

memo

to **Liane Welch and David Mattison, City of Bay City**
Laura Buhl, DLCD

from **Darci Rudzinski and Emma Porricolo, MIG | APG**

re **Bay City Code Update, Task 1.4 Key Issues Memorandum**

date **05/011/2022**

Introduction

The purpose of the Bay City Code Evaluation and Update Project is to amend the Bay City Development Ordinance (or “code”) to support economic development, expand housing choices, and enhance safe and multi-modal transportation choices. Objectives include achieving more compact development patterns and infill, making efficient use of public utilities and infrastructure, realizing a mix of uses in the Town Center¹, and enhancing safe and convenient travel around the city.

Phase One of the project was completed in 2021. The first phase evaluated the existing development requirements to understand ways the City can better:

- Provide transportation choices;
- Create livable neighborhoods and a lively vibrant Town Center;
- Support economic opportunities and vitality;
- Encourage compact land uses and well-connected transportation routes; and
- Protect natural resources.

Recommendations related to these topics were recorded in the Final Action Plan, dated April 6, 2021. Several recommendations or actions in Phase One raised additional questions or concerns from community members, City decision-makers, and staff. These “key issues” are the subject of this memo.

This memo is intended to take a closer look at select topic areas and issues from Phase One to better understand existing conditions and provide some context related to proposed code modifications. The key issues explored in this memorandum are:

- appropriate locations for middle housing types and increases in residential density;
- building heights;
- infrastructure capacity for higher densities; and
- fee-in-lieu program for required infrastructure improvements.

¹ For this project the Bay City Town Center is considered that are that is covered by the North High Intensity Zone (NHI).

With the help of City Staff, the project team will draft and revise the Development Ordinance to address key issues and barriers to achieving community objectives. Once drafted, the Development Ordinance amendments will be considered by the Planning Commission and City Council at public hearings.

Key Issues Evaluation

For each key issue, background information, identification of the problem statement and research objective, and findings are described.

LOCATIONS FOR MIDDLE HOUSING

Problem Statement

The Bay City community has expressed interest and desire to increase housing supply, particularly workforce housing and affordable housing options.

Objective

The purpose of this section is to evaluate appropriate locations for middle housing in Bay City based on various factors, such as vacant land, zoning, proximity to points of interest.

Background

Housing was a key topic in Phase One of the project. Various community members mentioned concerns about affordability and housing availability in general. The lack of rental opportunities in Bay City was noted as an issue, as well as struggles to find employees in Tillamook County, a situation exacerbated by the lack of workforce housing. A representative from Habitat for Humanity participated in stakeholder interviews and expressed interest in developing more housing in Bay City. Results from the Phase One survey revealed that 41% of survey respondents said middle housing should be permitted in all zones and 29% of survey respondents supported middle housing development in the Medium Intensity (MI) zone.

Housing Need in Bay City

The Tillamook County Housing Needs Analysis (HNA) completed in 2019 included Bay City. The study considered population growth and housing demand and found that 30% of Bay City renters are severely rent burdened.² As shown in Figure 1, there is an estimated need for all types of housing in the City.

Reducing code barriers and thereby expanding opportunities to permit middle housing types can be a tool to address housing availability. Middle housing is not synonymous with affordable housing; however, these housing types can provide more choice for developers, property owners, and residents in Bay City. Additionally, middle housing units can be smaller than single-family homes, providing more affordable housing choices.

² The US Department of Housing and Development defines severely rent burdened at paying more than 50% of one's income on rent.

Figure 1. Tillamook County Housing Land Need Forecast (Source: Tillamook County HNA, Exhibit 2.23)

| Tillamook County 20-year Housing Land Need Forecast at Midpoint | | | | | | | | | | |
|-----------------------------------------------------------------|-------------------------------|----------------------------------------|--------------------------------------------|------------------------------------|-----------------------------|-----------------------------|-------------|----------------|----------------|-----------------------------------|
| | Total Housing Need (Midpoint) | Housing Mix* | | | | Land Need (Buildable acres) | | | | Total Land Need (buildable acres) |
| | | Very Low Density (single family homes) | Low Density (single family and mfg. homes) | Medium Density (townhomes, plexes) | Higher Density (apartments) | Very Low Density | Low Density | Medium Density | Higher Density | |
| Tillamook UGB | 584 | - | 292 | 124 | 169 | - | 97 | 21 | 14 | 132 |
| Nehalem UGB | 151 | - | 75 | 32 | 44 | - | 25 | 5 | 4 | 34 |
| Bay City UGB | 138 | - | 69 | 29 | 40 | - | 23 | 5 | 3 | 31 |
| Manzanita UGB | 414 | - | 207 | 88 | 120 | - | 69 | 15 | 10 | 94 |
| Rockaway Beach UGB | 386 | - | 193 | 82 | 112 | - | 64 | 14 | 9 | 87 |
| Garibaldi UGB | 58 | - | 29 | 12 | 17 | - | 10 | 2 | 1 | 13 |
| Wheeler UGB | 57 | - | 28 | 12 | 17 | - | 9 | 2 | 1 | 13 |
| Subtotal UGBs | 1,788 | - | 894 | 378 | 518 | - | 298 | 63 | 43 | 404 |
| Unincorporated areas** | 815 | 407 | 326 | 81 | - | 815 | 109 | 14 | - | 937 |
| Total | 2,603 | 407 | 1,220 | 460 | 518 | 815 | 407 | 77 | 43 | 1,341 |
| *Assumes mix and density as follows: | | | | | | | | | | |
| | City/Town Housing Mix | Unincorp. Area Mix** | Dwellings per acre (avg.) | | | | | | | |
| Very Low Density* | 0% | 50% | 0.5 | | | | | | | |
| Low Density | 50% | 40% | 3 | | | | | | | |
| Medium Density | 21% | 10% | 6 | | | | | | | |
| Higher Density | 29% | 0% | 12 | | | | | | | |
| Total | 100% | 100% | | | | | | | | |

Source: compiled by FCS GROUP based on midpoint of housing forecast scenarios and expected market demand.

What housing types are currently permitted in Bay City?

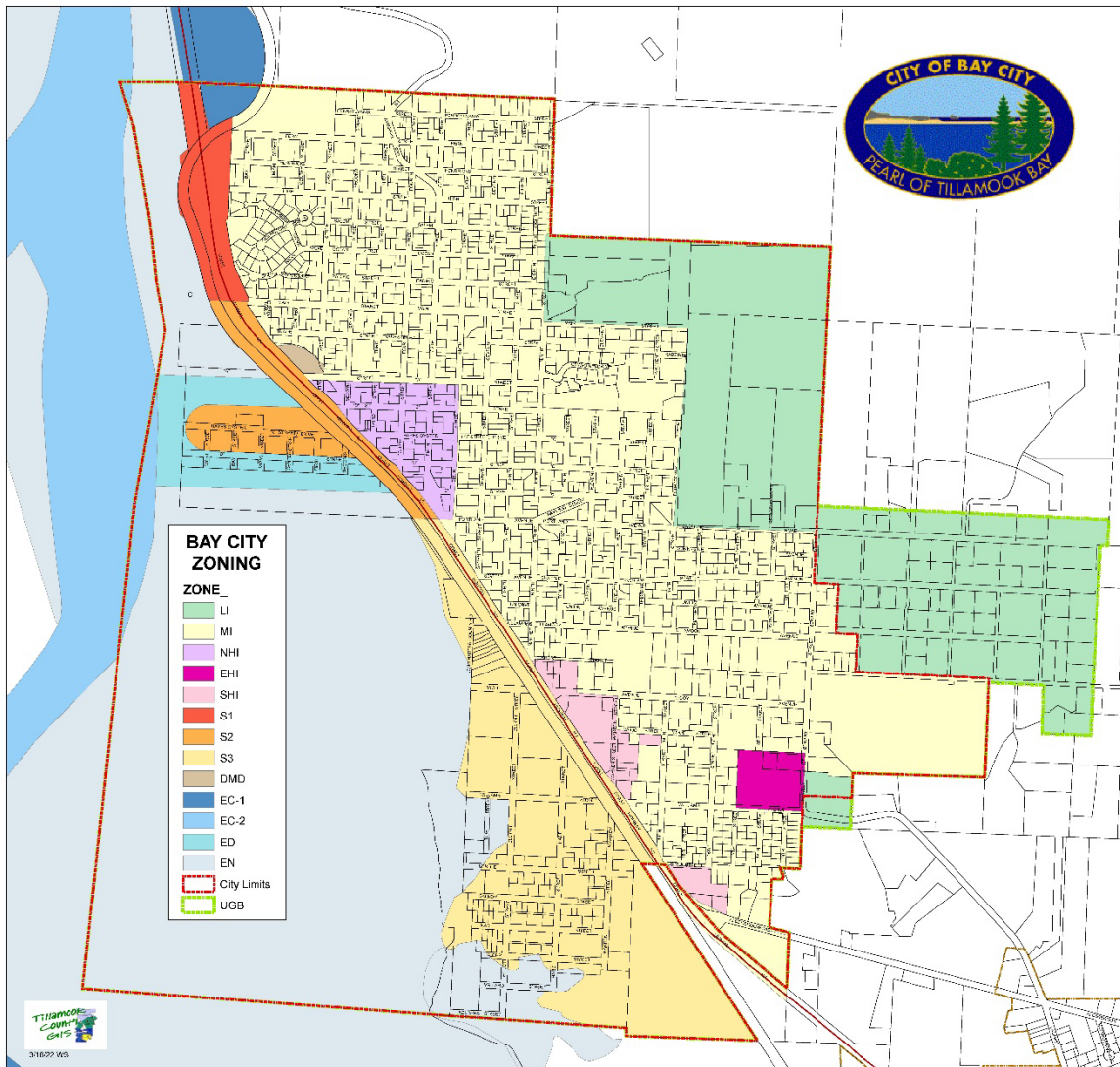
In Bay City residential development is permitted in the following zones:

- The Low Intensity (LI) zone is intended to identify lands within the urban growth boundary (UGB) that are less developable due to physical limitations (flooding, slope, etc.), distance from City services (i.e., sewer and water), or if their current use is agricultural land.
- The Medium Intensity (MI) Zone is intended to provide land for primarily residential use, with other uses allowed conditionally.
- The High Intensity (HI) zones are intended to permit a variety of uses, including mixed-use and commercial development.
- Shoreland 3 (S3) zone is intended to regulate uses within the City’s shoreland area in order to implement the Coastal Shoreland Goal and policies in the Comprehensive Plan.

The location of the zones is shown in the Zoning Map in Figure 2.

Single-family detached homes and duplexes are permitted outright in the MI, LI, and S3 zones. Multiple family (also known as multi-family), defined by the City as development with more than two units, is permitted conditionally in the MI and LI zones and is not permitted in the S3 zone. In the HI zone, single-family and multiple-family development is not permitted. Mixed-use development is permitted only in the North High Intensity Zone (NHI, which is the Town Center), not in the South or East High Intensity Zones (SHI and EHI). The Final Action Plan recommended permitting middle housing types in the MI and LI zones. The recommendation to permit middle housing did not include the NHI zone to preserve opportunities for commercial or mixed-use housing in the Town Center.

Figure 2. Bay City Zoning Map



[What is middle housing?](#)

Middle housing refers to a range of smaller attached or clustered housing types that are typically built at a similar scale as single-family detached houses. The term “missing middle” housing was coined by urban planner Daniel Parolek to refer to housing that fits in between single-family homes and larger apartment buildings but that has largely been missing from most cities’ neighborhood patterns for the last 70 years. With proper design and siting standards, middle housing can be developed and exist harmoniously within an existing single-family neighborhood.

