

4.2. Groundwater

4.2.1. Introduction

The following information includes a summary of groundwater resources, as presented in the January 2006 EA. Included as well are clarification of impacts and mitigation measures for the proposed action.

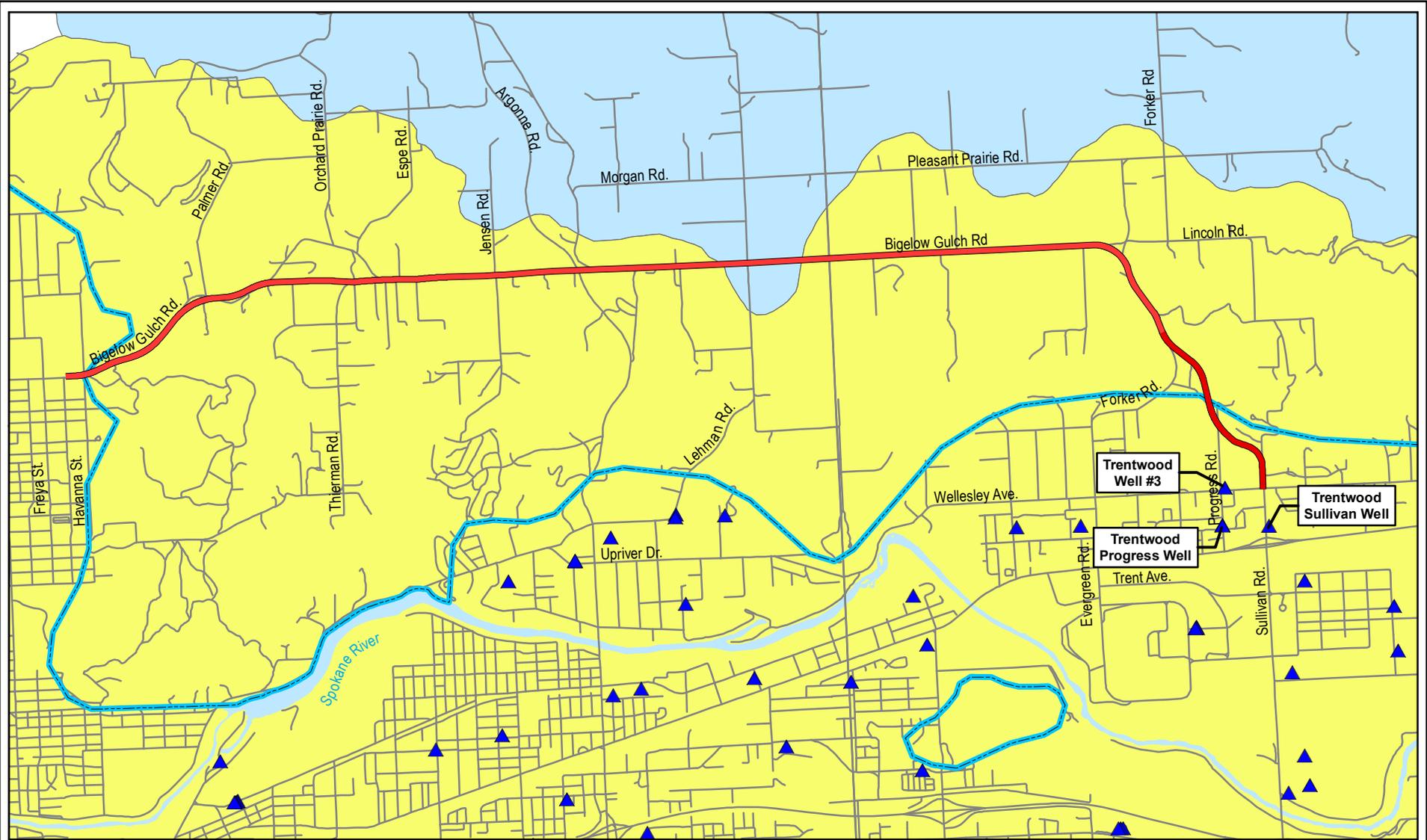
Spokane County received 41 public comments regarding groundwater (Appendix 3, categories 20.0 and 20.1). The comments primarily concerned the proposed action's effects on water supply wells and proposed mitigations along the alignment. Additional information is provided below regarding groundwater conditions in the area and the hydrogeology study for the project conducted by GeoEngineers (2005).

