



**CITY OF PROSSER, WASHINGTON
NOTICE OF COMPLETE APPLICATION AND
OPTIONAL DETERMINATION OF NONSIGNIFICANCE [DNS]**

Viking Homes

**Notice of Application and Optional Determination of Non-significance posted
November 20, 2019**

Type of Application: SEPA Checklist / Change of Zone
Date of Application: September 24, 2019 November 7, 2019
Name of Applicant: Viking Homes
Location of Project: Parcel 110844000006000

Description of proposed project: A rezone of a portion of the parcel from Steep Slope Residential (SSR) to Residential Medium Density (RM). The rezone consists of approximately 94.5 acres with the potential for future development and 43.5 acres to remain Steep Slope Residential in order to preserve the critical areas from higher density development.

Other permits: NA

The following additional permits are associated with this application: SEPA Checklist

The following studies have been required pursuant to RCW 36.70B.070: NA

Preliminary determination of consistency:

The City has determined that this application is consistent with the City's Development Regulations and Comprehensive Plan.

Environmental Review: The City is using the optional process contained in Washington Administrative Code (WAC) Section 197-11-355 to make its threshold determination. The City expects to issue a **Determination of Non-significance (DNS)** for this project. This may be your only opportunity to comment on the environmental impacts of the proposed project. A copy of the subsequent Threshold Determination for the project may be obtained upon request. The lead agency, the City of Prosser, will not act on this proposal for 14 days from the published date below.

City of Prosser Contact: Steve Zetz
Planning Director City of Prosser
601 7th Street, Prosser, WA, 99350

Comments: The public is invited to comment on the application and environmental review. The public comment period shall be **15-days and will begin November 20, 2019**. All public comments received on the Notice of Application must be received by the City of Prosser **no later than 5:00 pm, December 5, 2019**. Comments may be mailed or personally delivered to the;

Attn: Prosser City Clerk
601 7th Street,
Prosser, Washington, 99350

All available information and related documents for the application may be viewed at the City Clerk's Office, located at Prosser City Hall, 601 7th St, Prosser, Washington, between the hours of 8:00 a.m. and 5:00 p.m. Monday through Friday, excluding official holidays, or may be viewed at www.cityofprosser.com.

The person(s) receiving this notice may request a copy of the final decision in this matter.

The final decisions may be appealed in accordance with the Land Use Petition Act (RCW 36.70C).

City of Prosser **NOTICE OF PUBLIC HEARING** **Special Meeting December 12, 2019**

NOTICE IS HEREBY GIVEN by the undersigned City Planner of the City of Prosser, Washington, that the Planning Commission will hold a Special Meeting on December 12, 2019 at 6:00 p.m. or as soon thereafter as possible, in the City Council Chambers, City Hall, 601 7th Street, Prosser, Washington, for the purpose of receiving public comment on the following applications

1. Application for change of zone from Commercial to Residential High Density for parcel 135943000004001 commonly known as the property located east of Northwest Farm Supply.
2. Application for change of zone for a portion of parcel 110844000006000 commonly known as the land south and west of Kelandren Drive from Steep Slope Residential (SSR) to Residential Medium Density (RM).
3. Application for change of zone from Residential Medium Density (RM) to Residential High Density (RH) for parcel 111841012288006 commonly known as the land south of Park Avenue between Guernsey Street and Market Street.

Discussion Items will include changes to Chapter 17 and Chapter 18 of the Prosser Municipal Code

The City Hall Council Chambers is wheelchair accessible. American with Disabilities Act (ADA) accommodations are available upon request to the City Clerk at least 2 days in advance by calling (509) 786-2332.

All available information and related documents for the application may be viewed at the City Clerk's Office, located at Prosser City Hall, 601 7th Street, Prosser, Washington, between the hours of 8:00 a.m. and 5:00 p.m. Monday through Friday, excluding official holidays or may be viewed at www.cityofprosser.com. All interested persons may appear and provide testimony or provide³ written testimony at the public hearing or prior to the public hearing.

Written comments not received by December 5, 2019 will not be included in the Commission Packet.

The person(s) receiving this notice may request a copy of the final decision in this matter.

The final decisions may be appealed in accordance with the Land Use Petition Act (RCW 36.70C).

Dated: November 15, 2019



Steve Zetz
City Planner
City of Prosser
2019

Published: Prosser Record Bulletin
Publish Date: November 20,



FILE COPY

City of Prosser
NOTICE OF PUBLIC HEARING
Special Meeting December 12, 2019

NOTICE IS HEREBY GIVEN by the undersigned City Planner of the City of Prosser, Washington, that the Planning Commission will hold a Special Meeting on December 12, 2019 at 6:00 p.m, or as soon thereafter as possible, in the City Council Chambers, City Hall, 601 7th Street, Prosser, Washington, for the purpose of receiving public comment on the following applications

1. Application for change of zone from Commercial to Residential High Density for parcel 135943000004001 commonly known as the property located east of Northwest Farm Supply.
2. Application for change of zone for a portion of parcel 110844000006000 commonly known as the land south and west of Kelandren Drive from Steep Slope Residential (SSR) to Residential Medium Density (RM).
3. Application for change of zone from Residential Medium Density (RM) to Residential High Density (RH) for parcel 111841012288006 commonly known as the land south of Park Avenue between Guernsey Street and Market Street.

Discussion Items will include changes to Chapter 17 and Chapter 18 of the Prosser Municipal Code

The City Hall Council Chambers is wheelchair accessible. American with Disabilities Act (ADA) accommodations are available upon request to the City Clerk at least 2 days in advance by calling (509) 786-2332.

All available information and related documents for the application may be viewed at the City Clerk's Office, located at Prosser City Hall, 601 7th Street, Prosser, Washington, between the hours of 8:00 a.m. and 5:00 p.m. Monday through Friday, excluding official holidays or may be viewed at www.cityofprosser.com. All interested persons may appear and provide testimony or provide3 written testimony at the public hearing or prior to the public hearing.

Written comments not received by December 5, 2019 will not be included in the Commission Packet.

The person(s) receiving this notice may request a copy of the final decision in this matter.

The final decisions may be appealed in accordance with the Land Use Petition Act (RCW 36.70C).

Dated: November 15, 2019



Steve Zetz
City Planner
City of Prosser

Published: Prosser Record Bulletin
Publish Date: November 20, 2019



LAND USE ZONING & PERMIT APPLICATION

CITY OF PROSSER, WASHINGTON

APPLICANT'S NAME Knutzen Engineering

PROJECT NAME Viking Homes Prosser

PARCEL INFORMATION (Include all parcel(s) information. Attach additional sheets, if necessary.)

Project Address: _____
(Leave blank if not assigned)

Parcel Number (Property Tax Account Number): #110844000006000
SECTION 10, TOWNSHIP 8 NORTH, RANGE 24: PORTION DESCRIBED AS FOLLOWS: COMMENCING AT A ONE-INCH
Legal Description: IRON PIPE THAT IS THE EAST QUARTER CORNER OF SECTION 10, TOWNSHIP 8 NORTH, RANGE 24, EAST, RECORDS OF BENTON COUNTY, STATE OF WASHINGTON: THENCE SOUTH 21'

PROPERTY OWNER INFORMATION

Name: Ina Honarkhah Wilma Leyendekker-Cobb

Address: 23210 SE 24th ST City: Sammamish State: WA Zip: 98075

Phone: _____ Cell Phone: 206-755-9980 (Ina) & 253-653-8223 (Wilma)

Email _____ (email will not be used for transmittal of official findings)

OWNERS AUTHORIZED AGENT: Scott Krajack

Address: 19425 East Broadway Ave City: Spokane Valley State: WA Zip: 99016

Phone: (509)241-3555 Cell Phone: 208-659-4833

Email: scott@vikinghomes.com (email will not be used for transmittal of official findings)

PROJECT INFORMATION

- | | |
|--|---|
| <input type="checkbox"/> Site Review | <input type="checkbox"/> Conditional Use (requires Conditional Use form LUA-S1) |
| <input type="checkbox"/> Annexation | <input type="checkbox"/> Variance (requires Variance request form LUA-S2) |
| <input checked="" type="checkbox"/> Change of Zone | <input type="checkbox"/> Similar Use |
| <input type="checkbox"/> Accessory Dwelling Unit | <input type="checkbox"/> Encroachment |
| <input type="checkbox"/> Overlay Zone | <input type="checkbox"/> Adult Family Home |
| <input type="checkbox"/> Right-of-Way Use Permit | <input type="checkbox"/> Continuation and/or Minor Alteration of Non-Conforming Use |
| <input type="checkbox"/> Other | <input checked="" type="checkbox"/> SEPA |

PROJECT DESCRIPTION

The construction of a residential subdivision with associated utilities and stormwater drainage. A zone change from Steep Slope Residential to Medium Residential is being requested.

City of Prosser
601 7th Street
Prosser WA 99350
(509) 786-2332

PLEASE ATTACH THE REQUIRED VICINITY MAP

ESTIMATED PROJECT VALUATION: \$ To be determined

CONTRACTOR INFORMATION

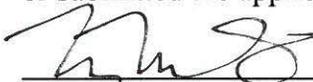
Company Name: To be determined. Email: _____

Contact Person: _____ Contact Phone: _____

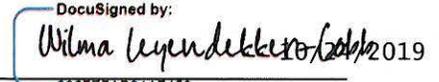
Address: _____ City: _____ State: _____ Zip: _____

Contractor's Registration No.: _____ Expiration Date: _____

I, the undersigned, do hereby certify that, to the best of my knowledge, the information on this application and other submitted information is true and correct. In addition, I understand that acceptance of this application and fees does not constitute submittal of a valid application until so informed by the City. I have attached, enclosed, or submitted the applicable fees for this application.

 11/6/2019
 Applicant Signature Date

DocuSigned by:
 24/2019
 Owner Signature
 Ina Honarkhah

DocuSigned by:
 2019
 Date
 Wilma Leyendekker-Cobb

If the property owner is other than an individual such as a corporation, partnership or agency, please provide proof of signatory authorization.

SITE REVIEW

Application must include the following.

1. Critical Areas Worksheet
2. Proof of Legal Lot
3. Proof of ownership or authority
4. 25 year Storm Water Calculations stamped by an engineer
5. Site Plan Drawing which shows....
 - All existing and proposed lot lines.
 - The location of all existing structures to remain and the location of all proposed structures.
 - N/A The location of all utilities proposed to be used.
 - N/A The proposed number and location of water meters.
 - N/A The location of all solid waste receptacle areas.
 - N/A The method of handling storm water removal.
 - N/A All easements and right-of-ways.
 - N/A All off-street parking and loading areas.
 - N/A All driveway locations.
 - N/A All landscaping, outdoor lighting and fencing..
 - A north arrow.
 - Scale of drawing

Deposits are required at the time an application is submitted. You will still get a monthly bill for actual costs incurred. Your deposit will not be refunded until the project has closed.

SITE REVIEW	\$250.00 Deposit
VARIANCE	\$300.00 Deposit
SEPA	\$500.00 Deposit
ANNEXATION	\$500.00 Deposit
ZONE CHANGE	\$750.00 Deposit
CONDITIONAL USE	\$500.00 Deposit

UPSTREAM BASIN ANALYSIS INCLUDED

CITY USE ONLY

RECEIVED BY _____ DATE _____

APPROVED BY _____ DATE _____

RETURNED BY _____ DATE _____

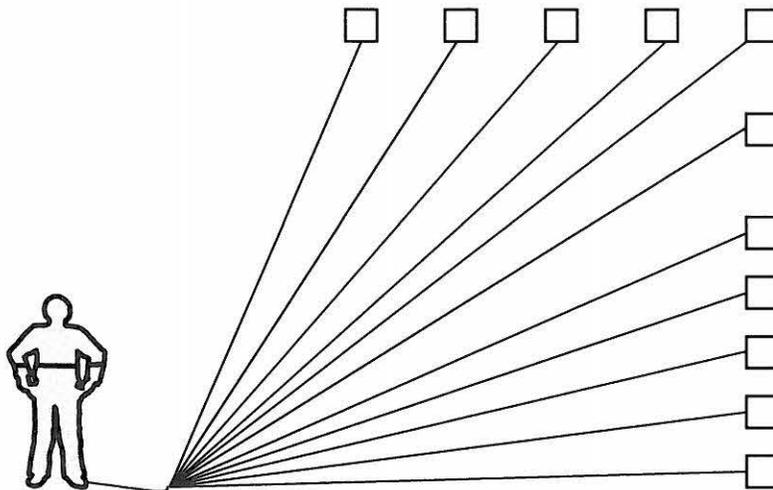
REASON FOR APPLICATION RETURN _____

CRITICAL AREAS WORKSHEET

Is there any standing or running water on the surface of the property or on any adjacent property at any time during the year?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Does the site have steep slopes with little to no vegetation?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Has any portion of the property or any adjacent property ever been identified as a wetland or swamp?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Does the site contain high percentages of silt and/or very fine sand?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are any willows, skunk cabbage, alders, cottonwoods, or cattails present on your property or adjacent properties?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Does the site contain ground water seepage or springs near the surface of the ground?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are there any indications of any portion of the property or on any adjacent property of rockslides, earthflows, mudflows, landslides, or other slope failure?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Please indicate which line best represents the steepest slope found on your property. (Check appropriate slope percentage box and mark correct box on diagram). <input type="checkbox"/> 0%-5% <input type="checkbox"/> 5%-10% <input type="checkbox"/> 10%-15% <input type="checkbox"/> 15%-20% <input type="checkbox"/> 20%-25% <input checked="" type="checkbox"/> 25%+	
Are there any fish and wildlife habitat conservation areas on or adjacent to the property?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Is the land development within an Aquifer Recharge Area?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Please describe the site conditions for any "yes" answers:			
The site is currently zoned SSR and has steep slopes on the south half of the property encompassing approximately 43.5 acres.			
The steepest slope on site is approximately 40% in the area that will remain undeveloped. The steepest slope in the future development area is approximately 20%. Approximately 3.9 acres of the northeast corner of the site is located in the Aquifer Recharge Area.			
Who prepared this information?			
<u> Knutzen Engineering </u>			

How to Determine the Slope of a Hillside

The slope is considered the vertical ↑ measure as it relates to the horizontal → measure. For example, if a slope has a rise of one foot over a four foot horizontal distance, the slope would be 1:4 or a 25% slope (1÷4).



