Cascade Trader

Chehalis, WA

Preliminary Drainage and Erosion Control Report

Fuller Designs Project No. 2088

November 16, 2020

Prepared by:

FULLER DESIGNS

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PRELIMINARY DRAINAGE AND EROSION CONTROL REPORT

Cascade Trader (Hamilton Site Fill)

Chehalis, Washington
November 16, 2020

Project Information

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Reviewing Agency

Jurisdiction: City of Chehalis
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References

2012 Stormwater Management Manual for Western Washington as Amended in December 2014 (The 2014 SWMMWW)

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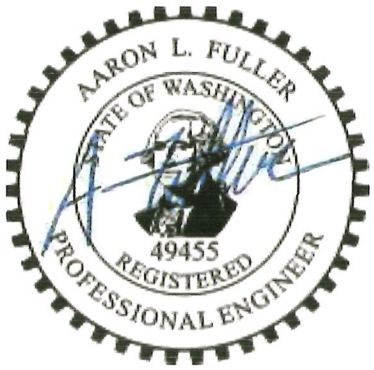
"I hereby certify that this Preliminary Drainage and Erosion Control Report for the Cascade Trader (Hamilton Site Fill) project has been prepared by me or under my supervision and meets minimum standards of the City of Chehalis and normal standards of engineering practice. I hereby acknowledge and agree that the jurisdiction does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities designed by me."



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PRELIMINARY DRAINAGE AND EROSION CONTROL REPORT

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SECTION 1 – PROPOSED PROJECT DESCRIPTION

Site Address:	215 North Hamilton Road
Parcel Number(s):	017896002000, 017896006015, 017896006001
Total Site Area:	6.66 Acres
Zoning:	CG (General Commercial)
Sec, Twn, Rge:	Section 15, Township 13N, Range 02W PT NW4 NW4 LY

Proposed Improvements
The site is located on North Hamilton Road 3200 feet South-East from the intersection with Hamilton Road and North Hamilton Road. This project will construct a gravel pad which will serve as a equipment storage area .

Stormwater runoff from the proposed impervious areas will sheet flow to the south west corner of the project where it will be dispersed into native drainage.

The lot will be served by:

City of Chehalis	Water
City of Chehalis	Sewer
Lewis County PUD	Electricity
Centurylink & Comast	Telecommunications
Lemay	Refuse & Recycling

The subject property is completely bordered by general commercial zoning.

SECTION 2 – EXISTING CONDITONS DESCRIPTION

The lot currently fronts North Hamilton Road. The front parcel has a large building with parking. The back two parcels are vacant farmland and existing gravel. The project area is mainly flat area that drains to the south west part of the property.

Vegetation onsite is consistent with pasture area.

Soils in the area include Lacamas Silt Loam and Olequa Silt Loam. The site primarily sits on the. A soil survey indicates this area is hydraulic group C/D, is moderate to poorly drained, and has moderate to poor infiltration potential consistent with Chehalis area farmlands. Also, this site has some gravel coverage.

The project improvements will be built in one phase immediately. The proposed construction schedule would be to start in Winter of 2020 and be complete within days.

SECTION 3 – OFFSITE ANALYSIS REPORTS

The area immediately adjacent to the proposed project properties is:

- West – General Commercial CG
- South – General Commercial CG
- East – General Commercial CG
- North – General Commercial CG

No adjacent properties contribute water to the site. The adjacent roadways to the North and East act as manmade barriers to runoff. These roads channel drainage to their own roadside ditches which do not contribute to the project site. Properties on all other sides are lower than this site and do not contribute runoff.

The proposed project plans to maintain the natural drainage paths by releasing stormwater to the south and east areas as it currently does. This areas have not been flagged as a possible stormwater problem area.

A downstream analysis shows runoff from the site proceeding south and west toward an existing storm pond and oxbow lake from the Newakum River. These ponds are approximately 500' from the project site. Another 500 feet after these ponds runoff will enter the Newakum River. This point in the Newakum River is below the confluence with the Newakum River South Fork and is listed as flow control exempt.

