Pepin Creek Subarea Plan

Planning Commission Draft | City of Lynden | Adopted March ~~January~~ 2020, Amended July 2021

Prepared for:

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Introduction

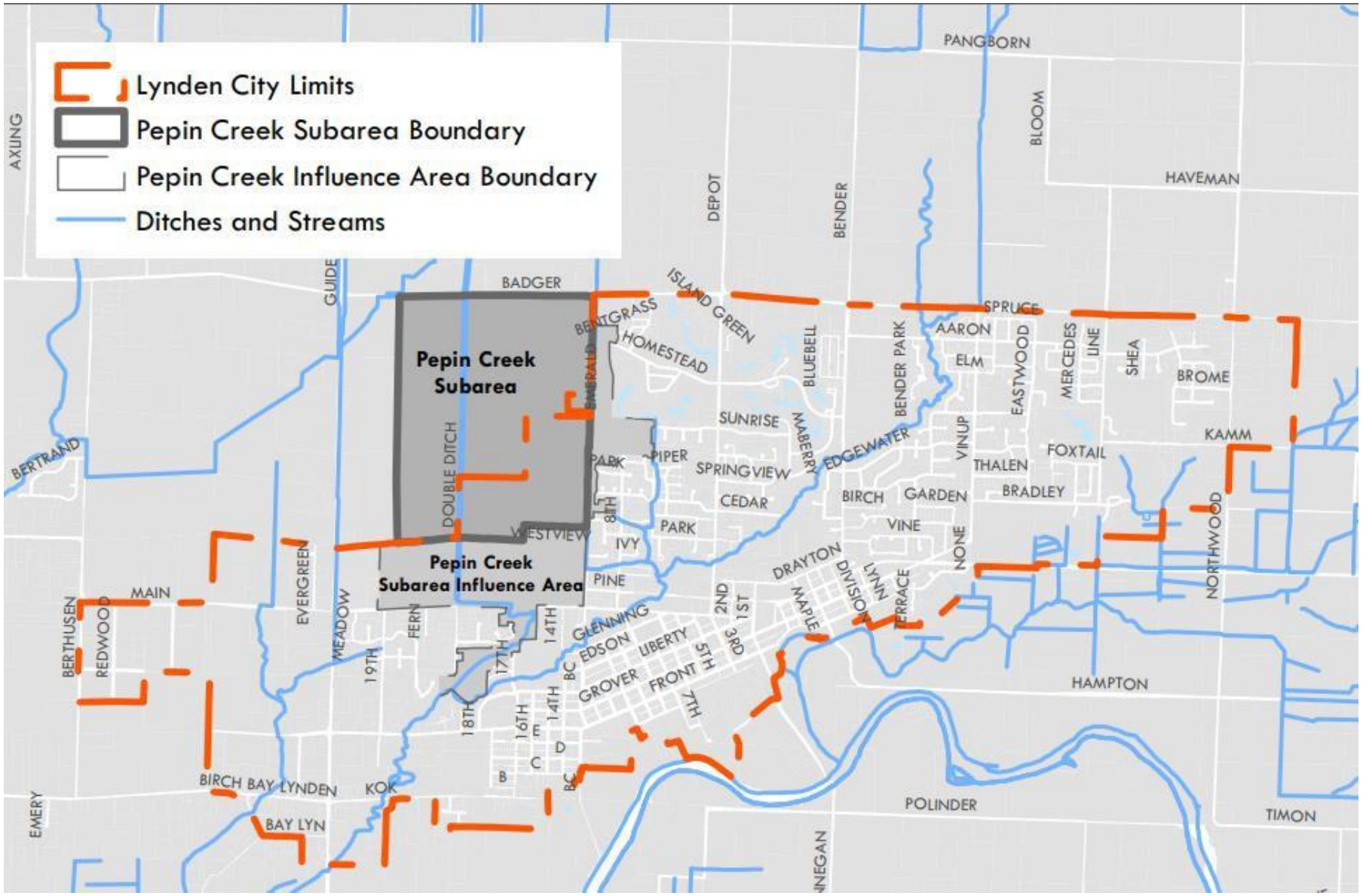
THE PEPIN CREEK SUBAREA PLAN

The Pepin Creek Subarea Plan is a 20-year plan for growth and development in the City of Lynden, identified as part of Lynden's 2016 Comprehensive Plan. Development here helps achieve multiple goals of the City, including providing a diversity of housing types to meet the needs of everyday Lynden households, promoting a small-town community character, fostering an active lifestyle with recreation amenities, and improving environmental sustainability. The subarea is the site for the restoration of Pepin Creek which involves the partial realignment of the creek from drainage channels along Double Ditch Road ~~and Benson Road~~ into a more natural channel that provides better wildlife habitat, flood control, and a recreational amenity. While future development can be accomplished in the subarea without the Pepin Creek Realignment project, subarea development in tandem with the Pepin Creek realignment provides the opportunity to improve a multi-modal transportation network to a standard which can accommodate growth, and create a distinctive, amenity rich neighborhood that adds greater value to the city.

THE PEPIN CREEK SUBAREA

The Pepin Creek Subarea (PCSA) is approximately 460 acres and includes the northwestern Lynden city limits and urban growth area (UGA). Approximately 110 acres is currently within city limits and the remaining 350 acres are in the UGA as shown in Exhibit 1. This Exhibit shows the PCSA and its influence area in relation to Lynden city limits and the surrounding unincorporated area.

Exhibit 1. The Pepin Creek Subarea in Context



Source: BERK, 2018.

The PCSA was added to Lynden's UGA as part of the Whatcom County Comprehensive Plan Update and the City's Comprehensive Plan Update adopted in 2016. Lynden is projected to grow by about 6,403 new residents between 2013 and 2036 (Whatcom County, 2016). Although there is capacity for some growth in other parts of the city, the PCSA has been identified as a primary area for future residential development over the next 20 years.

The PCSA has areas of high-water table and has experienced flooding. In the late 1800s and early 1900s, settlers rerouted the original Pepin Creek to allow farming in this area. Remnants of the historic creek were moved into the "ditches" along Double Ditch Road and Benson Road. They also collected stormwater from adjacent farmlands and an upstream tributary area in Whatcom County and Canada. During periods of heavy rain, these waterways would overflow onto the adjacent roads and land. This resulted in property impacts, safety problems, and road closures. The presence of fish, including salmon spawning grounds, constrain the roads under normal conditions, preventing roadway improvements on Benson Road and Double Ditch Road. In reaction to these conditions, the City of Lynden initiated the Pepin Creek Realignment project to restore Pepin Creek and modify the ditches. The Pepin Creek Realignment Project was also anticipated to prevent downstream flooding impacts in the Pepin Creek Subarea Influence Area.

In March of 2020 the Lynden City Council adopted the Pepin Creek Subarea Plan. Cost estimates and permitting challenges associated with the corresponding creek realignment plan led to a reduction in the scale of the creek realignment and a consolidation of arterial roadways. To reflect these changes the Pepin Creek Subarea Plan was updated mid-2021.

Additional information about the PCSA can be found in the Existing Conditions report in Appendix A

Frequently Used Terms

- **Pepin Creek Subarea Plan.** This document, which establishes goals and policies for the development of the subarea.
- **Pepin Creek Subarea.** The geography that is included in the Pepin Creek Subarea Plan.
- **Pepin Creek Realignment Project.** The engineering and environmental project that is moving the East and West ditches on Double Ditch Road into a consolidated Pepin Creek.
- **Pepin Creek Subarea Area of Influence.** The area downstream of Main Street that is influenced by the hydrology changes associated with the Pepin Creek Realignment Project.
- **Pepin Creek Project.** All the work to address environmental and land use considerations related to Pepin Creek. It includes the Pepin Creek Subarea Plan and the Pepin Creek Realignment Project.

Vision and Guiding Principles

VISION

The Pepin Creek Subarea allows Lynden to grow sustainably while preserving the community spirit, small town atmosphere, and connection to its agricultural roots that make Lynden unique.

GUIDING PRINCIPLES

Downtown Lynden. *Photo: Bill Kreager*

Pangborn Raspberry Farm. *Photo Credit: Whatcom Business Alliance website*

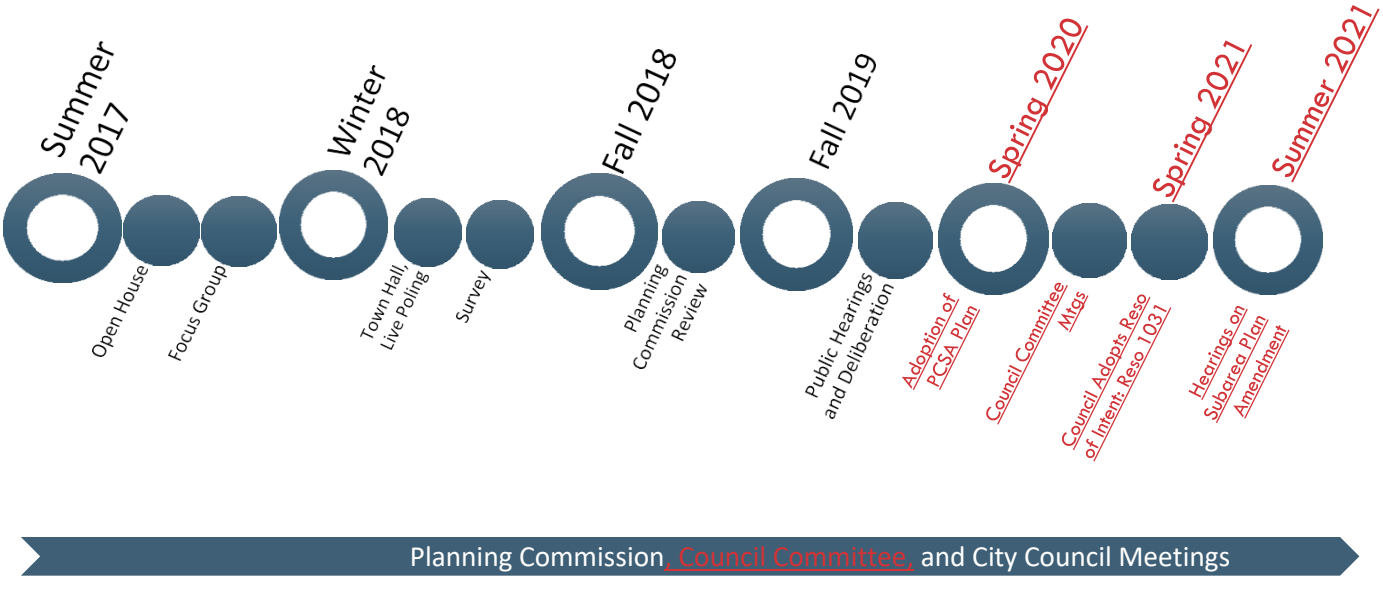
- **Small-Town Character**. Planning for growth in the PCSA, means Lynden can preserve the character of its existing neighborhoods and ensure that development within the subarea is designed to maintain community character.
- **Connection to Agriculture.** Lynden's history, social networks, and economy have connections to farming and agriculture. Coordinated growth within Lynden's city limits and UGA helps to prevent the conversion of farmland in the rural area and maintain the community's connections to an agricultural lifestyle.
- **Housing for the Whole Family**. As a multi-generational community, Lynden needs housing that meets the needs of the whole family. PCSA provides housing that meets the needs of people throughout their lifecycle, including housing that is affordable to those who work in Lynden.
- **Sustainable**. The restoration of Pepin Creek provides an enhanced, natural habitat for the fish and wildlife that live in this area. It also safely and effectively manages flooding and surface water impacts that affect property in the PCSA and its influence area.
- **Healthy**. Residents enjoy healthy lifestyles with plenty of access to open space and the ability to walk and bike safely throughout the PCSA.
- **Financially Feasible.** Development is an attractive investment for private developers and helps offset the costs of the Pepin Creek Restoration for the City. Ongoing maintenance associated with new development in the PCSA pays for itself.

Public Input and Outreach

The PCSA plan was developed with input from the community. Outreach efforts were designed to get a broad range of responses, including from those who may not regularly engage in civic decision-making, and to hear from people who may be uniquely affected by the decisions made in the PCSA. This approach resulted in a large volume of input that represented many different viewpoints in the community.

Town Hall Meeting, January 2018.

Broad engagement consisted of a town hall meeting and an online survey, both taking place in January 2018. Approximately 80 people attended the town hall meeting where planners gave a short presentation on the PCSA and the policies of the Comprehensive Plan. Attendees participated in a live polling exercise that reviewed housing types and densities under consideration in the PCSA and allowed them to express whether they liked or disliked various concepts. There was also opportunity to make comments and ask questions in an open format. The online survey reached approximately 640 people, about 90% of whom live in Lynden and included those who work, go to school, or attend church or social groups in town. Similar to the live polling exercise, the survey asked people about housing types and densities, and asked what people value about living in Lynden and what they might like to see changed.



Resident and Property Owner Open House, July 2017.

Targeted engagement was aimed at reaching those that may be particularly affected by the changes in the PCSA. This includes nearby residents and the development community, including developers, builders, and real estate brokers. A meeting with 35 nearby residents and property owners was held in July 2017 at the start of the planning process. This was an open house where planners presented on existing conditions and the purpose of the PCSA planning process and offered opportunity for comments and questions. To get the perspectives of the development community that might invest in the PCSA, City staff held focus groups and interviews and offered an online survey. Approximately 23 professionals participated in these engagements. These groups were asked about their preferences for investing in the PCSA and for information about the local housing market.

City Council and the Planning Commission also conducted a series of open public meetings where they received briefings, workshopped ideas, or provided direction for the PCSA. This series of meetings included sessions in July 2017, November 2017, and April 2018. At the November 2017 workshop, Council and Planning Commission participated in a live polling exercise that guided the development of the Plan, the results of the polling can be found in Appendix B. The direction of City Council and input from the public engagements drove the development of the concepts, vision, guiding principles, and policies of the PCSA plan.

Following the adoption of the PCSA Plan in March of 2020, additional estimations and permit research associated with the Pepin realignment and infrastructure was conducted. Resulting cost estimates and permitting challenges led to a revised Pepin Creek realignment plan. It reduced the scale of the creek realignment and consolidated arterial roadways but continued to facilitate residential growth in the area consistent with the identified vision. The revised plan was dubbed "Pepin Lite".

The Pepin Lite concepts were presented at a Special Council meeting February 2020. Subsequently, City staff worked with BERK Consulting to conduct a Financial Mitigation Strategy which sought to identify a feasible financial assessment tool for the implementation of the creek realignment and roadway improvements. Conclusions of the Financial Mitigation Study were presented at a Special Council Meeting in early 2021. These conclusions informed the Council's direction on next steps which were documented in a Resolution of Intent (Council Resolution 1031) passed on March 1, 2021.

Subarea Plan Concepts

LAND USE

Citywide Future Land Use

The City of Lynden Comprehensive Plan identifies the PCSA for urban growth. Whatcom County expects approximately 6,400 new people to live in Lynden and its UGA by 2036, which would grow the city to a total population of about 19,725. With an average of about 2.57 persons per household according to the Lynden Comprehensive Plan, the City needs to plan for nearly 2,500 new homes.

To meet this need, the Comprehensive Plan targets an average residential density of five units per acre within the city and UGA. In order to achieve that citywide average, new development areas need to be developed at a slightly higher density, averaging approximately seven units per acre. This is consistent with Goal 2P of the Whatcom County Comprehensive Plan that encourages an average density of 6-10 units per acre in Lynden. A mix of single-family and smaller-scale multi-family uses in the PCSA will meet this target density and help to preserve community character within existing neighborhoods in Lynden. It is estimated that development in the Pepin Creek Subarea could accommodate approximately 1,200 to 2,000 new homes. This allows most of Lynden to keep its Low Density Residential land use as shown in Exhibit 2. In addition, the provision of new housing within the UGA helps prevent the expansion of residential development into rural lands, helping to preserve the social, economic, and historical connections to agriculture that are important to Lynden's character and community values.

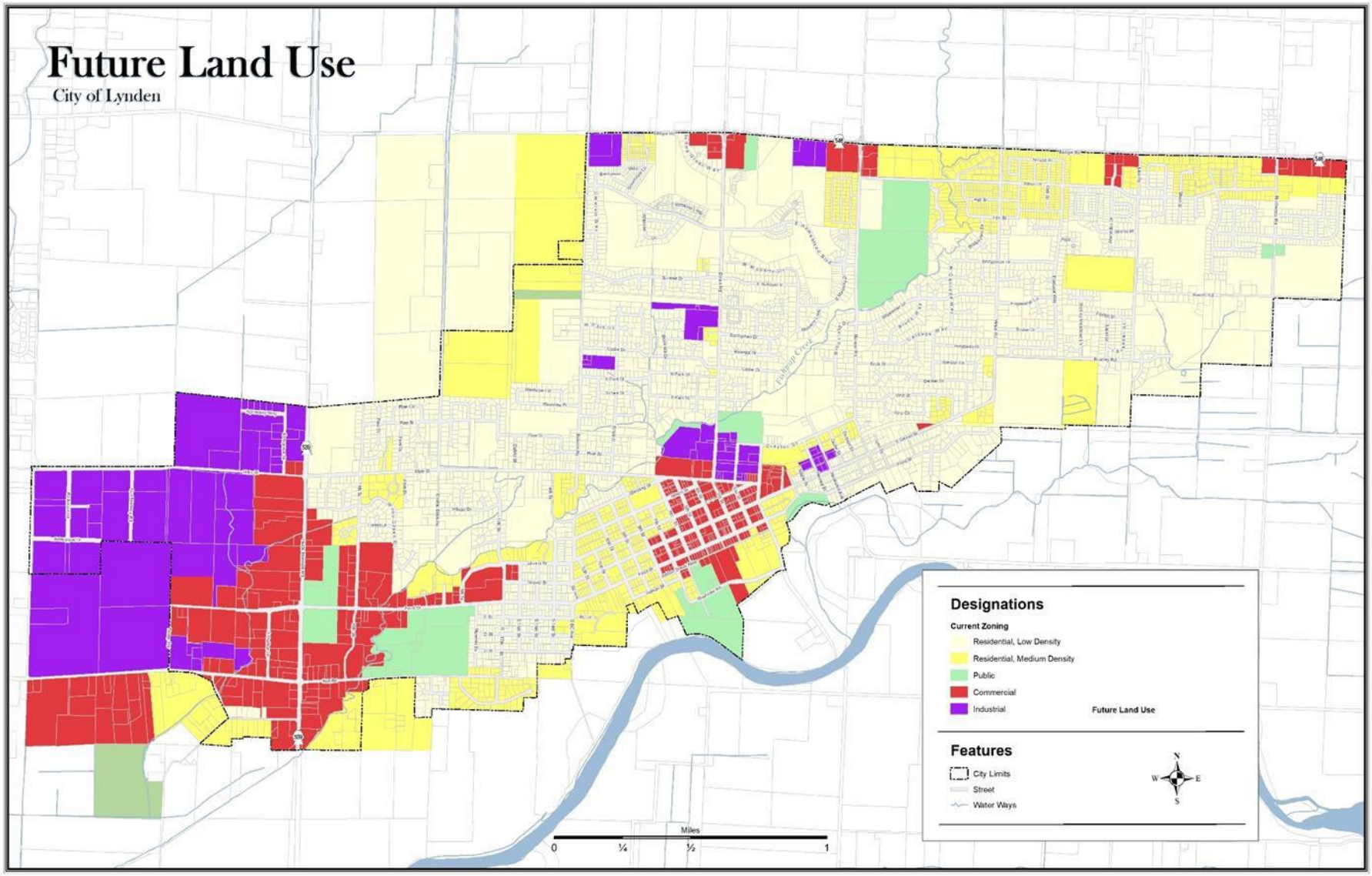
Pepin Creek Subarea Future Land Use

The PCSA is primarily a residential environment that supports Lynden families throughout their lifetime. Whether someone is starting out in life, building a family, or enjoying retirement, Pepin Creek residents can find a home that matches their needs in a community that maintains its small-town character with plenty of green spaces, fresh air, and in developments built to encourage social interactions between neighbors. The residential area is separated into two main categories: Low Density Residential land use and Medium Density land use as shown in Exhibit 3.

Low Density Residential Land Use

The purpose of the Low Density Residential land use district is to maintain "*stable, low density, largely single-family neighborhoods, while providing a range of housing types and prices*," as described in the Comprehensive Plan. Low Density Residential land use makes up the majority of the study area. It is expected that within the PCSA Low Density Residential land use district there will be a mix of traditional large lot single-family homes as well as smaller lot single-family homes. Smaller lot single-family homes should be located near public green space, such as the Pepin Creek corridor, to give a feeling of openness. Small lot developments in this zone may also be designed in a clustered pattern to create shared green space. It is implemented by the RS-72 and RMD zones in the Pepin Creek Subarea.

Exhibit 2. Future Land Use in Lynden and its Urban Growth Area*



Source: Lynden GIS, 2019 ~~*Shows land use designations prior to adoption of the Pepin Creek Subarea Plan~~

Medium Density Land Use

Medium Density Residential land use "*provides higher density housing options and a range of housing types to accommodate future growth,*" according to the Comprehensive Plan. This designation is placed near public open spaces to support residential styles that need less individual open space. Cottage housing, townhomes, and zero lot line housing is built at higher densities than single-family housing by producing smaller units on smaller lots and efficiently providing shared open spaces such as pocket parks and courtyards. This type of housing is often attractive to first time homebuyers, young adults just starting out, and seniors. It is located along the Pepin Creek corridor and adjacent to areas of the future City Park to maximize access to public open space. In areas where the Medium Density district abuts a lower intensity residential district, a transition area will be provided. The Medium Density Land Use Designation is implemented by RM-PC and RM-3 zones in the Pepin Creek Subarea. Small neighborhood commercial nodes may be allowed as secondary uses.

Public Use

There are about five acres of land set aside for Public Use for the airport runway protection area.

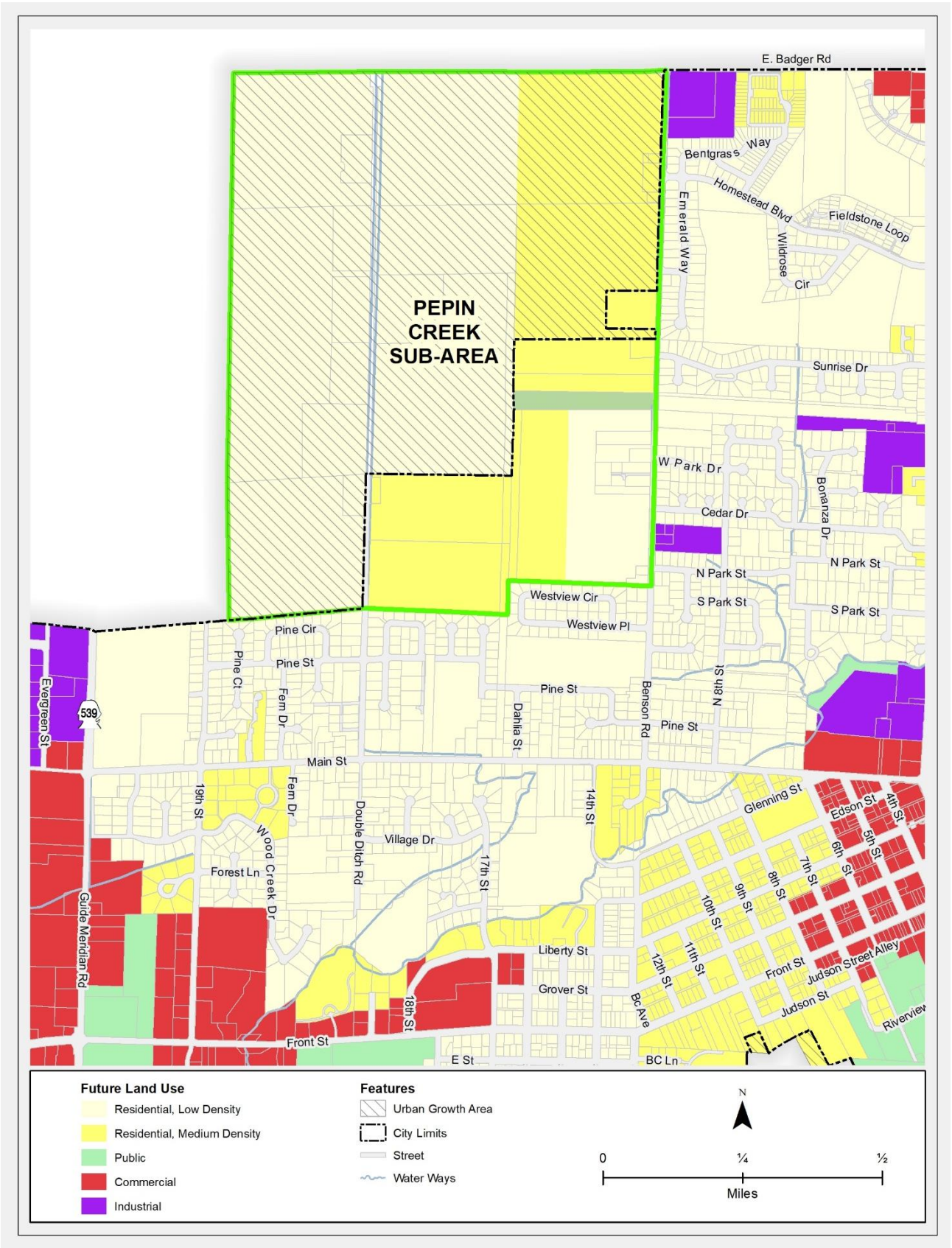
Airport Compatible Land Use

Lynden Municipal Airport, also called Jansen Field, sits on about 12 acres outside the PCSA to the east. There is small strip of land (approximately five acres) in the PCSA that the City purchased as a safety area and to prevent future development that might interfere with airport operations. This strip of land will be preserved as open space and will not be developed. Activity at the airport is generally limited to the smallest class of aircraft weighing less than 12,500 pounds with wingspans less than 49 feet. With a runway of only 2,425 feet, Jansen Field can accommodate approximately 70% of the smallest class of aircraft. The airport accommodates recreational flying and some business aircraft operations. (Airside, 2008).

Land use around the airport includes a mix of uses, including residential use as shown in Exhibit 3. Residences and the Homestead development lie to the north and a mix of residences, churches, commercial, and industrial areas lie to the south. To date, airport compatibility has not been a problem. New residential development in the PCSA may increase the potential for land use conflicts or compatibility issues. More frequent use of the Airport, as other local airstrips shutdown or limit small craft operations, could also increase the potential for land use compatibility issues.

Lynden does not have an airport compatibility land use plan. The Comprehensive Plan briefly mentions the airport as a regional transportation facility. Whatcom County's Comprehensive Plan includes policies for compatibility. Lynden does have an Airport Overlay zoning district that protects the area adjacent to the runway from hazards and allows some aviation-related uses. The Airport Overlay is extended to include the five-acre safety area in the PCSA as shown in Exhibit 3. In addition, the City should require new residential development in the PCSA to sign a covenant that acknowledges the potential for noise and other impacts related to airport operations as part of its platting process.

Exhibit 3. Future Land Use in the Pepin Creek Subarea



Comprehensive Plan Amendment 19-01.

ENVIRONMENT

The PCSA lies within the Nooksack River Water Resources Inventory Area 1. The PCSA and most of the city are outside the mapped Nooksack River's FEMA 100-year floodplain. Existing surface water resources in the PCSA include Pepin Creek, which is conveyed by Double Ditch East and Double Ditch West within the PCSA, Benson Ditch, and several lateral ditches (as shown in Exhibit 4). Pepin Creek drains to Fishtrap Creek, a tributary of the Nooksack River.

As part of the Pepin Creek Realignment Project, the City is planning to ~~reconstruct the~~construct a creek corridor through a portion of the subarea to reduce the threat of flooding. The creek realignment work is occurring separately from the planning for this subarea. ~~To date, work has already begun on the Pepin Creek Realignment project.~~

A local engineering firm, Reichhardt & Ebe Engineering, Inc. (R&E), has been working on a broad range of concepts for~~the~~ preliminary investigation and design of the new creek corridor. Traditionally the creek realignment plans ~~that runs~~included a corridor that ran north-south at the mid-point between Double Ditch Road and Benson Road from Badger Road at the north to Main Street at the southern edge of the PCSA.

~~Two significant~~Several design scenarios for the new Pepin Creek corridor have been analyzed. ~~Additional environmental review and collaboration with outside agencies is expected to begin in early 2020.~~

- Realignment: One design ~~is~~ anticipated ~~to~~ the accommodation of~~e~~ the existing water in the roadside ditches both at ordinary and flood stages. This design includes provisions to reinforce creek shorelines in the downstream reach south of Main Street where highly erosive soils and high stream flows threaten existing development. This design ~~is expected to~~ would provide flood protection, improve water quality and fish habitat, provide a recreational amenity, and function as the downstream receiving water body for managed stormwater in the subarea.
- Stormwater By-Pass: The second design scenario anticipate~~d~~s that the new creek corridor ~~will~~ would accommodate creek flows adequate for fish habitat while higher capacity flows, including flood stages, would be by-passed into a stormwater (pipe) system and discharged into Fishtrap Creek. This system reduces the risk to the downstream reach of Pepin Creek, south of Main Street, by re-directing high water flows rather than physical reinforcement of shorelines. A sophisticated fish exclusion system is included in this scenario to ensure fish are kept within the creek channel and not swept into the by-pass system. The by-pass pipes would be located within the Double Ditch right-of-way corridor.
- Pepin Lite: Cost estimates for both the full Realignment plan and the Stormwater By-Pass were prohibitive. As a result, the staff created a design scenario that calls for the consolidation of arterial roadways through a new diagonal arterial called Pepin Parkway. The use of portions of the existing arterials, the north end of Double Ditch Road and the south end of Benson Road, is de-emphasized as improvements to these roadways are delayed. The Pepin Lite design also reduces the scope of creek realignment. It focuses on the portion of Pepin Creek that flows within the existing City limits on Double Ditch Road and does not include the realignment of Benson ditch flows. This design provides a level of flood protection by interrupting overland flow, it improves water quality and fish habitat and provides a recreational amenity but to lesser degree than the plans studied previously.

The City has acquired most of the land needed for a 75 to 150-foot-wide creek corridor, and acquired another 40 acres, a portion of which ~~will be used for new city~~ is currently being designed as park ~~land in~~space for the subarea. The Pepin Lite plan utilizes some of this corridor to accommodate Pepin Parkway rather than realigned creek.

Preliminary site investigation and design work have been completed. The engineering team has also begun design a new Main Street Bridge. ~~which is needed in both the realignment and by-pass scenarios.~~ BERK Consulting ~~is supporting financial tools, which aim to~~ worked with staff to deliver a study of financial mitigation strategies in early 2021. The study gives guidance on collecting development's contribution to the creek realignment project. The study used the Pepin Lite plan cost estimates.

The PCSA is relatively flat, subject to wintertime flooding, and has seasonal high groundwater. Drainage in the PCSA is provided primarily by the roadside ditches along Benson Road and Double Ditch Road. Both ditches originate north of the City of Lynden and drain areas of Whatcom County north of Lynden and into Canada. Both ditches discharge to Fishtrap Creek and the subject of planned reroute project that is currently in the design and permitting process.

The PCSA is actively farmed and ditches on private property, beyond the roadway right-of-way, are present throughout. Within the agricultural portion of the PCSA there is an informal network of drain tile and ditches which provide drainage to the agricultural fields. There are reports of extensive forested wetlands historically occurring in the area. However, soil survey maps show the soils as drained, indicating that they may not support wetlands today.

The Fish and Wildlife Habitat Conservation Areas within the PCSA include the Double Ditch Road and Benson Road ditch systems. They are Washington Department of Fish and Wildlife priority habitats for federal and state listed salmonid species and documented habitat for locally important species (WDFW 2017a). Fish and Wildlife Habitat Conservation Areas are subject to the standard buffer widths established in the Lynden Municipal Code (LMC 16.16.380).

Wetlands within the PSCA are subject to the wetland requirements established in the Lynden Municipal Code as well (LMC 16.16.260 through 16.16.320). The terrestrial habitats in the study area consist of agriculture, grassland, and pasture. They provide habitat for a variety of bird species but are not documented Washington Department of Fish and Wildlife Priority Habitats or habitats for species of local importance, therefore they are not designated as Fish and Wildlife Habitat Conservation Areas.

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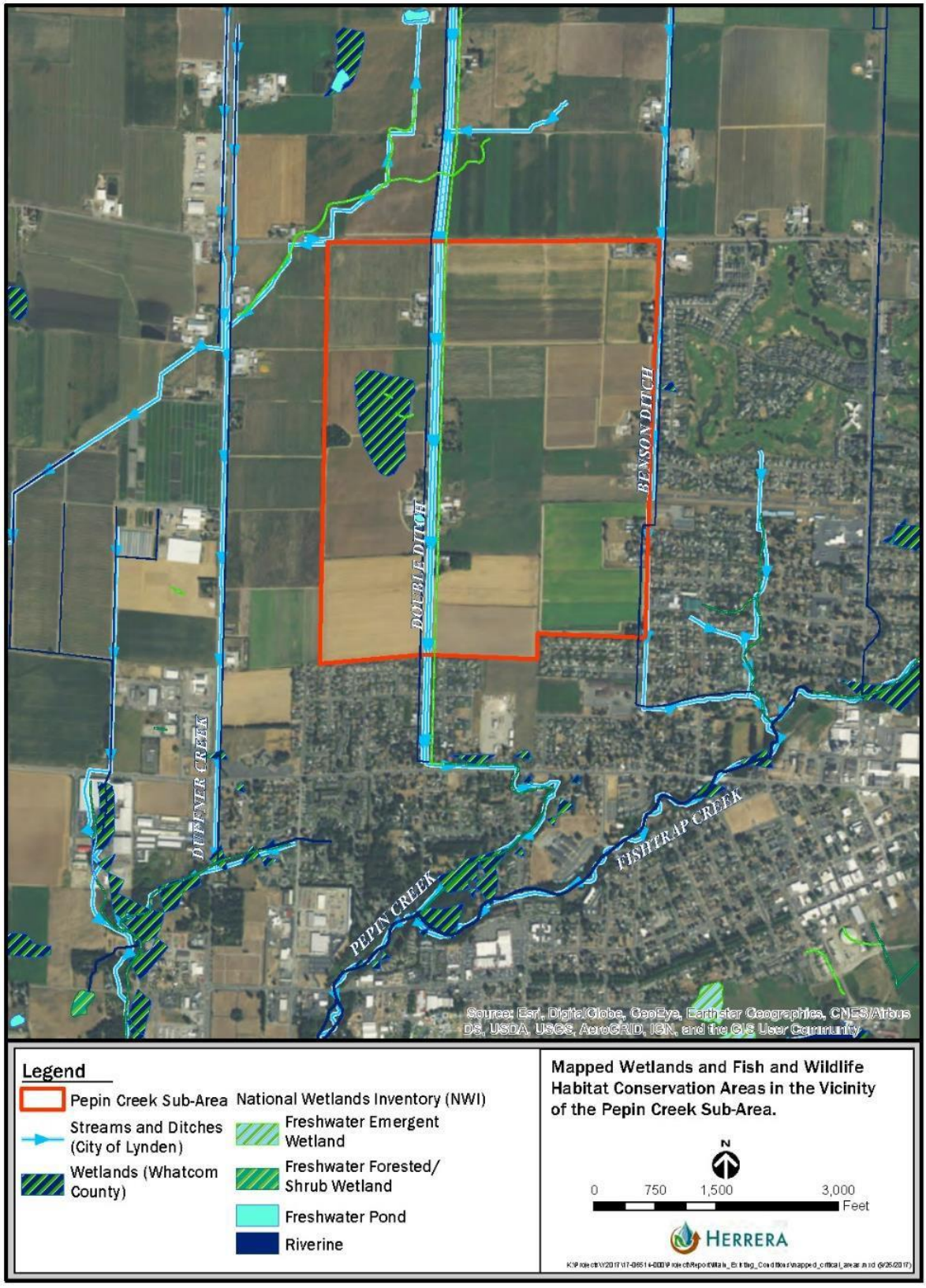
Exhibit 4. Water Resources in the Pepin Creek Subarea and Vicinity



Source: Herrera, 2017.

As the subarea develops, formal critical area delineations and adherence to required buffers and setbacks will be necessary, including an evaluation of potential impacts and required mitigation. Stormwater management will also be required to meet City codes and to ensure consistency with the current Ecology stormwater manual for Western Washington. Ideally, there will be opportunities to integrate low impact development stormwater management into other subarea plan features and roads.

Flood Hazard Mitigation

~~The Flood Hazard Mitigation Overlay is applicable to the entire PCSA and recognizes the hazards associated with surface flow flooding, ground water, drainage, and downstream constraints within the subarea. Overlay requirements will be included in an implementing ordinance.~~

The PCSA is not part of a mapped floodplain but has been subject to periodic wet season flooding that results from specific environmental and weather conditions. As such, it is critical the development that occurs here mitigates for these possibilities. The City, through SEPA authority, intends to enforce minimum design standards requirements such as elevated finished floor elevations. The requirements will ensure development in the subarea is designed and mitigated to prevent cumulative negative impacts to the surrounding community to avoid flooding of residential neighborhoods, life safety issues associated with road closures, and significant property damage. Additionally, the realigned portion of Pepin Creek will be designed to accommodate creek flows during a 100-year flood event and will intercept overland flows which have affected existing residential properties in the past.

TRANSPORTATION

Road System Capacity

Successfully accommodating new growth and development in the PCSA requires attention to the circulation system that connects the subarea to the rest of Lynden and the surrounding region, as well as the connections within the subarea itself. As identified in the Existing Conditions Report in Appendix A, there are few roads serving the PCSA because of its current agricultural, low intensity development pattern. The Lynden Comprehensive Plan anticipates the need for transportation improvements in the PCSA due to growth. The Transportation Element forecasts growth of up to 1,096 households in the subarea, which will require roadway improvements that support cars, bicycles, and pedestrians. Some of these road improvements are currently listed in Lynden's Transportation Improvement Plan. Lynden's Transportation Element is focused on intersection operations though adequate road extensions and design are also considered.

