PETERSBURG MEDICAL CENTER

Replacement Hospital Master Plan

January 31, 2020

NAC ARCHITECTURE

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Professionalism

Dignity

Quality

Teamwork

Petersburg Medical Center

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Assuring Petersburg Medical Center can remain a viable partner and provide the best possible community healthcare well into the future.

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Executive Summary

Petersburg Medical Center (PMC) has been providing medical services to the Petersburg community for more than 100 years. The current hospital was originally built in 1955. Significant hospital expansions and remodels were completed in 1969 and 1984. The physicians' clinic was added in 1994 and remodeled in 2011. PMC became a certified federally designated Critical Access Hospital in 2001.

Petersburg Medical Center is a vital part of the community, providing critical medical services to town and regional inhabitants and, in its capacity as a major employer, bringing significant economic benefits to the local economy. Access to quality medical care is central to keeping people in Petersburg and attracting and retaining other employers and businesses to the area. Assuring that PMC provides the needed, appropriate, and financially viable services necessary to maintain and improve community health and wellness is of paramount importance to the hospital and the design team.

Though the facility has been well maintained and has benefitted from small improvements over the years, the bulk of the hospital is now 25 to 55 years old and most of the supporting infrastructure is at the end of its useful life, requiring major investment in systems replacement. Many existing rooms are small, don't meet current requirements for accessibility, and cannot accommodate the spatial needs of equipment and technology, or the participation of family members in the delivery of care. The health benefits, and costs savings, of sub-acute preventative and rehabilitative care have increased demand for physical therapies beyond the available space. Significant modernization, expansion and re-configuration of existing rooms is needed to improve services. Given the age of the existing facility, and the disruption and risk of remodeling in place, this report focuses on the option of a replacement hospital that will serve current and future needs in a new, efficient, and sustainable structure.

The PMC board has pursued an extensive investigation of their position in the community and the SE Alaska region. Starting in 2001 with the Petersburg Community Needs Assessment, PMC has engaged their community in a discussion regarding healthcare service needs that are critical to their continued residency in Petersburg. This dialogue continued as documented in the Health Needs Assessment in 2015 and the Community Needs Assessment and Forces of Change document completed in 2018. PMC continues to reach out to the community through their Community Café sessions, and regular updates aired on KFSK radio. PMC has also looked closely at their internal operations and processes to identify how to improve efficiency, as presented in the 2006

Performance Improvement Consultation, and commissioned a survey of their buildings in the 2015 facility condition assessment.

In January of 2019 PMC received a Denali Grant to develop a master plan for a replacement hospital. The grant conditions require the master plan to provide several specific documents to better frame the context and requirements for a new hospital. These documents include:

1. A structural engineering report to better define the facility's compliance with current seismic performance requirements.
2. An inundation study to identify the risks of tsunami events, and if potential locations of the replacement hospital may offer greater protection from such an event.
3. A detailed debt capacity analysis.
4. Summary of workload, staffing and demographic data.
5. An updated market and service line analysis.
6. Numeric space program based on the market and service line analysis and current industry standards.
7. Conceptual site plans showing how departments based on the numeric space program may lay out on a new site and at the existing hospital site.
8. Cost estimates for direct construction costs and indirect project costs.

With the above information incorporated into a master plan the hospital will be in position to solicit funding to take the next step, conducting a site selection process with public and borough participation and completing a site development package.

Stakeholder Team

Throughout the master plan process NAC Architecture has relied on the guidance of a core stakeholder team to communicate the hospital's values and ambitions, as well as the specific needs of all departments and services. Through a series of meetings with hospital representatives the program was created and finalized, and site concepts critiqued and improved. As the project moves forward into design and construction the leadership of the core stakeholder group will safeguard the continuity of principles and vision identified in the master plan.

NAC Design Team

Dan Jardine, Principal in Charge

Ron van der Veen, Principal Designer

Michael O'Malley, Principal Planner

Steve Wescott, Project Architect

Petersburg Medical Center Core Team

Phil Hofstetter, CEO

Chad Wright, Executive Assistant

Ro Tejera, Controller

Devynn Johnson, Project Manager

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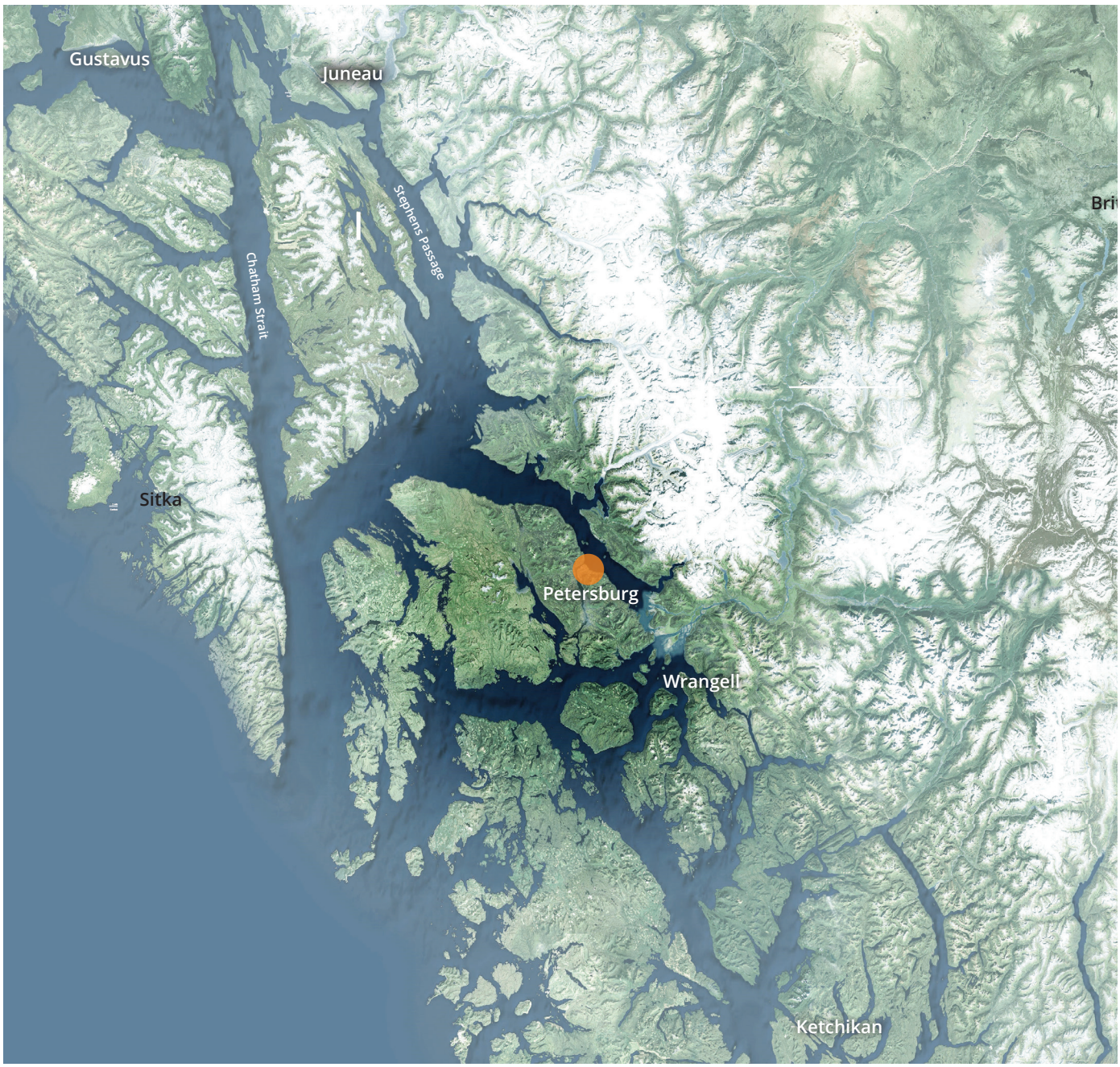
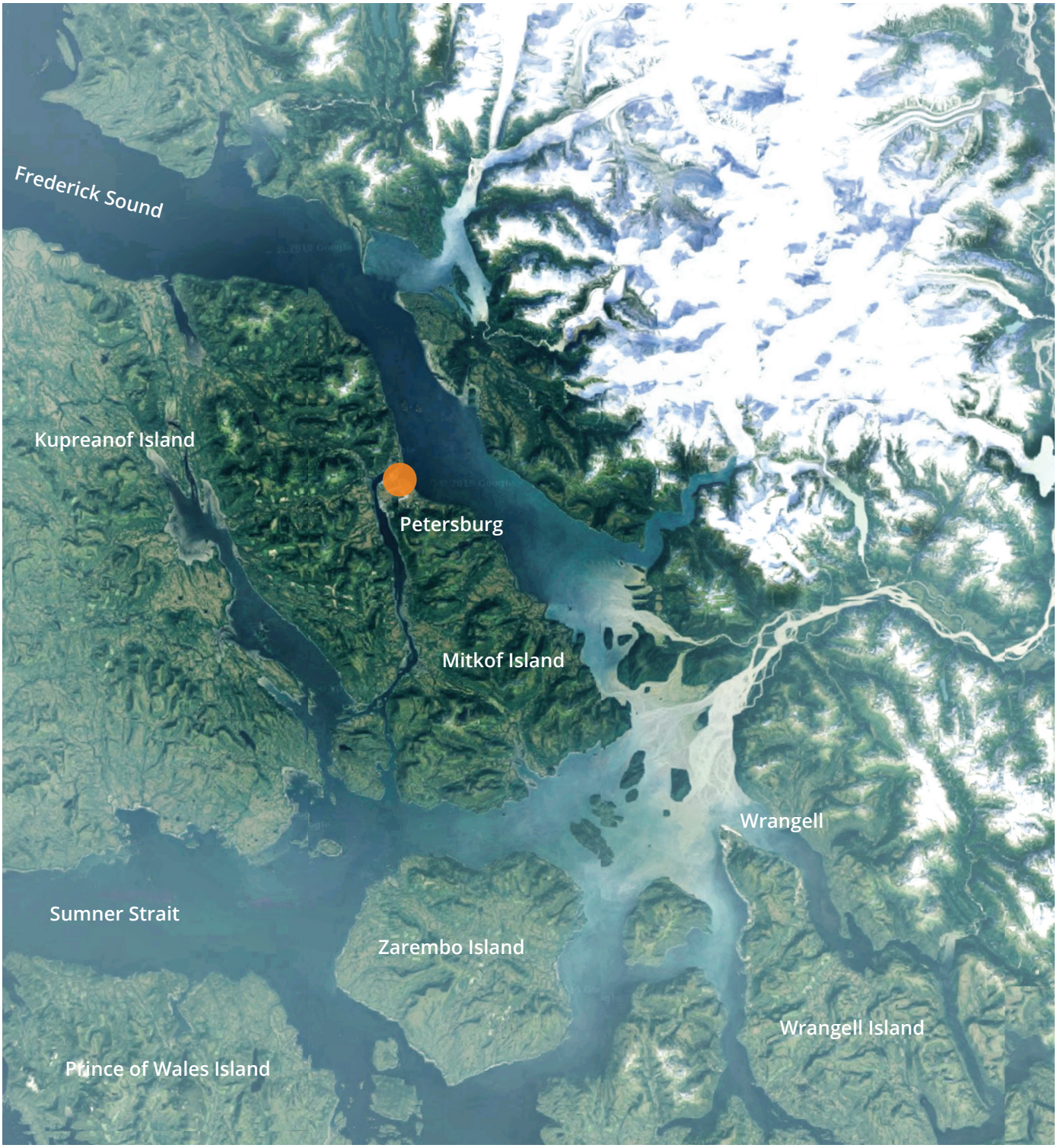
Petersburg Geography and Climate