Middle housing can include duplexes, triplexes, quadplexes, townhouses, cottage clusters, accessory dwelling units (ADUs), courtyard apartments, and other similar housing types. State regulations in Oregon include the following housing types as “middle housing” - duplexes, triplexes, quadplexes, townhomes, and cottage cluster housing. Examples of the various housing types are shown in Figure 3; middle housing types are described in Table 1. Middle housing types could diversify housing opportunities in the City and

research shows that it could potentially be built at a lower cost per unit than standard housing stock consisting of mostly single-family detached houses.³

Table 1. Description of Each Middle Housing Type

| Middle Housing Type | Description |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Duplex | Two connected or separated dwelling units on a single lot or parcel. |
| Triplex and Quadplex | Three or four connected or separated dwelling units on a single lot or parcel. |
| Townhouses | A dwelling unit that is part of a row of two or more attached dwelling units, where each unit is located on an individual lot or parcel and shares at least one wall with another dwelling unit. |
| Cottage Clusters | A grouping of multiple unconnected or horizontally connected dwelling units on a site with a common courtyard. Each dwelling may share a single lot or occupy its own lot. |

³ Up for Growth and ECONorthwest. Housing Underproduction in Oregon. Available at: <https://www.upforgrowth.org/sites/default/files/2018-10/UFGHousingUnderproductionInOregon.pdf>

Figure 3. Examples of Missing Middle Housing



Duplex



Duplex



Triplex



Townhomes



Small Apartment Complex



Courtyard Apartments



Cottage Cluster



Cottage Cluster

Findings

Recent initiatives to permit middle housing statewide in Oregon have been precipitated by the requirements of House Bill 2001 passed in 2019. The resulting state regulations for middle housing do not apply to Bay City due to its small population.⁴ However, the state standards provide a framework for a viable way to meet housing objectives in Bay City and provide guidance on how to permit middle housing. In addition, state regulations for middle housing are consistent with Transportation and Growth Management (TGM) Program principles, which promote housing choice and locating activities within or near the city center to allow efficient, multi-modal access to points of interests such as transit stops and community goods and services.

Residential Buildable Lands Inventory

The Bay City Buildable Lands Inventory (BLI), completed as a part of the Tillamook County HNA (Housing Needs Analysis), is the basis for understanding where development opportunities exist in Bay City. The BLI evaluated land available for development using tax assessor data and removed constrained lands from consideration. Constrained lands include those that are impacted by environmental constraints, such as wetlands, floodways, and steep slopes (25% or greater). There are approximately 180 acres of land available within the Bay City UGB that permit residential development through vacant, partially vacant, and redevelopable land.⁵

Figure 4 shows the location of buildable lands. Currently, 40% of vacant land is zoned low-density, and 60% is zone medium density. There is additional partially vacant and redevelopable land available. These parcels may also be attractive places for future growth, due to their proximity to desirable locations (e.g., Town Center or parks) and infrastructure availability.

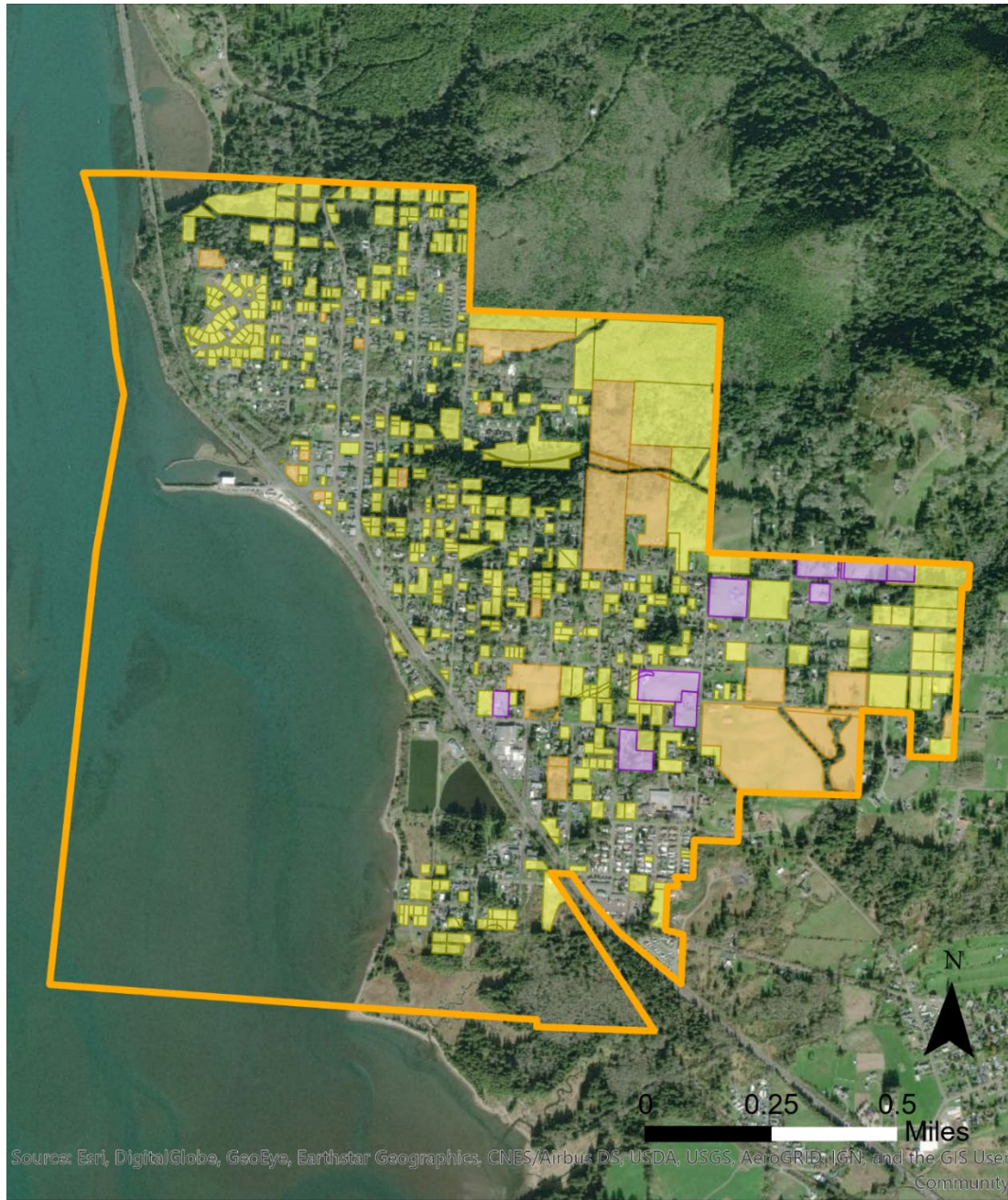
⁴ Oregon House Bill 2001 regulations for middle housing apply to cities with a population over 10,000 and cities in the Portland Metro region with a population greater than 1,000 people.

⁵ Vacant land: Properties with no structures or with very low value improvements (less than \$10,000) were considered vacant.

Partially vacant land: Properties that are occupied by a use (e.g., a home or building structure with value over \$10,000) but have enough land to be subdivided without the need for rezoning.

Redevelopable land: Properties where the total market value of improvements is less than the land value of the parcel. Due to the discrepancy between land and improvement value, there exists the strong likelihood that existing development will be converted to more intensive residential uses during the planning period.

Figure 4. Bay City BLI: Location of Vacant, Partially Vacant, and Redevelopable Lands (Source: Bay City BLI)



Bay City UGB Buildable Land Inventory 2019

-  Bay City
- Development Status**
-  Vacant
-  Partially Vacant
-  Redevelopable

Potential Middle Housing Locations

Proximity to destinations and activity areas, such as the uses found in the Town Center, is a key factor in determining good locations for increasing housing variety and supply. The proximity of residents to the places they work, play, and access goods – areas with commercial, employment, entertainment, and civic uses - encourages non-vehicular trips, reducing reliance on the automobile and impacts on the transportation system.

For this analysis, a half-mile buffer was drawn around the NHI zone, with the assumption that this distance provided good proximity to the Town Center and delineates an area wherein destinations could be accessed by walking or cycling. The half-mile boundary in Bay City illustrates a relatively small geography, but includes the majority of the City’s residential land area, as well as its historic commercial center and all of its government buildings, including the post office and the police station. In addition to the Town Center (NHI zone), the half-mile buffer covers a large portion of the MI zone and several large lots in the northeast corner of the LI zone.

The identified area contains a significant amount land that could reasonably accommodate a variety of middle housing types, based on the BLI and assuming some typical minimum lot sizes. Given the nature of Bay City’s current development patterns and based on requirements in other small cities, the following minimum lot sizes are assumed for this exercise:

- Single-family homes, duplexes, and triplexes: 5,000 square feet
- Quadplexes, cottage clusters, and townhouses (3+ units): 7,000 square feet

Figures 5 and 6 show buildable lands with sufficient lot sizes for middle housing.

Areas Suitable for Residential Development

Under current regulations duplexes are permitted outright, and other middle housing types are permitted conditionally, in the MI and LI zones. Middle housing is not permitted in the Shoreland S3 zone, which is consistent with the natural preservation objectives of that zone. Middle housing is not currently permitted in the SHI or EHI zones.

Given the factors described above, Table 2 shows the availability of the land (in acres) that meet the 5,000 square feet and 7,000 square feet minimum lot sizes; the location of these parcels is shown Figures 5 and 6. Within a half-mile of the Town Center, there are approximately 69 acres of vacant buildable land with lots greater than 5,000 square feet or greater, and 61 acres of vacant buildable land with lots 7,000 square feet or greater. Outside of the half-mile buffer from the Town Center, there are additional vacant lands; approximately 32 acres in the MI zones and 15 acres of vacant land in the LI zone on parcels 5,000 square feet or greater.

Table 2. Land Availability for Middle Housing

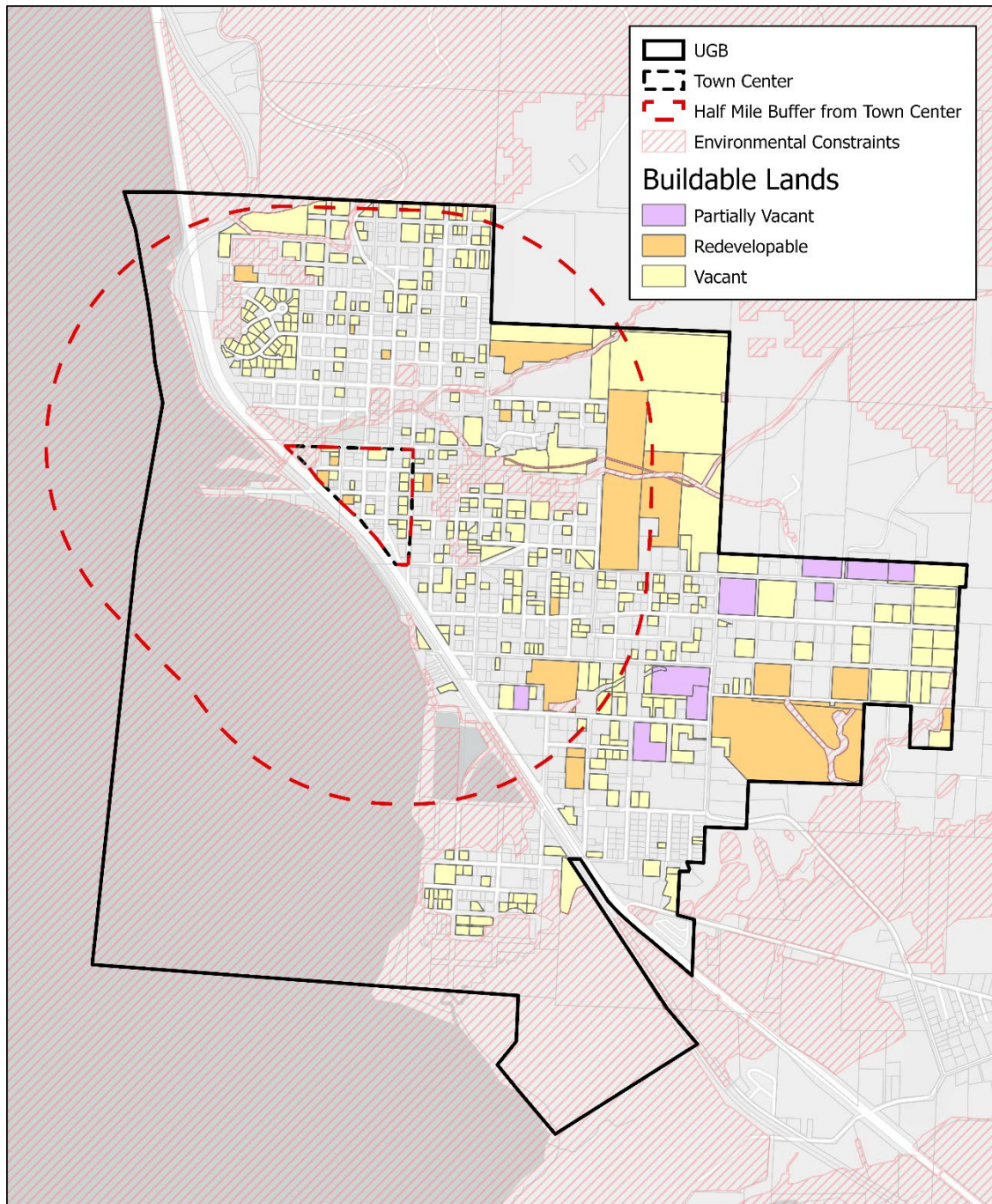
| BLI Land Classification | Min Lot Size | Total in Bay City (acres) | Within in Half Mile Buffer of the Town Center (acres) | MI Zone – Total (acres) | LI Zone – Total (acres) |
|-------------------------|--------------|---------------------------|-------------------------------------------------------|-------------------------|-------------------------|
| Vacant | 5,000 sf | 189.7 | 68.5 | 100.5 | 83.5 |
| | 7,000 sf | 178.8 | 60.7 | 90.1 | 83.5 |
| Partially Vacant | 5,000 sf | 20.1 | 1.0 | 19.9 | 10.5 |
| | 7,000 sf | 19.9 | 1.0 | 9.4 | 10.5 |
| Redevelopable | 5,000 sf | 78.8 | 12.5 | 37.3 | 40.6 |
| | 7,000 sf | 78.7 | 12.5 | 37.2 | 40.6 |

As shown in Table 2, there is an abundance of land available for middle housing development in the MI and LI zones and within a half-mile from the edge of the Town Center (NHI zone). As a relatively small city, almost all zones are located within a half-mile from the Town Center, suggesting that middle housing is suitable in almost all zones, considering the proximity to destinations as a principle locational factor.