SEPA ENVIRONMENTAL CHECKLIST

Purpose of checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

Instructions for applicants:

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Instructions for Lead Agencies:

Please adjust the format of this template as needed. Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

Use of checklist for nonproject proposals:

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the [SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS \(part D\)](#). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in Part B - Environmental Elements –that do not contribute meaningfully to the analysis of the proposal.

A. Background

1. Name of proposed project, if applicable:
Viking Homes Prosser
2. Name of applicant:
Knutzen Engineering

3. Address and phone number of applicant and contact person:
Nathan Machiela; 5401 Ridgeline Dr Suite 160, Kennewick, WA 99338.
4. Date checklist prepared:
10/11/2019
5. Agency requesting checklist:
City of Prosser
6. Proposed timing or schedule (including phasing, if applicable):
Change of zone 12/2019, Preliminary Plat 3/2020, Construction 6/2020-12/2026
7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.
Yes, the project will include a change of zone request, a preliminary plat, and approximately 6 phases of construction of roads and infrastructure for 289 single family residential homes.
8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.
A geotechnical survey will be prepared. An archaeological study will be prepared if required by the local jurisdiction.
9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.
None known of.
10. List any government approvals or permits that will be needed for your proposal, if known.
City of Prosser Grading Permit; City of Prosser Building Permit, City of Prosser Right of way and utility permits, Washington State Department of Transportation approval.
11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)
The proposal is to create a major subdivision with 289 lots on 138 acres. Approximately 94.5 acres will be developed and 43.5 acres of property on the south half of the site will remain undeveloped due to the steep slopes. City standard residential streets will be constructed to serve the subdivision. Access to the site will be from Kelandren Drive and Richards Road. The project is bounded on a majority of the northern property line by an irrigation canal known as Prosser West Lateral operated by Sunnyside Valley Irrigation District. Public sewer, water, power, gas and communication mains and services will be constructed to service the new housing. Storm water conveyance and infiltration facilities will be constructed to collect and dispose of storm water.
12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you

are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

Parcel #110844000006000, Parcel located at the corner of SW Kelandren Dr and the Prosser West Lateral Canal. Parcel extends South of the Prosser West Lateral canal and West of SW Kelandren Dr until you reach S 1500 Pr SW.

B. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site:

(circle one): Flat, rolling, hilly, **steep slopes**, mountainous, other _____

b. What is the steepest slope on the site (approximate percent slope)?

42% slope.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.

Finley stony fine sandy loam and Warden silt loam.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

The steep slopes appear stable and minimal sluffing has taken place on-site.

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.

Approximately 94.5 acres would be graded to accommodate the new subdivision. We anticipate between 300,000 and 450,000 CY of material to be moved on-site. The site is expected to balance without import or export of material.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

Wind and stormwater erosion could occur as a result of clearing and construction activity but will be minimized with the use of BMP's, such as silt fencing, construction entrance and dust control watering.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

Approximately 40% of the site will be impervious surfaces.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

Standard erosion control and BMP methods will be used, such as catch basin protection, silt fencing, and stabilized construction entrances. Dust during construction will be controlled by the use of a water truck as necessary.

2. Air

- a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known.

During construction dust and exhaust may occur. The final project will have vehicular traffic which will contribute to vehicle emissions.

- b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

None known.

- c. Proposed measures to reduce or control emissions or other impacts to air, if any:

Dust control measure will be implemented in accordance with recommendations by the Department of Ecology and the Benton County Clean Air Authority. Measures include but are not limited to watering, lowering speed limit of construction vehicles, dust control with a watering truck and reducing the amount of dust-generating activities on windy days.

3. Water

- a. Surface Water:

- 1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

Yes, the Yakima river is approximately 0.34 miles away from the site.

- 2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

No.

- 3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

None.

- 4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

No.

- 5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

No.

- 6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

No.

- b. Ground Water:

- 1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities

withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.

Groundwater will not be withdrawn in this site. Stormwater generated by impervious surfaces will be captured and disposed of via surface and subsurface infiltration.

- 2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

N/A.

c. Water runoff (including stormwater):

- 1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

The new impervious area's on site will generate increased stormwater runoff. The stormwater system for disposal will consist of catch basins, conveyance pipes and subsurface infiltration trenches and above ground stormwater ponds.

- 2) Could waste materials enter ground or surface waters? If so, generally describe.

No, the proposed system has a built-in water oil separator device (Inverted tee) to eliminate storm water contamination.

- 3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.

The drainage patterns will be altered within the project boundaries by constructing roads and grading the lots and directed drainage different than the natural pattern. The drainage collected through catch basins will be routed to infiltration trenches or ponds to mimic the natural drainage patterns as close as possible.

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:

Runoff generated from previous surfaces will either infiltrate into underlying soils or flow to on-site infiltration facilities. Stormwater disposal will be designed by a licensed engineer and submitted for review to the City of Prosser.

4. Plants

a. Check the types of vegetation found on the site:

deciduous tree: alder, maple, aspen, other

evergreen tree: fir, cedar, pine, other

shrubs

grass

pasture

crop or grain

Orchards, vineyards or other permanent crops.

wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other

____ water plants: water lily, eelgrass, milfoil, other
____ other types of vegetation

- b. What kind and amount of vegetation will be removed or altered?
Sage brush and desert grasses will be removed as needed for construction. The south 43 acres will remain natural vegetation.
- c. List threatened and endangered species known to be on or near the site.
None known per the Washington Department of Fish and Wildlife.
- d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:
Plants and trees will be planted in interior landscaped areas and around the perimeter of the site improvements. A large portion of the southern half of the site will remain undeveloped and in its natural state.
- e. List all noxious weeds and invasive species known to be on or near the site.
None known.

5. Animals

- a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site.

Examples include:

birds: hawk, heron, eagle, **songbirds**, other:
mammals: deer, bear, elk, beaver, other:
fish: bass, salmon, trout, herring, shellfish, other _____

- b. List any threatened and endangered species known to be on or near the site.
None have been observed on-site. The Washington State Department of Fish and Wildlife Priority Habitat Species Maps do not identify the site as a priority habitat for any wildlife species.
- c. Is the site part of a migration route? If so, explain.
Yes, the Columbia Basin is part of a migration route for a number of fowl.
- d. Proposed measures to preserve or enhance wildlife, if any:
None proposed.
- e. List any invasive animal species known to be on or near the site.
None known.

6. Energy and Natural Resources

- a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

Electrical will be used for lighting and all appliances. Natural gas may also be used for the completed project for heating and cooling.

b. Would your project affect the potential use of solar energy by adjacent properties?

If so, generally describe.

No.

c. What kinds of energy conservation features are included in the plans of this proposal?

List other proposed measures to reduce or control energy impacts, if any:

Use of LED light fixtures and energy efficient infrastructure. Daylighting of spaces to reduce need for artificial lighting. Project will be in compliance with the current State of Washington energy codes.

7. Environmental Health

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

No.

1) Describe any known or possible contamination at the site from present or past uses.

None known.

2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.

None known.

3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.

N/A.

4) Describe special emergency services that might be required.

Typical emergency services provided through the City will be used for this site.

5) Proposed measures to reduce or control environmental health hazards, if any:

None at this time.

b. Noise

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

Noises in the area are traffic and railroad. These noises are not expected to affect the project negatively.

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

Short term: Construction noises during working hours only while construction is taking place.

Long term: Traffic noise from residents.

3) Proposed measures to reduce or control noise impacts, if any:

Noise impacts from construction activities and ongoing operations are expected to be minimal. All operations will be conducted in a manner compliant with City of Prosser Policies and Washington State Maximum Environmental Noise Levels(Chapter 173-60-040 WAC).

8. Land and Shoreline Use

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe.

Currently the site is undeveloped land. Future development will not affect current land uses on nearby or adjacent properties.

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?

No.

1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:

There is farm land nearby, but it is not expected to effect or be effected by the proposal.

c. Describe any structures on the site.

None.

d. Will any structures be demolished? If so, what?

N/A.

e. What is the current zoning classification of the site?

SSR

f. What is the current comprehensive plan designation of the site?

Steep Slope Residential

g. If applicable, what is the current shoreline master program designation of the site?

N/A

h. Has any part of the site been classified as a critical area by the city or county? If so, specify.

Yes, it is classified as a steep slope critical area, and an aquifer recharge area by the City of Prosser.

i. Approximately how many people would reside or work in the completed project?

Approximately 722 people.

j. Approximately how many people would the completed project displace?

None.

k. Proposed measures to avoid or reduce displacement impacts, if any: _

N/A.

- L. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

The project will be permitted through the local jurisdictions with all applicable zoning ordinances.

- m. Proposed measures to ensure the proposal is compatible with nearby agricultural and forest lands of long-term commercial significance, if any:

N/A.

9. Housing

- a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

Approximately 289 units of medium income housing would be provided.

- b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

None

- c. Proposed measures to reduce or control housing impacts, if any:

The correct impact fees will be paid to the City of Prosser.

10. Aesthetics

- a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

Approximately 30'.

- b. What views in the immediate vicinity would be altered or obstructed?

Partial views of the nearby hills would be partly obstructed for pre-existing nearby home owners.

- b. Proposed measures to reduce or control aesthetic impacts, if any:

All materials and required landscaping will be in accordance with local ordinances. A significant amount of open space will be retained as natural and undeveloped.

11. Light and Glare

- a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

There will be street and house lighting during the dark hours of the day.

- b. Could light or glare from the finished project be a safety hazard or interfere with views?

No.

- c. What existing off-site sources of light or glare may affect your proposal?

None known of.

- d. Proposed measures to reduce or control light and glare impacts, if any:

Proposed lighting will be appropriately screened to direct light downward. All lighting will be in accordance with local codes.

12. Recreation

- a. What designated and informal recreational opportunities are in the immediate vicinity?
Wine tasting is common in the general area. The Yakima River is near the site. A local airport is approximately 3 miles from the site.
- b. Would the proposed project displace any existing recreational uses? If so, describe.
No.
- c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:
N/A.

13. Historic and cultural preservation

- a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers located on or near the site? If so, specifically describe.
No.
- b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.
None known.
- c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.
Internet search for project site Washington State Department of Archeology and Historic Preservation, National Register of Historic Places in Benton County.
- d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.
Upon any discovery of potential or known archaeological resources at the subject property prior to or during future on-site construction, the developer, contractor, and/or any other parties involved in construction shall immediately cease all on-site construction, and shall act to protect the potential or known historical and cultural resources area from outside intrusion, and shall notify, within a maximum period of twenty-four hours from the time of discovery, the City of Prosser Community Development Department of said discovery.

14. Transportation

- a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any.
The site is serviced by SE Kelandren Dr as well as W Richards Rd.

- b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop?
No, the nearest transit stop is about 1.45 miles.
- c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate?
Driveways and offstreet parking would be created. No parking spaces would be eliminated.
- d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private).
Yes, the existing canal crossing on Kelandren Drive will be improved. No other existing streets are planned to be improved at this time.
- e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.
No.
- f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates?
Approximately 289 AM trips and 2,751 ADT according to ITE Trip Generator Manual, land use code 210.
- g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.
No.
- h. Proposed measures to reduce or control transportation impacts, if any:
The development will pay impact fees as determined by the City of Prosser and provide street improvements as required by WSDOT and the City of Prosser.

15. Public Services

- a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe.
Yes, the subdivision will need public services such as fire and police protection. And the new residents will need public services such as public transit, health care, and schools.
- b. Proposed measures to reduce or control direct impacts on public services, if any.
The project will pay impact fees for development and the completed project will provide additional tax revenue for the City.

16. Utilities

- a. Circle utilities currently available at the site:
 electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system,
 other _____

- b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

Natural Gas – Cascade Natural Gas Company

Electricity – Benton PUD

Sewer – City of Prosser

Water – City of Prosser

Internet/Phone/Cable – Charter

Irrigation – City of Prosser

C. Signature

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: _____



Name of signee Nathan Machiela

Position and Agency/Organization Senior Engineer/Knutzen Engineer

Date Submitted: 11/6/2019

D. supplemental sheet for nonproject actions

(IT IS NOT NECESSARY to use this sheet for project actions)

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

Proposed measures to avoid or reduce such increases are:

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

Proposed measures to protect or conserve plants, animals, fish, or marine life are:

3. How would the proposal be likely to deplete energy or natural resources?

Proposed measures to protect or conserve energy and natural resources are:

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?

Proposed measures to protect such resources or to avoid or reduce impacts are:

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

Proposed measures to avoid or reduce shoreline and land use impacts are:

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

Proposed measures to reduce or respond to such demand(s) are:

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.