4.2.2. What groundwater resources are present in the project area?

The proposed action is situated in a designated Critical Aquifer Recharge Area (CARA) along the northern edge of the Spokane Valley-Rathdrum Prairie (SVRP) Aquifer, which is the primary drinking water supply for the Spokane metropolitan area (Figure 4.2-1). Because of its importance as a regional water supply, the SVRP aquifer was designated as a sole-source aquifer in 1978 by the U.S. Environmental Protection Agency (EPA) (Spokane County 2006c). The aquifer is located approximately 50 to 100 feet below ground level.

Groundwater in the area surrounding the proposed alignment occurs in both unconfined and confined conditions. The southeast portion of the proposed alignment is situated on glaciofluvial soils associated with the north margin of the SVRP Aquifer. A basalt aquifer underlies a portion of Orchard Prairie (Spokane County 2006c). The Orchard Prairie Aquifer is located partially in Water Resource Inventory Area (WRIA) 55 (Little Spokane River watershed) and partially within WRIA 57 (Middle Spokane watershed).

The stratigraphy comprises loess, overlying basalt, which in turn overlies Latah sediments and crystalline basement. The aquifer has limited groundwater resources and recharge occurs primarily by precipitation (Golder Associates 2003a). Along the remainder of the project alignment, unconfined aquifer(s) are discontinuous and of limited areal extent.



-  Project Alignment
-  Aquifer Boundary
-  Road
-  CARA
-  Purveyor Well
-  Low aquifer susceptibility

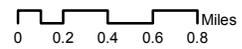


Figure 4.2-1
Aquifer Boundary, Purveyor Wells and Critical Aquifer Recharge (CARA) Designation in the Project Vicinity

Map Date: 6/26/2007

Groundwater Quality

The SVRP Aquifer contains good to excellent quality water; however, water quality trends indicated a gradual increase in contaminants within the aquifer (MacInnis et al 2000). The SVRP Aquifer is highly susceptible to contamination because it is unconfined and the aquifer materials' overlying sediments are very permeable (Spokane County 2006c). Pollutants enter the aquifer from a variety of sources, including runoff from impervious surfaces, contamination from hazardous waste sites and use of hazardous materials. Please see Section 4.15 for additional information regarding hazardous materials.

Spokane County, in cooperation with the Spokane Regional Health Districts and several local purveyors, has conducted detailed water quality monitoring of the SVRP aquifer for over 20 years as part of the Water Quality Management Program (Spokane County 2007a). Contaminants of concern detected in the SVRP aquifer include coliform bacteria, nitrate, and volatile organic compounds (VOCs). A number of programs have been implemented to address water quality issues, including the Spokane Aquifer Water Quality Management Plan (Spokane County 1979), watershed management plans for the middle Spokane River and Little Spokane River (Spokane County 2006c), designation of Aquifer Sensitive Overlay Zone standards as part of the Spokane County Zoning Code, the wellhead protection program managed by the Spokane Regional Health District, and CARA designation as part of the Growth Management Act; Ecology 2005).

Under current conditions, runoff from the existing roadway (approximately 34 acres of existing impervious area on Bigelow Gulch Road and Forker Road) runs off the roadway surface during storm events and soaks directly into the ground or enters stream channels and wetlands and eventually contributes to the SVRP aquifer or Orchard Prairie aquifer.

Groundwater Wells

Many documented water wells exist within 0.5 mile of the proposed action alignment. Existing groundwater wells include wells owned by Trentwood Irrigation District No. 3, and Pasadena Park Irrigation District No. 17).