SECTION 4 – APPLICABLE MINIMUM REQUIREMENTS

The minimum requirements for stormwater development and redevelopment sites are listed in Volume 1 chapter 2 of the 2014 Washington State Department of Ecology Stormwater Management Manual for Western Washington (SWMMWW). Not all minimum requirements of this section apply to all projects. Determination of applicable minimum requirements is based on section 2.4 of the WSDOE SWMMWW.

Based on the thresholds given in figures 2.4.1 and 2.4.2 of the SWMMWW, the proposed Cascade Trader project will create more than 5000 square feet of new impervious surface and thus must address all minimum requirements. These requirements as they apply to the project are discussed in more detail below.

Minimum Requirement #1 – Preparation of Drainage Control Plans:

A Stormwater Site Plan has been prepared (see Erosion Control and Drainage Plans).

Minimum Requirement #2 – Construction Stormwater Pollution Prevention Plan

A Construction Stormwater Pollution Prevention Plan (SWPPP) has been prepared. See section 7.

Minimum Requirement #3 – Source Control of Pollution

All known, available, and reasonable source control BMPs shall be applied to the project to limit pollutants from encountering stormwater. Construction specific BMP's will be provided during construction (see Section 7 SWPPP for reference).

Minimum Requirement #4 – Preservation of Natural Drainage Systems and Outfalls

Stormwater leaving the site will be dispersed toward natural drainages in the south west areas where runoff currently goes. The same discharge points will be used in both pre and post development. Improvements onsite do not propose to impact natural drainages inside their associated buffers.

Minimum Requirement #5 – On-site Stormwater Management

This redevelopment project is outside City limits (inside UGA) and is on a site larger than 5 acres. Therefore, LID performance standards and BMP T5.13 are applicable.

The proposed Best Management Practice's (BMP's) are as follows:

Lawn and Landscape Areas:

- All disturbed areas not being covered with a hard surface and all new lawn and landscape areas will contain soils meeting the Post-Construction Soil Quality and Depth (BMP T5.13) requirements.

Roof Areas:

- No roof areas are being considered in this project.

Other Hard Surface Areas:

- Stormwater runoff from the new gravel areas will be full dispersed in accordance with BMP T5.30.

Minimum Requirement #6 – Runoff Treatment

This project proposes to create more than 5000 square feet of pollution-generating hard surface (PGHS) and is subject to this minimum requirement.

Gravel surfaces will sheet flow to the south west portion of the site. With attentive grading, gravel pad edges will disperse runoff to the surrounding area. Since the gravel pad is properly dispersed the PGHS is reduced to 0 and further treatment devices or calculations are not required.

Minimum Requirement #7 – Flow Control

As said in MR#6 this project will disperse runoff to the surrounding area effectively reducing the PGHS to 0. Also this project is hydraulically linked to a flow control exempt water body (Newakum River). Further flow control devices or calculations are not required.

Minimum Requirement #8 – Wetlands Protection

The thresholds identified in Minimum Requirement #6 – Runoff Treatment, and Minimum Requirement #7 – Flow Control are used to determine the applicability

of this requirement to discharges to wetlands. Since Minimum Requirements #6 and #7 are properly mitigated, Minimum Requirement #8 is considered satisfied.

Minimum Requirement #9 – Operation and Maintenance

Maintenance of storm drainage facilities (bioswales, catch basins, ponds, etc..) will be the responsibility of the landowner whose property the individual structure is located on. A standard O&M manual is included in section 8

SECTION 5 – PERMANENT STORMWATER CONTROL PLAN

This project will utilize LID performance standards and Post-Construction Soil Quality and Depth in accordance with BMP T5.13 from Chapter 5 of the SWMMWW. Please refer to the project civil plans for permanent stormwater control plans.

SECTION 6 – CONSTRUCTION SWPPP

This project is required to prepare a construction Storm Water Pollution Prevention Plan in accordance with Minimum Requirement #2 and must be prepared in accordance with Volume II chapter 3 of the SWMMWW.

This drainage and erosion control report is intended to supplement the construction SWPPP by utilizing other sections in this report to cover required narrative elements. Also, the construction and erosion control plans supplied for the project are to act as the required drawing component of the construction SWPPP.

