Orchard Hills Planned Development

Resubmittal Package

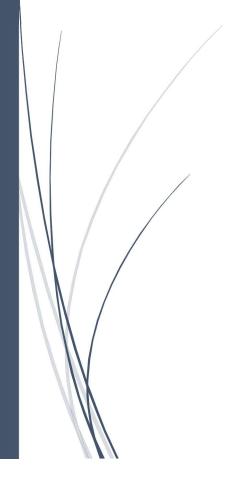


Table of Contents - Orchard Hills PD

- 1. Land Use Permit Application
- 2. Impact Assessment Checklist
- 3. Lot Legal Description
- 4. Executive Summary
- 5. Submittal check list
- 6. Project Team
- 7. Written Planned Development Program and Specifications
- 8. Development Site Plan and Drawings.
- 9. Preliminary Utilities Plan and Specifications.
- 10. SEPA Checklist
- 11. Wetlands Assessment
- 12. Geotechnical Report
- 13. Traffic Analysis
- 14. DOE Lead and Arsenic Testing Report
- 15. Limited Environmental Investigation
- 16. Booster Pump Water Pressure Calculations
- 17. Preliminary Storm Water Design Report
- 18. Easement Letters of Intent
- 19. Property Owners Within 300' List
- 20. Comments and Responses

1. Land Use Permit Application

Orchard Hills Planned Development (PD) - Resubmittal



Town of Twisp

118 S. Glover St • Box 278 • Twisp, WA 98856 • 509-997-4081 • 509-997-9204 TDD 800-833-6388

www.townoftwisp.com

I AND HEE DEDAME	To be completed by local government:		
LAND USE PERMIT APPLICATION	DE IN PORT DE		
(For Shoreline and Floodplain Development Permits, Use JARPA Form)	File ID#: PD22-02		
DATE: 5/16/22	Received Date: 5/23/22		
400	Vesting Date: 5/23/22		
PROJECT TITLE: ORCHARD HILLS			
OHOLAND HILLS	Fees Paid: 4/19/22		
	M Hearing Date: 1/13/22		
	☐ Action Date:		
	L Action Date:		
PARCEL #: 3322180099 PHYSICAL ADDR	ESS PROJECT: N/A		
(book all 41 - 4	apply		
Long Plat Preliminary Approval (SEPA)	Long Plat Final Approval		
	Short Plat		
Franned Development (SEPA)	Conditional Use Permit (SEPA)		
	Zoning Text or Map Amendment (SEPA)		
Zoning Map Amendment (SEPA)	Comprehensive Plan Amendment (SEPA)		
	Administrative Permit		
Other, Specify:	A CHILLIE		
APPI ICANTA Palm Investments No. 11 . 1	The state of the s		
APPLICANT: Palm Investments North LLC	Phone #: (509) 322-3032		
Mailing Address: P.O. Box 322, Winthrop, WA 9886	52		
Contact Person: Jerry Palm, President	Email Address:		
ENCINEED/SUDVEYOR OF BEGORD	The state of the s		
ENGINEER/SURVEYOR OF RECORD: Louis Sukova	aty		
Firm Name: North Cascades Engineering	Phone #: 509 341 4144		
Mailing Address: 1 Twin Lakes Road Winthrop W	A 98862		
Email Address:			
OWNER OF PROPERTY: Palm Investments North LLC			
Mailing Address: P.O. Box 322, Winthrop, WA 9886			
Address: 1.0. Box 322, Winthrop, WA 9886	2		
GENERAL PROJECT INFORMATION;			
This application is made pursuant to the fall			
This application is made pursuant to the following ordin (Please check appropriate Twisp Municipal Code)	nance sections: X TMC 18		
(and the control of	TMC 17		
	TMC 16		
Description of the proposal. Create residential starts (
Description of the proposal: Create residential single-familinfrastructure (streets, water sewer power). Manage starrage	y on undeveloped land. Construct public		
infrastructure (streets, water, sewer, power). Manage stormwate	er on-site. Dedicate open space to public use.		
Description of the existing use(s) of the			
Description of the existing use(s) of the property: The existing property is vacant, undeveloped land.			

Description of the primary use(s) of the property: The existing site is vacant and undeveloped. The proposed primary use is single-family residential.			
Description of other (appurtenant) uses: N/A			
Land	Use Description of the subject property:		
	Comprehensive Plan: Single-Family Low Density Residential (R1)		
	Shoreline Environment: N/A		
	Flood Plain Zone & Base Flood Elevation: N/A		
	Zoning District: Low-density residential single-family (R-1) district		
	Zoning Overlay District: N/A		
Are th	ere existing relevant permit or approvals held to the subject property? If yes, state the number and issuing agency: No		
Will th	ne proposal affect the access to the property? If yes, please describe: No		
Will th	provements and connection to Harrison Street AND TSABELLA LANE. The proposal require additional and/or new and/or changes to the water, sewer and storm es: If yes, please describe for each: Yes, new mainlines and service connections for water and		
sanitan	/ sewer. Stormwater will be managed on-site.		
	Concurrency:		
	Water Service is provided by: Town of Twisp		
	Sewer Service is provided by: Town of Twisp		
	Storm sewer service is provided by:		
uescrip	property served by an irrigation district? If yes, state the name of the servicing district and see any affect the proposal will have on the service: Yes. Methow Valley Irrigation District (MVID). will MAILANTE per district allotment.		
Please	also include:		
	Complete permit application		
6	Impact assessment checklist		
4	Site plan		
	Plans and specifications (if applicable)		
The same of			
	Sepa documents		
The same of the sa	Meets and bounds legal description (if applicable)		
	List of all adjacent landowners (with addresses) within 300' of project vesting fees (if required).		

I hereby apply for the above noted permit(s). By signing below, I hereby certify that I am the above applicant and hereby state that all the foregoing information, and all information attached hereto, as true to the best of my knowledge, with the understanding that inaccurate, incomplete and/or false information may cause delays and/or provide cause to void this application and any subsequent approvals. Further, I understand that in addition to the filing fees, I am responsible for reimbursement to the Town of Twisp for all costs incurred in the processing of this application. These costs may include, but are not limited to: postage, publishing, copies, peer review and special consultant review and inspection.

Applicant's Signature	5/16/22 Date
Property Owner's Signature (Mandatory if different from the applicant)	Date
*** FOR OFFICE U	USE BELOW ***
This proposal IS of IS NOT categorically exempt for With the State Environmental Policy Act.	rom a threshold determination in accordance
Basis of exemption if applicable:	
Decision Maker: Mul Ckhu	Date: 5/23/22

2. Impact Assessment Checklist

Orchard Hills Planned Development (PD)-Resubmittal

Internal Use Only	
File number	
M. Market, M. Market, Market, M. C. Commission,	-
Project Name	
1 Toject Ivaine	

TOWN OF TWISP IMPACT ASSESSMENT CHECKLIST

This checklist is to accompany all land use, shoreline and floodplain development applications, building permits for new construction, except for single-family homes, and business licenses for new or substantial expansion or modification to the primary use of your establishment that might affect performance standards. (For example, a cafe currently open only for breakfast and lunch that wants to expand to serve dinners and live music is required to fill this out as this might increase the demand for off-street parking or noise impacts.)

This checklist is to be used to aid the administrator in determining the nature and extent of impacts of a proposed development within the Town of Twisp based on performance and development standards adopted in the Zoning Ordinance # 632.

For developments requiring an Administrative Permit (AP), this checklist must be completed and recorded along with a SEPA checklist (if required) prior to the Town making any determination.

To be completed by applicant

1 0 1 4			
Project Title: ORCHARD HILL			
Development Location: Twisp, Washington			
Applicant Name: Palm Investments North LLC			
Mailing Address: P.O. Box 322, Winthrop, WA 98862			
Phone number: 509 322 3032 Email Address:	; palmci1@gmail.com		

Section 1. General Performance Standards

Please answer the following questions to the best of your ability with Y for yes and N or No. If Yes is answered, please provide a description as to how the impact will be mitigated on a separate sheet of paper. Please use "N/A" for items that are not applicable to your proposal.

Do you foresee any of the following impacts from your proposed project?	Y, N N/A
1. Artificial glare or lighting that might interfere with street traffic or trespass into residential area, including but not limited to strobe lights, arc welding, overhead lighting, or security lights.	N
2. Electrical interferences or electromagnetic radiation	N
3. Flammable or explosive material	N
4. Hazardous substances or waste (storage, emission or manufacture)	N
5. Noise	N
6. Odor	N
7. Please indicate your proposed hours of operation:	
8. Emissions (including dust, ash, or airborne particulates)	N
9. Vibration or concussion detectable beyond property lines	N
10. Outdoor storage of materials	N

Section 2. Specific Performance Standards

Please provide a description that adequately addresses the following elements.

1. Aesthetics: How does your proposal provide aesthetic consistency with the surrounding neighborhood character?

The project is designed and proposed to be built to existing Town of Twisp standards.

2. Traffic: Will your project generate traffic or affect current traffic patterns? If so, a traffic impact analysis may be required.

The project will result in approximately set daily trips per residential units, as estimated by the Institute for Transportation Engineers (ITE). There are no vehicular transportation issues identified in the transportation plan or the comprehensive plan. A traffic impact analysis HAS SEEN COMPLETED.

3. Parking: Does your project provide adequate off-street parking consistent with the Town of Twisp parking requirements? If you intend to create parking, please describe your proposed surfacing materials, stormwater management plans, how many vehicles and what type of business equipment.

Residential parking will be developed consistent with, and may exceed, Town of Twisp standards.

4. Roads and Drives: Does your project propose new roads, driveways or alleys? If so, please provide a description of road dimensions, surfacing materials and stormwater management.

New public streets will be created. See discussion of proposed public streets.

5. Buffers and screening: Do you propose to plant vegetative buffers or screens? If so, please provide site plan with plant list and design.

No.

6. Open Space: Do you propose to leave open space in your project? If so, please provide site plan with location of open space and landscape plan.

Open space will be provided. See discussion of proposed open space dedication.

7. Utilities: Please list the necessary utility hook-ups required for your project.

Water, sewer, gas, electric/power, and telecom.

the form of writing and/or a site plan where applicable to your project: ✓ Stormwater plan: A storm water management plan must be submitted with a development proposal for all uses other than single family dwellings, duplexes, and accessory dwellings. For those uses exempt from this requirement, adequate permeable surfaces must be maintained in yards and setbacks. Dog-control measures: Dog control measures are mandatory for all uses except single-family dwellings, duplexes, accessory structures and home businesses. SEPA checklist: If minimum threshold is determined. Roof Drainage Easements: If your project results in roof drainage onto neighboring properties, drainage easements are required. Water and Sewer: All new uses must connect to town water and sewer. (If other than a single-family residence, must include information regarding average water use and documentation used to determine this). Heating Ventilation and Air Conditioning Units: Screening of HVAC is required on all commercial and multi-family dwellings. Commercial Access: Access to commercial enterprises must be via public right of ways or adjacent commercial properties. Private roads and common areas: Management programs for joint ownership and use of roads and common spaces must be recorded on plat or site plan. Townhouses: Please see zoning ordinance for requirements and provide a site plan. Nuisances: Any nuisance shall be subject to Title 8.05 of Twisp Municipal Code. Section 4: Critical Areas To the best of your knowledge, is your project located in or adjacent to the following natural features? Please answer yes or no, or not sure. The Town of Twisp will make a determination if a Critical Areas Review may be required prior to granting a development permit. Steep slopes (geologically hazardous) Aquifer recharge Wetlands (including seasonally wet areas) Frequently flooded areas Wildlife habitat (including upland and/or riparian habitat) Is there a well on or near your property? Is there surface water on or near your property? What is your property currently being used for? The site is currently undeveloped and vacant.

Please provide information regarding the following elements (if applicable to your project) in

Section 3. Development Standards

Please provide a description of historical uses of your property if you know them:		
THE SITE WAS HISTORYCALY USED AS	s an orchand.	
To the best of my knowledge, the information paccurate information, structure placement, distancement development information for my properties.	ances, roads, driveways, land features, and other	
Applicant Signature	Date	
Owner Signature (if other than applicant)	Date	

3. Legal Description

Orchard Hills Planned Development (PD)-Resubmittal

EXHIBIT "A" LEGAL DESCRIPTION

PART OF THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 18. TOWNSHIP 33 NORTH, RANGE 22, E.W.M., MORE PARTICULARLY DESCRIBED AS FOLLOWS:

STARTING AT THE EAST QUARTER CORNER OF SECTION 18, TOWNSHIP 33 NORTH, RANGE 22, E.W.M., AND RUNNING THENCE NORTH 89 DEGREES 56 MINUTES WEST FOR A DISTANCE OF 912 FEET TO THE SOUTHWEST CORNER OF PAINTER'S SUBDIVISION AS RECORDED IN VOLUME "G" OF PLATS, PAGE 39, RECORDS OF OKANOGAN COUNTY, WASHINGTON, AND THE TRUE POINT OF BEGINNING:

THENCE FOLLOWING ALONG THE WEST BOUNDARY OF SAID PLAT, NORTH 00 DEGREES FOR A DISTANCE OF 237.56 FEET:

THENCE NORTH 66 DEGREES 00 MINUTES EAST FOR A DISTANCE OF 199.37 FEET:

THENCE NORTH 33 DEGREES 58 MINUTES 10 SECONDS EAST FOR A DISTANCE OF 149 02 FEET.

THENCE NORTH 00 DEGREES 00 MINUTES FOR A DISTANCE OF 275.00 FEET TO THE NORTHWEST CORNER OF SAID PAINTER MINUTESS SUBDIVISION:

THENCE NORTH 16 DEGREES 37 MINUTES WEST FOR A DISTANCE OF 606.00 FEET, MORE OR LESS, TO THE NORTH BOUNDARY OF THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 18, TOWNSHIP 33 NORTH, RANGE 22, E.W.M.:

THENCE WESTERLY ALONG THE NORTH BOUNDARY OF THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER TO THE NORTHWEST CORNER OF SAID SOUTHEAST QUARTER OF THE NORTHEAST QUARTER:

THENCE SOUTHERLY ALONG THE WEST BOUNDARY OF THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER TO THE SOUTHWEST CORNER OF SAID SOUTHEAST QUARTER OF THE NORTHEAST QUARTER;

THENCE EASTERLY ALONG THE SOUTH BOUNDARY OF THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER TO THE TRUE POINT OF BEGINNING;

EXCEPT, BEGINNING AT THE SOUTHEAST CORNER OF THE TWISP WATER WORKS RESERVOIR SITE, SITUATE IN THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER SECTION 18, TOWNSHIP 33 NORTH, RANGE 22, E.W.M. (SAID RESERVOIR SITE BEING FULLY DESCRIBED IN WARRANT/ DEED RECORDED ON PAGE 22 IN BOOK 85 OF DEED RECORDS OF OKANOGAN COUNTY, WASHINGTON) THE TRUE POINT OF BEGINNING;

THENCE NORTH 0 DEGREES 01 MINUTES EAST ALONG THE EASTERLY BOUNDARY LINE OF SAID SITE A DISTANCE OF 150.0 FEET TO THE NORTHEAST CORNER OF SAID SITE:

THENCE NORTH 13 DEGREES 55 1/2 MINUTES WEST A DISTANCE OF 363 7 FEET.

THENCE NORTH 22 DEGREES 55 1/2 MINUTES WEST A DISTANCE OF 38 FEET MORE OT LESS TO THE NORTHERLY BOUNDARY LINE OF SOUTHEAST QUARTER OF THE NORTHEAST QUARTER OF SAID SECTION 18, TOWNSHIP 33 NORTH, RANGE 22, E.W.M.;

THE FOREGOING OF SAID SECTION 18, TOWNSHIP 33 NORTH, RANGE 22, E.W.M.;

THE FOREGOING DESCRIPTION BEING A CENTER LINE AND THE LAND BEING CONVEYED BY THIS DESCRIPTION IS 16 FEET ON THE EASTERLY SIDE AND 16 FEET ON THE WESTERLY SIDE OF SAID CENTER LINE;

ALSO EXCEPT, BEGINNING AT THE EAST QUARTER CORNER OF SAID SECTION 18, TOWNSHIP 33 NORTH, RANGE 22, E.W.M.;

THENCE RUNNING NORTH 0 DEGREES 14 MINUTES WEST ALONG SAID SECTION LINE FOR A DISTANCE OF 874.8 FEET TO A POINT;

THENCE TURNING AND RUNNING SOUTH 65 DEGREES 57 MINUTES WEST A DISTANCE OF 76.1 FEET TO A POINT:

THENCE TURNING AND RUNNING NORTH 89 DEGREES 59 MINUTES WEST FOR A DISTANCE OF 672.0 FEET TO A POINT ON THE EASTERLY LINE OF SAID PARCEL OF LAND AND THE TRUE POINT OF BEGINNING:

THENCE TURNING AND RUNNING NORTH 0 DEGREES 01 MINUTES EAST FOR A DISTANCE OF 100.0 FEET TO A POINT:

THENCE TURNING AND RUNNING SOUTH 0 DEGREES 01 MINUTES EAST FOR A DISTANCE OF 150.0 FEET TO A POINT:

THENCE TURNING AND RUNNING SOUTH 89 DEGREES 59 MINUTES EAST FOR A DISTANCE OF 100.0 FEET TO A POINT:

THENCE TURNING AND RUNNING NORTH 0 DEGREES 01 MINUTES EAST FOR A DISTANCE OF 50.0 FEET TO THE TRUE POINT OF BEGINNING;

AND EXCEPT, COMMENCING AT THE EAST QUARTER CORNER OF SECTION 18, TOWNSHIP 33 NORTH, RANGE 22, E.W.M. AND PROCEED NORTH 0 DEGREES 14 MINUTES WEST ALONG THE EAST LINE OF SAID SECTION 18 FOR 874.8 FEET;

THENCE SOUTH 65 DEGREES 59 MINUTES WEST FOR 76.1 FEET;

THENCE NORTH 89 DEGREES 59 MINUTES WEST FOR 672.0 FEET;

THENCE NORTH 0 DEGREES 01 MINUTES EAST FOR 100.0 FEET:

THENCE NORTH 89 DEGREES 59 MINUTES WEST FOR 16.48 FEET TO THE INTERSECTION OF THE NORTHERLY LINE OF THE EXISTING RESERVOIR SITE AND THE WESTERLY BOUNDARY OF THE EXISTING ACCESS ROAD RIGHT OF WAY WHICH IS THE TRUE POINT OF BEGINNING OF THIS DESCRIPTION:

THENCE CONTINUE NORTH 89 DEGREES 59 MINUTES WEST FOR 83.52 FEET.

THENCE SOUTH 0 DEGREES 01 MINUTES WEST FOR 135.0 FEET;

THENCE NORTH 89 DEGREES 59 MINUTES WEST FOR 20.0 FEET;

THENCE NORTH 0 DEGREES 01 MINUTES EAST FOR 185.0 FEET.

THENCE SOUTH 89 DEGREES 59 MINUTES EAST FOR 91.11 FEET;

THENCE SOUTH 13 DEGREES 55 1/2 MINUTES EAST FOR 51.52 FEET TO THE POINT OF BEGINNING:

SITUATE IN THE CITY OF TWISP, COUNTY OF OKANOGAN, STATE OF WASHINGTON

4. Executive Summary

Orchard Hills Planned Development (PD) - Resubmittal

Resubmittal of the Orchard Hills Planned Development strives to balance the design objectives of Palm Investments North LLC with requirements and desires of the Town of Twisp and its residences.

Palm Investments North's original design objectives were to develop the property while preserving ridge line views, minimizing road infrastructure, increasing available housing and assisting in alleviating the affordable housing problem while staying fundamentally within the Town's vision of Development as defined in the Twisp Comprehensive Plan.

A large volume comments were received for the project. These Comments were compiled, reviewed, weighted and incorporated (if applicable) into the design. All Comments received a written response, see section "Comments and Responses" of this document. An overwhelming number of Comments regarding the road width, parking, snow plowing, etc. left very little opportunity to minimize road infrastructure. Thus, the road infrastructure design objectives were changed for this resubmittal but the other objectives remain unchanged.

The site plan has been revised to incorporate only roads that meet the design standards of Twisp as defined by the Twisp Public Works design standards. This required the reduction of the number and location of the public roads.

Palm Investments North still proposes dedicating 40% of the 16.81 acres to the Town of Twisp for the possible use as the Painter Addition Park indicated in the Twisp Comprehensive Plan. The proposed lots have been located below the ridge line to reduce the visual impact of the development.

Palm Investment North, LLC spent considerable effort in determining the best lot layout that would meet the project goals and have a good balance in terms of density. The starting point for this calculation was the number of lots that would be allowed if a subdivision per the R1 zoning was executed. The parcel encompasses 16.81 acres or 732244sqft so if 18% is removed for infrastructure (roads,etc) that leaves 600440 sqft remaining for lots. Which equates to 60 ten thousand square foot lots. By proposing a planned development with only 52 lots there will be less residences in final build out than is allowed at this time by R-1 zoning and they will be concentrated on smaller lots that are below the ridge line and preserve a large portion of lot (40%) as public open space. Since this area is proposed to be dedicated to the town the citizens could work with the Town to utilize it in ways that are consistent with the Towns open space policy. The open space was selected to maintain a route for hiking to the high point of the property if the Town of Twisp so desires. Additionally, the smaller lot sizes will be more affordable thus furthering the project goal of assisting to provide affordable housing.

The proponent has been in direct communications with The Methow Housing Trust and, although an agreement has not been finalized, it is anticipated that they will be procuring 10 of the lots to construct housing upon. Additionally, the cost of smaller lots should hold the cost down. It is also the request of Palm Investments North that a limited number of the lots be

allowed to have zero side lot line setbacks to allow townhouse construction to further promote affordable housing (see Site Plan).

This proposal does not include additional requirements over and above the Twisp Codes and Standards for permitting and building of residences within the Development. The proposed consolidated Development footprint and the lower number of lots (than allowed by zoning) will result in a reduced overall impact.

Palm Investments North has responded to the comments requesting more information be obtained on different portions of the project by hiring outside consultants. Please find attached: Wetlands Determination, Traffic Analysis, DOE Lead and Arsenic Testing Report and Geotechnical report. Any additional information obtained from these reports has been used to update the SEPA checklist and has verified the feasibility of the proposed design.

In conclusion, Orchard Hills Planned Development proposes 52 compact buildable lots, several zero lot line townhouses and 40% of the site dedicated to the Town of Twisp as Open Space. Advantages of this proposal include: increasing the number of buildable lots within the Town to assist in reducing the existing housing shortage; providing area for a potential Park, as included in Twisp Comprehensive Plan, within the dedicated Open Space; including the ridge line in the dedicated Open Space to assist in preserving Town views while providing public access for hiking; lastly, as desired by the adjacent neighbors, the overall number of proposed residences is less than allowed in the current property R1 zoning.

5. Submittal Checklist

Orchard Hills Planned Development (PD) - Resubmittal

Development Site Plan:

- ☐ 18.45.050(1)a Boundaries of the site and north arrow.
- 18.45.050(1)c Areas proposed to be developed with approximate footprints of proposed buildings and their nature (e.g., residential, community use, commercial, office, etc.)
- ₫ 18.45.050(1)e Proposed public dedications.
- ☐ 18.45.050(1)f Location, dimensions and schematic design of off-street parking areas or facilities, showing points of ingress and egress.
- 18.45.050(1)g Location of major physiographic features such as rivers, canals, floodplain areas, etc.
- 18.45.050(1)h Existing topographic contours for the entire site, at intervals of not more than five feet, together with existing drainage and identification of existing vegetation.
- 18.45.050(1)i Proposed land uses, densities and building types.
- ☑ 18.45.050(1)j Pedestrian and vehicular circulation pattern.
- ☐ 18.45.050(1)k Location and type of all existing and proposed recreational improvements, if any, to include nonmotorized trails and paths.
- ₫ 18.45.050(1)I Conceptual landscape plan.
- ☑ 18.45.050(1)m Proposed grading and drainage design.

Written Planned Development Program and Specifications:

₫ 18.45.050(2)a - An explanation of the density of the proposed project. The density goals are set forth in the regulations for the various zone districts (applies to residential uses only).

₫ 18.45.050(2)b - Proposed ownership pattern

□ 18.45.050(2)c - Operation and maintenance proposal (if not dedicated to the public) for the project amenities, roadways, utilities, etc. (e.g., property owners' association, condominiums). The performance goal is to assure that a long-range maintenance program is provided for all common areas and commonly used utilities and roadways, with provision for collection of a prorated share of costs and expenses of such maintenance and for decisjon-making with regard thereto.

18.45.050(2)d - General timetable for development, including any project phasing and conditions therefor and any foreseeable future expansion. The performance goal is to provide sufficient open spaces and project utilities and amenities for each phase of development, so that each phase can stand alone as a satisfactory completed project.

18.45.050(2)e - Description of existing and proposed community and recreational facilities. The performance goal is for larger projects or projects that have a significant impact on existing formal or informal recreational opportunities to minimize and mitigate such impact by retention and expansion of existing opportunities or provisions for new or improved community or public recreation opportunities, including park areas, access to river or public lands, or recreational improvements such as pools, tennis courts, etc.

18.45.050(2)f - Visual impacts, including description of project view orientation, proposals to minimize view obstruction from adjacent lands and public roadways, and proposed site barriers for utility or loading areas, parking areas, etc. The performance goal is to minimize degradation of the existing views of river areas, mountains and open lands, to preserve the aesthetic qualities which the town values, to provide aesthetically pleasing visual barriers to unsightly areas, and to assure that new developments benefit from the available views without preventing their enjoyment by others.

18.45.050(2)h - Stormwater collection and disposal plan. The performance goal is to assure that stormwater runoff after development does not exceed the amount before development, and that stormwater disposal has no negative impact on the water quality of either surface or groundwater of the Methow Valley, and to provide, where feasible, and at the developer's expense, a stormwater management system which can be extended to serve future developments.

Palm Investments North LLC 28 Longhill Rd, Winthrop, WA 98862 designed for the site, and to identify problem areas prior to development to prevent unanticipated erosion or drainage problems.

18.45.050(2)j - Air quality considerations and mitigation measures, including dust control measures. The performance goal is to allow no degradation of the air quality of the Twisp area, either from single projects or by cumulative impacts, and to prevent degradation of the ambient air quality by utilizing sufficient dust control measures both during periods of construction, and after project completion. Automobile emissions will be considered, and projects that will have a significant traffic impact will be expected to investigate all possible avenues to minimize motor vehicle usage, including provision for mass transit (such as bus or van runs to or from the project) and pedestrian/bike access.

18.45.050(2)k - Traffic circulation elements, including anticipated traffic increases (vehicles per day) and major times thereof. The performance goal is to assure a smooth flow of traffic through and throughout the town, to avoid traffic congestion and hazardous intersections, mergers or other traffic patterns, and to minimize increased traffic loads by encouraging pedestrian and nonvehicular transportation or mass transit.

18.45.050(2)I - Noise considerations and mitigation measures therefor. The performance goal is to minimize noise impacts on surrounding properties and the town in general, and mitigation measures to be examined include placing indoors those recreation facilities which may generate noise in the evening or night hours, limiting motor vehicle usage within the project, plantings to buffer noises, and limiting allowable hours and days of construction.

18.45.050(2)m - A concise statement of the general public benefits to be derived from the development of the proposed project, which may include but are not limited to increased open space, special wildlife or recreation benefits, perimeter transitions to surrounding land uses, or new public facilities included in the development (including dedicated or public trails, parks, etc.). The performance goal is to assure that all approved projects benefit the general welfare of the town of Twisp.

18.45.050(2)n - Proposals to control or prohibit further land divisions, where appropriate. The performance goal is to provide perpetual restriction on future division of the developed property beyond the approved density and/or below the approved minimum lot sizes, and to eliminate the need for town oversight to enforce such approved densities/lot sizes.

€ 18.45.050(2)o - Description of planned uses of and improvements to common open space areas, if any, and proposals to ensure future maintenance of common open space areas, and to ensure compliance with the open space requirements set forth in TMC 18.45.020.

18.45.050(2)p - An explanation of all restrictions and proposals to protect wildlife, including but not limited to dog control, fencing restrictions, maintenance of riparian areas, and maintenance or re-establishment of recommended native vegetation for wildlife habitat. The performance goal is to allow no net loss of key or critical wildlife habitats, to provide for wildlife passage through developed areas, and to minimize the threat of domestic pets to wildlife.

Preliminary Utilities Plan and Specifications:

18.45.050(3) - Preliminary utility plan

2 18.45.050(3) - Preliminary utility specifications

SEPA checklist:

□ 18.45.050(4) - SEPA checklist

6. Project Team

Orchard Hills Planned Development (PD) - Resubmittal



Developer:

Jerry and Julie Palm Palm Investments North, LLC PO box 322, Winthrop, WA 98862 (509)322-3032

Engineer of Record:

Louis Sukovaty, PE North Cascades Engineering, PLLC PO Box 309, Winthrop, WA 98862 (509)741-9713

Civil Engineering and Planning:

Sang Park PE, Civil Engineer
Ian Faulds, Senior Planner
LDC Corp.
1851 Central Place South, Suite 101, Kent, WA 98030
(425)806-1869

Transportation Consultant:

Ryan Shea, PTP, Senior Transportation Planner SCJ Alliance 8730 Tallon Lake, NE Suite 200, Lacey, WA 98516 (360)252-1465

Environmental Consultant:

Larry Lehman, Senior Biologist Grette and Associates, LLC 151 S. Worthen St. Suite 101, Wenatchee, Wa 98801 (509)663-6300

Geotechnical Consultant:

Nick Szot, PE Aspect Consulting, LLC 23 S Mission St C, Wenatchee, WA 98801 (509)888-7218

Palm Investments North LLC 28 Longhill Rd, Winthrop, WA 98862

7. Written Planned Development Program and Specifications

Orchard Hills Planned Development (PD) - Resubmittal



Property Description:

The Orchard Hills planned development is a vacant property 16.8 acres in size near the western town limits. It sits above May Street and is accesses from Harrison Avenue. An orchard once occupied a portion of the site, but was abandoned and removed in the 70's. Volunteer apple trees have reappeared from the roots stock over time.

The parcel varies in elevation from a low point of 1710 feet on the eastern boundary to the high point of over 1900 feet in the northwest property corner. The majority of the property is vegetated with native grasses, bitterbrush and related plants. A small portion along the Methow Valley Irrigation District easement contains trees. The Twisp Comprehensive Plan designation is Single-Family Low Density Residential (R1). The current zoning designation is Low-density residential single-family (R-1).

Planned Development Proposal:

The proposed project request approval of 52 single-family residential homesites on 16.81 acres, completed in three phases. Lot sizes range between 3,600 square feet and 8,800 square feet with the majority of lots between 5,500 and 8,000 square feet. Using flexibility afforded by the planned development process the project focuses homesites on the more level portion of the site, avoiding steep slopes that are prone to erosion and keeps building off the ridgeline. The project proposes to retain 6.8 acres undeveloped and permanently dedicated to the Town of Twisp for a community park or open space. The project will build new public infrastructure (streets, water, sewer, electric power, stormwater).

Explanation of the density of the proposed project (18.45.050(2)(a)):

Palm Investment North, LLC spent considerable effort in determining the best lot layout that would meet the project goals and have a good balance in terms of density. The starting point for this calculation was the number of lots that would be allowed if a subdivision per the R1 zoning was executed. The parcel encompasses 16.81 acres or 732244sqft so if 18% is removed for infrastructure (roads,etc) that leaves 600440 sqft remaining for lots. Which equates to 60 ten thousand square foot lots. By proposing a planned development with only 52 lots there will be less residences in final build out than is allowed at this time by R-1 zoning and they will be concentrated on smaller lots that are below the ridge line and preserve a large portion of lot (40%) as public open space. Since this area is proposed to be dedicated to the town the citizens could work with the Town to utilize it in ways that are consistent with the Towns open space policy. The open space was selected to maintain a route for hiking to the high point of the property if the Town of Twisp so desire. Additionally, the smaller lot sizes will be more affordable thus furthering the project goal of assisting to provide affordable housing.

Proposed ownership pattern (18.45.050(2)(b)):

The open space and residential streets are proposed to be dedicated to the Town. The remaining area will be split into lots and sold to individuals for residential use.

Operation and maintenance proposal (18.45.050(2)(c)):

To keep the maintenance standards within the Town uniform this project proposes to dedicate to the Town all residential streets and Open Space. No improvements have been proposed to the open space to limit maintenance and operation cost required by the Town. Town of Twisp Public works has indicated this would make the acquisition of the Open Space more appealing to them.

General timetable for development (18.45.050(2)(d)):

Palm Investment North, LLC is proposing to construct the development in three phases. Construction is projected to start in the spring of 2023. The general phases are outlined below. Surety acceptable to the Town of Twisp will be provided for any public infrastructure that is not constructed in the first phase.

Phase 1: During the first phase utilities will be completed from Harrison to the West property line and up to the water tanks and will include the potable water connection at the booster pump station. Roads will be completed from Harrison to the water tanks.

Phase2: The second phase will include the construction of Harrison to 40' beyond the water tower enclosure and the construction of the fire access road down to Isabella. Also included in this phase is the extension of the utilities to the north property line and road grading to the north property line. This phase will be completed prior to the sale of more than 30 lots.

Phase3: The third phase will finish the road improvements out to the north property line.

<u>Recreation (18.45.050(2)(e)):</u>

Palm Investment North, LLC is proposing not to construct any new recreational facilities for this project. This is primarily because the Twisp Public Works has indicated that acceptance of the open space is more appealing to them if it does not bring a maintenance burden with it. However, the proposed development has a walking path along the length of all roads and the open space reserves 40% of the area for hiking of unofficial paths and allows a route to access the high point to enjoy the vista. Currently, the adjacent neighborhood utilizes this property for these hikes without the consent. If the property is subdivided per current zoning these recreational opportunities in all likely hood will go away.

In spite of the fact that the open space will not be improved at this time, there is the potential to have many recreational amenities added as the Town and its citizens define their expectations in the future. Although not developed as a park at this time, it would be a great place for the Painter's Addition area proposed park as delineated in the Twisp Comprehensive Plan.

Visual Impacts (18.45.050(2)(f)):

Despite the fact that the site does not encompass any land designated in the comprehensive plan as having significant visual quality warranting special protection beyond that provided by town development regulations, Palm Investments North has made a concerted effort to minimize the visual impacts that this project will have for the citizens of Twisp and the surrounding areas. The proposed building lots have all been pulled down off the ridge line so as to make the residences less obvious.

Landscaping (18.45.050(2)(g)):

Landscaping is anticipated to be irrigated green spaces around the residential structures with the bulk of open space remaining in natural vegetation. A good portion of the project site has irrigation rights on the MVID ditch and the developer will install infrastructure within the street to distribute this water to each lot which has legal access. Strategic tree planting along the street may be implemented to screen areas such as the water tanks. Disturbed areas will be reseeded with natural vegetation. Since this proposal is for individual residential lots and the Town code does include any landscaping requirements for this type of construction, it is anticipated that it will eventually be approximately the same as the surrounding residential neighborhood.

Stormwater collection and disposal plan (18.45.050(2)(h)):

The preliminary design of the storm water system has been completed in accordance with the Storm Water Management Manual for Eastern Washington. Like almost all jurisdictions in Eastern Washington, Twisp has adopted this manual as the basis for its storm water management standards because it defines the best management practices that are applicable. Onsite Infiltration is the preferred method of disposing of stormwater runoff and this site is especially well suited for this. Palm Investments North hired Aspect Consulting to analyze the soils and infiltration rates to verify the feasibility of this approach. Their conclusion is that the soils are highly infiltrative and deep enough to support a storm water infiltration system more than adequate to meet the maximum design storm water flows. The report has been included in our resubmittal. The storm water system for this development will collect, treat and infiltrate all of the storm water for a design storm frequency of 10yr (Twisp standard) and any runoff in excess of this will be directed to the location it would have drained to prior to the development. There are comments alluding to an existing problem of seasonal water flow crossing the property at the south end and flowing into Painter's Addition. This project will not modify this area of the property and therefore will not solve or exacerbate the situation. To be clear, each residence when built will collect, treat and infiltrate their storm water as well.

Geophysical Characteristics (18.45.050(2)(i)):

The proposed project was designed to take advantage of existing topographic conditions and minimize site disturbance to the greatest extent practicable. Most steep slopes were incorporated into required open space and will be left undisturbed. The street network was located to minimize cut and fill. A Geotechnical Engineer was retained to ascertain both soil stability and infiltration capability.

Air Quality Considerations (18.45.050(2)(j)):

This planned development anticipates the air quality impacts to be less than if the parcel was developed as a simple subdivision as allowed by current zoning. Best management practices will be used during construction to limit dust. Fireplaces will be regulated by the Twisp Municipal Code requirements. By providing affordable housing within the Town of Twisp that is closer to groceries, banking, entertainment, etc., the project will result in less miles driven and less automobile emissions. All graded areas will be revegetated after construction to control dust. A dust control plan per best management practices will be utilized during construction.

<u>Transportation (18.45.050(2)(k)):</u>

The proposed development will have less lots than allowed by current zoning, as such will have no additional impacts over infill development constructed in accordance with the Town Code. SJC Alliance was hired to estimate the traffic flows resulting from the development. It is anticipated that 563 new automobile trips per day will arise because of this development on Harrison Ave. and May St. and these will not exceed the safe capacity of these streets. Interior to the planned development, all roads will be constructed in accordance with the Town of Twisp Standards. A fire apparatus access road from Isabella Lane generally following the existing water tower access road alignment to McIntosh Road is also proposed.

Noise (189.45.050(2)(I)):

This proposal is for a residential development with less total lots than allowed by current zoning. It is therefore anticipated that there will be no noise impacts in excess of those that would occur if the land was built out per the current zoning without a planned development.

Public Benefits (18.45.050(2)(m)):

The primary benefits to the public from this proposal are:

- 1. Increase the number of developable lots within the town, thereby contributing to a more sustainably affordable community.
- 2. Provide the open space for a park as planned for in the Twisp Comprehensive Plan.
- 3. Protect the iconic Twisp ridgeline from building.
- 4. Legitimize the Open Space for hiking and walking for the citizens of Twisp and maintain public access to the highpoint vista of the property.

