PUBLIC STORM DRAIN STANDARDS

Adopted by the Santa Rosa City Council

Resolution No. XXXXX

Date: 8/31/2023

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APPENDIX A: FLOOD AND DRAINAGE REVIEW PLAN SUBMITTAL CHECKLIST

I. PUBLIC STORM DRAIN DESIGN STANDARDS

QUICK REFERENCE SHEETS

DESIGN REQUIREMENTS

Minimum pipe diameter:	15 inches
Pipe materials:	Reinforced concrete pipe (RCP), , high-density polyethylene (HDPE) pipe, and high-performance polypropylene (HPPP) pipe that conforms to these specifications. HDPE and HPPP shall not be accepted for public owned utilities in Wildland-Urban Interface (WUI) Fire Areas as defined by the current City of Santa Rosa (City) WUI map and other restricted use defined herein.
Horizontal separation from sewer lines:	Five (5) feet clear (outer walls) except at crossings
Horizontal separation from water lines and other utilities:	Four (4) feet clear (outer walls) minimum except at crossings or as required by current City of Santa Rosa's *Water Distribution Design and Construction Standards*
Vertical curves:	Not allowed
Horizontal Curves:	RCP: 300 feet minimum radius (allowed at catch basins and when pipeline is installed under the pavement parallel to the concrete gutter). See detailed design standards. HDPE, HPPP: 3° mitered couplings with no joint or pipe deflection. Maximum of one mitered coupling per 10-foot length of pipe. See Design Requirements.
Pipe slope:	≤15%
Minimum cover:	12 inches for class III RCP and HDPE (outside of pipe to road subgrade) and as outlined in Table I-1 and Section 6 herein.
Maximum distance between structures:	300 feet
Minimum pipe velocity and slope:	Minimum three (3.0) feet per second at half full flow for closed conduit systems as detailed in these standards

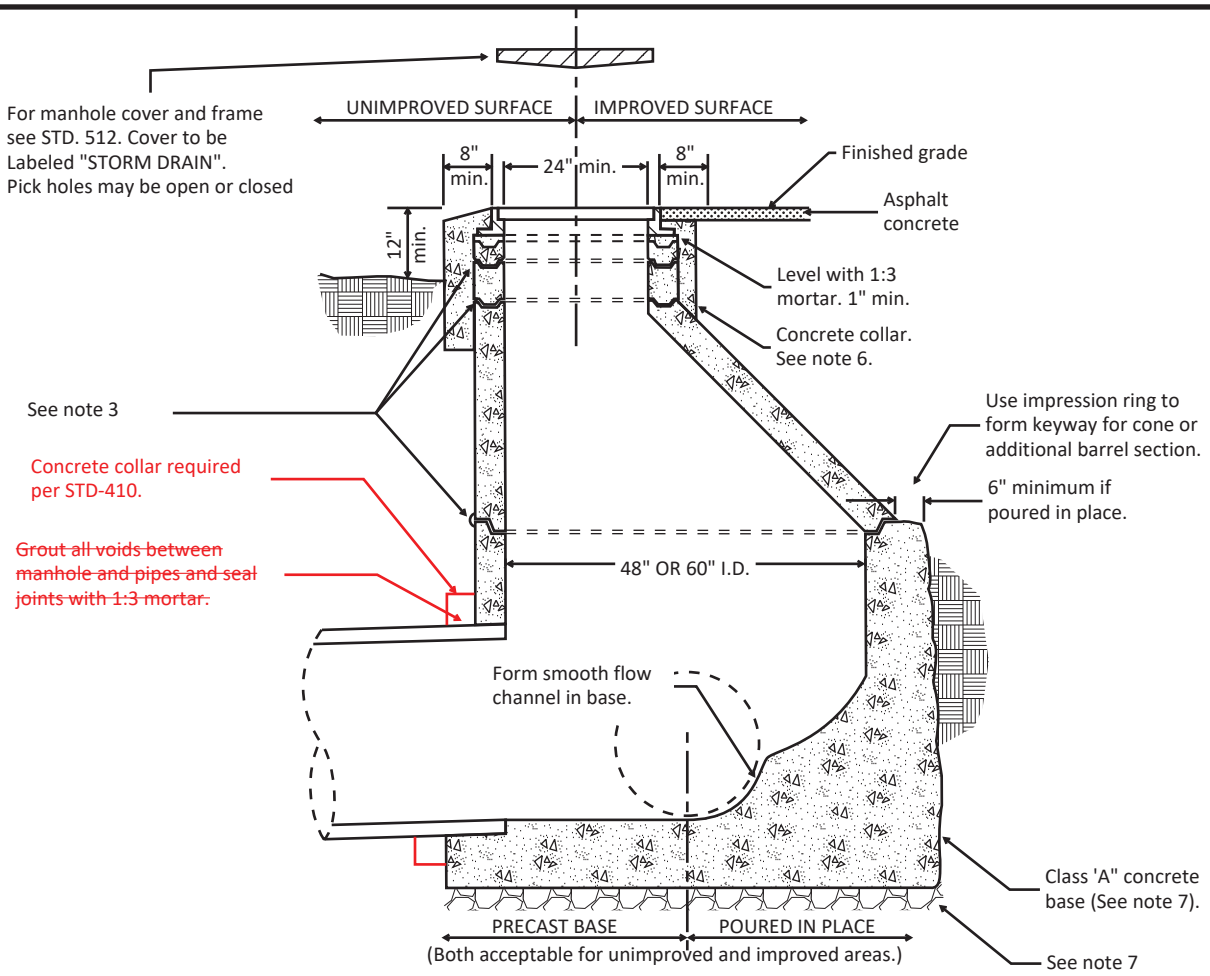
The City currently allows 20ft segments and joint d accordance with the man recommendations. Why i mitered couplings shown

This requirement is currently 400ft? Why isn't this change reflected in red? Does the City intend to decrease the allowed spacing?

Why is this being changed from 2.5fps? This can't be achieved for surcharged pipes with lower flow rates when the design engineer is required to use a 15-inch minimum pipe size.

	Minimum two and a half (2.5) feet per second at the design flow for earth channels, ditches, and hardened or concrete-lined channels for City-owned and operated channels For Sonoma Water-owned and operated channels, refer to the current Sonoma Water's *Flood Management Design Manual*
Time of Concentration Minimums	5 minutes – Urban commercial, industrial, residential with more than 8 units per acre Why is this being changed from 7 minutes to 5 minutes and why isn't this change shown in red? 10 minutes – Residential 2-8 units per acre 15 minutes – Residential less than 2 units per acre, undeveloped open space
Rainfall intensities	National Oceanic and Atmospheric Administration's (NOAA) Atlas 14 and NOAA's National Weather Service the Atlas 14 Precipitation Frequency Data Server, or current versions

Note: New development, redevelopment, and capital improvement projects may be required to implement stormwater quality source and treatment controls commonly referred to as either post construction Best Management Practices (BMPs) or Low Impact Development (LID) features. Refer to the current regional *Storm Water Low Impact Development Technical Design Manual* for design criteria.



NOTES:

1. When manholes are installed in unimproved areas, the top of the cover shall be a min. of 1 foot above adjacent finished grade.

2. Min. of one 3" grade adjustment ring. Max. height of grade adjustment ring=20". Alternatively, contractor may cast grade adjustment rings in place.

3. Set all sections in 1:3 mortar bed. Wet both tongue and groove before applying mortar. Wipe inside of joint smooth and plaster outside of joint with 1/2" layer of mortar. Ram-nek gaskets or approved equal may be used instead of mortar.

4. Cone section (taper) may be concentric or eccentric unless otherwise specified by the Engineer.

5. All precast manhole sections per ASTM C478.

6. Class "A" conc. collar shall be 2" below top of manhole cover in improved surface areas.

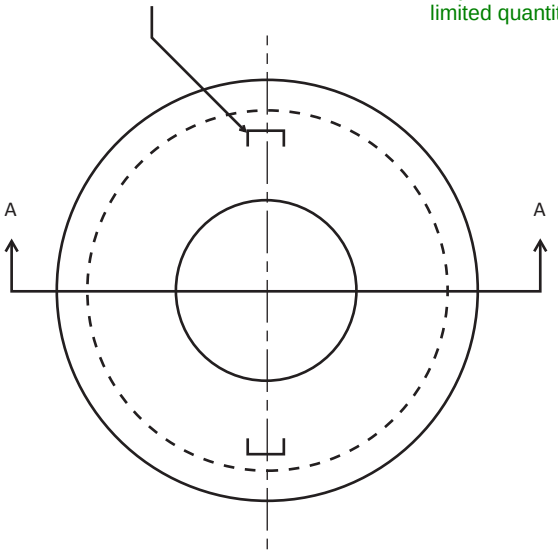
7. Poured-in-place base shall be poured full thickness to undisturbed sides of excavation, sloped at 1:1 or shall be formed. Precast base shall be from City Engineer's approved list and be placed on 6" thick 3/4" drain rock sub-base installed against undisturbed earth.

APPROVED 48" & 60" PRECAST STORM DRAIN MANHOLE COMPONENTS
See Engineer's approved list

CITY OF SANTA ROSA		
STANDARD CONCRETE STORM DRAIN MANHOLE		
Scale: NONE	DRAFT AUG 2023	
DWN: EDS CHK:	APPROVED:	FILE NO: STD - 400

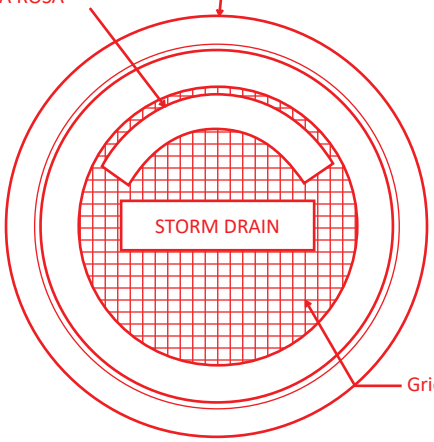
#5 lifting eye (TOTAL 2). Lifting eye to be located at balance point

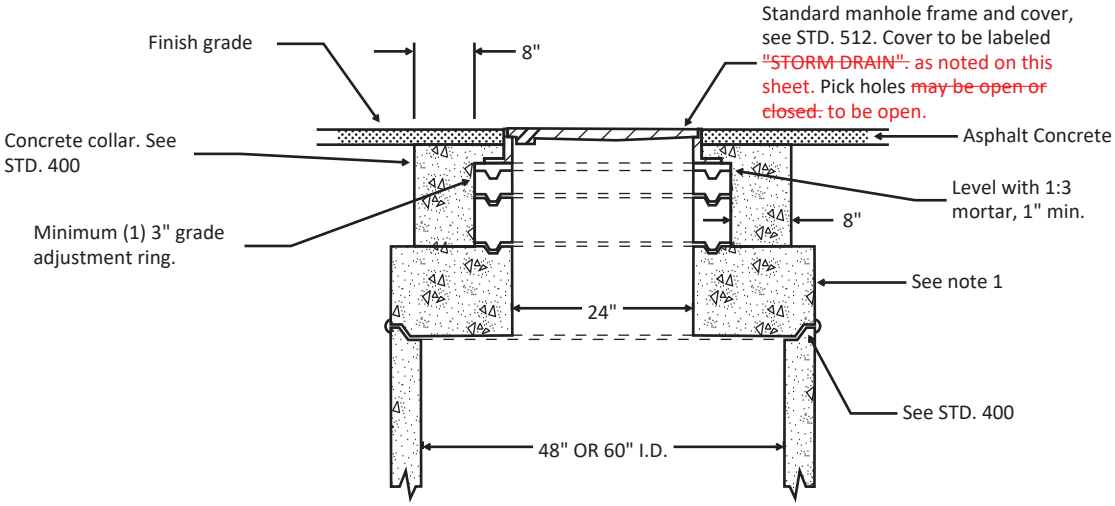
Labeling them City of Santa Rosa will add cost and create supply chain issues, because this will only be stocked by local manufacturers and in limited quantity.



Standard 24" heavy duty, non rocking manhole frame and cover.

"CITY OF SANTA ROSA"





SECTION A-A

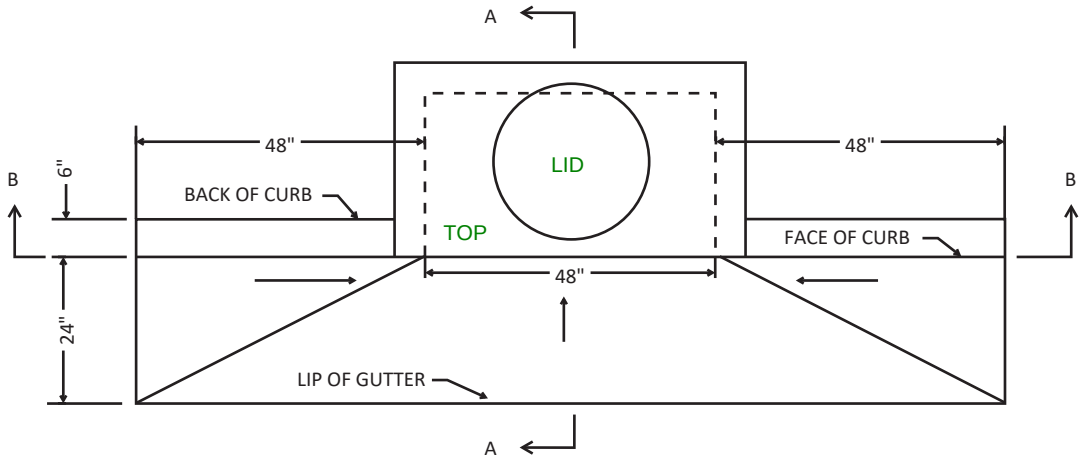
NOTES:

1. Reducer slab shall be designed to withstand H20 loading and conform to ASTM C478.
2. All inside joints to be grouted smooth.
3. Class A concrete collar shall be poured to 2" below finished grade.
4. Reducers shall be concentric. Eccentric reducers can be used if it would place the opening in a more desirable location or improve access.

