APPENDIX 12: CHAPTER 12 APPENDICES

12A: Ecology Review Comments dated May 10, 2013

12B: City of Yelm Responses to Ecology Review Comments dated May 10, 2013

12A: Ecology Review Comments dated May 10, 2013

141043

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300

May 10, 2013

Ms. Stephanie Ray
Program Project Manager
City of Yelm
105 Yelm Avenue West
Yelm, WA 98597

Re: City of Yelm Draft General Sewer Plan – Ecology Review Comments

Dear Ms. Ray:

We have completed our review of the *City of Yelm General Sewer Plan, Volume 1 of 2, September 2012*. Our comments are enclosed.

We would be happy to discuss these comments with you. We would also appreciate you responding to each comment in writing. We also suggest that you wait to edit the general sewer plan, if necessary, until after we have discussed these comments with you. Several comments (e.g 1-3) are for your information and do not require a response.

Please call Steve Ogle at (360) 407-6318 if you would like to schedule a time to discuss these comments.

Sincerely,

Gregory S. Zentner, Supervisor
Muncipal Operations Unit
Water Quality Program
Southwest Regional Office

cc: Jeff Morgan, P.E., Brown and Caldwell

1. Reclaimed water is a high priority for us and we believe for the city as well. At present, the city produces about three times as much reclaimed water as it puts to use. If the city needs to expand or modify its system to make use of its reclaimed water, now is a good time to do so. Interest rates and the cost of construct remain low, and Ecology is dedicating 25% of its State Revolving Funds to "Green" projects such as reclaimed water. We believe any project the city undertakes to re-use more of its reclaimed water would compete successfully in our funding program with other applicants for financial assistance.

2. A stipulation in the settlement agreement for Water Right CG2-21613C requires the city to infiltrate 56 acre feet per year (an average of approximately 51,000 gallons per day) of reclaimed water to groundwater at Cochrane Park.

   We cannot determine from the DMR data if the city is meeting this obligation as the DMR reports presently do not require the city to account for different uses of reclaimed water.

   For example, we cannot determine from the DMR data if the city sent enough water to the basins in 2011 and 2012 to satisfy its Water Right obligation. The city reported no use of reclaimed water from December 2010 through June 2011 and from November 2011 through mid-May 2012.

   When we next renew the permit, we may include measurement and reporting requirements for reclaimed water delivered to irrigation basins at Cochrane Park. Until then, the city should keep records of reclaimed water applied to the basins. If the city cannot directly measure this flow, we suggest estimating it through water balance calculations that account for evaporation and other losses in the system.

3. Page ES-6. And Section 6.4.1.4. Page 6-15. *BCEs were performed to evaluate alternatives for providing wastewater service to the proposed Thurston Highlands MPC. Results of the BCE are as follows:*

   - *The MPC will be served by a gravity collection system. Lower risk and equipment repair/replacement costs for the gravity alternative outweigh the potential advantages related to familiarity with STEP technology.*

   Ecology understands the developer of Thurston Highlands will be financially responsible for constructing the wastewater collection and treatment systems that will serve the development and the city will eventually own and operate the system. We also understand the city wants the developer to construct a gravity collection system.