The conclusion of this analysis is that Bay City has a large amount of available land in the MI and LI zones that would be suitable for siting middle housing. In addition, approximately 36% of the vacant land that could accommodate middle housing types is located in close proximity to the Town Center (within 0.5 miles).

Recommendation: Permit middle housing in the Moderate (MI) and Low Intensity (LI) zones. Given the size of Bay City, and the fact that much of the City’s land suitable for residential development lies within close proximity to the Town Center, it is appropriate to expand the permitted housing types and increase the number of residents that can reasonably reach the City’s destinations via means other than the automobile.

Figure 5. Middle Housing Buildable Lands – Lots 5,000 Square Feet or Greater (Data Source: Bay City BLI)



Bay City Buildable Lands

Minimum Lot Size - 5,000 SF

Source: Oregon Spatial Data Library, Tillamook County

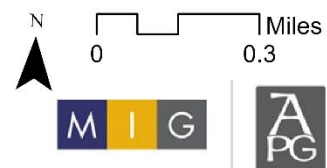
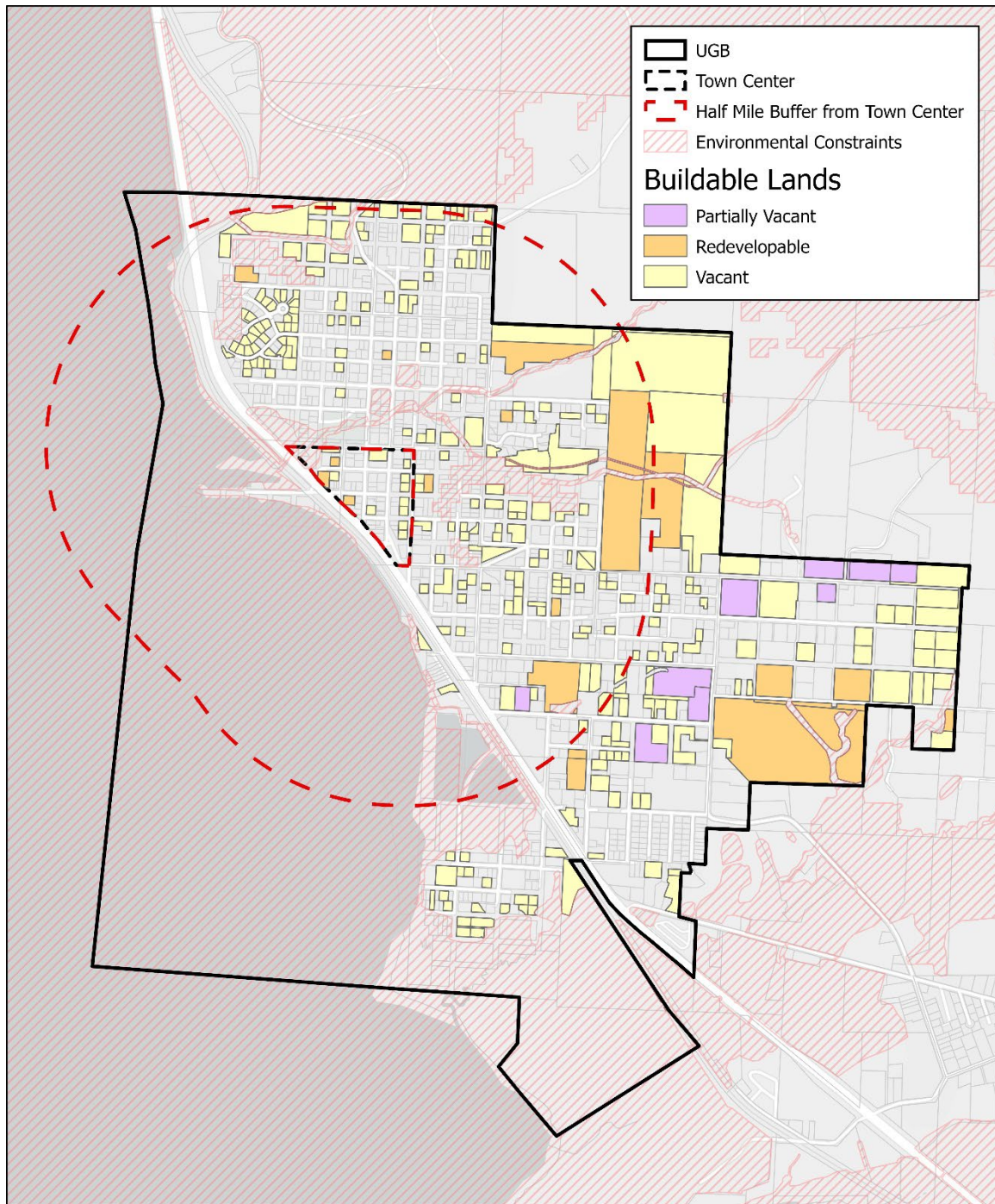


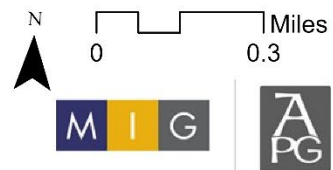
Figure 6. Middle Housing Buildable Lands, Lots 7,000 Square Feet or Greater (Data Source: Bay City BLI)



Bay City Buildable Lands

Minimum Lot Size - 7,000 SF

Source: Oregon Spatial Data Library, Tillamook County



BUILDING HEIGHT

Problem Statement

An increase in the maximum building height in the Town Center (NHI zone) was recommended in Phase One to reduce barriers to development and increase housing options in proximity to goods and services. The community expressed concerns about potential impacts to views and fire safety.

Objective

To better understand how the allowance of an additional story in specific areas of the Town Center could impact views and to determine how three-story development could be protected by the City Fire Department.

Background

Phase One evaluated potential barriers to development that currently exist in Bay City, based on conditions that cultivate a lively, multi-modal connected community. Current standards for the NHI zone permit a 24-foot maximum building height, with a 30-foot maximum permitted for mixed-use development through Planning Commission approval.⁶ The Final Action Plan recommended increasing the maximum height permitted in the Town Center to 36 feet, to allow for 3-story development.

The intent behind the recommendation was to provide more development options with the goal of encouraging more activity and more mixed use in the Town Center. Increasing building height is just one way to provide more options on how parcels are developed and may enhance the feasibility of certain parcels to be developed; this modification may enhance the chances for development and redevelopment in the Town Center. This is important for Bay City, where the community has voiced the desire to have more attractions and reasons to visit the Town Center and has identified housing availability and affordability as important issues to address through this project.

However, with increased building heights there is the possibility that future development will impact existing viewsheds. Community members expressed concerns about changes to views now available from properties within and immediately adjacent to the Town Center. In addition to concerns about losing views, the Bay City Fire Chief expressed concerns about firefighting operations and safety requirements associated with the increased heights.

In Phase One, 51% of survey respondents agreed that providing opportunities for mixed-use development in Bay City is important for a vital Town Center. Forty percent of respondents agreed that allowing for taller buildings in the Town Center would provide more opportunities for future development.

In response to the concerns expressed by the community, the project team conducted a viewshed study to ascertain the impacts of future building heights. Also, a review of the Oregon Fire Code and a discussion with the Bay City Fire Chief were conducted to better understand the fire safety regulations and requirements associated with 36-foot buildings.

⁶ Per Bay City Development Ordinance (Ord. 374), Section 1.413.

Findings

Viewshed Analysis

The Viewshed Analysis addresses questions arising from increasing the maximum building height in central Bay City to 36 feet, providing a better understanding of the potential impacts through data analysis. The analysis was performed with a GIS-based Spatial Analyst Visibility tool. This tool can show what locations are visible from a given elevation surface and viewpoint. For the Bay City exercise, viewshed categories are water (< 10 feet in elevation), shoreland (1- to 100 feet in elevation), and upland (> 100 feet in elevation). The locations of each viewshed category are shown on Figure 7. Fourteen locations or viewpoints were sampled for the analysis; locations are shown in Figure 8. The viewpoint locations were chosen based on knowledge of topography of the NHI zone and surrounding areas, omitting areas with significant slopes. For each viewpoint, the viewsheds were evaluated relative to the following building heights:

- Existing building height (as of 2009);
- 24 feet (current maximum height permitted outright);
- 30 feet (current maximum height conditionally permitted); and
- 36 feet (proposed maximum height).

Figure 7. Viewshed Categories. Water shown in blue, shoreland in red, and upland in green. Red dots depict the location of the viewpoints.

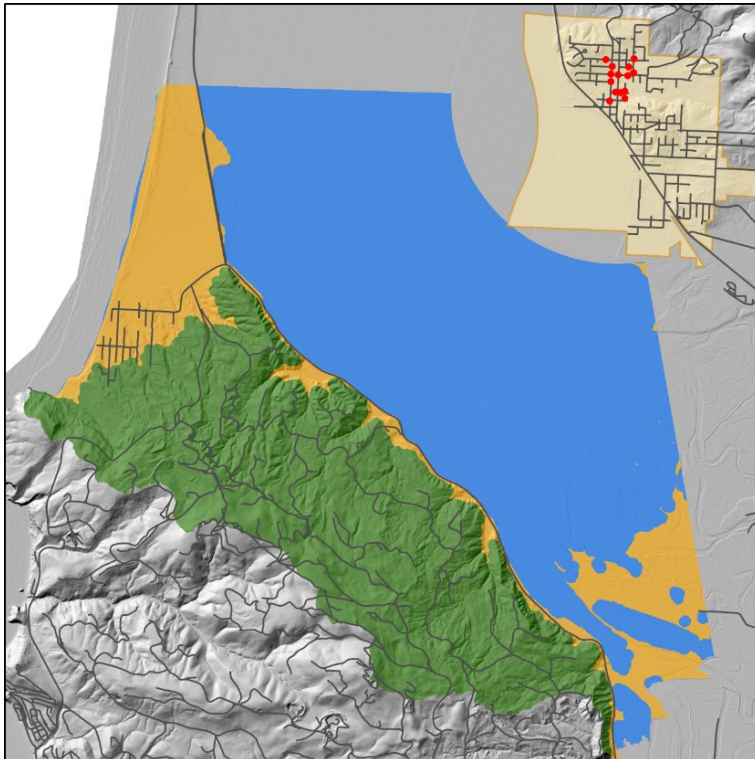
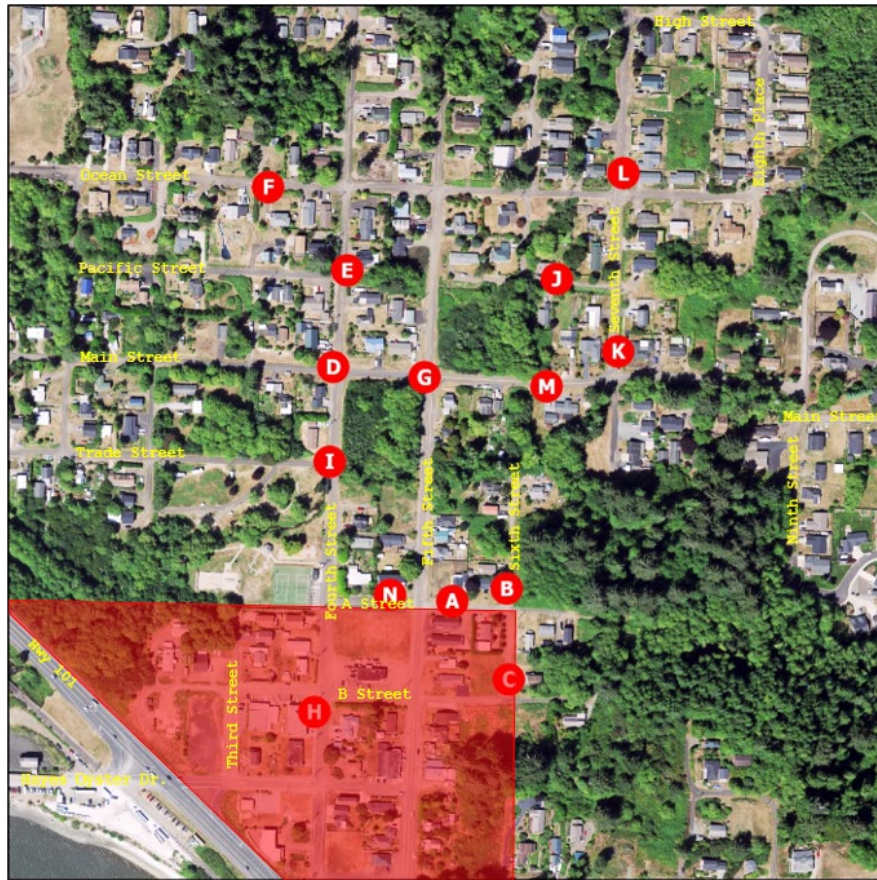


