

2.4 UTILITY AND ACCESS OPENINGS

2.4.1 GENERAL

This BDM focuses on openings in bridge and earth retaining systems (ERS). The BDM provides guidelines for accommodating openings for planned and future utilities and box girder bridge access openings. The openings shall comply with the requirements specified in STP 2.4.

Planned and future utility determinations, installations, and requirements should comply with the *Utility Manual for Bridges and Other Structures* (UM).

2.4.2 RECOMMENDED LOCATIONS OF UTILITY OPENINGS ON BRIDGES

Future utility openings should be placed in the outermost bays of structures to avoid traffic impacts, as there is a higher probability of adding utilities than maintaining existing ones.

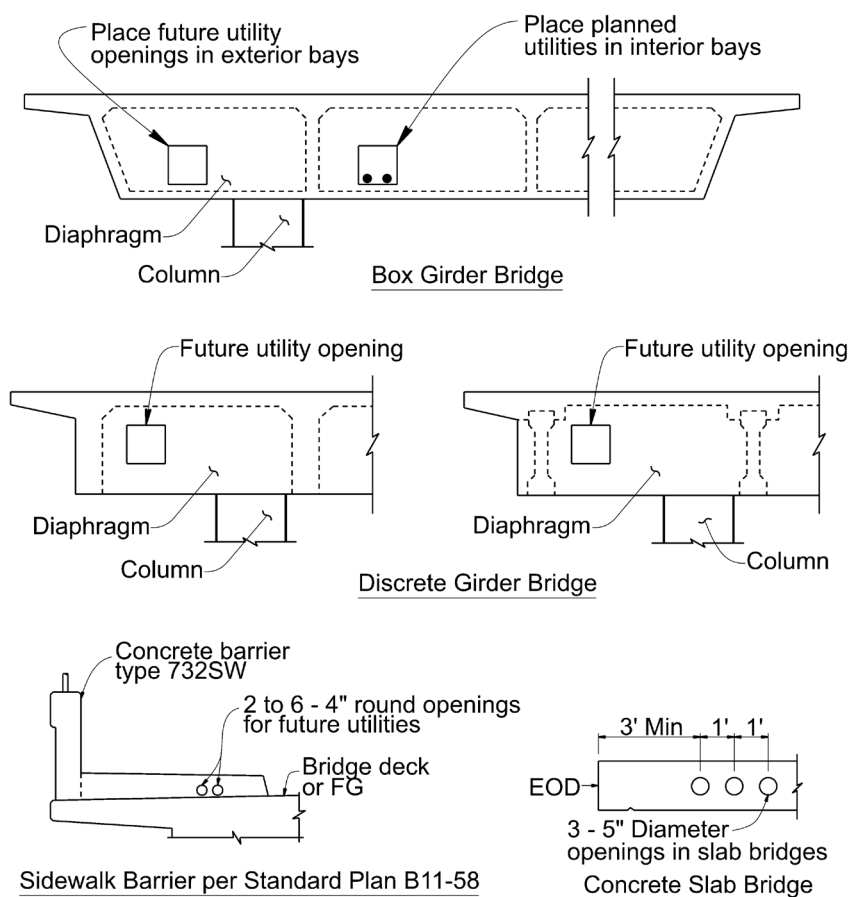


Figure 2.4.3-1 Preferred Locations for Planned and Future Utilities

2.4.3 UTILITY OPENING DETAILS ON BRIDGES

The utility opening sizes should be determined by the number of utilities and their types going through the opening. Based on past practice, the typical size of a future utility opening may range from a minimum of 18 inches to a maximum of 24 inches. The final opening dimensions should be determined in coordination with the District during the planning phase. The utilities determination on the bridge should comply with the UM. The minimum clearances through utility openings are indicated in Table 3.3.3-1 of UM, and the casings for utilities on bridges are indicated in section 2.3.1 of UM.