Control of Future Land Division (18.45.050(2)(n)):

No further division of the land is allowed by the Twisp Code for the residential lots due to zoning. For further land division to occur the zoning would have to change. The open space, if acquired by the Town, would be controlled by the Town. Deed restrictions could be added if deemed necessary.

Open Space (18.45.050(2)(o)):

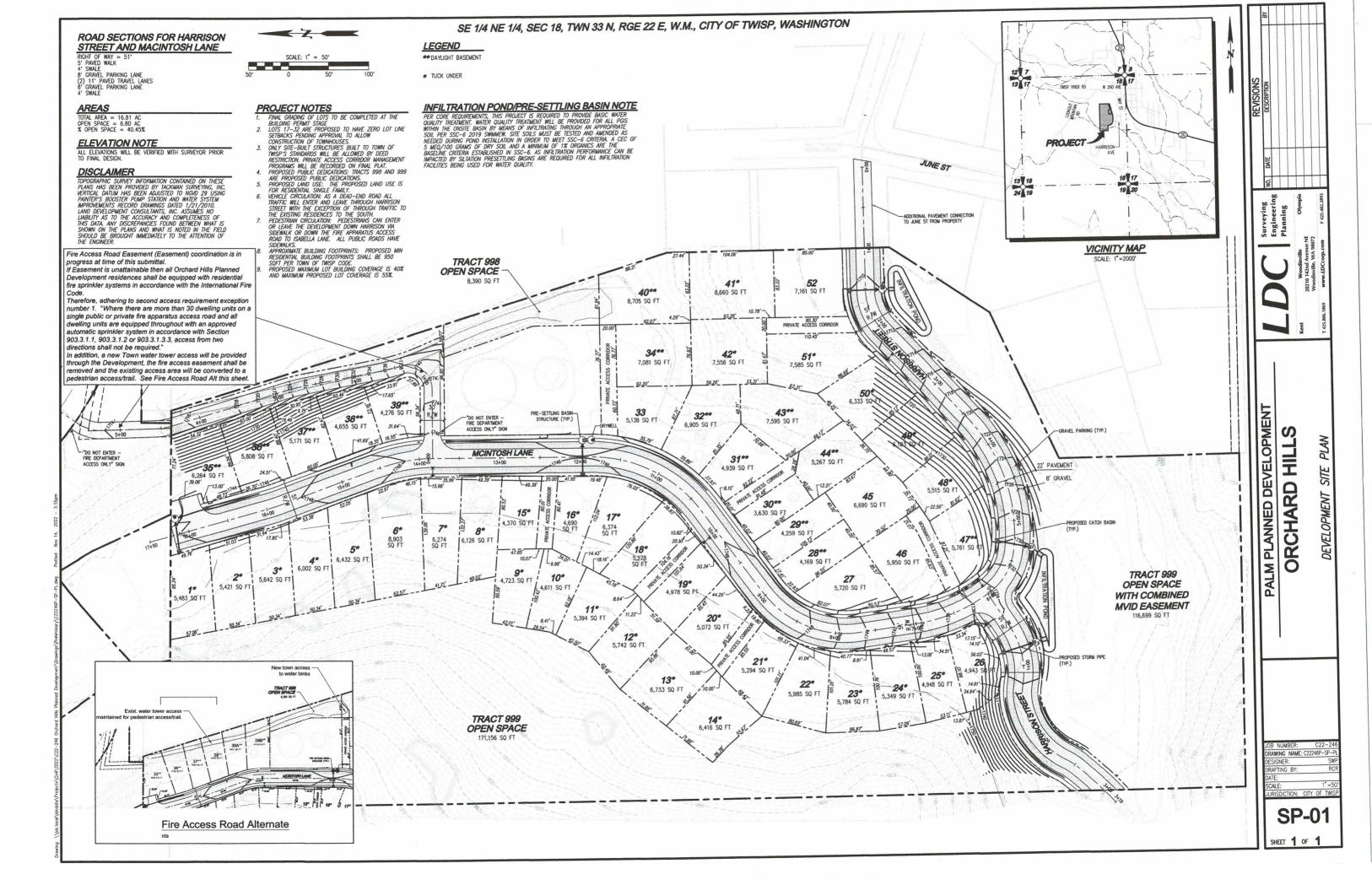
40% of the 16.81 acres of the parcel to be developed are proposed to be Open Space and dedicated to the Town of Twisp. Palm Investment North, LLC is proposing not to construct improvements within the Open Space as part of this project. This is primarily because the Twisp Public Works has indicated that acceptance of the open space is more appealing to them if it does not bring a maintenance burden.

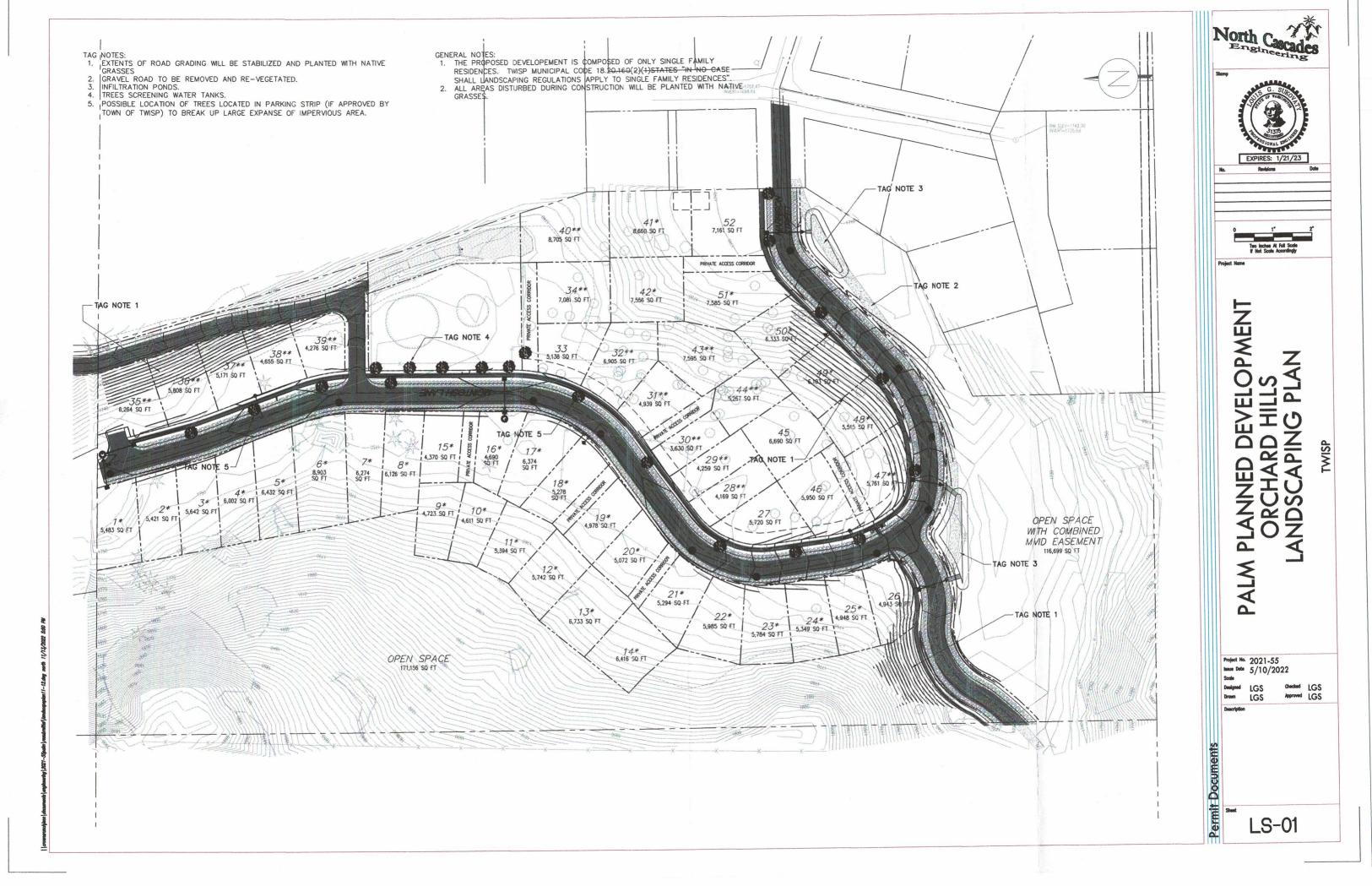
Wildlife Protections (18.45.050(2)(p)):

Although, this project contains no specific proposals for regulating or restricting domestic animals or for improving wildlife habitat within the town limits, it benefits wildlife by setting aside approximately 7 acre of the best habitat as Open Space and protecting it from development.

8. Development Site Plan and Drawings

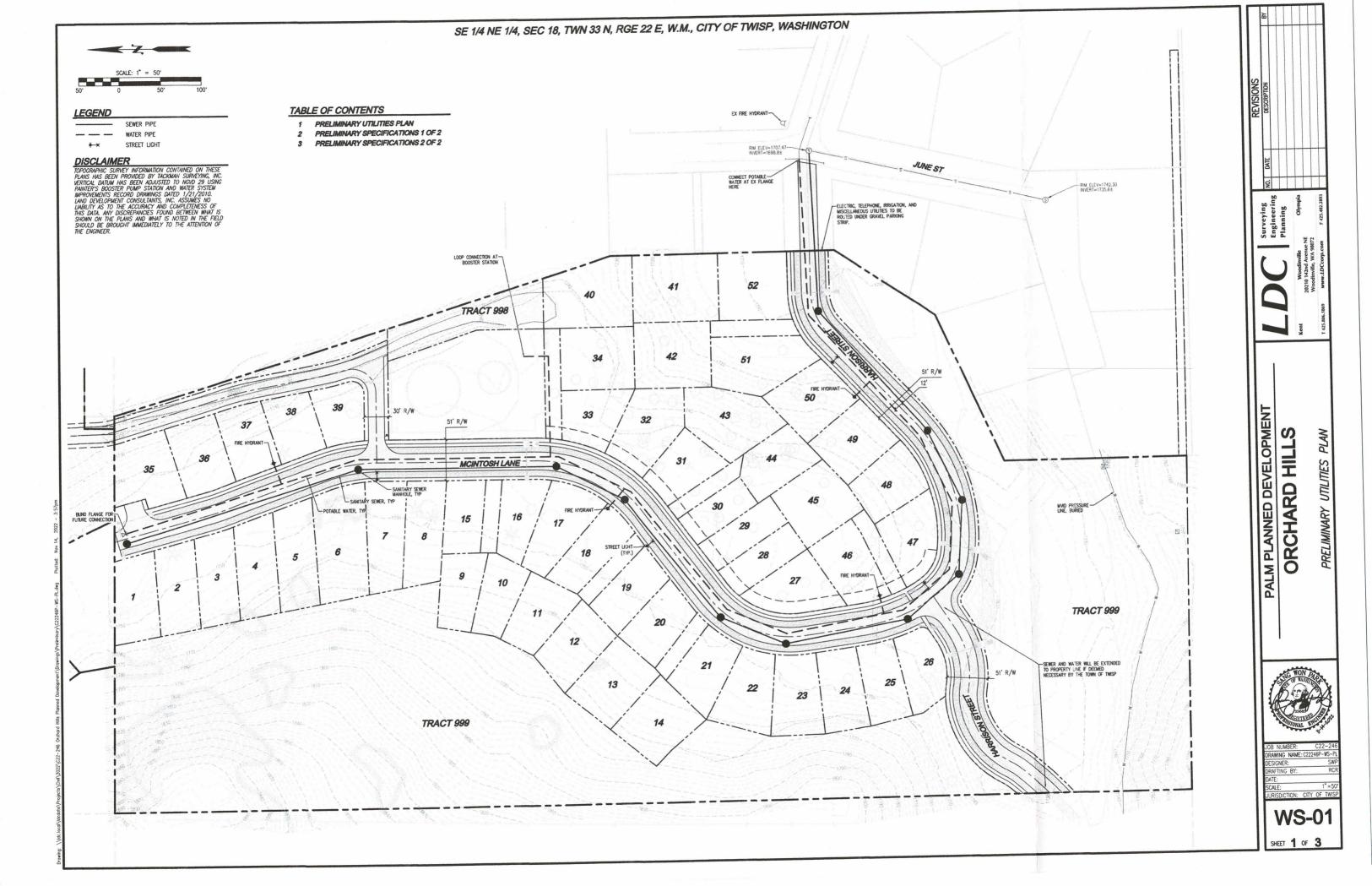
Orchard Hills Planned Development (PD) - Resubmittal





9. Preliminary Utilities Plan and Specifications

Orchard Hills Planned Development (PD) - Resubmittal



TWISP WATER SYSTEM STANDARDS

THE STANDARDS ESTABLISHED BY THESE DEVELOPMENT STANDARDS ARE INTENDED TO REPRESENT THE MINIMUM STANDARDS FOR THE DESIGN AND CONSTRUCTION OF WAITER SYSTEM FACULTIES. GREATER OR LESSER REQUIREMENTS MAY BE MANDARDS BY THE TOWN DUE TO LOCALIZED CONDITIONS. OTHER APPLICABLE STANDARDS THAT ARE REFERENCED WITHIN THESE DEVELOPMENT STANDARDS MILL ALSO BE USED AS DESIGNA AND CONSTRUCTION STANDARDS. EXTENDIONS, CONNECTIONS OR MODIFICATIONS TO THE EXISTING SYSTEM SHALL BE IN COMPILANCE WITH THE STATE DEPARTMENT OF HEALTH REQUIREMENTS.

A. THESE DESIGN STANDARDS APPLY TO ANY SYSTEM CONNECTED TO THE TOWN'S SYSTEM, WHETHER INSIDE OF THE MUNICIPAL LIMITS OR NOT.

B. DETAILED PLANS SHALL BE SUBMITTED FOR THE TOWN'S REVIEW WHICH PROVIDES THE LOCATIONS, SIZE, AND TYPE OF THE PROPOSED WATER SYSTEM AND POINTS OF CONNECTION. THESE PLANS SHALL BE SEPARATE FROM SEWER PLANS.

C. PROJECT PLANS SHALL HAVE A HORIZONTAL SCALE 20 FEET TO THE INCH AND A VERTICAL SCALE OF NOT MORE THAN 5 FEET TO THE INCH. PLANS SHALL SHOW:

LOCATIONS OF STREETS, RIGHTS-OF-WAY, EXISTING UTILITIES AND WATER SYSTEM FACILITIES;
 GROUND SURFACE, PIPE TYPE AND SIZE, AND WATER VALVES AND HYDRANTS STATIONING;
 ALL KNOWN EXISTING STRUCTURES, BOTH ABOVE AND BELOW GROUND, WHICH MIGHT INTERFERE WITH THE PROPOSED CONSTRUCTION, PARTICULARLY SEWER LINES, CAS MAINS, STORM DRAINS, OVERHEAD AND UNDERGROUND POWER AND ALL UNDERGROUND STRUCTURES, TELEPHONE LINES AND TELEVISION CABLES.
 ALL UTILITY EASEMENTS AND APPLICABLE COUNTY DECOROBAGE MINISTED.

D. COMPUTATIONS AND OTHER DATA USED FOR DESIGN OF THE WATER SYSTEM SHALL BE SUBMITTED TO THE TOWN FOR APPROVAL.

E. MATERIAL AND INSTALLATION SPECIFICATIONS SHALL CONTAIN APPROPRIATE REQUIREMENTS THAT HAVE BEEN ESTABLISHED BY THE INDUSTRY IN ITS TECHNICAL PUBLICATIONS, SUCH AS ASTM, AWWA, WPCF, AND APWA STANDARDS REQUIREMENTS SHALL BE SET FORTH IN THE PLANS FOR THE PIPE AND METHODS OF BEDDWIN AND BACKFILLING SO AS NOT TO DAMAGE THE PIPE OR ITS JOINTS.

F. THE LOCATION OF THE WATER MAINS, VALVES, HYDRAINS, AND PRINCIPLAL FITTINGS INCLIDING MODIFICATIONS SHALL BE STAKED BY THE OWNER. NO DEVATION SHALL BE MADE FROM THE REQUIRED LINE OR GRADE. THE OWNER SHALL VERIEY AND PROTECT ALL UNDERGROUND AND SURFACE UTILITIES ENCOUNTERED DURING THE PROFICES OF THIS WORK.

I. PRIOR TO FINAL INSPECTION, ALL PIPELINES SHALL BE TESTED AND DISINFECTED IN CONFORMANCE WITH AWWA OR STANDARD SPECIFICATIONS.

J. BEFORE ACCEPTANCE OF THE WATER SYSTEM BY THE TOWN, ALL PIPES, ASSEMBLIES, AND OTHER APPURTENANCES SHALL BE CLEANED OF ALL DEBRIS
AND FOREIGN MATERIAL. AFTER ALL OTHER WORK IS COMPLETED AND BEFORE FINAL ACCEPTANCE, THE ENTIRE ROADMAY, INCLUDING THE ROADSED, PLANTING,
SDEWALK AREAS, SHOULDERS, DRIVEWAYS, ALLEY AND SIDE STREET APPROACHES, SLOPES, DITCHES, UTILITY TRENCHES, AND CONSTRUCTION AREAS SHALL BE
NEARLY FINISHED TO THE LINES, GRADES AND CROSS SECTIONS FOR A NEW ROADWAY CONSISTENT WITH THE ORIGINAL SECTION.

K. THE OWNER SHALL BE REQUIRED, UPON COMPLETION OF THE WORK AND PRIOR TO ACCEPTANCE BY THE TOWN, TO FURNISH THE TOWN WITH A WRITTEN GUARANTEE (MAINTENANCE BOND) COVERING ALL MATERIAL. AND WORKMANSHIP FOR A PERIOD OF TWO YEARS AFER THE DATE OF FINAL ACCEPTANCE AND SHALL MAKE ALL MECESSARY REPAIRS DURING HIAT PERIOD AT THEIR OWN DEPHASE, IF SUCH REPAIRS ARE NECESSITATED AS THE RESULT OF FURNISHING POOR MATERIALS AND/OR WORKMANSHIP. THE GININER SHALL OBTAIN WARRANTES FROM THE CONTRACTORS, SUBCONTRACTORS ON SUPPLIERS OF MATERIAL OR EQUIPMENT WHERE SUCH WARRANTIES ARE REQUIRED AND SHALL DELIVER COPIES TO THE TOWN UPON COMPLETION OF THE WORK.

A. PRIOR TO CONSTRUCTION, THE OWNER SHALL NOTIFY THE TOWN FOR A PRE-CONSTRUCTION MEETING.

B. WORK SHALL BE PERFORMED ONLY BY CONTRACTORS EXPERIENCED IN LAYING PUBLIC WATER MAINS.

C. THE OWNER SHALL FOLLOW THE SCHEDULE PRESENTED AT THE PRE-CONSTRUCTION MEETING.

D. THE OWNER SHALL OBTAIN APPROVAL OF MATERIALS TO BE USED FROM THE PUBLIC WORKS DIRECTOR PRIOR TO ORDERING OF MATERIALS.

E. WATER MAINS SHALL BE LAID ONLY IN DEDICATED STREETS OR IN EASEMENTS WHICH HAVE BEEN GRANTED TO THE TOWN. A STREET IS NORMALLY NOT CONSIDERED DEDICATED UNTIL THE PLAT WHICH CREATED IT HAS BEEN OFFICIALLY FILED WITH THE COUNTY AUDITOR.

F. ALL WATER MAIN DISTRIBUTION PIPELINE CONSTRUCTION SHALL HAVE A MINIMUM 60-INCH COVER FROM FINISHED GRADE AND 60-INCH COVER OVER TRANSMISSION MAINS, WATER MAINS SHALL BE EXTENDED TO THE FAR PROPERTY LINE(S) OF THE PROPERTY BEING SERVED. OFF-SITE EXTENSIONS ARE REQUIRED TO HYDRAULICALLY LOOP EXISTING AND NEW SYSTEMS.

G. THE TOWN REQUIRES MINIMUM PIPE SIZES OF 8-INCH IN RESIDENTIAL ZONES, 10-INCH IN COMMERCIAL ZONES, AND 12-INCH IN INDUSTRIAL ZONES UNLESS A LARGER SIZE IS DETERMINED TO BE REQUIRED BY THE TOWN.

H. EVERY CROSS SHALL HAVE NO LESS THAN FOUR VALVES, EVERY TEE SHALL HAVE NO LESS THAN THREE VALVES. AN IN-LINE VALVE SHALL BE INSTALLED ON RUNS OF PIPE EVERY 400 FEET.

I. UNLESS OTHERWISE - BPROVED OR REQUIRED BY THE PUBLIC WORKS DIRECTOR, THE WATER MAIN SHALL BE DUCTLE IRON PIPE OR C900/C905 PVC AS SHOWN BELOW. THE MINIMUM SIZE FOR ALL WATER LINES SHALL BE 8 INCHES, EXCEPT FOR PIPES CONNECTING HYDRANTS LESS THAN 60' LONG.

PIPE DIAMETER CLASS

EXCEPTION: 6-INCH HYDRANT SPOOLS AND PIPELINES LOCATED BENEATH ROCK OR RETAINING WALLS SHALL BE DI. 53.

E. PIPES CONNECTING HYDRANTS TO MAINS SHALL BE 6 INCH IN DIAMETER OR LARGER AND NOT LONGER THAN 60'. 60 PLUS FEET REQUIRES 8 INCH OR LARGER.

F. PERMANENT DEAD-END LINES ARE NOT PERMITTED. WATER MAINS ON CUL-DE-SACS SHALL EXTEND TO THE PLAT LINE BEYOND THE CUL-DE-SAC TO NEIGHBORING PROPERTY FOR A CONVENIENT FUTURE CONNECTION, AND HAVE A 2-INCH BLOW OFF ASSEMBLY INSTALLED AT THE TERMINATION POINT. ALL LINES SHALL BE CAPABLE OF BEING LOOPED UPON FULL DEVELOPMENT.

G. ALL MATERIALS SHALL BE NEW, UNDAMAGED AND FREE FROM ANY DEBRIS

1. PROVIDE BENDS IN FIELD TO SUIT CONSTRUCTION AND IN ACCORDANCE WITH PIPE MANUFACTURER'S RECOMMENDATIONS SO AS NOT TO EXCEED ALLOWABLE DEFLECTION AT PIPE JOINTS.

J. PROVIDE THRUST BLOCKING AT ALL FITTINGS AND BENDS AS DESIGNED BY OWNER'S ENGINEER AND APPROVED BY THE PUBLIC WORKS DIRECTOR.

K. PROVIDE ANCHOR BLOCKING AT ALL UP-THRUST VERTICAL BENDS AS DESIGNED BY OWNER'S ENGINEER AND APPROVED BY THE PUBLIC WORKS DIRECTOR.

L. ALL VALVE MARKER POSTS SHALL BE PAINTED YELLOW AND MARKED WITH THE DISTANCE TO VALVE BEING REFERENCED.

M. RESIDENTIAL WATER SERVICE PIPE SHALL BE ONE-INCH CTS POLY WITH NO JOINTS

N. COMMERCIAL SERVICE LINES BETWEEN THE WATER MAIN AND THE WATER METER SHALL BE SIZED APPROPRIATELY.

ALL WATER SERVICES SHALL END WITHIN ROAD RIGHTS-OF-WAY OR EASEMENTS, EXCEPT WHEN OTHERWISE APPROVED BY THE PUBLIC WORKS DIRECTOR.

P. ALL WATER SERVICES SHALL BE INSTALLED BY THE TOWN, UNLESS APPROVED BY THE PUBLIC WORKS DIRECTOR. ALL COSTS ASSOCIATED WITH THIS WORK SHALL BE PAID FOR BY THE OWNER.
Q. ONE SAMPLING STATION IS REQUIRED FOR A DEVELOPMENT IN SIZE OF 5 TO 20 LOTS. ONE ADDITIONAL STATION IS REQUIRED FOR EACH ADDITIONAL 50 LOTS OR PORTIONS THEREOF.

R. ALL NEW SERVICE CONNECTIONS SHALL COMPLY WITH TMC CHAPTER 13.07 REGARDING CROSS CONNECTION CONTROL

S. CUT IN CONNECTIONS SHALL NOT BE MADE ON FRIDAYS, HOLIDAYS OR WEEKENDS. ALL TAPPING SLEEVES AND TAPPING VALVES SHALL BE PRESSURE TESTED PRIOR TO MAKING CONNECTION TO EXISTING MAINS. TAPS ARE TO BE MADE BY TOWN PERSONNEL (FEE IS REQUIRED).

T. OWNER SHALL REQUEST THE PUBLIC WORKS DIRECTOR APPROVAL PRIOR TO ANY WATER SHUT-OFF OR TURN-ON, AFFECTING THE WATER SYSTEM, A MINIMUM OF 3 WORKING DAYS IN ADVANCE. THE PUBLIC WORKS DEPARTMENT SHALL OPERATE ALL VALVES IN EXISTING SERVICE MAINS.

A. INSPECTIONS

THE OWNER SHALL REQUEST FOR INSPECTION A MINIMUM OF 3 WORKING DAYS IN WRITING PRIOR TO THE CONTRACTOR'S SCHEDULED NEED. INSPECTION SHALL BE REQUIRED FOR THE FOLLOWING ITEMS OF WORK:

PIPE AND BEDDING INSTALLATION; BACKFILL AND COMPACTION; PRESSURE TESTING.

1. WATER MAINS TO BE INSTALLED UNLESS OTHERWISE APPROVED (OR REQUIRED) IN WRITING BY THE TOWN ENGINEER SHALL BE EITHER DUCTILE IRON OR C905 PVC PIPE.

1. DUCTILE IRON SHALL BE:

A. THE DUCTILE IRON PIPE SHALL CONFORM TO STANDARD SPECIFICATIONS OR ANS/AWWA C151/A21.51-91 STANDARDS, AND CURRENT AMENDMENTS THERETO, EXCEPT THE DUCTILE IRON PIPE SHALL BE THICKNESS CLASS 52 FOR 4" THROUGH 14" DIAMETER PIPE (EXCEPT FOR 8-MOH HYDRANT SPOULS WHICH SHALL BE CLASS 53) AND CLASS 50 FOR 16" AND LARGER GRADE OF ROOM SHALL BE A MINIMUM OF 60-42-10. THE PIPE SHALL BE CHAPTED WITH AN ASPHALITIC COATING, EACH LENGTH SHALL BE PLAINLY MARKED WITH THE MANUFACTURERS'S IDENTIFICATION, YEAR CASE, CHASS OF PIPE 44ND WRIGHT.

PVC PIPE SHALL CONFORM TO AWWA C900 OR C905, CLASS 150, CAPABLE OF CONNECTING TO DUCTILE IRON FITTINGS. ALL FITTINGS SHALL BE DUCTILE

TYPE OF JOINT SHALL BE MECHANICAL JOINT OR PUSH-ON TYPE, EMPLOYING A SINGLE GASKET, SUCH AS "TYTON", EXCEPT WHERE OTHERMSE CALLING FOR FLANGED ENDS. BOLTS FURNISHED FOR MECHANICAL JOINT PIPE AND FITTINGS SHALL BE HIGH STRENGTH DUCTILE IRON, WITH A MINIMUM TENSILE STRENGTH OF \$5,0000 PSI.

SE 1/4 NE 1/4, SEC 18, TWN 33 N, RGE 22 E, W.M., CITY OF TWISP, WASHINGTON

4. RESTRAINED JOINT PIPE, WHERE SHOWN ON THE PLANS SHALL BE PUSH-ON JOINT PIPE WITH "FAST TIGHT" GASKETS AS FURNISHED BY U.S. PIPE OR EQUAL FOR 12" DIAMETER AND SMALLER PIPE AND "TIR FLEX" AS FURNISHED BY U.S. PIPE OR EQUAL FOR 16" AND 24" DIAMETER PIPES. THE RESTRAINED JOINT PIPE SHALL MEET ALL OTHER REQUIREMENTS OF THE NON-RESTRAINED PIPE.

5. ALL PIPE SHALL BE JOINTED BY THE MANUFACTURER'S STANDARD COUPLING, BE ALL OF ONE MANUFACTURER, BE CAREFULLY INSTALLED IN COMPLETE COMPUBING. WITH THE MANUFACTURER'S RECOMMENDATIONS.

JOINTS SHALL BE "MADE UP" IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, STANDARD JOINT MATERIALS, INCLUDING RUBBER RING GASKETS, SHALL BE FURNISHED WITH THE PIPE. MATERIAL SHALL BE SUITABLE FOR THE SPECIFIED PIPE SIZE AND PRESSURES.

7. ALL FITTINGS SHALL BE SHORT-BODIED, DUCTILE IRON COMPLYING WITH APPLICABLE STANDARD SPECIFICATIONS OR ANS/AWWA C110 OR C153 STANDARDS FOR 350 PS PRESSURE RATING FOR MECHANICAL JOINT FITTINGS AND 250 PSI PRESSURE RATING FOR FLANGED FITTINGS. ALL FITTINGS SHALL BE CEMENT LINED AND EITHER MECHANICAL JOINT OR FLANGED, AS INDICATED ON THE PLANS.

8. FITTINGS IN AREAS SHOWN ON THE PLANS FOR RESTRAINED JOINTS SHALL BE MECHANICAL JOINT FITTINGS WITH A MECHANICAL JOINT RESTRAINT DEVICE.
THE MECHANICAL JOINT RESTRAINT DEVICE SHALL HAVE A WIORKING PRESSURE OF AT LEAST 250 PSI WITH A MINIMUM SAFETY FACTOR OF 2:1 AND SHALL BE ROMAC "GRIP RING" (RETAINER GLANDS) OR TOWN APPROVED EQUAL.

9. ALL COUPLINGS SHALL BE DUCTILE IRON MECHANICAL JOINT SLEEVES.

10. THE PIPE AND FITTINGS SHALL BE INSPECTED FOR DEFECTS BEFORE INSTALLATION, ALL LUMPS, BUSTERS AND EXCESS COAL TAR COATING SHALL BE REWOVED FROM THE BELL AND SPIGOT END OF EACH PIPE, AND THE OUTSIDE OF THE SPIGOT AND THE INSIDE OF THE BELL SHALL BE WIRE—BRUSHED AND WIPED CLEAN AND OFFICE AND THE OFFICE THE PIPE IS LAID, ANY DAMAGE TO THE INTERIOR LINING CAUSED BY CUTTING OR OTHER MEANS MUST BE REPAIRED PRIOR TO INSTALLATION.

11. EVERY PRECAUTION SHALL BE TAKEN TO PREVENT FOREIGN MATERIAL FROM ENTERING THE PIPE WHILE IT IS BEING PLACED IN THE LINE. AFTER PLACING A LENGTH OF PIPE IN THE TRENCH, THE SPIGOT BHO SHALL BE CENTERED IN THE BEIL. AND PIPE FORECD HOME AND BROUGHT TO CORRECT LINE AND GRADE. THE PIPE SHALL BE SCURED IN PLACE WHIT SELECT BACKFUL TAMPED UNDER IT. PRECAUTION SHALL BE TAKEN TO PREVENTI DIET FROM ENTERING HE, SPACE, AT TIMES WHEN PIPE LATING IS NOT IN PROGRESS, THE OPEN BIDS OF PIPE SHALL BE CLOSED BY A WATERTIGHT PLUG. IF WATER IS IN THE TRENCH WHEN WORK RESIMES, THE SALL SHALL RELIAMIN IN PLACE LINTIL THE TRENCH IS PUMPED COMPLETELY DRY. NO PIPE SHALL BE LAD IN WATER OR WHEN TRENCH CONDITIONS ARE UNSUTTABLE.

13. THE CUTTING OF PIPE FOR INSERTING FITTINGS OR CLOSURE PIECES SHALL BE DONE IN A NEAT AND WORKMANLIKE MANNER, WITHOUT DAMAGE TO THE PIPE OR CEMENT LINING, AND SO AS TO LEAVE A SMOOTH END AT RIGHT ANGLES TO THE AX'S OF THE PIPE PIPE SHALL BE LAID WITH BELL ENDS FACING IN THE DIRECTION OF THE LAYING, UNLESS DIRECTED OTHERWISE BY THE TOWN. WHEREVER IT IS NECESSARY TO DEFLECT PIPE FROM A STRAIGHT LINE, THE AMOUNT OF DEFLECTION ALLOWED SHALL NOT EXCEED PIPE MANUFACTURER'S RECOMMENDATIONS.

15. FOR CONNECTION OF "TYTON" JOINTS, THE JOINTING SHALL BE DONE ACCORDING TO MANUFACTURER'S RECOMMENDATIONS, WITH SPECIAL CARE USED IN CLEANING GASKET SEAT TO PREVENT ANY DIRT OR SAND FROM CETTING BETWEEN THE GASKET AND PIPE, LUBRICANT TO BE USED ON THE GASKET SHALL BE NON-TOXIC AND FIRE FROM CONTAMINATION. WHEN A PIPE LENGTH IS CUIT, THE OUTER EDGE OF THE CUIT SHALL BE BEVELED WITH A FILE TO PREVENT INJURY TO THE GASKET DURING JOINTING.

16. VALVES, FITTINGS, PLUGS AND CAPS SHALL BE SET AND JOINTED TO PIPE IN THE MANNER AS REQUIRED. ALL DEAD ENDS ON NEW MAINS SHALL BE CLOSED WITH DEAD END M.J. PLUGS.

17. FITTINGS SHALL BE "BLOCKED" WITH POURED-IN-PLACE CONCRETE, WITH A FIRM MINIMUM BEARING AGAINST AN UNDISTURBED EARTH WALL TIMBER BLOCKING AND PRECAST CONCRETE BLOCKS SHALL NOT BE PERMITTED. THRUST BLOCKS SHALL BE POURED AS SOON AS POSSIBE AFTER SETTING SIN PLACE TO ALOW THE CONCRETE TO "SET" BEFORE APPLYING THE PRESSURE TEST. THE CONCRETE THRUST BLOCKS SHALL BE IN PLACE BEFORE BEGINNING THE PRESSURE TEST. ALOHOR BLOCKS SHALL BE ALLOWED TO SET SHOULDED THE NECESSARY BOND STRENGTH BETWEEN THE RENTORCING ROOS AND THE CONCRETE ANOHOR BEFORE BEGINNING THE PRESSURE TEST.

18. ALL OF THE NEW PIPING, VALVES AND BLOCKING SHALL HAVE BEEN INSTALLED, DISINFECTED AND TESTED UP TO THE POINT OF CUTTING INTO EXISTING LINES BEFORE THE CROSSOVER IS MADE. THE CROSSOVER TO THE EXISTING SYSTEM SHALL BE IN FULL READINESS, INCLUDING THE CUT AND SIZED SPECIALS. THE TOWN SHALL BE GIVEN 3 WORKING DAYS' NOTICE IN ADVANCE OF THE PLANNED "CUT—INS". ALL SLEEVES SHALL BE DUCTILE IRON.

ALL VALVES 12" AND SMALLER SHALL BE RESILIENT SEAT GATE VALVES.

ALL GATE VALVES 12'AND SMALLER SHALL CONFORM TO STANDARD SPECIFICATIONS OR ANS/AWMA C508—87 STANDARDS FOR RESILIENT—SEATED, HIGH
STRENGTH, BROWZE STEMMED GATE VALVES. THE VALVES SHALL BE IRON—BODIED, IRON DISK COMPLETELY ENCAPSULATED WITH POLITURETHANE RUBBER AND
BROWZE NON-RISMOS STEM WITH "O'R RING SEALS. THE POLYURETHANE SEALING RUBBER SHALL BE FUSION BONDED TO THE WIDGE TO MEET ASTIM TESTS FOR
RUBBERT TO METAL BOND ASTIM D429. THE VALVES SHALL OPEN COUNTER— CLOCKINGS AND BE FURNISHED WITH 2—INCH SQUARE OPERATING NUTS EXCEPT
VALVES IN

VALUES IN
VAULTS SHALL BE FURNISHED WITH HAND WHEELS. ALL SURFACES, INTERIOR AND EXTERIOR SHALL BE FUSION BONDED EPOXY COATED, ACCEPTABLE FOR POTABLE WATER.

THE VALVES SHALL BE SET WITH STEINS VERTICAL. THE AXIS OF THE VALVE BOX SHALL BE COMMON WITH THE AXIS PROJECTED OF THE VALVE STEM. THE TOPS OF THE ADJUSTABLE VALVE BOXES SHALL BE SET TO THE EXISTING OR ESTABLISHED GRADE, WHICHEVER IS APPLICABLE. VALVE STEM RISERS SHALL BE INSTALLED 12'TO 24'OF THE FINISHED GRADE OF THE VALVE BOX CAP.

VALVES SHALL BE CLOW, MUELLER, M&H, OR APPROVED EQUAL BY THE PUBLIC WORKS DIRECTOR.

2. TAPPING SLEEVES & TAPPING VALVES

THE TAPPING SLEEVES SHALL BE STAINLESS STEEL TAPPING SLEEVES RATED FOR A WORKING PRESSURE OF 250 PSI MINIMUM AND FURNISHED COMPLETE WITH JOINT ACCESSORIES.

TAPPING SLEEVES SHALL BE CONSTRUCTED IN TWO SECTIONS FOR EASE OF INSTALLATION AND SHALL BE ASSEMBLED AROUND THE MAIN WITHOUT INTERRUPTING SERVICE.

MECHANICAL JOINT STYLE SLEEVES SHALL BE DUCTILE IRON AND IS REQUIRED FOR SIZE—ON—SIZE CONNECTION TO CAST IRON PIPE. MECHANICAL JOINT SLEEVES SHALL BE CAST BY CLOW, DRESSER, MUELLER, TYLER, U.S. PIPE, OR APPROVED EQUAL BY THE PUBLIC WORKS DIRECTOR.

Tapping valves shall be flanged outlet for use with ductile iron pipe and shall have oversized seat rings to permit entry of the tapping Machine cutters. In all other respects, the tapping valves shall conform to the resilient seat gate valves herein specified with regards to Operation and materials.

THE INSTALLATION OF THE TAPPING SLEEVES AND VALVES SHALL BE PERFORMED BY A QUALIFIED CONTRACTOR.

ALL VALVES WITH OPERATING NUTS LOCATED MORE THAN 24" BELOW FINISHED GRADE SHALL BE EQUIPPED WITH EXTENSION STEMS TO BRING THE OPERATING NUT TO WITHIN 12" OF THE FINISHED GRADE.

