

The background of the slide features a close-up of vibrant green leaves with prominent veins, overlaid with a semi-transparent white rounded rectangle. Below the rectangle, the bottom portion of the slide shows a blue-green water surface with gentle ripples.

LID Challenge:

Topography and Density

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Rossmoor Corp Yard

448 ft

Belmont Terrace Subdivision



- 128-Lot Subdivision
- Multi-Family
- Free-standing
- Cluster-Style
- 13.8 Acre Site

- Two previously approved projects were merged.
- Earlier projects had predated C.3 requirements, but Belmont Terrace was required to provide treatment of runoff (but not flow control).



Steep Topography

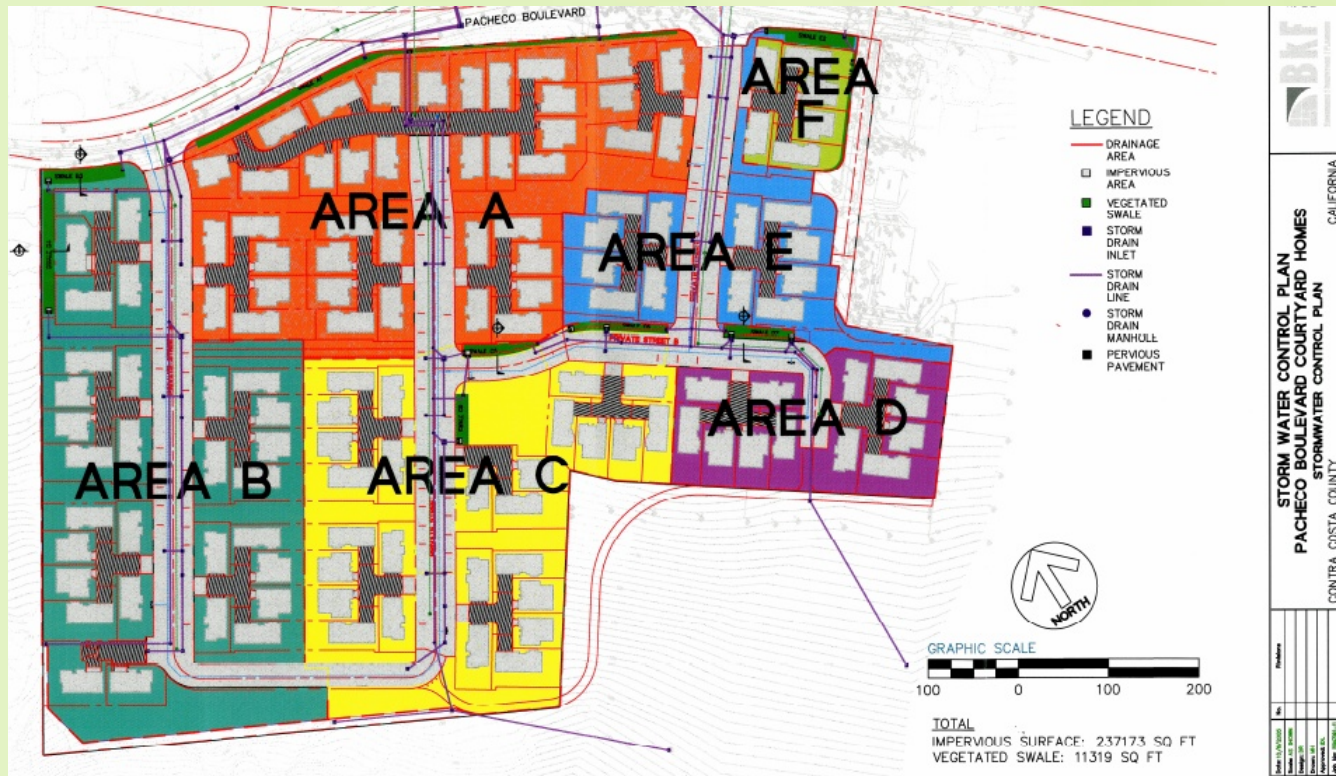


- Average Slope $\approx 25\%$
- 160' elevation drop

- Landslide mitigation required replacement of up to 35' of soil.
- Earlier project on the site was abandoned.

