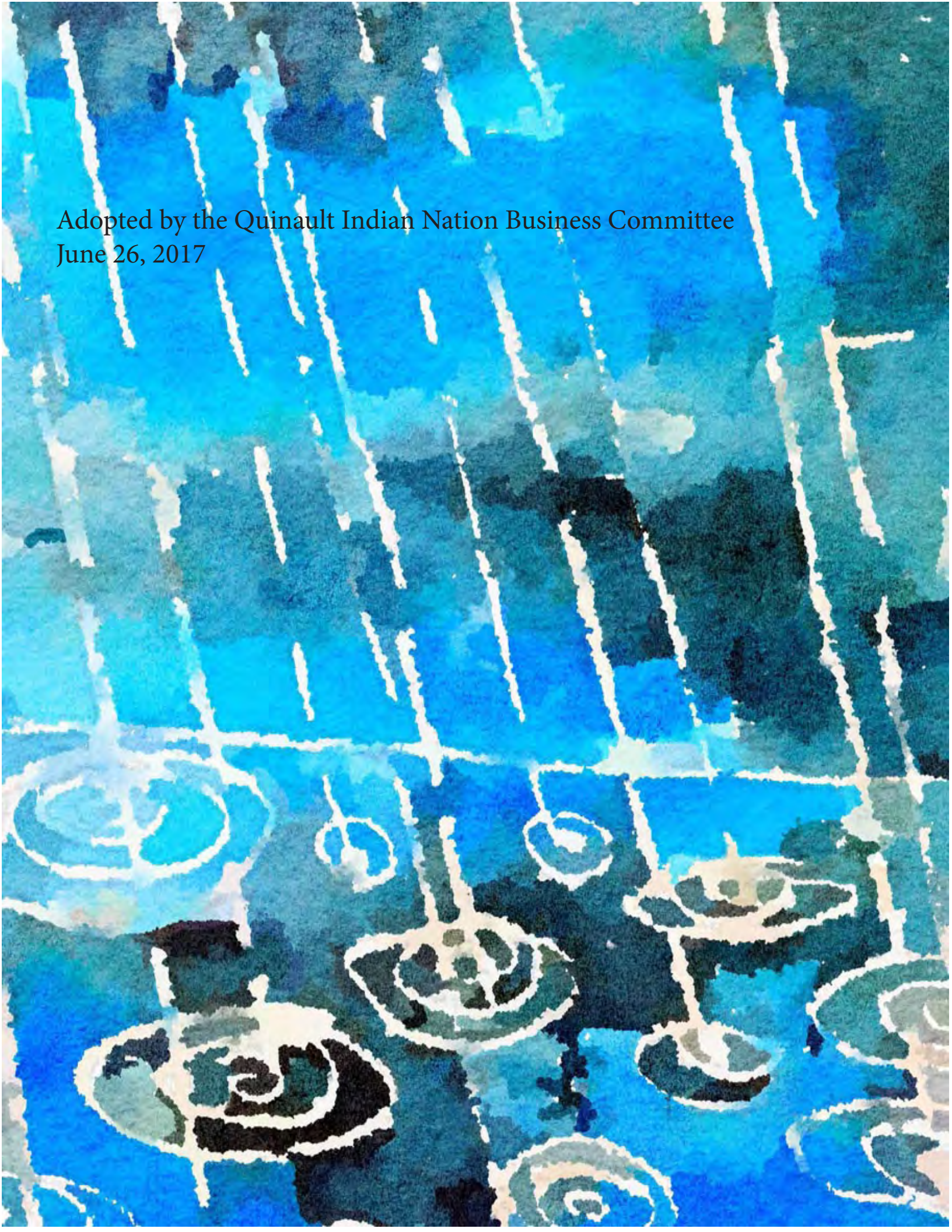


The Taholah Village Relocation Master Plan



Adopted by the Quinault Indian Nation Business Committee
June 26, 2017



This Master Plan was prepared by the Quinault Indian Nation Community Development and Planning Department. The Department would like to acknowledge those who have helped shaped the vision and the Master Plan:

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Quinault Indian Nation Business Committee

Fawn Sharp - President
Tyson Johnston - Vice President
Latosha Underwood - Secretary
Larry Ralston - Treasurer
Gina James - First Councilman
Jim Sellers - Second Councilman
Aliza Brown - Third Councilman
Noreen Underwood - Fourth Councilman
Dawneen DeLaCruz - Fifth Councilman
Clarinda Underwood - Sixth Councilman
Thomas Obi - Seventh Councilman

QIN Planning Staff

Charles Warsinske, RLA, Community Development and Planning Manager
Kelsey Moldenke, AICP LEED AP, Senior Planner
Sue Kalama, Administrative Assistant
Richard Carpenter, Land Use Planner
Carl Smith, AICP LEED AP, Environmental Planner

Artwork:

Chapter Page Watercolors - Coates Design Architects
Salmon, Tree and Sun - Doug James

Those who provided input or assistance:

Andrea Halstead, Chief Operating Officer
Patrick Hopper
Garrett Phillips
Teddy Wallace
Patricia Dunn
Marquel Waugh
Jesse Cardenas
Larry Workman
Marvin Oliver
Kathy Law
Quinault Housing Authority
QIN Finance Division
QIN Division of Natural Resources
QIN Division of Health and Wellness
QIN Division of Administration
QIN Division of Community Services
QIN Public Safety
QIN Office of the Attorney General
Quinault Land and Timber Enterprise
Kaul Design Associates
Coates Design Architects
Administration for Native Americans
Bureau of Indian Affairs
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EXECUTIVE SUMMARY

This document constitutes the Taholah Village Relocation Master Plan. It discusses the process of creating a vision and development plan for the project, establishes development and design standards for ensuring a quality community, determines infrastructure demands, incorporates culture, and sets forth implementing this project through phasing and financing.

Relocating an entire village is a rare undertaking, although as sea levels rise and awareness of the past earthquakes and tsunamis caused by the Cascadia Subduction Zone grows, the need to relocate the Lower Village of Taholah increases. Already subject to minor flooding during storms, after an 9.2 earthquake caused by the Subduction Zone, Taholah could be inundated by up to 50 feet of water. This would likely lead to mass casualties, as residents would have little time to escape to higher ground, as well as a total loss of property in the Lower Village. One-fifth of the Quinault Indian Nation (QIN) lives in the Lower Village of Taholah. Many facilities, including emergency services and the museum, the main repository for Quinault culture, are threatened by damage from a tsunami.

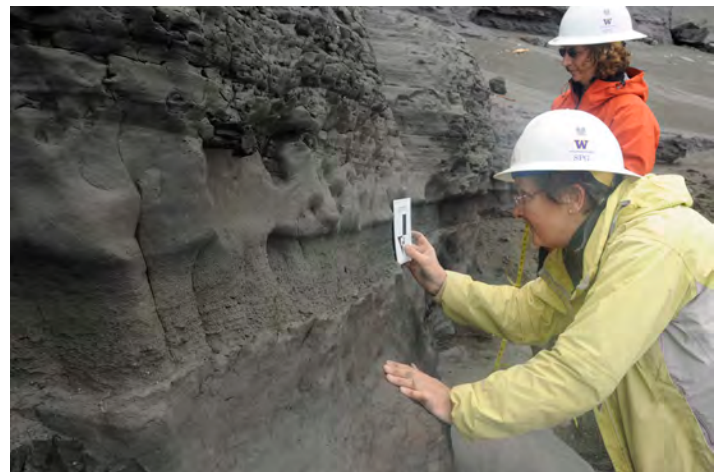
The new Upper Village of Taholah will be a mixed-use community consisting of approximately 300 dwellings units, approximately 200,000 square feet of community facilities and commercial buildings, as well as parks, trails, and open space. Comprised of five QIN-trust allotments, the total site area is approximately 207 acres.

The Taholah Village Relocation project will utilize and expand upon the history of the Lower Village, while introducing new housing concepts, steps to become a more resilient community in the face of disaster, and energy efficiency measures. Development and design standards have been incorporated into this document, in order to create a framework which reinforces the structure, character and quality desired for this community. These guidelines address building parcels, home lots, architecture, civil engineering and landscape architecture.

A phasing program has been designed to provide for development in a logical manner. Phasing will ensure that necessary roadways, site grading, and utility backbone improvements and easements will occur in a timely manner.

Numerous financing mechanisms may be required to facilitate and implement the development and operation of major infrastructure items and essential community facilities.

The Taholah Village Relocation Master Plan emphasizes the creation of a livable, pedestrian-oriented community that will provide for a unique Quinault identity and variety in housing in a safe location.

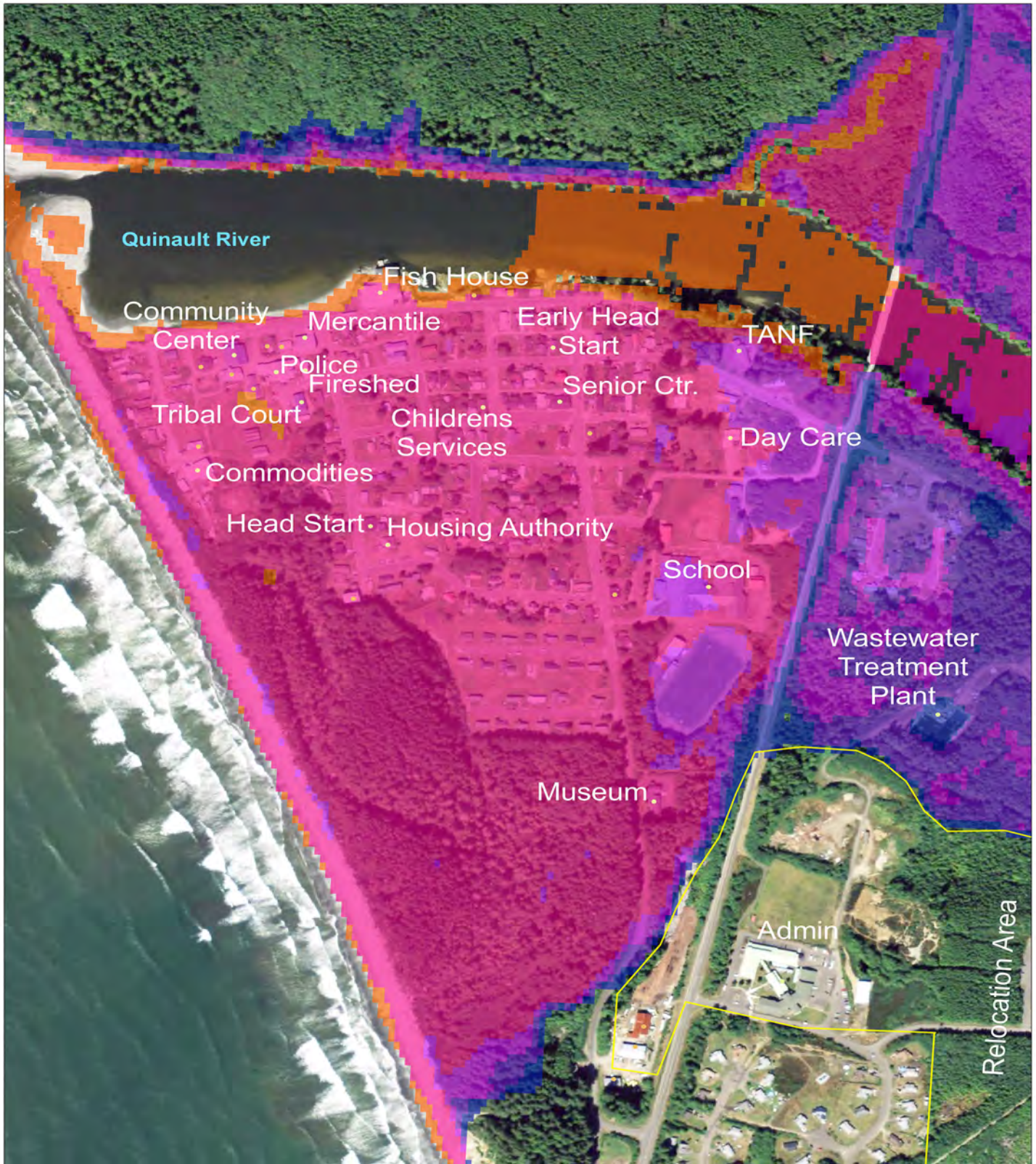


Geologists examining evidence of past tsunamis north of Taholah. Photo by Larry Workman

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History and the Need to Relocate





Lower Village Inundation Map with Various Community Buildings

Legend

● Important Community Buildings	Inundation Depth (meters)	6.1 - 9 (20 to 30 ft)	15.1 - 18 (49 to 59 ft)
● Other Community Buildings	0.1 - 3 (<10 feet)	9.1 - 12 (30 to 40 ft)	18.1 - 21 (59 to 69 ft)
— Relocationbdnyw3062	3.1 - 6 (10 to 20 ft)	12.1 - 15 (40 to 49 ft)	21.1 - 23.1 (69 to 76 ft)

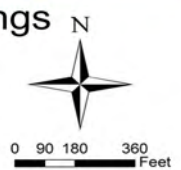


Figure 1-1: Lower Village Inundation Map



HISTORY AND THE NEED TO RELOCATE

The QIN has always depended on the Quinault River and the Pacific Ocean for sustenance. Both have played integral roles in the Nation's identity and survival. The Quinault traditionally lived in villages along the river and at its mouth. However, this proximity to the ocean and river threatens residents in low-lying areas. Tsunamis, flooding and rising sea levels associated with climate change could inundate villages and result in loss of life and devastating property damage.

According to geologists, 8.0 or greater magnitude earthquakes along the Cascadia Subduction Zone (CSZ) occur, on average, approximately every 500 years. The CSZ lies approximately 50 miles off-shore from Taholah. Historical records from Japan and physical evidence, such as the Ghost Forest along the nearby Copalis River, indicate that the most recent of these quakes occurred in January 1700. In the case of a 9.0 magnitude earthquake, the whole western side of the Olympic Peninsula might drop up to six feet, making low-lying areas even more vulnerable to tsunamis and later coastal flooding.

Taholah, the largest village on the reservation, is located at the confluence of the Quinault River and the Pacific Ocean and therefore is particularly vulnerable to rising waters and tsunamis. When Taholah was platted by the Bureau of Indian Affairs around 1915, the town was laid out on estuary soils and fill, making the village subject to liquefaction and to greater danger than would occur had it been laid out on a more solid footing. The draft FEMA Flood Insurance Rate Map (FIRM) for Taholah (2015) places the lower village west of Highway 109 in the one-percent flood zone and subject potentially to high flood insurance rates.



Lower Village of Taholah. Photo by Larry Workman

Tsunami modeling conducted by the Washington State Department of Natural Resources predicts that the lower village of Taholah would be entirely submerged to a depth of 40 feet if there were a 9.0 earthquake on the Cascadia Subduction Zone offshore. In the case of tsunami, there would be little time for residents to escape; a tsunami caused by an earthquake associated with the CSZ could reach Taholah within 20 minutes of the event. The United States Geological Survey estimates an evacuation time of nearly twenty minutes from the northwestern part of the village (assuming ideal conditions). Please refer to Figure 1-2.

Even minor storm events can endanger the lower village. In March 2014, a storm surge breached the seawall that protects Taholah, causing the QIN to declare a state of emergency. While the seawall was reconstructed after that event, the seawall is not a permanent solution. In December 2015, waves nearly topped the seawall during a minor storm. In March 2016, residents could canoe between First Street and the police station because of localized flooding likely

Localized Flooding on First Avenue After a Storm. Photo by QIN Planning Dept.





Sea Wall during a Storm, 2015. Photo by QIN Planning Dept. caused by the flooding of Long Pond, which lies south of the seawall.

c. 1885 Sketch of Taholah by Sarah Willoughby Special Collections Division, University of Washington Libraries, Negative No: NA4045

The safety of the nearly 700 people (about 20% of tribal membership) who live and work in the flood and tsunami zones in the Lower Village of Taholah is threatened by rising waters. At risk are nearly 100 tribal elders; 150 children who live or attend school in the lower village; 175 homes; a K-12 school; Head Start and day care facilities; the Senior Programs Center; The Mercantile; the Quinault Pride Fish house; the Quinault Cultural Center; police, fire, health, and other community facilities; administrative offices, such as those for the Tribal Court, Recreation, the Housing Authority, and the Quinault Nation Enterprise Board; and infrastructure for water, sanitation, communications, and transportation.

The Lower Village of Taholah is threatened, not only by the CSZ-triggered tsunami, but also rising sea levels caused by climatic change which may lead to increased flooding of the village. According to *Preparing for a Changing Climate: Washington State's Integrated Climate Response Strategy*, "for the central and southern Washington coasts, the medium estimate is an increase of 5 inches by 2050 and 11 inches by 2100. Increases of up to 3 feet for the northwest Olympic Peninsula, 3.5 feet for the central and southern coast, and 4 feet for Puget Sound by 2100 cannot be ruled out at this time due to large ranges for accelerating rates of ice melt from Greenland and Antarctica."

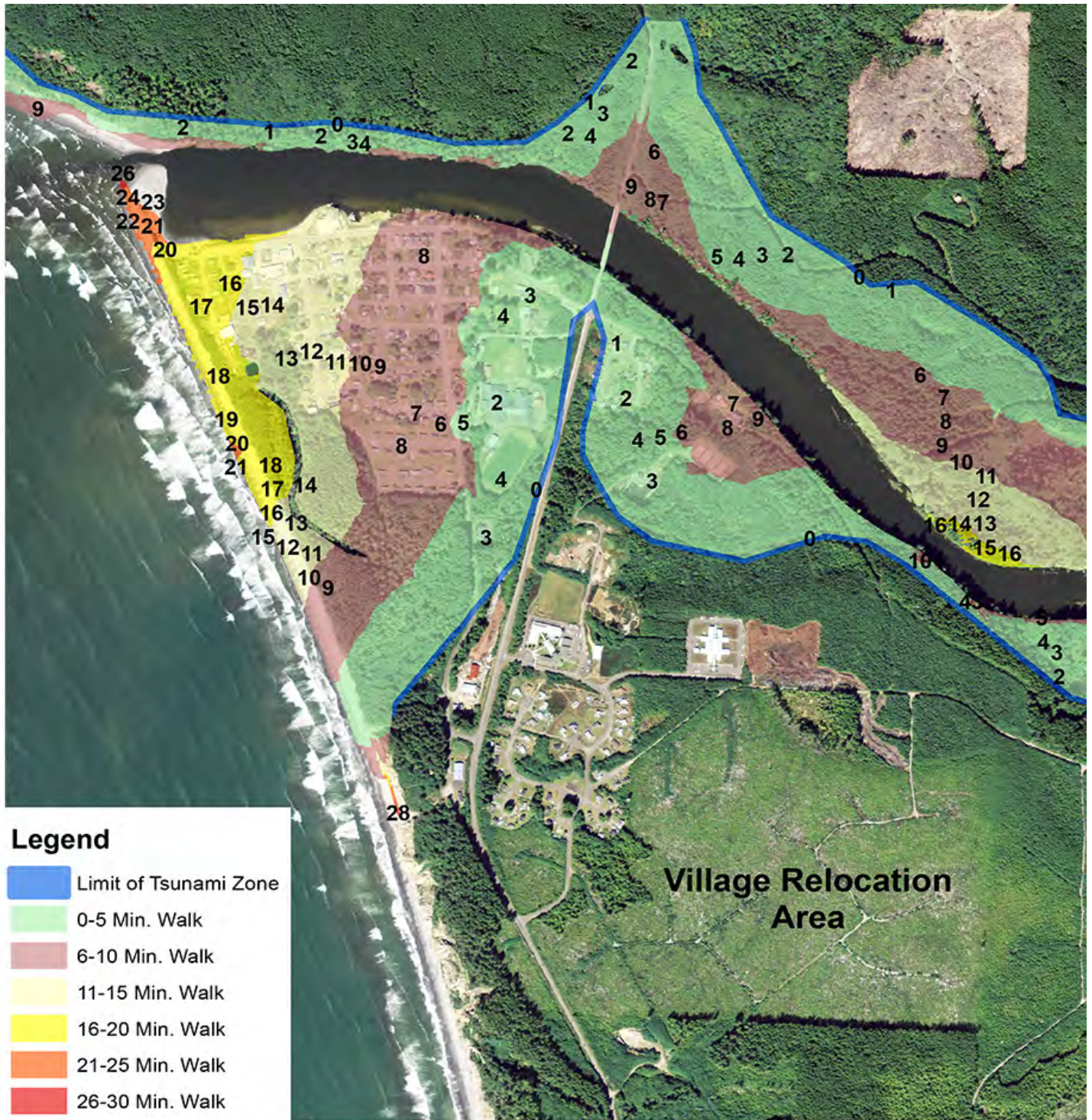
HISTORY OF MOVING

The 2016 All Hazards Mitigation plan strongly recommended that an "orderly and long-term progression of services, houses and businesses to the Upper Village" be undertaken, given the threat posed to the Lower Village by tsunamis. In 2012, visioning and community outreach called *Noskiakos* was initiated. *Noskiakos* was named for a former village at the mouth of the Quinault River. Community members identified their most immediate priorities through this process. The highest priority identified was relocation of the Head Start and Day Care programs. The next priority was relocation of the Senior Program and Youth Programs. Relocation of emergency services was also frequently mentioned. Community members stated that housing and essential services should be phased together for continuity.

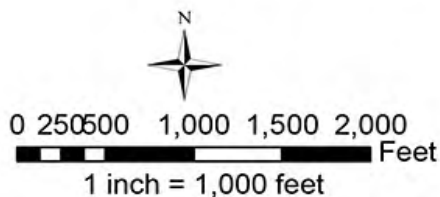
Most comments regarding housing reflected a desire for single family housing, but some community members mentioned a need for apartment units. Community members wanted both formal and informal gathering areas, such as the Mercantile, to be included in the Upper Village design. Visual and trail connections down to the river and ocean were also requested by community members.

THE RELOCATION PLAN

With support from the community, QIN leadership made the difficult decision to begin planning for relocating the lower village of Taholah to approximately 200 acres of higher ground 1/2 mile



Walking Times to Safe Area Above Tsunami Zone Taholah, WA



Data created and provided by USGS
Map created by QIN Planning Dept.



Figure 1-2: Walking Times to Safe Areas



Figure 1-3: Extent of Modeled Tsunami in Taholah. Rendering by QIN Planning Dept.

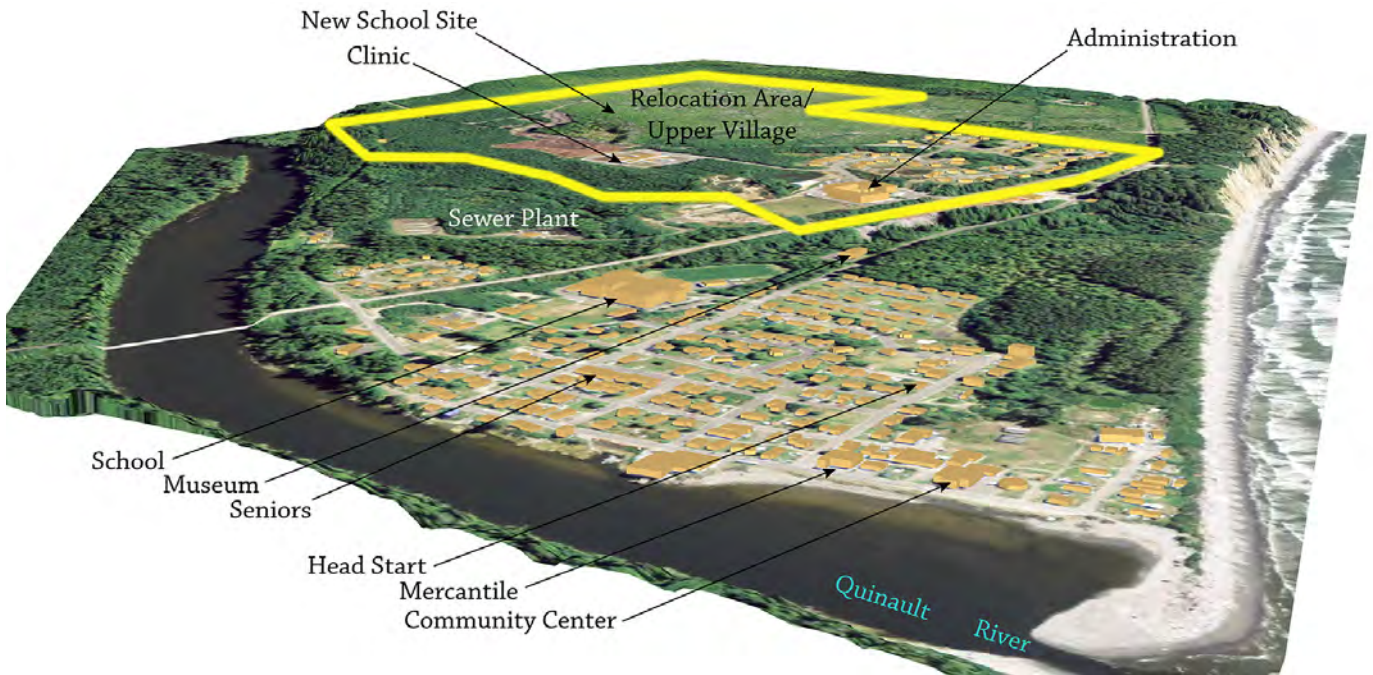
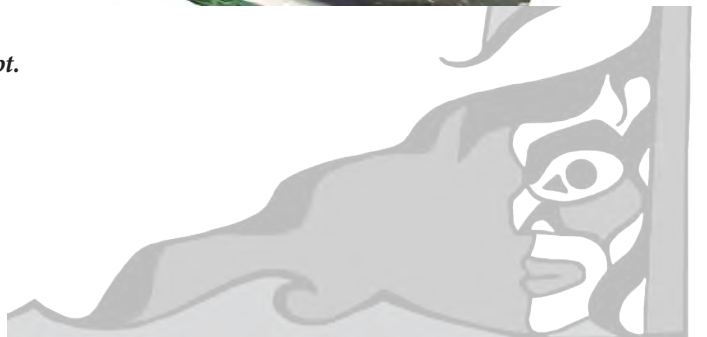


Figure 1-4: Existing Taholah Rendering by QIN Planning Dept.





from the existing village center. Development of this Master Plan was initiated in the spring of 2014 with support from a Social and Economic Development Strategies (SEDS) grant from the Administration for Native Americans. This Master Plan articulates land uses, private and public development standards, lot lines, and the location and design of public buildings and facilities. The aim is to provide the residents and businesses of the lower village with the opportunity to move to a safer place in a manner that ensures continuity in government service provision and affordable housing options for those who wish to relocate. The Relocation Area lies within the Taholah Infrastructure Growth Boundary (IGB), the area set aside for future development of the Village.

Because Taholah is relatively isolated and likely will be among the last areas to receive emergency aid, the Master Plan includes the best ways for the village to be resilient in case of disaster. This includes backup power and emergency water supplies and armoring of the wastewater facility.

The construction of the Multi-Use Building for the Senior Program, Day Care, Early Head Start and Head Start will commence shortly. This building is the first project to be designed and constructed, following the priorities set in the initial Noskiakos study.

Existing Taholah

The population of Taholah is approximately 825; approximately 660 of these residents live in the Lower Village. There are 175 residential units in the Lower Village; all but 10 of these are single family homes. The Quinault Housing Authority leases one five-unit building for elder housing, one duplex and one-triplex. Public buildings are located throughout the village. Administration, Natural Resources and the Health Center are located in the upper village. In the lower village, there is a small core of public buildings near Quinault Street and Second Avenue (Mercantile, Community Center, Police, Courts, Fish House); the remaining public buildings are dispersed throughout the residential area. Most of the residential areas in the Lower Village are within a five-minute (quarter-mile) walk of an important public facility (the Mercantile,

Senior Center, School, Health Center).

A large, permanent settlement pattern is relatively new to the Quinault. Historically, the Quinault lived in small villages or seasonal encampments along the length of the Quinault River. In fact, the name Quinault was adapted from Kw'i'nail, the name of a village at the mouth of the river, where Taholah stands today.

According to the QIN Comprehensive Plan, “families dispersed to different locations throughout the year along the length of the river, depending on the season and resource availability. Temporary camps consisted of simple shed roof or A-frame structures that were covered with mats. In some cases families built semi-permanent structures where resources could be consistently harvested. Longhouses were built of cedar posts, cross beams and stringers. The roofs and walls were made of split cedar planks which could be disassembled and transported to other locations when necessary.”

This free, seasonal movement ended in the late 1800s, with the establishment of land ownership and subdivision of land under the General Allotment Act of 1887, also known as the Dawes Act. The Dawes Act divided reservation land into allotments for tribal members, for the stated purpose of agricultural production. Land that was not allotted to Quinaults was allotted to members of other tribes and the remainder of reservation land was sold off to homesteaders. Shortly after 1910, the Bureau of Indian Affairs platted Taholah with a grid street pattern and established lots and ownership. Much of the Lower Village of Taholah was built on fill and therefore is now subject to liquefaction in earthquakes.

Public Buildings

Community Buildings in the Lower Village include:

- Community Center
- Taholah School

Offices and Services:



Taholah Village Relocation Master Plan

- Roundhouse: Communications (Newspaper and many records), Public Defender, Construction Management, Emergency Management, Director of Community Services
- Building Maintenance
- Child Support Services
- Commodities
- Community Development
- Day Care, Head Start and Early Head Start
- Diabetes Program
- Recreation
- Education
- Museum
- Senior Program
- Temporary Assistance for Needy Families (TANF)

Emergency Services and Justice:

- Police
- Criminal Court and Office of the Attorney General

Division of Natural Resources:

- QDNR Fisheries Storage
- Fire

Housing:

- Quinault Housing Authority offices and maintenance building

Enterprises:

- Quinault National Enterprise Board and associated accounting office
- The Mercantile
- Quinault Pride Fish House

Semi-public Uses

There are two religious institutions in the Lower Village, the Shaker Church and a new church on Cuitan Street near the TANF Building. The other church in Taholah is located on land above the tsunami zone. There are no other semi-public uses.

Recreation and Parks Facilities

Along with the recreation building, there are a few other recreational facilities in the Lower Village. There are a football field, softball field, basketball hoops



Top: Senior Building, Lower Village

Bottom: Taholah Mercantile, Lower Village

Photos by QIN Planning Dept.

and playground equipment at the school. There is an additional basketball hoop along Spruce Street and a playground between Pine and Cedar Streets. In the Upper Village, a basketball court and playground are located in the center of the Snob Hill development. The old Seabreeze baseball fields between First and Second Avenue have been abandoned and replaced by a field in the Upper Village to the north of the Administration Building. The field was built by and is maintained by the Taholah School District.

THE RELOCATION AREA

The Village Relocation Area, as selected by the Quinault Indian Nation Business Committee is comprised of all or part of five allotments, roughly ½-mile southeast of the lower village of Taholah. The Relocation area varies in elevation from 164 feet to 26 feet (the general elevation of the tsunami



zone along the northern edge of the Relocation Area near the wastewater treatment plant). Currently, the Relocation area can be seen as three topographically distinct areas. The southern half of the site is a plateau sloping from the high point of 164 feet along the Area's eastern boundary to State Route 109 in the west. This area is currently undeveloped, other than a few overgrown logging roads. North of the plateau, the site slopes steeply downward. This slope is the second distinct topographic area. At the toe of the slope there is a second flat area, or bench, on the top of bluffs above the river. This bench extends from the eastern boundary of the area to State Route 109. The northern edge of this bench is the northern boundary of the Relocation Area. The land to the north of the bluffs then slopes down to lower-lying areas and eventually to the river.

The Village Relocation Area is composed of two full allotments (164, 164A) and the areas above the tsunami zone on three allotments (162, 163 and 3062). There has been limited development on two allotments and no development on three of the allotments (164, 164A, 162). The Quinault Indian Nation owns or has substantial control of Allotments 162, 163, 164, 164A and 3062. The portion of 163 in the Relocation Area is generally flat, at an elevation of 128 feet. The Roger Saux Health Center is located on Allotment 163 along Kla Ook Wa Drive and currently the only development on this allotment. The remainder of the allotment is forested with trees less than twenty years in age.

Allotment 162, to the east, will be the location of the new Taholah School and Multi-Use Building (Senior Program, Day Care, Head Start and Early Head Start). The allotment is generally forested with trees less than twenty years old; the areas for the new school road and Multi-Use Building have been cleared. Two wetlands are also present on the allotment, an approximately 3-acre site just to the south of the Capoeman Ranch Road and a 1/3-acre wetland east of the homes on Aalis Drive on the northwest portion of Allotment 164A.

The Administration and Quinault Division of Natural Resources buildings, along with the Archives Building, the Sewage Treatment Plant and the upper baseball

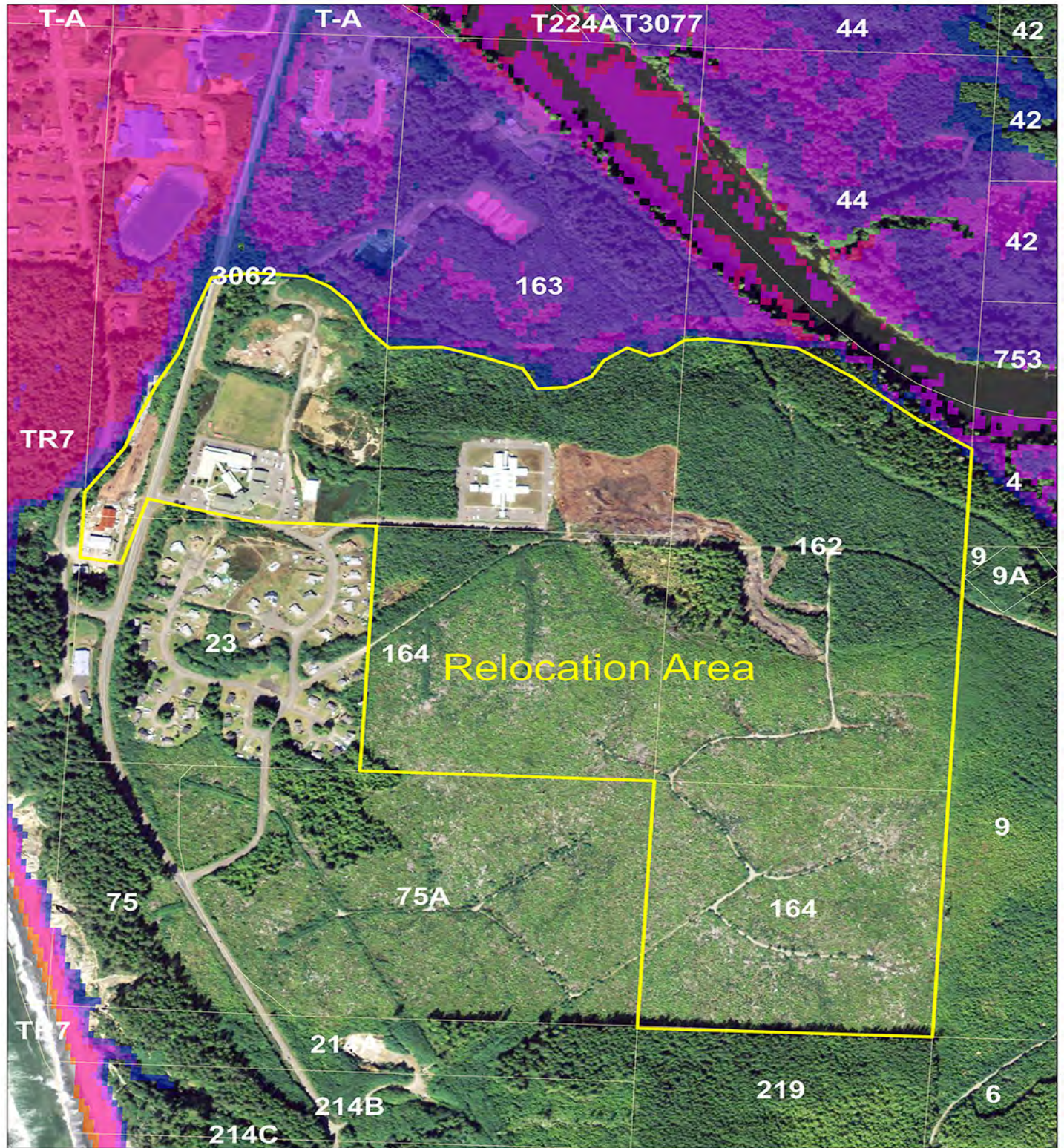
field, are located on Allotment 3062. Allotment 3062 slopes downward towards the river from elevation 90 to elevation 20 feet. Approximately half of Allotment 3062 is located above the tsunami zone. All existing uses are located above the tsunami zone except for the Sewage Treatment Plant. The allotment was previously used as a quarry and garbage dump. Much of the area of this allotment is still available for development.

Allotments 164 and 164A are generally flat and are forested by small trees. Allotment 164 drains to the west and 164A drains both to 163 to the north and to the south. Capoeman Road serves the residences on Snob Hill via an easement across adjacent Allotment 75A. There are no identified streams within the Village Relocation Area boundaries. The Relocation Area is surrounded by forest lands to the south and east, State Route 109 and the residential area of Snob Hill to the west, and lowlands within the tsunami zone sloping to the Quinault River to the north.

Existing Conditions

The soils within the Relocation Area are largely Joe Series, a well-drained gravelly soil. The soils associated with the large wetland are of the Sekiu Series, a poorly draining soil type. There are no areas prone to landslides or liquefaction within the Relocation Area (South Sound Geotechnical Consulting Geotechnical Report, June 3, 2014). There is generally a 2- to 4-foot layer of silt and clay and 1 to 2 feet of organic material, including stumps, on top of the silt and clay. Sand and gravel lie beneath the silt and clay. This organic material will need to be removed before infrastructure installation. Infiltration will be feasible in the areas of sand and gravel. Retention or detention facilities would be required in areas of silt and clay. Excavation to the gravel layer via drywells will facilitate infiltration.

The prevailing winds are from the west year-round. In the summer the winds come from the northwest and in the winter, the southwest. There are no endangered species or critical habitat in the Relocation Area. A large wetland will be retained in the northeastern portion of the site, as will a smaller wetland behind the existing homes on Aalis Drive.



Relocation Area Allotments

Legend

Relocation Area Boundary	Inundation Depth (meters)	6.1 - 9 (20 to 30 ft)	15.1 - 18 (49 to 59 ft)
Allotments	0.1 - 3 (<10 feet)	9.1 - 12 (30 to 40 ft)	18.1 - 21 (59 to 69 ft)
White Numbers are Allotment Numbers	3.1 - 6 (10 to 20 ft)	12.1 - 15 (40 to 49 ft)	21.1 - 23.1 (69 to 76 ft)

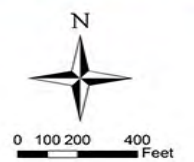


Figure 1-5: Allotment Map



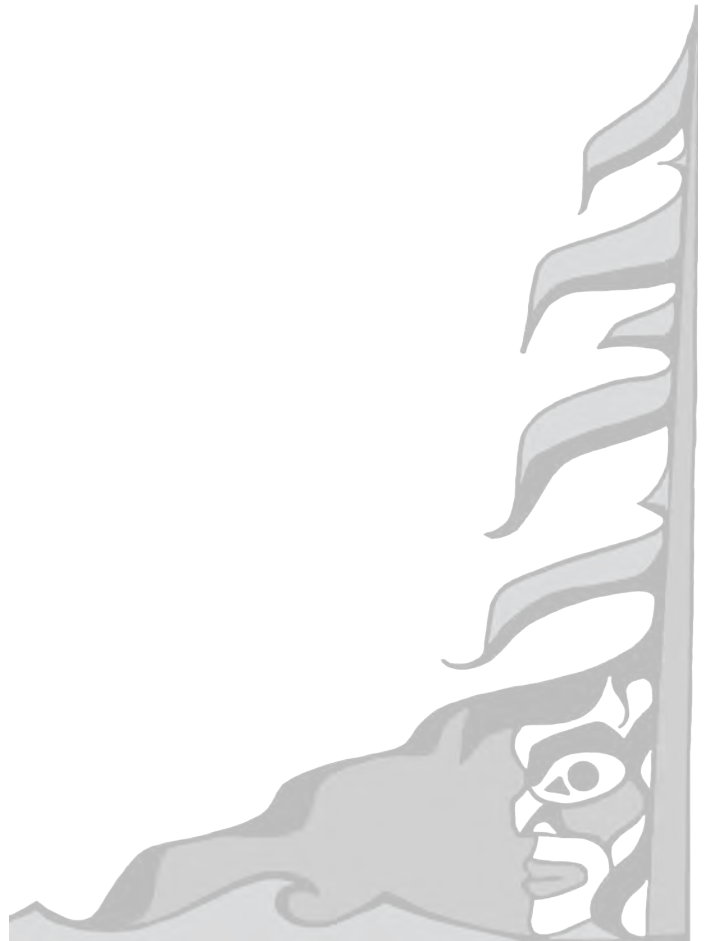
Views from the Relocation Area are relatively limited due to tree cover in the surrounding areas. Selective cutting could open up view corridors in selected locations to visually link the upper village with the Quinault River and the ocean.

The Relocation area is generally forested. The forested areas towards the north of the site were planted in the 1990s. The remainder of the forested area, roughly Two-thirds of the site was last harvested in 2005 and replanted in 2006. There are no records of endangered plants in the Relocation Area. No pesticides, herbicides or fertilizers are known to have been used in the Relocation Area, as there is a Business Committee resolution restricting the use of such chemicals on forest plots across the Reservation. This Plan envisions that a mature forest will remain at the northeast corner of the site.





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A watercolor illustration of a dense forest. The scene is viewed from a low angle, looking up at several tall, slender tree trunks that rise vertically towards the top of the frame. The foliage is rendered in various shades of green, from light lime to deep forest green, with some areas showing hints of yellow and brown, suggesting sunlight filtering through the leaves. The sky at the top is a mix of light blue and white, with some darker blue streaks. The overall style is soft and painterly, with visible brushstrokes and a textured appearance.

Goals and Priorities



SCOPE AND PURPOSE OF THE MASTER PLAN

The Master Plan staff has conducted Village-wide meetings and door-to-door and on-line surveys to gain an understanding of conditions, community aspirations and how best to translate the culture of the Lower Village to the Upper Village. This information influenced community design and priorities that will guide the subdivision and land use plans. This Master Plan incorporates the needs of the community and provides for the appropriate community facilities and housing; infrastructure; and business, administrative, public health and safety and recreation facilities. The community had identified moving the programs of the most vulnerable populations as a priority even before commencement of the planning process.