Geography

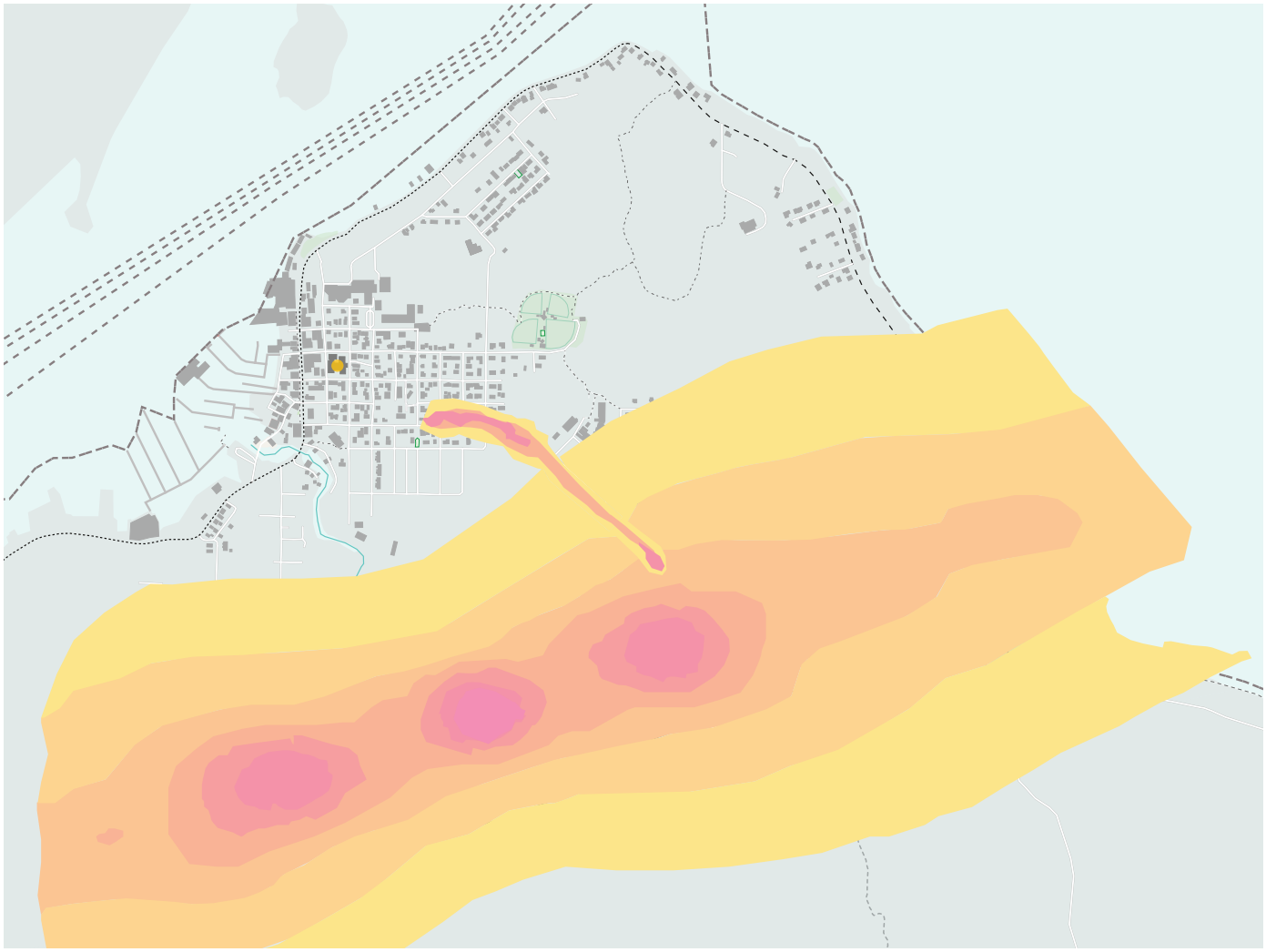
Petersburg is located on the northern tip of Mitkof Island in the Southeast Alaska panhandle, approximately midway between Ketchikan to the south and Juneau to the north. Access to Petersburg is solely by air or sea. The island airport is served daily by Alaska Airlines year-round as one of multiple stops on flights originating in Seattle and Anchorage and serving Ketchikan, Wrangell and Juneau.



Petersburg is also served year-round by the Alaska Marine Highway System ferries carrying passengers and vehicles. Winter sailings currently land in Petersburg twice a week. Price point and schedule lead most residents and visitors to favor air travel, but if someone needs to bring a personal vehicle the ferry is the only option. Bulk materials and goods typically arrive by barge at the Petersburg Port. Unlike Ketchikan, Juneau, Sitka and Skagway the narrows in Petersburg is not wide or deep enough to accommodate large passenger cruise ships. Tourism is limited to those arriving by air, ferry, or small expedition style cruise ships.



The proximity of the airport and noise generated by jet landings and takeoffs has a significant effect on areas around the airstrip plateau and down the Haugen Drive corridor. Though these noise events usually only occur twice a day and residents are conditioned to the experience, it may be worthwhile to consider triple pane glazing for greater acoustic separation for the alternative sites.

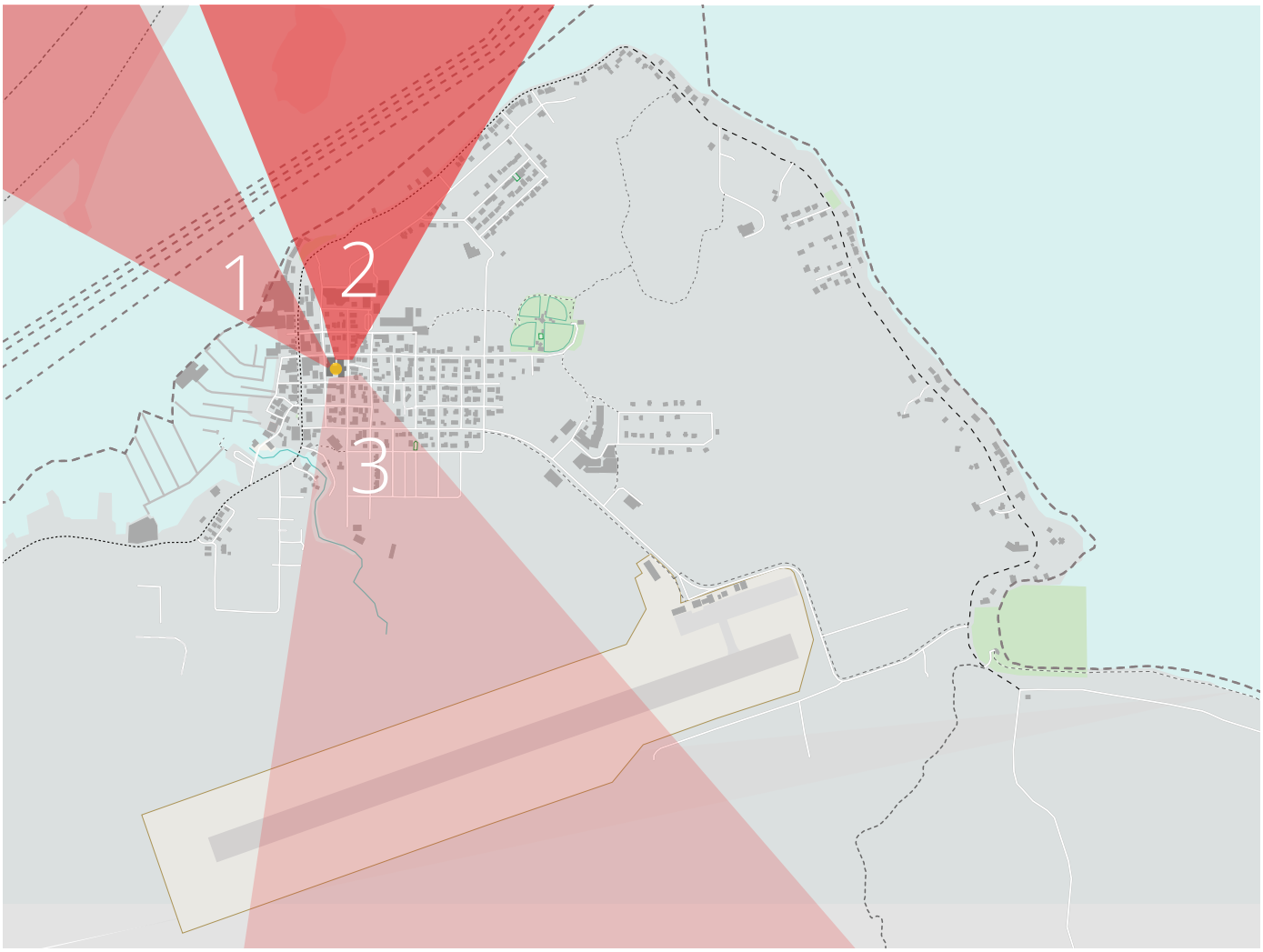


Alaska Road and Aviation

Decibels

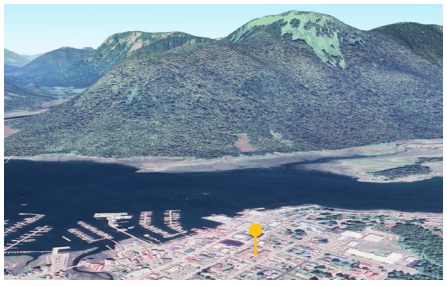
- 35 - 40
- 40.01 - 45
- 45.01 - 50
- 50.01 - 55
- 55.01 - 60
- 60.01 - 65

Petersburg is in a beautiful natural setting surrounded by dramatic, forested slopes and mountain peaks. Sites with a higher elevation and fewer obstructions, either man-made or natural, will present better opportunities to take advantage of these views for the benefit of staff and patients.