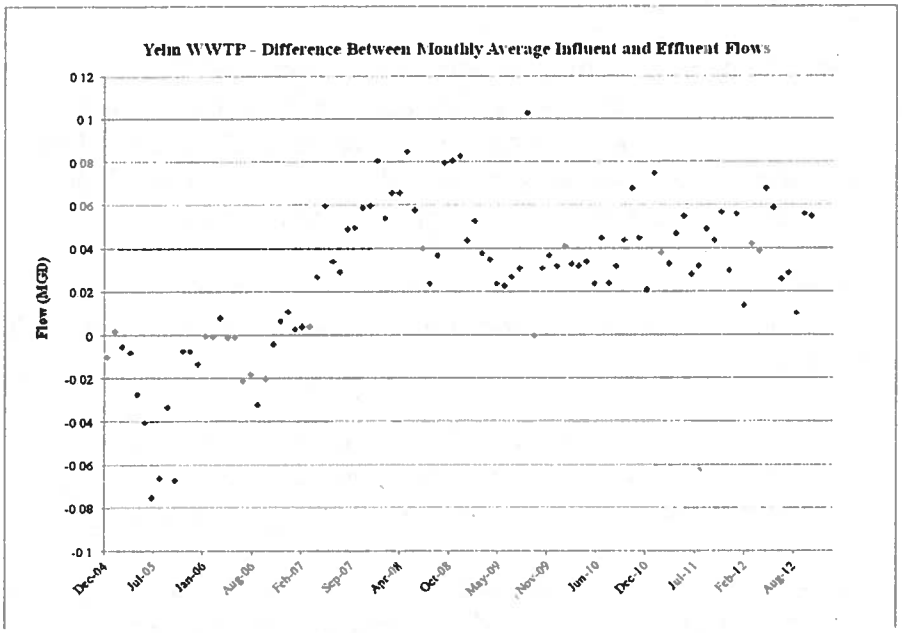
   From our perspective, the type of collection system to construct is the city's decision. A STEP system may be less expensive to construct but more costly to operate and maintain compared to a gravity collection system. Our eventual approval of this general sewer plan will not irrevocably commit the city to a gravity collection system. If the city decides to expand the STEP system (or implement some other type of collection system)

to serve Thurston Highlands, the city can submit an amendment to the general sewer plan to us for review and approval.

4. Table ES-5. Page ES-10. Project No. RW-1, termed "Expanded Cochrane Park RIBs", indicates the city will proceed with expanding the capacity of the rapid infiltration basins. Prior to design, the city will need to develop and submit to Ecology a hydrogeologic study plan (and later a final report) to evaluate the ability of the basins to accept water and the impact of re-use on groundwater quality.

   Section 2.6. Page 2-10. We reviewed monthly flow data (influent flow, reclaimed water use, discharge to Power Canal, and discharge to Nisqually River) the city reported on monthly discharge monitoring reports. The data indicate a difference of 30,000 to 60,000 gallons per day between the influent flow and combined discharges. Prior to approximately March 2007, the city reported more effluent than influent flow. From that date to the present, the reported influent flow exceeds the total effluent flows.

   Flow meters are not totally accurate but this difference is significant and greater than the inaccuracy of calibrated flow meters. When did the city most recently calibrate the flow meters, and how often does it do so?



5. Section 3.5.2.3.2. Page 3-14. The grinder pump evaluation assumes repairing the pump every 10 years and replacing the pump every 20 years. How did you determine this repair and replacement schedule?

6. Section 4.4.3. Page 4-13. *Prior to March 2011, samples for these measurements* (ammonia and nitrate) *are taken twice weekly; after March 2011, daily samples for nitrate and ammonia have been taken with a composite effluent sampler.*

If the city obtained these samples from the chlorine contact chamber discharge and in the manner required by the permit (24-hour composite), the city should have reported the results on the DMR for each outfall if the city has a discharge through that outfall – see permit condition S3.D . In the future, if you collect such data, you need to report it on your DMR.

7. Section 4.7.4. Page 4-2. *As discussed in Section 4.5.2.2, the concentration based BOD and TSS effluent limits do not apply because BOD and TSS removal in the septic tanks is considered an integral part of the overall treatment process.*

   To clarify, the 85% removal limit does apply, but we assume that if the effluent from the combined septic tank and wastewater treatment system meets the concentration based limitations of 30 milligrams per liter, then the system also meets the 85 percent removal requirement for BOD_5 and TSS.

8. Section 4.7.5.3.2. Page 4-23. The Nisqually River has a supplemental temperature standard of 13°C, evaluated as the 7-day average of daily maximum temperatures (7-DADMax), in effect from September 15 to July 1 of every year.