Trentwood Irrigation District No. 3 is a Group A purveyor (15 or more connections) and owns and operates three wells located in the vicinity of Wellesley Avenue and Sullivan Road, the closest of which is approximately 1,200 feet from the eastern terminus of the proposed action (Figure 4.2-1). The district boundaries include the portion of project area from east of Perrine Road to the eastern terminus of the project at Wellesley Avenue (Spokane County 2001b). The terminus of the proposed roadway would be within the Wellhead Protection Area defined by the District,

which extends due east beyond the intersection of Sullivan Road and Wellesley Avenue (Sinsley pers. comm.).

Pasadena Park Irrigation District No. 17 is also a Group A purveyor, with wells located near Argonne and Upriver Roads, approximately 1.4 miles south of the proposed action. The district boundaries include the portion of the project area from Orchard Prairie Road on the west, to the western boundary of the Trentwood Irrigation District on the east (Spokane County 2001b).

A search of the Ecology database of wells by Township, Range, and Section, showed 324 groundwater supply wells within 10 sections extending from Havana Street on the west to Wellesley Avenue on the east (Ecology 2007a). It is not known how many of these wells currently exist or are operational.

GeoEngineers (2005) conducted a preliminary hydrogeologic review of the proposed Bigelow Gulch/Forker Road alignment. Their study included review of preliminary plans and earthwork, review of surficial geology and a hydrogeologic reconnaissance, review of Ecology well logs, identification of sections of the alignment that could impact water supply wells, and recommendations. The focus of the analysis was on sections of the alignment where cuts greater than 4 feet deep are planned. A total of 12 cuts were identified based on engineering information provided by Spokane County (GeoEngineers 2005).

4.2.3. What regulations apply to groundwater?

Regulations and guidelines pertaining to groundwater quality and quantity apply at the federal, state, county, and municipal level. These regulations and guidelines are considered when reviewing potential effects to groundwater quality and quantity in the study area.

Federal

Safe Drinking Water Act of 1974. 42 USC Chapter 6A. This act sets the national primary drinking water standards, regulates underground injection of fluids, and designates sole source aquifers. The federal Underground Injection Control (UIC) Program works with state and local governments to oversee underground injection of waste to prevent contamination of drinking water resources.

Federal Water Pollution Control Act (Clean Water Act). The Water Pollution Control Act, better known as the Clean Water Act, 33 USC 1251 et seq., provides comprehensive federal regulation of all sources of water pollution. It prohibits the discharge of pollutants from non-permitted sources. The Clean Water Act authorizes the EPA to administer or delegate water quality regulations covered under the act. In Washington, authority is delegated primarily to U.S. Army Corps of Engineers (Corps) and Ecology.

State of Washington

Water Pollution Control Act (Revised Code of Washington [RCW] 90.48). This is the primary water pollution law for Washington State. Under state statute, discharge of pollutants into waters of the state is prohibited unless authorized. Washington Administrative Code (WAC) 173-201A mandates water quality standards for surface waters. All wastes must be provided with “all known, available, and reasonable methods of prevention, control, and treatment” prior to discharge into the state’s waters.

Groundwater Quality Standards (WAC 173-200). WAC 173-200 mandates standards to maintain the highest quality of the state’s groundwaters and to protect existing and future beneficial uses of the groundwater through the reduction or elimination of contaminant discharge.

State Drinking Water Regulations (WAC 246-290). WAC 246-290 defines basic regulatory requirements to protect the health of consumers using public drinking water supplies through protection of drinking water sources. The Washington Department of Health is the designated state agency for assuring safe and reliable public drinking water supplies, in cooperation with the Spokane Regional Health District and water purveyors. State regulations provide for two types of area-based controls (i.e., protective buffers) for source protection of wells and springs serving as sources of public water supplies. These two controls include Sanitary Control Areas (SCAs) and Wellhead Protection Areas.

Sanitary Control Area (SCA). By definition an SCA is an area established and maintained around a well or spring for the purpose of protecting it from existing and potential sources of contamination. The minimum SCA is a 100-foot radius about the source for wells, and 200 feet for springs, unless “engineering justification” supports a smaller area. The well or spring owner is required to have fee simple ownership of the SCA, and must prohibit or exercise direct control over the construction, storage, disposal, or application of existing or potential sources of contamination.