View Corridors

1 Kupreanof Island and Petersburg Creek

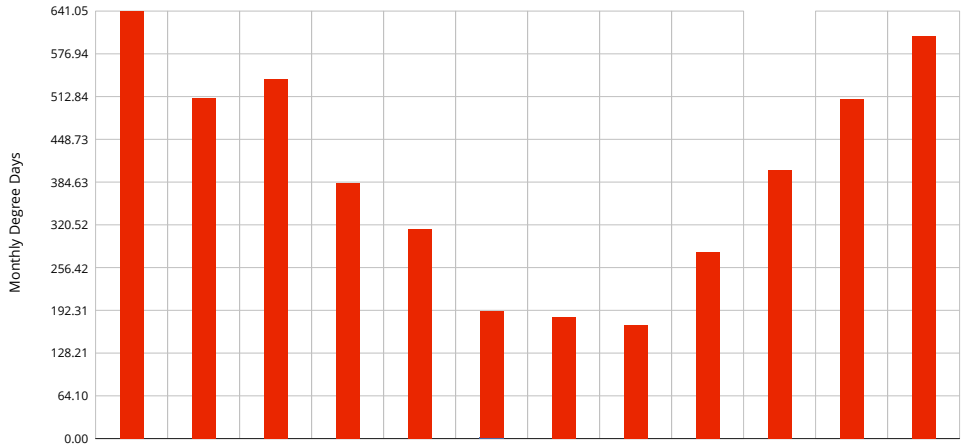


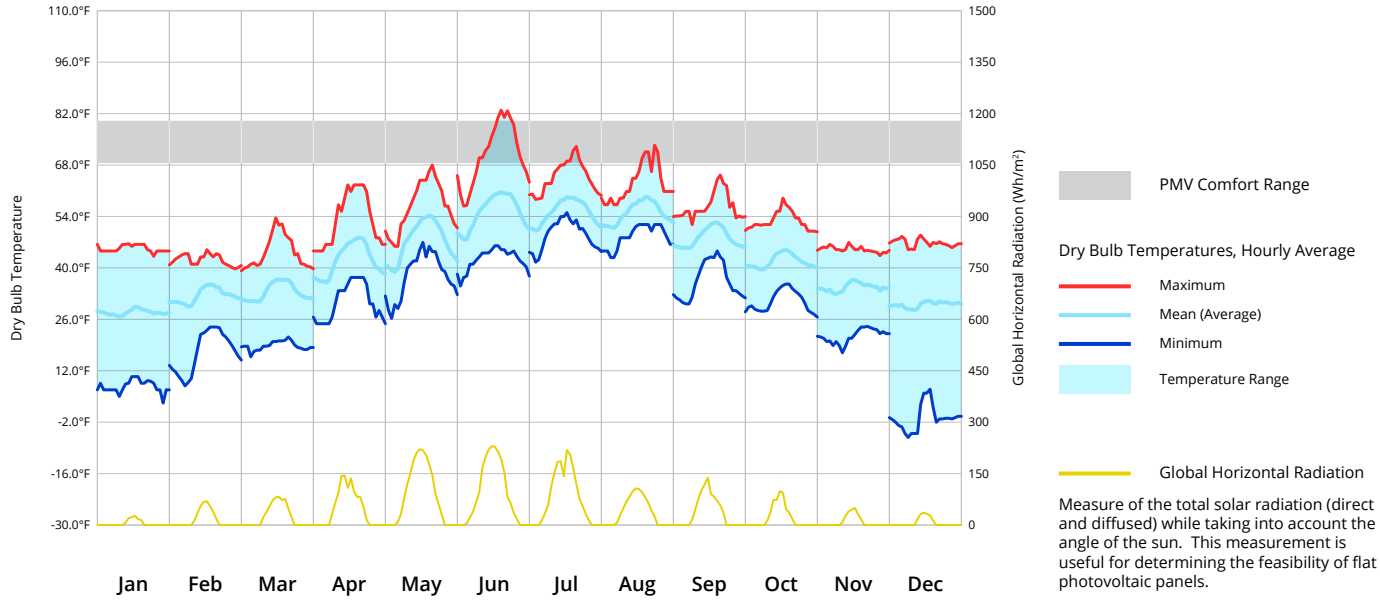
2 Sasby and Kupreanof Island

3 Mitkof Island

Climate

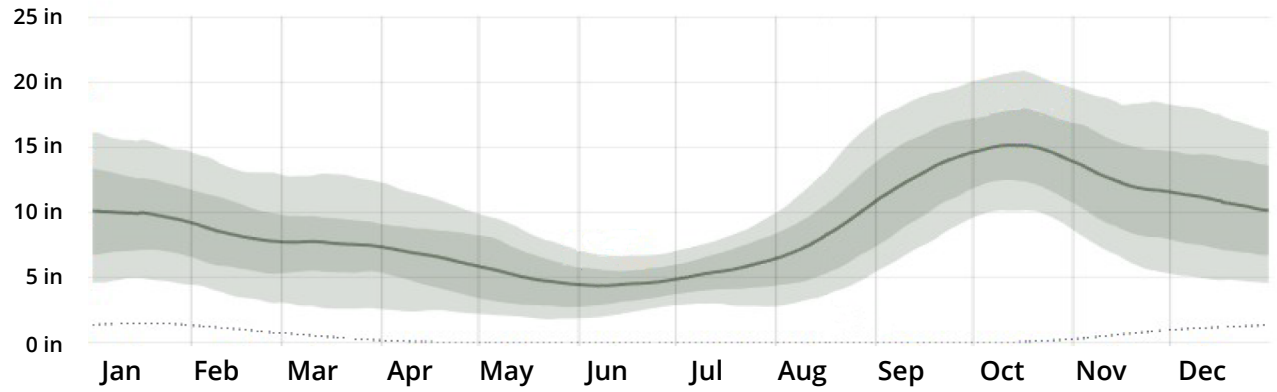
Though its location in a temperate marine environment spares Petersburg from the extreme cold temperatures experienced in other parts of Alaska, its climate still experiences heating degree days throughout the year. A heating degree day compares the mean outdoor temperatures recorded at a location with a standard temperature, usually 65 degrees F in the U.S., to discern if heating or cooling will be the predominant mode of conditioning indoor space.



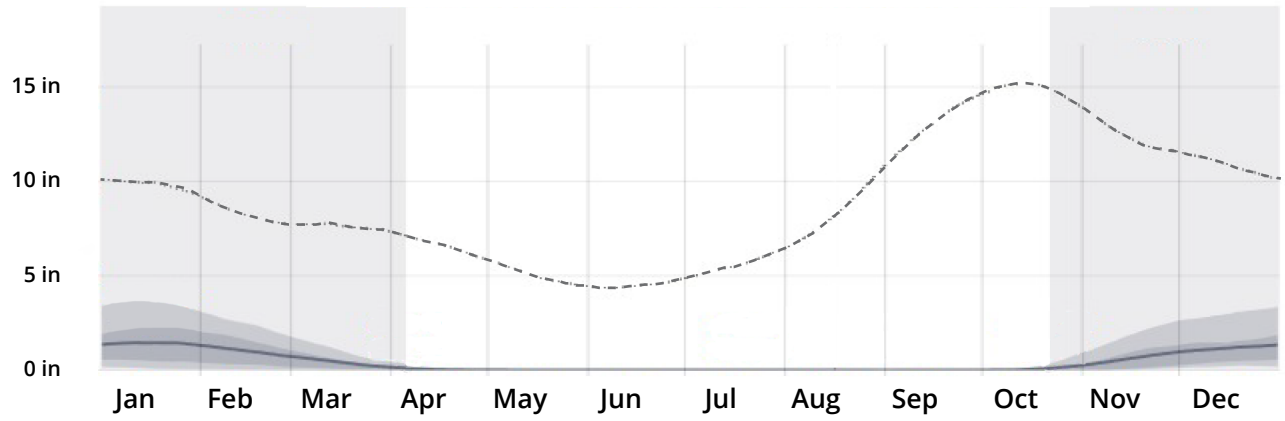


Measure of the total solar radiation (direct and diffused) while taking into account the angle of the sun. This measurement is useful for determining the feasibility of flat photovoltaic panels.

