

TOWN OF MAMMOTH LAKES - DEPARTMENT OF PUBLIC WORKS



SECTION 300
DRAINAGE

LAST REVISION : JULY 2013

MATERIALS:

1. AGGREGATE BASE SHALL BE CLASS 2, AND SHALL CONFORM TO THE PROVISIONS OF SECTION 26, "AGGREGATE BASES" OF THE CSS AND SHALL BE COMPACTED TO A MINIMUM OF 95% OF THE MATERIAL'S MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D-1557-00.
2. ASPHALT CONCRETE SHALL BE PER TOWN STANDARD 004-0, AND AS APPROVED BY THE PUBLIC WORKS DIRECTOR
3. CORRUGATED METAL PIPE CULVERTS 12 INCH TO 48 INCH IN DIAMETER SHALL CONFORM TO THE PROVISIONS IN SECTION 66, "CORRUGATED METAL PIPE", OF THE CSS AND SHALL BE 12 GAUGE. CORRUGATED STEEL FLARED END SECTIONS SHALL CONFORM TO THE PROVISIONS IN SECTION 75, "MISCELLANEOUS METAL", AND SECTION 70, MISCELLANEOUS DRAINAGE FACILITIES" OF THE CSS.
4. PLASTIC PIPE CULVERTS 12 INCH TO 48 INCH IN DIAMETER SHALL CONFORM TO THE PROVISIONS IN SECTION 64, "PLASTIC PIPE" OF THE CSS.
5. REINFORCED CONCRETE PIPE SHALL BE USED FOR CULVERTS GREATER THAN 48 INCHES IN DIAMETER IN CONFORMANCE WITH SECTION 65, "CONCRETE PIPE" OF THE CSS.
6. SLURRY CEMENT BACKFILL SHALL PER TOWN STANDARD 005-0, AND AS APPROVED BY THE PUBLIC WORKS DIRECTOR.
7. INSTALLATION OF TRAFFIC STRIPES AND PAVEMENT MARKINGS WILL BE IN CONFORMANCE WITH THE PROVISIONS OF SECTION 84, "TRAFFIC STRIPES AND PAVEMENT MARKINGS", OF THE CSS.
8. MINIMUM PIPE DIAMETER IN THE RIGHT-OF-WAY SHALL BE 18 INCH UNLESS APPROVED BY THE PUBLIC WORKS DIRECTOR.
9. DESIGN REQUIREMENTS AND REFERENCES:
 1. 1984 STORM DRAIN MASTER PLAN
 2. 2004 STORM DRAIN MASTER PLAN
 3. 1984 DRAINAGE AND EROSION CONTROL DESIGN MANUAL
 4. TOWN OF MAMMOTH LAKES MOU WITH LAHONTAN REGION WATER QUALITY CONTROL PLAN
 5. 2007 GENERAL PLAN

TOWN OF MAMMOTH LAKES - DEPARTMENT OF PUBLIC WORKS



**GENERAL REFERENCES FOR
DRAINAGE SYSTEMS**

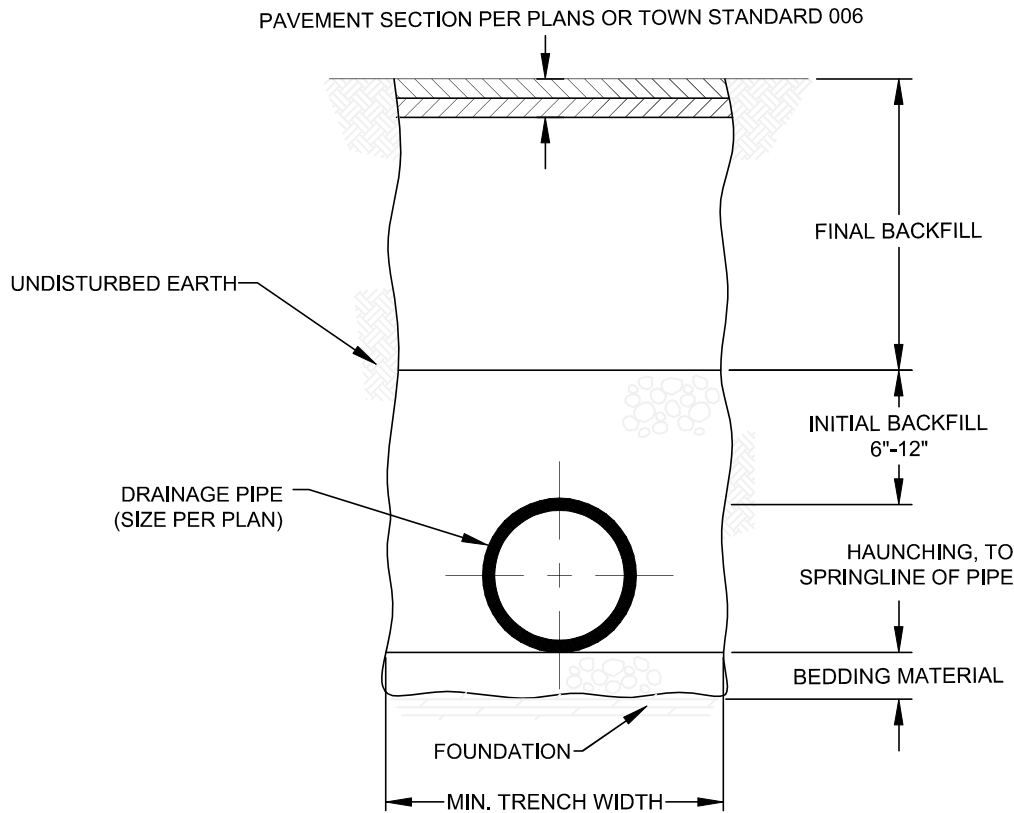
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DIRECTOR APPROVAL: 

