Technical Memorandum

Date:	August 23, 2021
Project:	Chehalis River Basin Flood Damage Reduction Project
To:	Chehalis Basin Flood Control Zone District
From:	HDR – Justin Williams, Jeffrey Allen
Subject:	Temporary Construction Facilities

1.0 Introduction

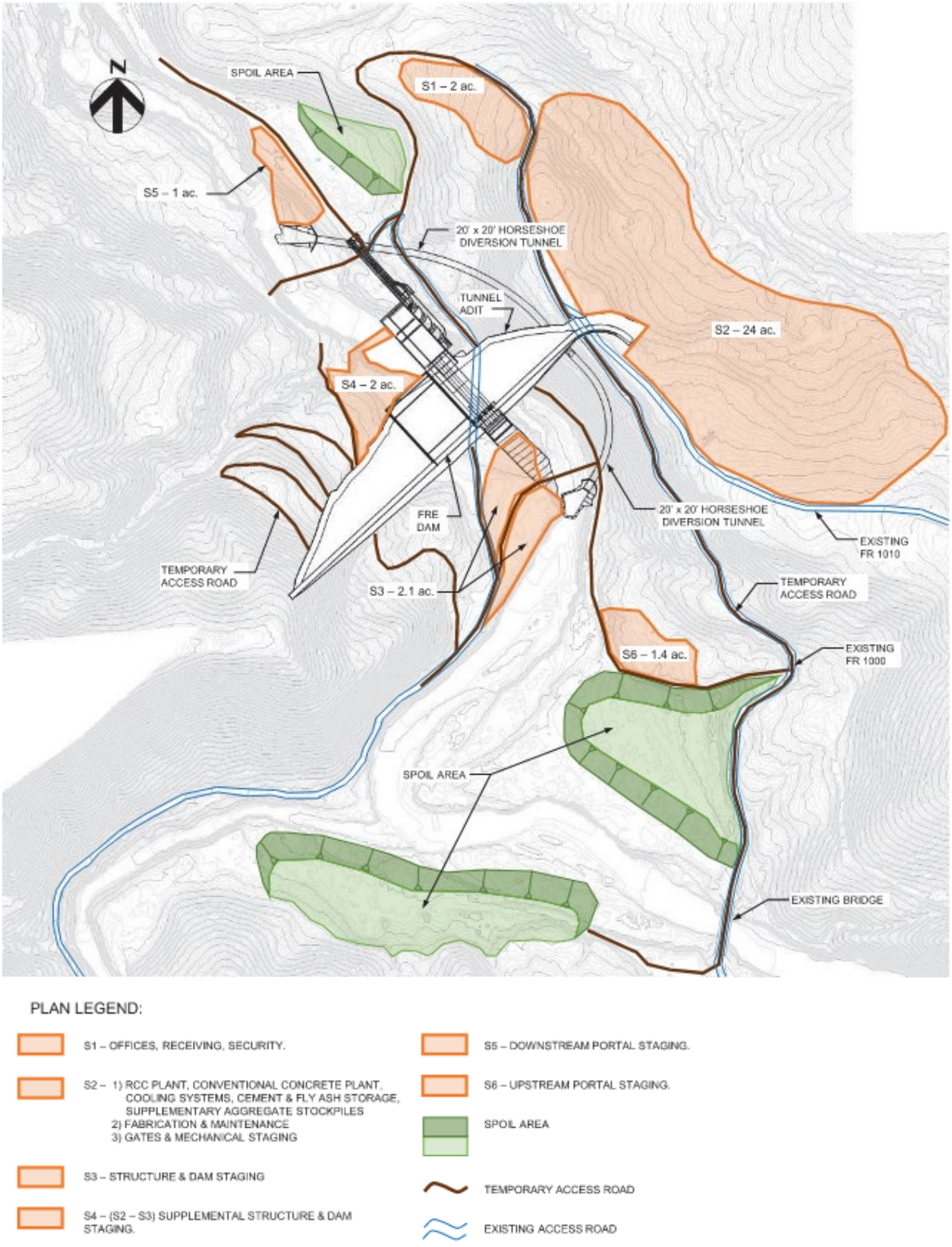
The Draft Environmental Impact Statements (EISs) prepared by the Washington State Department of Ecology (Ecology; pursuant to the State Environmental Policy Act) and the U.S. Army Corps of Engineers (USACE; pursuant to the National Environmental Policy Act) evaluate anticipated impacts associated with construction and operation of a proposed Flood Retention Only - Expandable (FRE) facility (i.e., the Chehalis River Basin Flood Damage Reduction Project [proposed project]) in the Chehalis Basin, Washington State. The Chehalis Basin Flood Control Zone District (District) is the project proponent. To inform development of the Final EISs, Ecology and USACE have requested additional information regarding the assumptions for temporary construction facilities associated with the FRE facility site. This technical memo provides further clarification on the conceptual layout of temporary construction facilities.