Intended BMPs which should be used during construction include but are not limited to:

- BMP C105: Stabilized Construction Entrance / Exit
- BMP C120: Temporary and Permanent Seeding
- BMP C123: Plastic Covering
- BMP C125: Topsoiling / Composting
- BMP C140: Dust Control
- BMP C153: Material Delivery, Storage and Containment
- BMP C160: Certified Erosion and Sediment Control Lead
- BMP C162: Scheduling
- BMP C233: Silt Fence

CONSTRUCTION STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

FOR

Cascade Trader

215 North Hamilton Road

Chehalis, WA 98532

Prepared by:

1101 Kresky Ave.
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General Requirements

Clearing and grading activities for this project shall be permitted only to the approved site development plan. These clearing and grading areas were established to preserve sensitive areas, buffers, native growth protection easements, and tree retention areas. These areas are delineated on the site plans and shall be marked on the development site.

The SWPPP shall be implemented beginning with initial land disturbance and until final stabilization. Sediment and Erosion control BMPs shall be consistent with the BMPs contained in chapters 3 and 4 of Volume II of the SWMMWW.

Seasonal Work Limitations - From October 15 through April 1, clearing, grading, and other soil disturbing activities shall only be permitted if shown to the satisfaction of the local permitting authority that silt-laden runoff will be prevented from leaving the site through a combination of the following:

1. Site conditions including existing vegetative coverage, slope, soil type and proximity to receiving waters.
2. Limitations on activities and the extent of disturbed areas.
3. Proposed erosion and sediment control measures.

Project Requirements - Construction SWPPP Elements

In most cases, all the following elements shall apply and be implemented throughout construction. Self-contained sites (discharges only to groundwater) must comply with all elements except for Element 3: Control Flow Rates.

Element 1: Preserve Vegetation/Mark Clearing Limits

- Before beginning land disturbing activities, including clearing and grading, clearly mark all clearing limits, sensitive areas and their buffers, and trees that are to be preserved within the construction area.
- Retain the duff layer, native topsoil, and natural vegetation in an undisturbed state to the maximum degree practicable.

Element 2: Establish Construction Access

- Limit construction vehicle access and exit to one route, if possible.
- Stabilize access points with a pad of quarry spalls, crushed rock, or other equivalent BMPs, to minimize tracking of sediment onto public roads.
- Locate wheel wash or tire baths on site, if the stabilized construction entrance is not effective in preventing tracking sediment onto roads.
- If sediment is tracked off site, clean the affected roadway thoroughly at the end of each day, or more frequently as necessary (for example, during wet weather). Remove sediment from roads by shoveling, sweeping, or pick up and transport the sediment to a controlled sediment disposal area.
- Conduct street washing only after sediment is removed in accordance with the above bullet.

- Control street wash wastewater by pumping back on-site, or otherwise prevent it from discharging into systems tributary to waters of the State.

Element 3: Control Flow Rates

- Protect properties and waterways downstream of development sites from erosion and the associated discharge of turbid waters due to increases in the velocity and peak volumetric flow rate of stormwater runoff from the project site.
- Where necessary to comply with the bullet above, construct stormwater retention or detention facilities as one of the first steps in grading. Assure that detention facilities function properly before constructing site improvements (e.g. impervious surfaces).
- If permanent infiltration ponds are used for flow control during construction, protect these facilities from siltation during the construction phase.

Element 4: Install Sediment Controls

- Design, install, and maintain effective erosion controls and sediment controls to minimize the discharge of pollutants.
- Construct sediment control BMPs (sediment ponds, traps, filters, etc.) as one of the first steps in grading. These BMPs shall be functional before other land disturbing activities take place.
- Minimize sediment discharges from the site. The design, installation and maintenance of erosion and sediment controls must address factors such as the amount, frequency, intensity and duration of precipitation, the nature of resulting stormwater runoff, and soil characteristics, including the range of soil particle sizes expected to be present on the site.
- Direct stormwater runoff from disturbed areas through a sediment pond or other appropriate sediment removal BMP, before the runoff leaves a construction site or before discharge to an infiltration facility. Runoff from fully stabilized areas may be discharged without a sediment removal BMP but must meet the flow control performance standard in Element #3, bullet #1.
- Locate BMPs intended to trap sediment on-site in a manner to avoid interference with the movement of juvenile salmonids attempting to enter off-channel areas or drainages.
- Where feasible, design outlet structures that withdraw impounded stormwater from the surface to avoid discharging sediment that is still suspended lower in the water column.