   We appreciate the temperature compliance evaluation presented in the draft general sewer plan. We may require temperature data collection when we next issue the permit. Our data collection and evaluation requirements may take a different form than the GSP's evaluation.

   In evaluating compliance with the temperature standard, we typically require facilities to deploy thermistors to collect temperature data every 30 minutes from effluent, the receiving water upstream of the outfall, and (at times) receiving water downstream of the outfall. Most recently issued NPDES permits require collecting temperature data in this manner for a minimum of three years during the critical condition. Table VI-2 on page VI-23 in Ecology's *Permit Writer's Manual* provides a description of the data required, and how the data are used, for evaluating compliance with the temperature criteria.

9. Section 4.7.7. Table 4-10. Page 4-25. We also appreciate the reasonable potential evaluation presented in the draft general sewer plan. We will likely produce a similar though somewhat different evaluation in the next permit.

   For example, for the reasonable potential analysis summary, the city used 95th percentile effluent concentrations. Our *Reaspot.xls* spreadsheet (available on Ecology's website) uses the measured maximum concentration to create a statistical maximum based upon on the coefficient of variation of the data and number of samples. Based on the information in Table 4-10, copper effluent concentrations could result in an effluent limit.

10. Section 4.11.2. Table 4-17. Page 4-35. The "Total solids to WAS" is the addition of "Biomass yield" and "Non-volatile TSS to WAS". It appears to us, the volatile

suspended solids, which we assume would be the value "TSS removed" minus "Non-volatile TSS to WAS" are unaccounted for in the mass balance. Neither treatment in the SBR or in the sludge holding tank will completely remove all the volatile suspended solids (VSS). A portion of the VSS will be converted to inert solids and become a part of the WAS load.

11. Section 5.2. Page 5-9. Is the city considering changing the piping and valving at Cochrane Park to directly discharge reclaimed water to the infiltration basins instead of initially discharging to the pond and wetlands? Since the city does not use the subsurface infiltration basin due to concerns that reclaimed water deteriorates in quality as it flows through the wetland system, discharging reclaimed water directly to subsurface system, or the open infiltration basins, might allow application of higher quality reclaimed water.

12. Section 5.6.2. Page 5-18. The draft general sewer plan discusses using reclaimed water to augment flows in Yelm Creek. If the city wants to pursue use of reclaimed water in this manner, the city would need to collect receiving water data to evaluate the use's compliance with the state water quality standards; and submit the evaluation to Ecology for our review and approval prior to use/discharge. We would also want to review the city's study plan prior to data collection. The NPDES permit would require modification to identify this as another use.

13. Section 6. The draft plan discusses requiring the developer of Thurston Highlands to construct a wastewater treatment plant to serve the development and that the developer will be responsible to develop uses of the treated wastewater instead of disposal by discharging to a surface waterbody. Ecology understands that the city wants to use the available capacity of the existing wastewater treatment plant to serve future growth within the city limits that does not include Thurston Highlands.

    We encourage the city to consider the benefits of owning (and operating) one wastewater treatment plant. Typically, it is less costly in terms of both capital and operation and maintenance costs to construct and operate one larger wastewater treatment instead of two smaller plants. Also, initial wastewater flow from Thurston Highlands will be small and would pose challenges to operate a treatment plant constructed in either phases related to development or for build-out of the service area.

14. Section 6.4.1.2.6. Table 6-5. Page 6-10. The annual hauling and disposal fee for a STEP system seems to include only waste activated sludge from the treatment plant. Table 6-5 should also include solids hauling and disposal costs for STEP system septage.

