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memorandum

date	March 18, 2020
to	Caitlan Cullen, Under Canvas
cc	Mary Laux, ESA
from	Nate Robinson, PE, ESA
subject	Stormwater Management Requirements for Under Canvas Columbia River Gorge Project

This memorandum summarizes the stormwater management regulations and requirements for the development of the Under Canvas Columbia River Gorge Project (Project) in Klickitat County, Washington. This memorandum also presents high-level design considerations for the design of stormwater management at the Project Area.

Under Canvas proposes the construction of a luxury camping facility on an approximately 120-acre property on tax parcels 04101200002100 and 04110700000200 located north of Husum, Klickitat County, Washington. The Project involves the installation of tent pads, bathroom facilities, on-site activity and communal areas, parking, utility and storage, and paths and trails.

Stormwater management for the Project Area must be designed in accordance with the Washington State Department of Ecology's (Ecology) Stormwater Management Manual for Eastern Washington (SWMMEW) (Ecology 2019). A Stormwater Site Plan prepared in accordance with the SWMMEW will need to be submitted to the Klickitat County Public Works Department for review and approval.

Stormwater Management Manual for Eastern Washington

Environmental Science Associates (ESA) has reviewed the SWMMEW in the context of the Under Canvas conceptual site plan for the Project shared with ESA on February 25, 2020. The site plan for the proposed development is conceptual in nature, and changes to the site layout could affect the requirements for stormwater management.

The amount of impervious area created or replaced by the Project will trigger differing requirements in the SWMMEW. Based on a review of the conceptual site plan, we estimate that the Project will create or replace approximately:

- 230,000 square feet of pollution-generating impervious surface.
- 60,000 square feet of non-pollution-generating impervious surface.

Pollution-generating impervious surfaces include roadways, driveways, and parking areas that receive regular vehicle traffic. Non-pollution-generating impervious surfaces include the cart paths, pedestrian walkways, and roofs. The SWMMEW considers gravel roadways as impervious surfaces.

The SWMMEW defines eight Core Elements required for stormwater management that are applied to an individual project in varying ways depending on the specific conditions and uses of the project area. Based on the review of the conceptual site plan design for the site, the development will need to meet the following Core Elements 1–8 from the SWMMEW:

- Core Element #1: Preparation of a Stormwater Site Plan
- Core Element #2: Construction Stormwater Pollution Prevention
- Core Element #3: Source Control of Pollution
- Core Element #4: Preservation of Natural Drainage Systems
- Core Element #5: Runoff Treatment
- Core Element #6: Flow Control
- Core Element #7: Operation and Maintenance
- Core Element #8: Local Requirements

Core Elements

The following is a brief summary of how each of the Core Elements may apply to this Project:

Core Element #1: Preparation of a Stormwater Site Plan

- The Project will require the preparation of a Stormwater Site Plan that includes site figures, a detailed report, and supporting calculations and that demonstrates consistency with the remaining applicable Core Elements. This Stormwater Site Plan will be submitted to the Klickitat County Public Works Department for review and approval.

Core Element #2: Construction Stormwater Pollution Prevention

- During construction of the Project, the runoff of sediment-laden water must be controlled from the site.
- A Stormwater Pollution Prevention (SWPP) Plan will be required for construction detailing the approaches to control erosion and sediment for the site.
- The Project will disturb greater than 1 acre of land and will therefore require a Construction Stormwater General Permit (CSWGP) from Ecology.

Core Element #3: Source Control of Pollution

- The Project design should implement best management practices (BMPs) to separate pollutant sources from stormwater runoff.

Core Element #4: Preservation of Natural Drainage Systems

- The Project design should preserve the natural drainage patterns on site to the maximum extent practicable. Site stormwater management should prioritize natural dispersion and infiltration.

Core Element #5: Runoff Treatment

- Stormwater runoff is required to be treated for water quality using BMPs. Sites that use Full Dispersion or drywells for stormwater management are not required to meet additional runoff treatment requirements. Additional discussion of runoff treatment is included in the sections on *Full Dispersion* and *Design Considerations* below.

Core Element #6: Flow Control

- The Project is required to control the flow of stormwater leaving the site up to the 25-year storm event. Design of the stormwater management system must meet the flow control requirements, which vary depending on the type of facility used for management. Dispersion and infiltration through drywells do not require additional flow control measures. Additional discussion of flow control is included in the sections on *Full Dispersion* and *Design Considerations* below.

Core Element #7: Operation and Maintenance

- An operation and maintenance manual will be developed for the maintenance of stormwater management facilities proposed for the Project.