Figure 8. Viewshed Analysis Viewpoints. NHI zone shown in red.



The analysis resulted in visibility scores for each viewpoint category and each building height level – 1st story (a window at 8.5 feet in height) and 2nd story window (18.5 feet in height). The scores correlate to how much land is visible for each situation, translated to individual data points – the higher the number of points, the greater the view. A score of zero means there is no view of the water, shoreland, or upland area.

For example, Figure 9 depicts the results for Viewpoint C. From a first-floor view, there are currently views of the water, shore, and upland.⁷ However, if a 24-foot building were to be built, the views

would be lost entirely. For a second-floor view, there’s a full view today, with current development, as well as if there are future 24-foot buildings. However, if a 30-foot building were built in the Town Center, from location C there is a loss of water and shore views. If a 36-foot building were built, no views would remain.

⁷ The first and second floor views are theoretical and may not reflect existing structures located at or immediately adjacent to the viewpoints.

Figure 9. Example Viewshed “Score,” Location C

| C | | water | shore | upland | total |
|-----|----|--------|-------|--------|---------|
| 1st | 00 | 193010 | 29568 | 299900 | 522478 |
| | 24 | 0 | 0 | 0 | 0 |
| | 30 | 0 | 0 | 0 | 0 |
| | 36 | 0 | 0 | 0 | 0 |
| 2nd | 00 | 961873 | 86770 | 463188 | 1511831 |
| | 24 | 268961 | 24576 | 514961 | 808498 |
| | 30 | 0 | 0 | 41683 | 41683 |
| | 36 | 0 | 0 | 0 | 0 |

The results of the visibility scores are summarized in Table 3. Of the fourteen locations analyzed, seven locations would not have any changes to current views with a change to maximum building heights.⁸ These are all located along and north of Main Street, except for Viewpoint D, which is located at the intersection of Main Street and Fourth Street. Six of the viewpoints would have reduced or entirely eliminated views given today’s height standards, with development of 24-foot or 30-foot-high buildings in the Town Center. These viewpoints are along A Street, as well as located along Fourth Street, south of Main Street (Viewpoints H and I).

A visual example is provided in Figure 11 for Viewpoint N. In this location most of the block to the south is vacant and it is clear from the graphic that current viewshed conditions are good. A structure built to 24 feet directly across the street from point N presents a significant obstruction to the view, reducing the view score to zero.

The analysis shows that building to 30 feet, which is allowed today with conditional use approval, would obstruct views currently available from most of the locations considered. Only one viewpoint, Viewpoint C near the intersection of B Street and Sixth Street, had a differential in viewsheds between 30-foot and 36-foot buildings. A change in the development code to allow for 36-foot buildings would impact views from this location. A graphic depiction of the changes in viewsheds for Viewpoint C are shown in Figure 10.

Table 3. Viewshed Analysis Results

| Impacts | Viewpoints/Locations |
|---------------------------------------|----------------------|
| No impact to views | E, F, G, J, K, L, M |
| 24-foot or 30-foot bldg. reduces view | D, H, I |
| 24-foot or 30-foot bldg. removes view | A, B, N |
| 36-foot bldg. eliminates view | C |

A complete description of the methodology and analysis findings are found in Attachment A. In summary, the most impacts will be seen on the edge of the NHI zone on the northern and eastern edges of the zone. However, most viewshed obstructions could occur with buildings constructed under current zoning regulations. Of the locations analyzed, only one viewpoint located near the intersection of B Street and Fourth Street (Viewpoint C) would have a viewshed eliminated with 36-foot buildings in the Town Center, as compared to what is allowed conditionally today.

⁸ Note, the model used for the analysis did not take into account required building setbacks or sloped roofs, so the results reflect the highest level of view impact possible. In the real world, it is likely there would be less view lost.

Figure 10. Viewshed from a second story at *Location C* at different build-out scenarios

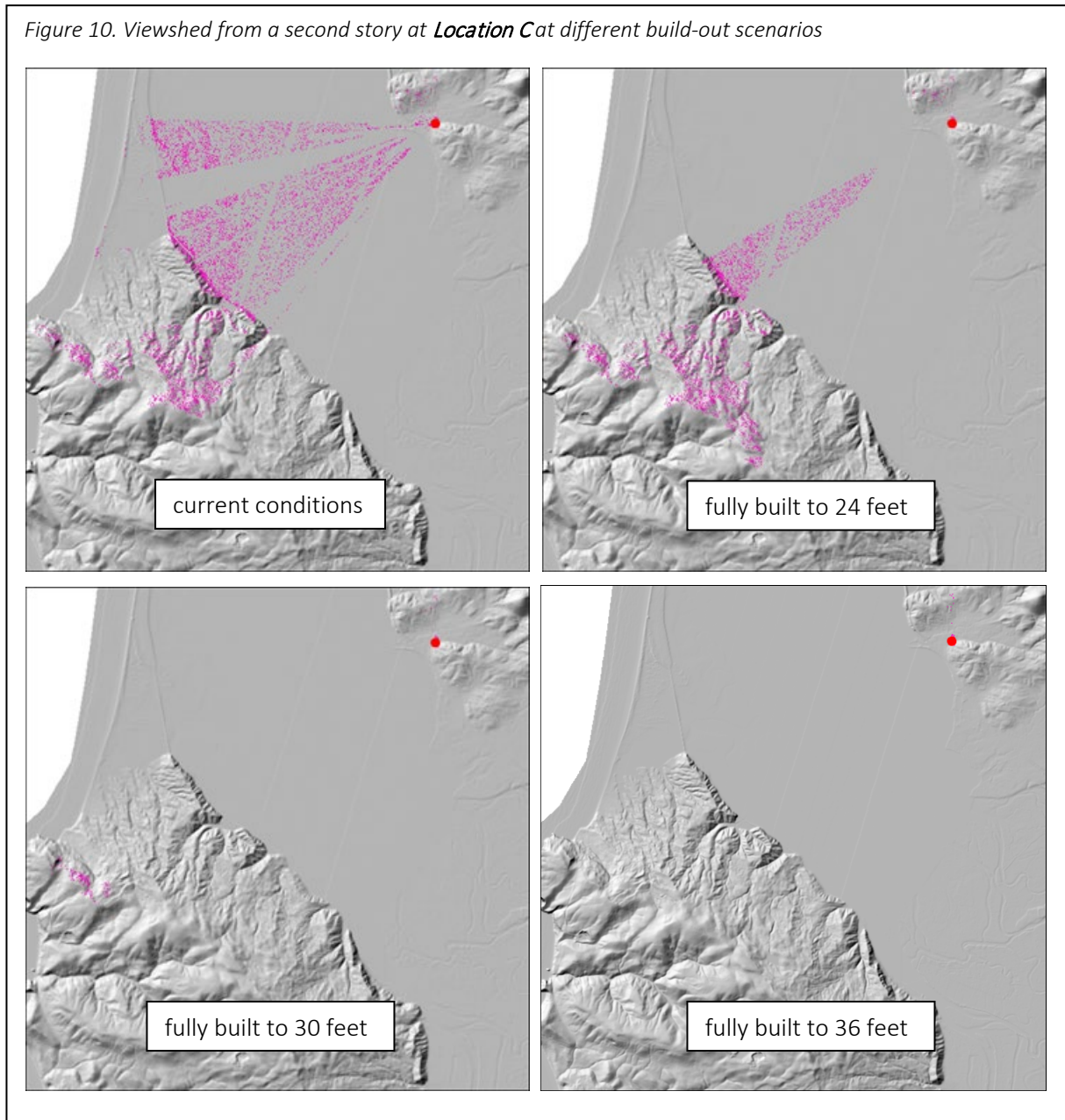
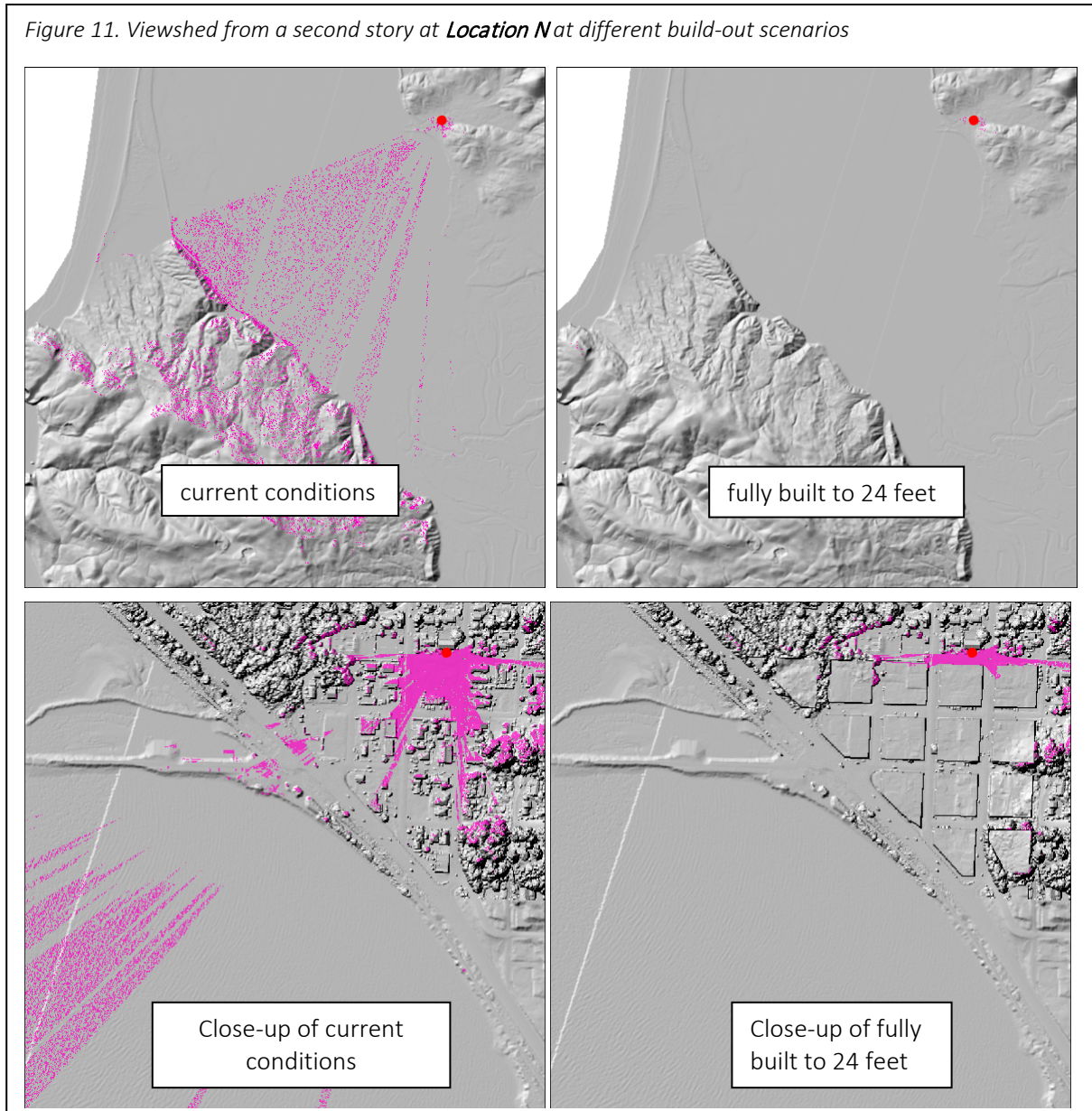


Figure 11. Viewshed from a second story at **Location N** at different build-out scenarios



Fire Safety Requirements

The Oregon Fire Code serves as the state's service manual to protect the public and all residents from fire and dangerous conditions. The Fire Code has varying requirements based on different building factors, such as building type (mixed-use, residential, commercial), height, and location.