15. Section 7.3. Page 7-3. The series of standard operating procedures prepared by Brown and Caldwell appear to either supplement or modify the operation and maintenance manual. According to WAC 173-240-080, the city should submit the revised operation and maintenance manual to Ecology for review and approval.
16. Section 8.1. Page 8-1. The draft general sewer plan mentions the city has "developed standards and requirements pertaining to wastewater collection" and refers to city construction standards in Appendix 8A. The plan submitted for review did not include

any appendix material. Ecology encourages the city to include collection system design criteria in the general sewer plan as doing so would make our review of future collection system expansion unnecessary. See the two WAC citations below:

WAC 173-240-030(1):

> *Before constructing or modifying domestic wastewater facilities, engineering reports and plans and specifications for the project must be submitted to and approved by the department, except as noted in WAC 173-240-030(5).*

WAC 173-240-030(5) states:

> *If the local government entity has received department* (Ecology) *approval of a general sewer plan and standard design criteria, engineering reports and plans and specifications for sewer line extensions, including pump stations, are not required to be submitted for approval. In this case the entity need only provide a description of the project and written assurance that the extension is in conformance with the general sewer plan.*

12B: City of Yelm Responses to Ecology Review Comments dated May 10, 2013

Yelm General Sewer Plan

Responses to Ecology Comment Letter dated May 10, 2013

Ecology Comment No. 1	Reclaimed water is a high priority for us and we believe for the city as well. At present, the city produces about three times as much reclaimed water as it puts to use. If the city needs to expand or modify its system to make use of its reclaimed water, now is a good time to do so. Interest rates and the cost of construct remain low, and Ecology is dedicating 25% of its State Revolving Funds to "Green" projects such as reclaimed water. We believe any project the city undertakes to re-use more of its reclaimed water would compete successfully in our funding program with other applicants for financial assistance.
City of Yelm Response	*The City appreciates Ecology's input related to funding of potential reclaimed water projects. The CIP includes a reclaimed water project to expand the Cochrane Park RIBs. The City will begin to implement the CIP once the General Sewer Plan(GSP) is approved.*
Ecology Comment No. 2	A stipulation in the settlement agreement for Water Right CG2-21613C requires the city to infiltrate 56 acre feet per year (an average of approximately 51,000 gallons per day) of reclaimed water to groundwater at Cochrane Park. We cannot determine from the DMR data if the city is meeting this obligation as the DMR reports presently do not require the city to account for different uses of reclaimed water. For example, we cannot determine from the DMR data if the city sent enough water to the basins in 2011 and 2012 to satisfy its Water Right obligation. The city reported no use of reclaimed water from December 2010 through June 2011 and from November 2011 through mid-May 2012. When we next renew the permit, we may include measurement and reporting requirements for reclaimed water delivered to irrigation basins at Cochrane Park. Until then, the city should keep records of reclaimed water applied to the basins. If the city cannot directly measure this flow, we suggest estimating it through water balance calculations that account for evaporation and other losses in the system.
City of Yelm Response	*Section 5.2.3.1 discusses metering improvements for Cochrane Park. A radio read meter has been installed at the park and is now being used to track water usage.*

Ecology Comment No. 3	Page ES-6. And Section6.4.1.4. Page 6-15. *BCEs were performed to evaluate alternatives for providing wastewater service to the proposed Thurston Highlands MPC. Results of the BCE are as follows:* • *The MPC will be served by a gravity collection system. Lower risk and equipment repair/replacement costs for the gravity alternative outweigh the potential advantages related to familiarity with STEP technology.* Ecology understands the developer of Thurston Highlands will be financially responsible for constructing the wastewater collection and treatment systems that will serve the development and the city will eventually own and operate the system. We also understand the city wants the developer to construct a gravity collection system. From our perspective, the type of collection system to construct is the city's decision. A STEP system may be less expensive to construct but more costly to operate and maintain compared to a gravity collection system. Our eventual approval of this general sewer plan will not irrevocably commit the city to a gravity collection system. If the city decides to expand the STEP system (or implement some other type of collection system to serve Thurston Highlands), the city can submit an amendment to the general sewer plan to us for review and approval.
City of Yelm Response	*Comment noted*
Ecology Comment No. 4	**Table ES-5. Page ES-10.** Project No. RW-1, termed "Expanded Cochrane Park RIBs", indicates the city will proceed with expanding the capacity of the rapid infiltration basins. Prior to design, the city will need to develop and submit to Ecology a hydrogeologic study plan (and later a final report) to evaluate the ability of the basins to accept water and the impact of re-use on groundwater quality. **Section 2.6. Page 2-10.** We reviewed monthly flow data (influent flow, reclaimed water use, discharge to Power Canal, and discharge to Nisqually River) the city reported on monthly discharge monitoring reports. The data indicate a difference of 30,000 to 60,000 gallons per day between the influent flow and combined discharges. Prior to approximately March 2007, the city reported more effluent than influent flow. From that date to the present, the reported influent flow exceeds the total effluent flows. Flow meters are not totally accurate but this difference is significant and greater than the inaccuracy of calibrated flow meters. When did the city most recently calibrate the flow meters, and how often does it do so?