Adhering to these goals will produce a walkable community denser than the existing Taholah with a greater mix of housing types, yet retain the rural feel of the community.

PUBLIC PARTICIPATION

Public participation has been critical to the preparation of this Master Plan. Information was solicited from community members at a series of community meetings and in various surveys over a two-year period. Staff set up booths at various community events to inform the public about the project and to talk with Quinault members about their concerns. Over the course of the preparation of the plan, seven community meetings and dinners were held at the Community Center. Staff also presented the project at an Elders' Dinner and set up informational tables at various other events, such as wellness fairs, the Tribal Picnic, and the Halloween party. Surveys were distributed and collected in association with the first three of these meetings, both at the meeting and on the project website. Staff went door-to-door in the lower village of Taholah to ask the public additional questions, educate community members about the plan, and answer questions. In the surveys and at the meetings, critical issues, concerns, challenges, community desires and partnerships were identified

and discussed.

The first survey question asked of community members was "What do you like about the community and what makes it special?" The most common answers were "our people," the river, the ocean, family, "our elders," "the closeness of our community", "that everyone knows each other", and "easy access to everything". From these responses, issues were identified and goals were set.

KEY ISSUES

During the public participation process, community members expressed their concerns regarding the relocation. This input, as well as feedback from staff members and the Business Committee, yielded nine main themes that the Master Plan should address. These themes include:

Elders

Quinault members have strongly indicated a desire to ensure that the needs of the elders are met as part of the Relocation, in terms of prioritizing both the relocation of facilities serving their needs, and providing easy access to these facilities once they are built. The design and construction of the Multi-use (Generations) Building, concurrent with the Master Plan, will be a major step in providing a modern space for elders with ample space and amenities above the tsunami zone. Other comments included a desire for one or two bedroom homes for seniors, concerns that parks and public spaces be accessible to elders and consideration of the financial situation of many elders in regard to costs of relocating to a new home.

Children

Along with elders, children are the highest priority for the residents of Taholah. Residents prioritized the early relocation of facilities geared towards children, including the school, Head Start programs and day care. Expansion of youth facilities, especially recreational facilities, was commonly mentioned in comments. The Multi-use (Generations) Building is a



positive first step in moving youth programs out of the tsunami zone.

Housing

Housing in the Upper Village is a major concern for Taholah residents. Residents asked many questions regarding house and lot size and how new homes would be paid for. Many residents were happy with their current lot sizes, though some residents needed homes for large families and others wanted smaller lots with reduced upkeep responsibilities. Based on comments at the community meetings and the surveys, the community is in favor of a mix of housing sizes and types. The Housing Authority expressed a desire to have the affordable homes scattered throughout neighborhoods, not concentrated in one area, where the homes can be more readily stigmatized. QIN Staff has also indicated a need for housing for the homeless and for people reentering the community after drug and other rehabilitation programs.

Culture

The Quinault people have a unique culture that can be integrated into the village design. Feedback from the community included a desire for areas for traditional basket-weaving materials to be grown and for art and language to be incorporated into the village to mark the village as Quinault.

Project Funding

The Relocation will be a significant investment of money, time and resources. Many concerns were raised at meetings and in surveys regarding how to fund various aspects of the project. This Master Plan outlines logical phasing for the housing, road and utility infrastructure and public facilities and link potential funding sources to each phase. The funding sources include Tribal revenue streams, foundations, government grants and various financial instruments, such as tax credit financing.

Public Facilities and Infrastructure

Community members expressed their opinions regarding the type of public facilities and gave some input as to preferred locations for various facilities, such as police and fire facilities. A substance abuse recovery/transition facility and laundry facilities were suggested in meetings. Safe streets, sidewalks and increased lighting were also suggested. Concerns of the community and the Business Committee have been incorporated in this Master Plan to generally site the required facilities and allow space for growth.

Recreation

Community members indicated that current recreation facilities in Taholah are lacking. Respondents mentioned a range of ideas for new recreation facilities, including a fitness walk and trails, more recreational opportunities and parks for youth, such as playgrounds and skate parks, a larger recreation facility than the Riverview Fitness Center, and an aquatic center. Taholah residents appreciated living in close proximity to playgrounds and sports facilities, such as basketball courts. There was a desire both for outdoor and indoor recreational facilities. Some residents preferred several small parks and other preferred one large park. Maintenance of the new recreational facilities (such as a swimming pool) was a concern to some residents.

Resilience to Disaster

Taholah is located at the end of State Route 109 and power and phone infrastructure lines. Community members were concerned about the water and power supplies, as well as facilities to be used as temporary shelter in case of disaster. Power outages are not infrequent, especially during winter storms. It is possible that, in the case of disaster, power from the Grays Harbor PUD will not be restored for months, perhaps up to two years. The Relocation provides an opportunity to plan for protecting existing infrastructure and finding effective backup strategies to provide essential services during a disaster. This is vital, as Taholah will likely be attended to last by



Federal and State aid agencies, given its location and population. New locations that are not in the tsunami zone must be found for emergency services.

The waterline servicing Taholah from the upriver well crosses the river on the SR 109 bridge and is vulnerable in the case of a tsunami. Maintaining a safe water supply in case the waterline is damaged in the earthquake and/or tsunami is of paramount importance.

Sustainability/Energy/Salmon:

The community members and Business Committee desire a community that is sustainable; after all, the Reservation is at risk from climate change. This plan examines and suggests home design and lot layout that are energy efficient. Alternative energy is incorporated as part of the plan for economic development, greenhouse gas reduction and resilience at the time of disaster.

Salmon are of extreme importance historically, culturally and economically to the Quinault. Thus, concern was expressed regarding cleanliness of water as it flowed off the site and potentially to salmon habitat. This plan emphasizes low impact stormwater development to limit any chemicals or excessive sediment from entering the river or ocean.

GUIDING PRINCIPLES

The desired outcome of this project is to identify and provide a blueprint for a village that will remove the residents of the Lower Village from imminent danger in a way that promotes public health, Quinault culture and sustainability.

Walkable Community

The Master Plan focuses on creating walkable neighborhoods to reduce greenhouse gas emission and improve public health through encouragement of walking, link parks and recreation facilities and mirror the existing development pattern of the Lower

Village. Various community members mentioned a need for walking paths in their surveys. Input from the Health and Wellness Division also indicated a desire for walking trails to improve health outcomes in the community, which is subject to high levels of obesity and diabetes.

Infrastructure Coordination

The Master Plan provides a detailed guide to development phasing, including infrastructure. The Master Plan includes street sections detailing the location of future stormwater, sewer, water and communications infrastructure. The Plan lists which infrastructure improvements must be completed before others can begin.

Culture

The inclusion of Quinault culture in the Master Plan will help create a unique village that provides residents and visitors of a sense of being in Quinault country. Culture can be manifested visually in art and traditional architecture and through the provision of facilities like salmon baking pits in the open space area. Less obviously, but just as culturally significant, the needs of the elders and children are prioritized.

Water Quality

Salmon has long been the staple food of the Quinault and the salmon runs continue to provide food to the Nation, as well as being a major economic driver for tribal members and the Quinault Nation Enterprise Board. Therefore, maintaining water quality in the Quinault River is paramount. The stormwater runoff that will be generated by the homes, commercial development, government buildings and roads in the Upper Village must not pollute the river. This Master Plan specifies the use of Low Impact Development stormwater facilities, including bioswales, detention and retention facilities and, where possible, infiltration measures. Bioswales and basins may be lined with native and culturally significant vegetation, including various reeds and camas.



Resilience

Given Taholah’s remote location and the probable severe damage that will be done to infrastructure in a major earthquake and tsunami, the village must be designed to be as resilient as possible. Even small events, such as windstorms, close roads and down power lines, isolating the village. Thus, planning for safe havens in case of disaster and alternative energy sources is a must when determining facility siting, sizing, orientation and programming.

PRIORITIES

Eventually all non-water related uses in the Lower Village will need to relocate to higher ground. Prioritization of the facility construction is important for life safety issues and infrastructure phasing. The following are the two categories of highest priority.

First Priority:

- Seniors, Head Start Early Head Start and Day Care Programs (prioritized 2007)
- Police and Courts
- Fire Station
- Community Center/Evacuation Center

Second Priority:

- Museum
- Maintenance Programs (Road, Building)
- Commodities
- Social Services, such as TANF, Child Support Services

This list is not exhaustive; buildings not on this list may be constructed before or concurrent with listed facilities. Schematic designs have been prepared for:

1. the Multi-Use (Generations) Building
2. the new community center/evacuation facility
3. a maintenance hub including Building Maintenance, Construction Management, Road Maintenance and the Rez Racer
4. the police station/courts building, and

5. the fire station.

The Taholah School is a priority for the community. However, the school is not under control of the QIN; the Taholah School District under the auspices of the State of Washington is responsible for the school relocation. Land has been set aside in the Relocation Area for the School and its accompanying sports fields. According to the Education Specification for the Taholah School prepared in 2011, a new school will be 86,000 square feet for K-12 classes. The Education Specification will need to be reviewed and updated before school design is undertaken by the Taholah School District. The northerly road to the school is approximately half complete. This extension of Kla Ook Wa Road was completed in 2015 from the Health Center to Capoeman Ranch Road.

The new Community Center is planned to be approximately 15,000 square feet. The Center will function much as the existing center in the Lower Village does, serving as the community space most used for community meetings, various fairs, sales, funerals and training sessions. The existing community center is one large hall with poor acoustics and audio/visual equipment. The new Community Center will contain smaller meeting rooms as well as a larger hall. There will be room dividers in the larger hall so that the hall may be transformed to a space that best fits the given function. A commercial kitchen is included to serve community functions, but will also address emergency needs.

The Community Center will also serve as the emergency shelter for Taholah. The bathrooms will be oversized and include shower facilities so that the Center can handle an influx of displaced residents. There will be extra storage for emergency supplies, such as cots and large tents. This facility could temporarily house 300 people.

Currently, there is no dedicated building for fire protection. A shed near the mercantile and part of the pole building near the wastewater treatment plant house much of the firefighting equipment. Thus, a central fire facility would greatly benefit



the community. The fire station is modeled on a design from a 2007 feasibility study. The proposed station is approximately 14,000 square feet. Space could be added for EMS personnel and equipment or EMS could be housed in a facility near the Health Center. The EMS facility will require secure storage for pharmaceuticals. The fire station will be located along the main entry road near State Route 109. Fire personnel expressed a desire to have fast access to State Route 109 to serve both upper and lower Taholah, as well as nearby areas, such as Santiago. Community members were concerned with siren noise and fire truck traffic and surveys showed a preference that the fire station be located away from the center of the village and most residential areas.

The Police Station will share a building with the courts and the combined facilities will encompass approximately 20,000 square feet. Currently, the police must escort defendants from the police station outdoors across a parking lot to the court facility, which is prone to security concerns and harsh weather. The new facility will allow secure, indoor escort of defendants to and from court. The courts portion of the building includes new or expanded facilities, such as more offices for probation officers; a jury room; designated bathroom facilities for substance testing; separation between the courtroom and lobby which is essential for cases requiring confidentiality; more difficult access for the public to the judge's chambers; and enough room for security screening equipment. The police area will also have new facilities, such as an armory, squad room and training room. Like the fire station, the police station will be located near State Route 109 and generally away from residences due to noise concerns, as well as security concerns inherent to a police facility.

The marine air of Taholah damages vehicles by promoting rust and corrosion. Most QIN maintenance vehicles are currently parked outside. Security issues regarding these vehicles have also occurred. There is a need to provide garages for these vehicles to prevent this harm to the Nation's investments. In the case of disaster, the tools and equipment of the various maintenance departments may be invaluable. Thus,

facilities for the roads and building maintenance programs, as well as construction management, are a priority. These programs will be housed together, along with the Rez Racer buses, in a new complex referred to here as the Maintenance Hub. It will consist of various garages and offices for each program. Space will also be set aside for a vehicle maintenance facility and vehicle washing facility. The maintenance hub will be located to the north and down the hill from the Administration Building.

The Multi-use (Generations) Building will be located to the east of the Health Center. Architectural and engineering design has commenced on this 32,000 square foot facility. The building will house the programs identified in 2007 as the first priority to relocate to higher ground, the Senior Program, Day Care, Head Start and Early Head Start. The language, education, recreation and MIS programs will also have space within the building. The children's programs will be protected by secured entries. A kitchen will serve the Seniors and children's programs and the building can serve as an interim emergency shelter until the completion of the new Community Center. Having the elders and children programs under one roof will provide opportunities for intergenerational interaction and learning. Various cultural facilities, such as fire pits, will be associated with the Seniors wing. The building is slated to open in 2018.

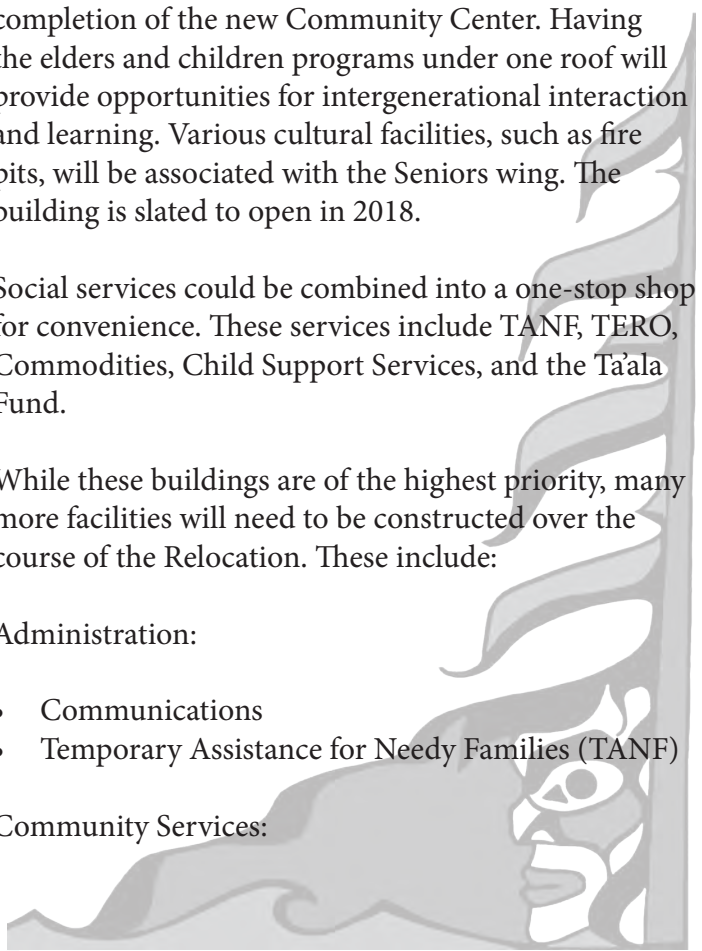
Social services could be combined into a one-stop shop for convenience. These services include TANF, TERO, Commodities, Child Support Services, and the Ta'ala Fund.

While these buildings are of the highest priority, many more facilities will need to be constructed over the course of the Relocation. These include:

Administration:

- Communications
- Temporary Assistance for Needy Families (TANF)

Community Services:





- Planning Department
- Custodial
- Other offices (Emergency Management, Director)
- Executive:
- Executive Offices Expansion
- Secured Storage Space

Finance:

- Filing Room
- Health and Wellness:
- Chemical Dependency
- Health Center Expansion

Public Safety:

- Animal Control

Quinault Department of Natural Resources (QDNR):

- Secure Storage for Storage for Fisheries, Environmental Protection, and Resource Protection

Quinault Housing Authority (QHA):

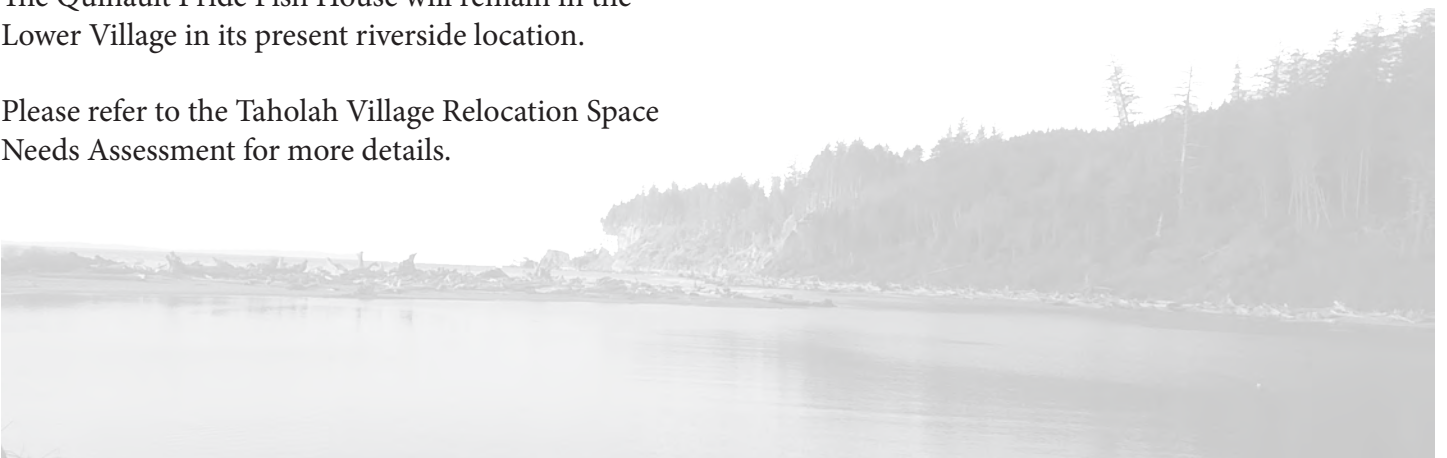
- Housing Administration
- Maintenance

Quinault Nation Enterprise Board (QNEB):

- Administration Offices
- Central Accounting
- Mercantile

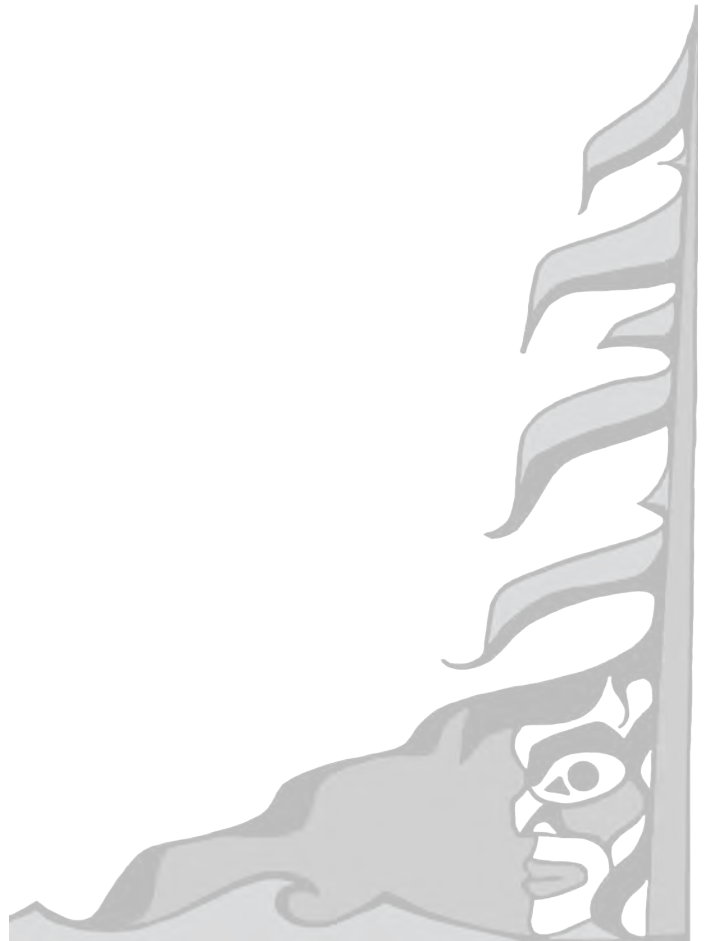
The Quinault Pride Fish House will remain in the Lower Village in its present riverside location.

Please refer to the Taholah Village Relocation Space Needs Assessment for more details.





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A watercolor-style illustration of a landscape. The scene features a winding river or path that flows from the upper right towards the lower left. The surrounding terrain is depicted with various shades of green, suggesting rolling hills and dense foliage. The sky is a mix of deep blues and lighter, hazy tones, with a prominent circular shape in the upper right quadrant that resembles a sun or moon. The overall style is soft and painterly, with visible brushstrokes and a rich, textured appearance.

Community Facilities



COMMUNITY FACILITIES

In January and February 2015, the Village Relocation Team met with the Division Directors, as well as other Quinault Indian Nation staff, to determine which facilities each division would require in the future. These facilities could be either new or expanded. The Relocation Team also met with the Quinault Nation Enterprise Board regarding its space needs for both its office uses and the Quinault Pride Fishhouse. This chapter also assesses the needed additional space and facilities that could be accommodated in the Upper Village, based on the staff interviews.

GOALS

- Identify the development needs of QIN programs and the requisite square footage of needed facilities
- Develop a vision for open spaces in the new village

EXISTING NEEDS AND FUTURE PLANS

All divisions have expressed a need for more space. Some needs are modest, such as Finance’s desire for less than 700 square feet more of space, while others are more significant, such as the new police and fire facilities, the Mercantile, and the Community Center. There is enough room in the Relocation Master Plan area for these facilities. The community and staff will need to decide on the new locations of these uses, whether any existing programs will be moved within the Upper Village, and which uses can be collocated. The community and staff will also need to prioritize the order in which these facilities are relocated. In the first section of this chapter, the needs of each division are tallied by department.

Approximately 125,000 square feet of new construction will be necessary to replace the existing facilities in the lower village, provide needed expansion for those facilities and provide required expansion for facilities already located above the Tsunami Zone, such as the Roger Saux Health Center.

Division	Space Needed (sq. ft.)
Administration	24,494
Community Services	20,012
Executive	1,608
Finance	632
Health and Wellness	34,568
Legal	8,100
Public Safety	24,250
QDNR	16,000
Quinault Housing	10,050
QNEB/QLTE	10,000
Other Facilities*	16,467
TOTAL	166,181

Figure 3-1: Space Needs

The following is a breakdown of necessary square footage of office space and other facilities by division (including replacement and additional needed space):

*Other Facilities includes the US Post Office, Bureau of Indian Affairs, the Community Center, Ta’ala Fund & Pacific Bank

For a more detailed description of the needed facilities and square footage, please refer to the Taholah Village Relocation Space Needs Assessment. Note that the Needs Assessment does not include the school or the Multi-use Building. Square footages for the Multi-Use Building are included in the chart above (19,500 square feet of Administration for Day Care, Head Start and Early Head Start and 10,500 square feet in Health and Wellness for the Senior Program).

The Taholah School (K-12) is located in the Lower Village and will need to be relocated. According to the Taholah School Master Plan, the new Taholah School will be approximately 85,000 square feet and cost approximately \$50 million. The school is described in further detail later in this chapter.



Administration Division

The Administration Division is primarily housed in the Administration Building in the Upper Village. However, several Administration Departments and Staff are located in facilities in the Lower Village. Lower Village facilities include Head Start on Second Avenue, Early Head Start on Cuitan Street, Child Support Services on Fourth Avenue, TANF on 5th Avenue, Communications in the Roundhouse and Education in the building adjacent to the Seniors Building. Functions of the Division in the Administration Building include the offices of the Chief Operating Officer and the Director, Human Resources, TERO, MIS, Centralized Records and the Mail Room.

Consolidation of some of these offices into one facility could prove advantageous, perhaps as part of a one-stop shop for community services (TANF, TERO, Commodities, etc), potentially along with social services provided by Health and Wellness.

The Head Start, Early Head Start and Day Care programs will anchor the new Multi-Use (Generations) Building, along with the Senior Program. This move will reduce the danger for the two most vulnerable populations in the village. The building will be approximately 30,000 square feet and will also house the Language, Adult Education and the Management Information Systems Department, all departments under the aegis of the Administration Division.

Community Services

Facilities for the Community Services Division are currently spread amongst several buildings in the Lower Village, including the Roundhouse, the Mini-Mall, the Building Maintenance building, the Recreation Facility, the Wastewater Treatment Plant, and the Custodial Building. Additionally, Road Maintenance and Vehicle Maintenance are located above the tsunami zone along 5th Avenue. The Rez Racer and some Utilities storage are located in the lower baseball field downhill from the administration building in a location above the tsunami zone. The Museum and Community Development and Planning

are located in the Mini-Mall.

Because the Museum is in the Tsunami Zone, priceless cultural knowledge and history is at risk of total loss. The Museum may relocate to Point Grenville or, more likely, to a location at the heart of the new village, just south of the Roger Saux Health Center. This location would provide a more secure location than Point Grenville, as community members will be nearby to report suspicious behavior, while Point Grenville is isolated and there are no “eyes on the street”. The location adjacent to a wetland may also allow for cultural landscapes to be created, such as a camas meadow that will complement the museum use. The museum is envisioned to have display space, a studio for making crafts, cold storage for items that potentially harbor damaging insects and an area for art sales. The Museum is anticipated to be approximately 5,000 square feet, more than tripling its current size.

A feasibility study for a Recreation Center has been commissioned, as an activity area for community members, especially the youth, has long been sought. The Recreation Center is envisioned to include indoor basketball courts, a fitness center, locker rooms, and potentially a swimming pool, a long-promised amenity. The Recreation Center will be located directly east of the Health Center, as facilities such as therapy pools could serve both programs. A room has been provided in the design of the Multi-Use (Generations) Building for the Recreation program for activities, such as showing movies.

Consolidation of some of these offices into one facility could prove advantageous. Several programs within the division could be housed in a central facility, with offices and storage in a building ideally designed based on the Roundhouse. This facility might house the division director, the Community Development and Planning Department, the Custodial Department, and Emergency Management. An ancillary shop facility for Building and/or Road Maintenance could be located adjacent to the office building or located elsewhere within the Relocation Area. The existing Road Maintenance facility is located to the west of State Route 109. The current location is above the tsunami zone, but the facility is run-down and



inadequate for the needs of the department. Trucks and heavy equipment are left outside, unsheltered from the salt air and weather, which causes the vehicles to deteriorate. Covered space for these vehicles is vital.

As part of this Master Plan, schematic drawings have been prepared for a Maintenance facility, referred to here as the Maintenance Hub. The Hub will most likely be located on the lower baseball field near the wastewater plant. In addition to covered space for the Road Maintenance Program, office and storage space for the Building Maintenance, Construction Maintenance and Beautification programs, covered parking for the RezRacer buses, an area for washing vehicles and a building for vehicle maintenance (oil changes, etc.) are included in the schematic plan.

The Wastewater Treatment Plant will remain in its current location. For more details, refer to the Infrastructure chapter.

Executive

The Council Chamber and Executive offices are located between the Administration Building and QDNR. The Chamber was built along with the Administration Building; the current Executive Offices were added later during the construction of the QDNR Building. The Chamber is 1,440 sf, with an additional 720 sf of restroom, foyer and closets (totaling 2,160 sf). There are four Executive offices and a lobby with a desk for two support staff. This area is 1,360 sf.

While a low priority, the Executive Offices would benefit from an increase in space. Currently two council desks are located in the chamber. An additional seven offices would provide space for all councilmembers. However, a more pressing need for the Council is the need for a secure, conveniently accessible facility for records that are accessed for use by the Business Committee. This facility should be centrally located. There is also a shortage of parking around the administration complex that can hinder visitors to the executive offices.

Finance

The Finance Department is housed wholly within the Administration Building and employs approximately 20 staff. The Division has no functions in buildings lying within the tsunami zone. Unlike other Divisions, the personnel of Finance are consolidated in one area and the Division is well located in the Administration complex, near complementary uses. Thus, there is not a need to plan for new, stand-alone facilities for Finance.

However, the Division is currently lacking in office space and would benefit from a filing room. If Bank of the Pacific or other offices within Administration were to move to new locations, the needs of Finance could be satisfied by using those vacated spaces. The Division's records are stored in various locations in Grays Harbor County. Consolidation of the records would be beneficial, but may best be done electronically.

Health and Wellness

Most functions of the Health and Wellness Division are housed in the Roger Saux Health Center. This includes Administration, Contract Health, Billing, Dentistry, Emergency/Primary Care, the Diabetes Program, some Social Services, Chemical Dependency, the Pharmacy, Mental Health and Family Services. The Business Committee has approved two additional medical staff, and a Quality Improvement Coordinator will be joining the staff shortly. Except for family services, all the departments in the Health Center are cramped. Dentistry would like to add staff and a conference room. There is no place to archive medical records. The building is already filled to capacity and the Division will probably opt to use a modular building for temporary office space to relieve the crowding. The Division employs approximately 90 people, 52 of whom commute to Taholah.

This division's facilities in the Lower Village include the Commodities Building, the Fitness Center, the Diabetes Program and the Senior Center. Additionally, the Emergency Medical Services (EMS) program has been recently transferred to the Health and Wellness Division. The Fitness Center, located along the river on Quinault Street, is currently slated to become part

JUSTICE CENTER CONCEPTUAL FLOOR PLAN
TAHOLAH VILLAGE RELOCATION MASTER PLAN PROJECT

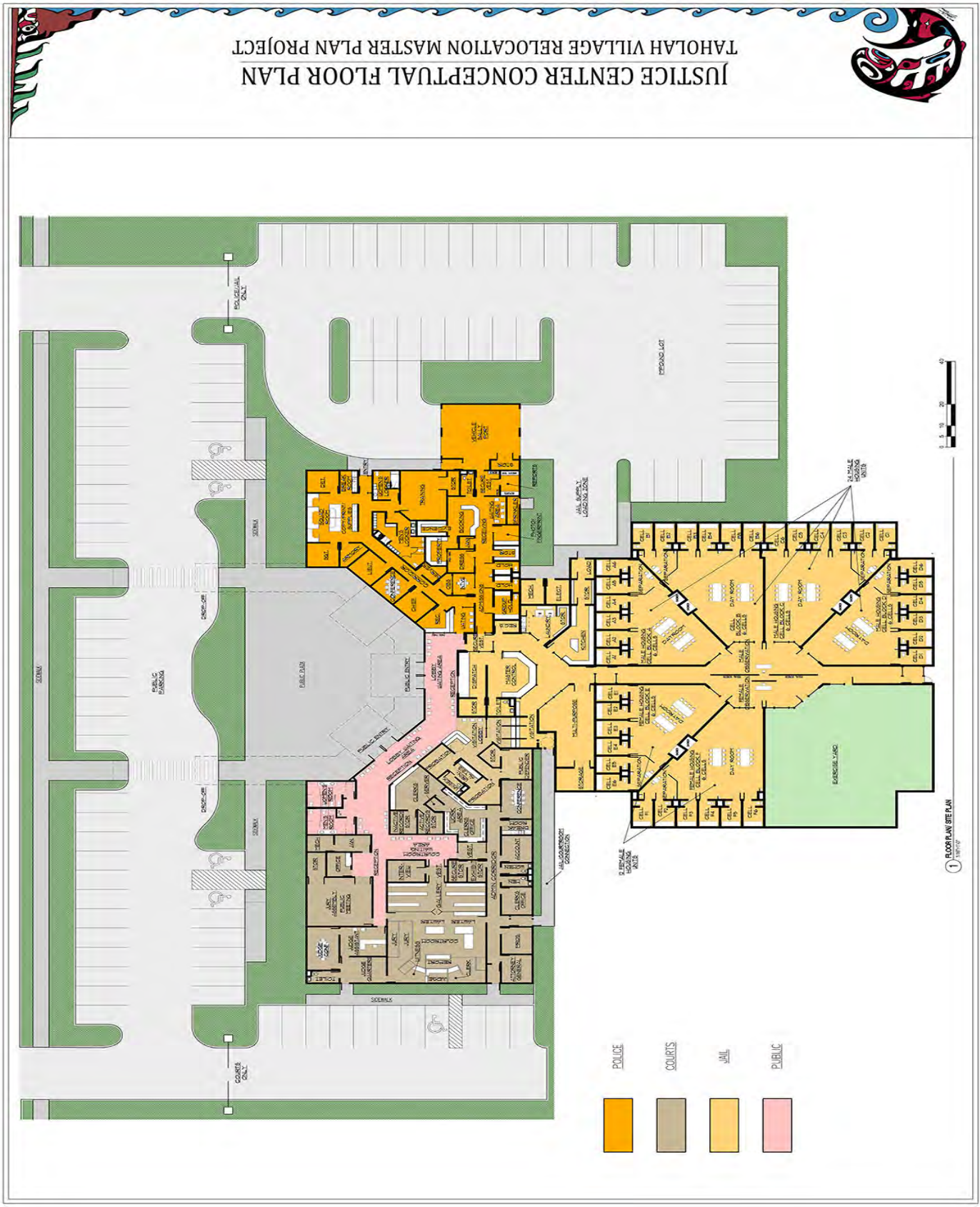


Figure 3-4: Schematic Plan for Justice Center
Kaul Design Associates, 2014



Community Facilities



Fire Station Rendering
QIN Planning

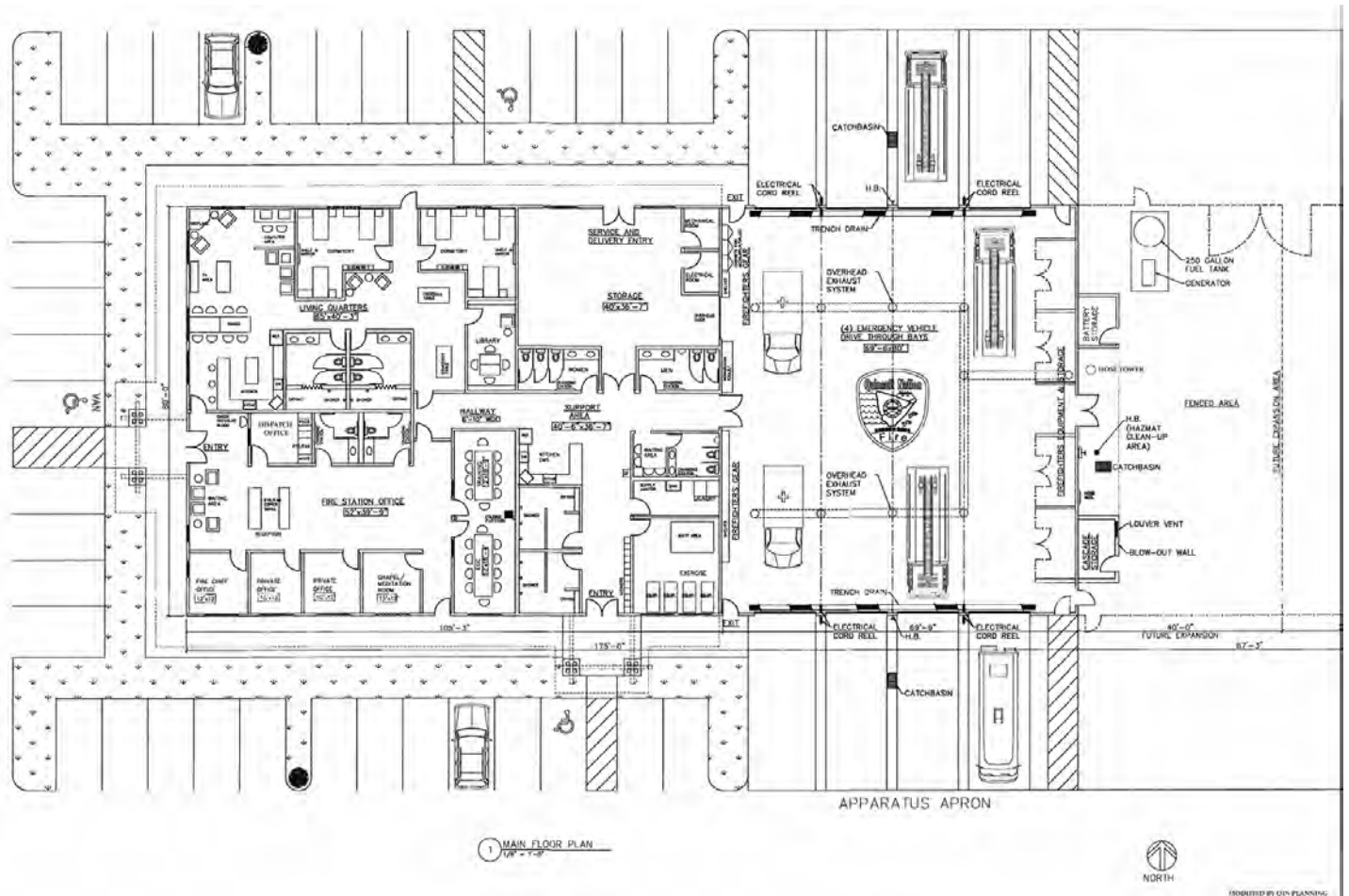


Figure 3-5: Schematic Plan for Fire Station
Shur Architects, 2007



of a Recreation Center to be placed east of the Health Center in the Upper Village.

The Senior Program will move to the Multi-Use (Generations) Building to the east of the Health Center. Facilities for the Senior Program forecast in the new building's design include a large kitchen, a dining area, an area for sitting, offices, a craft room, reading room/library, exercise room, a room for the nutrition program and a therapy room. The area in the building dedicated to Senior Program uses is approximately 10,500 square feet.

The Roger Saux Health Center was designed for expansion. It is currently 31,431 square feet. The architect's scheme allows for it to expand to 45,829 square feet. Therefore, expansion of medical facilities will occur on-site and a new site for such activities does not need to be identified.

Other facilities that could be beneficial to the community, but for which plans have not been started, include an assisted living facility, a treatment center for people with mental health and chemical dependency issues, a helipad and employee housing for some contract staff. Assisted living facilities are uncommon on Indian Reservations; generally, the infirm are cared for at home by family. Community members have expressed a desire for such a facility, but no detailed planning or budgeting for this facility has occurred as of yet. The assisted living facility would most likely need to be located on the parcel west of the Health Center.

A helipad near the clinic would be desirable, but should also be convenient for the police and fire. All medical providers live off the reservation; it would be beneficial to have employee housing, so that in case of disaster there is a place for the providers to stay or already be living. Those injured in a disaster could then be served quickly. Employee housing would likely be located in the Southeast neighborhood. Refer to the Housing Chapter for more detail.

The Health and Wellness Division stated that there may be a need for the Nation to invest in a mental health/chemical dependency recovery facility to aid in the reintegration of those with such problems back

into the community and more permanent, sustainable housing. This facility would house twenty people and require approximately five staff members. Staff would need to be able to lock down the facility and thus the facility would require perimeter fencing. Kitsap Mental Health's Keller House is a local example of such a facility. Opened in 2010, this 16,000 square foot facility accommodates 16 beds. It was built at a cost of \$4.3 million. Kitsap County has also studied a 16-bed facility of a smaller size, 7,000 square feet.

Public Safety/Police

The Police Department is located behind the post office near the court building. The Police Department is underserved in terms of space and type of facilities. There is a shortage of holding cells and a need for meeting areas for coordination with other law enforcement agencies. The Department is responsible for 15 law enforcement vehicles and two ambulances. The building is owned by the BIA.

Staff believes that the Police Station should not be located in the center of the community, due to noise, driving speeds during police response and the need to move inmates. Relocating the Police Station above the tsunami zone is a high priority, so the police may assist other community members in case of emergency, instead of focusing their efforts on their own escape and transport of inmates to higher ground. A location near SR109 and the court would be ideal. A helicopter landing zone near the station would also be beneficial. A sensible location for this facility would be just to the north of the Administration Building, due to the site's proximity to State Route 109.

Animal Control is located in a relatively new facility adjacent to the police station. There is one staff person associated with Animal Control, and the EMS personnel currently utilize an office in the Animal Control facility. Given the small number of staff and newness of the facility, the building program should meet the needs of Animal Control well into the future. Thus, relocation of the facility should be a low priority for the Nation.

Quinault Division of Natural Resources



Quinault Division of Natural Resources (QDNR) facilities in Taholah are concentrated in the QDNR building adjacent to the Administration Building. QDNR occupies approximately 25,000 square feet in that building, sharing the rest with the Bureau of Indian Affairs. QDNR has approximately 100 permanent employees and up to 30 seasonal employees, making it the largest Division at QIN. There is already a lack of office space and there are unfilled positions, so more office space is a priority. There may be enough space to adequately accommodate the office needs if sufficient new storage space is constructed elsewhere and the stored materials moved out. There is also a shortage of parking both for private and QIN/GSA vehicles. The only QDNR facilities in the Lower Village are two sheds belonging to Fisheries.

The wildland and structure fire functions have been combined into one unit under the auspices of QDNR. Per QDNR staff, the main firehall could be in Taholah with some equipment stored around the Reservation at Seedling Storage and Qui-nai-elt Village. However, the Seedling Storage facility may also be an appropriate location, as there is water service available there, and the site is along State Route 109 with quick access to Taholah, Santiago and Qui-nai-elt Village. Dispatch for wildland fire is currently in the QDNR building and dispatch for structural fire is at the police station. The dispatch facilities will be combined. A bunkhouse at the firehall would be useful, as would a fire training center that could hold 50 to 60 people. The training needs might be accommodated in a new village Community Center. The fire hall described in the 2007 Quinault Fire Station Feasibility Study by CooperZietz Engineers and Shur Architects is 14,000 square feet. Please refer to the figures showing the layout for a possible fire facility.

The Environmental Protection Department needs more office space and a warehouse to store gear. Approximately 2000 square feet of storage space is necessary. This space must be secure for the storage of gasoline, laboratory chemicals and drugs. This space could be shared with other QDNR departments. There is a need for garage space for work on outboard motors.

Resource Protection would be the easiest department to move out of the Natural Resources Building, but would need to remain nearby or attached to the building. Resource Protection has no secure area for confiscated materials, such as gill nets, and vehicles. There should be a covered area for the confiscated vehicle. Currently the vehicles are stored at the Road Maintenance shed, but new facilities more convenient to QDNR could be constructed and the shed transferred to road maintenance, which is in need of such a structure. There needs to be cold storage for live evidence, such as clams and crabs. This facility could be built at the base of the bluff adjacent and to the east of the baseball field to the north of the Administration Building.

Legal

The Legal Department is composed of the Office of the Attorney General (OAG) and the Criminal Court which currently share one building just south of the Police Station. The OAG includes five Attorneys/Assistant Attorneys General, two secretaries, the prosecutor and the public defender. The criminal court staff includes the Chief Judge, three clerks, two probation officers/bailiffs and an administrative assistant. The current configuration of the OAG and Court sharing a building will change in the Relocation. The staff of the OAG prefer to be near Administration and the Executives, as they spend much of their time in meetings with the Executives. However, the criminal court needs to be adjacent to the police facility, maybe even under the same roof, for safety reasons given the transfer of inmates between the two.