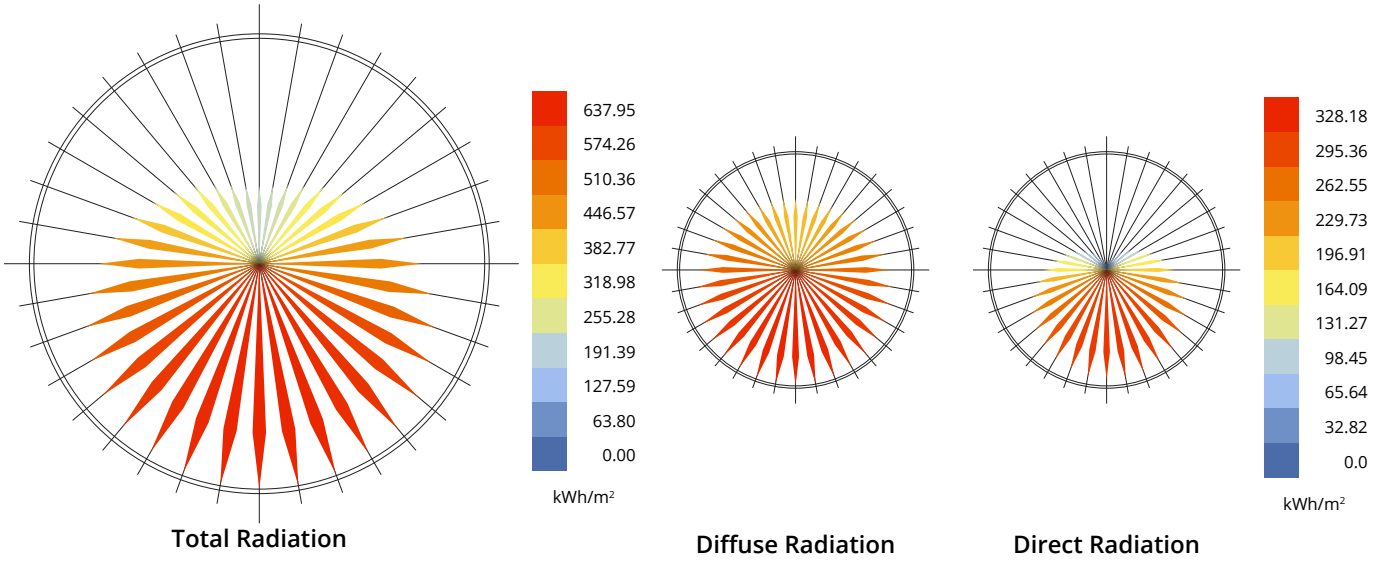
Petersburg also experiences significant cloud cover and precipitation, averaging 4-7 inches per month in the summer and peaking at 12-18 inches per month in the fall. Average annual snowfall is moderate, with Petersburg being snow free most of the year. The significant cloud cover results in more diffuse than direct solar radiation, limiting the effectiveness of photovoltaic solar panel energy generation. However, solar hot water panels tend to work well with diffuse radiation.

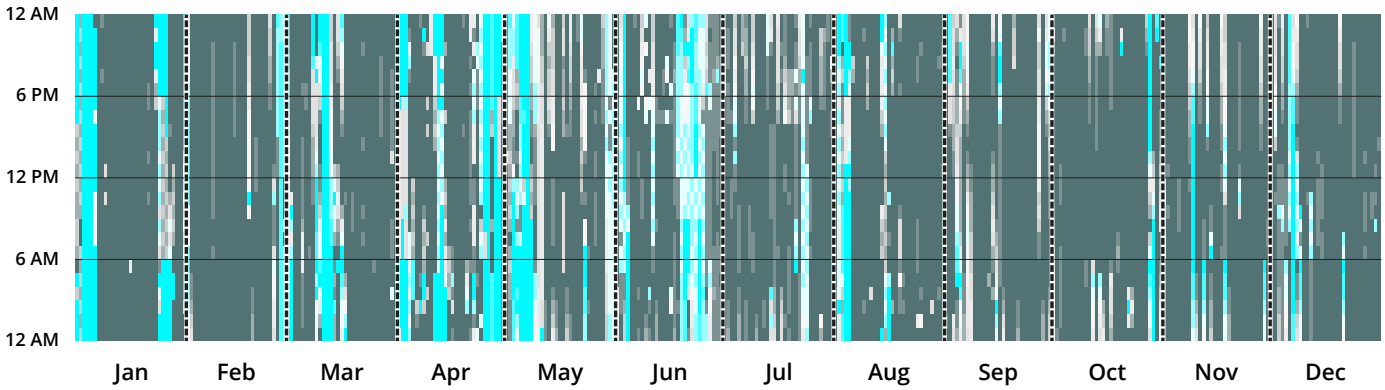


Average Monthly Rainfall

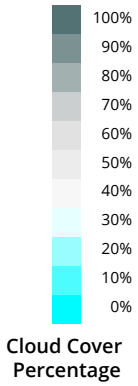


Average Liquid-Eqivalent Monthly Snowfall

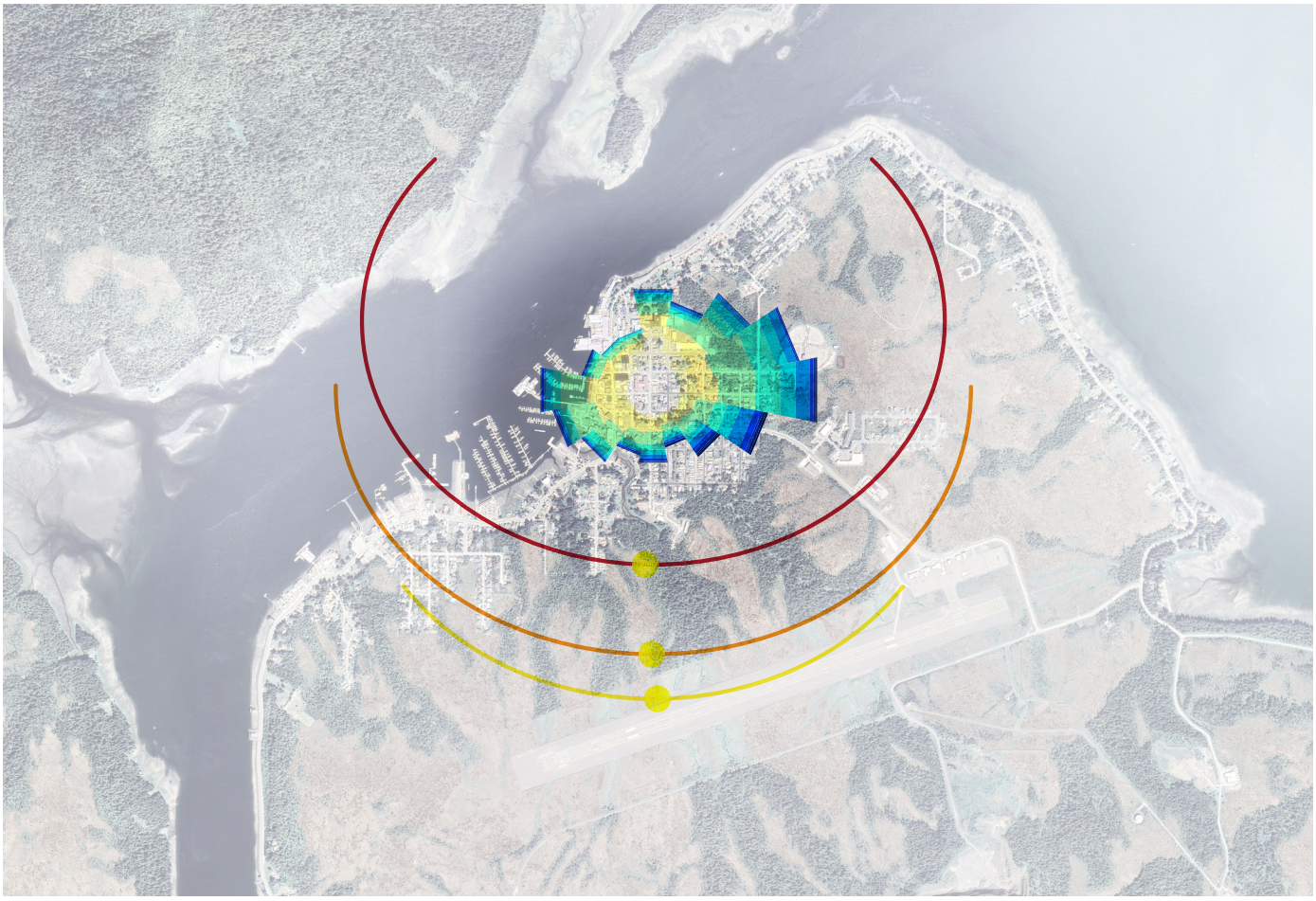




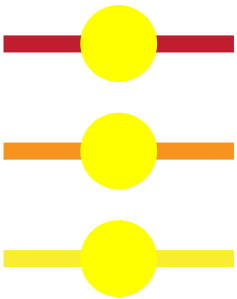
Cloud Coverage



Winds tend to predominantly come from the east, with the highest speeds experienced in spring and summer. The chart below combines a wind rose with seasonal sun paths to show relative microclimate effects. Generally, sites with north and east exposure will be cooler than those with south and west exposure, thought these effects are moderate in degree.



Sun Paths

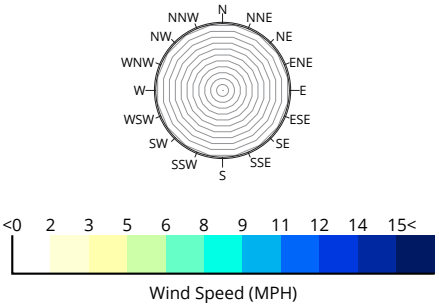


Summer Solstice
June 21

Fall/Spring Equinox
March 20/September 23

Winter Solstice
December 21

Wind Rose



History and Community

Fishing has historically been the primary industry in Petersburg. In recent decades the fishing industry has seen decline with fewer people employed, but those jobs that remain are stable with a higher average income. Other industries contributing to the economy are local and federal government, transportation, seafood processing, and tourism. The population census has declined from its peak of 3,400 in the late 1990's to about 3,100 today. The abundant natural resources, strength of community, and quality of life all play a part in residents' desire to live and work in Petersburg.

