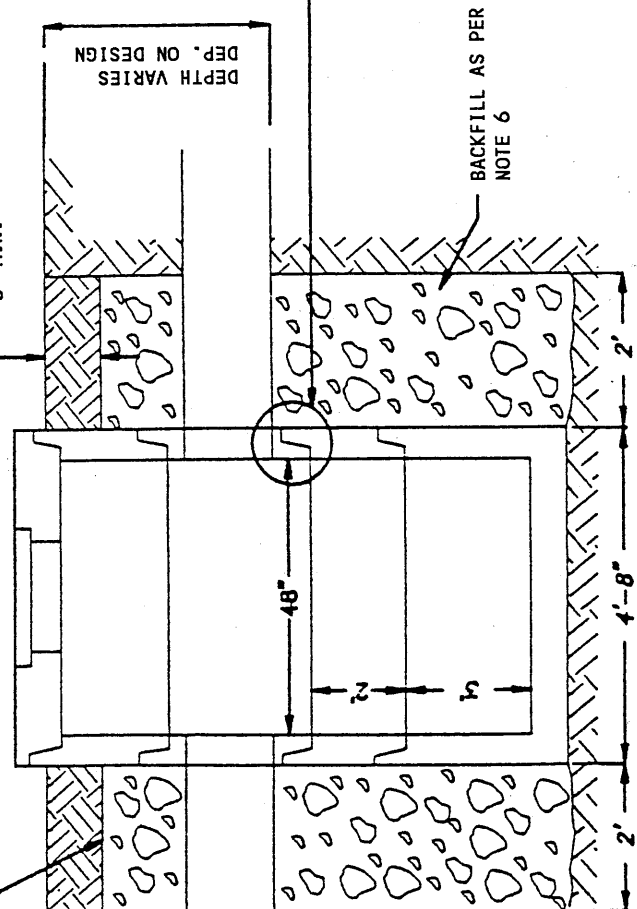


PLAN OF RING SECTION

TOP UNIT DETAIL

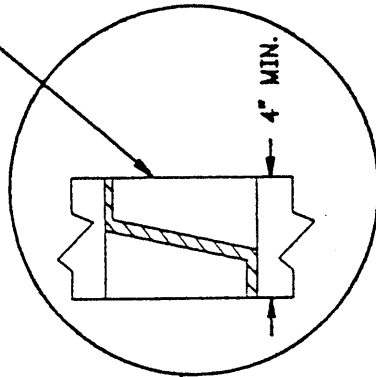


UNTREATED BUILDING PAPER OR FILTER FABRIC



JOINT DETAIL

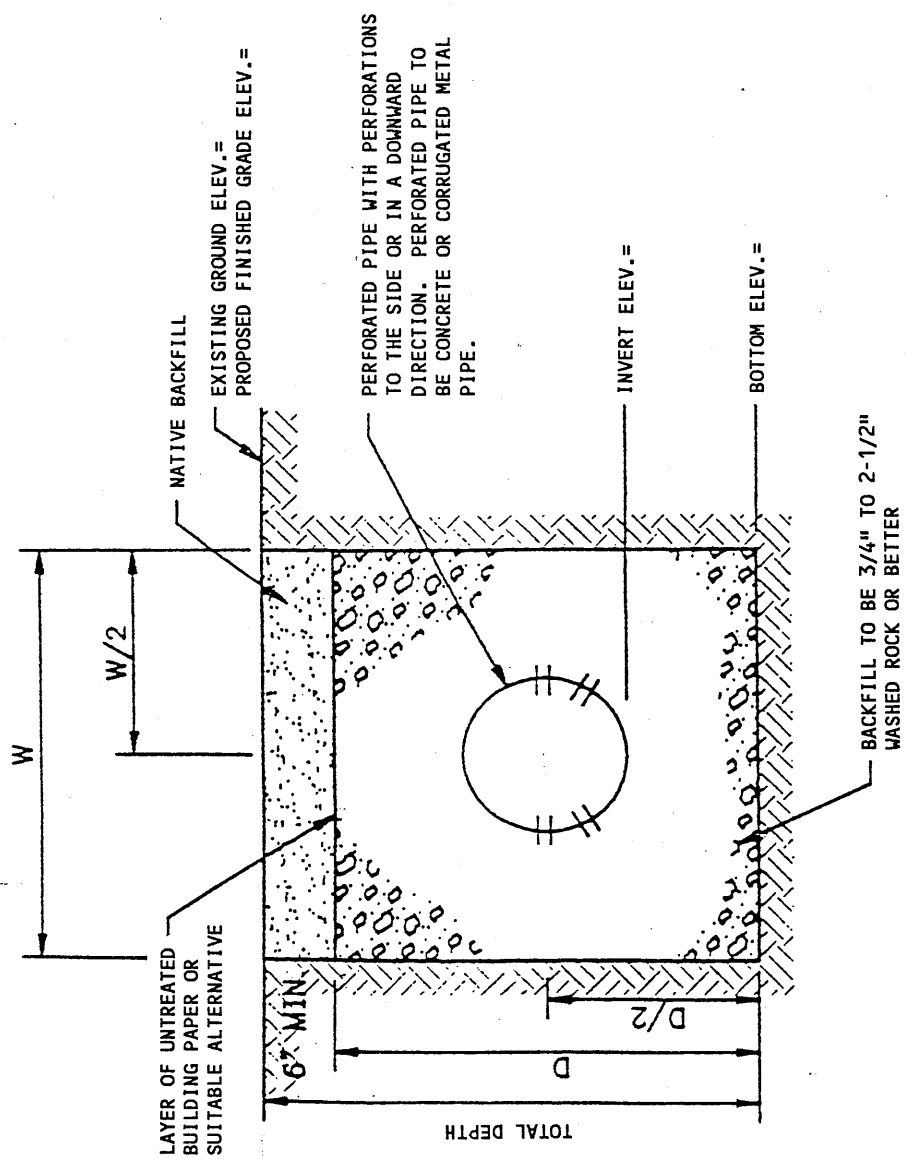
REMOVE BELL AND LIP FOR 1' AT FOUR LOCATIONS TO PROVIDE FOR SEEPAGE AT EACH JOINT SECTION