There are currently nine staff members in the Office of the Attorney General (OAG), three of whom are associated with the criminal court. Of these nine, the public defender currently maintains an office in the Roundhouse. The future space needs of the Office of the Attorney General are similar to the current space use (1,600 sf).

The Criminal Court will require new office space, a jury room, conference rooms for the attorneys and the probation officers. Additionally, the currently facility lacks security and privacy. A person can walk into



the building and continue unimpeded to the judge's chambers. The chambers should be located somewhere with greater protection. In the future, metal detectors may be necessary; space must be reserved in the design for the detectors. Sensitive conversations in the courtroom can be heard in the lobby; thus, the new courtroom needs to have sufficiently thick walls and some separation between the lobby and the courtroom is desirable. The probation officers could benefit from more office space and a small conference room. The public defender's office and conference room should be located away from the courtroom for the sake of privacy for the defendant. Occasionally, there is a need for the judge to order immediate drug testing for someone involved in a case. This testing must take place in a facility uncontaminated by heavy use by staff and the public. A separate bathroom facility for this purpose will be necessary. Overall, the court area will need to expand from 2,400 sf to 6,500 sf. A schematic plan has prepared for this facility. Please refer to the Justice Center plan.

Quinault Housing Authority

Per Quinault Housing Authority (QHA) staff, the new QHA Building should be approximately 1.5 times larger than its current size of 3,500 sf (5,250 sf). This would allow space for one additional staff member, a board room and a small classroom.

The QHA Maintenance Building is located across the street from the QHA Building at Second Avenue and Spruce Street. The QHA Maintenance Building should be relocated and expanded for more storage space and should be about 4,800 square feet. Per the QHA, the maintenance building should be connected to the QHA Building. The QHA facilities would be located in the Civic Corridor in the new village, most likely adjacent to the West Neighborhood. Alternatively, there may be space for a QHA facility to the north of the Multi-Use (Generations) Building.

Quinault Nation Enterprise Board

The Quinault Nation Enterprise Board (QNEB) properties in the Lower Village include its main office in the 5th Avenue MiniMall, the Mercantile, Centralized Accounting, and the Quinault Pride

Fishhouse. On February 21, 2015, the Relocation Team attended and presented the project at a QNEB Board Meeting. The square footage for a relocated Mercantile, Centralized Accounting and QNEB offices would be approximately 10,000 square feet. The QNEB board indicated a desire for the Fish House to remain by the river.

The main office of QNEB is located in the 5th Street MiniMall, a building QNEB owns and maintains. Its office uses currently use 1,200 square feet of space.

While there is no need for additional office space for the main office, consolidation of the office and centralized accounting would be desirable, according to Myrna Figg. A location relatively convenient to the Administration Building would also be desirable. These office uses do not need to be adjacent to the Fishhouse or Mercantile.

Centralized Accounting is located on 5th Avenue near the intersection with Spruce Street. There are currently 8 employees in the two-story building. Records are stored outside the building in storage sheds.

If a new facility were built for Centralized Accounting, QNEB office and accounting staff would consolidate in that facility. Additional space would also expedite hiring additional staff. Per Myrna Figg, the facility should be able to accommodate 20 to 30 employees and have space for records storage.

The Mercantile is the sole market in Taholah. The Mercantile sells mainly food, but also has an attached gas station. The Chitwhin Café, a small deli, is located in the west end of the building. There is some office space upstairs.

Were the Mercantile to be relocated, it should be larger than its current size, per QNEB management. This increased size would include meeting rooms which the store would cater and perhaps a larger restaurant in place of the deli. Community surveys indicate that many residents do not shop at the Mercantile as their primary food store and would like to see a greater variety of foods, especially fruit, more household



supplies and perhaps fishing equipment. The new Mercantile, were it to leave its current location, would be located in the Civic Corridor.

The Quinault Pride Fish House is located on Quinault Street extending over the river. The Fish House will remain in its riverside location, as it is a water-dependent use.

Quinault Land and Timber Enterprise

The Quinault Land and Timber Enterprise (QLTE) is located on the Old Shake Mill site on 5th Avenue. QLTE facilities are all situated above the Tsunami Zone. The current building is comprised of offices and a garage serving a staff of three.

In the new village, QLTE facilities can be housed in a building shared with QNEB and Centralized Accounting or remain in the current location, as there is room for possible expansion on-site.

Other Facilities, Tenants, and Other Potential Uses:

Community Center

The Community Center is located on Quinault Street adjacent to the Roundhouse, two blocks from the seawall. Facilities include a main hall, kitchen, bathrooms and janitorial closet. The Community Center is 6,800 square feet. The Community Center is used for community meetings, fairs, festivals, bazaars, training sessions, weddings, and memorial services, so it is a focal point for the village.

The Community Center in the Upper Village be utilized for these activities and can serve as an evacuation center as well, if properly designed. Thus, additional space will be needed for storage of emergency equipment, such as cots. The kitchen can remain the same size as the existing facility. The current hall cannot be split into smaller rooms, which can be problematic for small group presentations, given lighting and acoustics. The new facility should allow for movable curtains to create smaller spaces, and perhaps the plan should include smaller

conference rooms. A generator will be necessary to provide power in case of emergency. Please refer to the floorplan shown in this chapter.

Bureau of Indian Affairs

The Bureau of Indian Affairs (BIA) is located in the lower floor of the western wing of the QDNR Building.

The BIA, if relocated, would require a new vault in its space. The existing facility has a concrete block-walled vault, but the fire sprinklers would likely severely damage the records were they to be activated. Per the BIA Taholah superintendent, the BIA does not need to be situated with another particular use, but a location near QDNR would be desirable. The GSA would likely require a server room, also. The BIA may alternatively move some or all of its staff to the agency's Aberdeen office.

Post Office

The Post Office leases a building from the QIN on Quinault Street between the Mercantile and the Memorial Park. The facility is 1,344 sf. One to two employees service the village. The new facility can be slightly smaller than the existing facility, based on figures provided by the USPS. 13 parking spaces would be required, over twice as many as currently provided. The Post Office will be located in the Civic Corridor.

Bank of the Pacific

The Bank of the Pacific maintains a branch at the east end of the Administration Building with a staff of three employees. There are currently no restroom facilities within the bank.

In the future, the Bank would need restroom facilities and an area in which private conversations could be conducted. According to bank staff, the ideal size of the bank would be approximately 4,000 square feet. A drive-thru window would be required.



Taholah Village Relocation Master Plan



Figure 3-6: Schematic Plan for Community Center
Kaul Design Associates, 2014



Ta'ala Fund

The Ta'ala Fund is located in Pacific Beach at the intersection of SR109 and Ocean Beach Road and has a staff of five. There is a lack of storage space in the Ta'ala Fund building; most materials are currently stored in the restroom. Ta'ala Fund would be open to moving to Taholah. Ideally, the Fund could share a building with other financial agencies or social services in a one-stop shop. Complementary uses might include Commodities, TANF, and TERO.

PARKS AND RECREATION

At the third community meeting, community members were queried about their desires for recreation facilities in the new village. Residents indicated that they utilize the river and beach, as well as the basketball courts, school playground and school track. They indicated that they would most likely use playgrounds, play sports and walk in the new village.

Residents indicated that they desire sports facilities, a walking track, gardens, a picnic area and fire pits in new parks. The most requested sports facilities were a baseball field, playground, basketball courts and a skate park. The respondents were split on whether one large park or several smaller parks would be more appropriate. Other suggested facilities included a long house, quad tracks and public smokers to prepare meat and fish. Residents wanted to make sure that park facilities would be designed to easily serve elders. If parks are developed, the Nation should ensure that there is adequate maintenance staff to care for the parks. There are currently no large parks in Taholah, so new staff positions may need to be created.

There are two park and open space areas designated by this Master Plan. The first is the area south of Kla Ook Wa Drive where the large wetland is located. This area is largely encumbered by a slope, but could be used for trails and, if graded, some athletic facilities. The trails would connect the Civic Corridor with the school and the area of the Northeast Neighborhood south of the Ranch Road. The Community Center and museum can be integrated into the park and cultural pieces can be installed. The wetland can be improved into an amenity, perhaps with an adjacent camas meadow and

boardwalks. The area between the wetland and Kla Ook Wa Drive may be used for recreational facilities such as the skate park, community gardens, disaster equipment storage or fish smokers. Please refer to the schematic plan for the park on the following page.

The second park has been located in the Southeast Neighborhood, so that it is on flat land to allow for installation of athletic fields and courts and a community garden. The park will be approximately 5 acres. The final location of the park will be determined at the time that the land is subdivided. Stormwater facilities would also be a prudent use of the area.

Other open spaces may be distributed throughout the villages, associated with utility corridors and pathways.

A new recreation facility is planned for the area between the Health Center and the Multi-Use Building. This facility will provide the community with greater opportunities for fitness, unhindered by the generally rainy weather. The Riverfront Fitness Center on Quinault Street is a small facility; the new facility will provide a larger area for a fitness center, walking track, changing rooms, indoor basketball courts and, potentially, a swimming pool. This program is based on community input and the stated desire for these facilities. An expanded recreation facility will help encourage residents to exercise and increase wellness in a community that struggles with obesity and diabetes.

The first step to the development of this facility will be a feasibility plan that examines the desires of the community and the potential building and maintenance costs for the swimming pool in order to determine which facilities are economically sustainable. The study would determine the proper sizing of the pool and examine how the pool or pools may be used by programs. For example, the Health and Wellness Division might be able to use a pool for exercise classes for elders and physical therapy. Comparable facilities have cost between \$15 and \$20 million.



Taholah Village Relocation Master Plan



Figure 3-7: Central Park Schematic Drawing

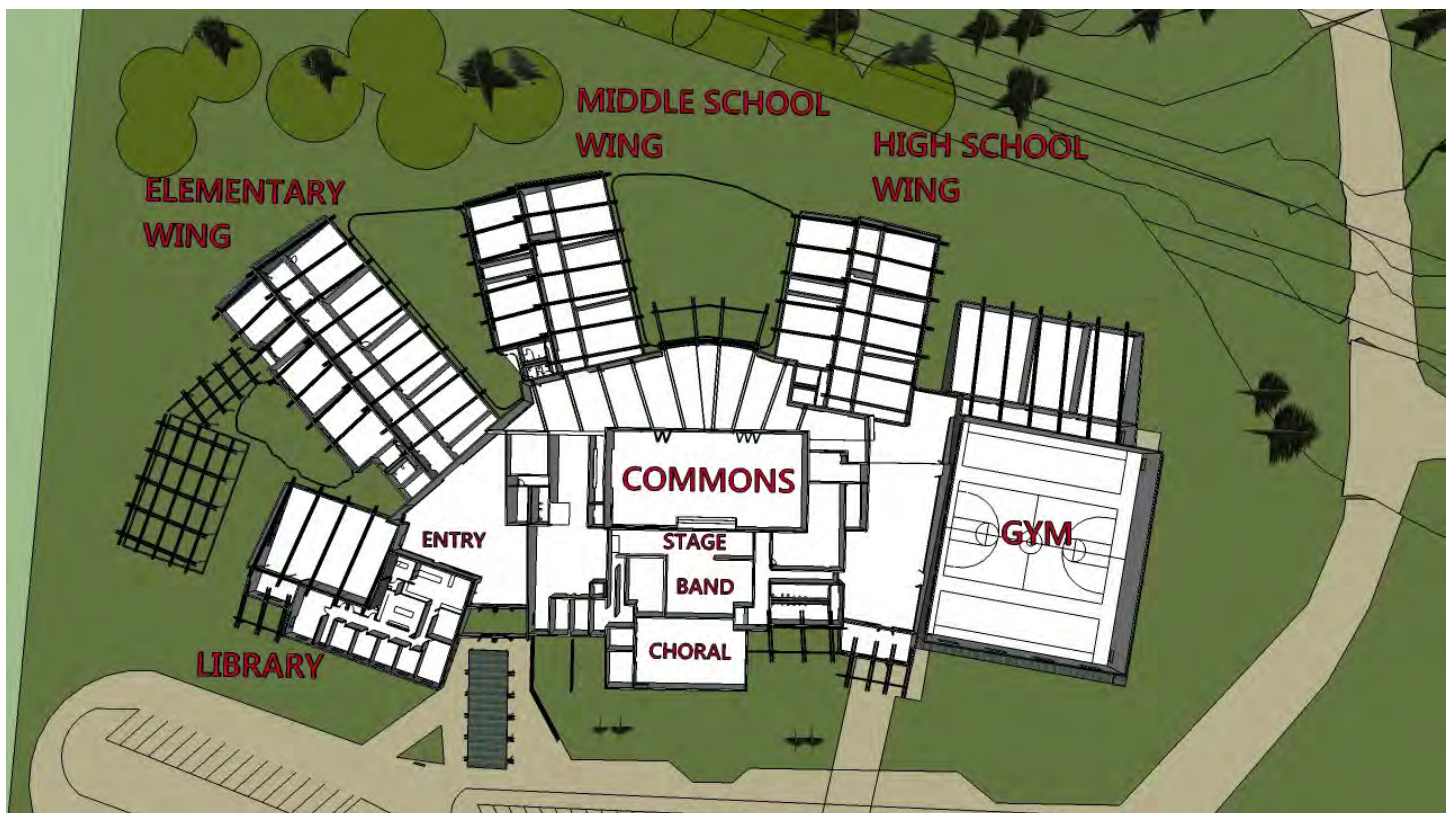


Figure 3-8: Floorplan of Proposed New Taholah School
Harthorne Hagen Architects, 2013



TAHOLAH SCHOOL

In 2013, a Master Plan was prepared for a new K-12 school in the Relocation Area. This document, the Taholah Education Center Master Plan (TECMP), included a schematic design for the new school, an education specification for the facility and an estimated cost for construction.

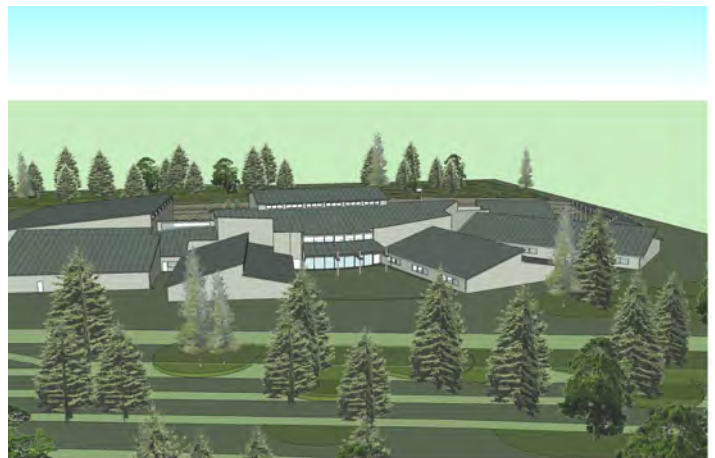
Per the TECMP, the new school is envisioned to accommodate between 230 and 350 students and 50 full-time staff in an 86,000 square foot facility. Classrooms were sized for 22 to 26 students, physical education facilities for classes averaging 35 students and Special Education facilities for classes averaging 15 students. The school, as designed in the TECMP, is essentially several building wings under a single roof, a unanimous selection by families, staff, faculty and community, due largely to the effects of the local weather. The classroom buildings are separated into Elementary Middle and High School “wings” that radiate from a central core area containing Administration, Cafeteria, Commons, Music and lounges. The gymnasium is near the Middle and High School wings. A covered play area is sited near the Elementary School wing of the building.

Support facilities in the design include a library, administration offices, a cafeteria/stage/central area (commons), music rooms, athletic and play facilities, and support rooms for students and staff. The TECMP included space for garden areas; an area for a Cultural Resources Program; facilities for aquaculture instruction, including a small hatchery; a Ceremonial Courtyard; and an environmental education shelter. The Cultural Resources Program space would include facilities for canoe and totem carving, basket weaving, painting and sculpture. The Environmental Education Center will provide access and educational space for wetland-related programs. Trails, viewing decks, blinds and a reed pond would be developed in and around the wetland.

The Ceremonial Courtyard would occupy the central position north of the building. A ceremonial fire pit will occupy the center of the courtyard with space available for seating in amphitheater-style around it.

According to the TECMP, this plaza will be designed to promote community and nature appreciation to the students from the parents and elders.

Funding the school will be a challenge; the TECMP estimates a total cost for school construction of \$48 million. According to the TECMP, the School District is not eligible for Bureau of Indian Affairs (BIA) capital projects funding and no single federal agency has adequate capital investment program appropriations to undertake the new school project. The State of Washington requires that school districts raise the local share (up to 80%) of the funding for a new school through local bond issues, however, the School District encompasses Tribal Trust Land and therefore has



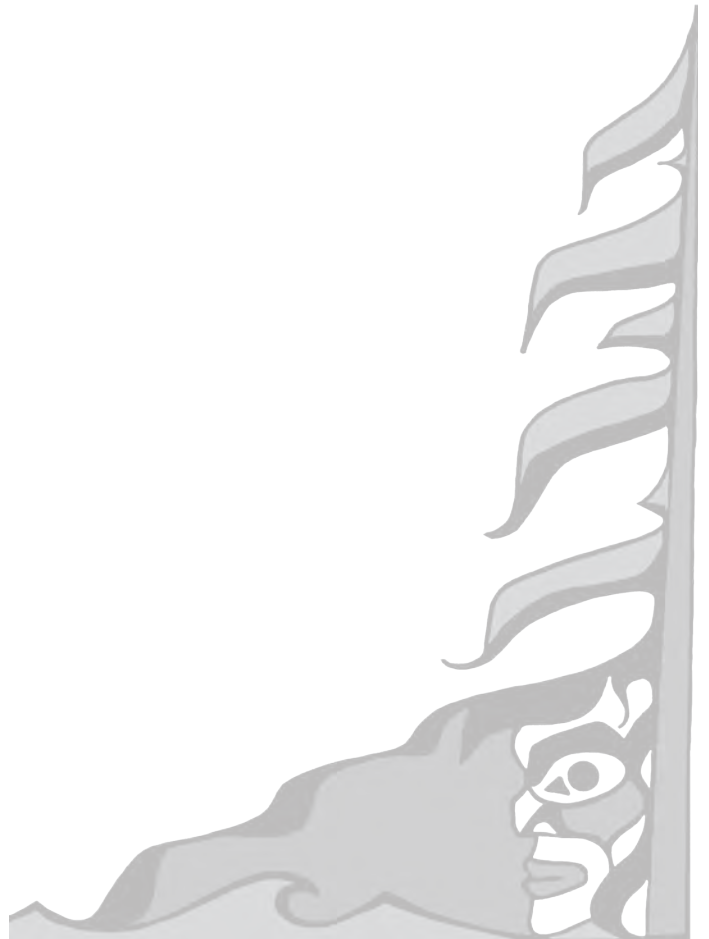
Overall view

Figure 3-9: Proposed New Taholah School
Harthorne Hagen Architects, 2013



virtually no bonding capacity. The TECMP concluded that the only viable option for funding a new school would be special federal financial assistance through Congress.

The TECMP was completed before the commencement of this Plan. Therefore there are some differences between the school layouts shown in the respective plans, such as different locations for the athletic facilities.





Housing



HOUSING

Approximately 175 housing units are situated in the Lower Village. The Relocation will provide opportunities for replacement, expansion and improvement in design and variety for housing in Taholah. Because people spend most of their time at home, rather than at work or other locations, the presence of homes in the tsunami zone greatly increases the likelihood of high mortality and severe property damage in the event of a disaster.

GOALS:

- Promote a mix of dwelling types to serve the needs of the community more than the existing housing mix in Taholah
- Encourage diversity in unit size and number of bedrooms in single family and multi-family developments to serve a range of living situations in the community, including singles, large families and elders.
- Relieve overcrowding in homes
- Serve all economic segments of the community from homeowners to the homeless
- Whenever possible, dwelling units shall be accessible without the need for ramps

DEMOGRAPHICS

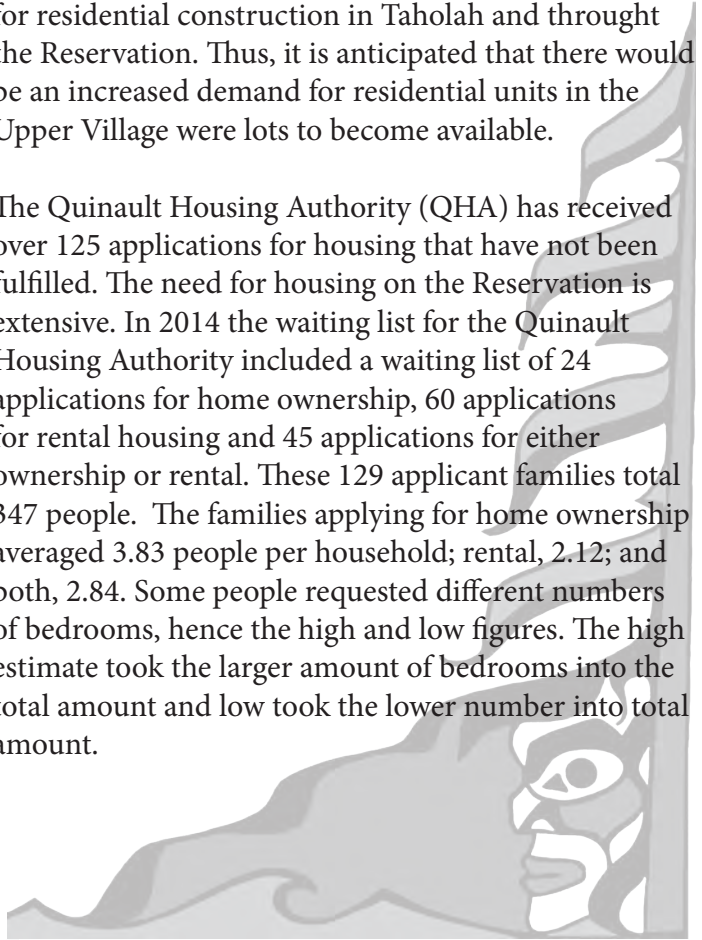
The population of the entire Quinault Indian Reservation was 2,045 in 2010, a 9.5% growth from 2000 (QHA Community Housing Needs Assessment). Approximately 30% of households on the reservation include children under 18. Approximately 13% of housing units on the Reservation were reported as overcrowded in the 2008-12 American Community Survey; the national average is 4%. Twenty-nine percent of housing units were reported as substandard; the national average is 36%. According to the 2009-13 American Community Survey, people with disabilities are more common on the Quinault Reservation

compared to the national average (21% to 12%), so accessibility should be an emphasis in residential design.

In the Taholah zip code (includes Taholah and outlying areas, including Santiago), two-thirds of the households own their homes. Approximately a quarter of the households are 1-person. 23% are 2-person households. 18% are 3-person and 34% are 4-person (use chart from Community Housing Needs Assessment). Two-person households are over twice as likely to rent as own a home, whereas 3-person households are three times more likely to own than rent. Almost all lots within the lower and upper villages of Taholah are owned by the Quinault Indian Nation and leased to residents, many of whom own the home on the property.

Per the 2010 Census, 5% of the population had in-migrated to the reservation within the previous year. However, this statistic may not be indicative of future in-migration trends, as there has been a documented demand for housing, but a shortage of land available for residential construction in Taholah and throughout the Reservation. Thus, it is anticipated that there would be an increased demand for residential units in the Upper Village were lots to become available.

The Quinault Housing Authority (QHA) has received over 125 applications for housing that have not been fulfilled. The need for housing on the Reservation is extensive. In 2014 the waiting list for the Quinault Housing Authority included a waiting list of 24 applications for home ownership, 60 applications for rental housing and 45 applications for either ownership or rental. These 129 applicant families total 347 people. The families applying for home ownership averaged 3.83 people per household; rental, 2.12; and both, 2.84. Some people requested different numbers of bedrooms, hence the high and low figures. The high estimate took the larger amount of bedrooms into the total amount and low took the lower number into total amount.





Total Rental Applicants	Home Ownership Applicants	Both Home and Rental Applicants
60	24	45
Total Population	Total Population	Total Population
127	92	128
Average Household Size Rental Applicants	Average Household Size Home Ownership Apps.	Average Household Size Home & Rental Apps.
2.12	3.83	2.84
Avg. Total Bedrooms Home (High, Low)	Avg. Bedrooms Home (High, Low)	Avg. Bedrooms Home & Rental (High, Low)
1.88, 1.75	2.42, 2.12	3.29, 3.01

Figure 4-1: Housing Applications

In order to serve the varied needs of the community, a range of housing types and lot sizes will be developed in each phase of development. Lotting for each neighborhood will include approximately 50% 7,500 square foot lots, 30% 6,000 square foot lots and 20% 10,000 square foot lots. Additionally, multi-family housing will be dispersed throughout the four neighborhoods.

COMMUNITY SURVEYS

Both the Planning Department, as part of this Master Plan, and the Quinault Housing Authority, as part of its Community Needs Assessment surveyed residents regarding their housing needs and preferences. Surveys were handed out at community meetings, posted on-line and/or distributed door-to-door. Over 60% of survey respondents desired a variety of lot sizes available in the new village. Slightly over half wanted a village with smaller lots and streets, sidewalks with more public space and trails. When asked “What don’t

you have in the lower village that you want in the new, upper village?”, residents asked for housing for larger families and apartments for singles.

When asked for a vision for the new, upper village, survey respondents foresaw “big houses for everybody”, a “community with a variety of houses”, “clean, well lit, mixed housing, planted green yards and a place where children are safe” with “nice parks and nice homes”.

According to the surveys, seventy percent of homes have at least one elder resident and over 40 percent had a disabled resident or frequent visitor. There was a desire for lots for elders and demand for both small homes/lots and large homes/lots. Those preferring smaller lots liked them for their low maintenance. Those who wanted larger homes expressed a desire for room for privacy, fences, garages, large doorways, paved driveways, grass yards, and front and back porch ramp access. A suggestion was made that the senior housing not be congregate housing.

Seventy-six percent of surveyed households felt that their housing was of adequate size. The people that felt their homes were too small lived in 3- bedroom homes. Most of those who felt their homes were inadequately-sized lived in families of five or six people. Twenty-six percent of the interviewed households were 5 or 6 people; most of these households stated that their ideal home size would be 4- to 6- bedrooms. Meeting this need would alleviate overcrowding in homes.

EXISTING CONDITIONS

Housing in the Lower Village is somewhat segregated by income. Low-income housing is concentrated in the southern portion of the Lower Village, on Cedar, Pine and Spruce Streets. In the Relocation Area, however, the neighborhoods will be mixed-income with lots allocated to the Quinault Housing Authority adjacent to others leased to market-rate owners. This will prevent certain areas being labeled as “the projects” and incurring a stigma. Most housing in Taholah is owner-occupied, though most of the underlying land is owned by the Quinault Nation.



SINGLE FAMILY HOUSING

This Master Plan proposes a community composed mainly of single-family homes with a mix of multi-family and transitional/supportive housing to serve specific groups. Lots in Taholah currently range from 5,250 square feet to over 12,000 square feet. Current Title 48 regulations require a minimum lot size of 7,500 square feet (the smaller lots predate Title 48). As part of this Master Plan, Title 48 has been revised to allow lots as small as 6,000 square feet. This reduction will yield a greater number of lots and provide for a greater variety of lot sizes. The lots are all large enough to accommodate homes to fulfill the needs of larger families, while retaining Taholah’s rural character. The three basic lot sizes will be 6,000 square feet, 7,500 square feet and 10,000 square feet at a ratio of 50% (7,500), 30% (6,000) and 20% (10,000). Single-family homes are a principally permitted use in Residential, Commercial and Forestry Zones and conditionally permitted in the Wilderness Zone.

NEW HOME TYPES

According to the 2016 QHA Community Needs Assessment, 86% of Reservation residents believe that a lack of a mix of dwelling types is a problem. Given the lack of variety of housing types in the existing village and the need to better serve a variety of family sizes, this Plan includes suggestions and lands set aside for housing types not currently found in Taholah. Community members in the community meetings commented on the need for small units that would not require lawn or landscape maintenance to house elders. Other discussions with QIN Staff and community members identified a need for housing for singles, especially those returning from college. Two housing types, cottages and accessory dwelling units, not currently found in Taholah can meet these needs.

Cottages

In this context, cottages refers to small homes, 600 square feet to 1000 square feet, on a shared property, functioning much as a condominium would. This works well in Taholah as the QIN owns the underlying land. Beautification personnel or Housing Authority

maintenance staff would tend the common areas and landscaping. Cottages could be larger if a second floor were added; however, the Housing Authority has stated that its preference is for single-story, fully accessible units for the greatest flexibility in serving its clients. Cottages often do not have attached garages; however, given the climate of Taholah and a community preference for units with garages, any cottage units in the new village should include attached garages. Cottages: The cottages should face the nearest street or green space, when possible.

Accessory Dwelling Units

Accessory dwelling units (ADUs) are attached or unattached dwelling units sharing a property with a primary home. ADUs, otherwise known as “granny flats” or “mother-in-law units”, can be used to provide housing for elders and singles in proximity to their extended family. Historically, Native Americans, more than other groups have cared for elderly relatives at home more than relying on assisted care facilities. The accessory dwelling units would allow elders some independence while being close to the younger generations, enabling easier care for the elders or facilitating child care by older relatives. Accessory dwelling units are not currently permitted by the QIN Zoning Code. This Master Plan includes changes to the Code to allow the accessory dwelling units. Please



Figure 4-2: Concept for Cottage Housing



refer to Title 48 for more details regarding regulations governing ADUs.

Multi-family

There are only three multi-family structures with a total of ten units in Taholah, all along Spruce Street across from the Housing Authority. Multi-family units in the Relocation Area will help satisfy the demand for housing for singles and elders and a lack of rental units. These units will likely be one story to have all rooms accessible per Housing Authority preferences, though there could be two-story units. The Place of Hidden Waters, a housing project in Tacoma by the Puyallup Tribe, is a model for multi-family housing in the new village. The mix of apartments and townhomes serve a varied population. Place of Hidden Waters is a sustainable project in a similar climate created in Indian country, so this shows that such a high-quality, sustainable project is achievable in Taholah. Apartments could be located in the Western Neighborhood north of the new Capoeman Road or in the multi-family area of the Northeast Neighborhood.

Multifamily housing is conditionally permitted in Residential and Commercial Zones. Multifamily uses can be standalone developments or can be combined with office or commercial space in the central corridor in mixed-use projects. There is a need for both 1- and 2-bedroom apartments. One- and two-bedroom



*PLACE OF HIDDEN WATERS
PHOTO BY QIN PLANNING*



TEMPORARY TRANSITIONAL/HOMELESS HOUSING CONCEPT



Prepared by QIN Planning Department

Figure 4-3: Concept for Transitional Housing



apartments could serve elders, singles and those returning from college, while 3- and 4-bedroom units could serve larger families.

Employee Housing

Employee housing has been identified by QIN staff members as a potential asset to the community. Taholah's remoteness requires long commutes; by providing housing opportunities in the new village, the QIN may be better able to attract and retain employees, such as teachers, nurses and doctors. After 5 pm on weekdays, such staff leaves the village. Were there to be a disaster during non-work hours, the presence of these staff members in the community would be beneficial. Employee housing could include a mix of housing types and would most likely be rental housing owned by the QIN. The provision of employee housing would be a secondary priority; creating residential opportunities for residents of the Lower Village is the top priority.

Supportive and Transitional Housing

The relocated village will serve all segments of the community from homeowners to the homeless and those transitioning back to the community from substance abuse rehabilitation and mental illness. Some families live in travel trailers for up to six months on Nation-owned lots. Those not fortunate to have secure housing or unable to maintain a home need roofs over their heads, also. Provision of transitional and supportive housing is also a goal of the Quinault Housing Authority, as outlined in the Authority's 2017-2022 Strategic Plan. An emergency shelter for victims of domestic violence may also need to be incorporated in the new village, either as part of the supportive housing or elsewhere in a neighborhood.

Two local models serve as examples of possible housing types for the homeless or transitional populations, Quixote Village in Olympia and Turkey Shoot on the Lummi Reservation. Both models include the integration of space for service providers; the facilities in this Master Plan may do so, although the location of these facilities within the Relocation

area is planned to be adjacent to social services and medical facilities, so it may be unnecessary to dedicate space for social services within the project itself. These potential models are discussed below.

Quixote Village

Quixote Village is a 30-unit development of single-room occupancy tiny homes that was developed to take the place of a homeless encampment. The Village is considered permanent supportive housing. Some social services, such as nurse visits, occur on-site, but many such activities occur off-site. Guests must sign in, have background checks run and residents participate in a chore rotation. There are two permanent staff members. At least one staff member is present 6 days a week during normal working hours. Along with the staff, the Village is run by a Residential Council of 5 elected members.

The 144-square foot units are comprised of a main space for a bed and half-bathroom (ADA units are slightly larger). The units are insulated and served by hot water, heater, intercoms and wi-fi. The units are furnished with a bed, coffee table, storage under the bed, and a chair. There is a closet in the bathroom. Along with the units, there is a central common building with a kitchen, a common area, 2 offices, a room of lockers (1 per unit), shower facilities and a coin laundry.

People are allowed to stay as long as they want, as long as they are not a nuisance. The lease includes a code of conduct, including a provision that no alcohol or drugs are allowed other than marijuana. Drug test and background checks are required upon signing lease. The residents are subject to drug testing during their residency. Residents receive 10-day notice to vacate if a drug test is failed. No violent or sex offenders are permitted, but those convicted of other crimes in the past are permitted. Residents must pay 30% of income; the staff works with residents on possible payment plans.

Cost for the project, including infrastructure, grading, and the common building was about \$80,000/unit. Funding for the project came from the State Housing



Trust Fund, HUD, CIP Grants, and the Medina Foundation.

Turkey Shoot

Turkey Shoot is comprised of 55 units of single and two-story triplexes, four-plexes and single-family homes. Turkey Shoot includes a component of transitional or “transformational” housing to ease people back into a stable life. The transitioning residents and families live in 3 bedroom four-plexes arranged around a shared central courtyard and in proximity to other residential uses, such as elder housing. Facilities for social programs are provided within the neighborhood.

A person transitioning from homelessness, prison or rehabilitation would re-enter the community by staying in an apartment for a year or two, then transition to a house for a year in the complex for a year before leaving for a home on their own lot or other housing opportunities. The infrastructure (utility and street) of the Turkey Shoot project was funded by a \$500K USDA Rural Development grant which was renewed over 4 to 5 years. Housing units were funded through HUD.

These examples are not the sole models that can be examined when designing such a project for Taholah; however they are proven in the Pacific Northwest and, in the case of Turkey Shoot, in Indian Country. As part of this Master Plan, transitional and supportive housing have been added to Title 48. Transitional and Supportive Housing are conditionally permitted uses in Residential, Commercial and Industrial zones.

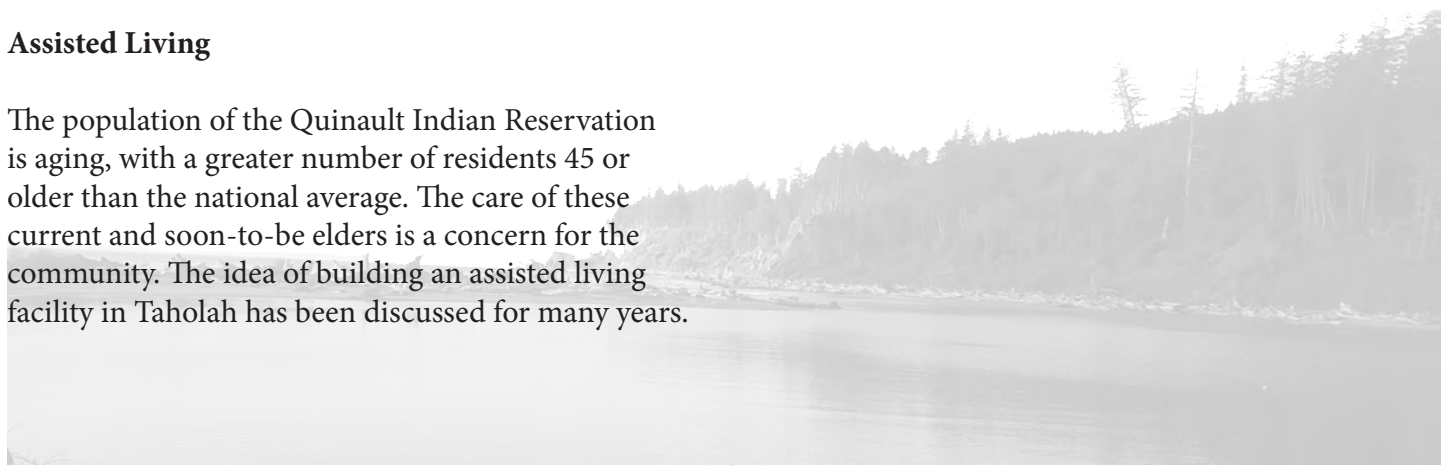
Assisted Living

The population of the Quinault Indian Reservation is aging, with a greater number of residents 45 or older than the national average. The care of these current and soon-to-be elders is a concern for the community. The idea of building an assisted living facility in Taholah has been discussed for many years.

Historically, Native American families have been more likely to care for an ailing elder in their home, rather than at an assisted living facility. However, input from the staff at the Roger Saux Health Center and the community indicates that there is a need for such a facility in Taholah. The facility would likely start small with approximately ten residents, but could expand as the need grew or the facility was marketed to elders of other Northwest tribes that lack such a facility. The Master Plan tentatively places this facility to the northwest of the Health Center. This location is ideal, as it is near medical services at the Health Center, not far from the Senior Program and perched on the bluff overlooking the Lower Village, mouth of the river and Cape Elizabeth.

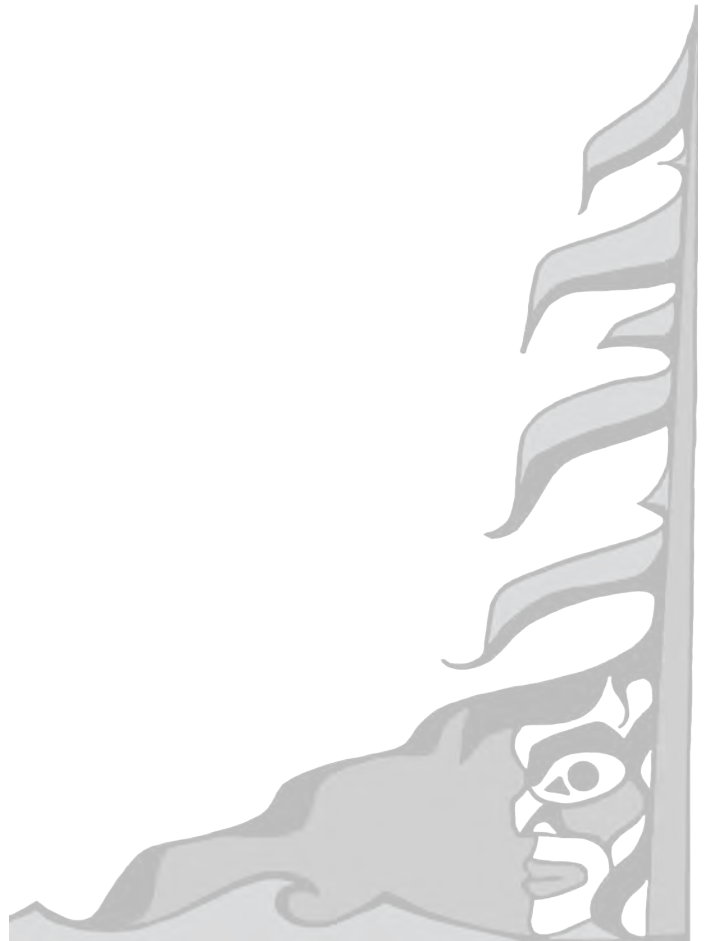
Energy Efficient Design

Energy efficiency will be an important aspect of home construction; information regarding energy efficiency in structures is found in the Sustainability chapter of this document.



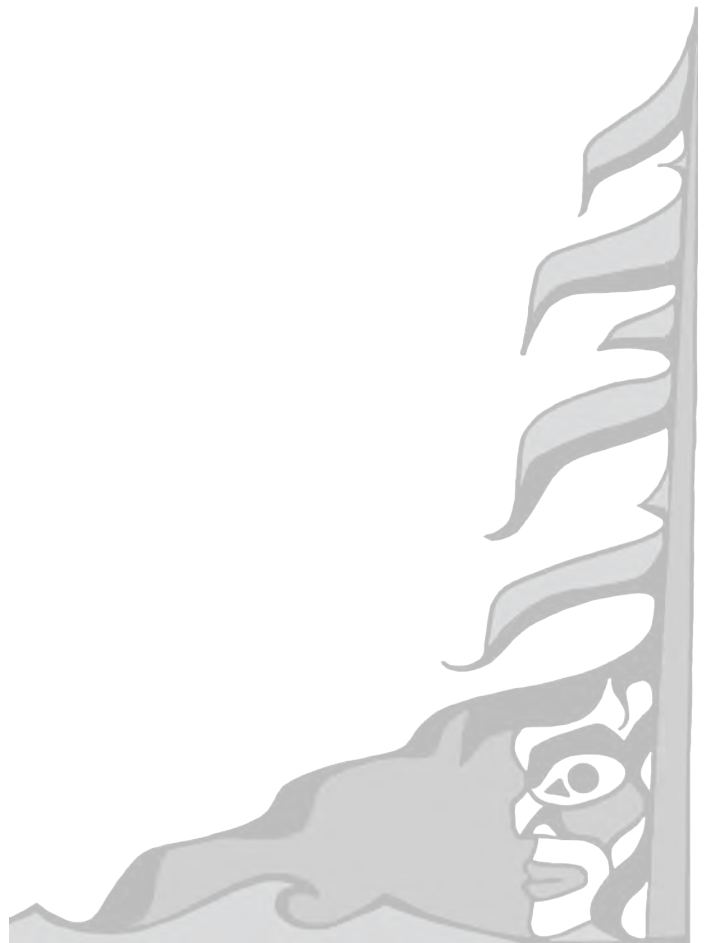


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An abstract painting depicting a city skyline at night. The sky is a deep, textured blue, with a large, bright, multi-colored light source (possibly the sun or moon) breaking through the clouds in the upper center. The light source is composed of various colors including white, yellow, orange, pink, and purple. Below the sky, the silhouettes of several tall buildings are visible against the dark background. The buildings are rendered in dark, almost black tones, with some internal details highlighted in bright colors like red, orange, and yellow. The overall style is expressive and textured, with visible brushstrokes and a rich color palette.