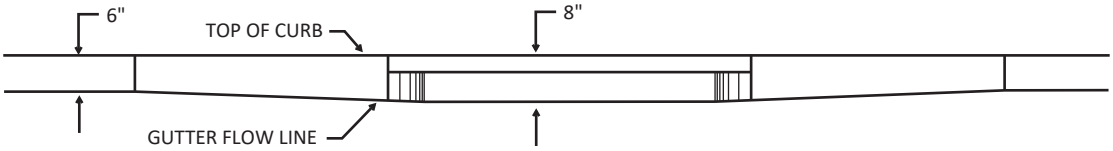
For detail and specifications of barrel section and base see City of Santa Rosa STD. 400

APPROVED 48" & 60" MANHOLE REDUCER SLAB
See Engineer's approved list

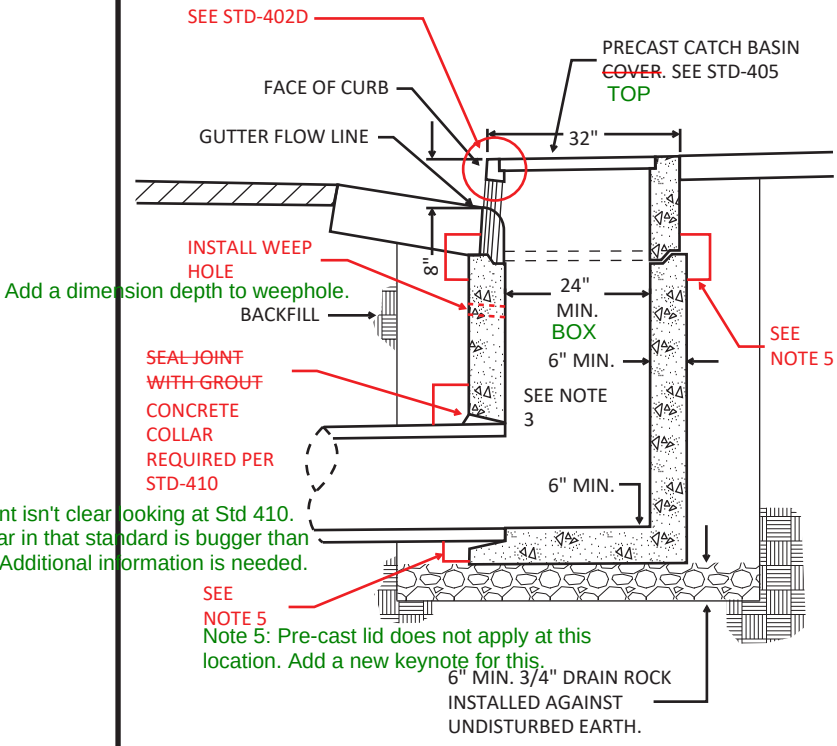
CITY OF SANTA ROSA		
PRECAST CONCRETE STORM DRAIN MANHOLE REDUCER SLABS		
Scale: NONE		DRAFT AUG 2023
DWN: EDS CHK:	APPROVED:	FILE NO: STD - 401



PLAN



SECTION B-B



SECTION A-A

APPROVED TYPE II CATCH BASINS

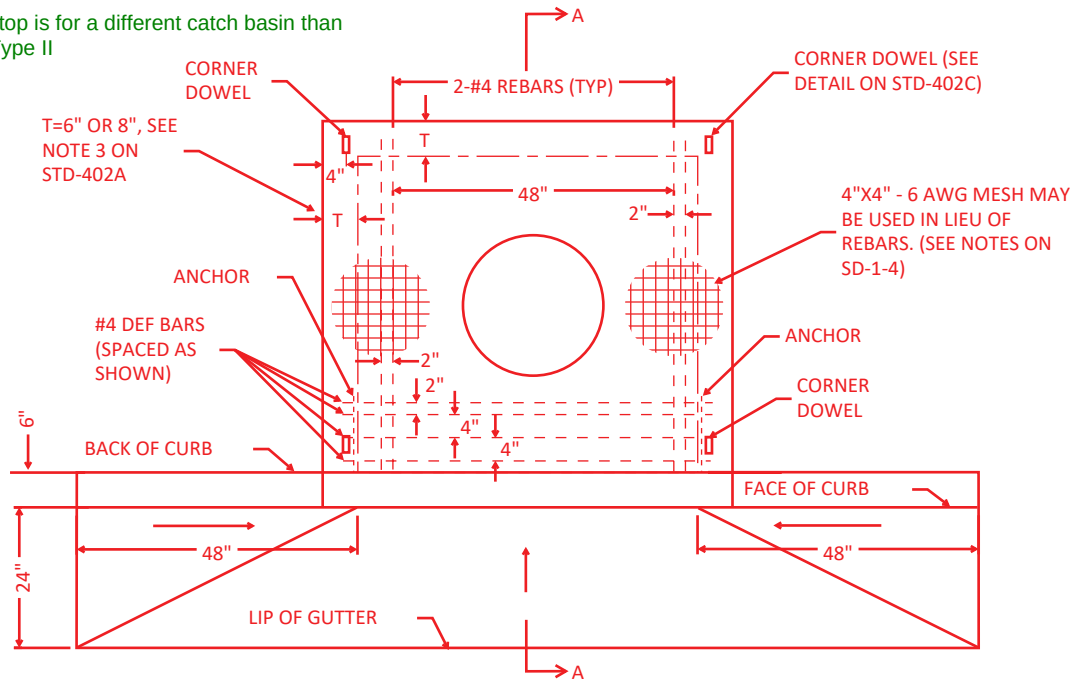
See Engineer's approved list

NOTES:

1. Catch basin box, and ~~lid~~ if not a monolithic pour, shall be constructed to withstand H20 loading. ~~Cover is not traffic rated.~~ top
2. Concrete shall have a compressive strength of 4000 psi in 28 days.
3. Wall thickness shall be 6" unless depth is greater than 8', then wall thickness shall be 8".
4. Install label per City STD. 409 if cover is not a cast iron cover with the decal incorporated into the cast iron.
5. A concrete collar per STD-410 is required when a pre-cast lid is placed on a pre-cast box.

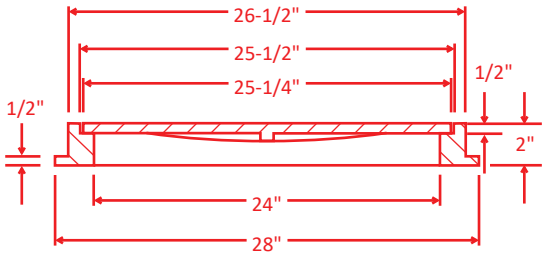
CITY OF SANTA ROSA		
TYPE II CATCH BASIN		
Scale: NONE		DRAFT AUG 2023
DWN: EDS CHK:	APPROVED:	FILE NO: STD - 402A

This top is for a different catch basin than the Type II

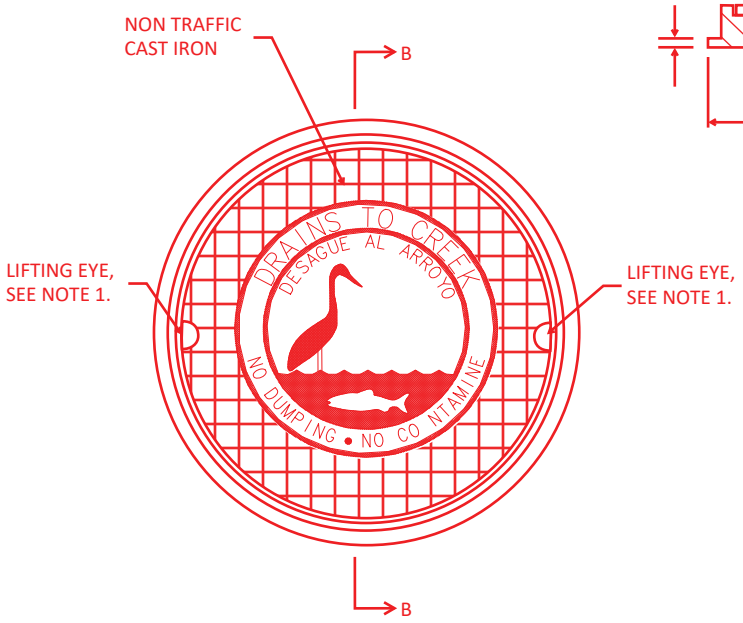


PLAN VIEW

Need to add back the Section A-A for clarity.



SECTION B-B



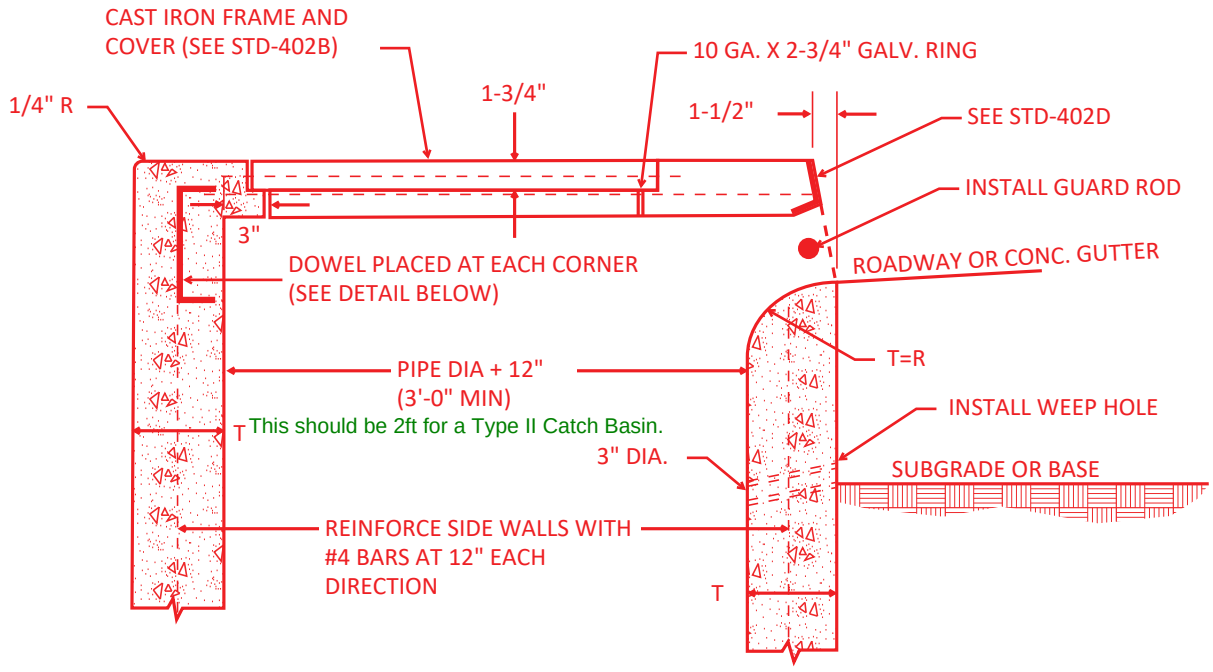
CATCH BASIN COVER

Make Sure graphics are commercially available. This Lid detail should probably be a separate detail and referenced in multiple standards.

NOTES:

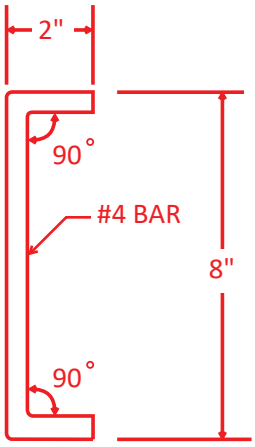
1. Include total of two open #5 lifting eyes to be located at balance point. Lifting eyes shall not be blocked by the rim and shall pass through width of lid.