NOTES:

1. DRYWELL IS A TYPE II CATCH BASIN AND MODIFIED AS SHOWN.
2. DRYWELL TO BE BUILT IN 1' OR 2' SECTIONS ONLY. EXCEPT FOR BASE WHICH SHALL BE A 3' SECTION.
3. BASE SECTION TO BE PLACED ON STABLE GROUND.
4. EACH DRYWELL SYSTEM SHALL HAVE AN OVERFLOW SYSTEM. SIZE TO BE DEPENDENT ON DESIGN CALCULATIONS.
5. TOP UNIT SHALL MEET W.S.D.O.T. SPECIFICATIONS FOR A TYPE 2 CATCH BASIN.
6. BACKFILL SHALL BE 3/4 INCH TO 2-1/2 INCHES WASHED GRAVEL. MATERIAL PASSING THE #40 SIEVE SHALL NOT EXCEED 2% BY WEIGHT.
7. FOR PERCOLATION TRENCH DETAIL SEE PAGE 5.

STANDARD DRYWELL
DETAIL

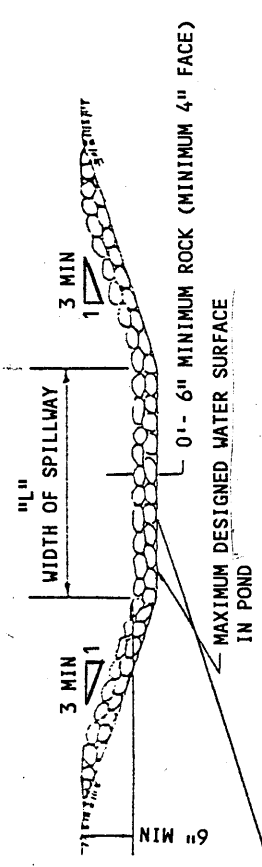
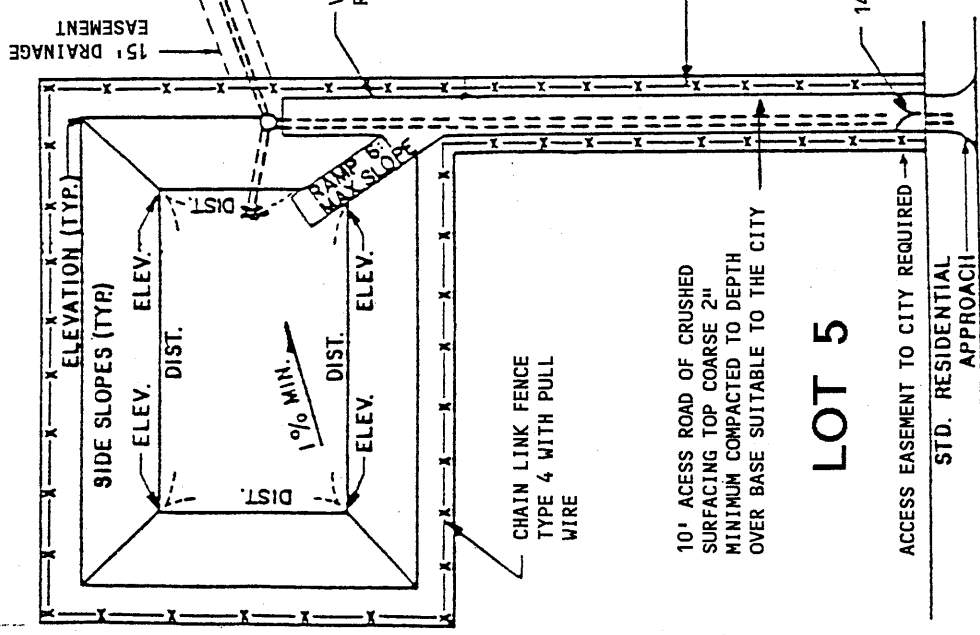