Element 5: Stabilize Soils

- Stabilize exposed and unworked soils by application of effective BMPs that prevent erosion. Applicable BMPs include but are not limited to: temporary and permanent seeding, sodding, mulching, plastic covering, erosion control fabrics and matting, soil application of polyacrylamide (PAM), the early application of gravel base early on areas to be paved, and dust control.
- Control stormwater volume and velocity within the site to minimize soil erosion.
- Control stormwater discharges, including both peak flow rates and total stormwater volume, to minimize erosion at outlets and to minimize downstream channel and stream bank erosion.
- Soils must not remain exposed and unworked for more than the time periods set forth below to prevent erosion:
    - During the dry season (April 2 – October 14): 7 days

    - During the wet season (October 15 - April 1): 2 days
    - Note that projects performing work under a NPDES Construction Stormwater General Permit issued by Ecology will have more restrictive time periods.
- Stabilize soils at the end of the shift before a holiday or weekend if needed based on the weather forecast.
- Stabilize soil stockpiles from erosion, protected with sediment trapping measures, and where possible, be located away from storm drain inlets, waterways and drainage channels.
- Minimize the amount of soil exposed during construction activity.
- Minimize the disturbance of steep slopes.
- Minimize soil compaction and, unless infeasible, preserve topsoil.

Element 6: Protect Slopes

- Design and construct cut-and-fill slopes in a manner to minimize erosion. Applicable practices include, but are not limited to, reducing continuous length of slope with terracing and diversions, reducing slope steepness, and roughening slope surfaces (for example, track walking).
- Divert off-site stormwater (run-on) or ground water away from slopes and disturbed areas with interceptor dikes, pipes and/or swales. Off-site stormwater should be managed separately from stormwater generated on the site.
- At the top of slopes, collect drainage in pipe slope drains or protected channels to prevent erosion.
- Place excavated material on the uphill side of trenches, consistent with safety and space considerations.
- Place check dams at regular intervals within constructed channels that are cut down a slope.

Element 7: Protect Drain Inlets

- Protect all storm drain inlets made operable during construction so that stormwater runoff shall not enter the conveyance system without first being filtered or treated to remove sediment.
- Clean or remove and replace inlet protection devices when sediment has filled one-third of the available storage (unless a different standard is specified by the product manufacturer).

Element 8: Stabilize Channels and Outlets

- Design, construct, and stabilize all on-site conveyance channels.
- Provide stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent stream banks, slopes and downstream reaches at the outlets of all conveyance systems.

Element 9: Control Pollutants

- Design, install, implement and maintain effective pollution prevention measures to minimize the discharge of pollutants.

- Handle and dispose of all pollutants, including waste materials and demolition debris that occur on-site in a manner that does not cause contamination of stormwater.
- Provide cover, containment, and protection from vandalism for all chemicals, liquid products, petroleum products, and other materials that have the potential to pose a threat to human health or the environment. On-site fueling tanks must include secondary containment. Secondary containment means placing tanks or containers within an impervious structure capable of containing 110% of the volume contained in the largest take within the containment structure. Double-walled tanks do not require additional secondary containment.
- Conduct maintenance, fueling, and repair of heavy equipment and vehicles using spill prevention and control measures. Clean contaminated surfaces immediately following any spill incident.
- Discharge wheel wash or tire bath wastewater to a separate on-site treatment system that prevents discharge to surface water, such as closed-loop recirculation or upland application, or to the sanitary sewer, with local sewer district approval.
- Apply fertilizers and pesticides in a manner and at application rates that will not result in loss of chemical to stormwater runoff. Follow manufacturers' label requirements for application rates and procedures.
- Use BMPs to prevent contamination of stormwater runoff by pH modifying sources. The sources for this contamination include, but are not limited to: bulk cement, cement kiln dust, fly ash, new concrete washing and curing waters, waste streams generated from concrete grinding and sawing, exposed aggregate processes, dewatering concrete vaults, concrete pumping and mixer washout waters.
- Adjust the pH of stormwater if necessary to prevent violations of water quality standards.
- Assure that washout of concrete trucks is performed off-site or in designated concrete washout areas only. Do not wash out concrete trucks onto the ground, or into storm drains, open ditches, streets, or streams. Do not dump excess concrete on-site, except in designated concrete washout areas. Concrete spillage or concrete discharge to surface waters of the State is prohibited.
- Obtain written approval from Ecology before using chemical treatment other than CO2 or dry ice to adjust pH.