Wellhead Protection Areas. The Safe Drinking Water Act requires that all federally defined public water systems (Group A systems which, according to WAC 246-290-020, include public water systems serving 25 or more persons or 15 or more connections) using ground water as their source must implement a wellhead protection program. Local health departments have authority and responsibility for protection of public health and most administer a drinking water program with primary focus on individual and Group B public water supplies (fewer than 15 connections or fewer than 25 persons served).

Underground Injection Control (UIC) (WAC 178-218). The UIC Program, authorized by the Safe Drinking Water Act, is designed to prevent contamination of

underground sources of drinking water from the use of injection wells. A UIC well is a hole that is constructed to put water and other fluids into the ground. Most of these wells are dug to dispose of stormwater or wastewater (e.g., drywells, drainfields, and infiltration trenches). The UIC Program was established in 1984 and is administered under 40 CFR, Part 144. Ecology administers the program under statutory authority of RCW 43-21A445 and RCW 90-48. All new underground control activities must treat the “waste” fluid before injection.

Stormwater Management Manual for Eastern Washington (Publication 04-10-076).

The stormwater manual for eastern Washington provides guidance in stormwater design and management and provides a commonly accepted set of technical standards and new design information and new approaches to stormwater management. The stormwater management practices will protect water quality in receiving waters (both surface and ground waters). The Manual identifies eight core elements for managing stormwater runoff from new development and redevelopment projects of all sizes, and guidance for preparation and implementation of stormwater site plans. The requirements of the core elements are met by the application of technology-based and water quality-based BMPs. Spokane County will utilize this manual or the *Washington State Department of Transportation Highway Runoff Manual* for stormwater design of the proposed action if the Spokane Regional Stormwater Manual has not been officially adopted by the time of design for this project.

WSDOT Highway Runoff Manual (M 31-16). The 2006 *Washington State Department of Transportation Highway Runoff Manual (2006b)* provides a guide for policies, procedures, and methods for developing and documenting the design and maintenance of improvements to WSDOT’s transportation system. The manual contains approved BMPs for managing water quantity and quality from WSDOT facilities. Selection criteria are established for the use of acceptable BMPs during construction and long-term maintenance of highways.

Spokane County

Spokane County Comprehensive Plan. Spokane County has adopted a comprehensive plan that expresses County goals and policies relevant to aquifer recharge areas and groundwater and surface water quality:

- **Goal NE.17a.** Prevent degradation of groundwater quality in Spokane County and improve water quality of aquifers that do not meet state standards.
- **Goal NE.17b.** Protect groundwater quality from development impacts.

Relevant policies associated with the above goals include:

- **NE.17.8.** Require appropriate stormwater runoff and spill control provisions for those who use and/or store critical materials within critical recharge areas.
- **NE.17.18.** BMPs should be used to treat stormwater runoff.

- NE.22.11. Where increased stormwater runoff potential exists due to a proposed development, runoff management procedures shall be required.

Spokane County CARAs (Section 11.20.075 of the SCC). By Resolution No. 3-0754, Spokane County adopted the CARAs regulations that supersede those that governed the Aquifer Sensitive Area designations (Spokane County et al. 2005). Groundwater recharge areas have critical impacts on aquifers used for potable water as defined by Section 365-190-030(2) WAC. Aquifer recharge areas are rated as having a high, moderate, or low susceptibility for contamination based on a scientific analysis of soils, hydraulic conductivity, annual rainfall, depth to the aquifer, vadose zone, and wellhead protection information. Much of the project area is located in a designated CARA (Figure 4.2-1).

Spokane Regional Stormwater Manual. Spokane County, in association with the Cities of Spokane and Spokane Valley, has published the Spokane Regional Stormwater Manual (Spokane County et al. 2005). While not yet officially adopted, these guidelines define the steps and requirements for stormwater design for roadways and other pollution-generating impervious surfaces in areas designated CARAs and designated Aquifer Sensitive Areas in the Cities of Spokane and Spokane Valley (Spokane County et al. 2005). Where applicable, the manual is intended to meet or exceed the criteria found in the Ecology *Stormwater Management Manual for Eastern Washington* (Washington State Department of Ecology 2004).