DATE: May 7, 2014

STANDARD PLAN

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GENERAL NOTES FOR STORM DRAIN TRENCH

1. **FOUNDATION:** WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH A FOUNDATION OF CLASS II MATERIAL AS DEFINED IN ASTM D2321, "STANDARD PRACTICE FOR INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS," LATEST EDITION; AS AN ALTERNATIVE AND AT THE DISCRETION OF THE ENGINEER. THE TRENCH BOTTOM MAY BE STABILIZED USING A WOVEN GEOTEXTILE FABRIC.
2. **BEDDING:** SUITABLE MATERIAL SHALL BE CLASS I, II OR III AND INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION.
3. UNLESS OTHERWISE SPECIFIED BY THE ENGINEER, MINIMUM BEDDING THICKNESS SHALL BE 4 INCH FOR 4 INCH - 24 INCH AND 42 INCH - 48 INCH CORRUGATED POLYETHYLENE PIPE (CPEP); 6 INCH FOR 30 INCH - 36 INCH CPEP.
4. **HAUNCHING AND INITIAL BACKFILL:** SUITABLE MATERIAL SHALL BE CLASS I, II OR III AND INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION.
5. UNLESS OTHERWISE SPECIFIED BY THE ENGINEER, MINIMUM TRENCH WIDTHS SHALL BE AS FOLLOWS:

<u>NOMINAL Φ INCH</u>	<u>MINIMUM RECOMMENDED TRENCH WIDTH INCH</u>
12 WHERE APPROVED	31
15 WHERE APPROVED	34
18	39
24	48
30	66

TOWN OF MAMMOTH LAKES - DEPARTMENT OF PUBLIC WORKS



STORM DRAIN TRENCH

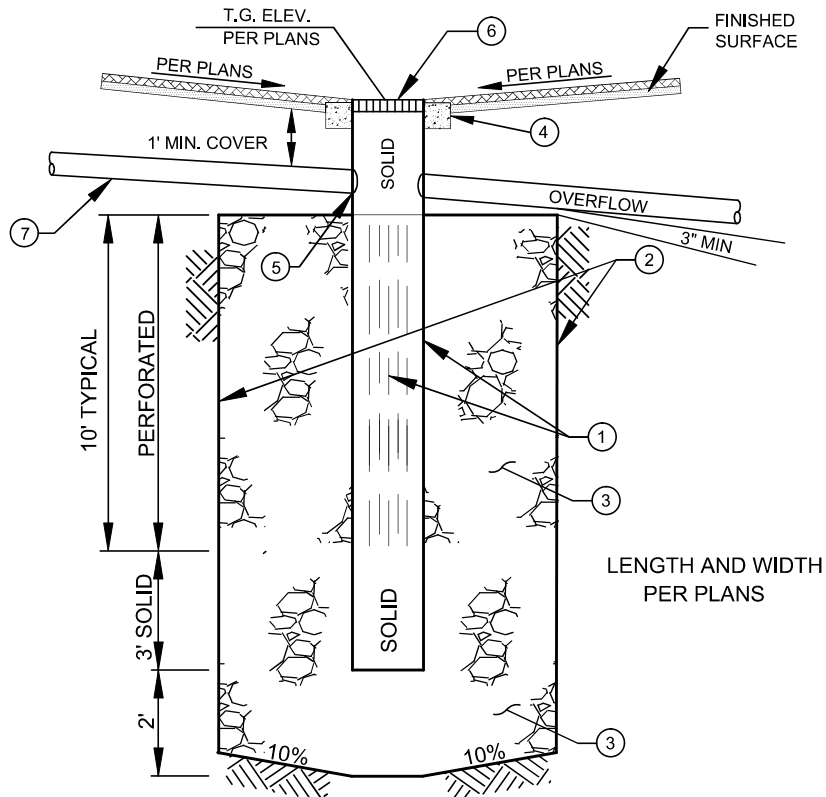
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STANDARD PLAN

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DRYWELL DETAIL

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○ CONSTRUCTION NOTES FOR DRYWELL

1. 36 INCH C.S.P. DROP INLET, 6 INCH SLOT AT EACH RIB; 2 INCH VERTICALLY BETWEEN SLOTS.
2. COVER ALL SIDES OF DRYWELL AND ROCK WITH FILTER FABRIC MIRAFI 140 OR NON WOVEN FABRIC EQUIVALENT.
3. 3 INCH - 6 INCH CLEAN COBBLE DRYWELL MATERIAL.
4. COLLAR TO BEAR ON COMPACTED SUB GRADE.
5. OVERFLOW PIPE INVERT SHALL BE ABOVE THE CLEAN COBBLE DRYWELL MATERIAL.
6. BICYCLE PROOF TRAFFIC RATED GRATE AND FRAME, "CALTRANS TYPE 36-RX" OR EQUAL WITH 8"X 8" 6 SACK COLLAR.
7. 12 INCH PVC DRAIN PIPE.

GENERAL NOTES FOR DRYWELL

1. SIZE OF DRYWELL SHALL BE BASED UPON CAPACITY REQUIREMENTS. MINIMUM SIZE SHALL BE FOR A ONE INCH ONE HOUR STORM FOR THE DRAINAGE AREA.
2. USE CALTRANS TYPE 36R AND 36RX GRATES OR EQUIVALENT. CALTRANS STANDARD D77-B.
3. IN ALL CASES WHERE BICYCLES HAVE ACCESS TO THE DRYWELL USE TYPE 36RX GRATE OR AS APPROVED BY THE PUBLIC WORKS DIRECTOR
4. 36R GRATES WILL NOT SUPPORT NORMAL HIGHWAY WHEEL LOADS. USE OUTSIDE THE ROADSIDE OR PAVED PARKING AREA ONLY.
5. FOR RESIDENTIAL USE ONLY, AS APPROVED BY THE PUBLIC WORKS DIRECTOR