AT THE TOP OF THE EXTENSION STEM, THERE SHALL BE A 2-INCH STANDARD OPERATING NUT, COMPLETE WITH A CENTERING FLANCE THAT CLOSELY FITS THE 5-INCH PIPE ENCASEMENT OF THE EXTENSION STEM. THE VALVE BOX SHALL BE SET IN A TELESCOPING FASHION AROUND THE 5- INCH PIPE OUT TO THE CORRECT LENGTH TO ALLOW FUTURE ADJUSTMENT UP OR DOWN.

EACH VALVE SHALL BE PROVIDED WITH AN ADJUSTABLE TWO-PIECE CAST IRON VALVE BOX OF FIVE INCHES MINIMUM INSIDE DIAMETER, VALVE BOXES SHALL HAVE A TOP SECTION WITH A 16-INCH MINIMUM LENGTH. THE VALVE BOXES AND COVERS SHALL BE 6800 WITH LOCKING LID OR APPROVED EQUAL BY THE PUBLIC WORKS DIRECTOR.

FOR EACH VALVE OUTSIDE OF ASPHALT, PROVIDE A VALVE CONCRETE PAD 24"X 24"X 6"WITH REINFORCING MESH CENTERED OVER VALVE BOX AND SET TO GRADE.

D. FIRE HYDRANTS

ALL FIRE HYDRANTS SHALL BE APPROVED BY THE NATIONAL BOARD OF FIRE UNDERWRITERS AND CONFORM TO AWWA SPECIFICATION C502, BREAKAWAY TYPE, IN WHICH THE VALVE MILL REMAIN CLOSED IF THE BARREL IS BROKEL THE HYDRANT BARREL SHALL HAVE A DIAMETER OF NOT LESS THAN 8 - 1/2 NICHES, AND THE VALVE DIAMETER SHALL BE NOT LESS THAN S-1/4 NICHES, EACH HYDRANT SHALL BE COULPPED. WITH THO 2 1/2-JINCH HOSE PORTS (NATIONAL STANDARD THEREAD), AND ONE 4-1/2- NICH POWAPET CONNECTION (NATIONAL STANDARD THEREAD), WITH PERMANENT 5-INCH STORZ HYDRANT ADAPTOR AND STORZ BLIND CAP (HICH SHALL BE NISTALLED ON THE HYDRANT FRIOR TO INSTALLATION.

EACH HYDRANT SHALL BE GUIPPED WITH A SULTIBLE POSITIVE ACTING DRAIN VALVE AND A 1-1/4-INCH COUNTER-CLOCKWISE OPENING PENTAGONAL OPERATING NUT. THE FIRE HYDRANTS SHALL BE 6' BURY OR MORE TO CONFORM TO THE STANDARD DETAIL, MACH MODEL 129.

THE HOLDING SPOOLS BETWEEN THE GATE VALVE AND FIRE HYDRANT SHALL BE MADE FROM 6-INCH CLASS 53 DUCTILE IRON PIPE, 0.34-INCH WALL THICKNESS, OR COOD PYC. THE HYDRANT AND GATE VALVE SHALL BE ANCHORED IN PLACE USING HOLDING SPOOLS AND MECHANICAL JOINT RESTRAINT DEVICE. THRUST BLOCK AT ALL TITLINGS SHALL BE IN ACCORDANCE WITH TOWN STANDARDS AND CONDITIONS.
HOLDING SPOOLS WITH LENGTH IN EXCESS OF 17 FEET SHALL BE SUPPLIED WITH AN M. J. SLEEVE AND MECHANICAL JOINT RESTRAINT DEVICE.

BETWEEN THE TIME THAT THE FIRE HYDRANT IS INSTALLED AND THE COMPLETED FACULTY IS PLACED IN OPERATION, THE FIRE HYDRANT SHALL AT ALL TIMES BE WRAPPED IN BURLAP, OR COVERED IN SOME OTHER SUITABLE MANNER TO CLEARLY INDICATE THAT THE FIRE HYDRANT IS NOT IN SERVICE.

E. BLOW-OFFS & AIR RELIEF ASSEMBLIES:

2—NCH BLOW OFF ASSEMBLIES SHALL BE INSTALLED AT THE TERMINUS OF ALL DEAD-END WATER MAINS. BLOW OFFS UTILIZED BY THE OWNER FOR FLUSHING THE WATER MAIN SHALL BE SUFFICIENT SIZE TO OBTAIN 2.5 FEET FER SECOND IN THE MAIN. THE SYSTEM SHALL BE DESIGNED TO DRAIN THE ENTIRE ASSEMBLY TO PREVENT FREEZING, TEMPORARY BLOW-OFFS SHALL BE REMOVED AND REPLACED WITH A SUITABLY SIZED WATERTICHT BRASS PLUG.

2-INCH AIR AND VACUUM RELEASE VALVES SHALL BE INSTALLED AT PRINCIPAL HIGH POINTS IN THE SYSTEM. THE INSTALLATION OF THESE ITEMS SHALL INCLUDE CONNECTION PIPING, GATE VALVE, VALVE BOX, AND ALL ACCESSORIES. VALVE MARKERS SHALL BE OPTIONAL WITH TOWN.

F. WATER SAMPLING STATION

ONE WATER SAMPLING STATION SHALL BE FURNISHED AND INSTALLED FOR EACH DEVELOPMENT IN SIZE OF 5 TO 20 LOTS. ONE ADDITIONAL SAMPLING STATION SHALL BE FURNISHED AND INSTALLED FOR EACH ADDITIONAL 50 LOTS OR PORTION THEREOF. THE WATER SAMPLING STATION(S) SHALL BE FURNISHED AND

INSTALLED AT A LOCATION AS DETERMINED BY THE PUBLIC WORKS DIRECTOR AND AS FURTHER SHOWN ON ANY PLANS.

PIPE BEDDING MATERIAL TO BE INSTALLED AND COMPACTED UNDER, AROUND AND ABOVE ALL PIPE AS SPECIFIED IN THIS SECTION SHALL BE CLEAN, WELL—GRADED SAND OR SAND/OR SAND/OR

ALL PERCENTAGES ARE BY WEIGHT. NATIVE MATERIAL MAY NOT BE USED FOR BEDDING

B. COPPER, PEX AND PVC LESS THAN 4"DIAMETER WATER SERVICE PIPE

ALL REQUIREMENTS OF 6.04 (G)(A) HEREIN APPLY, EXCEPT THAT BEDDING MATERIAL SHALL BE CLEAN SAND, FREE OF GRAVEL, WITH NO MORE THAN 5% PASSING THE NO. 200 SIEVE (BY WEIGHT).

6.05 WATER PIPE TESTING & DISINFECTING

ALL PIPELINES SHALL BE HYDROSTATICALLY TESTED AND DISINFECTED PER CURRENT APPLICABLE AWMA AND STANDARD SPECIFICATIONS PRIRE TO ACCEPTANCE
OF WORK. A WATER HYDRANT METER SHALL BE REQUIRED AND PROCURED FROM THE TOWN FOR ALL WATER HITUZED FOR FLUSHING PIPELINES. ALL PUMPS,
GAIDES, PLUS, SADDLES, ORDPRORTATION STORY, MISCELLANGUIS HOSE AND PIPING, AND MEASURING EQUIPMENT RECESSARY FOR PERFORMING THE TEST SHALL
BE FURNISHED, INSTALLED AND OPERATED BY THE FUNDER. FEED FOR THE PLAMP SHALL BE DISINFECTED TREATED WATER FROM A BARREL OR OTHER CONTAINER
WITHIN THE ACTUAL AUDITION OF "MAKEUP" WATER, SO THAT IT CAN BE MEASURED PERFORMALLY DURING THE TEST PERFOR. OWNER SHALL NOT TRANSPORT

THE PIPELINE SHALL BE BACKFILLED SUFFICIENTLY TO PREVENT MOVEMENT OF THE PIPE UNDER PRESSURE. ALL THRUST BLOCKS SHALL BE IN PLACE AND TIME ALLOWED FOR THE CONCRETE TO CURE BEFORE TESTING. WHERE PERMANENT BLOCKING, IS NOT REQUIRED, THE OWNER SHALL FURNISH AND INSTALL TEMPORARY BLOCKING.

AS SOON AS PIPE IS SEQUED AGAINST MOVEMENT UNDER PRESSURE, IT MAY BE FILLED WITH WATER AFTER APPROVAL FROM THE PUBLIC WORKS DIRECTOR TO DO SO. SATISFACTORY PERFORMANCE OF AIR VALVES SHALL BE CHECKED WHILE THE LINE IS FILLING.

6.06 TESTING AND FLUSHING PROCEDURAL ORDER

UPON APPROVAL FROM THE PUBLIC WORKS DIRECTOR, FILL THE PIPE LINE IN ACCORDANCE WITH THESE STANDARDS. THE NITIAL CHLORNE CONCENTRATION TEST IS PERFORMED BY THE PUBLIC WORKS DEPARTMENT.
PRESSURE TEST IN ACCORDANCE WITH THESE STANDARDS AFTER ACCOPTABLE CHLORNE CONCENTRATION TEST.
DEPRESSURZE AFTER ACCOPTABLE PRESSURE TEST, LEANING THE PIPE LINE FULL OF TREATED WATER.
24 HOURS LATER, THE RESIDUAL CHLORNE CONCENTRATION TEST IS PERFORMED BY THE PUBLIC WORKS DEPARTMENT.
FINAL FLUSTHING AFTER ACCEPTABLE CHLORNE CONCENTRATION TEST UTILL NO CHLORNE IS PRESENT,
FINAL FLUSTHING AFTER ACCEPTABLE CHLORNE CONCENTRATION TEST UTILL NO CHLORNE IS PRESENT,
FINAL CHLORNE CONCENTRATION IS TESTED BY THE PUBLIC WORKS DEPARTMENT.
BACTERIAL TEST SAMPLE IS TAKEN BY THE CONTRACTOR TO AN ACCREDITED LABORATORY FOR TESTING IN ACCORDANCE WITH THESE STANDARDS.

OTHER PRESSURE TESTING AND DISINFECTION PROCEDURES THAT CONFORM TO AWWA STANDARDS MAY BE APPROVED BY THE PUBLIC WORKS DIRECTOR UPON OF REQUEST BY THE OWNER.

6.07 BACKFLOW PREVENTION AND SPRINKLER SYSTEMS

ALL WATER SYSTEMS (LE. SPRINKLER SYSTEMS, SWMMING POOLS, LABORATORIES, FIRE SPRINKLERS, IRRIGATION SYSTEMS, CAR WASHES, FUNERAL HOMES, OR AT DIRECTION OF THE TOWN BUILDING INSPECTOR AND PUBLIC WORKS DEPARTMENT) CONNECTED TO THE PUBLIC WATER SYSTEM SHALL HAVE BACKFLOW PREVENTION AS REQUIRED BY WAC 248-54-285 AND TIME CHAPTER 13.07.

ALL SURVEYING AND STAKING SHALL BE PERFORMED BY AN ENGINEERING OR SURVEYING FIRM EMPLOYED BY THE OWNER AND CAPABLE OF PERFORMING SUCH WORK. THE ENGINEER OR SURVEYOR DIRECTING AND/OR PERFORMING SUCH WORK SHALL BE CURRENTLY LICENSED BY THE STATE OF WASHINGTON TO PERFORM SAID TASKS.

A. PROVIDE STAKING SUFFICIENT TO SATISFY PUBLIC WORKS DIRECTOR. IN NEW PLAT DEVELOPMENT, ROADWAY CENTERLINE OR EDGE OFFSET STAKING MUST BE READILY IDENTIFIABLE.

B. STAKE LOCATIONS OF ALL PROPOSED FIRE HYDRANT, BLOW-OFF, AIR-VAC, VALVES, METERS, ETC.

CLEARING AND GRUBBING WHERE REQUIRED SHALL BE PERFORMED WITHIN THE EASEMENT OR PUBLIC RICHT-CF- WAY AS PERMITTED BY THE TOWN AND/OR GOVERNING AGENCIES, DEBRIS RESULTING FROM THE CLEARING AND GRUBBING SHALL BE DISPOSED OF BY THE OWNER IN ACCORDANCE WITH THE TERMS OF ALL APPLICABLE PERMITS.

TRENCHES SHALL BE EXCAVATED TO THE LINE AND DEPTH DESIGNATED BY THE TOWN TO PROVIDE A MINIMUM OF 60° INCHES OF COVER OVER THE PIPE. EXCEPT FOR UNUSUAL DREJUNSTANCES WHERE APPROVED BY THE TOWN, THE TRENCH SIDES SHALL BE EXCAVATED VERTICALLY AND THE IRENCH WIDTH SHALL BE EXCAVATED ONLY TO SUCH WIDTHS AND DEPTHS AS A RECENSARY FOR ADECLARS WORKING SPACE ALLOWED BY THE GOVERNING AGENCY AND IN COMPLIANCE WHITE ALLOWED BY THE GOVERNING AGENCY AND IN SURFACE WATER SHALL BE DIVERTED SO AS NOT TO ENTER THE TRENCH. THE TRENCH SHALL BE KEPT FREE FROM WATER UNTIL JOHNS IS COMPLETE. SURFACE WATER SHALL BE DIVERTED SO AS NOT TO ENTER THE TRENCH. THE OWNER SHALL MAINTAIN SUFFICIENT PUMPING EQUIPMENT ON THE JOB TO ENSURE THAT THESE PROVISIONS ARE CARRIED OUT.

NATIVE MATERIAL FOR BACKFILL: MATERIAL MUST BE FREE OF WOOD WASTE, DEBRIS, CLODS OR ROCKS GREATER THAN THREE INCHES IN ANY DIMENSION. BACKFILLING AND SUFFACE RESTORATION SHALL CLOSELY FOLLOW INSTALLATION OF PIPE SO THAT NOT MORE THAN 100 FEST IS LEFT LEPOSED DURING CONSTRUCTION HOURS WITHOUT APPROVAL OF THE TOWN, SELECTED MATERIAL SHALL BE PLACED AND COMPACIED AROUND. AND UNDER THE PIPE BY HAND TOOLS, SPECIAL PRECAUTIONS SHOULD BE PROVIDED TO PROTECT THE PIPE TO A POINT IS INCHES ABOVE THE CROWN OF THE PIPE DUE TO LOCAL CONDITIONS, AS MAY BE SPECIFICALLY APPROVED BY THE TOWN, SUITABLE EXCAVAIED BACKFILL MATERIAL, AS DETERMINED BY THE TOWN, ANY BE UTILIZED AS BACKFILL OR IF SUCH MATERIAL IS NOT AVAILABLE FROM TRON-HING PERFANDINS, THE TOWN MAY FORTH THE PLACING OF GRAVEL BAS CONFORMING WITH STANDARD SPECIFICATIONS SECTION 9 03.10 FOR BACKFILLING THE TRENCH ALL EXCESS MATERIAL SHALL BE PROMPTLY LOADED AND HAILED TO WASTE.

EROSION CONTROL SHALL COMPLY WITH STANDARD SPECIFICATIONS M41-10.

AFTER ALL OTHER WORK ON A PROJECT IS COMPLETED AND BEFORE FINAL ACCEPTANCE, THE ENTIRE ROADWAY, INCLUDING THE ROADBED, PLANTING, SIDEWA AREAS, SHOULDERS, DRIVEWAYS, ALLEY AND SIDE STREET APPROACHES, SLOPES, DITCHES, UTILITY THENCHES, AND CONSTRUCTION AREAS SHALL BE NEATLY FINISHED TO THE LINES, GRADES AND CROSS SECTIONS OF A NEW ROADWAY CONSISTENT WITH THE ORIGINAL SECTION, AND TO THE SATISFACTION OF THE PUBLIC WORKES DIRECTOR.

UPON COMPLETION OF THE CLEANING AND DRESSING, THE PROJECT SHALL APPEAR UNIFORM IN ALL RESPECTS.

DRAINAGE FACILITIES SUCH AS INLETS, CATCH BASINS, CULVERTS, AND OPEN DITCHES SHALL BE CLEANED OF ALL DEBRIS, WHICH IS THE RESULT OF THE SOMER'S OPERATIONS, ALL PAYDLENTS AND OIL MAT SURFACES, WHETHER NEW OR OLD, SHALL BE THOROUGHLY CLEANED. DISTING IMPROVEMENTS SUCH AS PORTLAND CEMENT CONCRETE CURES, CURE AND CULTERS, WAILS, SDEWALLS, SAND OTHER FACILITIES, WHICH HAVE BEEN SPRAYED BY HE ASPHALT CEMENT, SHALL BE CLEANED TO THE SATISFACTION OF THE PUBLIC WORKS DIRECTOR.

CASTINGS FOR MONUMENTS, WATER VALVES, VAULTS AND OTHER SIMILAR INSTALLATIONS, WHICH HAVE BEEN COVERED WITH THE ASPHALT MATERIAL, SHALL BE CLEANED TO THE SATISFACTION OF THE PUBLIC WORKS DIRECTOR

VELOPME S 呈 DE CHARD PLANNED ď ALM 0

SPECIFICATIONS

PRELIMINARY

AWING NAME: C22246P-WS-ESIGNER: RAFTING BY:

WS-02

SHEET 2 OF 3

TWISP SEWER SYSTEM STANDARDS

THE STANDARDS ESTABLISHED BY THESE DEVELOPMENT STANDARDS ARE INTENDED TO REPRESENT THE MINIMUM STANDARDS FOR THE DESIGN AND CONSTRUCTION OF SANTIARY SEMER FACILITIES. GREATER OR LESSER REQUIREMENTS MAY BE MANDATED BY THE TOWN DUE TO LOCALIZED CONDITIONS. WASHINGTON STATE DEPARTMENT OF FECUCACY'S CRITERIA FOR SEWAGE WORKS DESIGN, LATEST EDITION, ASTADDARD SPECIFICATIONS MIST-TO LATEST EDITION, SHALL ALSO BE EMPLOYED BY THE TOWN IN ITS REVIEW AND APPROVAL OF SYSTEM CONNECTIONS, EXTENSIONS, AND/OR MODIFICATIONS.

7.02 DESIGN STANDARDS

THE DESIGN OF SANITARY SEWER SYSTEMS SHALL BE DEPENDENT ON LOCAL SITE CONDITIONS. THE DESIGN ELEMENTS OF SANITARY SEWER SYSTEMS SHALL CONFORM TO MINIMUM STANDARDS SET FORTH HEREIN. DEPENDENCE OF ECOLOGY PREVIOUR. SEWER EXTENSIONS MAY BE REQUIRED. IT SHALL BE THE RESPONSIBILITY OF THE OWNER'S ENGINEER TO OBTAIN

A. IF FUTURE EXTENSIONS OF THE SYSTEM ARE DEEMED PROBABLE BY THE TOWN, THE PROPOSED SYSTEMS SHALL BE EXTENDED TO FAR'PROPERTY LINE(S) AT THE MAXIMUM DEPTH AVAILABLE AS MAY BE INCESSARY TO PROVIDE ACCESS TO FUTURE DEVELOPMENT. AT A MINIMUM, ACCESS AND/OR EASEMENTS TO ALL SYSTEMS FROM ADJACENT AREAS WILL BE REQUIRED.

B. DETAILED PLANS SHALL BE SUBMITTED FOR THE TOWN'S REVIEW WHICH PROVIDES THE LOCATION, SIZE, TYPE AND DIRECTION OF FLOW OF THE PROPOSED SEWERS AND THE CONNECTION WITH EXISTING SEWERS. ALL ELEVATION INFORMATION SHALL BE TO THE TOWN DATUM.

C. PROJECT PLANS SHALL HAVE A HORIZONTAL SCALE 20 FEET TO THE INCH AND A VERTICAL SCALE OF NOT MORE THAN 5 FEET TO THE INCH. PLANS AND PROFILES SHALL SHOW.

LOCATIONS OF STREETS, RIGHTS-OF-WAY, EXISTING UTILITIES AND SEWERS.
ALL ASSOCIATED RIGHT-OF-WAY, EASEMENT AND/OR PROPERTY UNES.
STE TOPOGRAPHY AT A MINIMUM OF 5-FCOT INTERVALS, TO INCLUDE A MINIMUM OF 20-FOOT WITHIN ADJACENT AREAS.
VICINITY AND SITE LOCATION MAP.
GROUND SUFFACE ELEVATION.
PIPE TYPE, CLASS, AND SIZE.
MANHOLE STATIONING.

INVERT AND SURFACE ELEVATION AT EACH MANHOLE, AND GRADE OF SEWER BETWEEN ADJACENT MANHOLES. ALL MANHOLES SHALL BE NUMBERED ON THE PLANS AND CORRESPONDINGLY NUMBERED ON THE PROFILE.

WHERE THESE IS ANY OLD SENGEN OF THE SEWER BEING SUFFICIENTLY DEEP TO SERVE ANY RESIDENCE, THE OWNER SHALL INDICATE BUILDING AND BASEMENT FLOOR ELEVATIONS IN THE PROFILE.

ALL KNOWN EXISTING STRUCTURES, BOTH ABOVE AND BELOW GROUND, WHICH MIGHT INTERFERE WITH THE PROPOSED CONSTRUCTION, PARTICULARLY WATER MAINS, GAS MAINS, STORM DRAINS, OWERHEAD AND UNDERGROUND POWER LINES, TELEPHONES LINES, IRRIGATION SYSTEMS AND TELEVISION CABLES. ALL UTILITY EASEMENTS, INCLIDING COUNTY RECORDING NUMBERS.

DETAILS IN SCALE DRAININGS WHICH CLEARLY SHOW SPECIAL SEWER JOINTS AND CROSS—SECTIONS, AND SEWER APPURTENANCES SUCH AS MANHOLES AND RELATED ITEMS AND ALL OTHER ITEMS AS REQUIRED BY THE TOWN TO CLEARLY IDENTIFY CONSTRUCTION ITEMS, MATERIALS, AND/OR METHODS.

D. CONSTRUCTION OF NEW SEWER SYSTEMS OR EXTENSIONS OF EXISTING SYSTEMS WILL BE ALLOWED ONLY IF THE EXISTING RECEIVING SYSTEM IS CAPABLE OF SUPPORTING THE ADDED HYDRAULIC LOAD.

E. COLLECTION AND INTERCEPTOR SEWERS SHALL BE DESIGNED AND CONSTRUCTED FOR THE ULTIMATE DEVELOPMENT OF THE TRIBUTARY AREAS AND AS ESTABLISHED IN THE TOWN'S GENERAL SEWER PLAN.

F. SEWER SYSTEMS SHALL BE DESIGNED AND CONSTRUCTED TO ACHIEVE TOTAL CONTAINMENT OF SANITARY WASTES AND MAXIMUM EXCLUSION OF INFILIRATION AND INFLOW. SEWERS INSTALLED BELOW WATER TABLE MAY REQUIRE SPECIAL DESIGN AND INSPECTIONS.

G. COMPUTATIONS AND OTHER DATA USED FOR DESIGN OF THE SEWER SYSTEM MAY BE REQUIRED TO BE SUBMITTED TO THE TOWN FOR APPROVAL

H. ALL PIPE SHALL BE LAID IN STRAIGHT LINES AND AT UNIFORM RATE OF GRADE BETWEEN MANHOLES. VARIANCE FROM ESTABLISHED LINE AND GRADE SHALL NOT BE GREATER THAN 1/2-INCH, PROVIDED THAT SUCH VARIATION DOES NOT RESULT IN A LEVEL OR REVERSE SLOPING INVERT. ANY CORRECTIONS REQUIRED IN UNIE AND GRADE SHALL BE REVIEWED WITH THE PUBLIC WORKS DIRECTOR AND SHALL BE MADE SHALL BE ANDERED SHALL BE ANDERED WITH DIRECTOR OF THE OWNER.

1. DEFLECTION TESTS SHALL BE PERFORMED ON ALL PVC SEWER MAINS AND THE DEFLECTION TEST LIMIT SHALL BE 5.0 PERCENT OF THE BASE INSIDE DIAMETER OF THE PIPE.

J. AFTER ALL OTHER WORK IS COMPLETED AND BEFORE FINAL ACCEPTANCE, THE ENTIRE ROADWAY, INCLUDING THE ROADBED, PLANTING, SIDEWALK AREAS, SHOULDERS, DRIVEWAYS, ALLEY AND SIDE STREET APPROACHES, SLOPES, DITCHES, UTILITY TRENCHES, AND CONSTRUCTION AREAS SHALL BE REALLY FINISHED TO THE LINES, GRADES AND CROSS SECTIONS FOR A NEW ROADWAY CONSISTENT WITH THE ORIGINAL SECTION TO THE SATISFACTION OF THE PUBLIC WORKS DIRECTOR

K. THE OWNER SHALL BE REQUIRED, UPON COMPLETION OF THE WORK AND PRIOR TO ACCEPTANCE BY THE TOWN, TO FURNISH THE TOWN WITH A WRITTER GUARANTEE (MANTENANCE BOND) COVERING ALL MADERIAL, AND WORKMANSHIP FOR A PERGOD OF TWO YEARS AFTER THE DATE OF FINAL ACCEPTANCE AND THE OWNER SHALL MAKE ALL NECESSARY REPAIRS DURING PLAT PERGOD AT THEIR OWN EXPENSE, IF SUCH REPAIRS ARE NECESSITATED AS THE RESULT OF FURNISHING POOR MATERIALS AND/OR WORKMANSHIP. THE OWNER SHALL OBTAIN WARRANTIES FROM THE CONTRACTORS, SUBCONTRACTORS AND SUPPLIERS OF MATERIAL OR EQUIPMENT WHERE SUCH WARRANTIES ARE REQUIRED, AND SHALL DELIVER COPIES TO THE TOWN UPON COMPLETION OF THE WORK.

7.03 GENERAL REQUIREMENTS

A. PRIOR TO CONSTRUCTION, THE SEWER PLANS SHALL BE REVIEWED AND APPROVED BY THE PUBLIC WORKS DIRECTOR, DOE AND THE TOWN'S ENGINEER WHEN APPLICABLE.

B. PRIOR TO CONSTRUCTION, THE OWNER SHALL NOTIFY THE TOWN FOR A PRE-CONSTRUCTION MEETING.

C. WORK SHALL BE PERFORMED ONLY BY A WASHINGTON STATE LICENSED AND BONDED CONTRACTOR, WITH A TOWN BUSINESS LICENSE, IF REQUIRED, AND WITH DEMONSTRATED EXPERIENCED IN LAYING PUBLIC SEWER MAINS OF THE TYPE BEING PROPOSED FOR CONSTRUCTION.

D. MINIMUM HORIZONTAL AND VERTICAL SEPARATION SHALL BE MAINTAINED BETWEEN WATER AND SEWER UTILITIES AS REQUIRED BY THE DOE MANUAL ENTITLED "CRITERIA FOR SEWAGE WORKS DESIGN"; LATEST EDITION.

E. THE MAXIMUM DISTANCE BETWEEN MANHOLES SHALL BE 300 FEET UNLESS SPECIFICALLY APPROVED OTHERWISE BY THE PUBLIC WORKS DIRECTOR

F. PVC PIPE SHALL BE A MINIMUM CLASS S.D.R. 35 AND BE MANUFACTURED IN ACCORDANCE WITH ASTM D3034.

G. THE ALLOWABLE COVER (FINISHED GRADE) FOR MAIN LINE COLLECTION PIPING IS 5' TO 15'.

H. THE MINIMUM SLOPE FOR 4-INCH SIDE SEWER LATERALS SHALL BE 2.0% 6-INCH SIDE SEWER LATERALS SHALL BE 1.0% THE MINIMUM SLOPE FOR 8-INCH GRAVITY MAINS SHALL BE 0.4%. THE MINIMUM SLOPE FOR 12-INCH GRAVITY MAINS SHALL BE 0.4%. THE MINIMUM SLOPE FOR 12-INCH GRAVITY WAINS SHALL BE 0.4%.

I. EACH SIDE SEWER LATERAL SHALL HAVE AN APPROVED WATER-TIGHT CAP AT THE TERMINATION OF THE STUB, AND IT SHALL BE ADEQUATELY "BLOCKED" TO SATISFACTORILY RESIST THE AIR PRESSURE TESTING (5 LBS. FOR 5 MINUTES).

J. EACH SIDE SEWER LATERAL SHALL HAVE A TREATED 4" X 4" WOOD "MARKER" AT THE TERMINATION OF THE STUB. THE "MARKER" SHALL EXTEND FROM THE BOTTOM OF THE TRENCH TO 12 MCHES ABOVE FINISHED GRADE. ABOVE THE GROUND SURFACE, IT SHALL BE PAINTED "MHTE" WITH "S/S" AND THE DEPTH, IN FEET, STENDLED IN BLACK LETTERS 2—MOHES HIGH.

K. FRONT LOT CORNERS SHALL BE STAKED PRIOR TO CONSTRUCTION FOR SIDE SEWER TEE LOCATION.

L. ALL SIDE SEWERS SHALL BE EXTENDED A MINIMUM OF FIVE FEET PAST THE STREET RIGHT-OF-WAY LINE (OR PROPERTY LINE).

M. SIDE SEWER CONNECTIONS IF ALLOWED DIRECTLY INTO MANHOLES SHALL BE CONSTRUCTED ACCORDING TO THE DROP MANHOLE DETAIL WITHIN THESE SPECIFICATIONS.

N. MANHOLES, WHERE SEWER EXTENSION MAY OCCUR, SHALL BE PROVIDED WITH KNOCK-OUTS AND CHANNELED ACCORDINGLY.

O. MANHOLES SHALL BE PROVIDED WITH A 0.10-FOOT DROP ACROSS THE CHANNEL

P. LOCKING COVERS SHALL BE PROVIDED FOR ALL MANHOLES AND SHALL HAVE THE WORD SEMER*CAST INTEGRALLY ONTO ITS SURFACE.

Q. CONCRETE COLLARS SHALL BE PLACED AROUND ALL FRAMES FOR MANHOLES LOCATED IN GRAVEL DRIVE AREAS.

R. PIPE CONNECTIONS TO MANHOLES SHALL BE AS FOLLOWS: CORE THE MANHOLE AND CONNECT SEWER PIPE WITH A WATER-TIGHT FLEXIBLE RUBBER BOOT GROUTED INTO MANHOLE WALL, KOR-N-SEAL BOOT OR EQUAL.

S. PIPE TRENCHES SHALL NOT BE BACKFILLED UNTIL PIPE AND BEDDING INSTALLATION HAS BEEN INSPECTED AND APPROVED BY THE PUBLIC WORKS DIRECTOR.

T. FINAL AIR TESTING SHALL NOT BE ACCEPTED UNTIL AFTER THE ASPHALT TREATED BASE OR FINISHED PAVING IS ACCOMPUSHED, ALL OTHER UNDERGROUND UTILITIES HAVE BEEN INSTALLED, AND THE LINES HAVE BEEN FLUSHED, CLEANED, DEFLECTION TESTED AND TELEVISION INSPECTED.

U. MANHOLE RIM AND INVERT ELEVATIONS SHALL BE FIELD VERIFIED AFTER CONSTRUCTION BY THE OWNER'S ENGINEER(S) AND THE "AS BUILT DRAWINGS INDIVIDUALLY STAMED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF WASHINGTON HICK SHALL ATTEST TO THE FACT THAT THE INFORMATION IS CORRECT. AS—BUILT DRAWINGS SHALL BE TO TOWN DATUM, AND MUST BE ESUBMITTED AND APPROVED BY TE TOWN PROFET OF PROJECT ACCEPTANCE.

TRENCHING AND SHORING OPERATIONS SHALL NOT PROCEED MORE THAN 100 FEET IN ADVANCE OF PIPE LAYING WITHOUT APPROVAL OF THE TOWN, AND SHALL BE IN CONFORMANCE WITH WASHINGTON INDUSTRIAL SAFETY AND HEALTH ADMINISTRATION (WISHA) AND OFFICE OF SAFETY AND HEALTH ADMINISTRATION (OSHA) SAFETY STANDARD.

7.04 MATERIALS AND TESTING

THE OWNER SHALL REQUEST FOR INSPECTION A MINIMUM OF 3 WORKING DAYS IN WRITING PRIOR TO THE OWNER'S SCHEDULED NEED. INSPECTION SHALL BE REQUIRED FOR THE FOLLOWING ITEMS OF WORK:

1. PIPE AND BEDDING INSTALLATION; 2.BACKFILL AND COMPACTION.

UPON COMPLETION OF THE PROJECT ALL SEMER INSTALL SHALL BE INSPECTED WITH TELEVISION INSPECTION EQUIPMENT. THE OWNER SHALL PROVIDE THE TOWN WITH A COPY OF THE INSPECTION AND SHALL HAVE THE TOWN PRESENT DURING THE TELEVISION INSPECTION.

SE 1/4 NE 1/4, SEC 18, TWN 33 N, RGE 22 E, W.M., CITY OF TWISP, WASHINGTON

GRAVITY SEWER MAINS AND LATERALS SHALL BE DESIGNED AND CONSTRUCTED IN CONFORMANCE WITH STANDARD SPECIFICATIONS M41-10 CURRENT EDITION. PRESSURE SEWERS AND FORCE MAINS SHALL BE DESIGNED AND APPROVED BY DOE. THEY SHALL CONFORM WITH DOE CRITERIA FOR SEWAGE WORKS DESIGN, LATEST EDITION.

ALL PIPE SHALL BE JOINTED BY THE MANUFACTURER'S STANDARD COUPLING, BE ALL OF ONE MANUFACTURER, BE CAREFULLY INSTALLED IN COMPLETE COMPLIANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

THE SEWER PIPE, UNLESS OTHERWISE APPROVED BY THE PUBLIC WORKS DIRECTOR, SHALL BE LAID UPGRADE FROM POINT OF CONNECTION ON THE EXISTING SEWER OR FROM A DESIGNATED STARTING POINT. THE SEWER PIPE SHALL BE INSTALLED WITH THE BELL END FORMEND OR UPGRADE. WHEN PIPE LAYING IS NOT IN PROGRESS, THE FORWARD END OF THE PE SHALL BE KEPT TIGHTLY CLOSED WITH AN APPROVED TEMPORARY PLUG.

ALL EXTENSIONS, ADDITIONS AND REVISIONS TO THE SEWER SYSTEM, UNLESS OTHERWISE INDICATED, SHALL BE MADE WITH SEWER PIPE JOINTED BY MEANS OF A FLOXIBLE GASKET WHICH SHALL BE FABRICATED AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND APPROVED BY THE PUBLIC WORKS DIRECTION.

PIPE HANDLING AFTER THE GASKET HAS BEEN AFFIXED SHALL BE CAREFULLY CONTROLLED TO AVOID DISTURBING THE GASKET AND KNOCKING IT OUT OF POSITION, OR LOADING IT WITH DIRT OR OTHER FOREIGN MATERIAL. ANY GASKETS SO DISTURBED SHALL BE REMOVED, CLEANED, RE-LUBRICATED IF REQUIRED, AND REPLACED BEFORE THE RESONNING IS ATTEMPTED.

CARE SHALL BE TAKEN TO PROPERLY ALIGN THE PIPE BEFORE JOINTS ARE ENTIRELY FORCED HOME, DURING INSERTION OF THE TONGUE OR SPIGOT, THE PIPE SHALL BE PARTIALLY SUPPORTED BY HAND, SUNG OR CRANE TO MINIMIZE UNEQUAL LATERAL PRESSURE ON THE GASKET UNTIL THE GASKET IS PROPERLY POSITIONED.

FOR THE JOINING OF DISSIMILAR PIPES, SUITABLE ADAPTER COUPLINGS SHALL BE USED WHICH HAVE BEEN APPROVED BY THE PUBLIC WORKS DIRECTOR.

ALL GRAWITY SEMER PIPE SHALL BE BEDDED WITH PEA GRAVEL OR OTHER MATERIAL APPROVED BY THE PUBLIC WORKS DIRECTOR. THE PVC PIPE SHALL BE BEDDED FROM A DEPTH OF FOUR INCHES BELOW THE PIPE TO EIGHT INCHES ABOVE THE PIPE.

MANHOLE MATERIAL, SIZE, TYPE, CONSTRUCTION, TESTING, ADJUSTMENTS AND APPURTENANCES MUST CONFORM TO STANDARD SPECIFICATIONS M41-10 CURRENT EDITION. THE OWNER SHALL BE RESPONSIBLE FOR ANY EXISTING DEFECTS IN THE EVISITING MANHOLE UNLESS THESE DEFECTS ARE MITNESSED BY THE PUBLIC MORKS DIRECTOR PRIOR TO ANY WORK BEING PERFORMED TO MAKE THE CONNECTION. THE OWNER SHALL BE REQUIRED TO REMOVE ANY AND ALL DEBRIS IN THE EXISTING MANHOLE AND DOWNSTREAM REACHES AS A RESULT OF HIS/HER WORK.

MANHOLE SECTIONS SHALL BE PLACED AND ALIGNED SO AS TO PROVIDE VERTICAL SIDES AND VERTICAL ALIGNMENT OF THE LADDER STEPS. THE COMPLETED MANHOLE SHALL BE RIGD, TRUE TO DIMENSION, AND BE WATER TIGHT. ROUGH, UNEVEN SURFACES WILL NOT BE PERMITTED. THE MORTAR USED BETWEEN THE JOINTS IN THE PRE-CAST SECTIONS AND FOR LAYING MANHOLE

ADJUSTING BRICKS SHALL BE COMPOSED OF ONE-PART CEMENT TO TWO PARTS OF PLASTER SAND. ALL JOINTS SHALL BE THOROUGHLY WETTED AND COMPLETELY FILLED WITH MORTAR, SMOOTHED BOTH INSIDE AND OUTSIDE TO INSURE WATER TIGHTNESS. THE OUTSIDE AND INSIDE OF PRE-CAST CONCRETE MANHOLE SECTIONS SHALL BE PLASTERED AND TROWELED SMOOTH WITH 1/2-INCH (MINIMUM) OF MORTAR IN ORDER TO ATTAIN A WATERTIGHT SURFACE.

DROP MANHOLES SHALL, IN ALL RESPECTS, BE CONSTRUCTED AS A STANDARD MANHOLE WITH THE EXCEPTION OF THE DROP CONNECTION AS FURTHER DETAILED HEREIN.