CITY OF SANTA ROSA		
TYPE II CATCH BASIN		
Scale: NONE	DRAFT AUG 2023	
DWN: EDS CHK:	APPROVED:	FILE NO: STD - 402B



SECTION A-A
(FROM STD-402B)

This section should really be a part of Std 402B

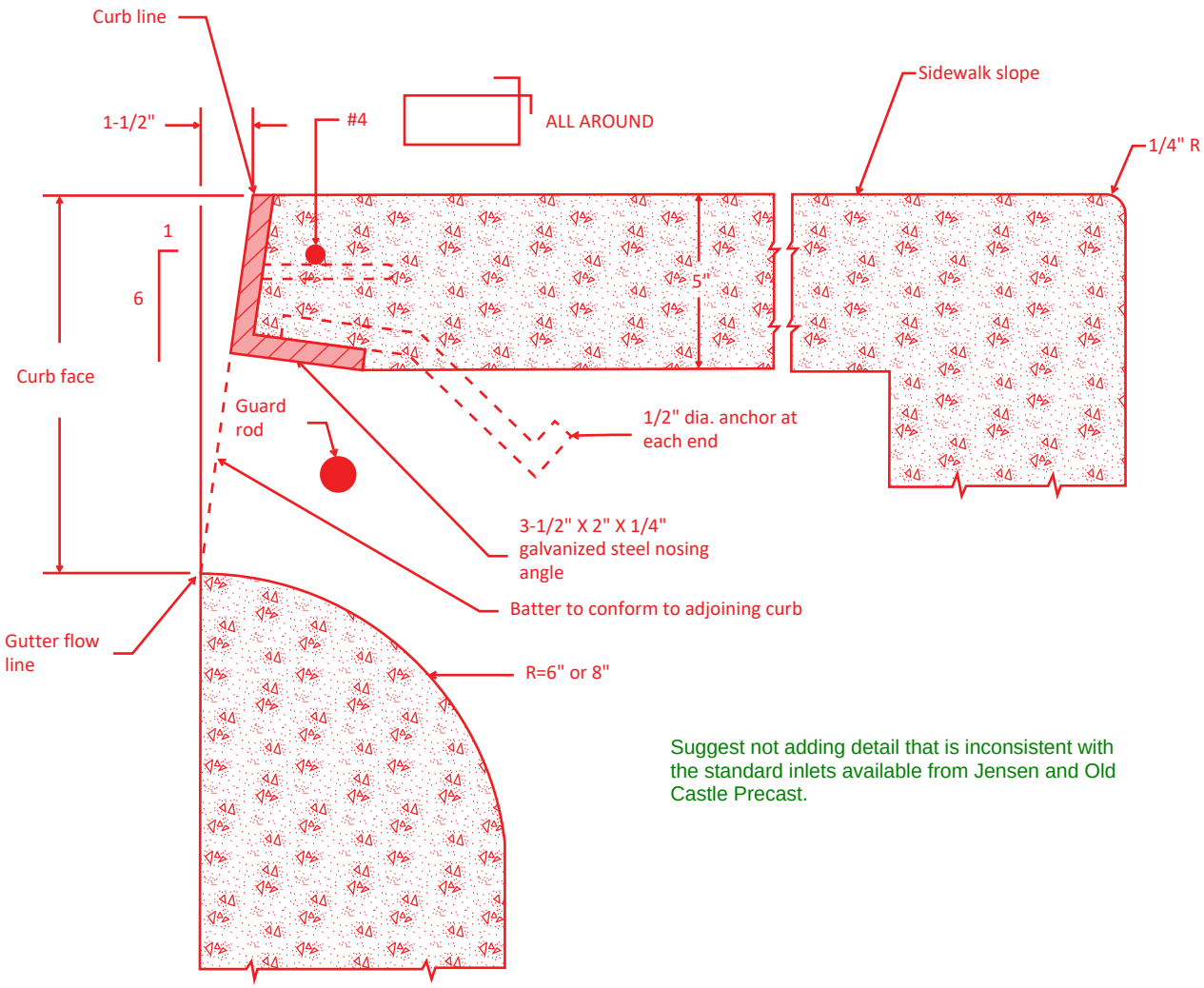


CORNER DOWEL DETAIL

NOTES:

1. Floor shall be poured and approved prior to pouring of the top.
2. See STD-402E for additional notes.

CITY OF SANTA ROSA		
TYPE II CATCH BASIN		
Scale: NONE	DRAFT AUG 2023	
DWN: EDS CHK:	APPROVED:	FILE NO: STD - 402C



Suggest not adding detail that is inconsistent with the standard inlets available from Jensen and Old Castle Precast.

THROAT OPENING DETAIL

NOTES:

1. All metal parts shall be hot dipped galvanized after fabrication.
2. All galvanized damaged by welding shall receive two coats of aluminum paint.

CITY OF SANTA ROSA		
TYPE II CATCH BASIN		
Scale: NONE	DRAFT AUG 2023	
DWN: EDS CHK:	APPROVED:	FILE NO: STD - 402D

NOTES:

1. Connection pipes may be placed in any position around the walls provided they point in the proper direction and the position is otherwise consistent with the improvement plan.

2. Curvature of the lip and sidewalls at gutter opening shall be formed by curved forms and shall not be made by plastering.

3. Wall thickness (T)
   - T = 6 inches if H is 8 feet or less
   - T = 8 inches if H exceeds 8 feet

how can both of these situations be true?

4. ~~Depth (H) shall be a maximum of 6 feet.~~ For depths between 6 feet to 12 feet, catch basin shall be on a manhole base, see STD-402C. For depths greater than 12 feet ~~deep~~ require a special design by a registered civil engineer.

5. Floor of basin shall be troweled and re-troweled to produce a hard, polished surface of maximum density and smoothness. Slope of floor parallel with curb shall be 1 to 12 unless otherwise specified. clarify the intent.

6. Manhole shall be placed as shown on improvement plans. Why not this detail?

7. Outlet pipe shall be trimmed to the final shape and length before concrete is poured.

8. Reinforcing steel shall be #4 round deformed bars, or wire mesh as indicated. If wire mesh is used, additional 4"X4" 6 AWG mesh shall be placed around the inlet opening @45 degrees to main mesh reinforcing.

9. Concrete shall meet the requirements of section 90-2 "Minor Concrete" of State Standard Specification.

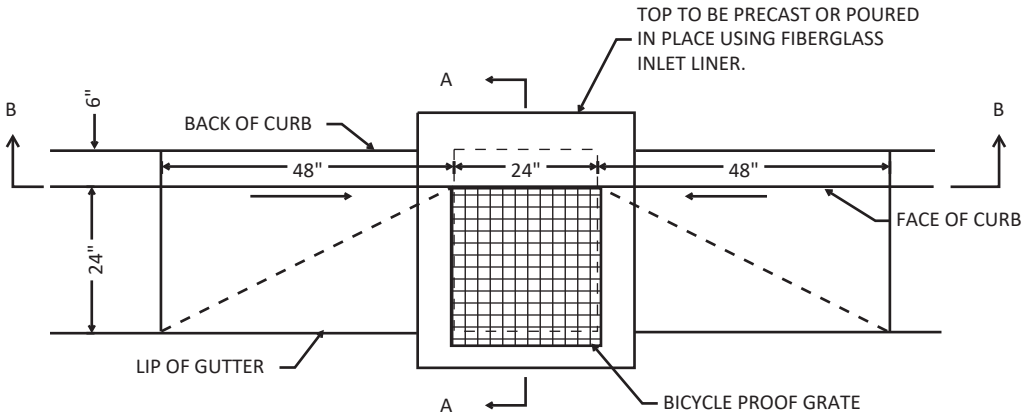
10. Steps: Steps are required as follows:
    - If H is 3.5 feet or less, no steps are required.
    - If H is more than 3.5 feet, but no more than 4 feet, install 1 step 12 inches above floor of basin
    - If H is more than 4 feet, isntall steps 12 inches apart, with the top step 6 inches below the suface of the basin and 12 inches above the floor.
    - All steps shall be 6 to 7 inches from the wall.
    - 3/4 inch galvanized steel or polypropylene plastic (Caltrans D72).

11. Surface of all exposed concrete in basin shall conform in slope, grade, color, finish, and scoring to existing or proposed curb and walk adjacent to the basin.

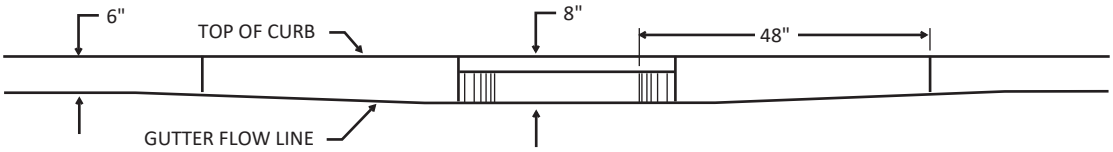
12. General Notes:
    - Catch basin details shown are for cast-in-place and/or when not included on the Engineer's List of approved items.

Need to clarify that CB's on Engineers Approved list don't need to meet all of the geometric criteria shown on this standard. It looks like we tried to state this above, but it isn't clear as worded.

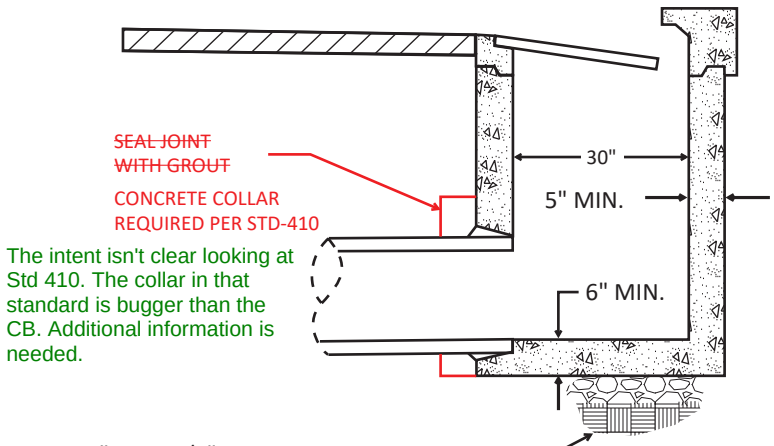
CITY OF SANTA ROSA		
TYPE II CATCH BASIN		
Scale: NONE	DRAFT AUG 2023	
DWN: EDS CHK:	APPROVED:	FILE NO: STD - 402E



PLAN



SECTION B-B



The intent isn't clear looking at Std 410. The collar in that standard is bugger than the CB. Additional information is needed.

SECTION A-A

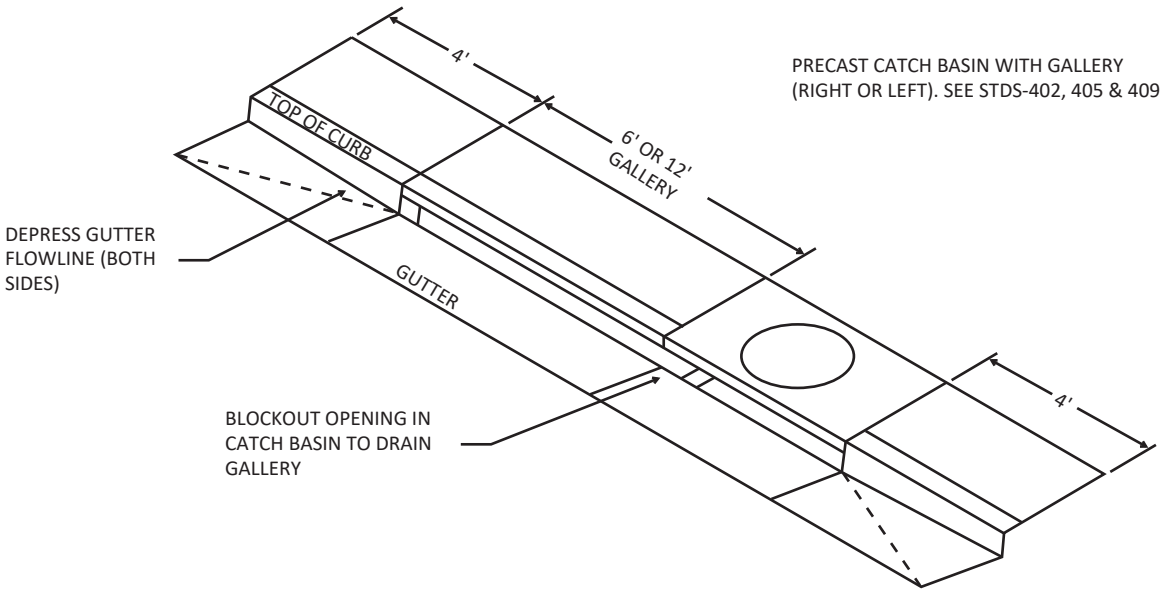
NOTES:

1. Concrete shall have a compressive strength of 4000 psi in 28 days.
2. Grate and nosing angle shall be hot dipped galvanized after fabrication per ASTM A-123
3. Grate frames shall be installed tight against gutter flowline
4. Catch basin box and grate shall be constructed to withstand H20 loading.
5. Install label per City STD-409.

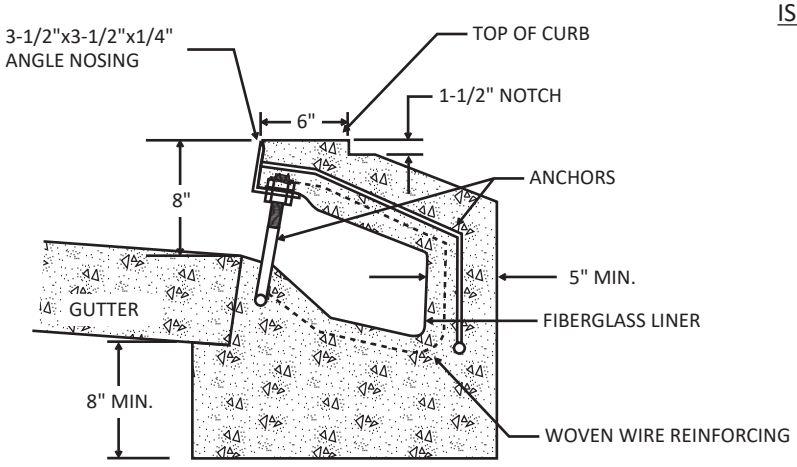
ONLY TO BE USED WHERE SPECIFICALLY APPROVED BY VARIANCE

APPROVED TYPE I CATCH BASINS
See Engineer's approved list

CITY OF SANTA ROSA		
TYPE I CATCH BASIN		
Scale: NONE	DRAFT AUG 2023	
DWN: EDS CHK:	APPROVED:	FILE NO: STD - 403



ISOMETRIC VIEW



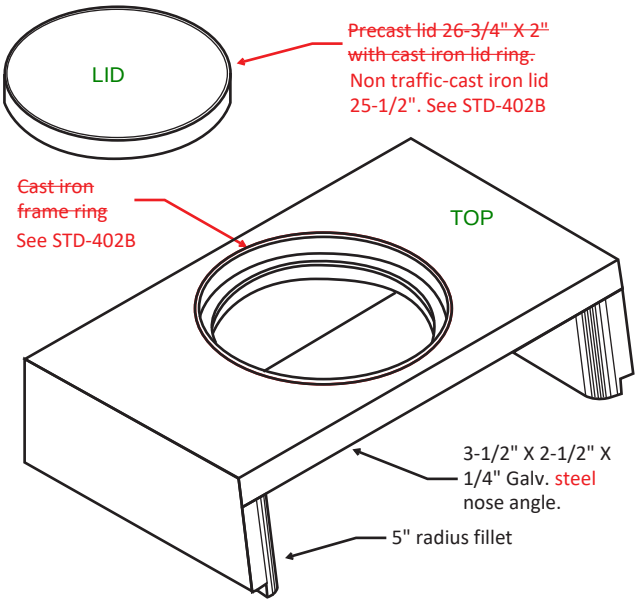
TYPICAL SECTION INSTALLED

NOTES:

