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A FRAMEWORK FOR ACTION ON STORMWATER: Ridge to River Phase 1 Final Report

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4. TECHNICAL REPORT: ENVIRONMENTAL DATA ASSESSMENT

Our Phase 1 workplan states that:

> The Stone team will complete a GIS-based assessment of physical watershed characteristics, including slopes, soil types, proximity to water resources and the sensitivity of the waterbody, current and planned land use, the location of impervious surfaces including roads, and existing stormwater infrastructure. We will work with the Taskforce to determine the relative weight that should be given to each of these characteristics in order to score and rank different areas within the watershed. Ultimately, this assessment will be used to identify areas within the watershed that may disproportionately contribute to stormwater quality or quantity concerns. The results of this assessment will be presented as a map, or series of maps.

This report provides the methods and results of the environmental data assessments we proposed in our memo dated March 3, 2016.

4.1 Key Findings of the Environmental Data Assessment

There is an abundance of environmental data, of widely varying completeness and quality, in existence for the Mad River Valley. The datasets were developed to serve a variety of purposes and, as such, are not always well-suited for the types of evaluation that have the greatest utility in terms of informing the Ridge to River Program's development. Descriptions of the data sources, as well as methodologies for creating derived datasets where applicable, are included in Section 4.7 as an appendix. Maps of the salient findings are also included in this report. Map 1 includes a numbering convention for all sub-watersheds, which is carried through tables and maps in the remainder of the report. The following findings and points of interest are brought forward from the more detailed discussion so that they are highlighted for Task Force and FMR consideration.

- There is no single impervious cover dataset that is available for the entire Mad River watershed that is both reasonably accurate and relatively up to date, especially in terms of capability to distinguish impervious cover on developed lands from impervious cover associated with the transportation network (Section 4.3.1 and Map 9). Because developed land cover as represented in watershed-wide but low-resolution datasets represents a very small fraction of the overall land cover in the watershed (<5%), the lack of a single, high quality and current impervious cover dataset substantially limits the accuracy of environmental data assessments that seek to associate observed conditions and/or risk with impervious cover. Further, an accurate and current impervious cover dataset is foundational to the ability to track changes in impervious cover over time.
- Although there are active efforts to improve mapping and management of recreational trails in the Valley, currently any assessment would under-estimate the potential influence of recreational trails on water quality (Section 4.4.5). Further, given the more limited extent of the public dataset, it is difficult

to ascertain whether the known trails are indeed representative of trail location throughout the watershed.

- At watershed forest cover thresholds below 65%, work in the Pacific Northwest and elsewhere tends to mark an observed transition in downstream channels from minimally to severely degraded stream conditions (Booth et al. 2002). There are three Mad River sub-watersheds, including Rice Brook and unnamed tributary watersheds 9 and 11, which have less than 65% of their areas in forest cover (Section 4.2.1 and Map 3).
- Overall, road density in the Mad River watershed is slightly higher than the densities observed in watersheds with low development intensity (0.6-1.0 km/km^2) in Chittenden County (Section 4.4.1 and Map 12). Sub-watersheds with the highest road densities are generally those with relatively concentrated development (villages or ski areas), but 30 of the Mad River's 41 catchments (or nearly three-quarters of the sub-watersheds) have over one kilometer of road network per square kilometer of watershed area.
- Private driveways represent 236 km / 147 miles of transportation infrastructure in the Mad River watershed—or half again the length the road network (468 km / 291 miles, Table 9; see also Section 4.4.4 and Map 15). The total length of roads and driveways combined is 704 kilometers or 437 miles. Of the total driveway network, 96 km/60 miles have slopes in excess of 15%, representing about two-fifths of driveways on a watershed basis.
- About one fifth of the Mad River's sub-watersheds host the majority of the Valley's agricultural land cover; Folsom, Freeman, and High Bridge Brooks, as well as five un-named tributaries (7, 8, 9, 11, and 13) close to the Valley floor, have greater than 15% of their total land area in agricultural cover (Section 4.5 and Map 16).
- Roughly 21% (1,436 acres) of the Valley's agricultural land cover was identified as having one or more potential erosion indicators (steep slopes, erodible soils, or both) (Section 4.5.2 and Maps 17-18). Of this, 608 acres are located in close proximity to water resources.
- Much of the Mad River watershed's forested cover may be vulnerable to erosion when disturbed, due to the presence of steep slopes and highly erodible soils. A small portion of the forested land cover (3,708 acres or 4.0% of the Mad River's watershed area) is located in close proximity to water resources (Section 4.6 and Maps 20-21).