D. OIL/WATER SEPARATION, GREASE INTERCEPTOR

INDUSTRIAL OR COMMERCIAL BUSINESSES THAT REGULARLY WASH VEHICLES OR ENGAGE IN ENGINE CLEANING AND OTHER CLEANING OPERATIONS THAT
USE ACIDS, CAUSTICS, OR OTHER METAL BRIGHTEMERS AS PART OF THEIR INTEGRAL MANITEMANCE OPERATIONS, MUST USE CLOSED LOOP WATER RECYCLING
SYSTEMS THAT HAVE ZERO DISCHARGE TO THE TOWN'S SANITARY SEMER SYSTEM. THESE SYSTEMS WILL BE REVIEWED BY THE TOWN AND DOE FOR PROPER
DESIGN, CONSTRUCTION AND MANITEMANCE.

INDUSTRIAL OR COMMERCIAL BUSINESSES THAT CENERATE MINERAL/PETROLEUM OILS EXCEEDING 100
MILLIGRAMS PER LITER 10 BE DISCHARGED TO THE TOWN'S SANTIARY SEMER SYSTEM, PRE-TREATMENT IS REQUIRED, AN OIL/WAITER SEPARATION DEVICE SHALL
BE INSTALLED BY THE OWNER, SELECTION AND SIZING OF AN OIL/WAITER SEPARATIOR SHALL BE SUBJECT TO THE APPROVAL OF THE PUBLIC WORKS DIRECTOR.

3. COMMERCIAL FOOD PREPARATION OPERATIONS THAT GENERATE FATS, OLS AND GREASE WASTE MUST HAVE A PROPERLY SIZED GREASE INTERCEPTOR INSTALLED BY THE OWNER IN CONFORMANCE WITH THE UNIFORM PLUMBING CODE, APPENDIX H STANDARDS AND THISP MUNICIPAL CODE. SELECTION AND SIZING OF AN INTERCEPTOR SHALL BE SUBJECT TO THE APPROVAL OF THE PUBLIC WORKS DIRECTOR.

SIDE SEMER LATERAL MATERIAL, SIZE, TYPE, CONSTRUCTION AND TESTING MUST CONFORM TO STANDARD SPECIFICATIONS M41-10 CURRENT EDITION.

A SIDE SEWER LATERAL IS CONSIDERED TO BE THAT PORTION OF A SEWER LINE THAT WILL BE CONSTRUCTED BETWEEN A MAIN SEWER LINE AND THE FINAL CONNECTION POINT TO THE BUILDING, ALL APPLICABLE SPECIFICATIONS GIVEN HERBIN FOR SEWER CONSTRUCTION SHALL BE HELD TO APPLY TO SIDE SEWER LATERALS, SIDE SEWERS SHALL BE FOR A SINGLE CONNECTION ONLY AND BE A MINIMUM FOUR—NIGHD DIAMETER PIPE, SIDE SEWERS SHALL BE CONNECTED TO THE TIEE, PROVIDED IN THE SEWER MAIN WHERE SUCH IS AVAILABLE, UTILIZING APPROVED FITTINGS OF ADAPTERS. THE SIDE SEWER SHALL RISE AT A MAXIMUM OF 45" AND A MINIMUM SLOPE OF TWO PERCENT, FROM THE SEWER MAIN TO PROVIDE EACH LOT WITH THE DEEPEST SEWER POSSIBLE.

THE OWNER SHALL PROVIDE FOR EACH SIDE SEWER SERVICE A 4-INCH X 4-INCH TREATED WOODEN POST WHICH EXTENDS FROM THE INVERT OF THE END OF THE 6-INCH PIPE TO ABOVE THE EXISTING GROUND. THE EXPOSED AREA OF THIS POST SHALL BE PAINTED WHITE AND SHALL HAVE SELECTED THEREON IN TWO-INCH LETTERS (BLACK PAINT) 'S/S' AND SHALL ALSO INDICATE THE DEPTH OF THE SEWER SERVICE STUB FROM FINISHED GRADE.

WHERE NO TEE OR WYE IS PROVIDED OR AVAILABLE, CONNECTION OF 4-INCH AND 6-INCH SIDE SEWER SHALL BE MADE BY MACHINE-MADE TAP AND SADDLE, ONLY BY THE THISP PUBLIC WORKS DEPARTMENT. THE PUBLIC WORKS DIRECTOR SHALL REVIEW THE EXACT LOCATION AND MATERIAL UST. SADDLES SHALL BE PLACED BETWEEN 45* AND BO'OFF VERTICAL. THE MAXIMAL BEDID FERMISSELE AT MAY ONE FITTING SHALL NOT EXCEED 45°, THE OWNER WILL PROVIDE A SAFE EXCAVATED ACCESS TO THE SEWER CONNECTION FOR THE TWISP PUBLIC WORKS DEPARTMENT TO PERFORM THE TAP.

THE MAXIMUM BEND OF ANY COMBINATION OF TWO ADJACENT FITTINGS SHALL NOT EXCEED 45' (ONE-EIGHTH BEND) UNLESS STRAIGHT PIPE OF NOT LESS THAN THREE FEET IN LENGTH IS INSTALLED BETWEEN SUCH ADJACENT FITTINGS.

PROVIDE GREASE TRAP OR GREASE INTERCEPTOR IN ACCORDANCE WITH DOE CRITERIA FOR SEWAGE WORKS DESIGN LATEST EDITION, OR AS APPROVED BY THE TOWN.

ALL STATE HIGHWAY, RAILROAD, AND STREAM CROSSINGS SHALL BE ENCASED WITH A STEEL CASING OR DUCTILE IRON OR PVC SLEEVE, AS APPROVED BY THE TOWN AND PREVALING REGULATORY ACENCIES. THE WELDED STEEL CASING OR SLEEVE SHALL BE OF SUFFICIENT DIAMETER, SIZE AND STRENGTH TO ENCLOSE THE SEWER PIPE AND TO MITHSTAND MAXIMUM HIGHWAY OR RAILROAD LOADING. SIZING AND WALL THICKNESS OF CASING IS SUBJECT TO APPROVAL BY THE PUBLIC WORKES DIRECTOR. LINK SEAL, FOAM OR GROUT FILL BETWEEN THE CASING AND THE SEWER PIPE SHALL BE REQUIRED TO HOLD THE SLEEVE AND PIPE APART AND SEAL THE ENDS.

7.06 STREET PATCHING AND RESTORATION

SEE SECTION 5 FOR REQUIREMENTS REGARDING STREET PATCHING.

7.07 ADJUSTMENT OF NEW AND EXISTING UTILITY STRUCTURES TO GRADE

SEE SECTION 5 FOR REQUIREMENTS REGARDING STREET PATCHING.

BEFORE ACCEPTANCE OF SEWER SYSTEM CONSTRUCTION, ALL PIPES, MANHOLES, CATCH BASINS, AND OTHER APPURTENANCES SHALL BE CLEANED OF ALL DEBRIS AND FOREIGN MATERIAL AFTER ALL OTHER WORK ON THIS PROJECT IS COMPLETED AND BEFORE FINAL ACCEPTANCE. THE ENTIRE ROADWAY, INCLIDING THE ROADBED, PLANTING, SIDEWALK AREAS, SHOULDERS, DRIVEWAYS, ALLEY AND SIDE STREET APPROACHES, SLOPES, DITCHES, UTILITY TRENCHES, AND CONSTRUCTION AFACS SHALL BE NEATLY PINSHED TO THE LINES, GRADES AND CROSS SECTIONS OF A NEW ROADWAY CONSISTENT WITH THE ORIGINAL SECTION, TO THE SATISFACTION OF THE PUBLIC WORKS DIRECTOR.

DRAINAGE FACILITIES SUCH AS INLETS, CATCH BASINS, CULVERTS, AND OPEN DITCHES SHALL BE CLEANED OF ALL DEBRIS WHICH IS THE RESULT OF THE OWNER'S OPERATIONS.

ALL PAVEMENTS AND OIL MAT SURFACES, WHETHER NEW OR OLD, SHALL BE THOROUGHLY CLEANED. EXISTING IMPROVEMENTS SUCH AS PORTLAND CEMENT CONCRETE CURRES, CUIRB AND GUTTERS, WALLS, SIDEWALLS, AND OTHER FACULTIES WHICH HAVE BEEN SPRAYED BY THE ASPHALT CEMENT SHALL BE CLEANED TO THE SATISFACTION OF THE PUBLIC WORKS DIRECTOR.

CASTINGS FOR MANHOLES, VALVES, LAMP HOLES, VALUES AND OTHER SIMILAR INSTALLATIONS WHICH HAVE BEEN COVERED WITH THE ASPHALT MATERIAL SHALL BE CLEANED TO THE SATISFACTION OF THE TOWN.

PRIOR TO THE COMPLETION OF WORK, THE CONSTRUCTED SANITARY SEWER SYSTEM SHALL BE CLEANED AND TESTED IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 7-17.

THE OWNER SHALL BE REQUIRED, UPON COMPLETION OF THE WORK, AND PRIOR TO ACCEPTANCE BY THE TOWN, TO FURNISH THE TOWN A WRITTEN GUARANTEE (MANTENANCE BOND) COVERING ALL MATERIAL AND WORKMANSHIP FOR A PERIOD OF TWO YEARS AFTER THE DATE OF FINAL ACCEPTANCE AND SHALL MAKE ALL NECESSARY REPAIRS DURING THAT PERIOD AT THEIR OWN EXPENSE, IF SUCH REPAIRS ARE NECESSITATED AS THE RESULT OF FURNISHING POOR MATERIALS AND/OTR WORKMANSHIP. THE OWNER SHALL OBTAIN WARRANTIES FROM THE CONTRACTIONS, SUBCONTRACTIONS AND SUPPLIERS OF MATERIAL OR EQUIPMENT WHERE SUCH WARRANTIES ARE REQUIRED, AND SHALL DELIVER COPIES TO THE TOWN UPON COMPLETION OF THE WORK.

EASEMENT DOCUMENTS, IF APPLICABLE, SHALL BE FILED AND RECORDED WITH THE OKANOGAN COUNTY AUDITOR'S OFFICE AND THE DOCUMENTS REVIEWED BY THE TOWN'S ATTORNEY PRIOR TO PROJECT ACCEPTANCE.

DEVELOPMENT S 불 RCHARD PLANNED PALM

SPECIFICATIONS

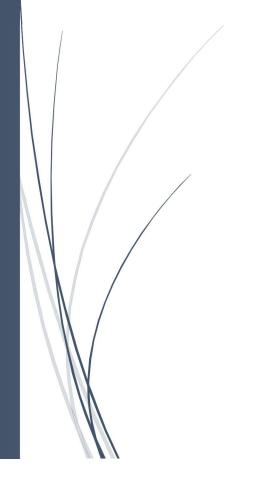


JOB NUMBER:	C22-246
DRAWING NAME: C2224	6P-WS-DT
DESIGNER:	SWP
DRAFTING BY:	RCR
DATE:	
SCALE:	
ILIRISDICTION: CITY	OF TWISP

WS-03 SHEET 3 OF 3

10. SEPA Checklist

Orchard Hills Planned Development (PD) - Resubmittal



Palm Investments North LLC BY NORTH CASCADES ENGINEERING PLLC

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 <u>all parts of your proposal</u>, 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 <u>SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (part D)</u>. 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 [HELP]

- 1. Name of proposed project, if applicable: Orchard Hills
- 2. Name of applicant: Palm Investments North LLC
- 3. Address and phone number of applicant and contact person: Contact Name(s): Jerry

Palm & Julie Palm

Address: P.O. Box 322, Winthrop, WA 98862

Phone Number: (509) 996-2884

- 4. Date checklist prepared: **April 2022**
- 5. Agency requesting checklist: **Town of Twisp**
- 6. Proposed timing or schedule (including phasing, if applicable):

The project is anticipated to begin the Summer of 2023 2023 with infrastructure phasing as coordinated with the Town of Twisp.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

No.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

None to our knowledge. Soils and Geotechnical report, Preliminary Traffic Analysis, Wetlands determination and delineation, Habitat Assessment and Lead and Arsenic testing.

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.

No.

10. List any government approvals or permits that will be needed for your proposal, if known.

Permits as required by the Town of Twisp. NPDES Construction Storm Water Permit from DOE.

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.)

A residential single Planned Development is proposed for the Orchard Hills project, a 16.81-acre site. Orchard Hills is a low impact development with limited hardscape and dedicated Open Space (approx 40%). Its focus will be on pedestrian circulation, softscape amenities and downtown Twisp connections.

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.

The site is located in the Town of Twisp and the parcel identified as Okanogan County parcel number: 3322180099.

B. Environmental Elements [HELP]

- 1. Earth [help]
- a. General description of the site:

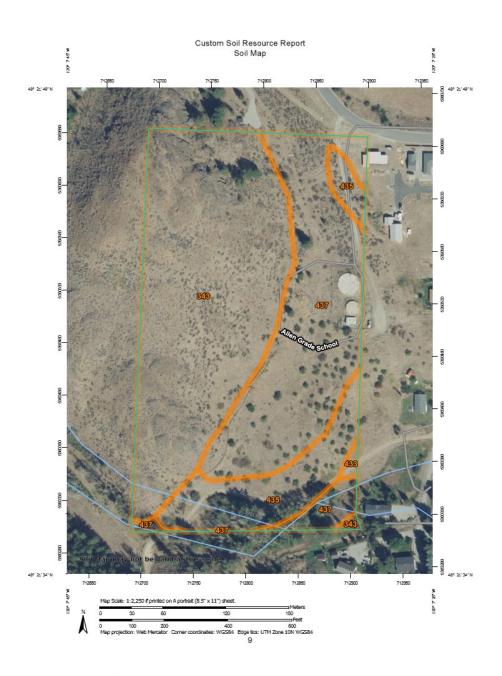
(circle one): Flat, rolling, hilly, steep slopes, mountainous, other:

Within the project area the site slope varies from flat (1%) to steep

(24%). b. What is the steepest slope on the site (approximate percent slope)?

Within the Project area the steepest slope is approximately 24%.

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.



Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
343	Lithic Haploxerepts-Newbon complex, 15 to 45 percent slopes	9.9	49.9%
433	Owhi ashy fine sandy loam, 0 to 3 percent slopes	0.1	0.4%
435	Owhi ashy fine sandy loam, 0 to 25 percent slopes, extremely stony	2.8	14.1%
437	Owhi gravelly ashy fine sandy loam, 0 to 8 percent slopes	7.1	35.6%

SEPA Environmental checklist (WAC 197-11-960) July 2016Page 3 of 17

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

In general, the site soils appear stable. At the northwest corner of the site, within the proposed Open Space Area, there appears to be historical rock movement.

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.

Within the approximate 11 acres of development area, excavation and grading will be typical for infrastructure and construction of single and multi-family homes. Select materials will be imported as necessary for infrastructure improvements.

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

Temporary sediment/erosion control measures will be incorporated during construction to prevent sediment transport off site. This plan is part of the NPDES Construction Storm Water Permit from DOE

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

Approximately 30% of the site will be covered with impervious surfaces after project construction and complete buildout.

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

Temporary sediment/erosion control measures will be incorporated during construction to prevent sediment transport off site. NPDES Construction Storm Water Permit from DOE will be obtained and an associated plan implemented All land disturbed during construction will be stabilized and revegetated. Measures to reduce or control erosion include stormwater management and dedication of permanent open space.

2. Air [help]

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.

Potential sources of emissions to the air during construction include construction dust (mitigated by erosion control measures) and construction vehicle emissions. After project completion, potential sources of emissions to the air include vehicle and typical home emissions.

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

Not to our knowledge.

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

Dust abatement measures will be incorporated during construction as necessary to reduce and control emissions. The Department of Ecology publication "Methods for Dust Control" 2016 will be utilized to prepare a dust control plan in accordance with the town of Twisp's codes and regulations and best management practices. After construction, increased pedestrian circulation and routes provided by the project, and possible Town public transportation expansion will assist in the reduction of emissions.

3. Water [help]

- a. Surface Water: [help]
 - 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, seasonal flow from upstream tributary at proposed Open Space area located at south end of site. This site has had a wetlands determination by an outside consultant and no wetlands are present.

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.

All proposed infrastructure and improvements are upgradient of seasonal drainage area. Work will be adjacent to this season flow area but no wetlands exist.

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: [help]
 - 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.

No. The proposal is within the Town of Twisp municipal water system.

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. Waste discharge will be to the Town of Twisp public sewer system.

- 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.

Stormwater runoff-will result from developed hardscape areas including buildings, roadways, pedestrian paths and parking areas. These areas will be directed via sloped surfaces and conveyance piping to water quality and infiltration swales or dry wells designed and sized to meet the requirements of the DOE Stormwater Manual for Eastern Washington 2019. As required by Town of Twisp standards all storm water up to the design storm required by the Town of Twisp will be infiltrated.

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

Groundwater and surface water will be protected from conventional pollutants by best management practices as described in the DOE Stormwater Manual of Eastern Washington and adopted by the Town of Twisp. as described in above measures, c.1). No, additional waste materials anticipated.

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

No.

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

As required by Town of Twisp standards all storm water up to the design storm required by the Town of Twisp will be infiltrated. This will be accomplished using best management practices practices as described in the DOE Stormwater Manual of Eastern Washington and adopted by the Town of Twisp.

4. Plants [help]

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

X_deciduous tree: alder, maple, aspen, other
X evergreen tree: fir, cedar, pine, other
X_shrubs
_ <u>X</u> _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?

The project will disturb approximately 9 to 11 acres (50% to 60%) of the site. Majority of vegetation disturbed will be grasses and shrubs and volunteer apple trees.

c. List threatened and endangered species known to be on or near the site.

None known.

c. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

Proposed Landscaping will incorporate the use of native plants, water quality swales and other measures to preserve or enhance vegetation. Most landscaping will be installed by individual homeowners of single-family residences and is exempt from TMC landscaping regulations per 18.20.160(2)(a)

e. List all noxious weeds and invasive species known to be on or near the site.

Possible Knapweed.