NOTES:

1. PIPE FOR STORM DRAIN PERCOLATION SYSTEMS SHALL MEET W.S.D.O.T. SPECIFICATIONS FOR ZINC-COATED (GALVANIZED) CORRUGATED IRON OR STEEL UNDERDRAIN PIPE (CHAPTER 9-04.2(4)) OR PERFORATED CORRUGATED ALUMINUM ALLOY UNDERDRAIN PIPE (CHAPTER 9-04.2(5)).
2. PERFORATED CONCRETE UNDERDRAIN PIPE MEETING W.S.D.O.T. SPECIFICATIONS CHAPTER 9.05.2(2) AND A.A.S.H.T.O. DESIGNATED M175, TYPE M1, MAY BE USED WITH THE ADDITIONAL CONDITIONS: THE PERFORATIONS SHALL BE CIRCULAR AND A MINIMUM OF 1/2 INCH IN DIAMETER. THEY SHALL BE CLEANLY CUT AND THE INSIDE AND OUTSIDE OF THE PIPE SHALL BE PERFECTLY SMOOTH AND UNIFORM WITH NO EXCESS CONCRETE LEFT FROM THE HOLE PERFORATIONS PROCESS. THERE SHALL BE A MINIMUM OF 7 SETS OF PERFORATIONS WITH 2 PER SET OF PERFORATIONS FOR EACH 3-1/2 FEET OF PIPE LENGTH. RUBBER GASKETS OR GROUTING OF JOINTS FOR PERFORATED PIPE RUNS WILL NOT BE REQUIRED. INSPECTION OF THE PERFORATED CONCRETE PIPE SHALL BE MADE BY THE CITY BEFORE INSTALLATION OF THE PIPE IN THE GROUND.

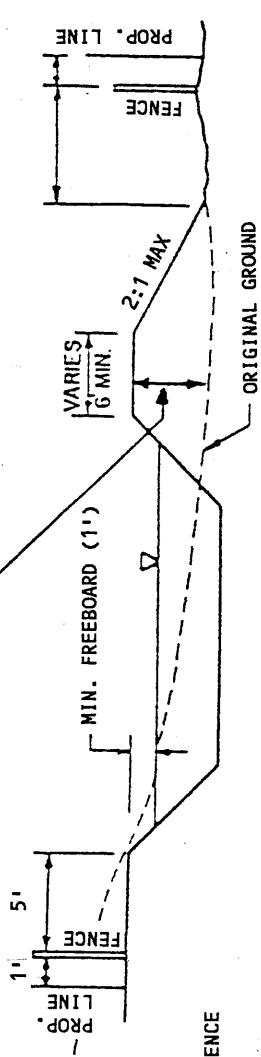
STORMWATER INFILTRATION TRENCH SECTION

NATURAL OUTLET



TYPICAL DETENTION POND DETAIL

FILL HEIGHT SHALL NOT EXCEED FOUR (4) FEET WITHOUT APPLICABLE W.D.O.E. APPROVAL.