City of Yelm Response	*Table ES-5. Page ES-10. Comment noted. The City will take the initial steps to implement the CIP, including the necessary planning and study efforts, once the GSP is approved.* *Section 2.6. Page 2-10. City records indicate that the flow meters have not been calibrated since installation. Table 5-3 and associated table note identify that the City is aware of the problem and will begin implementing annual calibrations. The City is also investigating how much in-plant reclaimed water uses may be contributing to the discrepancy.*
Ecology Comment No. 5	Section 3.5.2.3.2. Page 3-14. The grinder pump evaluation assumes repairing the pump every 10 years and replacing the pump every 20 years. How did you determine this repair and replacement schedule?
City of Yelm Response	*Both STEP and grinder pump repair and replacement schedules were based primarily upon manufacturer guidelines (Orenco and E-One, respectively). These guidelines were compared to City of Yelm maintenance staff experience as well as communications with Holmes Harbor Sewer District, which uses both STEP and grinder pumps in its collection system.*
Ecology Comment No. 6	Section 4.4.3. Page 4-13. Prior to March 2011, samples for these measurements (ammonia and nitrate) were taken twice weekly; after March 2011, daily samples for nitrate and ammonia have been taken with a composite effluent sampler. If the city obtained these samples from the chlorine contact chamber discharge and in the manner required by the permit (24-hour composite), the city should have reported the results on the DMR for each outfall if the city has a discharge through that outfall- see permit condition S3.D. In the future, if you collect such data, you need to report it on your DMR.
City of Yelm Response	*Jim Doty from the City of Yelm followed up with Ecology regarding this comment. In response, Steve Ogle from Ecology emailed the City on June 7, 2013 to confirm that the City is monitoring and reporting data as required by the permit.*

Ecology Comment No. 7	Section 4.7.4. Page 4-2. As discussed in Section 4.5.2.2, the concentration based BOD and TSS effluent limits do not apply because BOD and TSS removal in the septic tanks is considered an integral part of the overall treatment process. To clarify, the 85% removal limit does apply, but we assume that if the effluent from the combined septic tank and wastewater treatment system meets the concentration based limitations of 30 milligrams per liter, then the system also meets the 85 percent removal requirement for BOD5 and TSS.
City of Yelm Response	*Comment noted. The text will be corrected as follows: "As discussed in Section 4.5.2.2, because BOD and TSS removal in the septic tanks is considered an integral part of the overall treatment process it is assumed that the 85 percent removal requirement for BOD and TSS is met when the combined septic tank and wastewater treatment system meets the concentration based limitations of 30 mg/L."*
Ecology Comment No. 8	Section 4.7.5.3.2. Page 4-23. The Nisqually River has a supplemental temperature standard of 13°C, evaluated as the 7-day average of daily maximum temperatures (7- DADMax), in effect from September 15 to July 1 of every year. We appreciate the temperature compliance evaluation presented in the draft general sewer plan. We may require temperature data collection when we next issue the permit. Our data collection and evaluation requirements may take a different form than the GSP's evaluation. In evaluating compliance with the temperature standard, we typically require facilities to deploy thermistors to collect temperature data every 30 minutes from effluent, the receiving water upstream of the outfall, and (at times) receiving water downstream of the outfall. Most recently issued NPDES permits require collecting temperature data in this manner for a minimum of three years during the critical condition. Table VI-2 on page VI-23 in Ecology's Permit Writer's Manual provides a description of the data required, and how the data are used, for evaluating compliance with the temperature criteria.
City of Yelm Response	*Comment noted. The City will request that potential temperature data collection requirement be discussed with Ecology during development of the next NPDES permit revision.*