1. Nosing assembly shall be hot dipped galvanized after fabrication per ASTM A-123.
2. Concrete shall be class A.
3. Install label per City STD-409

APPROVED STORMD RAIN GALLERY FORM
See Engineer's approved list

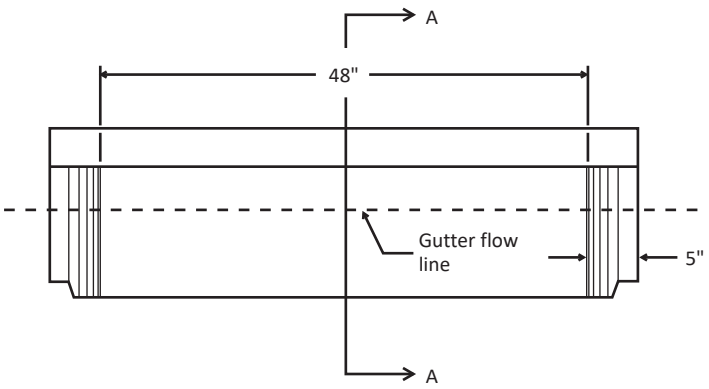
CITY OF SANTA ROSA		
STORM DRAIN GALLERY		
Scale: NONE		DRAFT AUG 2023
DWN: EDS CHK:	APPROVED:	FILE NO: STD - 404



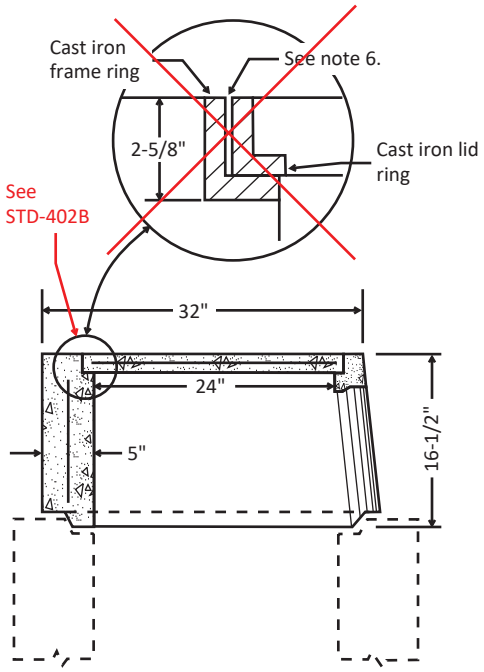
ISOMETRIC

NOTES:

1. Concrete shall have a compressive strength of 4000 PSI at 28 days
2. Nosing angle shall be galvanized in accordance with ASTM specification A-123.
3. Exposed concrete surface shall have broom finish.
4. Cast iron shall conform to ASTM 48-30.
5. Apply label per City STD-409.
6. Frame ring inside diameter to be 5/16" to 3/8" greater than lid ring outside diameter.



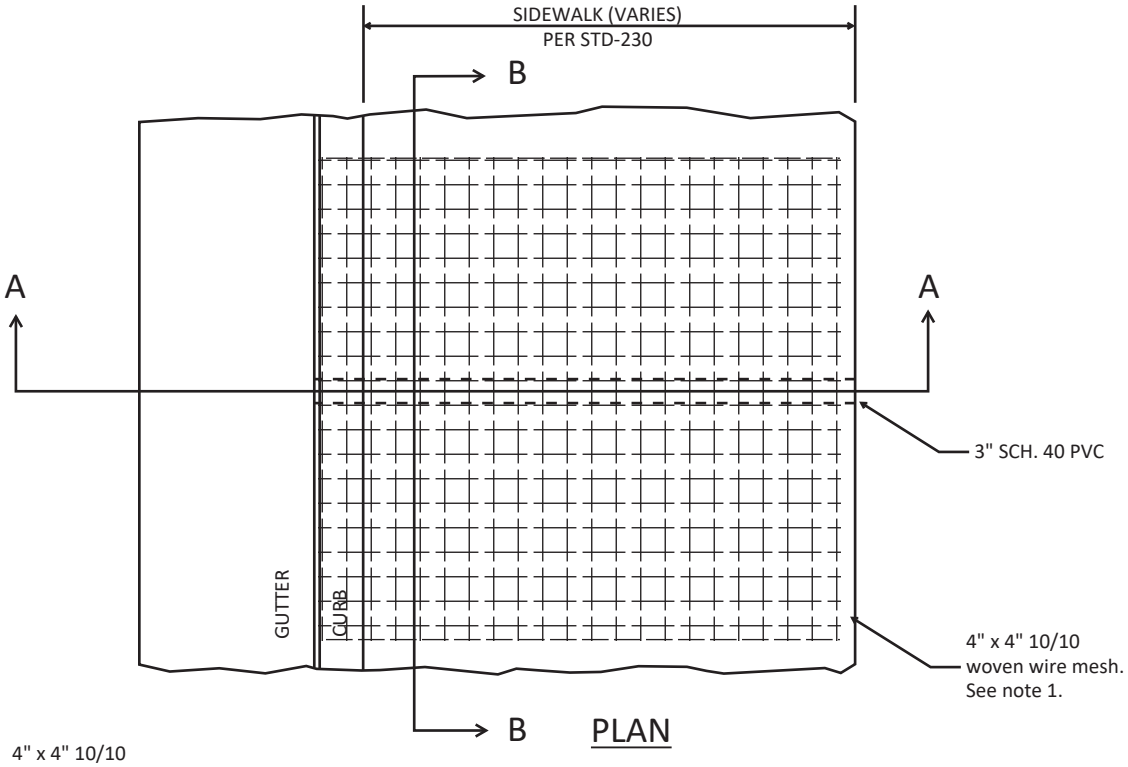
ELEVATION

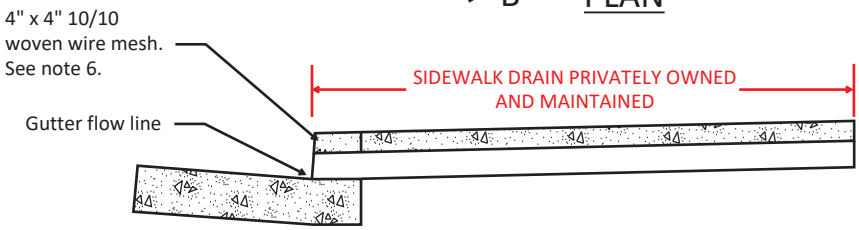


SECTION A-A

APPROVED PRECAST CATCH BASIN COVERS
See Engineer's approved list

CITY OF SANTA ROSA		
TOP PRECAST CATCH BASIN ~~COVER~~		
Scale: NONE	DRAFT AUG 2023	
DWN: EDS CHK:	APPROVED:	FILE NO: STD - 405





SECTION A-A

NOTES:

1. Wire mesh shall be full width of sidewalk minus 2". Length of wire mesh shall, at a minimum, equal the width and be centered over the pipe.

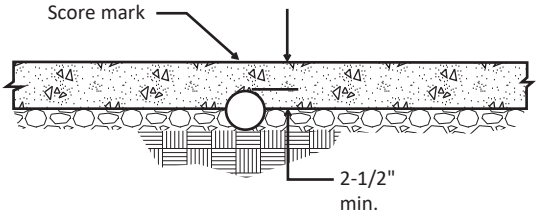
2. On-site drainage and location of curb outlets shall be by owner to the satisfaction of the City Engineer.

3. Drain pipe shall be installed so that the top of pipe is 2-1/2" (min.) below finished grade at back of sidewalk.

4. Sidewalk shall be removed to the nearest scoremark.

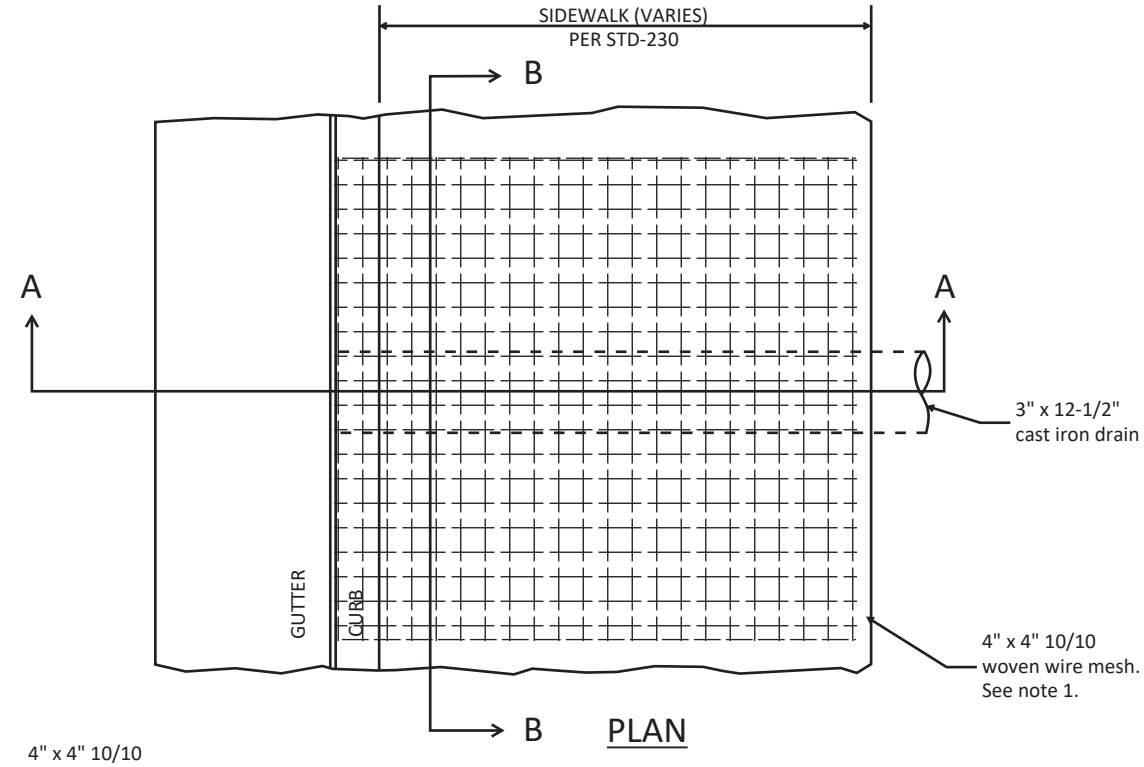
5. If sidewalk and gutter are not contiguous, curb may be cored or curb and gutter removed and replaced a minimum of one foot on each side of the drain pipe. Dowel new gutter to existing curb and gutter with (2) 12" #4 rebars, place one dowel in curb and one in gutter pan using epoxy.

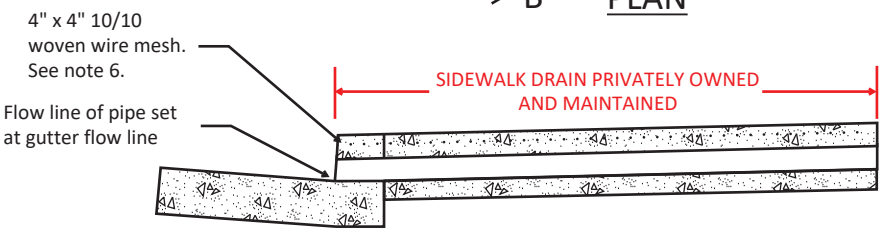
6. If sidewalk and gutter are contiguous, pour monolithic with wire fabric extending into curb.



SECTION B-B
(for one 3" pipe)

CITY OF SANTA ROSA		
3" SIDEWALK DRAIN		
Scale: NONE		DRAFT AUG 2023
DWN: EDS CHK:	APPROVED:	FILE NO: STD - 406A





SECTION A-A

NOTES:

1. Wire mesh shall be full width of sidewalk minus 2". Length of wire mesh shall, at a minimum, equal the width and be centered over the pipe.

2. On-site drainage and location of curb outlets shall be by owner to the satisfaction of the City Engineer.

3. Drain pipe shall be installed so that the top of pipe is 2-1/2" (min.) below finished grade at back of sidewalk.

4. Sidewalk shall be removed to the nearest scoremark.

5. If sidewalk and gutter are not contiguous, curb may be cored or curb and gutter removed and replaced a minimum of one foot on each side of the drain pipe. Dowel new gutter to existing curb and gutter with (2) 12" #4 rebars, place one dowel in curb and one in gutter pan using epoxy.

