TPF-5(372) Bridge IFC Hierarchy Proposal

Discussion with bSI TI Bridge and IFC4.x IF

Proposed Hierarchy Diagrams

Notes:

- Purpose -> Provide spatial and logical organizations that are adaptable to most/all bridge types within the Alignment-based Reference View (AbRV). This enables consistency across software implementations and managing user (AASHTO member and service provider) expectations
- Our feedback, coordinated with the bSI TI Bridge project and the IFC4.x Implementers Forum (IF) will help establish consistency, just like the previous Implementers Agreements (IA) from earlier schema versions
- The concept of “FOUNDATION” is now identified as a functional/spatial concept (IfcBridgePart:FOUNDATION), within the respective PIER or ABUTMENT concepts/instances and their overall description/composition.
- Detailed complexity of components/sub-components will depend on construction type (e.g. precast concrete vs. steel built-up section girders).

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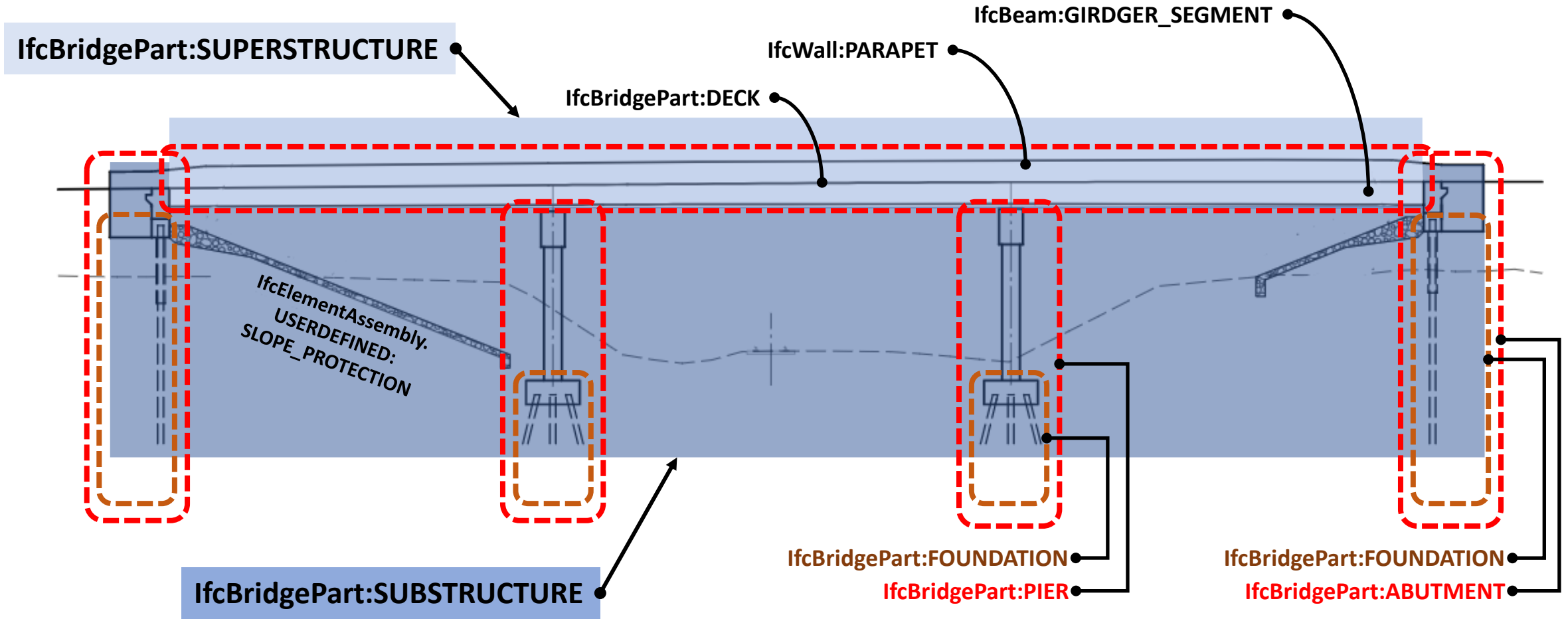
Proposed General Spatial Hierarchy Diagram