Ecology Comment No. 9	Section 4.7.7. Table 4-10. Page 4-25. We also appreciate the reasonable potential evaluation presented in the draft general sewer plan. We will likely produce a similar though somewhat different evaluation in the next permit. For example, for the reasonable potential analysis summary, the city used 95th percentile effluent concentrations. Our Reaspot.xls spreadsheet (available on Ecology's website) uses the measured maximum concentration to create a statistical maximum based upon on the coefficient of variation of the data and number of samples. Based on the information in Table 4-10, copper effluent concentrations could result in an effluent limit.
City of Yelm Response	*Comment noted. The City will request that the reasonable potential analysis for copper and other parameters with Ecology be discussed during development of the next NPDES permit revision.*
Ecology Comment No. 10	Section 4.11.2. Table 4-17. Page 4-35. The "Total solids to WAS" is the addition of "Biomass yield" and "Non-volatile TSS to WAS". It appears to us, the volatile suspended solids, which we assume would be the value "TSS removed" minus "Non-volatile TSS to WAS" are unaccounted for in the mass balance. Neither treatment in the SBR or in the sludge holding tank will completely remove all the volatile suspended solids (VSS). A portion of the VSS will be converted to inert solids and become a part of the WAS load.
City of Yelm Response	*The calculation assumes that since the influent VSS exerts a biochemical oxygen load, the conversion of some of that influent VSS to inert solids is included in the biomass yield calculation. In summary, the weight of waste solids to be disposed of is calculated as the weight of biomass produced (based on an assumed yield per pound of BOD consumed) and an assumed amount of non-volatile TSS that passes through the treatment process without being consumed. The purpose of this calculation is to estimate capacity of the existing solids handling system and the point at which it will need to be expanded. A more precise calculation will be prepared as part of the future facilities planning effort.*

Ecology Comment No. 11	Section 5.2. Page 5-9. Is the city considering changing the piping and valving at Cochrane Park to directly discharge reclaimed water to the infiltration basins instead of initially discharging to the pond and wetlands? Since the city does not use the subsurface infiltration basin due to concerns that reclaimed water deteriorates in quality as it flows through the wetland system, discharging reclaimed water directly to subsurface system, or the open infiltration basins, might allow application of higher quality reclaimed water.
City of Yelm Response	*Yes, the City is considering piping/valving changes at Cochrane Park to allow direct discharge of reclaimed water to the infiltration basins. However, the City believes that the pond and wetlands are an important component of the reclaimed water distribution system (public perception) and has no plans to discontinue their use. The City plans to continue the current discharge of 56 ac-ft per year (or 50,000 gpd) to the pond/wetlands with direct discharge of an additional 56 ac-ft year to the infiltration basins to meet the total 112 ac-ft per year commitment in the 2011 Water Right Mitigation Plan.*
Ecology Comment No. 12	Section 5.6.2. Page 5-18. The draft general sewer plan discusses using reclaimed water to augment flows in Yelm Creek. If the city wants to pursue use of reclaimed water in this manner, the city would need to collect receiving water data to evaluate the use's compliance with the state water quality standards; and submit the evaluation to Ecology for our review and approval prior to use/discharge. We would also want to review the city's study plan prior to data collection. The NPDES permit would require modification to identify this as another use.
City of Yelm Response	*Flow augmentation of Yelm Creek scored the lowest (least favorable) in the BCE presented in Section 5.6. Based upon the results of the BCE, the City is not actively pursuing the flow augmentation alternative. If the City elects to pursue this alternative in the future, Ecology will be consulted early in the planning phase.*

