













## 1. Advance Planning Study

Early in the advance planning stage (Phase “K” or “0”), the Structure Designer may request an SPGR to develop a planning study. The request is made via a transmittal memo and should include the following information:

- Attachment 1
- Location Map and aerial photos
- Any As-Builts available
- Scope of proposed work
- Description of any site constraints
- Proposed ERS types and locations
- Foundation type and location being considered
- ERS layout
- Cross-sections and elevation view
- Any Hydraulic information or Preliminary Hydraulic Report

The SPGR provided by the Geotechnical Designer should include the following information:

- Feasible ERS types
- Advantages and disadvantages
- Recommended ERS
- Any existing corrosion data
- Any known site conditions

## 2. Preliminary Foundation Report (PFR)

Early in the design stage (Phase “1”) and after bridge site submittal, the Structure Designer will request a PFR to develop a draft structure General Plan. The request is made via a transmittal memo and should include the following information:

- Applicable table(s) from Attachment 2
- Scope of proposed work
- Project Schedule
- PFR due date
- Proposed ERS types and locations
- Location map
- Preliminary layout of ERS (include APS when available)
- Cross-sections and elevation view
- Foundation type and location being considered
- Any hydraulic information or Preliminary Hydraulic Report
- Any Scour data



The PFR provided by Geotechnical Designer should include the following:

- Subsurface conditions including groundwater
- Geologic hazards (e.g. Fault, Fault Style, Magnitude, Distance, and PGA)
- Feasible ERS type(s)
- Recommended ERS type
- Feasible foundation type(s)
- Recommended foundation type
- Constructability
- Corrosion and/or hazardous waste evaluation
- Drainage considerations

### 3. Draft Structure General Plan

The Structure Designer may prepare a Type Selection Report and schedule Type Selection Meeting (not all projects will have more than one feasible ERS type in which case a Type Selection Meeting may not be required if all functional units confirm the ERS type). When scheduling a Type Selection Meeting, the Structure Designer will invite:

- Geotechnical Designer
- District Project Manager
- District Project Engineer
- Structure Construction
- Other functional units involved in the project

It is recommended that the Structure Designer contact the Geotechnical Designer prior to the Type Selection Meeting to discuss the information in the PFR and the Type Selection Report.

### 4. Foundation Report (FR)

After type selection, the Structure Designer will request an FR to develop plans, specifications and estimate (PS&E). The request is made via a transmittal memo and should include the following information:

- Applicable table(s) from Attachment 3
- Scope of proposed work
- FR due date
- Site plans
- Draft general plan
- ERS type(s) being considered
- Preliminary design loads
- Structure plan showing wall location and elevations



- Cross sections and elevation view
- Any utility or roadway drainage facility locations impacting the ERS
- Hydraulic Report

The Geotechnical Designer is to provide a draft FR for review and comment. The Structure Designer will review the draft FR and will provide comments, if any, including verification or submittal of final design loads to the Geotechnical Designer. Depending on the scope of structure work or complexity of the ERS, more than one draft FR may be necessary prior to a signed FR. The signed FR provided by the Geotechnical Designer should include the following:

- Foundation recommendations
- Shallow foundation and/or pile data tables as shown in Attachment 4

The Geotechnical Designer must send a Log of Test Borings (LOTB) to the Structure Designer, immediately following the signed FR.

## 5. Project Review

The Structure Designer will schedule a Constructability Review (CR), and request the Geotechnical Designer to participate in the CR and to review draft SPS&E for conformance with the FR.

Structure Designer will provide the following:

- Draft SPS&E package for review and comments
- Due date for review comments

The Geotechnical Designer will:

- Attend Constructability Review Meeting
- Review and send comments on Draft SPS&E package

The Structure Designer must request a Foundation Review when the Structure P&Q has been completed and the Draft Structure Specifications are available for review. In addition, the Structure Specification Engineer shall be contacted by the Structure Designer for participation and input in the Foundation Review. At the conclusion of the Foundation Review, the Geotechnical Designer provides a signed Foundation Review Form to the Structure Designer, which they will sign, make a copy for their records and return one signed copy to the Geotechnical Designer.





## 6. Advertised Contract

The Structure Specification Engineer requests support from both the Structure Designer and the Geotechnical Designer during the contract development process. The Structure Designer and Geotechnical Designer may also help address bidder inquiries pertaining to ERS.

## 7. Construction Engineering Work

Construction staff may request technical support from the Structure Designer and Geotechnical Designer during construction. When requested, the Structure Designer and Geotechnical Designer will provide:

- Technical Support with contract documents and design requirements
- CCO concurrence and other design changes as needed
- Shop drawing review and approval
- Value Engineering Change Proposal (VECP) Review

## 8. Project Completion

The Structure Designer will develop As-Built Plans (with Shop Plans of proprietary systems) for BIRIS.