Core Element #8: Local Requirements

- Stormwater management will meet any additional local requirements. Klickitat County has not identified requirements for stormwater management in addition to the requirements of the SWMMEW.

Full Dispersion

Full Dispersion is the dispersion of stormwater runoff through a designated area of native vegetation and can be used to meet runoff treatment and flow control requirements (Core Elements 5 and 6). Given the large area of native vegetation available on site, this will be a simple and cost-effective method of stormwater management, and the use of Full Dispersion should be maximized as is practical for the Project. Full Dispersion is described in the SWMMEW as follows:

> *This BMP allows for "fully dispersing" runoff from impervious surfaces and cleared areas of commercial and residential development sites that protect a portion of the site (or for large sites, a portion of an area within a subbasin drainage on the site) in a natural, native vegetation cover condition. Natural vegetation is preserved and maintained in accordance with guidelines. Runoff from roofs, driveways, and roads within the development is dispersed within the site by using the areas of preserved vegetation.*

Full Dispersion of stormwater through native vegetation within the Project Area is allowed for sites that are not high-use sites and meet the native vegetation area requirements for Full Dispersion. A high-use site is defined in the SWMMEW as the following:

> *Any road with average daily traffic (ADT) > 30,000 vehicles; and parking areas with either more than 100 trip ends per 1,000 square feet of gross building area or > 300 total trip ends are high-use traffic areas. Examples include commercial buildings with a frequent turnover of customers and other visitors.*

The Under Canvas Columbia River Gorge Project Site Trip Generation and Distribution Summary (March 10, 2020) prepared by DKS Associates estimates the maximum daily average trips for the Project to range from 156

for 60 tents to 325 for 120 tents. We understand that the site will most likely have less than 120 tents and will likely not be categorized as a high-use site. If the site is expected to exceed 300 trip ends and is classified as a high-use area, Full Dispersion will not be allowed and a more engineered stormwater treatment system will be required.

Full Dispersion may be used to manage stormwater for sites where less than 10% of the site is impervious area. The proposed parcel for development is 120 acres, and the proposed impervious area will be less than the 10% of total site area (12 acres) for which dispersion is allowed.

An easement or other legal agreement may be required by the County for the preservation of natural vegetation within the designated dispersion areas.

Design Considerations

ESA understands the desire for a low-impact approach to stormwater management at the site that is consistent with the natural character and aesthetics of the campground. This approach aligns well with the requirements of the SWMMEW, which prioritizes the preservation of natural drainage patterns, dispersion of stormwater into native vegetation, and infiltration on site. ESA anticipates that stormwater runoff from a large portion of the site can be managed using Full Dispersion, while additional BMPs may be necessary for specific challenging areas. Specific design considerations include the following:

- When designing for dispersion, roadways, paths, and other impervious areas should be designed to sheet flow into adjacent native vegetation to the maximum extent possible. Where it is impractical to avoid concentrating flow, runoff should be collected and conveyed via ditches or pipes to a point where the runoff can be dispersed across native vegetation with the use of a flow spreader.

- Dispersion areas will require a flow path of at least 100 feet through native vegetation.

- Dispersion areas should generally be less than 15–20% slope. Dispersion areas with slopes greater than 20% will require supporting documentation from a geotechnical engineer. The slopes at the site generally range between 10% and 50%. Designation of dispersion areas will need to make careful consideration of slopes on the site.

- Dispersed stormwater cannot be discharged over the septic drainfield. The stormwater design will need to direct runoff away from the designated drainfield location.

- Where dispersion is impractical because of site constraints such as steep slopes, alternative stormwater management facilities such as drywells or infiltration trenches may be used to meet runoff treatment and flow control requirements by infiltrating stormwater. A geotechnical investigation to measure the infiltration rate of the native soils will be necessary to support the design of these facilities.

Required Submittals

The following stormwater-related permit submittals are described above in this memorandum and will be required prior to Project construction:

- Stormwater Site Plan – Submitted to Klickitat County
- Construction SWPP Plan – Submitted to Klickitat County
- Construction Stormwater General Permit (CSWGP) – Submitted to Ecology

References

DKS Associates. 2020. *Under Canvas Columbia River Gorge Project Site Trip Generation and Distribution Summary*. March 10, 2020.

Ecology (Washington State Department of Ecology). 2019. *Stormwater Management Manual for Eastern Washington*. Publication Number 18-10-044. August 2019. Available: https://fortress.wa.gov/ecy/publications/documents/1810044.pdf.