Neighborhoods





NEIGHBORHOODS

While moving public facilities is important, residents spend most of their time in their homes. Concurrent with the relocation of public facilities, there is a need for the creation of residential lots to give those in the Lower Village a place to which they can relocate. There is also a need to relieve the current shortage of lots available to community members. The Relocation Area has been split into three neighborhoods, reflecting the boundaries of the existing allotments and a the Civic Corridor traversing western two allotments. These neighborhoods are the Northeast, West, and Southeast. The neighborhood graphics show lotting patterns; please note that these plans are conceptual and subject to change at the time that the neighborhoods are designed and constructed.

GOALS

- Provide a mix of housing types in each neighborhood to serve a variety of households
- Provide ample opportunities for housing and space for civic uses
- Relieve shortage of buildable lots
- Create walkable neighborhoods with the school, museum and community center at the heart of the village

NORTHEAST NEIGHBORHOOD

The Northeast Neighborhood includes the area of the relocation in Allotment 162. The neighborhood is generally split into two distinct areas by a 25-foot slope generally traversing the allotment approximately 700 feet north of the allotment’s southern boundary. The southern third of the neighborhood, perched above the slope, will house an energy park and the new K-12 school with its associated athletic facilities. North of the slope, a residential neighborhood will provide the first opportunity for families to relocate from the tsunami zone. Two existing roads in the neighborhood will be utilized as part of the new

village. Kla Ook Wa Drive, the road serving the Health Center, was extended and paved in 2015 by the School District. This street will provide initial vehicle access and utilities to the area. Kla Ook Wa Drive will eventually serve the school and connect to the road network of the Southeast Neighborhood, providing a second ingress/egress route to the neighborhood. Capoeman/Ranch Road intersects Kla Ook Wa in the neighborhood and proceeds east to forest lands and the river. Capoeman/Ranch Road, currently a one-lane gravel road, will be improved to a two-lane paved road to the eastern boundary of the allotment. There is a large wetland to the southwest of the residential neighborhood. This wetland will serve as an open space amenity and will be associated with storm water treatment.

To the north, the neighborhood abuts the top of the bluff. A mature forest on the slope of the bluff will remain for erosion control and as a scenic amenity. The existing water main serving the Village is routed through the neighborhood. A north-south street has been aligned to include the water main within its right-of-way. The other streets are aligned in an east-west direction to maximize solar exposure.

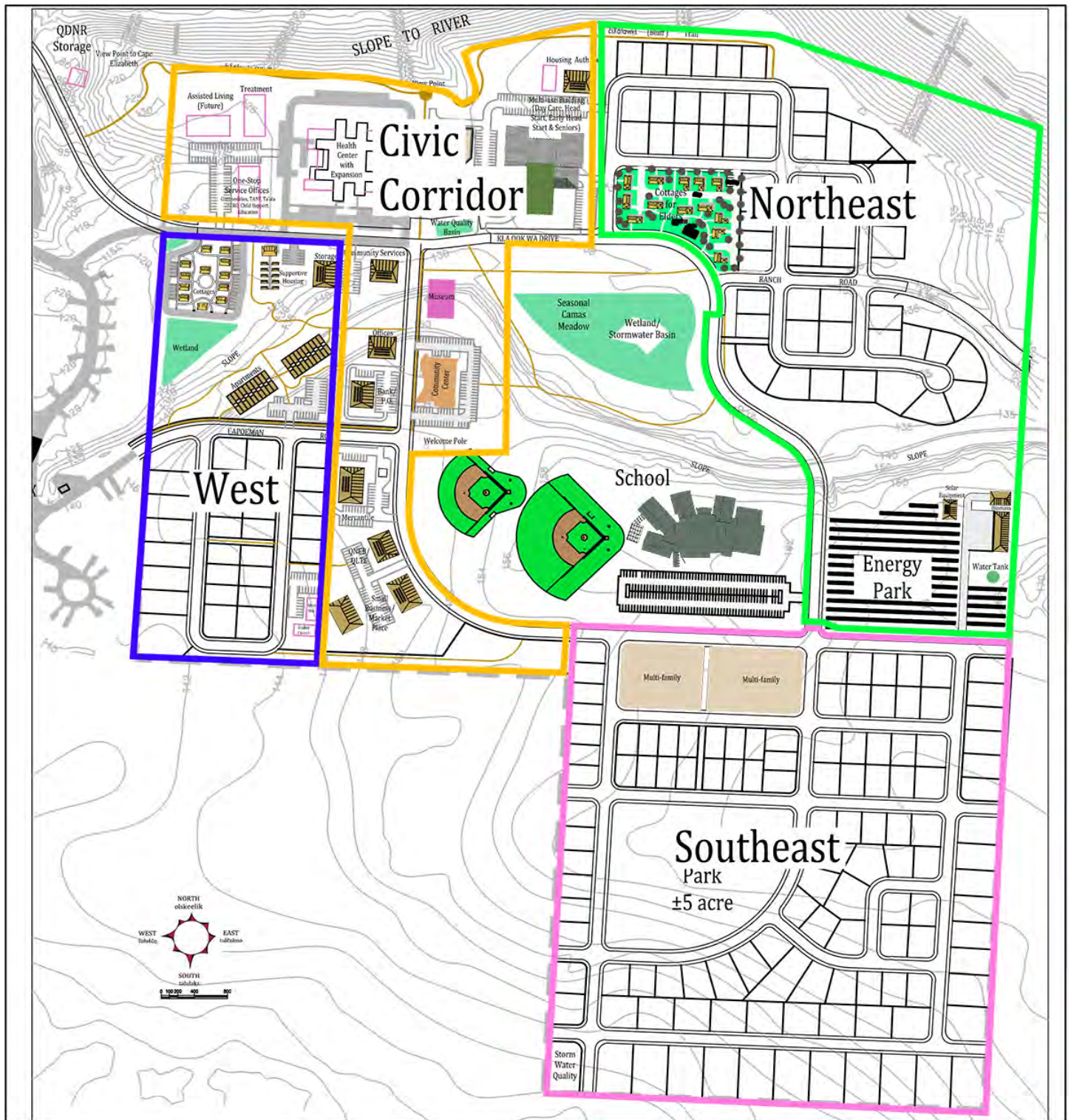
The proposed Biomass Energy Facility was originally planned to be located across the street from the Health Center to provide hot water to the various civic buildings scattered throughout the upper village. This proposed site for this facility has been moved from the center of the community to the Northeast Neighborhood, as part of the Energy Park.

WEST NEIGHBORHOOD

The West Neighborhood is located on approximately the western half of Allotment 164A. The existing 25-foot slope will be regraded to allow for street construction at a 5% grade or less on the new entry road. The remainder of the slope will remain so as not to affect a wetland at the foot of the slope on the western edge of the Allotment. The west neighborhood will be largely residential. Capoeman Road will be extended and realigned to intersect the new entry road across from the community center linking the existing



Taholah Village Relocation Master Plan



NEIGHBORHOODS TAHOLAH VILLAGE RELOCATION MASTER PLAN



Figure 5-1: Neighborhoods



Neighborhoods

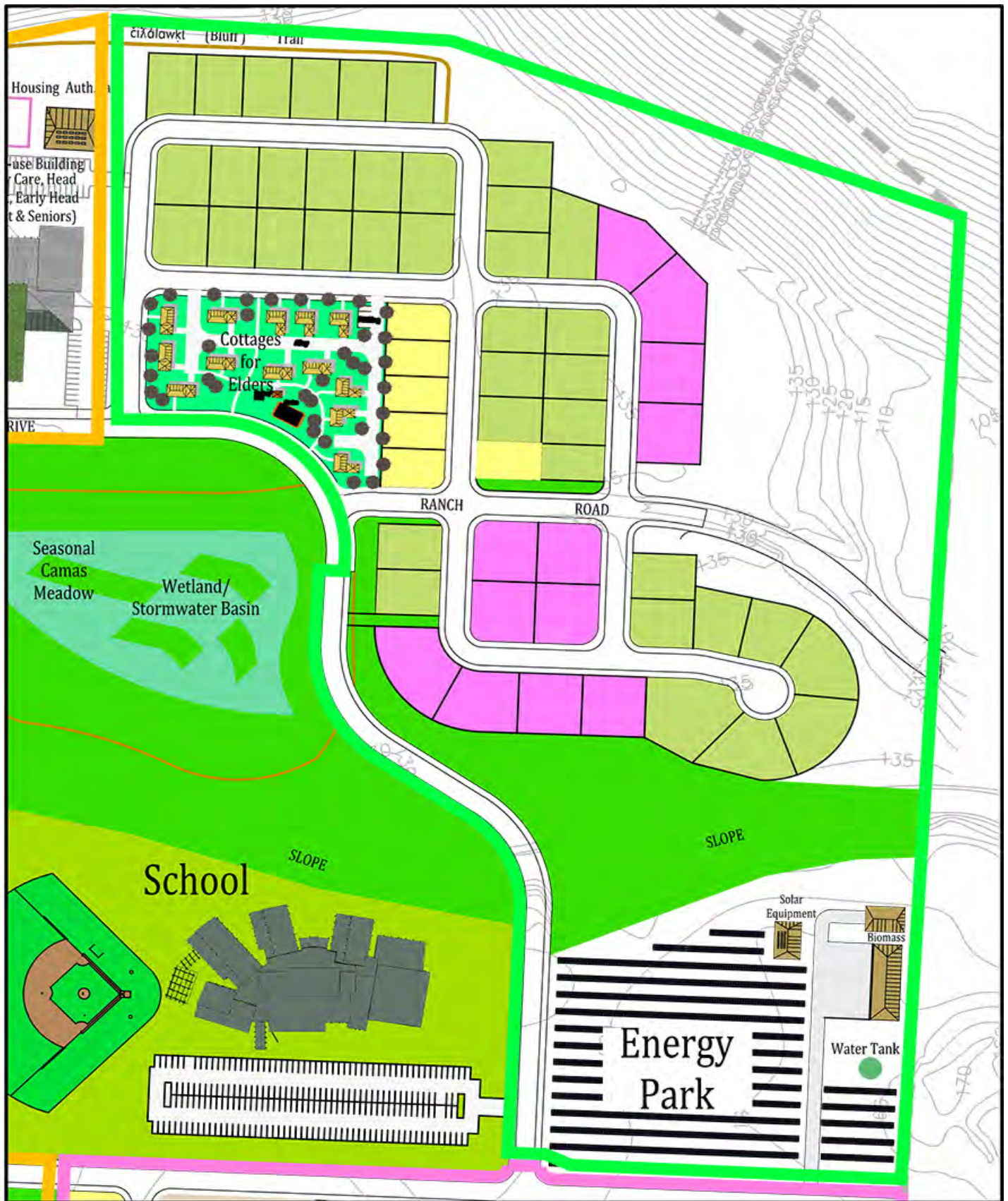


Figure 5-2: Northeast Neighborhood (outlined in green)
 Lotting and buildings shown are conceptual and subject to change at time of development
 Yellow lots are approximately 6,000 square feet, yellow are 7,500 sf and purple, 10,000 sf



Snob Hill development with an important public facility. The sidewalk along Capoeman Road will be enhanced with landscape to provide a vegetated link between the existing recreational facilities in Snob Hill and the Community Center and school.

Single family homes will occupy the area south of the realigned Capoeman Road. Apartments are slated for the area north of Capoeman Road above the slope. The existing wetland will remain at the foot of the slope. The wetland should be enhanced to be an amenity or should be fenced to avoid the wetlands becoming an attractive nuisance. The area along the south side of Kla Ook Wa Drive at the foot of the slope is set aside for smaller housing units, both cottages and housing for the homeless and for those transitioning back into the community from treatment. The West Neighborhood has been selected as the location for semi-public uses, such as churches, because of its proximity to the Civic Corridor and the Corridor's larger, non-residential uses. The Plan suggests that the semi-public uses be located adjacent to the commercial and civic uses in the Corridor. The semi-public uses can be located within the residential area, as churches and other such uses are permitted uses in Residential zones in Title 48.

The water main serving the community currently follows the existing gravel Capoeman Road. As Capoeman Road is to be realigned and a portion of the slope graded, the water main will also need to be realigned.

SOUTHEAST NEIGHBORHOOD

The Southeast Neighborhood is roughly equivalent to the lands of Allotment 164. This neighborhood is generally flat and drains both to the north and south. The neighborhood will be predominantly residential with residential densities increasing as the distance from the school and civic corridor increase. There are also opportunities for a park and open space. Streets are generally laid out in an east-west direction to maximize passive solar opportunities. Walkways are spaced at no less than 500 feet to reduce walking distances and block lengths. The highest point in the Relocation Area is located along the eastern edge of

the neighborhood. Property in the vicinity of the high point may need to be set aside for a water tower.

CIVIC CORRIDOR

The Civic Corridor traverses the eastern edge of the West Neighborhood, lying along the proposed new entry road on Allotment 164 and to the north of Kla Ook Wa Drive including the existing Health Center and the lands adjacent to the east and west. The Corridor is bounded by the West Neighborhood to the west, the south boundary of Allotment 164, Kla Ook Wa Drive on the north and the proposed school on the east. The uses in the corridor will consist of commercial uses, such as the Mercantile and bank, the post office, public offices and the new Community Center. The area west of the Health Center could be utilized for an assisted living facility, office buildings or the police station.

The Community Center will not only serve as a meeting space for community meetings, bazaars and funerals, but also serve as an emergency evacuation shelter. Extra storage has been provided in the building for cots and emergency food and bathrooms have been oversized to provide showers and extra facilities in case the building is used as a shelter.

The office and commercial spaces on the west side of the main north-south street in the Civic Corridor may also include housing in mixed-use buildings (office or commercial on the ground floor and one to two stories of apartments above). Such development would require careful site planning for integration of resident parking. Such a development would require agreement between QIN and the Housing Authority or new staff to maintain the building and collect rents. Alternatively, the buildings could be two stories of office space.

The baseball field adjacent to the community building will serve as a helipad for the community. The field is convenient for moving supplies to the Community Center in case of emergency and easily accessible from the police station and Health Center.

The existing Health Center was designed for expansion



Neighborhoods

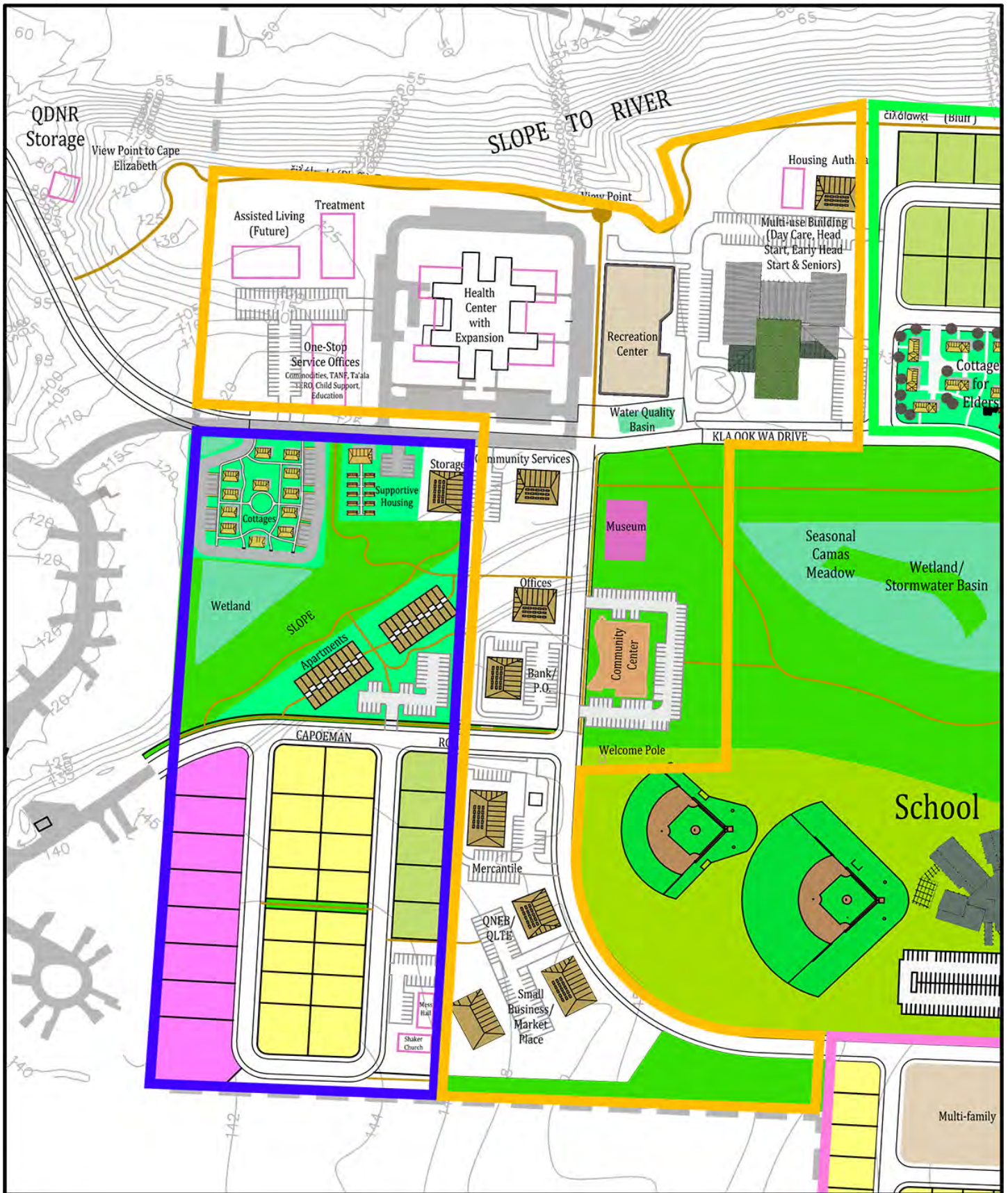


Figure 5-3: West Neighborhood (outlined in blue) & Civic Corridor (outlined in orange)
 Lotting and buildings shown are conceptual and subject to change at time of development
 Yellow lots are approximately 6,000 square feet, yellow are 7,500 sf and purple, 10,000 sf



Figure 5-4: Southeast Neighborhood

Lotting and buildings shown are conceptual and subject to change at time of development
Yellow lots are approximately 6,000 square feet, yellow are 7,500 sf and purple, 10,000 sf



Neighborhoods

at the time of its original design. All expansion of the Health Center should be able to be accommodated within the Health Center's current site. Future facilities that might be associated with the Health Center could be placed on the site adjacent to the west. Interviews conducted with the Health Center staff indicated potential facilities might include an assisted living facility and a residential substance abuse home.

The Generations Building will house the priority programs for Relocation (the Seniors Program, Day Care, Head Start and Early Head Start), as well as various complementary programs. This facility will be located to the east of the Health Center at the heart of the community, the intersection of Kla Ook Wa Road and the new entry road. A recreation facility is slated for the land directly east of the Health Center and will

include a fitness center, locker rooms, a basketball court and, potentially, a pool.

Many community members remarked on lack of storage space in their homes. Additionally, various QIN programs also would benefit from additional storage space. A storage building, either owned and operated by the QIN or as a private enterprise, would be a use that would likely benefit the community. A storage building is shown on this plan along Kla Ook Wa Road, but could be located anywhere within the Civic Corridor.

Along with the West Neighborhood, the site will be graded to remove the steep area sloping to the north along the existing gravel Capoeman Road. This will allow streets and sidewalks to be graded at less

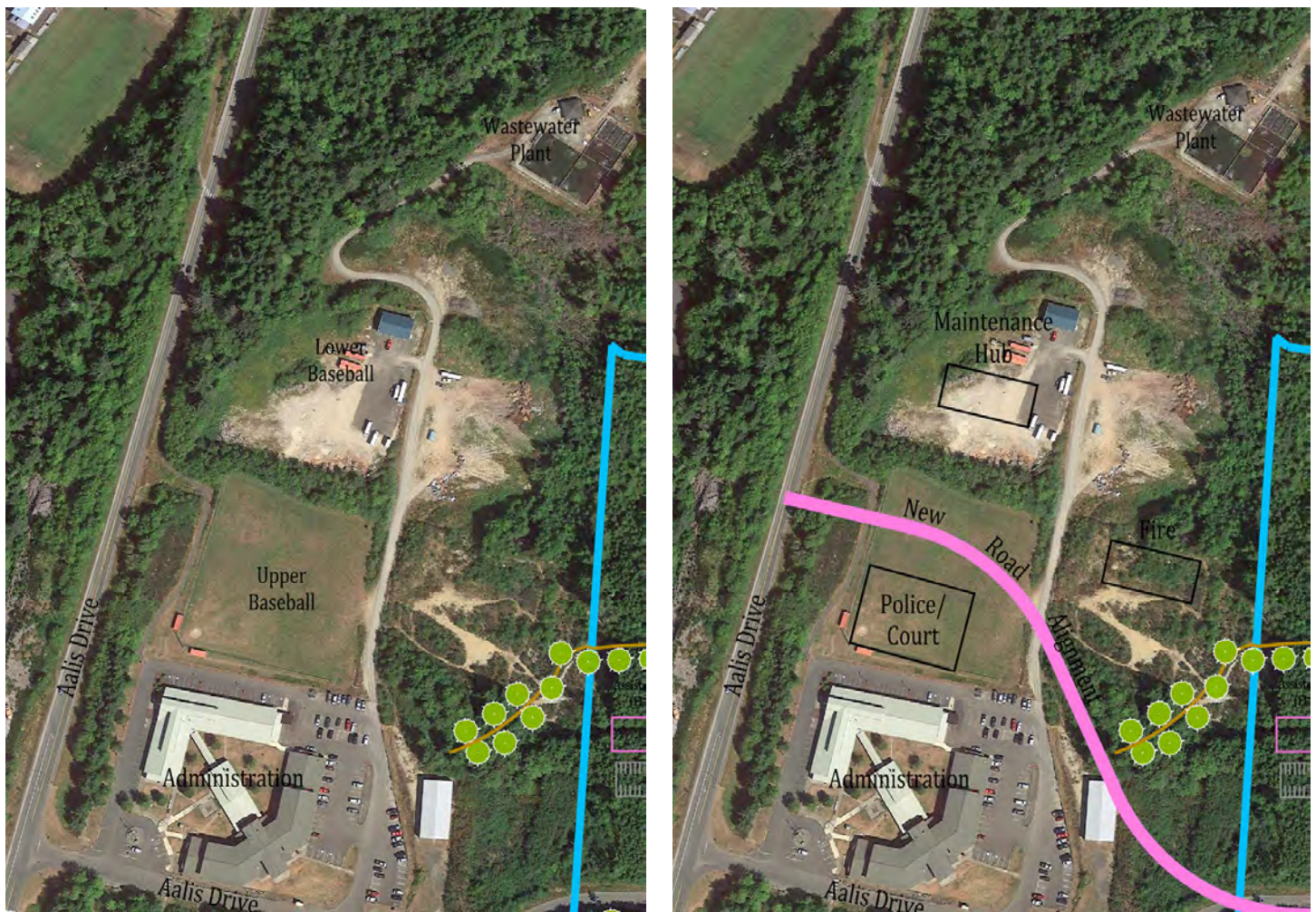


Figure 5-5: Allotment 3062 Existing Conditions and Possible Future Uses
Lotting and buildings shown are conceptual and subject to change at time of development



than a 5% slope, reducing speeds on the road and encouraging those of all abilities to walk through the Corridor.

A trail connection should be made at the south end of the neighborhood linking the main street with the residences 400 to 500 feet south of the main street's intersection with Capoeman Road.

NORTHERN BLUFF

The bluff at the northern edge of the Relocation Area would remain as open space and subject to the new zoning designation of Village Open Space. Development would extend to the top of the bluff, but the only development activity allowed within the open space area is selective cutting of trees to establish a visual connection to the river and ocean. A trail is planned along the top of the bluff connecting the northeast neighborhood to the wider trail network, including the Lower Village.

ALLOTMENT 3062

Various uses may be placed on Allotment 3062 north of the Administration Building. Currently, there are a ballfield (upper) and a former ballfield (lower) to the north of Administration or on the parcel due west of the Health Center. The police and courts building will be located directly north of the Administration Building on the upper ballfield. The lower ballfield may house the maintenance hub facility. To the east of the upper ballfield, there is ample space for a fire station, if the station is located in the village. Alternatively, the fire station may be located near Point Grenville. at Seedling Storage. Areas of Allotment 3062 may also accommodate QDNR storage buildings. There is a shortage of parking at the Administration Complex. Additional parking lots may be sited on Allotment 3062; lots for General Services Administration vehicles could be placed further from the Complex to provide more space for employees' vehicles..

PARKS, OPEN SPACE AND TRAILS

In order to encourage residents to walk more and to reduce driving within the village, a network of

trails will connect open spaces and neighborhoods. Pathways will be built connecting the central park and school with new parks in the Relocation Area and to the existing facilities in the Snob Hill neighborhood. The trail system will connect to the existing trail from the Taholah School to the Administration Building, as well as the walking routes created by the Health and Wellness Division. Trails will be 5 feet wide and paved. At a minimum, a pedestrian walkway shall be provided every 500 ft. along any street, connecting it to the next parallel street. Mid-block pathways shall occupy a corridor no less than 15 feet in width and the sidewalk itself shall be no less than 5 feet in width. Trails can be lit with solar lighting, such as that used on the Haxton Way project on the Lummi Reservation. The lights adjust brightness automatically upon sensing oncoming pedestrians and then reduce the brightness as after the pedestrian has passed. This will allow for lighting within the community even in the case of power outage and will cause the least amount of disturbance to neighboring properties and reduce light pollution. Parks and open space provide opportunities to incorporate art and culture into the village.

THE FUTURE OF THE LOWER VILLAGE

Given that no residents will be forced to move from the Lower Village, there will likely be some residents there for several years or longer. As the residents of the Lower Village gradually relocate to higher ground, a plan for the Lower Village will be necessary. A plan at this time is premature; however, a moratorium on new residential buildings in the Lower Village is advisable as land in the new village becomes available. Suggestions for the Lower Village have been made during the public participation process include celebration space for Chief Taholah Days, gardens, recreational areas, such as sports fields and RV parks, and the reintroduction of fish habitat in a constructed estuary.

OTHER FACILITIES

Health and Wellness Division staff suggested a farm be included in the new village or in the general vicinity. A schematic plan was created to explore such a use. This plan included acreage for orchards, rotational grazing for livestock, such as goats and alpacas, vegetable



gardens, apiaries, greenhouses, market space to sell produce, and outdoor dining. The farm would be used for job training and the production of fresh vegetables and fruits to be used within the village. The supply of food in the immediate vicinity will help improve health outcomes in the community, as well as serve as a potential food source in the case of disaster. The schematic plan considered a farm of approximately 25 acres. This use is likely too large for integration into the new village, as the limited area is needed for homes and community facilities. If adjacent or nearby lands were acquired by the Nation, a farm would be prime use.

backbone infrastructure. The QIN may construct the neighborhoods or commission other entities, such as the Quinault Housing Authority, to construct the neighborhoods. Lots within the new village will be leased to residents, as is the case in most of Taholah currently.

The phasing plan may be required to change due to unforeseen infrastructure or community needs. The phasing of the project will continue the balance of land uses throughout development, as is possible, based upon any changed conditions related to infrastructure or the community needs.

IMPLEMENTATION

Phasing

The following program is the currently anticipated phasing for the relocated village. This phasing program is conceptual and is subject to modification as conditions change over time. Specific timing for project buildout will depend upon demand for housing and community facilities, funding and infrastructure availability. This program has been designed to provide for development in a logical manner and efficient use of infrastructure improvements.

As the sole landowner, the Quinault Indian Nation will be the master developer of the new village in that the Nation will be responsible for subdivision of land and will assume responsibility for items such as

This phasing process is illustrated in detail in the following Phasing Plan exhibit. The order in which neighborhoods are built out has been established based on the logical patterns of infrastructure improvements and anticipated market demands. All necessary roadways, site grading, and utility backbone improvements and easements will occur in a timely manner with each development subphase as required by the demands generated by each infrastructure demand phase.

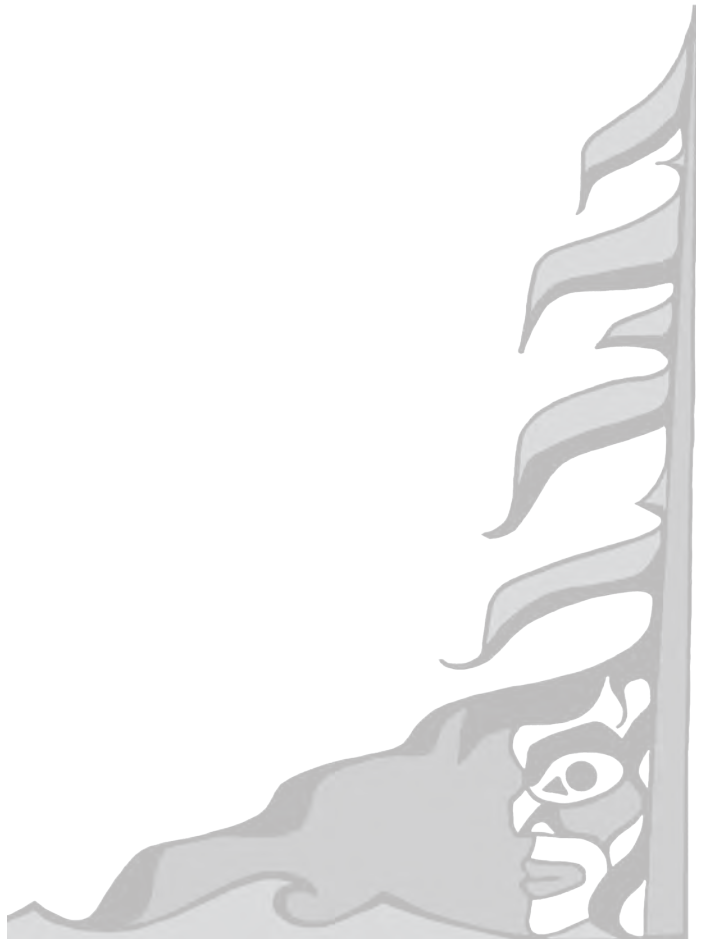
Below is a table illustrating each development phase by area, acreage and number of units. The number of units, linear footage of road, and square footage of buildings is based on a conceptual lotting diagram and the Space Needs Assessment and is subject to change based on the future needs of the QIN.

<i>Neighborhood</i>	<i>Acreage</i>	<i>Approximate Sq. Ft. Buildings</i>	<i>Approximate Number of Single Family Residential Lots</i>	<i>Approximate Number Multi-family Units</i>	<i>Linear Feet of Road</i>
Northeast	63.4	85,000 (school)	57	11	5,825 LF
West	16.9	N/A	29	52	2,388 LF
Civic Corridor	53.6	99,900	0	0	1,451 LF
Allotment 3062	15.6	55,150	0	0	1,435 LF
Southeast	44.4	N/A	117	24	10,065 LF
TOTAL	193.9 ac.	240,050 sf	203	87	21,164 LF (4 mi.)

Figure 5-6: Neighborhood Development Land Use Summary
Estimated Unit Yield and Road Lengths



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Art & Culture



ART & CULTURE

Quinault culture can be incorporated in the new village in several ways via art, language, architecture, and landscaping. Street names, art and signage can incorporate Quinault language. The museum, along with craft and carving space, can be located at the heart of the community. Plants traditionally used by the Quinault will be used in public spaces.

GOALS

- Provide opportunities for art throughout the village to create a unique identity for the village and employ Quinault artists
- Re-establish a connection to native and traditionally-used plants
- Suggest architecture that is reminiscent of traditional Quinault buildings

ARCHITECTURE

The Quinault traditionally used two types of building, the longhouse and the pit house. The longhouses were constructed from cedar plant and posts with



Examples of Longhouse architecture and pole and beam construction

gabled roofs. Design of public buildings in encouraged to echo the longhouse design to create a common theme along the main roads in the public areas. This common theme will identify Taholah as Quinault and unique. This distinctiveness may also attract economic development through tourism. Elements of the longhouse that should be incorporated in the new public buildings include:

- Gabled Roof
- Use of Cedar
- Post and Beam Construction



Baskets. Variety of Quinault weaving patterns and basket shapes. Top: Cone basket for ferns Bottom: Twill weave maple basket (mExoi)

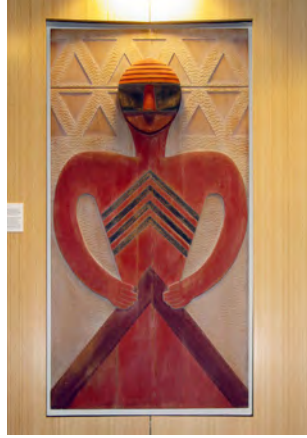
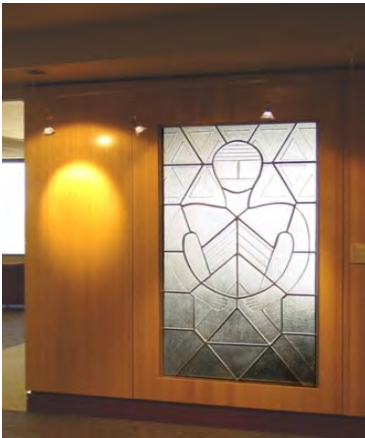


ART

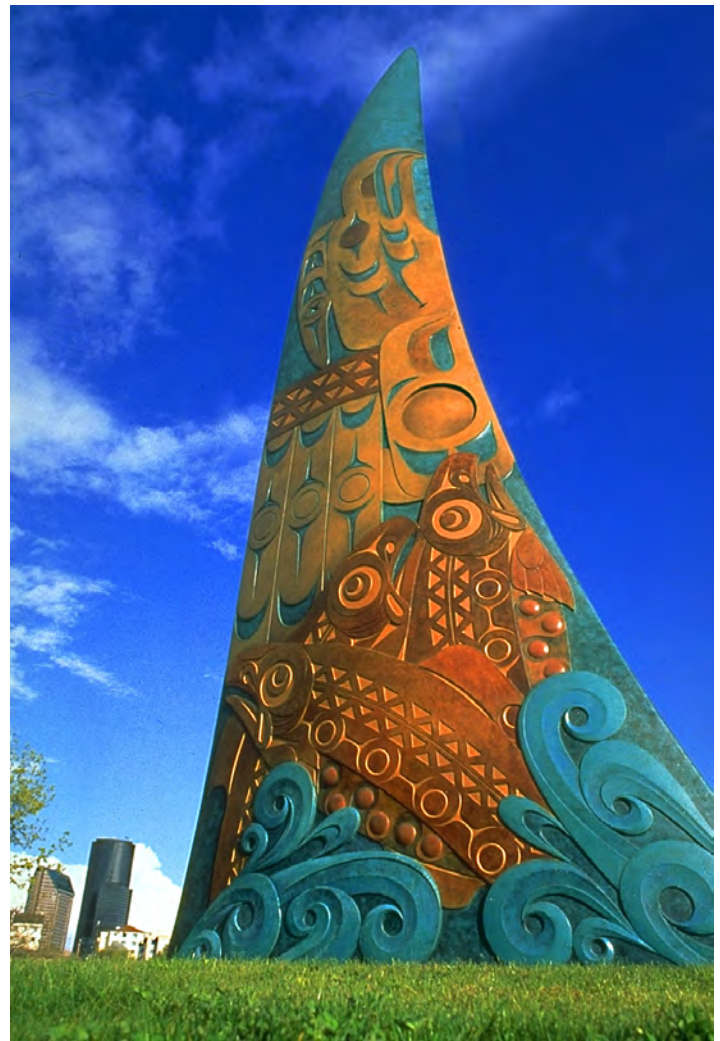


Quinault art can manifest both in large installation and small details paying home to traditional patterns. Large art installations include story poles and totem poles in select public areas throughout the village. Spirit boards and smaller carvings reminiscent of speakers' staffs can be incorporated into building facades. Details such as

Below: Copper can be an effective outdoor art medium. (Courtesy Marvin Oliver)



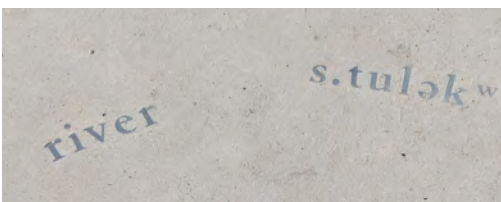
Top: Art on Paddle (Quinault Museum)
Below: Examples of art incorporated into walls and windows. (Courtesy of Marvin Oliver)



Above: Signage can incorporate the Quinault language like this sign at Snoqualmie Falls
Below: Language incorporated in to paving at Snoqualmie Falls



Above right: Speaker Staff
Right, next column: Spirit Board (Corinna English)





shapes and patterns of weaves, nets, paddles and traditional painting can be translated to glass etching, brick patterns, painted or can be carved in doors.

The shape of baskets can serve as the inspiration for architectural details, such as light fixtures or flower pots. Materials appropriate for outdoor installations include the traditional medium of wood, as well as non-traditional material such as glass, fiberglass, powder-coated steel and bronze.

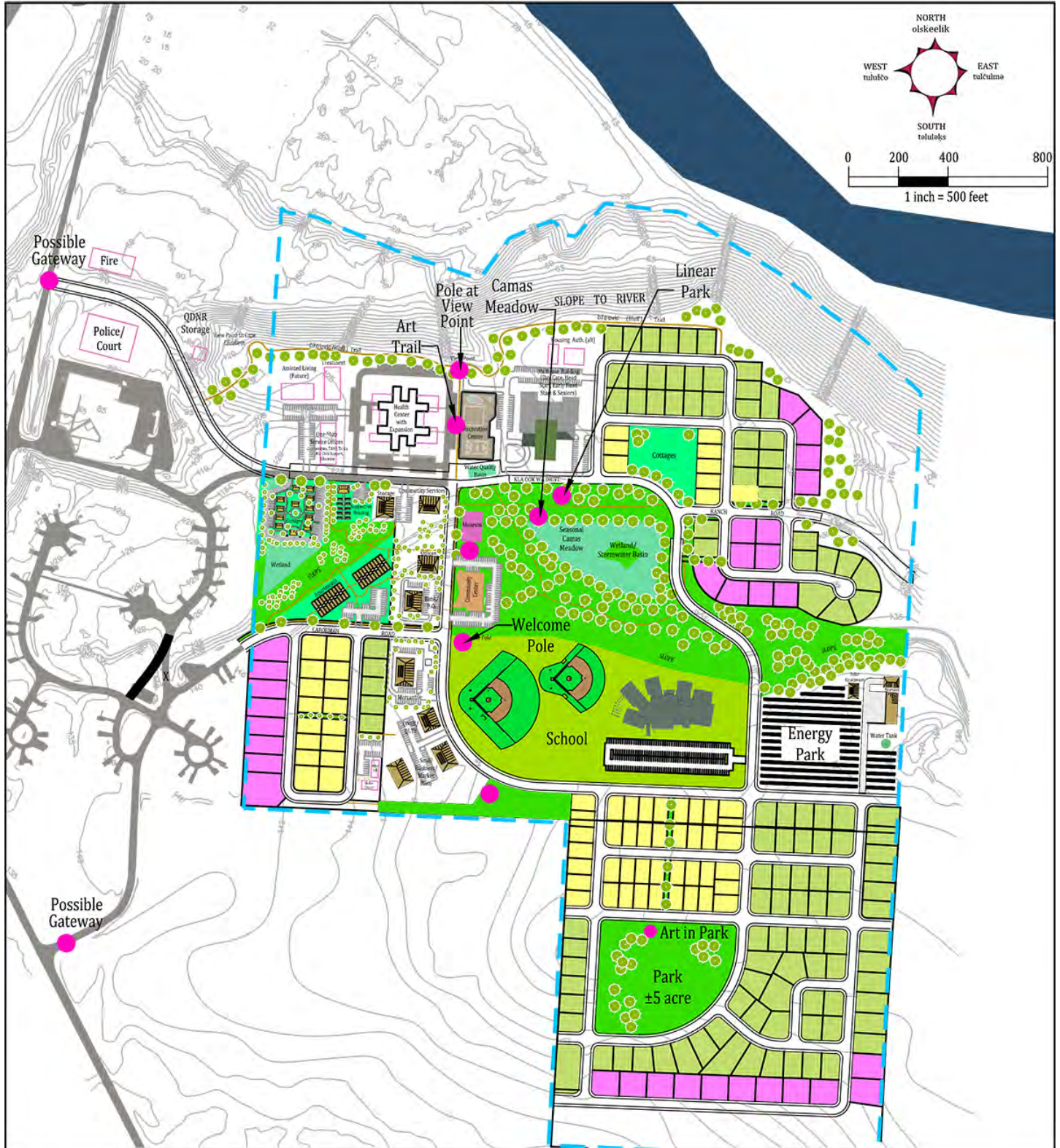
Art should feature prominently as people enter the village on the main road and as they travel along the main road through a cultural corridor. There should be a gateway to the village announcing one's arrival in Taholah. This gateway could include welcome poles, canoes and other traditional elements. The cultural corridor would extend from the gateway at 109 along the main road to Kla Ook Wa Drive, where the museum is planned to be. The cultural elements will continue along a trail between the health center and the recreation building to the top of the bluff where there could be a tall art installation marking the end of the axis and a viewpoint. Please refer to the map on the next page for detail. Fire pits and smokehouses may also be included in public areas for the cooking of salmon at public gatherings; these facilities can also be used in case of disaster when the electrical system is down.



Use art to break up blank walls

OPPOSITE: Opportunities for Art Installations in the Relocation Areas. Sites shown in purple.

Example of Welcome Pole in copper (Courtesy Marvin Oliver)



POTENTIAL CULTURAL INSTALLATIONS
TAHOLAH VILLAGE RELOCATION MASTER PLAN





Pauline Capoeman picking Indian tea

The inclusion of art within the community not only creates a distinct identity for Taholah and connects residents with their cultural heritage and instills civic pride; it also provides economic opportunity for talented Quinault artists through commissions. Art also adds to the beauty of the community. Blank walls should be adorned with art to enhance the visual feel of a building.