Upstream Watershed Analysis

Viking Homes – Prosser Subdivision

Prepared For:

Viking Homes LLC
19425 E Broadway
Spokane Valley, WA 99016

Prepared By:

Nathan Machiela, PE
Levi Gilbert, EIT
Project No. 19155



Preparation Date:

November 6, 2019

Table of Contents

1.0	PROJECT AND SITE INFORMATION	1
2.0	METHODOLOGY	3
3.0	WATERSHED ANALYSIS AND CONVEYANCE DESIGN.....	3

Table of Figures

FIGURE 1. VICINITY MAP.....	1
FIGURE 2. EXISTING SITE CONDITIONS.....	1
FIGURE 3. UPSTREAM WATERSHED MAP.....	2

Table of Tables

TABLE 1. WATERSHED MAP LEGEND.....	2
TABLE 2. FLOW AND CAPACITY.....	3

Appendices

APPENDIX A – HYDROCAD REPORT
APPENDIX B – USDA NRCS WEB SOIL SURVEY RESULTS

1.0 PROJECT AND SITE INFORMATION

The proposed subdivision by Viking Homes is located approximately 2.0 miles southwest of downtown Prosser, Washington on Benton County Parcel #:1-1084-400-0006-000, as shown in Figure 1 and 2 below. The parcel is 138 acres and is currently undeveloped with native vegetation. The proposal includes rezoning the property and constructing improvements for nearly 300 residential lots including single family residences, roadways, and infrastructure improvements to serve the future homes. This site is located on the downhill side of an approximately 550-acre watershed that produces approximately 8.2 acre-feet of stormwater runoff during a design event. The site generally drains towards the Yakima River which is located approximately 1/3 of a mile north of the site.



Figure 1. Vicinity Map.
(Google Maps Image)



Figure 2. Existing Site Conditions.
(Google Earth Image)

The NRCS Web Soil Survey classifies the site soil as a variation of either stony loam or silty loam depending on the location. These soils have a saturated hydraulic conductivity ranging from as low as 1.28 in/hr and as high as 42.6 in/hr. However, during the evaluation of the watershed it was assumed that no infiltration occurred prior to the stormwaters arrival to the proposed conveyance system. The soil type is classified as a type C soil with grass cover which yields a CN value of 74. South of the basin line shown in figure 3, the topography slopes to the south with a distinct basin line at the top of slope.

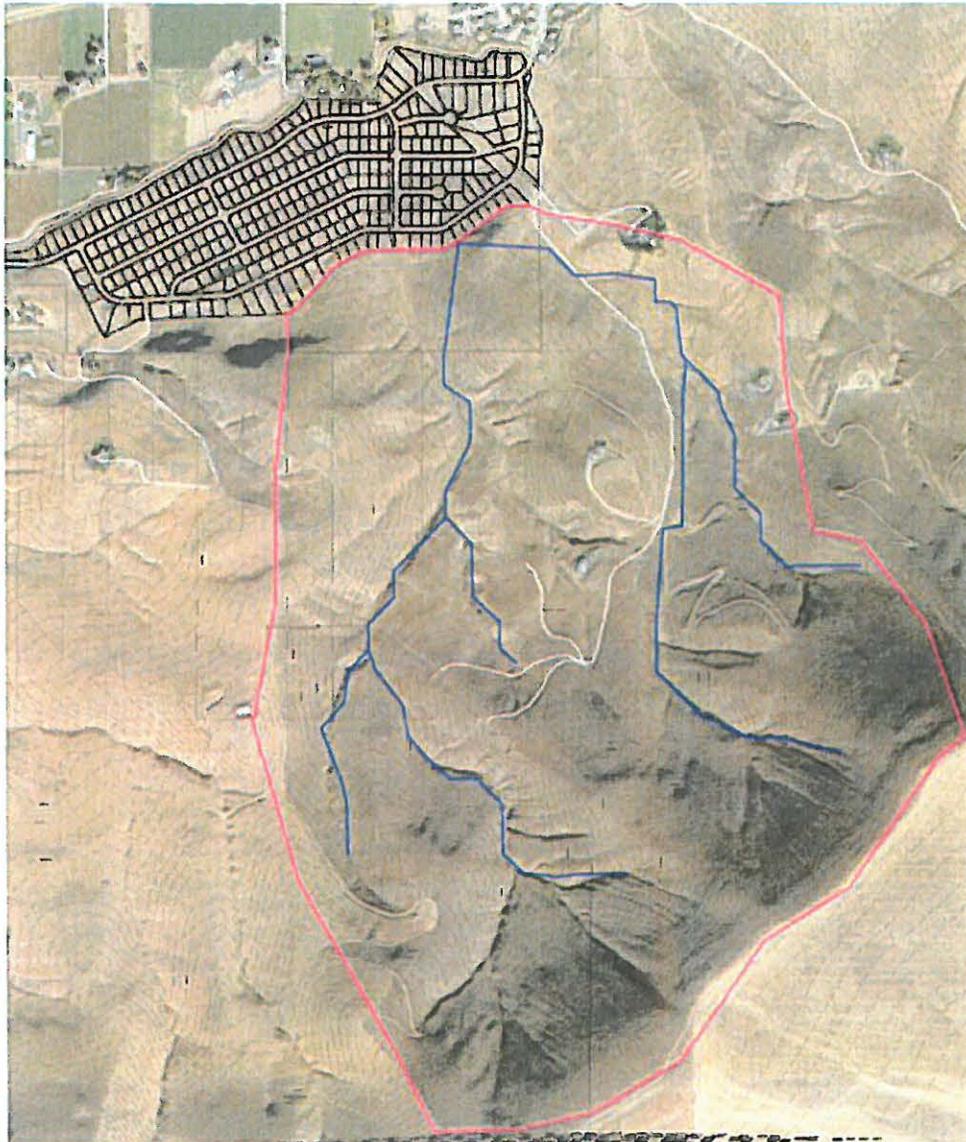


Figure 3. Upstream Watershed Map.

Table 1. Watershed Map Legend.

Line Type	Description
	Upper Ridgeline of Watershed
	Channel Locations within Watershed

2.0 METHODOLOGY

The Watershed Analysis was developed in accordance with the Stormwater Management Manual for Eastern Washington (SMMEW).

The Stormwater modeling was performed using HydroCAD 10.0 and all Stormwater calculations were completed utilizing the SCS TR-20 method. The Watershed design storm event was the 25-Year, Type IA Design Storm having a 24-hour rainfall total of 1.6 inches per the 25-Year 24-Hour Isopluvials by NOAA Atlas 2 as referenced in the SMMEW.

This design was based on the following assumptions:

1. Sheet flow would occur from any exterior ridge or isolated high point within the watershed and would remain as a sheet flow for a maximum of 300-feet. These sheet flow areas were assumed to be passing over range type areas.
2. After 300-feet, the sheet flow would transition to shallow concentrated flow until the stormwater runoff reached a defined open channel. These shallow concentrated flows were assumed to be passing over short grass pastures.
3. Open channels were defined as channels visible on aerial photographs and were assumed to be Earth channels that were clean and winding.

3.0 WATERSHED ANALYSIS AND CONVEYANCE DESIGN

The stormwater produced by the design storm event will be conveyed through the proposed residential subdivision using corrugated metal pipe (CMP) or an equivalent storm pipe material and constructed open channels. The stormwater runoff from the watershed will be directed to a consolidation location in order to convey the flow through the proposed development. The design of the CMP was determined by using specified times of concentration and average slopes based on the type of flow (see Table 2).

Additionally, this design focused on the use of a CMP, if the future development is to use open channel for any portion of the conveyance system further analysis will be required.

Refer to Appendix A for the stormwater calculations in the HydroCAD Report. The scope of this report includes stormwater runoff only.

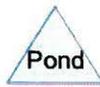
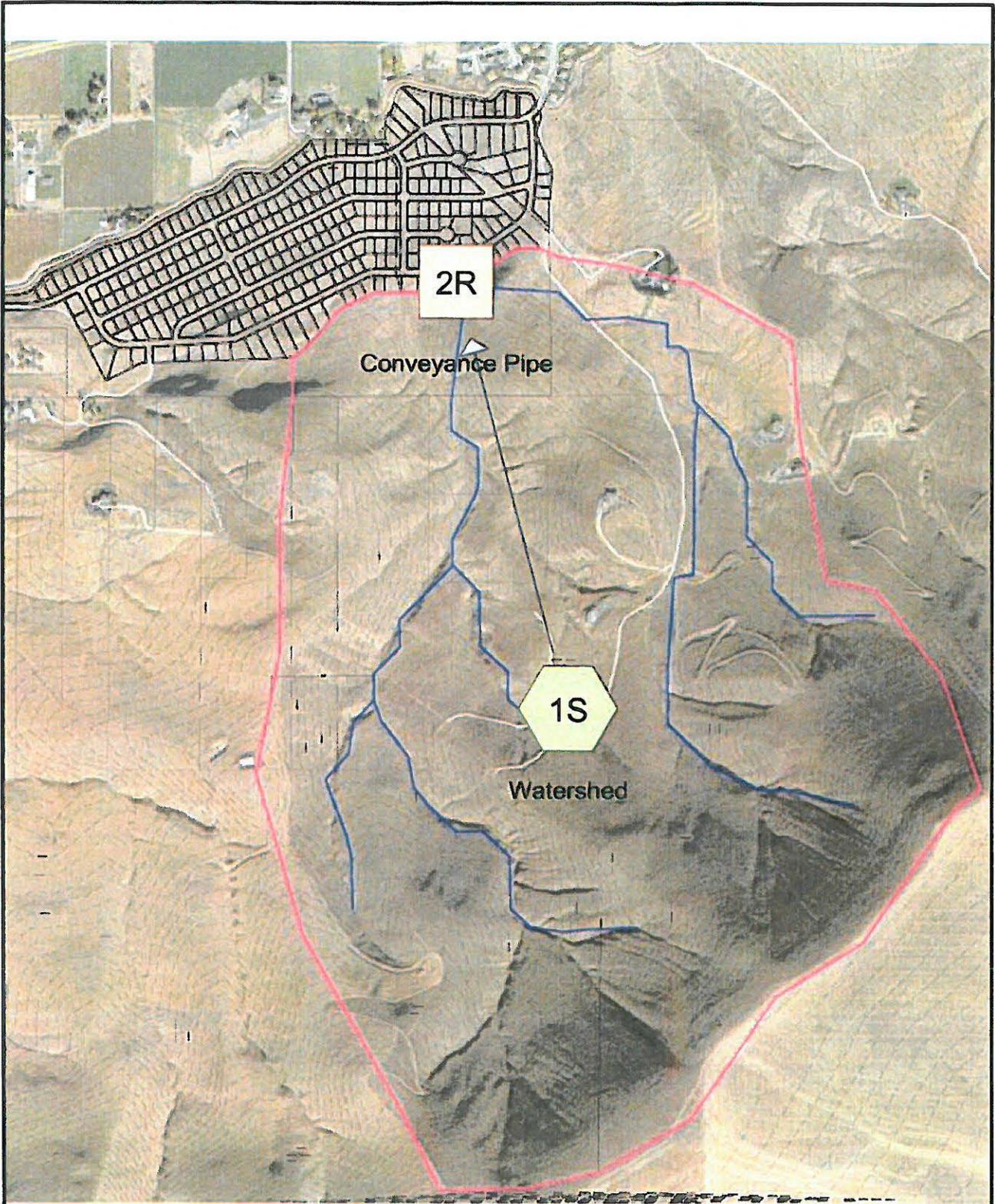
The downstream outfall is expected to stay the same in the post developed condition. Additional on-site analysis should take place with site specific engineering to further evaluate the downstream condition.

Table 2. Flow and Capacity.

Flow Type	Time of Concentration (min)	Average Slope (ft/ft)	Flow Length (ft)	CMP Diameter (in)	Available Capacity	Peak Capacity	Peak Depth
Sheet	14.2	0.23	300				
Shallow Concentrated Flow	6.5	0.23	1,300	18	11.88 cfs	7.28 cfs	0.85'
Open Channel	7.8	0.11	6,236				

APPENDIX A

HydroCAD Report



Routing Diagram for 19155-Watershed
Prepared by Knutzen Engineering, Printed 11/6/2019
HydroCAD® 10.00-25 s/n 09152 © 2019 HydroCAD Software Solutions LLC

19155-Watershed

Prepared by Knutzen Engineering

HydroCAD® 10.00-25 s/n 09152 © 2019 HydroCAD Software Solutions LLC

Printed 11/6/2019

Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
546.650	74	>75% Grass cover, Good, HSG C (1S)
546.650	74	TOTAL AREA

19155-Watershed

Type IA 24-hr Type 1A 25yr Rainfall=1.60"

Prepared by Knutzen Engineering

Printed 11/6/2019

HydroCAD® 10.00-25 s/n 09152 © 2019 HydroCAD Software Solutions LLC

Page 3

Time span=5.00-30.00 hrs, dt=0.05 hrs, 501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Watershed

Runoff Area=546.650 ac 0.00% Impervious Runoff Depth=0.18"
Flow Length=7,836' Tc=28.5 min CN=74 Runoff=7.28 cfs 8.315 af

Reach 2R: Conveyance Pipe

Avg. Flow Depth=0.85' Max Vel=7.06 fps Inflow=7.28 cfs 8.315 af
18.0" Round Pipe n=0.025 L=1,116.0' S=0.0473 ' Capacity=11.88 cfs Outflow=7.28 cfs 8.315 af

Total Runoff Area = 546.650 ac Runoff Volume = 8.315 af Average Runoff Depth = 0.18"
100.00% Pervious = 546.650 ac 0.00% Impervious = 0.000 ac

19155-Watershed

Prepared by Knutzen Engineering

HydroCAD® 10.00-25 s/n 09152 © 2019 HydroCAD Software Solutions LLC

Type IA 24-hr Type 1A 25yr Rainfall=1.60"