Interagency Agreements

A 1988 Sole Source Aquifer Memorandum of Understanding between the Federal Highway Administration (FHWA), Environmental Protection Agency (EPA) Region 10, and WSDOT is intended to ensure that highway projects are designed and constructed in a manner that will prevent the introduction of contaminants into a sole source aquifer in quantities that may create a significant hazard to public health. The agreement is available at <http://wsdot.wa.gov/environment/compliance/agreements.htm>.

As a cooperating agency, EPA has directed WSDOT to confer with Spokane County on matters relating to the SVRP aquifer.

4.2.4. How were potential effects evaluated?

The analysis of impacts was a process of reviewing background information and making design modifications to avoid or minimize effects, following the methods and guidelines of the *Washington State Department of Transportation Environmental Procedures Manual* (M31-11) (WSDOT 2006a).

Of importance was the consideration of potential impact to water quality and the Sole Source Aquifer (SVRP Aquifer), designated CARA, and to the quality and supply of water of wells located within 1,000 feet of the proposed alignment. GeoEngineers (2005) recommended that wells within 1,000 feet be identified and located in the field. Pre-construction (baseline) testing of quality and quantity would be conducted, followed by post-construction testing to be compared with baseline testing results.

It was assumed that potentially significant impacts could occur as a result of the proposed action altering groundwater conditions protected by law. It was assumed that all aspects of the proposed action would be performed in accordance with all applicable existing laws, regulations, and permit conditions.

4.2.5. What impacts would the Urban Connector Alignment have on groundwater?

Proposed Action

How would construction affect groundwater?

The proposed action poses several potential short-term impacts on groundwater during construction. As mentioned in the January 2006 EA, grading and construction within the proposed alignment could affect water quality in the aquifer. There is a possibility that fuels, oils, solvents, and other potentially hazardous materials may be introduced to the groundwater, which could result in an incremental increase in contamination of the aquifer. In addition, there would be potential for erosion and sedimentation (particularly in areas of erodible soils) associated with land clearing, cutting and filling, and other soil-disturbing activities. As stated in Chapter 2, *Project Description*, construction activities will begin with the installation of erosion control BMPs based on the requirements of the Spokane Regional Stormwater Manual (if adopted), Ecology's *Stormwater Management Manual for Eastern Washington* (Ecology 2004), or the *Washington State Department of Transportation Highway Runoff Manual* (2006b). In the final construction plans, Spokane County will identify specifications of BMPs for grading and erosion control that are necessary to reduce erosion and sedimentation. These BMPs will be selected to achieve maximum sediment removal and represent the best available technology that is economically achievable.

Excavation for the project would be required, and it is likely that groundwater would be encountered in some form. If groundwater is encountered, temporary construction dewatering may be necessary. Dewatering could alter groundwater flow patterns or mobilize contaminants in surface soils. Construction dewatering details would not be known until the design is complete, but it would likely be accomplished by a combination of measures, including the use of sump pumps where low-volume seepage is encountered. Disposal of dewatering water would depend on the method

selected, volume of water, and proximity to water bodies. Water may be directed to settlement ponds or Baker tanks prior to discharge to creeks.

Water Wells

Wellhead Protection and Sanitary Control Areas

One drinking water well owned and operated by the Trentwood Irrigation District No. 3 is located at the corner of Progress Road and Wellesley Avenue, approximately 1,200 feet west of the proposed eastern terminus of the proposed Urban Connector Alignment at Sullivan Road and Wellesley Avenue (Figure 4.2-1). Since construction of the roadway could potentially introduce pollutants onto the soil surface and possibly into the groundwater, it will be important for Spokane County to coordinate with the Trentwood Irrigation District regarding construction activities and prescribed stormwater BMPs within or in close proximity to the District's designated wellhead and sanitary control protection areas.