. The Bay City Fire Chief has identified the following needs that would result from the allowance of a 36-foot height maximum:

- New ladder truck and new structure to house it;
- hydrants and water mains for higher fire flows;
- stand pipe and fire department connections, and
- maintenance and additional staffing for Bay City Fire.

Estimated associated costs include approximately \$1M for a new ladder truck, \$50,000-\$100,000 for additional equipment, \$10,000 - \$40,000 a year for ladder maintenance and testing, and location, design, and construction costs for a new fire station.

These considerations will need to be part of the community conversation related to increasing maximum building heights. The project team will meet with state fire officials to better understand Oregon Fire Code regulations and the implications of an increase in local building height maximums - specifically the development and operational impacts for the Bay City Fire Department.

Additional Findings

Increasing the size (including height) of a potential building can increase the feasibility of developing or redeveloping a site. Reducing barriers to development in the Town Center addresses project and community objectives, including providing more housing choices and enhancing opportunities for developers. Additionally, three-story structures can accommodate more business on the ground floor and will provide a built-in residential customer base for existing and future businesses in the Town Center. From a design perspective, two- to four-story buildings are ideal for small town city centers because they are tall enough to define a space but not overwhelm it.⁹ Finally, many small Oregon Coast cities permit three-story structures, including:

- The City of Bandon, which permits a maximum building height of 35 feet in the downtown;
- The City of Cannon Beach, which has a 36-foot maximum height in the C2, General Commercial Zone, and a maximum height of 28 feet in the C1, Limited Commercial Zone, that covers their town center;
- Gold Beach, where the maximum building height in the commercial zone is 35 feet; and
- The City of Waldport the maximum building height is 35 feet in the Downtown District zone.

⁹ Urban Land Institute. Ten Principles for Developing Successful Town Centers. Available at: http://uli.org/wp-content/uploads/ULI-Documents/TP_TownCenters.ashx .pdf

Recommendation: Increase maximum height from 24 ft. or 30 ft. (30 ft. requires PC approval) to 36 feet to allow for 3-story development, pending further discussion with officials from the Office of the State Fire Marshal.

The Viewshed Analysis showed that changing the maximum height permitted would have negligible impacts on viewsheds, as compared to what is currently allowed. However, allowing future development to be built to three stories could have significant operational implications for the Bay City Fire Department; further information will be sought through discussions with the City Fire Chief and personnel from the Office of the State Fire Marshal.

INFRASTRUCTURE PLANNING FOR HIGHER DENSITY RESIDENTIAL

Problem Statement

Staff concern about the ability of Bay City's infrastructure to accommodate denser development patterns that would be enabled by allowing housing types such as middle housing and ADUs.

Objective

Ensure City infrastructure facilities for water and wastewater systems have sufficient capacity to remain operating properly with increased and higher-density development.

Background

In Phase One, City Staff expressed concerns regarding the effects of denser development patterns on the City's infrastructure systems, particularly wastewater, water, and stormwater. The impact of accessory dwelling units (ADUs) on infrastructure (water and wastewater) capacity was also mentioned.¹⁰

Findings

Although development code regulations can be changed to permit greater residential density, new housing construction will happen over time and residential growth is expected to be gradual. Reasonable assumptions for Oregon communities are a 3% increase in density due to middle-housing types over a 20-year timeframe.¹¹ Similarly, allowing ADUs is not expected to result in a big impact on housing availability or residential density, but will provide increased housing options gradually over time.

To ensure the City's infrastructure facilities for water and wastewater systems have sufficient capacity to remain operating properly with increased and higher-density development, Bay City should continue to:

- 1) plan and maintain the public/municipal water and wastewater systems through citywide infrastructure plans; and
- 2) collect system development charges (SDCs) from new development based on their impacts.

¹⁰ These concerns were primarily expressed by City staff; infrastructure capacity and impacts were not discussed with community members in Phase One.

¹¹ Oregon House Bill 2001 allows jurisdictions to assume an increase in residential capacity of up to 3% for the purposes of accommodating needed housing over a 20-year planning period. House Bill 2001 provisions do not apply to a city as small as Bay City; however, the numerical growth estimates developed by state agencies, reflects the research and confidence in the gradual development that is expected to be seen in Oregon cities. See https://www.oregon.gov/lcd/UP/Documents/HB_2001_HB_2003_Frequently_Asked_Questions.pdf

Infrastructure Planning

Oregon Statewide Planning Goal 11, Public Facilities, as implemented through OAR 660-011-0010 through OAR 660-011-0045, ensures that jurisdictions adequately plan for growth. Cities and counties in Oregon are required to develop and maintain Public Facilities Plans to help ensure that urban development within their boundaries is guided and supported by types and levels of urban facilities and services appropriate for the needs and requirements of the community. Facilities and services must be provided in a “timely, orderly and efficient arrangement.” Bay City complies through these adopted infrastructure plans:

- Stormwater Master Plan (2003),
- Transportation System Plan (2009),
- Kilchis Regional Water District (2009), and
- Wastewater Facilities Plan (2019).

Infrastructure master plans generally use a 20-year planning horizon to forecast future conditions. The Wastewater Facilities Plan forecasted 20-year growth in Bay City using PSU population Research Center data, estimating an additional 400 residents in 2040 and an annual growth rate of 1.21% between 2020 and 2040 (see Figure 12). The 2003 Stormwater Report did not focus on population growth, but rather residential land uses and development, the primary source of stormwater in Bay City. At the time approximately 51% of lots in Bay City were developed and the plan anticipated continued growth in Bay City at a “relatively slow rate,” based on a maximum of 12 residential permits between 1998 to 2002.

Figure 12. Estimated Population Growth for 2040 (Source: Table 2 of the Bay City Wastewater Facilities Plan Update, 2019)

Table 2 Population and Growth
Wastewater Facilities Plan Update, Bay City, Oregon

| Year | 1970 ⁽¹⁾ | 1980 ⁽¹⁾ | 1990 ⁽¹⁾ | 2000 ⁽¹⁾ | 2010 ⁽¹⁾ | 2020 ⁽²⁾ | 2030 ⁽²⁾ | 2040 ⁽²⁾ | UBO ⁽³⁾ |
|----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|----------------------|
| Estimated Population | 898 | 986 | 1,027 | 1,149 | 1,286 | 1,462 | 1,636 | 1,815 | 2,230 ⁽⁴⁾ |
| Annual Growth Rate | -- | 0.98% | 0.42% | 1.19% | 1.19% | 1.37% | 1.20% | 1.09% | -- |

1. U.S. Census.
2. PRC, 2017. *Forecasts for Total Population: Bay City UGB*. Portland, OR:Population Research Center, Portland State University.
3. UBO: Ultimate Build Out.
4. HBH. 2010. *City of Bay City, Tillamook County, Oregon; Wastewater Facilities Plan*. Sherwood, OR:HBH Consulting Engineers.

System Development Charges

Proposed development pays for impacts to the regional infrastructure through SDCs. These fees are set by the City and are intended to cover the development’s proportionate impact on the municipal infrastructure systems. SDC revenues may be levied and used for capital improvement costs (e.g., new pump station), but not for system maintenance or for projects that either fix existing system deficiencies or replace existing capacity.

Bay City’s adopted SDCs are in Ordinance 577 and Ordinances 644 (including 2022-14 and 2022-15). Bay City’s SDC ordinances allow funds to be used for capital improvements to the following facilities or assets:

- Water supply, treatment, and distribution
- Wastewater collection, transmission, treatment, and disposal

The City should continue to require SDC contributions to maintain City systems, but may consider a review of these fees to ensure that they are consistent with community objectives and in line with those

required in other communities. The City's infrastructure master plans do not identify significant issues related to growth. However, considering the age of these plans and code amendments anticipated with this project, targeting a timeframe and potential funding for updates should be considered. The City plans to conduct sewer and water rate studies in FY 22-23.

Recommendation: Based on the findings described above, the City should review SDC fees and seek opportunities to update infrastructure master plans.

FEE-IN-LIEU PROGRAM FOR TRANSPORTATION IMPROVEMENTS

Problem Statement

Explore how street improvement requirements can be implemented when it is not feasible or desirable to require physical improvements at the time of development approval.

Objective

Review the feasibility of a fee-in-lieu program to address transportation improvement/funding concerns and evaluate the cost and benefits of a fee-in-lieu program in Bay City.

Background

In Phase One, City Staff requested a further exploration on how street improvement requirements could be implemented when it is not feasible or desirable to require physical improvements at the time of development approval. Additionally, both community members and City leaders expressed the desire to allocate street improvements or associated fees related to bicycle and pedestrian street improvements closer to higher trafficked areas, such as near the parks in the Town Center. The Phase One Project Management Team discussed how a fee-in-lieu program for transportation facility improvements could meet some of the desires expressed while maintaining existing infrastructure funding. More research into legal implications and the administrative burden of such a program was requested prior to the City making related code recommendations.

Findings

What is a fee-in-lieu program? What is the relationship to other transportation improvement requirements and funding sources?

As part of a subdivision or site plan review processes, infrastructure improvements may be required to mitigate the impacts of the proposed development on city-wide systems. Approval of the proposal may be conditioned with improvements needed to meet City transportation standards. Cities require transportation facility improvements on local streets as part of development approval such as constructing sidewalks, half-street, or full-street improvements. SDCs are fees that are intended to cover the development's impact on the municipal infrastructure system, proportionate to the impact of the proposed development. For example, transportation SDCs for a single-family home will be less than a multi-family apartment, since the number of trips generated will be significantly less. Bay City currently does not collect transportation SDCs.

Fee-in-lieu programs provide an alternative to constructing required infrastructure improvements at the time of development. Instead of the developer constructing the improvement, the developer pays the equivalent funds into a fee-in-lieu program managed by the City. The City then has the funds to construct

the improvements, at a time that is opportune, with the City as the project manager. Additionally, administrative costs are often added to the fee-in-lieu cost on top of cost of improvements.