5. Animals [help]

a. <u>List</u> any birds and <u>other</u> 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 _____
```

Typical Eastern Washington east slope of the Cascades bird species, rodents, small predators and deer.

b. List any threatened and endangered species known to be on or near the site.

No known threatened or endangered species.

c. Is the site part of a migration route? If so, explain.

No known migration route.

d. Proposed measures to preserve or enhance wildlife, if any:

Incorporation of native plant landscaping and Open Space. By including the southern portion of the property in open space the best overall wildlife habitat is protected, this area includes the best grazing, tree and shrub cover and seasonal water. The upland area to be in open space includes shrub step type habitat.

e. List any invasive animal species known to be on or near the site.

No known invasive animal species.

6. Energy and Natural Resources [help]

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.

For HVAC and lighting, the project proposes using electric, propane, wood and solar to meet the completed project's energy needs. All uses will be residential.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

Not to our knowledge.

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:

Energy conservation features include reducing paved surfaces and development footprint while encouraging solar, energy efficient housing, and pedestrian access, circulation and connections.

7. Environmental Health [help]

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

After testing arsenic was found to be present but not primarily in the location of the old orchard and at depth that are not consistent with pesticide application. The arsenic found is highest in concentration the higher you go and closer to the rock outcroppings and seems to be natural background arsenic. Palm Investments North will coordinate with the Department of Ecology on mitigation required. The types of mitigation that is usually done is outlined in the Department of Ecology's "Model Remedies for Former Orchards". The testing seems to indicates that the source of the arsenic is naturel mineralogy and there may be spots of elevated concentration withing the surrounding neighborhood as well. No elevated lead levels were found.

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

See above.

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.

High arsenic levels probably of natural origins.

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.

None known.

4) Describe special emergency services that might be required.

None known.

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

A dust control plan using best management practices per DOE Publication 96-433 "Methods for Dust Control" will be implemented. Where levels of arsenic exceed DOE cleanup levels within areas disturbed by construction, they will be mitigated by one or a combination of the four model remedies endorsed by DOE.

b. Noise

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

None.

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 noise consistent with general construction activity during regular business hours.

Long-term noise consistent with residential living.

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

Project proposes to reduce and control noise by reducing hard surfaces with minimal width vehicular access and local access roads, and encouraging pedestrian trips by providing trails and walkways. Construction will be limited to normal business hours.

8. Land and Shoreline Use [help]

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.

The current undeveloped site is situated adjacent to single family residential properties and one of the Town of Twisp water reservoirs. The proposed development includes single family housing which is consistent with surrounding residential use and zoning.

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 non-forest use?

Not to our knowledge. An orchard was planted on part of the site in the 40's but was removed in the 70's. We are not aware of any other past agricultural uses.

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:

Not to our knowledge.

Describe any structures on the site.

There are no existing structures on the site.

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

N/A

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

Low density single-family residential (R1)

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

Single-Family Low Density Residential (R1). The comprehensive plan also identifies a need for a park in the vicinity.

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, (i) Potential Aquifer Recharge Area, (ii) Steep Slopes. All water storm water will be infiltrated and lots are laid out to avoid steep slopes.

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

100

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:

Proposal is developed pursuant to adopted Town of Twisp regulations. This is a proposed residential development with less overall density than the current zoning.

m. Proposed measures to reduce or control impacts to agricultural and forest lands of long term commercial significance, if any:

N/A

9. Housing [help]

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

53 lots of single residential lots.

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

None.

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

Intent of Planned Development is to increase housing by providing smaller high quality lots and a limited number lots with zero side setback to allow the building of townhouses.

10. Aesthetics [help]

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

Proposed structures should not exceed 30 feet in height consistent with Town of Twisp regulations.

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

None to our knowledge.

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

Compliance with Town of Twisp regulations.

11. Light and Glare [help]

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

Typical lighting from residential properties and traffic. This would be in the early morning and evenings.

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

None to our knowledge. The distance from other residences and by situating lots well below the ridge line the proposed development should have little impact on views and should not produce noticeable glare.

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

None to our knowledge.

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

Compliance with Town of Twisp regulations. Keep all building lots at least 30' below the ridge line.

12. Recreation [help]

a. What designated and informal recreational opportunities are in the immediate vicinity?

None. Currently residents of Painter's Addition use the land without permission for hiking.

b. Would the proposed project displace any existing recreational uses? If so, describe.

None.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

No existing recreation onsite exists. By putting 40% into open space and maintaining an informal route to the ridge summit, the informal hiking will be legal and maintained into the future.

13. Historic and cultural preservation [help]

a. Are there any buildings, structures, or sites, located on or near the site that are over 45years old listed in or eligible for listing in national, state, or local preservation registers? If so, specifically describe.

No.

b. Are there any landmarks, features, or other evidence of Indian or historic use oroccupation? 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 to our knowledge. No, The Methow Artifacts Research Project identifies no artifacts that where found on the site.

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.

The Methow Artifacts Research Project identifies no artifacts that were found on the site. Known locations of native American camps and settlements were researched online and at the Interpretive Center in Twisp. It is an unlikely place for extensive use due to the distance from a reliable water source.

- 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.
- e. **N/A**

14. Transportation [help]

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.

Public streets and highways serving the site include HYW 20, Harrison Avenue, June Street, Marie Street, and May Street, see vicinity map below. Additionally, a fire apparatus access road is proposed from Isabella Lane to McIntosh Rd generally following the existing water tank access road.



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.

c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate?

The proposed project will create residential parking for the development pursuant to Town of Twisp regulations. This at a minimum is two off street parking spaces per dwelling unit and more than 2000 linear feet of 8' parking strips along side of roads.

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, proposal creates driveway access to residential properties, one public roads (Mcintosh Lane, Apple Way and Golden Lane), connection to existing Town of Twisp Road network, and pedestrian pathways.

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?

At build out:

 single family residences would generate an additional of 505 daily vehicle trips per day according to Institute of Transportation Engineers (ITE) trip estimates of 9.54 trips per dwelling unit; Study by independent consultant SJC Alliance estimates that there will be 563 new trips per day on May St and Harrison Ave. There is no anticipated commercial traffic. g. Will the proposal interfere with, affect or be affected by the movement of agricultural andforest products on roads or streets in the area? If so, generally describe.

Not to our knowledge.

SEPA Environmental checklist (WAC 197-11-960) July 2016Page 14 of 17

h. Proposed measures to reduce or control transportation impacts, if any:

The proposal includes pedestrian pathways for circulation and connections to adjacent neighborhoods and downtown Twisp.

15. Public Services [help]

- a. Would the project result in an increased need for public services (for example: fireprotection, police protection, public transit, health care, schools, other)? If so, generally describe.
 - No. Project is consistent with the Town of Twisp comprehensive plan.
- b. Proposed measures to reduce or control direct impacts on public services, if any.

None.

16. Utilities [help]

a.	Circle	utilities	curre	ently av	/ailable	at the s	ite:			
elec	tricity,	natural	gas,	water,	refuse	service,	telephone,	sanitary sev	ver, sept	ic system
othe	er									

The site is currently vacant and undeveloped. Electricity, water (domestic, fire and irrigation), refuse service, telephone and sanitary sewer are currently available adjacent to the east property line.

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.

Utilities required for the project include:

- Electricity Okanogan County PUD #1
- Water domestic and fire Town of Twisp
- Sanitray Sewer Town of Twisp
- Water irrigation Methow Valley Irrigation District (MVID)
- Refuse service Wastewise Methow

Telephone – CenturyLink

C. Signature [HELP]

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.

Signat	ure:
Name	of signee
SEDA Env	vironmental checklist (WAC 197-11-960) July 2016Page 15 of 17
	on and Agency/Organization
	Date Submitted:
	upplemental sheet for nonproject actions [HELP] 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

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

DEPA CHECKIIST - Orchard Hills PD	Page
are:	
3. How would the proposal be likely to deplete energy or natural resources?Propo	sed
measures to protect or conserve energy and natural resources	
are:	
4. How would the proposal be likely to use or affect environmentally sensitive area orareas 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 who itwould allow or encourage land or shoreline uses incompatible with existing plans?	ether
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 publicservices 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 orrequirements for the protection of the environment.

11. Wetlands Assessment

Orchard Hills Planned Development (PD) - Resubmittal

Palm Investments North LLC
BY NORTH CASCADES ENGINEERING PLLC

Palm Investments North LLC PO Box 322 Winthrop, WA 98862 September 21, 2022

Re: Wetland Assessment on parcel no. 3322180099

Introduction

On September 9, 2022, Grette Associates conducted a site visit to determine if wetlands are present on parcel #3322180099, at Unassigned Harrison Ave in Twisp, WA. This wetland determination is required due to the proposed subdivision of the subject property and following the identification of potential wetlands (online mappers). Following the site visit, Grette Associates determined that no wetlands are present on the subject property, as well as there are no wetlands on the adjacent parcels that would impact the development of the subject property (wetland buffers). Methodology and data collection methods are described below.

Methodology

Guidance and methodology for determining the presence/absence of wetlands were based on the 1987 U.S. Army Corps of Engineers Wetlands Delineation Manual (USACE 1987¹, the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West (Version 2.0) (USACE 2008²), and the USACE's National Wetland Plant List, ver. 3.5 (USACE 2020³). The methods in these manuals recognize that the three parameters of hydrology, hydric soils, and hydrophytic vegetation are generally found in wetlands and that these parameters are important in the establishment and maintenance of wetland communities. Additionally, adjacent parcels were investigated both visually and using online resources such as the National Wetland Inventory (NWI) mapper, Washington Department of Fish and Wildlife (WDFW) Priority Habitat and Species (PHS) mapper, and aerial photography to determine if any buffers from nearby wetlands would affect the property.

On the subject property, the wetland assessment was conducted by visually inspecting the locations most likely to contain wetland conditions (mapped areas, depressions/low spots, and areas with hydrophytic vegetation). To the extent possible, Grette Associates also visually inspected adjacent parcels, though permission was not granted to physically access these parcels. The survey focused on the areas that appeared most likely to contain wetland conditions based on vegetation and topography.

¹ U.S. Army Corps of Engineers (USACE). 1987. Field Guide for Wetland Delineation: 1987 Corps of Engineers Manual. Technical Report.

² U.S. Army Corps of Engineers. 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0), ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-08-28. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

³ U.S. Army Corps of Engineers 2020. National Wetland Plant List, version 3.5. NWPL Home v3.4-f9c (army mil)

Background

The USFWS National Wetland Inventory (NWI) Map was queried to determine if wetlands are mapped on the subject parcel. Based on the NWI map, no wetlands are present on the subject parcel or adjacent parcels. Mapping indicates that a potential stream channel is located along the southern boundary of the parcel.



Figure 1. NWI map of the subject parcel and surrounding vicinity. Depression on the subject parcel is located along the southern boundary (red arrow) and adjacent to a potential stream channel.

Site Description

The property is located on the east side of a mildly to steeply sloping isolated hill, which is divided by this and the adjacent property (Figure 2). The property to the west consists of a steeply sloped hill and agriculture, while the properties to the north, east and southeast are comprised of low to moderate density residences and appurtenances. The property to the south is also in residential use; however, those parcels are larger in size. The entire northwestern portion of the property consists of a naturally vegetated, steeply sloped hill. Vegetation within this portion of the property consists primarily of shrub steppe habitat with areas of large ponderosa pines. Where the gradient is reduced on the eastern half of the parcel, the subject property was historically utilized as a commercial orchard. The orchard has been removed and vegetation consists of a combination of native and non-native species. A gravel road (Harrison Ave) is located near the toe of the hillslope along the southern parcel boundary. A depression is located just to the south of Harrison Ave where the potential mapped wetland is located. To the south of the depression, the topography begins to steepen away from the site. Municipal water supply tanks are located toward the center of the eastern property line.



Figure 2. Subject property to be subdivided.

Site Investigation

The wetland investigation consisted of a reconnaissance of the areas on the parcel most likely to contain wetlands based on vegetation, topography and NWI and WDFW PHS mapping (Photographs 1-6). The most likely wetland location includes the depression just to the south of Harrison Ave where the NWI mapper identified a potential riverine wetland. During the site visit, no signs of active hydrology were present at the site. The potentially mapped riverine channel was fully vegetated at the time of the site visit and did not show any indications of recent surface flow. To the east of the depression, the topography increases before leveling out. No channel-like features are present. This area is comprised of a fairly level grassy field perched above the depression (Photograph 2). To the west, the topography also increases away from the depression and Harrison Ave bisects what may have been a historic drainage at one point in the past. No culvert is present below the road to connect the depressional area to the remainder of the potential upslope and off-site drainage. No signs of surface flow were observed on the west side of the depression or within the visible area of the off-site drainage (Photograph 5).

Vegetation in the mapped potential stream channel and depression is comprised primarily of upland species with a limited distribution of riparian species such as cottonwood (*Populus balsamifera trichocarpa*) (FAC) and redosier dogwood (*Cornus stolonifera*) (FACW). The site does not contain areas that meet the vegetation criteria for wetland conditions.

The parcel was also evaluated with informal test pits and one formal data test pit (SP1) in the depression to investigate the site for the presence of sub-surface hydrology and hydric soils. These pits were dug in locations most likely to pass wetland criteria based on topography, vegetation and NWI mapping. Signs of hydrology and hydric soils were not identified at the site. The results of the formal test pit are presented below (Attachment 2).

No pits were dug outside of the depression. The remainder of the parcel is located upslope and away from the depression and mapped potential stream channel and is fully vegetated with upland species (Photograph 6).

Vegetation

Vegetation at SP1 includes quaking aspen (*Populus tremuloides*) (FACU), redosier dogwood (*Cornus stolonifera*) (FACW), and snowberry (*Symphoricarpos albus*) (FACU). A herbaceous layer was not present at the site, which is likely due to the shade of the overhead canopy and ground disturbance from heavy use of the depression by deer and bear for bedding and shelter. There are no obligate (OBL) species located at the sample site. The presence of dogwood is limited in its distribution, with plants being spindly in nature. Based on this information, the site does not meet the wetland vegetation criteria.

Soils

Soils in test pit SP1 revealed very dark brown (10YR 2/2) silty loam soils; consistent with the USGS Owhi soil series description. Redoximorphic features were limited to a 2-inch layer of faint (7.5YR 4/6) redox concentrations within the matrix between 9 and 11 inches in depth. The band of redox was too deep, too narrow and too faint to qualify as hydric. Soils at the site showed no indications of prolonged inundation. Based on this information the soils on the subject parcel do not meet the criteria for hydric soils.

Hydrology

The soil pit SP1 was dug to a depth of approximately 12 inches. Signs of hydrology were not observed in the soil pit. Soils were loose and the color was consistent with the USGS soil series description. The primary source of potential wetland hydrology would most likely be snow melt and storm events leading to the sub-surface drainage of the hillslopes to the north and south of the depression. However, the surface area upslope of the depression is relatively limited in size and is not contributing enough hydrology to form hydric soil conditions at the site. No stream channels or water courses were identified at the site and no culverts or conduits for stormwater were observed. Based on this information, the site does not meet the wetland hydrology criteria.

Adjacent Parcels

Adjacent parcels were observed visually for indications of wetlands that may generate wetland buffers onto the subject property. However, no such conditions were observed. Based on these observations, no wetlands appear to be present on the adjacent properties with buffers that would affect the subject property.

In summary, no portion of the subject property exhibits conditions that meet the vegetation, hydraulic, and soil wetland criteria, and no adjacent parcels appear to contain wetland conditions. Therefore, it is my determination that no wetlands are present on the subject property and no buffers from nearby wetlands would affect the property.

The potential drainage along the south end of the parcel does not connect to a higher order waterbody and does not exhibit channel features that indicate surface water flow. As a result, no buffer is required to protect any habitat functions and values.

Critical Areas

As part of the initial site investigation, Grette Associates queried the WDFW PHS mapper for potential critical areas present on the subject property. The potential riverine wetland was identified on the PHS mapper along with other critical areas. The other PHS mapped on the subject property include shrub-steppe habitat, Western gray squirrel, and golden eagle. The wetland determination verified that there are no existing wetlands on the subject property. During the site investigation a full habitat assessment on the subject property was also conducted. The results of the habitat assessment indicated that there was shrub-steppe vegetation present on the subject property; however, most of this was located on the steeply sloped portion of the property that is not proposed for development. Further the majority of the large, mature trees that would be utilized by Western gray squirrel and golden eagle are located in portions of the property that are not proposed for development. Specifically, they are located within the open space areas proposed in the northwestern and southern portions of the property.

If you have any questions, please call or email. I can be reached at 509-663-6300 / erond@gretteassociates.com.

Sincerely,

Even arew

Eron Drew Grette Associates ^{LLC} Biologist II

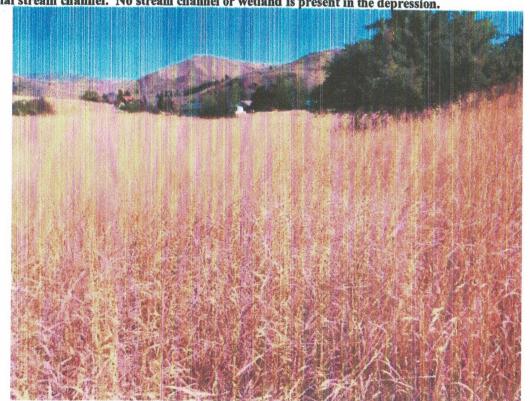
Attachments: 1: Photographs

2: Data Sheets

Attachment 1: Photographs



Photograph 1. A vegetated depression is located to the south of Harrison Ave and is mapped as containing a potential stream channel. No stream channel or wetland is present in the depression.



Photograph 2. Area located to the east of the depression. No stream channel is present.



Photograph 3. SP1 soils; non-wetland.



Photograph 4. SP1 vegetation; non-wetland.



Photograph 5. Area located to the west of the depression. No stream channel is present.



Photograph 6. Area located to the north of Harrison Ave. The remainder of the parcel is upslope of the depression and is comprised of upland vegetation.

Attachment 2: Wetland Determination Data Sheets

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: SCJ Orchard Hills			_City/Cou	nty: Twisp, (Okanogan	Sam	pling Date:9/	1/22
Applicant/Owner: Palm Investments No	orth LLC				State: WA	Sam	nling Doints C	D4
estigator(s): ED: Grette Associates.	LLC			Section 1	Township Range: 94	8 Taski Da	DEVAMA	
andform (hillslope, terrace, etc.): Dep	ression		Localre	lief (concav	o convey name): Ca	0, 133N, RZ	ZEVVIVI	***************************************
Subregion (LRR): B		1 at: 48 3		mer (concavi	e, convex, none): Co	ncave	Slope	(%): <u>1-3</u>
subregion (LRR): B	and (loom 0, 250/ al-	Lat. 40.0	0002		Long: <u>-120.1269</u>		Datum:	************************
oil Map Unit Name: Owhi ashy fine sa	indy joam 0-25% sio	pe (435)	_	***************************************	NWI cla	assification: _		
re climatic / hydrologic conditions on t				⊠ No □	(If no, explain in Ren	narks.)		
re Vegetation, Soil, or F				Are "N	lormal Circumstance	s" present?	Yes 🛛 No	
re Vegetation, Soil, or F					ded, explain any ans			
SUMMARY OF FINDINGS - A	Attach site map	showing	sampli	ng point	locations, trans	ects, imp	ortant feat	ures, e
Hydrophytic Vegetation Present?	Yes ☐ No ☒		le	the Sample	d Aron		and the second s	- Arrana marana da
Hydric Soil Present?	Yes 🗌 No 🖾		1	thin a Wetla				
Wetland Hydrology Present? Remarks: Sample taken at downslope channel present Bare ground present	Yes ☐ No ☒		1			☐ No 🛭		
EGETATION – Use scientific	names of plan							
Tree Stratum (Plot size: r-15)		Absolute % Cover	Dominar	nt Indicator ? Status	Dominance Test			
1. Populus tremuloides					Number of Domina	ant Species	ă.	
					That Are OBL, FA	CW, or FAC:	1	(A)
	inner mente stimber gir findele myster ein stimber tekning in a zere eint september ein	-		William Continues	Total Number of D			
		Montessanickangspacionsonica		-	Species Across Al	I Strata:	3	(B)
_apling/Shrub Stratum (Plot size: r-1		50			Percent of Domina That Are OBL, FA	ant Species CW, or FAC:	33	(A/B)
		25	Υ	FACW	Prevalence Index	workehoot.	The same of the same of the same of	
. Comus stolomiera								
2. Symphoricarpos albus					The second secon		Multiply by	r
2. Symphoricarpos albus	medine a servició el altrica el molto de el mangalo esta el esta el mangalo el mangalo el mangalo el mangalo e	25	Υ	FACU	Total % Cover	of:		
2. Symphoricarpos albus 3.		25	<u>Y</u>	FACU	Total % Cover OBL species 0	r of:	(1 = 0	
2. Symphoricarpos albus 3.		25	<u>Y</u>	FACU	Total % Cover OBL species 0 FACW species 25	r of	c1 = 0 c2 = 50	
2. Symphoricarpos albus 3.		25	<u>Y</u>	FACU	Total % Cover OBL species 0 FACW species 25 FAC species 0	of:	c 1 = 0 c 2 = 50 c 3 = 0	
2. Symphoricarpos albus 3		25	<u>Y</u>	FACU	Total % Cover OBL species 0 FACW species 25 FAC species 0 FACU species 75	of:	c 1 = 0 c 2 = 50 c 3 = 0 c 4 = 300	
Symphoricarpos albus Left Stratum (Plot size: r-5)		50	= Total (FACU	Total % Cover OBL species 0 FACW species 25 FAC species 0 FACU species 75 UPL species 0	of:	(1 = 0) (2 = 50) (3 = 0) (4 = 300) (5 = 0)	Thinkman Astropas Thinkman Astropas Thinkman Astropas Thinkman Astropas
Symphoricarpos albus Left Stratum (Plot size: <u>r-5)</u>		50	= Total (FACU	Total % Cover OBL species 0 FACW species 25 FAC species 0 FACU species 75 UPL species 0 Column Totals: 10	of	$\begin{array}{c} (1 = 0) \\ (2 = 50) \\ (3 = 0) \\ (4 = 300) \\ (5 = 0) \\ (4) \\ (350) \end{array}$	Training Astropas
Symphoricarpos albus Lerb Stratum (Plot size: r-5)		50	= Total (FACU	Total % Cover OBL species 0 FACW species 25 FAC species 0 FACU species 75 UPL species 0	of	$\begin{array}{c} (1 = 0) \\ (2 = 50) \\ (3 = 0) \\ (4 = 300) \\ (5 = 0) \\ (4) \\ (350) \end{array}$	Training Astropas
Symphoricarpos albus Illustratum (Plot size: r-5)		50	Y = Total (Cover	Total % Cover OBL species 0 FACW species 25 FAC species 0 FACU species 75 UPL species 0 Column Totals: 10 Prevalence In	of:	$\begin{array}{c} (1 = 0) \\ (2 = 50) \\ (3 = 0) \\ (4 = 300) \\ (5 = 0) \\ (5) \\ (5 = 0) \\ (5 = 0) \\ (6 = 3.5) \end{array}$	Training Astropas
2. Symphoricarpos albus 3		50	= Total (Cover	Total % Cover OBL species 0 FACW species 25 FAC species 0 FACU species 75 UPL species 0 Column Totals: 10 Prevalence In Hydrophytic Vege	of:	$\begin{array}{c} (1 = 0) \\ (2 = 50) \\ (3 = 0) \\ (4 = 300) \\ (5 = 0) \\ (5) \\ (5 = 0) \\ (5 = 0) \\ (6 = 3.5) \end{array}$	Training Astropas
2. Symphoricarpos albus 3		50	Y = Total (Cover	Total % Cover OBL species 0 FACW species 25 FAC species 0 FACU species 75 UPL species 0 Column Totals: 10 Prevalence In	of:	$\begin{array}{c} (1 = 0) \\ (2 = 50) \\ (3 = 0) \\ (4 = 300) \\ (5 = 0) \\ (5) \\ (5 = 0) \\ (5 = 0) \\ (6 = 3.5) \end{array}$	Training Astropas
2. Symphoricarpos albus 3		50	Y = Total (Cover	Total % Cover OBL species 0 FACW species 25 FAC species 0 FACU species 75 UPL species 0 Column Totals: 10 Prevalence In Hydrophytic Vege Dominance Tes Prevalence Ind Morphological	of: One	(1 = 0 (2 = 50 (3 = 0 (4 = 300 (5 = 0 A) 350 (Provide sup	(B)
2. Symphoricarpos albus 3		50	Y = Total (Cover	Total % Cover OBL species 0 FACW species 25 FAC species 0 FACU species 75 UPL species 0 Column Totals: 10 Prevalence In Hydrophytic Vege Dominance Tec Prevalence Ind Morphological A data in Ren	r of: O O	(1 = 0 (2 = 50 (3 = 0 (4 = 300 (5 = 0 A) 350 (Provide suppreparate she	(B)
Cornus stolonifera Symphoricarpos albus I.		50	Y = Total (Cover	Total % Cover OBL species 0 FACW species 25 FAC species 0 FACU species 75 UPL species 0 Column Totals: 10 Prevalence In Hydrophytic Vege Dominance Tes Prevalence Ind Morphological	r of: O O	(1 = 0 (2 = 50 (3 = 0 (4 = 300 (5 = 0 A) 350 (Provide suppreparate she	(B)
2. Symphoricarpos albus 3		50	= Total C	Cover	Total % Cover OBL species 0 FACW species 25 FAC species 0 FACU species 75 UPL species 0 Column Totals: 10 Prevalence In Hydrophytic Vege Dominance Tes Prevalence Ind Morphological Adata in Ren Problematic Hy	r of: One of the content of the	(1 = 0 (2 = 50 (3 = 0 (4 = 300 (5 = 0 A) 350 (Provide supplements) separate she getation (Expenses)	poorting set)
2. Symphoricarpos albus 3		50	= Total C	Cover	Total % Cover OBL species 0 FACW species 25 FAC species 0 FACU species 75 UPL species 0 Column Totals: 10 Prevalence In Hydrophytic Vege Dominance Tec Prevalence Ind Morphological A data in Ren	r of: Oo Oo Oo	(1 = 0 (2 = 50 (3 = 0 (4 = 300 (5 = 0 A) 350 (Provide sup separate she getation (Expland hydrological short)	porting let)
2. Symphoricarpos albus 3		50	= Total C	Cover	Total % Cover OBL species 0 FACW species 25 FAC species 0 FACU species 75 UPL species 0 Column Totals; 10 Prevalence In Hydrophytic Vege Dominance Tee Prevalence Ind Morphological of data in Ren Problematic Hy Indicators of hydric be present, unless	r of: Oo Oo Oo	(1 = 0 (2 = 50 (3 = 0 (4 = 300 (5 = 0 A) 350 (Provide sup separate she getation (Expland hydrological short)	porting let)
2. Symphoricarpos albus 3		50	= Total C	Cover	Total % Cover OBL species 0 FACW species 25 FAC species 0 FACU species 75 UPL species 0 Column Totals: 10 Prevalence In Morphological of data in Ren Problematic Hy Indicators of hydric be present, unless	r of: Oo Oo Oo	(1 = 0 (2 = 50 (3 = 0 (4 = 300 (5 = 0 A) 350 (Provide supplements) separate she getation (Expense)	porting let)

Sampling Point: SP1

	ription: (Describ	a to the debt					III ababiic	
Depth	Matrix Color (maiot)	0/	ACCORDING TO SELECT STREET, SALES AND ACCOUNTS ASSESSMENT OF SELECT STREET, SALES AND ACCOUNTS ASSESSMENT OF SERENCE SERVICES AND ACCOUNTS ASSESSMENT OF SERVICES ASSESSMENT OF SERVICE	ox Feature	THE RESERVE AND PERSONS ASSESSED.			
inches)	Color (moist)		Color (moist)		Type ¹	Loc ²	Texture	Remarks
0-8	10YR 2/2	100		-	-	-	silty loam	
9-11	10YR 2/2	95	7.5YR 4/6	5	<u>C</u>	M	silty loam	redox is faint
12	10YR 2/2	100		organia terminalistici propriesta del	-	***************************************	silty loam	
		-		-		Attendeductions of the second		
FENCH CONTRACTOR (AND AND AND AND AND AND AND AND AND AND	-	-						
							E-Marie Salamon Hay Commission Co	
**************************************				STREET STATES OF THE STATES OF	* almonissimmuseumologues	Vanish and street and street		*** *** ******************************
**************************************		nder servendetendering och		-		-	Aptimitational journal potential principal principal	
4		one pulsassonominessonne de		-	•		Manufacture and construction of production of the	
	ncentration, D=De					ed Sand G		ocation: PL=Pore Lining, M=Matrix.
Histosol (2			ea.)		-	tors for Problematic Hydric Soils ³ :
	pedon (A2)		☐ Sandy Redox (☐ Stripped Matrix					m Muck (A9) (LRR C)
☐ Black His			Loamy Mucky)			m Muck (A10) (LRR B) duced Vertic (F18)
	Sulfide (A4)		Loamy Gleyed					Parent Material (TF2)
	Layers (A5) (LRR	and the second s	Depleted Matrix					er (Explain in Remarks)
	k (A9) (LRR D)		☐ Redox Dark Su					
	Below Dark Surface		Depleted Dark	•	7)			