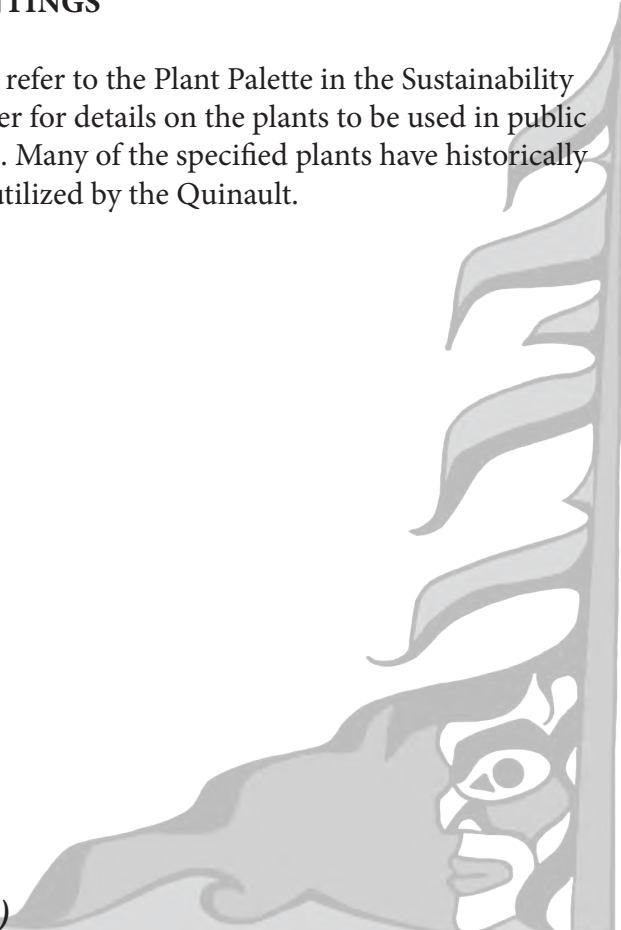
PRAIRIES

One possible method of incorporating Quinault culture into the new village is the design of stormwater quality facilities to mimic the bogs, known on the Reservation as prairies, which are home to native plants, such as Labrador (Indian) tea. The prairies could be accommodated in parks or within the existing wetland areas. Creation of prairies would require careful preparation of the soil. There are areas of peat in the Relocation Area that are not wetlands. These areas would be the most likely areas to successfully support a constructed prairie.

PLANTINGS

Please refer to the Plant Palette in the Sustainability Chapter for details on the plants to be used in public spaces. Many of the specified plants have historically been utilized by the Quinault.

Figure 6-1: Potential Cultural Installation Sites (opposite)



Infrastructure





INFRASTRUCTURE

This chapter details the infrastructure in the Relocation Area, first with a discussion of the existing street, wastewater, and water facilities and then with an accounting of the infrastructure that will be necessary to serve the new development.

Infrastructure will play a major role in the future of the new village and will constitute the majority of the costs for the new village.



Kla Ook Wa Drive east of Health Center

Photo by QIN Planning

GOALS

- Ensure adequate road, sewer, water, power and communication infrastructure within the new village and logical and predictable placement of utilities
- Specify road widths that discourage speeding and reduce impervious surfaces
- Build new trail infrastructure to link neighborhoods in the new village to each other and existing wellness routes to encourage walking and bicycling to improve community health
- Ensure sensible phasing of development
- Consider future transit routes to ensure adequate service throughout the community
- Estimate the cost of developing the village to set funding goals



Wastewater Treatment Plant

Photo by QIN Planning

EXISTING INFRASTRUCTURE

Streets

Other than a few logging roads, the area is served by Aalis Drive at the Administration Building; Kla Ook Wa Drive, which serves the Health Center; and Capoeman Ranch Road, a gravel road that traverses the site, eventually ending at the river. These roads are all toward the northern end of the Relocation Area. In 2015, Kla Ook Wa Road was extended beyond the

Health Center to approximately the western boundary of Allotment 162. Capoeman Drive serves the Snob Hill residential area to the west of the Relocation Area via an easement across Allotment 75A and will be extended into the Relocation Area. Capoeman Road and Aalis Drive are the two street connections to State Route 109.

Wastewater

Sewer lines in the Relocation Area will connect to the existing sanitary sewer system in Capoeman Road and the sewer line serving the Health Center. The Wastewater Treatment Plant is located on Allotment 3062 just north of the Master Plan boundary. The plant is located within the tsunami zone, though would be affected only by a worst-case scenario, and is located above the 1% Flood Zone (100-year flood).



The Plant, built in 2005, consists of a Control Building and four cells at elevation 28 feet. Four infiltration ponds are located to the north; the top of the ponds are at elevation 24 feet. One sewer line feeds the four cells. Approximately 100 feet upstream of the cells the line branches, one pipe carrying the sewage from the upper village and a force main carrying the sewage from the lower village. Because the wastewater treatment plant is relatively new, adequately sized for the expanded village, and situated at the upper reaches of the tsunami zone, construction of a new plant is a low priority. Indian Health Service has indicated that the plant is well-located to handle effluent from both the Upper and Lower Villages. Please refer to the Resilience Chapter for more details on how wastewater should be handled in the case of disaster.

The gravity sewer line from the upper village and the force main are less than ten years old. The sewer pipes in the upper village have been installed since the mid-1990s. The sewage in the lower village all flows to a lift station at the intersection of Queets and Commux Streets and then to the force main to the sewage treatment plant. The pipes in the lower village were installed in 1963 and 1968. The sewer line in 5th Street, which passes by the MiniMall and QLTE and was at one time connected to the sewers in Snob Hill, was installed in 1978, when the first development on Snob Hill was occurring.

Water

A well several miles upstream of Taholah provides the village with an ample supply of water. The water is piped underground along logging roads on the north side of the river. The pipe surfaces and crosses the river on the State Route 109 bridge north of the village. The water line as it crosses the bridge is vulnerable to damage in case of a tsunami. When the line was originally built, it was designed to travel underneath the Quinault River. However drilling operations were unsuccessful due to the nature of the soil beneath the river.

Once on the south side of the river, the pipe bears east and eventually up the slopes near the Relocation Area's northeastern edge. The pipe turns west and follows Capoeman/Ranch Road to the vicinity of the Health

Center and then turns southeast along the Capoeman/Ranch Road into Snob Hill and eventually to the storage tank west of Highway 109 near the Lighthouse Church. Development in most of the Relocation Area would connect to this pipe or others from Snob Hill. Development north of the Administration Building would connect to water lines serving the Administration Building.



Water Tank

Photo by QIN Planning

Power and Communications

Electricity service to Taholah comes via a 12.47 KV transmission line along SR 109 from the south, through Pacific Beach and Moclips with connection to the Upper village area via Aalis Drive and Capoeman Road. Electrical lines extend to the clinic (QIN owned). A 480 KVA transformer is situated on the western side of the building.

In the upper village the lines are underground. In the residential areas of the Upper Village, the lines are owned by Grays Harbor Public Utility District (GHPUD). The underground lines to the administration building, sewage plant and Health Center are privately owned by QIN. Electricity, phone lines and fiber optic telecommunications will be supplied to the currently undeveloped portions of the Relocation Area via underground services currently in Aalis Drive and Capoeman Road. Any costs associated with the power line construction required for a new subdivision would be the responsibility of the QIN. Once the power infrastructure is in place, GHPUD will be responsible for its operation and any maintenance needed in the future. New lines could be installed



underground or overhead, depending on the QIN's preferences.

Cellular phone service is spotty in Taholah. WiFi extenders located in various public buildings improve service on Verizon phones. WiFi extenders are located in Administration, QDNR, the Health Clinic, the MiniMall, Taholah School, the Police Station, the Senior Center, Riverfront Fitness, Early Head Start, Quinault Pride and Building Maintenance). Phone lines share the power poles along State Route 109 with the power lines. QIN is currently working to increase cellular service in Taholah.

The internet is accessed by Taholah residents via a DSL line owned by Centurylink (also the home phone service provider). QIN facilities are currently served by a fiber optic line originating at the administration building. This line is installed underground in the upper village area (serving the Health Center, QDNR/ Administration) and aerially on the telephone poles in the lower village where it serves all QIN government offices, except Riverview Fitness, Early Head Start and the Sewage Treatment Plant. The main line extends from Administration to the Senior Center with no spur lines to the governmental facilities along 5th Street. A line south from the Senior Center on the same poles as the main line serves these government buildings. Fixed Wireless equipment communicating directly with the tower provide internet to the Fitness Center, the Sewage Treatment Plant and Early Head Start. Fiber optic telecommunications will be supplied to the currently undeveloped portions of the Relocation Area via underground services currently in Aalis Drive and Capoeman Road. An extension of fiber from Moclips to Taholah is planned at this time.

QIN recently installed 6,000 linear feet of higher speed fiber optic cable originating at the telecommunications tower at the intersection of Capoeman and Aalis Drives. The cable is installed underground, extending along Aalis Drive to Highway 109, then along Highway 109 south to 5th Street and then north along 5th Street to the Senior Programs Building. This line serves the Administration Building/QDNR, QLTE, Road Maintenance, the Mini-Mall, QNEB Accounting, Taholah School, the Diabetes facility and the Senior Center. Individual buildings can be served with spur

lines from the main line, unlike the existing fiber lines.

This higher speed fiber optic line could be extended into the new Upper Village to serve QIN buildings and/or private residences. The cost of installing the new lines is estimated to be \$95,000 per mile. Road right-of-way plans would need to include joint trench facilities with room for 2 to 4 conduits (4-inch).

In case of power outage, seven days' worth of batteries and a generator are in place at the telecommunications tower for use if the batteries drain. Police personnel, MIS and the emergency manager are trained in safe use of the emergency equipment.

Power, phone and internet infrastructure is vulnerable to fallen trees in storms and is unlikely to survive a tsunami, as the inundation will cause severe damage to lines along State Route 109 between Mileposts 33 and 37 where the highway is only a few feet above sea level.

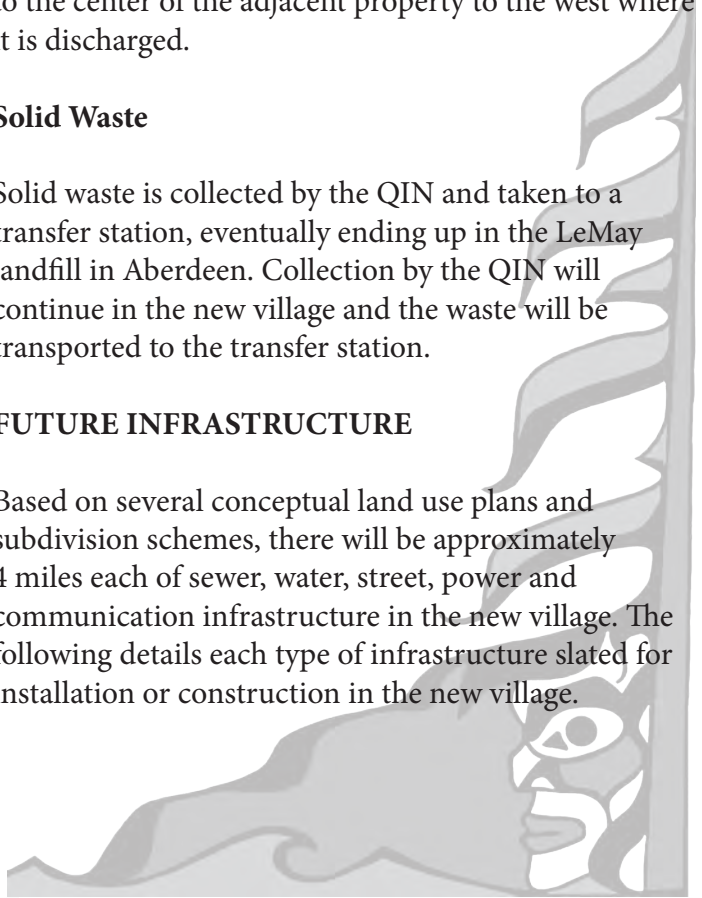
Stormwater infrastructure in the Relocation Area is limited. Stormwater from the Health Center is collected in a ditch along Kla Ook Wa and piped north to the center of the adjacent property to the west where it is discharged.

Solid Waste

Solid waste is collected by the QIN and taken to a transfer station, eventually ending up in the LeMay landfill in Aberdeen. Collection by the QIN will continue in the new village and the waste will be transported to the transfer station.

FUTURE INFRASTRUCTURE

Based on several conceptual land use plans and subdivision schemes, there will be approximately 4 miles each of sewer, water, street, power and communication infrastructure in the new village. The following details each type of infrastructure slated for installation or construction in the new village.





Streets

There will be three street sections used in the Relocation Area based on street use and volume. The Kla Ook Wa Drive section was designed prior to adoption of this Master Plan. Capoeman Road and the main street in the Civic Corridor will use a second street section.

The majority of the streets in the Relocation Area will be residential streets. The rights-of-way for the streets will be 50 feet wide, including 30 feet of pavement (2 11-foot lanes and one 8-foot parking lane), two 5-foot sidewalks and a 10-foot bioswale on one side of the street. Any cul-de-sacs will have a radius of 40 feet (right-of-way 50 feet). Alternatively, a cul-de-sac may be similar to the bulb at the eastern terminus of Chai Chu Drive with a central island. If there is a central island, the drive lane around the island will be 20 feet in width or greater. If the radius of the cul-de-sac is less than 47 feet, a mountable curb on the island will be provided. The islands will be landscaped and used for stormwater storage and infiltration. The streets are relatively narrow to reduce vehicle speed and reduce

impervious surfaces and stormwater runoff.

A new connection to State Route 109 on the north side of the Administration complex may be necessary as traffic volumes in the Upper Village increase with relocation. The existing access to SR 109, Aalis Drive, is narrow and subject to traffic conflicts with the Administration parking lot. Aalis Drive could be widened, but doing so would require a substantial retaining wall in the hillside on the south side of the road. Were the west end of Kla Ook Wa Drive rerouted to the north along the northern edge of the existing baseball field, the field and surrounding areas could be more readily developed.

Additionally, a reconfiguration of the Capoeman Road-Aalis Drive intersection near the cellular phone tower in the residential area south of the Administration Building will likely be necessary. The increased traffic volumes on Capoeman Road will make the intersection dangerous as drivers veer to the east along Capoeman Road. Aalis Drive should be rerouted to the location of the basketball court and intersect Chai Chu Drive at its existing intersection with Ji Lem Drive. Capoeman Road would maintain its existing right-of-way and continue into the Relocation Area.

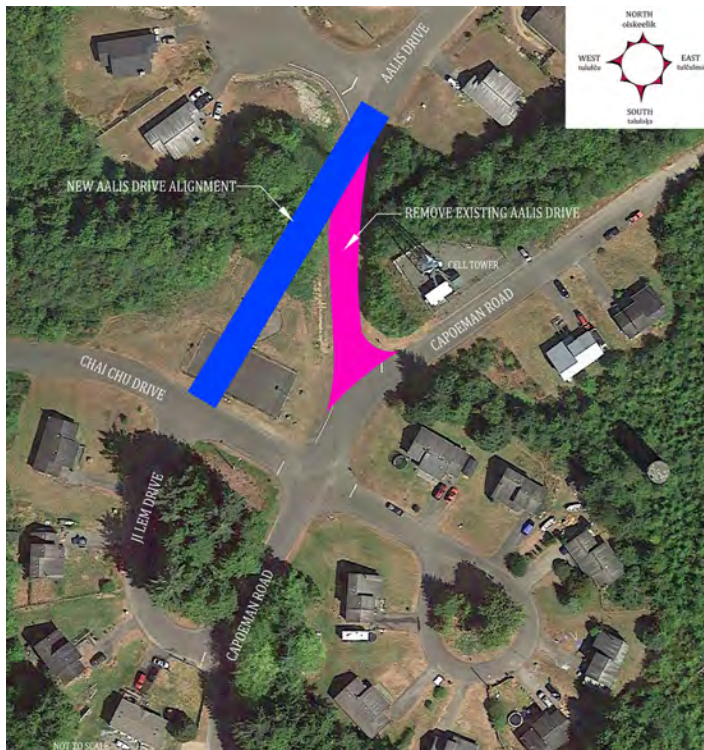


Figure 7-1: Realignment of Capoeman-Aalis Intersection

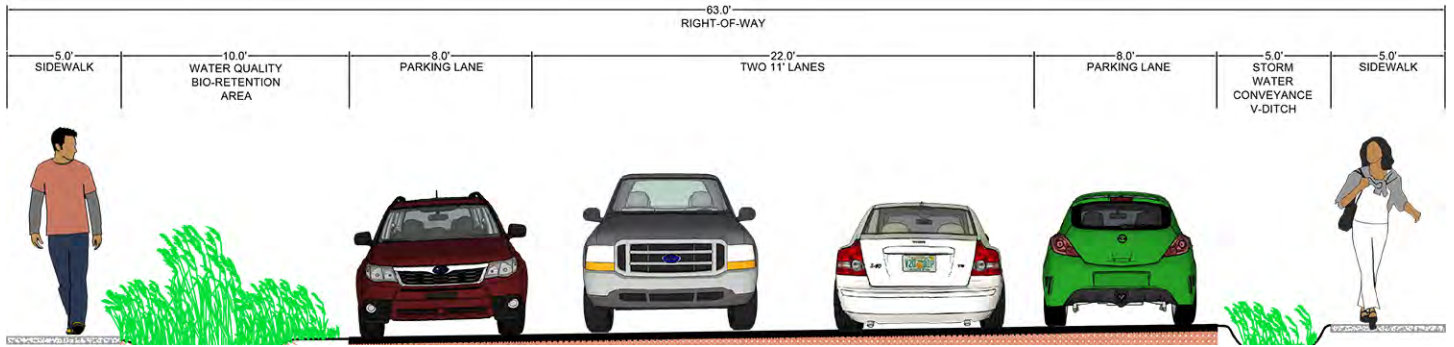
There is an 80-foot easement along Capoeman Road on Allotment 75A, so Capoeman Road could be widened and improved, as it will be one of the two entrances to the new village. Capoeman Road and the main street in the Civic Corridor will have a 63-foot right-of-way, with a pavement width of 38 (2 driving lanes and two parking lanes).

If Allotment 75A is developed in the future, either by individual owner or the Nation, a new collector road should be constructed from SR109 to the main street in the Civic Corridor. Street connections to adjacent allotments are to be provided at the time of a neighborhood's construction.

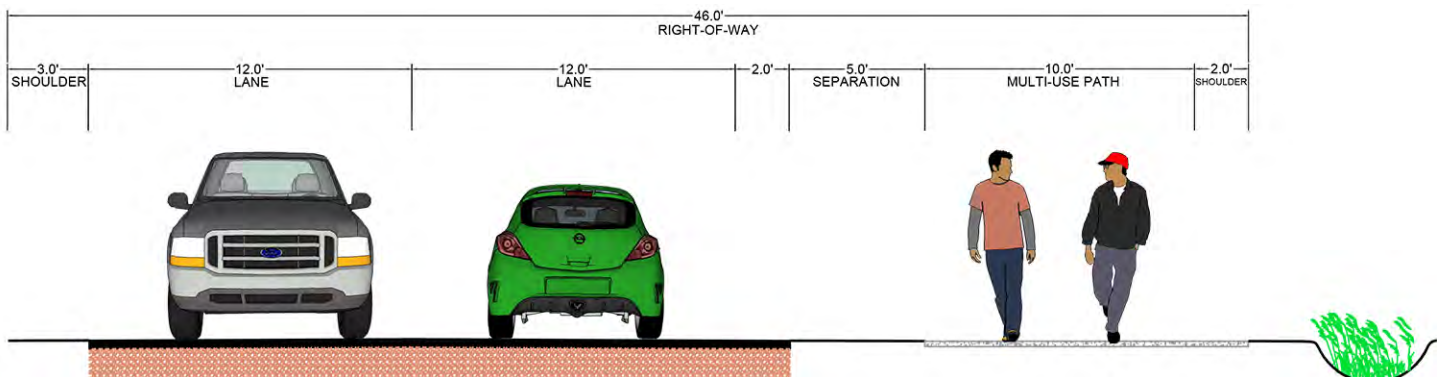
Streets should be constructed in an east-west configuration, where possible, to allow for optimal positioning of homes for capture of sunlight for both



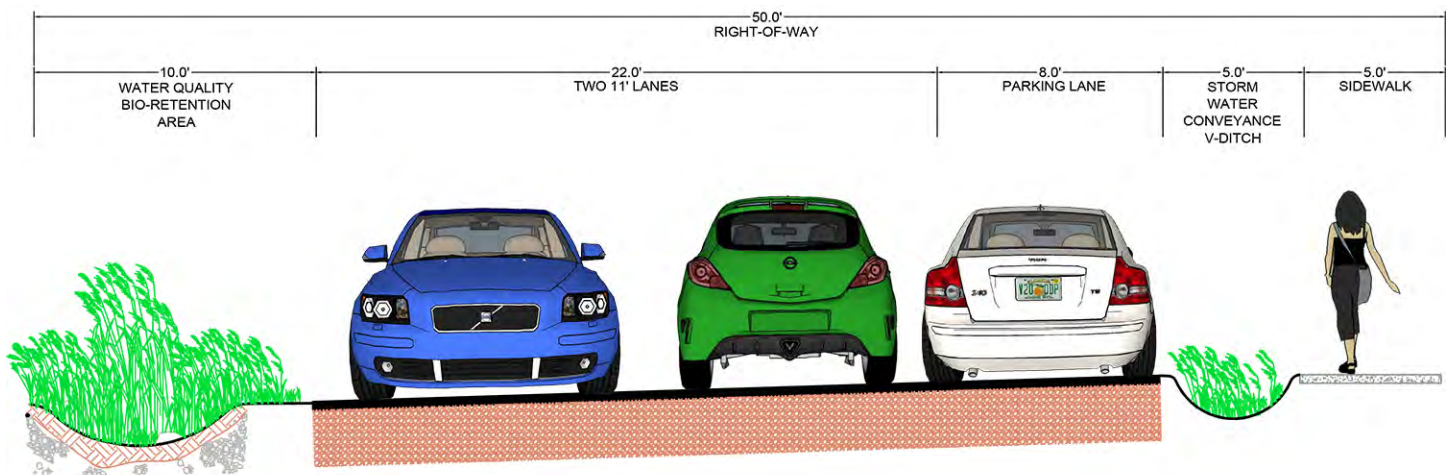
Taholah Village Relocation Master Plan



STREET SECTION: CAPOEMAN ROAD AND MAIN STREET IN CIVIC CORRIDOR



STREET SECTION: KLA OOK WA DRIVE AND EXTENSIONS



STREET SECTION: RESIDENTIAL STREET

Figure 7-2: Street Sections



active equipment, such as solar panels, and for passive heating.

Several members of the community expressed concern about truck traffic in the new village. Truck traffic should not be routed through residential neighborhoods. Truck traffic should be restricted to Aalis Drive (not in the residential area), the north-south street in the Civic Corridor, the existing portion of Kla Ook Wa Drive and the future extension of Kla Ook Wa Drive to State 109. Capoeaman Road should be signed as prohibited to truck traffic.

Transit

Grays Harbor Transit and the RezRacer currently serve the Health Center in the Relocation Area. It is anticipated that both services would alter their existing routes and pick up/drop off riders along the new main entry road in the civic corridor. Stops along this route would allow most of the village to access bus transportation within a 5- to 10- minute walk of their home. Most offices, the school, the Health Center, the Mercantile and the Post Office would all be convenient to these stops.

While there are no bus shelters in the Lower Village, a series of shelters will be installed to protect riders from the elements in the Upper Village. There is an existing shelter at the Natural Resources Building. Likely locations for these shelters include the future intersection of Capoeaman Road and Kla Ook Wa Drive, the future Recreation Building and the school. The buses stop at the Health Center underneath the covered entry, so no shelter will be needed at the Health Center. The buses would no longer travel along the south side of the Administration/Natural Resources Building, so the shelter would move to the north side of the complex, along the new road connecting to State Route 109.

Sewer

Indian Health Service estimates that there will be adequate capacity in the existing facilities to serve the new development. The existing system was constructed to handle effluent from a population of 1,350. Sewer

lines will be installed in the street rights-of-way.

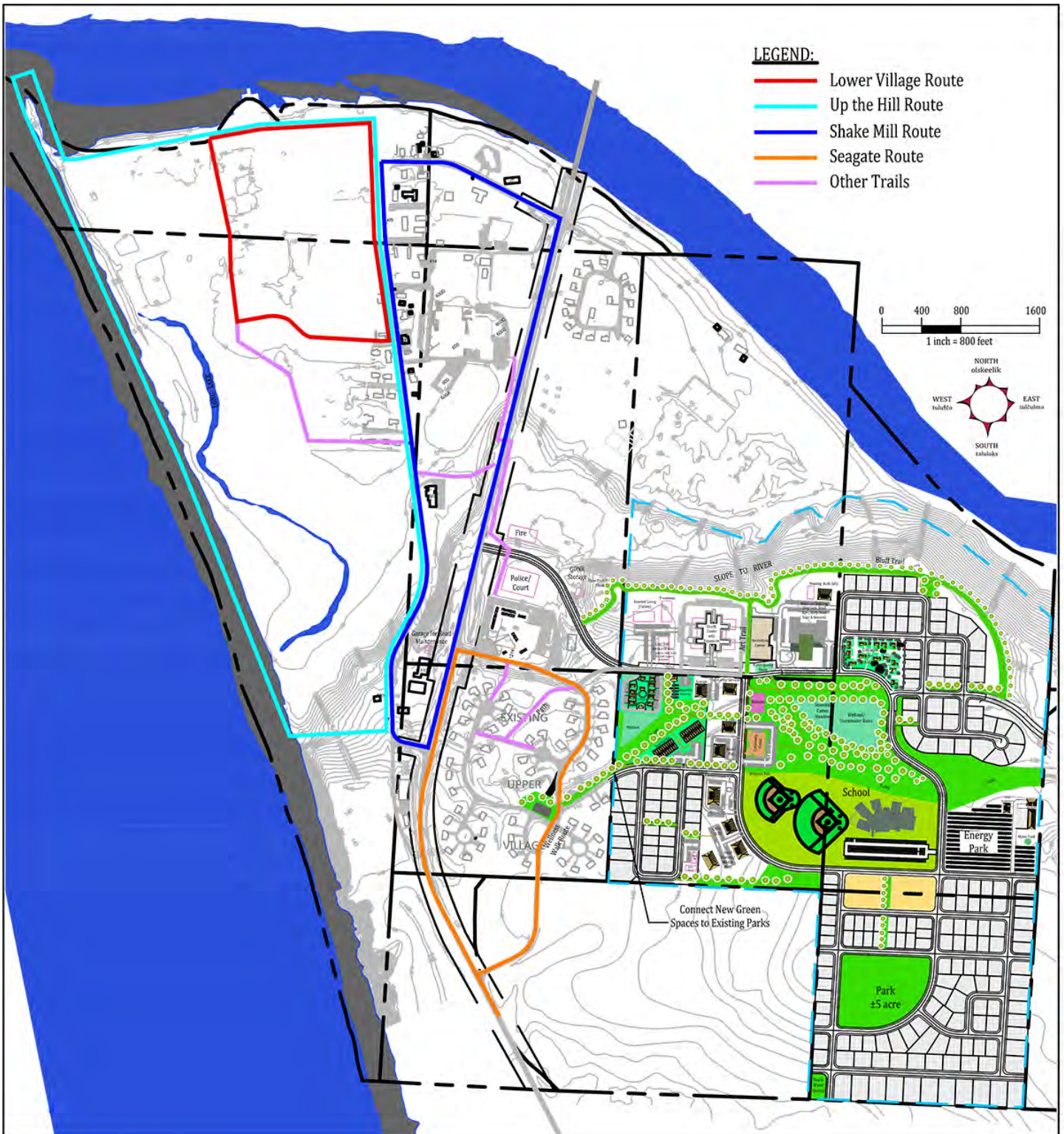
Wastewater will flow from the southeast, west and northeast neighborhoods via a pipe at the Health Center. The existing sewers at and to the west of the Health Center are deficient and need to be replaced. The pipes may be located along the current path of the sewer or rerouted along Kla Ook Wa Drive, eventually connecting with the system flowing north from Snob Hill. Wastewater from the Southeast Neighborhood will likely flow in a line under the main street in the civic corridor to the main that leads to the Wastewater Treatment Plant, as a gravity system would be able to serve the entire neighborhood with this routing. Alternatively, a line could be placed under the Kla Ook Wa Road extension to the Energy Park. This layout would require a pump station to drain the neighborhood.

The main downstream from the clinic should be a 12-inch or 15-inch pipe. The line under the main street in the civic corridor from the intersection southeast of the Health Center to the intersection southwest of the Energy Park should be a 10-inch line. The remainder of the sewer lines in the development should be 8-inch lines.

Water

Water lines will be installed in the street rights-of-way. The water lines along the main roads should be 12-inch lines; lines associated with other streets should be 8-inch lines. This will allow for adequate fireflow.

A new water tank for the Village will likely be necessary to maintain adequate water pressure in the higher areas of the project, such as the southeast neighborhood. The high point of the Relocation Area (approximately 165 feet) is at the southeast corner of Allotment 162, in an area designated as the Energy Park. This is an appropriate site for the tank. The tank may need to be elevated as much as 95 feet to match the tank on the north side of the river.



WELLNESS WALKING ROUTES AND FUTURE TRAILS
TAHOLAH VILLAGE RELOCATION MASTER PLAN

Figure 7-3: Wellness Walking Routes and Future Trails in the Upper Village

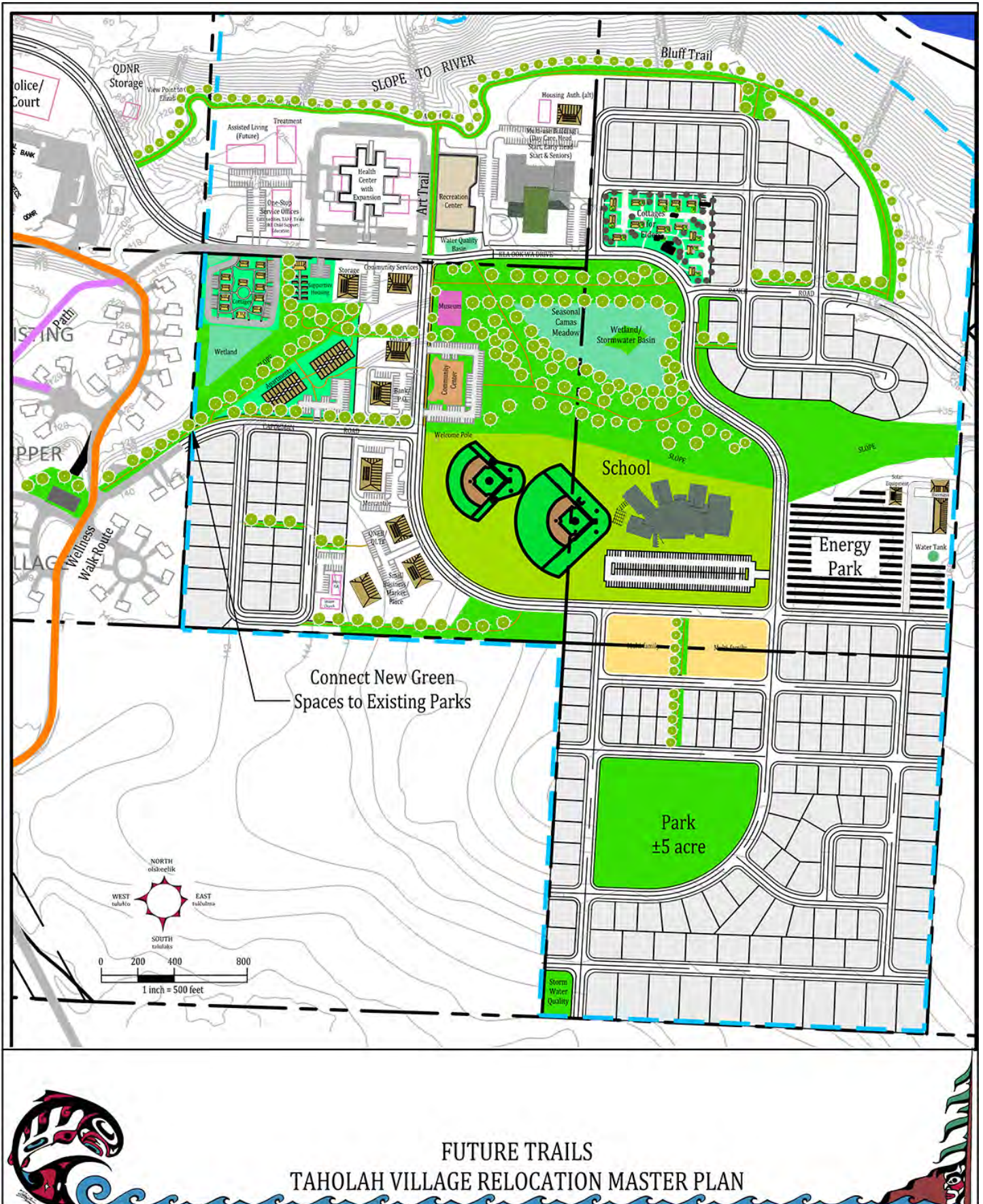


Figure 7-4: Future Trails in the Upper Village



Taholah Village Relocation Master Plan

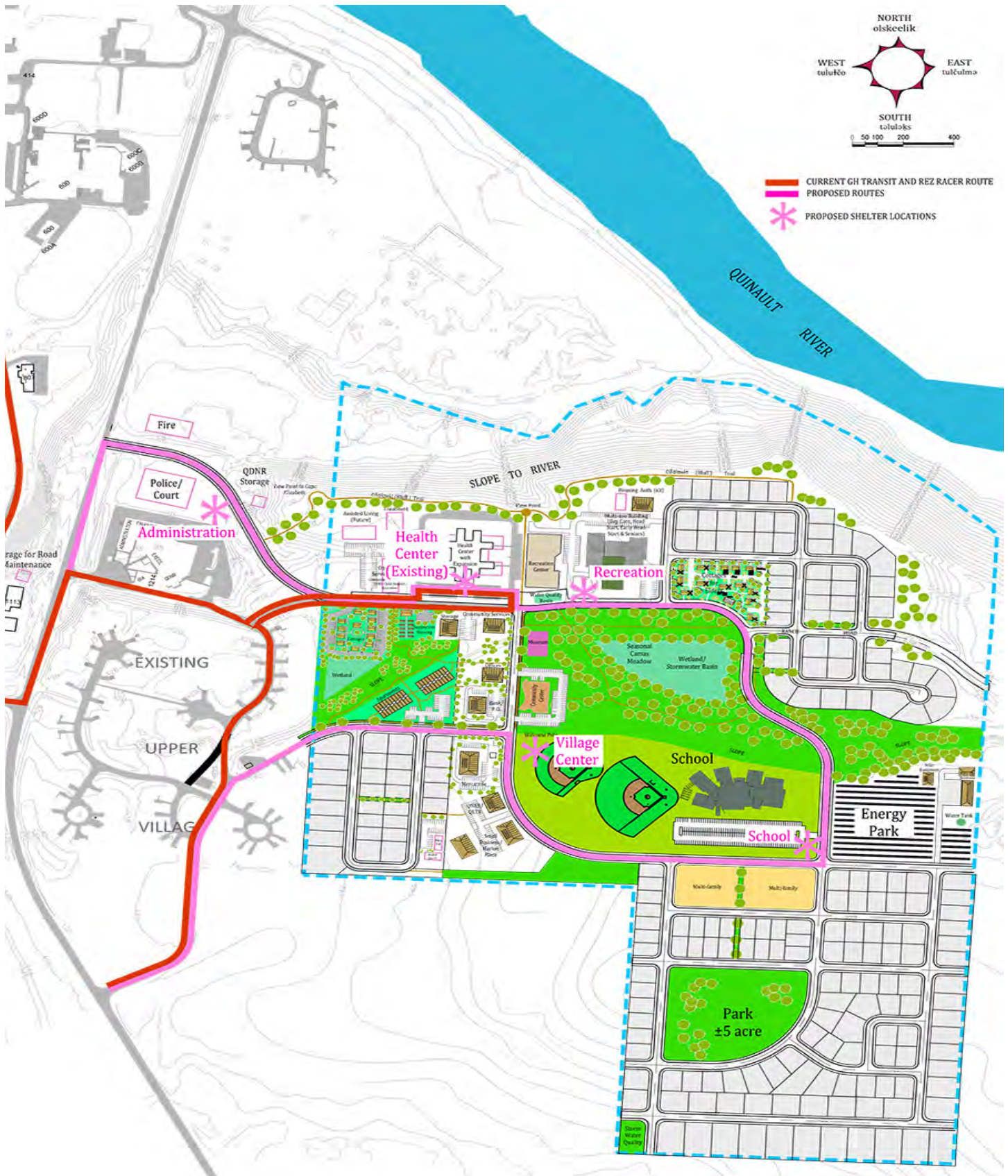


Figure 7-5: Existing and Suggested Transit Routes and Stops



Figure 7-6: Map of Existing Water Infrastructure - Lower Village

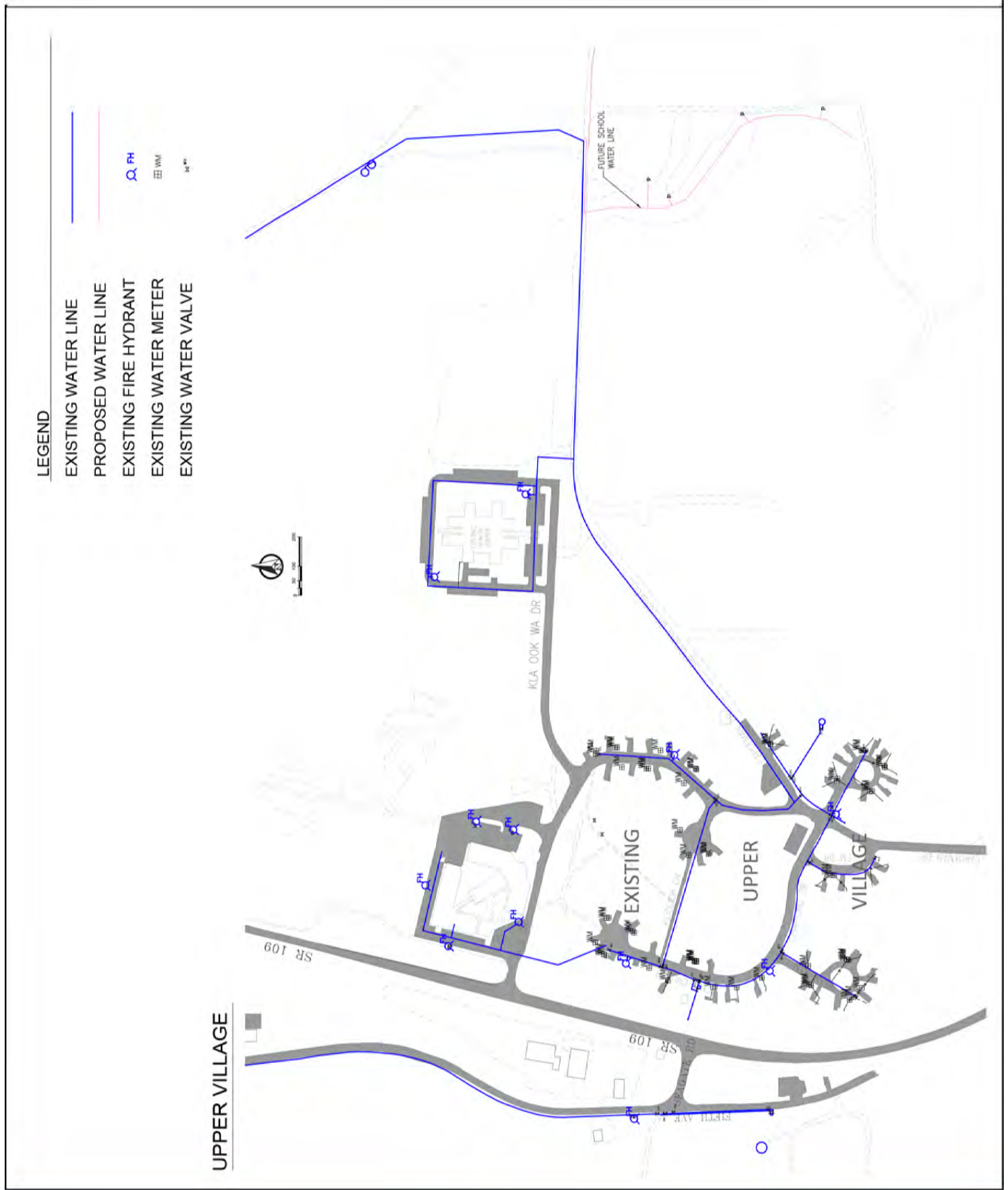
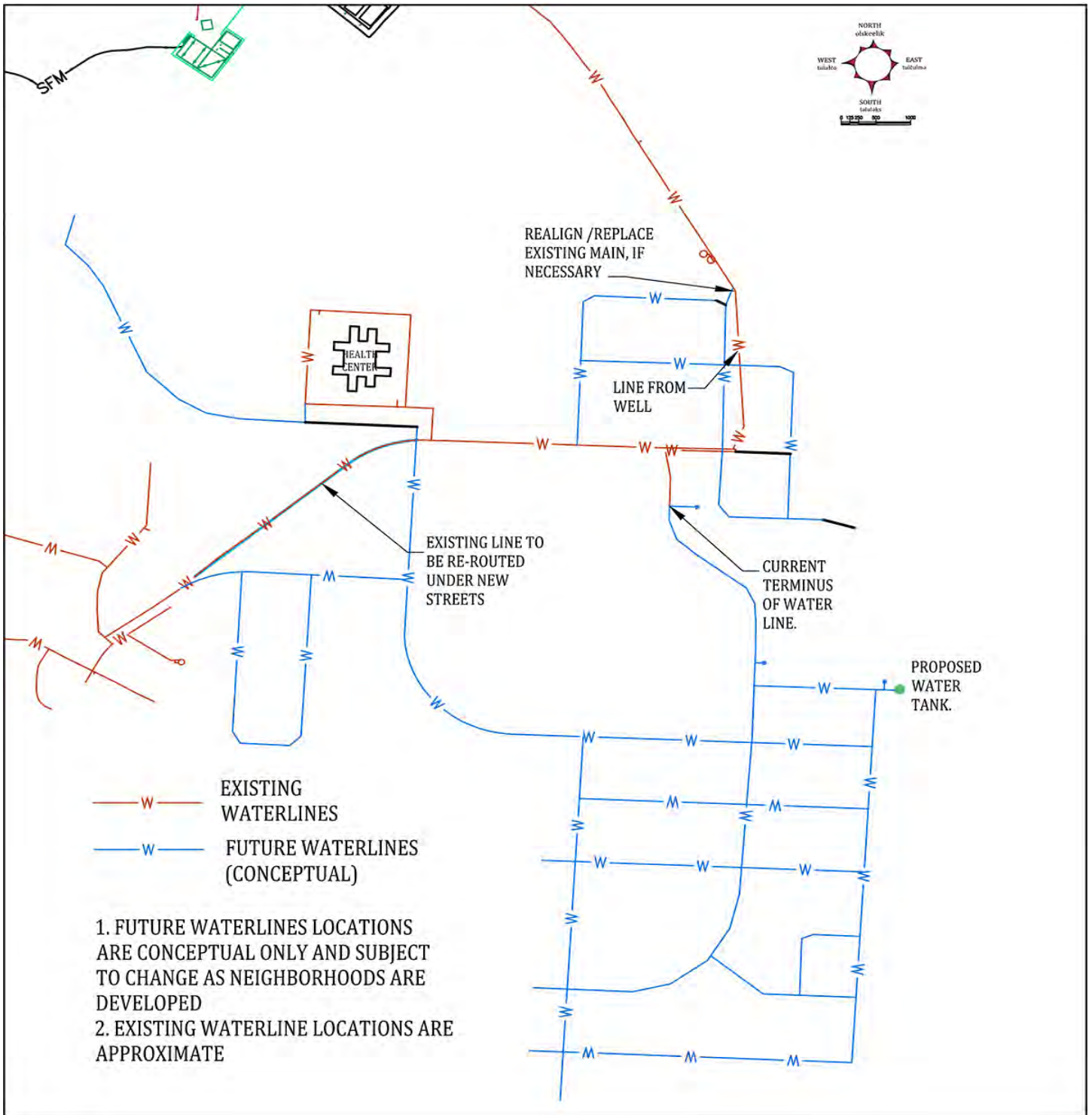