As part of a hydrogeologic study of the project area, GeoEngineers stated that excavation is the construction activity most likely to impact adjacent domestic water sources (GeoEngineers 2005). Based on the hydrogeologic study conducted by GeoEngineers, the risk for affecting groundwater wells during construction is greatest at three proposed cut areas along the alignment. These areas are shown in Table 4.2-1.

Table 4.2-1. Significant Cuts along the Alignment

Area	Approximate Stationing (feet) ¹	Approximate Maximum Cut Depth (feet)	Water Well Report Search Area (Township, Range, and Section) ²
6 (located at Jensen Road on Bigelow Gulch Road)	149+50 to 157+00	8	S30, T26N, R44E
7 (located west of Old Argonne Road on Bigelow Gulch Road)	185+50 to 191+00 ³	14	E1/2, S30, T26N, R44E W1/2, S29, T26N, R44E
8 (located east of Old Argonne Road on Bigelow Gulch Road)	195+00 to 198+50	1	W1/2, S29, T26N, R44E

¹ Approximate stationing and maximum cut depth were estimated from undated preliminary project plans provided by Spokane County, December 16, 2004.

² Standard Township and Range System abbreviations are used. For example, E1/2, S26, T26N, R43E refers to the east half of Section 26, Township 26 North, Range 43 East.

³ The cut that extends from about Station 185+50 to Station 191+00 was associated with a previous study completed by GeoEngineers, October 12, 2005.

Source: GeoEngineers 2005

Impacts on groundwater quantity and quality are possible, particularly if blasting is required because of the low storativity and high groundwater velocities for the

shallow basalt aquifer (GeoEngineers 2005). Construction was completed in 2005 in Area 7 as part of the Argonne/Bigelow Road intersection improvement project. According to Spokane County Public Works, blasting is unlikely based on past construction experience along Bigelow Gulch Road. Potential construction areas with rock outcroppings appear to be such that ripping will be the appropriate means of excavation (Hemmings pers. comm.).

How would operation of the project affect groundwater in the area?

During project operation, pollutant loading generated by road runoff on the 90.7 acres of impervious surface would enter the project's stormwater detention and treatment system. Without proper treatment, pollutants carried in stormwater can move through soil and have the greatest potential for contributing to aquifer contamination. Stormwater may contain hydrocarbons as well as soluble pollutants (e.g., nitrate, sodium, chloride, soluble heavy metals, and organic compounds) that would require treatment as required by the Spokane County Guidelines for Stormwater Management. The 1998 stormwater manual is presently in effect; however, the draft 2005 manual is currently under review, and will most likely be adopted and in effect by the time this project is approved.

Approximately 33% of the impervious surface area would be within the Little Spokane watershed, with the remaining 67% within the Middle Spokane River watershed and associated with the SVRP.

The proposed action would increase the amount of impervious surface within the project limits by approximately 164%. With projected Average Daily Traffic (ADT) of 19,000 vehicles per day in the design year 2025, the proposed Urban Connector Alignment is classified as a "moderate-use" project based on guidelines set forth in the draft Spokane Regional Stormwater Manual (Spokane County et al. 2005) and the Ecology *Stormwater Management Manual for Eastern Washington* (2004). Moderate-use sites are expected to generate sufficient concentrations of metals so that additional runoff treatment is required prior to discharge.

Because the project occurs within a CARA, stormwater water quality treatment facilities will be installed to treat the first half-inch of stormwater runoff produced by the project prior to discharge (Spokane County 1998b). This first half-inch of runoff contains approximately 90% of the contaminants from any runoff event. The treatment method chosen must remove approximately 95% of total suspended solids, 50% of dissolved solids, 20 to 50% of nitrates, 80% of total nitrogen, 90% of phosphorus, 80% of metals, 60% of organic chemicals, and 99% of bacteria (Spokane County 1998b).