	k Surface (A12)	Į.	Redox Depress	sions (F8)				tors of hydrophytic vegetation and
-	ucky Mineral (S1) eyed Matrix (S4)							and hydrology must be present,
	ayer (if present):					***************************************	unle	ss disturbed or problematic.
Type: 12								
Type: 12 Depth (incl		ots					Hydric Soi	il Draggaré? Van 🗆 Na 🖂
Depth (incl	hes): rocks and roc	THE REAL PROPERTY AND ADDRESS OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS N	thick enough to in	idicate wet	and cond	itions Die		il Present? Yes No 🗵
Depth (incl	hes): rocks and roc	deep and not	thick enough to ir	idicate wet	and cond	itions. Dis		il Present? Yes ☐ No ☒ ited to a 2 inch layer between 9-11
Depth (incl	hes): rocks and roc	deep and not	thick enough to ir when dry.	ndicate wet	and cond	itions. Dis		
Depth (incl	hes): rocks and roc	deep and not	thick enough to ir when dry.	ndicate wet	and cond	itions. Dis		
Depth (incl	hes): rocks and roc	deep and not	thick enough to ir when dry.	dicate wet	and cond	itions. Dis		
Depth (incl amarks: Rec inches. Not vis	hes): <u>rocks and roc</u> dox is patchy. Too sible when soils is	deep and not	thick enough to ir when dry.	idicate wet	and cond	itions. Dis		
Depth (incleanmarks: Recurrences. Not vis	hes): <u>rocks and roc</u> dox is patchy. Too sible when soils is	deep and not wet and faint	thick enough to ir when dry.	idicate wet	and cond	itions. Dis		
Depth (incl amarks: Rec Inches. Not vis	hes): <u>rocks and roc</u> dox is patchy. Too sible when soils is	deep and not wet and faint	when dry.		and cond	itions. Dis	tribution is limi	ted to a 2 inch layer between 9-11
Depth (incl amarks: Rec Inches. Not vis HYDROLOG Wetland Hyd Primary Indica	hes): rocks and roc dox is patchy. Too sible when soils is	deep and not wet and faint	when dry.	ly)	and cond	itions. Dis	tribution is limi	endary Indicators (2 or more required)
Depth (incl amarks: Rec Inches. Not vis HYDROLOG Wetland Hyd Primary Indica Surface W	hes): rocks and roc dox is patchy. Too sible when soils is GY rology Indicators ators (minimum of el	deep and not wet and faint	check all that app	ly) (B11)	and cond	itions. Dis	tribution is limi	endary Indicators (2 or more required) Vater Marks (B1) (Riverine)
Depth (incl amarks: Rec Inches. Not vis HYDROLOG Wetland Hyd Primary Indica Surface W	hes): rocks and roc dox is patchy. Too sible when soils is GY rology Indicators ators (minimum of o /ater (A1) er Table (A2)	deep and not wet and faint	check all that app Salt Crust Biotic Crus	ly) (B11) st (B12)		itions. Dis	Seco	andary Indicators (2 or more required) Vater Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine)
Depth (incl amarks: Rec Inches. Not vis HYDROLOG Wetland Hyd Primary Indica Surface W High Wate Saturation	hes): rocks and roc dox is patchy. Too sible when soils is GY rology Indicators ators (minimum of o /ater (A1) er Table (A2)	deep and not wet and faint and faint	check all that app	ly) (B11) st (B12) vertebrates	s (B13)	itions. Dis	Seco	andary Indicators (2 or more required) Vater Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Orift Deposits (B3) (Riverine)
Depth (incl amarks: Rec Inches. Not vis HYDROLOG Wetland Hyd Primary Indics Surface W High Wate Saturation Water Mai	hes): rocks and rocks and rocks is patchy. Too sible when soils is GY rology Indicators ators (minimum of other (A1) ar Table (A2) in (A3) rks (B1) (Non river)	deep and not wet and faint cone required;	check all that app Salt Crust Biotic Crust Aquatic In Hydrogen	ly) (B11) st (B12) vertebrates Sulfide Od	s (B13) or (C1)		Seco	andary Indicators (2 or more required) Vater Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Orift Deposits (B3) (Riverine) Oralinage Patterns (B10)
Depth (incl amarks: Rec Inches. Not vis HYDROLOG Wetland Hyd Primary Indica Surface W High Wate Saturation Water Mai Sediment	hes): rocks and roc dox is patchy. Too sible when soils is GY rology Indicators ators (minimum of o vater (A1) or Table (A2) or (A3)	deep and not wet and faint cone required: rine)	check all that app Salt Crust Biotic Crust Aquatic In	ly) (B11) st (B12) vertebrates Sulfide Od Rhizospher	i (B13) or (C1) es along I	iving Roo	Seco	andary Indicators (2 or more required) Vater Marks (B1) (Riverine) Gediment Deposits (B2) (Riverine) Oralinage Patterns (B10) Ory-Season Water Table (C2)
Depth (incl amarks: Rec Inches. Not vis HYDROLOG Wetland Hyd Primary Indica Surface W High Water Saturation Water Mai Sediment Drift Depo	hes): rocks and roc dox is patchy. Too sible when soils is GY rology Indicators ators (minimum of o vater (A1) er Table (A2) n (A3) rks (B1) (Non rive) Deposits (B2) (No	deep and not wet and faint cone required: rine)	check all that app Salt Crust Biotic Crus Aquatic In Hydrogen Oxidized F	ly) (B11) st (B12) vertebrates Sulfide Od Rhizospher of Reduced	(B13) or (C1) es along L I Iron (C4	.iving Roo	Seco	andary Indicators (2 or more required) Vater Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Oralinage Patterns (B10) Ory-Season Water Table (C2) Crayfish Burrows (C8)
Depth (incl amarks: Rec Inches. Not vis HYDROLOG Wetland Hyd Primary Indica Surface W High Water Saturation Water Man Sediment Drift Depo Surface S	hes): rocks and roc dox is patchy. Too sible when soils is GY rology Indicators ators (minimum of o /ater (A1) er Table (A2) n (A3) rks (B1) (Non rive) Deposits (B2) (No	deep and not wet and faint cone required; rine) n riverine)	check all that app Salt Crust Biotic Crust Aquatic In Hydrogen Oxidized F	ly) (B11) st (B12) vertebrates Sulfide Od Rhizospher of Reduced in Reduction	(B13) or (C1) es along L d Iron (C4 n in Tilled	.iving Roo	Second V Second C C C C C C C C C	andary Indicators (2 or more required) Vater Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Orift Deposits (B3) (Riverine) Orainage Patterns (B10) Ory-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9)
Depth (incl amarks: Rec Inches. Not vis HYDROLOG Wetland Hyd Primary Indica Surface W High Wate Saturation Water Mai Sediment Drift Depo Surface Se Inundation	hes): rocks and roc dox is patchy. Too sible when soils is GY rology Indicators ators (minimum of o /ater (A1) er Table (A2) n (A3) rks (B1) (Non rive Deposits (B2) (No rsits (B3) (Non rive oil Cracks (B6)	deep and not wet and faint cone required; rine) n riverine)	check all that app Salt Crust Biotic Crus Aquatic In Hydrogen Oxidized F Presence Recent Iro	(B11) st (B12) vertebrates Sulfide Od Rhizospher of Reduced n Reductio	i (B13) or (C1) es along L d Iron (C4 n in Tilled	.iving Roo	Second V Second C Sec	andary Indicators (2 or more required) Vater Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Orift Deposits (B3) (Riverine) Orainage Patterns (B10) Ory-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Shallow Aquitard (D3)
Depth (incl amarks: Rec Inches. Not vis HYDROLOG Wetland Hyd Primary Indica Surface W High Wate Saturation Water Man Sediment Drift Depo Surface Se Inundation Water-Sta	hes): rocks and roc dox is patchy. Too sible when soils is GY rology Indicators ators (minimum of o vater (A1) er Table (A2) n (A3) rks (B1) (Non rive Deposits (B2) (No rive sits (B3) (Non rive oil Cracks (B6) Visible on Aerial II ined Leaves (B9)	deep and not wet and faint cone required; rine) n riverine)	check all that app Salt Crust Biotic Crus Aquatic In Hydrogen Oxidized F Presence Recent Iro	(B11) st (B12) vertebrates Sulfide Od Rhizospher of Reduced n Reductio	i (B13) or (C1) es along L d Iron (C4 n in Tilled	.iving Roo	Second V Second C Sec	andary Indicators (2 or more required) Vater Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Orift Deposits (B3) (Riverine) Orainage Patterns (B10) Ory-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9)
Depth (incleanance) Jamarks: Recurrence Not vision inches. Not vision	hes): rocks and rocks is patchy. Too sible when soils is a rology Indicators ators (minimum of a rable (A2) in (A3) rks (B1) (Non rive (B3) (deep and not wet and faint : one required; rine) n riverine) erine)	check all that app Salt Crust Biotic Crust Aquatic In Hydrogen Oxidized F Presence Recent Iro	ly) (B11) st (B12) vertebrates Sulfide Od Rhizospher of Reduceto Reductio Surface (Colain in Rer	(B13) or (C1) es along L I ron (C4) n in Tilled C7) narks)	.iving Roo	Second V Second C Sec	andary Indicators (2 or more required) Vater Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Orift Deposits (B3) (Riverine) Orainage Patterns (B10) Ory-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Shallow Aquitard (D3)
Depth (incl amarks: Rec Inches. Not vis HYDROLOG Wetland Hyd Primary Indica Surface W High Wate Saturation Water Man Sediment Drift Depo Surface Se Inundation Water-Sta	hes): rocks and rocks is patchy. Too sible when soils is a rology Indicators ators (minimum of a rable (A2) in (A3) rks (B1) (Non river) (B2) (Non river) (B3) (Non river) (Non riv	deep and not wet and faint cone required; rine) n riverine) magery (B7)	check all that app Salt Crust Biotic Crust Aquatic In Hydrogen Oxidized F Presence Recent Iro Thin Muck Other (Exp	ly) (B11) st (B12) vertebrates Sulfide Od Rhizospher of Reduceto Reductio Surface (Colain in Rer	(B13) or (C1) es along L I ron (C4) n in Tilled C7) narks)	.iving Roo	Second V Second C Sec	andary Indicators (2 or more required) Vater Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Orift Deposits (B3) (Riverine) Orainage Patterns (B10) Ory-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Shallow Aquitard (D3)
Depth (incleanance) Jamarks: Recurrence Not vision inches. Not vision	hes): rocks and rocks is patchy. Too sible when soils is a rology Indicators ators (minimum of a rable (A2) in (A3) rks (B1) (Non river) (B2) (Non river) (B3) (Non river) (Non riv	deep and not wet and faint : one required; rine) n riverine) erine)	check all that app Salt Crust Biotic Crust Aquatic In Hydrogen Oxidized F Presence Recent Iro Thin Muck Other (Exp	ly) (B11) st (B12) vertebrates Sulfide Od Rhizospher of Reduced n Reduction Surface (Colain in Reductions)	i (B13) or (C1) es along l d Iron (C4 n in Tilled (77) narks)	.iving Roo	Second V Second C Sec	andary Indicators (2 or more required) Vater Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Orift Deposits (B3) (Riverine) Orainage Patterns (B10) Ory-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Shallow Aquitard (D3)
Depth (incl amarks: Rec Inches. Not vis IYDROLOG Wetland Hyd Primary Indics Surface W High Water Saturation Water Mai Sediment Drift Depo Surface Se Inundation Water-Sta Field Observe Surface Water Water Table P Saturation Pre	hes): rocks and rocks is patchy. Too sible when soils is a rology Indicators: ators (minimum of color (A3) rks (B1) (Non river) (B2) (Non river) (B3) (Non river) (B3) (Non river) (B4) (Non river) (B4) (Non river) (B5) (Non river) (B6) (Non river) (Non river) (B6) (Non river) (Non river	deep and not wet and faint cone required; rine) n riverine) magery (B7)	check all that app Salt Crust Biotic Crust Aquatic In Hydrogen Oxidized F Presence Recent Iro Thin Muck Other (Exp	ly) (B11) st (B12) vertebrates Sulfide Od Rhizospher of Reducetion Reduction Surface (Colain in Rer	(B13) or (C1) es along l d Iron (C4 n in Tilled C7) narks)	Living Roo) Soils (C6	seco	andary Indicators (2 or more required) Vater Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Orift Deposits (B3) (Riverine) Orainage Patterns (B10) Ory-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Shallow Aquitard (D3)
Depth (incl amarks: Rec Inches. Not vis IYDROLOG Wetland Hyd Primary Indica Surface W High Water Saturation Water Mai Sediment Drift Depo Surface Se Inundation Water-Sta Field Observa Surface Water Water Table P Saturation Pre (includes capil	hes): rocks and rocks is patchy. Too sible when soils is a rology Indicators ators (minimum of a rable (A2) in (A3) rks (B1) (Non river) (B2) (Non river) (B3) (Non river) (B3) (Non river) (B3) (Non river) (B4) (B4) (B5) (B6) (B6) (B6) (B6) (B7) (B7) (B7) (B7) (B7) (B7) (B7) (B7	rine) n riverine) magery (B7) Yes \(\) No [Yes \(\) No [Yes \(\) No [check all that app Salt Crust Biotic Crust Aquatic In Hydrogen Oxidized F Presence Recent Iro Thin Muck Other (Exp	ly) (B11) st (B12) vertebrates Sulfide Od Rhizospher of Reduced n Reductio Surface (Colain in Rer	i (B13) or (C1) es along l d Iron (C4 n in Tilled (27) narks)	Living Roo) Soils (C6	seco	endary Indicators (2 or more required) Vater Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Orift Deposits (B3) (Riverine) Oralnage Patterns (B10) Ory-Season Water Table (C2) Orayfish Burrows (C8) Seaturation Visible on Aerial Imagery (C9) Shallow Aquitard (D3) (AC-Neutral Test (D5)
Depth (incl amarks: Rec Inches. Not vis IYDROLOG Wetland Hyd Primary Indica Surface W High Water Saturation Water Mai Sediment Drift Depo Surface Se Inundation Water-Sta Field Observa Surface Water Water Table P Saturation Pre (includes capil	hes): rocks and rocks is patchy. Too sible when soils is a rology Indicators: ators (minimum of color (A3) rks (B1) (Non river) (B2) (Non river) (B3) (Non river) (B3) (Non river) (B4) (Non river) (B4) (Non river) (B5) (Non river) (B6) (Non river) (Non river) (B6) (Non river) (Non river	rine) n riverine) magery (B7) Yes \(\) No [Yes \(\) No [Yes \(\) No [check all that app Salt Crust Biotic Crust Aquatic In Hydrogen Oxidized F Presence Recent Iro Thin Muck Other (Exp	ly) (B11) st (B12) vertebrates Sulfide Od Rhizospher of Reduced n Reductio Surface (Colain in Rer	i (B13) or (C1) es along l d Iron (C4 n in Tilled (27) narks)	Living Roo) Soils (C6	seco	endary Indicators (2 or more required) Vater Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Orift Deposits (B3) (Riverine) Oralnage Patterns (B10) Ory-Season Water Table (C2) Orayfish Burrows (C8) Seaturation Visible on Aerial Imagery (C9) Shallow Aquitard (D3) (AC-Neutral Test (D5)
Depth (includes capill includes capill includes capill includes capill inches. Not vision amarks: Rec inches. Not vision ama	hes): rocks and roc dox is patchy. Too sible when soils is GY rology Indicators ators (minimum of or Jater (A1) er Table (A2) n (A3) rks (B1) (Non rive Deposits (B2) (No rive (B3) (Non rive oil Cracks (B6) Visible on Aerial In ined Leaves (B9) ations: r Present? Present. Present	rine) magery (B7) Yes No [Ye	check all that app Salt Crust Biotic Crust Aquatic In Hydrogen Oxidized F Presence Recent Iro Thin Muck Other (Exp	ly) (B11) st (B12) vertebrates Sulfide Od Rhizospher of Reduced n Reductio Surface (Colain in Rer	i (B13) or (C1) es along l d Iron (C4 n in Tilled (27) narks)	Living Roo) Soils (C6	seco	endary Indicators (2 or more required) Vater Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Orift Deposits (B3) (Riverine) Oralnage Patterns (B10) Ory-Season Water Table (C2) Orayfish Burrows (C8) Seaturation Visible on Aerial Imagery (C9) Shallow Aquitard (D3) (AC-Neutral Test (D5)
Depth (includes capill includes capill includes capill includes capill inches. Not vision amarks: Rec inches. Not vision ama	hes): rocks and rocks is patchy. Too sible when soils is a rology Indicators ators (minimum of a rable (A2) in (A3) rks (B1) (Non river) (B2) (Non river) (B3) (Non river) (B3) (Non river) (B3) (Non river) (B4) (B4) (B5) (B6) (B6) (B6) (B6) (B7) (B7) (B7) (B7) (B7) (B7) (B7) (B7	rine) magery (B7) Yes No [Ye	check all that app Salt Crust Biotic Crust Aquatic In Hydrogen Oxidized F Presence Recent Iro Thin Muck Other (Exp	ly) (B11) st (B12) vertebrates Sulfide Od Rhizospher of Reduced n Reductio Surface (Colain in Rer	i (B13) or (C1) es along l d Iron (C4 n in Tilled (27) narks)	Living Roo) Soils (C6	seco	endary Indicators (2 or more required) Vater Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Orift Deposits (B3) (Riverine) Oralnage Patterns (B10) Ory-Season Water Table (C2) Orayfish Burrows (C8) Seaturation Visible on Aerial Imagery (C9) Shallow Aquitard (D3) (AC-Neutral Test (D5)
Depth (includes capill	hes): rocks and roc dox is patchy. Too sible when soils is GY rology Indicators ators (minimum of or Jater (A1) er Table (A2) n (A3) rks (B1) (Non rive Deposits (B2) (No rive (B3) (Non rive oil Cracks (B6) Visible on Aerial In ined Leaves (B9) ations: r Present? Present. Present	rine) magery (B7) Yes No [Ye	check all that app Salt Crust Biotic Crust Aquatic In Hydrogen Oxidized F Presence Recent Iro Thin Muck Other (Exp	ly) (B11) st (B12) vertebrates Sulfide Od Rhizospher of Reduced n Reductio Surface (Colain in Rer	i (B13) or (C1) es along l d Iron (C4 n in Tilled (27) narks)	Living Roo) Soils (C6	seco	endary Indicators (2 or more required) Vater Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Orift Deposits (B3) (Riverine) Oralnage Patterns (B10) Ory-Season Water Table (C2) Orayfish Burrows (C8) Seaturation Visible on Aerial Imagery (C9) Shallow Aquitard (D3) (AC-Neutral Test (D5)

13. Traffic Analysis

Orchard Hills Planned Development (PD) - Resubmittal

Palm Investments North LLC
BY NORTH CASCADES ENGINEERING PLLC



Technical Memo

To

Town of Twisp

From:

Ryan Shea, PTP, Senior Transportation Planner

Date:

September 09, 2022

Project:

Orchard Hills

Subject:

Traffic Scoping Analysis

Introduction:

Palm Investments North, LLC is proposing construction of the Orchard Hills project, a single-family residential development near Harrison Avenue and May Street in Twisp, Washington. The proposed project includes 53 single family lots. This Traffic Scoping Analysis estimates the trip generation, distribution, and assignment for the proposed development. **Figure 1** illustrates the site vicinity and the transportation network serving the project area.

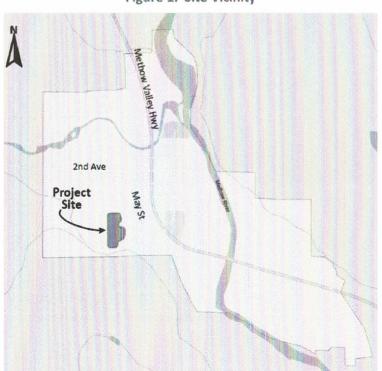


Figure 1. Site Vicinity



Proposed Development

The proposed project would construct 53 single-family residential lots in the Town of Twisp. The project also proposes to dedicate approximately 7.5 acres to the Town of Twisp for a community park or permanent open space. Access to the project is proposed to be from Harrison Avenue. The project is anticipated to be constructed over three phases, with full build out occurring by 2028.

The preliminary site plan is attached.

Project Traffic Characteristics

The two project-related characteristics having the most effect on area traffic conditions are peak hour trip generation and the directional distribution of traffic volumes on the surrounding roadway network.

Site-Generated Traffic Volumes

Vehicle trip generation was calculated using the trip generation rates contained in the 11th edition of the <u>Trip Generation Manual</u> by the *Institute of Transportation Engineers (ITE)*. Single-Family Detached Housing (land use code 210) land use category matches the proposed development and has been used to calculate the trip generation. For this analysis, the "fitted-curve" equation was used to estimate trips in preference to using the average trip rate as this approach was recommended by ITE.

Table 1 shows the trip generation characteristics for the land use category Single-Family Attached Housing.

Table 1. ITE Trip Generation Rate - Single-Family Detached Housing (Land Use Code 210)

Peak Period	Variable	Trip Rate	Enter %	Exit %
AM peak hour of Adjacent Street	Dwelling Units	0.79*	26%	74%
PM peak hour of Adjacent Street	Dwelling Units	1.03*	63%	37%
Daily	Dwelling Units	10.62*	50%	50%

^{*}Fitted curve equation rate

The total trip generation expected from this project is calculated by applying the unit measure for each land use category to the appropriate trip generation rate. The trip generation for the proposed *Strickland Plat* project is shown in **Table 2** below.

Table 2. Project Trip Generation

Peak Period	Size	Total Trips	Enter	Exit
AM peak hour of Adjacent Street	53	42	11	31
PM peak hour of Adjacent Street	53	55	35	20
Daily	53	563	281	282



Site Traffic Distribution and Assignment

For this study, the regional distribution of traffic to and from the proposed project was estimated based on locations and densities of commercial and employment areas. The regional traffic distribution percentages and site traffic assignment for the proposed development for the PM peak hour and daily time periods are shown on **Figure 2.**

Public Comments

It is understood that information about this project has been shared with the public and concerns have been raised. Regarding traffic, the following concerns have been expressed:

- The proposed roadways will be too narrow to accommodate traffic and other travel modes/snow removal/emergency access.
- Current fire code requires two access points for developments over 30 units and the project proposes a single access point.
- Project traffic impacts at the intersection of May Street and Second Avenue.

The specific design requirements to ensure accommodations of snow removal and emergency access will be dictated by the Town roadway design standards. The project internal street network has been designed to accommodate future connections to adjacent properties when they develop, which would provide additional vehicle connections. Traffic operational impacts to existing intersections, including May Street at Second Avenue, and an assessment of pedestrian facilities, can be further addressed if necessary in a traffic impact analysis.

We have presented this information for the Town's use in determining the Scope of Work for a Traffic Impact Analysis. If you have any questions or need additional information, please call me at 360.352.1465.

Respectfully, SCJ Alliance

Ryan Shea, PTP

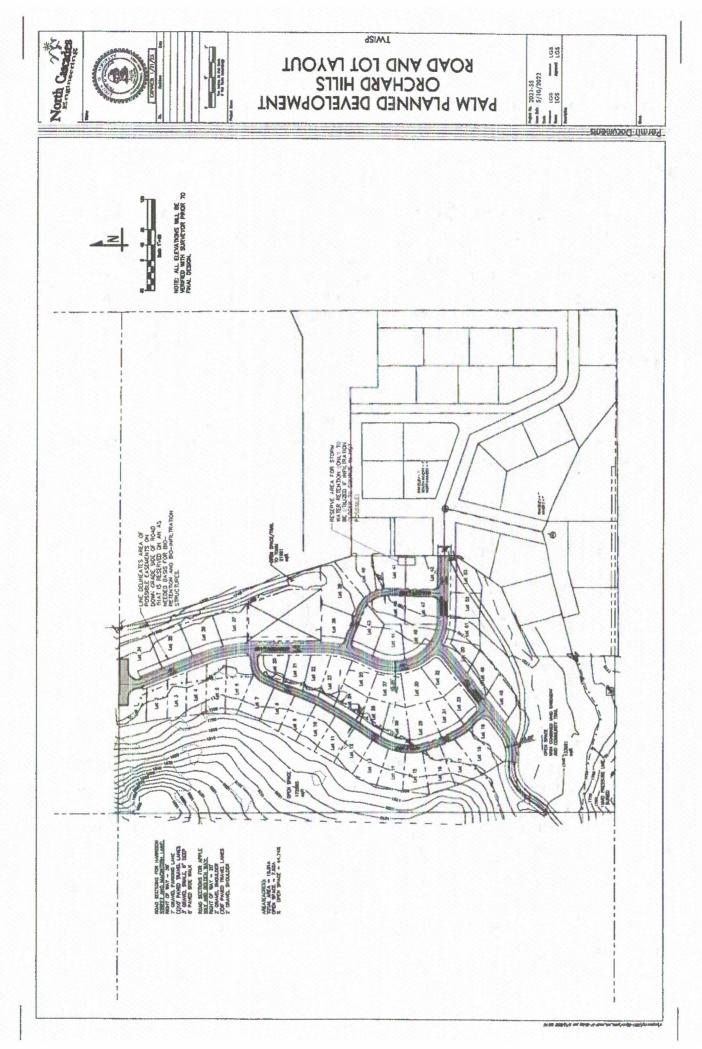
Senior Transportation Planner

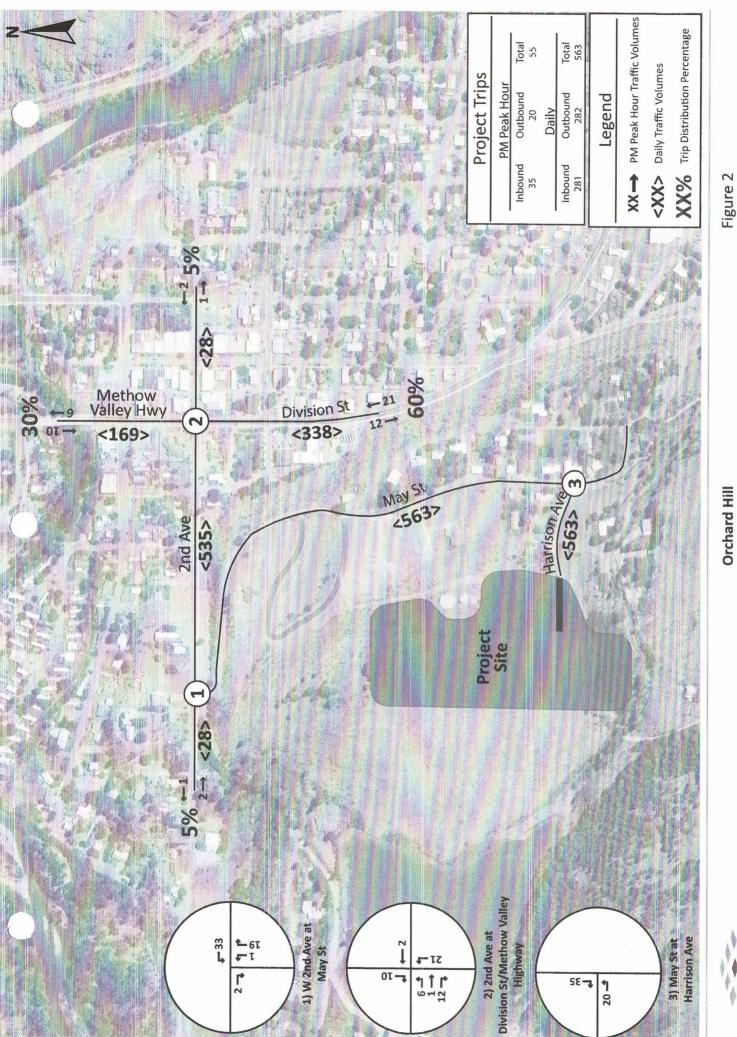
Enclosures:

Preliminary Site Plan

Figure 2

C:\Users\jacki.taylor\Documents\Twisp Housing Project\2022-0902 Orchard Hills Traffic Scoping.docx





Orchard Hill Twisp, Washington Traffic Scoping Analysis

SCJ ALLIANCE

rigure 2 Site-Generated Traffic Volumes PM Peak Hour

14. DOE Lead and Arsenic Testing Report

Orchard Hills Planned Development (PD) - Resubmittal

Palm Investments North LLC
BY NORTH CASCADES ENGINEERING PLLC



STATE OF WASHINGTON DEPARTMENT OF ECOLOGY

Central Region Office

1250 West Alder St., Union Gap, WA 98903-0009 • 509-575-2490

9/27/2022

Palm Investments North, LLC P.O. Box 322 Winthrop, WA 98862

Lead and Arsenic Soil Sampling Results for parcel# 3322180099, Twisp Re:

Dear Palm Investments North, LLC:

Thank you for contacting the Washington State Department of Ecology (Ecology) to request complimentary soil sampling. The results showed lead and arsenic above Washington State cleanup levels (Model Toxics Control Act—Chapter 173-340 WAC). Your results are detailed in the enclosed table and will be made available online through our Dirt Alert mapping tool.²

This property will require cleanup prior to occupancy.

Ecology has pre-approved cleanups, called model remedies, available to help you. Refer to our publication, Model Remedies for Cleanup of Former Orchard Properties in Central and Eastern Washington³ as a resource.

Once the cleanup is complete, please fill out the Building Self-Certification form⁴ and return it to FormerOrchards@ecy.wa.gov. We will update our records and notify your local building authority so an occupancy permit may be issued.

For more information, we encourage you to read our blog series, Legacies of Lead and Arsenic,5 to learn how lead and arsenic came to be so widespread in the soil throughout central Washington. Our Dirt Alert⁶ and Former Orchard Lands⁷ websites also have information about lead and arsenic contamination.

¹ https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340

² https://apps.ecology.wa.gov/dirtalert/orchard

³ https://apps.ecology.wa.gov/publications/SummaryPages/2109006.html

⁴ https://apps.ecology.wa.gov/publications/SummaryPages/ECY070667.html

⁵ https://ecology.wa.gov/Search-Results?searchtext=legacies+of+lead+and+arsenic&searchmode=allwords

⁶ https://ecology.wa.gov/Spills-Cleanup/Contamination-cleanup/Dirt-Alert-program

⁷ https://ecology.wa.gov/Spills-Cleanup/Contamination-cleanup/Cleanup-sites/Former-orchard-lands

Palm Investments North, LLC 9/27/2022 Page 2

Feel free to contact me at Hector.Casique@ecy.wa.gov or 509-208-1288 or our Community Outreach Specialist Tina Wilson at Tina.Wilson@ecy.wa.gov or 509-208-4383 if you have any additional questions.

Sincerely,

Hector Casique
Project Manager
Former Orchard Lands
Toxics Cleanup Program

cc: Okanogan County Planning and Development

Palm Investments North, LLC 9/27/2022 Page 3

Soil Sampling Results for parcel# 3322180099, Twisp

On September 14, 2022, Ecology took 54 soil samples from the property parcel number listed above (Table 1).

Soil samples with more than 20 ppm (parts per million) of arsenic or 250 ppm of lead are above state cleanup levels. They are listed below in **bold**.

Table 1: Soil test results using a Portable Handheld X-Ray Fluorescence (XRF) Analyzer.

Soil Sample Depth	Reading #	Latitude	Longitude	Arsenic (ppm) Concentration	Arsenic Error* + ppm	Lead (ppm) Concentratio	Lead Error* <u>+</u> ppm
(inches)	Example	46.6020	-120.5080	10	2	150	20
-	1	48.3607	-120.1254	19	1	11	11
4	2	48.3609	-120.1254	13	1	12	1
4	3	48.3611	-120.1253	19	2	52	2
4	4	48.3613	-120.1254	10	1	6	1
4	5	48.3615	-120.1253	8	1	8	1
4		48.3616	-120.1253	10	1	5	1
4	6	48.3617	-120.1255	11	1	7	1
4	8	48.3617	-120.1258	7	1	6	1
4	9	48.3616	-120.1260	10	1	12	1
4	10	48.3615	-120.1264	21	2	57	2
4	11	48.3615	-120.1266	32	2	93	2
4		48.3616	-120.1265	40	2	83	2
4	12	48.3618	-120.1263	34	2	99	3
4	13	48.3622	-120.1261	10	1	9	1
4	14	48.3623	-120.1265	21	1	13	1
4	15	48.3623	-120.1265	31	2	15	1
4	16	48.3618	-120.1265	30	2	11	1
8	17		-120.1261	16	1	23	2
4	18	48.3618	-120.1263	11	1	12	1
4	19	48.3614	-120.1261	14	1	14	1
4	20	48.3613	-120.1261	9	1	7	1
4	21	48.3611			1	10	1
4	22	48.3611	-120.1265 -120.1267		1	59	2
4	23	48.3612	-120.1207		2	73	2
4	24	48.3610			2	59	2
4	25	48.3608			3	87	3
4	26	48.3607	-120.1271		1	12	1
4	27	48.3607			2	45	2
4	28	48.3605 48.3604			2	41	2

Palm Investments North, LLC 9/27/2022 Page 4

4	30	48.3605	-120.1263	11		8	1
4	31	48.3607	-120.1263	9	1	7	1
4	32	48.3608	-120.1263	15	1	28	2
4	33	48,3610	-120.1262	7	1	7	1
4	34	48.3610	-120.1262	7	1	7	1
4	35	48,3612	-120.1271	20	1 0 0 1	5	1
4	36	48.3614	-120.1272	22	1	7	1
4	37	48.3614	-120.1271	19	2	11	1
4	38	48.3614	-120.1271	41	2	7	1
4	39	48.3615	-120.1270	45	2	8	1
4	40	48.3617	-120.1268	64	2	9	1
4	41	48.3618	-120.1269	67	2	9	1
4	42	48.3620	-120.1268	88	2	7	1
4	43	48.3620	-120.1268	88	2	7	1
4	44	48.3622	-120.1268	89	2	11	1
4	45	48.3622	-120.1266	37	2010 2	11	1
4	46	48.3612	-120.1257	7	1	6	1
4	47	48.3611	-120.1258	8	4 0.2 0. 1 1 4 to	3 4	1
4	48	48.3611	-120.1258	6	2 3.1.11 1 1 1	5	1
4	49	48.3610	-120.1258	8	1 . A.S.	9	1
4	50	48.3608	-120.1258	7	1	8	1
4	51	48.3608	-120.1257	9	1	10	1
4	52	48.3606	-120.1255	15	1	3	1
4	53	48.3607	-120.1253	20	1	7	1
4	54	48.3608	-120.1252	15	1	8	1

^{*} Instrument deviances within a sample test. Example: 10 ppm Arsenic with a 2 ppm error has a concentration range of 8-12 ppm. 150 ppm Lead with a 20 ppm error has a concentration range of 130-170 ppm.

16. Booster Pump Water Pressure Calculations

Orchard Hills Planned Development (PD) - Resubmittal

Palm Investments North LLC
BY NORTH CASCADES ENGINEERING PLLC

Orchard Hills Fire Flow Calculation w/8" Connection at Booster Pump Station

By: North Cascades Engineering, PLLC Louis Sukovaty, PE

Date: 9/13/2022 J#2021-55

Pump Elevation=	1741 ft
Pump Suction Pressure=	3 psi
	6.9 ft
Fire Flow=	1000 gpm
Required Residual pressure at hydrants=	20 psi
	46 ft
Residential Flow=	72 gpm
Total Flow	1072 gpm
Available head from pump curve at total flow=	69 ft

Theoretical maximum elevation of hydrant at booster

Station (No piping, no dynamic losses)

1770.9 ft

Calculation of Maximum Elevation of Hydrants with pipe 8" pipe connected at booster station, not looped:

Dynamic head loss in 8" plastic pipe of varing equivelent lengths not looped:

	Equiv. Length	Flow	Head Loss	Head Loss
Head Loss	400 ft	1072 gpm	2.8 psi	6.44 ft
Head Loss	500 ft	1072 gpm	3.5 psi	8.05 ft
Head Loss	600 ft	1072 gpm	4.2 psi	9.66 ft
Head Loss	700 ft	1072 gpm	4.9 psi	11.27 ft
Head Loss	800 ft	1072 gpm	5.6 psi	12.88 ft
Head Loss	900 ft	1072 gpm	6.3 psi	14.49 ft
Head Loss	1000 ft	1072 gpm	7 psi	16.1 ft

Maximum elevations of hydrants at different equivalent pipe lengths from booster station (8" plastic pipe, not looped)

	Equiv. Length	
Hydrant pipe distance from booster station	400 ft	1764.46 ft
Hydrant pipe distance from booster station	500 ft	1762.85 ft
Hydrant pipe distance from booster station	600 ft	1761.24 ft
Hydrant pipe distance from booster station	700 ft	1759.63 ft
Hydrant pipe distance from booster station	800 ft	1758.02 ft
Hydrant pipe distance from booster station	900 ft	1756.41 ft
Hydrant pipe distance from booster station	1000 ft	1754.8 ft

Calculation of Maximum Elevation of Hydrants with pipe 8" pipe connected at booster station, looped:

Looped with connection at Harrison and booster station, Rough calculation based on 3000 ft of 8" equivalent pipe for alternate flow path.

	Equiv. Length	Approx. Flow	Dynamic Loss psi	Dynamic Loss ft
Flow path one	600 ft	761 gpm	2.26 psi	5.198 ft
Flow path two	3000 ft	311 gpm	2.26 psi	5.198 ft

Maximum elevation of hdyrant with looped system connected at Harrison and Booster Station:

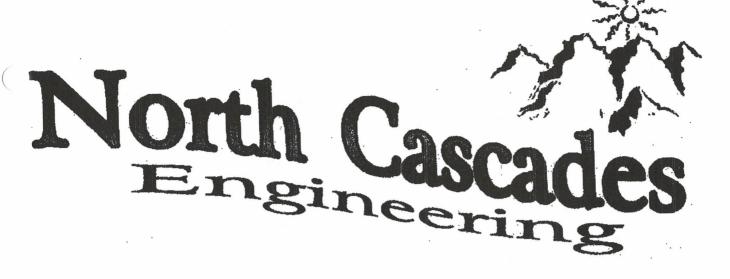
Max hydrant elevation=

1765.702

17. Preliminary Storm Water Design Report

Orchard Hills Planned Development (PD)

Palm Investments North LLC
BY NORTH CASCADES ENGINEERING PLLC



Preliminary Storm Water Design Report For: Orchard Hills Planned Development

PREPARED FOR:

Jerry and Julie Palm Winthrop, WA 98862



May 5, 2022 NCE J#2021-55

BY:
North Cascades Engineering, PLLC
Box 309
Winthrop, WA 98862
(509)741-9713

Louis Sukovaty, P.E.

Scope: The intent of this preliminary design is to analyze the "Orchard Hills Planned Development" site and determine a design strategy to accommodate storm flows and water quality treatment as required by relevant codes and standards.

Standards: Storm drainage design for the Orchard Hills Planned Development will adhere to the current additions of the Twisp Development Standards, Twisp Municipal Code and the Washington State Department of Ecology Storm Water Management Manual for Eastern Washington "Best Management Practices".

Site Location and Description: Located west of downtown Twisp this approximately 17ac site is accessed by Harrison Avenue. The site grade varies with the high point near the northwest corner and low areas located along the southeast and east property lines, elevation varies from 2020' to 2200'. This site is currently undeveloped with remnants of an old orchard lying at the center of the proposed development. Along the south side of the site, storm water from primarily off site flows are conveyed in an existing natural swale from west to east with the majority of the flow infiltrating prior to exiting site. Due to the highly infiltrative soils on site, it appears that the majority of the storm water flowing from the northwest and west portion of the site infiltrate prior to intersecting the east property line or entering the south swale.

Soils: In the locations of the planned development soils are primarily hydrological group A (highly infiltrative) per NRCS Soil Resources Report (see attached). To the west and northwest the site encounters some NRCS designate 343 soils with a designate hydrological group ranging from B to D. Very little of the development will impinge on the 343 soils and where it does it is anticipated water will be conveyed to locations with infiltrative soils. Soil tests to determine the actual soil infiltration rates should be a prerequisite of final design.

Primary Design Approach: Per the standards listed above the primary design considerations for this site are water quality and water quantity. For water quality the design storm runoff from all pollution producing surfaces will be treated with bio retention and/or bio infiltration. For water quantity, the highly infiltrative soil will be utilized to infiltrate the peak developed design volume with drywells while the 100yr storm will be infiltrated to the greatest extent feasible with any excess being routed through the storm drainage system to natural drainage locations. To allow the greatest constructability and phase ability of the project the drainage will be separated into road and frontage improvements and the individual buildout of the lots.

Road and Frontage improvements Water Quality: For the road and frontage improvements the water quality will be handled with Bio retention and/or Bio infiltration located parallel to the proposed Road and Frontage Improvements. Storm water from pollution generating surfaces will flow to these water quality facilities which will be sized to meet the water quality design storm, and located within drainage easements. After treatment, the water quality storm flows will be infiltrated.