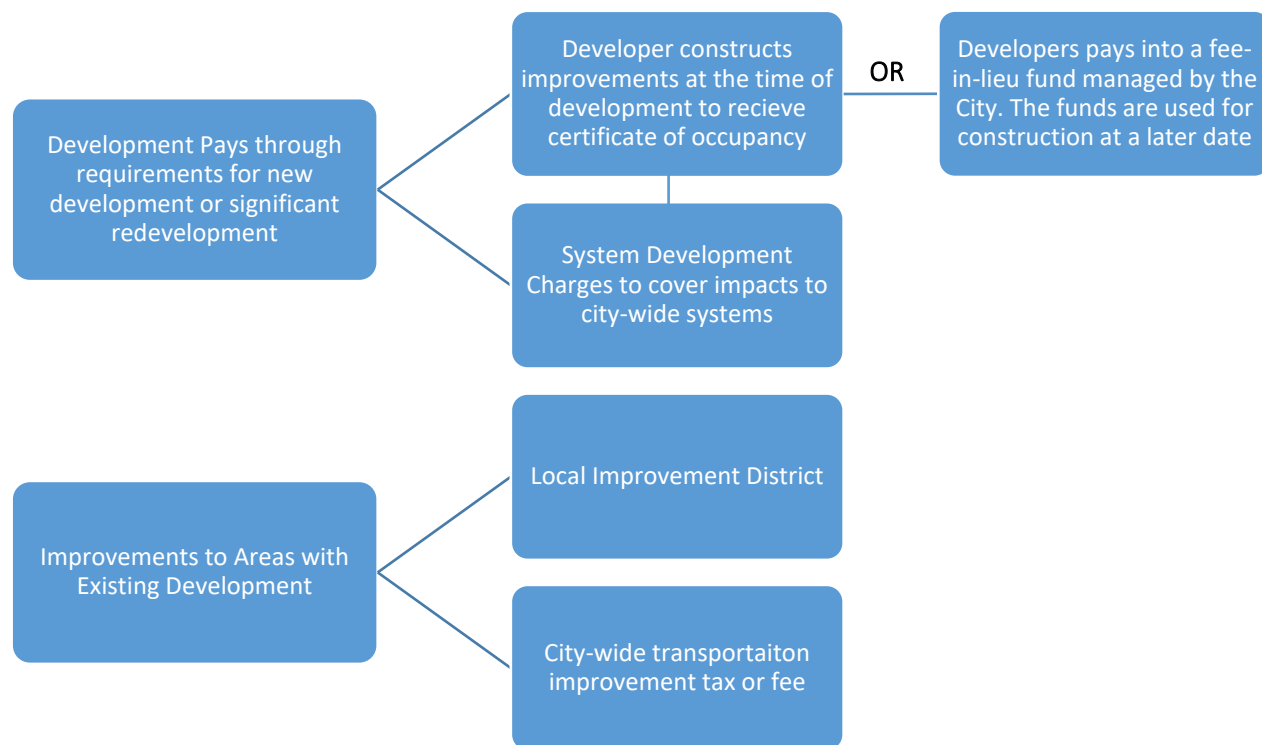
Figure 13 shows the relationship of fee-in-lieu programs to other improvement and funding mechanisms for transportation improvements.

Most jurisdictions have specific conditions that must be met in order to allow a developer to use fee-in-lieu program. Typical conditions include:

1. Required improvements are not feasible due to the inability to achieve proper design standards, existing conditions make the improvement infeasible, or an incremental improvement at the time of development is not a good public investment.¹²
2. Required improvements would create a safety hazard.
3. Required improvements are part of a larger approved capital improvement project that is listed as a funded project in the City's Capital Improvement Plan (CIP) or a City project in the near future.
4. Required improvements would create a situation that would not comply with City standards without extensive additional offsite improvements.
5. Required improvements are less than needed to meet City standards due to the City's inability to require full improvements based on proportionality requirements on the development.

¹² Examples include contributions to an off-site intersection traffic signal or paying fees in lieu of undergrounding overhead wires for a small segment within a longer corridor.

Figure 13. Funding Sources for Infrastructure Improvements (Costs to Development)



There are costs associated with program administration, including construction administration. For example, the City of Warrenton collects fees equivalent to 125% of the cost of construction for the sidewalk fee-in-lieu program.¹³ The City of Gerhart’s program includes the improvement cost plus anticipated inflation costs. The City of Milwaukie uses the Engineering-News Record Construction Cost Index (CCI) for Seattle to determine the inflation rate to apply to fee-in-lieu costs.¹⁴

Other Funding Tools

Local Improvement Districts (LIDs) are another tool used to make transportation improvements. A LID is a fee or tax imposed on properties within a defined district to collect funds for the improvements. Typically, LIDs are used in areas that are developed (e.g., new or improved sidewalks in an older residential neighborhood). Pursuant to state requirements, there are two pathways to establishing a LID: either by a petition of the majority of the property owners in the area or through a city council. State law allows a city council to proceed with an LID unless two-thirds or more of the participants vote no on the proposal.¹⁵ LIDs are used in cities across Oregon, including Ashland, Bend, and Lake Oswego.

¹³ City of Warrenton. Sidewalk Construction Fee-In-Lieu Calculation. Available at: <https://www.ci.warrenton.or.us/publicworks/page/engineering-specifications-design-guide>

¹⁴ City of Milwaukie. Master Fee Schedule FY 2020. Available at: https://www.milwaukieoregon.gov/sites/default/files/fileattachments/finance/page/44991/master_fee_schedule_fy_2020.pdf

¹⁵ City of Ashland. LIDs. Available at: <https://www.ashland.or.us/Page.asp?NavID=108>

LIDs may be formed in areas that are developing or already developed to pay for improvements that are not related to mitigation from a single development. A non-remonstrance agreement is required as part of deferring the cost of an improvement, where property owners within the district agree not to object to the future formation of a local improvement district. However, this method can impose significant costs that property owners might be unable to pay if the payment comes due in a lump sum.

Another alternative to address transportation improvement in developed areas is a city-wide tax or fee, such as the Milwaukie SAFE program. The Milwaukie SAFE program is a fee added to the City's utility bill, with fee rates based on the type of property, used to improve the bike and pedestrian network across the City. The funds are used for improvements such as multi-use trails, new sidewalks, and replacement ADA ramps.¹⁶

Implementing a Fee-in-lieu Program

The benefits and challenges with implementing a fee-in-lieu program include:

- Collecting fee-in-lieu can reduce some of the burden on the developer who would otherwise have to construct improvements at the time of development and allow the City to manage construction. Fee-in-lieu can help the City avoid requiring incremental, inefficient improvements and gain efficiencies and control over aggregating costs in implementing improvements as part of larger projects.
- Fees can be collected for small projects (e.g., development of an individual house) where it is infeasible to make a small improvement. In Oregon City, fee-in-lieu is often required when the improvement is smaller or when the public improvement exceeds 10% of the cost of an individual house planned to be built.¹⁷
- A change in Bay City policy to allow for fee in lieu would necessitate an amendment to the Development Ordinance to allow for the process, including identifying the conditions under which the City will accept fee-in-lieu. The establishment of the program should be undertaken with the assistance of the City's Legal Counsel.
- There are costs associated with program administration; the needed staff time for overseeing the program will need to be considered prior to implementation.

Summary

Table 4 provides a summary of the findings from each of the four key issues.

¹⁶ City of Milwaukie. Safe Access For Everyone (SAFE). Available at: <https://www.milwaukieoregon.gov/engineering/safe>

¹⁷ City of Oregon City. Public Works Engineering Fees. Available at: <https://www.orcity.org/publicworks/engineering-fees>

Table 4. Summary Table

| Problem Statement | Summary of Findings | Recommendations |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Middle Housing | | |
| <p>The Bay City community’s interest and desire to have more housing was clearly expressed in Phase One. The lack of rentals was also noted by community members.</p> | <p>There is an abundance of land available for middle housing development in the MI and LI zones and within a half-mile from the edge of the Town Center (NHI zone). As a relatively small city, almost all zones are located within a half-mile from the Town Center, suggesting that middle housing is suitable in almost all zones, considering the proximity to destinations as a principle locational factor.</p> | <p>Recommendation: Within the MI and LI zones, middle housing is appropriate in all locations. Considering the size of Bay City most properties are located within a reasonable distance from destinations to allow non-vehicular travel by foot or bike.</p> |
| Building Height | | |
| <p>An increase in the maximum building height in the Town Center (NHI zone) was recommended in Phase One to reduce barriers to development in the Town Center. Additional analysis was conducted to address concerns about viewshed impact and fire safety.</p> | <p>The Viewshed Analysis showed that building to current standards would already eliminate views from all but one of the 14 viewpoints analyzed. One viewpoint, located near the intersection of B Street and Sixth Street, would see a greater impact to views with an allowance of building heights of 36 feet in the Town Center.</p> <p>There are significant operational costs involved with bringing the Bay City Fire Department’s equipment to the level that could serve buildings over 30 feet.</p> | <p>Recommendation: Increase maximum building height to 36 feet. The proposed change will have a nominal impact on viewsheds, compared to currently allowed heights, and the standard is consistent with what is allowed in other Coastal cities.</p> <p>Note, this recommendation is pending discussion with representatives from the Office of the State Fire Marshal to better understand the Fire Code and implications of the change on local operations.</p> |

| Problem Statement | Summary of Findings | Recommendations |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| State Requirements for Infrastructure Planning | | |
| <p>The additional research addresses questions related to the adequacy of municipal infrastructure to handle denser development patterns in Bay City.</p> | <p>State statutes require cities to have adopted infrastructure plans that have 20-year planning horizons. System Development Charges are a tool to collect funds from development to address impacts to the regional infrastructure, to fund capital improvements identified in the City infrastructure/public facilities plan.</p> <p>Permitting higher density housing types in Bay City (e.g., middle housing and ADUs), is expected to yield gradual development of the newly permitted housing types. Gradual growth will allow the City to ensure the growth is not outpacing the current or forecasted infrastructure systems' capacities.</p> | <p>Recommendation: The City should review SDC fees and seek opportunities to update infrastructure master plans.</p> |
| Fee-in-Lieu Program for Transportation Improvements | | |
| <p>Funding street improvements was an issue identified in Phase One of the project; additional research addresses how street improvement requirements can be implemented when it is not feasible or desirable to require physical improvements at the time of development approval.</p> | <p>A fee-in-lieu program could allow the developer to pay a fee in lieu of constructing needed improvements at the time of development, and the City to avoid incremental, inefficient improvements and gain efficiencies and have control over aggregating costs as part of larger projects.</p> | <p>Recommendation: The City should evaluate the feasibility of implementing a fee-in-lieu program for transportation improvements as a means to encourage more development.</p> <p>Note that a change in City policy and associated code amendments would require careful legal review and the administrative costs associated with fee-in-lieu will need to be considered prior to implementing a program.</p> |

Next Steps

The key issues explored in this memorandum and the associated findings will be reviewed and discussed with Bay City staff, Bay City Planning Commission, stakeholders, and the public. The input received during community conversations and the findings of this memorandum will be considered as the project management team works through the next steps – developing new and revised development requirements for Bay City. The draft code amendments will be considered for adoption at public hearings in front of Planning Commission and City Council.

Attachment A - Viewshed Analysis Methodology by DLCD

This analysis addresses questions relating to potential viewshed impacts of raising the maximum building height in central Bay City. The analysis was performed primarily in ArcGIS Pro, relying on the Spatial Analyst Visibility tool. This tool, given a viewpoint and an elevation surface, will report the locations on that surface “visible” from the viewpoint.

A field trip was made to Bay City to take photos at locations which might have a view of the bay or beyond across the city center. These view points are labeled A through I in Figure 1. A few additional view points, J through N, were added to represent other locations which might have a view of the bay or beyond across the city center.

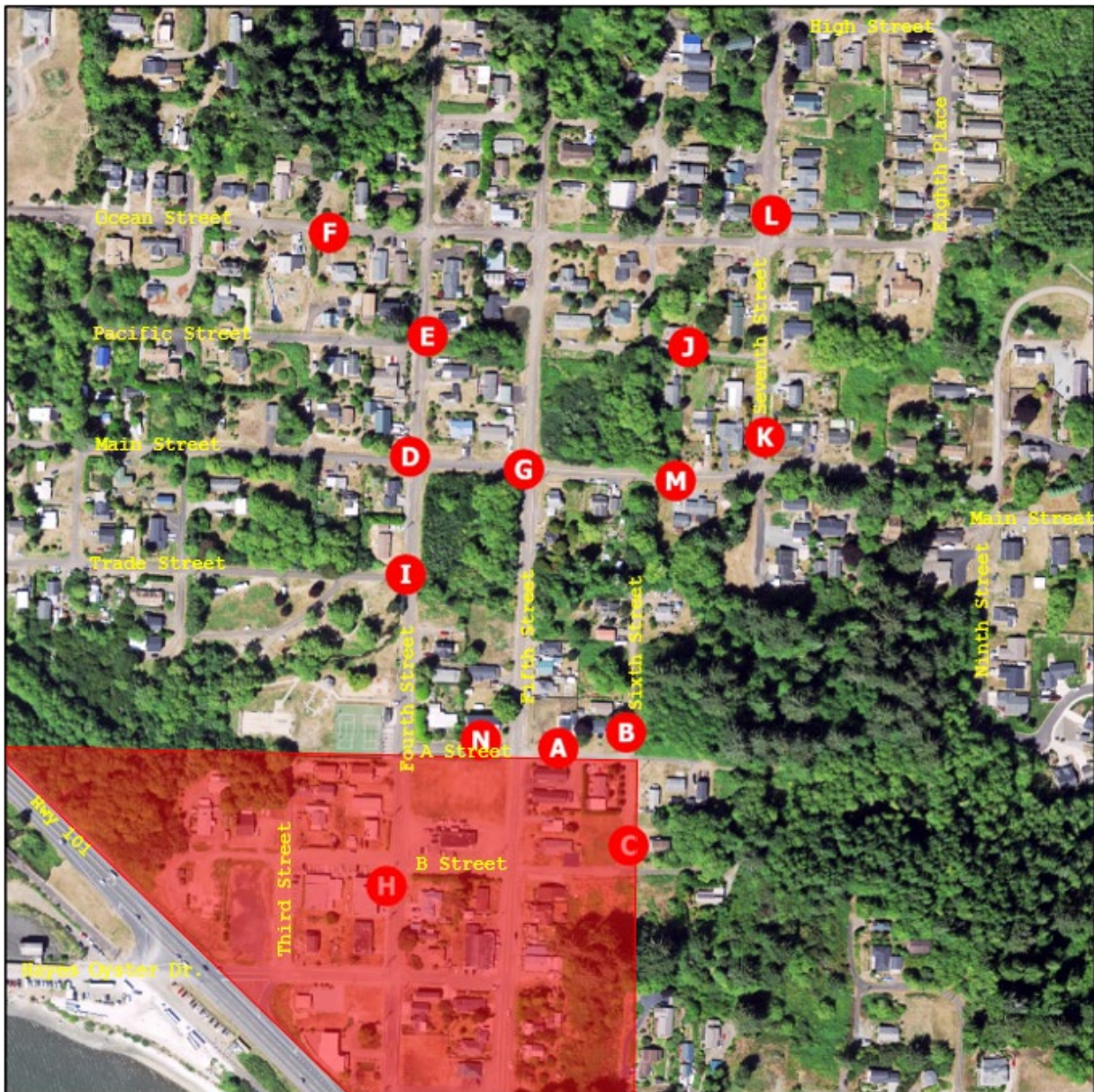


Figure 1: Study area, with the North High Intensity Zone (Town Center) in red.