A number of methods are commonly used to treat stormwater including bio-infiltration swales, biofiltration channels, vegetated filter strips, wet ponds, extended detention evaporation ponds, and standard evaporation ponds. The proposed

stormwater design for the project uses swales and infiltration as the means to collect, treat, and disperse stormwater. Once collected, surface water runoff from the east end of Weile Avenue to Forker Road would be dispersed to infiltration trenches adjacent and parallel to the roadway. In the areas of steeper grades, runoff would be collected from the roadway and directed to detention/treatment ponds prior to discharge to streams. Natural channels (including natural seasonal swales) will not be used as biofiltration facilities per Ecology guidelines (Ecology 2004). Furthermore, critical areas will be preserved or enhanced and will not be used as sediment treatment areas.

The swales and detention ponds would provide pretreatment by removal of solids and some separation of oil and water prior to infiltration or discharge to streams. Infiltration would be designed to infiltrate the 24-hour, 25-year frequency storm runoff from the project's impervious surface areas within 72 hours. The stormwater treatment system design would be consistent with the adopted version of the Spokane Regional Stormwater Manual in effect at the time of project approval.

Under current conditions, most of the stormwater runoff in the vicinity of the project flows off the roads and into roadside ditches, streams, or adjacent lawns where the stormwater either infiltrates into the ground, or in the case of Bigelow Gulch Creek, mixes with stream flow and ultimately discharges into the floodplain west of Palmer Road. With the exception of the Argonne Road/Bigelow Gulch Road intersection project completed in 2005, stormwater receives no detention or treatment prior to entering the streams.

Under the proposed action, all stormwater generated from the roadway, including previously untreated areas and new impervious surface will be treated for quality and quantity. Due to the new alignment some portions of existing roadway would be abandoned and will not receive stormwater treatment but instead would be restored as wildlife habitat.

Potential impacts from discharges of contaminants to groundwater from stormwater will be reduced with implementation of the measures dictated by the Spokane County Guidelines for Stormwater Management (Spokane County et al. 2005) and the approved stormwater BMPs in the WSDOT *Highway Runoff Manual* (M31-16) (WSDOT 2006b). Stormwater treated using appropriate Ecology-approved BMPs will meet or exceed Washington State groundwater quality standards for contaminants commonly found in stormwater and these water quality standards meet or exceed state drinking water standards.

What are the indirect effects on groundwater?

Indirect effects are those caused by the proposed action that occur later or farther removed in distance, but that are still reasonably foreseeable.

The proposed Urban Connector Alignment could lead to the use of groundwater resources or discharge of stormwater and potential pollutants to groundwater. Modifications from development resulting from the proximity of the alignment could also occur.

As required by SCC, all development would be subject to the regulations to protect groundwater, particularly in the CARA, and the use of groundwater as a water supply would be subject to Ecology and Spokane Health District rules and regulations. Assuming that all requirements for such use would be fulfilled, the indirect impacts would not be considered significant.

What measures are proposed to minimize effects to groundwater?

Groundwater protection BMPs will be Ecology-approved and appropriate for the site, and will include:

Construction

- Spokane County will enforce the CARA regulations (Section 11.20.075) of the Spokane County Ordinance to prevent fuels, oils, solvents, and other potentially hazardous materials from entering groundwater (see Section 4.15 for other mitigation measures regarding hazardous materials).
- Prior to construction, Spokane County will coordinate with Trentwood Irrigation District No. 3 and will define BMPs for construction and stormwater management and spill/incident response planning associated with the proposed Urban Connector Alignment in the vicinity of the District's water supply wells.
- Spokane County will also prepare a drainage report, a geotechnical site characterization report, and a downstream/down-gradient analysis to complete the final stormwater design. Soil Cation Exchange Capacity (CEC) testing will be completed to substantiate the treatment soil composition. These reports will specify if treatment other than bio-filtration will be needed to protect groundwater resources.
- Spokane County will prepare and implement a spill prevention, control, and countermeasures plan (SPCC) following WSDOT specification 1-07.15(1) for road, bridge, and municipal construction. Spokane County will use the *Critical Materials Handbook* to define BMPs to ensure that any construction-related materials spilled or leaked onsite are contained and cleaned up.
- Spokane County will conduct pump tests prior to construction, where recommended by the geotechnical engineer for the project, to estimate the influence area from dewatering and develop a dewatering plan to monitor groundwater withdrawal, avoid groundwater contamination, and to collect and treat groundwater prior to discharge.