Utility opening details for discrete girder and box girder superstructures are available in Standard Plans B6-10 and B7-10, respectively, for sidewalk barriers in B11-58, and for conduits along standard concrete barrier sheets in the Standard Plans. These standard plans include opening details at bent caps, abutment diaphragms, intermediate diaphragms, in-span hinges, and the conduit size and numbers in the barrier.

The openings through in-span hinges with prestressing anchorages are not covered by the Standard Plans. The hinges are normally highly congested with reinforcement. When utility openings are proposed to pass through hinges, designers should fully evaluate reinforcement placement and perform the necessary structural analyses to ensure the performance and capacity of the hinges are appropriate.

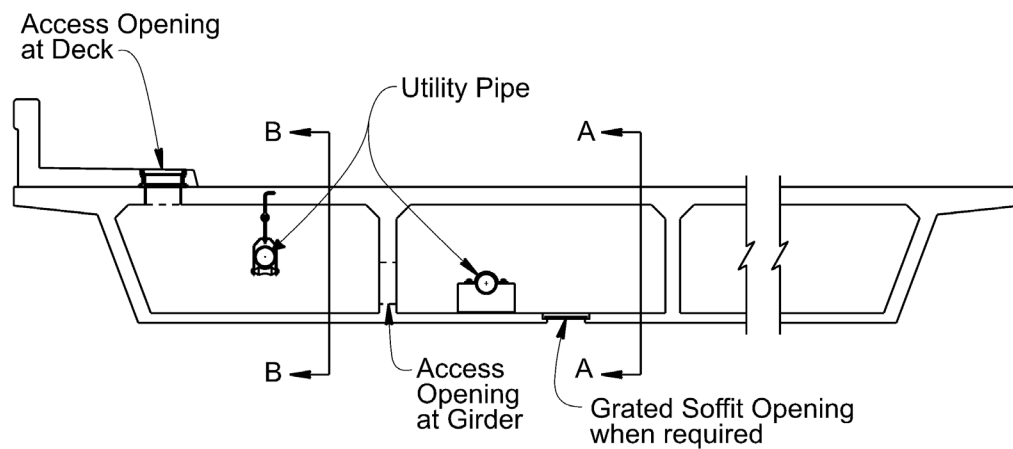
2.4.4 RECOMMENDED LOCATIONS OF ACCESS OPENINGS IN BRIDGES

Access openings should be provided for accessing the box girder bridge cell area to accommodate inspections, utility maintenance, and future utility installations. These openings may be placed in the deck, soffit, or girder stem in accordance with the details in Standard Plans B7-11 and B14-5, as needed.

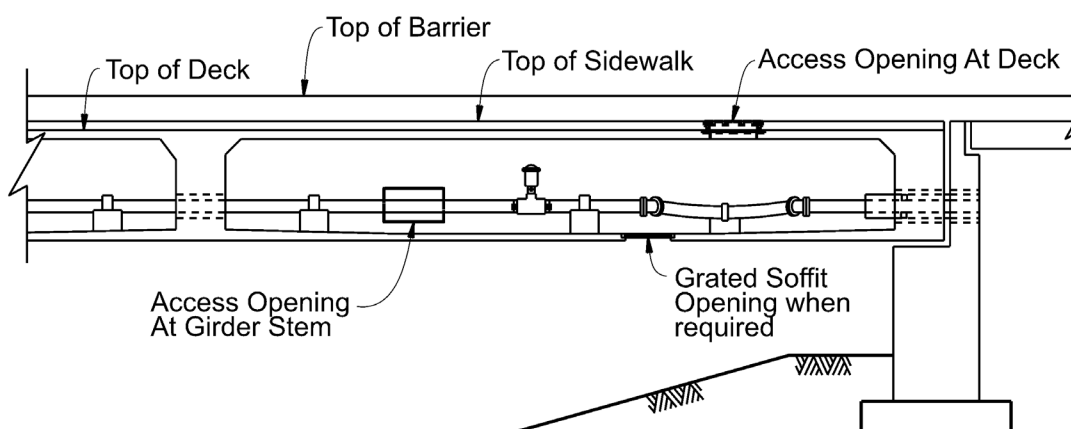
When planned water and sewer lines are present, grated soffit access openings are required per the UMFBAOS. Refer to Section 4.3 of it for additional requirements.