The elevation surfaces used in the analysis were built from lidar data collected in 2009, presented as digital elevation models (DEMs). The highest-hit DEM represents the tops of features, such as trees and buildings. The bare-earth DEM models the earth's surface with all vegetation and structures removed. Empty areas, such as fields and roads, have essentially the same elevation in both models. Figure 2 shows the city center highest-hit DEM on the left and the bare-earth DEM on the right, both models shaded to reveal features.

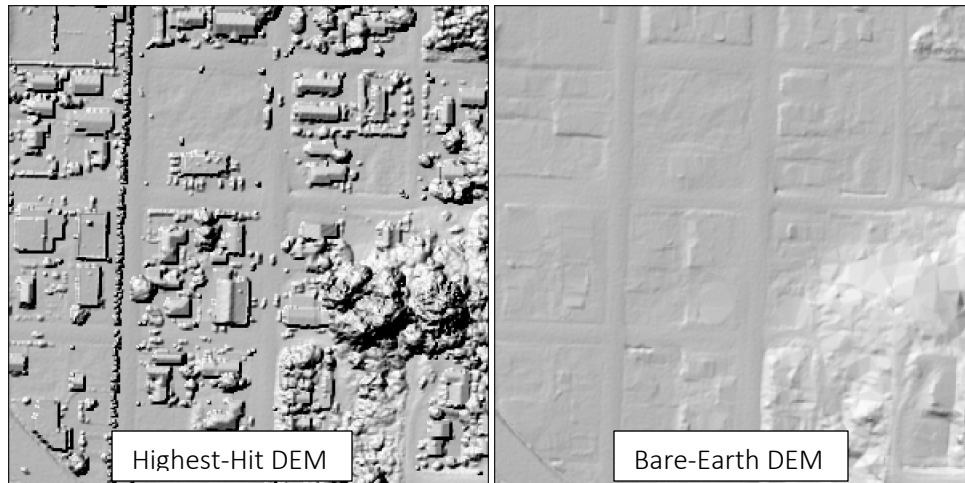


Figure 2

The highest-hit DEM was used to test visibility because it represents features that would interfere with a view (trees, buildings, etc.) that are removed from the bare-earth DEM. However, additional processing of the highest-hit DEM needed to be done to remove tall features that don't greatly interfere with what is visible in the distance, such as utility and lighting poles. Where such features exist in the highest-hit DEM their values were replaced with bare-earth values. Figure 3 shows where powerlines, which would be "seen" by the Visibility tool as a 70-foot tall barrier, were removed.

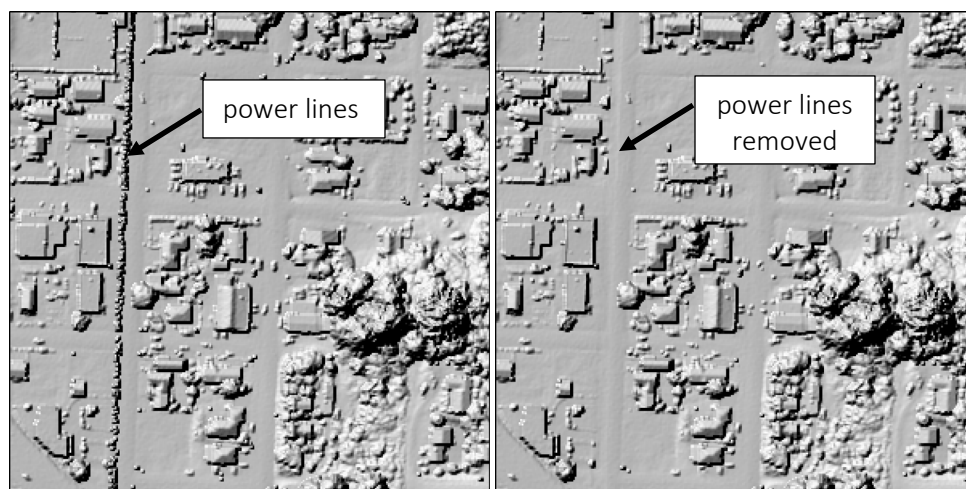


Figure 3

The modified highest-hit DEM allows us to calculate what might be seen from a given viewpoint. Figure 4 shows a photo taken from location C (Figure 1) and Figure 5 shows the results from the Visibility tool for the same location with current (2009) conditions. The yellow dots on the aerial image in Figure 5 are the points “visible” from location C. The scattering of dots at 1 in the aerial image represent the water and portion of Bayocean Spit seen at 1 in the photo. The dots at 3 in the aerial image correspond to the portion of Cape Meares seen at 3 in the photo. The dots at 4 in the aerial image would be visible from the photo location if the photographer turned to the left. The trails of dots across the bay at 2 where the photo shows no view of the water can be explained by the difference in elevation between the photographer’s eye level and the assumed eye level used in the analysis: visibility was calculated for heights of 8.5 feet and 18.5 feet, roughly corresponding to standing at a first floor window and a second floor window, respectively. The photographer’s eye level might be closer to 5.5 feet. At the higher height, a view of the bay and beyond would appear over the single-story house just to the left of center in the photo.



Figure 4: Location C (see Fig. 1 for reference), looking W on 6th Street, B Street immediately to the left.



Figure 5: Viewshed from Location C (see Fig. 1 for reference).

To model how views would change with different building heights, the city center was artificially “built up”. The parcels in the city center had their highest-hit elevations replaced by bare-earth elevations, essentially removing all structures. The bare-earth elevation was then increased by 24, 30, and 36 feet. Figure 6 shows the visibility results for location C from a second-story window with current (2009) conditions and the three build-out scenarios. As expected, fewer dots appear as more and higher building occurs. With full build-out under the current code, only a small portion of Cape Meares is visible. With full build-out at 36 feet all views of the bay and beyond are lost.

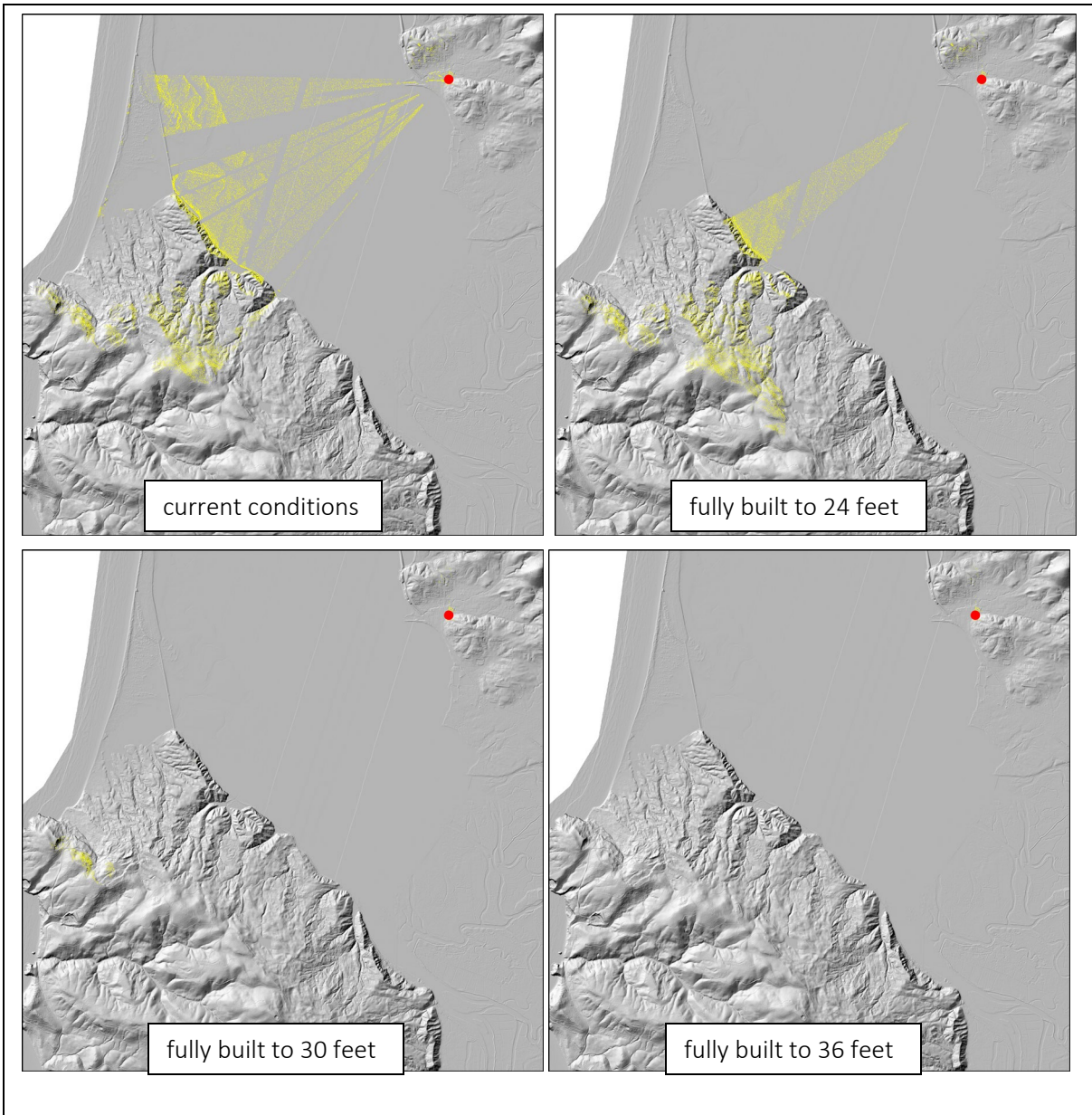


Figure 6: Viewshed from a second story at Location C (see Fig. 1 for reference) at different build-out scenarios. From a first story, all views are lost with build out at 24 feet, which is the current by-right maximum height.

Rather than relying on a subjective visual inspection of loss of dot density (a reduced view), the dots were counted. To get a sense of the nature of the view being lost the viewshed was defined into three categories: water (< 10 feet in elevation), shoreland (1- to 100 feet in elevation), and upland (> 100 feet in elevation). These categories are shown in Figure 7 with water in blue, shoreland in orange, and upland in green.