## Attachments

Foundation data tables of various types are included as attachments to this memo. They are not exhaustive, nor are they complete by themselves, since they cannot contain all information needed for the design of any particular type of ERS. These tables are included to assist in the minimum needed information to exchange during communications at the various stages of design.

1. Attachment 1 contains the Summary of Proposed Earth Retaining Systems. This table contains the minimum information to be sent to the Geotechnical Designer for each proposed ERS on the project, along with the request for the SPGR.



2. Attachment 2 contains the Preliminary Foundation Data Tables. These tables contain the minimum information for each proposed ERS on the project to be sent to the Geotechnical Designer, along with the request for the PFR. Choose the table or tables that apply to the project.
  - Preliminary Foundation Data Table For Special Design ERS
  - Preliminary Foundation Data Table For A Modified Standard Plan On Spread Footing
  - Preliminary Foundation Data Table For A Modified Standard Plan On Piles
3. Attachment 3 contains the Geotechnical Design Data Tables. These tables contain the minimum information to be sent to the Geotechnical Designer, along with the request for the FR. Choose the table or tables that apply to the projects.
  - Geotechnical Design Data Table - Parts 1 and 2 (Note this table is in two parts, and both must be sent together)
  - Geotechnical Design Data Table For A Modified Standard Plan On Piles
4. Attachment 4 contains two sets of tables, a pair for shallow foundations and a pair for piles. Each pair consists of Design Recommendations and the corresponding Data Table for the contract documents. The appropriate set or sets must be included in the final FR.
  - The Shallow Foundation Design Recommendations (For special design use only) shows the format for information provided by the Geotechnical Designer to be included in the FR. (Note this table is in two parts, and both must be sent together)
  - The Shallow Foundation Data Table shows the format for information provided by the Geotechnical Designer to be included in the Contract Plans.
  - The Pile Foundation Design Recommendations shows the format to be included in the FR for standard plan walls on standard plan piles. The design tip elevations for lateral loads are determined by the Structure Designer.
  - The Pile Data Table shows the format to be included in the Contract Plans for Standard plan walls on standard plan piles. The design tip elevation for lateral loads are determined by the Structure Designer.



## References

This document was based on the following guidance materials within the Department:

1. *Bridge Design Aids 3-7, Pile Layouts For Standard Plan Retaining Walls* (2014)
2. *Bridge Design Aids 3-8, Mechanically Stabilized Embankment* (2013)
3. *Bridge Standard Detail Sheets (XS Sheets), Section 12 Earth Retaining Systems* (2014)
4. *Bridge Standard Detail Sheets (XS Sheets), Section 13 Mechanically Stabilized Embankment* (2014)
5. *Bridge Standard Detail Sheets (XS Sheets), Section 14 Retaining Walls with Soundwalls* (2014)
6. *California Amendments to the AASHTO LRFD Bridge Design Specifications – 6th Edition* (2014)
7. *Caltrans Corrosion Guidelines, Version 2.0* (2012)
8. *Highway Design Manual* (2014)
9. *Memo-To-Designers 1-5, Distribution of Plans* (1996)
10. *Memo-To-Designers 1-35, Foundation Recommendations and Reports* (2008)
11. *Memo-To-Designers 2-12, Special Design Earth Retaining Systems Numbering* (2012)
12. *Memo-To-Designers 3-1, Deep Foundations* (2014)
13. *Memo-To-Designers 4-1, Spread Footings* (2014)
14. *Memo-To-Designers 5-5, Design Criteria of Standard Earth Retaining Systems* (2014)
15. *Memo-To-Designers 5-12, Earth Retaining Systems Using Ground Anchors* (2012)
16. *Memo-To-Designers 5-14, Review of Shop Drawings for Ground Anchors* (2012)
17. *Memo-To-Designers 5-20, Foundation Report/Geotechnical Design Report Checklist for Earth Retaining Systems* (2004)



18. *Standard Plans 2010, Crib Walls (C Sheets)*
19. *Standard Plans 2010, Retaining Walls (B Sheets)*
20. *Standard Specifications 2010, Section 46 (Ground Anchors and Soil Nails)*
21. *Standard Specifications 2010, Section 47 (Earth Retaining Systems)*
22. *Standard Specifications 2010 - Section 49 (Piling)*
23. *Workplan Standards Guide, Release 11.0 (2014)*

Additional references –

1. *AASHTO LRFD Bridge Design Specifications*, 6th Edition, American Association of State Highway Transportation Officials, Washington DC, 2012.
2. Report Number FHWA-IF-06-017 GEC No. 7, *Soil Nail Walls*, U.S. Department of Transportation, Federal Highway Administration, 2003.
3. Report Number FHWA-NHI-09-087 *Corrosion/Degradation of Soil Reinforcement*, U.S. Department of Transportation, Federal Highway Administration, 2009.
4. Report Number FHWA-NHI-10-024 GEC No 11 *Design of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes*, Volumes I and II, U.S. Department of Transportation, Federal Highway Administration, 2009.

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