2.0 Conceptual Layout of Temporary Construction Facilities

HDR has developed a preliminary project site plan drawing plate that provides an example of potential contractor staging, laydown, and spoil areas. The contractor's means and methods will determine the detailed layout for each of the proposed use areas.

Staging and construction laydown areas will be prepared with appropriate site grading, surfacing, and drainage provisions that allow construction equipment and materials to be stored, secured, and utilized. These areas will be located near the construction site and include construction offices, areas for material processing and storage, and parking for construction vehicles. Figure 1 shows a preliminary layout of staging and spoil areas. Refer to the *Access Road Technical Memorandum* for more detail on access road impacts.

Figure 1. Chehalis Preliminary Layout of Staging and Spoil Areas



HDR will advance the design of staging areas identified on Figure 1 to consider a balanced cut and fill operation on a rough order of magnitude. The design will include quantities for earthwork, ground surface aggregate stabilization, clearing, and curbing and restoration. Section 2.1 below discusses further efforts for environmental control during construction. A preliminary estimate of vehicle use associated with the temporary construction facilities will be developed.

2.1 Temporary Erosion and Sediment Control

Temporary Erosion and Sediment Control (TESC) measures will be implemented to help minimize stormwater impacts such as storm flow runoff, soil erosion, waterborne sediment from exposed soils, and degradation of water quality from on-site pollutant sources. TESC best management practices (BMP) will be implemented in accordance with Ecology's Construction Stormwater General Permit and *Stormwater Management Manual for Western Washington*. Supplemental BMP specifications will be obtained from the current version of Washington State Department of Transportation's Standard Specifications for Road, Bridge, and Municipal Construction and Lewis County standards. BMPs may include items such as:

- Silt fence
- Vegetated strips
- Brush barriers
- Erosion control at culvert ends such as compost berms, sand bags, silt fence, and geotextile
- Compost socks
- Straw bales
- Check dams
- Catch basin and inlet protection
- Wheel wash stations
- Water quality and quantity BMPs, including
    - Baker tanks
    - Sediment traps
    - Flow control structures
    - Oil-water separators
    - Interceptor dikes and swales
    - Ditches
    - Level spreaders
- Temporary stockpile slope stabilization and coverings such as mulch, nets and blankets, plastic coverings, temporary seeding and sodding, and compost blankets

The contractor will hold the permit for erosion and sediment control and be responsible for developing the plan, location, and maintenance for all required BMPs. A TESC plan will be developed during final design.

2.2 Fuel Storage and Containment Areas

Fuel storage area design and locations will be based on contractor's means and methods. Primary and secondary containment will be required, and all fuel storage areas will be located where they cannot be affected by a flood event. A mobile fueling truck and large stationary fuel cell likely will be utilized.

2.3 Process Aggregate for Roller-Compacted Concrete

Quarry development, followed by quarry operations and aggregate production, will begin early and proceed through much of the construction period. A separate memo has been developed to address quarry operations.