Element 10: Control De-Watering

- Discharge foundation, vault, and trench de-watering water, which has similar characteristics to stormwater runoff at the site, into a controlled conveyance system before discharge to a sediment trap or sediment pond.
- Discharge clean, non-turbid de-watering water, such as well-point ground water, to systems tributary to, or directly into surface waters of the State, as specified in Element #8, provided the de-watering flow does not cause erosion or flooding of receiving waters. Do not route clean dewatering water through stormwater sediment ponds. Note that "surface waters of the State" may exist on a construction site as well as off site; for example, a creek running through a site.
- Handle highly turbid or otherwise contaminated dewatering water separately from stormwater.
- Other treatment or disposal options may include:
    1. Infiltration.

2. Transport off-site in a vehicle, such as a vacuum flush truck, for legal disposal in a manner that does not pollute state waters.
3. Ecology-approved on-site chemical treatment or other suitable treatment technologies.
4. Sanitary or combined sewer discharge with local sewer district approval, if there is no other option.
5. Use of a sedimentation bag that discharges to a ditch or swale for small volumes of localized dewatering.

Element 11: Maintain BMPs

- Maintain and repair all temporary and permanent erosion and sediment control BMPs as needed to assure continued performance of their intended function in accordance with BMP specifications.
- Remove all temporary erosion and sediment control BMPs within 30 days after achieving final site stabilization or after the temporary BMPs are no longer needed.

Element 12: Manage the Project

- Phase development projects to the maximum degree practicable and consider seasonal work limitations.
- Inspection and monitoring – Inspect, maintain and repair all BMPs as needed to assure continued performance of their intended function. Projects regulated under the Construction Stormwater General Permit must conduct site inspections and monitoring in accordance with Special Condition S4 of the Construction Stormwater General Permit.
- Maintaining an updated construction SWPPP – Maintain, update, and implement the SWPPP.
- Projects that disturb one or more acres must have site inspections conducted by a Certified Erosion and Sediment Control Lead (CESCL). Project sites disturbing less than one acre may have a CESCL or a person without CESCL certification conduct inspections. By the initiation of construction, the SWPPP must identify the CESCL or inspector, who must be present onsite or on-call at all times.
- The CESCL or inspector (project sites less than one acre) must have the skills to assess the:
    - Site conditions and construction activities that could impact the quality of stormwater.
    - Effectiveness of erosion and sediment control measures used to control the quality of stormwater discharges.
- The CESCL or inspector must examine stormwater visually for the presence of suspended sediment, turbidity, discoloration, and oil sheen. They must evaluate the effectiveness of BMPs and determine if it is necessary to install, maintain, or repair BMPs to improve the quality of stormwater discharges.
- Based on the results of the inspection, construction site operators must correct the problems identified by:
    - Reviewing the SWPPP for compliance with the 13 construction SWPPP elements and making appropriate revisions within seven (7) calendar days of the inspection.
- Immediately beginning the process of fully implementing and maintaining appropriate source control and/or treatment BMPs as soon as possible, addressing the problems not

later than within 10 days of the inspection. If installation of necessary treatment BMPs is not feasible within 10 days, the construction site operator may request an extension within the initial 10day response period.

- Documenting BMP implementation and maintenance in the site log book (sites larger than 1 acre).
- The CESCL or inspector must inspect all areas disturbed by construction activities, all BMPs, and all stormwater discharge points at least once every calendar week and within 24 hours of any discharge from the site. (For purposes of this condition, individual discharge events that last more than one day do not require daily inspections. For example, if a stormwater pond discharges continuously over the course of a week, only one inspection is required that week.) The CESCL or inspector may reduce the inspection frequency for temporary stabilized, inactive sites to once every calendar month.