The majority of Petersburg residents and industries reside in the town proper and along the coastal roads that radiate out from the center of town. Haugen Drive is the main route between the town center and the airport, with other services along its length including the fire hall, post office, and grocery center. The hospital is located in the center of town, and this has been a source of convenience for both staff and patients. However, the site is restricted by its boundaries and offers few parking spots. The site is surrounded by commercial operations and a mixture of single and multi-family residences, making it difficult to expand the campus.

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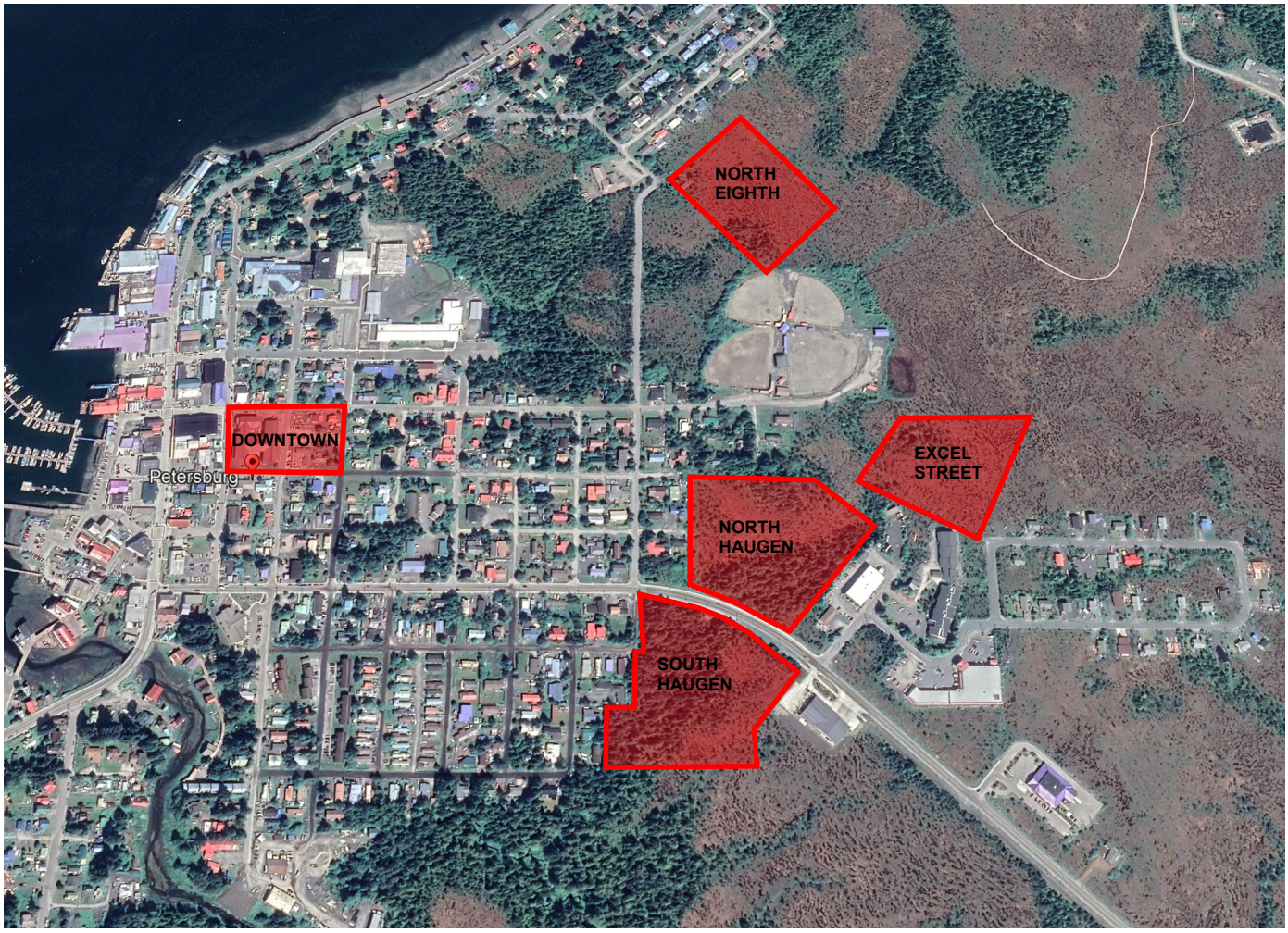
Potential Sites

The geography around Petersburg is characterized by forests, wetlands and extensive tracts of muskeg, a soft, moisture absorbing organic material that presents unique challenges to site development. Much of the vacant land outside the town core is owned publicly by the Borough of Petersburg, making acquisition of property for a new hospital relatively simple. FAA restrictions limit how closely the new hospital can be located near the airport. The Army Corps of Engineers will have oversight over development of land containing wetlands.

For the purpose of the master plan the design team considered the existing downtown hospital site as well as four undeveloped sites offered for consideration by the Borough for building a new replacement hospital. Two of the undeveloped sites are located adjacent to Haugen Drive, one is off Excel Street to the east, and one is near North Eighth Street adjacent to the softball fields. All the undeveloped sites are largely made up of wetlands and muskeg, requiring extensive site preparation. They do however offer greater potential for creating an efficiently designed facility with ample parking due to their larger size.

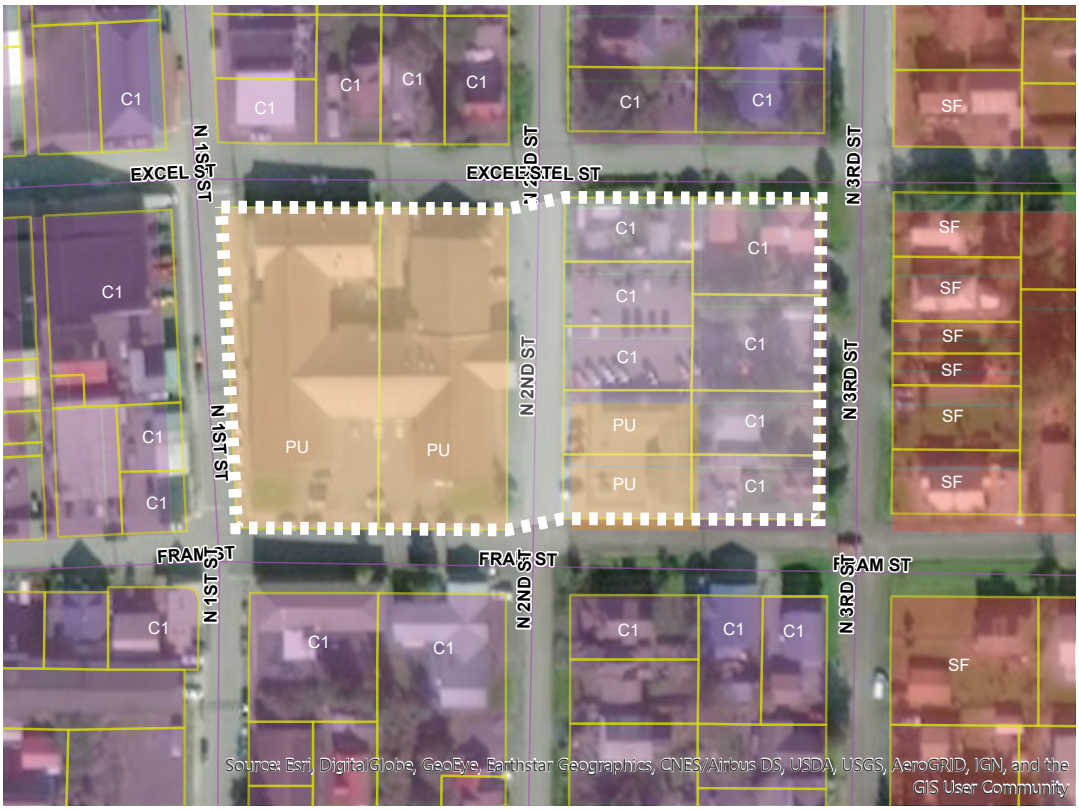


Downtown Hospital Site

The existing hospital and clinic are located on a single block downtown, bounded by Excel Street to the north, Fram Street to the south, First Street to the west and Second Street to the east. The site is currently zoned as a Public Use, which is the appropriate zone for a hospital. The site slopes from the southwest up to the northeast resulting in the main SW entrance to the hospital a floor below the NE Clinic entrance and ER entrance on the east side.

To accommodate the expanded program the design team considered the full block to the east as part of the necessary site development area, creating a 115,362 SF (2.65 acre) single large lot. This adjacent block is a mixture of Public Use and Commercially zoned properties. Current uses include surface parking for the hospital, the Clausen Memorial Museum, and residential houses. All these existing uses would need to be displaced and the stretch of North 2nd street between the two blocks vacated to create a viable site large enough for the replacement hospital.

Water and Sewer connections are available at the surrounding streets. A storm drain connection is available only at Fram Street. Storm water currently flows at the surface of the streets down to Fram where it is intercepted at catch basins and directed to subsurface culverts. Power and phone/data is elevated on power poles at the east sides of North 1st Street, North 2nd Street, and North 3rd Street, and at the south sides of Excel and Fram Streets. If North 2nd Street is vacated the power and phone/data lines will need to be relocated.



Alternative Sites

No one site was identified as the designated location for the replacement hospital. Final site selection will be the result of a process of weighing the advantages and disadvantages of each of the sites identified above, and perhaps other sites that may be made available by the Borough to consider. The process will solicit participation from the hospital, the Borough, and the community to assure that all selection criteria is properly weighted and scored to support a rational and consensus driven decision.