The proposed action would require a National Pollution Discharge Elimination System (NPDES) general permit and SWPPP, and a TESC plan that will incorporate BMPs previously identified. Figure 4.1-2, sheets 1 and 2, show the proposed construction stormwater controls. Groundwater protection BMPs will include:

- delineating clearing limits to protect sensitive natural resource areas;
- establishing stabilized construction access points;
- protecting slopes using a combination of grading, seeding, and mulching;
- installing silt fences;
- isolating and controlling stormwater runoff from material storage areas, construction areas, and fueling areas; and
- protecting existing storm drain inlets.

Water Wells

As previously mentioned, construction (cuts and blasting) of the proposed action could potentially affect water quality and quantity in private water wells adjacent to the roadway. To address and mitigate for this potential impact, Spokane County will:

- identify and locate in the field, any well and/or spring located within 1,000 feet of the roadway alignment;
- evaluate the water supply source hydrogeology to estimate source vulnerability where recommended by the geotechnical engineer for the project or as requested by applicable property owners;
- establish pre-construction baseline groundwater quality and quantity at the subject water wells, including capacity testing and flow measurements of spring sources provided that owner consent can be obtained;
- conduct post-construction, groundwater quality and quantity measurements of the wells and springs and compare with baseline testing results; and
- provide an alternate source of water (e.g., new well or extension of water supply from nearest irrigation district) for wells impacted by the project.

Operations

Significant adverse impacts on groundwater resources will be avoided through compliance with the adopted Spokane Regional Stormwater Manual at the time of project design. The proposed action will also meet the level of stormwater management established by the WSDOT *Highway Runoff Manual* (WSDOT 2006b) and *Stormwater Management Manual for Eastern Washington* (Ecology 2004).

The current Spokane County guidelines state:

All land developed within the Aquifer Sensitive Area...where deemed feasible by Spokane County Engineer, shall treat stormwater runoff prior to discharge to surface water or groundwater.

A long-term stormwater management plan for the project will specify BMP control requirements in accordance with the Spokane County Guidelines for Stormwater Management. The key elements of the long-term plan could include the following practices:

- All stormwater contacting paved roadway surfaces will be collected for pretreatment prior to discharge.
- All collected stormwater will be diverted to detention structures to minimize hydrologic impacts on streams caused by flow rate increases during storm events.
- Collected stormwater will be treated in sedimentation structures to control sediment or particle-bound pollutants.
- Grass-lined percolation basins will be used; however, oil-water separators will probably not be used, because the forecasted vehicle volumes on the roadway are below Ecology's threshold value requiring use of oil-water separators.

Spokane County will also prepare a drainage plan based on estimated precipitation rates and surface runoff in accordance with the criteria set forth in the guidelines.

Analysis of the effects of the proposed action on groundwater indicates that none would rise to a level of significance. The construction, water well protection, and operation measures listed in this section were considered in combination with proposed mitigation listed in Section 4.2.3, Bigelow Gulch Road EA dated January 2006 in reaching this conclusion.

No Action

How would construction affect groundwater?

Under No Action, construction of the Urban Connector Alignment would not occur and there would be no impact to groundwater.

How would operation affect groundwater?

Stormwater runoff from the existing roadway (with the exception of the recently constructed Argonne Road intersection) receives no detention or treatment prior to entering streams. Under No Action, untreated stormwater carrying pollutants, would continue to discharge to groundwater via runoff. Roadway runoff volumes would remain unchanged because impervious surfaces would not increase under No Action. However, future increases in traffic volumes on the existing road surface would result in higher levels of pollutants (suspended solids, petroleum hydrocarbons, and metals) in surface runoff, a portion of which may infiltrate to groundwater.