2.4 Roller-Compacted Concrete Test Fill

A roller-compacted concrete (RCC) test fill will be completed several days to a few weeks in advance of production RCC placement to confirm mix design properties and demonstrate plant operation and placement preparedness.

2.5 iRoller-Compacted Concrete Cofferdam Construction

While final design will address diversion requirements and responsibilities, conceptually, upstream and downstream RCC cofferdams may be utilized to isolate the dam foundation area from the active river while allowing overtopping protection for lower-frequency flood flows. The cofferdams may be utilized in part for test fill operations.

2.6 Roller-Compacted Concrete Dam Construction

RCC for the main dam will be placed on the prepared, competent rock foundation and constructed in horizontal lifts. Figure 1 details a 24-acre staging area for the on-site RCC batching plant. Once hauled or conveyed to the final lift placement location, the RCC is spread by bulldozer and compacted by smooth drum vibratory rollers. Each lift surface requires proper bonding with successive RCC lifts. Lifts that are not covered quickly enough by fresh RCC require a combination of cleaning and bedding concrete placement, depending on age.

Concurrent with the RCC placement, upstream and downstream dam faces, abutment preparation, dam contraction joints, drainage gallery construction, and other related tasks contribute to a dynamic and multi-disciplined construction operation. The preliminary design considers cast-in-place concrete for the upstream and downstream dam faces.

2.7 Water Use during Construction

Construction water will be required for dust control, aggregate processing, concrete production, embankment fill, offices, warehouses, shops, tunneling operations, and various unlisted uses. Dam projects require a considerable amount of water with usage varying due to concrete specifications, aggregate in-situ properties, aggregate processing specifications, embankment compaction requirements, seasonal climate, number of on-site workers/staff, and various other project requirements. Based on other project experiences, an approximate range of 700,000 to 2,000,000 gallons per day can be assumed. Actual water demand requirements cannot be

determined at this time due to limited design detail, but can be assumed to be 2,000,000 gallons per day at this time. A water demand evaluation will be performed during final design to refine the estimate.

2.8 Water Rights for Construction

A feasibility study will be performed to identify water rights requirements for construction following Ecology guidelines. Water may be pulled directly from the Chehalis River, or a well(s) may be drilled to obtain water. Public water supply lines within the area for project construction use are assumed to be unavailable.

2.9 Aggregate and Concrete Material Processing Equipment

The material production location for aggregates, concrete, and RCC is currently assumed to come from either of two quarries: North Quarry site and South Quarry site (refer to Quarry Operations Technical Memo).

Aggregate processing equipment will involve drilling, blasting, off-road hauling, high production and multiple-shift crushing, screening, and potential washing operations. The aggregate processing equipment will likely involve primary, secondary, and tertiary crushing and will be arranged in a system to produce between 400 and 800 tons per hour.

An estimate will be performed to provide project trucking impacts on public roads. This will include material import to the site, which may include concrete aggregate sand, powder cement, powder flyash or other supplemental cementitious materials, mobilization, demobilization, and other permanently installed materials. The estimate will not include any daily work force vehicular use or off-road hauling of materials from the quarry to the on-site staging areas.

RCC and conventional concrete production will likely require two on-site, central mix, concrete batch plants. Near-continuous placement requirements for dam construction contribute to the need for two concrete batch plants to produce RCC and conventional concrete separately. A central mix plant includes components for aggregate, cementious, and water and admixture supply and batching; mixing equipment; and often concrete heating and cooling systems. Truck deliveries from the plant to the dam placement site are impractical and often not allowed. Conveyor delivery from the plant to the dam's active lift surface, followed by conveyor and/or on-lift trucks to the final placement for spreading, is more common and should be assumed.