Figure 7-7: Map of Existing Water Infrastructure - Upper Village



WATER INFRASTRUCTURE (FUTURE)
TAHOLAH VILLAGE RELOCATION MASTER PLAN

Figure 7-8: Map of Future Water Infrastructure - Upper Village



Taholah Village Relocation Master Plan

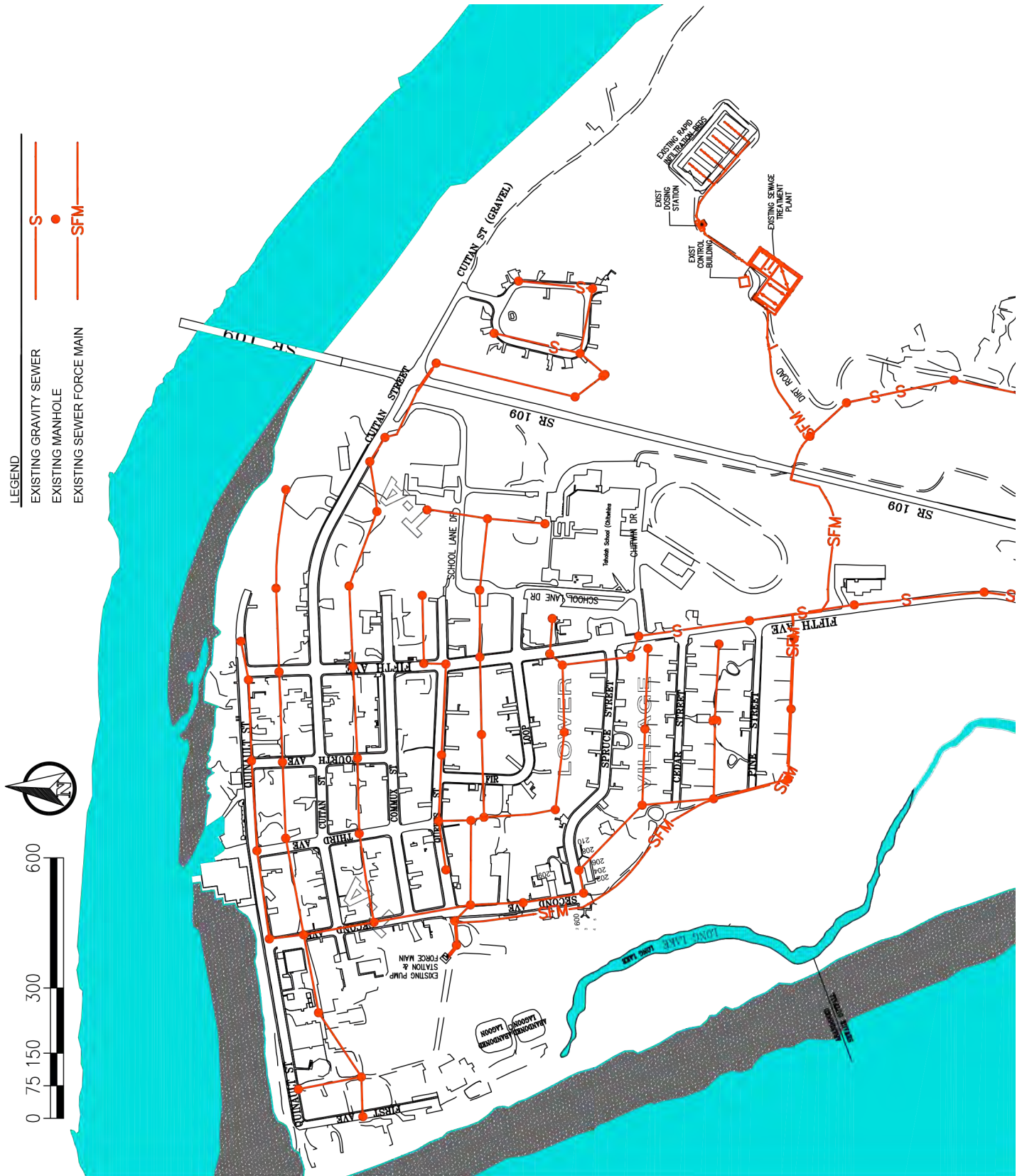
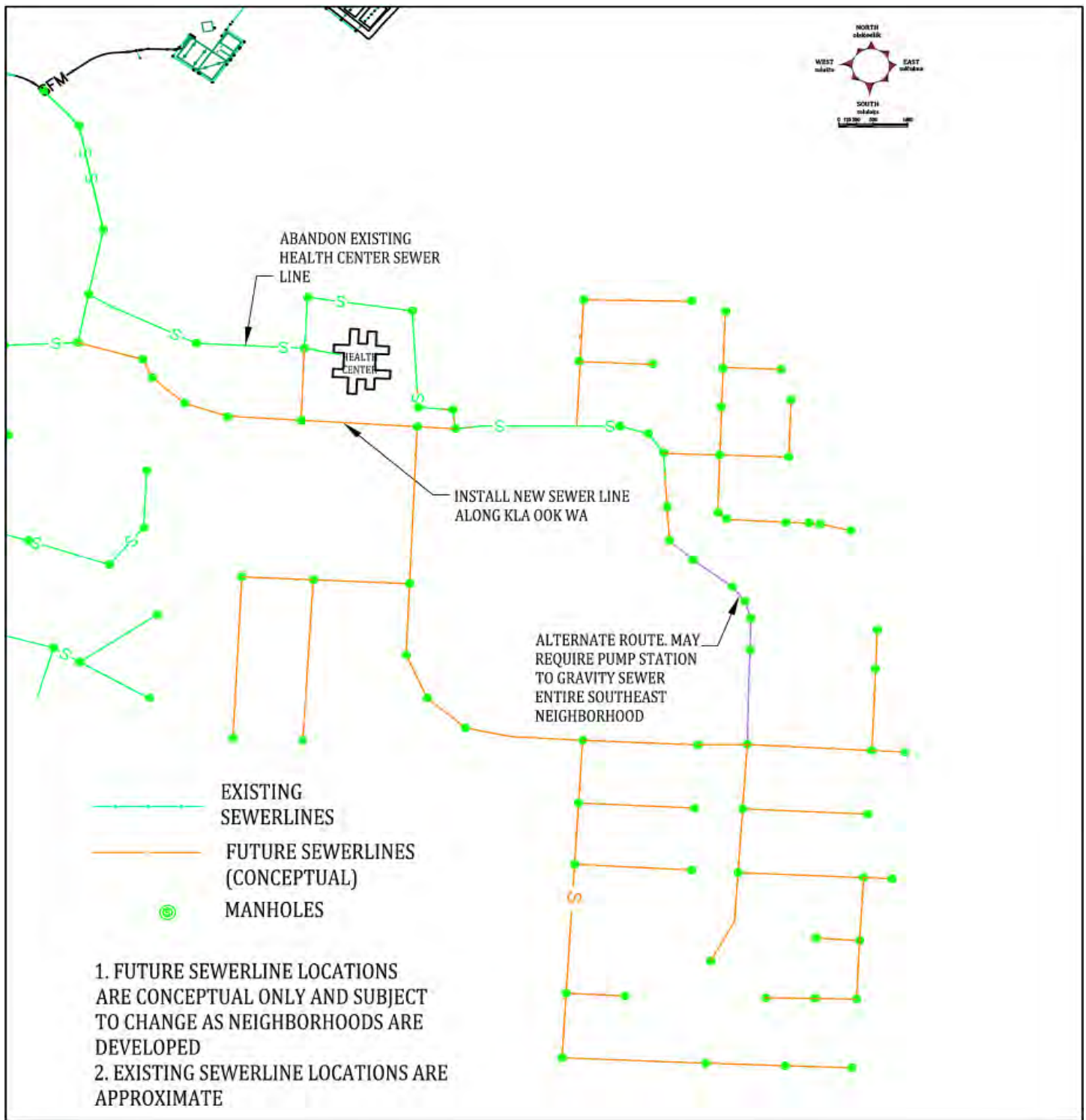


Figure 7-9: Map of Existing Sewer Infrastructure - Lower Village



SEWER INFRASTRUCTURE (FUTURE) TAHOLAH VILLAGE RELOCATION MASTER PLAN



Figure 7-11: Map of Future Sewer Infrastructure - Upper Village



Stormwater

Stormwater will be conveyed in bioswales along streets and on the premises of community buildings. The goal of stormwater control in development plans will be to retain as much stormwater on-site as possible. This can be done through rain gardens and drywells, for example. The upper layers of soil across much of the Relocation Area do contain expanding silts, which are not conducive to infiltration. However, infiltration tests done by a geotechnical engineer indicate that glacial till gravel underlies this silt. This gravel is amenable to infiltration, though in some places a dry well may need to be up to 20 feet deep. Infiltration tests must be done for each development at the time of design. Please refer to the Sustainability Chapter for more details.

Utility Corridors

Joint trench utilities (power, fiber optic cable, telephone and other dry utilities) are to be placed in utility corridors. These utilities are to be installed beneath the sidewalk or multi-use trail. Placement of underground vaults and structures, such as transformers and splice boxes, should be at the back of the sidewalk. In instances where these cannot be placed underground, landscaping should be used for visual screening. If the vaults and other structures are owned by the Grays Harbor PUD, cable company or another non-QIN entity, public utility easements may need to be created around these facilities. On Kilaook Wa Drive, the dry utilities were placed under the multi-use trail and the water line runs parallel to the street to the south.

QIN-owned utilities (water and sewer) are to be placed under streets. In some cases, the Utilities Department may permit these utilities to be placed in utility corridors. This situation may occur if there is not adequate room for both utilities to be installed with adequate separation distance under a street. This may also be permitted if construction phasing requires the utilities to be installed prior to street construction (or if they already exist, such as the water main that traverses the Northeast Neighborhood) which might risk damage to the pipes during construction.

Trails

A trail system in the new village will link to trails and walking routes in the Lower Village to maintain a connection with the river and ocean. The main link connecting the Lower Village and the existing Upper Village is the trail from the school to the Administration Building. This trail is the primary escape route in case of tsunami, but is in need of repair due to poor drainage along State Route 109 and the resultant soil subsidence.

New trails to the Upper Village will connect to this trail along the new road north of the Administration Building. A new trail along the bluff at the northern end of the Relocation Area will link the school trail to the Civic Corridor and Northeast Neighborhood. There are opportunities along this trail for views to Cape Elizabeth, to the mouth of the Quinault, and to the north above the River towards the Olympic Mountains. Selective tree removal may be required

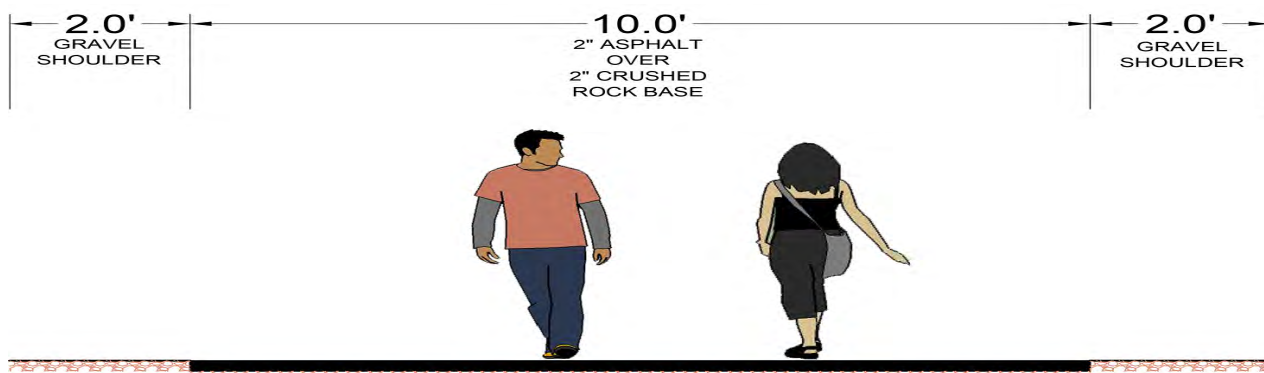


Figure 7-12: Trail Section (Typical)



to achieve some of these views; selective cutting is permitted by the new Village Open Space Zoning.

A trail will extend south from the Bluff Trail between the Health Center and future Recreation Center, connecting to the main street, museum and park area south of Kla Ook Wa Drive. This trail will be lined with Quinault art installations, such as welcome poles. Please refer to the Culture Chapter for more details.

Trails within the central park area will link the main street to the school and Southeast Neighborhood. An enhanced sidewalk/trail will follow the north side of the Capoeman Road extension into the Relocation Area, providing a visual link between the new village and the basketball court and trail in the existing neighborhood south of the Administration Building.

Trails will be 10 feet wide to allow for ample space for users and maintenance vehicles. Bollards should be placed at intersections that allow pedestrian, wheelchair and bicycle use, while excluding quads and other motorized vehicles. Please refer to Figures 7-4 and 7-12.

PROJECT COSTS

Based on a conceptual design prepared in July 2016, Kaul Design Associates prepared an Opinion of Probable Cost (OPC) for the infrastructure of the project. The OPC broke down the costs for each phase of the project and each type of infrastructure. The OPC is a estimate based on a conceptual plan; therefore, the actual project costs will differ from the estimate. Most likely costs will increase as time passes. The three phases of the project are:

Phase 1: Northeast Neighborhood

Phase 2: West Neighborhood and New Access Road and Utility Extension

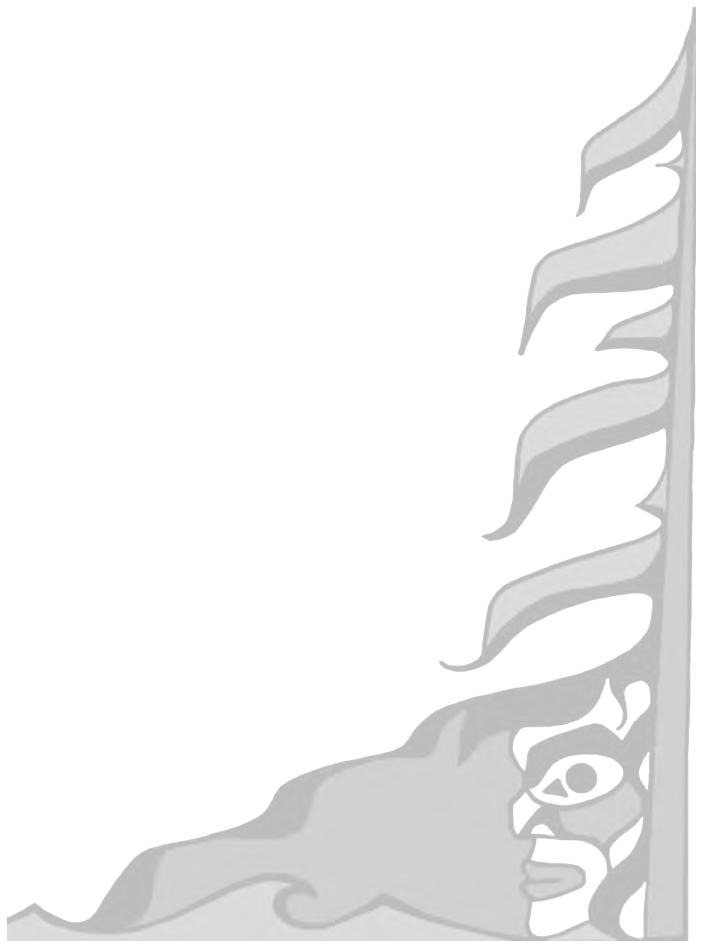
Phase 3: Southeast Neighborhood

The OPC considered water, sewer, and drainage infrastructure, as well as parking lot surfacing,

sidewalks, striping and general items, such as excavation, clearing and grubbing, fill, backfill and compaction and the cost of flagging crews. *The costs of community buildings and housing is not included in this estimate.*

The following chart shows the estimated costs for each phase. Also included in the chart are calculations for a 15% mobilization charge for construction and a 30% concept level contingency factor. The OPC did not include power or fiber optic cable communications lines; these items have been assigned a cost per linear foot and included in the charts. A detailed OPC is included in the appendices.

The Grays Harbor Public Utility District (GHPUD) estimates a cost of \$2.9 million to construct the backbone power infrastructure in the new village. This figure does not include costs or the school or energy park.





PHASE 1 INFRASTRUCTURE	
Infrastructure Type	Estimated Cost
Water	\$2,689,089
Sewer	\$1,045,685
Roads	\$585,531
Drainage	\$121,961
General	\$4,654,911
Power	\$400,000
Communications (\$18/LF for 6,844 LF)	\$123,192
PHASE 1 SUBTOTAL	\$9,620,369
15% Mobilization Charge	\$1,443,095
30% Concept Level Contingency Factor of Subtotal	\$2,886,110
PHASE 1 TOTAL	\$13,949,574

PHASE 2 INFRASTRUCTURE	
Infrastructure Type	Estimated Cost
Water	\$1,259,376
Sewer	\$1,479,750
Roads	\$1,033,880
Drainage	\$345,681
General	\$8,872,569
Power	\$700,000
Communications (\$18/LF for 3,819 LF)	\$92,772
PHASE 2 SUBTOTAL	\$13,784,028
15% Mobilization Charge	\$2,067,604
30% Concept Level Contingency Factor of Subtotal	\$4,135,208
PHASE 2 TOTAL	\$19,986,840

Figure 7-13: Infrastructure Opinion of Probable Cost

Since the Quinault Nation does not currently maintain a history of civil engineering project construction cost data, KDA has developed an Opinion of Probable Cost (OPC) worksheet for the Taholah Master Plan Project. The OPC utilizes itemized Unit Items & Unit Quantification Type commonly used by WSDOT and other Puget Sound Agencies to develop their project Bond Quantity Estimates. There was no one source found that included a list of Unit Costs for all of the work required for this Master Plan. The Unit Cost Data was populated from a variety of sources that includes: the Construction Estimate for the 2015 construction of the school road extension in Taholah & Unit Costs from Bond Quantity Worksheets made available by City, County, State & Franchise Utility Bonding Worksheets with the closest proximity to Taholah. The RS Means manual was used to locate an appropriate Remote Site Factor and construction Contingency. The Unit Quantities were developed by maintaining separate drawings of the Unit Type ACAD linework by phase to list the expected quantity for each phased portion of the Unit Type. Unit Costs for Phase 1 is based on the 30% design plans and the remaining phases is based on the current conceptual Master Plan dated July 13, 2016.

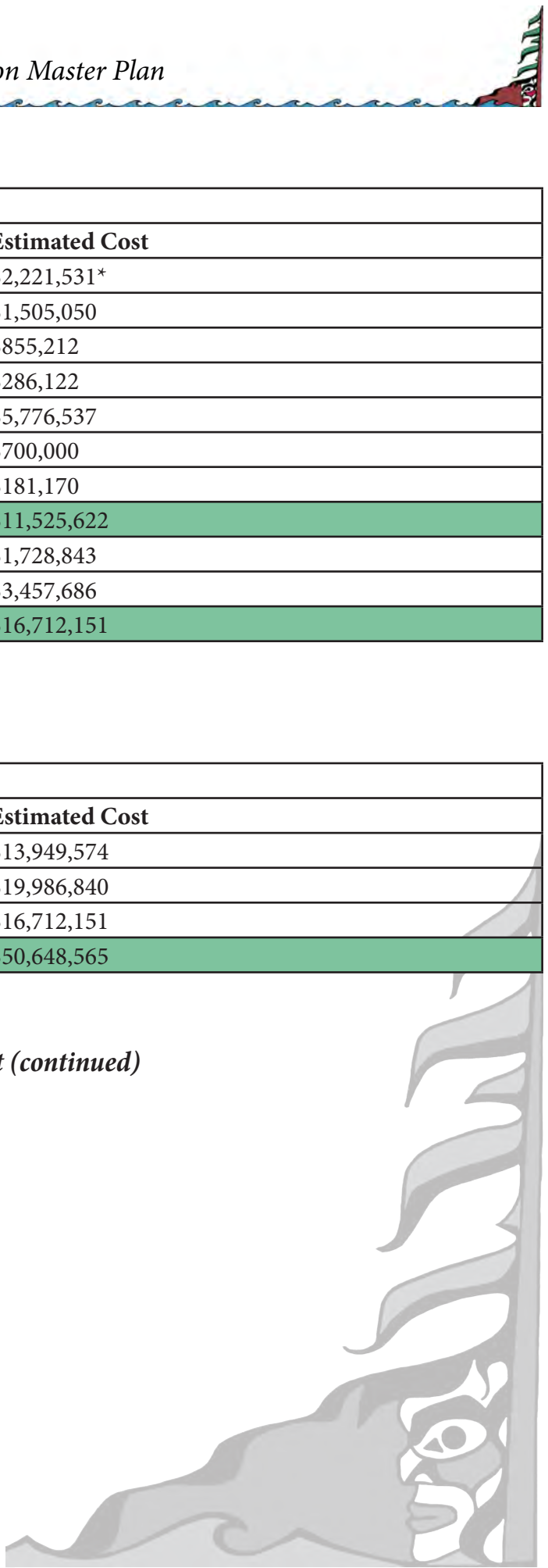


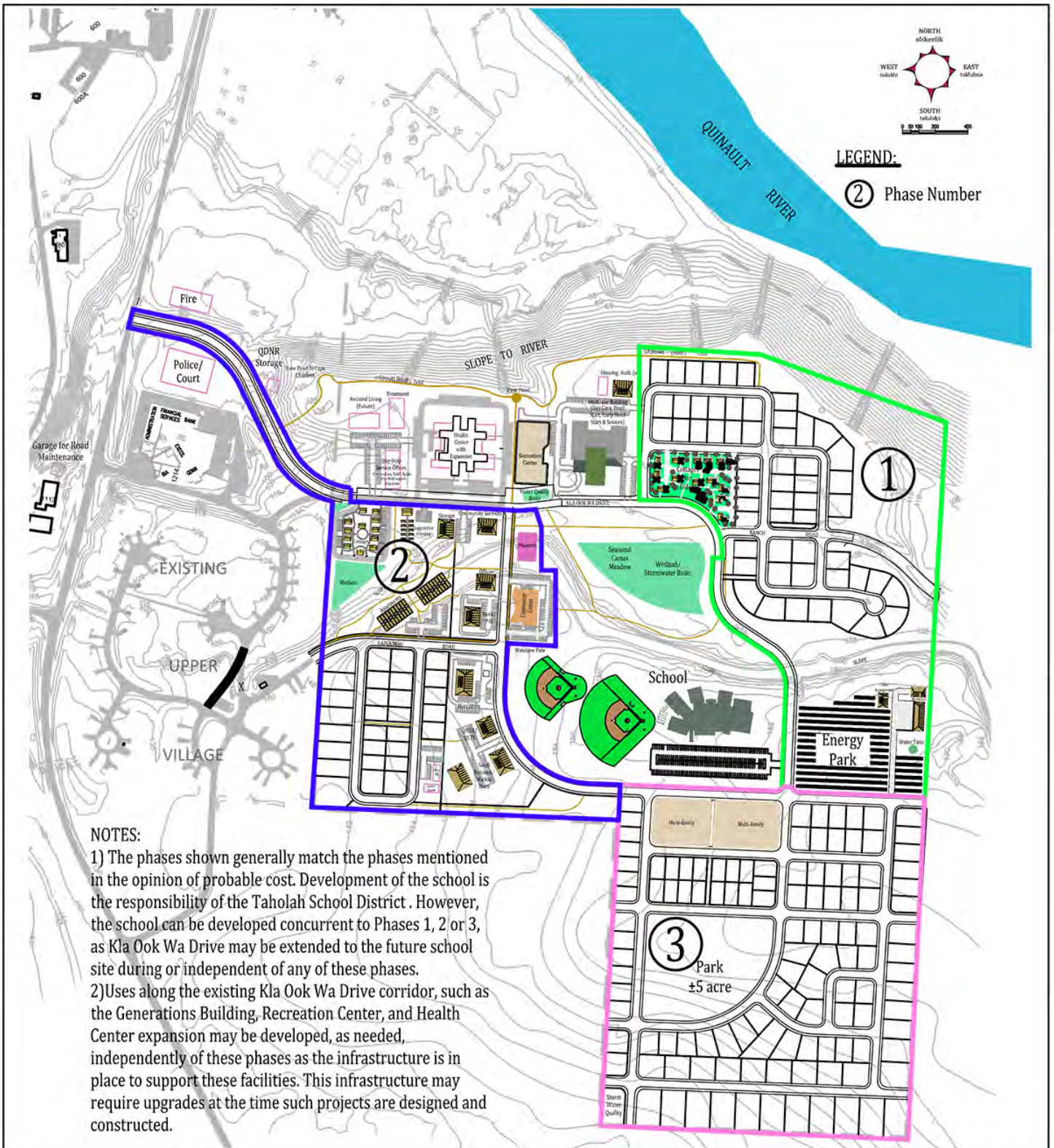
PHASE 3 INFRASTRUCTURE	
Infrastructure Type	Estimated Cost
Water	\$2,221,531*
Sewer	\$1,505,050
Roads	\$855,212
Drainage	\$286,122
General	\$5,776,537
Power	\$700,000
Communications (\$18/LF for 10,065 LF)	\$181,170
PHASE 3 SUBTOTAL	\$11,525,622
15% Mobilization Charge	\$1,728,843
30% Concept Level Contingency Factor of Subtotal	\$3,457,686
PHASE 3 TOTAL	\$16,712,151

*Includes \$1.32 million storage tank

INFRASTRUCTURE COSTS	
Phase	Estimated Cost
Phase 1	\$13,949,574
Phase 2	\$19,986,840
Phase 3	\$16,712,151
INFRASTRUCTURE COST TOTAL	\$50,648,565

Figure 7-13: Infrastructure Opinion of Probable Cost (continued)

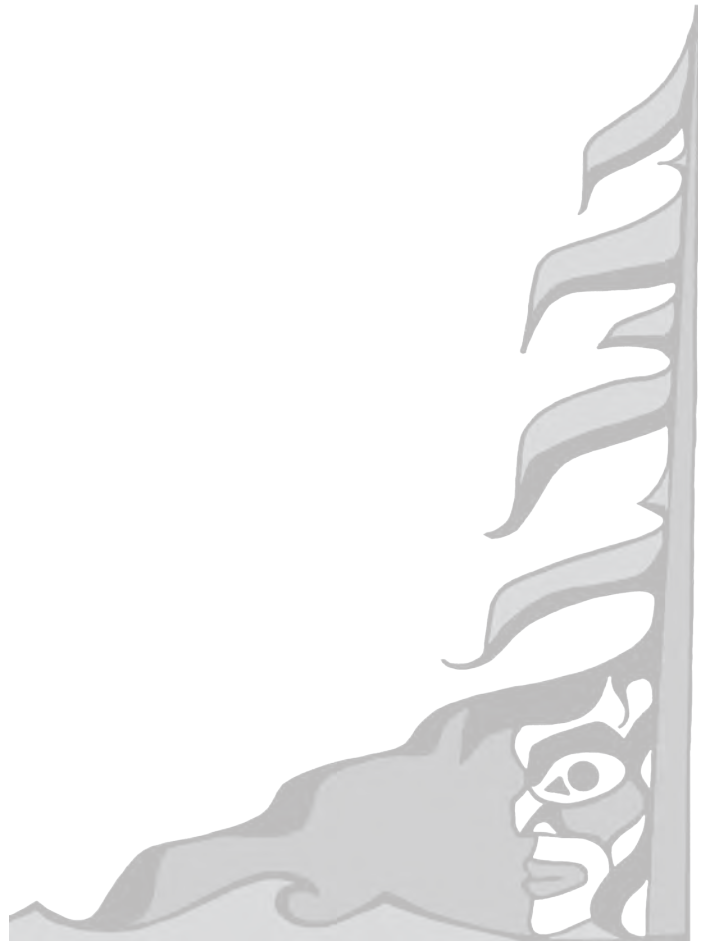




PHASING DIAGRAM
TAHOLAH VILLAGE RELOCATION MASTER PLAN



Figure 7-14: Phasing Diagram





Sustainability



SUSTAINABILITY

Given the deleterious effects that climate change potentially will have on the Lower Village of Taholah, pursuing a sustainable future in the new village is an important facet of this Master Plan. Additionally, maintaining good water quality is a priority of the Master Plan, especially because of the salmon runs in the Quinault River. To these ends, this chapter outlines the Quinault House, a model for energy efficiency and appropriate architectural design; a renewable energy park; and low impact development for stormwater.

GOALS

- Encourage energy efficiency in homes and community buildings
- Encourage the use of native landscaping to reduce the need for irrigation
- Require low impact development methods for stormwater to reduce impacts on the Quinault River
- Develop an energy park to supply energy and heating to the village to reduce the village’s carbon footprint and increase resilience in the event of a disaster

ENERGY

The Quinault House

The Quinault House is an example prepared for this Master Plan to demonstrate suggested building materials and principles that are suited for Taholah’s climate and are energy efficient. While called the Quinault House, the principles and materials are also suggested for community facilities and other non-residential structures as well. Taholah receives an average of 88 inches of rain per year and is subject to strong winds during storms. Therefore, structures should be designed to withstand winds and moisture. Mold and water damage are frequently found in structures in Taholah. Energy efficiency measures will

reduce energy bills and the village’s carbon footprint.

The Quinault House is not meant as a design for a specific home, nor will its elements be required to be incorporated into each building in the new village. It is included in this Plan to educate community members and QIN staff about energy efficiency and the importance of building in a manner that is compatible with the climate of Taholah. The use of energy efficient measures, such as passive solar heating and natural lighting, is also a goal of the 2017-2022 Quinault Housing Authority Strategic Plan.

The following summarizes principles that may be applied throughout the design and construction of future structures. More detail is provided in the sections following.

Planning

- Plot lots out to minimize winter low-angle shading of homes from trees, other structures, and topography where feasible
- Site homes on lots to maximize solar potential, where possible
- Grade lots to encourage natural drainage away from foundations and promote ease of maintenance

Building Envelope

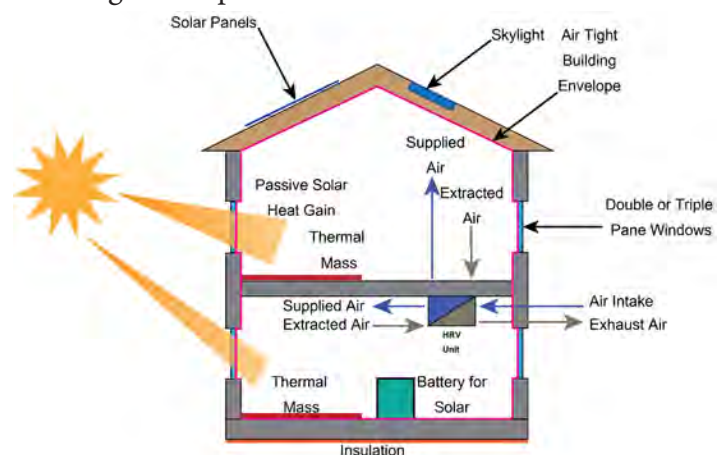


Figure 8-1: Quinault House



- Build homes with slab-on-grade construction
- Design floor plan to maximize exposed slab floor in sunlit areas
- Use 2"x 6" wall studs construction techniques rather than 2"x 4"
- Use R-38 cellulose attic insulation
- Design window placement on walls to maximize daylighting of living areas and uncovered slab floors
- Design building envelope to a heat load of roughly 5.0 Btu/hr/ft²
- Limit building envelope air leakage to a maximum of 3.0 ACH@50 Pascals (ACH=Air Changes per Hour)
- Maximize roof eave overhangs to enhance weather protection
- Design medium pitch roofs with minimal valleys
- Provide a rain screen behind exterior wall cladding
- Use durable exterior cladding materials and appropriate installation techniques to minimize bulk water intrusion
- Drain roofs directly to tight line storm drains and onto storm water mitigation system(s) or rain barrels
- Train housing staff and homeowners in the principles of building science and building maintenance to ensure building and mechanical system durability
- Use R-5 fiberglass, rather than wood, doors
- Double- or triple-paned windows
- Durable materials, especially those from sustainable sources are encouraged
- Schedule and ensure regular building maintenance

Mechanical Systems

- Install high-efficiency (≥ 12.0 HSPF) ductless or hydronic heat pump technology with distribution systems located entirely within the conditioned space
- Install heat pump water heaters with EF (Energy Factor) of ≥ 2.0 in attached garages
- Install whole house and local exhaust ventilation per ASHRAE Standard 62.2 or equivalent

Lighting, Appliances, and Miscellaneous Loads

(LAML)

- Install 100% high-efficiency lighting
- Install high-efficiency Energy Star dishwashers with low hot water consumption
- Install Energy Star refrigerators
- Install high-efficiency Energy Star front-loading washing machines and encourage the use of outside line drying in lieu of electric dryer when appropriate
- Encourage and educate homeowners on effective LAML conservation strategies

	Maximum Energy Savings
Wood Stud Walls	2x6 wood stud walls R-21 fiberglass batt insulation
Attic Insulation	R-38 cellulose insulation
Roof Material	Asphalt shingles, medium color
Radiant Barrier	None
Slab insulation	4-ft R-10 perimeter, R-5 Gap XPS
Window Type	Double-pane, low-e, medium heat gain, air fill, insulated frames
Doors	Fiberglass
Infiltration	7ACH50
Heating type	Ductless, mini-split heat pump
Cooling	Same
Water Heater	Hybrid heat pump
Refrigerator	Energy Star
Dishwasher	Energy Star
Clothes Washer	Energy Star
Plug-in Lighting	100% LED
PV Capacity	4 kW PV
Source Energy Savings (%)	57%
Life-cycle Cost Savings (%)	9%

Figure 8-2: Energy Savings Chart

Source: National Renewable Energy Laboratory



Renewable Energy Production

- Construct homes to be rooftop photovoltaic (PV) ready
- Consider grid-tied PV and designing the system in each home to be battery backup-ready
- Consider a community solar PV system

The energy conservation measures outlined above are likely to be more cost-effective than the energy production measures. The community should prioritize the construction of well-insulated, air sealed, and durable structures with effective ventilation systems and high-efficiency mechanical systems. The reduction in energy leakage and demand will reduce the amount of money and space that could be devoted to photovoltaics and other renewable energy projects.

Building Envelope

A building envelope is referred to as all aspects of the building that separate interior space from exterior space. The boundary between thermally conditioned and unconditioned spaces of the building envelope is considered the thermal boundary. A home's thermal envelope built to current Washington State Energy Code requirements accounts for roughly 40% of the home's annual energy consumption. A building's thermal boundary usually maintains its integrity longer than do mechanical systems and other loads. With proper and routine maintenance, a building envelope can last 100 years or more. Useful mechanical system life spans are often between 10 and 20 years, and technological advances are likely to outpace the useful life spans of currently available mechanical equipment. Therefore, maximizing the building envelope's thermal performance should be prioritized over mechanical equipment and appliance efficiencies.

Reducing air leakage is always a very cost-effective component of residential energy conservation. Air leakage rates of 3.0 ACH50 (3 air exchanges per hour at 50 pascals) can be accomplished without the use of specialized materials. Proper training is essential to ensure that the tradespeople involved with the home construction apply the appropriate attention to detail throughout the construction process. This process can

be evaluated as each new home is built; air leakage test results can help inform and evaluate air sealing performance.

There is no such thing as a home that is too tight, but each habitable space must receive the benefits of whole house ventilation as the homes get tighter. This can be accomplished with a heat recovery ventilation system. With any whole house ventilation system, the system must be properly maintained and operated to assure optimal performance and indoor air quality.

Slab-on-grade construction may provide superior ease of maintenance and improved indoor air quality, be more accessible to the physically impaired, and be more adaptable to age-in-place housing. Washington State University (WSU) experts indicate that long-term energy performance of slab-on-grade construction will likely be superior to framed floor construction due to durability of the components. WSU found that annual energy cost savings (kWh) reached a point of diminishing returns with an R-25 fully insulated slab. However, it is important to note that R-25 slab insulation at the slab perimeter, while a difficult design detail to implement, is necessary to protect exposed insulation and create a durable and long-lasting thermal component. WSU recommends that this detail be evaluated when the home prototype structural design process begins. A fully insulated R-25 slab for this 1,500 ft² prototype home saved ~450 kWh annually relative to an R-10 fully insulated slab in WSU models. Slab edge details are less problematic with 2" depth of R-10 insulation as opposed to 5" for the R-25 insulation.

The slab design should include an appropriate vapor barrier over a compacted gravel base for the insulation to sit on. Although the insulation under slab foundations are considered as part of the vapor barrier, it is not advisable to rely solely on the material and taped seams to prevent water from wicking up into the concrete slab. Per WSU, slab-on-grade construction also lends itself well to providing thermal mass for passive solar gains during the heating season and thermal storage during the warmer summer months. This mass has a small but measurable impact on reducing heating costs.



The building commissioning process should include commissioning of the building envelope to insure that all performance requirements are being met. Commissioning of the building envelope can identify areas of concern related to air infiltration and leakage, moisture diffusion, surface condensation, and rain water entry—all issues that can negatively impact the building's energy performance and indoor environmental quality. Of particular importance is to begin commissioning of the building envelope during design when design modifications can be easily incorporated, rather than waiting until construction when remediation can cost significantly more.

Windows

Windows and glazed doors should be distributed to maximize day lighting and encourage passive solar gains. This can be accomplished by designing an open-concept floorplan on the south aspect of the home and optimizing window placement to provide direct sunlight to the uncovered slab. Bedrooms, bathrooms, the mechanical room and utility room, and any space not frequently used during daylight hours should be placed along north-facing walls and on second floors when practical.

Optimizing solar gains in Taholah's climatic region may not have huge thermal energy benefits, but it will help reduce lighting loads and raise mean radiant temperatures inside the home when the sun is out; this will improve occupant comfort and improve indoor air quality by helping to dry interior surfaces. The ratio of glazing area to floor area should be as low as practical to reduce heating loads. In the Taholah climatic region, there is no energy conservation advantage to having a minimum area of glazing because there is just not enough solar gain potential in the heating season to outweigh the heat loss through the glazing to the outside. In order to provide adequate cross ventilation on warmer days, rooms should have windows that can be opened.

While the National Renewable Energy Laboratory suggested that double-paned windows be used for maximum efficiency, WSU suggested that triple

pane windows with a U-value of 0.15 could be substituted for U-0.30 double pane windows that meet Washington Energy Code requirements. The triple pane windows were found to reduce the heat load by 13%. If a solar heat gain coefficient of 0.60 is specified for the triple pane windows, the resulting increase in heat gain during the heating season will reduce energy consumption by 6% at little or no cost. However, it should be noted that specifying the triple pane windows may be twice the cost of the double pane windows permitted by code.

Walls

Thermally, any combination of cavity and continuous exterior insulation with identical R-values would perform similarly. However, fiberglass and rock wool insulation are advised for their ability to dry out more readily if saturated. For similar reasons, exterior grade plywood (CDX) made up of five or more layers of veneer is advised over oriented strand board (OSB) for exterior wall sheathing. CDX has twice the drying potential of OSB, making it more forgiving and durable than OSB.

For optimal wall assembly durability, construction details should include an air-impermeable but vapor-open weather barrier installed between the exterior continuous rigid rock wool insulation and plywood wall sheathing. A vapor-open weather barrier protects the wall assembly from bulk water and wind intrusion while allowing vapor to pass through (this works much like Gore-Tex® fabric). A rain screen should be installed between the exterior cladding and the rock wool. The interior of the exterior walls should remain vapor-open and not include a vapor retarder so the wall can dry to the inside. Exterior walls should be properly sealed to prevent air intrusion from the interior and exterior into the wall cavities. Air intrusion into wall assemblies contributes to the bulk of moisture transported from the interior to the exterior, and can lead to moisture-related durability issues within the wall assembly.

A rigid plastic foam (EPS, XPS, Polyisocyanurate) exterior continuous insulation of a similar R-value will perform similarly to other types of thermal insulation,



but it does not have the same drying potential as the assembly specified. The windy and wet climatic conditions of Taholah warrant special attention to ensure the wall assembly is airtight and vapor-open to prevent premature deterioration of the building assembly.

Light-framed wood construction has a proven record of durability and performance in the marine climate of the Pacific Northwest when it is well designed, constructed, and maintained. Other wall-framing strategies such as structurally insulated panels (SIP) and insulated concrete forms (ICF) are viable alternatives but were not included in this analysis due to non-thermal concerns about durability, availability, and cost.

Cladding and Roofs

Exterior shading, provided by eaves and roof overhangs, had very little impact on energy consumption in the modeled prototype home. However, substantial eaves and roof overhangs are suggested to provide critical protection from rainwater intrusion into the building wall and window assemblies. Rain screens behind the exterior cladding of all walls should be seriously considered. Although this feature will have little direct effect on the energy consumption of the home, it will increase the drying potential of the wall and protect the integrity of the wall assembly and insulation.

Exterior cladding (siding) should be selected for its ability to inhibit intrusion of wind-driven rain. Properly installed lap siding will likely perform best in rainforest conditions. Cedar or cement fiber plank or shake lap siding should be primed on both the face and back to limit moisture intrusion into the material. Cement fiber or cedar plywood panels can also be an effective cladding material when properly flashed at all edges. With any cladding material, care should be taken to ensure all cut edges are primed and painted when installed. Butt joints should be back flashed. Avoid caulking joint seams, and leave appropriate gaps at joints to discourage capillary wicking, encourage drying, and ensure the integrity of the building's thermal envelope. Use of tongue-and-groove and channel siding is not advised due to increased potential for intrusion of wind-driven rain at seams between

boards. Minimizing seams and maximizing lap will increase the cladding's ability to resist wind-driven rain penetration.