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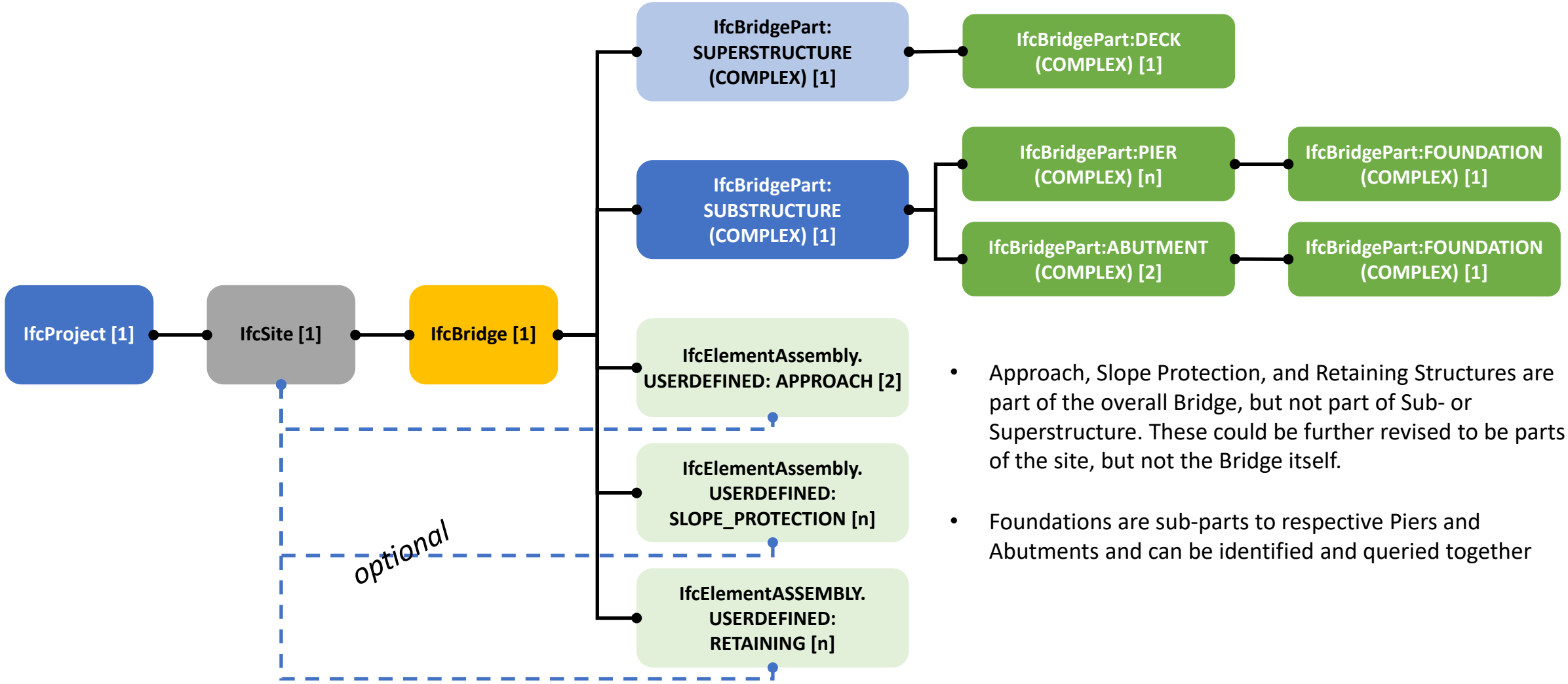
Proposed Primary Spatial Hierarchy



- Approach, Slope Protection, and Retaining Structures are part of the overall Bridge, but not part of Sub- or Superstructure. These could be further revised to be parts of the site, but not the Bridge itself.
- Foundations are sub-parts to respective Piers and Abutments and can be identified and queried together