As part of the 2016 Comprehensive Plan update process, Whatcom County studied different growth scenarios for the PCSA ranging from 578-1,433 new households and published an Environmental Impact Statement (EIS) with the results, see the details in Appendix C (Whatcom County, 2015). The analysis was based on a transportation model developed by the Whatcom Council of Governments (WCOG) that focused on the volume and capacity of roadways at a countywide scale. The model showed that traffic would be within adopted level of service standards for roadways per Whatcom County standards, except in two areas. Guide Meridian Road between the existing city limits and East Badger Road would likely experience some slowdowns in afternoon peak traffic and there would be additional delays on East Badger Road between Guide Meridian Road and the existing city limits.

Once the City began more focused planning for the PCSA, the City asked the WCOG to apply its model to study the effect of a greater number of households on traffic. The WCOG tested the effect of 1,559

households in the PCSA. It assumed development of Pepin Parkway as an extension of Homestead Boulevard, connecting to Double Ditch Road. Overall, the study found that traffic impacts would be consistent with the projected results from the County's 2015 EIS. Predictably, the presence of the Pepin Parkway reduces traffic flows on the southern portion of Benson R~~r~~oad and increases traffic on Double Ditch Road south of the parkway to Main. Despite the difference in traffic flow, this indicates that the

Pepin Creek road system should be able to handle the transportation needs that accompany growth, although modifications to the Transportation Improvement Program are needed to account for the changes in traffic flow related to Pepin Parkway.

After the WCOG studied this option, the City shifted the proposed location of Pepin Parkway as shown in Exhibit 5. Instead of extending from Homestead Boulevard, Pepin Parkway is proposed to begin at Benson Road near Sunrise Drive. After a brief review of this change, the WCOG concluded it would not significantly alter the results of their previous analysis. As a result, the traffic impacts should still be consistent with the projected results from the County's 2015 EIS.

Additional revisions were made to the Pepin Parkway with the refinement of the Pepin Lite concept. The Parkway was shifted to utilize more of the property that the City already owned and is intended to generally follow the path shown in Exhibit 5.5.

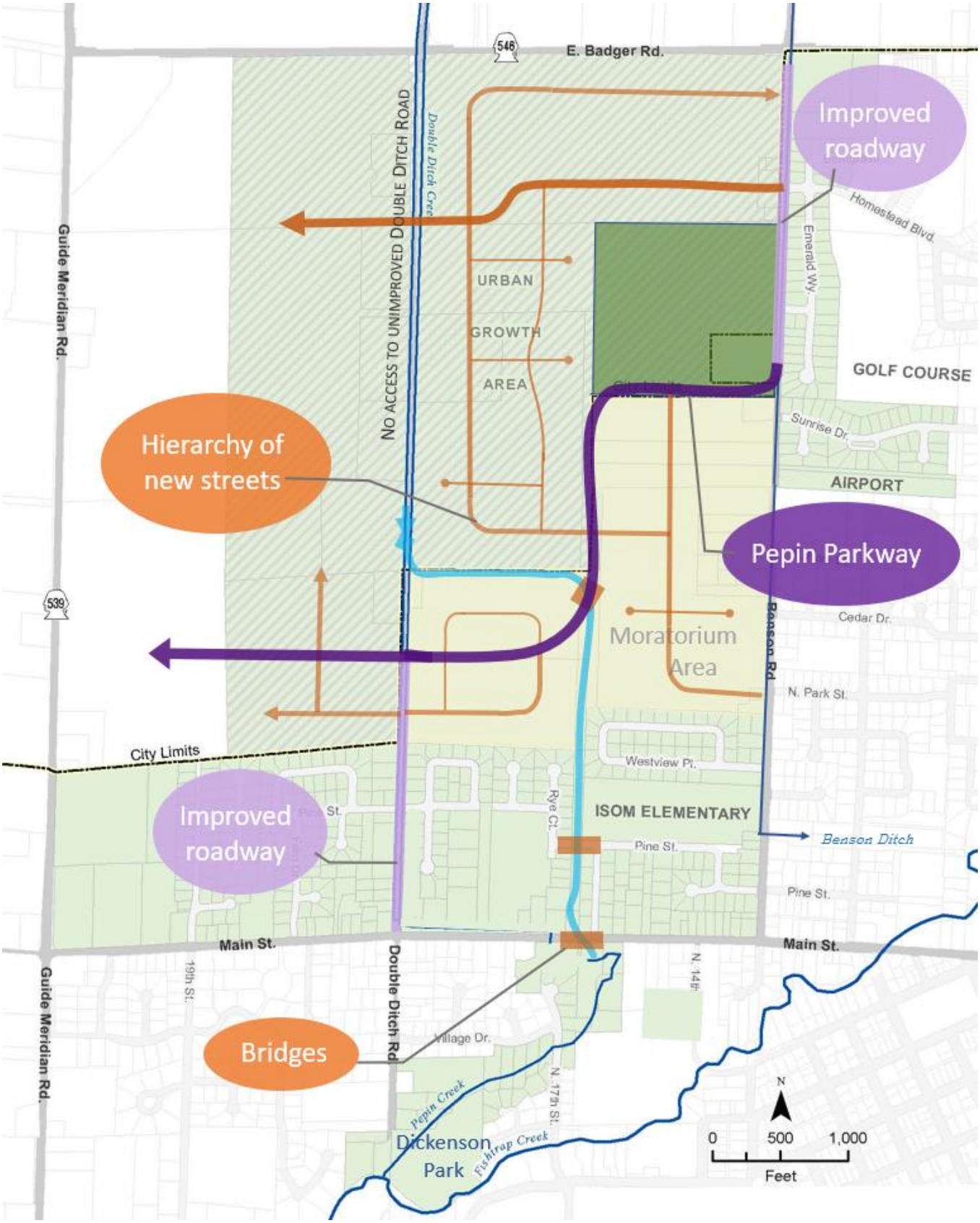
Circulation

The road system in the PCSA will create~~s~~ a hierarchy of streets that maximizes connectivity within the subarea and within the individual neighborhoods~~. as shown in Exhibit 5.~~ This hierarchy is designed to provide connectivity between the neighborhoods and the surrounding City of Lynden. The arterial connection will be the north end of Benson Road, Pepin Parkway, and the south end of Double Ditch with neighborhood networks connecting to these improved / new streets. Neighborhood streets should be discouraged from connecting to portions of Benson or Double Ditch that are not slated for arterial upgrades. ~~and incorporates low impact development practices into the street design to allow for sustainable drainage techniques.~~ To make this hierarchical system work, there are a variety of streets and alleyways that accommodate a full range of development types and road functions. These roadways are designed to provide a safe and inviting environment for pedestrians with sidewalks and curbs along all new streets. This type of circulation system is easily navigated and encourages physical activity throughout the community.

In addition to the road system, the PCSA vision includes a network of connected trails and pathways throughout the community that are separated from the vehicle network, including a regional multi-modal trail along the Pepin Creek realignment corridor. These trails and pathways will safely accommodate a variety of users and provide connections between homes, local amenities, and regional destinations such as: neighborhood retail, schools, parks, natural and open spaces, and downtown Lynden. By connecting trails and pathways to the road system at key points and along Pepin Parkway, the non-motorized circulation system ~~shown in Exhibit 6~~ encourages safe and healthy transportation and recreational activities such as walking, running and biking. Revisions to this network will be needed to adjust to the Pepin Lite infrastructure plan. The priority of connecting residents within the Subarea to parks, schools, and the larger trail network will guide these revisions.

City engineering standards will be updated to reflect the planned cross-sections. The City may implement its desired cross section with its land use and environmental permit authorities, consistent with Policy PC 6.6, until city standards are amended.

Exhibit 5. Circulation in the Pepin Creek Subarea



Source: Lynden Planning Department, 2021.

Benson Road and Double Ditch Road

Currently, three existing public roads serve the PCSA and connect it to downtown Lynden and surrounding areas as show in Exhibit 5. East Badger Road runs along the northern edge of the PCSA. Benson Road and Double Ditch Road run north-south through the subarea with Benson Road located along the eastern edge of the PCSA and Double Ditch in the western half of the subarea. Double Ditch includes the channels that currently contain the waters of Pepin Creek. Likewise, Benson Road includes a ditch containing a fish bearing waterway and stormwater damage. The waters of Pepin Creek ~~and potentially the Benson Road ditch~~ will be redirected toward the new channel through the realignment process. This process, as well as the anticipated growth in the PCSA, will require that the roadway network is redesigned and improved.

Portions of Benson and Double Ditch roads that create the diagonal arterial connection with Pepin Parkway will ~~likely~~ be improved in phases ~~while~~ and the construction of Pepin Parkway will become a priority to facilitate regional traffic and accommodate growth. Pepin Parkway and adjacent roadway improvements represent~~s~~ a safer transportation corridor than the existing conditions on Benson and Double Ditch roads. Traffic will be discouraged from using portions of Double Ditch Road and Benson Road that are not improved with the Pepin Lite plan through the use of additional stop conditions and intersection alignment. Pepin Parkway will have limited intersections, no driveway access, and no parking. There will be a sidewalk and a wide planting strip provided on each side of the street between the curb and the sidewalk to provide a safe pedestrian environment. The roads will also include either a dedicated bike lane on the shoulder of the vehicular travel lane, or a combined bike and pedestrian travel lane that is wide enough to safely accommodate both modes. Traffic calming strategies should be included in the final design of these roads to ensure safety and reduce speeds along these straight roads. The improvements made to Benson and Double Ditch Road will be ~~improved~~ to an alternate standard which could include the concepts illustrated in Exhibit 7. Improvements on Benson Road will likely include pedestrian walkways on only one side of the roadway so that the existing fish-bearing roadside ditch can remain in place. Where the ditch fronts the west side of the road, new development is expected to provide public pedestrian walkways within the development in the place of a Benson Road sidewalk. This may be located in a pedestrian easement that is located outside of the street right-of-way.

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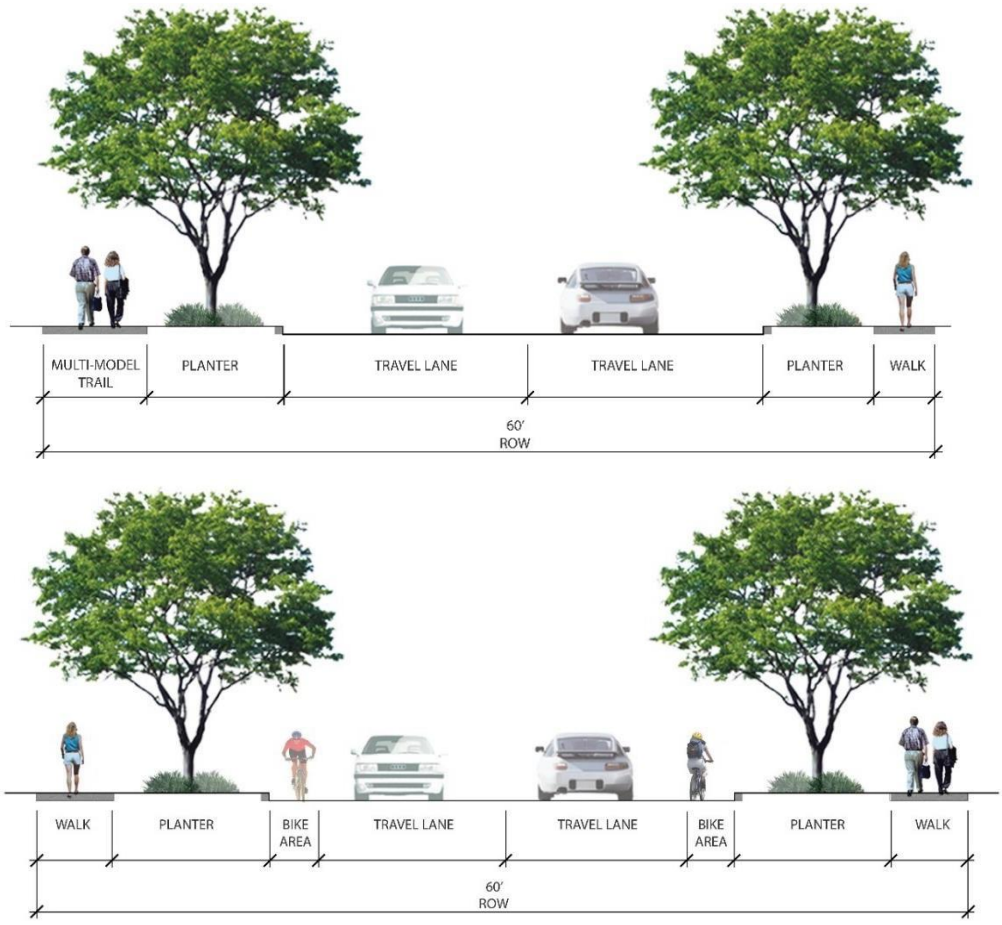
Exhibit 7. Conceptual Benson and Double Ditch Roads Cross Sections



Source: Herrera and Communita, 2018.

Pepin Parkway

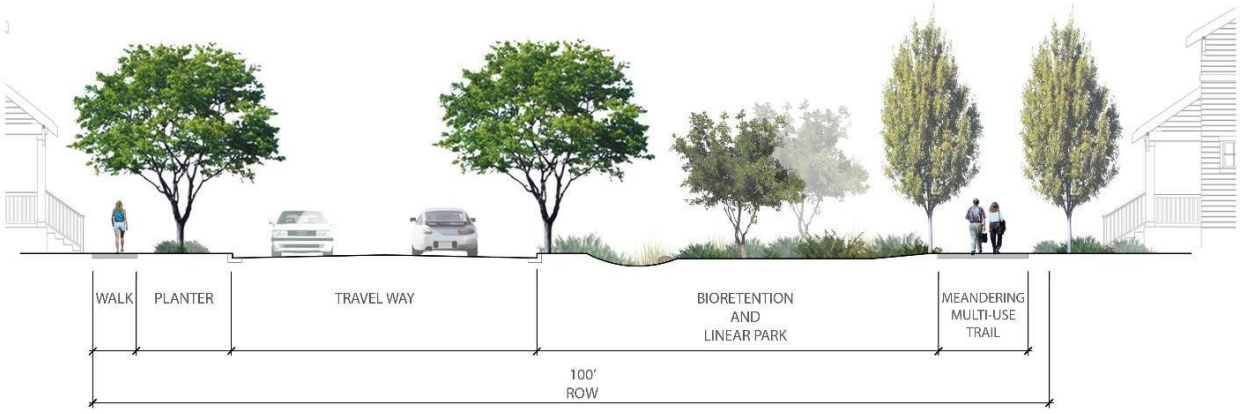
Pepin Parkway will run east/west through the subarea, starting on the southern edge of the City owned Benson Park property, ~~approximately midway along~~near the intersection of Sunrise Drive and Benson Road in the subarea. The Parkway will provide ~~an additional~~ excellent access opportunities to the Benson Road Park.~~park entrance.~~ ~~Crossing the creek channel at the end of the airport safety zone, t~~The proposed path of the Parkway once again takes advantage of property already owned by the City by moving south within the property originally intended for creek corridor until it crosses into the existing City limits. A bridge is planned her to cross the realigned Pepin Creek. The Parkway will likely run along existing property lines and connect with Double Ditch Road. On the west side of ~~the new creek channel~~Double Ditch Road, Pepin Parkway will ~~connect~~ continue west to provide access as needed. ~~to future city roads.~~

Pepin Parkway will include a sidewalk and a large planting strip on both sides of the road that can accommodate large trees. When feasible, ~~A~~a multi-modal trail will be on one side, separated from the vehicles by a wide landscaped area. Parking may be provided in parking pockets where needed. The parkway should act as part of the neighborhoods rather than a barrier. The new street will facilitate safe access to developing properties within the sub-area.

Pepin Parkway will also serve as a linear park that integrates different housing developments into a neighborhood by limiting intersections and incorporating a multi-modal trail that meanders through a

park-like setting. Where feasible, the parkway will include bio-retention and natural drainage, which will help with stormwater control and provide landscaping to enhance the feeling of comfort for pedestrians. Ideally, homes will front or side onto Pepin Parkway. When this is not possible, a heavy landscape buffer will be provided.

Exhibit 8. Conceptual Pepin Parkway Cross Section

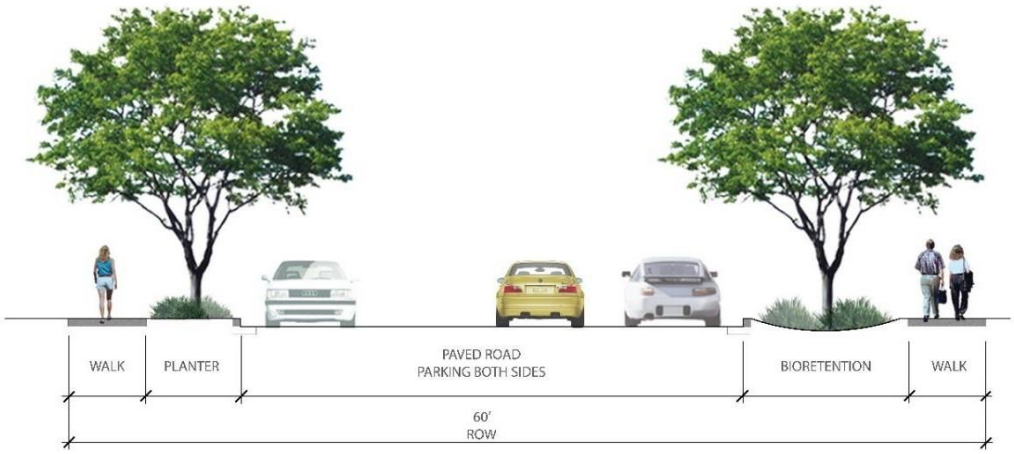


Source: Herrera and Communita, 2018.

Neighborhood Roads

Neighborhood Roads are a secondary system of roads that provide connectivity between individual developments and the PCSA as shown in Exhibit 5. They connect developments to the Pepin Parkway, Benson Road, improved portion of Double Ditch Road~~s~~, E. Badger Road, and Homestead Boulevard. Homes will feature porches and stoops that front or side on Neighborhood Roads to create a feeling of community. Trees and sidewalks will be provided on both sides of the street to enhance the pedestrian-friendly streetscape. Natural drainage systems may be integrated into the planting strip to carry stormwater to the Pepin Parkway drainage system. Parking will be provided on both sides of the street to allow space for residents and the guests, as well as to calm traffic moving through the area (see Exhibit 9).

Exhibit 9. Conceptual Neighborhood Roads Cross Section

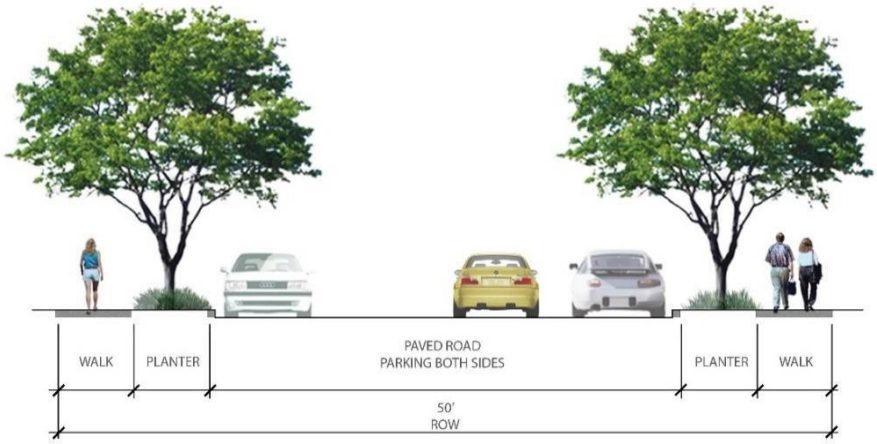


Source: Herrera and Communita, 2018.

Village or Cluster Access

Village and Cluster Access streets are intended to be public streets with a right-of-way width of only 50 feet (see Exhibit 10). This street type is intended to provide vehicular access to a maximum of eight units. It will also provide pedestrian connectivity with a planting strip and sidewalk on both sides of the street. The access roads include parking on both sides of the street for residents and guests and where possible, front porches will face the street to encourage social interaction amongst residents.

Exhibit 10. Conceptual Village or Cluster Access Street Cross Section

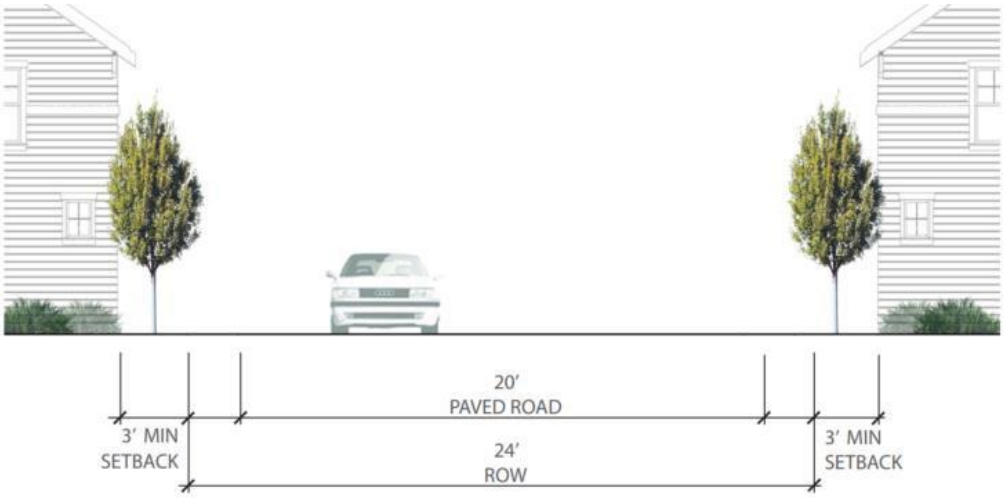


Source: Herrera and Communita, 2018.

Alleys

The use of private alleys in the PCSA is permitted. Alleys can be used to create a pedestrian friendly streetscape and eliminate pedestrian and vehicular conflicts. The use of alleys also minimizes curb cuts and allows for better social interaction and encourages walking and health in a safe pedestrian environment. Alleys in the PCSA will be 24' ROW in which 20' will be paved (see Exhibit 11).

Exhibit 11. Conceptual Alley Cross Section

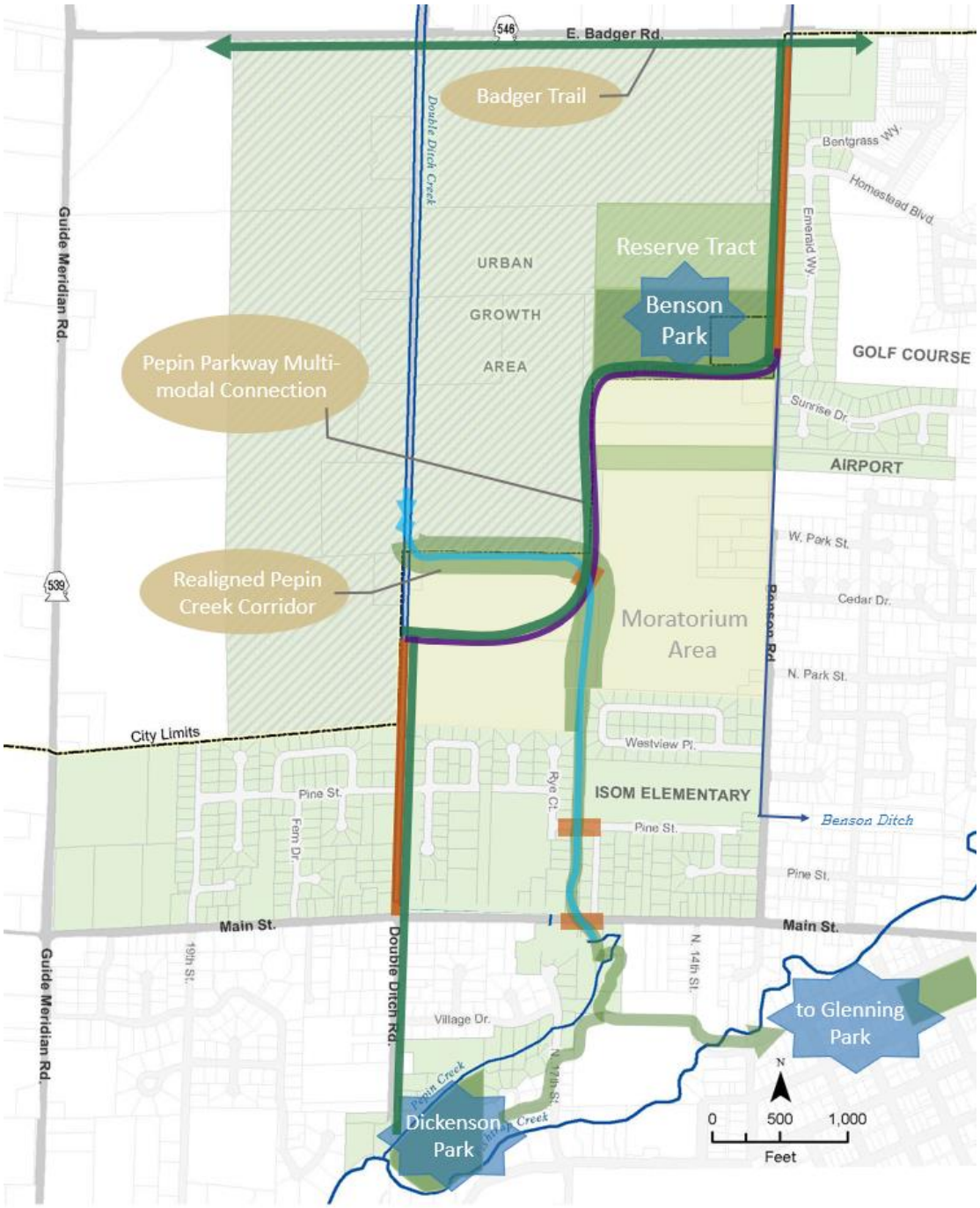


Source: Herrera and Communita, 2019.

OPEN SPACE

Open space in the PCSA includes a diversity of parks and an interconnected trail system to meet a wide variety of recreational needs and encourage healthy activity. This framework of parks, open spaces, and trails is shown in Exhibit 12. Park facilities range from a large city park to smaller pocket parks and open spaces. All parks are in close proximity to residents and connected through a network of trails and sidewalks. Parks serve several functions in the PCSA: to provide community space, to support a sense of neighborhood identity, to minimize the impacts of density, and to create a sense of place. Public streets will be located at the edges of parks and open spaces in the PCSA to help keep them feeling open and safe. Rear yards and privacy fences as borders to parks and open spaces should be avoided.

Exhibit 12. Conceptual Parks and Open Space Framework



City Park

A ~~15~~ 20 acre city park is currently being planned in the PCSA on the southern half of the City-owned property along Pepin Parkway and Benson Road where it will be easily accessible to all Lynden residents. The northern half of the property will be reserved for future park space or community uses. A conceptual park layout with elementary school concept is shown in Exhibit 13. An existing barn on the property is proposed to remain as a community gathering place and to host community events. Restoration of the barn meets one of the PCSA Guiding Principles by reflecting Lynden's agricultural connections and history. The park will include both active uses such as sports fields, as well as passive uses such as picnic tables and trails. A trailhead will provide easy access to the trail system throughout the PCSA, which provides access for nearby residents to get to the park and allows visitors to experience the Pepin Creek corridor. Parking could be shared with other uses on the site.

Exhibit 13. Conceptual City Park Layout

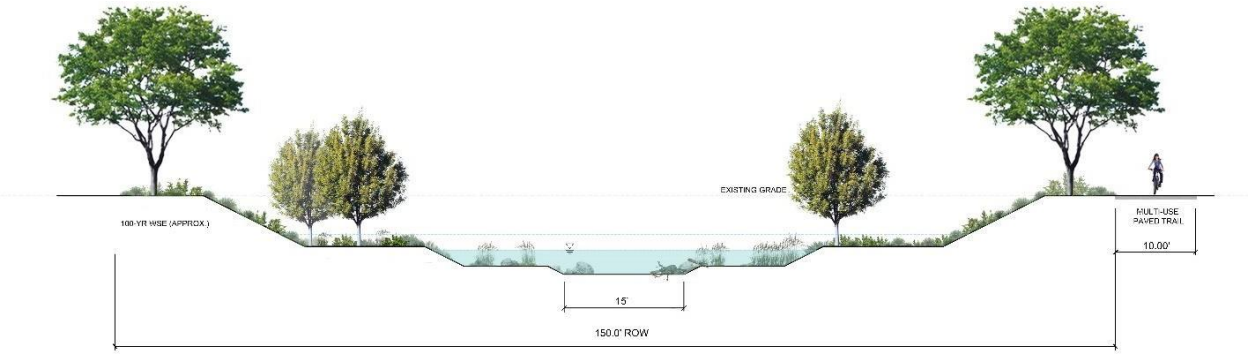
Source: Communita, 2019.

Pepin Creek Corridor

In areas where Pepin Creek will be realigned, the new ~~The Pepin Creek Corridor~~corridor will provide~~s~~ a linear open space ~~through the site~~ that connects to ~~the city park and to~~ the roadway network where it intersects with Pepin Parkway. This open space corridor will range from 75 feet to 150 feet wide. Where feasible, a~~A~~ multi-modal trail will sit on one side of the creek and a pedestrian trail on the other side of the creek as shown in Exhibit 14. Trail connections from adjacent developments will link to the Pepin Creek corridor. Restoration of Pepin Creek will provide an enhanced, more natural habitat for fish and wildlife as well as a recreational amenity for residents. It will also mitigate the impacts of

local flooding by accommodating Pepin Creek during high water conditions.

Exhibit 14. Conceptual Pepin Creek Corridor Cross Section



Source: Herrera and Communita, 2018.

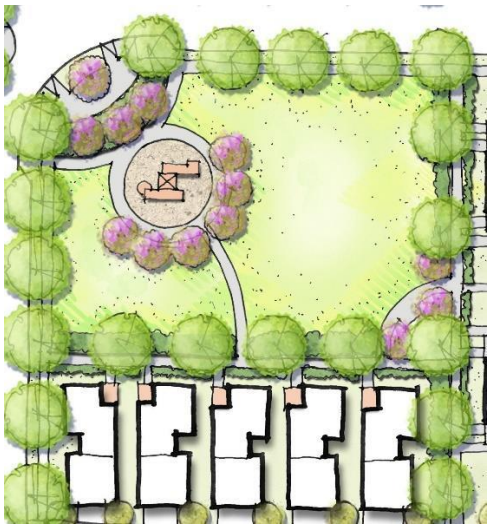
Integrated stormwater and pathway create a park-like atmosphere.

Pepin Parkway is designed as a linear park and will provide a multi-modal trail in a park like setting on one side of the road and a sidewalk on the other side as shown in Exhibit 8. Pepin Parkway provides opportunities for transportation and recreation for bikers and pedestrians. Limited intersections on Pepin Parkway will reinforce the park like atmosphere and will be used to pull the developments in the PCSA into a cohesive neighborhood.

Neighborhood Parks

Neighborhood parks are encouraged in residential areas and provide active play areas for residents within a half mile walking distance. These parks may also be used passively as open space and to provide outdoor recreation space for denser housing. Larger than a pocket park, neighborhood parks are a hub for resident gatherings and provide neighborhood identity. All neighborhood parks are easily accessible from a public street and connected to the trail and sidewalk network of the community (see Exhibit 15).

Exhibit 15. Conceptual Drawing of a Neighborhood Park



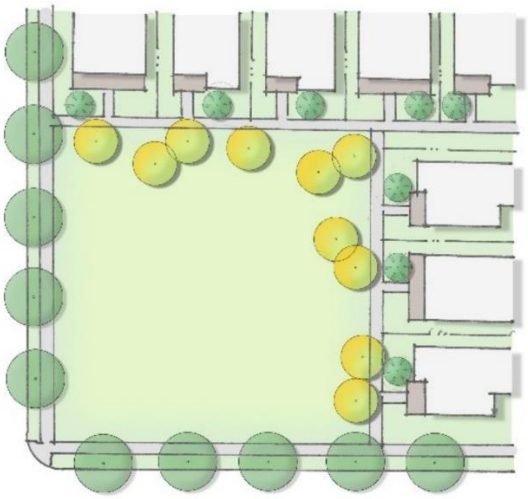
Source: Communita, 2018.

Example of a Neighborhood Park with small play structure.

Pocket Parks

Pocket parks are small parks that are less than half an acre in size and provide a community focal point for adjacent homes that front on the park and nearby homes within walking distance. Typically maintained by the surrounding homeowner's association, they are especially important in denser residential areas where adjacent residents rely on them as outdoor living spaces that serve as flexible play areas, recreational activity space, and community gathering places. Pocket parks can provide a safe place for kids to play in areas where private yard space is limited. Pocket Parks are highly visible, connected to the network of community trails and sidewalks, and accessible from a public street. They also provide access to homes that are oriented with the front doors facing the pocket park (see Exhibit 16.)

Exhibit 16. Conceptual Drawing of a Pocket Park



Source: Communita, 2018

Example of homes fronting on a pocket park.

HOUSING

The Housing Element of the Comprehensive Plan presents a demographic profile of Lynden compared to Whatcom County and Washington state. Lynden's household size is 2.57 persons per household, slightly higher than Whatcom County at 2.5 and Washington state at 2.54. The Census Bureau estimates that in 2016 the population of Lynden had a median income of $61,828, which is about 14% higher than the median income of $54,207 for Whatcom County. Median home value in Lynden was $287,200, slightly above that of Whatcom County at $283,000. In Lynden, 69% of homes are owner-occupied, compared to 63% in the county and the state.[1]

Compared to the other geographies Lynden has a higher median age and larger population of residents over age 65. A relatively high percentage of households, 17% are people age 65 and older who live alone, compared to under 10% in the other geographies. Census information shows that approximately one third of Lynden's population is under age 18, compared to about a quarter of the population in Whatcom County.

This demographic profile aids in understanding the type of housing that might be needed in the PCSA. Based on the age profile, housing is needed for families and older adults. Older adults may be looking to move to smaller housing units with less yard space to maintain as their children establish their own families or after the loss of a spouse. These needs may range from smaller single-family homes to cottage units to senior apartments. Families with children need housing that they can afford with ample places for children to play, whether it is in private yards or nearby parks and open space. The size and type of housing needed varies by family. Young families starting out often need smaller "starter homes" that provide entry into the housing market.

Housing affordability is also an issue for families looking to buy a home. With a median income of $61,828, new single-family homes are out of reach for many.[2] People working in healthcare, retail, or as teachers make about 70% of the area median income, or about $43,000. The purchase of a new single-family home requires an income of approximately $75,000 or more, or approximately 120% of the area median income. This would likely be a home on a lot under 6,000 square feet for entry level buyers, which could include a smaller single-family home, a townhome, a cottage, or other more compact housing type. Providing a range of unit types provides alternatives for homeownership at a variety of price points in the market.

COMMUNITY CHARACTER

The PSCA will become a new neighborhood designed to preserve essential elements of Lynden's character, including its connection to its agricultural roots, its small-town atmosphere, and its community spirit. The network of parks, trails, open spaces, streets and sidewalks work together to create a community feeling. Homes with porches and stoops facing this network encourage community interaction.

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[1] See the Lynden Comprehensive Plan Housing Element, Table 1 for the comparison between Lynden, Whatcom County, and Washington state. Census information comparing Lynden and Whatcom County can be found at: https://www.census.gov/quickfacts/fact/table/whatcomcountywashington,lyndencitywashington/PST045217.

[2] Housing affordability was analyzed by looking at both a 5% and 10% down mortgage and looking at the cost of new single-family home comparables in Homestead.

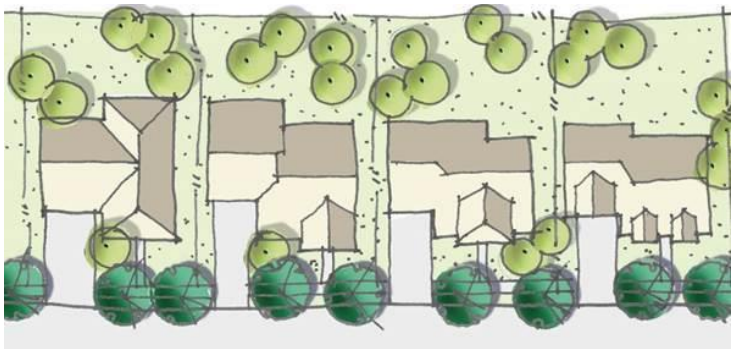
Ample gathering spaces help a community thrive by giving places for formal and informal get togethers. The availability of recreational amenities encourages healthy lifestyles and makes it easy for people to get around the subarea to visit with neighbors and participate in civic life. Lynden also strives to provide housing for family members in all stages of life. The planned land use and zoning in the PCSA hopes to achieve these goals by allowing a variety of home types to be built in the subarea such as: large single-family lots, small lots, attached homes, cottages, and senior housing.

The Design Standards created for residential areas of the city help guide the new community in preserving Lynden's community character and reflect its heritage as a small, agricultural town. This is accomplished through guidance on site planning and layout, architectural design, and landscaping. Standards help avoid a monotonous neighborhood by requiring quality materials and a variety of architectural styles. Required parks and open spaces in the medium density areas maintain an uncrowded feeling of a small town and are particularly important in areas of higher density. The necessary elements of design for each of the housing types are shown below.