Printed 11/6/2019

Page 4

Summary for Subcatchment 1S: Watershed

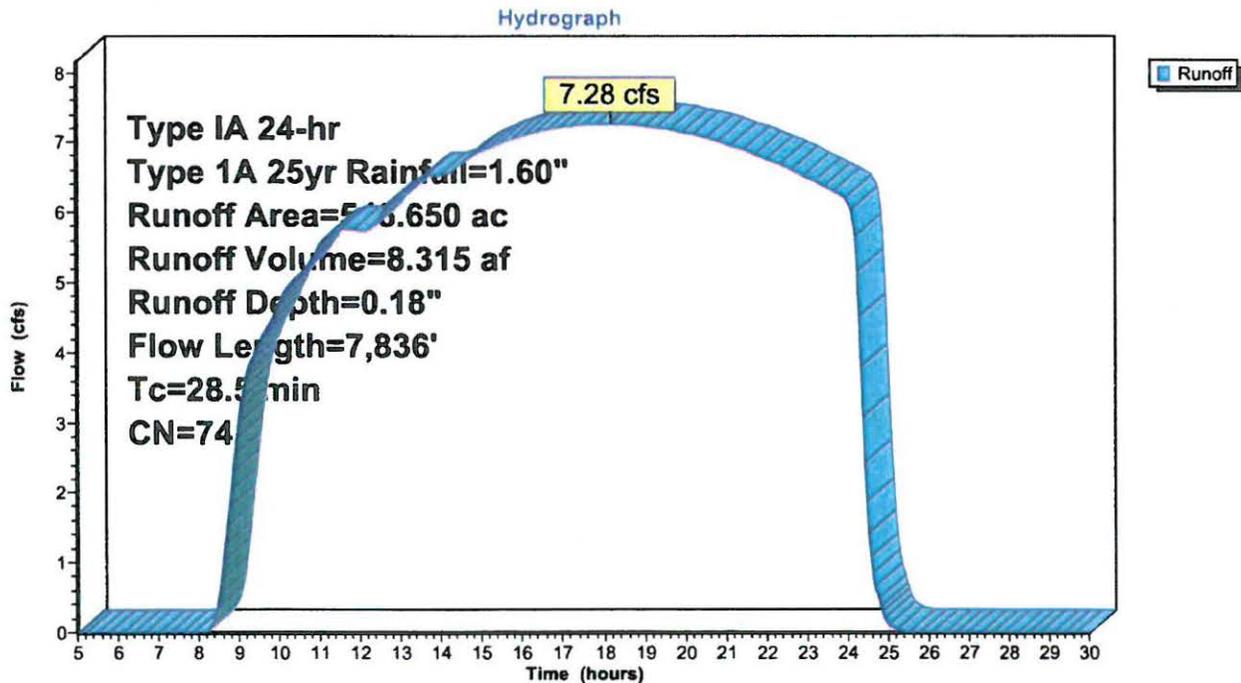
Runoff = 7.28 cfs @ 18.16 hrs, Volume= 8.315 af, Depth= 0.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
 Type IA 24-hr Type 1A 25yr Rainfall=1.60"

Area (ac)	CN	Description
546.650	74	>75% Grass cover, Good, HSG C
546.650		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	300	0.2300	0.35		Sheet Flow, Range n= 0.130 P2= 1.00"
6.5	1,300	0.2300	3.36		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
7.8	6,236	0.1100	13.32	33.31	Channel Flow, Area= 2.5 sf Perim= 4.5' r= 0.56' n= 0.025 Earth, clean & winding
28.5	7,836	Total			

Subcatchment 1S: Watershed



19155-Watershed

Type IA 24-hr Type 1A 25yr Rainfall=1.60"

Prepared by Knutzen Engineering

Printed 11/6/2019

HydroCAD® 10.00-25 s/n 09152 © 2019 HydroCAD Software Solutions LLC

Page 5

Hydrograph for Subcatchment 1S: Watershed

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.25	0.00	0.00	18.25	1.39	0.11	7.28
5.25	0.27	0.00	0.00	18.50	1.40	0.11	7.28
5.50	0.29	0.00	0.00	18.75	1.41	0.12	7.27
5.75	0.31	0.00	0.00	19.00	1.42	0.12	7.25
6.00	0.33	0.00	0.00	19.25	1.43	0.12	7.23
6.25	0.35	0.00	0.00	19.50	1.44	0.13	7.21
6.50	0.38	0.00	0.00	19.75	1.45	0.13	7.19
6.75	0.40	0.00	0.00	20.00	1.46	0.13	7.15
7.00	0.43	0.00	0.00	20.25	1.47	0.14	7.12
7.25	0.46	0.00	0.00	20.50	1.48	0.14	7.08
7.50	0.50	0.00	0.00	20.75	1.49	0.14	7.04
7.75	0.59	0.00	0.00	21.00	1.50	0.15	7.00
8.00	0.68	0.00	0.00	21.25	1.51	0.15	6.95
8.25	0.73	0.00	0.01	21.50	1.52	0.15	6.90
8.50	0.77	0.00	0.58	21.75	1.53	0.16	6.84
8.75	0.80	0.00	1.81	22.00	1.53	0.16	6.78
9.00	0.83	0.00	3.01	22.25	1.54	0.16	6.72
9.25	0.86	0.01	3.77	22.50	1.55	0.17	6.65
9.50	0.88	0.01	4.13	22.75	1.56	0.17	6.59
9.75	0.90	0.01	4.39	23.00	1.57	0.17	6.52
10.00	0.92	0.01	4.73	23.25	1.58	0.17	6.44
10.25	0.94	0.02	4.98	23.50	1.58	0.18	6.37
10.50	0.96	0.02	5.12	23.75	1.59	0.18	6.29
10.75	0.98	0.02	5.31	24.00	1.60	0.18	6.21
11.00	1.00	0.02	5.56	24.25	1.60	0.18	5.18
11.25	1.02	0.03	5.71	24.50	1.60	0.18	1.88
11.50	1.03	0.03	5.78	24.75	1.60	0.18	0.51
11.75	1.05	0.03	5.78	25.00	1.60	0.18	0.14
12.00	1.06	0.03	5.72	25.25	1.60	0.18	0.03
12.25	1.08	0.04	5.76	25.50	1.60	0.18	0.00
12.50	1.09	0.04	5.94	25.75	1.60	0.18	0.00
12.75	1.11	0.04	6.19	26.00	1.60	0.18	0.00
13.00	1.12	0.04	6.21	26.25	1.60	0.18	0.00
13.25	1.14	0.05	6.31	26.50	1.60	0.18	0.00
13.50	1.15	0.05	6.50	26.75	1.60	0.18	0.00
13.75	1.16	0.05	6.53	27.00	1.60	0.18	0.00
14.00	1.18	0.06	6.53	27.25	1.60	0.18	0.00
14.25	1.19	0.06	6.59	27.50	1.60	0.18	0.00
14.50	1.20	0.06	6.71	27.75	1.60	0.18	0.00
14.75	1.22	0.07	6.80	28.00	1.60	0.18	0.00
15.00	1.23	0.07	6.88	28.25	1.60	0.18	0.00
15.25	1.24	0.07	6.95	28.50	1.60	0.18	0.00
15.50	1.26	0.08	7.01	28.75	1.60	0.18	0.00
15.75	1.27	0.08	7.06	29.00	1.60	0.18	0.00
16.00	1.28	0.08	7.11	29.25	1.60	0.18	0.00
16.25	1.29	0.09	7.15	29.50	1.60	0.18	0.00
16.50	1.31	0.09	7.18	29.75	1.60	0.18	0.00
16.75	1.32	0.09	7.21	30.00	1.60	0.18	0.00
17.00	1.33	0.09	7.24				
17.25	1.34	0.10	7.26				
17.50	1.35	0.10	7.27				
17.75	1.36	0.10	7.28				
18.00	1.38	0.11	7.28				

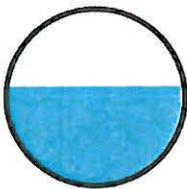
Summary for Reach 2R: Conveyance Pipe

Inflow Area = 546.650 ac, 0.00% Impervious, Inflow Depth = 0.18" for Type 1A 25yr event
 Inflow = 7.28 cfs @ 18.16 hrs, Volume= 8.315 af
 Outflow = 7.28 cfs @ 18.23 hrs, Volume= 8.315 af, Atten= 0%, Lag= 4.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
 Max. Velocity= 7.06 fps, Min. Travel Time= 2.6 min
 Avg. Velocity = 5.73 fps, Avg. Travel Time= 3.2 min

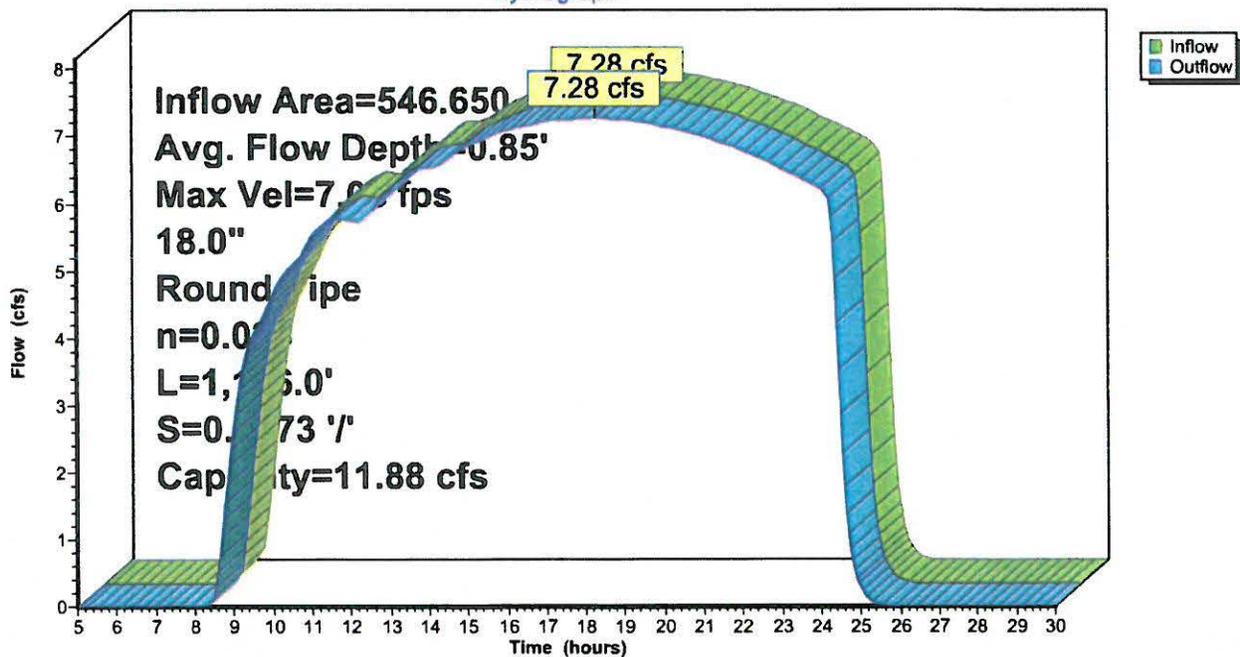
Peak Storage= 1,151 cf @ 18.19 hrs
 Average Depth at Peak Storage= 0.85'
 Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 11.88 cfs

18.0" Round Pipe
 n= 0.025 Corrugated metal
 Length= 1,116.0' Slope= 0.0473 '/'
 Inlet Invert= 781.40', Outlet Invert= 728.60'



Reach 2R: Conveyance Pipe

Hydrograph



Hydrograph for Reach 2R: Conveyance Pipe

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
5.00	0.00	0	781.40	0.00
5.50	0.00	0	781.40	0.00
6.00	0.00	0	781.40	0.00
6.50	0.00	0	781.40	0.00
7.00	0.00	0	781.40	0.00
7.50	0.00	0	781.40	0.00
8.00	0.00	0	781.40	0.00
8.50	0.58	119	781.57	0.18
9.00	3.01	573	781.90	2.63
9.50	4.13	748	782.01	4.04
10.00	4.73	827	782.05	4.63
10.50	5.12	881	782.09	5.08
11.00	5.56	935	782.12	5.49
11.50	5.78	965	782.14	5.76
12.00	5.72	960	782.13	5.74
12.50	5.94	982	782.15	5.87
13.00	6.21	1,020	782.17	6.21
13.50	6.50	1,054	782.19	6.46
14.00	6.53	1,059	782.19	6.53
14.50	6.71	1,079	782.21	6.68
15.00	6.88	1,101	782.22	6.86
15.50	7.01	1,116	782.23	6.99
16.00	7.11	1,129	782.24	7.09
16.50	7.18	1,138	782.24	7.17
17.00	7.24	1,145	782.25	7.23
17.50	7.27	1,149	782.25	7.27
18.00	7.28	1,151	782.25	7.28
18.50	7.28	1,150	782.25	7.28
19.00	7.25	1,147	782.25	7.26
19.50	7.21	1,143	782.24	7.22
20.00	7.15	1,136	782.24	7.16
20.50	7.08	1,127	782.23	7.09
21.00	7.00	1,117	782.23	7.01
21.50	6.90	1,105	782.22	6.91
22.00	6.78	1,091	782.21	6.80
22.50	6.65	1,075	782.20	6.68
23.00	6.52	1,058	782.19	6.54
23.50	6.37	1,040	782.18	6.39
24.00	6.21	1,021	782.17	6.23
24.50	1.88	502	781.85	2.88
25.00	0.14	94	781.54	0.27
25.50	0.00	18	781.45	0.03
26.00	0.00	4	781.42	0.00
26.50	0.00	2	781.41	0.00
27.00	0.00	1	781.40	0.00
27.50	0.00	0	781.40	0.00
28.00	0.00	0	781.40	0.00
28.50	0.00	0	781.40	0.00
29.00	0.00	0	781.40	0.00
29.50	0.00	0	781.40	0.00
30.00	0.00	0	781.40	0.00