TOWN OF MAMMOTH LAKES - DEPARTMENT OF PUBLIC WORKS



RESIDENTIAL DRYWELL

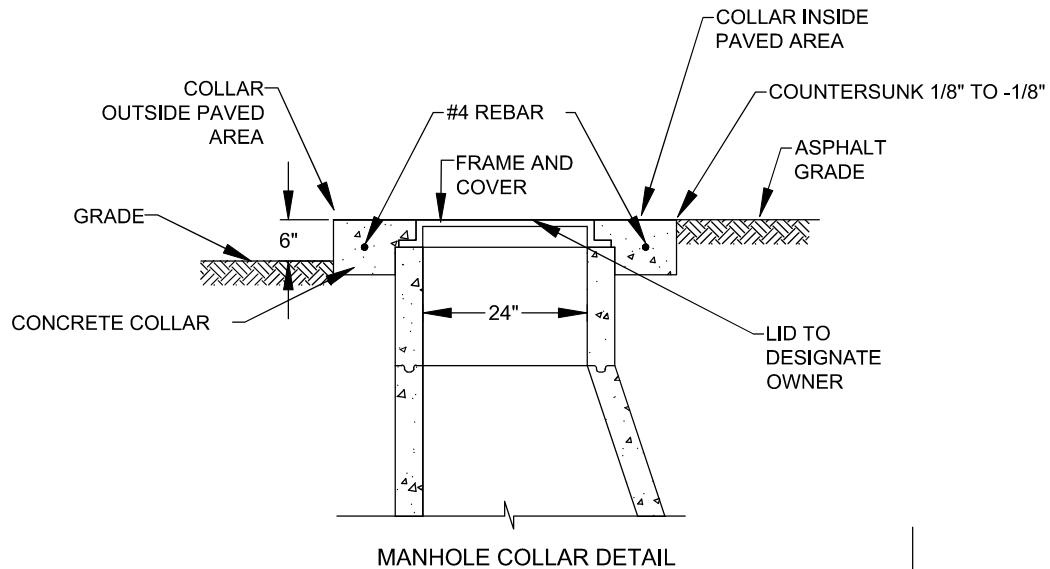
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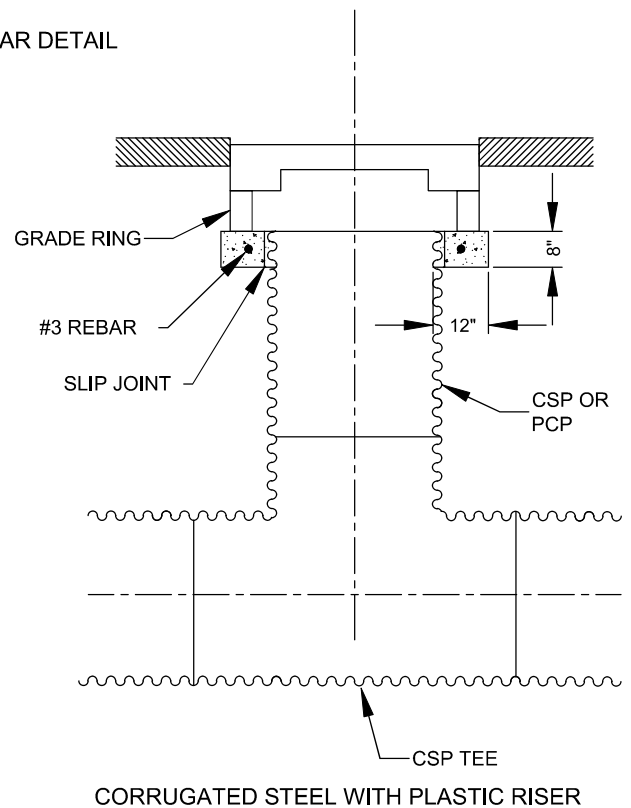
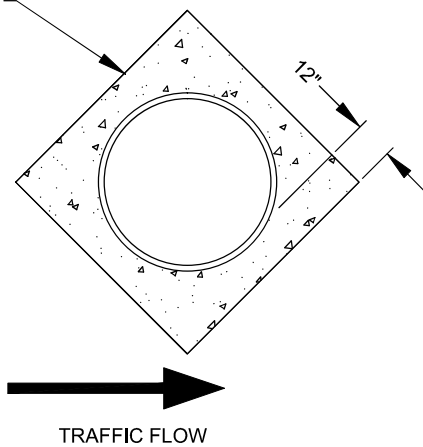
STANDARD PLAN

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MANHOLE COLLAR
TO BE SET DIAGONAL
TO THE FLOW OF
TRAFFIC



GENERAL NOTES FOR MANHOLE OUTSIDE OF PAVED AREA

1. PLACE CONCRETE COLLAR SUCH THAT NO EDGES ARE PERPENDICULAR TO TRAFFIC FLOW.
2. PRESSURE MANHOLES SHALL BE DESIGNED TO RETAIN COVER ON MANHOLE. COVERS SHALL BE HELD DOWN WITH MACHINE BOLTS. REFER TO THE APWA STANDARD.