The soffit access openings are recommended to be located in the soffit near the abutment of any box girder cell containing utility lines or future utility openings for easier access.

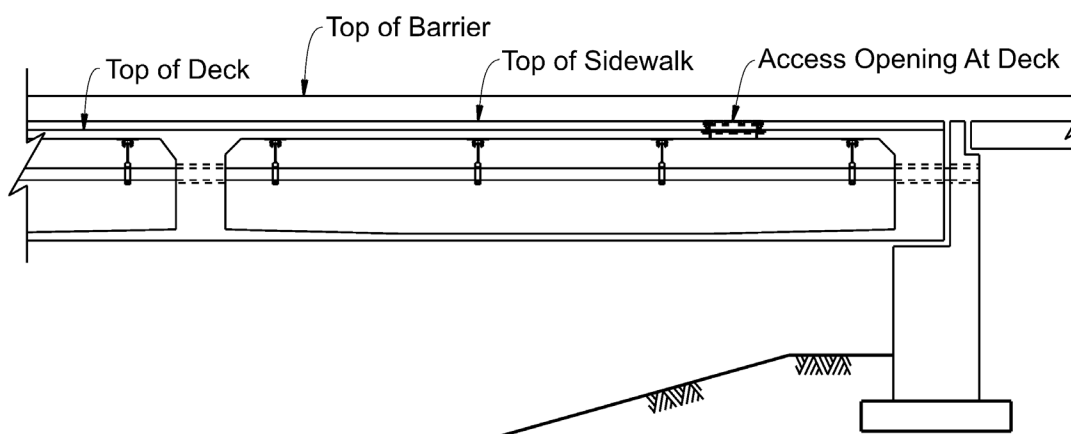
The other access openings may be in the shoulder, sidewalk, or traveled way, when appropriate. Openings may also be placed in girders to provide access to the adjacent bays. The placement of access openings in the girder should be thoroughly evaluated to prevent interference with post-tensioning duct locations, and the girder's capacity at the opening should be checked. Refer to the *Highway Design Manual* for guidance.



Cross-Section View



Section A-A



Section B-B

Figure 2.4.4-1 Preferred Locations for Access Opening

2.4.5 UTILITY OPENING IN EARTH RETAINING SYSTEMS

The location of utilities associated with ERS may offer greater flexibility than bridges. Utilities may be placed within a concrete barrier that is above or in front of the wall facing, or in a conduit attached to the outside of the facing. Utilities may also be embedded in the backfill soil above, beside, or around the ERS. However, removing the backfill to place a utility after the ERS has been in service can destabilize the ERS. For this reason, provisions for future utility openings are generally not considered in ERS.

Most ERS are designed for a 75-year service life; however, backfill soils used for ERS may degrade embedded utility conduits and pipes within approximately 40 years of installation. Therefore, drains and other conduits that are not encased in concrete or otherwise protected from soil and water degradation should be located where future access for inspection, replacement, or repair is feasible over the life of the structure.

The following utility locations should be avoided to the extent practicable:

- Utilities are displacing most of the soil backfill supporting the ERS
- Utilities located immediately adjacent to bridge or ERS foundations, including piles, pile caps, and spread footings
- Utilities located where they run in between or interfere with reinforced soil components, such as soil nails, ground anchors, and Mechanically Stabilized Earth soil reinforcement layers
- Utilities interfering with the bridge abutment design

2.4.6 REFERENCES

1. Caltrans. (2025). *Highway Design Manual* 7th Edition, California Department of Transportation, Sacramento, CA.
2. Caltrans. (2025). *Standard Plans*, California Department of Transportation, Sacramento, CA.
3. Caltrans. (2025). [*Utility Manual for Bridges and Other Structures*](#), California Department of Transportation, Sacramento, CA.