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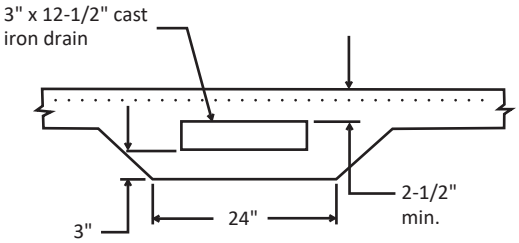
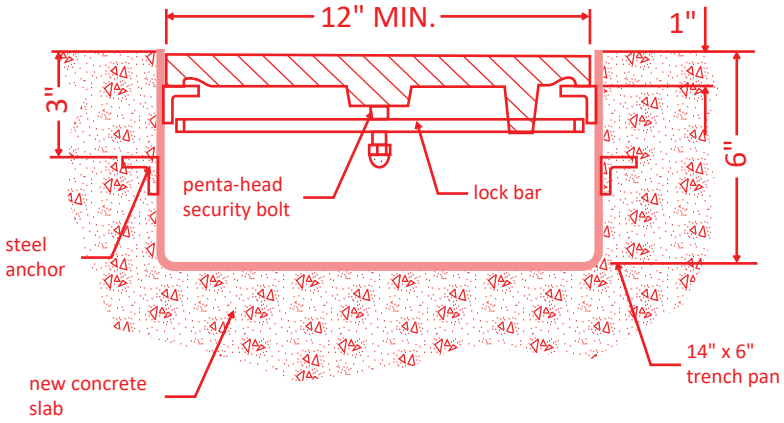


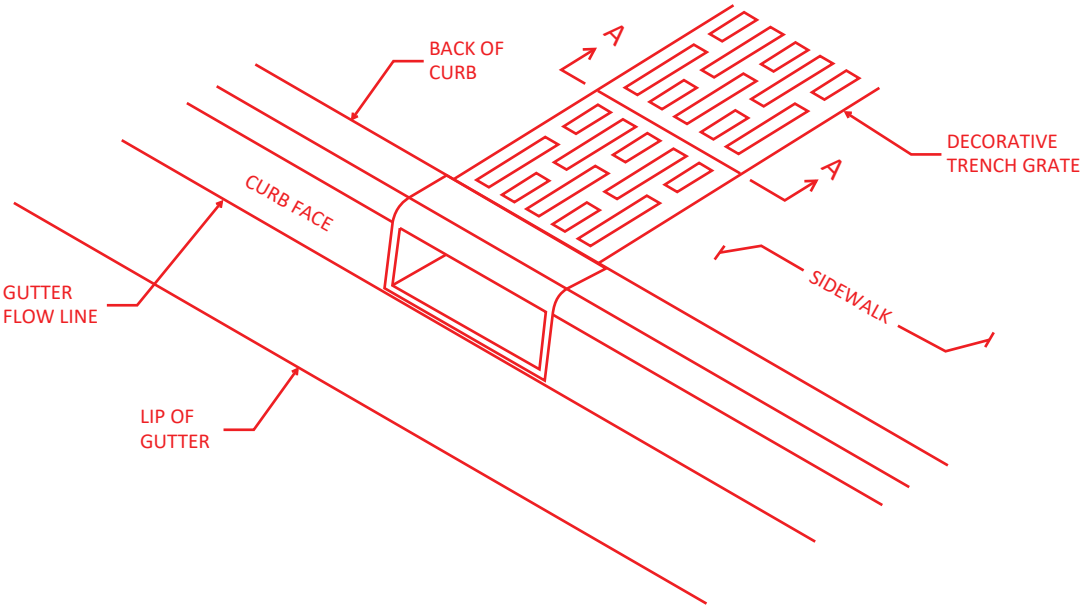
SECTION B-B

CAST IRON SIDEWALK DRAIN
See Engineer's Approved List

CITY OF SANTA ROSA		
3" X 12-1/2" CAST IRON SIDEWALK DRAIN		
Scale: NONE		DRAFT AUG 2023
DWN: EDS CHK:	APPROVED:	FILE NO: STD - 406B



SECTION A-A

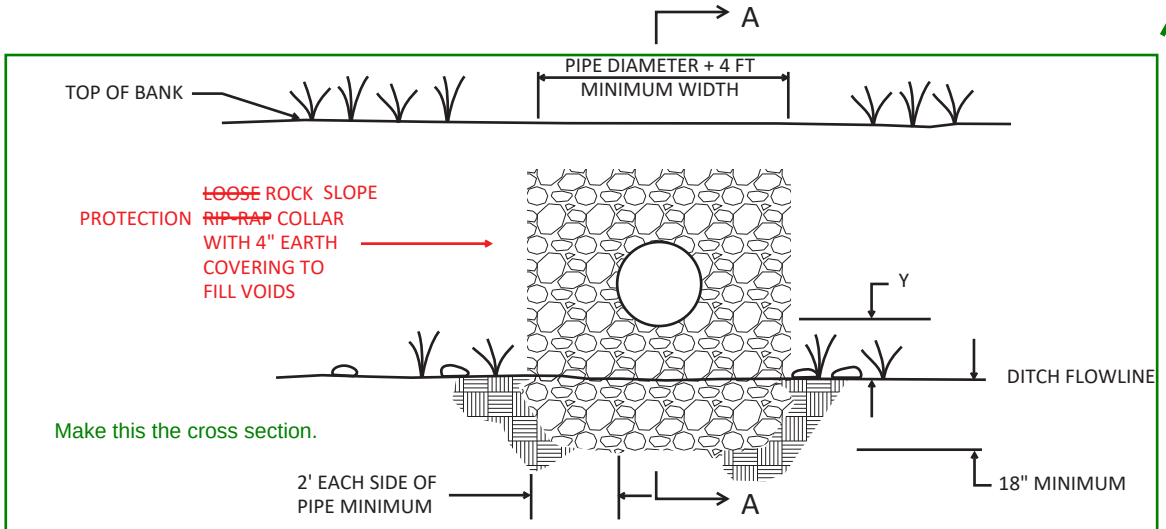


ISOMETRIC VIEW

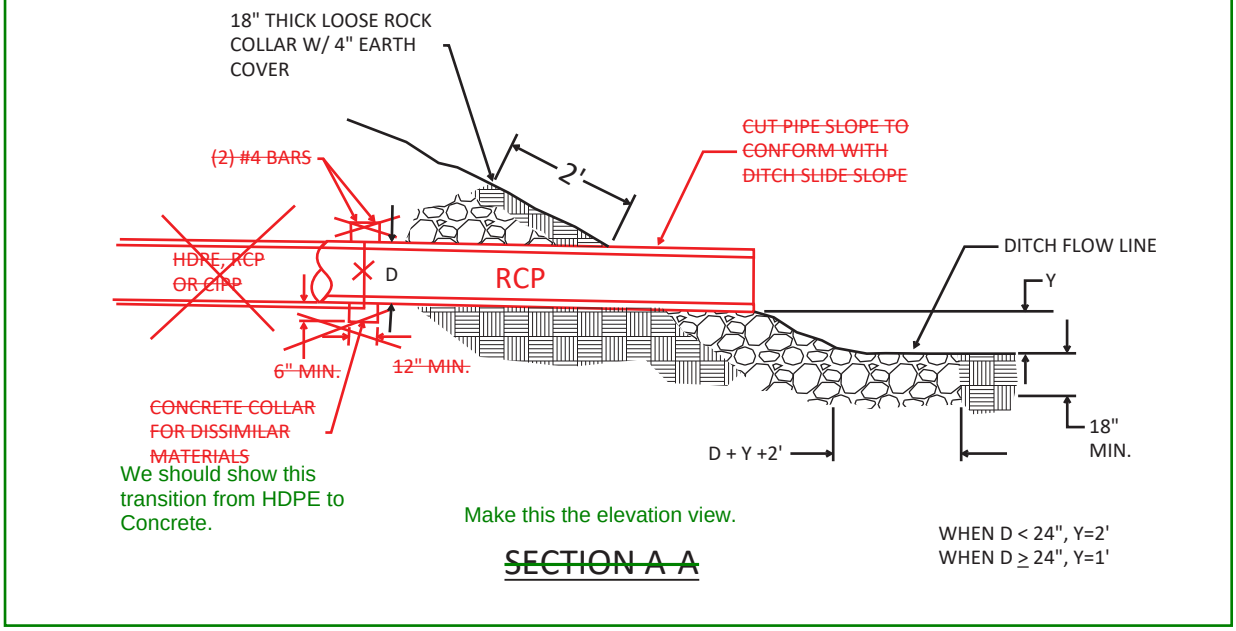
NOTES:

1.

CITY OF SANTA ROSA		
TRENCH DRAIN AND GRATE		
Scale: NONE	DRAFT AUG 2023	
DWN: EDS CHK:	APPROVED:	FILE NO: STD - 406C



STORM DRAIN OUTLET ELEVATION



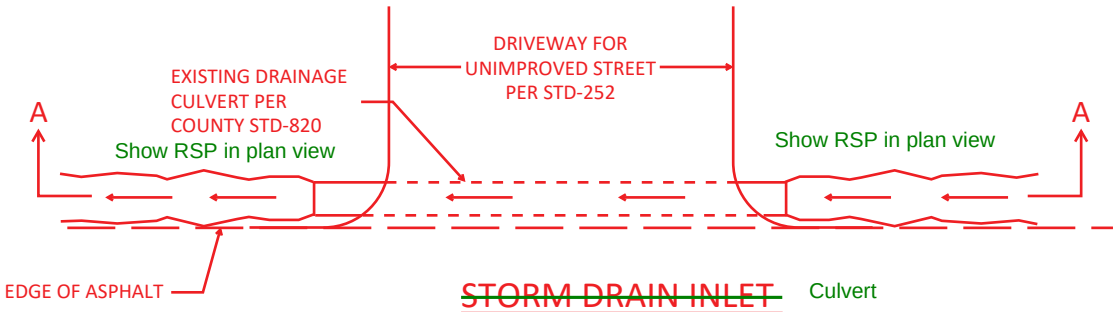
~~SECTION A-A~~

~~NOTES:~~

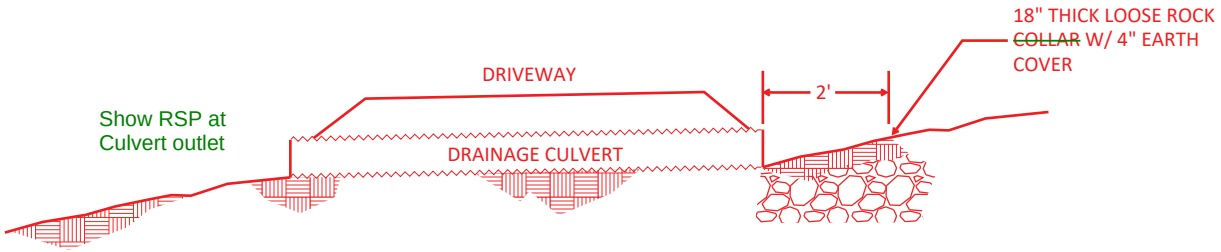
1. ~~CMP shall conform with Section 66-3 of the Standard Specifications.~~

2. ~~HDPE pipe shall conform with Section 64 of the Standard Specification for type S pipe.~~

CITY OF SANTA ROSA		
SLOPE PROTECTION ~~*LOOSE* ROCK *RIP-RAP*~~ *STORM DRAIN ~~OUTLET~~/~~INLET~~* Inlet/ou		
Scale: NONE	*DRAFT AUG 2023*	
DWN: EDS *CHK:*	*APPROVED:*	*FILE NO:* *STD - 407*



~~STORM DRAIN INLET~~ Culvert
PLAN VIEW



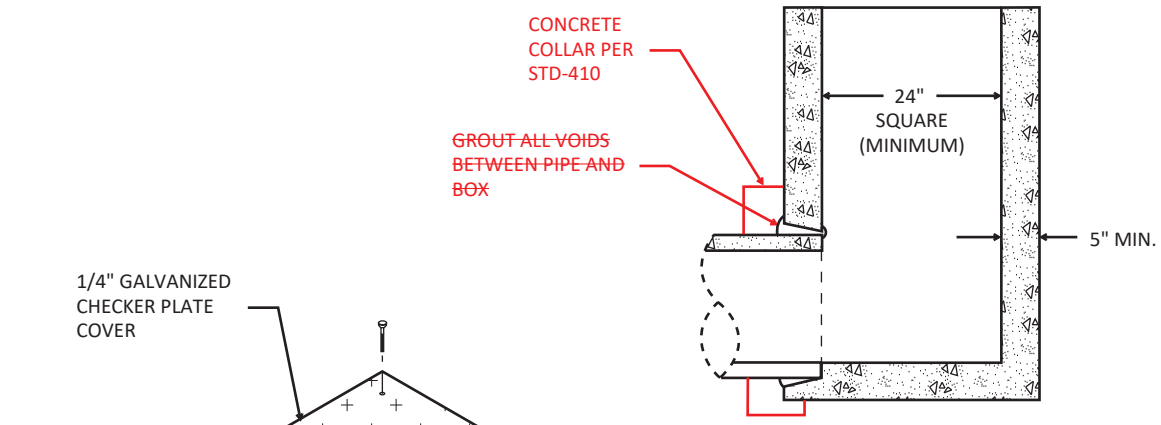
~~STORM DRAIN INLET~~ Culvert
SECTION A-A