Standard Lots

Standard lots are allowed throughout the PCSA. This housing type primarily serves established families and professionals. The lots are larger ranging in size from 7,200-12,000 square feet. The homes are also larger ranging from 3,000-4,200 square feet. All standard lots are detached homes and will reflect the character of existing Lynden homes. These lots have larger yards for children and pets. The design of the homes will meet the community needs and the design of the neighborhoods and homes will be controlled by the City's Residential Design Standards. The City's Residential Design Standards require that the homes have obvious front entries, garage doors that are less than 50% of the façade of the home, and not more than 12 feet forward of the living space. These standards help create a pedestrian friendly streetscape. The site plan in Exhibit 17 shows how standard lots may be laid out on a site. The architectural design shall be a variety of styles and have an illuminated front porch or stoop.

Exhibit 17. Conceptual Standard Lot Site Plan



Source: Communita, 2018.

Standard, or "large lot" single-family home.

Small Lots

The small lots serve the market needs of first-time homebuyers, young professionals, and young families and are allowed throughout the PCSA. Homes in this category are detached and sit on lots ranging from 4,000-7,200 square feet. These are typically 3-4 bedrooms homes between 2,000-3,000 square feet. Smaller lots can work well with front or alley access. Each home has a back yard for children and pets and a front porch that faces the street or a common open space. Homes with alley access can be situated on a park or open space, providing extra amenity, as shown in Exhibit 18. Design standards emphasize variations in materials and styles to prevent a monotonous appearance. The front porch of each home could also face a landscaped street or pocket park as shown in Exhibit 18 and Exhibit 19.

Small-lot single family home.

Exhibit 18. Conceptual Small Lot Site Plan with Alley Access

Source: Communita, 2018.

Above: Small-lot single-family home with alley access that fronts on a park.

Below: Small-lot single-family home with front access.

Exhibit 19. Conceptual Small Lot Site Plan with Front Access

Source: Communita, 2018.

Cottages

Cottages meet the market needs of active seniors, first time homebuyers, professional couples and empty nesters. These homes may be attached or detached, are typically clustered around pocket parks, and would be allowed in medium density areas. Each home has a smaller private open space but will share a common open space with the other homes in the neighborhood. Cottage residents do not need to maintain a larger yard. The City's Residential Design Standards and Zoning Code will control how much common open space is required and the location of it. The minimum lot size of a detached cottage is 4,000 square feet. The minimum lot size of an attached cottage is 3,000 square feet. Cottage homes can be accessed from an alley, shared auto court, or a street. The homes will be 1,400-2,400 square feet with 2-3 bedrooms. All homes have a front porch or stoop facing the street or a pocket park to encourage social interaction. The City Residential Design Standards will provide guidance on the design of the homes and require high quality materials and provide variety of architectural character (see Exhibit 20 for a conceptual plan).

Cottage housing fronting on a street.

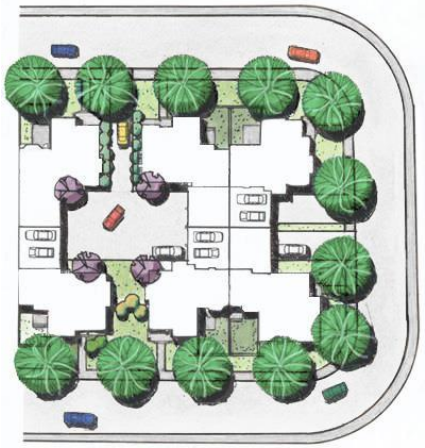
Exhibit 20. Conceptual Cottage Site Plan

Source: Communita, 2019.

Attached Cluster Homes

Cluster homes are a style of single-family home that are attached at the garage or in the rear of the lot for efficient site planning (see Exhibit 21). This efficiency lowers the cost of the home. Attached cluster housing meets the market needs of empty nesters, professional couples, and households that are downsizing Each of the cluster homes are located on their own lots and can be as small as 3,000 square feet. There is a small private yard on each lot. The Zoning Code and the City's Residential Design Standards will require a common open space. The homes will be 2-3 bedrooms and range from 1,600-2,400 square feet. High quality architectural design will be controlled by the City's Residential Design Standards which includes standards that require a variety of architectural styles and materials. Attached cluster homes would be allowed in RM-PC zone.

Exhibit 21. Conceptual Attached Cluster Home Site Plan



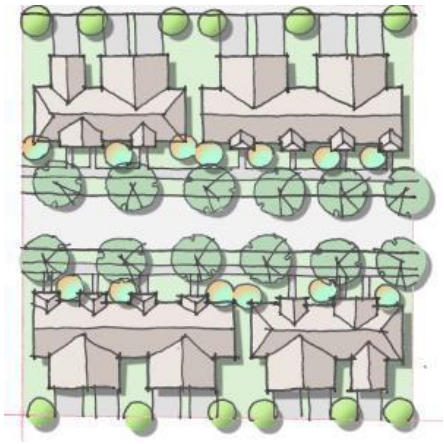
Source: Communita, 2018.

Attached single-family home clusters.

Townhomes

Townhomes are attached single-family homes that serve the market for first time homebuyers, young professionals, and young families. Each townhome is on its own fee simple lot, meaning that the owners have complete ownership of the land and the home, but are subject to a maintenance agreement or association covenants. Lots will range from 1,600-2,100 square feet and each will have a small private courtyard or small yard in addition to shared common open space. Whether townhomes take their access from the alley or the front, each unit will have a front porch or stoop facing a common open space or the street (see Exhibit 22). The City's Residential Design Standards and Zoning require that common open space be provided. The townhomes will be 2-3 bedrooms and range in size from 1,200-2,000 square feet. The City's Residential Design Standards provide for variety in the elevations, materials, colors, and styles to prevent a monotonous appearance and create a high-quality streetscape. Townhomes would be allowed in medium density areas.

Exhibit 22. Conceptual Site Plan - Townhomes Built with Pocket Parks



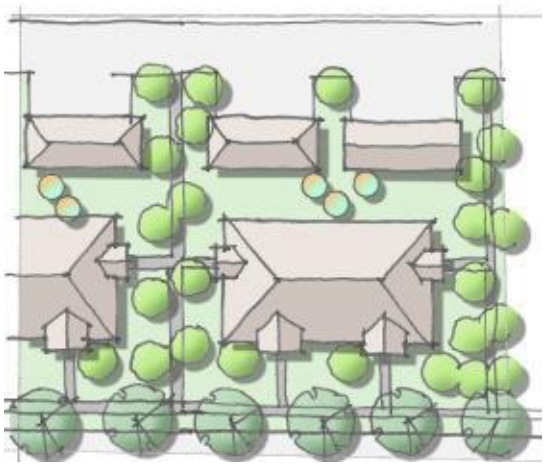
Source: Communita, 2019

Townhomes with garages on an alley.

Multi-family Housing

Multi-family housing is allowed in the PCSA in the RM-PC and the RM-3 zones and will serve the rental market. This housing will include a maximum of 12 units in small multi-family buildings. Developments will reflect the character of the surrounding neighborhood, while providing housing for a variety of residents. Units will range from studio units up to three-bedroom units and approximately 500-1,400 square feet. Common open space will be integrated into each site as well as private open space for each unit. Parking shall be located behind or to the side with main entries facing the street or common open spaces and create a pedestrian friendly streetscape. The City's Residential Design Standards require variations in materials and modulation of the building which helps integrate the larger building into the surrounding neighborhood.

Exhibit 23. Conceptual Site Plan - Multi-family Housing



Source: Communita, 2019.

Multi-family Housing.

Goals and Policies

LAND USE AND HOUSING

PC-1: New growth in the PCSA supports the character, development pattern, and densities in and around Lynden.

PC 1.1 Accommodate most of Lynden's 20-year growth projection in the Pepin Creek Subarea to use land efficiently and avoid future conversion of designated agricultural lands to urban residential uses.

PC 1.2 Plan development in the PCSA at an overall net density of at least seven units per acre to allow continued low density residential development in the rest of Lynden.

PC 1.3 Develop moderate density housing near public parks and open spaces to give a feeling of openness.

PC-2: The housing choices in the PCSA meet the needs of people in different stages of life.

PC 2.1 Allow a variety of lot sizes for single-family housing to accommodate families with different needs and preferences.

PC 2.2 Encourage a variety of unit types at moderate densities to provide housing that meets the needs of younger adults, older adults, singles, and couples.

PC 2.3 Provide opportunities for assisted living in the PCSA.

PC 2.4 Provide opportunities for homeownership by supporting housing that is affordable to households at a variety of incomes and with a variety of needs.

PC-3: Land use in the PCSA is compatible with adjacent uses.

PC 3.1 Ensure land use compatibility by applying a transition area to the Residential Medium Density district where it is adjacent to a Low Density Residential district.

PC 3.2 Allow for neighborhood commercial uses where Pepin Parkway intersects Benson Road.

PC 3.3 Recognize the Lynden Municipal Airport as an essential public facility by requiring new development to sign a covenant acknowledging noise and other potential impacts related to normal airport operations.

ENVIRONMENT

PC-4: The Pepin Creek realignment reduces flooding, improves habitat, and serves as a community amenity for the residents of Lynden.

PC 4.1 Provide fish and wildlife habitat within the Pepin Creek corridor.

PC 4.2 Increase drainage functionality and reduce flooding in the subarea.

PC 4.3 Serve as a recreational amenity by including a trail.

PC-5: Environmental stewardship is integrated into the landscape of the PCSA.

PC 5.1 Protect wetlands in accordance with the City's critical area regulations.

PC 5.2 Identify opportunities to enhance wetlands as part of the environmental restoration of the PCSA.

PC 5.3 Require natural stormwater management that is integrated with or mimics natural systems.

PC 5.4 Regulate development design and location in the Flood Hazard Mitigation Overlay to prevent cumulative negative impacts to the surrounding community and avoid flooding of residential neighborhoods, life safety issues associated with road closures, and significant property damage.

CIRCULATION

PC-6: The PCSA connects seamlessly with motorized and non-motorized transportation networks.

PC 6.1 Apply a hierarchy of streets that safely accommodate cars, bicycles, and pedestrians at each level.

PC 6.2 Encourage streets with the least amount of paved area for their class and function to help calm traffic, lower construction and maintenance costs, and provide environmental benefits.

PC 6.3 Efficiently address motorized circulation by ensuring that the road network is well connected to downtown Lynden.

PC 6.4 Plan for future roadway connections on arterial and collector roads to ensure the completion of an efficient and effective road network.

PC 6.5 Develop a network of multi-use trails, sidewalks, and bike lanes to ensure that people can travel safely by foot and by bicycle.

PC 6.6 Ensure that individual developments within the PCSA are linked by roadways and multi-use trails. Require developments to provide street and trail extensions and frontage improvements to be designed consistent with Subarea Plan cross sections and city standards.

PC 6.7 Accommodate changes to the runway and taxi area at Lynden Municipal Airport with improvements to Benson Road.

OPEN SPACE

PC-7: All developments in the PCSA are connected to a network of open spaces.

PC 7.1 Utilize the Pepin Creek corridor as a recreational amenity.

PC 7.2 Ensure that all housing units have easy access to open space whether the space is a private yard; shared park, courtyard, or green space; or public park or open space.

PC 7.3 Require development to provide plentiful green space to give a feeling of openness.

PC 7.4 Ensure safe and healthy places for children to play in all residential developments.

COMMUNITY CHARACTER

PC-8: The PCSA maintains Lynden's small-town character and feeling of community.

PC 8.1 Design residential areas to welcome community interaction by providing porches, stoops, and other semi-private space along landscaped street frontages.

PC 8.2 Scale single-family housing in proportion to its lot to avoid a feeling of overcrowding.

PC 8.3 Apply size restrictions to moderate density housing to ensure it is developed at a scale that feels consistent with small-town character.

PC 8.4 Apply design standards that encourage housing that looks distinctive and attractive and avoids the repetition of housing forms that give a mass-produced look.

PUBLIC FACILITIES AND INFRASTRUCTURE

PC-9: The PCSA is efficiently served by public services and infrastructure.

PC 9.1 Require development to pay its fair share of costs toward infrastructure and public services.

PC 9.2 Ensure that costs to the City associated with the development of the PCSA and the Pepin Creek Corridor are recovered by the City over a reasonable time.

PC 9.3 Balance the timing and scale of public investment with private investments to ensure that the PCSA is a feasible opportunity for new development.

PC 9.4 Update City Water, Sewer, & Stormwater comprehensive plans to include the PCSA and ensure that primary public infrastructure is well planned and can be built incrementally if needed.

Implementation

ZONING

Zoning in the Pepin Creek Subarea is established to produce an average of approximately seven dwelling units per acre using a variety of housing types to meet the needs of families throughout their life. Exhibit 24 shows the zoning classifications for the Pepin Creek Subarea. Uses are primarily residential with allowances for related and compatible uses such as schools, parks, daycares, churches, and limited neighborhood-serving commercial development in the Commercial Overlay areas. Design standards are applied to create a safe, attractive community, with a high quality of life.

Residential Single Family – 72 (RS-72) Zone

The RS-72 zone is the lowest density zone in the Pepin Creek Subarea, allowing 2-4 units per acre and requiring a minimum lot size of 7,200 square feet. This allows for large lot single-family housing and can be found throughout the city. In the Pepin Creek Subarea, the RS-72 is subject to the City's Residential Design Standards.

Residential Medium Density (RMD) Zone

The RMD zone allows for low density housing at densities of up to 4-8 units per acre. A minimum lot size of 6,000 square feet is permitted for detached homes and 4,000 square feet per unit for attachedhomes are permitted. This zone is used elsewhere within the city and promotes a creative mix of single-family and duplex housing types. Development in this zone is subject to the City's Residential Design Standards.

Residential Medium Density – Pepin Creek (RM-PC) Zone

At densities up to 8-12 units per acre, the RM-PC zone allows a variety of housing types, some of which are unique to the Pepin Creek Subarea. The RM-PC allows small lot single-family homes and cottages, with a minimum lot size of 4,000 square feet for detached units. It also allows single-family attached units such as townhouses, duplexes, units attached at the garage, or other housing types with fee-simple ownership and small multi-family buildings. Single-family attached homes are units located on their own lot, which is a minimum of 3,000 square feet. Where the RM-PC zone is adjacent to single-family zoning a transition area will be established to limit height and limit uses to single-family residences.

Residential Medium Density – Three (RM-3) Zone

The RM-3 zone allows for medium density residential development with a variety of housing types up to 16 dwelling units per acre. This zone sets a minimum lot size of 7,200 square feet and allows, with appropriate square footage, up to 12 units per building. This zone is located near park and trail features which will offer a feeling of openness and provide access to those amenities. .

Public Use Zone

The Public Use zone is a citywide zone in Lynden that provides for civic amenities and uses. In the PCSA, the Public Use zone is applied to City-owned property that will be used for a park and potentially another civic use, such as a school. The Public Use zone follows the uses and standards of its zone, not those created especially for the Pepin Creek Subarea. The airport safety area is publicly owned in part and regulatory in part and addressed in overlays below.

Zoning Overlays

There are three zoning overlays present in the Pepin Creek Subarea. Every zoning overlay has an underlying zoning designation that establishes the base uses and standards that are in place. The overlay adds additional standards or bonuses that are applied as well.

Neighborhood Commercial Overlay

Although future land use in the PCSA is mostly residential, the Neighborhood Commercial Overlay provides opportunities for commercial development at the intersection of Pepin Parkway and Benson Road. If there is a market for small, neighborhood-scale commercial development such as a convenience store or coffee shop, the commercial overlay shows where it could be allowed. Neighborhood commercial allows residents to avoid a trip into town for some basic goods and services, which is convenient for residents and prevents road congestion. If the market does not support commercial development in the Pepin Creek Subarea, the area with the Neighborhood Commercial Overlay can be developed according to the underlying residential land use.

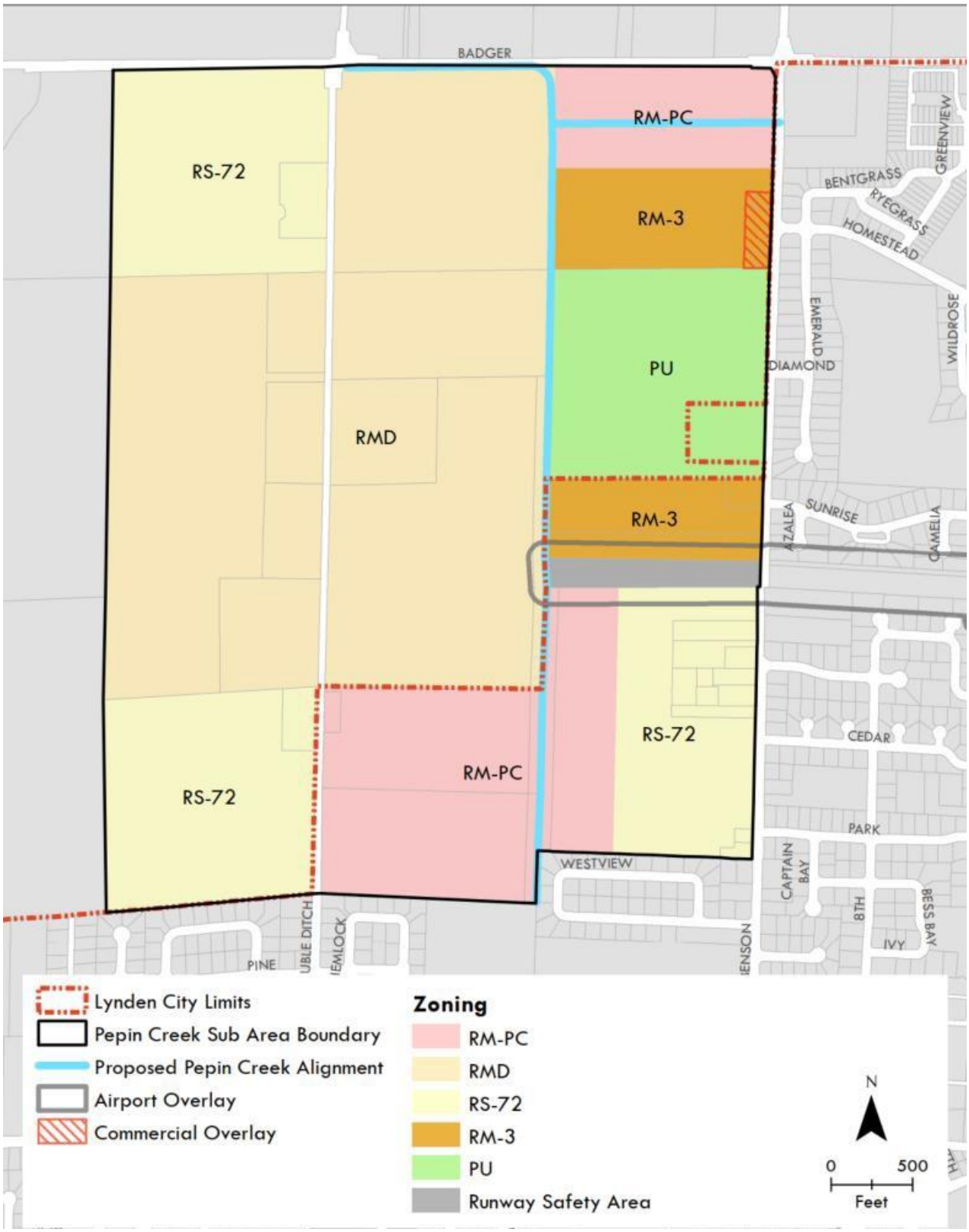
Airport Overlay

The Airport Overlay is a special designation on property located adjacent to the airport. The runway and primary facilities of the airport are just outside the PCSA boundary, but the PCSA includes part of the runway safety area. The primary purpose of the Airport Overlay is to prevent airway obstructions and ensure the safety of both airfield users and nearby property owners. The Airport Overlay also allows a few airport-related uses, such as airplane hangars, which are not allowed elsewhere in the underlying zone.

Flood Hazard Mitigation Overlay

The Flood Hazard Mitigation Overlay includes the entire PCSA. It primarily recognizes the hazards associated with surface flow flooding, ground water, drainage, and downstream constraints within the subarea. It also recognizes that development in the subarea must be designed and mitigated to prevent cumulative negative impacts to the surrounding community and that development without proper mitigation could result in the flooding of residential neighborhoods, life safety issues associated with road closures, and significant property damage. Additional information about existing flood hazard conditions and flood hazard mitigation can be found in Appendix E. Subsequent study will be needed to further define mitigation strategies and will be conducted along with the finalization of the channel realignment design.

Exhibit 24. Zoning in the Pepin Creek Subarea (Exhibit to be updated to show new creek alignment)



Source: BERK, 2019.

Land Capacity Analysis

The zoning is designed to meet the growth targets established for the City of Lynden and the PCSA at full buildout. This was determined by looking at the theoretical minimum and maximum development potential and identifying two midpoints that are more likely to represent future development. The theoretical limits apply the ~~minimum and~~ maximum densities allowed under the zoning to the developable acreage resulting in ~~0 to 2,508~~2,882 units as the ~~minimum and~~ maximum ~~range~~ unit count for development. (This represents an increase from previous estimates as the Pepin Lite plan resulted in less area dedicated to infrastructure and creek corridor and more area available for development.) In practice, development typically occurs somewhere in the middle. The Analysis ~~midpoint~~ midrange of ~~1,381~~ 1,569 is the average of the theoretical minimum and theoretical maximum. The analytical maximum presents a higher limit of ~~1,902~~ 2,166 is set at a development level of 75% of the theoretical maximum for the zoning. For planning and analysis purposes, the range of ~~1,381 to 1,902~~ 1,569 to 2,166 units was used to estimate likely development in the PCSA (see Exhibit 25).

Exhibit 25. Land Capacity Ranges in the Pepin Creek Subarea

	Developable Acreage	Theoretical Minimum	Theoretical Maximum	Analysis Max	Theoretical Midrange
RS-72	93.37	0	467	373	373
RMD	127.07	0	1,271	953	635
RM-3	27.19	0	435	307	205
RM-PC	59.14	0	710	532	355
Commercial Overlay RM-3	1.58	0	25	0	13
TOTAL	**306.77**	**0**	**2,882**	**2,166**	**1,569**

~~Zone/Overlay~~	~~Theoretical Minimum~~	~~Theoretical Maximum~~	~~Analysis Midpoint~~	~~Analysis Maximum~~
~~TOTAL units~~	~~0~~	~~2,508~~	~~1,381~~	~~1,902~~

PHASING

Only about 20% of the PCSA is currently within city limits; the majority is part of Lynden's UGA. Until the land within the UGA is annexed it will be subject to Whatcom County's adopted land use and zoning, which classifies this land for agricultural use. Subarea Plan implementation will occur within city limits during its first phase, as shown in Exhibit 26.

Ideally Pepin Creek Subarea plan phasing will match the progress of the Pepin Creek Realignment Project. An initial phase, known as the intercept ditch, was constructed in 2018 and extended at the end of 2019. The intercept ditch functions as a flood protection measure for existing infrastructure and housing developments by interrupting overland flow of flood waters. The design of the realignment project will be subject to additional environmental review, anticipated in early 2020. Once a specific design is selected the first phase could begin as soon as 2022 in association with planned culvert improvements along Badger Road by the Washington State Department of Transportation. However, this timeline does not account for any significant delays that may be encountered during the design, financing, or construction of these improvements. Phase 1 subarea development will likely occur ahead or in tandem with the development of the first parts of the channel if financial participation in the channel

realignment project can be assured.

~~**Exhibit 26. Pepin Creek Subarea Phase 1**~~

~~Source: BERK, 2019.~~

Development that gets ahead of the realignment project will need to accommodate space for the future development on the realigned portion of the Pepin Creek channel and meet buffer requirements and setbacks from the existing Pepin Creek channel in Benson Road and Double Ditch Road. Until the Pepin Creek Realignment project is completed, the channels on Benson and Double Ditch are unavailable for integration into low impact development stormwater systems. These inefficiencies may limit the development potential of lands that redevelop prior to the completion of the Pepin Creek realignment and are more likely to affect ~~Phase 1~~earlier phases of development.

~~Phase 2~~Later phases of development will ~~likely~~ occur~~s~~ when the UGA is annexed and services are extended. Earlier development may occur in the Southwest and Northeast portions of the UGA where road infrastructure is present and proposed for improvement and funding with application of impact fees, e.g. Benson Road and Main Street.

~~Phase 3~~Final phases of the Pepin Creek Subarea ~~is~~are likely to include areas to the West and Northwest that are currently being farmed, have had recent investments in agricultural production, or where there are more constraints like the wetland/pond. There may be a greater willingness to monitor the Pepin Creek realignment progress, as well as the timing of new or improved roads in these areas, while continuing current agricultural activities.

Annexation of the UGA should consider the ability to implement the PCSA plan. The City has more control over the timing of development in the UGA because it can control annexation in future phases. Annexation and development that occurs prior to realignment of the channel should have a plan for addressing potential development inefficiencies with creative site planning or project phasing.

CAPITAL FACILITIES PLAN

Development on the PCSA will require substantial investments in infrastructure and capital facilities. Exhibit 27 shows the total costs, by category, of the improvements needed to allow for development in the subarea. It is important to note that these are point-in-time costs that assume this project is completed all at one time, in 2019 dollars. As the work on the infrastructure is phased and completed, cost estimates will need to be updated to reflect inflation and the carrying costs based on the phasing.

The majority of capital facilities expected in the PCSA are related to new development. New development is expected to provide for these capital facilities through direct infrastructure construction and the payment of related fees and charges. The development of new capital facilities and infrastructure will be guided by City of Lynden plans, policies, and regulations as shown in the sections below.

Transportation

The City of Lynden maintains a Transportation Improvement Plan (TIP) that lists local transportation projects. Each year an updated TIP is submitted to the Whatcom Council of Governments and the Washington State Department of Transportation (WSDOT) to ensure that projects eligible for federal and state funding can compete for funds. Projects listed on the TIP include motorized, non-motorized improvements, on-going maintenance projects, and projects to served new growth. In the most recent TIP (2019-2024) three projects appear on the list for the PCSA. These projects include:

- Pepin Creek – bridges, multi-modal trail, and changes to roads and road drainage associated with the realignment of Pepin Creek.
- Benson Road – safety and capacity improvements.
- SR 546 Intersection with City Arterials – capacity improvements that will be led by WSDOT.

In addition to the TIP, the Comprehensive Plan lists additional projects that will be needed to meet the needs of growth by 2036. These include the extension of safe bicycle connections from Homestead Boulevard and the creation of a multi-modal network of trails, pathways, and sidewalks in the PCSA.

Some of the transportation facilities needed in the PCSA will be constructed by the developer. Title 12 of the Lynden Municipal Code (LMC) specifies the standards and minimum requirements for the construction of streets and sidewalks. It specifically adopts the WSDOT manual for application, design, and construction of improvements. It also applies City of Lynden Engineering Design and Development Standards in LMC 13.24 and Titles 16-19 and the Washington Department of Ecology stormwater manual. The City of Lynden intends to use its established traffic impact fees in place at the time of application as the mechanism to collect a fair share from development for the construction of the regional arterial streets. More information is available in the finance section of this plan.

Stormwater

The City of Lynden operates its Municipal Separate Stormwater System under a National Pollutant Discharge and Elimination System Phase II permit. Stormwater management is regulated through Chapter 13.24 of the LMC (Lynden Municipal Code). This code section sets forth the minimum requirements for new development and redevelopment, including the use of the 2014 Stormwater Management Manual for Western Washington by the Washington State Department of Ecology. The City operates its Municipal Separate Stormwater System as a stormwater utility.

The City's Stormwater Comprehensive Plan is currently being updated and has not been issued. This subarea was the subject of a 2009 amendment to the current 1992 Stormwater comprehensive plan which described the need for what became the Pepin Creek realignment project (Reichart & Ebe, 2009).

One concept for Pepin Parkway is ~~planned~~ to have a continuous open vegetated channel between the proposed roadway and the proposed multi-use trail. This area is sized to provide water quality treatment and detention flow control storage for the public roadway. There are no other planned stormwater facilities and it is assumed that each development project would provide meet its own stormwater management within the project per the current City of Lynden Code.

Exhibit 27. Improvements Needed to Support Development in the PCSA

	Total Cost	Existing Developer Commitment	Existing Public Commitment		Unaccounted Funds
			General City Funds	Grants	
Regional Road Improvements	$15,826,000	$2,915,291	$12,910,709		$0
Road Improvements (planned)	$11,607,000	$2,915,291	$8,691,709		$0
Road Improvements (additional)*	$4,219,000		$4,219,000		$0
Local Roads (Developer Constructed)	$9,251,000	$9,251,000			$0
Roads & Bridges	$5,400,000				$5,400,000
Pepin Parkway	$1,800,000				$1,800,000
Pepin Creek Bridges	$3,600,000				$3,600,000
Water/Sewer Improvements	$17,645,000	$17,645,000			$0
Water Improvements	$5,299,000	$5,299,000			$0
Sewer Improvements	$12,346,000	$12,346,000			$0
Stormwater Improvements (onsite)	$5,524,000	$5,524,000			$0
Wetland Mitigation	$600,000				$600,000
Creek Realignment and Downstream	$43,983,000			$3,900,000	$40,083,000
Utility Connection Fees (Water/Sewer/Storm)		$17,139,591			$0
TOTAL	$98,229,000 $98,557,882	$52,474,882	$12,910,709	$3,900,000	$46,083,000
DEVELOPER CONTRIBUTION ASSUMING EXISTING CITY COMMITMENTS					

Source: City of Lynden, 2019; Herrera, 2019; and BERK Consulting, 2020.

Water

The City of Lynden owns and operates a municipal water system that serves retail customers within the city limits and the UGA and provides wholesale supply to several adjacent water associations. An existing 12 inch City of Lynden water main runs along the eastern boundary of the PCSA in Benson Road, and the existing developments within the existing city limits portion of the PCSA are served by City water mains. However, the interior of the PCSA currently in agricultural use is not served by public water mains. These agricultural uses appear to be served by six wells located within the PCSA.

The City of Lynden's Water System Plan (Gray & Osborne, 2009) projects growth in the city overall but does not address the growth of the PCSA specifically; in the next Water System Plan Update, the PCSA should be addressed. The Water System Plan identifies one CIP in Benson Road to upgrade 660 linear feet of 4 inch pipe with 12 inch pipe. To meet the projected demand, it will be necessary to run a new primary water main loop from Main Street Up Double Ditch to Badger Road and then east on Badger Road to Benson Road. Other smaller water mains would be extended into the PCSA as part of land development projects. This new 9,250 linear feet primary loop is assumed to be 12 inch diameter, however, the design of this loop needs to be verified by modelling.

Wastewater

The City owns, operates, and manages wastewater collection and treatment facilities serving 2,879 acres. The City of Lynden General Sewer Plan Update (BHC, 2016) estimates the City of Lynden's population will grow to 19,000 people by 2036 and expand to serve total of 4,204 acres. The sewer plan does not provide specific plans for serving the PCSA, which is identified as sewer basins "F" and "UGA" in the plan. The plan anticipates that these basins will be upgraded by developer extensions. The existing sewer collection system was modelled at the 20-year planning horizon and three gravity sewer deficiencies were identified. There were no pump station or force main deficiencies identified.

To serve the proposed development in the PCSA a new network of new gravity sewers, pump stations, and force mains will be necessary to collect and convey wastewater from the PCSA to the existing sanitary sewer collection network. The northern edge of the PCSA at Benson Road is approximately 10 feet higher than the southern boundary of the PCSA. It is expected that the northern portion of the PCS will be filled to facilitate the development; and that one large or several smaller new sanitary sewer pump stations located in the mid to southern portion of the PCSA will be necessary to provide wastewater collection. A new gravity sewer within the PCSA will convey wastewater to the new pump station(s) and discharge via force main(s) to the existing sanitary sewer collection system.

The 20-year full buildout of the PCSA is expected to include about ~~1,381~~ 1,569 units to a maximum of ~~1,902~~ 2,166 units corresponding to a population of ~~3,854 to 5,307~~ 4,378 to 6,043 residents. Per the sewer plan, the residential wastewater production rate in Lynden for residential is 45 gallons per day per capita. Therefore, the expected wastewater flows range from ~~173,430 to 238,815~~ 197,010 to 271,935 gallons per day. This results in a required total pump station capacity of to 400 to 600 gpm (gallons per minute) in one or more pump stations.

FINANCE

~~At this time, the City of Lynden assumes that the infrastructure investments needed to make the overall Pepin Creek Subarea developable (excluding the cost of utility hookups at the parcel-level) will be $98,229,000, as shown in Exhibit 27. Of these infrastructure costs, the City has committed to paying $16,810,709. For development to be feasible, the City asserts that developers will be responsible for the remaining cost of all improvements needed to support development of the subarea.~~

~~The future subarea developer(s) are already committed to paying for $35,335,291 of these costs as they will make the improvements (including regional road improvements, construction of local roads and Pepin Parkway, and water, sewer, and stormwater improvements) directly. They are also committed to paying utility connection fees for water, sewer, and stormwater, for a total existing commitment of $52,474,882.~~

~~We completed a financial feasibility analysis, provided in full in Appendix D for two scenarios:~~

- ~~Threshold Feasibility. Developers can buy the land and pay their existing commitments, for a total cost of between $74,470,000 and $76,914,000.~~
- ~~Full Feasibility. Developers can buy the land and pay the total infrastructure costs less the existing city commitment, for a total cost of between $120,553,000 and $122,997,000.~~

~~This analysis shows that the Pepin Creek Subarea developable land value is within the values of comparable developments. It is important to remember that the cost of the land and value of the land are not the same thing, as the former does not account for the developer's profit. For this project to be feasible the future value of the land must be within the values of comparable developments. Profit is not factored into this because developer's expectations for profit for this kind of development are not known.~~

~~Funding and Financing Tools for Subarea Development~~

~~The City has committed $16,810,709 to this effort. $3,900,000 of that value is grant funded, however the City will need to come up with the remaining $12,910,709. The City may also fund and finance improvements that are the obligation of developers upfront and recover funds from developers to refund that investment later.~~

~~This plan identifies funding and financing mechanisms that can be used to generate City revenues to fund and finance the improvements, either in total or just upfront, and, where developers are responsible for costs.~~

In 2020 the City of Lynden contracted with BERK Consulting to undertake a Financial Mitigation Strategies Study. The study examined two different financial instruments to pay for capital improvements with the Pepin Creek Subarea. These two financial tools include State Environmental Policy Act (SEPA) mitigation fees and a Local Improvement District (LID).

This study examined financial instruments, SEPA mitigation fees and Local Improvement Districts. These instruments are based on two very different ideas. SEPA mitigation fees are collected to mitigate the impacts to various aspects of the natural or built environment. LIDs are designed to capture back increased property values that are accrued by private property owners after the investment of public monies. In other words, SEPA mitigation fees are collected to pay for negative effects to the public from development whereas LIDs are meant to redistribute benefits accrued by private owners. As such, each instrument has its own methodology described with its calculation. However, for consistency, the SEPA mitigation fee analysis and the LID feasibility analysis used the same numbers and assumptions wherever possible.

Both analyses use the same project costs. These costs are a subset of the 13 projects identified as the overall Pepin Creek realignment and transportation capital improvements as shown in Exhibit 26. Nine of the projects are specific to the Subarea as shown in **Error! Reference source not found.**27.

Exhibit 26. Identified Pepin Lite Capital Investments (2020$, Rounded to the Nearest $1,000)

Name	Pine Street Vehicular Bridge	Pine Street Pedestrian Bridge
Creek Capital Improvements		
Pepin Creek Main Stem	$8,136,000	$8,136,000
Pepin Creek East / West Connection	$1,508,000	$1,508,000
Pepin Creek Downstream of Main St.*	$3,439,000	$3,439,000
Double Ditch Rd. Cross Culvert	$793,000	$793,000
Creek Subtotal	**$13,876,000**	**$13,876,000**
Traffic Capital Improvements		
Benson Rd. Pedestrian Improvements – South*	$268,000	$268,000
Main St. Bridge* (funded)	$3,012,000	$3,012,000
Pine St. Bridge*	$2,808,000	$695,000
Double Ditch Roadway Improvements	$5,019,000	$5,019,000
Benson Rd. Pedestrian Improvements – North	$356,000	$356,000
Benson Roadway Improvements	$4,784,000	$4,784,000
Pepin Parkway Bridge	$2,651,000	$2,651,000
Pepin Parkway Roadway Improvements	$5,882,000	$5,882,000
Main St. / Double Ditch Rd. Intersection Improvements	$1,344,000	$1,344,000
Traffic Subtotal	**$26,124,000**	**$24,011,000**
Total	**$40,000,000**	**$37,887,000**
Total Excluding Projects Outside Pepin Creek Subarea	**$30,473,000**	**$30,473,000**
Total Projects Outside Pepin Creek Subarea	**$9,527,000**	**$7,414,000**

Exhibit 27. Sub-area Specific Projects (2020$, Rounded to the Nearest $1,000)

Project	Estimated Cost
Creek Capital Improvements	
Pepin Creek Main Stem	$8,136,000
Pepin Creek East / West Connection	$1,508,000
Double Ditch Rd. Cross Culvert	$793,000
Traffic Capital Improvements	
Double Ditch Rd. Roadway Improvements	$5,019,000
Benson Rd. Pedestrian Improvements – North	$356,000
Benson Roadway Improvements	$4,784,000
Pepin Parkway Bridge	$2,651,000
Pepin Parkway Roadway Improvements	$5,882,000
Main St. / Double Ditch Rd. Intersection Improvements	$1,344,000
Total	**$30,471,000**

A feasibility assessment of forming a Local Improvement District (LID) consistent with the Subarea boundaries and a SEPA mitigation analysis was conducted using the subarea specific project list (Exhibit 27). The LID Study concluded that, based on the expected benefit to the affected properties, an LID is either not feasible (costs greater than benefits) or marginally feasible (83% cost/benefit ratio).