Installation and maintenance of proper roof drainage is essential to protect the building's thermal envelope. Appropriately sized gutters and downspouts must be provided to drain roofs directly to tight line storm drains connected to storm water mitigation system(s).

Advanced framed ventilated roof assemblies with R-60 insulation show the best thermal performance for the investment. This will require a raised heel truss of roughly 20". Asphalt roofs and metal roofs are appropriate for the climate, with metal roofs generally having a longer life.

Mechanical Systems

Designing heat recovery ventilation (HRV) into the Quinault House design is ideal for energy conservation and indoor air quality, especially in homes tighter than 2.0 ACH50. HRV's deliver outside air directly to individual zones and provide filtration. Unfortunately, HRV's are expensive and require routine maintenance. If maintenance is not performed regularly, these systems will not perform appropriately resulting in increased potential for indoor air quality issues. A routine maintenance program sponsored by the Quinault Indian Nation or Quinault Housing Authority could help maintain proper function of HRV's.

Exhaust-only whole house ventilation is an alternative that may prove more maintenance-free. However, these systems do not provide filtration and distribution effectiveness is not as good.

Ease of maintenance of the mechanical system should be a priority, since a complicated system may lead to homeowners avoiding maintenance and result in mold and other problems within the building.

Heating and Hot Water

Centrally ducted air source heat pumps (ASHPs) are commonly installed throughout the region. The technology is proven and the trades are experienced



in installing such systems. Properly designed and installed ducted ASHPs will evenly distribute conditioned air. They have proven reliability and are roughly 200% efficient when designed and installed properly (An ASHP can extract much more energy from the air than it takes in equivalent electrical energy to power the mechanics. Thus efficiencies can exceed 100%). However, several design and installation issues can significantly degrade the system's performance.

Duct leakage outside the thermal envelope is one of the biggest issues related to these systems. Current energy code limits leakage, but many systems still fail to meet those requirements. These systems also employ electric resistance (ER) heat as backup (small, 750-1500 watt baseboard or wall heaters). Controls are supposed to be set to prevent activation of the ER heat when the heat pump itself can handle the load. Because these controls are seldom tuned correctly, nameplate efficiencies are rarely realized.

The various configurations of the prototype Quinault House have heating system design loads of less than 10,000 Btu. It would be difficult – or impossible – to find a ducted ASHP that is small enough to match the heat load of the prototype Quinault House. Grossly oversizing of ASHP systems leads to short cycling energy waste and occupant comfort complaints. Although the analysis shows good performance for a properly tuned and installed centrally ducted forced air heat pump, we do not recommend their use in this prototype for the reasons discussed above. Nameplate efficiency was used in this analysis. Analysis results likely overestimate performance of actual installed systems.

Inverter-driven zonal ductless mini-split heat pumps (DHP) installed in the main living area and combined with backup ER wall heaters in isolated but habitable areas of the home are becoming common in the Pacific Northwest, and are now code required for any home using ER zonal heating strategies. These systems are simple, easy to install, very efficient, quiet, and provide very comfortable heat. They come in sizes small enough for effective use in small and efficient homes. DHP systems do not require the same attention to system commissioning that ducted ASHPs do in order to operate optimally. Commissioning is testing

all systems and components of a building to ensure that they have been installed correctly and are working according to the operational requirements of the equipment.

WSU's analysis of this DHP system in the prototype Quinault House indicates that it performs better than a traditional heat pump because there are no ducts, so no duct leakage. This technology looks to be a great fit for this home design given the heating load of the prototype home configurations. Installation and maintenance costs are also low, and they have a proven track record in the Pacific Northwest when installed in well-insulated and air-sealed homes.

Several varieties of air-to-water heat pumps for combination space and water heating are available. Like any other heat pump, they work by transferring heat from ambient outside air to the interior environment through an outside compressor and a refrigerant cycle. Unlike the two heat pumps mentioned above, air-to-water heat pumps transfer heat from ambient outside air to water, which can then be used to heat both the home and the domestic hot water. These heat pumps are typically used to supply hot water for a hydronic floor heating system and a storage tank for domestic hot water uses.

Air to water heat pump systems achieve similar heating system efficiencies as the DHPs but deliver additional energy savings by providing domestic hot water at efficiencies not seen with any other technology. Cost effectiveness of these systems compared to DHP technology must be thoroughly evaluated to define the best value. System design and installation can be more complicated than the other two systems discussed, and trade expertise with these systems is harder to find. Both the ducted and ductless ASHP systems provide air conditioning as well as heating. These models predict the added electrical load to be up to 350 kWh annually. However, use of natural cooling strategies such as cross ventilation, night flushing, and exterior shade can be employed to reduce this load to well below model predictions.

Water heating options are fairly limited. Standard storage tank electric water heater efficiencies max out at roughly 93% efficient. They perform best if designed



to be installed within the thermal boundary. This will limit waste of heat that radiates from the tank. This waste heat will reduce the heating load during the heating season. When installed in unconditioned space, all waste heat is lost.

Heat pump water heaters (HPWHs) can be 100% to 200% efficient. (A HPWH can extract much more energy from the air than it takes in equivalent electrical energy to power the mechanics. Thus efficiencies can exceed 100%). Because they are fairly loud, they should not be installed within the home. Additionally, HPWHs installed inside utilize the conditioned air of the home to heat the water and then exhaust cool air back to the space where they are located. This increases the heating load of the home during the heating season. Installing a HPWH in an attached garage is a decent compromise for reducing noise and space heating impacts; however, HPWHs lose efficiency when located in a cooler space, such as a garage. Annualized efficiency of 150% can be expected when installed in an unconditioned space.

The air-to-water heat pumps for combined space and water heating systems perform well and do not have the same issues of standalone HPWHs. Although cost efficiencies are gained when utilizing the heating systems heat pump to also heat a home's hot water needs, additional costs are incurred. These systems must also include a heat exchanger and storage tank. However, these combination space heating and water heating systems show great promise in outperforming all other systems evaluated in this analysis.

Air Quality

New and existing homes, whether drafty or air tight, are susceptible to an unhealthy buildup of indoor air pollutants. These pollutants can include, but are not limited to, biological organisms such as fleas, dust mites, molds, mildews, and volatile organic compounds (VOCs) that off-gas from homebuilding materials and the furnishings and finishes brought into the home.

Additionally, without mechanical ventilation, any home in any climate is susceptible to an unhealthy buildup of moisture that can affect the indoor air

quality and building durability. A family of four can emit roughly 3 gallons of moisture into a house every day. If not properly exhausted through controlled ventilation, this moisture can build up to a point where biological pollutants such as molds, mildews, fleas, and dust mites flourish. Properly designed, installed, and operated mechanical ventilation will exhaust polluted and moist interior air to the outside and bring outside replacement air in. Even during the long, rainy winters in Taholah, this air exchange will reduce the relative humidity in the home, and decrease the risk of indoor air quality and building durability issues.

Whole house and local exhaust ventilation can be accomplished by installing systems designed to the current Washington State Code requirements for residential ventilation systems or ASHRAE Standard 62.2-2016. With any whole house ventilation system, care must be taken to properly maintain and operate the system to assure optimal performance and indoor air quality. Educating home occupants in the function and proper operation and maintenance of mechanical ventilation systems is imperative to maximize indoor air quality and building durability.

In order to reduce concentrations of chemicals that may be harmful to residents and the environment, low-emitting materials, such as paints, sealants and adhesives with no volatile organic compounds should be used.

Indoor Lighting

Lighting, appliances and miscellaneous loads in high performance homes should utilize the latest in energy efficient technologies. Appliances should meet Energy Star requirements. Not all Energy Star appliances are created equal. The annual consumption data for products of interest must be evaluated prior to specifying. In general, the following guidance can be used when specifying LAMLs :

- 100% CFL or LED lighting
- high efficiency Energy Star dishwashers with low GPM hot water consumption
- Energy Star refrigerators
- high efficiency Energy Star front-loading washing



machines

OUTDOOR LIGHTING

Full cut-off, high efficiency light fixtures are encouraged for outdoor use to reduce light pollution and maintain clear night skies. Lighting along trails should, at least in part, be powered by solar panels and include motion sensors, so that the lights are only on when needed. These solar-powered lights would remain on even during power outages and disasters, providing emergency lighting to the community.

ALTERNATIVE ENERGY PARK

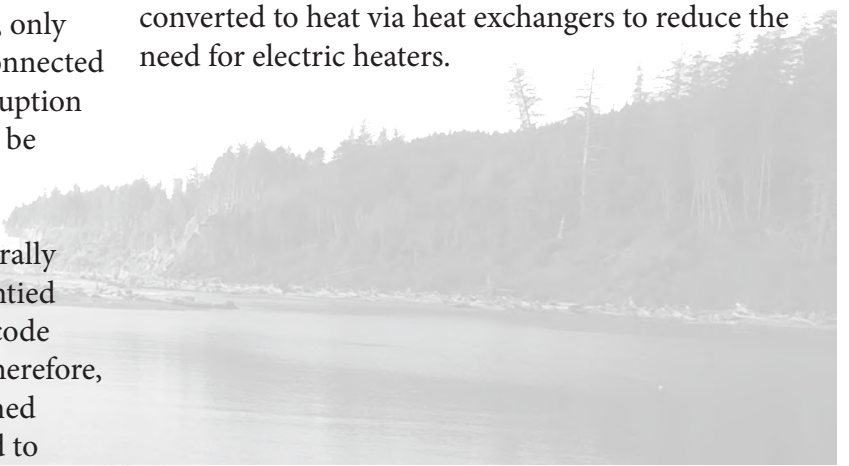
Because of Taholah's isolation and the fact that the only powerline serving the village is susceptible to the tsunami, as well as to routine damage during storms, energy resilience within the village is an important aspect of the Master Plan. The need for resilience suggests a strategy of using off-grid energy to the greatest extent possible. Photovoltaics is the most likely source of power from solar energy. Solar energy could be collected either at each home and community building through rooftop solar panels or at a separate, collective solar array. Community PV may be advantageous to communities such as the Quinault Indian Nation, where constraints of organizing community property partnerships may not be a large issue. A community system may be advantageous over rooftop systems, as the overall costs will be less and homeowners will not have to purchase and maintain systems. However, one large interconnected community PV power generation system may be less secure, since one problem can bring down the entire system, while if a rooftop system malfunctions, only one building is affected. If Taholah were still connected to the Grays Harbor PUD grid, however, a disruption in service by the community system would not be problematic.

Photovoltaic panels and their riggings are generally rated for 110 mph winds. Panels are not warranted for conditions beyond 110 mph. The building code standard wind load for Taholah is 135 mph. Therefore, rooftop solar panels will require custom-designed riggings to maintain their warranty if subjected to

135 mph. The National Renewable Energy Laboratory estimates a village of approximately 400 homes and 200,000 sf of community buildings similar to the village shown in the Master Plan would require approximately 20-25 acres of land to be set aside, if the sole power source were solar panels in an array. However, a smaller area would be necessary if a mix of energy sources were used or if only essential facilities were to be powered in the case of disaster.

A solar array would be less costly than solar panels on each building and could more easily optimize capture of solar energy than placement on individual homes and interference from trees. Additionally, the electricity for the array could serve homes in the lower village before those residents relocate to higher ground and the homes south of the Administration Building that were not designed or laid out with photovoltaics in mind. The advantages of solar panels on each building are probable earlier deployment of solar energy in the village – the panels could be installed with the first buildings to be constructed in the new village – and avoiding a lapse in service to the entire village if there is a problem at the solar array.

To this end, approximately seven acres to the east of the school site are designated as an Energy Park. The Energy Park will serve a portion the community's energy needs via housing a solar array and a biomass facility that will provide heat to community facilities. The biomass facility will be powered by locally sourced logs from timber operations on the Reservation. A buried and insulated pipe conveying hot water will flow downhill to serve various community buildings, such as the Multi-use Building, Health Center and Administration Building with the hot water being converted to heat via heat exchangers to reduce the need for electric heaters.





STORMWATER

STORMWATER LOW IMPACT DEVELOPMENT

As protection of salmon is a guiding principle of this Master Plan, the development covered in this plan will not harm or harass anadromous fish in the Quinault River or other fish-bearing streams. There is no fish habitat within the Relocation Area, but stormwater could potentially run off to the river or a stream south of the Relocation Area. This stormwater could convey pollutants, sediments and runoff with elevated temperatures to streams, all of which could adversely affect fish populations. The most effective way to avoid harm and harassment of fish is to retain as much stormwater as possible in the Relocation Area. Any runoff leaving the Relocation Area should be treated to ensure that as many pollutants as possible are filtered out and that water does not leave the site at temperatures such that fish in the Quinault River would be subject to thermal stress.

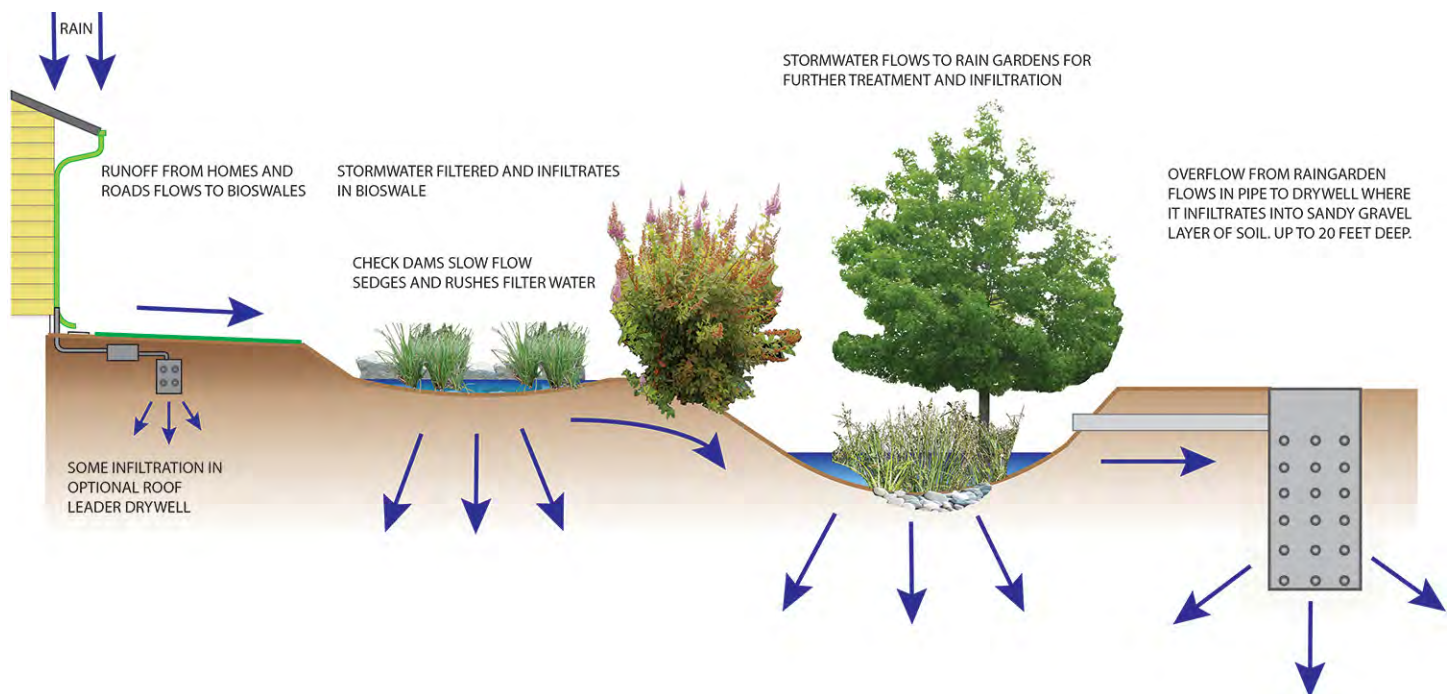
To achieve these goals, stormwater infrastructure will adhere to Low Impact Development (LID) standards for stormwater facilities. Various LID methods that are appropriate to Taholah include:

- Development without curbs and gutters

- Vegetated swales, filter strips and buffers
- Rain gardens, drywells and other facilities to increase infiltration
- Rain barrels and cisterns
- Rainwater recycling
- Runoff storage beneath or integrated into parking lots, streets and sidewalks
- Avoidance of overbuilt parking lots
- Green roofs
- Permeable pavements
- Native and drought tolerant landscaping
- Soil modification to increase infiltration capacity
- Wildflower meadows

For instance, given the desire to have traditionally used plants in the new village, the wildflower meadow could be populated by camas, bog Labrador tea and salmonberry. The climate of Taholah and the use of native plants will reduce the utility of rain barrels, as ample water is naturally available for landscaping, but the barrels could still be useful in community gardens. LID facilities may be placed in yards, the public right-of-way, parking areas or parks. Features like rain gardens provide habitat for birds and other wildlife.

Figure 8-3: Low Impact Development





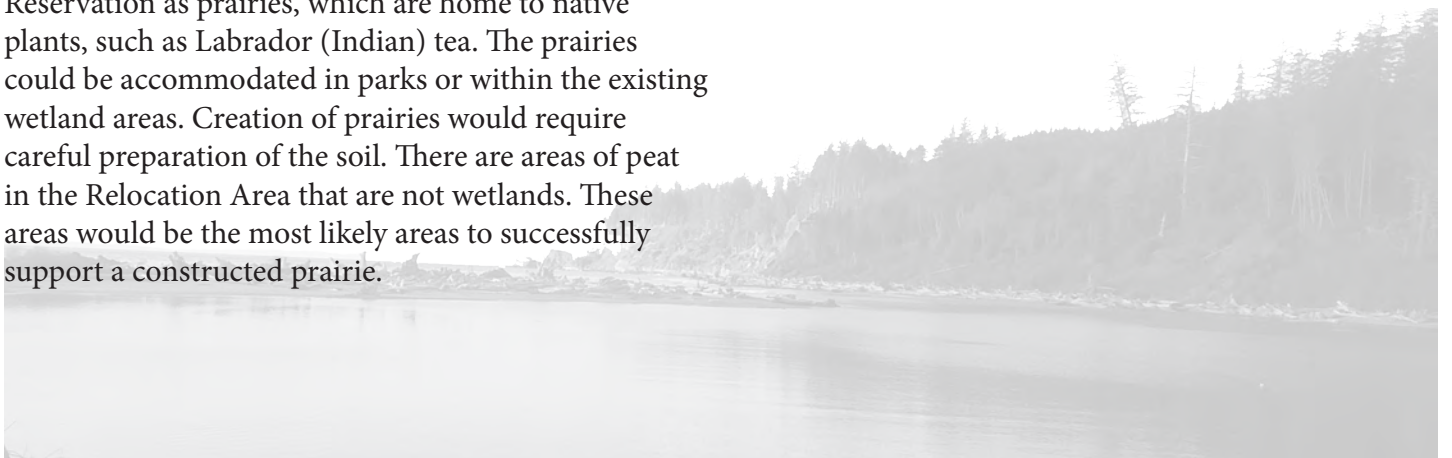
Rain Gardens and Bioswales

A typical raindrop falling on a rooftop in the new village would travel from the building's gutter either to a rain barrel, a small drywell connected to the gutter system or via a pipe or runoff to a bioswale along a street. The water would flow through the bioswale to a rain garden. While flowing through the bioswale and rain garden, much of the water will infiltrate into the soil. Temperatures will dissipate and pollutants will be filtered by plants in the swale or garden. If there is adequate flow to move the water through the swale and rain garden, the water will overflow into a drywell, a large perforated pipe placed vertically in the soil. The water will collect in the drywell and will be absorbed by the soils. While the top layer of soil in the new village does not readily absorb runoff, geotechnical tests indicate that the soils accept the water at an adequate rate when the drywells are sunk to a depth where sandy gravels are found underlying the relocation area. Thus, polluted water will not reach fish habitat in the Quinault River or the drainage south of the relocation area.

Stormwater facility designs should strive to meet the standards described in the Stormwater Management Manual for Western Washington (amended 2014). LID reduces the need for stormwater infrastructure, such as storm drain pipes, curbs, gutters and inlet structures.

PRAIRIES

One possible method of incorporating Quinault culture into the new village is the design of stormwater quality facilities to mimic the bogs, known on the Reservation as prairies, which are home to native plants, such as Labrador (Indian) tea. The prairies could be accommodated in parks or within the existing wetland areas. Creation of prairies would require careful preparation of the soil. There are areas of peat in the Relocation Area that are not wetlands. These areas would be the most likely areas to successfully support a constructed prairie.





Landscaping in public areas in the new village will consist mainly of native plants common to the area. Many of these plants have been utilized by the Quinault historically for baskets, medicine, food and other uses. The plants provide food and habitat to local wildlife, are climatically suited to the area, and will not require much maintenance, fertilizers or additional watering. Tree locations should be carefully chosen as to not negatively affect solar access on neighboring properties.

Plant Palette for Public Areas

*Asterisks indicate traditional use by Quinaults and other Northwest Indians

Sun

- Camas – *Camassia quamash**
- Red elderberry – *Sambucus racemosa* (can cause digestive problems) – (edible when toxic seed is removed)*
- Blue elderberry- *Sambucus caerulea* (edible when toxic seed is removed)*
- Salal –*Gaultheria shallon**
- Blackcap raspberry –*Rubus leucodermis**
- Woodland strawberry- *Fragaria vesca**
- Coastal strawberry- *Fragaria chiloensis**
- Common bearberry- *Arctostaphylos uva-ursi**
- Golden currant –*Ribes aureum**
- Wapato - *Sagattaria latifolia**
- Nodding onion – *Allium cernuum**
- Tall Oregon-grape – *Mahonia aquifolium*
- Creeping Oregon-grape – *Mahonia repens*
- Oregon iris – *Iris tenax*
- Cascara – *Rhamnus purshiana*
- Madrone – *Arbutus menziesii*
- Coltsfoot- *Petasites frigidus*
- Mock orange – *Philadelphus lewisii*
- Big leaf maple – *Acer macrophyllum*
- Columbia lily – *Lilium columbianum*



Camas (molaḱels)

Shade

- Mountain huckleberry- *Vaccinium membranaceum**
- Evergreen huckleberry- *Vaccinium ovatum**
- Coastal strawberry- *Fragaria vesca**
- Common bearberry- *Arctostaphylos uva-ursi**
- Indian plum- *Oemleria cerasiformis*
- Lady fern- *Athyrium filix-fermina*
- Ostrich fern- *Matteucia struthiopteris*
- Spiny wood fern- *Dryopteris expansa*
- Bracken fern- *Pteridium aquilinum**
- Miners lettuce – *Claytonia perfoliata*
- Redwood violet- *Viola sempervirens*
- Wapato- *Sagattaria latifolia*



- Beaked hazelnut- *Corylus cornuta*
- Pacific Rhododendron – *Rhododendron macrophyllum*
- Pacific Dogwood – *Cornus nuttallii*
- Coltsfoot– *Petasites frigidus*
- Mock orange – *Philadelphus lewisii*
- Tall Oregon-grape – *Mahonia aquifolium*
- Creeping Oregon-grape – *Mahonia repens*
- Cascara – *Rhamnus purshiana*
- Madrone – *Arbutus menziesii*
- Vine Maple – *Acer circinatum*

Wet

- Camas – *Camassia quamash**
- Red elderberry- *Sambucus racemosa**
- Cranberry- *Vaccinium ovatum**
- Springbank clover- *Trifolium wormskjoldii**
- Pacific silverweed- *Potentilla anserina* ssp. *pacifica**
- Salmonberry – *Rubus spectabilis**
- Thimbleberry- *Rubus parviflorus**
- Lady fern – *Athyrium filix-femina**
- Wapato- *Sagattaria latifolia**
- Blackcap raspberry- *Rubus leucodermis**
- Cattail – *Typha latifolia**
- Bog Labrador Tea – *Rhododendron groenlandicum**

Well Drained

- Blue elderberry – *Sambucus caerulea**
- Mountain huckleberry – *Vaccinium membranaceum**
- Evergreen huckleberry – *Vaccinium ovatum**
- Service berry – *Amelanchier alnifolia**
- Soapberry- *Shepherdia canadensis**
- Wild blackberry- *Rubus ursinus**
- Choke cherry – *Prunus virginiana**
- Crabapple- *Malus fusca**
- Black gooseberry- *Ribes lacustre**
- Indian plum – *Oemleria cerasiformis**
- Nootka rose- *Rosa nutkana**
- Ostrich fern- *Matteuccia struthiopteris**
- Douglas fir- *Pseudotsuga menziesii**
- Western hemlock- *Tsuga heterophylla**
- Miners lettuce- *Claytonia perfoliata**
- Redwood violet – *Viola sempervirens**
- Hooker's onion- *Allium acuminatum**
- Biscuit root (wild carrot)- *Lomatium dissectum**

Dry



Tall Oregon Grape



Elderberry



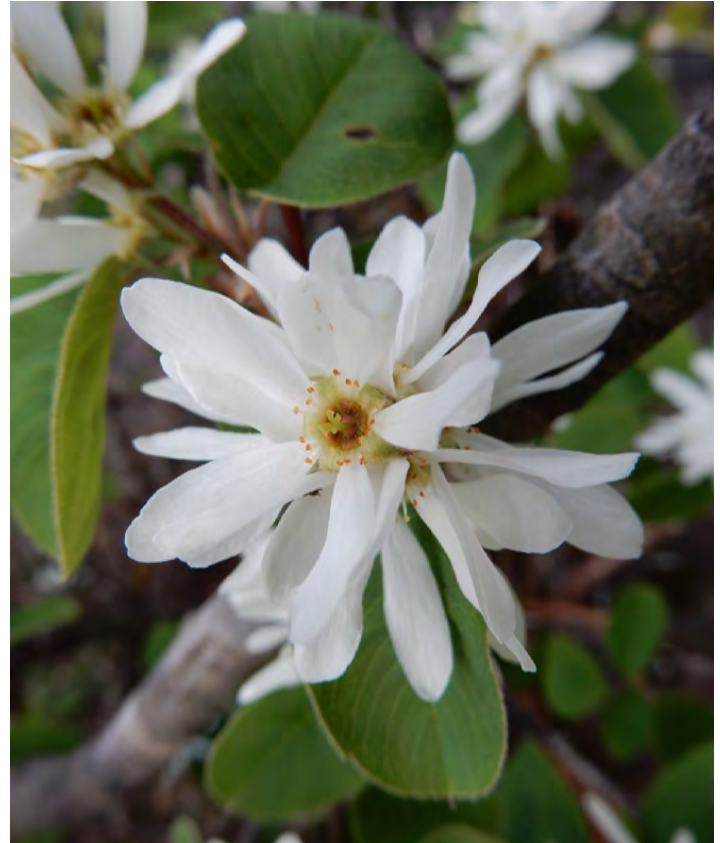
- Common bearberry – *Arctostaphylos uva-ursi**
- Golden currant – *Ribes aureum**
- Licorice fern- *Polypodium glycyrrhiza**
- Bracken fern- *Pteridium aquilinum**
- Hooker’s onion – *Allium acuminatum**
- Biscuit root (wild carrot) – *Lomatium dissectum**

Light shade

- Salmonberry- *Rubus spectabilis**

Moist

- Choke cherry – *Prunus virginiana**
- Crabapple – *Malus fusca**
- Black gooseberry – *Ribes lacustre**
- Indian plum- *Oemleria cerasiformis**
- Nootka rose- *Rosa nutkana**
- Spiny wood fern- *Dryopteris expansa**
- Bracken fern- *Pteridium glycyrrhiza**
- Miners lettuce – *Claytonia perfoliata**
- Nodding onion- *Allium cernuum**
- Beaked hazelnut- *Corylus cornuta**
- Douglas fir (limited)- *Pseudotsuga menziesii**
- Western hemlock (limited)- *Tsuga heterophylla**
- Sitka spruce (limited)- *Picea sitchensis**



Serviceberry

Edible Plants

- Red elderberry- *Sambucus racemosa**
- Blue elderberry- *Sambucus caerulea**
- Mountain huckleberry- *Vaccinium membranaceum**
- Evergreen huckleberry- *Vaccinium ovatum**
- Cranberry- *Vaccinium macrocarpon**
- Service berry- *Amenlanchier alnifolia**
- Salmonberry- *Rubus spectabilis* Berries and Sprouts (bear candy) *
- Blackcap raspberry- *Rubus leucodermis**
- Thimbleberry- *Rubus parviflorus* - Berries and Sprouts (bear candy) *
- Wild blackberry- *Rubus ursinus**
- Woodland strawberry- *Fragaria vesca**
- Coastal strawberry- *Fragaria chiloensis**
- Bitter cherry- *Prunus emarginata**
- Choke cherry- *Prunus virginiana**
- Common bearberry – *Arctostaphylos uva-ursi**
- Golden currant- *Ribes aureum**
- Black gooseberry- *Ribes lacustre**



Nootka Rose



- Indian plum- *Oemleria cerasiformis**
- Nootka rose- *Rosa nutkana**
- Cattail- *Typha latifolia**
- Fiddlehead ferns (bracken fern) - *Pteridium aquilinum**
- Fiddlehead ferns (lady fern) - *Athyrium filix-femina* *
- Hazelnuts- *Corylus avellana**
- Acorns - *Quercus* spp.
- Walnuts – *Jugans nigra**
- Beaked hazelnuts –*Corylus cornuta* *
- Bog Labrador Tea – *Ledum groenlandicum**



Douglas Spirea

Rain Gardens/ Infiltration Areas

Bioswale Bottom Ground Layer

- Dense sedge- *Carex densa*
- Slough sedge- *Carex obnupta*
- Taper Tip rush – *Juncus acuminatus*
- Jointed rush- *Juncus articulatus*
- Common monkey flower - *Mimulus guttatus*
- Graceful cinquefoil – *Potentilla gracilis*
- Common rush – *Juncus effusus*
- Dagger-leaf rush – *Juncus ensifolius*
- Small-fruited bulrush – *Scirpus microcarpus*
- Pacific Ninebark – *Physocarpus capitatus*
- Douglas Spirea – *Spiraea douglasii*



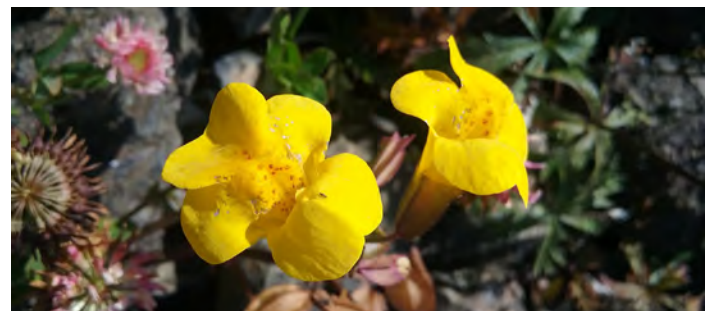
Common Rush

Slide Slopes Ground Layer

- Western fescue – *Festuca occidentalis*
- Tufted hair grass – *Deschampsia caespitosa*
- Bog Labrador Tea – *Rhododendron groenlandicum*

Side Slopes Understory

- Red Osier Dogwood- *Cornus stolonifera*
- Nootka rose- *Rosa nutkana**
- Snowberry- *Symphoricarpos albus*
- Black Twinberry- *Lonicera involucrata*
- Camas – *Camassia quamash**
- Red elderberry- *Sambucus racemosa**
- Cranberry- *Vaccinium ovatum**
- Springbank clover-*Trifolium wormskioldii**
- Pacific silverweed- *Potentilla anserina* ssp *pacifica* *
- Salmonberry- *Rubus spectabilis**



Monkeyflower



- Thimbleberry- *Rubus parviflorus**
- Lady fern- *Athyrium filix-femina**



Salmonberry



Pacific Rhododendron

A watercolor painting of a forest scene. The sky is a vibrant blue, with some green and yellow patches. The trees are rendered in various colors, including yellow, orange, brown, and black. The overall style is soft and painterly.

Economic Opportunities and Funding



ECONOMIC OPPORTUNITIES AND FUNDING

Funding for the new village will come from a variety of sources, both public and private. These are listed below and discussed with regard to the specific infrastructure the individual programs may support. Please note that grant availability and information is subject to change due to appropriations and agency goals.

GOALS

- Identify funding sources for community facilities and infrastructure
- Identify economic opportunities that will arise from the new development and resources available on the Reservation

PROGRAMS

Public Programs

- USDA Rural Development
- Federal Highway Administration (FHWA)
- Housing and Urban Development (HUD)
- Indian Health Service
- FEMA
- Tribal Economic Development Bonds
- Bureau of Indian Affairs
- Washington State Department of Health
- Washington State Department of Ecology

Private Funding Opportunities

- Low Income Housing Tax Credits
- New Market Tax Credits
- Venture Capitalists
- Banks
- Foundations

Community Buildings

USDA Rural Development has both loans and grants available for community buildings via the Community Facilities Direct Loan & Grant Program. Most USDA funding is via loans, rather than grants. This program

will fund essential community facilities such as child care centers, courts, museums, fire stations, police stations, community centers, assisted living facilities, transitional housing, community gardens and food pantries, all of which will be needed in the new village. A maximum of 75% of project cost could be covered by a grant, so were the Nation to receive such a grant other funding would also need to be obtained.

FEMA Pre-Disaster Mitigation Grant Program moneys are also available to community facilities in harm's way; however the value of the FEMA payment to remove the endangered facility will likely be much less than the full replacement value for such structures. FEMA moneys can help pay for the relocated community facilities, but would likely need to be combined with funding from other sources. If FEMA funds are accepted as part of this program, the land may not be used for future development. This may infringe of Tribal sovereignty and should be considered, if pursuing these funds.

Indian Community Development Block Grants can be used for community facilities if the facilities benefit Low Income communities.

Roads

HUD

HUD Indian Community Development Block Grants (Community Facilities) can fund streets and neighborhoods, as well as single or multi-purpose community facilities.

USDA

While focused on business development, the USDA Rural Business Enterprise Grant will fund new construction, parking, streets and roads, utilities and distance learning.

The Federal Highway Administration Tribal Transportation Program (formerly the BIA Indian Reservation Roads Program) provides the Quinault Nation an annual award for road maintenance. These funds may be used for planning, engineering and



construction of roads, as well as pedestrian and bicycle facilities, parking areas, interpretive signage and transit programs, all of which will be included in the new village.

Water, Wastewater and Stormwater

USDA Rural Development can provide funds via the Water and Waste Disposal Loan and Grant program. These funds will generally be long-term, low-interest loans, not grants. This program provides funding for drinking water systems, sanitary sewage disposal, sanitary solid waste disposal, and storm water drainage in rural areas.

USDA RD Emergency Community Water Assistance Grants Program helps eligible communities prepare for, or recover from, an emergency that threatens the availability of safe, reliable drinking water for households and businesses.

The Economic Development Administration Public Works Program grants may be used for the revitalization, expansion and upgrade of physical infrastructure. This grant is tied to diversifying local economies generation and retention of long-term, private-sector jobs.

Indian Health Service may provide funding for water and sanitary sewer projects and conduct infrastructure system studies. However, if HUD funds are used on the same project, the QIN must take care that the funds aren't mixed in a way that will violate IHS and HUD regulations.

USDA Emergency Community Water Assistance Grants

USDA grants are available when a decline in water supply or quality is considered imminent due to an emergency situation. Earthquakes, and likely tsunamis, would be considered qualifying emergencies.

Washington Department of Health: Drinking Water Revolving Fund

The Washington Department of Health has a \$25,000 grant that could be used to explore for additional well sites on the south side of the Quinault River. Also available is a maximum \$300,000 grant for preconstruction. This could pay for engineering and cultural studies and must move the Nation closer to applying for a construction loan.

Washington Department of Ecology

The Department of Ecology has funding that could be used for the design and/or construction of a berm or other armoring for the sewage treatment plant. Due to the tsunami danger, the project may qualify as a hardship. The Department of Ecology can also assist with stormwater facilities. Ecology staff recommends referring to the facilities as bio-infiltration facilities, rather than rain gardens.

Cultural Facilities, Art and Trails

National Endowment for the Arts

The Our Town Creative Placemaking Grant Program funds projects that create activity, develop community identity and a sense of place and help revitalize local economies. Grants range from \$25,000 to \$200,000. The Art Works Grants Program funds, among other projects, the commissioning and development of new work and the professional training of artists. The Art Work grants range from \$10,000 to \$100,000. These art grants can be tapped to create freestanding installations or the integration of art into buildings and support Quinault artists through commissions.

Washington State Historical Society

The Washington State Historical Society, via Heritage Capital Projects Fund (HCPF) grant program, may reimburse up to 33% of the eligible costs of selected heritage capital projects; grantees must provide at least a 67% match. Applicants must demonstrate significant public benefit in the form of heritage interpretation and preservation, involve property



that will be held a minimum of 13 years beyond the completion of the project. HCPF-funded projects must have a minimum total project cost of \$25,000 and applicants request a grant of no more than \$1,000,000. These funds could be used for interpretative trails, signage and Quinault art installations.

Power and Communication

USDA Rural Development provides loans through its Rural Electric Program and Telecommunication Infrastructure Loan Program that could help fund the extension of electric lines and broadband in the new village. The USDA Broadband Community Connect Program Grants may be used to finance the construction, acquisition, or leasing of facilities, including spectrum, land or buildings, used to deploy service to all residential and business customers located within the proposed service area. Funding will include up to 10 Computer Access Points to be used in the Community Center, which must reside on property owned by the awardee. The cost of providing the service will be free to community center for two years. The grants are much less likely to be awarded than the loans. The aim of the project will be to have connections to each home, which will minimize the need for a facility in the Community Center.

Recreation Facilities

Washington Department of Commerce

The Washington Youth Recreational Facilities Program provides funds to Washington non-profit entities for construction and renovation of nonresidential youth recreation facilities. The grants will pay for up to 25% of eligible costs. Operating costs are ineligible. The grant cap is \$1,200,000.

Low Income Housing

The Department of Housing and Urban Development (HUD) provides funding for low income housing. These grants, such as the Indian Community Development Block Grants, and loan guarantee programs, like the Section 184 Loan Guarantee

Programs, would most likely come via the Quinault Housing Authority (QHA). QHA has years of experience applying for and utilizing these programs. Imminent Threat funding for the project is unlikely, according to HUD staff.

USDA Rural Development’s Multi-Family Housing Direct Loan Program provides loans for construction of multi-family housing for low-income, elderly or disabled individuals.

FEMA Pre-Disaster Mitigation Grant Program moneys are also available to replace housing in harm’s way. This program covers all housing, not specifically low-income housing.

Section 502 Direct Home Loan

These loans are primarily used to help very low and low income individuals or households purchase homes in rural areas. Funds can be used to acquire, build (including funds to purchase and prepare sites and to provide water and sewage facilities), repair, renovate or relocate a home.

Section 502 Home Loan Guarantee

Applicants seeking a USDA Rural Development home loan guarantee may have an income of up to 115 percent of the median income for the area in which they live. Families must be without adequate housing, but be able to afford the mortgage payments, including taxes and insurance. Additionally, applicants must have reasonable credit histories.

Mutual Self-Help Housing Loans

The Section 502 Mutual Self-Help Housing Loan Program is used primarily to help very low- and low-income households construct their own homes through the Mutual Self-Help Housing Program.

Washington Department of Commerce

The Washington State Department of Commerce uses its Housing Trust Fund dollars to fund a diverse array



of projects that serve low-income populations. Most projects funded to via the Housing Trust Fund serve households with special needs or incomes below 30% of Area Median Income, including homeless families, seniors, and people with developmental disabilities. Housing Trust Fund dollars may also be used to develop projects that serve population of up to 80% of Area Median Income. This source would be likely to fund housing for the homeless.