TYPICAL POND OVERFLOW SPILLWAY

SCALE: 1" = 20' HORIZONTAL
1" = 2' VERTICAL

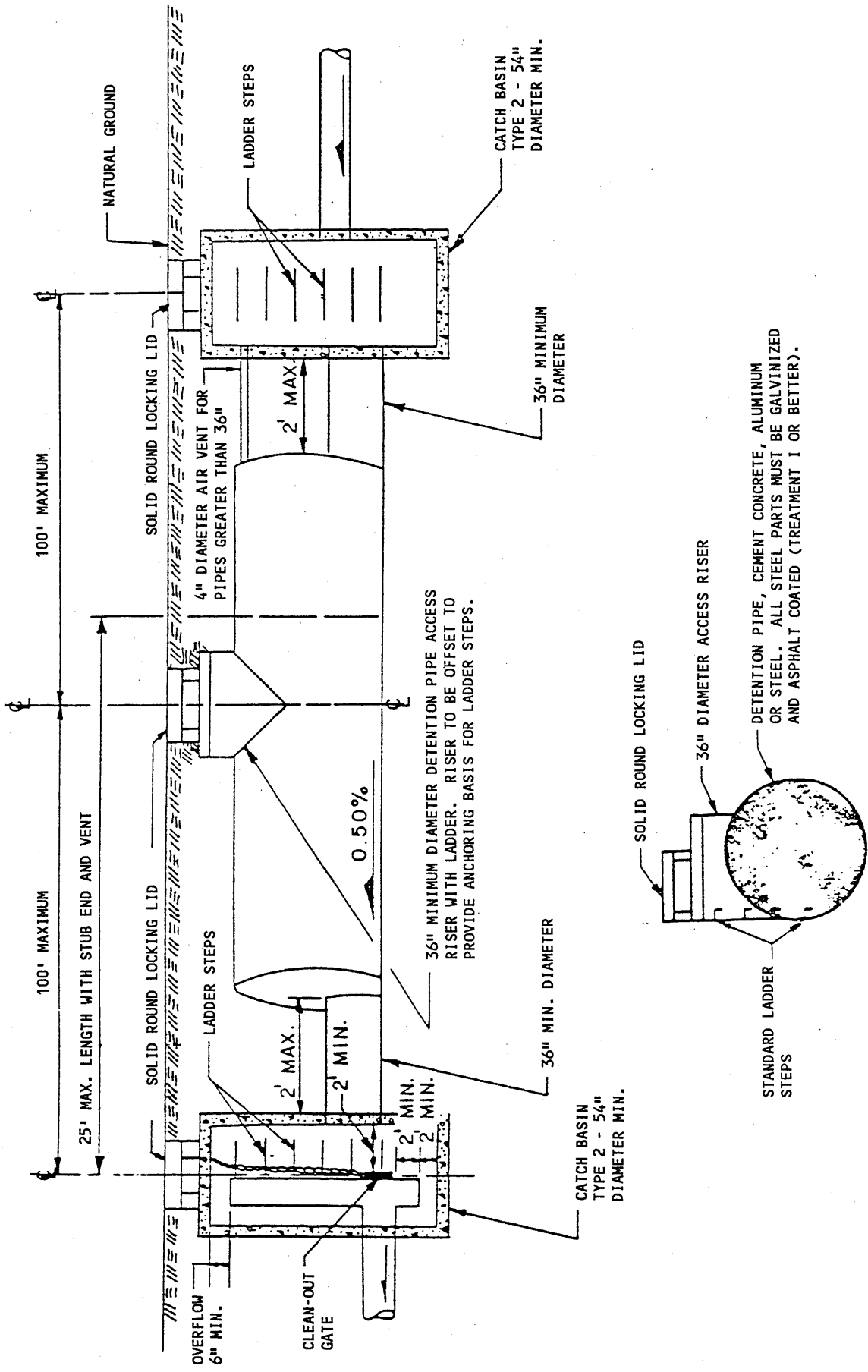
LOT 6

LOT 5

NOTES:

1. ALL EMBANKMENT TO BE COMPACTED
2. CONSTRUCTION PLANS TO SHOW ALL DIMENSIONS, SLOPES AND ELEVATIONS.

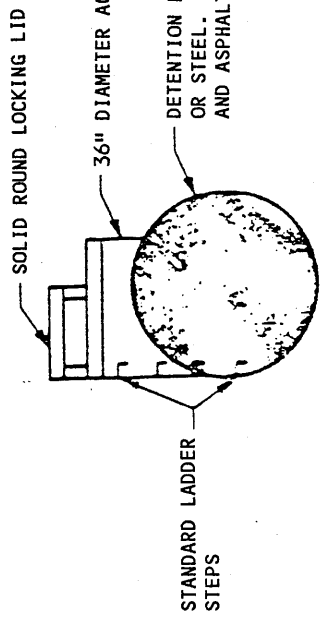
STANDARD BASIN DETAIL

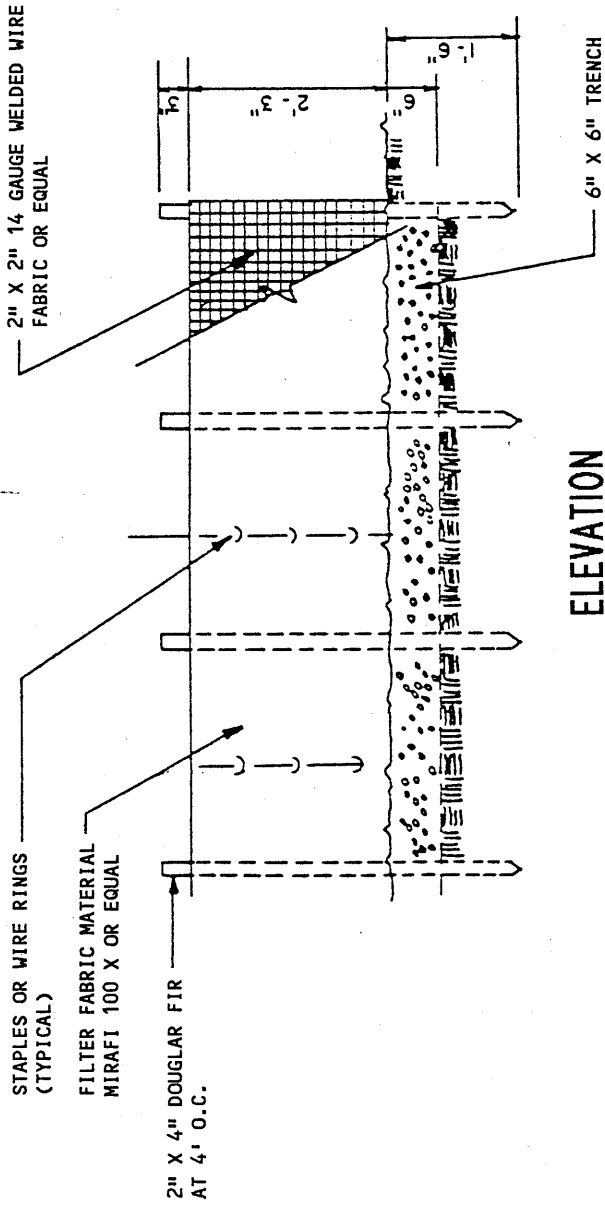


**TYPICAL CLOSED
DETENTION
PIPE DETAIL**

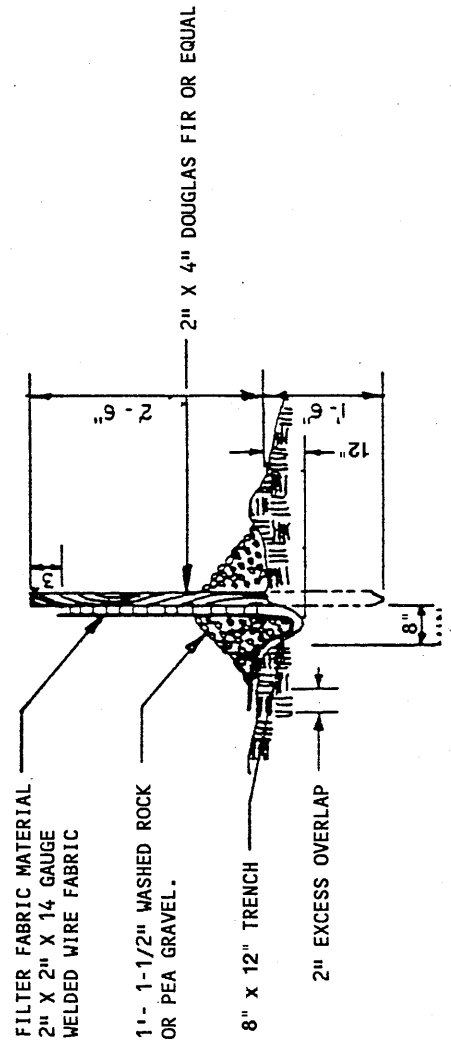
**SECTION THRU ACCESS PORTAL
NO SCALE**

DETENTION PIPE, CEMENT CONCRETE, ALUMINUM OR STEEL. ALL STEEL PARTS MUST BE GALVANIZED AND ASPHALT COATED (TREATMENT 1 OR BETTER).