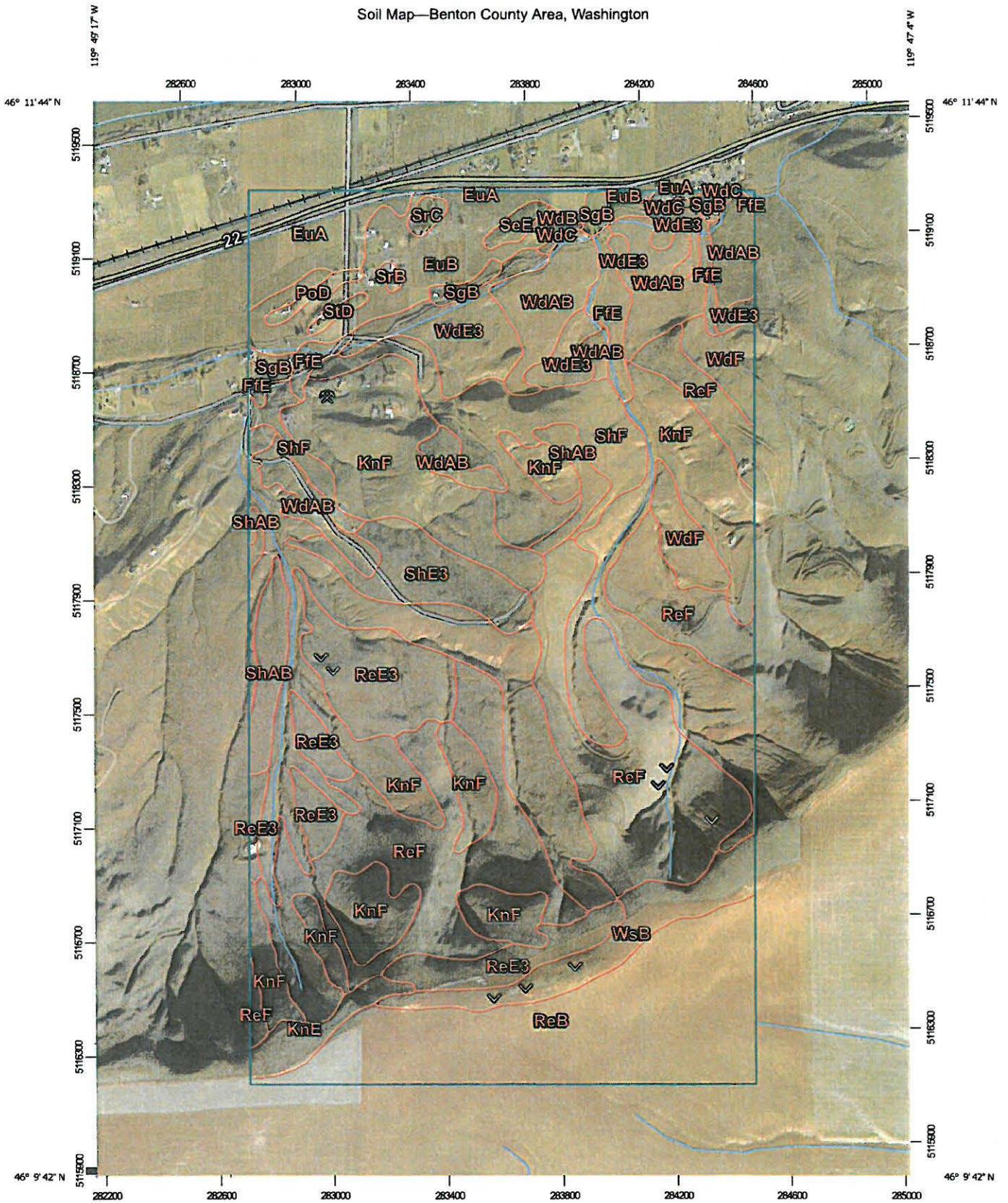
Stage-Discharge for Reach 2R: Conveyance Pipe

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
781.40	0.00	0.00	781.93	5.70	3.18	782.46	7.54	10.07
781.41	0.40	0.00	781.94	5.75	3.29	782.47	7.56	10.19
781.42	0.71	0.00	781.95	5.81	3.41	782.48	7.57	10.31
781.43	0.95	0.01	781.96	5.86	3.53	782.49	7.58	10.43
781.44	1.14	0.02	781.97	5.91	3.64	782.50	7.60	10.55
781.45	1.32	0.02	781.98	5.96	3.76	782.51	7.61	10.66
781.46	1.49	0.04	781.99	6.02	3.88	782.52	7.62	10.78
781.47	1.65	0.05	782.00	6.07	4.00	782.53	7.62	10.89
781.48	1.80	0.07	782.01	6.11	4.13	782.54	7.63	11.00
781.49	1.94	0.08	782.02	6.16	4.25	782.55	7.64	11.11
781.50	2.08	0.11	782.03	6.21	4.37	782.56	7.65	11.21
781.51	2.21	0.13	782.04	6.26	4.50	782.57	7.65	11.32
781.52	2.34	0.15	782.05	6.30	4.63	782.58	7.66	11.42
781.53	2.46	0.18	782.06	6.35	4.76	782.59	7.66	11.52
781.54	2.58	0.22	782.07	6.39	4.88	782.60	7.66	11.61
781.55	2.70	0.25	782.08	6.44	5.01	782.61	7.66	11.71
781.56	2.81	0.28	782.09	6.48	5.14	782.62	7.66	11.80
781.57	2.92	0.32	782.10	6.52	5.28	782.63	7.66	11.89
781.58	3.03	0.36	782.11	6.56	5.41	782.64	7.66	11.97
781.59	3.13	0.41	782.12	6.61	5.54	782.65	7.66	12.05
781.60	3.23	0.45	782.13	6.65	5.67	782.66	7.66	12.13
781.61	3.33	0.50	782.14	6.68	5.81	782.67	7.65	12.21
781.62	3.43	0.55	782.15	6.72	5.94	782.68	7.64	12.28
781.63	3.52	0.60	782.16	6.76	6.08	782.69	7.64	12.35
781.64	3.61	0.66	782.17	6.80	6.21	782.70	7.63	12.41
781.65	3.71	0.72	782.18	6.83	6.35	782.71	7.62	12.47
781.66	3.79	0.78	782.19	6.87	6.48	782.72	7.60	12.53
781.67	3.88	0.84	782.20	6.90	6.62	782.73	7.59	12.57
781.68	3.97	0.90	782.21	6.94	6.75	782.74	7.58	12.62
781.69	4.05	0.97	782.22	6.97	6.89	782.75	7.56	12.66
781.70	4.14	1.04	782.23	7.00	7.03	782.76	7.54	12.70
781.71	4.22	1.11	782.24	7.04	7.16	782.77	7.52	12.73
781.72	4.30	1.19	782.25	7.07	7.30	782.78	7.50	12.75
781.73	4.37	1.26	782.26	7.10	7.44	782.79	7.47	12.77
781.74	4.45	1.34	782.27	7.13	7.57	782.80	7.44	12.78
781.75	4.53	1.42	782.28	7.15	7.71	782.81	7.41	12.78
781.76	4.60	1.50	782.29	7.18	7.85	782.82	7.38	12.77
781.77	4.67	1.59	782.30	7.21	7.98	782.83	7.34	12.75
781.78	4.75	1.67	782.31	7.24	8.12	782.84	7.30	12.73
781.79	4.82	1.76	782.32	7.26	8.25	782.85	7.25	12.68
781.80	4.89	1.85	782.33	7.29	8.39	782.86	7.20	12.63
781.81	4.96	1.94	782.34	7.31	8.52	782.87	7.14	12.55
781.82	5.02	2.03	782.35	7.34	8.66	782.88	7.06	12.44
781.83	5.09	2.13	782.36	7.36	8.79	782.89	6.92	12.21
781.84	5.15	2.23	782.37	7.38	8.92	782.90	6.72	11.88
781.85	5.22	2.33	782.38	7.40	9.05			
781.86	5.28	2.43	782.39	7.42	9.18			
781.87	5.34	2.53	782.40	7.44	9.31			
781.88	5.40	2.63	782.41	7.46	9.44			
781.89	5.46	2.74	782.42	7.48	9.57			
781.90	5.52	2.85	782.43	7.50	9.70			
781.91	5.58	2.96	782.44	7.51	9.82			
781.92	5.64	3.07	782.45	7.53	9.95			

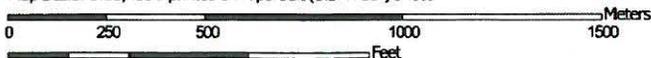
APPENDIX B

USDA NRCS Web Soil Results

Soil Map—Benton County Area, Washington



Map Scale: 1:18,400 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

11/6/2019
Page 1 of 27

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
EuA	Esquatzel silt loam, 0 to 2 percent slopes	37.4	2.7%
EuB	Esquatzel silt loam, 2 to 5 percent slopes	58.0	4.2%
FfE	Finley stony fine sandy loam, 0 to 30 percent slopes	22.2	1.6%
KnE	Kiona very stony silt loam, 0 to 30 percent slopes	14.6	1.1%
KnF	Kiona very stony silt loam, 30 to 65 percent slopes	371.5	26.9%
PoD	Prosser silt loam, 5 to 15 percent slopes	3.9	0.3%
ReB	Ritzville silt loam, 0 to 5 percent slopes	145.5	10.5%
ReE3	Ritzville silt loam, 15 to 30 percent slopes, severely eroded	84.3	6.1%
ReF	Ritzville silt loam, 30 to 65 percent slopes	269.6	19.5%
SeE	Scooteny stony silt loam, 0 to 30 percent slopes	4.2	0.3%
SgB	Scooteny gravelly silt loam, 2 to 5 percent slopes	11.0	0.8%
ShAB	Shano silt loam, 0 to 5 percent slopes	28.3	2.0%
ShE3	Shano silt loam, 15 to 30 percent slopes, severely eroded	35.1	2.5%
ShF	Shano silt loam, 30 to 65 percent slopes	74.6	5.4%
SrB	Starbuck silt loam, 0 to 5 percent slopes	1.3	0.1%
SrC	Starbuck silt loam, 5 to 8 percent slopes	3.2	0.2%
StD	Starbuck stony silt loam, 0 to 15 percent slopes	2.3	0.2%
WdAB	Warden silt loam, 0 to 5 percent slopes	84.5	6.1%
WdB	Warden silt loam, 2 to 5 percent slopes	2.0	0.1%
WdC	Warden silt loam, 5 to 8 percent slopes	6.8	0.5%
WdE3	Warden silt loam, 15 to 30 percent slopes, severely eroded	52.2	3.8%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
WdF	Warden silt loam, 30 to 65 percent slopes	29.0	2.1%
WsB	Willis silt loam, 0 to 5 percent slopes	38.6	2.8%
Totals for Area of Interest		1,380.0	100.0%

Report—Engineering Properties

Absence of an entry indicates that the data were not estimated. The asterisk "*" denotes the representative texture; other possible textures follow the dash. The criteria for determining the hydrologic soil group for individual soil components is found in the National Engineering Handbook, Chapter 7 issued May 2007(<http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba>). Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Engineering Properties—Benton County Area, Washington														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>			<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	
EuA—Esquatzel silt loam, 0 to 2 percent slopes														
Esquatzel	90	B	0-11	Silt loam	ML	A-4	0-0-0	0-0-0	100-100-100	100-100-100	95-98-100	75-83-90	0-5-10	NP
			11-44	Silt loam, very fine sandy loam	ML	A-4	0-0-0	0-0-0	100-100-100	100-100-100	85-93-100	65-80-95	20-25-30	NP-3-5
			44-60	Stratified very fine sandy loam to silt loam	ML	A-4	0-0-0	0-0-0	100-100-100	100-100-100	95-98-100	60-75-90	20-25-30	NP-3-5
EuB—Esquatzel silt loam, 2 to 5 percent slopes														
Esquatzel	90	B	0-11	Silt loam	ML	A-4	0-0-0	0-0-0	100-100-100	100-100-100	95-98-100	75-83-90	0-5-10	NP
			11-44	Silt loam, very fine sandy loam	ML	A-4	0-0-0	0-0-0	100-100-100	100-100-100	85-93-100	65-80-95	20-25-30	NP-3-5
			44-60	Stratified very fine sandy loam to silt loam	ML	A-4	0-0-0	0-0-0	100-100-100	100-100-100	95-98-100	60-75-90	20-25-30	NP-3-5

Engineering Properties—Benton County Area, Washington														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity Index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>			<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	
FFe—Finley stony fine sandy loam, 0 to 30 percent slopes														
Finley	90	A	0-3	Stony fine sandy loam	SM	A-2, A-4	0-3-5	5-15-25	75-80-85	70-75-80	55-58-60	25-33-40	15-20-25	NP-3-5
			3-13	Fine sandy loam, gravelly loam, gravelly sandy loam	GM, SM	A-1, A-2, A-4	0-0-0	0-5-10	60-73-85	50-65-80	40-50-60	20-35-50	15-20-25	NP-3-5
			13-28	Very gravelly loam, very cobbly sandy loam, extremely cobbly fine sandy loam	GM, SM	A-1, A-2	0-1-2	35-45-55	40-55-70	25-43-60	20-30-40	10-20-30	15-20-25	NP-3-5
			28-60	Very cobbly loamy sand, extremely gravelly loamy sand, extremely cobbly loamy sand	GP-GM	A-1	0-1-2	35-45-55	20-35-50	15-30-45	5-8-10	0-5-10	0-5-10	NP
KnE—Kiona very stony silt loam, 0 to 30 percent slopes														
Kiona	100	B	0-4	Very stony silt loam	ML	A-4	25-30-35	0-5-10	70-78-85	60-70-80	55-65-75	50-60-70	20-25-30	NP-3-5
			4-20	Very stony silt loam, very cobbly loam, cobbly very fine sandy loam	GM, ML, SM	A-4	0-0-0	30-35-40	60-73-85	60-68-75	45-58-70	35-50-65	20-25-30	NP-3-5
			20-60	Very gravelly loam, very cobbly silt loam, very cobbly sandy loam	GM	A-1, A-2, A-4	0-0-0	35-45-55	45-58-70	35-48-60	35-43-50	15-30-45	15-20-25	NP-3-5