Road and Frontage Improvements Water Quantity: For the road and frontage improvements the storm water quantity control, roadside ditches and culverts will convey the peak developed design flow to drywall's which will infiltrate the peak developed design volume. Thus, flows above the water quality design storm are proposed to overflow into drywells located within the infiltrative soil areas.

Lot Water Quality and Quantity: Each lot will provide its own onsite water quality treatment for pollution generating surfaces with bio retention and/or bio infiltration and will convey peak design flows, and provide drywells to infiltrate the peak developed design volume.

Example Drywell Details: See attached details for schematics of drywells that will meet the Town of Twisp's basic requirements.

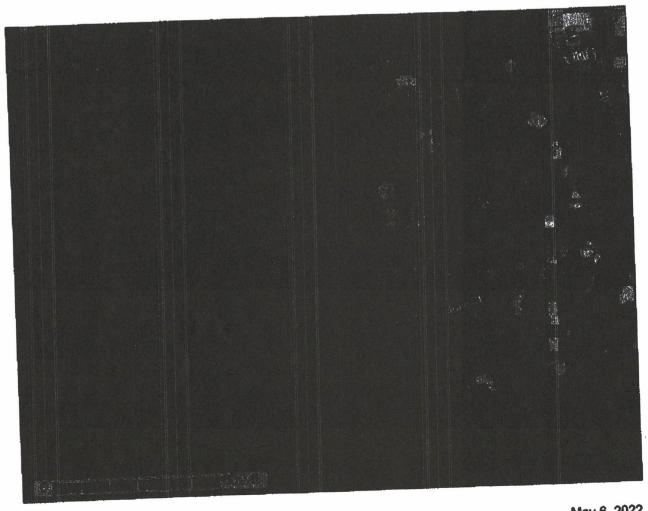


United States Department of Agriculture

Resources Conservation Service

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

Custom Soil Resource Report for **Okanogan County** Area, Washington



Preface

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

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

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

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

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

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

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

	_
Preface	. Z
***************************************	-
to the same transfer and the same transfer a	-
AL	
THE PARTY OF THE P	
And the same fine condu loam. I) to 3 Delicent Siupes	10
and the send to the pandy last of the pancent sides, walled the	
	17
427—Owhi gravelly ashy fine sandy loam, U to o percent stopes	
References	,

How Soil Surveys Are Made

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

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

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

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

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

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

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

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

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

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

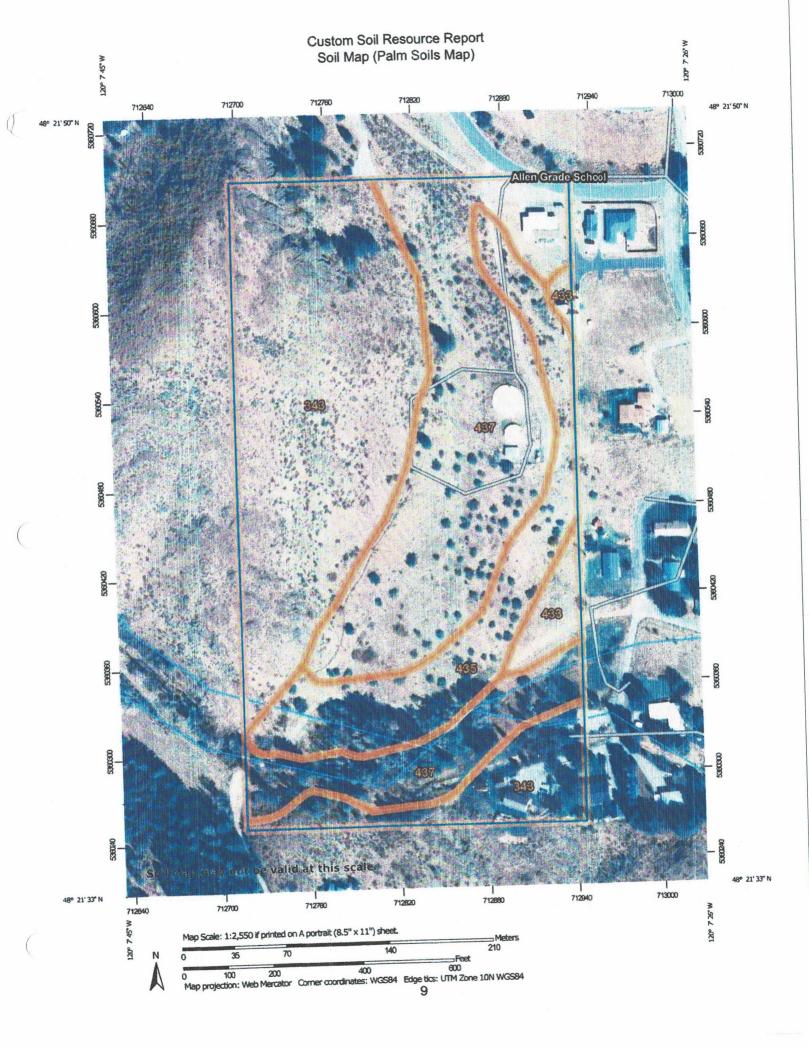
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree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

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

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

Soil Map

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



MAP LEGEND

Spoil Area Area of Interest (AOI) Area of Interest (AOI) Stony Spot **Very Stony Spot** Soils Soll Map Unit Polygons Wet Spot Soil Map Unit Lines Other Soil Map Unit Points Special Line Features **Special Point Features** Mater Feetures Blowout Streams and Canals Borrow Pit Transportation Clay Spot Interstate Highways **Closed Depression Gravel Pit US Routes Gravelly Spot** Major Roads TORNE Local Roads Landfill THE WAY Lava Flow Background **Aerial Photography** Marsh or swamp Mine or Quarry Miscellaneous Water Perennial Water Rock Outcrop Saline Spot Sandy Spot Severely Eroded Spot Sinkhole Slide or Slip Sodic Spot

MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Okanogan County Area, Washington Survey Area Data: Version 17, Aug 31, 2021

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

Date(s) aerial images were photographed: Jul 16, 2021—Oct 6, 2021

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

Map Unit Legend (Palm Soils Map)

	o statis pastojadnik tjetje je		
343	Lithic Haploxerepts-Newbon complex, 15 to 45 percent	10.4	42.0%
433	Owhi ashy fine sandy toam, 0 to 3 percent slopes	0,7	3.0%
435	Owhi ashy fine sandy loam, 0 to 25 percent slopes, extremely	3.9	15.7%
437	Owhi gravelly ashy fine sandy	9.8	39.3%
Totals for Area of Interest	loam, 0 to 8 percent slopes	24.8	100.0%

Map Unit Descriptions (Palm Soils Map)

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

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

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

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

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

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

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

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

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

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

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

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

Okanogan County Area, Washington

343—Lithic Haploxerepts-Newbon complex, 15 to 45 percent slopes

Map Unit Setting

National map unit symbol: 21rwq Elevation: 1,200 to 4,000 feet

Mean annual precipitation: 11 to 15 inches Mean annual air temperature: 47 to 52 degrees F

Frost-free period: 110 to 140 days

Farmland classification: Not prime farmland

Map Unit Composition

Lithic haploxerepts, range, and similar soils: 50 percent Newbon, extremely stony surface, and similar soils: 30 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lithic Haploxerepts, Range

Setting

Landform: Hills, mountains

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Upper third of mountainflank, center third

of mountainflank, mountaintop

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Volcanic ash or mixed volcanic ash (4 to 12 inches thick) over

colluvium and residuum

Typical profile

A - 0 to 3 inches: cobbly ashy sandy loam Bw - 3 to 12 inches: cobbly ashy sandy loam 2C - 12 to 18 inches: very gravelly sandy loam 2R - 18 to 22 Inches: unweathered bedrock

Properties and qualities

Slope: 15 to 45 percent

Depth to restrictive feature: 8 to 20 inches to lithic bedrock

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95

Depth to water table: More than 80 inches

Frequency of flooding: None Frequency of ponding: None

Available water supply, 0 to 60 inches: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: D

Ecological site: R008XY301WA - VERY SHALLOW 10-16 PZ

Description of Newbon, Extremely Stony Surface

Setting

Landform: Mountains, hills

Landform position (two-dimensional): Backslope, footslope

Landform position (three-dimensional): Mountainflank, mountainbase, side slope,

base slope

Down-slope shape: Convex Across-slope shape: Convex Parent material: Glacial till

Typical profile

A1 - 0 to 2 inches: gravelly loam A2 - 2 to 13 inches: gravelly loam Bw - 13 to 25 inches: gravelly loam C - 25 to 60 inches: very gravelly loam

Properties and qualities

Slope: 15 to 45 percent

Surface area covered with cobbles, stones or boulders: 9.0 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high

(0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 7.1 inches)

interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonimigated): 7e

Hydrologic Soil Group: B

Ecological site: R008XY102WA - Loamy 10-16 PZ

Hydric soll rating: No

Minor Components

Rock outcrop

Percent of map unit: 15 percent

Hydric soil rating: No

Kartar

Percent of map unit: 3 percent

Hydric soil rating: No

Conconully

Percent of map unit: 2 percent

433—Owhi ashy fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 21ry) Elevation: 1,000 to 3,600 feet

Mean annual precipitation: 11 to 15 inches Mean annual air temperature: 48 to 50 degrees F

Frost-free period: 110 to 140 days

Farmland classification: Prime farmland if irrigated

Map Unit Composition

Owhi and similar soils: 80 percent Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Owhi

Setting

Landform: Outwash terraces

Landform position (three-dimensional): Tread

Down-slope shape: Linear Across-slope shape: Linear

Parent material: Mixed volcanic ash (7 to 15 inches thick) over glacial outwash

Typical profile

A1 - 0 to 5 inches: ashy fine sandy loam A2 - 5 to 11 inches: ashy fine sandy loam 2Bw - 11 to 24 inches: gravelly sandy loam 2CB - 24 to 31 inches: very gravelly loamy sand 2C - 31 to 60 inches: extremely gravelly coarse sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: 12 to 26 inches to strongly contrasting textural

stratification

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95

to 19.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None Frequency of panding: None

Available water supply, 0 to 60 inches: Very low (about 2.0 inches)

interpretive groups

Land capability classification (irrigated): 4s Land capability classification (nonirrigated): 4s

Hydrologic Soil Group: A

Ecological site: R008XY201WA - DRY STONY 10-16 PZ

Minor Components

Conconully

Percent of map unit: 5 percent Hydric soil rating: No

Haley

Percent of map unit: 5 percent Hydric soil rating: No

Winthrop

Percent of map unit: 5 percent Hydric soil rating: No

Poque

Percent of map unit: 5 percent Hydric soil rating: No

435—Owhi ashy fine sandy loam, 0 to 25 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 21ryp Elevation: 1,000 to 4,000 feet

Mean annual precipitation: 11 to 15 inches

Mean annual air temperature: 48 to 50 degrees F

Frost-free period: 110 to 140 days

Farmland classification: Not prime farmland

Map Unit Composition

Owhi, extremely stony surface, and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Owhl, Extremely Stony Surface

Setting

Landform: Outwash terraces

Landform position (three-dimensional): Riser

Down-slope shape: Linear Across-slope shape: Linear

Parent material: Mixed volcanic ash (7 to 15 inches thick) over glacial outwash

Typical profile

A1 - 0 to 5 inches: ashy fine sandy loam A2 - 5 to 11 inches: ashy fine sandy loam 2Bw - 11 to 24 inches: gravelly sandy loam 2CB - 24 to 31 inches: very gravelly loamy sand 2C - 31 to 60 inches: extremely gravelly coarse sand

Properties and qualities

Slope: 0 to 25 percent

Surface area covered with cobbles, stones or boulders: 9.0 percent Depth to restrictive feature: 12 to 26 inches to strongly contrasting textural

stratification

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95

to 19.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None Frequency of ponding: None

Available water supply, 0 to 60 inches: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: A

Ecological site: R008XY201WA - DRY STONY 10-16 PZ

Hydric soil rating: No

Minor Components

Pogue

Percent of map unit: 10 percent

Hydric soil rating: No

Winthrop

Percent of map unit: 5 percent

Hydric soil rating: No

437—Owhi gravelly ashy fine sandy loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2dh2s Elevation: 1,000 to 4,000 feet

Mean annual precipitation: 11 to 15 inches Mean annual air temperature: 48 to 50 degrees F

Frost-free period: 110 to 140 days

Farmland classification: Prime farmland if irrigated

Map Unit Composition

Owhi and similar soils: 80 percent Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Owhi

Setting

Landform: Outwash terraces

Landform position (three-dimensional): Tread

Down-slope shape: Linear Across-slope shape: Linear

Parent material: Mixed volcanic ash (7 to 15 inches thick) over glacial outwash

Typical profile

A1 - 0 to 5 inches: gravelly ashy fine sandy loam

A2 - 5 to 11 inches: ashy fine sandy loam 2Bw - 11 to 24 inches: gravelly sandy loam 2CB - 24 to 31 inches: very gravelly loamy sand 2C - 31 to 60 inches: extremely gravelly coarse sand

Properties and qualities

Slope: 0 to 8 percent

Depth to restrictive feature: 12 to 26 inches to strongly contrasting textural

stratification

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95

to 19.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None Frequency of ponding: None

Available water supply, 0 to 60 inches: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): 4s Land capability classification (nonlirigated): 4s

Hydrologic Soil Group: A

Ecological site: R008XY201WA - DRY STONY 10-16 PZ

Hydric soil rating: No

Minor Components

Poque

Percent of map unit: 10 percent

Hydric soil rating: No

Unnamed

Percent of map unit: 10 percent

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service.
U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware, U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

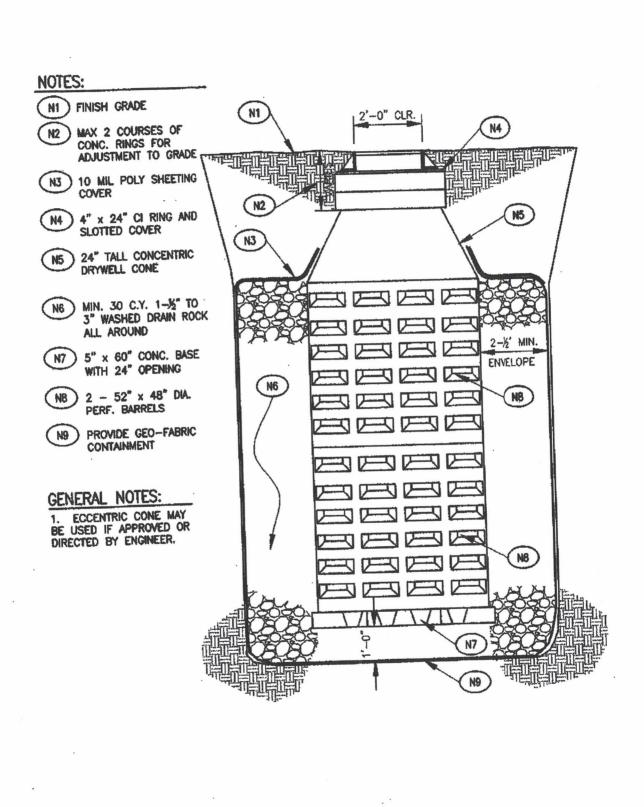
United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

Custom Soil Resource Report

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf



TOWN OF TWISP, WA STANDARD DETAILS EXTRA DEPTH DRYWELL 602

1	5/14/2019	Town
		of Twisp
SION #	DATE	Iwish

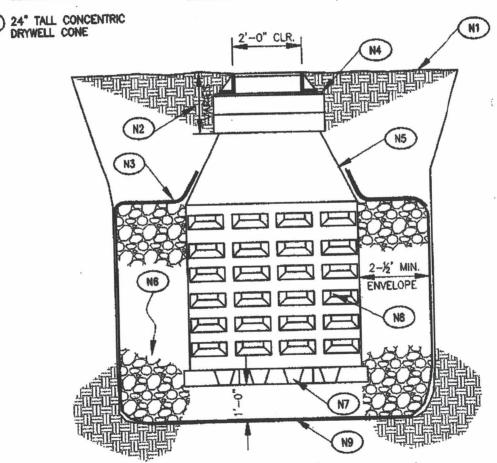
REV

NOTES:

- FINISH GRADE
- MAX 2 COURSES OF CONC. RINGS FOR ADJUSTMENT TO GRADE
- N3 10 MIL POLY SHEETING COVER
- $4^{\prime\prime}$ x 24" CI RING AND SLOTTED COVER
- MIN. 15 C.Y. 1-1/2" TO 3" WASHED DRAIN ROCK ALL AROUND
- $5^{\circ\prime}$ x $60^{\circ\prime}$ CONC. BASE WITH 24" OPENING
- 52" x 48" DIA. PERF. BARRELS N8
- PROVIDE GEO-FABRIC CONTAINMENT

GENERAL NOTES:

ECCENTRIC CONE MAY BE USED IF APPROVED OR DIRECTED BY ENGINEER.



TOWN OF TWISP, WA STANDARD DETAILS STANDARD DRYWELL

501

5/14/2019 DATE REVISION

Town of Twisp

18. Easement Letters of Intent

Orchard Hills Planned Development (PD)

Palm Investments North LLC
BY NORTH CASCADES ENGINEERING PLLC

Andrew Wyatt 206.890.8190 andydwyatt@gmail.com

Jerry Palm Palm Investments North, LLC 509.322.3032 palmci1@gmail.com

Jerry,

I am writing in response to your interest in creating north access for the Orchard Hills Planned Development (OHPD), parcel 3322180099, Town of Twisp file ID# PD22-02.

You asked for an easement to cut a road from the northern edge of OHPD, trending northeast to the Town of Twisp's water tower easement and then north to Isabella Lane.

This new road would impact parcel 8833700404, owned by myself and Katherine Wyatt, and may affect parcel 8833700403, owned by Mark Frederick and Zuzana Kovalova.

The purpose for this north access is for OHPD to meet international fire codes, which say a planned development as large as OHPD will require two access roads.

This Letter of Intent states our openness to the proposal, with some considerations.

We would like to review the engineering for the road. It is possible the road will be for emergency use only. We would like to work with you and Frederick/Kovalova to vacate an existing road and utilities easement across our property, one that provides access to the Frederick/Kovalova parcel. We would like water and power pulled from OHPD down to Isabella Lane, to create a loop in the water system and provide an access point for our parcel.

Depending on what engineering finds, we may have additional considerations.

Moving forward, please work directly with our representative, Tim Matsui, for all related matters. Tim is authorized to make any decisions related to my parcel.

Tim Matsui 206.409.3069 tim.matsui@gmail.com

I do not need to be cc'd on any correspondence nor contacted directly.

Thank you,

Andrew Wyatt

19. Property Owners within 300ft List

Orchard Hills Planned Development (PD) - Resubmittal

Palm Investments North LLC
BY NORTH CASCADES ENGINEERING PLLC

Property within 300 ft of Orchard Hills PD

Carol & Clifford Wisman Po Box 306 Carlton, Wa 98814 100 Florence Lane

Timothy Matsui & Jessica Kutma 1752 NW Market Street #1635 Seattle, Wa 98107 102 Florence Lane

Alison Talbot & Jeffery McDonald PO Box 36 Winthrop, Wa 98862 103 Florence Lane

Rudolph & Katrina Miniutti 3648 Old Pacific Hwy South Kelso, Wa 98626 104 Florence Lane

Roger & Anna Stull 14 Renwick Drive Crossville, TN 38558 105 Florence Lane

Ben Sabold & Nimmi Chadwaney Po Box 338 Twisp, Wa 98856 405 May Street, Lot 1&3 Reid Short Plat

Scott Domergue PO Box 935 Twisp, Wa 98856 501 June Street

Marcia Butchart PO Box 886 Twisp, Wa 98856 515 June Street Mike and Soo Ing-Moody PO Box 534 Twisp, Wa 98856 622 Moody Lane

Stephen & Jill Alexander, Trust PO Box 1126 Twisp, Wa 98856 401 Harrison Street

Russ and Laura Thomas PO Box 833 Twisp, Wa 98856 410 Harrison Street

Howard & Jeanne Day PO Box 524 Twisp, Wa 98856 415 Harrison Street

Bill & Suellen White PO Box 975 Twisp, Wa 98856 40 Lookout Mountain Road

Mark Fredrick and Zuzana Kovalova PO Box 1358 Twisp, Wa 98856

Andrew and Katherine Wyatt 9766 East Leavenworth Road Leavenworth, Wa 98826

Town of Twisp PO box 278 Twisp, Wa 98856

Gavin Trust PO Box 381 Twisp, Wa 98856 455 Marie Street

Jami Schneider 146 Elbow Canyon Road Twisp, Wa 98856 514 June Street Janelle Delfino 2970 Hwy 153 Twisp, Wa 98856 10 Isabella Lane

Irvine Revocable Living Trust c/o Barbara Irvine PO box 355 Twisp, Wa 98856

Possibly more than 300ft away

Howard & Pearl Cherrington PO Box 681 Twisp, Wa 98856 Lot 4 Isabella

Catte Hubbard PO Box 1929 New London, NH 03257 Lot 3 Isabella

Joseph & Jennifer Walls 22 Palomino Drive Winthrop, Wa 98862 106 Florence Lane

Douglas & Mindy Irvine PO Box 122 Twisp, Wa 98856 612 June Street

Larry & Barara Schaber PO Box 605 Twisp, Wa 98856 618 June Street Daughters Legacy LLC PO Box 218 Twisp, Wa 98856 2 Isabella Lane

Wayne & Joni Stevie PO Box 122 Twisp, Wa 98856 515 May Street

Marie Tracy 33 Elmer Road Twisp, Wa 98856 8 Isabella Lane

Quon-Kemna Trust 1711 NE Naomi Place Seattle, Wa 98115 6 Isabella Lane

Marilyn Bardin PO Box 1298 Twisp, Wa 98856 509 May Street

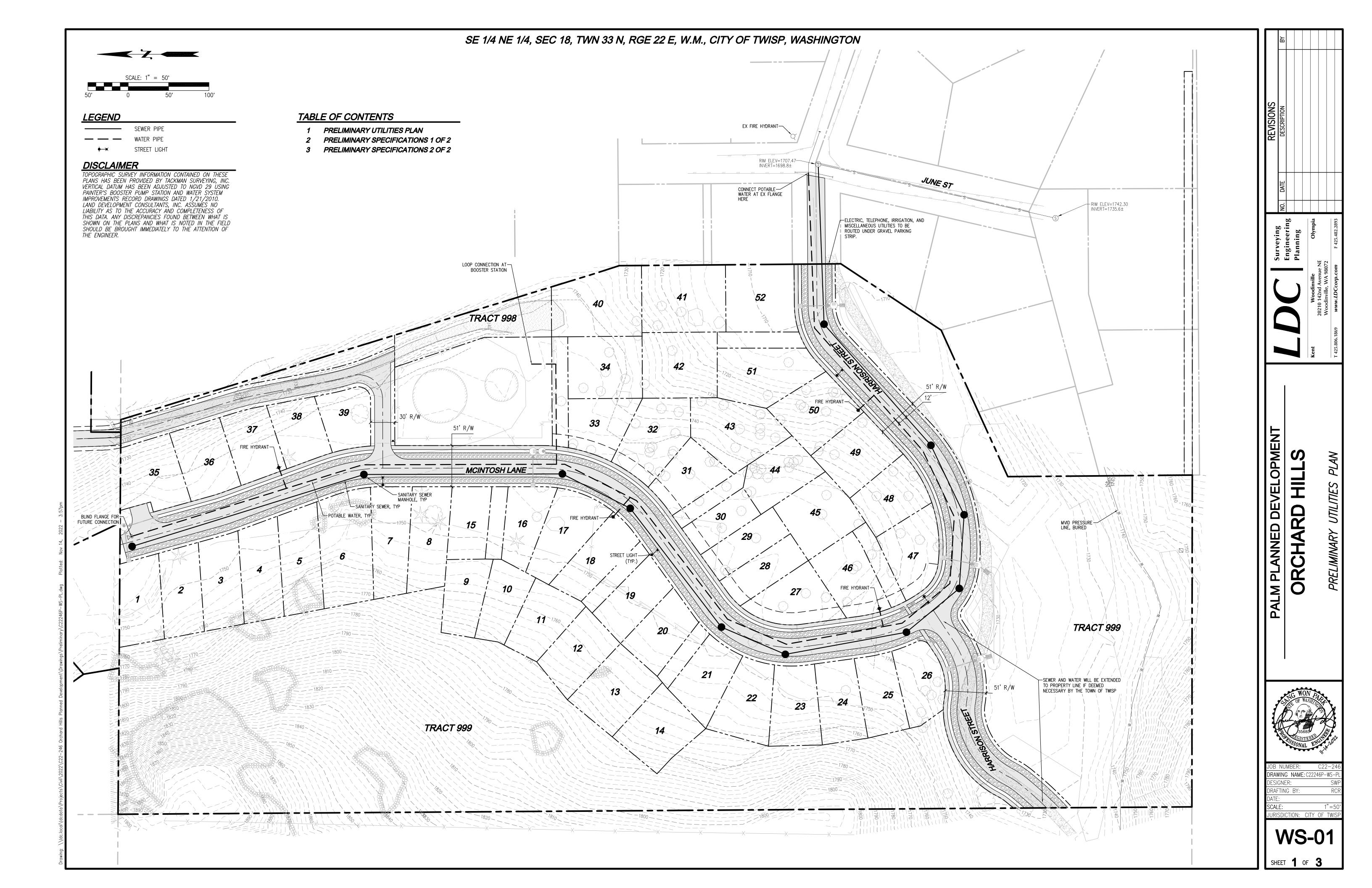
William & Sandy Moody PO Box 262 Twisp, Wa 98856 620 Moody Lane

Alan and Lois Caswell PO Box 54 Twisp, Wa 98856 13 Isabella Lane

William Bates PO Box 891 Twisp, Wa 98856 9 Isabella Lane

Arthur Tasker and Barbara Gohl PO Box 444 Twisp, Wa 98856 7 Isabella Lane Kenneth and Virginia Borg PO Box 1235 Twisp, Wa 98856 5 Isabella Lane

Ellen Aagaard 5322 NE 67th Street Seattle, Wa 98115 1 Isabella Lane



TWISP WATER SYSTEM STANDARDS

4. ALL UTILITY EASEMENTS AND APPLICABLE COUNTY RECORDING NUMBER.

THE STANDARDS ESTABLISHED BY THESE DEVELOPMENT STANDARDS ARE INTENDED TO REPRESENT THE MINIMUM STANDARDS FOR THE DESIGN AND CONSTRUCTION OF WATER SYSTEM FACILITIES. GREATER OR LESSER REQUIREMENTS MAY BE MANDATED BY THE TOWN DUE TO LOCALIZED CONDITIONS. OTHER APPLICABLE STANDARDS THAT ARE REFERENCED WITHIN THESE DEVELOPMENT STANDARDS WILL ALSO BE USED AS DESIGN AND CONSTRUCTION STANDARDS. EXTENSIONS. CONNECTIONS OR MODIFICATIONS TO THE EXISTING SYSTEM SHALL BE IN COMPLIANCE WITH THE STATE DEPARTMENT OF HEALTH REQUIREMENTS.

6.02 DESIGN STANDARDS

- A. THESE DESIGN STANDARDS APPLY TO ANY SYSTEM CONNECTED TO THE TOWN'S SYSTEM, WHETHER INSIDE OF THE MUNICIPAL LIMITS OR NOT.
- B. DETAILED PLANS SHALL BE SUBMITTED FOR THE TOWN'S REVIEW WHICH PROVIDES THE LOCATIONS, SIZE, AND TYPE OF THE PROPOSED WATER SYSTEM AND POINTS OF CONNECTION. THESE PLANS SHALL BE SEPARATE FROM SEWER PLANS.
- C. PROJECT PLANS SHALL HAVE A HORIZONTAL SCALE 20 FEET TO THE INCH AND A VERTICAL SCALE OF NOT MORE THAN 5 FEET TO THE INCH. PLANS SHALL SHOW:
- LOCATIONS OF STREETS, RIGHTS-OF-WAY, EXISTING UTILITIES AND WATER SYSTEM FACILITIES;
- GROUND SURFACE, PIPE TYPE AND SIZE, AND WATER VALVES AND HYDRANTS STATIONING; ALL KNOWN EXISTING STRUCTURES, BOTH ABOVE AND BELOW GROUND, WHICH MIGHT INTERFERE WITH THE PROPOSED CONSTRUCTION, PARTICULARLY SEWER LINES, GAS MAINS, STORM DRAINS, OVERHEAD AND UNDERGROUND POWER AND ALL UNDERGROUND STRUCTURES, TELEPHONE LINES AND TELEVISION
- D. COMPUTATIONS AND OTHER DATA USED FOR DESIGN OF THE WATER SYSTEM SHALL BE SUBMITTED TO THE TOWN FOR APPROVAL.

MATERIAL AND INSTALLATION SPECIFICATIONS SHALL CONTAIN APPROPRIATE REQUIREMENTS THAT HAVE BEEN ESTABLISHED BY THE INDUSTRY IN ITS IECHNICAL PUBLICATIONS, SUCH AS ASTM, AWWA, WPCF, AND APWA STANDARDS. REQUIREMENTS SHALL BE SET FORTH IN THE PLANS FOR THE PIPE AND METHODS OF BEDDING AND BACKFILLING SO AS NOT TO DAMAGE THE PIPE OR ITS JOINTS. THE LOCATION OF THE WATER MAINS, VALVES, HYDRANTS, AND PRINCIPAL FITTINGS INCLUDING MODIFICATIONS SHALL BE STAKED BY THE OWNER. NO DEVIATION SHALL BE MADE FROM THE REQUIRED LINE OR GRADE. THE OWNER SHALL VERIFY AND PROTECT ALL UNDERGROUND AND SURFACE UTILITIES ENCOUNTERED DURING THE PROGRESS OF THIS WORK. PRIOR TO FINAL INSPECTION, ALL PIPELINES SHALL BE TESTED AND DISINFECTED IN CONFORMANCE WITH AWWA OR STANDARD SPECIFICATIONS.

BEFORE ACCEPTANCE OF THE WATER SYSTEM BY THE TOWN, ALL PIPES, ASSEMBLIES, AND OTHER APPURTENANCES SHALL BE CLEANED OF ALL DEBRIS AND FOREIGN MATERIAL. AFTER ALL OTHER WORK IS COMPLETED AND BEFORE FINAL ACCEPTANCE, THE ENTIRE ROADWAY, INCLUDING THE ROADBED, PLANTING, SIDEWALK AREAS, SHOULDERS, DRIVEWAYS, ALLEY AND SIDE STREET APPROACHES, SLOPES, DITCHES, UTILITY TRENCHES, AND CONSTRUCTION AREAS SHALL BE NEATLY FINISHED TO THE LINES, GRADES AND CROSS SECTIONS FOR A NEW ROADWAY CONSISTENT WITH THE ORIGINAL SECTION

THE OWNER SHALL BE REQUIRED, UPON COMPLETION OF THE WORK AND PRIOR TO ACCEPTANCE BY THE TOWN, TO FURNISH THE TOWN WITH A WRITTEN GUARANTEE (MAINTENANCE BOND) COVERING ALL MATERIAL AND WORKMANSHIP FOR A PERIOD OF TWO YEARS AFTER THE DATE OF FINAL ACCEPTANCE AND SHALL MAKE ALL NECESSARY REPAIRS DURING THAT PERIOD AT THEIR OWN EXPENSE, IF SUCH REPAIRS ARE NECESSITATED AS THE RESULT OF FURNISHING POOR MATERIALS AND/OR WORKMANSHIP. THE OWNER SHALL OBTAIN WARRANTIES FROM THE CONTRACTORS, SUBCONTRACTORS AND SUPPLIERS OF MATERIAL OR EQUIPMENT WHERE SUCH WARRANTIES ARE REQUIRED AND SHALL DELIVER COPIES TO THE TOWN UPON COMPLETION OF THE WORK.

6.03 GENERAL REQUIREMENTS

- A. PRIOR TO CONSTRUCTION, THE OWNER SHALL NOTIFY THE TOWN FOR A PRE-CONSTRUCTION MEETING.
- WORK SHALL BE PERFORMED ONLY BY CONTRACTORS EXPERIENCED IN LAYING PUBLIC WATER MAINS.
- C. THE OWNER SHALL FOLLOW THE SCHEDULE PRESENTED AT THE PRE—CONSTRUCTION MEETING.
- D. THE OWNER SHALL OBTAIN APPROVAL OF MATERIALS TO BE USED FROM THE PUBLIC WORKS DIRECTOR PRIOR TO ORDERING OF MATERIALS.

E. WATER MAINS SHALL BE LAID ONLY IN DEDICATED STREETS OR IN EASEMENTS WHICH HAVE BEEN GRANTED TO THE TOWN. A STREET IS NORMALLY NOT CONSIDERED DEDICATED UNTIL THE PLAT WHICH CREATED IT HAS BEEN OFFICIALLY FILED WITH THE COUNTY AUDITOR.

ALL WATER MAIN DISTRIBUTION PIPELINE CONSTRUCTION SHALL HAVE A MINIMUM 60-INCH COVER FROM FINISHED GRADE AND 60-INCH COVER OVER TRANSMISSION MAINS. WATER MAINS SHALL BE EXTENDED TO THE FAR PROPERTY LINE(S) OF THE PROPERTY BEING SERVED. OFF-SITE EXTENSIONS ARE REQUIRED TO HYDRAULICALLY LOOP EXISTING AND NEW SYSTEMS.

G. THE TOWN REQUIRES MINIMUM PIPE SIZES OF 8-INCH IN RESIDENTIAL ZONES, 10-INCH IN COMMERCIAL ZONES, AND 12-INCH IN INDUSTRIAL ZONES UNLESS A LARGER SIZE IS DETERMINED TO BE REQUIRED BY THE TOWN.

H. EVERY CROSS SHALL HAVE NO LESS THAN FOUR VALVES, EVERY TEE SHALL HAVE NO LESS THAN THREE VALVES. AN IN-LINE VALVE SHALL BE INSTALLED ON RUNS OF PIPE EVERY 400 FEET. UNLESS OTHERWISE APPROVED OR REQUIRED BY THE PUBLIC WORKS DIRECTOR, THE WATER MAIN SHALL BE DUCTILE IRON PIPE OR C900/C905 PVC AS SHOWN BELOW. THE MINIMUM SIZE FOR ALL WATER LINES SHALL BE 8 INCHES, EXCEPT FOR PIPES CONNECTING HYDRANTS LESS THAN 60' LONG.

PIPE DIAMETER CLASS

"THROUGH 14" CLASS 52 CLASS 150 16" AND LARGER CLASS 50 CLASS 150

EXCEPTION: 6-INCH HYDRANT SPOOLS AND PIPELINES LOCATED BENEATH ROCK OR RETAINING WALLS SHALL BE DI. 53.

E. PIPES CONNECTING HYDRANTS TO MAINS SHALL BE 6 INCH IN DIAMETER OR LARGER AND NOT LONGER THAN 60'. 60 PLUS FEET REQUIRES 8 INCH OR

PERMANENT DEAD-END LINES ARE NOT PERMITTED. WATER MAINS ON CUL-DE-SACS SHALL EXTEND TO THE PLAT LINE BEYOND THE CUL-DE-SAC TO NEIGHBORING PROPERTY FOR A CONVENIENT FUTURE CONNECTION, AND HAVE A 2-INCH BLOW OFF ASSEMBLY INSTALLED AT THE TERMINATION POINT. ALL LINES SHALL BE CAPABLE OF BEING LOOPED UPON FULL DEVELOPMENT.

- G. ALL MATERIALS SHALL BE NEW, UNDAMAGED AND FREE FROM ANY DEBRIS.
- ALL FITTINGS SHALL BE CEMENT-LINED DUCTILE IRON.

PROVIDE BENDS IN FIELD TO SUIT CONSTRUCTION AND IN ACCORDANCE WITH PIPE MANUFACTURER'S RECOMMENDATIONS SO AS NOT TO EXCEED ALLOWABLE DEFLECTION AT PIPE JOINTS.

- J. PROVIDE THRUST BLOCKING AT ALL FITTINGS AND BENDS AS DESIGNED BY OWNER'S ENGINEER AND APPROVED BY THE PUBLIC WORKS DIRECTOR.
- K. PROVIDE ANCHOR BLOCKING AT ALL UP-THRUST VERTICAL BENDS AS DESIGNED BY OWNER'S ENGINEER AND APPROVED BY THE PUBLIC WORKS DIRECTOR.
- ALL VALVE MARKER POSTS SHALL BE PAINTED YELLOW AND MARKED WITH THE DISTANCE TO VALVE BEING REFERENCED.
- M. RESIDENTIAL WATER SERVICE PIPE SHALL BE ONE—INCH CTS POLY WITH NO JOINTS.
- COMMERCIAL SERVICE LINES BETWEEN THE WATER MAIN AND THE WATER METER SHALL BE SIZED APPROPRIATELY.
- ALL WATER SERVICES SHALL END WITHIN ROAD RIGHTS-OF-WAY OR EASEMENTS, EXCEPT WHEN OTHERWISE APPROVED BY THE PUBLIC WORKS DIRECTOR. ALL WATER SERVICES SHALL BE INSTALLED BY THE TOWN, UNLESS APPROVED BY THE PUBLIC WORKS DIRECTOR. ALL COSTS ASSOCIATED WITH THIS WORK SHALL BE PAID FOR BY THE OWNER. Q. ONE SAMPLING STATION IS REQUIRED FOR A DEVELOPMENT IN SIZE OF 5 TO 20 LOTS. ONE ADDITIONAL STATION IS REQUIRED FOR EACH ADDITIONAL 50
- R. ALL NEW SERVICE CONNECTIONS SHALL COMPLY WITH TMC CHAPTER 13.07 REGARDING CROSS CONNECTION CONTROL.

CUT IN CONNECTIONS SHALL NOT BE MADE ON FRIDAYS, HOLIDAYS OR WEEKENDS. ALL TAPPING SLEEVES AND TAPPING VALVES SHALL BE PRESSURE TESTED PRIOR TO MAKING CONNECTION TO EXISTING MAINS. TAPS ARE TO BE MADE BY TOWN PERSONNEL (FEE IS REQUIRED).

- OWNER SHALL REQUEST THE PUBLIC WORKS DIRECTOR APPROVAL PRIOR TO ANY WATER SHUT-OFF OR TURN-ON, AFFECTING THE WATER SYSTEM, A MINIMUM OF 3 WORKING DAYS IN ADVANCE. THE PUBLIC WORKS DEPARTMENT SHALL OPERATE ALL VALVES IN EXISTING SERVICE MAINS.
- 6.04 MATERIALS & INSPECTIONS

LOTS OR PORTIONS THEREOF.

A. INSPECTIONS

THE OWNER SHALL REQUEST FOR INSPECTION A MINIMUM OF 3 WORKING DAYS IN WRITING PRIOR TO THE CONTRACTOR'S SCHEDULED NEED. INSPECTION SHALL BE REQUIRED FOR THE FOLLOWING ITEMS OF WORK:

- PIPE AND BEDDING INSTALLATION; BACKFILL AND COMPACTION:
- PRESSURE TESTING.
- B. WATER MAINS & FITTINGS
- WATER MAINS TO BE INSTALLED UNLESS OTHERWISE APPROVED (OR REQUIRED) IN WRITING BY THE TOWN ENGINEER SHALL BE EITHER DUCTILE IRON OR C900 OR C905 PVC PIPE. 1. DUCTILE IRON SHALL BE:
- THE DUCTILE IRON PIPE SHALL CONFORM TO STANDARD SPECIFICATIONS OR ANSI/AWWA C151/A21.51-91 STANDARDS, AND CURRENT AMENDMENTS THERETO, EXCEPT THE DUCTILE IRON PIPE SHALL BE THICKNESS CLASS 52 FOR 4" THROUGH 14" DIAMETER PIPE (EXCEPT FOR 6-INCH HYDRANT SPOOLS WHICH SHALL BE CLASS 53) AND CLASS 50 FOR 16" AND LARGER. GRADE OF IRON SHALL BE A MINIMUM OF 60-42-10. THE PIPE SHALL BE CEMENT LINED TO A MINIMUM THICKNESS OF 1/16", AND THE EXTERIOR SHALL BE COATED WITH AN ASPHALTIC COATING. EACH LENGTH SHALL BE PLAINLY MARKED WITH THE MANUFACTURER'S IDENTIFICATION, YEAR CASE, THICKNESS, CLASS OF PIPE AND WEIGHT.
- PVC PIPE SHALL CONFORM TO AWWA C900 OR C905, CLASS 150, CAPABLE OF CONNECTING TO DUCTILE IRON FITTINGS. ALL FITTINGS SHALL BE DUCTILE

TYPE OF JOINT SHALL BE MECHANICAL JOINT OR PUSH-ON TYPE, EMPLOYING A SINGLE GASKET, SUCH AS "TYTON", EXCEPT WHERE OTHERWISE CALLING FOR FLANGED ENDS. BOLTS FURNISHED FOR MECHANICAL JOINT PIPE AND FITTINGS SHALL BE HIGH STRENGTH DUCTILE IRON, WITH A MINIMUM TENSILE STRENGTH OF 50,000 PSI.

SE 1/4 NE 1/4, SEC 18, TWN 33 N, RGE 22 E, W.M., CITY OF TWISP, WASHINGTON

4. RESTRAINED JOINT PIPE, WHERE SHOWN ON THE PLANS SHALL BE PUSH-ON JOINT PIPE WITH "FAST TIGHT" GASKETS AS FURNISHED BY U.S. PIPE OR EQUAL FOR 12" DIAMETER AND SMALLER PIPE AND "TR FLEX" AS FURNISHED BY U.S. PIPE OR EQUAL FOR 16" AND 24" DIAMETER PIPES. THE RESTRAINED JOINT PIPE SHALL MEET ALL OTHER REQUIREMENTS OF THE NON-RESTRAINED PIPE.

ALL PIPE SHALL BE JOINTED BY THE MANUFACTURER'S STANDARD COUPLING. BE ALL OF ONE MANUFACTURER, BE CAREFULLY INSTALLED IN COMPLETE COMPLIANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

6. JOINTS SHALL BE "MADE UP" IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, STANDARD JOINT MATERIALS, INCLUDING RUBBER RING GASKETS, SHALL BE FURNISHED WITH THE PIPE. MATERIAL SHALL BE SUITABLE FOR THE SPECIFIED PIPE SIZE AND PRESSURES.

7. ALL FITTINGS SHALL BE SHORT-BODIED, DUCTILE IRON COMPLYING WITH APPLICABLE STANDARD SPECIFICATIONS OR ANSI/AWWA C110 OR C153 STANDARDS FOR 350 PSI PRESSURE RATING FOR MECHANICAL JOINT FITTINGS AND 250 PSI PRESSURE RATING FOR FLANGED FITTINGS. ALL FITTINGS SHALL BE CEMENT LINED AND EITHER MECHANICAL JOINT OR FLANGED, AS INDICATED ON THE PLANS.

FITTINGS IN AREAS SHOWN ON THE PLANS FOR RESTRAINED JOINTS SHALL BE MECHANICAL JOINT FITTINGS WITH A MECHANICAL JOINT RESTRAINT DEVICE. THE MECHANICAL JOINT RESTRAINT DEVICE SHALL HAVE A WORKING PRESSURE OF AT LEAST 250 PSI WITH A MINIMUM SAFETY FACTOR OF 2:1 AND SHALL BE ROMAC "GRIP RING" (RETAINER GLANDS) OR TOWN APPROVED EQUAL.

9. ALL COUPLINGS SHALL BE DUCTILE IRON MECHANICAL JOINT SLEEVES.

10. THE PIPE AND FITTINGS SHALL BE INSPECTED FOR DEFECTS BEFORE INSTALLATION. ALL LUMPS, BLISTERS AND EXCESS COAL TAR COATING SHALL BE REMOVED FROM THE BELL AND SPIGOT END OF EACH PIPE, AND THE OUTSIDE OF THE SPIGOT AND THE INSIDE OF THE BELL SHALL BE WIRE- BRUSHED AND WIPED CLEAN AND DRY, AND FREE FROM OIL AND GREASE BEFORE THE PIPE IS LAID. ANY DAMAGE TO THE INTERIOR LINING CAUSED BY CUTTING OR OTHER MEANS MUST BE REPAIRED PRIOR TO INSTALLATION.

11. EVERY PRECAUTION SHALL BE TAKEN TO PREVENT FOREIGN MATERIAL FROM ENTERING THE PIPE WHILE IT IS BEING PLACED IN THE LINE. AFTER PLACING A LENGTH OF PIPE IN THE TRENCH, THE SPIGOT END SHALL BE CENTERED IN THE BELL AND PIPE FORCED HOME AND BROUGHT TO CORRECT LINE AND GRADE THE PIPE SHALL BE SECURED IN PLACE WITH SELECT BACKFILL TAMPED UNDER IT. PRECAUTION SHALL BE TAKEN TO PREVENT DIRT FROM ENTERING THE JOINT SPACE. AT TIMES WHEN PIPE LAYING IS NOT IN PROGRESS, THE OPEN ENDS OF PIPE SHALL BE CLOSED BY A WATERTIGHT PLUG. IF WATER IS IN THE TRENCH WHEN WORK RESUMES, THE SEAL SHALL REMAIN IN PLACE UNTIL THE TRENCH IS PUMPED COMPLETELY DRY. NO PIPE SHALL BE LAID IN WATER OR WHEN TRENCH CONDITIONS ARE UNSUITABLE.

13. THE CUTTING OF PIPE FOR INSERTING FITTINGS OR CLOSURE PIECES SHALL BE DONE IN A NEAT AND WORKMANLIKE MANNER, WITHOUT DAMAGE TO THE PIPE OR CEMENT LINING, AND SO AS TO LEAVE A SMOOTH END AT RIGHT ANGLES TO THE AXIS OF THE PIPE. PIPE SHALL BE LAID WITH BELL ENDS FACING IN THE DIRECTION OF THE LAYING, UNLESS DIRECTED OTHERWISE BY THE TOWN. WHEREVER IT IS NECESSARY TO DEFLECT PIPE FROM A STRAIGHT LINE, THE AMOUNT OF DEFLECTION ALLOWED SHALL NOT EXCEED PIPE MANUFACTURER'S RECOMMENDATIONS.

14. FOR CONNECTION OF MECHANICAL JOINTS. THE SOCKET, PLAIN END OF EACH PIPE AND GASKET SHALL BE CLEANED OF DIRT BEFORE JOINTING, AND SHALL BE JOINTED ACCORDING TO MANUFACTURER'S DIRECTIONS. BOLTS SHALL BE TIGHTENED ALTERNATELY AT TOP, BOTTOM AND SIDES, SO PRESSURE ON GASKET IS EVEN.

15. FOR CONNECTION OF "TYTON" JOINTS, THE JOINTING SHALL BE DONE ACCORDING TO MANUFACTURER'S RECOMMENDATIONS, WITH SPECIAL CARE USED IN CLEANING GASKET SEAT TO PREVENT ANY DIRT OR SAND FROM GETTING BETWEEN THE GASKET AND PIPE. LUBRICANT TO BE USED ON THE GASKET SHALL BE NON-TOXIC AND FREE FROM CONTAMINATION. WHEN A PIPE LENGTH IS CUT, THE OUTER EDGE OF THE CUT SHALL BE BEVELED WITH A FILE TO PREVENT INJURY TO THE GASKET DURING JOINTING.

16. VALVES, FITTINGS, PLUGS AND CAPS SHALL BE SET AND JOINTED TO PIPE IN THE MANNER AS REQUIRED. ALL DEAD ENDS ON NEW MAINS SHALL BE CLOSED WITH DEAD END M.J. PLUGS.

17. FITTINGS SHALL BE "BLOCKED" WITH POURED-IN-PLACE CONCRETE, WITH A FIRM MINIMUM BEARING AGAINST AN UNDISTURBED EARTH WALL. TIMBER BLOCKING AND PRECAST CONCRETE BLOCKS SHALL NOT BE PERMITTED. THRUST BLOCKS SHALL BE POURED AS SOON AS POSSIBLE AFTER SETTING THE FITTINGS IN PLACE TO ALLOW THE CONCRETE TO "SET" BEFORE APPLYING THE PRESSURE TEST. THE CONCRETE THRUST BLOCKS SHALL BE IN PLACE BEFORE BEGINNING THE PRESSURE TEST. ANCHOR BLOCKS SHALL BE ALLOWED TO SET SUFFICIENTLY TO DEVELOP THE NECESSARY BOND STRENGTH BETWEEN THE REINFORCING RODS AND THE CONCRETE ANCHOR BEFORE BEGINNING THE PRESSURE TEST

18. ALL OF THE NEW PIPING, VALVES AND BLOCKING SHALL HAVE BEEN INSTALLED, DISINFECTED AND TESTED UP TO THE POINT OF CUTTING INTO EXISTING LINES BEFORE THE CROSSOVER IS MADE. THE CROSSOVER TO THE EXISTING SYSTEM SHALL BE IN FULL READINESS, INCLUDING THE CUT AND SIZED SPECIALS. THE TOWN SHALL BE GIVEN 3 WORKING DAYS' NOTICE IN ADVANCE OF THE PLANNED "CUT—INS". ALL SLEEVES SHALL BE DUCTILE IRON.

ALL VALVES 12" AND SMALLER SHALL BE RESILIENT SEAT GATE VALVES.

RESILIENT-SEATED GATE VALVES

ALL GATE VALVES 12"AND SMALLER SHALL CONFORM TO STANDARD SPECIFICATIONS OR ANSI/AWWA C509-87 STANDARDS FOR RESILIENT-SEATED, HIGH STRENGTH, BRONZE STEMMED GATE VALVES. THE VALVES SHALL BE IRON-BODIED, IRON DISK COMPLETELY ENCAPSULATED WITH POLYURETHANE RUBBER AND BRONZE, NON-RISING STEM WITH "O" RING SEALS. THE POLYURETHANE SEALING RUBBER SHALL BE FUSION BONDED TO THE WEDGE TO MEET ASTM TESTS FOR RUBBER TO METAL BOND ASTM D429. THE VALVES SHALL OPEN COUNTER— CLOCKWISE AND BE FURNISHED WITH 2-INCH SQUARE OPERATING NUTS EXCEPT VAULTS SHALL BE FURNISHED WITH HAND WHEELS. ALL SURFACES, INTERIOR AND EXTERIOR SHALL BE FUSION BONDED EPOXY COATED, ACCEPTABLE FOR