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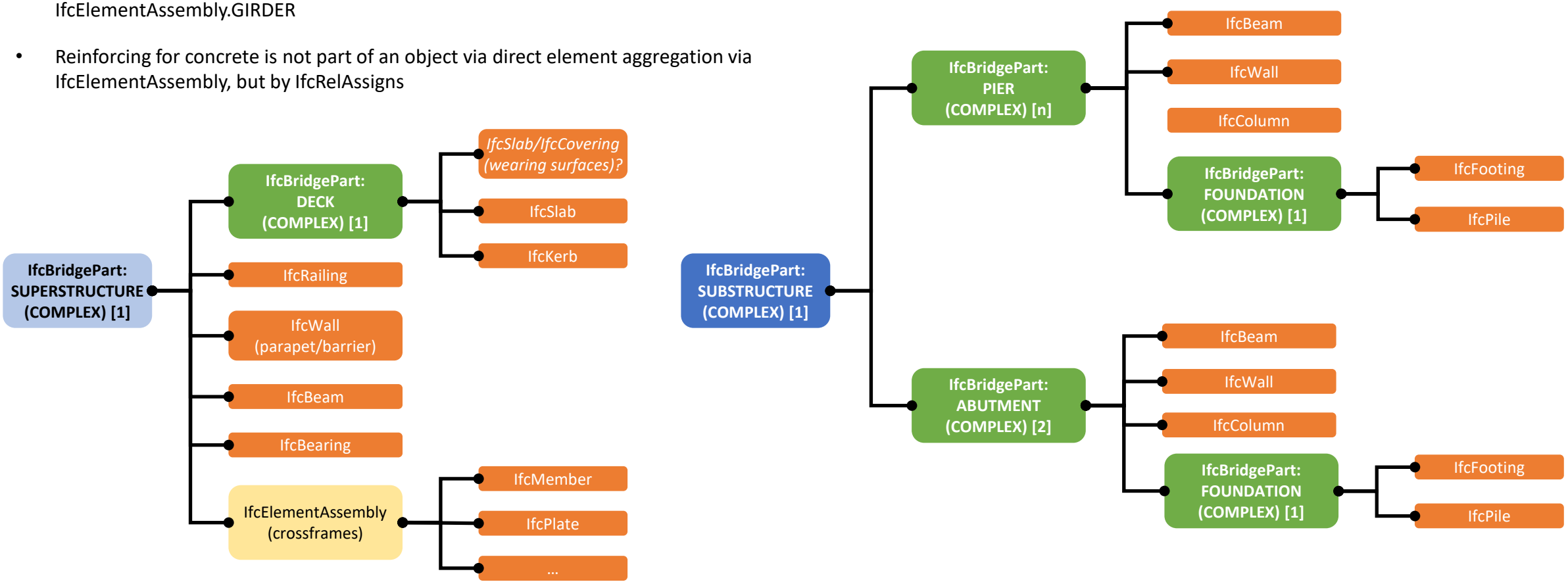
Proposed Logical Hierarchies/Relationships with the Primary Spatial Organization

- Depending on construction type (Concrete vs. steel, built-up vs. cold-rolled members) the concept of "girder" or "beam" may be as simple as IfcBeam.GIRDER_SEGMENT or an aggregation of parts as IfcElementAssembly.GIRDER
- Reinforcing for concrete is not part of an object via direct element aggregation via IfcElementAssembly, but by IfcRelAssigns



TPF-5(372) Bridge IFC Hierarchy Proposal

Aggregated elements/systems (1/2):

Pier

- Wall
  - Reinforcing
  - Keyways
- Pier Cap
  - Reinforcing
  - Keyways
- Column
  - Reinforcing
  - Keyways
- Pile
  - Reinforcing
  - Casing
- Pile Cap / Footing
  - Reinforcing
  - Keyways

Abutment

- Wall
  - Reinforcing
  - Keyways
- Pile Cap / Footing
  - Reinforcing
  - Keyways
- Pile
  - Reinforcing
  - Casing

Approach Slab

- Slab
  - Reinforcing
- Sleeper Slab / Footing
  - Reinforcing
- Shear connection to Abutment

Deck

- Wearing surface (optional)
- Slab(s)
  - Reinforcing
- Kerb
  - Reinforcing
- Barriers
  - Reinforcing
- Railings
- Conduits / Piping
  - Junction boxes
- Expansion Joints
- Girders
  - A mess of stuff depending on material and construction type
- Crossframes/Diaphragms/Bracing
  - Multiple items
- Bearings
- Drainage
  - Drain
  - Pipes
- Supports for signage and lighting

TPF-5(372) Bridge IFC Hierarchy Proposal

Aggregated elements/systems (2/2):

Slope Protection

- Slab
  - Reinforcing
- Drainage

Retaining Structures

- Wall
  - Reinforcing
- Connections
- Pile / Soil Nails