North Haugen Site

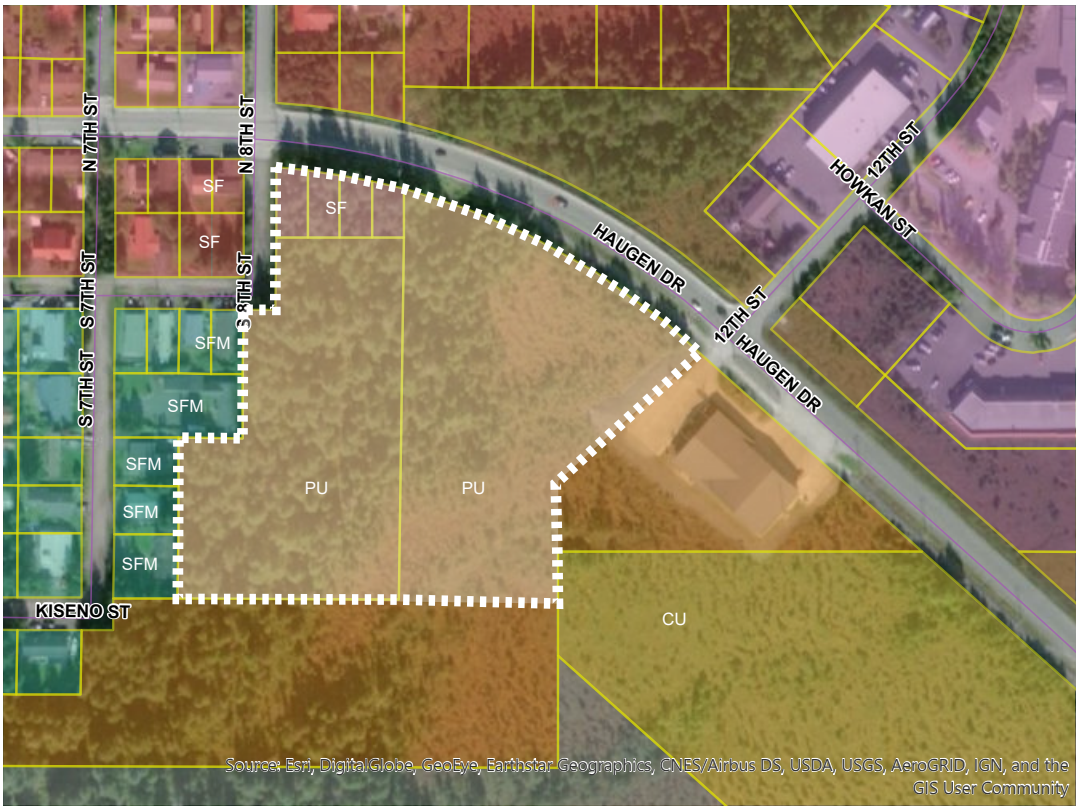
This site fronts Haugen Drive to the south. The other sides of the site abut residential and commercial properties and undeveloped land. Gjoa Street dead ends at the west side of the property and Fram Street dead ends at the northwest corner of the site. The land is currently zoned for Single Family and Open Space/Recreational. The site is relatively flat and slightly depressed below the Haugen Drive right of way. The site is undeveloped with a mixture of trees and shrubs and likely wetlands and muskeg. Total site area is 378,037 SF (8.68 acres.)

A 10-inch water main abuts the west property line. An 8-inch sewer line is available at Gjoa Street. There is also an 8-inch sewer line and 8-inch water line available at the south side of Haugen Drive. No storm drainage catchment system is available. Storm runoff would rely on natural drainage patterns. A stormceptor manhole would likely be required to catch any silt or oil runoff from paved areas before it is released. Power and phone/Data is elevated on power poles along the south side of Haugen Drive, requiring a crossing to serve the site.

South Haugen Site

This site fronts Haugen Drive to the north. The other sides abut residential and public properties and undeveloped land. Ira II Street and Eighth Street intersect at the west side of the site. The Fire Hall is located at the northeast corner of the site. The site is relatively flat but significantly depressed below the Haugen Drive right of way. The land is currently zoned for Public Use with a small portion zoned for Single Family. The site is undeveloped with a mixture of trees and shrubs and likely wetlands and muskeg. Total site area is 367,344 SF (8.43 acres.)

An 8-inch water line and 8-inch sewer line are available at the south side of Haugen Drive. No storm drainage catchment system is available. Storm runoff would rely on natural drainage patterns. A stormceptor manhole would likely be required to catch any silt or oil runoff from paved areas before it is released. Power and phone/Data is elevated on power poles along the south side of Haugen Drive.



Excel Street Site

The Excel Street site fronts undeveloped land on three sides and abuts commercial and retirement residential uses to the south. The Borough zoning map shows an extension of the Excel Street right of way aligned with the north side of the site and an extension of the Thirteenth Street right of way aligned with the east edge of the site. The map also shows an extension of the Twelfth Street right of way bisecting the site, but this could very likely be amended to create a single contiguous lot. The site is currently zoned for Open Space Recreational, Commercial, and Multifamily Residential uses. The site is relatively flat and level with surrounding properties. The site is undeveloped save for a nature trail, with a mixture of trees and shrubs and likely wetlands and muskeg. Total site area is 229,452 SF (5.27 acres.)

There is an 8-inch water line and an 8-ich sewer line at Thirteenth Street near the southeast corner of the property. The next closest connection point is a 10-inch water and 8-inch sewer at the corner of Tenth Street and Excel Street, 650 feet away. Like the Haugen sites there is no storm catchment system available so mitigated storm discharge to natural drainage patterns would be the expected approach. Power and phone/data are available along the west side of Thirteenth Street, and further away at the intersection of Howkan Street and Twelfth Street.

Eighth Street Site

This site is located north of the softball field, touching the intersection of Eighth Street and Aaslaug Street at its west corner. The site abuts undeveloped land on all four sides, except for a single house at the corner of Eighth and Aaslaug. The Borough zoning map shows an extension of the Eighth Street right of way on the northwest side and an extension of the Aaslaug Street right of way on the southwest side. The map also shows unnamed street rights of way bisecting the site in two locations, but it is likely these can be vacated to create a single contiguous lot. The site is currently zoned for Public Use. The undeveloped land abutting the northwest and northeast sides are zoned Single Family. Land abutting the other sides of the site to the south and east are zoned for Multifamily Residential, Public Use, and Open Space Recreational. The site is relatively flat with a mixture of trees and shrubs, and likely wetlands and muskeg. The total site area is 251,557 SF (5.78 acres.)

There are no water and sewer lines at the site. The nearest connection point is at the intersection of Lake Street and Aaslaug Street, approximately 250 feet from the site. At that location there is an 8-inch water line and an 8-inch sewer line. Like the other undeveloped sites there is no storm catchment system available so mitigated storm discharge to natural drainage patterns would be the expected approach. Power and phone/data are available at the intersection of Eighth Street and Aaslaug Street.

Selection Criteria

The following is a suggested list of selection criteria and potential scoring to consider as part of the process. These criteria weigh the relative difficulty of development of each site with the potential benefits to the healthcare experience. Higher scores are awarded to sites where development is easier and there is greater potential to create an inspirational, healing environment. This list will likely evolve and perhaps expand as the process moves forward and more stakeholders contribute to the discussion.

1. Presence of and access to existing utilities

Developing water, sewer, power, and telephone services can be a major expense. To the degree that existing services are already available nearby these costs can be mitigated.

2. Proximity to existing roads

Property adjacent to a major street such as Haugen will provide easy access for patients and staff. Access from adjacent residential streets is less desirable.

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3. Muskeg risk and elevation of site relative to existing adjacent roads

An undeveloped site will require removal of muskeg and importation of structural fill to create a building pad and road beds. If the site is level with adjacent streets the amount of structural fill will be minimized.

4. Proximity to residential development

Most housing in Ketchikan is built on piles. If the site is adjacent to residential properties care will need to be taken when removing muskeg to avoid a negative impact to the adjacent houses through a drop in the water table or earth movement. Cost could add up for temporary barriers at the property line or for other mitigation.

5. Existing Zoning designation

If site is zoned for a use other than Public, such as residential or recreational use, it may complicate land use review and require more time to approve. Note that the size of the project will likely require a master planned development review under the current zoning code.

6. Existing Use to be displaced

If the site has an existing use that is of value to the public or to an individual property owner the costs of property acquisition and use mitigation can quickly mount.

7. Existing structures to be demolished

Demolition of existing structures is an additional cost on top of site development. Mitigation of Hazardous materials could be involved.

8. Access to views and sunlight

Distant territorial views and access to daylight are documented contributors to wellness and healing. Views are plentiful in Petersburg but if there is an existing structure or site feature that may obstruct views from patient areas or block access to daylight it should be avoided.

9. Close to Downtown

Currently the hospital is located within the center of town, making it easy for staff and visitors to walk to patronize local businesses and run errands. The further away from the city center the harder it is for staff and visitors to engage in town live without using an automobile.

10. Size

To accommodate a single story scheme, parking, vehicle access and drives the size of the parcel will need to be roughly 350,000 to 375,000 SF. For a 2-Story scheme the size of the parcel will need to be roughly 300,000 to 350,000 SF.

Scoring

The following is a preliminary score matrix that could be used to weigh each of the criteria and score each of the individual sites. Scores could range from -5 to +5 with higher scores awarded to sites that exhibit distinct advantages for a criterion, and lower scores for sites that represent fewer advantages or even serious challenges. Ultimately at the end of the selection process all participants would fill out a similar sheet and the cumulative results considered a major, but not the only factor in the final site selection.

Criteria	Existing In Town	North Haugen	South Haugen	Excel Street	North Eighth
1. Access to Utilities	-	-	-	-	-
2. Proximity to Roads	-	-	-	-	-
3. Site Elevation/Muskeg Risk	-	-	-	-	-
4. Proximity to Residential	-	-	-	-	-
5. Zoning Designation	-	-	-	-	-
6. Existing Use Displaced	-	-	-	-	-
7. Structures to Demolish	-	-	-	-	-
8. Access to Views and Sunlight	-	-	-	-	-
9. Close to Downtown	-	-	-	-	-
10. Size	-	-	-	-	-
Total Score	**-**	**-**	**-**	**-**	**-**

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Seismic Evaluation Report

Petersburg Medical Center, like many hospitals across the country, bears the history of a series of expansions and remodels over many years, leading to a legacy of compromised environments and aging infrastructure. The current condition of the hospital was well documented in the 2015 Facility Condition Assessment completed by Jensen Yorba Lott. That study highlighted the difficulties of providing quality services in functionally obsolescent spaces designed long before advances in medical technology and the rise of the information age. It also described the challenge of maintaining aging systems that are no longer supported by their manufacturers and for which parts are hard to find. Though 'grandfathered' as code compliant at the time of construction, many spaces are not consistent with current code standards or industry standards based on best practice.