THE VALVES SHALL BE SET WITH STEMS VERTICAL. THE AXIS OF THE VALVE BOX SHALL BE COMMON WITH THE AXIS PROJECTED OFF THE VALVE STEM. THE TOPS OF THE ADJUSTABLE VALVE BOXES SHALL BE SET TO THE EXISTING OR ESTABLISHED GRADE, WHICHEVER IS APPLICABLE. VALVE STEM RISERS SHALL BE INSTALLED 12"TO 24"OF THE FINISHED GRADE OF THE VALVE BOX CAP.

VALVES SHALL BE CLOW, MUELLER, M&H, OR APPROVED EQUAL BY THE PUBLIC WORKS DIRECTOR.

2. TAPPING SLEEVES & TAPPING VALVES

THE TAPPING SLEEVES SHALL BE STAINLESS STEEL TAPPING SLEEVES RATED FOR A WORKING PRESSURE OF 250 PSI MINIMUM AND FURNISHED COMPLETE WITH JOINT ACCESSORIES TAPPING SLEEVES SHALL BE CONSTRUCTED IN TWO SECTIONS FOR EASE OF INSTALLATION AND SHALL BE ASSEMBLED AROUND THE MAIN WITHOUT INTERRUPTING SERVICE.

MECHANICAL JOINT STYLE SLEEVES SHALL BE DUCTILE IRON AND IS REQUIRED FOR SIZE-ON-SIZE CONNECTION TO CAST IRON PIPE. MECHANICAL JOINT SLEEVES SHALL BE CAST BY CLOW, DRESSER, MUELLER, TYLER, U.S. PIPE, OR APPROVED EQUAL BY THE PUBLIC WORKS DIRECTOR.

TAPPING VALVES SHALL BE FLANGED OUTLET FOR USE WITH DUCTILE IRON PIPE AND SHALL HAVE OVERSIZED SEAT RINGS TO PERMIT ENTRY OF THE TAPPING MACHINE CUTTERS. IN ALL OTHER RESPECTS, THE TAPPING VALVES SHALL CONFORM TO THE RESILIENT SEAT GATE VALVES HEREIN SPECIFIED WITH REGARDS TO OPERATION AND MATERIALS.

THE INSTALLATION OF THE TAPPING SLEEVES AND VALVES SHALL BE PERFORMED BY A QUALIFIED CONTRACTOR.

ALL TAPS WILL BE MADE BY THE PUBLIC WORKS DEPARTMENT. FEES ARE REQUIRED.

ALL VALVES WITH OPERATING NUTS LOCATED MORE THAN 24" BELOW FINISHED GRADE SHALL BE EQUIPPED WITH EXTENSION STEMS TO BRING THE OPERATING NUT TO WITHIN 12" OF THE FINISHED GRADE

AT THE TOP OF THE EXTENSION STEM. THERE SHALL BE A 2-INCH STANDARD OPERATING NUT, COMPLETE WITH A CENTERING FLANGE THAT CLOSELY FITS THE 5-INCH PIPE ENCASEMENT OF THE EXTENSION STEM. THE VALVE BOX SHALL BE SET IN A TELÉSCOPING FASHION AROUND THE 5- INCH PIPE CUT TO THE CORRECT LENGTH TO ALLOW FUTURE ADJUSTMENT UP OR DOWN.

EACH VALVE SHALL BE PROVIDED WITH AN ADJUSTABLE TWO-PIECE CAST IRON VALVE BOX OF FIVE INCHES MINIMUM INSIDE DIAMETER. VALVE BOXES SHALL HAVE A TOP SECTION WITH A 16-INCH MINIMUM LENGTH. THE VALVE BOXES AND COVERS SHALL BE 6800 WITH LOCKING LID OR APPROVED EQUAL BY THE PUBLIC WORKS DIRECTOR.

VALVE MARKERS

FOR EACH VALVE OUTSIDE OF ASPHALT, PROVIDE A VALVE CONCRETE PAD 24"X 24"X 6"WITH REINFORCING MESH CENTERED OVER VALVE BOX AND SET TO

D. FIRE HYDRANTS

ALL FIRE HYDRANTS SHALL BE APPROVED BY THE NATIONAL BOARD OF FIRE UNDERWRITERS AND CONFORM TO AWWA SPECIFICATION C502, BREAKAWAY TYPE, IN WHICH THE VALVE WILL REMAIN CLOSED IF THE BARREL IS BROKEN. THE HYDRANT BARREL SHALL HAVE A DIAMETER OF NOT LESS THAN 8- 1/2 INCHES, AND THE VALVE DIAMETER SHALL BE NOT LESS THAN 5-1/4 INCHES. EACH HYDRANT SHALL BE EQUIPPED WITH TWO 2 1/2-INCH HOSE PORTS (NATIONAL STANDARD THREAD), AND ONE 4-1/2- INCH PUMPER CONNECTION (NATIONAL STANDARD THREAD), WITH PERMANENT 5-INCH STORZ HYDRANT ADAPTOR AND STORZ BLIND CAP WHICH SHALL BE INSTALLED ON THE HYDRANT PRIOR TO INSTALLATION. EACH HYDRANT SHALL BE EQUIPPED WITH A SUITABLE POSITIVE ACTING DRAIN VALVE AND A 1-1/4-INCH COUNTER-CLOCKWISE OPENING PENTAGONAL

OPERATING NUT. THE FIRE HYDRANTS SHALL BE 6' BURY OR MORE TO CONFORM TO THE STANDARD DETAIL, M&H MODEL 129.

THE HOLDING SPOOLS BETWEEN THE GATE VALVE AND FIRE HYDRANT SHALL BE MADE FROM 6-INCH CLASS 53 DUCTILE IRON PIPE, 0.34-INCH WALL THICKNESS, OR C900 PVC. THE HYDRANT AND GATE VALVE SHALL BE ANCHORED IN PLACE USING HOLDING SPOOLS AND MECHANICAL JOINT RESTRAINT DEVICE. THRUST BLOCK AT ALL FITTINGS SHALL BE IN ACCORDANCE WITH TOWN STANDARDS AND CONDITIONS. HOLDING SPOOLS WITH LENGTH IN EXCESS OF 17 FEET SHALL BE SUPPLIED WITH AN M. J. SLEEVE AND MECHANICAL JOINT RESTRAINT DEVICE.

BETWEEN THE TIME THAT THE FIRE HYDRANT IS INSTALLED AND THE COMPLETED FACILITY IS PLACED IN OPERATION, THE FIRE HYDRANT SHALL AT ALL TIMES BE WRAPPED IN BURLAP, OR COVERED IN SOME OTHER SUITABLE MANNER TO CLEARLY INDICATE THAT THE FIRE HYDRANT IS NOT IN SERVICE.

E. BLOW-OFFS & AIR RELIEF ASSEMBLIES:

2-INCH BLOW OFF ASSEMBLIES SHALL BE INSTALLED AT THE TERMINUS OF ALL DEAD-END WATER MAINS. BLOW OFFS UTILIZED BY THE OWNER FOR FLUSHING THE WATER MAIN SHALL BE SUFFICIENT SIZE TO OBTAIN 2.5 FEET PER SECOND IN THE MAIN. THE SYSTEM SHALL BE DESIGNED TO DRAIN THE ENTIRE ASSEMBLY TO PREVENT FREEZING. TEMPORARY BLOW-OFFS SHALL BE REMOVED AND REPLACED WITH A SUITABLY SIZED WATERTIGHT BRASS PLUG.

2-INCH AIR AND VACUUM RELEASE VALVES SHALL BE INSTALLED AT PRINCIPAL HIGH POINTS IN THE SYSTEM. THE INSTALLATION OF THESE ITEMS SHALL INCLUDE CONNECTION PIPING, GATE VALVE, VALVE BOX, AND ALL ACCESSORIES. VALVE MARKERS SHALL BE OPTIONAL WITH TOWN.

F. WATER SAMPLING STATION

ONE WATER SAMPLING STATION SHALL BE FURNISHED AND INSTALLED FOR EACH DEVELOPMENT IN SIZE OF 5 TO 20 LOTS. ONE ADDITIONAL SAMPLING STATION SHALL BE FURNISHED AND INSTALLED FOR EACH ADDITIONAL 50 LOTS OR PORTION THEREOF. THE WATER SAMPLING STATION(S) SHALL BE FURNISHED AND

INSTALLED AT A LOCATION AS DETERMINED BY THE PUBLIC WORKS DIRECTOR AND AS FURTHER SHOWN ON ANY PLANS.

- G. BEDDING FOR WATER MAINS AND SERVICE LINES
- A. DUCTILE IRON AND PVC PIPE (ALL SIZES),

PIPE BEDDING MATERIAL TO BE INSTALLED AND COMPACTED UNDER, AROUND AND ABOVE ALL PIPE AS SPECIFIED IN THIS SECTION SHALL BE CLEAN. WELL-GRADED SAND OR SAND/GRAVEL MIXTURE WITH A MAXIMUM PARTICLE SIZE OF 5/8 INCH, ENTIRELY FREE OF CLAY, SILT, ORGANIC OR DELETERIOUS MATTER AND FROZEN MATERIAL. MINIMUM MATERIAL WEIGHT SHALL BE 110 POUNDS PER CUBIC FOOT AT 95% RELATIVE COMPACTION. BEDDING SHALL CONFORM TO THE FOLLOWING GRADUATION REQUIREMENTS:

SIEVE SIZE PERCENT PASSING* 34" SQUARE 100 3/8" SQUARE 95-100

U.S. NO. 8 0-10 U.S. NO. 200 SAND EQUIVALENT 35 MIN.

- ALL PERCENTAGES ARE BY WEIGHT. NATIVE MATERIAL MAY NOT BE USED FOR BEDDING
- B. COPPER, PEX AND PVC LESS THAN 4"DIAMETER WATER SERVICE PIPE

ALL REQUIREMENTS OF 6.04 (G)(A) HEREIN APPLY, EXCEPT THAT BEDDING MATERIAL SHALL BE CLEAN SAND, FREE OF GRAVEL, WITH NO MORE THAN 5% PASSING THE NO. 200 SIEVE (BY WEIGHT).

6.05 WATER PIPE TESTING & DISINFECTING

ALL PIPELINES SHALL BE HYDROSTATICALLY TESTED AND DISINFECTED PER CURRENT APPLICABLE AWWA AND STANDARD SPECIFICATIONS PRIOR TO ACCEPTANCE OF WORK, A WATER HYDRANT METER SHALL BE REQUIRED AND PROCURED FROM THE TOWN FOR ALL WATER UTILIZED FOR FLUSHING PIPELINES. ALL PUMPS. GAUGES, PLUGS, SADDLES, CORPORATION STOPS, MISCELLANEOUS HOSE AND PIPING, AND MEASURING EQUIPMENT NECESSARY FOR PERFORMING THE TEST SHALL BE FURNISHED, INSTALLED AND OPERATED BY THE OWNER. FEED FOR THE PUMP SHALL BE DISINFECTED TREATED WATER FROM A BARREL OR OTHER CONTAINER WITHIN THE ACTUAL AMOUNT OF "MAKEUP" WATER, SO THAT IT CAN BE MEASURED PERIODICALLY DURING THE TEST PERIOD. OWNER SHALL NOT TRANSPORT

THE PIPELINE SHALL BE BACKFILLED SUFFICIENTLY TO PREVENT MOVEMENT OF THE PIPE UNDER PRESSURE. ALL THRUST BLOCKS SHALL BE IN PLACE AND TIME ALLOWED FOR THE CONCRETE TO CURE BEFORE TESTING. WHERE PERMANENT BLOCKING IS NOT REQUIRED, THE OWNER SHALL FURNISH AND INSTALL TEMPORARY

AS SOON AS PIPE IS SECURED AGAINST MOVEMENT UNDER PRESSURE, IT MAY BE FILLED WITH WATER AFTER APPROVAL FROM THE PUBLIC WORKS DIRECTOR TO DO SO. SATISFACTORY PERFORMANCE OF AIR VALVES SHALL BE CHECKED WHILE THE LINE IS FILLING. 6.06 TESTING AND FLUSHING PROCEDURAL ORDER

- UPON APPROVAL FROM THE PUBLIC WORKS DIRECTOR, FILL THE PIPE LINE IN ACCORDANCE WITH THESE STANDARDS.
- THE INITIAL CHLORINE CONCENTRATION TEST IS PERFORMED BY THE PUBLIC WORKS DEPARTMENT. PRESSURE TEST IN ACCORDANCE WITH THESE STANDARDS AFTER ACCEPTABLE CHLORINE CONCENTRATION TEST
- DEPRESSURIZE AFTER ACCEPTABLE PRESSURE TEST, LEAVING THE PIPE LINE FULL OF TREATED WATER.
- 24 HOURS LATER, THE RESIDUAL CHLORINE CONCENTRATION TEST IS PERFORMED BY THE PUBLIC WORKS DEPARTMENT. FINAL FLUSHING AFTER ACCEPTABLE CHLORINE CONCENTRATION TEST UNTIL NO CHLORINE IS PRESENT. FINAL CHLORINE CONCENTRATION IS TESTED BY THE PUBLIC WORKS DEPARTMENT

BACTERIAL TEST SAMPLE IS TAKEN BY THE CONTRACTOR TO AN ACCREDITED LABORATORY FOR TESTING IN ACCORDANCE WITH THESE STANDARDS. OTHER PRESSURE TESTING AND DISINFECTION PROCEDURES THAT CONFORM TO AWWA STANDARDS MAY BE APPROVED BY THE PUBLIC WORKS DIRECTOR UPON

6.07 BACKFLOW PREVENTION AND SPRINKLER SYSTEMS

ALL WATER SYSTEMS (I.E. SPRINKLER SYSTEMS, SWIMMING POOLS, LABORATORIES, FIRE SPRINKLERS, IRRIGATION SYSTEMS, CAR WASHES, FUNERAL HOMES, OR AT DIRECTION OF THE TOWN BUILDING INSPECTOR AND PUBLIC WORKS DEPARTMENT) CONNECTED TO THE PUBLIC WATER SYSTEM SHALL HAVE BACKFLOW PREVENTION AS REQUIRED BY WAC 248-54-285 AND TMC CHAPTER 13.07.

6.08 STAKING

OF REQUEST BY THE OWNER.

ALL SURVEYING AND STAKING SHALL BE PERFORMED BY AN ENGINEERING OR SURVEYING FIRM EMPLOYED BY THE OWNER AND CAPABLE OF PERFORMING SUCH WORK. THE ENGINEER OR SURVEYOR DIRECTING AND/OR PERFORMING SUCH WORK SHALL BE CURRENTLY LICENSED BY THE STATE OF WASHINGTON TO PERFORM

PROVIDE STAKING SUFFICIENT TO SATISFY PUBLIC WORKS DIRECTOR. IN NEW PLAT DEVELOPMENT, ROADWAY CENTERLINE OR EDGE OFFSET STAKING MUST BE READILY IDENTIFIABLE.

B. STAKE LOCATIONS OF ALL PROPOSED FIRE HYDRANT, BLOW-OFF, AIR-VAC, VALVES, METERS, ETC.

6.09 TRENCH EXCAVATION

CLEARING AND GRUBBING WHERE REQUIRED SHALL BE PERFORMED WITHIN THE FASEMENT OR PUBLIC RIGHT-OF- WAY AS PERMITTED BY THE TOWN AND/OR GOVERNING AGENCIES. DEBRIS RESULTING FROM THE CLEARING AND GRUBBING SHALL BE DISPOSED OF BY THE OWNER IN ACCORDANCE WITH THE TERMS OF ALL

TRENCHES SHALL BE EXCAVATED TO THE LINE AND DEPTH DESIGNATED BY THE TOWN TO PROVIDE A MINIMUM OF 60" INCHES OF COVER OVER THE PIPE. EXCEPT FOR UNUSUAL CIRCUMSTANCES WHERE APPROVED BY THE TOWN, THE TRENCH SIDES SHALL BE EXCAVATED VERTICALLY AND THE TRENCH WIDTH SHALL BE EXCAVATED ONLY TO SUCH WIDTHS AND DEPTHS AS ARE NECESSARY FOR ADEQUATE WORKING SPACE AS ALLOWED BY THE GOVERNING AGENCY AND IN COMPLIANCE WITH ALL SAFETY REQUIREMENTS OF THE PREVAILING AGENCIES. THE TRENCH SHALL BE KEPT FREE FROM WATER UNTIL JOINING IS COMPLETE. SURFACE WATER SHALL BE DIVERTED SO AS NOT TO ENTER THE TRENCH. THE OWNER SHALL MAINTAIN SUFFICIENT PUMPING EQUIPMENT ON THE JOB TO ENSURE THAT THESE PROVISIONS ARE CARRIED OUT.

TRENCHING AND SHORING OPERATIONS SHALL NOT PROCEED MORE THAN 100 FEET IN ADVANCE OF PIPE LAYING WITHOUT APPROVAL OF THE TOWN, AND SHALL BE IN CONFORMANCE WITH WASHINGTON INDUSTRIAL SAFETY AND HEALTH ADMINISTRATION (WISHA) AND OFFICE OF SAFETY AND HEALTH ADMINISTRATION (OSHA) SAFFTY STANDARD.

6.10 BACKFILLING

NATIVE MATERIAL FOR BACKFILL: MATERIAL MUST BE FREE OF WOOD WASTE, DEBRIS, CLODS OR ROCKS GREATER THAN THREE INCHES IN ANY DIMENSION. BACKFILLING AND SURFACE RESTORATION SHALL CLOSELY FOLLOW INSTALLATION OF PIPE SO THAT NOT MORE THAN 100 FEET IS LEFT EXPOSED DURING CONSTRUCTION HOURS WITHOUT APPROVAL OF THE TOWN. SELECTED MATERIAL SHALL BE PLACED AND COMPACTED AROUND AND UNDER THE PIPE BY HAND TOOLS. SPECIAL PRECAUTIONS SHOULD BE PROVIDED TO PROTECT THE PIPE TO A POINT 12 INCHES ABOVE THE CROWN OF THE PIPE. DUE TO LOCAL CONDITIONS, AS MAY BE SPECIFICALLY APPROVED BY THE TOWN, SUITABLE EXCAVATED BACKFILL MATERIAL, AS DETERMINED BY THE TOWN, MAY BE UTILIZED AS BACKFILL, OR IF SUCH MATERIAL IS NOT AVAILABLE FROM TRENCHING OPERATIONS, THE TOWN MAY ORDER THE PLACING OF GRAVEL BASE CONFORMING WITH STANDARD SPECIFICATIONS SECTION 9 03.10 FOR BACKFILLING THE TRENCH. ALL EXCESS MATERIAL SHALL BE PROMPTLY LOADED AND HAULED TO WASTE.

6.11 STREET PATCHING AND RESTORATION

SEE SECTION 5 FOR REQUIREMENTS REGARDING STREET PATCHING.

6.12 EROSION CONTROL

EROSION CONTROL SHALL COMPLY WITH STANDARD SPECIFICATIONS M41-10.

6.13 FINISHING AND CLEANUP

AFTER ALL OTHER WORK ON A PROJECT IS COMPLETED AND BEFORE FINAL ACCEPTANCE, THE ENTIRE ROADWAY, INCLUDING THE ROADBED, PLANTING, SIDEWALK AREAS, SHOULDERS, DRIVEWAYS, ALLEY AND SIDE STREET APPROACHES, SLOPES, DITCHES, UTILITY TRENCHES, AND CONSTRUCTION AREAS SHALL BE NEATLY FINISHED TO THE LINES, GRADES AND CROSS SECTIONS OF A NEW ROADWAY CONSISTENT WITH THE ORIGINAL SECTION, AND TO THE SATISFACTION OF THE PUBLIC WORKS DIRECTOR.

UPON COMPLETION OF THE CLEANING AND DRESSING, THE PROJECT SHALL APPEAR UNIFORM IN ALL RESPECTS.

DRAINAGE FACILITIES SUCH AS INLETS, CATCH BASINS, CULVERTS, AND OPEN DITCHES SHALL BE CLEANED OF ALL DEBRIS, WHICH IS THE RESULT OF THE OWNER'S OPERATIONS. ALL PAVEMENTS AND OIL MAT SURFACES, WHETHER NEW OR OLD, SHALL BE THOROUGHLY CLEANED. EXISTING IMPROVEMENTS SUCH AS PORTLAND CEMENT CONCRETE CURBS, CURB AND GUTTERS, WALLS, SIDEWALKS, AND OTHER FACILITIES, WHICH HAVE BEEN SPRAYED BY THE ASPHALT CEMENT, SHALL BE CLEANED TO THE SATISFACTION OF THE PUBLIC WORKS DIRECTOR.

CASTINGS FOR MONUMENTS, WATER VALVES, VAULTS AND OTHER SIMILAR INSTALLATIONS, WHICH HAVE BEEN COVERED WITH THE ASPHALT MATERIAL, SHALL BE CLEANED TO THE SATISFACTION OF THE PUBLIC WORKS DIRECTOR

OPMI (J) 呈

R ℩Ω

DRAWING NAME: C22246P-WS-AFTING BY

SDICTION: CITY OF TWI

TWISP SEWER SYSTEM STANDARDS

7.01 GENERAL

THE STANDARDS ESTABLISHED BY THESE DEVELOPMENT STANDARDS ARE INTENDED TO REPRESENT THE MINIMUM STANDARDS FOR THE DESIGN AND CONSTRUCTION OF SANITARY SEWER FACILITIES. GREATER OR LESSER REQUIREMENTS MAY BE MANDATED BY THE TOWN DUE TO LOCALIZED CONDITIONS. WASHINGTON STATE DEPARTMENT OF ECOLOGY'S CRITERIA FOR SEWAGE WORKS DESIGN, LATEST EDITION, AND STANDARD SPECIFICATIONS M41–10 LATEST EDITION, SHALL ALSO BE EMPLOYED BY THE TOWN IN ITS REVIEW AND APPROVAL OF SYSTEM CONNECTIONS, EXTENSIONS, AND/OR MODIFICATIONS.

7.02 DESIGN STANDARDS

THE DESIGN OF SANITARY SEWER SYSTEMS SHALL BE DEPENDENT ON LOCAL SITE CONDITIONS. THE DESIGN ELEMENTS OF SANITARY SEWER SYSTEMS SHALL CONFORM TO MINIMUM STANDARDS SET FORTH HEREIN.

DEPARTMENT OF ECOLOGY APPROVAL OF SEWER EXTENSIONS MAY BE REQUIRED. IT SHALL BE THE RESPONSIBILITY OF THE OWNER'S ENGINEER TO OBTAIN ECOLOGY APPROVAL, IF NEEDED.

A. IF FUTURE EXTENSIONS OF THE SYSTEM ARE DEEMED PROBABLE BY THE TOWN, THE PROPOSED SYSTEMS SHALL BE EXTENDED TO "FAR" PROPERTY LINE(S) AT THE MAXIMUM DEPTH AVAILABLE AS MAY BE NECESSARY TO PROVIDE ACCESS TO FUTURE DEVELOPMENT. AT A MINIMUM, ACCESS AND/OR EASEMENTS TO ALL SYSTEMS FROM ADJACENT AREAS WILL BE REQUIRED.

B. DETAILED PLANS SHALL BE SUBMITTED FOR THE TOWN'S REVIEW WHICH PROVIDES THE LOCATION, SIZE, TYPE AND DIRECTION OF FLOW OF THE PROPOSED SEWERS AND THE CONNECTION WITH EXISTING SEWERS. ALL ELEVATION INFORMATION SHALL BE TO THE TOWN DATUM.

C. PROJECT PLANS SHALL HAVE A HORIZONTAL SCALE 20 FEET TO THE INCH AND A VERTICAL SCALE OF NOT MORE THAN 5 FEET TO THE INCH. PLANS AND PROFILES SHALL SHOW:

LOCATIONS OF STREETS, RIGHTS-OF-WAY, EXISTING UTILITIES AND SEWERS.

ALL ASSOCIATED RIGHT-OF-WAY, EASEMENT AND/OR PROPERTY LINES.
SITE TOPOGRAPHY AT A MINIMUM OF 5-FOOT INTERVALS, TO INCLUDE A MINIMUM OF 20-FOOT WITHIN ADJACENT AREAS.
VICINITY AND SITE LOCATION MAP.

GROUND SURFACE ELEVATION.
PIPE TYPE, CLASS, AND SIZE.
MANHOLE STATIONING.

INVERT AND SURFACE ELEVATION AT EACH MANHOLE, AND GRADE OF SEWER BETWEEN ADJACENT MANHOLES. ALL MANHOLES SHALL BE NUMBERED ON THE PLANS AND CORRESPONDINGLY NUMBERED ON THE PROFILE.

WHERE THERE IS ANY QUESTION OF THE SEWER BEING SUFFICIENTLY DEEP TO SERVE ANY RESIDENCE, THE OWNER SHALL INDICATE BUILDING AND BASEMENT FLOOR ELEVATIONS IN THE PROFILE.

ALL KNOWN EXISTING STRUCTURES, BOTH ABOVE AND BELOW GROUND, WHICH MIGHT INTERFERE WITH THE PROPOSED CONSTRUCTION, PARTICULARLY WATER MAINS, GAS MAINS, STORM DRAINS, OVERHEAD AND UNDERGROUND POWER LINES, TELEPHONES LINES, IRRIGATION SYSTEMS AND TELEVISION CABLES. ALL UTILITY EASEMENTS, INCLUDING COUNTY RECORDING NUMBERS.

DETAILS IN SCALE DRAWINGS WHICH CLEARLY SHOW SPECIAL SEWER JOINTS AND CROSS— SECTIONS, AND SEWER APPURTENANCES SUCH AS MANHOLES

AND RELATED ITEMS AND ALL OTHER ITEMS AS REQUIRED BY THE TOWN TO CLEARLY IDENTIFY CONSTRUCTION ITEMS, MATERIALS, AND/OR METHODS.

D. CONSTRUCTION OF NEW SEWER SYSTEMS OR EXTENSIONS OF EXISTING SYSTEMS WILL BE ALLOWED ONLY IF THE EXISTING RECEIVING SYSTEM IS CAPABLE.

OF SUPPORTING THE ADDED HYDRAULIC LOAD.

E. COLLECTION AND INTERCEPTOR SEWERS SHALL BE DESIGNED AND CONSTRUCTED FOR THE ULTIMATE DEVELOPMENT OF THE TRIBUTARY AREAS AND AS ESTABLISHED IN THE TOWN'S GENERAL SEWER PLAN.

F. SEWER SYSTEMS SHALL BE DESIGNED AND CONSTRUCTED TO ACHIEVE TOTAL CONTAINMENT OF SANITARY WASTES AND MAXIMUM EXCLUSION OF INFILTRATION AND INFLOW. SEWERS INSTALLED BELOW WATER TABLE MAY REQUIRE SPECIAL DESIGN AND INSPECTIONS.

G. COMPUTATIONS AND OTHER DATA USED FOR DESIGN OF THE SEWER SYSTEM MAY BE REQUIRED TO BE SUBMITTED TO THE TOWN FOR APPROVAL.

H. ALL PIPE SHALL BE LAID IN STRAIGHT LINES AND AT UNIFORM RATE OF GRADE BETWEEN MANHOLES. VARIANCE FROM ESTABLISHED LINE AND GRADE SHALL NOT BE GREATER THAN 1/2—INCH, PROVIDED THAT SUCH VARIATION DOES NOT RESULT IN A LEVEL OR REVERSE SLOPING INVERT. ANY CORRECTIONS REQUIRED IN LINE AND GRADE SHALL BE REVIEWED WITH THE PUBLIC WORKS DIRECTOR AND SHALL BE MADE AT THE EXPENSE OF THE OWNER.

I. DEFLECTION TESTS SHALL BE PERFORMED ON ALL PVC SEWER MAINS AND THE DEFLECTION TEST LIMIT SHALL BE 5.0 PERCENT OF THE BASE INSIDE DIAMETER OF THE PIPE.

J. AFTER ALL OTHER WORK IS COMPLETED AND BEFORE FINAL ACCEPTANCE, THE ENTIRE ROADWAY, INCLUDING THE ROADBED, PLANTING, SIDEWALK AREAS, SHOULDERS, DRIVEWAYS, ALLEY AND SIDE STREET APPROACHES, SLOPES, DITCHES, UTILITY TRENCHES, AND CONSTRUCTION AREAS SHALL BE NEATLY FINISHED TO THE LINES, GRADES AND CROSS SECTIONS FOR A NEW ROADWAY CONSISTENT WITH THE ORIGINAL SECTION TO THE SATISFACTION OF THE PUBLIC WORKS DIRECTOR

K. THE OWNER SHALL BE REQUIRED, UPON COMPLETION OF THE WORK AND PRIOR TO ACCEPTANCE BY THE TOWN, TO FURNISH THE TOWN WITH A WRITTEN GUARANTEE (MAINTENANCE BOND) COVERING ALL MATERIAL AND WORKMANSHIP FOR A PERIOD OF TWO YEARS AFTER THE DATE OF FINAL ACCEPTANCE AND THE OWNER SHALL MAKE ALL NECESSARY REPAIRS DURING THAT PERIOD AT THEIR OWN EXPENSE, IF SUCH

REPAIRS ARE NECESSITATED AS THE RESULT OF FURNISHING POOR MATERIALS AND/OR WORKMANSHIP. THE OWNER SHALL OBTAIN WARRANTIES FROM THE CONTRACTORS, SUBCONTRACTORS AND SUPPLIERS OF MATERIAL OR EQUIPMENT WHERE SUCH WARRANTIES ARE REQUIRED, AND SHALL DELIVER COPIES TO THE TOWN UPON COMPLETION OF THE WORK.

7.03 GENERAL REQUIREMENTS

A. PRIOR TO CONSTRUCTION, THE SEWER PLANS SHALL BE REVIEWED AND APPROVED BY THE PUBLIC WORKS DIRECTOR, DOE AND THE TOWN'S ENGINEER WHEN APPLICABLE.

B. PRIOR TO CONSTRUCTION, THE OWNER SHALL NOTIFY THE TOWN FOR A PRE-CONSTRUCTION MEETING.

C. WORK SHALL BE PERFORMED ONLY BY A WASHINGTON STATE LICENSED AND BONDED CONTRACTOR, WITH A TOWN BUSINESS LICENSE, IF REQUIRED, AND WITH DEMONSTRATED EXPERIENCED IN LAYING PUBLIC SEWER MAINS OF THE TYPE BEING PROPOSED FOR CONSTRUCTION.

D. MINIMUM HORIZONTAL AND VERTICAL SEPARATION SHALL BE MAINTAINED BETWEEN WATER AND SEWER UTILITIES AS REQUIRED BY THE DOE MANUAL ENTITLED "CRITERIA FOR SEWAGE WORKS DESIGN", LATEST EDITION.

E. THE MAXIMUM DISTANCE BETWEEN MANHOLES SHALL BE 300 FEET UNLESS SPECIFICALLY APPROVED OTHERWISE BY THE PUBLIC WORKS DIRECTOR.

F. PVC PIPE SHALL BE A MINIMUM CLASS S.D.R. 35 AND BE MANUFACTURED IN ACCORDANCE WITH ASTM D3034.

G. THE ALLOWABLE COVER (FINISHED GRADE) FOR MAIN LINE COLLECTION PIPING IS 5' TO 15'.

H. THE MINIMUM SLOPE FOR 4-INCH SIDE SEWER LATERALS SHALL BE 2.0% 6-INCH SIDE SEWER LATERALS SHALL BE 1.0% THE MINIMUM SLOPE FOR 8-INCH GRAVITY MAINS SHALL BE 0.5%. THE MINIMUM SLOPE FOR 10-INCH GRAVITY MAINS SHALL BE 0.4%. THE MINIMUM SLOPE FOR 12-INCH GRAVITY MAINS SHALL BE 0.3%.

I. EACH SIDE SEWER LATERAL SHALL HAVE AN APPROVED WATER-TIGHT CAP AT THE TERMINATION OF THE STUB, AND IT SHALL BE ADEQUATELY "BLOCKED" TO SATISFACTORILY RESIST THE AIR PRESSURE TESTING (5 LBS. FOR 5 MINUTES).

J. EACH SIDE SEWER LATERAL SHALL HAVE A TREATED 4" X 4" WOOD "MARKER" AT THE TERMINATION OF THE STUB. THE "MARKER" SHALL EXTEND FROM THE BOTTOM OF THE TRENCH TO 12 INCHES ABOVE FINISHED GRADE. ABOVE THE GROUND SURFACE, IT SHALL BE PAINTED "WHITE" WITH "S/S" AND THE DEPTH. IN FEET. STENCILED IN BLACK LETTERS 2—INCHES HIGH.

K. FRONT LOT CORNERS SHALL BE STAKED PRIOR TO CONSTRUCTION FOR SIDE SEWER TEE LOCATION.

ALL SIDE SEWERS SHALL BE EXTENDED A MINIMUM OF FIVE FEET PAST THE STREET RIGHT-OF-WAY LINE (OR PROPERTY LINE).

M. SIDE SEWER CONNECTIONS IF ALLOWED DIRECTLY INTO MANHOLES SHALL BE CONSTRUCTED ACCORDING TO THE DROP MANHOLE DETAIL WITHIN THESE SPECIFICATIONS.

N. MANHOLES, WHERE SEWER EXTENSION MAY OCCUR, SHALL BE PROVIDED WITH KNOCK-OUTS AND CHANNELED ACCORDINGLY.

). MANHOLES SHALL BE PROVIDED WITH A 0.10-FOOT DROP ACROSS THE CHANNEL.

LOCKING COVERS SHALL BE PROVIDED FOR ALL MANHOLES AND SHALL HAVE THE WORD "SEWER" CAST INTEGRALLY ONTO ITS SURFACE.

Q. CONCRETE COLLARS SHALL BE PLACED AROUND ALL FRAMES FOR MANHOLES LOCATED IN GRAVEL DRIVE AREAS.

R. PIPE CONNECTIONS TO MANHOLES SHALL BE AS FOLLOWS: CORE THE MANHOLE AND CONNECT SEWER PIPE WITH A WATER-TIGHT FLEXIBLE RUBBER BOOT GROUTED INTO MANHOLE WALL, KOR-N-SEAL BOOT OR EQUAL.

S. PIPE TRENCHES SHALL NOT BE BACKFILLED UNTIL PIPE AND BEDDING INSTALLATION HAS BEEN INSPECTED AND APPROVED BY THE PUBLIC WORKS DIRECTOR.

T. FINAL AIR TESTING SHALL NOT BE ACCEPTED UNTIL AFTER THE ASPHALT TREATED BASE OR FINISHED PAVING IS ACCOMPLISHED, ALL OTHER UNDERGROUND UTILITIES HAVE BEEN INSTALLED, AND THE LINES HAVE BEEN FLUSHED, CLEANED, DEFLECTION TESTED AND TELEVISION INSPECTED.

U. MANHOLE RIM AND INVERT ELEVATIONS SHALL BE FIELD VERIFIED AFTER CONSTRUCTION BY THE OWNER'S ENGINEER(S) AND THE "AS BUILT" DRAWINGS INDIVIDUALLY STAMPED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF WASHINGTON WHICH SHALL ATTEST TO THE FACT THAT THE INFORMATION IS CORRECT. AS—BUILT DRAWINGS SHALL BE TO TOWN DATUM, AND MUST BE SUBMITTED AND APPROVED BY THE TOWN PRIOR TO PROJECT ACCEPTANCE.

TRENCHING AND SHORING OPERATIONS SHALL NOT PROCEED MORE THAN 100 FEET IN ADVANCE OF PIPE LAYING WITHOUT APPROVAL OF THE TOWN, AND SHALL BE IN CONFORMANCE WITH WASHINGTON INDUSTRIAL SAFETY AND HEALTH ADMINISTRATION (WISHA) AND OFFICE OF SAFETY AND HEALTH ADMINISTRATION (OSHA) SAFETY STANDARD.

7.04 MATERIALS AND TESTING

A. INSPECTION

THE OWNER SHALL REQUEST FOR INSPECTION A MINIMUM OF 3 WORKING DAYS IN WRITING PRIOR TO THE OWNER'S SCHEDULED NEED. INSPECTION SHALL BE REQUIRED FOR THE FOLLOWING ITEMS OF WORK:

1. PIPE AND BEDDING INSTALLATION; 2.BACKFILL AND COMPACTION.

UPON COMPLETION OF THE PROJECT ALL SEWER INSTALL SHALL BE INSPECTED WITH TELEVISION INSPECTION EQUIPMENT. THE OWNER SHALL PROVIDE THE TOWN WITH A COPY OF THE INSPECTION AND SHALL HAVE THE TOWN PRESENT DURING THE TELEVISION INSPECTION.

SE 1/4 NE 1/4, SEC 18, TWN 33 N, RGE 22 E, W.M., CITY OF TWISP, WASHINGTON

B. SEWER MAINS, LATERALS AND FORCE MAINS

GRAVITY SEWER MAINS AND LATERALS SHALL BE DESIGNED AND CONSTRUCTED IN CONFORMANCE WITH STANDARD SPECIFICATIONS M41-10 CURRENT EDITION.

PRESSURE SEWERS AND FORCE MAINS SHALL BE DESIGNED AND APPROVED BY DOE. THEY SHALL CONFORM WITH DOE CRITERIA FOR SEWAGE WORKS DESIGN,

ALL PIPE SHALL BE JOINTED BY THE MANUFACTURER'S STANDARD COUPLING, BE ALL OF ONE MANUFACTURER, BE CAREFULLY INSTALLED IN COMPLETE COMPLIANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

THE SEWER PIPE, UNLESS OTHERWISE APPROVED BY THE PUBLIC WORKS DIRECTOR, SHALL BE LAID UPGRADE FROM POINT OF CONNECTION ON THE EXISTING SEWER OR FROM A DESIGNATED STARTING POINT. THE SEWER PIPE SHALL BE INSTALLED WITH THE BELL END FORWARD OR UPGRADE. WHEN PIPE LAYING IS NOT IN PROGRESS, THE FORWARD END OF THE PIPE SHALL BE KEPT TIGHTLY CLOSED WITH AN APPROVED TEMPORARY PLUG.

ALL EXTENSIONS, ADDITIONS AND REVISIONS TO THE SEWER SYSTEM, UNLESS OTHERWISE INDICATED, SHALL BE MADE WITH SEWER PIPE JOINTED BY MEANS OF A FLEXIBLE GASKET WHICH SHALL BE FABRICATED AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND APPROVED BY THE PUBLIC WORKS DIRECTOR.

PIPE HANDLING AFTER THE GASKET HAS BEEN AFFIXED SHALL BE CAREFULLY CONTROLLED TO AVOID DISTURBING THE GASKET AND KNOCKING IT OUT OF POSITION, OR LOADING IT WITH DIRT OR OTHER FOREIGN MATERIAL. ANY GASKETS SO DISTURBED SHALL BE REMOVED, CLEANED, RE-LUBRICATED IF REQUIRED, AND REPLACED BEFORE THE REJOINING IS ATTEMPTED.

CARE SHALL BE TAKEN TO PROPERLY ALIGN THE PIPE BEFORE JOINTS ARE ENTIRELY FORCED HOME. DURING INSERTION OF THE TONGUE OR SPIGOT, THE PIPE SHALL BE PARTIALLY SUPPORTED BY HAND, SLING OR CRANE TO MINIMIZE UNEQUAL LATERAL PRESSURE ON THE GASKET UNTIL THE GASKET IS PROPERLY POSITIONED.

FOR THE JOINING OF DISSIMILAR PIPES, SUITABLE ADAPTER COUPLINGS SHALL BE USED WHICH HAVE BEEN APPROVED BY THE PUBLIC WORKS DIRECTOR.

ALL GRAVITY SEWER PIPE SHALL BE BEDDED WITH PEA GRAVEL OR OTHER MATERIAL APPROVED BY THE PUBLIC WORKS DIRECTOR. THE PVC PIPE SHALL BE BEDDED FROM A DEPTH OF FOUR INCHES BELOW THE PIPE TO EIGHT INCHES ABOVE THE PIPE.

C. MANHOLES

MANHOLE MATERIAL, SIZE, TYPE, CONSTRUCTION, TESTING, ADJUSTMENTS AND APPURTENANCES MUST CONFORM TO STANDARD SPECIFICATIONS M41-10 CURRENT EDITION.

THE OWNER SHALL BE RESPONSIBLE FOR ANY EXISTING DEFECTS IN THE EXISTING MANHOLE UNLESS THESE DEFECTS ARE WITNESSED BY THE PUBLIC WORKS DIRECTOR PRIOR TO ANY WORK BEING PERFORMED TO MAKE THE CONNECTION. THE OWNER SHALL BE REQUIRED TO REMOVE ANY AND ALL DEBRIS IN THE EXISTING MANHOLE AND DOWNSTREAM REACHES AS A RESULT OF HIS/HER WORK.

1. MANHOLE SECTIONS

MANHOLE SECTIONS SHALL BE PLACED AND ALIGNED SO AS TO PROVIDE VERTICAL SIDES AND VERTICAL ALIGNMENT OF THE LADDER STEPS. THE COMPLETED MANHOLE SHALL BE RIGID, TRUE TO DIMENSION, AND BE WATER TIGHT. ROUGH, UNEVEN SURFACES WILL NOT BE PERMITTED. THE MORTAR USED BETWEEN THE JOINTS IN THE PRE-CAST SECTIONS AND FOR LAYING MANHOLE

ADJUSTING BRICKS SHALL BE COMPOSED OF ONE—PART CEMENT TO TWO PARTS OF PLASTER SAND. ALL JOINTS SHALL BE THOROUGHLY WETTED AND COMPLETELY FILLED WITH MORTAR, SMOOTHED BOTH INSIDE AND OUTSIDE TO INSURE WATER TIGHTNESS. THE OUTSIDE AND INSIDE OF PRE—CAST CONCRETE MANHOLE SECTIONS SHALL BE PLASTERED AND TROWELED SMOOTH WITH 1/2—INCH (MINIMUM) OF MORTAR IN ORDER TO ATTAIN A WATERTIGHT SURFACE.

2. DROP MANHOLES

DROP MANHOLES SHALL, IN ALL RESPECTS, BE CONSTRUCTED AS A STANDARD MANHOLE WITH THE EXCEPTION OF THE DROP CONNECTION AS FURTHER DETAILED HEREIN.

D. OIL/WATER SEPARATION, GREASE INTERCEPTOR

1. INDUSTRIAL OR COMMERCIAL BUSINESSES THAT REGULARLY WASH VEHICLES OR ENGAGE IN ENGINE CLEANING AND OTHER CLEANING OPERATIONS THAT USE ACIDS, CAUSTICS, OR OTHER METAL BRIGHTENERS AS PART OF THEIR INTEGRAL MAINTENANCE OPERATIONS, MUST USE CLOSED LOOP WATER RECYCLING SYSTEMS THAT HAVE ZERO DISCHARGE TO THE TOWN'S SANITARY SEWER SYSTEM. THESE SYSTEMS WILL BE REVIEWED BY THE TOWN AND DOE FOR PROPER DESIGN, CONSTRUCTION AND MAINTENANCE.

2. INDUSTRIAL OR COMMERCIAL BUSINESSES THAT GENERATE MINERAL/PETROLEUM OILS EXCEEDING 100
MILLIGRAMS PER LITER TO BE DISCHARGED TO THE TOWN'S SANITARY SEWER SYSTEM, PRE—TREATMENT IS REQUIRED. AN OIL/WATER SEPARATION DEVICE SHALL
BE INSTALLED BY THE OWNER, SELECTION AND SIZING OF AN OIL/WATER SEPARATOR SHALL BE SUBJECT TO THE APPROVAL OF THE PUBLIC WORKS DIRECTOR.

3. COMMERCIAL FOOD PREPARATION OPERATIONS THAT GENERATE FATS, OILS AND GREASE WASTE MUST HAVE A PROPERLY SIZED GREASE INTERCEPTOR INSTALLED BY THE OWNER IN CONFORMANCE WITH THE UNIFORM PLUMBING CODE, APPENDIX H STANDARDS AND TWISP MUNICIPAL CODE. SELECTION AND SIZING OF AN INTERCEPTOR SHALL BE SUBJECT TO THE APPROVAL OF THE PUBLIC WORKS DIRECTOR.

E. SIDE SEWER LATERAL

SIDE SEWER LATERAL MATERIAL, SIZE, TYPE, CONSTRUCTION AND TESTING MUST CONFORM TO STANDARD SPECIFICATIONS M41-10 CURRENT EDITION.

A SIDE SEWER LATERAL IS CONSIDERED TO BE THAT PORTION OF A SEWER LINE THAT WILL BE CONSTRUCTED BETWEEN A MAIN SEWER LINE AND THE FINAL CONNECTION POINT TO THE BUILDING. ALL APPLICABLE SPECIFICATIONS GIVEN HEREIN FOR SEWER CONSTRUCTION SHALL BE HELD TO APPLY TO SIDE SEWER LATERALS. SIDE SEWERS SHALL BE FOR A SINGLE CONNECTION ONLY AND BE A MINIMUM FOUR—INCH DIAMETER PIPE. SIDE SEWERS SHALL BE CONNECTED TO THE TEE, PROVIDED IN THE SEWER MAIN WHERE SUCH IS AVAILABLE, UTILIZING APPROVED FITTINGS OR ADAPTERS. THE SIDE SEWER SHALL RISE AT A MAXIMUM OF 45° AND A MINIMUM SLOPE OF TWO PERCENT, FROM THE SEWER MAIN TO PROVIDE EACH LOT WITH THE DEEPEST SEWER POSSIBLE.

THE OWNER SHALL PROVIDE FOR EACH SIDE SEWER SERVICE A 4-INCH X 4-INCH TREATED WOODEN POST WHICH EXTENDS FROM THE INVERT OF THE END OF THE 6-INCH PIPE TO ABOVE THE EXISTING GROUND. THE EXPOSED AREA OF THIS POST SHALL BE PAINTED WHITE AND SHALL HAVE SELECTED THEREON IN TWO-INCH LETTERS (BLACK PAINT) "S/S" AND SHALL ALSO INDICATE THE DEPTH OF THE SEWER SERVICE STUB FROM FINISHED GRADE.

WHERE NO TEE OR WYE IS PROVIDED OR AVAILABLE, CONNECTION OF 4-INCH AND 6-INCH SIDE SEWER SHALL BE MADE BY MACHINE-MADE TAP AND SADDLE, ONLY BY THE TWISP PUBLIC WORKS DEPARTMENT. THE PUBLIC WORKS DIRECTOR SHALL REVIEW THE EXACT LOCATION AND MATERIAL LIST. SADDLES SHALL BE PLACED BETWEEN 45° AND 80° OFF VERTICAL. THE MAXIMUM BEND PERMISSIBLE AT ANY ONE FITTING SHALL NOT EXCEED 45°. THE OWNER WILL PROVIDE A SAFE EXCAVATED ACCESS TO THE SEWER CONNECTION FOR THE TWISP PUBLIC WORKS DEPARTMENT TO PERFORM THE TAP.

THE MAXIMUM BEND OF ANY COMBINATION OF TWO ADJACENT FITTINGS SHALL NOT EXCEED 45° (ONE-EIGHTH BEND) UNLESS STRAIGHT PIPE OF NOT LESS THAN THREE FEET IN LENGTH IS INSTALLED BETWEEN SUCH ADJACENT FITTINGS.

PROVIDE GREASE TRAP OR GREASE INTERCEPTOR IN ACCORDANCE WITH DOE CRITERIA FOR SEWAGE WORKS DESIGN LATEST EDITION, OR AS APPROVED BY THE TOWN.

7.05 CROSSINGS

ALL STATE HIGHWAY, RAILROAD, AND STREAM CROSSINGS SHALL BE ENCASED WITH A STEEL CASING OR DUCTILE IRON OR PVC SLEEVE, AS APPROVED BY THE TOWN AND PREVAILING REGULATORY AGENCIES. THE WELDED STEEL CASING OR SLEEVE SHALL BE OF SUFFICIENT DIAMETER, SIZE AND STRENGTH TO ENCLOSE THE SEWER PIPE AND TO WITHSTAND MAXIMUM HIGHWAY OR RAILROAD LOADING. SIZING AND WALL THICKNESS OF CASING IS SUBJECT TO APPROVAL BY THE PUBLIC WORKS DIRECTOR. LINK SEAL, FOAM OR GROUT FILL BETWEEN THE CASING AND THE SEWER PIPE SHALL BE REQUIRED TO HOLD THE SLEEVE AND PIPE APART AND SEAL THE ENDS.

7.06 STREET PATCHING AND RESTORATION

SEE SECTION 5 FOR REQUIREMENTS REGARDING STREET PATCHING.

7.07 ADJUSTMENT OF NEW AND EXISTING UTILITY STRUCTURES TO GRADE

SEE SECTION 5 FOR REQUIREMENTS REGARDING STREET PATCHING

7.08 FINISHING AND CLEANUP

BEFORE ACCEPTANCE OF SEWER SYSTEM CONSTRUCTION, ALL PIPES, MANHOLES, CATCH BASINS, AND OTHER APPURTENANCES SHALL BE CLEANED OF ALL DEBRIS AND FOREIGN MATERIAL. AFTER ALL OTHER WORK ON THIS PROJECT IS COMPLETED AND BEFORE FINAL ACCEPTANCE, THE ENTIRE ROADWAY, INCLUDING THE ROADBED, PLANTING, SIDEWALK AREAS, SHOULDERS, DRIVEWAYS, ALLEY AND SIDE STREET APPROACHES, SLOPES, DITCHES, UTILITY TRENCHES, AND CONSTRUCTION AREAS SHALL BE NEATLY FINISHED TO THE LINES, GRADES AND CROSS SECTIONS OF A NEW ROADWAY CONSISTENT WITH THE ORIGINAL SECTION, TO THE SATISFACTION OF THE PUBLIC WORKS DIRECTOR.

DRAINAGE FACILITIES SUCH AS INLETS, CATCH BASINS, CULVERTS, AND OPEN DITCHES SHALL BE CLEANED OF ALL DEBRIS WHICH IS THE RESULT OF THE OWNER'S OPERATIONS.

ALL PAVEMENTS AND OIL MAT SURFACES, WHETHER NEW OR OLD, SHALL BE THOROUGHLY CLEANED. EXISTING IMPROVEMENTS SUCH AS PORTLAND CEMENT CONCRETE CURBS, CURB AND GUTTERS, WALLS, SIDEWALKS, AND OTHER FACILITIES WHICH HAVE BEEN SPRAYED BY THE ASPHALT CEMENT SHALL BE CLEANED TO THE SATISFACTION OF THE PUBLIC WORKS DIRECTOR.

CASTINGS FOR MANHOLES, VALVES, LAMP HOLES, VAULTS AND OTHER SIMILAR INSTALLATIONS WHICH HAVE BEEN COVERED WITH THE ASPHALT MATERIAL SHALL BE CLEANED TO THE SATISFACTION OF THE TOWN.

7.09 CLEANING AND TESTING

PRIOR TO THE COMPLETION OF WORK, THE CONSTRUCTED SANITARY SEWER SYSTEM SHALL BE CLEANED AND TESTED IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 7-17.

7.10 GENERAL GUARANTEE AND WARRANTY

THE OWNER SHALL BE REQUIRED, UPON COMPLETION OF THE WORK, AND PRIOR TO ACCEPTANCE BY THE TOWN, TO FURNISH THE TOWN A WRITTEN GUARANTEE (MAINTENANCE BOND) COVERING ALL MATERIAL AND WORKMANSHIP FOR A PERIOD OF TWO YEARS AFTER THE DATE OF FINAL ACCEPTANCE AND SHALL MAKE ALL NECESSARY REPAIRS DURING THAT PERIOD AT THEIR OWN EXPENSE, IF SUCH REPAIRS ARE NECESSITATED AS THE RESULT OF FURNISHING POOR MATERIALS AND/OR WORKMANSHIP. THE OWNER SHALL OBTAIN WARRANTIES FROM THE CONTRACTORS, SUBCONTRACTORS AND SUPPLIERS OF MATERIAL OR EQUIPMENT WHERE SUCH WARRANTIES ARE REQUIRED, AND SHALL DELIVER COPIES TO THE TOWN UPON COMPLETION OF THE WORK.

EASEMENT DOCUMENTS, IF APPLICABLE, SHALL BE FILED AND RECORDED WITH THE OKANOGAN COUNTY AUDITOR'S OFFICE AND THE DOCUMENTS REVIEWED BY THE TOWN'S ATTORNEY PRIOR TO PROJECT ACCEPTANCE.

 Eying neering ning
 MC. DATE
 DESCRIPTION
 BY

 Olympia
 25.482.2893
 ACCOUNTY
 ACCOUNTY
 ACCOUNTY
 BY

Surveying
Engineering
Planning
Woodinville Olympia

Kent Woodinville
20210 142nd Avenue NE
Woodinville, WA 98072

ALM PLANNED DEVELOPMENT
ORCHARD HILLS



JOB NUMBER: C22-246

DRAWING NAME: C22246P-WS-DT

DESIGNER: SWP

DRAFTING BY: RCR

DATE:

WS-03

SDICTION: CITY OF TWIS

SHEET 3 OF 3