SEPA considers a range of natural and built environment topics, including transportation. Where adverse impacts are identified, mitigation measures are applied consistent with the City's SEPA substantive authority based on policies, plans, rules, or regulations adopted by the City such as the Comprehensive Plan, Pepin Creek Subarea Plan, and other development regulations. Fees collected to pay for mitigation measures deemed necessary to offset adverse environmental impacts cannot not also be included in GMA impact fee calculations.

The BERK study pursued traffic impacts as a means of quantifying and assessing development within the subarea. The transportation model results suggest that the expected development in the subarea will result in a significant increase in local trips – from a baseline of 83 to 6,563. 98.7% of the local trips are new; this percentage represents the maximum portion of transportation infrastructure reasonably related to development. When this impact is applied to project costs it can be divided into cost per trip as shown in Exhibit 28.

Exhibit 28. Cost per Trip Calculations

Total Project Cost	$30,471,000
Project Cost Related to Growth (98.7%)	$30,085,000
Local Trips in Study Area	6,563
Estimated PM Peak Trips	1,744
Per Trip Project Cost Related to Growth	**$17,251.33**

Note: Project costs are rounded to the nearest $1,000, but the per trip calculation uses the exact project cost estimate.
Source: BERK, 2021.

The City can charge up to the amount reasonably related to the development creating the traffic impacts. However, the City can also supplement funding from other sources to help defray costs. The City may elect to account for other mitigation measures implemented by developers as growth occurs within the Subarea.

Funding and Financing Mechanisms (Beyond Existing Tools) to Support Expected City Contributions and Upfront Funding of Improvements

- **Sales Tax generated on development.** Sales tax is generated from the taxable sales of goods occurring within the city's boundaries. Sales tax impacts from potential site development will be generated in two ways:
  - The initial construction of the development will generate sales tax for the full cost of supplies, material, and labor used in construction.
  - Additional residents added to the development will generate ongoing sales and use tax revenues for purchases made in the city limits.

Funding and Financing Mechanisms to Recover Funds from Development

- ~~**State Environmental Policy Act Mitatgation Fees.** SEPA grants wide-ranging authority to impose mitigating conditions relating to a project's environmental impacts. A local government's authority under SEPA to mitigate environmental impacts includes the authority to impose impact fees on a developer to pay for the mitigation of impacts on public facilities and services. In this case, the public facility or service being paid for would be the Pepin Creek downstream stabilization and creek realignment.~~

- **Property Owner and Developer Contributions.** In cases of large developments, the City may work with a developer to enter into a development agreement governing the development. This agreement can include obligations for the developer to pay for infrastructure necessary to support the ~~devleopment~~development.

- ~~**Local Improvement District/Utility Local Improvement District.** Local Improvement Districts (LIDs) are a financing tool used to require benefiting properties to finance needed capital improvements through the formation of special assessment districts. Special assessment districts permit improvements to be financed and paid for over time through assessments on the benefiting properties. Utility Local Improvement Districts (ULIDs) have the additional characteristic of allowing for utility revenue to be pledged to the repayment of the ULID debt in support of the issuance of bonds.~~

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Appendix A – Existing Conditions Report

Please note that the information in the Existing Conditions Report presents the best information available at the time it was issued in October 2017. Since that time some details may have changed as additional information became known. For example, the Pepin Creek Area of Influence was modified after further study. In the few areas of inconsistency, the Subarea Plan presents the best and most up-to-date information as of the time of its issuance.

Existing Conditions Report

Pepin Creek Subarea Plan | City of Lynden | October 2017

Prepared for:
Planning & Community Development Department
City of Lynden
300 4th Street
Lynden, WA 98264

Prepared by:
BERK Consulting, Inc.
Herrera Environmental Consultants

Under the direction of:
Communita Atelier

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Appendix

1.0 Project Overview

The Pepin Creek Subarea Plan will examine land use, financial, and environmental strategies and opportunities for the Pepin Creek Subarea, in conjunction with the Pepin Creek Realignment project. The Realignment project is a regional habitat improvement project that will move fish-bearing waters away from Double Ditch and Benson Roads into a new stream channel while increasing flood water capacity along the Creek and integrating recreational opportunities and new development. With the implementation of the Realignment project, it is the goal that drainage, water quality, and habitat will be improved and allow development in the Subarea.

This Existing Conditions Report is a first product of the Subarea Plan process and provides an overview of current conditions, challenges, and opportunities for the area, including the following topics:

1. Project Overview
   - Study Area
   - Area Context
   - Pepin Creek Project
2. Natural Environment and Infrastructure
   - Surface Water Hydrology
   - Critical Areas
   - Stormwater
   - Utilities
3. Built Environment and Planning
   - Land Use
   - Zoning and Development Standards
   - Population and Housing
   - Development Potential and Market Considerations
   - Transportation
   - Parks and Open Spaces

Frequently Used Terms

- **Pepin Creek Realignment project.** The engineering and environmental project that plans to re-route the majority of the flow from the East and West ditches on Double Ditch Road and the Benson Road Ditch into a consolidated channel for Pepin Creek PCSA.

Pepin Creek Subarea Plan. The planning project that will establish goals and policies for the development of the subarea.

Pepin Creek Subarea. The geography that is included in the Pepin Creek Subarea Plan.

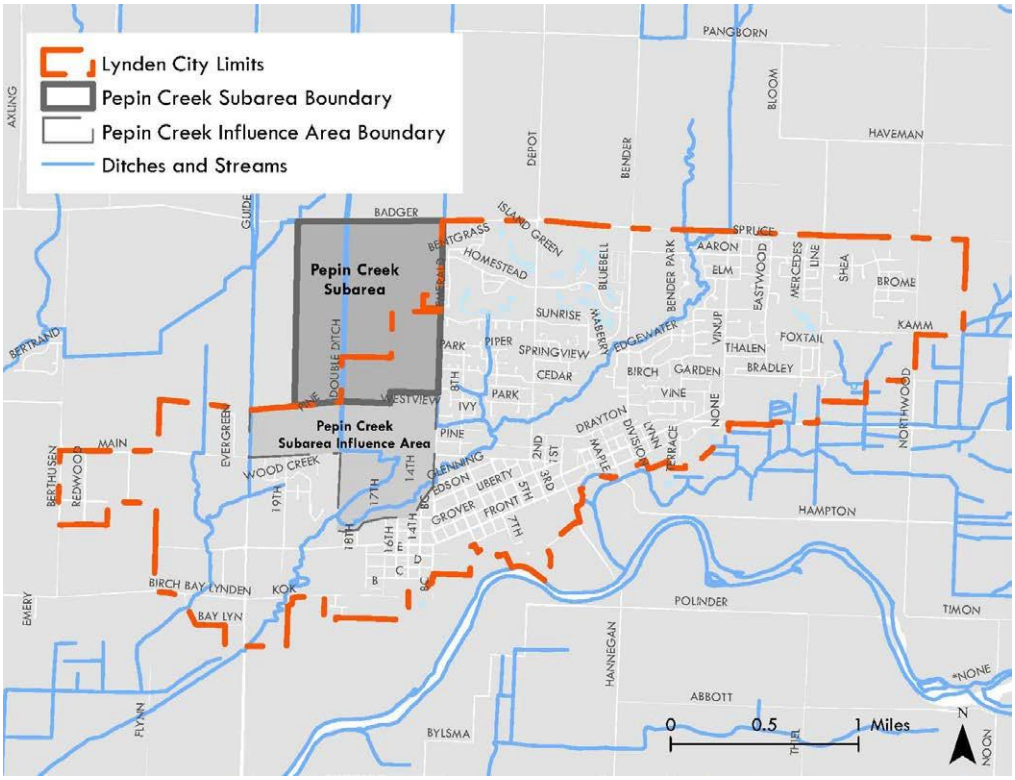
Pepin Creek Subarea Area of Influence. The area downstream of Main Street that is influenced by the hydrology changes associated with the Pepin Creek Realignment project.

Pepin Creek Project. All the work to address environmental and land use considerations related to Pepin Creek. It includes the Pepin Creek Subarea Plan and the Pepin Creek Realignment project.

1.1. STUDY AREA

The Pepin Creek Subarea (PCSA) is an approximately 460-acre area including the northwestern Lynden city limits and urban growth area (UGA). Approximately 24 percent of the Subarea, or 110 acres, is within city limits and the remaining 76 percent, or 350 acres, are in the UGA. Exhibit 1-1 shows the PCSA and its influence area in relation to Lynden city limits and the surrounding unincorporated area.

Exhibit 1-1. Pepin Creek Subarea Context Map



Source: City of Lynden, 2017; Herrera, 2017; BERK, 2017

1.2. AREA CONTEXT

The PCSA was added to Lynden's UGA as part of the Whatcom County Comprehensive Plan Update and the City's Comprehensive Plan Update adopted in 2016. Lynden is projected to grow by about 6,403 new residents between 2013 and 2036 (Whatcom County 2016). Although there is capacity for some of this growth in other parts of the city, the PCSA has been identified as a primary area for future residential development over the next 20 years. Without further planning, the existing conditions in the Subarea may complicate future residential development.

The PCSA has areas of high-water table and has experienced flooding. In the late 1800's and early 1900's, settlers rerouted the original Pepin Creek in order to farm the land in this area. Remnants of the

historic creek were moved into the "ditches" along Double Ditch Road and Benson Road. These ditches still bear fish and are used as salmon spawning grounds. They also collect stormwater from adjacent farmlands and have upstream tributary area in Whatcom County and Canada. During periods of heavy rain, these waterways are inundated with rain and overflow onto the adjacent roads and land, leading to the potential for property impacts and a number of road closures in the last 20 years. The presence of these fish-bearing ditches also constrain the roads under normal conditions, preventing roadway improvements on Benson Road and Double Ditch Road until such time that the existing waterway system can be modified through the Pepin Creek Realignment project.

In September 2016, the City imposed a development moratorium on the PCSA to halt development there until plans for the Pepin Creek project can be completed to address drainage, financial, and flooding concerns. Otherwise, premature development could affect the development of properties in the Subarea, as well as impact properties further downstream.

1.3. PEPIN CREEK SUBAREA PROJECT

As part of the Pepin Creek project, the City is planning to reconstruct the creek corridor to reduce flooding and gain other environmental benefits associated with the Pepin Creek Realignment project. As part of the Subarea plan the City will plan for phased improvements, financing, and appropriate development standards to guide residential development in the Pepin Creek Subarea. Work has already begun on the Pepin Creek Realignment project:

- A local engineering firm, Reichhardt & Ebe Engineering, Inc. (R&E), has been working on the preliminary investigation and design of the new creek corridor that runs north-south at the mid-point between Double Ditch Road and Benson Road. The new Pepin Creek corridor will accommodate the existing water in the roadside ditches, provide additional stormwater capacity to control flooding, improve water quality and fish habitat, provide a recreational amenity, and function as the downstream receiving water body for managed stormwater in the Subarea.
- The City has acquired most of the land needed for a 75- to 150 foot-wide creek corridor, and acquired an additional 40 acres, a portion of which will be used for new City parkland in the Subarea. Preliminary site investigation and design work have been completed.
- Downstream (below Main Street, shown as the Influence area in Exhibit 1-1), the City has begun investigation and design work for existing bank stabilization issues with County grant funding to design a new Main Street Bridge.

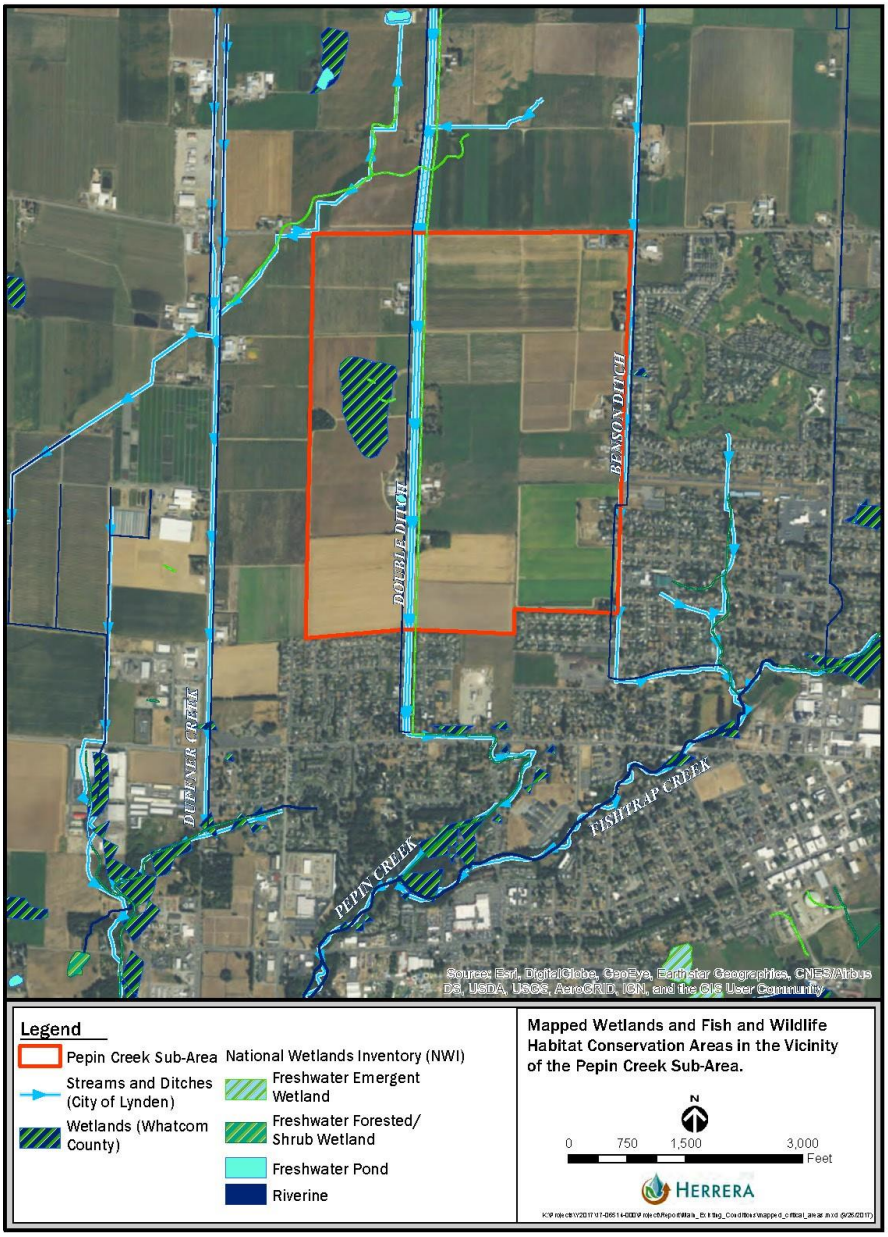
2.0 Natural Environment and Infrastructure

2.1. SURFACE WATER HYDROLOGY

2.1.1. Existing Conditions

The PCSA lies within the Nooksack River Water Resources Inventory Area 1. The Nooksack River flows east to west just south of the City of Lynden; however, the PCSA and the majority of the City lies outside the mapped Nooksack River's FEMA 100-year floodplain. Existing surface water resources in the PCSA include a number of ditches, such as Double Ditch and Benson Ditch (as shown in Exhibit 2-1), which drain to Pepin Creek and Fishtrap Creek, a tributary of the Nooksack River. Fishtrap Creek bisects the City from northeast to southwest and Pepin Creek flows through the western portion of the City from north to south. Pepin Creek is a natural stream that originates in Canada, where it is referred to as Pepin Brook, and drains farmland and other urban areas along its course. Near the US-Canada border, Pepin Creek is channelized and flows south in two parallel channels, known as West Double Ditch and East Double Ditch, along Double Ditch Road. A flow splitter maintained and operated by Whatcom County splits the flow into the two ditches. West and East Double Ditch flow south through the PCSA and eventually join the more natural drainage course of Pepin Creek south of Main Street. Benson Ditch also originates just north of the US-Canada border and flows south along Benson Road until it reaches Isom Elementary School, where the ditch is directed east towards Fishtrap Creek.

Exhibit 2-1. Mapped Critical Areas in the PCSA and vicinity



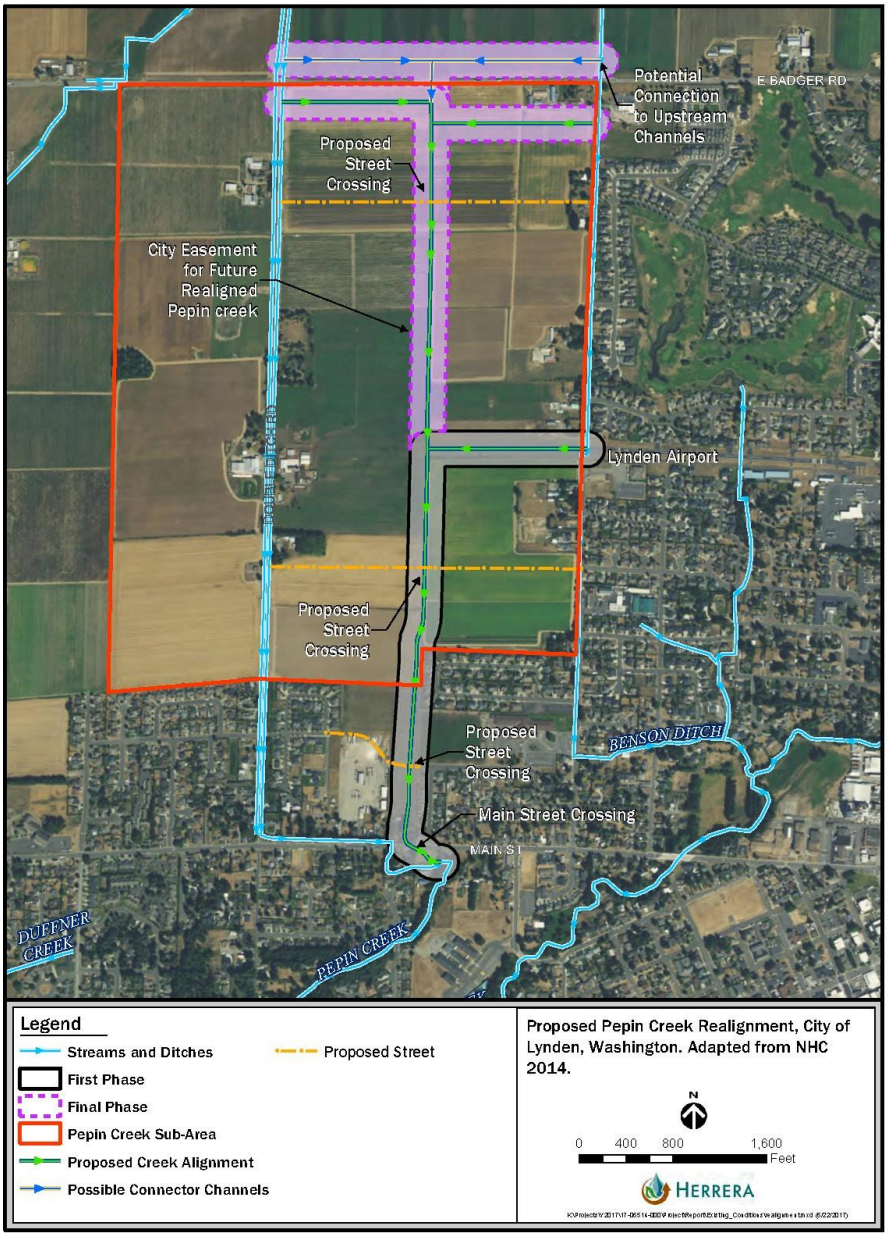
2.1.2. Proposed Pepin Creek Realignment

The Pepin Creek Realignment project would realign and join Benson Ditch with West and East Double Ditch to create a restored Pepin Creek through the PCSA (see Exhibit 2-2). The primary goals of the proposed Pepin Creek realignment are to allow the full arterial street construction of Benson and Double Ditch Roads, improve in-channel and riparian habitat, and to provide significant relief from flooding by providing 100-year flood conveyance. The City has secured a majority of a 150-foot wide right-of-way (ROW) easement to serve as the probable corridor for the realigned creek channel, running north to south through the PCSA along the approximate mid-point between Double Ditch and Benson Roads (see Exhibit 2-2).

The Pepin Creek Realignment project is separate from, but interconnected with, the PCSA Plan. The realignment project has received some separate dedicated funding, is being designed by a separate engineering consultant, Reichhardt & Ebe Engineering, Inc. (R&E), and is likely to be phased with the full development of the PCSA. And yet, the new Pepin Creek channel must be integrated within the PCSA and must be sized to convey the runoff from a built-out PCSA without worsening flooding or erosion conditions off-site or downstream. Anticipated project phasing for both the Pepin Creek Realignment project as well as the PCSA will be evaluated and proposed as part of the final PCSA Plan.

Several concepts have been considered for the realignment project, starting with recommendations provided by the Washington Department of Fish and Wildlife (WDFW) in 2012 and further evaluated in 2014 with the Pepin Creek Relocation Feasibility Analysis (Northwest Hydraulic Consultants (NHC) 2014). A final design concept for the realigned Pepin Creek channel is still being developed (Zylstra personal communication September 22, 2017) and is anticipated to be ready in late fall of 2017. This section discusses some anticipated concepts for the realigned channel and riparian corridor, given previous analyses completed by the City and their consultants and based on preliminary information and communications exchanged between the City, their consultants, and this PCSA planning team.

Exhibit 2-2. Proposed Pepin Creek Realignment



Estimated Pepin Creek Hydrology

Peak flows for Pepin Creek have been estimated based on a flood frequency analysis performed (NHC 2014) on historical data collected from the USGS Fishtrap Creek at Front Street gauge #12212050 and extrapolations based on basin area (North Lynden Watershed Improvement District [NLWID] 2009). Exhibit 2-3 below provides a summary of these estimated flows. Additional flow data collection along Pepin Creek and the Double Ditch and Benson Road drainages has been completed since the NHC 2014 analysis; however, this data was not yet available at the time this report was completed.

Exhibit 2-3. Estimated Pepin Creek Flows

RECURRENCE INTERVAL (YEARS)	FISHTRAP CREEK AT FRONT ST (USGS GAGE)	PEPIN CREEK AT BADGER RD	BENSON DITCH AT BADGER RD	PEPIN CREEK AT CONFLUENCE WITH FISHTRAP CREEK (EXISTING BASIN)	PEPIN CREEK AT CONFLUENCE WITH FISHTRAP CREEK (WITH FUTURE BENSON CREEK)
(BASIN AREA, SQ.MI.) [1]	(37.15)	(6.55)	(1.65)	(6.90)	(9.09)
1.01	212	46.4	13.8	48.5	61.8
2	654	143	42.6	149	190
5	853	188	56.3	196	250
10	966	214	64.7	224	285
25	1,095	244	74.3	256	324
50	1,183	265	80.7	277	351
100	1,265	284	86.6	297	376
200	1,342	301	91.9	315	399
500	1,442	324	98.7	338	429

[1] Basin Area is derived from basins delineated for the NLWID Watershed Plan (2009).

One important consideration for the realignment project is the potential for existing bank erosion problems downstream of Main Street to be worsened by increased flows resulting from the realignment project. According to the NHC 2014 analysis, the re-routing of the Benson Ditch drainage into Pepin Creek, combined with the possible loss of upstream flood storage from fields flooding less frequently, could cause the downstream reach of Pepin Creek to experience a 25 to 30 percent increase in the peak annual discharge.

Another important consideration is the need to balance the benefits of upstream conveyance improvements and reduced flooding of fields and roadways upstream with adequate flood retention or energy dissipation somewhere along the new realigned Pepin Creek channel to ensure that flooding or erosion problems are not worsened downstream of Main Street. The downstream preliminary analysis currently being completed by R&E for the realignment project will evaluate this (Zylstra personal communication April 7, 2017).

Because any future development of the PCSA will be subject to the Washington State Department of Ecology's Stormwater Management Manual for Western Washington (Ecology SWMMWW 2012), all stormwater will be managed to provide flow control (in addition to runoff treatment for water quality) consistent with a historical forested land cover condition. As a result, the development of the PCSA should

not increase peak flows and, in fact, decrease peak flows relative to current conditions for that part of the basin being redeveloped from farmland into urban development.

Channel Connections on the North Side of the PCSA

A challenge for the upstream portion of the realigned channel design involves evaluating how to connect Pepin Creek at Double Ditch Road with the head of the realigned channel that will flow south through the PCSA. Current options being evaluated (see Exhibit 2-2) include routes and culverts connecting the two Double Ditch drainages on either the north or the south side of Badger Road. Previous analyses have recommended that if a north-side route is selected and the two double ditch drainages were connected on the east side of Double Ditch Road, upstream of Badger Road, then a roughly 28-foot-wide (WDFW 2012) to 45-foot-wide (NHC 2014) culvert or bridge would have to be installed under Badger Road approximately mid-way between Badger Road and Double Ditch Road, to convey Pepin Creek into the PCSA. However, if a south-side route is selected, and the two double ditch drainages were connected on the east side of Double Ditch road, downstream of Badger Road, then a roughly 16-foot-wide (WDFW 2012) to 35-foot-wide (NHC 2014) culvert or bridge would have to be installed under Double Ditch Road to convey flows to the east ditch downstream of Badger Road and east towards the realigned creek channel. Ditch flows heading to the east along the south side of Badger Road could be blocked off in order to direct all flow towards the realigned creek channel in the PCSA. The west ditch on the south side of Badger Road would also need to be blocked off to convey all flow through the new culvert to the realigned creek channel. Under the south side scenario, previous recommendations have included the potential installation of overflow culverts under Badger Road as another means of handling peak flood flows.

A new culvert under Benson Road would also be needed to connect the Benson Ditch located on the east side of Benson Road to the selected realigned Pepin Creek Corridor, whether north or south of Badger Road.

Channel Geometry

The channel geometry for the realigned Pepin Creek channel will need to be designed according to several important design criteria. First, it must achieve the goals of providing adequate conveyance capacity for reduced flooding frequency, and improved channel and riparian habitat. However, the design must also consider several other driving factors including topography, groundwater elevations, and sediment supply.

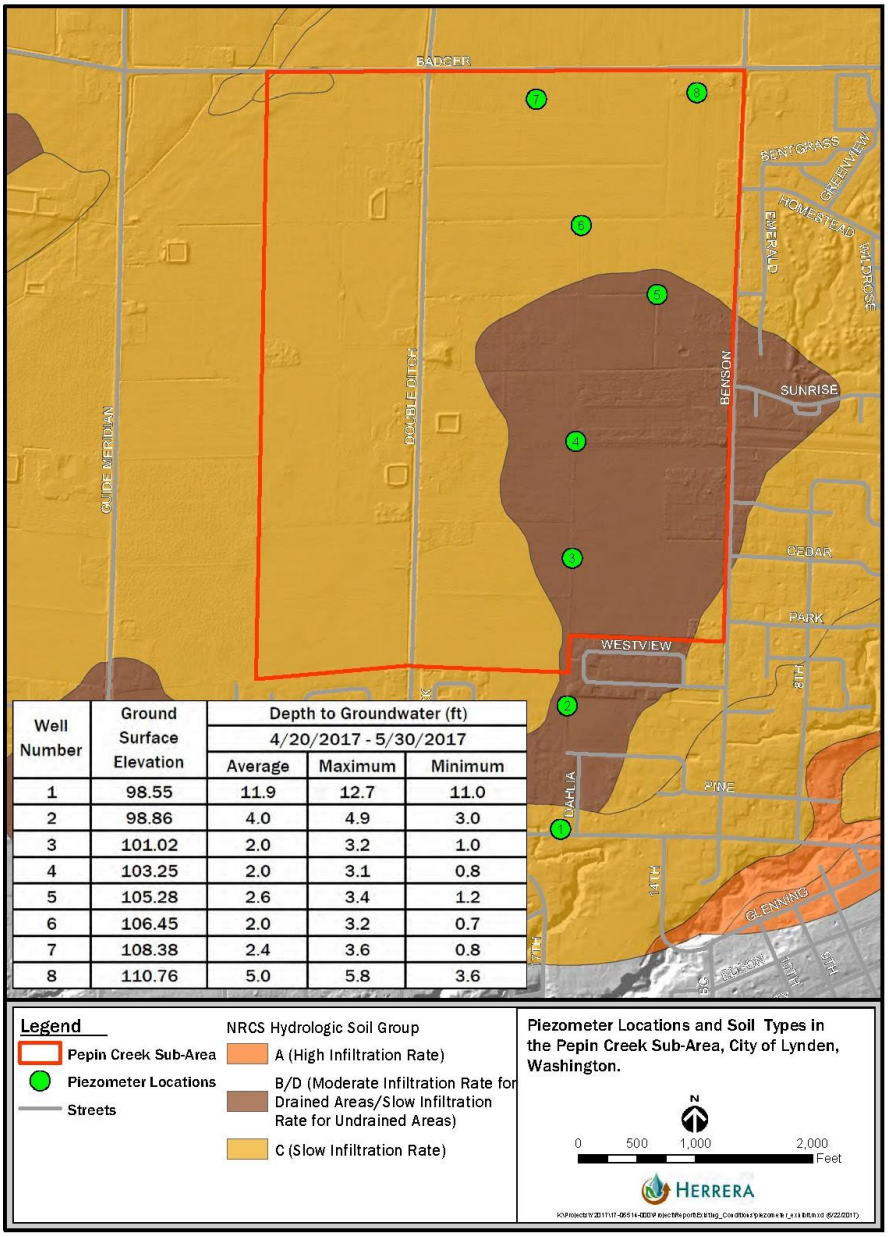
Preliminary hydraulic design calculations have assumed that the new connector and realigned channels would be capable of conveying flows up to and including a 100-year flow without flooding adjacent fields. However, the cross-sectional shape and slope required to achieve this level of conveyance has not been fully studied and may need to change along the realigned channel due to the changes in topography and depth to groundwater. Near Badger Road, the topography is mostly flat, and, according to recent spring 2017 measurements (R&E 2017), groundwater elevations are likely to be just a few feet below the current ground surface (see Exhibit 2-4). Further downstream, near Main Street, Pepin Creek drops into the Fishtrap Creek valley and similarly, groundwater elevations are several feet deeper than the adjacent ground surface (see Exhibit 2-4). As a result, the channel cross section in the northern portion of the PCSA will likely need to be somewhat wider to fully contain flood flows at a shallower depth. As the depth to groundwater increases relative to the adjacent ground, the channel can

deepen. The total channel length of the connector channel at the northern portion of the project is approximately 1,200 feet and has been estimated to have a water surface elevation slope of about 0.1 percent (WDFW 2012).

The realigned channel flowing north to south through the PCSA would be approximately 6,000 feet long and, depending on the cross-section geometry selected and level of excavation below existing ground, could have a water surface elevation slope that ranges from 0.2 percent to 0.23 percent given the local topography and likely channel excavation depths (NHC 2014). Previous analyses estimated that these slopes would correspond to a multistage channel with potentially two or three stages (NHC 2014). A multi-stage channel could be designed with a low-flow channel that has adequate depth for fish passage during low flows and additional bankfull and flood stages that provide additional storage for higher flows. For example, in 2014, NHC estimated that a three-stage channel could have an 8-foot-wide, 2-foot-deep low flow channel, a 32-foot-wide, 3-foot-deep bankfull channel and then a broader 64-foot-wide floodplain (NHC 2014).

Finally, from a habitat and geomorphic perspective, it is likely that the native substrate in the PCSA will contain fine-grained sandy loamy material (NLWID 2009). This, combined with an anticipated lack of bedload sediment supply to the reach, will inform how large wood, vegetation, and other habitat features can be used within the channel design to retain sediment and promote channel and bank stability. The channel design is currently being developed.

Exhibit 2-4. Average Groundwater Depths in the PCSA for April and May 2017 (R&E 2017)



Well Number	Ground Surface Elevation	Depth to Groundwater (ft) 4/20/2017 - 5/30/2017		
		Average	Maximum	Minimum
1	98.55	11.9	12.7	11.0
2	98.86	4.0	4.9	3.0
3	101.02	2.0	3.2	1.0
4	103.25	2.0	3.1	0.8
5	105.28	2.6	3.4	1.2
6	106.45	2.0	3.2	0.7
7	108.38	2.4	3.6	0.8
8	110.76	5.0	5.8	3.6

2.2. CRITICAL AREAS

2.2.1. Wetlands

Several wetlands were previously identified in the PCSA. The National Wetlands Inventory (NWI) identifies emergent wetlands lining the eastern ditch that conveys Pepin Creek (Double Ditch East), and two wetlands located west of Double Ditch Road, including a ponded wetland with aquatic bed vegetation and an emergent wetland within an agricultural field (USFWS 2017). The ponded wetland and wetland west of Double Ditch road are also identified on the Whatcom County critical areas wetland map in the same general locations (Whatcom County 2017).

Soil survey maps show that about two-thirds of the site is rated as 88 percent hydric, corresponding to the Hale silt loam map unit, and about one-third of the site is rated as 34 percent hydric, corresponding to the Edmonds-Woodlyn loams map unit (Natural Resources Conservation Service [NRCS] 2017). Hydric soil mapping indicates a potential for wetlands to occur within the PCSA, as hydric soils are an indicator of wetland presence. However, the NRCS soil mapping also indicates that the Hale silt loam map unit is drained. Therefore, wetland hydrology may not be present within this unit depending on the extent of drained conditions. A formal wetland determination is necessary to confirm wetland presence, including an evaluation of hydric soil, wetland hydrology, and hydrophytic vegetation indicators.

During a reconnaissance-level site visit, the mapped emergent wetland west of Double Ditch Road was confirmed, which resembles a depressional and swale-like feature with saturated soil, localized ponding, and emergent vegetation (Wetland A, see Exhibit 2-1). The swale connects to the western ditch that conveys Pepin Creek. In addition, localized depressions containing surface water and/or saturated soils were observed within agricultural fields, indicating areas of potential wetlands, but a detailed investigation was not possible due to limited access. In addition, wetland habitat conditions were commonly observed along ditches occurring within the PCSA. Based on the potential for a high groundwater table during the early growing season and presence of mapped hydric soils, it is possible that other wetlands are present in the study area. Further investigation and a formal wetland determination followed by delineation is necessary to determine wetland presence.

A preliminary rating of Category IV applies to Wetland A (see Exhibit 2-1) and wetlands lining ditches in the PCSA, based on moderate level of functions for water quality improvement, low to moderate level of hydrologic function and low to moderate level of habitat functions. According to the Hydrogeomorphic Classification system, Wetland A is a depressional wetland and ditch wetlands are either depressional or riverine (Brinson 1993). Wetland A and ditch wetlands are palustrine emergent wetlands according to the USFWS classification system (Cowardin et al. 1979). Standard wetland buffers are based on classification (rating) (Lynden Municipal Code [LMC] 16.16.300). For Category IV wetlands, the standard buffer width is 25 feet.

Additional information on wetlands is provided in the *Critical Areas Memorandum – Wetlands and Fish and Wildlife Habitat Conservation Areas* provided in Appendix A (Herrera 2017).

2.2.2. Fish and Wildlife Habitat Conservation Areas

Fish and wildlife habitat conservation areas (FWHCAs) noted during the site reconnaissance include streams and ditches in the PCSA. These aquatic resources include WDFW priority habitats for federal and state listed species (WDFW 2017a), and documented habitat for locally important species according to the Lynden Municipal Code (LMC). Wetland habitats that are also designated as fish and

wildlife habitat conservation areas are subject to the wetland requirements established in LMC 16.16.260 through 16.16.310; they are discussed in the wetland section above.

The terrestrial habitats in the study area are composed of agriculture, grassland, and pasture which provide habitat for a variety of bird species but are not documented WDFW Priority Habitats or habitats for species of local importance according to LMC.

The Double Ditch and Benson Ditch systems generally consist of manmade roadside or farm ditches from the US-Canada border to Main Street in Lynden. These reaches are characterized as straight, prismatic channels with relatively low roughness, typically grass-lined and armored with little or no shading or flow complexity (NLWID 2010). The ditch systems were constructed beginning in the late 19th Century to drain wetlands and support agricultural expansion into the area north of the Nooksack River (Hawley 1945 as cited in NHC 2014). The National Wetlands Inventory (NWI) identifies Double Ditch West and Benson Ditch as deep water habitats occurring in the study area (USFWS 2017).

Pepin Creek originates in Canada and flows southwest to the U.S./Canada border. Just south of the border, Whatcom County operates a flow splitter that directs flow into both ditches. Between the border and Lynden's Main Street, Pepin Creek is conveyed by two parallel farm ditches, referred to herein as Double Ditch West and Double Ditch East. The two ditches join at Main Street and flow along the north side of Main Street before passing through a box culvert. Downstream of Main Street, the stream becomes steeper and more confined before discharging into Fishtrap Creek (NHC 2014). According to the Whatcom County fish habitat conservation areas map, Double Ditch West and Double Ditch East are fish-bearing streams with current know distribution (Whatcom County 2017). Documented presence of salmonids in Double Ditch East includes fall Chinook salmon (spawning), winter steelhead (spawning), coho salmon (rearing), and fall chum salmon (WDFW 2017b). In addition, the presence of bull trout is presumed. Fall chum salmon and bull trout presence is presumed in Double Ditch West; and modeled presence of salmonids includes winter steelhead, bull trout, pink salmon, and fall Chinook salmon (WDFW 2017a). In addition, two species of rare sucker, the Nooksack Dace and Salish Sucker have been observed in Double Ditch (NLWID 2010). Federal and state listing status of these species is shown in Exhibit 2-5.