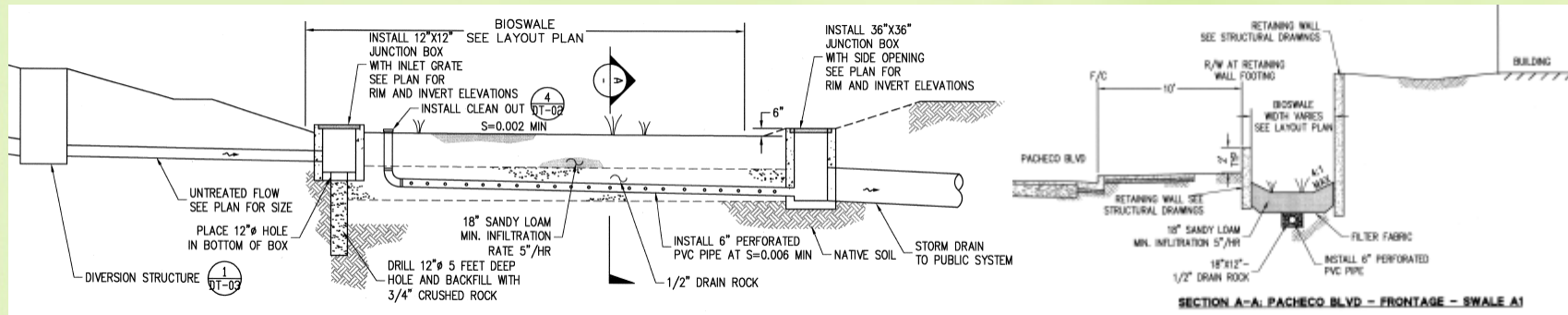


Site Design



- Site is divided into Drainage Management Areas.
- Runoff from each Drainage Management Area is treated by one IMP.

Treatment Design

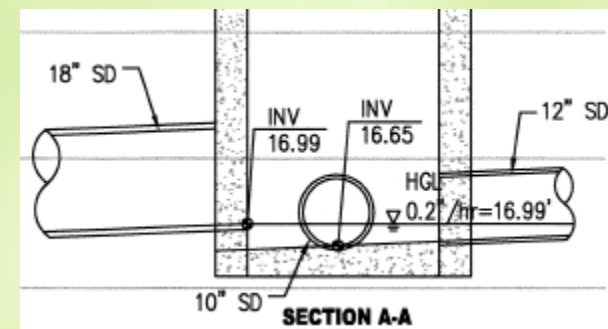
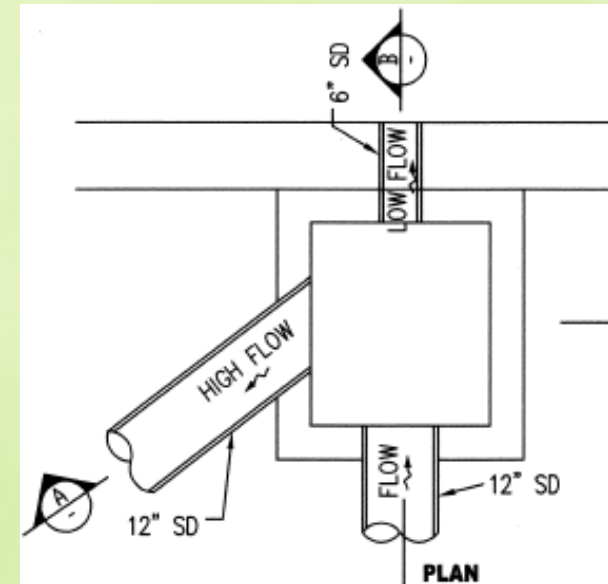


- Application predated the flow control requirement.
- Each treatment IMP is sized to 4% of tributary impervious area.
- IMPs are bioretention areas enclosed by retaining walls.



High Flows Bypass Treatment

- Due to slope and soil conditions, diversion structures added to divert high flows around IMPs.
 - 6" pipe conveys design flows to IMP for treatment, with flow line level with bottom of structure.
 - 12" pipe bypasses IMP and conveys higher flows to storm drain system, with flow line elevated above that of 6" line.



- Some initial installations flawed, with the flow line of bypass pipe lower than that of treatment pipe.

Design Considerations



- Considering stormwater management early is crucial to a well-integrated design.
- IMPs had to be enlarged to compensate for elimination of pervious pavements.

- Hazards associated with IMPs should be considered during initial project design.



Know Utility Locations!!!



- This bioretention area has to be redesigned due to a conflict with an unknown underground pipeline.

- A planned retaining wall had to be replaced with an earthen berm.
- Coordinating stormwater management design with planned utility locations is also crucial.



During Construction



- Time construction of IMPs deliberately – avoid having to reconstruct IMPs!
- Use IMP excavations as sedimentation basins during the construction process.

- Protect IMPs once they are constructed – avoid having to reconstruct IMPs!



Initial Lessons Learned

- It is possible for steep, densely-developed sites to comply with C.3.
- IMPs can and should be attractive, safe and green project amenities.
- Early incorporation of stormwater management into project design is crucial.
- Thorough planning - design and scheduling - saves time and money and makes for a more desirable project.



So How's It Look?



Looks pretty good, huh?

Some Design Issues

- Properly designed energy dissipation is an absolute imperative!



- And getting elevations correct is extremely important!

Fine Grading is Crucial!



- Bioretention Areas should be graded as flat as possible to prevent channelization.

- The ponding area should be far larger.



But Despite Any Design Issues...



...the Proof is in the Clean Water.