ROCK SLOPE PROTECTION

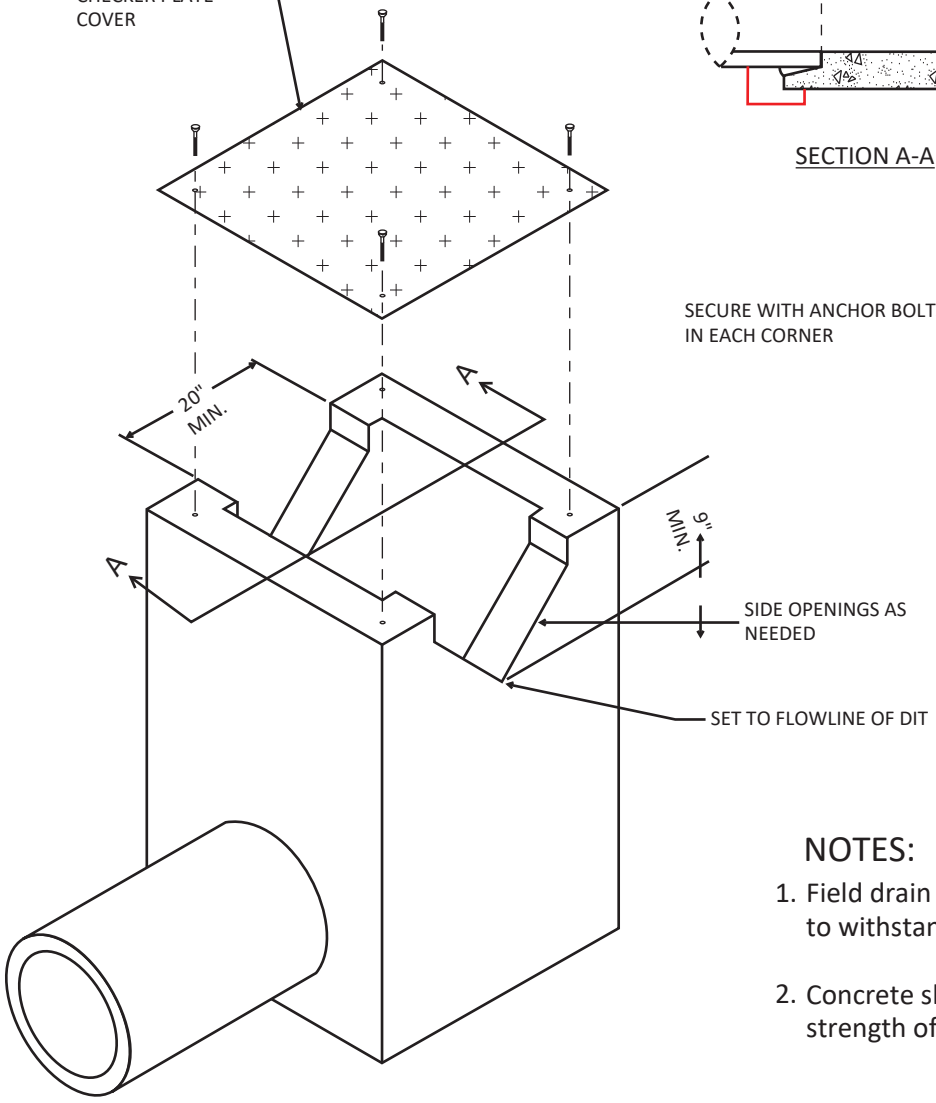
MATERIALS

Rocks shall be angular and well graded from an average diameter of four(4) inches to an average diameter of fifteen (15) inches with approximately fifty (50) percent by weight smaller than nine (9) inches in average diameter. Not more than ten (10) percent of the rock rip rap by weight shall be less than four (4) inches average diameter. Not more than ten (10) percent of the rock riprap by weight shall be greater than fifteen (15) inches in average diameter and none shall exceed an average diameter of twenty 20" inches.

CITY OF SANTA ROSA		
SLOPE PROTECTION ~~LOOSE~~ ROCK ~~RIP-RAP~~ for driveway culverts ~~STORM DRAIN OUTLET~~/~~INLET~~		
Scale: NONE	DRAFT AUG 2023	
DWN: EDS CHK:	APPROVED:	FILE NO: STD - 407



SECTION A-A



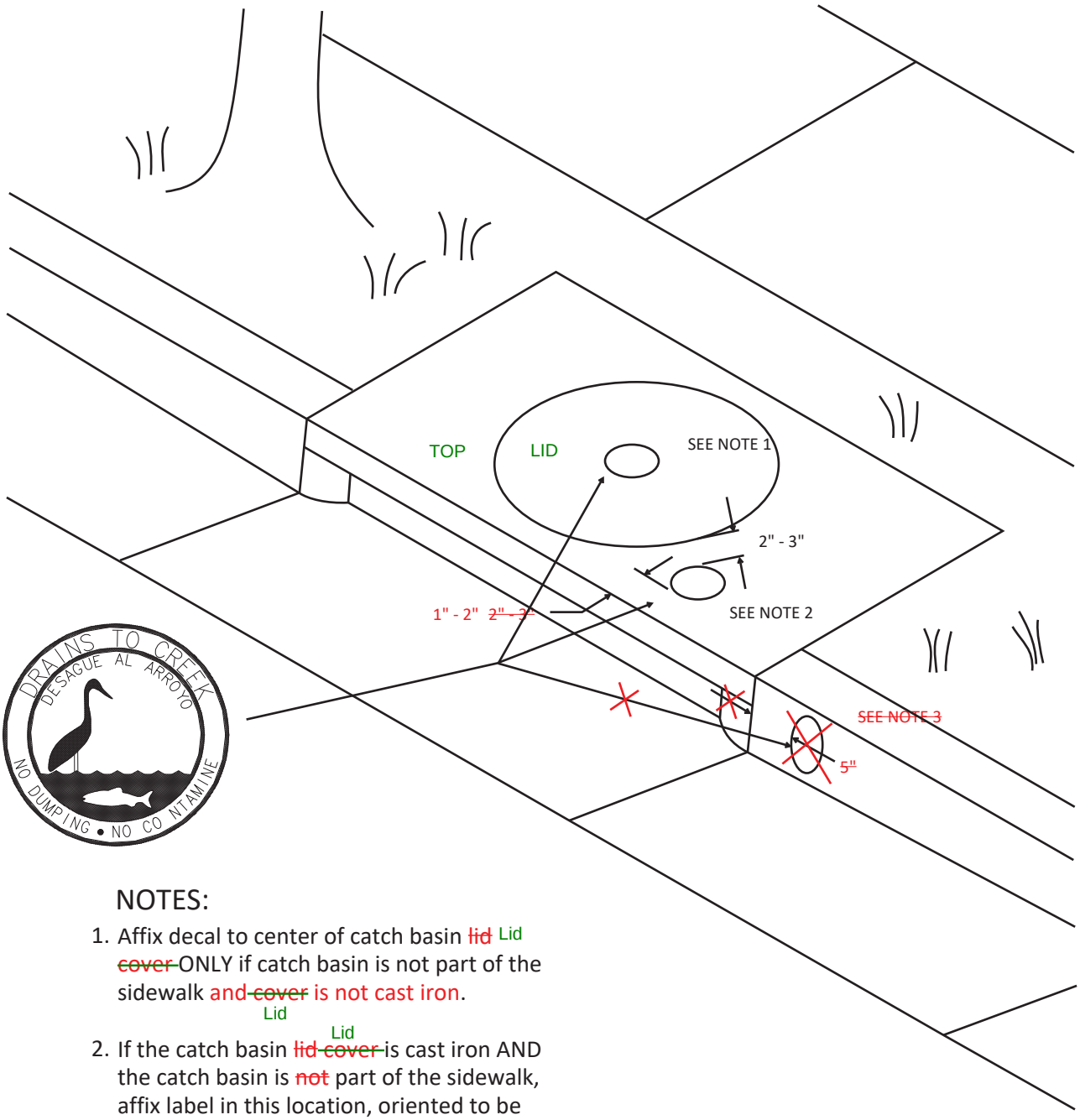
ISOMETRIC VIEW

NOTES:

1. Field drain box shall be constructed to withstand H20 loading.
2. Concrete shall have a compressive strength of 4000 psi in 28 days

PRECAST SIDE OPENING FIELD DRAIN
See Engineer's approved list

CITY OF SANTA ROSA		
PRECAST SIDE OPENING FIELD DRAIN		
Scale: NONE	DRAFT AUG 2023	
DWN: EDS CHK:	APPROVED:	FILE NO: STD - 408



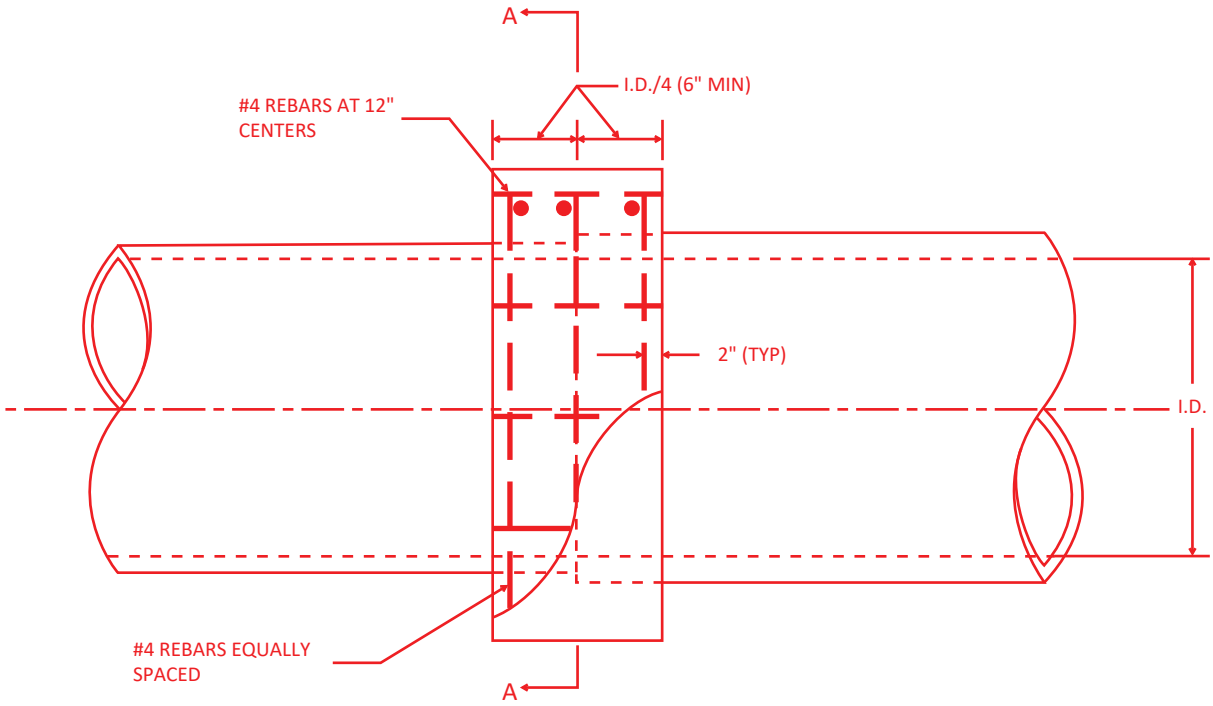
NOTES:

1. Affix decal to center of catch basin ~~lid~~ Lid ~~cover~~ ONLY if catch basin is not part of the sidewalk and ~~cover~~ Lid is not cast iron.
2. If the catch basin ~~lid cover~~ Lid is cast iron AND the catch basin is ~~not~~ part of the sidewalk, affix label in this location, oriented to be read from the street aligned with the top of curb.

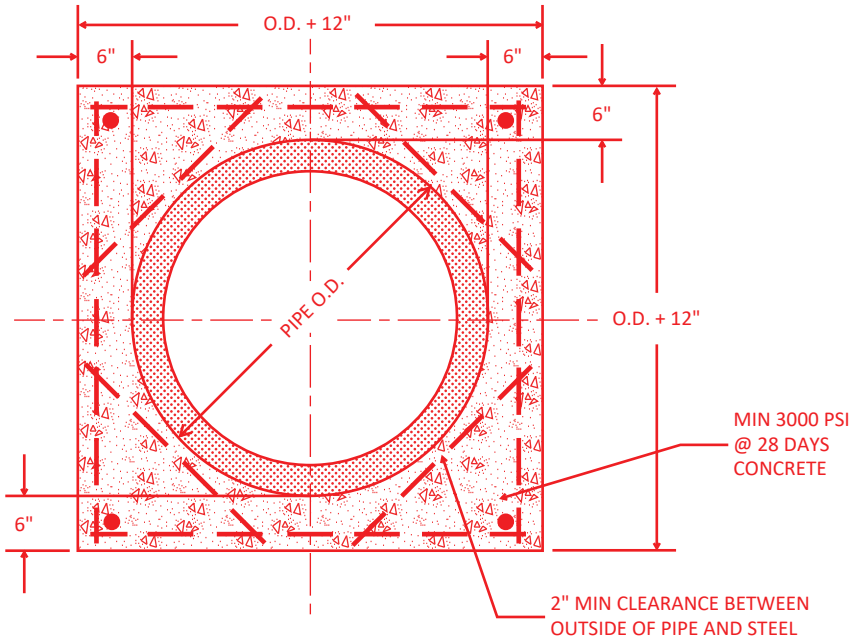
~~3. Affix label on the curb face right of the catch basin if catch basin is part of the sidewalk. The left side may be used if the right side curb is damaged or painted.~~