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STORM DRAIN COLLAR

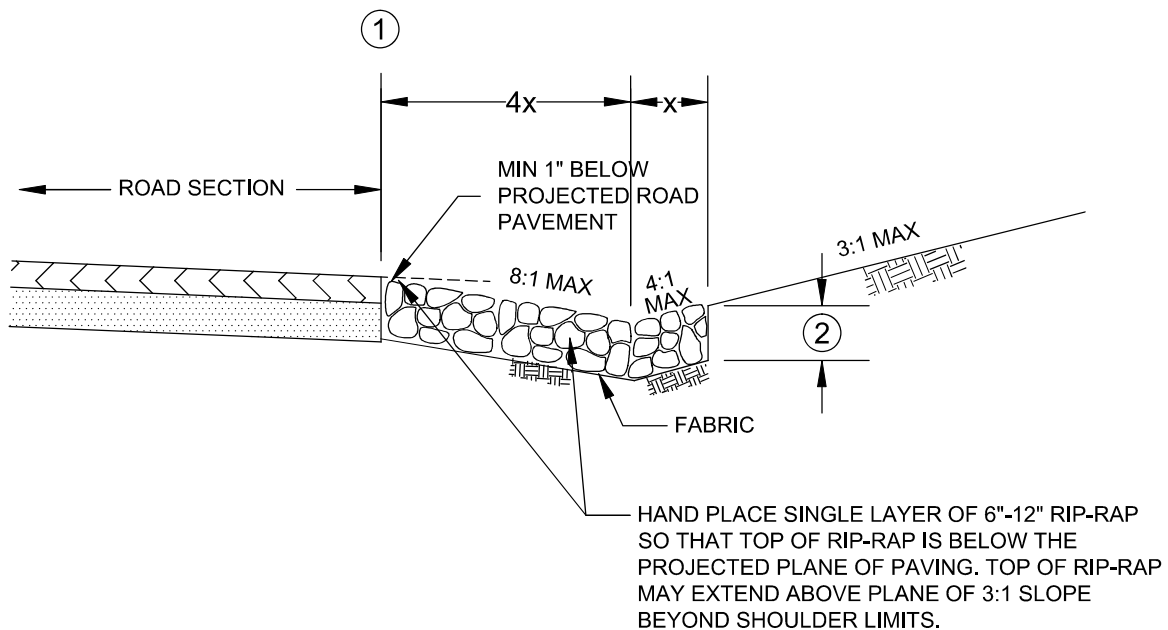
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TYPICAL COBBLE SWALE DETAIL

NTS

GENERAL NOTES FOR A TYPICAL COBBLE SWALE

1. SIZE OF SHOULDER, COBBLE SWALE, OFFSET FROM STREET MUST BE APPROVED BY THE TOWN OF MAMMOTH LAKES PUBLIC WORKS DEPARTMENT.
2. SIZE AND DEPTH OF COBBLE SWALE SHALL BE BASED UPON CAPACITY REQUIREMENTS.
3. RIP-RAP SIZE SHALL BE BASED UPON HYDRAULIC CAPACITY, VELOCITY AND QUANTITY OF RUNOFF. FOR TYPICAL SWALES, < 10 FPS AND < 3 CFS, RIP-RAP SHALL CONFORM TO CALTRANS STANDARD SPECIFICATIONS SECTION 72 - ROCK SLOPE PROTECTION CLASS-FACING.

TOWN OF MAMMOTH LAKES - DEPARTMENT OF PUBLIC WORKS



TYPICAL COBBLE SWALE

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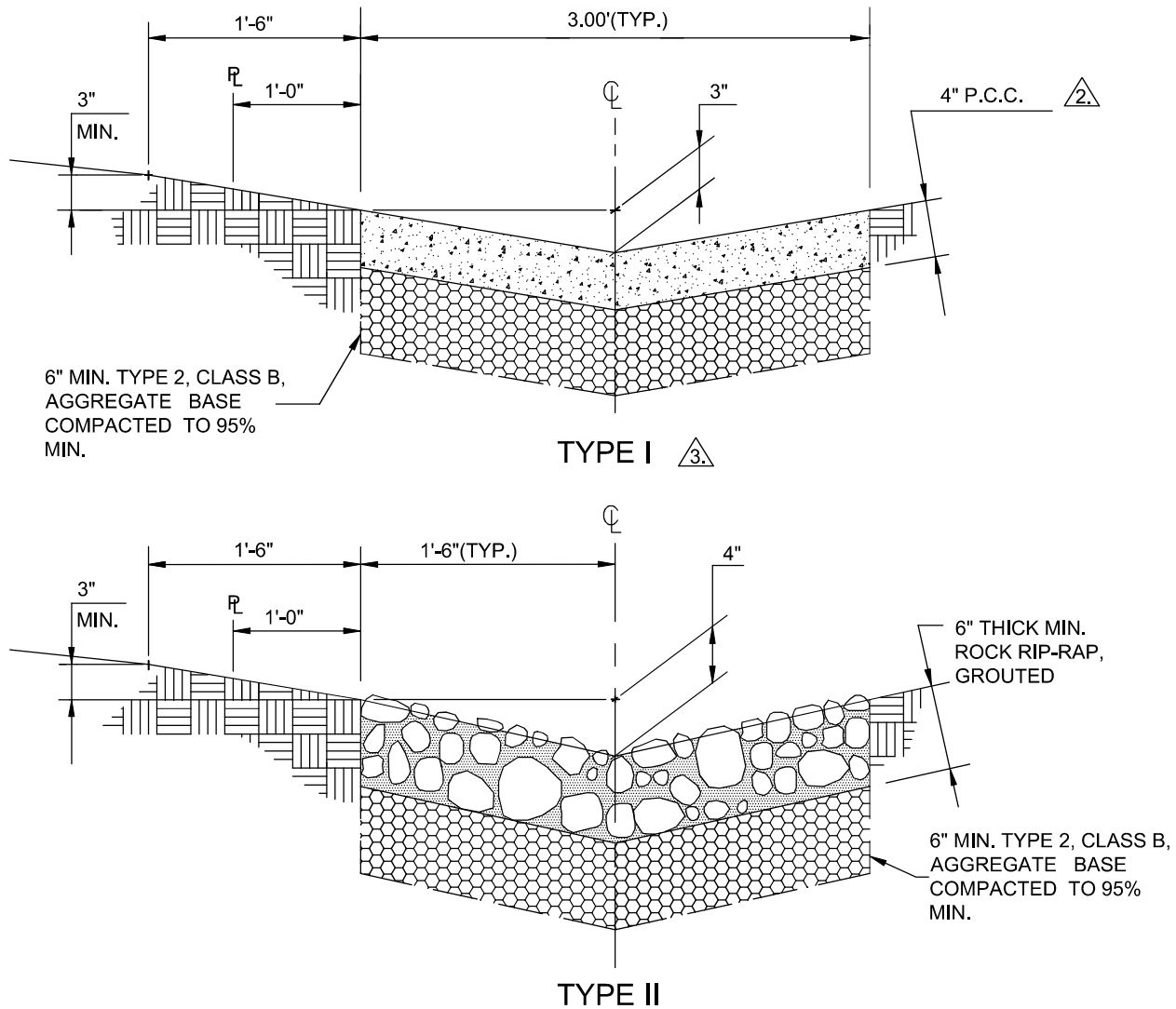