Element 13: Protect Low Impact Development BMPs

- Protect all Bioretention and Rain Garden BMPs from sedimentation through installation and maintenance of erosion and sediment control BMPs on portions of the site that drain into the Bioretention and/or Rain Garden BMPs. Restore the BMPs to their fully functioning condition if they accumulate sediment during construction. Restoring the BMP must include removal of sediment and any sediment-laden Bioretention/rain garden soils, and replacing the removed soils with soils meeting the design specification.
- Prevent compacting Bioretention and rain garden BMPs by excluding construction equipment and foot traffic. Protect completed lawn and landscaped areas from compaction due to construction equipment.
- Control erosion and avoid introducing sediment from surrounding land uses onto permeable pavements. Do not allow muddy construction equipment on the base material or pavement. Do not allow sediment-laden runoff onto permeable pavements or base materials.
- Pavement fouled with sediments or no longer passing an initial infiltration test must be cleaned using procedures in accordance with this manual or the manufacturer's procedures.
- Keep all heavy equipment off existing soils under LID facilities that have been excavated to final grade to retain the infiltration rate of the soils.

SECTION 7 – SPECIAL REPORTS AND STUDIES

A soils report from the NRCS USDA web soil survey website is included on the next pages. The information from this soil report was used to approximate subsurface site conditions and runoff potential.

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Lewis County Area, Washington

November 5, 2020

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:2,930 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 40 80 160 240

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lewis County Area, Washington
Survey Area Data: Version 20, Jun 4, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 30, 2019—May 10, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
48	Chehalis silty clay	0.6	2.9%
118	Lacamas silt loam, 0 to 3 percent slopes	5.4	23.7%
152	Olequa silt loam, 0 to 5 percent slopes	10.2	44.8%
172	Reed silty clay loam	6.5	28.6%
Totals for Area of Interest		**22.7**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or

landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Lewis County Area, Washington

48—Chehalis silty clay

Map Unit Setting

National map unit symbol: 2hgb
Elevation: 30 to 600 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 150 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Chehalis and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chehalis

Setting

Landform: Flood plains, terraces
Parent material: Alluvium

Typical profile

H1 - 0 to 17 inches: silty clay
H2 - 17 to 44 inches: silty clay loam
H3 - 44 to 60 inches: stratified fine sandy loam to silty clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: NoneOccasional
Frequency of ponding: None
Available water capacity: High (about 11.2 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B
Forage suitability group: Soils with Few Limitations (G002XV502WA)
Other vegetative classification: Soils with Few Limitations (G002XV502WA)
Hydric soil rating: No

Minor Components

Alvor

Percent of map unit: 5 percent
Landform: Terraces
Hydric soil rating: Yes

Reed

Percent of map unit: 5 percent

Landform: Flood plains
Hydric soil rating: Yes

118—Lacamas silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2h8l
Elevation: 250 to 1,200 feet
Mean annual precipitation: 40 to 70 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 125 to 200 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Lacamas, drained, and similar soils: 60 percent
Lacamas, undrained, and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lacamas, Drained

Setting

Landform: Terraces, flood plains

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 17 inches: silt loam
H3 - 17 to 27 inches: silty clay
H4 - 27 to 60 inches: clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: About 12 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 6.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Forage suitability group: Seasonally Wet Soils (G002XV202WA)
Other vegetative classification: Seasonally Wet Soils (G002XV202WA)
Hydric soil rating: Yes

Description of Lacamas, Undrained

Setting

Landform: Flood plains, terraces

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 17 inches: silt loam
H3 - 17 to 27 inches: silty clay
H4 - 27 to 60 inches: clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 6.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C/D
Forage suitability group: Seasonally Wet Soils (G002XV202WA)
Other vegetative classification: Seasonally Wet Soils (G002XV202WA)
Hydric soil rating: Yes

Minor Components

Klaber

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Prather

Percent of map unit: 3 percent
Hydric soil rating: No

Scamman

Percent of map unit: 2 percent
Landform: Terraces
Hydric soil rating: Yes

152—Olequa silt loam, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2h9v
Elevation: 40 to 300 feet

Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 to 52 degrees F
Frost-free period: 150 to 220 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Olequa and similar soils: 90 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Olequa