The 2015 assessment looked at all major components of the hospital, including structural. However, performing a seismic analysis was beyond the contracted scope of work at that time. The report recommended that a full structural analysis be performed to determine what upgrades may be needed to bring the facility up to current seismic code.

As part of the current Master Plan KPFF Structural Engineering was engaged to perform an American Society of Civil Engineers (ASCE) 41 Tier 1 evaluation of the existing structure. A Tier 1 evaluation is an initial screening of the building's potential seismic deficiencies in the event of an earthquake. The evaluation is conducted through review of historical structural drawings coupled with non-destructive visual inspection, using a standard Tier 1 checklist. Though not the full structural analysis recommended in the facility condition assessment, it is the standard first step towards identifying seismic risks. The evaluation was completed for the 1967 long term care wing and the 1983 hospital addition. No drawings were available for the 1990 clinic, so it was not included in the evaluation.

Deficiencies

Potential seismic deficiencies were found at both the long-term care building and the hospital. Though these conditions may have been acceptable at the time, seismic design awareness and code development have advanced greatly over the last decades, bringing into question past solutions.

At the long-term care building concrete shear wall dowel embedment into the foundation is insufficient, there is no tension connection between cedar piles and pile caps to resist uplift, and attic bracing is insufficient to transfer lateral forces to the shear walls.

At the hospital load paths to steel moment frames are unclear, some moment frames do not meet drift limits, attic bracing is insufficient to transfer loads to moment frames, connections of moment frame columns to the foundation are insufficient, it is unlikely that moment frame connections are able to the strength of the beams, moment frame members do not meet compact section requirements, there are no girder flange continuity plates moment frame joints, moment frame beam flanges are not braced out of plane at the attic, and there may be insufficient tensile capacity in the steel framing and connections.

The above is a condensed summary of the findings. The full report and tier 1 checklist are included in the appendix. Though not an exhaustive and conclusive analysis these findings further question the feasibility of trying to adapt the existing long-term care and hospital buildings to contemporary standards and suggest that there may be significant cost and disruption associated with correcting the identified deficiencies, and other potential deficiencies that may be found when hidden structure is exposed during corrective action.

Inundation Study

Like any waterfront community Petersburg is potentially vulnerable to shore based flood events from a variety of sources. Of interest to the city and the hospital is the relative level of flood risk associated with the current downtown site compared to other potential sites for a replacement hospital further uphill.

As part of the Master Plan the firm of Herrera was engaged to perform an inundation study to assess the risks of coastal flood events including sea level rise, storm surge, and tsunamis generated by earthquakes, glacial collapse, ground landslides or submarine landslides. Following is a brief summary of the findings.

Sea Level Rise

The impact of projected world sea level rise is tempered in the SE Alaska archipelago by tectonic uplift contributing to vertical land movement. Even without the vertical land movement phenomenon the elevation of the existing hospital in Petersburg is sufficiently above the most extreme sea level rise scenarios prior to year 2150 to avoid inundation.

Storm Surge

Storm surge is caused by wind and low atmospheric pressure and can be intensified by wave action. Wave heights are relatively modest in the areas around Petersburg. Worst case projections for storm surge height in Petersburg is 21 feet above Mean Lower Low Water (MLLW) level. The existing hospital is located 40 feet above MLLW.

Earthquake Generated Tsunamis

This most common type of tsunami is typically caused by large distant earthquakes. Petersburg, like many parts of SE Alaska, is protected by large islands to the west and the effect of this type of tsunami is greatly dissipated by the time it reaches Petersburg. The more local subduction earthquakes common to outer SE Alaska have been projected to produce tsunamis of up to 10 feet in height. But in the protected inner areas of SE Alaska like Petersburg the models indicate the potential for subduction to be less than 5 feet in height, not enough to threaten the existing hospital.

Glacial Collapse Tsunamis

Pro-glacial tsunamis occur when a large ice sheet calves at the terminus of a tidewater glacier. The tsunamis generated by these events can be quite high, and the likelihood of occurrence is probable as global temperatures rise. The closest glaciers to Petersburg that may experience this type of event are Baird Glacier and the Le Conte Glacier, both about 20 miles away. But their effect on Petersburg is expected to be minimal. This is primarily because the length and depth of the bays fronting these glaciers will quickly absorb the initial energy of the tsunamis.

Landslide Generated Tsunamis

These events are caused by a large land mass collapse from a steep waterfront slope. In Petersburg, Petersburg Mountain is the only land mass of sufficient size to produce a tsunami that would impact the existing PMC. But there is no evidence of past catastrophic land sliding, or flank collapse anywhere on Petersburg Mountain so the risk of such an event is pure speculation. If it did occur the resulting tsunami would likely inundate all of Petersburg including the uphill alternative sites.

Submarine Landslide Tsunamis

These events are caused when a large deposit of sediment at the mouth of a river suddenly slides into deeper water. Such an event occurred in Skagway in 1994 when a large amount of recently deposited sediment from the Skagway river sloughed into the deep Taiya Inlet. In Petersburg the amount of sediment contributed by Petersburg Creek is modest and the shallow depth of the narrows would not allow a rapid lateral movement of submarine sediment.

Conclusion

The likelihood of inundation of the existing PMC is very low for most of the potential source events. The one event that would impact PMC is itself so unlikely as to not be a credible risk. If it did happen then the location of the hospital is immaterial. The above is a summary of the findings in the Herrera report. The full report with study citations and comparative events is in the appendix.

PETERSBURG MEDICAL CENTER MFP MARKET ANALYSIS

SEPTEMBER 2019

NAVIGANT

Market and Financial Analysis

As they contemplate the opportunities for improved services and outcomes that a new replacement facility can offer Petersburg Medical Center must tailor their planning to address both local demographics and national trends. PMC is a progressive healthcare organization eager to incorporate strategies that have been proven to improve health and wellness on the national stage. Coordinated patient-focused care provided by a dedicated team working in a collaborative environment to assure whole health, early detection and intervention to avoid catastrophic complications of untreated chronic conditions, post procedure rehab and in-home continuity of care to assure reliable recovery, expanding virtual access to care via searchable electronic medical records and telemedicine, forging partnerships with local organizations and employers, and providing a safe, efficient environment that supports rigorous infection prevention measures are all recognized, successful approaches to enhancing community health.

The implementation of these progressive programs needs to be customized to the local population and respond to the realities of reimbursement sources. Providing programs that not only respond to the needs of the community but also align with the priorities of the Center for Medicare and Medicaid Services (CMS) and private insurers will contribute to a fiscally sound operation and assure a secure future for PMC.

Navigant, a nationally recognized healthcare operations consultant, was engaged to address the master plan requirements for a demographic and workload analysis, market and service line analysis, and an updated debt capacity analysis. Below is a condensed summary of the findings. The complete Navigant report is included in the appendix.

Service Area Market Demographics

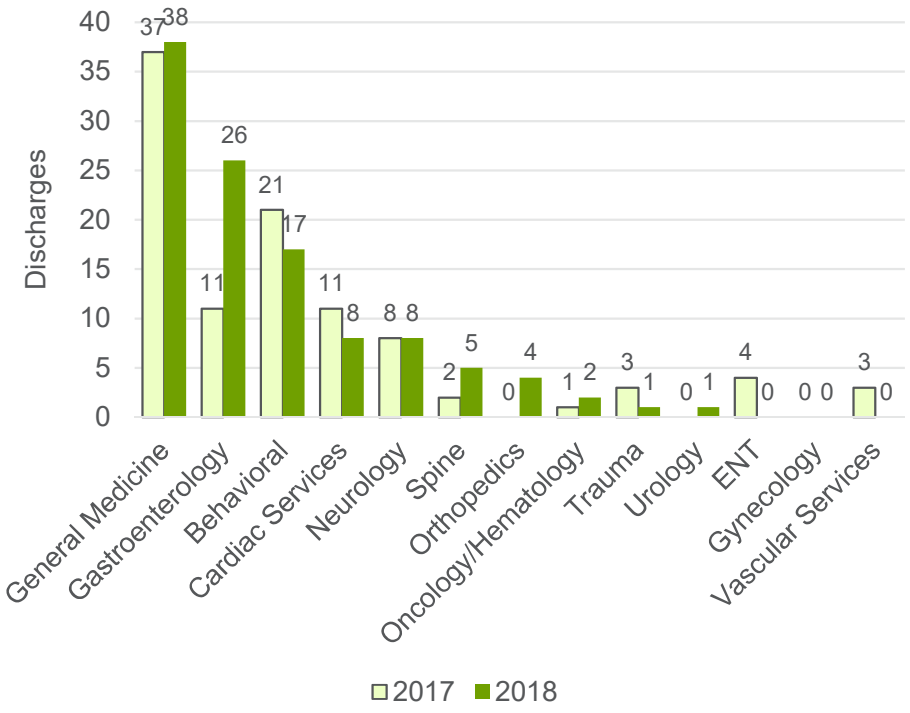
2019-2024

Service Area Population by Age Cohort	2019	2024	5 Year Growth No.	5 Year Growth Percent	5 Year Growth CAGR
Age 0-17	721	733	*12*	*1.7%*	*0.3%*
Age 18-44	1,046	1,026	*(20)*	*-1.9%*	*-0.4%*
Age 45-64	940	879	*(61)*	*-6.5%*	*-1.3%*
Age 65-84	456	557	*101*	*22.1%*	*4.1%*
Age 85+	38	39	*1*	*2.6%*	*0.5%*
Service Area Total	**3,201**	**3,234**	***33***	***1.0%***	***0.2%***
Female Age 15-44	**540**	**535**	***(5)***	***-0.9%***	***-0.2%***