1. GRATE
2. EDGE OF STANDARD ROADWAY
3. ROAD SECTION
4. 36 INCH CMP
5. SHOP WELD, CONTINUOUS WELD
6. CONCRETE BASE PER TOWN STANDARD 004, AND AS APPROVED BY THE PUBLIC WORKS DIRECTOR.
7. 3 INCH ASPHALT CONCRETE DRAIN ON SUB GRADE COMPACTED TO 95%.
8. ALL PIPE TO BE HOT DIP GALVANIZED AND DROP INLET SHALL CONFORM TO APWA-SOUTHERN CALIFORNIA CHAPTER STANDARDS.
9. 3/4 INCH DRAIN ROCK, 6 INCHES DEEP MINIMUM, WRAPPED IN NON WOVEN FABRIC.
10. 4 INCH DRAIN.

1. USE TYPE 36R AND 36RX GRATES, CALTRANS STANDARD D77-B.
2. IN ALL CASES WHERE BICYCLES HAVE ACCESS TO THE DROP INLET, USE TYPE 36RX GRATE.
3. 36R GRATES WILL NOT SUPPORT NORMAL HIGHWAY WHEEL LOADS, USE OUTSIDE THE ROADBED ONLY.
4. INLET AND OUTLET PIPES SHALL NOT PROTRUDE INTO BASIN.

PUBLIC WORKS
DIRECTOR APPROVAL:

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NOTES:

1. MAXIMUM DRAINAGE AREA SHALL BE 6 LOTS.
2. CONCRETE SHALL BE TOWN STANDARD 004, OR AS APPROVED BY THE PUBLIC WORKS DIRECTOR.
3. MAXIMUM FLOWLINE GRADE FOR A TYPE I SHALL BE 6%.
4. MAXIMUM CHANGE IN HORIZONTAL ALIGNMENT SHALL BE 10 DEGREES.
5. PCC DRAINAGE SWALES SHALL HAVE EXPANSION JOINTS EVERY 30 FEET AND WEAKENED PLANE JOINTS EVERY 10 FEET.
6. ACCESS SHALL BE PROVIDED TO THE POINT OF DISCHARGE IN ACCORDANCE WITH TOWN STANDARDS.

TOWN OF MAMMOTH LAKES - DEPARTMENT OF PUBLIC WORKS



LOT LINE DRAINAGE SWALE

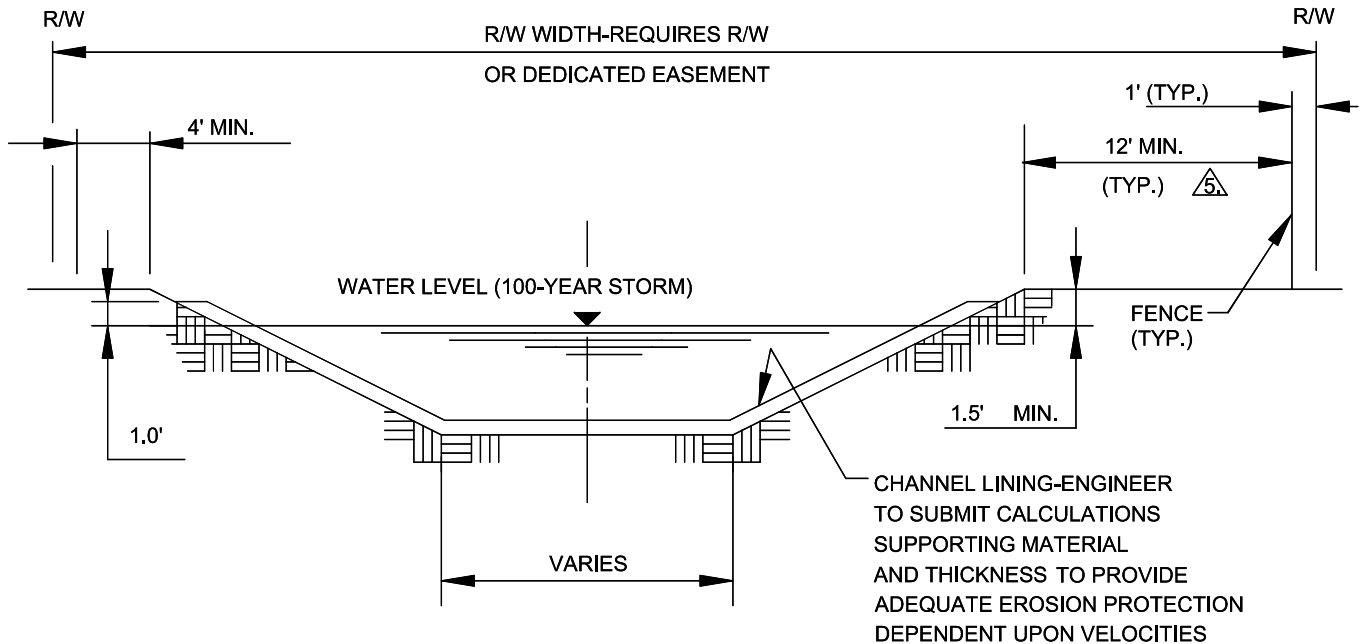
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TYPICAL SECTION