Exhibit 2-5. Federal and State Listing Status of Fish in the Study Area

FISH SPECIES	FEDERAL STATUS	STATE STATUS
Puget Sound Chinook	Threatened	Species of Concern
Puget Sound steelhead	Threatened	none
Bull trout	Threatened	Species of Concern
Coho salmon	none	none
Pink salmon	none	none
Fall chum	none	none
Salish sucker	none	State monitored
Nooksack dace	none	none

Source: WDFW 2017c

Benson Ditch is generally a single roadside ditch along Benson Road that begins south of the U.S./Canada border. Benson Ditch flows south along the east side of Benson Road until just south of the Lynden airport, where it crosses to the west side of the road. The ditch is directed toward Fishtrap Creek at Isom Elementary School. According to the Whatcom County fish habitat conservation areas map, Benson Ditch has presumed potential/historic distribution of fish (Whatcom County 2017). Benson Ditch is modeled habitat for winter steelhead, pink salmon, coho salmon, and bull trout (WDFW 2017b). The ditch is typically dry from mid-June to early October (NLWID 2010).

In addition, several agricultural ditches with seasonal flow were observed during the site reconnaissance in Spring 2017 which are tributaries to Double Ditch East and Benson Ditch. Based on the documented, presumed, or modeled presence of fish in Double Ditch East and Benson Ditch, tributary ditches provide potential seasonal habitat for anadromous or resident fish populations. According to LMC 16.16.330, Double Ditch East and Double Ditch West are Class A streams based on documented presence of listed species. Benson Ditch and several of the tributary ditches in the project area are Class B streams based on potentially accessible habitat for fish. Class A and B streams have standard buffer widths of 150 feet and 100 feet, respectively.

Additional information on FWHCAs is provided in the *Critical Areas Memorandum – Wetlands and Fish and Wildlife Habitat Conservation Areas* provided in Appendix A (Herrera 2017).

2.2.3. Frequently Flooded Areas

Although there are no mapped FEMA special flood hazard zones for Pepin Creek or Benson Ditch, these areas have recently experienced some overland flow flooding, as described below.

Peak Flood Events

There have been recent flood events in the Pepin Creek and Benson Ditch basins. Most notably, there were severe rain-on-snow events that occurred in January 2005 and January 2009. The January 2009 flood affected the entire Nooksack River valley and is the flood of record (note, of 18 years of record between 1999 and 2016) for the USGS gauge #12212050 on Fishtrap Creek at Front Street. In contrast, flood mapping completed by the Whatcom Conservation District suggests that the 2005 event caused the second greatest extent of flooding for the Pepin Creek subbasin; however, the 2005 event only ranked 5th of the recorded peaks at the Fishtrap Creek gauge. Anecdotal information suggested that the particular problem faced by the Pepin Creek system is that, unlike Fishtrap Creek, Pepin Creek is primarily composed of roadside ditches that fill with snow and then likely receive additional snow cleared from adjacent roadways. The many driveway culverts along Double Ditch Road likely further exacerbate conveyance and flooding problems during any peak rainfall event, not to mention rain-on-snow events.

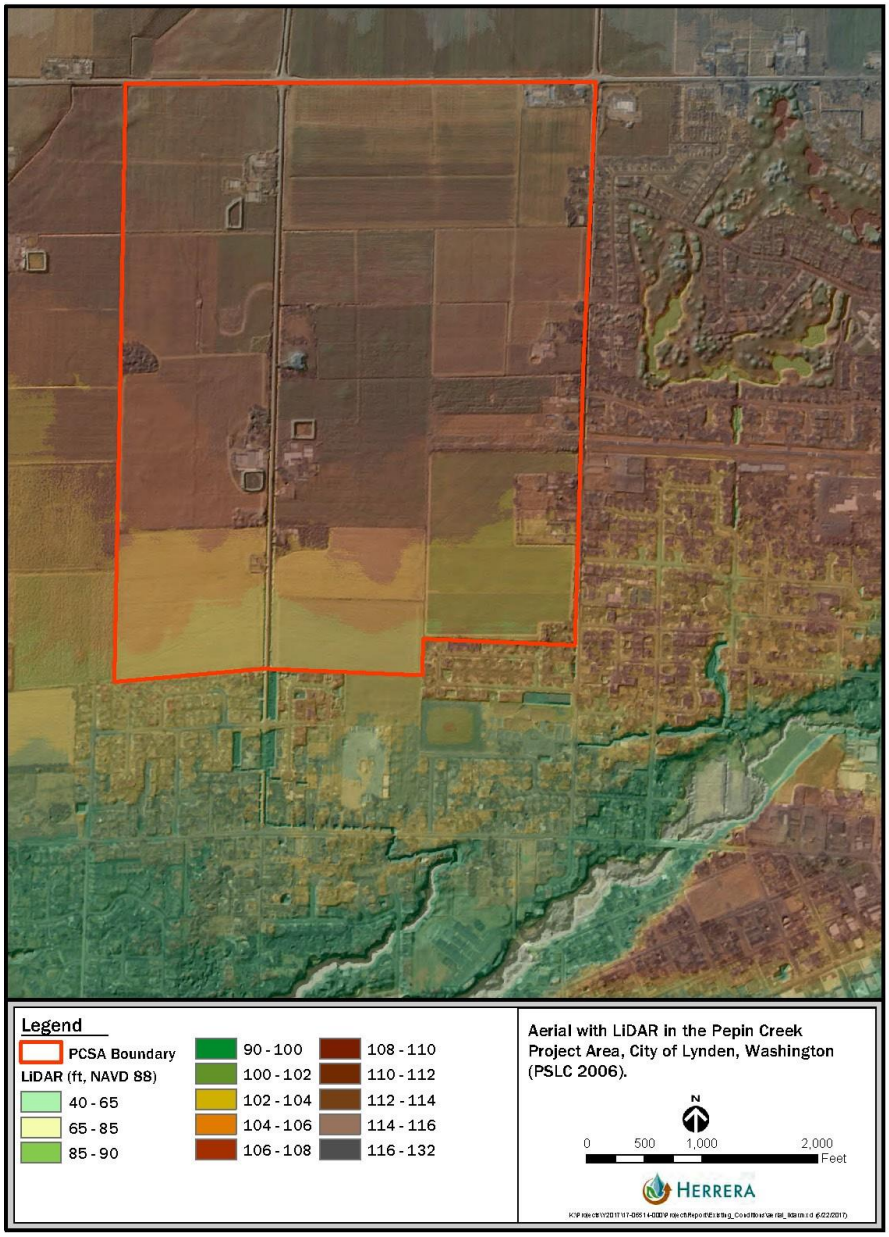
Flooding Patterns

In their 2014 evaluation, NHC noted many conversations with the City of Lynden, R&E Engineers, and the community, including inundation mapping completed by the Whatcom Conservation District, which describe the flooding patterns of Pepin Creek in the PCSA. During large floods like the 2005 or 2009 events, Pepin Creek overtops its banks at many locations between Main Street and the Canadian border. There are many culvert crossings and reaches with lower banks that experience overtopping. Flood flows from Double Ditch will spread to the east across adjacent fields and join Benson Ditch at Benson Road. As

such, flooding tends to result in an exchange of floodwaters between the Pepin Creek, Benson Road, and Fishtrap Creek basins.

A review of available LiDAR data (Puget Sound LiDAR Consortium [PSLC] 2006) (see Exhibit 2-6) indicates there is a swale remnant heading in the northeasterly to southwesterly direction crossing the area of Double Ditch Road just north of Badger Road that may have conveyed some flood flow to the west away from Double Ditch. However, according to NHC (2014), the general flow direction of Pepin Creek floodwaters in the PCSA vicinity is from West to East, where the farm fields between Double Ditch Road and Benson Road are inundated. From there, some of this flood water heads south towards Pepin Creek at Main Street, while much of it enters Benson Ditch and flows south to a cross-culvert under Benson Road near Diamond Lane. This additional floodwater contribution to Benson Ditch and the cross-culvert under Benson Road can aggravate downstream roadway overtopping and flooding of the area to the south east of the intersection of Benson Road and Badger Road. Further, the low point at the Benson Road ditch near Diamond Lane corresponds to a location where floodwaters can flow through the Homestead Development and pass through the Lynden Airport before returning to Fishtrap Creek between Depot and Benson Roads.

Exhibit 2-6. Aerial with LiDAR in the Pepin Creek Project Area



Potential Impact of the Realignment Project on Flooding

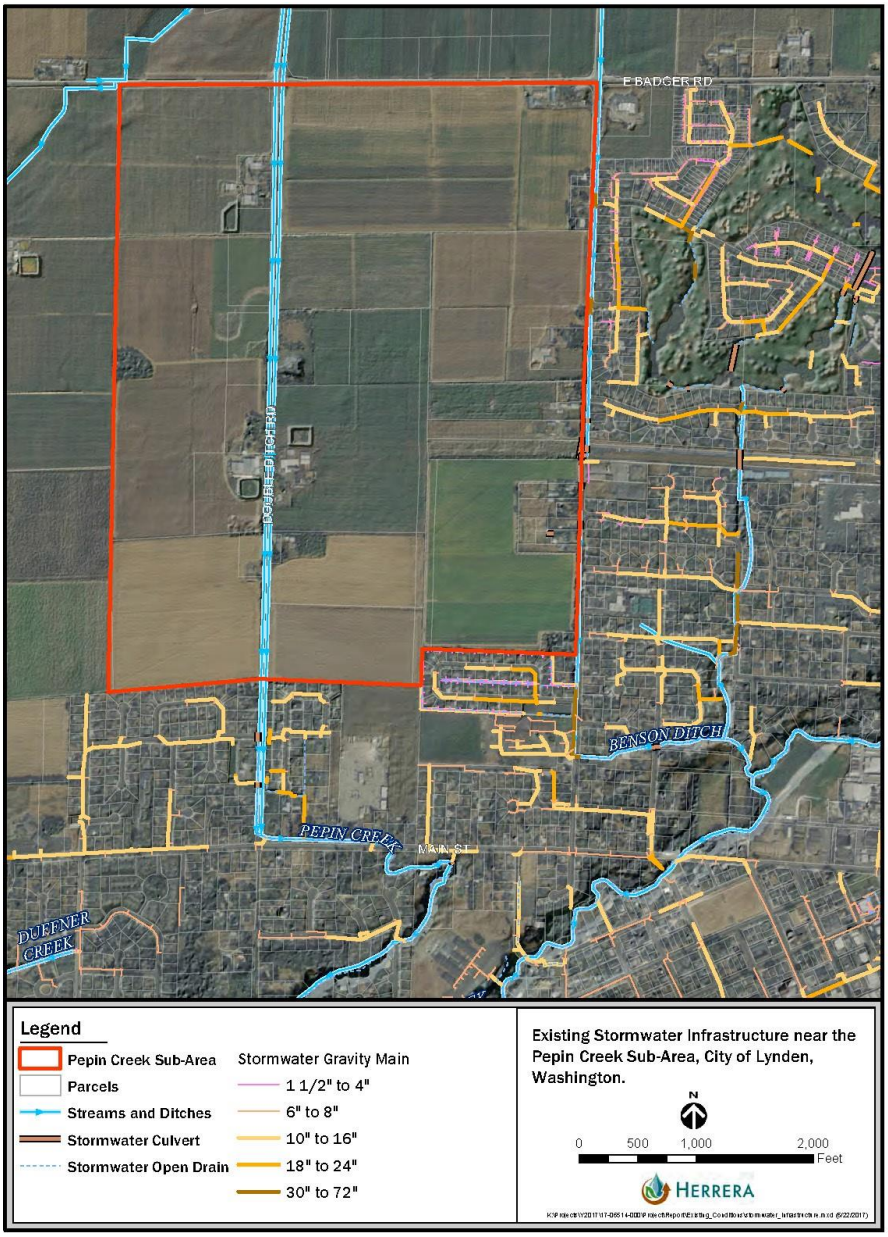
As is typical of agricultural areas where creeks have been straightened and realigned around fields or roadways and ditches have been excavated to drain water away from agricultural fields, the surface hydrologic patterns are complex and difficult to monitor or model. Detailed and precise topographic information would be required to inform a numerical model attempting to evaluate existing flow patterns under various flow conditions, and given the relatively flat topography, fairly small and even localized changes (such as additional ditch maintenance one year, or additional roughness imposed by changing the crop vegetation type another year) can influence flooding patterns.

To the extent that the Pepin Creek realignment project can successfully separate creek inflows from roadway runoff downstream of Badger Road, reduce the overtopping problems experienced at low spots and driveway culverts, and provide improved conveyance for Pepin Creek, flooding problems are likely to be reduced. However, flooded agricultural fields could provide significant flood storage during peak rainfall events that may shields downstream areas along Pepin Creek (downstream of Main Street) from experiencing the full force of these peak flows. It will be important for the PCSA planning efforts and the Pepin Creek realignment project to acknowledge and prepare for this possible change, and consider where and how much flood control may be needed

2.3. STORMWATER

The City Public Works Department is responsible for the operation and maintenance of the City's public stormwater collection and conveyance system. Stormwater is captured by catch basins distributed across the city and conveyed through a network of ditches and pipes ranging in size from six to 72 inches (see Exhibit 2-7). Outfalls discharge to various water bodies and drainage ditches. There is no City-owned pipe conveyance infrastructure in the PCSA. Within the PCSA, surface drainage and sub-surface drainage (via agricultural drain tiles) is directed to the double ditches of Pepin Creek and Benson Ditch.

Exhibit 2-7.Stormwater Facilities in Pepin Creek Subarea



2.4. UTILITIES

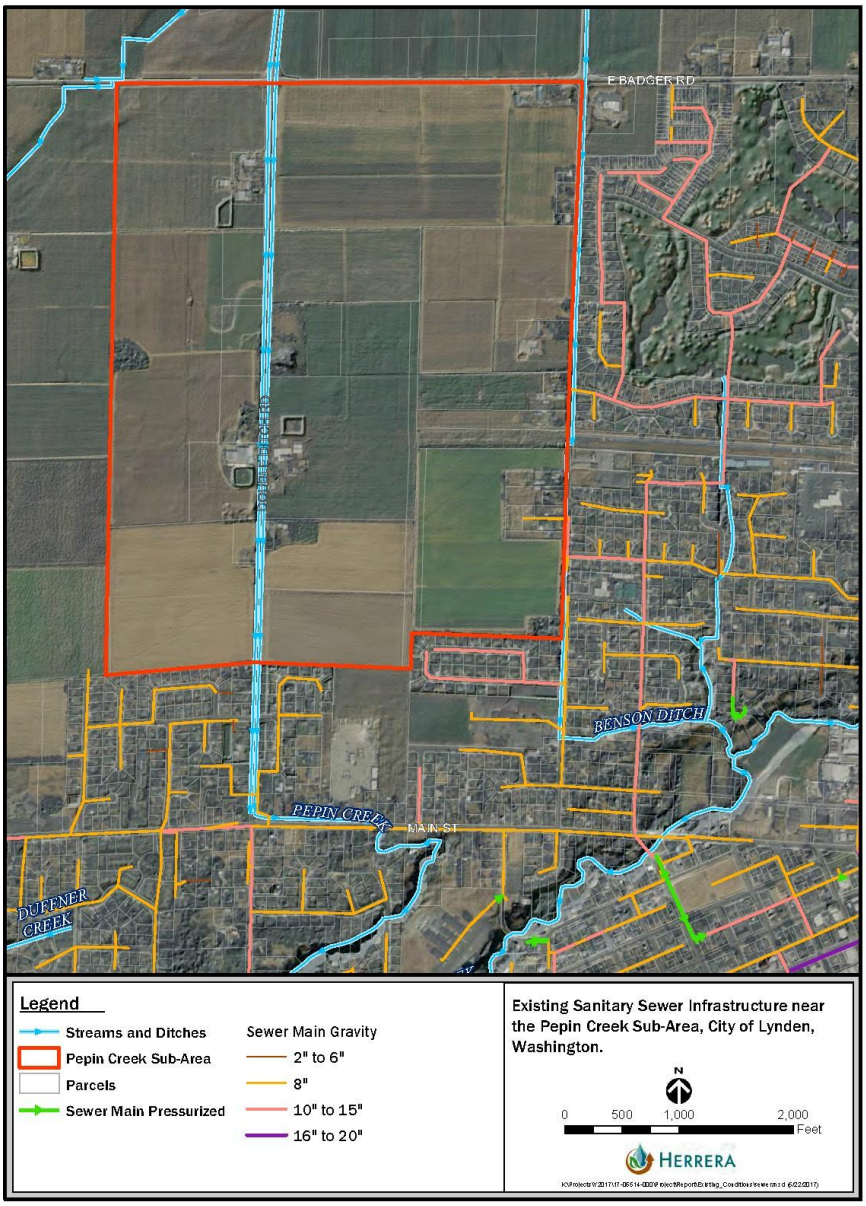
The City Public Works Department is responsible for the operation and maintenance of the City's sanitary sewer and water systems.

2.4.1. Sanitary Sewer

Sanitary sewer service is provided by the City via a citywide collection and conveyance system and a wastewater treatment plant (WWTP) located at the end of South 6th Street near the Nooksack River. According to the 2016 General Sewer Plan (BHC Consultants 2016), the existing WWTP was designed for an annual average flow of 1.82 million gallons per day (MGD), a maximum monthly flow of 2.18 MGD, and a peak hourly flow of 6.82 MGD. The WWTP capacity was evaluated at the 6-year (2022) and 20-year (2036) planning horizons to determine its ability to treat incoming wastewater at predicted loadings while meeting effluent limits. While future flow capacity is not expected to be an issue, future projections suggest that total suspended solids (TSS) loadings may exceed design capacity on both an average annual and maximum monthly basis. The Sewer Plan recommends that the City look at re-rating the influent solids loading capacity for the WWTP. This information is important for the PCSA planning effort because it is estimated that the bulk of the City's future growth will occur within the PCSA.

The City owns and operates over four miles of force mains and 57 miles of gravity sewer. Pipe sizes range from three inches to 24 inches and are comprised of polyvinyl chloride (PVC), ductile iron, asbestos cement, and vitrified clay. Due to the relatively flat terrain and Fishtrap Creek, which bisects the city, the sanitary collection system includes 14 pump stations to convey wastewater from more distant areas or areas with lower elevation to the WWTP. There are no sanitary sewer lines that currently service the PCSA. The closest sanitary main is the 12-inch PVC line that runs north-south along North 8th St and Emerald Way to the west of the PCSA. See Exhibit 2-8.

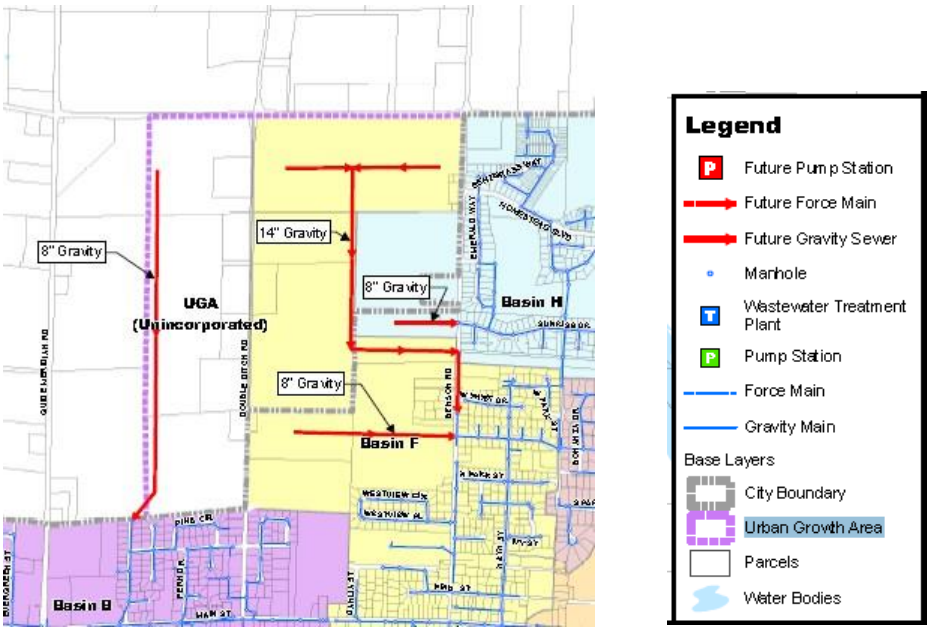
Exhibit 2-8. Existing Sanitary Sewer Infrastructure in the Pepin Creek Project Area



Capital projects for the 20-year planning period include projects to meet projected demand, operational improvements, and refurbishment of existing facilities.

Lynden's 2016 General Sewer Plan's projected domestic wastewater loadings for 2022 and 2036 include the City and UGA population. A portion of the PCSA study area is in Basin H and a portion is in Basin F. The rest of the study area is outside of the service area boundary for the General Sewer Plan 6-Year Capital Improvement Plan (CIP). Future sewer extensions identified in the General Sewer Plan include future gravity sewer lines along the western border of the study area, and within Basin F where it overlaps with the study area (see Exhibit 2-9).

Exhibit 2-9. General Sewer Plan Future Sewer Extensions for Pepin Creek Subarea



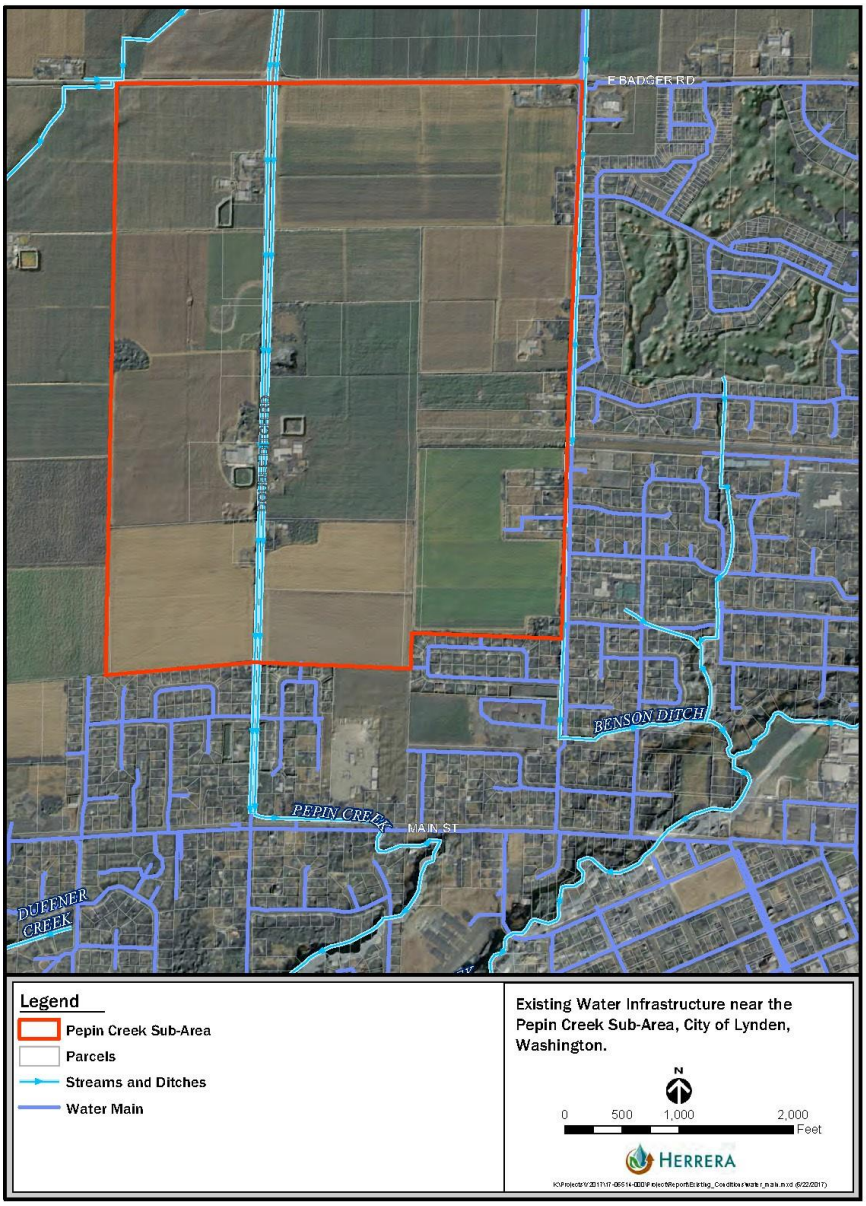
Source: City of Lynden General Sewer Plan, 2016; BHC Consultants, 2016

2.4.2. Water Service

Potable water is provided by the City to most residents in Lynden. The City's source of potable water is from an intake on the Nooksack River upstream of the Hannegan Road bridge. There are also several dozen private water supply wells within the city limits, including six wells in the PCSA. These wells are privately owned and are used as irrigation or potable water for residences not yet served by the City.

There are no municipal waterlines that enter the PCSA. The closest main lines are the 12-inch PVC line that runs east-west along Main Street south of the PCSA and the 12-inch PVC and ductile iron line that runs north-south along Benson Road immediately to the west (See Exhibit 2-10).

Exhibit 2-10. Existing Water Infrastructure in the Pepin Creek Project Area



Twenty-year capital planning in the 2017 Comprehensive Plan includes projects to improve the system and acquire additional water rights

3.0 Built Environment and Planning

3.1. LAND USE

Land within the PCSA is predominantly in agricultural use for crops and dairy, almost 85 percent, with the remaining land predominantly in single family residential use. Exhibit 3-1 shows acreages by current land use category and Exhibit 3-2 shows the current land uses, reflecting Whatcom County Assessor's data as adapted by the City of Lynden.

Exhibit 3-1. Current Land Use Acreages

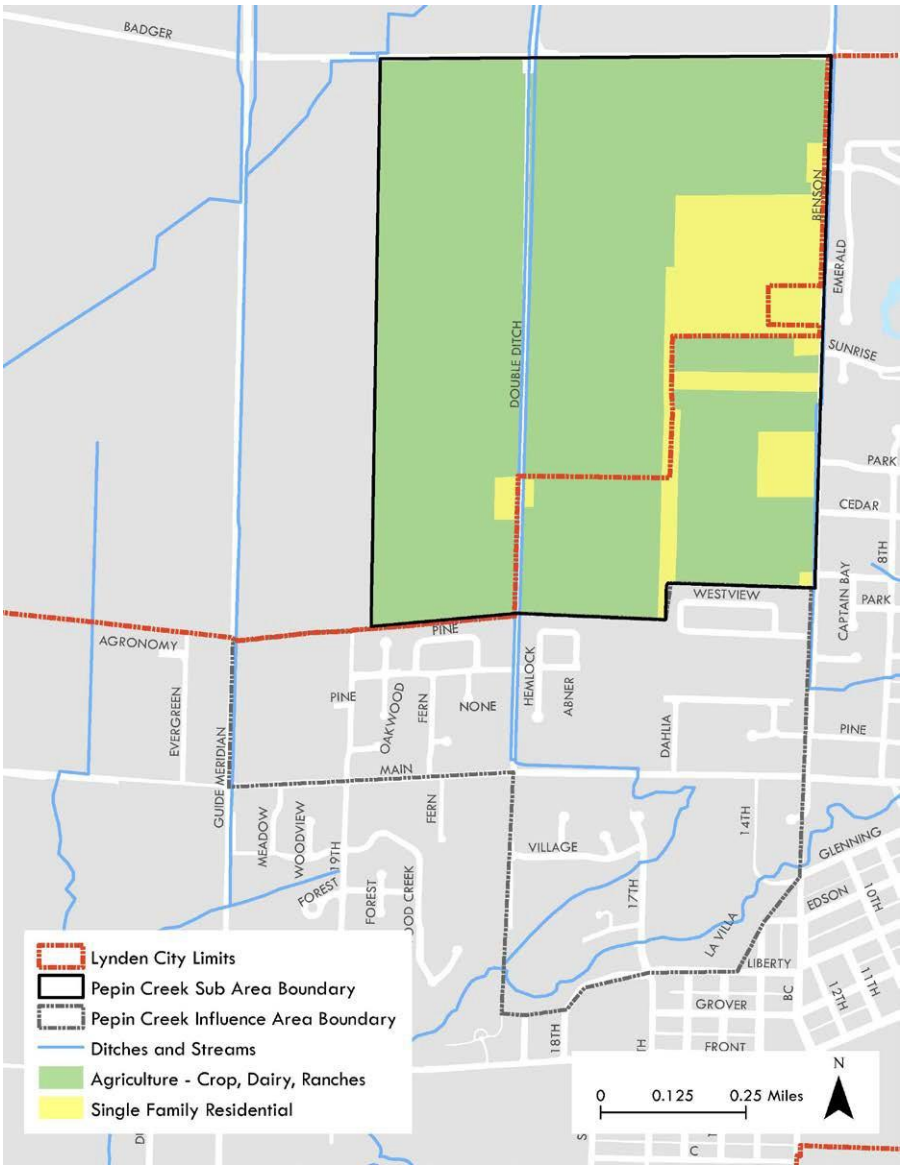
LAND USE CATEGORY	ACRES	PERCENTAGE
Agriculture – Crop, Dairy, Ranches	390.46	85.7%
Church	0.02	0.0%
Single Family Residential	65.37	14.3%
TOTAL	**455.85**	**100.0%**

Source: City of Lynden, 2017; Whatcom County, 2017; BERK, 2017.

Within the PCSA, approximately 89% of the land is owned by private landowners, while the remainder is owned by the City of Lynden. Exhibit 3-3 shows the publicly-owned parcels (in blue), owned by the City of Lynden. The large public parcel in the northeast is planned to be a public park and will be incorporated into plans for the Subarea and the Pepin Creek Realignment. Additional public parcels include rights-of-way for utilities and a runout area for the airport located just to the east of the study area (between Sunrise and West Park Drives).

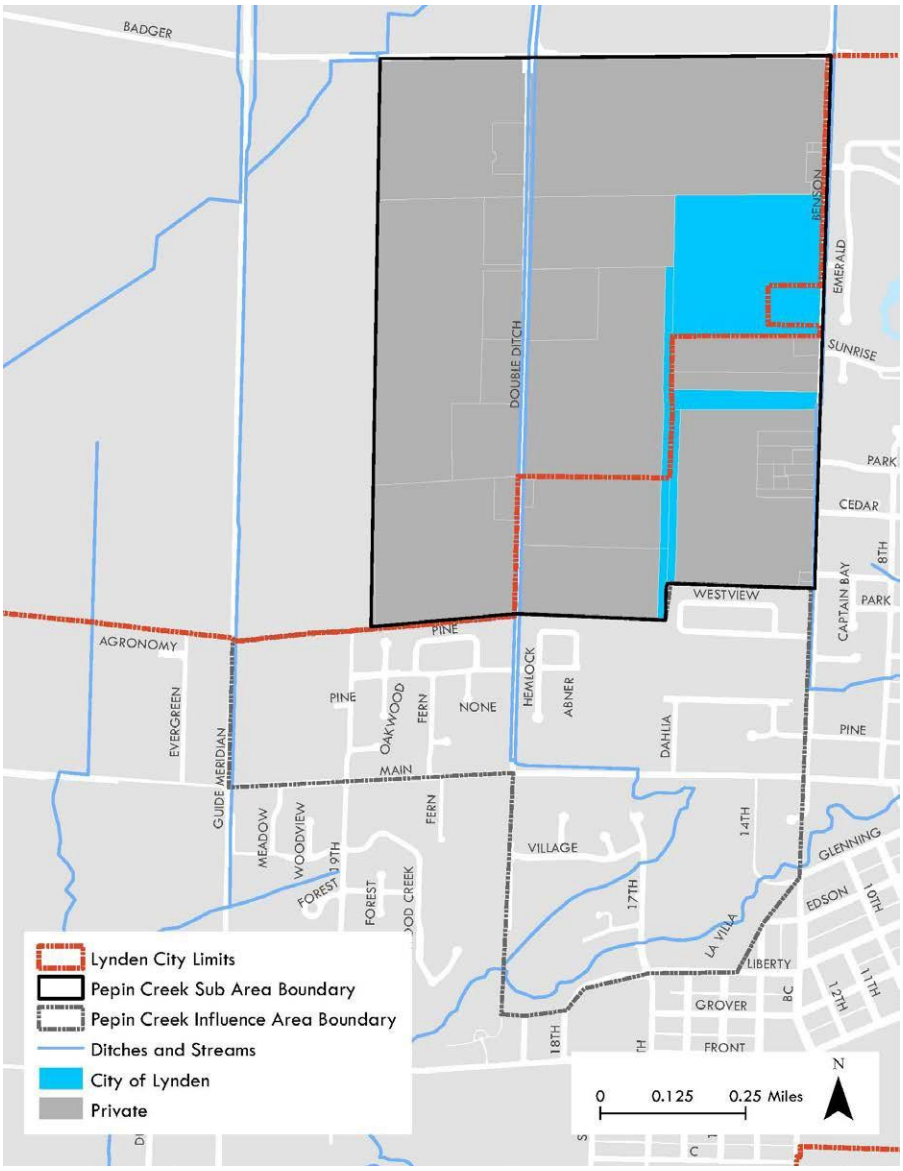
With agricultural uses predominating, the land is largely undeveloped. Exhibit 3-4 shows the footprints of all existing structures in the Pepin Creek Subarea. The structures are predominantly single-family residences and agriculture-related buildings.

Exhibit 3-2. Pepin Creek Subarea Current Land Use



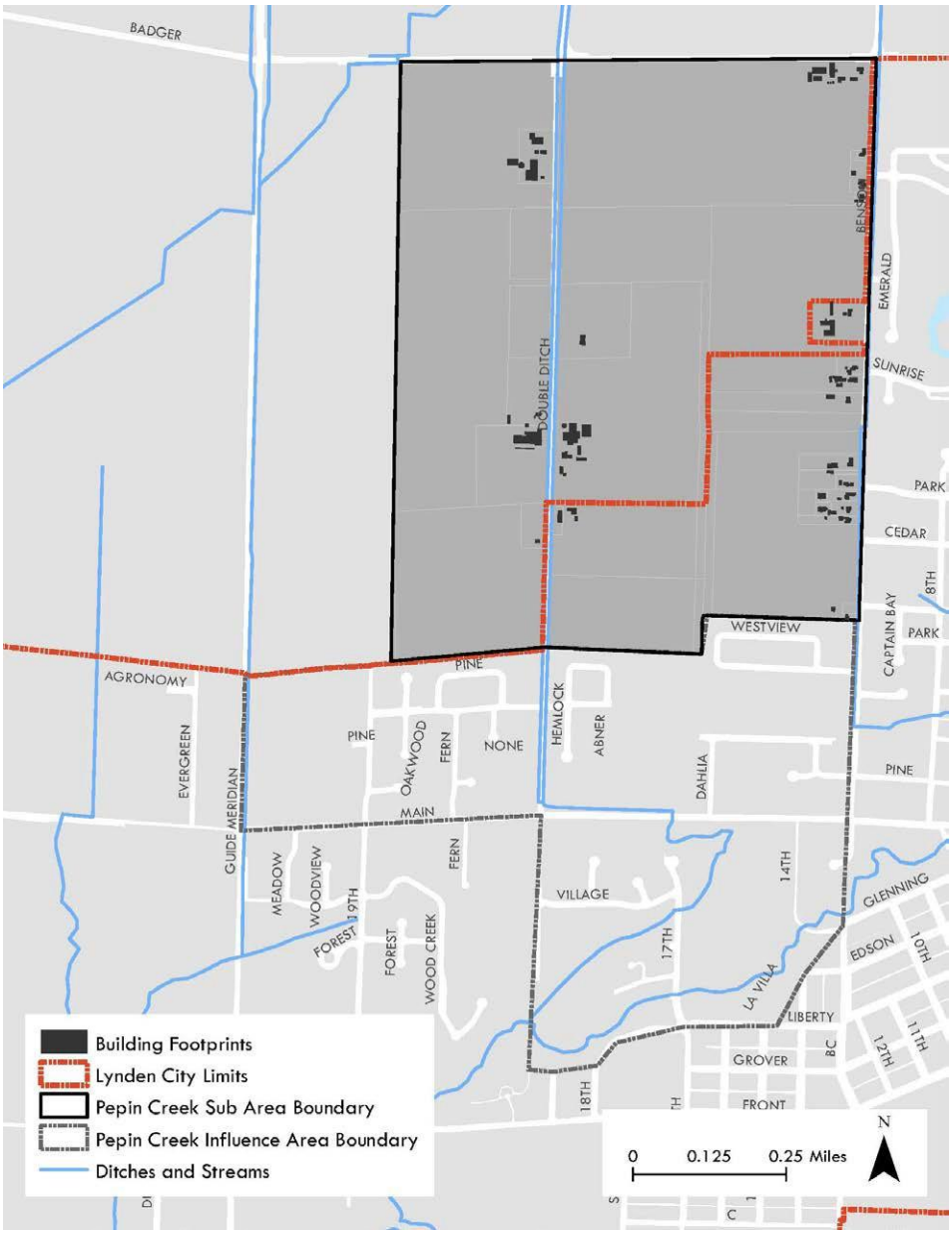
Source: City of Lynden, 2017; Whatcom County, 2017; BERK, 2017

Exhibit 3-3. Pepin Creek Subarea Ownership



Source: City of Lynden, 2017; Whatcom County, 2017; BERK, 2017

Exhibit 3-4. Pepin Creek Subarea Building Footprints



Source: City of Lynden, 2017; BERK, 2017

3.2. ZONING AND DEVELOPMENT STANDARDS

3.2.1. Zoning

The UGA land currently regulated by Whatcom County zoning is given a future land use designation of Low Density Residential (RL) and Medium Density Residential (RM) in the City of Lynden Comprehensive Plan. The RL zone typically leads to zoning for a lot area between 7,200 and 10,000 square feet and between four and eight units per acre. The RM zone typically results in zoning that allows for between two and 50 units per building, with development densities between eight and 24 units per acre.

The Whatcom County Comprehensive Plan anticipates residential development; however, the zoning has not been amended yet by the County, and the UGA land is zoned Agricultural (76 percent of the PCSA). Upon annexation, the area would receive a City zone consistent with the guidance of the pending Subarea Plan.