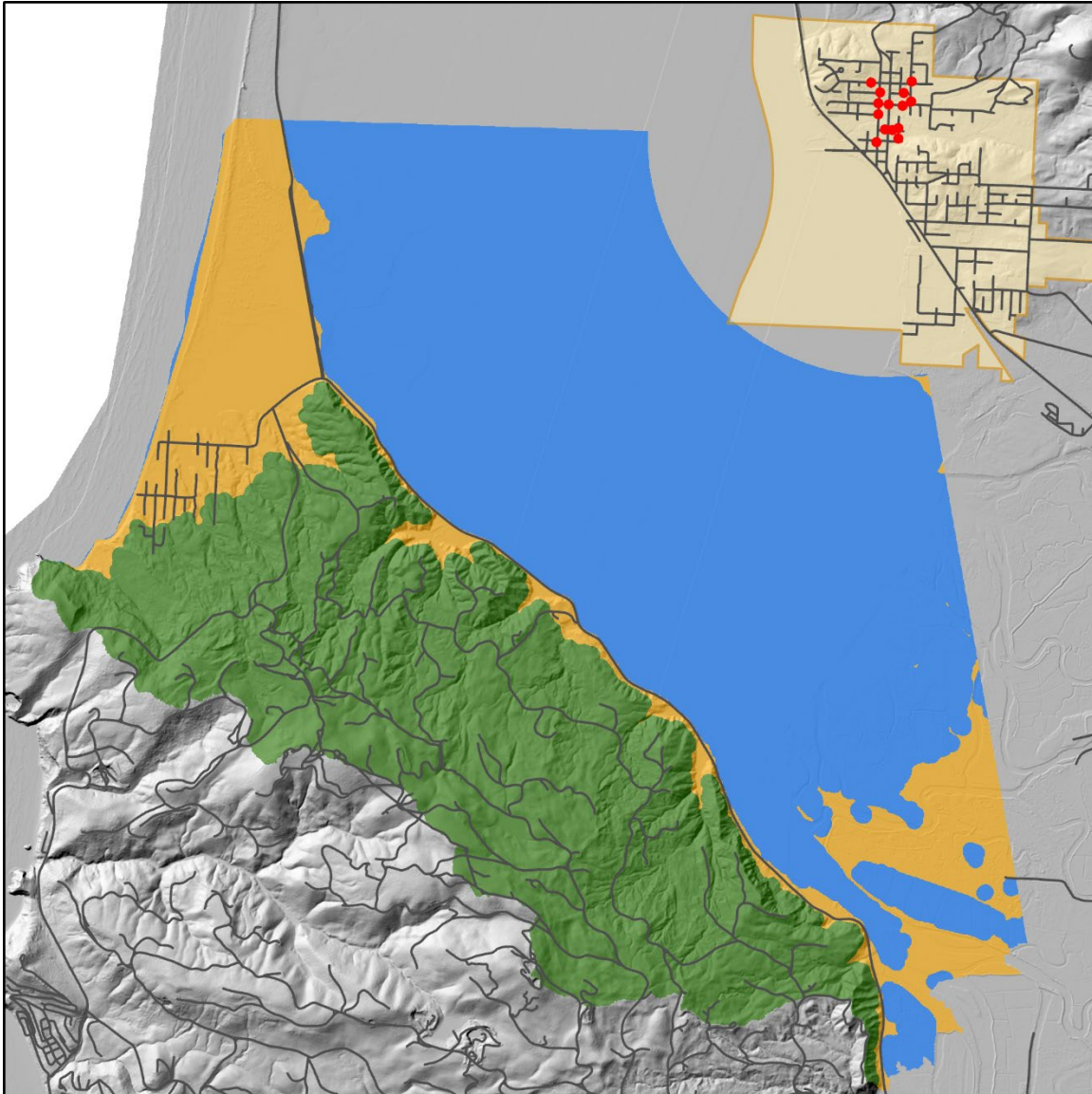


Figure 7: Dot categories depicted in data tables, below, with water in blue, shoreland in orange, and upland in green.

The tables below show the visibility counts for the three categories for each viewpoint for each floor for each build-out scenario. The letter in the upper left indicates the viewpoint shown in Figure 1, 1st and 2nd indicates building stories (estimated at 8.5 feet above ground level for one story and 18.5 feet above ground level for the second story); 00 means current conditions (2009); and 24, 30, and 36 mean build-out to that number of feet in height. As it turns out, location C is the only one analyzed where an increase in allowed building height from 30 feet to 36 feet would eliminate a view not already lost by build-out under current codes. Such a code change could impact the views at several other locations, but not eliminate them entirely.

Attachment A - Viewshed Analysis

| | | water | shore | upland | total |
|-----|----|--------|--------|---------|---------|
| 1st | 00 | 256929 | 37715 | 202759 | 497403 |
| | 24 | 0 | 0 | 0 | 0 |
| | 30 | 0 | 0 | 0 | 0 |
| | 36 | 0 | 0 | 0 | 0 |
| 2nd | 00 | 971965 | 113877 | 1114820 | 2200662 |
| | 24 | 0 | 2433 | 75179 | 77612 |
| | 30 | 0 | 0 | 0 | 0 |
| | 36 | 0 | 0 | 0 | 0 |

| | | water | shore | upland | total |
|-----|----|--------|-------|--------|---------|
| 1st | 00 | 52160 | 9820 | 656542 | 718522 |
| | 24 | 0 | 0 | 0 | 0 |
| | 30 | 0 | 0 | 0 | 0 |
| | 36 | 0 | 0 | 0 | 0 |
| 2nd | 00 | 879110 | 84089 | 980970 | 1944169 |
| | 24 | 71903 | 14118 | 816897 | 902918 |
| | 30 | 0 | 0 | 0 | 0 |
| | 36 | 0 | 0 | 0 | 0 |

| | | water | shore | upland | total |
|-----|----|--------|-------|--------|---------|
| 1st | 00 | 193010 | 29568 | 299900 | 522478 |
| | 24 | 0 | 0 | 0 | 0 |
| | 30 | 0 | 0 | 0 | 0 |
| | 36 | 0 | 0 | 0 | 0 |
| 2nd | 00 | 961873 | 86770 | 463188 | 1511831 |
| | 24 | 268961 | 24576 | 514961 | 808498 |
| | 30 | 0 | 0 | 41683 | 41683 |
| | 36 | 0 | 0 | 0 | 0 |

| | | water | shore | upland | total |
|-----|----|--------|-------|--------|--------|
| 1st | 00 | 48067 | 6507 | 83840 | 138414 |
| | 24 | 32379 | 4443 | 84112 | 120934 |
| | 30 | 31928 | 3998 | 77278 | 113204 |
| | 36 | 31650 | 3947 | 74230 | 109827 |
| 2nd | 00 | 94521 | 16479 | 208666 | 319666 |
| | 24 | 104697 | 17670 | 208732 | 331099 |
| | 30 | 56920 | 13642 | 208732 | 279294 |
| | 36 | 46360 | 7418 | 204919 | 258697 |

| | | water | shore | upland | total |
|-----|----|--------|-------|---------|---------|
| 1st | 00 | 294267 | 29458 | 728274 | 1051999 |
| | 24 | 294508 | 29759 | 728274 | 1052541 |
| | 30 | 294508 | 29759 | 728274 | 1052541 |
| | 36 | 294307 | 29759 | 728274 | 1052340 |
| 2nd | 00 | 621193 | 76385 | 1041085 | 1738663 |
| | 24 | 675059 | 78661 | 1041176 | 1794896 |
| | 30 | 675059 | 78661 | 1041176 | 1794896 |
| | 36 | 675037 | 78661 | 1041176 | 1794874 |

| | | water | shore | upland | total |
|-----|----|---------|--------|---------|---------|
| 1st | 00 | 787116 | 70592 | 669581 | 1527289 |
| | 24 | 787116 | 70592 | 669581 | 1527289 |
| | 30 | 787116 | 70592 | 669581 | 1527289 |
| | 36 | 787116 | 70592 | 669581 | 1527289 |
| 2nd | 00 | 1789534 | 134809 | 1159501 | 3083844 |
| | 24 | 1789534 | 134809 | 1159501 | 3083844 |
| | 30 | 1789534 | 134809 | 1159501 | 3083844 |
| | 36 | 1789534 | 134809 | 1159501 | 3083844 |

| | | water | shore | upland | total |
|-----|----|-------|-------|--------|-------|
| 1st | 00 | 0 | 0 | 0 | 0 |
| | 24 | 0 | 0 | 0 | 0 |
| | 30 | 0 | 0 | 0 | 0 |
| | 36 | 0 | 0 | 0 | 0 |
| 2nd | 00 | 0 | 0 | 0 | 0 |
| | 24 | 0 | 0 | 0 | 0 |
| | 30 | 0 | 0 | 0 | 0 |
| | 36 | 0 | 0 | 0 | 0 |

| | | water | shore | upland | total |
|-----|----|--------|-------|--------|--------|
| 1st | 00 | 73744 | 18848 | 68357 | 160949 |
| | 24 | 39776 | 9461 | 20735 | 69972 |
| | 30 | 37616 | 9060 | 18337 | 65013 |
| | 36 | 36403 | 8864 | 17015 | 62282 |
| 2nd | 00 | 179858 | 27692 | 89353 | 296903 |
| | 24 | 98087 | 14061 | 25950 | 138098 |
| | 30 | 96191 | 13762 | 24913 | 134866 |
| | 36 | 94848 | 13534 | 24369 | 132751 |

Attachment A - Viewshed Analysis

| | | water | shore | upland | total |
|-----|----|-------|-------|--------|--------|
| 1st | 00 | 12296 | 5286 | 33328 | 50910 |
| | 24 | 9857 | 3659 | 22066 | 35582 |
| | 30 | 9764 | 3628 | 21647 | 35039 |
| | 36 | 9691 | 3612 | 21417 | 34720 |
| 2nd | 00 | 55143 | 8088 | 42329 | 105560 |
| | 24 | 35473 | 4732 | 29138 | 69343 |
| | 30 | 35124 | 4680 | 24663 | 64467 |
| | 36 | 34836 | 4655 | 23820 | 63311 |

| | | water | shore | upland | total |
|-----|----|-------|-------|--------|-------|
| 1st | 00 | 0 | 0 | 0 | 0 |
| | 24 | 0 | 0 | 0 | 0 |
| | 30 | 0 | 0 | 0 | 0 |
| | 36 | 0 | 0 | 0 | 0 |
| 2nd | 00 | 0 | 0 | 0 | 0 |
| | 24 | 0 | 0 | 0 | 0 |
| | 30 | 0 | 0 | 0 | 0 |
| | 36 | 0 | 0 | 0 | 0 |

| | | water | shore | upland | total |
|-----|----|-------|-------|--------|-------|
| 1st | 00 | 0 | 0 | 0 | 0 |
| | 24 | 0 | 0 | 0 | 0 |
| | 30 | 0 | 0 | 0 | 0 |
| | 36 | 0 | 0 | 0 | 0 |
| 2nd | 00 | 0 | 0 | 4672 | 4672 |
| | 24 | 0 | 0 | 4672 | 4672 |
| | 30 | 0 | 0 | 4672 | 4672 |
| | 36 | 0 | 0 | 4672 | 4672 |

| | | water | shore | upland | total |
|-----|----|-------|-------|--------|--------|
| 1st | 00 | 0 | 0 | 36933 | 36933 |
| | 24 | 0 | 0 | 36933 | 36933 |
| | 30 | 0 | 0 | 36933 | 36933 |
| | 36 | 0 | 0 | 36933 | 36933 |
| 2nd | 00 | 0 | 0 | 128100 | 128100 |
| | 24 | 0 | 0 | 128826 | 128826 |
| | 30 | 0 | 0 | 128826 | 128826 |
| | 36 | 0 | 0 | 128826 | 128826 |

| | | water | shore | upland | total |
|-----|----|-------|-------|--------|-------|
| 1st | 00 | 0 | 0 | 0 | 0 |
| | 24 | 0 | 0 | 0 | 0 |
| | 30 | 0 | 0 | 0 | 0 |
| | 36 | 0 | 0 | 0 | 0 |
| 2nd | 00 | 0 | 0 | 0 | 0 |
| | 24 | 0 | 0 | 0 | 0 |
| | 30 | 0 | 0 | 0 | 0 |
| | 36 | 0 | 0 | 0 | 0 |

| | | water | shore | upland | total |
|-----|----|--------|--------|---------|---------|
| 1st | 00 | 268648 | 43742 | 992353 | 1304743 |
| | 24 | 0 | 0 | 0 | 0 |
| | 30 | 0 | 0 | 0 | 0 |
| | 36 | 0 | 0 | 0 | 0 |
| 2nd | 00 | 890374 | 113363 | 1275373 | 2279110 |
| | 24 | 0 | 0 | 1590 | 1590 |
| | 30 | 0 | 0 | 0 | 0 |
| | 36 | 0 | 0 | 0 | 0 |