NOTES

1. REFER TO THE TOWN OF MAMMOTH LAKES STORM DRAINAGE AND EROSION CONTROL MANUAL FOR MORE DETAILED DESIGN CRITERIA PERTAINING TO THIS DRAINAGE CHANNEL.
2. DESIGN VELOCITIES LESS THAN 6 FPS: CHANNEL LINING OF NON-ERODING, LONG LIFE, LOW MAINTENANCE MATERIAL AS APPROVED BY THE TOWN ENGINEER. SIDE SLOPES 3:1 MAXIMUM UNLESS OTHERWISE APPROVED BY THE TOWN ENGINEER.
3. DESIGN VELOCITIES 6 TO 10 FPS: CHANNEL LINING OF LOOSE ROCK RIP-RAP SIZED FOR VELOCITY. SIDE SLOPES 2:1 MAXIMUM.
4. DESIGN VELOCITIES GREATER THAN 10 FPS: CHANNEL LINING OF CONCRETE OR AN ENGINEERED EQUIVALENT. SIDE SLOPES 1:1 MAXIMUM.
5. PAVED ACCESS ROAD(S) SHALL BE CONSTRUCTED TO TOWN STANDARDS WHEN DETERMINED NECESSARY BY THE TOWN ENGINEER.
6. VEHICULAR ACCESS TO THE CHANNEL FLOOR FOR MAINTENANCE SHALL BE PROVIDED.

TOWN OF MAMMOTH LAKES - DEPARTMENT OF PUBLIC WORKS



**MAJOR DRAINAGE CHANNEL
(CONVEYING 100-YEAR STORM)**

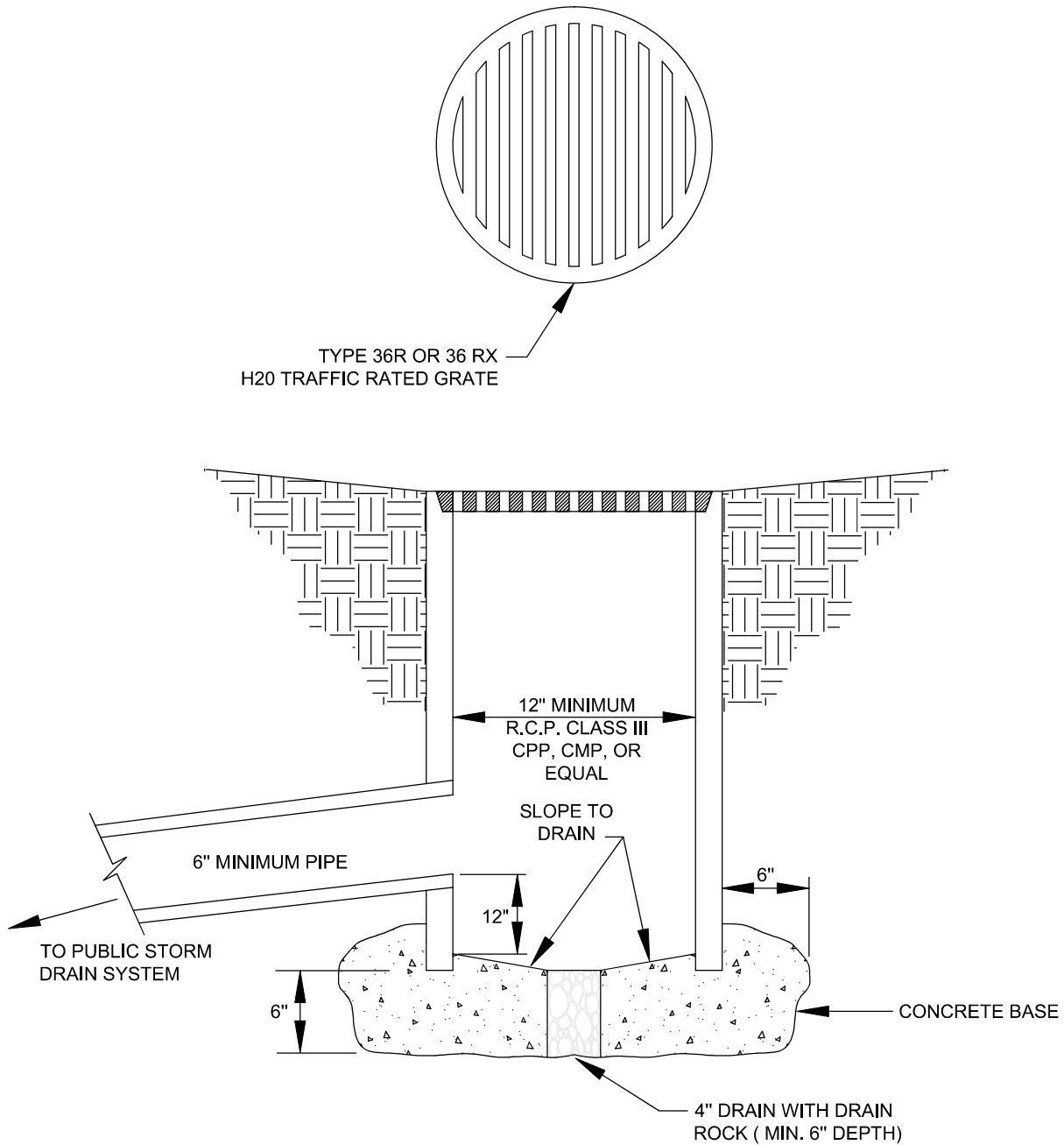
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NOTES:

1. CONCRETE PER TOWN STANDARD 004, AND AS APPROVED BY THE PUBLIC WORKS DIRECTOR.
2. TO BE OWNED AND MAINTAINED BY PRIVATE DEVELOPMENTS ONLY. NOT TO BE USED IN DRIVEWAYS OR WHERE DRAINAGE ORIGINATES FROM AREAS USED FOR VEHICULAR TRAFFIC.
3. INSTALL GREASE AND SEDIMENT TRAPS PER TOWN GENERAL PLAN R.5.B