Engineering Properties--Benton County Area, Washington														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth <i>In</i>	USDA texture	Classification		Pct Fragments		Percentage passing sieve number--				Liquid limit <i>L-R-H</i>	Plasticity Index <i>L-R-H</i>
					Unified	AASHTO	>10 inches <i>L-R-H</i>	3-10 inches <i>L-R-H</i>	4 <i>L-R-H</i>	10 <i>L-R-H</i>	40 <i>L-R-H</i>	200 <i>L-R-H</i>		
KnF--Kiona very stony silt loam, 30 to 65 percent slopes														
Kiona	100	B	0-4	Very stony silt loam	ML	A-4	25-30-35	0-5-10	70-78-85	60-70-80	55-65-75	50-60-70	20-25-30	NP-3-5
			4-20	Very stony silt loam, very cobbly loam, cobbly very fine sandy loam	GM, ML, SM	A-4	0-0-0	30-35-40	60-73-85	60-68-75	45-58-70	35-50-65	20-25-30	NP-3-5
			20-60	Very gravelly loam, very cobbly silt loam, very cobbly sandy loam	GM	A-1, A-2, A-4	0-0-0	35-45-55	45-58-70	35-48-60	35-43-50	15-30-45	15-20-25	NP-3-5
PoD--Prosser silt loam, 5 to 15 percent slopes														
Prosser	100	C	0-3	Silt loam	ML	A-4	0-0-0	0-0-0	100-100-100	95-98-100	85-90-95	50-70-90	20-25-30	NP-3-5
			3-28	Very fine sandy loam, silt loam	ML	A-4	0-0-0	0-3-5	95-98-100	90-95-100	80-85-90	50-65-80	20-25-30	NP-3-5
			28-34	Unweathered bedrock	--	--	--	--	--	--	--	--	--	--
ReB--Ritzville silt loam, 0 to 5 percent slopes														
Ritzville	100	B	0-6	Silt loam	ML	A-4	0-0-0	0-0-0	100-100-100	95-98-100	95-98-100	70-80-90	15-20-25	NP-3-5
			6-36	Silt loam	ML	A-4	0-0-0	0-0-0	100-100-100	100-100-100	95-98-100	80-85-90	15-20-25	NP-3-5
			36-60	Silt loam, fine sandy loam	ML	A-4	0-0-0	0-0-0	100-100-100	100-100-100	95-98-100	75-83-90	15-20-25	NP-3-5

Engineering Properties—Benton County Area, Washington														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity Index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>			<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	
ReE3—Ritzville silt loam, 15 to 30 percent slopes, severely eroded														
Ritzville	100	B	0-2	Silt loam	ML	A-4	0-0-0	0-0-0	100-100-100	95-98-100	95-98-100	70-80-90	15-20-25	NP-3-5
			2-36	Silt loam	ML	A-4	0-0-0	0-0-0	100-100-100	100-100-100	95-98-100	80-85-90	15-20-25	NP-3-5
			36-60	Silt loam, fine sandy loam	ML	A-4	0-0-0	0-0-0	100-100-100	100-100-100	95-98-100	75-83-90	15-20-25	NP-3-5
ReF—Ritzville silt loam, 30 to 65 percent slopes														
Ritzville	100	B	0-6	Silt loam	ML	A-4	0-0-0	0-0-0	100-100-100	95-98-100	95-98-100	70-80-90	15-20-25	NP-3-5
			6-36	Silt loam	ML	A-4	0-0-0	0-0-0	100-100-100	100-100-100	95-98-100	80-85-90	15-20-25	NP-3-5
			36-60	Silt loam, fine sandy loam	ML	A-4	0-0-0	0-0-0	100-100-100	100-100-100	95-98-100	75-83-90	15-20-25	NP-3-5

Engineering Properties—Benton County Area, Washington														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity Index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	
SeE—Scooteneystony silt loam, 0 to 30 percent slopes														
Scooteneystony silt loam	100	B	0-4	Stony silt loam	ML, SM	A-4	2-4-5	5-10-15	90-95-100	75-80-85	70-75-80	40-50-60	20-25-30	NP-3-5
			4-21	Loam, very fine sandy loam, silt loam	ML, SM	A-4	0-0-0	0-3-5	90-95-100	75-85-95	70-80-90	40-50-60	20-25-30	NP-3-5
			21-38	Gravelly silt loam, gravelly fine sandy loam, cobbly loam	SM	A-2, A-4	0-3-5	5-10-15	75-80-85	60-68-75	60-65-70	30-40-50	20-25-30	NP-3-5
			38-60	Very gravelly sandy loam, very cobbly sandy loam, very gravelly loam	GM, SM	A-1, A-2	0-5-10	20-38-55	55-73-90	50-55-60	30-40-50	15-25-35	15-20-25	NP-3-5
SgB—Scooteneystony gravelly silt loam, 2 to 5 percent slopes														
Scooteneystony gravelly silt loam	100	B	0-4	Gravelly silt loam	SM	A-4	0-0-0	0-3-5	80-85-90	60-68-75	50-55-60	40-45-50	20-25-30	NP-3-5
			4-21	Loam, very fine sandy loam, silt loam	ML, SM	A-4	0-0-0	0-3-5	90-95-100	75-85-95	70-80-90	40-53-65	20-25-30	NP-3-5
			21-38	Gravelly silt loam, gravelly fine sandy loam, cobbly loam	SM	A-2, A-4	0-3-5	0-10-20	80-90-100	60-78-95	55-65-75	30-40-50	20-25-30	NP-3-5
			38-60	Very gravelly fine sandy loam, very cobbly sandy loam, very gravelly loam	SM	A-1, A-2	0-5-10	20-33-45	70-80-90	40-48-55	40-45-50	15-25-35	15-20-25	NP-3-5

Engineering Properties--Benton County Area, Washington														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number--				Liquid limit	Plasticity Index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>			<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	
ShAB--Shano silt loam, 0 to 5 percent slopes														
Shano	100	B	0-6	Silt loam	ML	A-4	0-0-0	0-0-0	100-100-100	100-100-100	95-98-100	75-80-85	15-20-25	NP-3-5
			6-28	Silt loam	ML	A-4	0-0-0	0-0-0	100-100-100	100-100-100	95-98-100	80-85-90	15-20-25	NP-3-5
			28-60	Silt loam	ML	A-4	0-0-0	0-0-0	100-100-100	100-100-100	95-98-100	80-85-90	15-20-25	NP-3-5
ShE3--Shano silt loam, 15 to 30 percent slopes, severely eroded														
Shano	100	B	0-6	Silt loam	ML	A-4	0-0-0	0-0-0	100-100-100	100-100-100	95-98-100	75-80-85	15-20-25	NP-3-5
			6-21	Silt loam	ML	A-4	0-0-0	0-0-0	100-100-100	100-100-100	95-98-100	80-85-90	15-20-25	NP-3-5
			21-60	Silt loam	ML	A-4	0-0-0	0-0-0	100-100-100	100-100-100	95-98-100	80-85-90	15-20-25	NP-3-5
ShF--Shano silt loam, 30 to 65 percent slopes														
Shano	100	B	0-8	Silt loam	ML	A-4	0-0-0	0-0-0	100-100-100	100-100-100	95-98-100	75-80-85	15-20-25	NP-3-5
			8-33	Silt loam	ML	A-4	0-0-0	0-0-0	100-100-100	100-100-100	95-98-100	80-85-90	15-20-25	NP-3-5
			33-60	Silt loam	ML	A-4	0-0-0	0-0-0	100-100-100	100-100-100	95-98-100	80-85-90	15-20-25	NP-3-5

Engineering Properties--Benton County Area, Washington														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number--				Liquid limit	Plasticity Index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>			<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	
SrB--Starbuck silt loam, 0 to 5 percent slopes														
Starbuck	90	D	0-12	Silt loam	ML	A-4	0-0-0	0-3-5	100-100-100	90-95-100	80-85-90	70-75-80	20-25-30	NP-3-5
			12-17	Silt loam, fine sandy loam, very gravelly silt loam	GM, ML, SM	A-2, A-4	0-0-0	0-8-15	65-83-100	60-78-95	50-60-70	30-50-70	20-25-30	NP-3-5
			17-21	Unweathered bedrock	--	--	--	--	--	--	--	--	--	--
SrC--Starbuck silt loam, 5 to 8 percent slopes														
Starbuck	90	D	0-12	Silt loam	ML	A-4	0-0-0	0-3-5	100-100-100	90-95-100	80-85-90	70-75-80	20-25-30	NP-3-5
			12-17	Silt loam, fine sandy loam, very gravelly silt loam	GM, ML, SM	A-2, A-4	0-0-0	0-8-15	65-83-100	60-78-95	50-60-70	30-50-70	20-25-30	NP-3-5
			17-21	Unweathered bedrock	--	--	--	--	--	--	--	--	--	--
StD--Starbuck stony silt loam, 0 to 15 percent slopes														
Starbuck	90	D	0-12	Stony silt loam	ML	A-4	2-4-5	6-11-15	90-95-100	85-90-95	80-85-90	55-68-80	15-20-25	NP-3-5
			12-17	Gravelly loam, fine sandy loam, silt loam	ML, SM	A-2, A-4	0-0-0	0-8-15	80-85-90	60-75-90	50-55-60	30-45-60	20-23-25	NP-3-5
			17-21	Unweathered bedrock	--	--	--	--	--	--	--	--	--	--

Engineering Properties--Benton County Area, Washington														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	
WdAB--Warden silt loam, 0 to 5 percent slopes														
Warden	100	B	0-9	Silt loam	ML	A-4	0-0-0	0-0-0	95-98-100	95-98-100	85-93-100	70-75-80	25-28-30	NP-3-5
			9-19	Very fine sandy loam, silt loam	ML	A-4	0-0-0	0-0-0	95-98-100	95-98-100	95-98-100	75-83-90	25-28-30	NP-3-5
			19-60	Stratified very fine sandy loam to silt loam	ML	A-4	0-0-0	0-0-0	95-98-100	95-98-100	95-98-100	75-83-90	25-28-30	NP-3-5
WdB--Warden silt loam, 2 to 5 percent slopes														
Warden	90	B	0-9	Silt loam	ML	A-4	0-0-0	0-0-0	95-98-100	95-98-100	85-93-100	70-75-80	25-28-30	NP-3-5
			9-19	Very fine sandy loam, silt loam	ML	A-4	0-0-0	0-0-0	95-98-100	95-98-100	95-98-100	75-83-90	25-28-30	NP-3-5
			19-60	Stratified very fine sandy loam to silt loam	ML	A-4	0-0-0	0-0-0	95-98-100	95-98-100	95-98-100	75-83-90	25-28-30	NP-3-5
WdC--Warden silt loam, 5 to 8 percent slopes														
Warden	100	B	0-9	Silt loam	ML	A-4	0-0-0	0-0-0	95-98-100	95-98-100	85-93-100	70-75-80	25-28-30	NP-3-5
			9-19	Very fine sandy loam, silt loam	ML	A-4	0-0-0	0-0-0	95-98-100	95-98-100	95-98-100	75-83-90	25-28-30	NP-3-5
			19-60	Stratified very fine sandy loam to silt loam	ML	A-4	0-0-0	0-0-0	95-98-100	95-98-100	95-98-100	75-83-90	25-28-30	NP-3-5

Engineering Properties—Benton County Area, Washington														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity Index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	
WdE3—Warden silt loam, 15 to 30 percent slopes, severely eroded														
Warden	100	B	0-2	Silt loam	ML	A-4	0-0-0	0-0-0	95-98-100	95-98-100	85-93-100	70-75-80	25-28-30	NP-3-5
			2-12	Very fine sandy loam, silt loam	ML	A-4	0-0-0	0-0-0	95-98-100	95-98-100	95-98-100	75-83-90	25-28-30	NP-3-5
			12-60	Stratified very fine sandy loam to silt loam	ML	A-4	0-0-0	0-0-0	95-98-100	95-98-100	95-98-100	75-83-90	25-28-30	NP-3-5
WdF—Warden silt loam, 30 to 65 percent slopes														
Warden	100	B	0-9	Silt loam	ML	A-4	0-0-0	0-0-0	95-98-100	95-98-100	85-93-100	70-75-80	25-28-30	NP-3-5
			9-19	Very fine sandy loam, silt loam	ML	A-4	0-0-0	0-0-0	95-98-100	95-98-100	95-98-100	75-83-90	25-28-30	NP-3-5
			19-60	Stratified very fine sandy loam to silt loam	ML	A-4	0-0-0	0-0-0	95-98-100	95-98-100	95-98-100	75-83-90	25-28-30	NP-3-5
WsB—Willis silt loam, 0 to 5 percent slopes														
Willis	100	C	0-6	Silt loam	ML	A-4	0-0-0	0-0-0	100-100-100	100-100-100	90-95-100	70-75-80	15-18-20	NP-3-5
			6-10	Silt loam	ML	A-4	0-0-0	0-0-0	100-100-100	95-98-100	95-98-100	85-90-95	20-25-30	NP-3-5
			10-30	Silt loam	ML	A-4	0-0-0	0-0-0	95-98-100	95-98-100	95-98-100	80-85-90	20-25-30	NP-3-5
			30-34	Cemented material	—	—	—	—	—	—	—	—	—	—