2.10 Contingency Protocols for Overtopping Cofferdams

Routing the river flow around the work area is a critical component of the project, and sizing the diversion for low frequency (e.g., >10–25 year recurrent flows) is impractical. Consequently, diversion cofferdam and tunnel capacity may be exceeded during construction and will require advance awareness and preparation to provide construction as well as downstream public safety. A river flow notification plan is the first line of defense required to provide the contractor advanced warning of a potential high-flow event. The plan should provide 24 to 36 hours of advanced notification to the contractor of the potential overtopping flow. The contractor would put such monitoring in place upstream and in such an event demobilize all equipment from the work area until the upstream watershed has drained to a point where the river flows run back

through the tunnel. In the event that an overtopping event occurs, the contractor would require time to recover from the event and rehabilitate cofferdams and foundation preparation areas back to a safe and operable condition. The contractor may elect to construct an RCC cofferdam, which would reduce the erodibility potential and may streamline recover efforts.

2.11 Dewatering Needs

Unwatering (i.e., removing water from a surface hole or collection) will be required in the construction area between the upper and lower cofferdams. The intent is to unwater slowly to facilitate safe and timely removal of any fish trapped between the cofferdams. Foundation dewatering (i.e., removing groundwater to manage the groundwater table and groundwater discharges into work area) during excavation, foundation preparation, and subsequent RCC dam and hydraulic structures construction will last several months and generally be engaging clean water from shallow sumps and wells located along the excavation between the cofferdam limits. Water is likely to be pumped upstream for initial discharge into the Chehalis River if clean, or alternatively into settling ponds or tanks for selective treatment as needed. The overall dewatering plan will be up to the contractor's means and methods required to efficiently execute the project. Large mobile pumps will likely be used to preliminarily draw down the water level between the cofferdams. Select temporary wells or a series of temporary wells behind the cofferdams may be required to catch and handle any seepage through the cofferdams or their foundations. If seepage is minimal through the cofferdams, the contractor may elect to use sump pits to handle nuisance water. The downstream portal staging area will likely be utilized for any water quality settling tanks and any additional required treatment. Depending on final design requirements, a detailed dewatering and unwatering plan or plan requirements will be developed to outline water quantity and duration and to identify quality thresholds that may require treatment.

2.12 Potential Mahaffey Creek Diversion

The access road up the westerly abutment of the dam may provide construction access into and utilizing the Mahaffey Creek canyon. If so, a collection basin may be constructed to channel creek flows through a pipe beneath the access and staging, and along the western side of the Chehalis River to downstream of the lower cofferdam. Another option may be to create an open trench to carry Mahaffey Creek flows; however, the pipeline approach may be needed to best create needed abutment access and staging. A diversion analysis will be performed to identify the expected flows on Mahaffey Creek; to determine pipeline sizing, pipeline routing, and whether small training walls or ponding areas are necessary; and to identify construction access requirements required to divert Mahaffey Creek.

2.13 Diversion Tunnel Location

The location of the Chehalis River diversion tunnel was based on a variety of factors. One of the main factors was locating the inlet portal in a straight alignment to the existing river channel to improve the entry of river flows to the portal. Another notable driving factor was determining the shortest, most cost-effective tunnel length. The eastern abutment also has optimal underground geology to support the tunneling operation, including shallow underground solid rock for tunnel portals, no apparent soft ground, minimal apparent discontinuities/faults within the rock, and

optimal construction access to tunnel portals. A detailed diversion tunnel concept and/or related diversion requirements will be developed with the final design.

3.0 Summary

The purpose of this memo is to clarify certain assumptions about the conceptual layout of construction facilities. These assumptions will inform the agencies' impact analysis of disturbed areas for development of the Final EISs.

As the proposed project advances to subsequent design and permitting phases, further refinements to the layout of construction facilities are expected. Specific details (e.g., locations, quantities) will be determined as part of the selected contractor's means and methods within the specified permit requirements. BMPs will be designed to meet permit requirements. The District commits to avoiding, minimizing, or mitigating all impacts related to the proposed project.