Setting

Landform: Terraces

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 20 inches: silt loam
H3 - 20 to 51 inches: silty clay loam
H4 - 51 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Forage suitability group: Soils with Few Limitations (G002XV502WA)
Other vegetative classification: Soils with Few Limitations (G002XV502WA)
Hydric soil rating: No

Minor Components

Lacamas

Percent of map unit: 3 percent
Landform: Terraces
Hydric soil rating: Yes

172—Reed silty clay loam

Map Unit Setting

National map unit symbol: 2hbk

Elevation: 30 to 500 feet
Mean annual precipitation: 40 to 80 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Reed, drained, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Reed, Drained

Setting

Landform: Flood plains, terraces

Typical profile

H1 - 0 to 6 inches: silty clay loam
H2 - 6 to 14 inches: silty clay loam
H3 - 14 to 60 inches: clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: NoneFrequent
Frequency of ponding: None
Available water capacity: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: D
Forage suitability group: Wet Soils (G002XV102WA)
Other vegetative classification: Wet Soils (G002XV102WA)
Hydric soil rating: Yes

Minor Components

Chehalis

Percent of map unit: 4 percent
Hydric soil rating: No

Alvor

Percent of map unit: 1 percent
Landform: Terraces
Hydric soil rating: Yes

SECTION 8 – OPERATION AND MAINTENANCE MANUAL

The Following pages contain maintenance needs for most of the components that are part of your drainage system, as well as components that you may not have. Let us know if there are any components that are missing from these pages. Ignore the requirements that do not apply to your system. You should plan to complete a checklist for all system components on the following schedule

1. Monthly from November through April
2. Once in late summer (preferably September).
3. After any major storm (use 1" of precipitation in 24 hours) for any items marked "S".

Using photocopies of these pages, check off the items you looked for after each inspection. Add comments on issues found and actions taken. Keep these records in your files. These files will be needed to write your annual report if required. Some items may not need to be looked at every time an inspection is done. Use the suggest frequency at the left of each item as a guideline for your inspection.

You may call the jurisdiction for technical assistance. Please do not hesitate to call, especially if you are unsure whether a situation you have discovered may be a developing issue.

ATTACHMENT 'A': MAINTENANCE PROGRAM

COVER SHEET

Inspection Period: _____

Number of Sheets Attached: _____

Date Inspected: _____

Inspector's Signature: _____

ATTACHMENT "A": MAINTENANCE PROGRAM

Maintenance Checklist for **Conveyance Systems** (Pipes, Ditches and Swales)

Frequency	Drainage System Feature	□□□Req'd	Problem	Conditions To Check For	Conditions That Should Exist
M.S.	Pipes	□	Sediment & debris	Accumulated sediment that exceeds 20% of the diameter of the pipe.	Pipe cleaned of all sediment and debris.
M		□	Vegetation	Vegetation that reduces free movement of water through pipes.	All vegetation removed so water flows freely.
A		□	Damaged (rusted, bent or crushed)	Protective coating is damaged, rust is causing more than 50% deterioration to any part of pipe.	Pipe repaired or replaced.
M		□		Any dent that significantly impedes flow (i.e., decreases the cross section area of pipe by more then 20%).	Pipe repaired or replaced.
M				Pipe has major cracks or tears allowing groundwater leakage.	Pipe repaired or replaced.
M.S.	Swales	□	Trash & debris	Dumping of yard wastes such as grass clippings and branches into swale. Unsightly accumulation of non-degradable materials such as glass, plastic, metal, foam and coated paper.	Remove trash and debris and dispose as prescribed by County Waste Management Section.
M		□	Sediment buildup	Accumulated sediment that exceeds 20% of the design depth.	Swale cleaned of all sediment and debris so that it matches design.
M		□	Vegetation not growing or over-grown	Grass cover is sparse and weedy or areas are overgrown with woody vegetation.	Aerate soils and reseed and mulch bare areas. Maintain grass height at a minimum of 6" for best stormwater treatment. Remove woody growth, recontour and reseed as necessary.
M		□	Conversion by home-owner to incompatible use	Swale has been filled in or blocked by shed, woodpile, shrubbery, etc.	If possible, speak with homeowner and request that swale area be restored. Contact County to report problem if not rectified voluntarily.
A		□	Swale does not drain	Water stands in swale or flow velocity is very slow. Stagnation occurs.	A survey may be needed to check grades. Grades need to be in 1% range if possible. If grade is less than 1%, underdrains may need to be installed.