APPROVED STORM DRAIN LABELS
See Engineer's approved list

CITY OF SANTA ROSA		
STORM DRAIN LABELS		
Scale: NONE		DRAFT AUG 2023
DWN: EDS CHK:	APPROVED:	FILE NO: STD - 409

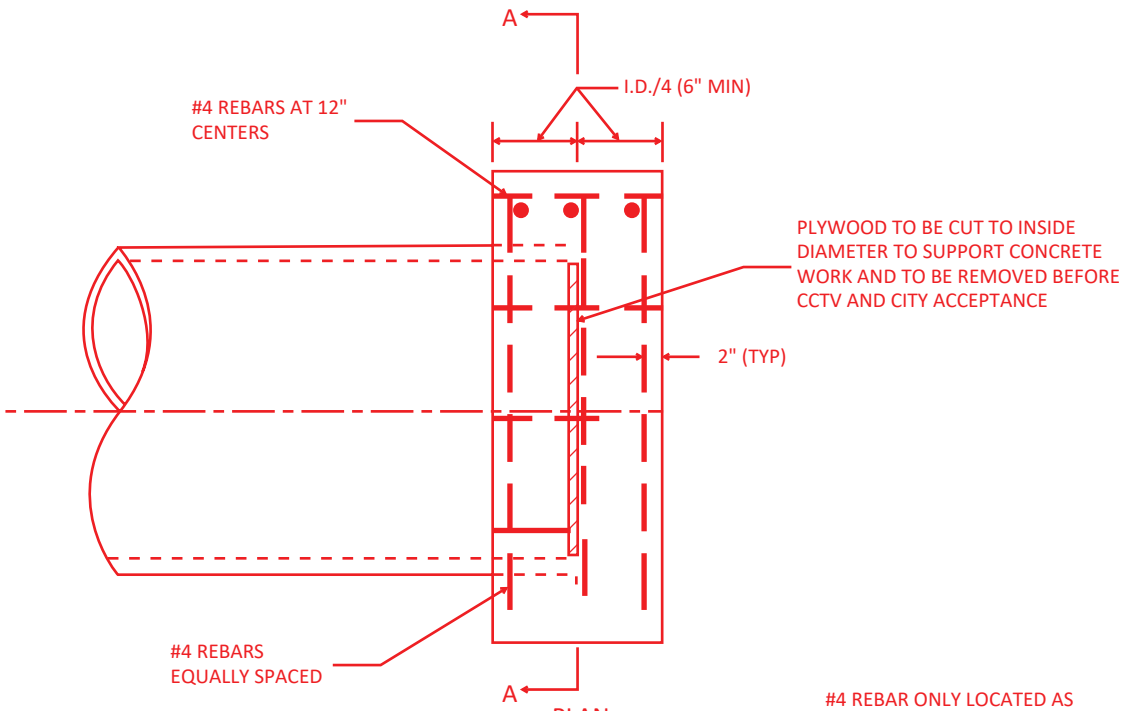


PLAN

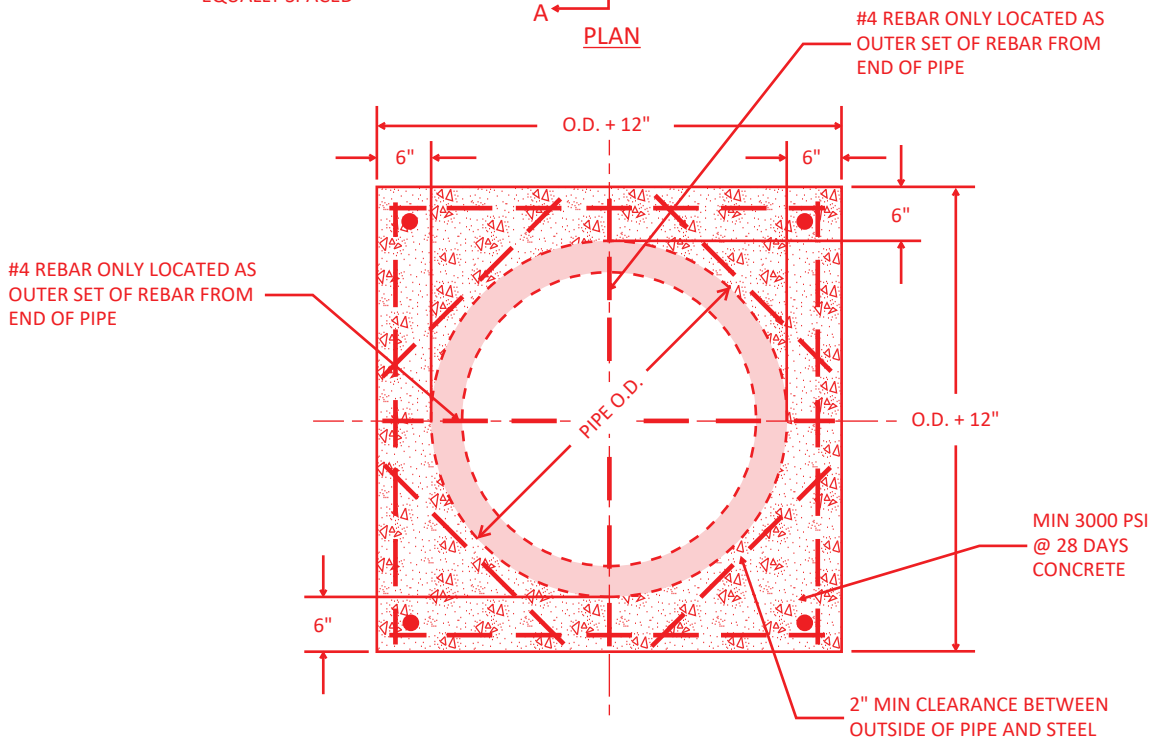


SECTION B-B

CITY OF SANTA ROSA		
REINFORCED CONCRETE PIPE COLLAR		
Scale: NONE	DRAFT AUG 2023	
DWN: EDS CHK:	APPROVED:	FILE NO: STD - 410



PLAN

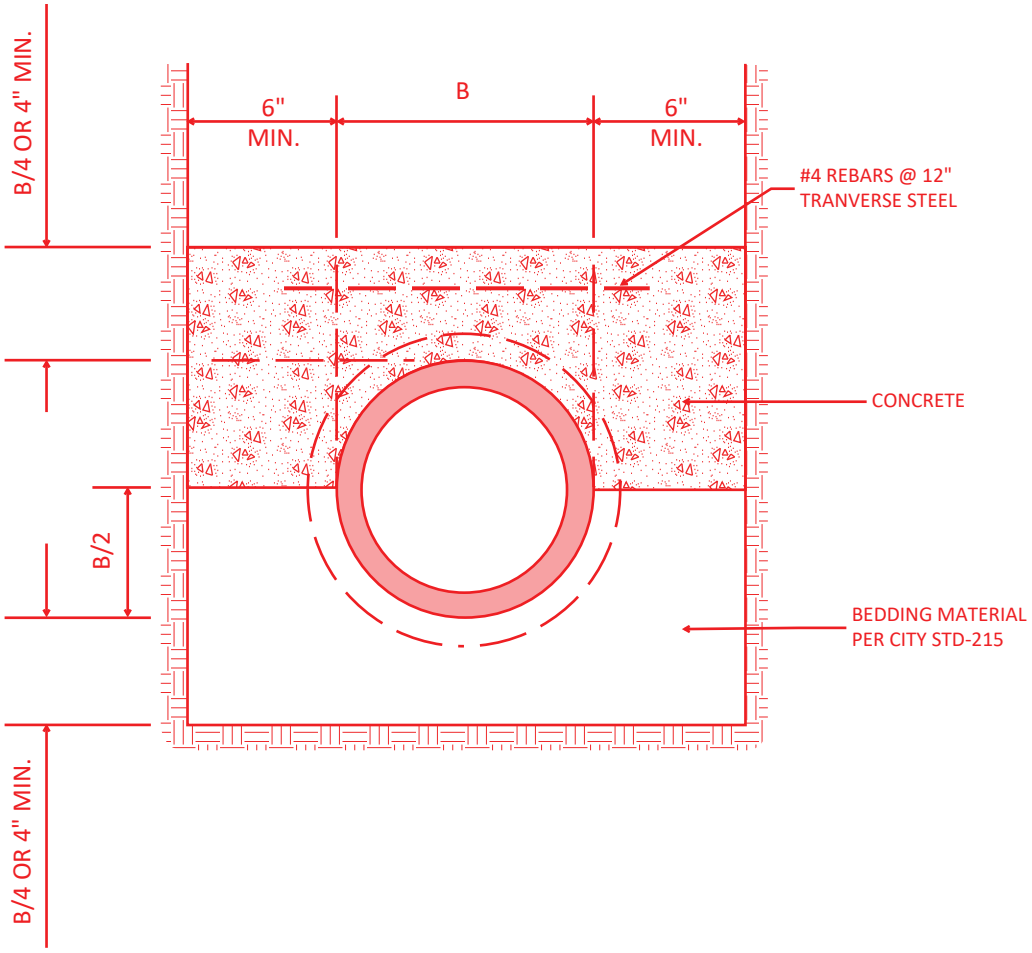


SECTION B-B

NOTES:

1. All reinforced concrete stub caps to be inspected by City during construction and before being covered.

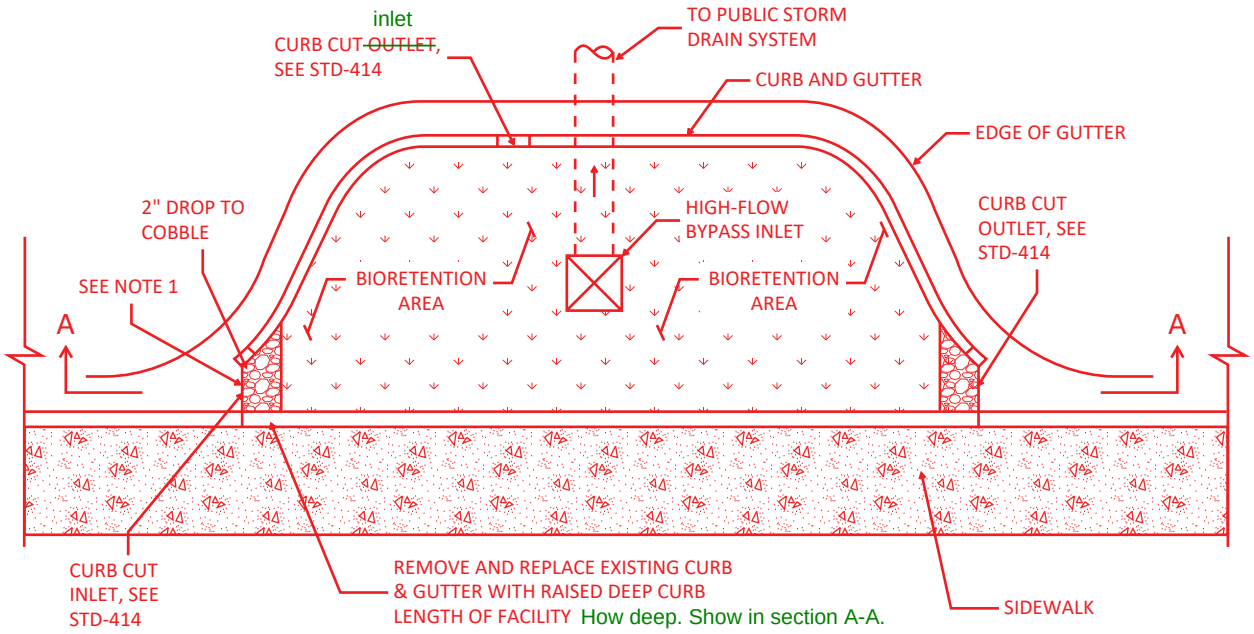
CITY OF SANTA ROSA		
REINFORCED CONCRETE STUB CAP		
Scale: NONE	DRAFT AUG 2023	
DWN: EDS CHK:	APPROVED:	FILE NO: STD - 411



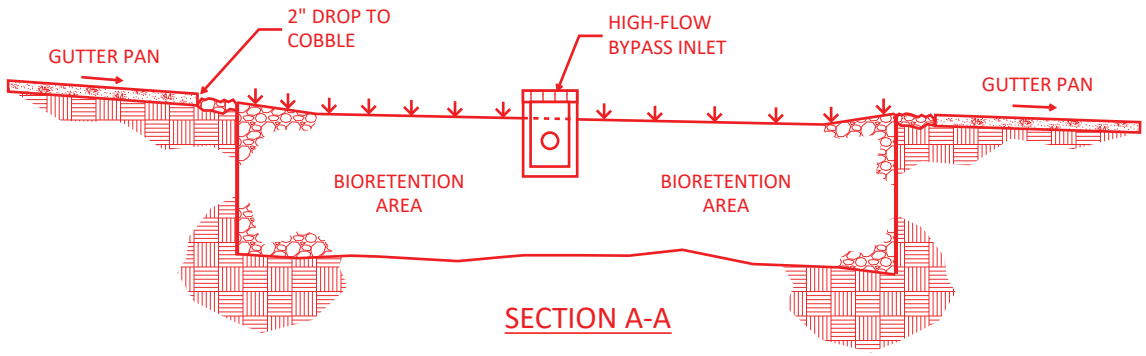
NOTES:

1. All concrete for concrete bedding cap shall be Claass V concrete.
   spelling
2. Concrete bedding cap required when a storm drain pipe encroaches in a roadway structural section or is less than three (3) feet below finish grade.
3. Use reinforcing steel when designated on the ~~plans~~ drawings.
4. Unless otherwise specified, concrete bedding cap shall be paid for as part of the construction of ~~pipe sewer or conduits~~ storm drain.

CITY OF SANTA ROSA		
CONCRETE BEDDING CAP		
Scale: NONE	DRAFT AUG 2023	
DWN: EDS CHK:	APPROVED:	FILE NO: STD - 412



PLAN VIEW



SECTION A-A

NOTES:

1. This standard detail assumes gradual longitudinal and cross slopes of the roadway. Steeper slopes in either direction will impact conveyance and elevation differences between the facility and adjacent roadway , curb, and sidewalk surfaces. Retrofit projects will face greater constraints than new construction. Site specific design is critical to avoid grade conflicts and maximizing ponding area. Grading plans that provide spot elevations across the entire facility and along adjacent surfaces are necessary.