Report—Physical Soil Properties

Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Physical Soil Properties—Benton County Area, Washington														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/In</i>	<i>Pct</i>	<i>Pct</i>					
EuA— Esquatzel silt loam, 0 to 2 percent slopes														
Esquatzel	0-11	-28-	-66-	2- 6- 8	1.10-1.20 -1.30	4.00-9.00-14.00	0.19-0.21-0.23	0.0- 1.5- 2.9	1.0- 1.5- 2.0	.55	.55	5	3	86
	11-44	-21-	-69-	5-10- 15	1.20-1.30 -1.40	4.00-9.00-14.00	0.19-0.21-0.23	0.0- 1.5- 2.9	0.0- 0.5- 1.0	.64	.64			
	44-60	-21-	-69-	5-10- 15	1.25-1.40 -1.55	4.00-9.00-14.00	0.18-0.21-0.23	0.0- 1.5- 2.9	0.0- 0.5- 1.0	.64	.64			
EuB— Esquatzel silt loam, 2 to 5 percent slopes														
Esquatzel	0-11	-28-	-66-	2- 6- 8	1.10-1.20 -1.30	4.00-9.00-14.00	0.19-0.21-0.23	0.0- 1.5- 2.9	1.0- 1.5- 2.0	.55	.55	5	3	86
	11-44	-21-	-69-	5-10- 15	1.20-1.30 -1.40	4.00-9.00-14.00	0.19-0.21-0.23	0.0- 1.5- 2.9	0.0- 0.5- 1.0	.64	.64			
	44-60	-21-	-69-	5-10- 15	1.25-1.40 -1.55	4.00-9.00-14.00	0.18-0.21-0.23	0.0- 1.5- 2.9	0.0- 0.5- 1.0	.64	.64			

Physical Soil Properties--Benton County Area, Washington														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	Pct	Pct	Pct	g/cc	micro m/sec	In/In	Pct	Pct					
FfE--Finley stony fine sandy loam, 0 to 30 percent slopes														
Finley	0-3	-60-	-34-	4- 6- 7	1.20-1.30 -1.40	14.00-28.00-42.00	0.10-0.12-0.14	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.17	.32	3	5	56
	3-13	-66-	-27-	4- 7- 10	1.30-1.40 -1.50	14.00-28.00-42.00	0.09-0.11-0.13	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.17	.37			
	13-28	-48-	-45-	4- 7- 10	1.30-1.40 -1.50	14.00-28.00-42.00	0.08-0.10-0.11	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.15	.49			
	28-60	-82-	-16-	0- 2- 4	1.40-1.50 -1.60	141.00-300.00-705.00	0.03-0.04-0.05	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.05	.24			
KnE--Kiona very stony silt loam, 0 to 30 percent slopes														
Kiona	0-4	-33-	-56-	7-11- 15	1.15-1.25 -1.35	4.00-9.00-14.00	0.14-0.16-0.17	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.20	.49	5	7	38
	4-20	-33-	-56-	7-11- 15	1.30-1.40 -1.50	4.00-9.00-14.00	0.08-0.10-0.11	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.24	.55			
	20-60	-47-	-44-	3- 9- 15	1.30-1.40 -1.50	4.00-9.00-14.00	0.07-0.08-0.09	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.15	.49			

Physical Soil Properties--Benton County Area, Washington														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/In</i>	<i>Pct</i>	<i>Pct</i>					
KnF--Kiona very stony silt loam, 30 to 65 percent slopes														
Kiona	0-4	-33-	-56-	7-11- 15	1.15-1.25 -1.35	4.00-9.00-14.00	0.14-0.16-0.17	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.20	.49	5	7	38
	4-20	-33-	-56-	7-11- 15	1.30-1.40 -1.50	4.00-9.00-14.00	0.08-0.10-0.11	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.24	.55			
	20-60	-47-	-44-	3- 9- 15	1.30-1.40 -1.50	4.00-9.00-14.00	0.07-0.08-0.09	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.15	.49			
PoD--Prosser silt loam, 5 to 15 percent slopes														
Prosser	0-3	-34-	-58-	5- 9- 12	1.15-1.20 -1.25	4.00-9.00-14.00	0.16-0.18-0.20	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.49	.49	2	5	56
	3-28	-34-	-58-	5- 9- 12	1.30-1.38 -1.45	4.00-9.00-14.00	0.16-0.18-0.20	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.55	.55			
	28-34	—	—	—	—	—	—	—	—					
ReB--Ritzville silt loam, 0 to 5 percent slopes														
Ritzville	0-6	-22-	-71-	5- 8- 10	1.10-1.20 -1.30	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	1.0- 1.5- 2.0	.55	.55	5	5	56
	6-36	-22-	-71-	5- 8- 10	1.20-1.30 -1.40	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.64	.64			
	36-60	-22-	-71-	5- 8- 10	1.30-1.38 -1.45	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.64	.64			

Physical Soil Properties—Benton County Area, Washington														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/In</i>	<i>Pct</i>	<i>Pct</i>					
ReE3—Ritzville silt loam, 15 to 30 percent slopes, severely eroded														
Ritzville	0-2	-22-	-71-	5- 8- 10	1.10-1.20 -1.30	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	1.0- 1.5- 2.0	.55	.55	5	5	56
	2-36	-22-	-71-	5- 8- 10	1.20-1.30 -1.40	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.64	.64			
	36-60	-22-	-71-	5- 8- 10	1.30-1.38 -1.45	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.64	.64			
ReF—Ritzville silt loam, 30 to 65 percent slopes														
Ritzville	0-6	-22-	-71-	5- 8- 10	1.10-1.20 -1.30	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	1.0- 1.5- 2.0	.55	.55	5	5	56
	6-36	-22-	-71-	5- 8- 10	1.20-1.30 -1.40	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.64	.64			
	36-60	-22-	-71-	5- 8- 10	1.30-1.38 -1.45	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.64	.64			

Physical Soil Properties--Benton County Area, Washington														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	Pct	Pct	Pct	g/cc	micro m/sec	In/In	Pct	Pct					
SeE-- Scooteney stony silt loam, 0 to 30 percent slopes														
Scooteney	0-4	-34-	-59-	5- 8- 10	1.15-1.25 -1.35	4.00-9.00-14.00	0.15-0.18-0.20	0.0- 1.5- 2.9	1.0- 1.5- 2.0	.32	.55	4	6	48
	4-21	-34-	-59-	5- 8- 10	1.20-1.33 -1.45	4.00-9.00-14.00	0.18-0.19-0.20	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.64	.64			
	21-38	-34-	-59-	5- 8- 10	1.30-1.38 -1.45	14.00-28.00-42.00	0.10-0.12-0.13	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.32	.55			
	38-60	-50-	-40-	0-10- 10	1.30-1.43 -1.55	14.00-28.00-42.00	0.05-0.07-0.09	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.15	.43			
SgB-- Scooteney gravelly silt loam, 2 to 5 percent slopes														
Scooteney	0-4	-34-	-59-	5- 8- 10	1.15-1.25 -1.35	4.00-9.00-14.00	0.13-0.16-0.18	0.0- 1.5- 2.9	1.0- 1.5- 2.0	.32	.55	4	6	48
	4-21	-34-	-59-	5- 8- 10	1.20-1.33 -1.45	4.00-9.00-14.00	0.18-0.19-0.20	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.64	.64			
	21-38	-34-	-59-	5- 8- 10	1.30-1.38 -1.45	14.00-28.00-42.00	0.10-0.12-0.13	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.32	.55			
	38-60	-50-	-40-	0-10- 10	1.30-1.43 -1.55	14.00-28.00-42.00	0.05-0.07-0.09	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.15	.43			

Physical Soil Properties--Benton County Area, Washington														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	Pct	Pct	Pct	g/cc	micro m/sec	In/In	Pct	Pct					
ShAB--Shano silt loam, 0 to 5 percent slopes														
Shano	0-6	-22-	-71-	5- 8- 10	1.15-1.23 -1.30	4.00-9.00-14.00	0.18-0.19-0.20	0.0- 1.5- 2.9	1.0- 1.5- 2.0	.55	.55	5	5	56
	6-28	-22-	-71-	5- 8- 10	1.30-1.38 -1.45	4.00-9.00-14.00	0.18-0.19-0.20	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.64	.64			
	28-60	-22-	-71-	5- 8- 10	1.30-1.38 -1.45	4.00-9.00-14.00	0.18-0.19-0.20	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.64	.64			
ShE3--Shano silt loam, 15 to 30 percent slopes, severely eroded														
Shano	0-6	-22-	-71-	5- 8- 10	1.15-1.23 -1.30	4.00-9.00-14.00	0.18-0.19-0.20	0.0- 1.5- 2.9	1.0- 1.5- 2.0	.55	.55	5	5	56
	6-21	-22-	-71-	5- 8- 10	1.30-1.38 -1.45	4.00-9.00-14.00	0.18-0.19-0.20	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.64	.64			
	21-60	-22-	-71-	5- 8- 10	1.30-1.38 -1.45	4.00-9.00-14.00	0.18-0.19-0.20	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.64	.64			
ShF--Shano silt loam, 30 to 65 percent slopes														
Shano	0-8	-22-	-71-	5- 8- 10	1.15-1.23 -1.30	4.00-9.00-14.00	0.18-0.19-0.20	0.0- 1.5- 2.9	1.0- 1.5- 2.0	.55	.55	5	5	56
	8-33	-22-	-71-	5- 8- 10	1.30-1.38 -1.45	4.00-9.00-14.00	0.18-0.19-0.20	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.64	.64			
	33-60	-22-	-71-	5- 8- 10	1.30-1.38 -1.45	4.00-9.00-14.00	0.18-0.19-0.20	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.64	.64			

Physical Soil Properties—Benton County Area, Washington														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
SrB—Starbuck silt loam, 0 to 5 percent slopes														
Starbuck	0-12	-32-	-56-	5-12- 18	1.15-1.23 -1.30	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.55	.55	1	5	56
	12-17	-32-	-56-	5-12- 18	1.30-1.38 -1.45	4.00-9.00-14.00	0.12-0.14-0.15	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.32	.64			
	17-21	—	—	—	—	—	—	—	—					
SrC—Starbuck silt loam, 5 to 8 percent slopes														
Starbuck	0-12	-32-	-56-	5-12- 18	1.15-1.23 -1.30	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.55	.55	1	5	56
	12-17	-32-	-56-	5-12- 18	1.30-1.38 -1.45	4.00-9.00-14.00	0.12-0.14-0.15	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.32	.64			
	17-21	—	—	—	—	—	—	—	—					
StD—Starbuck stony silt loam, 0 to 15 percent slopes														
Starbuck	0-12	-34-	-59-	5- 7- 8	1.15-1.25 -1.35	4.00-9.00-14.00	0.11-0.13-0.15	0.0- 1.5- 2.9	1.0- 1.5- 2.0	.37	.55	1	6	48
	12-17	-33-	-57-	5-10- 15	1.30-1.40 -1.50	4.00-9.00-14.00	0.12-0.16-0.20	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.37	.64			
	17-21	—	—	—	—	—	—	—	—					

Physical Soil Properties--Benton County Area, Washington														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility Index
										Kw	Kf	T		
	In	Pct	Pct	Pct	g/cc	micro m/sec	In/In	Pct	Pct					
WdAB-- Warden silt loam, 0 to 5 percent slopes														
Warden	0-9	-21-	-68-	8-12- 15	1.15-1.23 -1.30	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	1.0- 2.0- 3.0	.43	.43	5	5	56
	9-19	-21-	-68-	8-12- 15	1.30-1.38 -1.45	4.00-9.00-14.00	0.16-0.18-0.20	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.55	.55			
	19-60	-21-	-68-	8-12- 15	1.35-1.43 -1.50	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.55	.55			
WdB--Warden silt loam, 2 to 5 percent slopes														
Warden	0-9	-21-	-68-	8-12- 15	1.15-1.23 -1.30	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	1.0- 2.0- 3.0	.43	.43	5	5	56
	9-19	-21-	-68-	8-12- 15	1.30-1.38 -1.45	4.00-9.00-14.00	0.16-0.18-0.20	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.55	.55			
	19-60	-21-	-68-	8-12- 15	1.35-1.43 -1.50	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.55	.55			
WdC--Warden silt loam, 5 to 8 percent slopes														
Warden	0-9	-21-	-68-	8-12- 15	1.15-1.23 -1.30	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	1.0- 2.0- 3.0	.43	.43	5	5	56
	9-19	-21-	-68-	8-12- 15	1.30-1.38 -1.45	4.00-9.00-14.00	0.16-0.18-0.20	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.55	.55			
	19-60	-21-	-68-	8-12- 15	1.35-1.43 -1.50	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.55	.55			

Physical Soil Properties--Benton County Area, Washington														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/In</i>	<i>Pct</i>	<i>Pct</i>					
WdE3— Warden silt loam, 15 to 30 percent slopes, severely eroded														
Warden	0-2	-21-	-68-	8-12- 15	1.15-1.23 -1.30	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	1.0- 2.0- 3.0	.43	.43	5	5	56
	2-12	-21-	-68-	8-12- 15	1.30-1.38 -1.45	4.00-9.00-14.00	0.16-0.18-0.20	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.55	.55			
	12-60	-21-	-68-	8-12- 15	1.35-1.43 -1.50	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.55	.55			
WdF—Warden silt loam, 30 to 65 percent slopes														
Warden	0-9	-21-	-68-	8-12- 15	1.15-1.23 -1.30	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	1.0- 2.0- 3.0	.43	.43	5	5	56
	9-19	-21-	-68-	8-12- 15	1.30-1.38 -1.45	4.00-9.00-14.00	0.16-0.18-0.20	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.55	.55			
	19-60	-21-	-68-	8-12- 15	1.35-1.43 -1.50	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.55	.55			