ECONOMIC DEVELOPMENT OPPORTUNITIES

Not only will the Relocation provide for the health and safety of the Village, but it will present the Nation with the potential for economic development. The new village will be one of the largest projects in Grays Harbor County. Wood and gravel, the raw materials for housing and road infrastructure, are abundant within the boundaries of the Quinault Reservation. By utilizing these resources, the Nation would retain money within the community and reduce the carbon footprint of its development through use of local materials. The Nation, either through government initiatives or the efforts of individual Quinault entrepreneurs, could invest in the following:

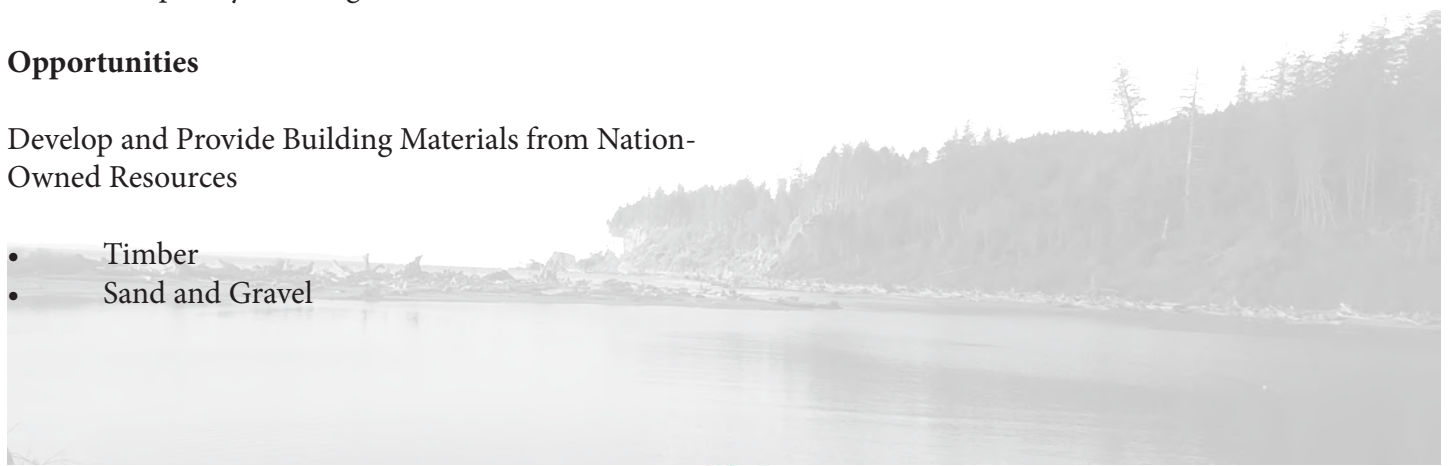
The relocation presents several business development opportunities, such as:

- Concrete Batch Plant
- Asphalt Batch Plant
- Saw Mill/Drying Facility
- Labor Training/Provider
- Communications Tower and Other Facilities
- Temporary Housing for Construction Crews

Opportunities

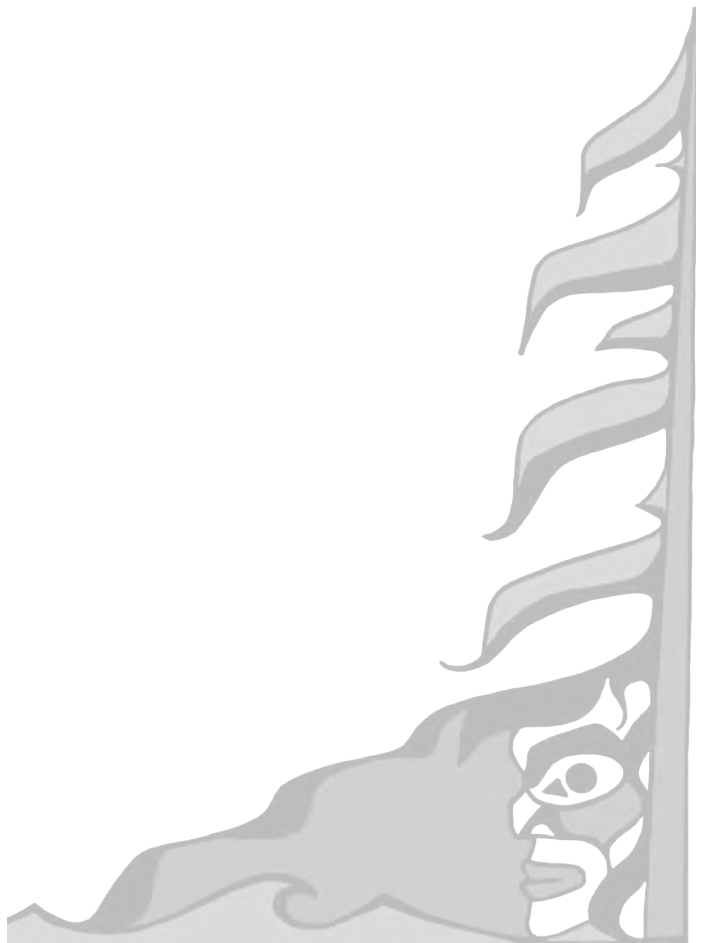
Develop and Provide Building Materials from Nation-Owned Resources

- Timber
- Sand and Gravel





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Land Use Code Changes





COMPREHENSIVE PLAN AND TITLE 48 ZONING CHANGES

COMPREHENSIVE PLAN

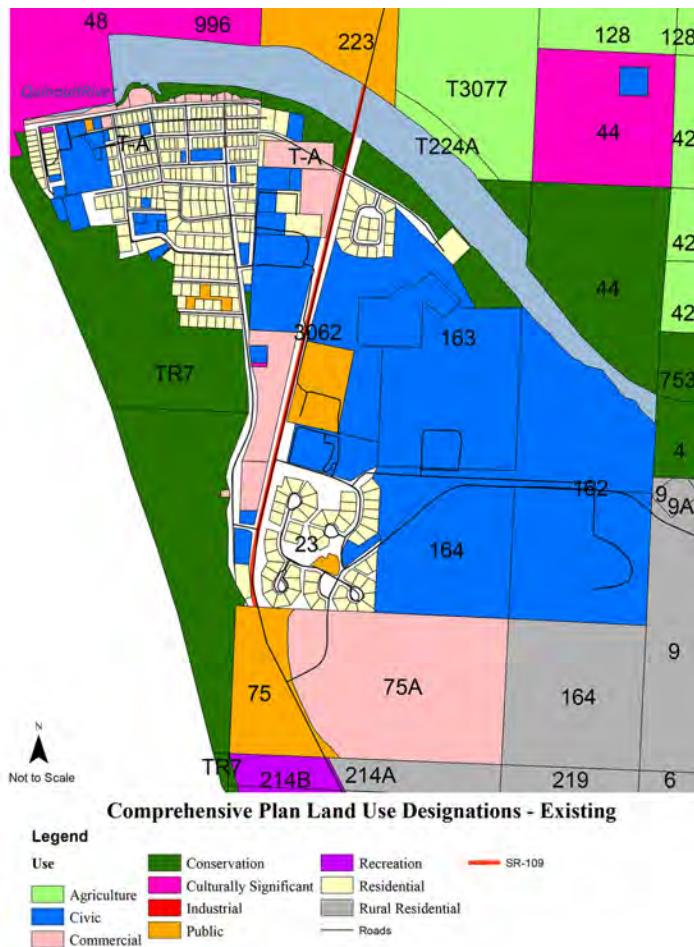
The QIN Comprehensive Land Use Plan of 2011 governs development on the Quinault Indian Reservation. In the Relocation Area, 162, 163 and 164A are designated as Civic and 164 as Rural Residential.

In order to allow a mix of uses and greater flexibility in subdivision of the large parcels, adoption of this Master Plan amends the Comprehensive Plan, as follows:

The addition of a new land use designation: **Village Mixed**

The Comprehensive Land Use Plan is revised to include the following Future Use Classification (page 158):

Figure 10-1: Existing 2011 Comprehensive Plan Land Use Designations



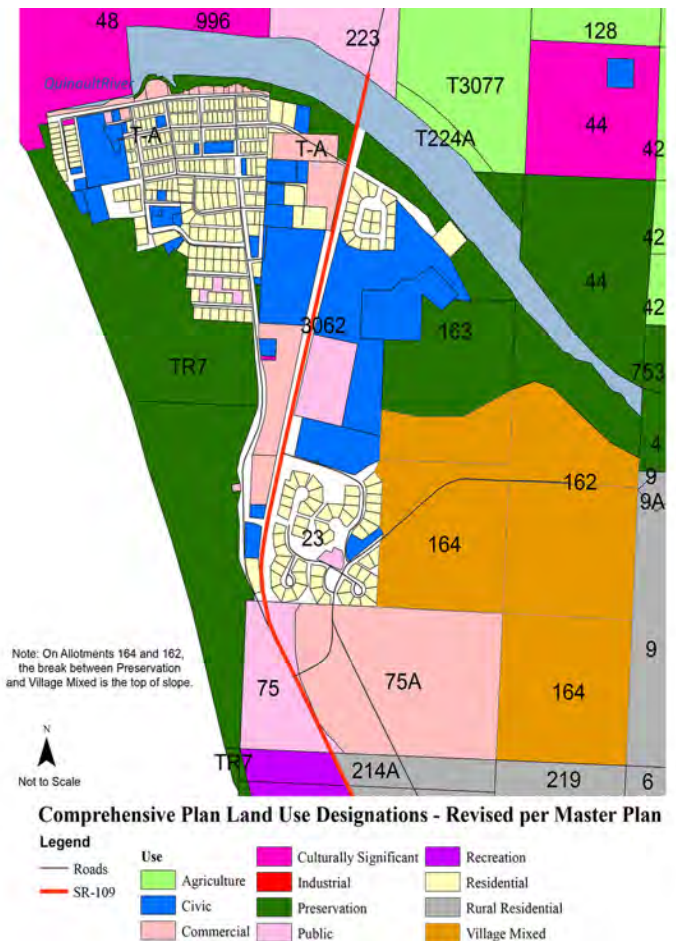
1) **12. Village Mixed** is used in Taholah and Queets to include villages and neighborhoods that might include commercial, residential, civic, semi-public, industrial and recreational uses. This allows greater flexibility within a village setting for mixing uses, for instance a civic building adjacent to a commercial building.

2) the land use designations for Allotments 164 and 164A are Village Mixed.

3) North of the top of the bluff adjacent to the Roger Saux Health Center, Allotments 162 and 163 are designated as Preservation.

4) South of the bluff, 162 and 163 are designated Village Mixed.

Figure 10-2: Revised Comprehensive Plan Designations





TITLE 48

Map Amendments

Title 48 is the zoning code for the Quinault Indian Nation. As the new lands are incorporated into Taholah, various map and text amendments to Title 48 are necessary to allow new building types in the Upper Village and redesignate the land use assigned to allotments. These changes are as follows and shown on the Revised Title 48 Zoning Designations Map on the following page (Figure 10-4).

Allotment 162 is amended from Residential to Residential and Village Open Space.

Allotment 163 is amended from Residential to

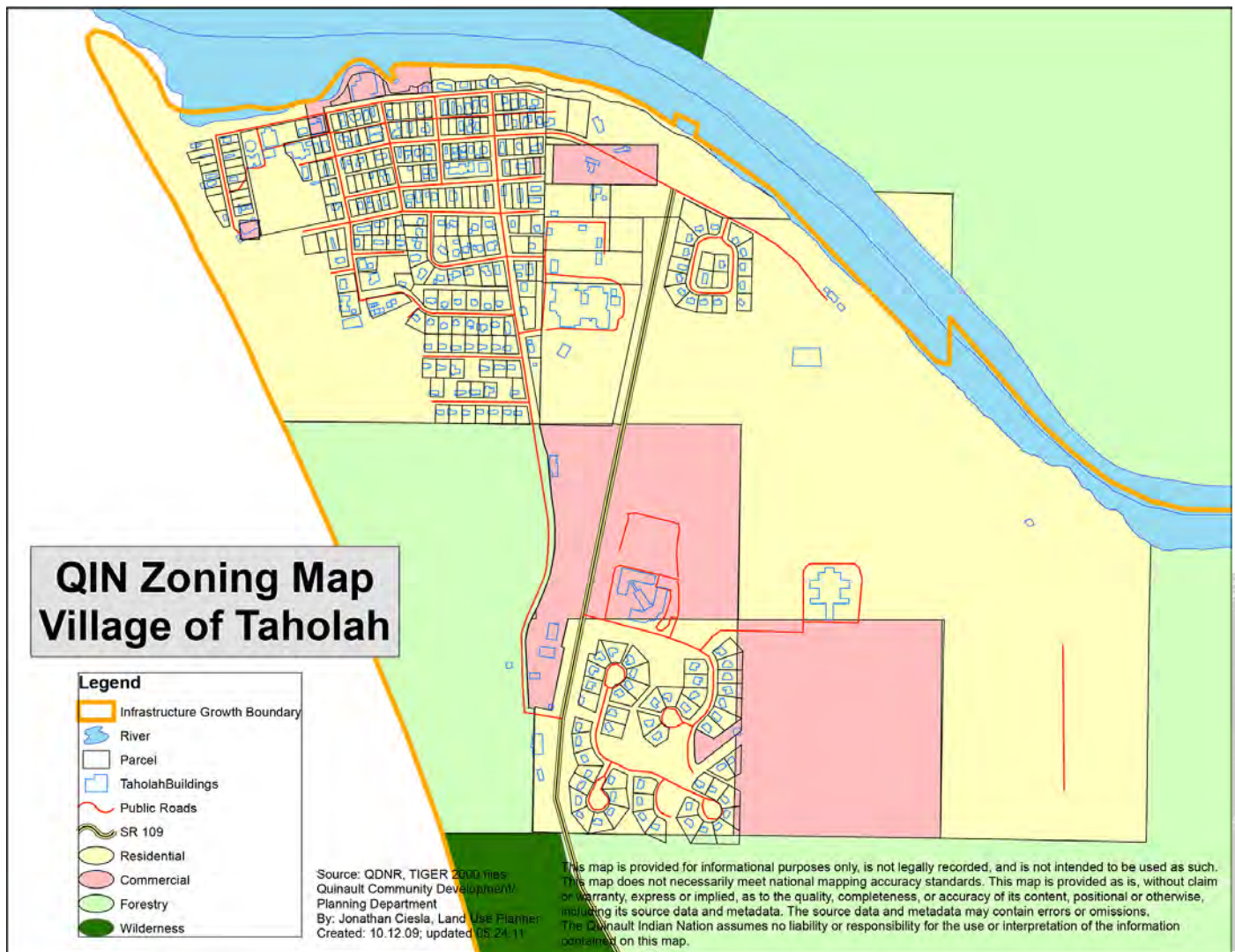
Residential and Village Open Space.

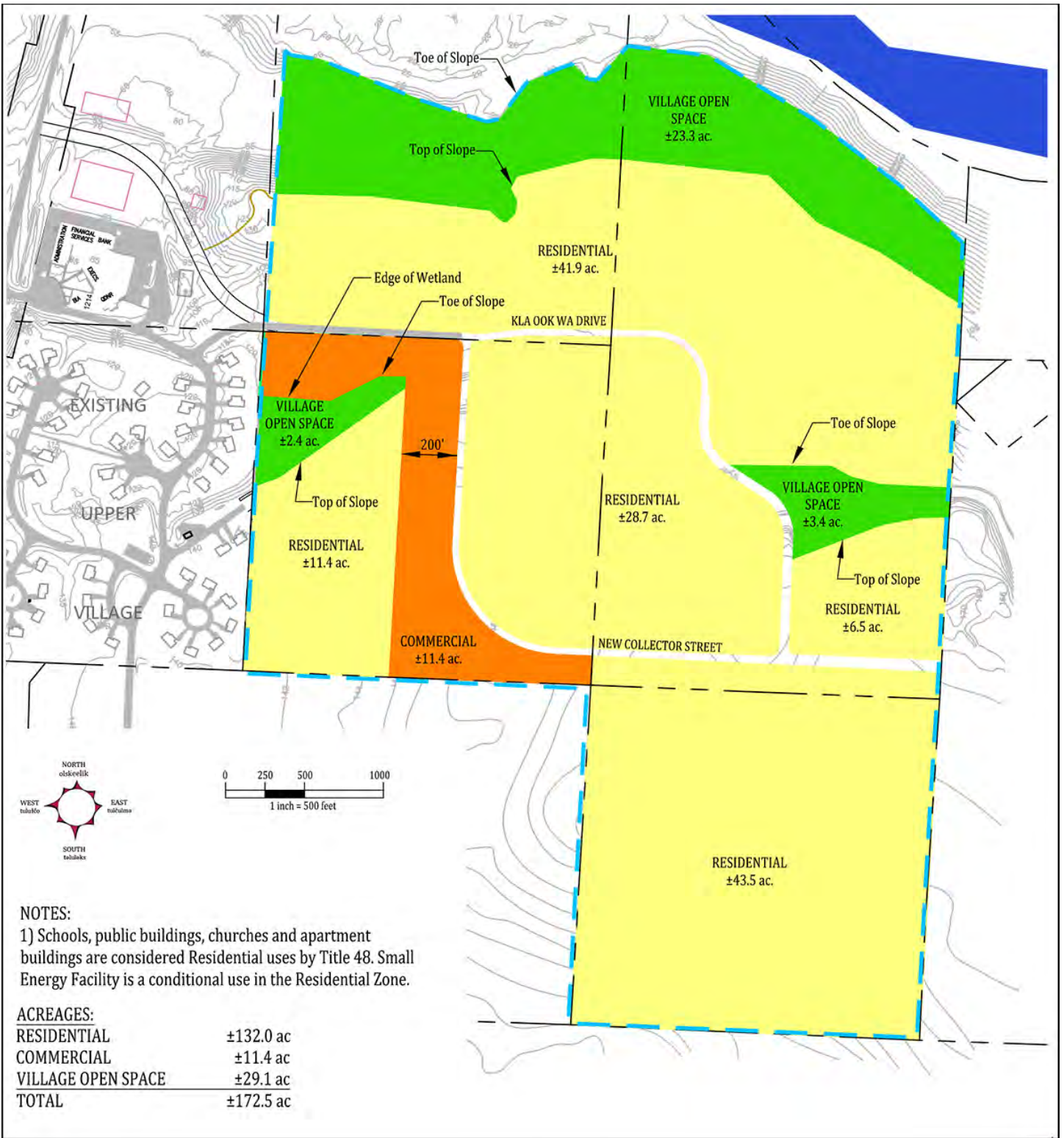
Allotment 164 is amended from Forestry to Residential.

Allotment 164A is amended from Commercial to Residential, Commercial and Village Open Space.

It should be noted that many uses not conventionally considered as residential are considered to be residential by Title 48. These include schools, churches, public uses and cemeteries. The boundaries of the land use designations shown on the Revised Title 48 Designations Map follow topographical boundaries, such as top of slope. Where dimensions of a zone may not be obvious, the dimensions are noted on the map.

Figure 10-3: Existing Title 48 Zoning Designations





REVISED TITLE 48 ZONING DESIGNATIONS
TAHOLAH VILLAGE RELOCATION MASTER PLAN

Figure 10-4: Revised Title 48 Zoning Designations



Text Amendments

In addition to the map amendments listed above, many text amendments to Title 48 are necessary. The following modifications are made to the listed sections.

Add a definition to Section 48.02:

Accessory Dwelling Unit means an additional living quarters on a single-family lot that are independent of the primary dwelling unit. The separate living spaces are equipped with kitchen and bathroom facilities, and can be either attached or detached from the main residence.

Modify to add “or storm water facility” to Artificial Wetland definition in 48.02

Artificial wetland or storm water facility means wetlands created from non-wetland sites through purposeful, legally authorized human action, such as irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, and landscape amenities.

Add a definition to Section 48.02:

Commercial Recreational Vehicle Facility means a campground with sanitary facilities and staff oversight. This does not include residential use of a trailer, which is governed by section 48.07.020

Add a definition to Section 48.02:

Cultural facility means a structure or installation where traditional activities occur or Quinault art is displayed. These include, but are not limited to, museums, trails, art installations, outdoor cooking equipment, such as smokers, and carving sheds.

Add a definition to Section 48.02:

Energy Generation Facility (Small) means a facility used for the creation of electricity or hot water. These include biomass plants, solar arrays and wind energy facilities. The maximum size of such a project is 20 acres.

Add a definition to Section 48.02:

Habitat Restoration Projects: means conversion of alteration of land to improve areas upon which fish and other animals depend on for spawning feeding and migration.

Add a definition to Section 48.02:

Live-Work unit means a building type with office or retail space configured on the first floor, and residential space above.

Add a definition to Section 48.02:

Supportive Housing means housing linked with a social service. This includes housing facilities for those without homes or requiring a place to stay while completing rehabilitation programs. Along with residential units, these facilities often include shared facilities, such as meeting rooms, kitchens, laundry, showers and other such facilities. Supportive housing may be inclusive in one building or may include several buildings. The length of stay of the occupant is determined by individual lease.

Add new section:

48.05.35 Village Open Space Zone (VOS)

- (a) The purpose of the Village Open Space Zone is to permit limited to no development on lands associated with Taholah, Queets, Amanda Park and Qui-naielt village in order to retain natural and recreational areas, parkland and areas of severe slope.
- (b) Non- motorized vehicle paths, trails and selective tree removal for safety and view purposes are the only uses permitted in areas of greater than 15% slope. These uses are conditionally permitted.

To 48.05.080 add new uses and a new Land Use Category to Table 1, “Village Open Space”. Permitted uses are Artificial Wetland and Stormwater Facility and Parks. Conditional Uses are Commercial Recreation Facilities and Campgrounds, Cultural Facilities, Habitat Restoration Projects, Non-Motorized Vehicle Paths and Trails, Selective Tree Removal and Sports



Fields.

To Zoning District Use Table 1, Residential Uses add a row Supportive Housing. Supportive Housing is a conditional use in the Residential, Commercial and Industrial Zones. Add a row, Live/Work. Live/Work is a conditional use in Commercial and Industrial zones.

To “Zoning District Use Table 1, Public and Semi-public Uses” add two rows, Artificial Wetland and Stormwater Facility and Energy Facility - Small. Artificial Wetland and Stormwater Facility is a conditional use in Residential, Commercial, Industrial, Forestry, Wilderness and Village Open Space. Energy - Facility - Small is a conditional use in Residential, Commercial, Industrial and Forestry.

To “Zoning District Use Table 1, Other” add five rows, Cultural Facilities, is a permitted use in all zones. Habitat Restoration Projects, Non-motorized vehicle Paths and Trails, and Selective Tree Removal are permitted uses in Residential, Commercial, Industrial and Forestry Zones and are conditional uses in Wilderness and Village Open Space. Sports fields are a conditional use in all zones.

Revise Section 48.06.020 Address to add:

Accessory Units shall be addressed with the address of the primary residence followed by the letter A. (e.g. 435 Queets Street and 435 A Queets Street)

Revise Section 48.06.040 Off-Street Parking to add:

(c) Transitional and Supportive Housing require 1 parking space per unit. Homes with accessory dwelling units require an additional off-street parking space beyond the two required for a unit in the Residential zone. This space may be in a driveway or garage.

Revise 48.06.030 Building Setbacks to add note at the top of the chart.

*Refer to Section 48.06.040(c) for additional parking requirements for Residential uses.

Add asterisk to “2 per unit*” Residential Off-street parking

Revise Section 48.06.050 Required Public Right-of-Way to add “residential and”.

(a) Minimum standards for new street right-of-way shall be: fifty (50) feet for residential and collector streets, sixty (60) feet for secondary arterials, seventy (70) feet for primary arterials and one hundred fifty (150) feet for major highways. Said standards shall be decreased only upon recommendation of the Planning Commission and approval of the Business Committee.

Add new Section 48.06.180 Accessory Dwelling units

48.06.180 Accessory Dwelling Units

An accessory dwelling unit (ADU) is an additional residential unit on the same lot as a primary single family dwelling that provides complete, independent living facilities for one or more persons.

Accessory dwelling units may be established on any lot in any district where a primary single family dwelling is permitted, provided all setback requirements can be met. Only one second unit is permitted per primary single family dwelling on the same lot. Development criteria for second units include:

- Type of Unit. A second unit may be attached, detached, or located within the living area of the primary dwelling unit on the lot.
- Minimum and Maximum Floor Area. The maximum floor area of a second unit shall not exceed 750 square feet or 40 percent of the floor area of the primary dwelling, whichever is less, except that an attached second unit of 400 square feet in floor area is permitted regardless of the size of the primary dwelling. No second unit may be smaller than 150 square feet.
- Development Standards. Second units shall



conform to setback, height, lot coverage, and other zoning requirements applicable to the primary dwelling in the zoning district where the second unit is proposed, subject to the following additional standards:

- An attached or detached second unit shall be located on the interior side of a corner lot or behind the existing dwelling.
- An attached second unit that results in two-story construction shall be located in the rear half of the structure.
- A second unit shall have a separate, private exterior entrance.
- Architectural Compatibility. The architectural design, exterior materials and colors, roof pitch and style, type of windows, and trim details of the second unit shall be substantially the same as, and visually harmonious and compatible with, the primary dwelling, as determined by the Land Use Planner.
- Exceptions. Exceptions to Development Standards and Architectural Compatibility above shall require an Administrative Use Permit and a finding that the second unit is compatible with, and preserves, the single family character of the primary dwelling and the surrounding neighborhood. Exceptions to Minimum and Maximum Floor Area and Parking above shall require a Conditional Use Permit.
- For the accessory unit to be occupied, the property owner in the case of individual trust land or the owner of the primary unit in case of Tribal trust property must occupy the primary unit.
- Deed Restriction. The second unit shall not be sold, transferred, or assigned separately from the primary dwelling.

capacity containing hazardous liquids or gases that are not common liquid industrial fuels installed in the Upper Village will require review by the Planning Department to ensure that there is an acceptable separation distance (per U.S. Department of Housing and Urban Development guidelines) from Residential zones. Such tanks may be installed underground or behind blast barriers, such as walls, so that residences are not threatened by potential explosions or fire. Blast barriers must be designed by a licensed professional engineer.

48.07.050 Taholah Village Relocation Mitigation Measures

When a development application is filed with the Community Development and Planning Department within the bounds of the Upper Village of Taholah (Allotments 23, 3062, 162, 163, 164, 164A) and additional worksheet must be included with the standard Quinault Indian Nation Master Land Use Development Application. This supplementary worksheet will include a checklist of Mitigation Measures developed as part of the Environmental Assessment of the Taholah Village Master Plan. The Community Development and Planning Department will analyze the proposed development to ensure consistency with the listed Mitigation Measures.

48.06.190 Storage Tanks

Any new storage tanks over 100 gallons containing common liquid industrial fuels or tanks of any



AMENDMENT PROCESS FOR MASTER PLAN

It is anticipated that certain modifications to the Master Plan text and exhibits may be necessary during the life of the community. Any modifications to these documents shall occur in accordance with the amendment process described in this section. These amendments include, but are not limited to, changes in phasing, plant palette, editorial corrections to text or graphics, changes to text or graphics to conform with other pre-eminent laws, trail realignments, updated regulations or policies, or retroactive changes to text or graphics to conform with existing conditions. Amendments allow for administrative changes to the Master Plan and shall be approved by the Planning Commission. All amendments shall be consistent with the Comprehensive Plan.

The phasing plan may be required to change due to unforeseen infrastructure or market conditions. The phasing of the project will continue the balance of land uses throughout development, as is possible, based upon any changed conditions related to infrastructure or the market.

The Environmental Assessment for the project estimated approximately 400 residential units and 200,000 square feet of commercial and community facilities on Allotments 162, 163, 164 and 164A. If a project will cause the amount of development on these four allotments to substantially exceed these totals, an amendment will be required. If an allotment is added to the Master Plan area, an amendment detailing the design standards and land use will be required.

NEPA MITIGATION MEASURES

A Finding of No Significant Impact was made September 1, 2016 by the Superintendent of the Taholah Agency of the Bureau of Indian Affairs for the Environmental Assessment for this Plan. The following Mitigation Measures were included in the Environmental Assessment for the Master Plan and an Amendment to the Environmental Assessment to reduce any adverse effects on the human environment to a less than significant level. These measures will be followed during the implementation of the Master Plan. Failure to implement these mitigation measures will result in the requirement to amend the approved Environmental Assessment.

Mitigation Measure #1: As access to Allotment 75A was not allowed by the landowners for site investigation, any development projects on the allotment will require further geotechnical and wetland studies prior to construction. At the time that the areas on all allotments containing wetlands are developed, the effects of that construction on the wetlands should be reconsidered. If an effect on a wetland is anticipated, an updated 8-step process should be performed for the specific project, the project's effects on the wetlands and to investigate possible mitigations.

Mitigation #2: Should any human remains or historical or unique archaeological resources be discovered during site development work, the work shall cease until the Cultural Resource Specialist has indicated that work will not damage historic or cultural resources. At the time of construction an Inadvertent Discovery Plan should be prepared.

Mitigation Measure #3: All work activities will conform to local noise ordinances. The primary noise sources will be construction equipment such as vehicle engines and compressors. Since residences are present within 100 feet of the Project site, noise abatement controls such as careful staging of noise intensive construction activities during daylight hours and the use of less noise intensive construction practices will



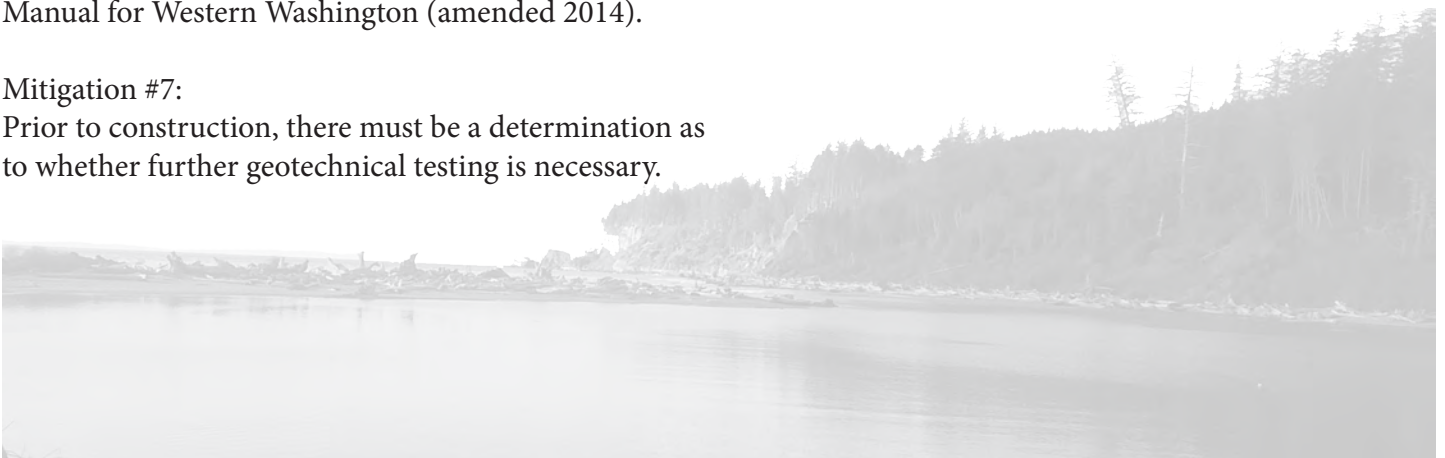
be instituted to minimize potential adverse effects. No blasting with a charge 2 lbs. or greater will be permitted. Use of helicopters to clear the site or in construction is not allowed from April 1 to September 15.

Mitigation Measure #4: Air quality impacts from fugitive dust emissions will be controlled through best management practices, such as wetting roadways, and dust covers on vehicles hauling fill from the Project site.

Mitigation Measure #5: New storage tanks over 100 gallons in volume containing flammable substances shall be buried or placed behind barriers, such as walls or diking. Containment must be to HUD standards for blast overpressure and thermal radiation covered by 24 CFR Part 51 Subsection C. New storage tanks in the Upper Village shall require review by the Community Development and Planning Department, so that there will be an acceptable separation distance to residence and other nearby structures or the danger of explosion is adequately mitigated.

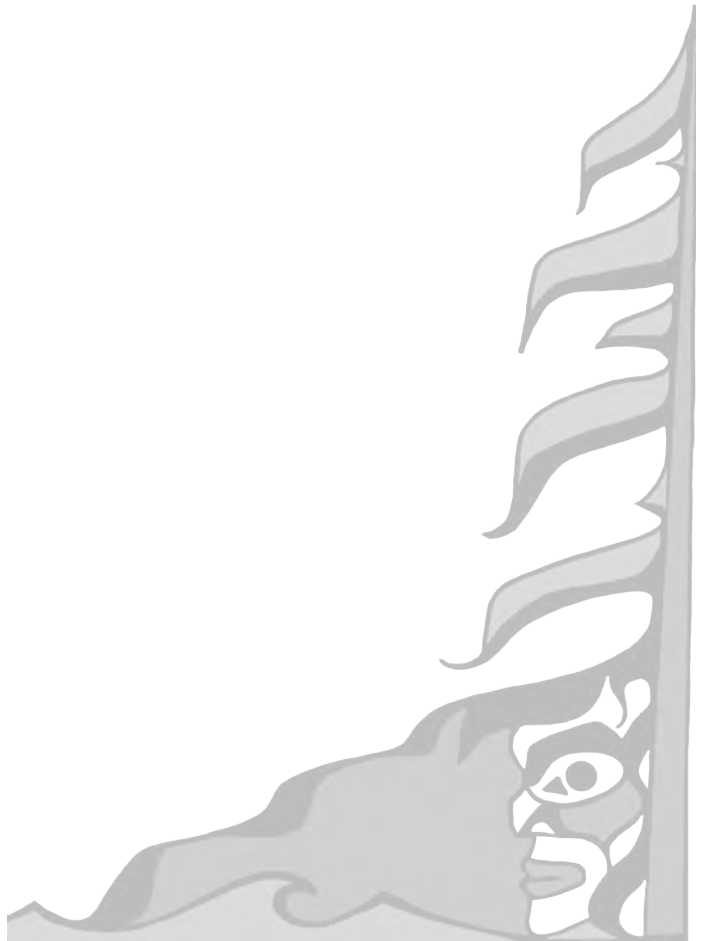
Mitigation #6: Best Management Practices elements of Low Impact Stormwater Development shall be incorporated into the final site design to mitigate potential stormwater, drainage, and water quality impacts for the project site. Efforts will be made to keep stormwater on-site. If the stormwater exits the site, it will do so only after measures have been taken to remove excess temperature from the water, so as to not thermally harass native char species or other species of fish off-site, and significantly increase sedimentation. Designs should strive to meet the standards described in the Stormwater Management Manual for Western Washington (amended 2014).

Mitigation #7:
Prior to construction, there must be a determination as to whether further geotechnical testing is necessary.



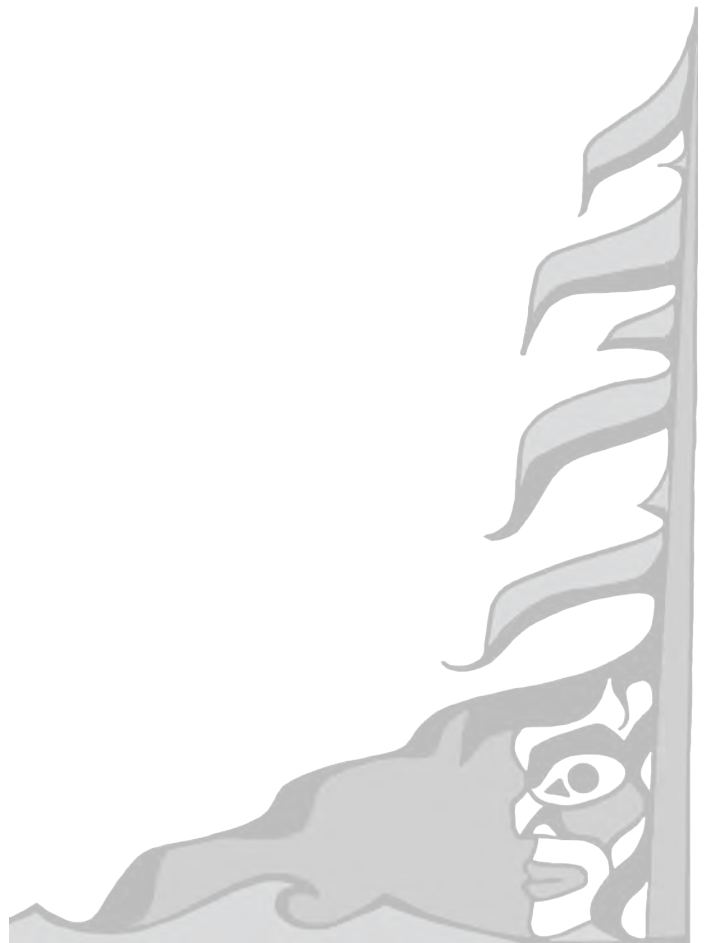


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Resilience







RESILIENCE

The Village of Taholah is isolated from the rest of Grays Harbor County and the road network. It is located at the end of State Route 109 and power lines. There are no railroad or airport facilities. Thus, in case of disaster, Taholah will need to shelter-in-place. The sewer and water systems are vulnerable to earthquake and tsunami damage. In order to understand how the new village would be affected by an earthquake and tsunami and how the community would best react to service interruptions in public utility service, the US Army Corps of Engineers FEST-A (USACE) was invited to simulate a disaster in Taholah. The destruction caused by an earthquake and tsunami would render the Lower Village uninhabitable. Those living in the Lower Village would become refugees, as would any employees that would be cut off from their homes outside Taholah by damage to State Route 109.

GOALS

- Prepare for the aftermath of an earthquake and tsunami when power, water, and sanitation infrastructure may be jeopardized to ensure a safe recovery before and after relief arrives

DISASTER RESPONSE

According to the recommendations of the FEST-A team, relief efforts will require two design elements: an area to land helicopters and supplies, and eight cleared, flat acres of land. The area for landing and unloading supplies must be clear of power lines, trees and other things that pose a threat to aircraft. The current area used for helicopters is the baseball field to the north of the Administration Building. This space or a similar space would be adequate for relief purposes. This baseball field will likely be redeveloped, so another area should be developed in the new village. This Plan envisions the baseball and softball fields for the new school to serve as the new facility. These fields will be centrally located near the center of the village, the community center/emergency shelter and the Health Center to promote the ease of moving relief supplies throughout the village and for medical evacuations. The eight acres would house those displaced by the

tsunami. Those displaced would live in relief tents until permanent housing was established. Tents, showers, latrines and a dining area would comprise the relief camp. There would be a need for three 10,000 gallon water tanks and a power source, such as a generator.

Because Taholah is a close-knit community and many residents in the Lower Village have relatives in the existing housing south of the Administration Building, some of the displaced may be able to shelter in the homes of those relatives, potentially reducing the number of acres required. As the residents of the Lower Village gradually relocate to homes in the new



End of the Highway
QIN Planning

village. The parks can serve as this open space. After the Community Center is constructed, the need for the outdoor area for a refuge for those displaced by a tsunami will diminish. Alternatively, tents could be set up in the lawns of the homes south of the Administration Building. This solution, however, is not preferred, as not all residential lots are flat and it would cause stress to existing residents.



Wastewater

The existing wastewater treatment plant sits well below the new village, within the upper extents of the modeled tsunami inundation. As the facility is in a relatively high area compared to the rest of the Lower Village, there is a chance that the facility will survive unscathed. However, prudent planning requires the assumption that there will be some damage to the plant.

Originally, QIN Planning Staff explored building a berm around the plant to armor the facility from the tsunami. However, this is likely infeasible and an expensive solution, as the berm would need to be upwards of 12 feet high and 40 feet wide and would encroach on wetlands. In the estimation of the USACE, the plant may survive the earthquake, as most of the facility is built into the ground and will move with the soil during the earthquake. The tsunami, were it to reach the plant, would likely damage the control facility and equipment at the top of the ponds, but not the ponds. USACE suggests that the backup generator be relocated outside of the zone of inundation and that secondary control electronics be provided at the new back-up generator site. The relocated power and control facility will allow the treatment facility to be returned to operation as soon as possible.

While repairs are made to the wastewater treatment plant, an interim method of human waste disposal will be necessary. The USACE examined three potential solutions; portable toilets with WAG (Waste Alleviation and Gel) bags, container toilets and slit trench latrines.

The USACE's recommended method is the Wag bags Toilets with liquid waste infiltration. Per the USACE, the Wag bag method has several advantages: it can be quickly deployed, there are no energy requirement either for set up or use of the bagged facility, facilities could be concentrated if the population is housed in a disaster camp setting or distributed to individual residences, and it requires no power to operate. The stockpiled materials (toilet seats, containers and bags) have a long storage life and are relatively insensitive

to temperature and moisture. After the crisis passes the Wag Bags would need to be transported to an appropriate disposal system.

According to the USACE, The Toilets with Wag bags and urinals strategy "consists of a toilet seat with a container lined with a plastic bag. After an individual use, the waste material is double sealed in a bag for disposal. The bags are primarily used to contain solid waste. An infiltration field would also be constructed to handle liquid wastes. The facility would consist of facilities (tubes) to collect liquid waste and convey the waste to a buried infiltration field. A disposal site, either temporary or permanent would still be required for the bagged waste. The liquid waste disposal field would require excavation and transportation of grave infiltration medium. Ten gallon trash bags will be used for the WAG Bag system. This will allow trash bags to be used, reducing the number of different items required for the disaster storage."

Water

The water supply of Taholah is derived from a well located on the north side of the river and several miles upstream. The supply reaches the community via a pipe that crosses the bridge at the northern terminus of State Route 109, well within the tsunami zone. An earthquake could cause the bridge to collapse, damaging the pipe and cutting off supply. The shaking from the earthquake would likely damage the existing water infrastructure in the community. Thus, the water supply is vulnerable to interruption and alternative emergency measures should be examined. When the well and water system were constructed in 2003, test wells were dug on the south side of the river near Taholah. However, none of the test wells produced adequate quality or quantity, requiring bringing the water from the current well site. Even if the pipe survives the disaster, if power to the well were cut off, the water supply would also be threatened. A generator at the well site should be provided to power the well, as well as fuel stored to supply the generator. Resupply of fuel to the generator would be problematic as the bridge is the sole access to the north side of the river.



The USACE explored two options: installation of a new pipe under the river and use of a package plant. At the time of the original design and installation of the pipe across the river, the Indian Health Service planned to route the pipe under the river. However, this approach proved infeasible as the soil under the river is mostly cobbles and the drilling machine failed several times to successfully tunnel under the river. The pipe was then placed on the bridge. The strategy to bore under the river is likely still infeasible. The following text is the USACE’s description of the preferred option and recommendation.



Water Main Crossing Bridge
QIN Planning

“Use package plant – This method would require a Reverse Osmosis Water Purification Unit (ROWPU) system. This system is a trailer mounted reverse osmosis system. The trailer is a self-contained water purification system containing a filtration unit and associated pumps, generators, and pumps sufficient to process river water to drinking water standards. The ROWPU will be used to provide the potable water requirements (drinking and cooking water) for the facility. Non-potable water would be supplied for other demands such as bathing.

The ROWPU trailer would be located upstream of the existing village at the river. The purification unit would process river water and deliver potable water. The estimated potable water demand is 12,000 gallons per day (gpd). The non-potable demand is estimated to be 18,000 gpd. Separate pumps would be needed to supply water to the disaster camp. It is suggested that collapsible bladder tanks be used to provide storage of both potable and non-potable water. The proposed storage would allow for maintenance of the ROWPU unit and the delivery pumps. It is suggested that a minimum of three days storage be provided for potable water once the water reaches the disaster camp. Additional pumps will be required to pressurize the distribution system.

Transmission

Conveyance of the water from the filtration site to the disaster camp will require two dedicated

transmission systems. One for potable water and one for non-potable water. Each system will require a dedicated pump and a dedicated transmission system. The pumps should deliver approximately 20 gallons per minute at a minimum of discharge pressure of 75 pounds per square inch (psi). The transmission line should be 2-inches in diameter with a length of approximately 1,200-feet. PVC pipe was assumed in the transmission system analysis. It may be possible to use rolled flexible pipe. Whichever pipe is selected appropriate fittings will also need to be stored.

Two pumps and two 1,200 linear feet transmission lines will be required One pump and one transmission line for the potable water system and one for the non-potable system. In addition, dedicated bladder tanks will be required for each system.

Distribution

Water from the transmission lines will deliver water to bladder tanks located at the disaster camp. Flow from the bladder tanks will be delivered to the distribution system with pumps. The pumps should be capable of delivering the peak flow of approximately 20 gpm. The desired minimum pressure in the distribution system is 20 psi. Two distribution systems will be used, one for potable water and one for non-potable water.



The distribution system within the disaster camp is assumed to be composed of PVC pipe. A Two inch diameter line will deliver non-potable water to the shower facilities. At each shower tent a 1-inch diameter line will deliver non-potable water to each shower head. The shower heads will be connected to the 1-inch line via ½-inch diameter pipe. A valve should be installed at the point where the 2-inch line connects to the tent, and at each shower head.

A 2-inch diameter potable line will distribute potable water to the kitchen facilities and to potable water taps located in the disaster camp. 1-inch diameter pipe will “T” off of the 2-inch pipe to carry potable water to the taps. ½-inch pipe will “T” off of the 1-inch pipe to the individual potable water taps. Isolation valves should be provided at location one pipe “T” off of another pipe.”