ELEVATION

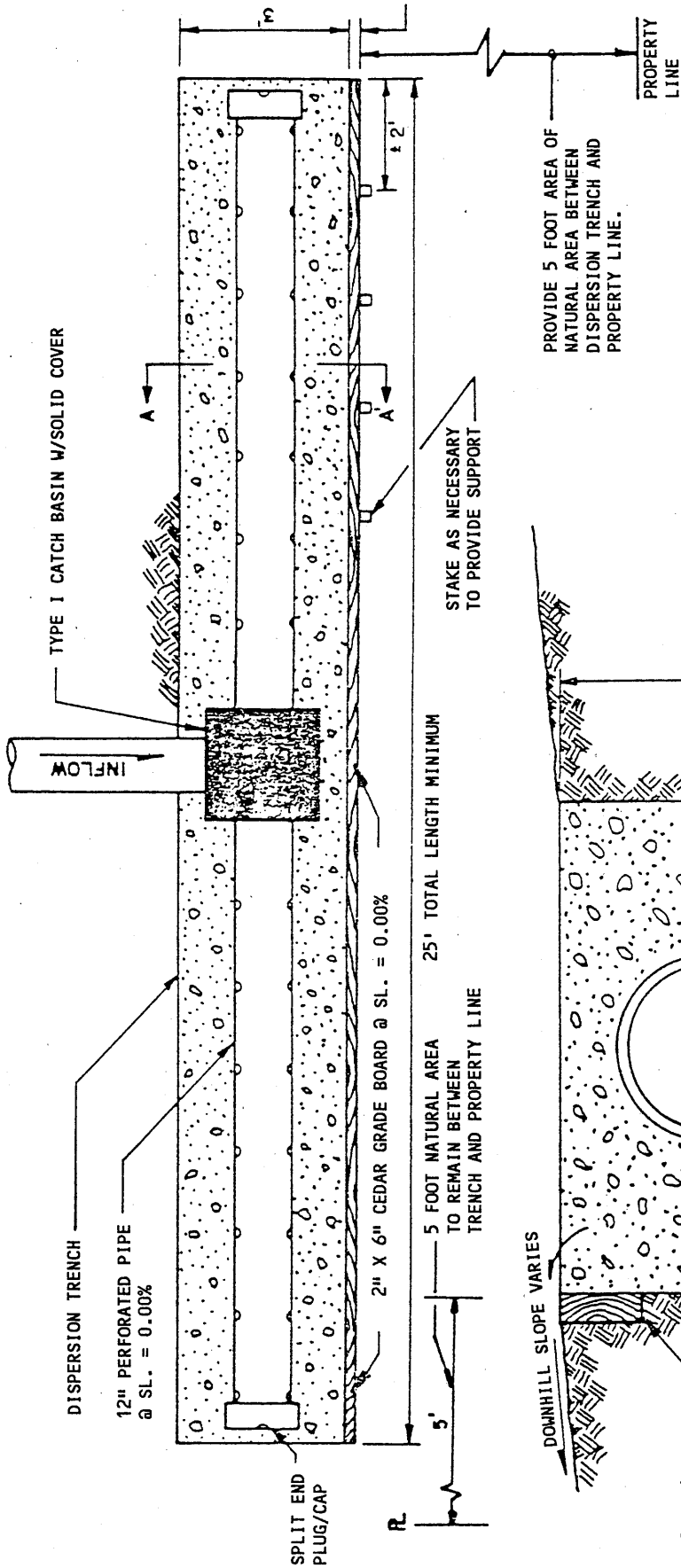


TYPICAL CROSS SECTION

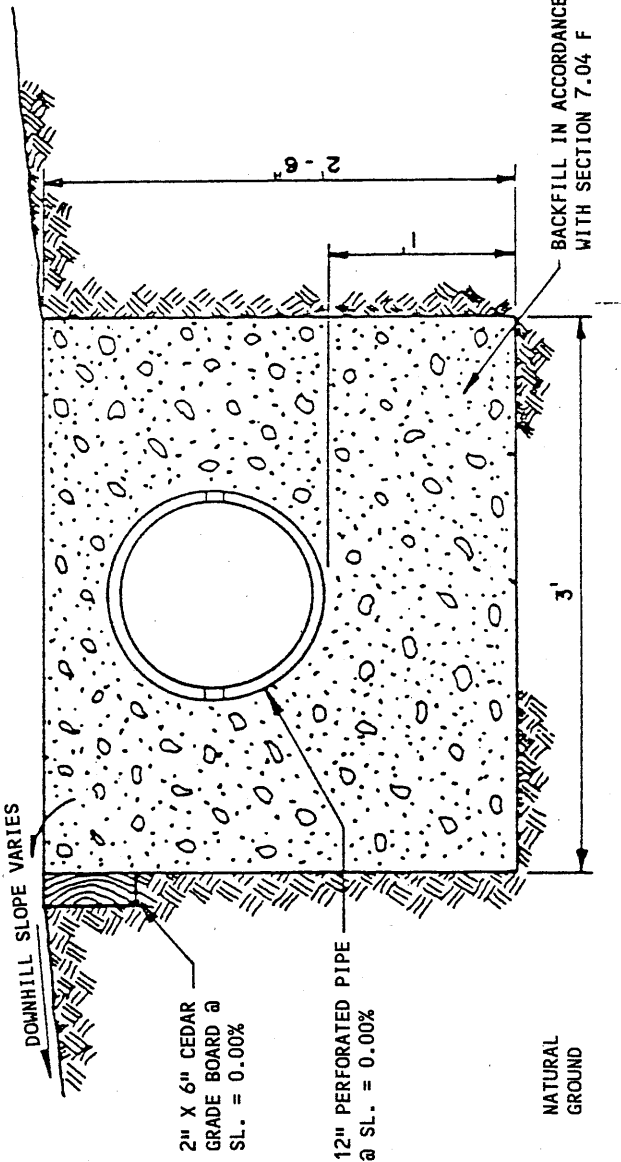
NOTES:

1. PLACE 1' OF 3/4" TO 1-1/2" WASHED ROCK OR PEA GRAVEL ON BOTH SIDES OF FENCE TO CREATE A BEVEL SHAPE.
2. FABRIC SHALL COVER BOTTOM OF 6" X 6" TRENCH AND EXTEND BEYOND THE LIMITS OF THE GRAVEL IN ORDER TO MAINTAIN AN EXCESS OVERLAP OF 2" MINIMUM AS SHOWN IN TYPICAL CROSS-SECTION.

SILTATION FENCE DETAIL

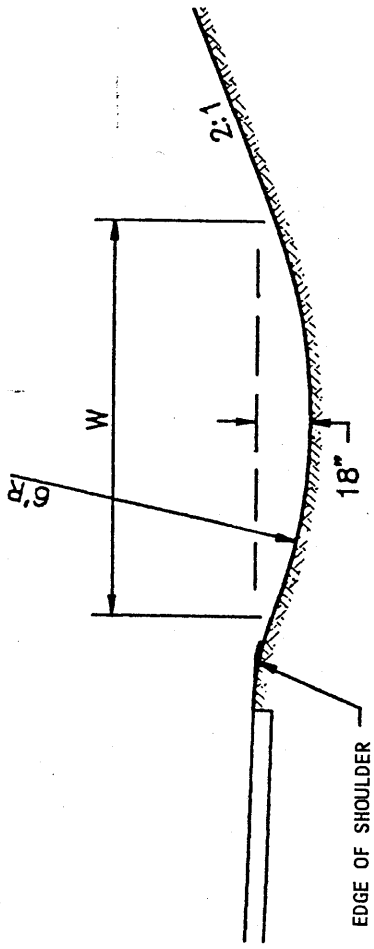


PLAN
 SCALE 1" = 3'

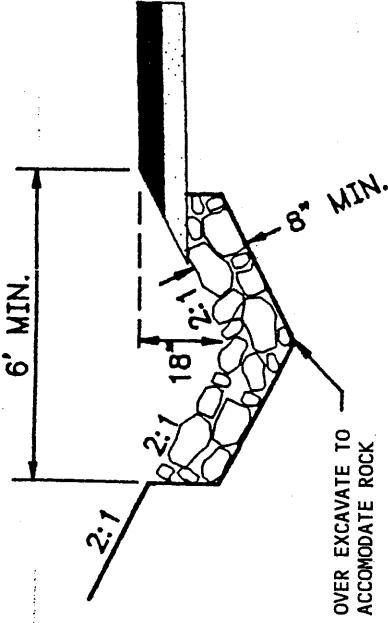


SECTION A-A'
 SCALE 1" = 1'