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YARD DRAIN

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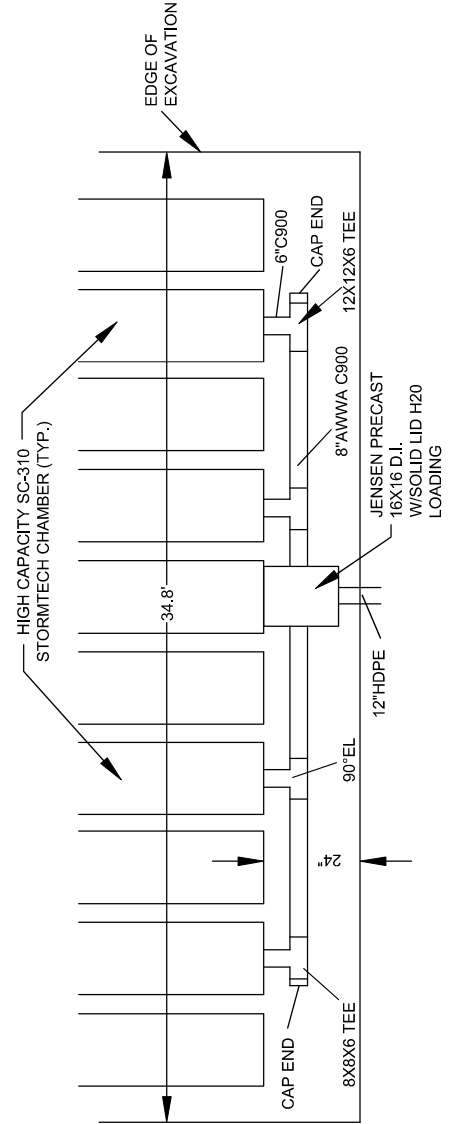
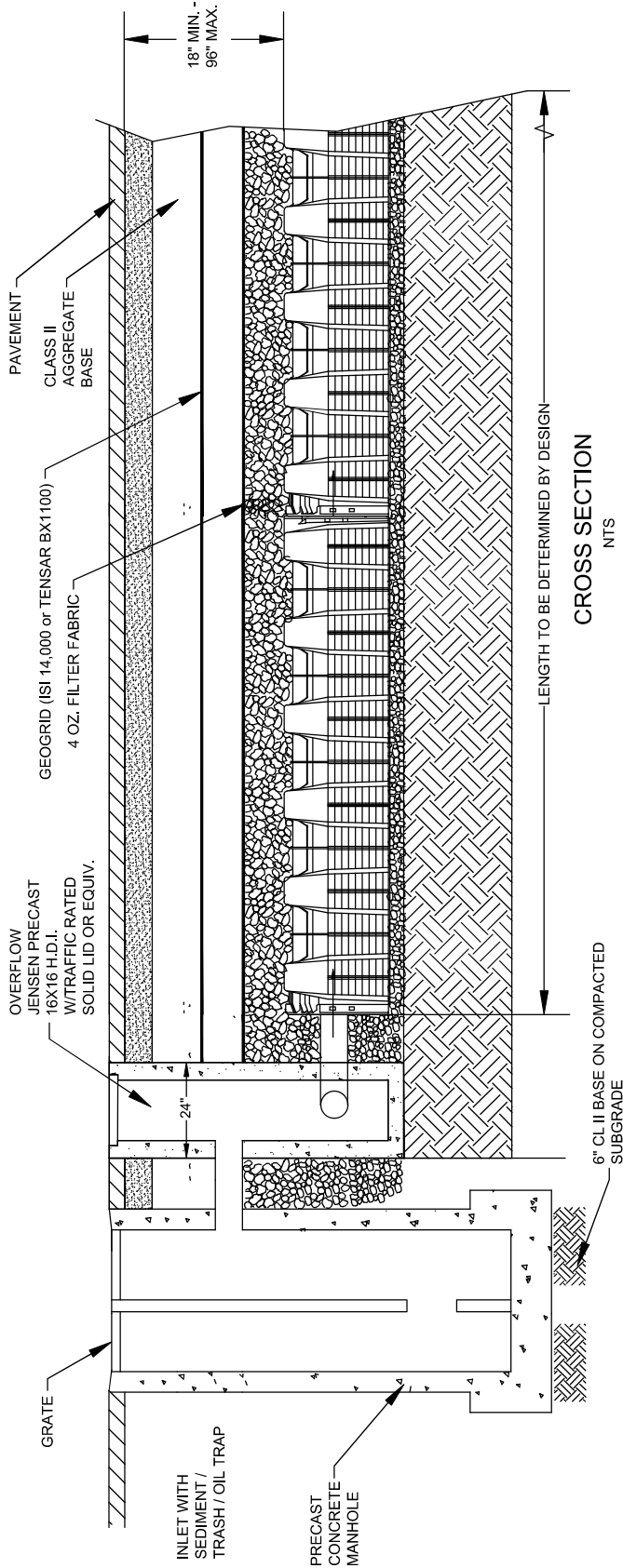
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STANDARD PLAN

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ALL DIMENSIONS TO BE DETERMINED BY DESIGN