Land in the city limits is subject to City zoning. City territory is zoned predominantly Residential Mixed Density (18 percent of the Subarea), with some single family residential and public use zoning (see Exhibit 3-6).

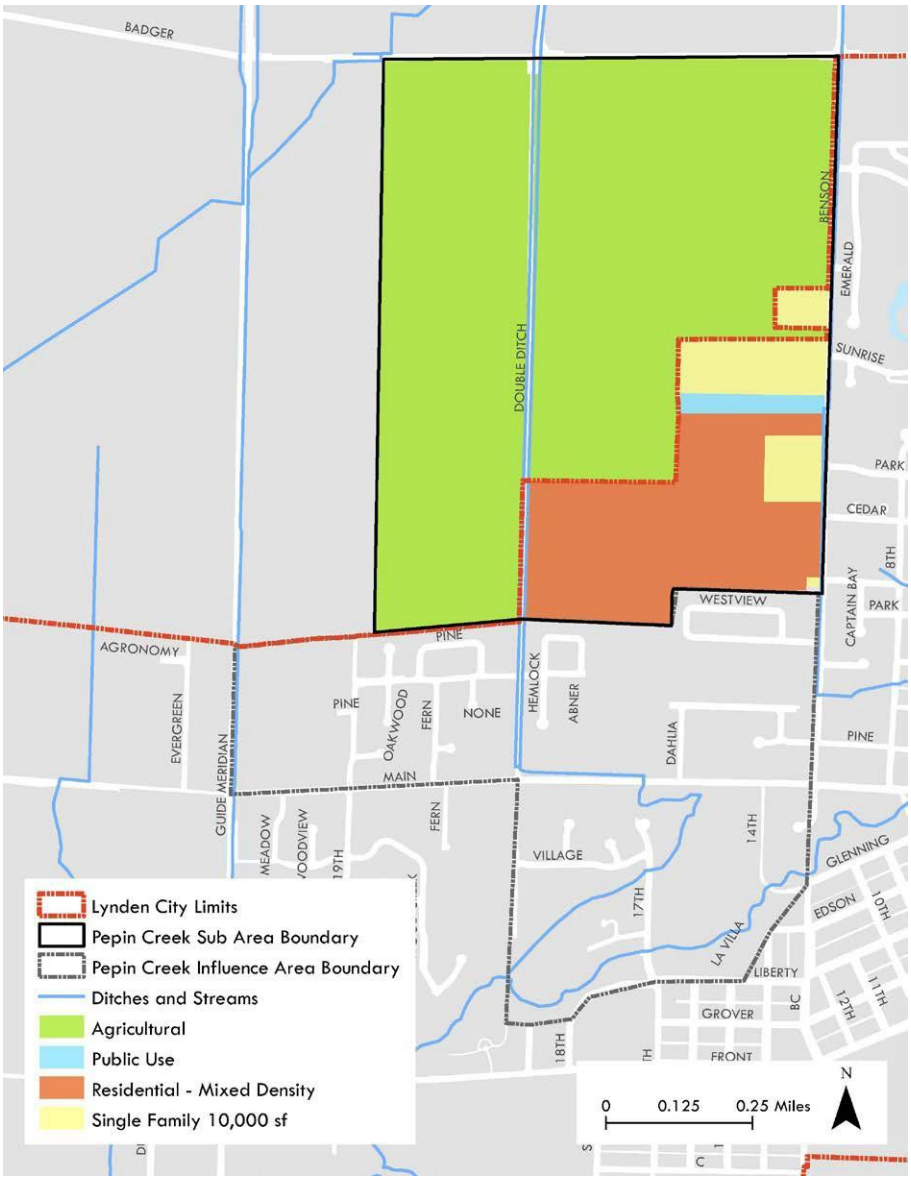
Exhibit 3-5 shows the zoning acreages, and Exhibit 3-6 maps PCSA zoning.

Exhibit 3-5. Zoning Acreages

ZONING CATEGORY	ACRES	PERCENTAGE
Agricultural (County)	344.55	75.6%
Public Use (City)	5.15	1.1%
Residential 7,200 sf (City)	0.20	0.0%
Residential 10,000 sf (City)	26.44	5.8%
Residential Mixed Density (City)	79.51	17.4%
TOTAL	**455.85**	**100%**

Source: City of Lynden, 2017; Whatcom County, 2017; BERK, 2017

Exhibit 3-6. Pepin Creek Subarea Zoning Map



Source: City of Lynden, 2017; Herrera, 2017; BERK, 2017

3.2.2. Existing Plans

The City of Lynden Comprehensive Plan identifies comprehensive planning priorities for the UGA:

- Plan for increased density as expanding into unoccupied portions of the UGA and zone at higher density.
- Plan for more than 6,400 people to be added to the city and UGA by 2036 – including the Pepin Creek Area.
- Do not extend urban services outside the UGA, which would perpetuate urban sprawl, and preserve surrounding agricultural uses.
- Target an average net residential density of five units per acre within the city limits and UGA, while maintaining the small-town atmosphere of Lynden (Goal LU-1, Policy 1B).
- Phase annexations and development within the UGA to ensure consistency with the Comprehensive Plan and prioritize infill development over expansions into agricultural and rural lands (Goal LU-2).
- Encourage the preservation and protection of critical areas within the UGA and advocate the annexation of land that has provided reasonable buffers for sensitive areas (Goal LU-6, Policy 1A).

Current Stormwater Utilities Capital Improvement Projects listed in the Comprehensive Plan include the Pepin Creek Realignment project to be completed within ten years. In 2016, the cost was identified as $8.2 million with local and state funds as the identified funding sources. In September 2016, the Public Works Department estimated that this cost had grown to $15 million.

3.2.3. Airport

Within the PCSA there is a runout area for the airport located just to the east of the study area (between Sunrise and West Park Drives). The Lynden Municipal Airport to the east hosts small aircraft and a helicopter. It has approximately 5,000 annual operations. The runway is 2,439 feet long, 40 feet wide, has an asphalt surface, and is equipped with non-standard runway lights.[1]

To promote land use compatibility the PCSA Plan should consider the following:

- Protect the runway safety area through traffic calming on Benson Road.
- Protect the airspace in the area west of the airport through an avigation easement.
- Avoid water features to avoid waterfowl near the airport.
- Create an overlay north and south of the runout area addressing potential access to the airport from housing located along the City property, like that currently located along the Airport property.

[1] WSDOT. 2012. Airport Economic Profile. Available: https://www.wsdot.wa.gov/NR/rdonlyres/53A01C75-7DB0-4F93-8AFA-57F76FEE15F5/0/2012Lynden.pdf.

3.3. POPULATION AND HOUSING

3.3.1. Population & Employment

The City of Lynden had an estimated population of 12,872 in 2013, including its UGAs. It grew at an average rate of 2.13 percent from 2010 to 2013, higher than Whatcom County's rate of 0.77 percent over the same time period. The County Comprehensive Plan allocated a target growth to the City of 19,725, including its UGAs, by the year 2036. To reach this target, the city and its UGAs would need a projected average annual growth rate of 1.82 percent from 2013 to 2036. The Washington State Office of Financial Management estimated that the April 1, 2017 population of Lynden was 13,620, not including its UGAs.

The population of the PCSA was about 57 in 2013, based on Assessor and permit records developed for the Whatcom County Comprehensive Plan Update and Whatcom Council of Government's transportation model.

Assumptions of different plans and studies regarding future growth are noted below:

Pepin Creek Growth Assumptions in Comprehensive Plan Updates 2016

SCENARIO	HOUSING UNITS	HOUSEHOLDS	POPULATION
Whatcom County Alternative 1: 2013 No Action	594	578	1,653
Whatcom County Alternative 2: Historic Shares	745	727	2,081
Lynden Transportation Element Whatcom County Alternative 3: Multi-Jurisdictional Resolution	1,124	1,096	3,143
Whatcom County Alternative 4 Targeted Land Use Change	1,470	1,433	4,114
Whatcom County Preferred Alternative 2016	951		2,714

Source: Whatcom County Land Capacity Analysis and Transportation Analysis Zone Assumptions, 2016; Lynden Transportation Element 2016

By 2036, the PCSA population is anticipated to represent 16 percent of Lynden's total population, while it currently represents 0.4 percent.

Exhibit 3-7. Lynden and Pepin Creek Population Estimates, 2013 & 2036

	2013 POPULATION	PROJECTED 2036 POPULATION
Lynden (with UGAs)	12,872	19,275
Pepin Creek Subarea (PCSA)	57	2,714 to 3,086
PCSA as % of Lynden Total Population	0.4%	Up to 16%

Source: BERK, 2013 & 2017

The PCSA is estimated to have no jobs and is not expected to gain any by 2036, based on current plans.

3.3.2. Housing and Capacity for Growth

As discussed previously, only 25 percent of the PCSA is currently zoned residential. As of 2013, there were an estimated 24 housing units in the Subarea. That number is expected to grow to 1,096 in 2036 under City Transportation Element assumptions, which are similar to the County's range of alternatives tested for the Comprehensive Plan in 2016.

3.4. DEVELOPMENT POTENTIAL AND MARKET CONSIDERATIONS

This section provides a high-level, preliminary threshold analysis of the development potential in the PCSA by comparing land values today to land values under future development conditions. In addition, the potential benefits of developing the Subarea are outlined. When a vision, land use concept plan, and engineering and environmental mitigation costs are better understood, this analysis will be updated. At that time, considerations for how responsibility should be apportioned to both public and private stakeholders based on benefit received will be explored.

In the following analysis, the investments required in the PCSA are considered economically feasible under the following conditions.

- From the City of Lynden perspective: funds are available from public sources and private property owners to cover all costs, under a realistic set of assumptions about future development.
- From the private developer perspective: the property owner's costs are less than the increase in value realized as a result of the improvements.

3.4.1. Land Values

The total current land value in the PCSA is $0.49/sf according to Whatcom County Assessor market value estimates. This value varies by zoning category, as shown in Exhibit 3-8, with residential zoning in the city limits having the highest value ($1.50/sf - $3.89/sf), and agricultural land in unincorporated Whatcom County valued lower, at $0.40/sf.

Exhibit 3-8. Land Value by Zoning Category in the Pepin Creek Subarea

ZONING CATEGORY	LAND VALUE	SQUARE FEET	LAND VALUE/SF
Agricultural (County)	$6,064,243	14,996,917	$0.40
Public Use (City)	$192,060	224,338	$0.86
Residential 7,200 sf (City)	$84,640	17,163	$4.93
Residential 10,000 sf (City)	$1,747,758	1,241,042	$1.41
Residential Mixed Density (City)	$1,686,782	3,533,590	$0.48
TOTAL	**$9,775,483**	**20,013,049**	**$0.49**

Source: City of Lynden, 2017; Whatcom County Assessor Market Value Estimates, 2017; BERK, 2017

Infrastructure Improvement Costs

An initial investment is required to make the properties in the PCSA suitable for residential use. The currently anticipated costs associated with these improvements are estimated between $85 and $95

million, and are highly dependent on costs associated with anticipated wetland mitigation. (Wetlands are discussed further in Section 2.2.1). Exhibit 3-9 and Exhibit 3-10 below show the current total estimated public and private costs of improving the land. The assumptions used to arrive at these costs are outlined below and may change in the future.

Public Improvement Costs

- **Road Improvements** assume the project costs from the Transportation Element for upgrading Double Ditch and Benson Road to City standards (projects R-14 and R-2). To estimate the cost associated with updating the portion of the road currently outside of city limits, the cost of R-2, to improve the length of Benson Road, was doubled.
- **Utility Improvements** use construction costs to estimate the cost of improvements.
    - **Sewer costs** assume a cost of $670 per lineal foot (similar to lineal foot costs of gravity main projects in the City sewer plan), with the circumference of the PCSA used to estimate the required feet of sewer line. This is a placeholder value and does not include possible needs for a pump station.
    - **Water costs** are estimated from the cost per lineal foot of the City's anticipated Water Project D-12 (which increases the capacity of the water line in Benson Road). This cost per lineal foot was then multiplied by the circumference of the PCSA.
- **Creek Realignment** is estimated to cost $15 million according to early estimates by the Public Works Department.
- **Downstream Stabilization** is estimated at $2.1 million per City of Lynden staff.
- **Wetland mitigation** costs are dependent on several factors, such as the portion of the site that is wetlands, the portion that is filled, and whether mitigation is done on or off-site. Assumptions for this analysis include placeholder values for a low and high estimate until more is known about wetland mitigation. See Section 3.2 for more information on wetlands.
    - **Low estimate.** The low estimate, with a total mitigation cost of $3.7 million, assumes that 25% of the PCSA is wetlands and that 75 acres will be enhanced on-site, leaving 374 acres of net developable land prior to discounts for roads and facilities.
    - **High estimate.** Assumes that 50% of the subarea is wetlands, and 15% will be filled, with 100 acres of on-site enhancement. Though the total mitigation cost does not appear high, the reduced developable land (265 acres before discounts for roads and facilities) in this scenario makes the cost per developed square foot higher.

Expected Developer Costs

For the purpose of this initial threshold analysis, the costs of improving the PCSA are based on the addition of approximately 1,096 units. The final master plan may include more units to accommodate more growth.

- **Transportation Impact Fee.** Costs are estimated to be $2,111 per unit.
- **Stormwater Utility Charge.** Costs are estimated at $4,000 per unit, per City of Lynden staff.
- **Sewer Facility Charge.** Costs are estimated at $6,350 per unit.

- **Water Facility Charge.** Costs are estimated from the general facility charge of $4,590/unit for water, which assumes each single-family home will have a three-quarter-inch meter.
- **Internal Road System** assumes that 10% of the PCSA will be set aside for an internal road network for a total of 7.8375 miles of road at an estimated cost of $300 per lineal foot.

Exhibit 3-9. Public Scale Costs of Improving Pepin Creek Subarea

REQUIRED INVESTMENT	COST	COST PER SQUARE FOOT*
Road Improvements	**$15,750,000**	$0.79
Utility Improvements	**$17,536,553**	$0.88
Sewer	*$12,346,224*	*$0.62*
Water	*$5,190,329*	*$0.26*
Creek Realignment	**$15,000,000**	$0.75
Downstream Stabilization	**$2,100,000**	$0.10

Note: Cost per square foot is an estimate based on a subarea of 460 acres.
Source: BERK 2017

Exhibit 3-10. Expected Developer Costs of Improving Subarea Land

REQUIRED INVESTMENT	COST	COST PER SQUARE FOOT
Transportation Impact Fee	$2,313,656	$0.12
Stormwater	$4,384,000	**$0.22**
Sewer	$6,959,600	$0.35
Water	$5,030,640	$0.25
Internal Roads	$12,414,600	$0.62

Note: Cost per square foot is an estimate based on a subarea of 460 acres.
Source: BERK 2017

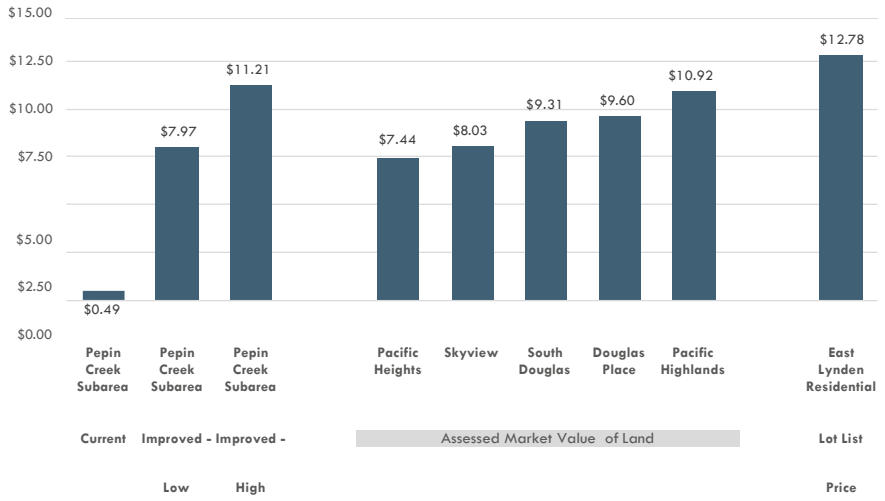
Once a discount is applied for the roads and facilities (assumed at 30% of the remaining net developable land), the current market value of the land plus the investment costs needed to improve the land yields a cost of $7.97 to $11.21 per square foot. This represents the "fully burdened" cost of the land.

Comparable single-family communities parcels in Ferndale and East Lynden have assessed market values of land that vary in price from $7.44 to $10.92 per square foot, as seen in Exhibit 3-11. Similarly, the market list price for "fully burdened" land in East Lynden is $12.78 per square foot.

These comparable communities are assumed to be development ready with streets and utilities available at street frontage and no extraordinary site conditions. However, many of the comparable sites have features such as greenways and retention ponds, as seen in Exhibit 3-11.

Exhibit 3-11. Example Development Comparisons

a. PCSA Development Costs compared to Market Value of Land in Comparable Communities



b. Example Development Zoning and Features

HOA	Total Parcels	Zoning	Green Way/Belt	Retention Pond	Percent of Acres not Developable
Skyview	80	RS6.5	13.06	0.00	47%
Pacific Heights	43	RS8.5	0.00	0.44	5%
Douglas Place	19	RS6.5	0.00	0.38	11%
South Douglas	41	RS6.5	0.00	0.52	7%
Pacific Highlands	185	RS10.5	4.62	0.96	16%

Source: Whatcom County Assessor Data, 2017; BERK, 2017

In all cases, the market value of land in the comparable areas is similar to the anticipated costs of land with improvements in the PCSA. The list price for lots in comparable communities in East Lynden exceed the improved value of the land in the Subarea. This suggests that adding the cost of improvements to the very low land values in the Subarea does not push the development economics beyond the current market conditions experienced in other areas, but may indicate a need for more public investment.

It should be noted that this is a simple threshold analysis of potential market considerations and not a

detailed development pro-forma analysis designed to assess specific feasibility of any particular development opportunity in the PCSA. Additional analysis will be required to determine the public and

private benefits of redeveloping the Subarea, how to apportion financial responsibility, and what the final land use mix should be.

3.4.2. Potential Benefits of Developing the Subarea

A public revenue model to estimate likely tax revenue impacts from new development will be provided later in the PCSA planning process once a vision and land use concepts are further developed, along with methods to apportion public and private responsibility based on benefit received. In the meantime, developing the Subarea is expected to produce, at a minimum, the following public and fiscal benefits:

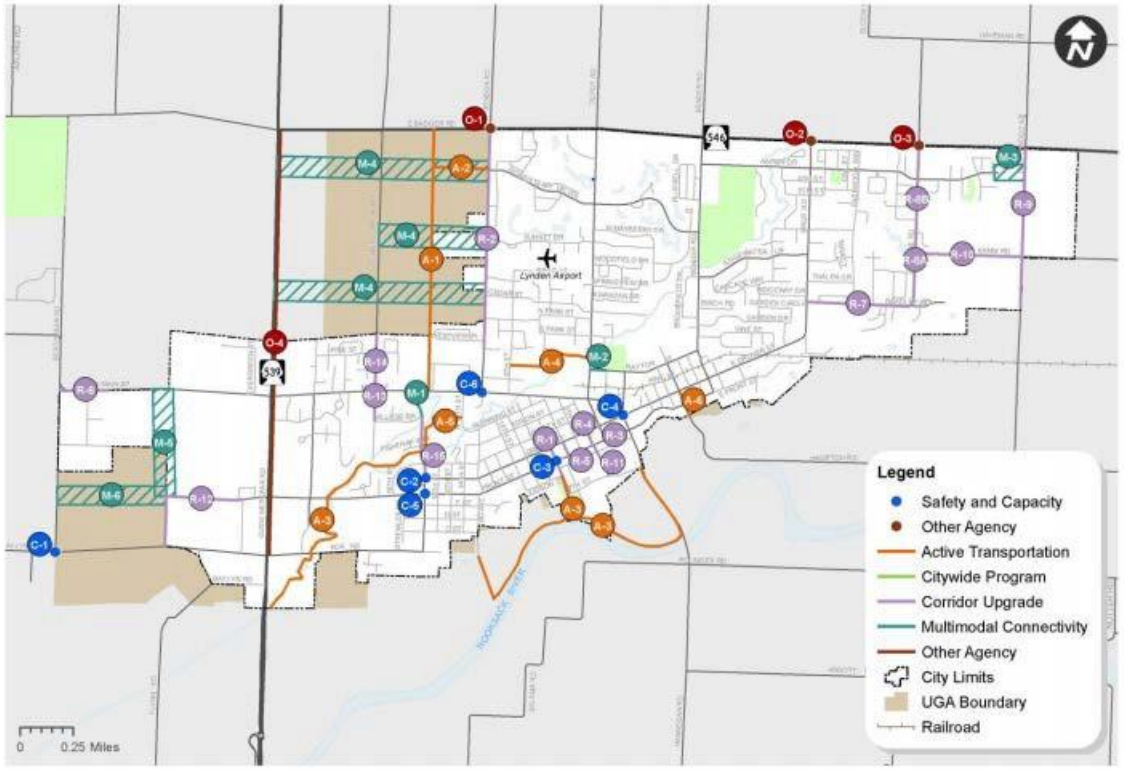
- Increased opportunity for single family residential to accommodate population growth.
- Increased property values and tax base.
- Additional increased tax revenues from property and utility taxes.
- Some offsetting expenditures for public services.
- If a mitigation bank investment is made (instead of purchasing credits from an existing bank) some investment recovery through outside purchases of credits.

3.5. TRANSPORTATION

3.5.1. Local Circulation

Transportation within in the PCSA is limited to three primary roads that service the area. Badger Road, part of Highway 546, runs east-west along the north side of the Subarea and is a designated Freight Route. Two north-south roads, Double Ditch Road and Benson Road, connect the Subarea to the rest of Lynden where they intersect with Main Street. Benson Road is a designated collector in the Lynden Comprehensive Plan, meaning that it is the primary route for channeling traffic from the Subarea on to arterial routes in the city. Since the PCSA is primarily in agricultural use, documented traffic volumes are low. There are no recognized non-motorized routes or corridors in the Subarea.

Exhibit 3-12. Transportation Improvement Projects Identified in the Lynden Comprehensive Plan



The Lynden Comprehensive Plan anticipates the need for transportation improvements in the PCSA. The Transportation Element forecasts growth of up to 1,096 households in the Subarea, which will require roadway improvements that support cars, bicycles, and pedestrians. These improvements include:

- Project A-1 to build a multi-use path along Pepin Creek between Badger Road and Main Street.
- Project A-2 to build a safe bicycle connection that extends from Homestead Boulevard between Benson Road and Pepin Creek.
- Project M-4 to build a network of multi-modal connections with funds gathered from future development of the Subarea – the location and nature of this network will be identified through the PCSA Plan.
- Project 0-1 to build improvements to Highway 546 that will be led by the Washington State Department of Transportation.

Exhibit 3-12 shows the transportation improvements identified in the Lynden Comprehensive Plan.

3.6. PARKS AND OPEN SPACES

The City of Lynden's 2014 Park and Trail Master Plan includes priorities for parks and trail corridors in the UGA, when given the opportunity prior to development. The PCSA will include existing plans to improve the park and trail system for the City and the UGA.

4.0 References

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5.0 Abbreviations

Capital Improvement Plan (CIP)

Light Detection and Ranging (LiDAR)

Low Density Residential (RL)

Lynden Municipal Code (LMC)

Medium Density Residential (RM)

Million gallons per day (MGD),

National Wetlands Inventory (NWI)

National Wetlands Inventory (NWI)

Natural Resources Conservation Service (NRCS)

North Lynden Watershed Improvement District (NLWID)

Northwest Hydraulic Consultants (NHC)

Pepin Creek Subarea (PCSA)

Polyvinyl chloride (PVC),

Puget Sound LiDAR Consortium (PSLC)

Reichhardt & Ebe Engineering, Inc. (R&E)

Right-of-way (ROW)

Total suspended solids (TSS)

Urban growth area (UGA)

Washington Department of Fish and Wildlife (WDFW)

Wastewater treatment plant (WWTP)

Water Resources Inventory Area (WRIA)

Appendix

Critical Areas Memorandum

Wetlands and Fish and Wildlife Habitat Conservation Areas

Pepin Creek Sub-Area Plan – City of Lynden – October 10, 2017

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Appendices

Table of Exhibits

1.0 Introduction

1.1. PROJECT PURPOSE AND DESCRIPTION

The City of Lynden (City) is conducting land use planning for the Pepin Creek Sub-Area (PCSA) to facilitate future urban development. The proposed project aims to plan the future development of the PCSA through the creation of a sub-area plan and eventual annexation of the PCSA into the City.

1.2. BACKGROUND

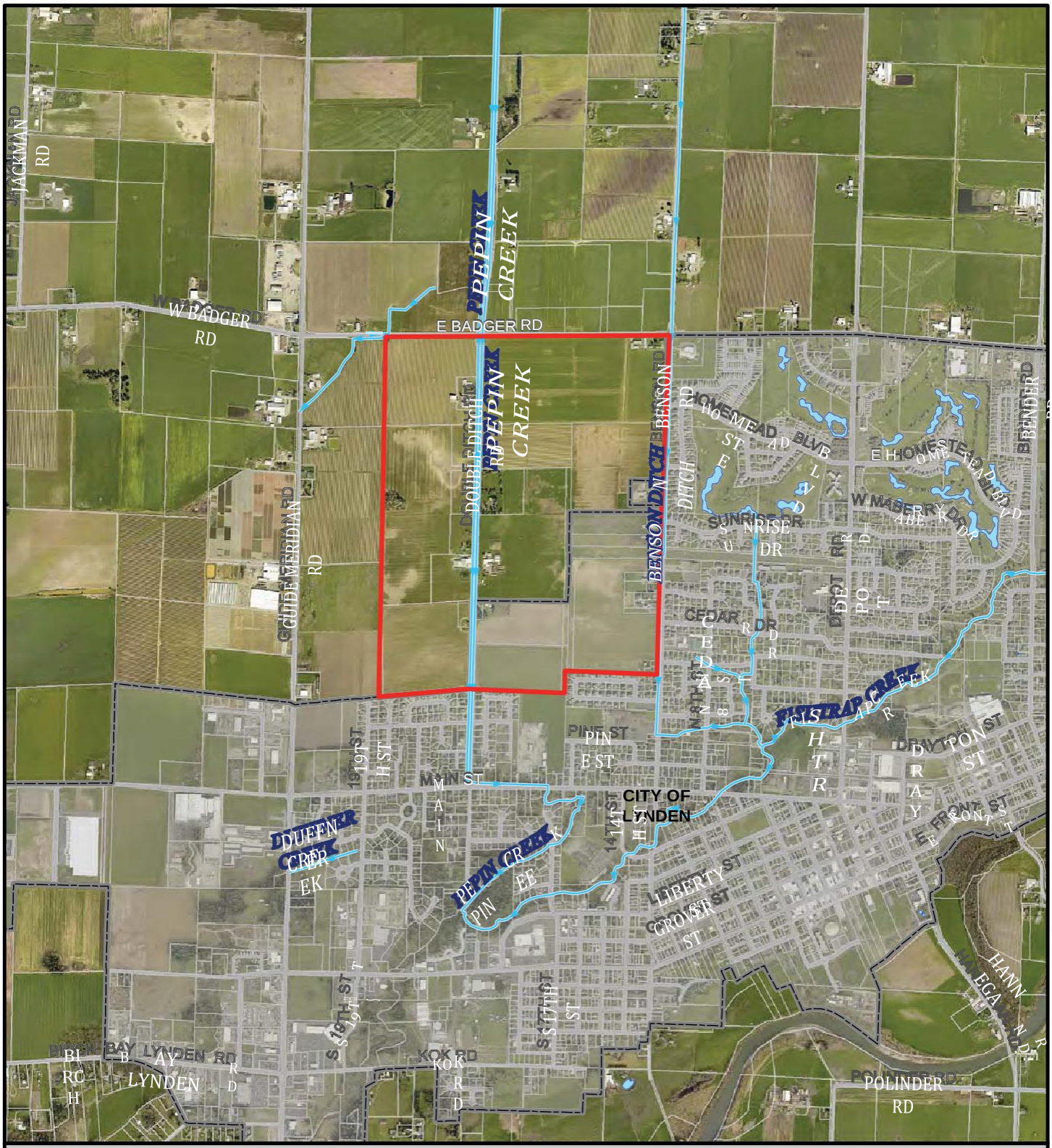
The PCSA planning effort is being closely coordinated with the planning, design, and permitting for two separate, City projects related to relocating Pepin Creek. The first project would relocate and join the roadside ditches along Double Ditch Road and Benson Road within a proposed, restored stream channel corridor within the PCSA (Appendix A). The project would be phased; the first phase would relocate Benson Ditch to the new channel alignment beginning near the Lynden Airport, and the final phase would relocate the ditches along both Double Ditch and Benson Roads just south of Badger Road. The new stream corridor would be oriented from north to south at the midpoint between Double Ditch and Benson Roads. The second project is to design and construct a new bridge on Main Street that would cross the future alignment of Pepin Creek. As part of the bridge project, the City is conducting hydraulic analyses of the current reach of Pepin Creek south of Main Street.

Two ditches, one on each side of Double Ditch Road, convey Pepin Creek, which is called Pepin Brook on the Canadian side of the US-Canada border. Throughout this memorandum, the ditches are referred to as Double Ditch West and Double Ditch East. The ditch along Benson Road is referred to as Benson Ditch.

1.3. PURPOSE OF TECHNICAL MEMORANDUM

The City contracted Herrera Environmental Consultants, Inc. (Herrera), as part of a team led by Communita Atelier, to prepare a critical areas memorandum that documents preliminary findings on existing conditions of critical areas occurring within the PCSA study area (Exhibit 1). Critical areas examined include wetlands and fish and wildlife habitat conservation areas regulated by federal and state agencies; and the City of Lynden.

Findings in this technical memorandum are based on a review of background information and a 1-day, reconnaissance-level, site visit. This memorandum includes preliminary mapping of the critical areas within the study area and preliminary analysis of wetland and stream classifications.



Legend

- Streams and Ditches
- Parcels
- City Limits
- Study Area
- Streets
- Lakes

Exhibit 1.
Study Area for the Pepin Creek Sub-Area Critical Areas Reconnaissance.

N

0 1,000 2,000 4,000 Feet

HERRERA

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2.0 Regulatory Framework

2.1. FEDERAL REGULATIONS

Federal laws regulating habitat and species include Sections 404 and 401 of the Clean Water Act (United States Code [USC], Title 33, Chapter 1344 [33 USC 1344]), the Endangered Species Act (16 USC 1531), the Bald and Golden Eagle Protection Act (16 USC 668-668c), and the Migratory Bird Treaty Act (16 USC 703–712).

2.1.1. Clean Water Act Section 404

Section 404 of the federal Clean Water Act (CWA) regulates the placement or removal of soil or other fill, grading, or alteration (hydrologic or vegetative) in waters of the United States, including wetlands, streams, and ditches. The US Environmental Protection Agency and US Army Corps of Engineers (USACE) recently clarified the definition of waters of the United States in the Clean Water Rule, which became effective on August 28, 2015 (40 CFR Parts 110, 112, 116, et al.). USACE administers the Section 404 permitting program under the CWA. The permits include nationwide (general) permits for projects involving minor fills, grading, or alteration; and individual permits for projects that require larger areas of disturbance to waters of the United States. Under CWA Section 404, USACE issues manuals and technical guidelines for identifying wetlands and delineating wetland boundaries; and has authority to determine the jurisdictional status and approve jurisdictional boundaries of waters of the United States.

USACE's mitigation policy involves avoiding adverse impacts and offsetting unavoidable adverse impacts on existing aquatic resources, including wetlands, by achieving a goal of no overall net loss of values and functions. Compensatory mitigation from the permittee is required for unavoidable impacts. Types of mitigation include: purchasing credits in a mitigation bank; paying in-lieu fees; and restoring, establishing, enhancing, or preserving wetlands.

2.1.2. Clean Water Act Section 401

Section 401 of the CWA is administered in Washington State by the Washington State Department of Ecology (Ecology), as mandated by the Washington State Water Pollution Control Act (Chapter 90.48 Revised Code of Washington [RCW]). Section 401 requires that proposed dredge (removal) and fill activities permitted under Section 404 be reviewed and certified to ensure that such activities meet state water quality standards and protect wetlands. State 401 certification is administered by Ecology for all Section 404 permits. State 401 certification is granted without the need for a separate permit from Ecology for projects that: 1) qualify for a Section 404 nationwide permit, 2) meet specific 401 certification conditions of the nationwide permit, and 3) meet Ecology 401 General Conditions. If a project does not meet those three criteria, an Individual 401 Water Quality Certification permit is required by Ecology.

2.1.3. Endangered Species Act

The Endangered Species Act (ESA) directs the "Services" (i.e., the US Fish and Wildlife Service [USFWS] and National Marine Fisheries Service [NMFS]) to identify and protect endangered and threatened species and their critical habitat, and to provide a means to conserve their ecosystems. Among its other

provisions, the ESA requires the Services to assess civil and criminal penalties for violations of the ESA or its regulations. Section 9 of the ESA prohibits take of federally-listed species. In the ESA, "take" is defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct" (16 USC 1532). The term "harm" includes significant habitat alteration that kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering, (50 CFR 17.3). Projects involving federal lands, funding, or authorizations (e.g., Section 404 permit) will require consultation between the federal agency and the Services, pursuant to Section 7 of the ESA.

2.1.4. Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (BGEPA) of 1940 prohibits the take of any bald eagle (Haliaeetus leucocephalus) or golden eagle (Aquila chrysaetos) or the parts, nests, or eggs of such birds without prior authorization. In the BGEPA, "take" is defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect molest, or disturb." "Disturb" was defined in 2007 (72 FR 31132) as "to agitate or bother a bald or golden eagle to a degree that causes…injury to an eagle, reduced productivity, or nest abandonment…." Although bald eagles were removed from the ESA listings in 2007, bald and golden eagles are protected under BGEPA and the Migratory Bird Treaty Act. Through recent regulation (50 CFR 22.26), USFWS can authorize take of bald and golden eagles when the take is associated with, but is not the purpose of, an otherwise lawful activity and cannot practicably be avoided.

2.1.5. Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) is the cornerstone of migratory bird conservation and protection in the United States. The MBTA implements four treaties that provide for international protection of migratory birds. It is a strict liability statute, meaning that proof of intent, knowledge, or negligence is not an element of an MBTA violation. The statute's language is clear that actions resulting in a "taking" or possession (permanent or temporary) of a protected species, in the absence of a USFWS permit or regulatory authorization, are a violation. The MBTA (16 U.S.C. 703) states, "Unless and except as permitted by regulations…it shall be unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill…possess, offer for sale, sell … purchase … ship, export, import …transport or cause to be transported…any migratory bird, any part, nest, or eggs of any such bird…"

The word "take" is defined by regulation as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect" (50 CFR 10.12). USFWS maintains a list of all species protected by the MBTA at 50 CFR 10.13. This list currently includes 1,027 species of migratory birds.

2.2. WASHINGTON STATE REGULATIONS

Washington State laws and programs designed to control loss and impacts on habitats and species include the State Environmental Policy Act (Chapter 43.12C Revised Code of Washington [RCW]), Section 401 of the Clean Water Act (a federal law that is implemented in the state by Ecology as noted above), State Hydraulic Code (Chapter 77.55 RCW and Washington Administrative Code [WAC] 220-110), and the Growth Management Act (Chapter 36.70A RCW).

2.2.1 State Environmental Policy Act

The Washington State Environmental Policy Act (SEPA) provides a way to identify possible environmental impacts that may result from government decisions including, but not limited to, construction of public facilities. Information provided during the SEPA review process helps agency decision makers, applicants, and the public understand how a proposal will affect the environment including, but not limited to, aquatic resources (e.g., lakes, wetlands), shorelines, earth, plants, and animals. Under SEPA, the City of Lynden is the lead agency for the proposed project and is responsible for identifying and evaluating potential adverse environmental impacts.

2.2.1. State Hydraulic Code

The Washington Department of Fish and Wildlife (WDFW) administers the Hydraulic Project Approval (HPA) program under the state Hydraulic Code, which was specifically designed to protect fish life. An HPA permit is required for projects that will use, divert, obstruct, or change the natural flow or bed of any of the salt or fresh waters of the state.

2.2.2. Growth Management Act

The Washington State Growth Management Act (GMA) requires state and local governments to manage growth by identifying and protecting critical areas and natural resource lands, designating urban growth areas, preparing comprehensive plans, and implementing them through capital investments and development regulations.

2.3. LOCAL CODE

The study area is in unincorporated Whatcom County, within the City of Lynden urban growth area. It is expected to be annexed in the future, at which time it will be subject to the Lynden Municipal Code (LMC), which includes critical areas regulations required under the GMA that pertain to protection of habitats and species. Critical areas regulated by the City include wetlands; and fish and wildlife habitat conservation areas (e.g., streams). Critical areas regulations specify wetland categories/classes based on ratings, stream types/classes, required buffer widths, development standards, and mitigation requirements. Buffers are required to protect the functions and values of wetlands; and fish and wildlife habitat conservation areas.

2.3.1. Wetlands

Wetlands in Lynden are rated based on categories that reflect the functions and values of each wetland. Wetland categories are based on the criteria provided in the most recent version of Ecology's Washington State Wetland Rating System for Western Washington (Hruby 2014), as determined using the appropriate rating forms contained in that publication (LMC 16.16.270). Wetlands are rated as Category I, II, III, or IV according to the functions provided and their score using the Ecology rating system.

Wetland categories are generally defined as follows:

- Category I wetlands are those that: 1) represent a unique or rare wetland type; or 2) are more

sensitive to disturbance than most wetlands; or 3) are relatively undisturbed and contain ecological

attributes that are impossible to replace within a human lifetime; or 4) provide a high level of functions.