CITY OF SANTA ROSA		
STREET BIORETENTION BULB-OUT, MID-BLOCK, ~~CORNER CROSSING~~		
Scale: NONE	DRAFT AUG 2023	
DWN: EDS CHK:	APPROVED:	FILE NO: STD - 413

Not sure how
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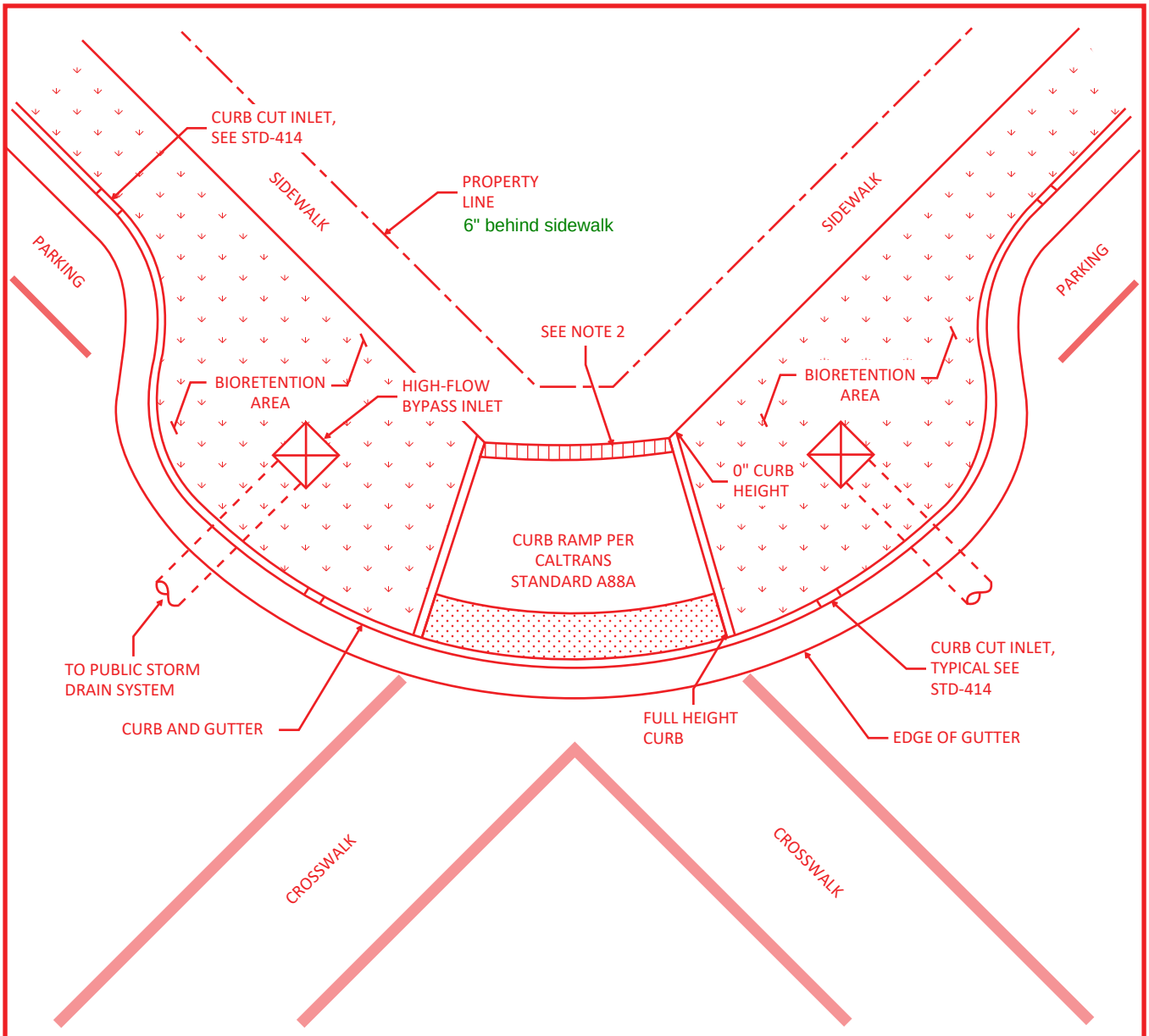
bays. Mid Blo
require specia



PLAN VIEW

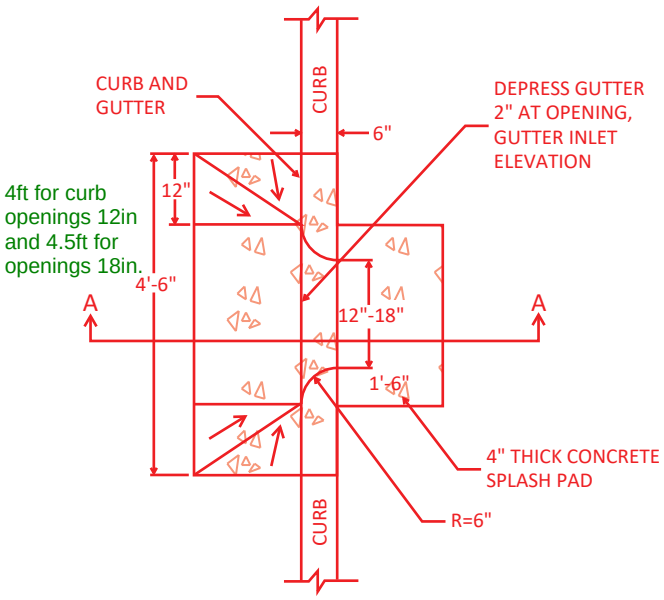
NOTES CONTINUED:

2. For the treatment of sidewalk runoff, a trench grate may be installed at the edge of the sidewalk transition to the curb ramp, as needed. The trench grate shall be Americans with Disabilities Act (ADA) compliant and heel proof.

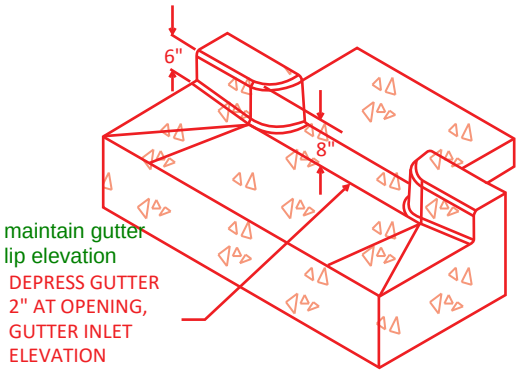
3. Curb cut inlets to be located as governed by the grading design so as to prevent flows being concentrated toward the ramp to gutter transition location.

4. The number of curb cut inlets needed shall be governed by the inlet capacity and flooded width calculations presented in the Drainage Report.

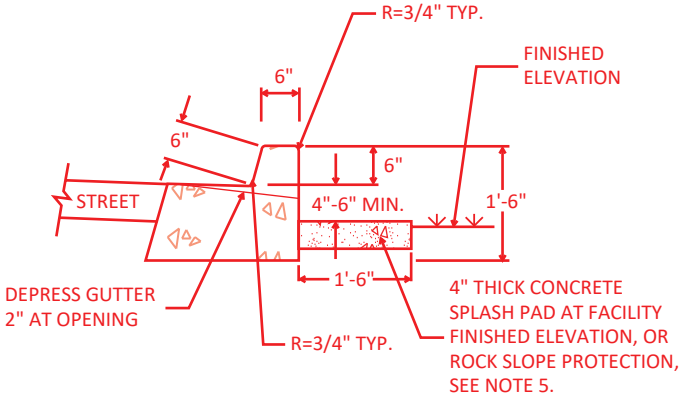
CITY OF SANTA ROSA		
STREET BIORETENTION BULB-OUT, ~~MID-BLOCK,~~ CORNER CROSSING		
Scale: NONE	DRAFT AUG 2023	
DWN: EDS CHK:	APPROVED:	FILE NO: STD - 413



PLAN VIEW



PERSPECTIVE VIEW

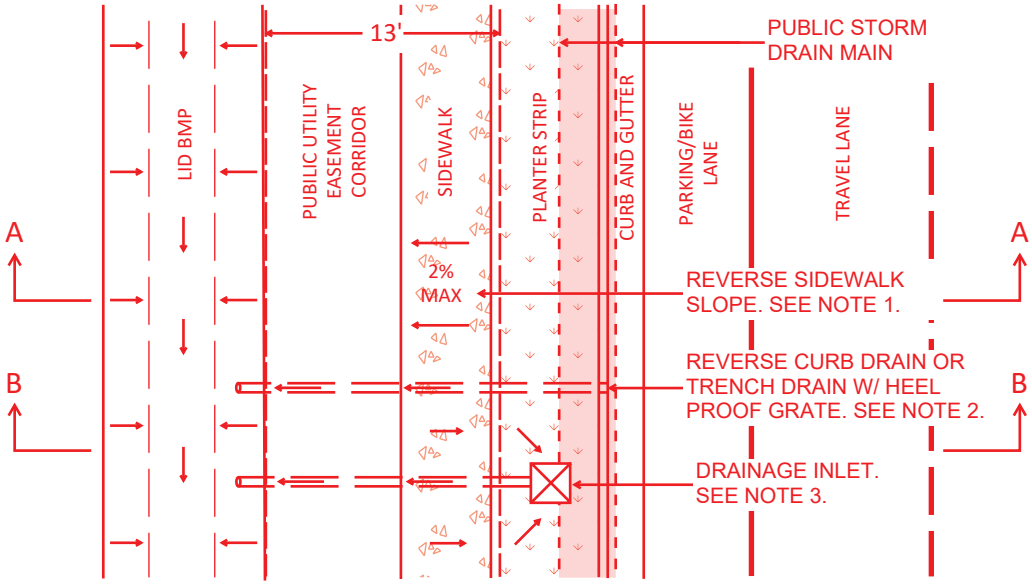


SECTION A-A

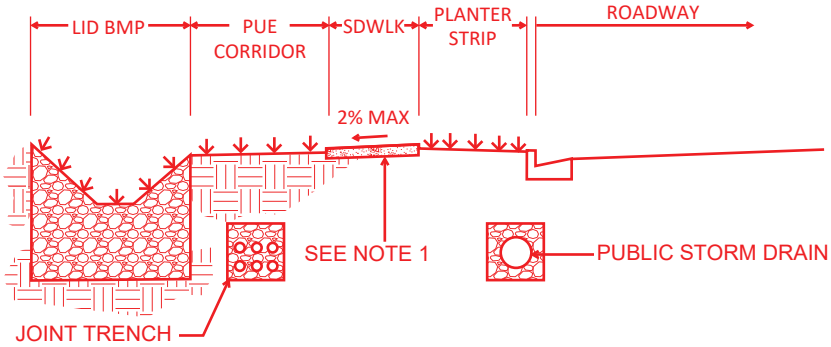
NOTES:

1. For use with stormwater facilities with flat bottoms.
2. Provide spot elevations on plans for finished grade, gutter inlet, top of curb, lip of gutter, etc.
3. Curb and wall details may be modified by Civil and Geotechnical Engineer subject to approval by the City Engineer.
4. Curb height may be reduced to 4" where adjacent to a sidewalk.
5. If rock slope protection is used, calculations for the sizing based on flow velocities is required in the drainage report and Stormwater Low-impact Development Report, as applicable.

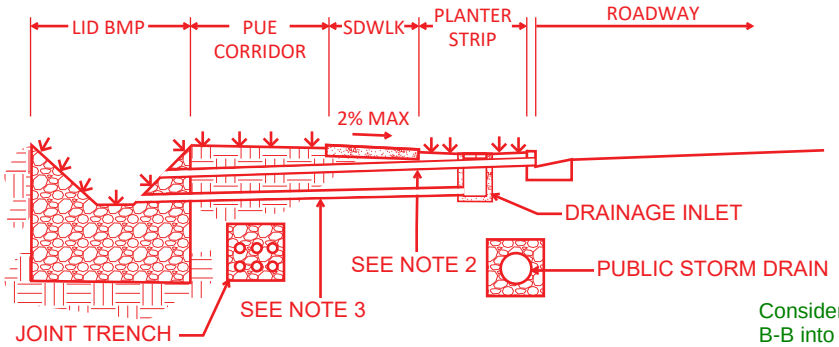
CITY OF SANTA ROSA		
CURB CUT INLET/OUTLET FOR PLANTERS		
Scale: NONE	DRAFT AUG 2023	
DWN: EDS CHK:	APPROVED:	FILE NO: STD - 414



PLAN VIEW



SECTION A-A



SECTION B-B

Consider breaking Sections A-A and B-B into 2 separate details.

CITY OF SANTA ROSA		
STORM DRAIN UNDER CURB OR PLANTER		
Scale: NONE	DRAFT AUG 2023	
DWN: EDS CHK:	APPROVED:	FILE NO: STD - 415

NOTES:

1. For the treatment of replaced or proposed sidewalk behind the planter strip or contiguous sidewalk, the sidewalk may be reversed and runoff graded to or conveyed to a LID BMP. This option does not treat the roadway.

2. Reverse curb drain per STD-406A/B or trench drain with a heel proof grate.

3. Sidewalk runoff captured within the planter strip then conveyed to the LID BMP via SCH. 40 PVC. Only sidewalk treatment is provided

   Why limited to Schedule 40 PVC?

4. No rebar or reinforcement shall be placed over public storm drain facilities.

5. No improvements within the sidewalk, planter strip, or right-of-way shall intrude within the pipe or pipe bedding.

6. No portion of any structure or LID BMP shall extend within, over, under, or upon any public utility easement unless otherwise approved by the City Engineer.

7. Utility services and laterals may run through a public utility easement perpendicularly, but private utilities may not run longitudinally within the PUE.

8. A curb cut may be added to treat the roadway.

9. Prior to utility crossings and connections over or under the existing public storm drain, the contractor shall pothole and ensure no conflicts occur with the existing storm drain facilities.

10. The contractor shall be responsible for repairing, damage, or deterioration occurring to the existing public storm drain as a direct result of construction activity related to the installation of the improvements.

CITY OF SANTA ROSA		
STORM DRAIN UNDER CURB OR PLANTER		
Scale: NONE	DRAFT AUG 2023	
DWN: EDS CHK:	APPROVED:	FILE NO: STD - 415