TOWN OF MAMMOTH LAKES - DEPARTMENT OF PUBLIC WORKS

COMMERCIAL DRYWELL / INFILTRATOR

STANDARD PLAN

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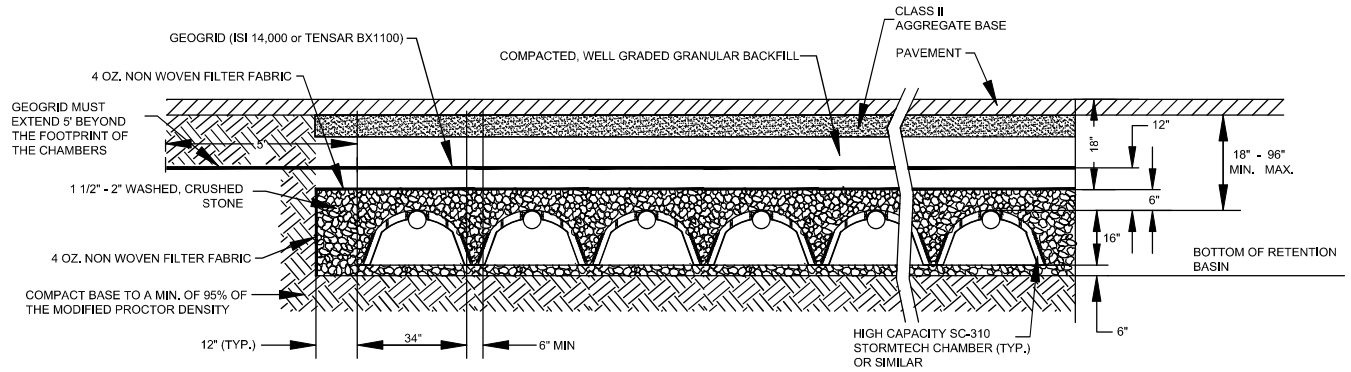
SHEET 1 OF 2

PUBLIC WORKS

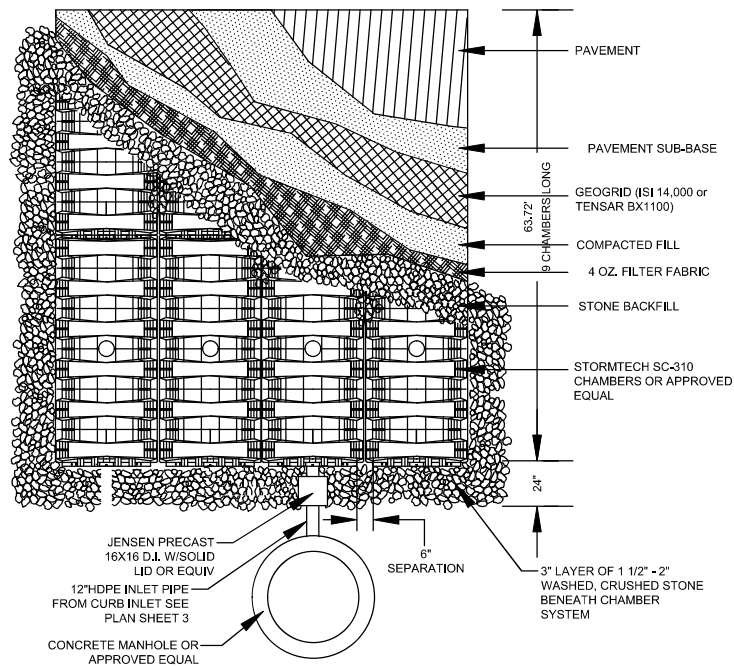
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TYPICAL CROSS SECTION
NOT TO SCALE



PLAN VIEW

GENERAL NOTES FOR DRYWELL

- A. SIZE OF DRYWELL AND INFILTRATOR SHALL BE BASED UPON CAPACITY REQUIREMENTS. MINIMUM SIZE SHALL BE FOR A ONE INCH, ONE HOUR STORM FOR THE DRAINAGE AREA AND SHALL BE DESIGNED BY LICENSED ENGINEER.
- B. IN ALL CASES WHERE BICYCLES HAVE ACCESS TO THE DRYWELL USE BICYCLE PROOF GRATES.
- C. DESIGN SHALL BE IN COMPLIANCE WITH REGULATIONS SET FORTH BY THE STATE WATER RESOURCES CONTROL BOARD

TOWN OF MAMMOTH LAKES - DEPARTMENT OF PUBLIC WORKS

COMMERCIAL DRYWELL / INFILTRATOR

STANDARD PLAN

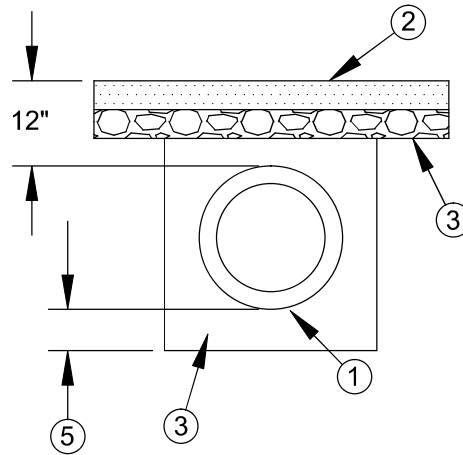
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CULVERT DETAIL

GENERAL NOTES FOR CULVERTS

- ①. CULVERT TYPE SHALL BE MIN. 16 GAUGE CMP OR APPROVED ALTERNATIVE BY THE PUBLIC WORK DIRECTOR
- ②. ASPHALT PAVEMENT SECTION SHALL BE TOWN STANDARD 006
- ③. BEDDING AND BACKFILL SHALL CONFORM TO TOWN STANDARD 005
4. EXCAVATION MIN 4 INCHES BELOW FLOWLINE
- ⑤. EXCAVATION IN ROCK, MIN 6 INCHES BELOW FLOWLINE
6. AN ENCROACHMENT PERMIT IS REQUIRED FOR ALL WORK PERFORMED IN TOWN RIGHT-OF-WAY
7. MIN 24 HR NOTICE FOR INSPECTION, PRIOR TO BACKFILL OF CULVERT OR CONCRETE POUR

TOWN OF MAMMOTH LAKES - DEPARTMENT OF PUBLIC WORKS



CULVERT STANDARDS

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