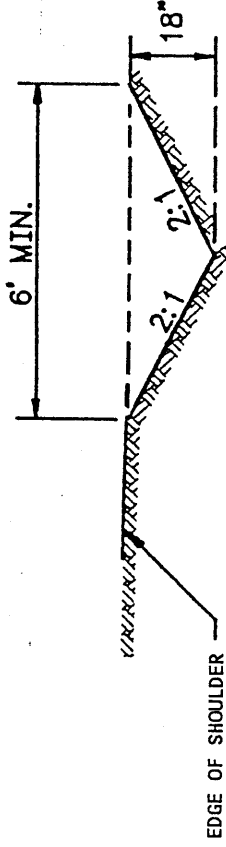
DISPERSSION TRENCH
 DETAIL



CIRCULAR



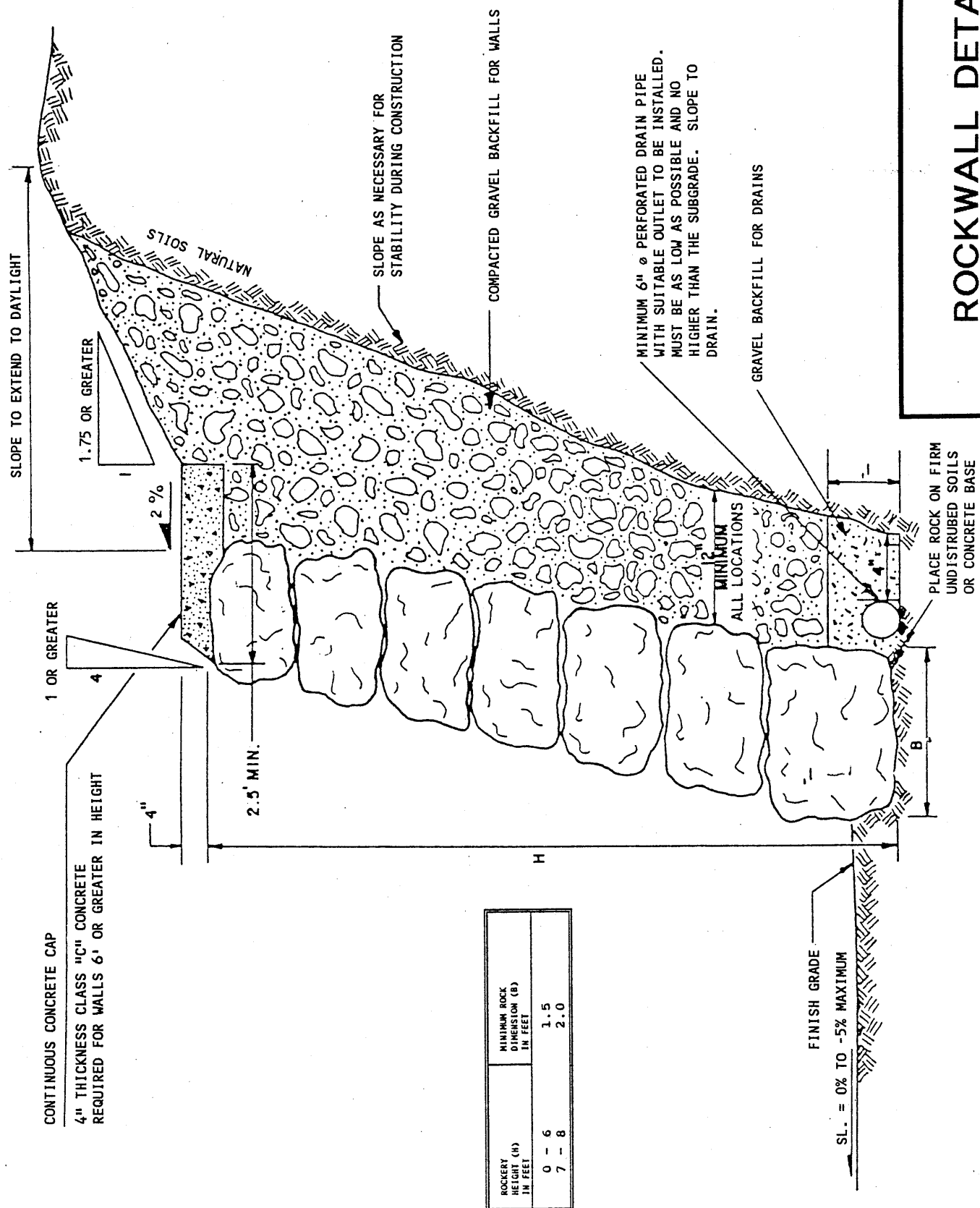
ROCK-LINED
TRIANGULAR OR
CIRCULAR DITCH



TRIANGULAR

DITCH DETAILS

ROCKWALL DETAIL



CONTINUOUS CONCRETE CAP
 4" THICKNESS CLASS "C" CONCRETE
 REQUIRED FOR WALLS 6' OR GREATER IN HEIGHT

1 OR GREATER

2 %

1.75 OR GREATER

SLOPE TO EXTEND TO DAYLIGHT

SLOPE AS NECESSARY FOR STABILITY DURING CONSTRUCTION

COMPACTED GRAVEL BACKFILL FOR WALLS

MINIMUM 6" Ø PERFORATED DRAIN PIPE WITH SUITABLE OUTLET TO BE INSTALLED. MUST BE AS LOW AS POSSIBLE AND NO HIGHER THAN THE SUBGRADE. SLOPE TO DRAIN.

GRAVEL BACKFILL FOR DRAINS

MINIMUM ALL LOCATIONS

PLACE ROCK ON FIRM UNDISTURBED SOILS OR CONCRETE BASE

FINISH GRADE
 SL. = 0% TO -5% MAXIMUM

ROCKERY HEIGHT (H) IN FEET	MINIMUM ROCK DIMENSION (B) IN FEET
0 - 6	1.5
7 - 8	2.0

H

B

2.5' MIN.

4"