Physical Soil Properties--Benton County Area, Washington														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/In</i>	<i>Pct</i>	<i>Pct</i>					
WsB--Willis silt loam, 0 to 5 percent slopes														
Willis	0-6	-22-	-71-	5- 8- 10	1.15-1.25 -1.35	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	1.0- 1.5- 2.0	.55	.55	2	5	56
	6-10	-14-	-73-	10-13- 15	1.30-1.38 -1.45	4.00-9.00-14.00	0.18-0.20-0.21	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.55	.55			
	10-30	-14-	-73-	10-13- 15	1.30-1.38 -1.45	4.00-9.00-14.00	0.18-0.19-0.20	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.55	.55			
	30-34	—	—	—	—	0.01-0.20-0.42	0.00-0.00-0.00	—	—					

Data Source Information

Soil Survey Area: Benton County Area, Washington
 Survey Area Data: Version 15, Sep 16, 2019



Report—Chemical Soil Properties

Chemical Soil Properties--Benton County Area, Washington								
Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	<i>In</i>	<i>meq/100g</i>	<i>meq/100g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
EuA—Esquatzel silt loam, 0 to 2 percent slopes								
Esquatzel	0-11	5.0-10	—	6.6-7.8	0	0	0	0
	11-44	5.0-10	—	7.4-8.4	1-5	0	0.0-2.0	0
	44-60	5.0-10	—	7.4-8.4	1-5	0	0.0-2.0	0
EuB—Esquatzel silt loam, 2 to 5 percent slopes								
Esquatzel	0-11	5.0-10	—	6.6-7.8	0	0	0	0
	11-44	5.0-10	—	7.4-8.4	1-5	0	0.0-2.0	0
	44-60	5.0-10	—	7.4-8.4	1-5	0	0.0-2.0	0
FfE—Finley stony fine sandy loam, 0 to 30 percent slopes								
Finley	0-3	5.0-10	—	7.4-8.4	0	0	0	0
	3-13	2.0-6.0	—	7.4-8.4	0	0	0	0
	13-28	2.0-6.0	—	7.4-8.4	5-20	0	0.0-2.0	0
	28-60	0.0-2.0	—	7.9-8.4	10-20	0	0.0-2.0	0
KnE—Kiona very stony silt loam, 0 to 30 percent slopes								
Kiona	0-4	4.0-7.0	—	7.4-7.8	0	0	0	0
	4-20	4.0-7.0	—	7.4-7.8	0	0	0	0
	20-60	2.0-7.0	—	7.9-8.4	5-15	0	0.0-2.0	0

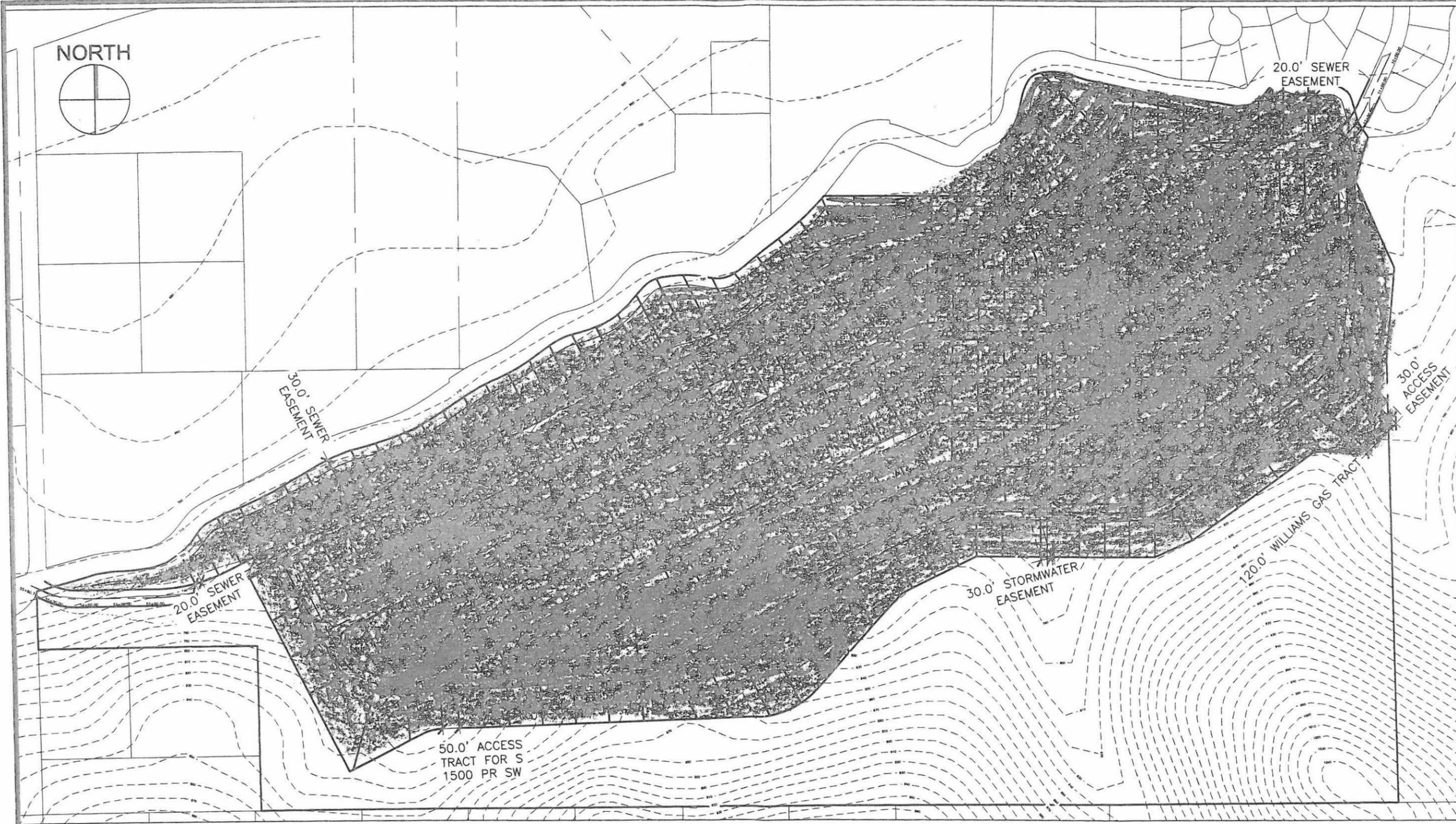
Chemical Soil Properties--Benton County Area, Washington								
Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	<i>In</i>	<i>meq/100g</i>	<i>meq/100g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
KnF—Kiona very stony silt loam, 30 to 65 percent slopes								
Kiona	0-4	4.0-7.0	—	7.4-7.8	0	0	0	0
	4-20	4.0-7.0	—	7.4-7.8	0	0	0	0
	20-60	2.0-7.0	—	7.9-8.4	5-15	0	0.0-2.0	0
PoD—Prosser silt loam, 5 to 15 percent slopes								
Prosser	0-3	5.0-15	—	6.6-7.3	0	0	0	0
	3-28	5.0-15	—	6.6-7.8	0	0	0	0
	28-34	—	—	—	—	—	—	—
ReB—Ritzville silt loam, 0 to 5 percent slopes								
Ritzville	0-6	5.0-10	—	6.6-8.4	0	0	0	0
	6-36	5.0-10	—	6.6-8.4	0	0	0	0
	36-60	5.0-10	—	7.9-8.4	5-15	0	0.0-2.0	0
ReE3—Ritzville silt loam, 15 to 30 percent slopes, severely eroded								
Ritzville	0-2	5.0-10	—	6.6-8.4	0	0	0	0
	2-36	5.0-10	—	6.6-8.4	0	0	0	0
	36-60	5.0-10	—	7.9-8.4	5-15	0	0.0-2.0	0
ReF—Ritzville silt loam, 30 to 65 percent slopes								
Ritzville	0-6	5.0-10	—	6.6-8.4	0	0	0	0
	6-36	5.0-10	—	6.6-8.4	0	0	0	0
	36-60	5.0-10	—	7.9-8.4	5-15	0	0.0-2.0	0

Chemical Soil Properties--Benton County Area, Washington								
Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	<i>In</i>	<i>meq/100g</i>	<i>meq/100g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
SeE--Scootene y stony silt loam, 0 to 30 percent slopes								
Scootene y	0-4	4.0-9.0	—	6.6-7.8	0	0	0	0
	4-21	3.0-6.0	—	6.6-7.8	0	0	0	0
	21-38	3.0-6.0	—	7.9-8.4	5-10	0	0.0-2.0	0
	38-60	0.0-3.0	—	7.9-8.4	5-10	0	0.0-2.0	0
SgB--Scootene y gravelly silt loam, 2 to 5 percent slopes								
Scootene y	0-4	4.0-9.0	—	6.6-7.8	0	0	0	0
	4-21	3.0-6.0	—	6.6-7.8	0	0	0	0
	21-38	3.0-6.0	—	7.9-8.4	5-10	0	0.0-2.0	0
	38-60	0.0-3.0	—	7.9-8.4	5-10	0	0.0-2.0	0
ShAB--Shano silt loam, 0 to 5 percent slopes								
Shano	0-6	5.0-10	—	6.6-8.4	0	0	0	0
	6-28	5.0-12	—	7.4-8.4	0	0	0.0-2.0	0
	28-60	5.0-14	—	7.4-9.0	2-15	0	0.0-2.0	0
ShE3--Shano silt loam, 15 to 30 percent slopes, severely eroded								
Shano	0-6	5.0-10	—	6.6-8.4	0	0	0	0
	6-21	5.0-12	—	7.4-8.4	0	0	0.0-2.0	0
	21-60	5.0-14	—	7.4-9.0	2-15	0	0.0-2.0	0

Chemical Soil Properties--Benton County Area, Washington								
Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	<i>In</i>	<i>meq/100g</i>	<i>meq/100g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
ShF--Shano silt loam, 30 to 65 percent slopes								
Shano	0-8	5.0-10	—	6.6-8.4	0	0	0	0
	8-33	5.0-12	—	7.4-8.4	0	0	0.0-2.0	0
	33-60	5.0-14	—	7.4-9.0	2-15	0	0.0-2.0	0
SrB--Starbuck silt loam, 0 to 5 percent slopes								
Starbuck	0-12	5.0-10	—	6.6-7.3	0	0	0	0
	12-17	5.0-10	—	7.4-7.8	0	0	0	0
	17-21	—	—	—	—	—	—	—
SrC--Starbuck silt loam, 5 to 8 percent slopes								
Starbuck	0-12	5.0-10	—	6.6-7.3	0	0	0	0
	12-17	5.0-10	—	7.4-7.8	0	0	0	0
	17-21	—	—	—	—	—	—	—
StD--Starbuck stony silt loam, 0 to 15 percent slopes								
Starbuck	0-12	2.0-6.0	—	6.6-7.3	0	0	0	0
	12-17	2.0-6.0	—	7.4-7.8	0	0	0	0
	17-21	—	—	—	—	—	—	—
WdAB--Warden silt loam, 0 to 5 percent slopes								
Warden	0-9	5.0-15	—	6.6-7.8	0	0	0	0
	9-19	5.0-10	—	6.6-7.8	0	0	0	0
	19-60	5.0-10	—	7.9-8.4	10-30	0	0.0-2.0	0

Chemical Soil Properties--Benton County Area, Washington								
Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	<i>In</i>	<i>meq/100g</i>	<i>meq/100g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
WdB--Warden silt loam, 2 to 5 percent slopes								
Warden	0-9	5.0-15	—	6.6-7.8	0	0	0	0
	9-19	5.0-10	—	6.6-7.8	0	0	0	0
	19-60	5.0-10	—	7.9-8.4	10-30	0	0.0-2.0	0
WdC--Warden silt loam, 5 to 8 percent slopes								
Warden	0-9	5.0-15	—	6.6-7.8	0	0	0	0
	9-19	5.0-10	—	6.6-7.8	0	0	0	0
	19-60	5.0-10	—	7.9-8.4	10-30	0	0.0-2.0	0
WdE3--Warden silt loam, 15 to 30 percent slopes, severely eroded								
Warden	0-2	5.0-15	—	6.6-7.8	0	0	0	0
	2-12	5.0-10	—	6.6-7.8	0	0	0	0
	12-60	5.0-10	—	7.9-8.4	10-30	0	0.0-2.0	0
WdF--Warden silt loam, 30 to 65 percent slopes								
Warden	0-9	5.0-15	—	6.6-7.8	0	0	0	0
	9-19	5.0-10	—	6.6-7.8	0	0	0	0
	19-60	5.0-10	—	7.9-8.4	10-30	0	0.0-2.0	0
WsB--Willis silt loam, 0 to 5 percent slopes								
Willis	0-6	2.0-5.0	—	6.6-7.8	0	0	0	0
	6-10	3.0-5.0	—	7.4-8.4	0	0	0	0
	10-30	2.0-4.0	—	7.9-8.4	1-10	0	0.0-2.0	0
	30-34	—	—	—	—	—	—	—

NORTH

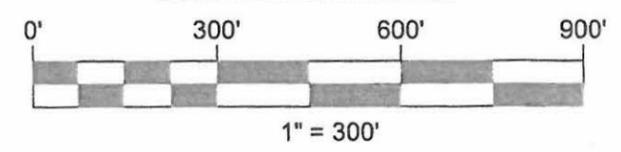


DESIGN	JCF
APPD	NJM
DATE	9/17/2019
NO.	SK01

VIKING HOMES PROSSER SUBDIVISION
PRELIMINARY LAYOUT
 PROSSER, WA

SUBDIVISION PARCEL SUMMARY	
TOTAL LOT COUNT	289
MINIMUM LOT SIZE	7,545 SF
MAXIMUM LOT SIZE	32,109 SF
AVERAGE LOT SIZE	8,400 SF

**CALL 811
 2 BUSINESS DAYS
 BEFORE YOU DIG**



KNUTZEN ENGINEERING
 5401 RIDGELINE DR.
 SUITE 160
 KENNEWICK, WA 98338
 1-509-222-0959
 www.knutzenengineering.com

CADFILE: 19155XC01