- Category II wetlands are difficult, though not impossible, to replace and provide high levels of some functions. They occur more commonly than Category I wetlands but still need a relatively high level of protection.
- Category III wetlands are: 1) wetlands with a moderate level of functions (scores between 16 and 19 points), 2) can often be adequately replaced with a well-planned mitigation project, and 3) are interdunal wetlands between 0.1 and 1 acre in size. Wetlands scoring between 16 and 19 points generally have been disturbed in some way, and are often less diverse or more isolated from other natural resources in the landscape than are Category II wetlands.
- Category IV wetlands have the lowest levels of functions (scores less than 16 points) and are often heavily disturbed. They are wetlands that should be able to be replaced and, in some cases, be improved. However, experience has shown that replacement cannot be guaranteed in any specific case. Category IV wetlands may provide some important functions and also need to be protected.

Standard wetland buffer widths are based on the wetland rating and range between 25 and 200 feet, measured horizontally from the wetland edge (LMC 16.16.300). According to the LMC, a regulated wetland or its standard buffer shall not be altered unless a detailed study demonstrates that a proposal will not degrade the functions and values of the subject wetland or will provide compensation adequate to mitigate for impacts to functions and values. Compensatory mitigation requirements involve creating/restoring or enhancing wetlands for proposals that result in wetland losses (LMC 16.16.310) at specified ratios that correspond to the category of the wetland affected.

2.3.2. Fish and Wildlife Habitat Conservation Areas

Fish and wildlife habitat conservation areas (FWHCAs) are designated based on meeting any one of the following criteria (LMC 16.16.320):

- Areas with which endangered, threatened, and sensitive species have a primary association;
- Habitats and species of local importance that have been designated by the city at the time of application;
- Naturally occurring ponds under 20 acres and their submerged aquatic beds that provide fish or wildlife habitat;
- Waters of the state as defined by WAC 222-16, including Fishtrap Creek, Duffner Ditch, Double Ditch, Kamm Creek, and their tributaries;
- Areas with which anadromous fish species have a primary association;
- Lakes, ponds, streams, and rivers planted with game fish by a governmental or tribal entity;
- State natural area preserves and natural resource conservation areas.

LMC 16.16.330 defines the following classes of stream habitat:

- Class A river/stream habitat includes those rivers and streams with documented presence of a species listed as threatened or endangered by a state or federal agency.
- Class B river/stream habitat includes those rivers and streams not included in class A that also include:
  - Areas with documented presence of species listed as sensitive by a state or federal agency;
  - Areas that provide habitat for anadromous or resident fish populations; or
  - Areas planted with game fish by a governmental or tribal entity.
- Class C river/stream habitat includes those nonfish-bearing rivers and streams not included in either class A or class B.

Stream buffers reflect the sensitivity of the species or habitat present and the type and intensity of the proposed adjacent human use or activity. Standard buffer widths, measured horizontally in landward direction from the ordinary high water mark, are based on the stream class and range between 50 and 100 feet (LMC 16.16.360). According to the LMC, a regulated FHWCA or its standard buffer shall not be altered unless a detailed study demonstrates that a proposal will not degrade the functions and values of the subject habitat or will provide compensation adequate to mitigate for impacts to functions and values.

3.0 Methods

The critical areas assessment provided in this technical memorandum is based on a review of background information, a reconnaissance-level site visit, and regulations pertaining to wetlands and FWHCAs. Herrera biologists conducted the reconnaissance by walking city-owned parcels, the stream corridor easement, and road rights-of-way.

3.1. WETLANDS

Herrera collected information on wetlands within and adjacent to the study area by reviewing existing documentation and conducting a reconnaissance-level field investigation. Identification of wetlands is based on a three-factor approach involving indicators of hydrophytic vegetation, hydric soil, and wetland hydrology. Those indicators are defined in the 1987 Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987) and the Regional Supplement to the US Army Corps of Engineers Wetlands Delineation Manual: Western Mountains, Valleys, and Coast Region (USACE 2010). These manuals are collectively referred to herein as the Corps Manual.

3.1.1. Review of Existing Documentation

Herrera evaluated potential wetland areas in the study area by reviewing the following data sources:

- National Wetlands Inventory (USFWS 2017)
- City of Lynden Critical Areas Maps (City of Lynden 2017)
- Whatcom County Critical Area Ordinance maps - Wetlands (Whatcom County 2017)
- Natural Resources Conservation Service online soil survey maps and soil descriptions (NRCS 2017a)
- LiDAR images (PSLC 2017)
- Aerial photographs
- Groundwater monitoring data (R&E 2017)

3.1.2. Reconnaissance-Level Field Investigation

The field investigation was conducted by walking the study area and making observations from publicly accessible lands (e.g., road rights-of-way, City-owned property, the airport easement, and the stream corridor easement). Features observed within the study area that could potentially be defined as wetlands were identified, assigned a preliminary name and classification, and approximately mapped based on aerial photography.

Because land use in the study area consists largely of agricultural fields, Herrera biologists were not able to rely on naturally occurring hydrophytic vegetation indicators to identify potential wetlands. Potential wetland areas were identified primarily based on presence of mapped hydric soils and wetlands, and observations of visible wetland hydrology indicators (e.g., surface water and surface saturation).

Herrera biologists conducted a preliminary soil investigation by digging one soil pit. The soil was characterized by digging a 24-inch deep test pit and documenting the presence of hydric soil and hydrology indicators as defined in the Corps Manual.

Wetland boundaries were not delineated in accordance with Corps Manual protocols, which require a more in-depth analysis including subsurface observations of soils and hydrology. The boundaries of wetlands and potential wetland areas shown on the exhibits in this memorandum are approximate; they are based on field observations and are supported by analysis of existing documentation (e.g., mapped hydric soils and wetlands).

Herrera biologists determined preliminary categories and ratings of wetlands based on field observations augmented by analysis of aerial photographs. However, Ecology rating forms were not completed. Wetlands will be rated according to the Ecology rating system when wetlands are delineated during a future phase of the project.

3.2. FISH AND WILDLIFE HABITAT CONSERVATION AREAS

Herrera collected information about FWHCAs within and adjacent to the study area by reviewing existing documentation and conducting a field investigation.

3.2.1. Review of Existing Documentation

Herrera reviewed the following data sources:

- City of Lynden critical areas map (City of Lynden 2017)
- Whatcom County Critical Area Ordinance maps – Fish and Wildlife Habitat Conservation Areas (Whatcom County 2017)
- North Lynden Watershed Improvement District Drainage and Fish Habitat Management Plan (NLWID 2016)
- Pepin Creek Relocation Feasibility Analysis (NHC 2014)
- North Lynden Watershed Improvement District Agriculture-Watershed Characterization and Mapping Report (Whatcom County Agriculture-Watershed Project 2016)
- Priority Habitats and Species database (WDFW 2017a)
- SalmonScape mapping database (WDFW 2017b)
- Aerial photographs

3.2.2. Reconnaissance-Level Field Investigation

The field investigation was conducted by walking the study area and making observations from publicly accessible lands (e.g., road rights-of-way, City-owned property, the airport easement, and the stream corridor easement). Features observed within the study area that could potentially be defined as FWHCAs were identified. During reconnaissance surveys, dominant riparian vegetation and dominant substrate of streams and ditches, (e.g., sand, gravels, and cobbles) were documented.

4.0 Results

4.1. WETLANDS

4.1.1. Background Information

The PCSA is currently actively farmed, and ditches are present throughout. There are reports of extensive forested wetlands historically occurring in the Fishtrap Creek drainage. The area around Lynden was described as upland hills with forests of fir, cedar, spruce, and hemlock, and lower ground with cottonwood, alder, maple, birch, spruce, and areas of dense brush (FCW 2012).

Wetland Inventories

Based on a review of background information, several wetlands were previously identified in the study area. The National Wetlands Inventory (NWI) identifies emergent wetlands lining Double Ditch East as well as two wetlands west of Double Ditch Road, including a ponded wetland with aquatic bed vegetation and an emergent wetland within an agricultural field (Exhibit 2). Exhibit 3 shows the classifications of NWI wetlands in the study area. The wetlands west of Double Ditch Road are identified in the same general locations on the Whatcom County critical areas wetland map (Whatcom County 2017); however, the County map shows the emergent wetland substantially larger than it is shown on the NWI (Exhibit 2).

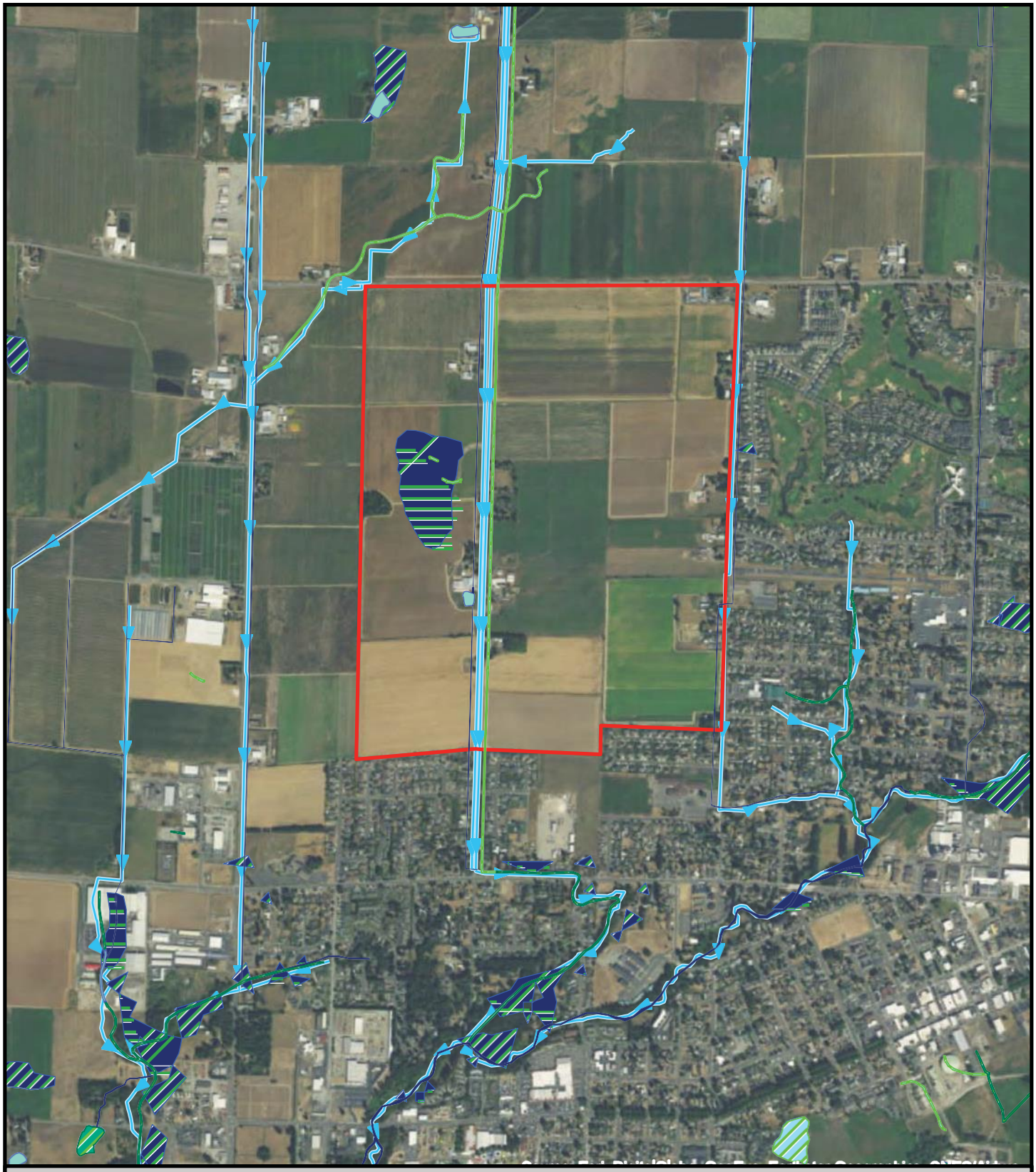


Exhibit 2.
Mapped Wetlands and Fish and Wildlife Habitat Conservation Areas in the Vicinity of the Pepin Creek Sub-Area.

Exhibit 3. Classification of Wetlands and Deepwater Habitats Mapped in the Study Area by the National Wetlands Inventory.

LOCATION	CLASSIFICATION	DESCRIPTION
Double Ditch West	R5UBFx	Riverine, unknown perennial, unconsolidated bottom, semipermanently flooded, excavated
Double Ditch East	PEM1Cx	Palustrine emergent wetland, persistent vegetation, seasonally flooded, excavated
Pond west of Double Ditch Road	PABFh	Palustrine aquatic bed wetland, semipermanently flooded, diked/impounded
Wetland west of Double Ditch Road	PEM1C	Palustrine emergent wetland, persistent vegetation, seasonally flooded
Benson Ditch	R5UBFx	Riverine, unknown perennial, unconsolidated bottom, semipermanently flooded, excavated

Source: USFWS 2017

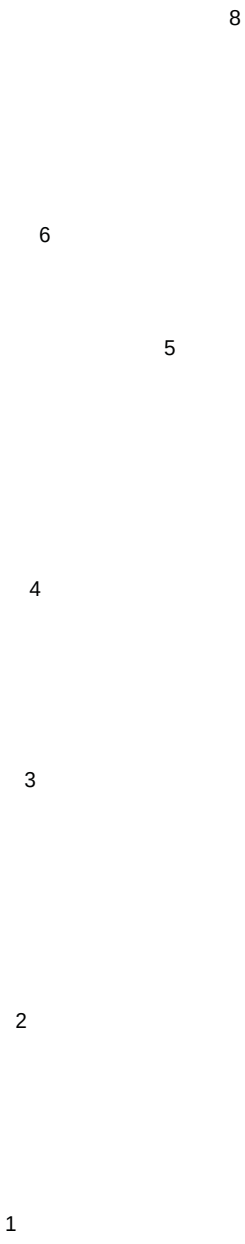
Groundwater Monitoring

According to the Corps Manual, the PCSA represents a highly disturbed site due to active agricultural practices that have resulted in disturbance to soil structure, elimination of naturally occurring vegetation communities, and draining of soils (i.e., lowering of groundwater table). In such cases, hydrologic monitoring is useful for determining if wetland hydrology is present. According to the Corps Manual, wetland hydrology requires 14 or more consecutive days of flooding or ponding, or a water table 1 foot or less below the soil surface, during the growing season at a minimum frequency of 5 years in 10 (50 percent or higher probability) (National Research Council 1995).

In support of the design of the Pepin Creek and Benson Ditch channel relocation, shallow groundwater wells (i.e., piezometers) were installed on City-owned property and easements. Monitoring of groundwater depth began on April 20, 2017, during the growing season. A partial record through May 30 is provided in Exhibit 4. Locations of the wells are shown on Exhibit 5. The limited available data set indicates that wetland hydrology is not present. However, the data show that groundwater was between 1 and 2 feet below the surface at Wells 3, 4, 6, and 7 on April 20, followed by a gradual decrease in groundwater levels, corresponding to low levels of precipitation. Spikes in groundwater elevation (for example, on May 11) correspond to precipitation events. The data indicate potential for wetland hydrology in the vicinity of monitoring wells to occur earlier in the growing season, when higher levels of precipitation are anticipated.

Exhibit 4. Groundwater Monitoring Data for the Study Area, April 20 through May 30, 2017

			WATER TABLE DEPTH BELOW GROUND SURFACE (FEET)							
Date	**Weather**	**Precip. (inches)**	**Well 1**	**Well 2**	**Well 3**	**Well 4**	**Well 5**	**Well 6**	**Well 7**	**Well 8**
4/20/17	Sunny	0.18	11	3	1.167	1.083	--	1.25	1.75	4.5
4/21/17	Sunny	0	11	3	1.167	1.083	--	1.25	1.75	4.5
4/24/17	Sunny	0.13	11.167	3.167	1.083	1.167	--	1.417	1.417	4.25
4/25/17	Sunny	0.01	11.33	3.167	1.25	1.583	2.083	1.417	1.667	4.667
4/27/17	Sunny	0.19	11.5	3.75	1	1.75	2.583	2.25	2.5	5
4/28/17	Sunny	0	11.5	3.583	2.16	2	2.583	2.25	2.75	5.16
5/1/17	Rainy	0.05	11.75	4.083	2.416	2.416	2.83	2.5	2.9166	5.16
5/2/17	Sunny	0	11.83	4.16	2.416	2.416	2.91	2.5	2.916	5.25
5/4/17	Sunny	0.15	11.75	4.083	2.16	2.16	2.583	1.916	2.16	4.83
5/8/17	Sunny	0	12	4.33	2.5	2.416	2.75	2.416	2.583	5.167
5/9/17	Sunny	0	12	4.416	2.5	2.5	2.75	2.416	2.75	5.25
5/11/17	Rainy	0.56	12.16	4.416	2.75	2.66	3.083	2.583	3.083	5.33
5/12/17	Sun/Rain	0	12.25	4.33	2.416	2.5	2.91	2.33	2.583	5.166
5/15/17	Rainy	0.56	12.167	4.25	2.33	2.167	2.416	2.416	2.5	5
5/16/17	Overcast	0.28	12.083	3.583	1.083	0.75	1.16	0.66	0.75	3.583
5/18/17	Sunny	0	12	3.83	1.5	1.33	1.66	1.16	1.5	4.33
5/19/17	Sunny	0	12	3.916	1.83	1.583	2.083	1.5	1.75	4.66
5/22/17	Sunny	0	12.16	4.33	2.33	2.25	2.66	2.16	2.66	5.16
5/25/17	Sunny	0	12.25	4.583	2.66	2.75	3.16	2.66	3.16	5.5
5/26/17	Sunny	0	12.33	4.66	2.66	2.75	3.25	2.75	3.25	5.66
5/30/17	Overcast	0	12.66	4.916	3.16	3.083	3.416	3.16	3.583	5.83



Legend

Study Area
Groundwater Monitoring Well
Streets

NRCS Soil Classification
Edmonds-Woodlyn loams, 0 to 2 percent slopes
Fishtrap muck, drained, 0 to 2 percent slopes
Hale silt loam, drained, 0 to 2 percent slopes
Laxton loam, 0 to 3 percent slopes
Lynden-Urban land complex, 0 to 3 percent slopes
Lynnwood sandy loam, 5 to 20 percent slopes
Tromp loam, 0 to 2 percent slopes

Exhibit 5.
Mapped Soil Classifications and Groundwater Monitoring Well Locations in the Vicinity of the Pepin Creek Sub-Area.

0 450 900 1,800
Feet

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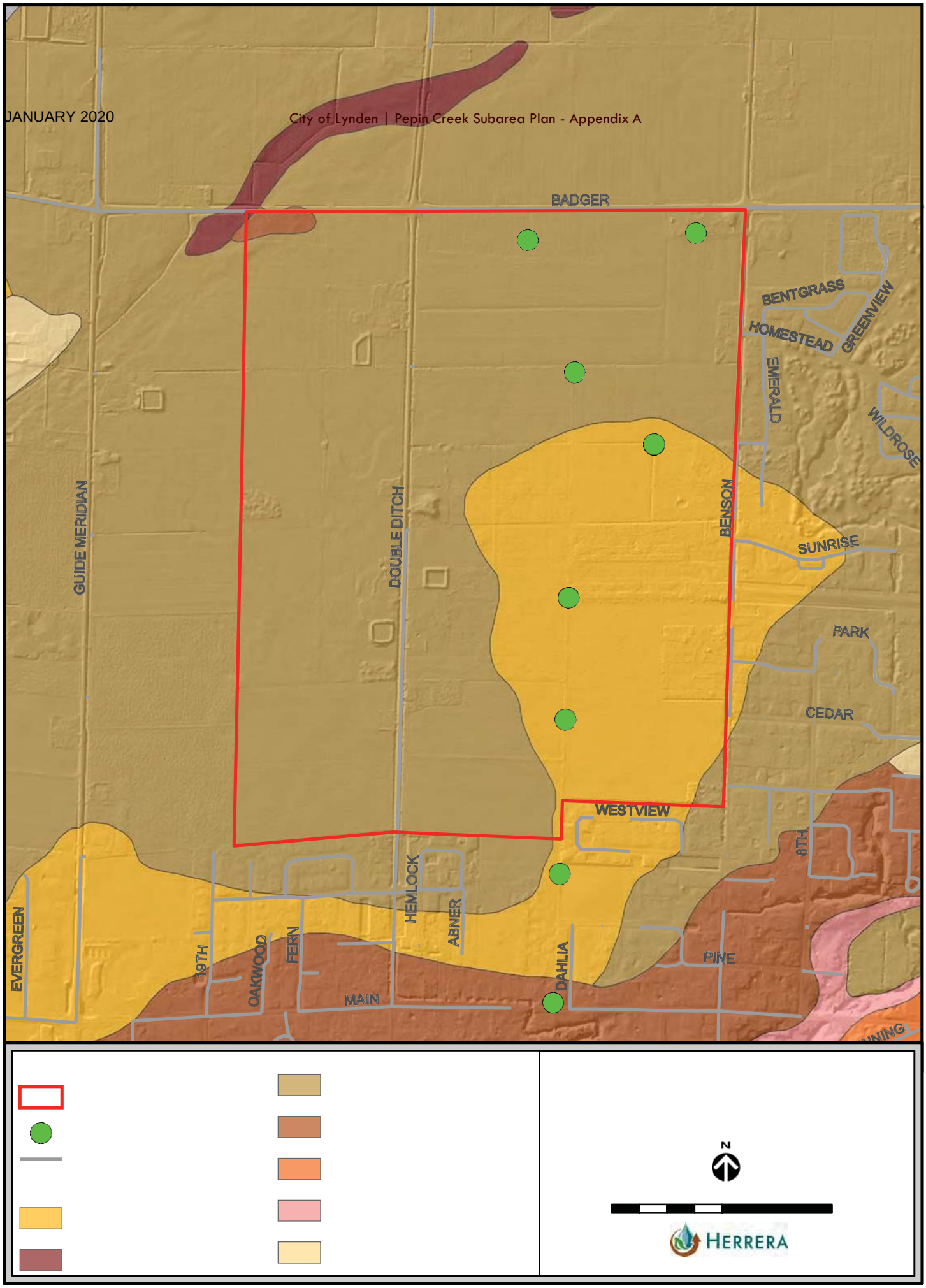

BADGER
BENTGRASS
HOMESTEAD
GREENVIEW
EMERALD
WILDROSE
GUIDE MERIDIAN
DOUBLE DITCH
BENSON
SUNRISE
PARK
CEDAR
WESTVIEW
9TH
HEMLOCK
ABNER
EVERGREEN
19TH
OAKWOOD
FERN
MAIN
DAHLIA
PINE
N
HERRERA

Topography and Soils

LiDAR imagery obtained from Puget Sound LiDAR Consortium shows that the study area gradually slopes to the south toward the Nooksack River. Elevation ranges from 65 to 116 feet above sea level (PSLC 2017).

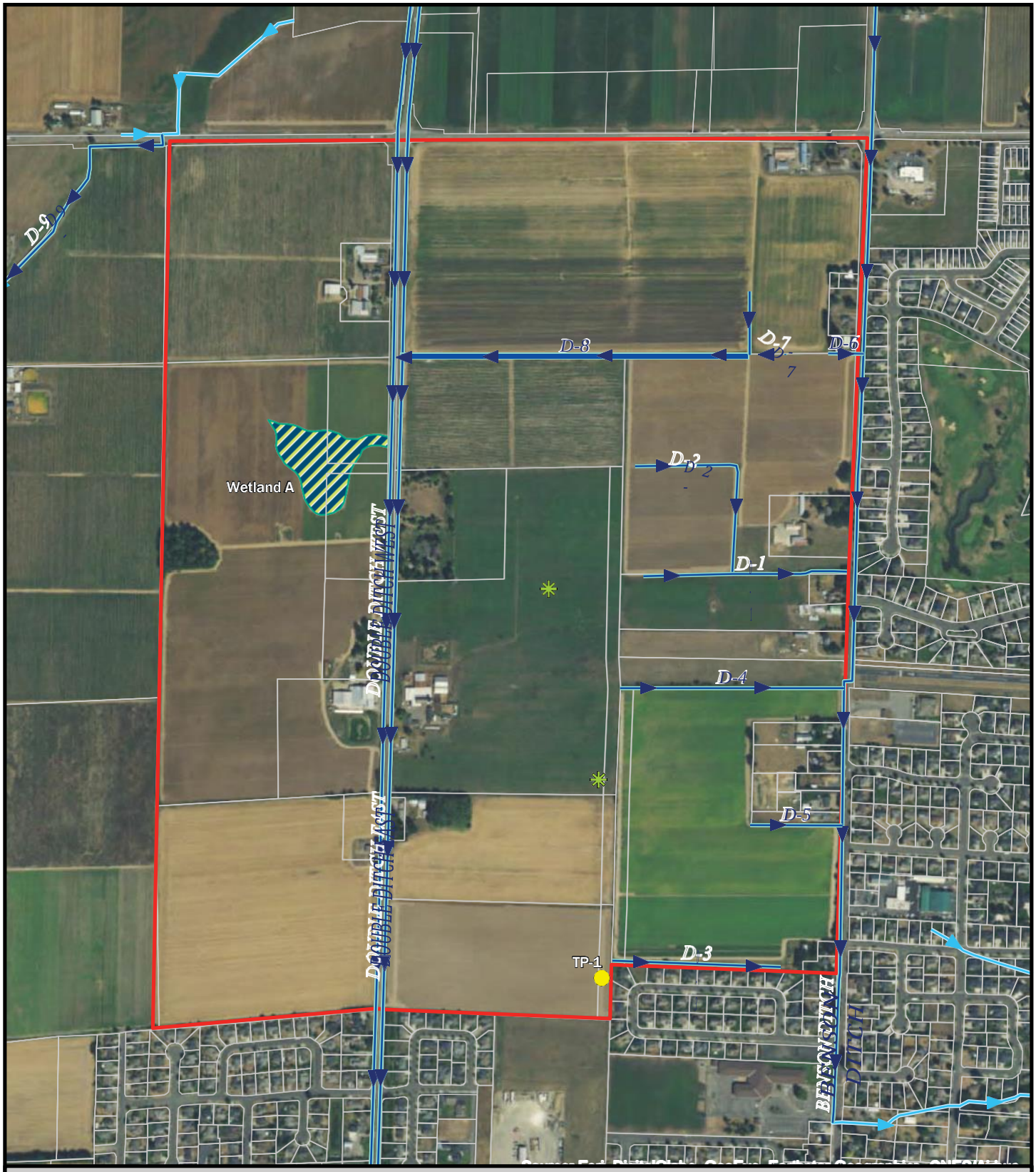
The Natural Resources Conservation Service (NRCS) classifies soils by hydric rating, which is useful in determining the presence of wetland soils in support of wetland determinations. The hydric rating indicates the percent of the map unit that meets the NRCS criteria for hydric soils (NRCS 2017b). Soil survey maps show that about two-thirds of site is rated as 88 percent hydric, corresponding to the Hale silt loam map unit, and about one-third of the site is rated as 34 percent hydric, corresponding to the Edmonds-Woodlyn loams map unit (NRCS 2017a) (Exhibit 5). Hydric soil mapping indicates a potential for wetlands to occur within the PCSA because hydric soils are an indicator of wetland presence. However, the NRCS soil mapping also indicates that the Hale silt loam map unit is drained. Therefore, wetland hydrology may not be present within that map unit, depending on the extent of drained conditions. A formal wetland determination, including an evaluation of hydric soil, wetland hydrology, and hydrophytic vegetation indicators, is necessary to confirm wetland presence.

4.1.2. Reconnaissance-Level Field Investigation

Potential Wetland Areas

Herrera biologists observed a depressional and swale-like feature west of Double Ditch Road with saturated soil, localized ponding, and emergent vegetation; it is shown as Wetland A on Exhibit 6. The area corresponds to the emergent wetland mapped by NWI (USFWS 2017) and Whatcom County (2017). The swale connects to Double Ditch West. In addition, localized depressions containing surface water and/or saturated soils were observed, indicating areas of potential wetlands, but a detailed investigation was not possible due to limited access. In addition, wetland habitat conditions were commonly observed along ditches occurring within the PCSA. Based on the potential for a high groundwater table during the early growing season and presence of mapped hydric soils, it is possible that other wetlands are present in the study area. Further investigation and a formal wetland determination followed by delineation are necessary to confirm wetland presence.

Herrera biologists searched for the ponded wetland that was mapped by NWI and Whatcom County (Exhibit 2) but did not find a pond at that location.



Legend

- Study Area
- Parcels
- Observed Wetland
- Observed Streams and Ditches
- Streams and Ditches (City of Lynden)
- TP-1 (Test Pit)
- Observed Ponding and Surface Soil Saturation

Exhibit 6.
Wetlands, Streams, and Ditches Observed in the Study Area.

N

0 400 800 1,600 Feet

HERRERA

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Soils

The test pit shown on Exhibit 6 was dug in an area that is mapped as Edmonds-Woodlyn loams. The hydric rating for that map unit is 34 percent hydric. Soil in the top 16 inches of the test pit was dark brown (7.5YR 3/2) silt loam. Saturation was present at 6 inches below the surface; however, an underlying water table was not observed in the test pit. From 16 to 24 inches, the soil was brown (7.5YR 5/2) silt loam with 40 percent prominent, strong brown (7.5YR 4/6) redoximorphic features. The soil in the test pit does not meet the criteria for a hydric soil (USACE 2010).

4.1.3. Wetland Classification and Buffers

According to the Ecology wetland rating system (Hruby 2014), a preliminary rating of Category IV applies to Wetland A west of Double Ditch Road and wetlands lining ditches in the PCSA. The rating is based on moderate level of functions for water quality improvement, low to moderate level of hydrologic function, and low to moderate level of habitat functions. According to the Hydrogeomorphic Classification system (Brinson 1993), Wetland A is a depressional wetland and the ditch wetlands are either depressional or riverine. Wetland A and the ditch wetlands are palustrine emergent wetlands according to the USFWS classification system (Cowardin et al. 1979). Standard wetland buffers are based on classification (rating) (LMC 16.16.300). For Category IV wetlands, the standard buffer width is 25 feet.

4.2. FISH AND WILDLIFE HABITAT CONSERVATION AREAS

FWHCAs noted during the site reconnaissance include streams and ditches in the study area. Those aquatic resources include WDFW priority habitats for federal and state listed species (WDFW 2017a), and documented habitat for locally important species according to the LMC. Wetland habitats that are also designated as FHWCAs are subject to the wetland requirements established in LMC 16.16.260 through 16.16.310; they are described in the *Wetlands* section, above.

The terrestrial habitats in the study area consist of agriculture, grassland, and pasture. They provide habitat for a variety of bird species but are not documented WDFW Priority Habitats or habitats for species of local importance according to the LMC. Therefore, this section focuses on the Double Ditch and Benson Ditch systems.

4.2.1. Background Information

The Double Ditch and Benson Ditch systems generally consist of manmade roadside or farm ditches from the US-Canada border to Main Street in Lynden. The ditches are characterized as straight, prismatic channels with relatively low roughness, typically grass-lined and armored, with little or no shading or flow complexity (NLWID 2010). The ditch systems were constructed beginning in the late 19th Century to drain wetlands and support agricultural expansion into the area north of the Nooksack River (Hawley 1945). There are numerous road and farm access crossings along Double Ditch West, Double Ditch East, and Benson Ditch, many of which act as hydraulic constrictions during periods of high flow (NHC 2014). The NWI identifies Double Ditch West and Benson Ditch as deepwater habitats occurring in the study area (Exhibits 2 and 3).

Pepin Creek originates in Canada and flows southwest to the US-Canada border. Between the border and Main Street in Lynden, Pepin Creek is conveyed by two parallel farm ditches, Double Ditch West and Double Ditch East. The two ditches join at Main Street and flow along the north side of Main Street before passing through a box culvert. Downstream of Main Street, the stream becomes steeper and more confined before discharging into Fishtrap Creek (NHC 2014). According to the Whatcom County fish habitat conservation areas map, Double Ditch West and Double Ditch East are fish-bearing streams with current known distribution (Whatcom County 2017). Documented presence of salmonids in Double Ditch East includes fall Chinook salmon (spawning), winter steelhead (spawning), coho salmon (rearing), and fall chum salmon (WDFW 2017b). In addition, the presence of bull trout is presumed. Fall chum salmon and bull trout presence is presumed in Double Ditch West; and modeled presence of salmonids includes winter steelhead, bull trout, pink salmon, and fall Chinook salmon (WDFW 2017a). In addition, two species of rare sucker, the Nooksack Dace and Salish Sucker, have been observed in Double Ditch (NLWID 2010). Federal and state listing status of fish species are shown in Exhibit 7.

Benson Ditch is generally a single roadside ditch along Benson Road that begins near the US-Canada border. Benson Ditch flows south along the east side of Benson Road until just south of the Lynden airport, where it crosses to the west side of the road. The ditch is directed toward Fishtrap Creek south of Isom Elementary School. According to the Whatcom County fish habitat conservation areas map, Benson Ditch has presumed potential/historical distribution of fish (Whatcom County 2017). Benson Ditch is modeled habitat for winter steelhead, pink salmon, coho salmon, and bull trout (WDFW 2017b). The ditch is typically dry from mid-June to early October (NLWID 2010).

Exhibit 7. Federal and State Listing Status of Fish in the Study Area.

FISH SPECIES	FEDERAL STATUS	STATE STATUS
Puget Sound Chinook	Threatened	Species of Concern
Puget Sound steelhead	Threatened	none
Bull trout	Threatened	Species of Concern
Coho salmon	none	none
Pink salmon	none	none
Fall chum	none	none
Salish sucker	none	State monitored
Nooksack dace	none	none

Source: WDFW 2017c

Habitat conditions in Double Ditch and Benson Ditch were assessed for the North Lynden Watershed Improvement District Drainage and Fish Habitat Management Plan (NLWID 2010). Results of those investigations are presented in Exhibit 8.

Exhibit 8. Ditch Characterization from North Lynden Watershed Improvement District Drainage and Fish Habitat Management Plan.

	DOUBLE DITCH[1]	BENSON DITCH[2]
Habitat Conditions	Minimal habitat. Long glide sections with minimal riffles. Fine sand and silt substrate. Reed canarygrass encroaches into channel during summer.	Minimal habitat. This reach is usually dry from mid-June to early October.
Riparian Characteristics	Predominately reed canarygrass. Small areas with trees and shrubs associated with home landscaping.	Mostly grasses. Some woody vegetation where the ditch passes by farmsteads and homes.
Fish Passage Barriers	None	None
Spawning Habitat	Very limited due to lack of riffles, poor quality substrate	None
Fish Utilization	Transit, rearing for salmon and trout	Winter rearing for salmon and trout

1 The east and west branches of Double Ditch within the study area
2 Benson Ditch from East Badger Road to East Boundary Road (north of the study area)

4.2.2. Reconnaissance-Level Field Investigation

Within the study area, Herrera biologists identified Double Ditch (East and West), Benson Ditch, and nine connecting lateral/tributary ditches (see Exhibit 6). Characteristics of the ditches in the study area are summarized in Exhibit 9.

Exhibit 9. Ditches in the Study Area.

NAME	FLOWS TO	WIDTH OF OHWM	FLOW, SATURATION	WETTED DEPTH	NOTES
Benson Ditch	Fishtrap Creek	7 feet	Seasonal	12 inches	Glide habitat, fine substrate, iron bacteria
D-1	Benson Ditch	4.5 feet	Seasonal, saturated	N/A	Wetland fringes, no OHWM west of a concrete culvert that enters south of the barn.
D-2	D-1, Benson Ditch	1.8 feet	Seasonal, saturated	N/A	North-south segment contains wetland fringes, vegetated with pasture grasses and RCG. East-west segment is unvegetated.
D-3	No outlet	No evident OHWM	Seasonal, saturated	N/A	Wetland habitat, vegetated with RCG, one cedar growing in ditch. Eastern end of the ditch is filled in at new housing development.
D-4	Benson Ditch	3 feet	Seasonal, saturated	N/A	Wetland fringes, vegetated with RCG. Width of wetland including ditch is 9 feet near Benson Road.
D-5	Benson Ditch	No evident OHWM	Seasonal, saturated	N/A	Did not have permission to access. Wetland fringes, vegetated with RCG, observed from Benson Road.
D-6	Benson Ditch	No evident OHWM	Seasonal, saturated	N/A	Ditch is filled in except for a small section near Benson Road. There are signs of flooding on adjacent field.
Double Ditch East	Pepin Creek	11 feet	Perennial	16 inches	Wetland fringe is 1 to 2 feet wide on each side. Steep banks.
Double Ditch West	Pepin Creek	6.6 feet	Perennial	26 inches	Wetland fringe is 1 to 2 feet wide on each side. Steep banks.
D-7 north-south segment	Double Ditch East	3.5 feet	Seasonal, saturated	N/A	Wetland fringes, vegetated with RCG, cottonwood saplings.
D-7 east-west segment	Double Ditch	2.5 feet	Seasonal, saturated	N/A	Wetland fringes, vegetated with RCG.
D-8	Double Ditch	5 feet	Seasonal, saturated	N/A	Bare substrate transitioning to RCG-filled ditch to the west. Water observed in ditch near Double Ditch Road.
D-9	Bertrand Creek	6 feet	Seasonal, standing water	3 inches	1- to 2-foot wetland fringe along each site. Substrate is fine sand, small gravel.

N/A = Not applicable, no flow observed during site visit or no access; OHWM = ordinary high water mark; RCG = reed canarygrass

4.2.3. Stream Classification and Buffers

Streams designated as FWHCAs according to LMC 16.16.330 were classified. Stream classes and corresponding standard buffer widths are presented in Exhibit 10.