Ecology Comment No. 13	Section 6. The draft plan discusses requiring the developer of Thurston Highlands to construct a wastewater treatment plant to serve the development and that the developer will be responsible to develop uses of the treated wastewater instead of disposal by discharging to a surface waterbody. Ecology understands that the city wants to use the available capacity of the existing wastewater treatment plant to serve future growth within the city limits that does not include Thurston Highlands. We encourage the city to consider the benefits of owning (and operating) one wastewater treatment plant. Typically, it is less costly in terms of both capital and operation and maintenance costs to construct and operate one larger wastewater treatment instead of two smaller plants. Also, initial wastewater flow from Thurston Highlands will be small and would pose challenges to operate a treatment plant constructed in either phases related to development or for build-out of the service area.
City of Yelm Response	*Comment noted. The City considered these issues, and as outlined in Section 6.1, determined that any alternative including treatment of Thurston Highlands flows at the existing WRF is not feasible.*
Ecology Comment No. 14	Section 6.4.1.2.6. Table 6-5. Page 6-10. The annual hauling and disposal fee for a STEP system seems to include only waste activated sludge from the treatment plant. Table 6-5 should also include solids hauling and disposal costs for STEP system septage.
City of Yelm Response	*Table 6-5 (titled WAS Volume and Disposal Cost Comparison for Collection System Alternatives) was developed only to compare WAS hauling and disposal fees associated with STEP and gravity/grinder pump collection system alternatives.* *STEP system septage hauling and disposal costs were calculated to be approximately $41.66 per tank per year, as discussed in Section 3.6 and referenced in the text prior to Table 6-5. The BCE summary table (Table 6-6) comparing STEP, grinder pump, and gravity collection system alternatives for use within Thurston Highlands includes hauling and disposal costs for both STEP system septage and the WAS anticipated for each alternative.*

Ecology Comment No. 15	Section 7.3. Page 7-3. The series of standard operating procedures prepared by Brown and Caldwell appear to either supplement or modify the operation and maintenance manual. According to WAC 173-240-080, the city should submit the revised operation and maintenance manual to Ecology for review and approval.
City of Yelm Response	*The City will submit a revised Operation and Maintenance Manual including the referenced Standard Operating Procedures following approval of the GSP.*
Ecology Comment No. 16	Section 8.1. Page 8-1. The draft general sewer plan mentions the city has "developed standards and requirements pertaining to wastewater collection" and refers to city construction standards in Appendix 8A. The plan submitted for review did not include any appendix material. Ecology encourages the city to include collection system design criteria in the general sewer plan as doing so would make our review of future collection system expansion unnecessary. See the two WAC citations below: WAC 173-240-030(1): *Before constructing or modifying domestic wastewater facilities, engineering reports and plans and specifications for the project must be submitted to and approved by the department, except as noted in WAC 173-240-030(5).* WAC 173-240-030(5) states: *If the local government entity has received department (Ecology) approval of a general sewer plan and standard design criteria, engineering reports and plans and specifications for sewer line extensions, including pump stations, are not required to be submitted for approval. In this case the entity need only provide a description of the project and written assurance that the extension is in conformance with the general sewer plan.*
City of Yelm Response	*The City believes the draft GSP submittal to Ecology did include the appendix material in a separate volume; however, the reference to the construction standards was incorrect. City of Yelm Development and Construction Standards are provided in Appendix 1B. Appendix 8A contains the City's Design Guidelines. Appendix references will be corrected in the text of the final GSP.*