If you are unsure whether a problem exists, please contact the Jurisdiction and ask for technical assistance.
Comments:

Key: A = Annual (March or April preferred)
M = Monthly (see schedule)
S = After major storms

ATTACHMENT "A"

Maintenance Checklist for Ponds

Frequency	Drainage System Feature	Req'd	Problem	Conditions to Check For	Conditions That Should Exist
M,S	General	√	Trash & debris buildup in pond.	Clumping of yard wastes such as grass clippings and branches into basin. Unsightly accumulation of nondegradable materials such as glass, plastic, metal, foam and coated paper..	Removed trash and debris and dispose as prescribed by City Waste Management Section
M,S		√	Trash rack plugged or missing	Bar screen over outlet more than 25% covered by debris or missing.	Replace screen. Remove trash and debris and dispose as prescribed by City Waste Management Section.
M		√	Poisonous vegetation	Any poisonous vegetation which may constitute a hazard to the public. Examples of poisonous vegetation include: tansy ragwort, poison oak, stinging nettles, and devilsclub.	Remove poisonous vegetation. Do not spray chemicals on vegetation without obtaining guidance from the Cooperative Extension Service and approval from the City.
M,S		√	Fire hazard or pollution	Presence of chemicals such as natural gas, oil and gasoline, obnoxious color, odor or sludge noted.	Find sources of pollution and eliminate them. Water is free from noticeable color, odor or contamination.
M		√	Vegetation not growing or is overgrown	For grassy ponds, grass cover is sparse and weedy or is overgrown. For wetland ponds, plants are sparse or invasive species are present.	For grassy ponds, selectively thatch, aerate, and reseed ponds. Grass cutting unnecessary unless dictated by aesthetics. For wetland ponds, handplan nursery-grown wetland plants in bare areas. Contact the Cooperative Extension Service for direction on invasive species such as purple loosestate and reed canary grass. Pond bottoms should have uniform dense coverage of desired plant species.
M		√	Rodent holes	Any evidence of rodent holes if facility is acting as a dam or berm, or any evidence of water piping through dam or berm via rodent holes.	Rodents destroyed and dam or berm repaired. Contact the Thurston County Health Department for guidance.
M		√	Insects	When insects such as wasps and hornets interfere with maintenance activities, or when mosquitoes become a nuisance.	Insects destroyed or removed from site. Contact Cooperative Extension Service for guidance.
A		√	Tree growth	Tree growth does not allow maintenance access or interferes with maintenance activity (i.e., slope mowing, silt removal, or equipment movements). If trees are not interfering with access, leave trees along.	Trees do not hinder maintenance activities. Selectively cultivate trees such as alders for firewood.
M	Side slopes of pond	√	Erosion on berms or at entrance/exit.	Check around inlets and outlets for signs of erosion. Check berms for signs of sliding or settling. Action is needed where eroded damage over 2 inches deep and where there is potential for continued erosion.	Find causes of erosion and eliminate them. Then slopes should be stabilized by using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction.
M	Storage area	√	Sediment buildup in pond	Accumulated sediment that exceeds 10% of the designed pond depth. Buried or partially buried outlet structure probably indicates significant sediment deposits.	Sediment cleaned out to designed pond shape and depth; pond reseeded if necessary to control erosion.
A	Pond dikes	√	Settlements	Any part of dike, which has settled 4 inches, lower than the design elevation.	Dike should be build back to the design elevation.

A	Emergency overflow/ spillway	√	Rock missing	Only one layer of rock exists above native soil in area 5 square feet or larger, or any exposure of native soil.	Replace rocks to design standards.
One Time	Emergency overflow/ spillway	√	Overflow missing	Side of pond has no area with large rocks to handle emergency overflows.	Contact City for guidance.

If you are unsure whether a problem exists, please contact the Jurisdiction and ask for technical assistance.
Comments:

Key: A = Annual (March or April preferred)
M = Monthly (see schedule)
S = After major storms