Exhibit 10. Preliminary Stream Classes and Standard Buffers for Ditches in the Study Area.

STREAM/DITCH	STREAM CLASS (CITY OF LYNDEN)	RATIONALE	BUFFER WIDTH (FEET)
Benson Ditch	Class B	Seasonal habitat for anadromous or resident fish populations	100
D-1	Class B	Seasonal habitat for anadromous or resident fish populations. Connects to Benson Ditch, no barriers present	100
D-2	Class B	Seasonal habitat for anadromous or resident fish populations. Connects to Benson Ditch via D-1, no barriers present	100
D-4	Class B	Seasonal habitat for anadromous or resident fish populations. Connects to Benson Ditch, no barriers present	100
D-5	Class B	Seasonal habitat for anadromous or resident fish populations. Connects to Benson Ditch, no barriers present	100
D-6	Class C	Fish presence unlikely, limited habitat	50
Double Ditch East	Class A	Documented fish presence, federally listed species	150
Double Ditch West	Class A	Documented fish presence, federally listed species	150
D-7	Class C	Fish presence unlikely. The ditch is partially filled in, no connection with fish bearing waters.	50
D-8	Class B	Seasonal habitat for anadromous or resident fish populations	100
D-9	Class B	Seasonal habitat for anadromous or resident fish populations. Connects to Bertrand Creek	100

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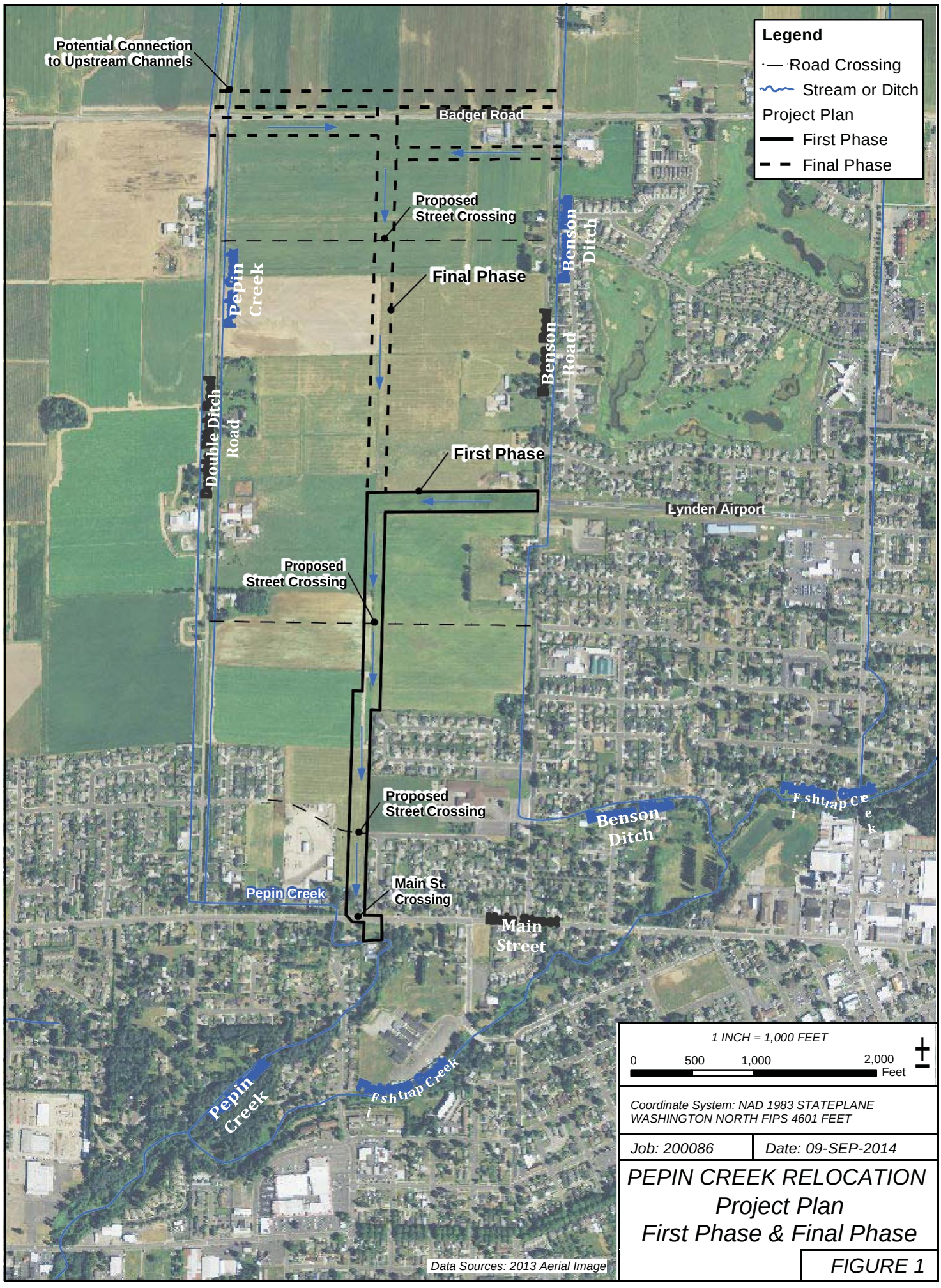
Legend
Road Crossing
Stream or Ditch
Project Plan
First Phase
Final Phase
Potential Connection to Upstream Channels
Badger Road
Proposed Street Crossing
Final Phase
Pepin Creek
Benson Ditch
Benson Road
Double Ditch Road
First Phase
Lynden Airport
Proposed Street Crossing
Proposed Street Crossing
Benson Ditch
Fishtrap Creek
Pepin Creek
Main St. Crossing
Main Street
Pepin Creek
Fishtrap Creek
1 INCH = 1,000 FEET
0
500
1,000
2,000
Feet
Coordinate System: NAD 1983 STATEPLANE WASHINGTON NORTH FIPS 4601 FEET
Job: 200086
Date: 09-SEP-2014
PEPIN CREEK RELOCATION
Project Plan
First Phase & Final Phase
FIGURE 1
Data Sources: 2013 Aerial Image
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Appendix B – Council Workshop

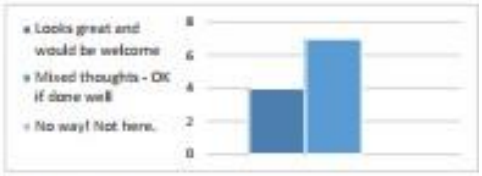
Session Name: New Session 11-30-2017 8-54 PM
Date Created: 11/30/2017 6:48:42 PM

Active Participants: 12 of 12
Questions: 7

Results by Question

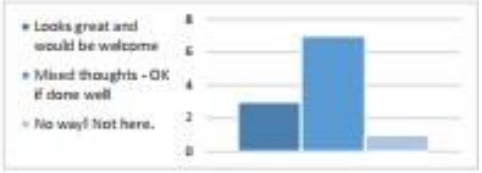
1. Small Lot Housing (Multiple Choice)

	Responses Percent	Count
Looks great and would be welcome	36%	4
Mixed thoughts - OK if done well	64%	7
No way! Not here.	0%	0
Totals	100%	11



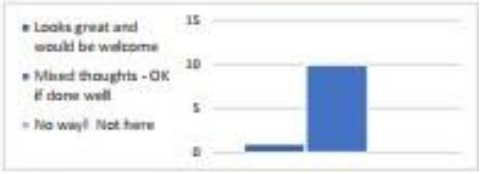
2. Detached Cottage Lots (Multiple Choice)

	Responses Percent	Count
Looks great and would be welcome	27%	3
Mixed thoughts - OK if done well	64%	7
No way! Not here.	9%	1
Totals	100%	11



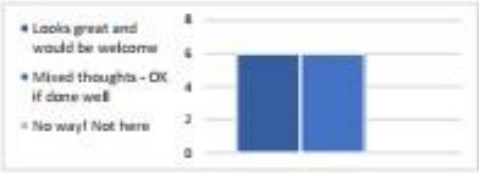
3. Townhome Lots (Multiple Choice)

	Responses Percent	Count
Looks great and would be welcome	9%	1
Mixed thoughts - OK if done well	91%	10
No way! Not here	0%	0
Totals	100%	11



4. Attached / Clustered (Multiple Choice)

	Responses Percent	Count
Looks great and would be welcome	50%	6
Mixed thoughts - OK if done well	50%	6
No way! Not here	0%	0
Totals	100%	12



5. Mixed Housing with Density (Multiple Choice)

	Responses Percent	Count
Looks great and would be welcome	0%	0
Mixed thoughts - OK if done well	33%	4
No way! Not here	67%	8
Totals	100%	12

6. Stacked Units (Multiple Choice)

	Responses Percent	Count
Looks great and would be welcome	0%	0
Mixed thoughts - OK if done well	9%	1
No way! Not here	91%	10
Totals	100%	11

7. What unit count should be our goal in Pepin Creek? (Multiple Choice)

	Responses Percent	Count
1,100 - 1,300	0%	0
1,300 - 1,700	8%	1
1,700 - 2,000	92%	11
Totals	100%	12

Appendix C – Transportation Analysis

As identified in the Existing Conditions Report in Appendix A, there are few roads serving the study area given its low intensity and agricultural development pattern. The Lynden Comprehensive Plan anticipates the need for transportation improvements in the PCSA. The Transportation Element forecasts growth of up to 1,096 households in the Subarea, which will require roadway improvements that support cars, bicycles, and pedestrians. Lynden's Transportation Element is focused on intersection operations though adequate road extensions and design are also considered.

The County and cities tested different growth in the PCSA to support Comprehensive Plan Updates in 2016 with results included in an Environmental Impact Statement (EIS). Assumptions of different plans and studies regarding future growth are noted below.

Pepin Creek Growth Assumptions – Transportation Modeling

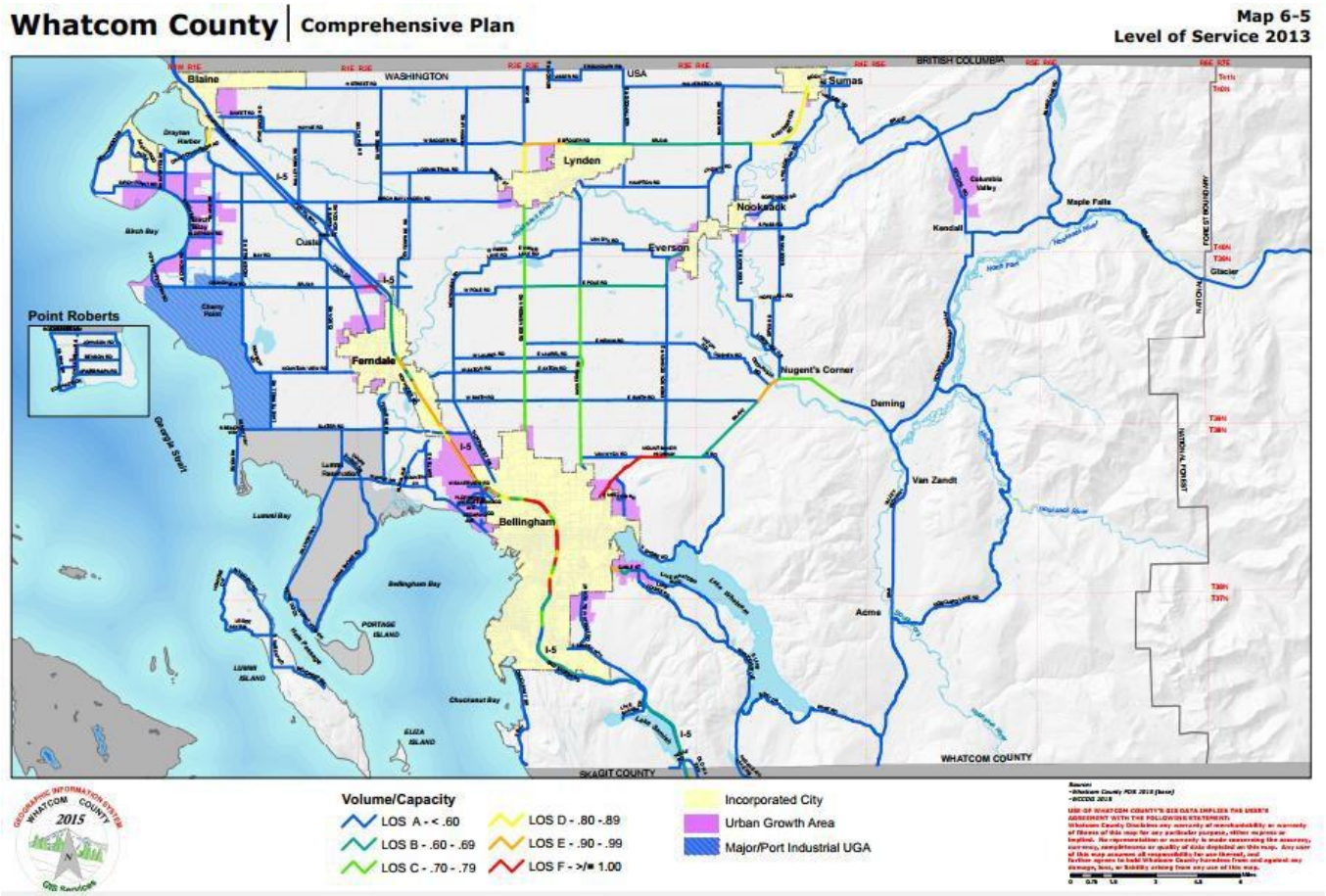
Scenario	Households
Whatcom County Alternative 1: 2013 No Action 2016	578
Whatcom County Alternative 2: Historic Shares 2016	727
Lynden Transportation Element 2016 Whatcom County Alternative 3: Multi-Jurisdictional Resolution 2016	1,096
Whatcom County Alternative 4 Targeted Land Use Change 2016	1,433
Whatcom County Preferred Alternative 2016	927
Pepin Creek Subarea Evaluation (WCOG) 2019	1,559

Source: Whatcom County Land Capacity Analysis and Transportation Analysis Zone Assumptions, 2016; Lynden Transportation Element, 2016; WCOG, 2019.

At a countywide scale, the 2016 analysis focused on the volume/capacity (V/C) ratios of roadways. To calculate the V/C of a road segment, projected weekday afternoon peak-hour traffic volume is divided by the road's hourly carrying capacity. Roadway level of service (LOS) designations range from unrestricted flow of traffic (LOS A) to stop-and-go traffic (LOS F). At LOS C or better, a road segment is less than 80% full (or a V/C less than 0.80). The flow of traffic is generally stable, though individual users are significantly affected by the presence of other vehicles. At LOS D, the volume-to-capacity ratio is greater than or equal to 0.80 but less than 0.90. At LOS D, small increases in flow may cause some delays and decreases in speed during the afternoon peak hour. The adopted level of service is C for rural arterials and collectors, and D for rural primary routes and urban arterials.

Results of the Preferred Alternative tested in 2016 indicated roadway operations at LOS C or better except that Guide Meridian Road functioned at LOS D between the city limits and East Badger Road, and East Badger Road operated at LOS E between Guide Meridian and the city limits as shown below.

Exhibit 2~~8~~9. Whatcom County Transportation Analysis Map



Additional analysis of other alternatives can be found in the 2016 Comprehensive Plan and Development Regulations Update and Urban Growth Area (UGA) Review EIS.

Recognizing the more focused subarea planning effort for the PSCA, the City of Lynden engaged the Whatcom Council of Governments (WCOG) to test greater numbers of households, evaluating about 1,969 households, or 1,042 above the Preferred Alternative evaluated in a 2016 Final Environmental Impact Statement. The households tested represent an occupancy rate of 97% of the 2,020 housing units the upper range considered in fall 2017.

The range of units and trips tested in the 2016 EIS and in 2018 for the Subarea Master Plan is listed below.

Exhibit 3029. Housing Units, Households and Trips

Alternative	Housing Units	Households	Trips
Whatcom County Alternative 1 2013 No Action	594	578	75
Whatcom County Alternative 2 Historic Shares	745	727	101
Whatcom County Alternative 3 Multi-Jurisdictional Resolution (Lynden Transportation Element)	1,124	1,096	156
Whatcom County Alternative 4 Targeted Land Use Change	1,470	1,433	206
Whatcom County Preferred Alternative 2016	951	927	132
Pepin Creek Subarea Master Plan (maximum tested)	1,600	1559	224

Source: WCOG, 2019.

In addition to the regional network tested in the 2016 EIS, WCOG added the effect of additional road extensions including the development of Pepin Parkway from Homestead Blvd and extended through the subarea to Double Ditch Road at the point of the bridge anticipated to cross Pepin Creek. The connection of Double Ditch Road to Badger Road is deleted.

Most of the units were added in the northern half of the study area. The results of the 2019 analysis by the WCOG indicated general consistency with the Preferred Alternative results, and:

- Congestion relief on most of Double Ditch Road
- Congestion relief on most of Benson Road
- Slight volume increase on Benson Road between Badger Road and Homestead Blvd.
- Volume increase on Double Ditch Road between the proposed Pepin Parkway and Main Street.

Overall, the WCOG found the model showed sufficient capacity.

Appendix D – Financial Analysis

~~To understand whether development will be feasible under the assumption that developers will pay the remaining cost of all improvements to support development, BERK completed a development feasibility analysis to estimate the level of City investment, if any, that is needed to make development of the Pepin Creek Subarea feasible. Since development feasibility analysis is by nature speculative, it has been completed to an order-of-magnitude precision, with final values rounded to the nearest 1,000. Where per square foot values are estimated, they are rounded to the nearest 0.10.~~

~~The subarea is 460 acres of which we expect approximately 270 acres to be developable. The remaining acreage is undevelopable for two reasons:~~

- ~~Infrastructure to support new development will consume a portion of the acreage.~~
- ~~Some of the land is unsuitable for development for environmental reasons.~~

~~The remaining acreage still must be purchased by the developer(s), as it is either where the necessary transportation and utility infrastructure for the development will be sited or it is, realistically, to be sold part and parcel with the developable land. Additionally, this land is where the environmental improvements needed to make the subarea developable, like the Pepin Creek downstream stabilization and realignment, will occur.~~

~~This share of undevelopable land, coupled with the variation in development allowable based on a midrange land use scenario, which assumes 1,381 new housing units for the development, means that not all the land will have the same value. However, as the developer will ultimately be responsible for all the infrastructure, it is to be expected that they will need to factor the cost of all the land into their feasibility assessment. For this reason, the currently undevelopable land is valued as if it is all created equally on a square footage basis.~~

~~The total land value per the Whatcom County Assessor is $9,775,483. The assessor's value for this property is likely to be low for two reasons:~~

- ~~It is generally accepted that Whatcom County Assessor's property assessments, like all county assessments in Washington state, are conservative. Coupled with the Whatcom County Assessor's assessment, whereby 1/6th of County's properties are annually physically inspected, leading to somewhat stale assessment values, it is expected that the assessment would be modestly below market value.~~
- ~~Both the City of Lynden's 2016 Comprehensive Plan and the forthcoming Pepin Creek Subarea Plan will signal to the market that the Pepin Creek Subarea is the next logical site for development in the City of Lynden. The subarea's updated zoning, which will allow for more intensive development than elsewhere in the city, increases the development potential of the land and its value.~~

~~One of the parcels within the subarea, the Bovenkamp property, recently sold for 133% above market value, confirming that the Whatcom County Assessor's assessments for these properties are likely significantly under market value. To account for this potential undervaluing, we assumed that the land will cost between 125% and 150% more than the Whatcom County Assessor estimates, for a total land value (rounded to the nearest $1,000 of $21,995,000 to $24,439,000).~~

~~BERK then added the estimated cost of the infrastructure investments needed to make the land developable. The total infrastructure costs are $98,229,000; developers will also need to contribute up~~

to $17,139,591 in utility connection fees for water, sewer, and stormwater to support the development. The desire is that developers will bear these costs fully, except for an already-committed contribution of $16,810,709 from the City to support the regional and local road improvements, and the creek realignment and downstream stabilization. Because this feasibility assessment seeks to identify the City of Lynden's contributions to those infrastructure costs, if any, that will be necessary to support the development there are two bounds identified for this analysis:

- Threshold Feasibility. Developers can buy the land and pay their existing commitments, for a total cost of between $74,470,000 and $76,914,000.
- Full Feasibility. Developers can buy the land and pay the total infrastructure costs less the existing city commitment, for a total cost of between $120,553,000 and $122,997,000.

These analytic bounds and the resulting cost per square foot of developable land are shown in Exhibit 30.

Exhibit 30. Cost per Square Foot of Developable Land

	Threshold Feasibility (Existing Developer Commitment)		Full Feasibility (Total Infrastructure Costs less Existing City Commitment*)	
	Low	*High*	*Low*	*High*
Total Land Value	$ 21,995,000	$ 24,439,000	$ 21,995,000	$ 24,439,000
Total Infrastructure Costs	$ 52,475,000	$ 52,475,000	$ 98,558,000	$ 98,558,000
TOTAL COST	$ 74,470,000	$ 76,914,000	$ 120,553,000	$ 122,997,000
Cost per Square Foot of Developable Land	$ 6.40	$ 6.60	$ 10.30	$ 10.50

Source: Whatcom County Assessor's Office, 2018; and BERK Consulting, 2019.

The values above present a range of costs for the developable land. For the project to be feasible under the bounds of the analysis, the value of the land must be greater than its costs, based on the assumption that developers will not pursue a project unless it is profitable. Since the value of the developable land is not known, the analysis compares the cost of the developable land to the value of land in comparable developments. BERK identified six comparable developments for the purposes of this comparison, including:

- Homestead – Lynden, WA
- Pacific Highlands – Ferndale, WA
- Pacific Heights – Ferndale, WA
- Skyview – Ferndale, WA
- Douglas Place – Ferndale, WA
- South Douglas – Ferndale, WA

Whatcom County Assessor's data provides approximate land values for the land in these comparable developments. It is expected that the assessments for these properties also significantly under values the land. Because the land is already developed, it is expected that that undervaluing is not nearly as significant. The Whatcom County Assessor's potential undervaluing of the land is accounted for by adjusting these values upward by a low value of 25% and high of 50%.

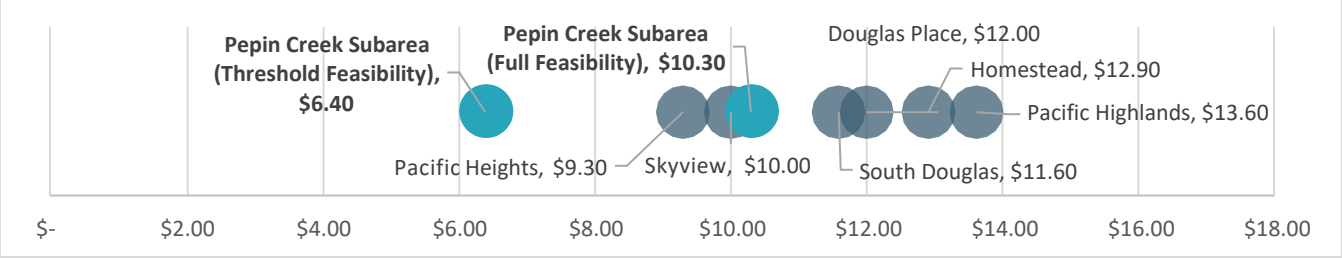
Exhibit 31. Per Square Foot Land Values for Comparable Developments in Whatcom County

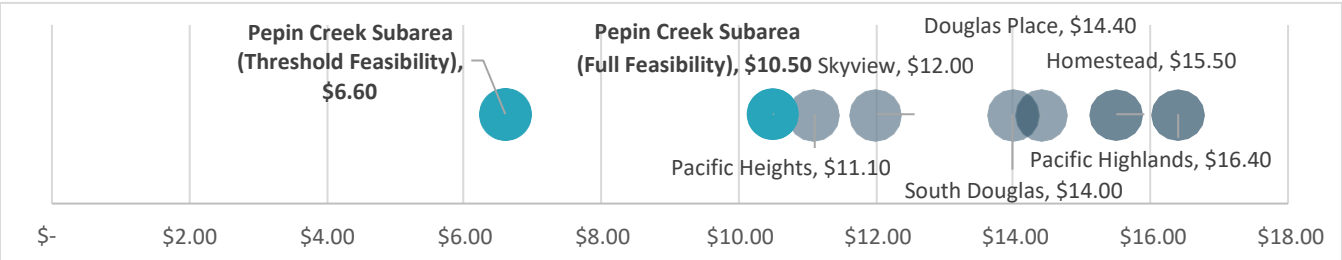
~~Comparable Development City Per Square Foot Land Value~~

~~Source: Whatcom County Assessor's Office, 2018; and BERK Consulting, 2018.~~

~~These potential values can then be compared to the per square foot values estimated for the cost of the Pepin Creek Subarea land, as shown in Exhibit 30.~~

~~**Exhibit 32. Comparison of Pepin Creek Subarea Developable Land Costs to Land Values in Comparable Developments (Low (top), based on 25% adjustment to Assessor's value, and High (bottom), based on 50% adjustment to Assessor's values)**~~





~~The comparison shows that in both feasibility scenarios (threshold and full feasibility), the Pepin Creek subarea developable land value is on the lower end and within the values of comparable developments. It is important to remember that cost of the land and value of the land are not the same thing, as the former does not account for the developer's profit. It is expected that for this project to be feasible the future value of the land must be within the values of comparable developments. Profit is not factored into this because developer's expectations for profit for this kind of development are not known.~~

Source: Pepin Creek Financial Mitigation Strategies Study. BERK Consulting, Inc February 11, 2021

To help indicate whether the planned capital projects will inhibit development, BERK analyzed comparable development costs from other housing and mixed-use developments within the region. The underlying assumption to this analysis is that the costs of existing infrastructure investments are capitalized into the land value. By comparing the fully developed land value for similar existing housing developments with the xpected market value of the land within the Subarea plus necessary infrastructure and permitting development costs, some indication of the relative developer burden can be found.

The subarea is 460 acres of which we expect approximately 307 acres to be developable. The remaining acreage is undevelopable for two reasons:

- Infrastructure to support new development will consume a portion of the acreage.
- Some of the land is unsuitable for development due to critical areas (e.g. wetlands).

This undevelopable land, coupled with the variation in development allowable based on the theoretical midrange land use scenario, which assumes 1,568 new housing units for the development, means that not all the land will have the same value. However, as the developer will ultimately be responsible for all the infrastructure , it is to be expected that they will need to factor the cost of all the land into their feasibility assessment. For this reason, the currently undevelopable land is valued as if it is all created equally on a square footage basis.

The 2017 total land value per the Whatcom County Assessor is $8,172,000. The assessor's value for these properties is likely to be low for two reasons:

- Whatcom County Assessor's property assessments are likely conservative, as shown by a comparison of sale values and assessed values. Coupled with the conservative assessment, Whatcom County Assessor's assement schedule is to inspect 1/6th of County's properties annually, leading to a lag in assessment values.
- Both the City of Lynden's 2016 Comprehensive Plan and the Pepin Creek Subarea Plan will signal to the market that the Pepin Creek Subarea is the next logical site for the development in the City of Lynden. The subarea's updated zoning, which will allow for more intensive development than elsewhere in the City, increases the development potential of the land and its value.

One of the parcels within the subarea, the Boenkamp property, sold for $3,500,000, significantly above the Whatcom County Assessor's assessed market value. On a developable per acre basis, the Bovenkamp property sold for 199% more per acre than the per developable acre value for the Subarea as a whole. Another pending sale if 656% more per acre. To account for this potential undervaluaing, BERK used these two values, 199% and 656%, as the lower and upper bounds to estimate the market value of the Subarea developable acreage.

BERK then added the estimated cost of the infrastructure investments needed to make the land developable under City plans and requirements. This infrastructure cost includes regional road improvements beyond those connected to Pepin Creek Lite; inner development roads; water and sewer improvements; stormwater improvements; and utility connection fees. Across the Subarea these costs are estimated to be $52,421,000. The maximum developer portion (98.7%) of the Pepin Creek Lite is $30,085,000; after accounting for a $3,900,000 grant, the assumed Pepin Creek Lite burden assumed in this analysis is $26,185,000.

- **Current Infrastructure and Permitting Development Costs.** Developers can buy the land and pay their existing commitments, for a total cost of between $68,689,000 and $105,990,000.
- **Infrastructure and Permitting Development Costs Including Pepin Creek Lite.** Developers can buy the land and pay the total infrastructure costs less the existing city commitment, for a total cost of between $94,874,000 and $132,175,000.

These analytic bounds and the resulting cost per square foot of developable land are shown in Exhibit 31.

Exhibit 31. Cost per Square Foot of Developable Land for Pepin Creek Lite.

	Current Infrastructure and Permitting Development Costs		Infrastructure and Permitting Development Costs Including Pepin Creek	
	Low	*High*	*Low*	*High*
Total Land Value	$16,268,000	$53,569,000	$16,268,000	$53,569,000
Total Infrastructure Costs	$52,421,000	$52,421,000	$78,606,000	$78,606,000
TOTAL COST	**$68,689,000**	**$105,990,000**	**$94,874,000**	**$132,175,000**
Cost per Square Foot of Developable Land	**$5.10**	**$7.90**	**$7.10**	**$9.90**

Note: Square foot costs rounded to the nearest $0.10 and Subarea totals rounded to the nearest $1,000.
Sources: Whatcom County Assessor's Office, 2018; and BERK Consulting, 2021.

The values above present a range of costs for the developable land. For the Pepin Creek Lite project to be feasible under the bounds of the analysis, the value of the land must be greater than its costs, based on the assumption that developers will not pursue a project unless it is profitable. Since the value of the developable land is not known, the analysis compares the costs of the developable land to the value of the land in comparable developments. BERK used the same size comparable developments as identified in the Subarea Plan:

- Homestead – Lynden, WA
- Pacific Highlands – Ferndale, WA
- Pacific Heights – Ferndale WA
- Skyview – Ferndale, WA
- Douglas Place – Ferndale, WA
- South Douglas – Ferndale, WA

Whatcom County Assessor data provides approximate land values for the land in these comparable developments. It is expected that the assessments for these properties also under values the land. However, as the land is already developed and infrastructure costs will be capitalized into the value, unlike the Subarea properties. For this reason, BERK used the Whatcom County Assessor's market land values for these developments, shown in Exhibit 32.

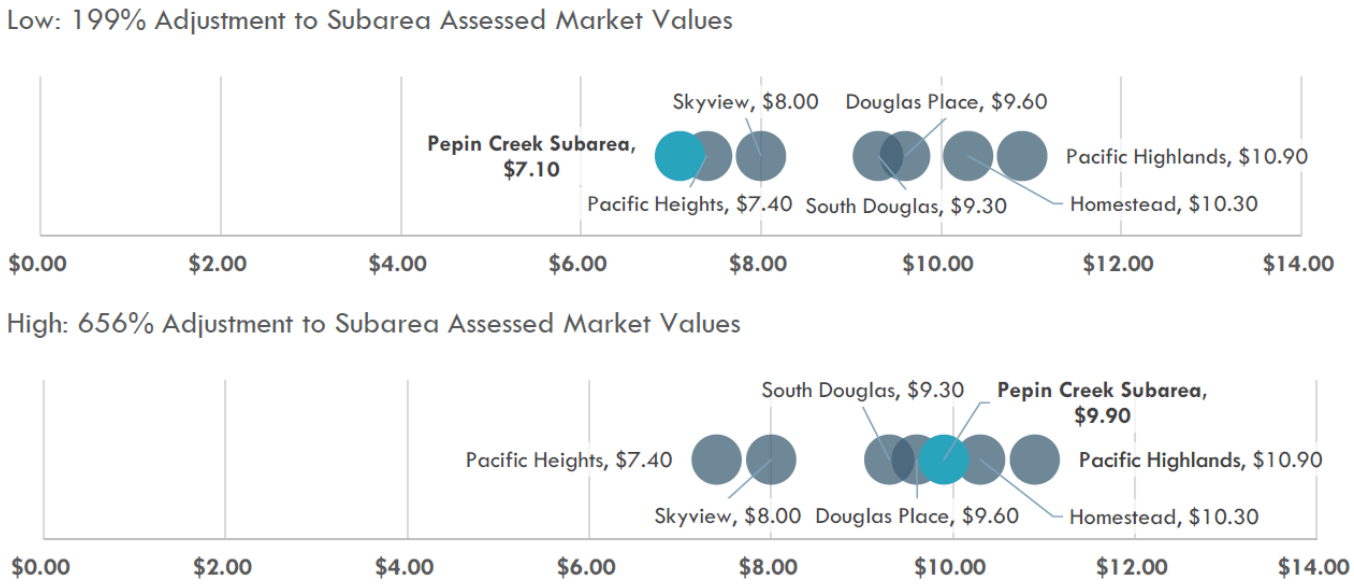
Exhibit 32. Per Square Foot Land Values for Comparable Developments in Whatcom County

Comparable Development	City	Assessor Market per Square Foot Land Value
Pacific Highlands	Ferndale	$10.90
Pacific Heights	Ferndale	$7.40
Skyview	Ferndale	$8.00
Douglas Place	Ferndale	$9.60
South Douglas	Ferndale	$9.30
Homestead	Lynden	$10.30

Note: Square foot costs rounded to the nearest $0.10 and Subarea totals rounded to the nearest $1,000.
Sources: Whatcom County Assessor's Office, 2018; and BERK, 2018.

These potential values can then be compared to the per square foot values estimated for the cost of the Pepin Creek Subarea properties (Exhibit 33).

Exhibit 33. Comparison of Pepin Creek Lite Developable Costs to land Values in Comparable Developments.



Note: Square foot costs rounded to the nearest $0.10 and Subarea totals rounded to the nearest $1,000.
Sources: Whatcom County Assessor's Office, 2018; City of Lynden, 2020; and BERK, 2021.

The comparison suggests that the costs of the City's proposed developments for Pepin Creek Lite will result in development costs comparable to costs that developers were willing to pay in past developments. This analysis can only provide an indication of how the costs of the known and proposed development costs compare with existing developments. Ultimately, developers' decisions will be made based on the market conditions at the time of development.

Appendix E – Flood Hazards

This appendix contains additional information to document the existing conditions related to flooding and flood hazards in the PCSA. The PCSA has experienced significant flooding and water inundation events in the past, which have endangered public safety and damaged or destroyed property. The most recent events were in 2009 and 2005. In 2005, the area was flooded as a result of heavy rainfall coupled with snow and ice melt and frozen ground.

North Lynden Flooding (looking south)

North Lynden Flooding (looking north)

Flooded fields in the PCSA

During this 2005 event, beginning north of the city and extending into Canada both Double Ditch and the Benson Road ditch systems were over-topped allowing water to sheet flow across roads an onto private properties. The drainage systems in developed areas which received the discharged water were not designed to handle such extreme conditions. The Homestead development on the east side of Benson Road north of the airport and the Dahlia Street and Pine Street areas were inundated with water. This flooding adversely affected emergency response, local traffic, and access to residences. Many insurance claims were filed based on the flooding, however, the City's insurance carrier denied the claims citing that the City's storm water system was adequate for the expected storm water volume and the storm event was far in excess of an expected or normal storm water condition. This left many city residents frustrated and without recourse for addressing their property damage.




Homestead Area (Emerald Way), Lynden (Four Photos)

During the 2009 flood event, the PCSA also experienced property damage and road closures:

Woodcreek Drive East

Pine Street

Double Ditch Road and Main Street Intersection – Looking South

The Washington State Growth Management Act (GMA) requires cities to adopt policies and development regulations based on the best available science to protect critical areas. One such critical area designation required by GMA is "frequently flooded areas." Lynden regulates frequently flooded areas within the city that are also part of the National Flood Insurance Program or within the 100-year flood plain designations of the Federal Emergency Management Agency. However, based on the known history of flooding in this basin under certain weather conditions, Lynden recognizes the need to address frequently flooded areas not presently captured in Lynden's current flood management scheme. ~~This need would be addressed through adoption of a flood hazard mitigation overlay.~~

Lynden is required to consider the impacts of flooding and inundations of water prior to subdivision approval and may deny a subdivision application on based on such concerns. Also, the City may go beyond adopted regulations to ensure safety and prevent flood hazards when it is apparent that the regulations are not adequate to deter the type of flooding and inundations of water which occur in the PCSA. Prior to development, landowners ~~within the Flood Hazard Mitigation Overlay designation~~ will be required to implement mitigation measures to address potentially adverse environmental impacts to the natural and built environment.

~~A Flood Hazard Mitigation Overlay is recommended to include the entire PCSA. Its purpose is to~~ Development conditions within the PCSA must recognize and manage the flood hazards associated with a combination of surface flows from north of the city, ground water saturation, frozen and impervious soils, drainage limitations, heavy rainfall, and downstream constraints within the subarea. Based on the past history and these more recent flood records, development in the PCSA without proper mitigation will likely result in significant adverse impacts on area land development (housing and related ingress and egress), transportation (street systems, traffic movement, and traffic hazards) and public services and utilities (police, fire, emergency access, communications, and water and sewer).

~~The Flood Hazard Mitigation Overlay~~Flood area management is intended to assure that development in the subarea is designed and permitted to prevent cumulative negative impacts within the PCSA and the surrounding community. The City has a strong interest in preventing the future flooding of residential neighborhoods, avoiding the life safety concerns associated with flooded public roads and road closures, and protecting public and private property from flood damage, all of which has occurred in past storm events in the PCSA. The City has been working to design infrastructure which would mitigate these flooding events which has been referred to as the "Pepin Creek Realignment Project". Acceptable mitigation strategies for the overlay will be further defined by the City and it is recommended that a subsequent study of potential mitigation for development in the PCSA be completed concurrently with the Pepin Creek Realignment Project design.

~~*Note: A Flood Hazard Mitigation ordinance is likely to be presented for City Council approval concurrently with the Pepin Creek Subarea Plan and will be added to this appendix prior to finalization.*~~