Demographic and Workload Analysis

Drawing from public data on population trends in the SE Alaska region, hospital admission records and previous studies completed by PMC and the Borough, Navigant compiled a contemporary profile of the community. Findings included:

- Petersburg population will increase slower than the state as a whole.
- PMC service area will see a 3% increase in those over 65 in the next 5 years. Percent of Medicare recipients is expected to grow in line with aging population.
- Inpatient volumes will remain relatively flat, and remain low compared to state and national benchmarks
- Outpatient specialty volume will grow slightly in the next 5 years.
- Lab and imaging volumes will grow significantly over the next 5-10 years.
- While imaging volume will increase, MRI demand is expected decrease.
- PMC has no direct competition for acute primary care, urgent care, emergency and inpatient services.
- The number of privately insured patients is expected to decrease by 5% over the next 10 years.
- Facilities that represent possible competition for chronic care management and post-acute care include Wrangell Medical Center, Ketchikan Medical Center, Bartlett Regional Hospital in Juneau, and Swedish and Virginia Mason in Seattle



Market and Service Line Analysis

Accessing internal PMC admission and billing records Navigant completed an internal assessment of the current facility use and identified trending volumes. Findings included:

- General Medicine, Gastroenterology, Behavioral Health, and Cardiac services represent the largest volume of inpatient admissions.
- Gastroenterology, Nephrology, Substance Abuse, and Pulmonology represent the largest percentage of inpatient volume.
- Computerized Tomography (CT), Physical Therapy, Home Health and Treatment Room visits have all shown significant recent growth.
- The majority of patient days at PMC are Long Term Care.
- The Average Daily Census (ADC) in the Acute Care wing remains below 1.0.

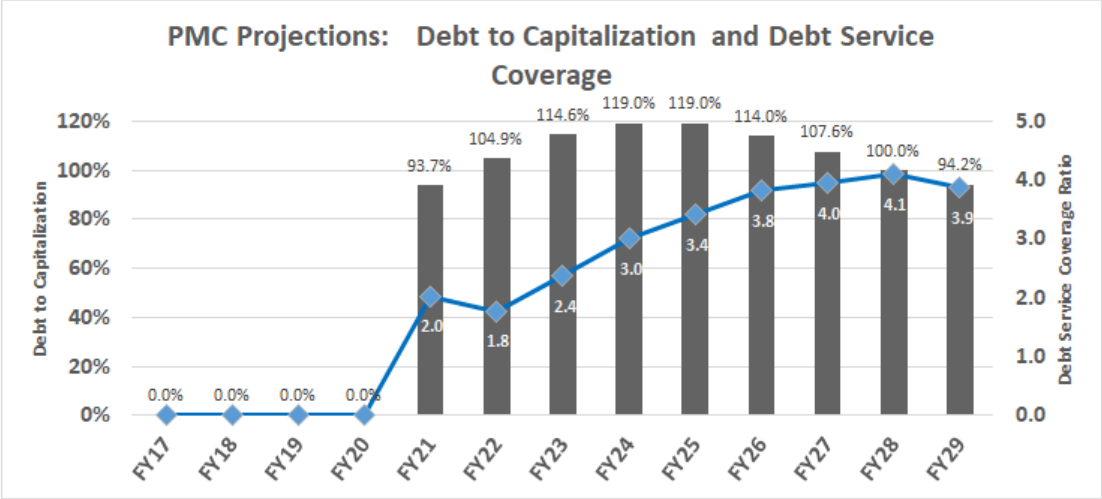
Based on the above Navigant generated a forecast of bed needs and service line growth.

PMC Total ALL AREAS											
	Bed Need										
Bed Type	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
	Projected										
Petersburg SNF											
Patient Days	4,818	5,002	5,194	5,392	5,599	5,813	6,035	6,266	6,506	6,755	7,013
Average Daily Census	***13.2***	***13.7***	***14.2***	***14.8***	***15.3***	***15.9***	***16.5***	***17.2***	***17.8***	***18.5***	***19.2***
Population Age 65+ in Petersburg	494	513	533	553	574	596	619	642	667	693	719
Year over Year Change		3.8%	3.8%	3.8%	3.8%	3.8%	3.8%	3.8%	3.8%	3.8%	3.8%

- PMC currently operates 12 acute and swing beds. Average ADC for acute beds is 0.8. Average ADC for swing beds is 2.5. Given this low census the current 12 beds are more than enough to meet demand.
- There may be a slight increase in acute care admissions if surgical procedures and OB/birthing services are restored to the hospital.
- Though the number of acute beds exceeds average daily need, the surplus capacity allows PMC to respond to catastrophic events where the number of patients needing admission can spike upwards temporarily.
- PMC currently operates a 15 bed Skilled Nursing Facility (SNF) Long Term Care unit. Current ADC is 13.2, suggesting capacity for growth. Given the low number of SNF beds available in Alaska generally, and the aging population, Navigant forecasts that a growth to 20 Long Ter Care beds is sustainable.

- Ancillary services are all expected to grow over the next 10 years. But the growth is expected to be met with a single room for each of the following services:

    - Computerized Tomography (CT)
    - Mammography
    - Ultrasound
    - DEXA Bone Density Scanning
    - X-Ray
    - Emergency Department Exam, including observation
    - Outpatient Surgery
    - Endoscopy



Financial Projections and Debt Capacity Analysis

Financial projection and calculation of debt capacity rely on making assumptions about the future growth, or decline, of revenue based on current financial performance. The FY 2020 Budget recently completed by PMC was used as the baseline. It should be noted that this calculation of debt capacity is based on the PMC facility as it stands now, fully depreciated and with a depressed valuation due to its age. Essentially it calculates how much debt the hospital can take on right now to finance improvements, not considering potential grants, subsidized loans or tax revenues. Following are the assumptions and focus used in the calculation:

- PMC will retain its current constant market share of patients and services.
- The budget will continue to be approximately be break even from a total margin perspective
- Focus on how interest payments will affect the operating income/margin debt and how easily PMC can afford the debt service.
- Assumed that the capital improvement will be entirely funded over a 30-year term at 5.5% interest.
- Assumed no additional debt and limited capital spending over the term of the loan.
- Earnings Before Interest, Taxes, Depreciation and Amortization (EBIDTA) remains positive through the life of the loan.
- Assumed Days Cash on Hand will slowly build in a positive trajectory.

Based on the above the estimate of Petersburg Medical Center's debt capacity is **$5.0 M.** This is not sufficient to fund meaningful improvements to PMC, let alone finance a replacement facility. It will fall to successful pursuit of state or federal grants to secure the capital necessary to take on a major project. If such grants are realized and a new hospital is built, the new facility can be amortized over many years, significantly improving cash flow and potentially increasing the debt capacity of the hospital to an amount that can be coupled with grant money to build a viable project budget.

Program

Integrity

Professionalism

Dignity

Quality

Teamwork

Petersburg Medical Center

Hospital Program

Building on the bed and service line forecast provided by Navigant, coupled with preferred service lines identified by the staff and community in the hospital's outreach sessions, NAC Architecture created a draft numeric program indicating the number and sizes of rooms necessary to provide the anticipated services. This program was then reviewed and modified in a series of sessions with department heads and hospital administrators to assure it met expectations and is in alignment with need and revenue projections.

The resulting program has a total facility Gross Square Foot (GSF) area 60% higher than the existing facility. The growth is due to three factors; increase in the number of rooms, additional types of rooms and an increase in the size of rooms. The increased number of rooms is driven by the expansion of the SNF Long Term Care and an increase in the number of exam and treatment rooms in the Clinic. The increase in types of rooms is driven by the need to add new services and spaces in physical therapy, dietary and admissions/entry. The increase in size of rooms is primarily driven by the need to comply with current code minimums and industry standards for patient care spaces, ADA required clearances, need to accommodate new medical equipment modalities, and provide the backbone and distribution of Information Technology.

SPACE	EXISTING			PROPOSED		
DEPARTMENTS	**NSF**	**GF**	**DSF**	**NSF**	**GF**	**DSF**
MAIN ENTRY RECEPTION	875	1.10	966	**2,525**	**1.15**	**2,904**
ADMINISTRATION	2,183	1.18	2,578	**1,200**	**1.35**	**1,620**
INFORMATION TECHNOLOGY	0	0	0	**1,140**	**1.25**	**1,425**
BUSINESS/MED. RECORDS	884	1.19	1,051	**1,120**	**1.25**	**1,400**
LONG TERM CARE	4,430	1.38	6,094	**8,460**	**1.50**	**12,690**
CLINIC	2,736	1.95	5,342	**6,430**	**1.40**	**9,002**
ACUTE CARE	3,578	1.20	4,295	**5,990**	**1.20**	**7,188**
EMERGENCY DEPARTMENT	954	1.10	1,053	**1,440**	**1.50**	**2,160**
LABORATORY	1,683	1.12	1,881	**2,060**	**1.25**	**2,575**
IMAGING	1,437	1.48	2,126	**3,470**	**1.50**	**5,205**
PHARMACY	117	1.00	117	**640**	**1.20**	**768**
SURGERY	1,045	1.46	1,522	**1,810**	**1.60**	**2,896**
CENTRAL STERILE	480	1.09	523	**760**	**1.30**	**988**
PHYSICAL THERAPY	1,096	1.14	1,253	**2,682**	**1.25**	**3,353**
HOME HEALTH	1,672	1.44	2,416	**440**	**1.40**	**616**
MAINTENANCE	2,376	1.26	3,000	**2,376**	**1.15**	**2,580**
DIETARY	1,656	1.21	2,000	**2,940**	**1.30**	**3,822**
CENTRAL SUPPLY	5,012	1.20	6,000	**4,840**	**1.30**	**6,292**
OTHER SUPPORT SPACES	4,660	0.00	0	**0**	**0.00**	**0**

TOTAL DEPARTMENT GROSS SQUARE FOOTAGE	**42,217**	**67,483**
Building grossing factor	1.16	1.30
TOTAL DEPARTMENT GROSS SQUARE FOOTAGE	**49,000**	**87,728**

Building Grossing Factor
Exterior walls, public corridors, mechanical and electrical services, stairs and elevators

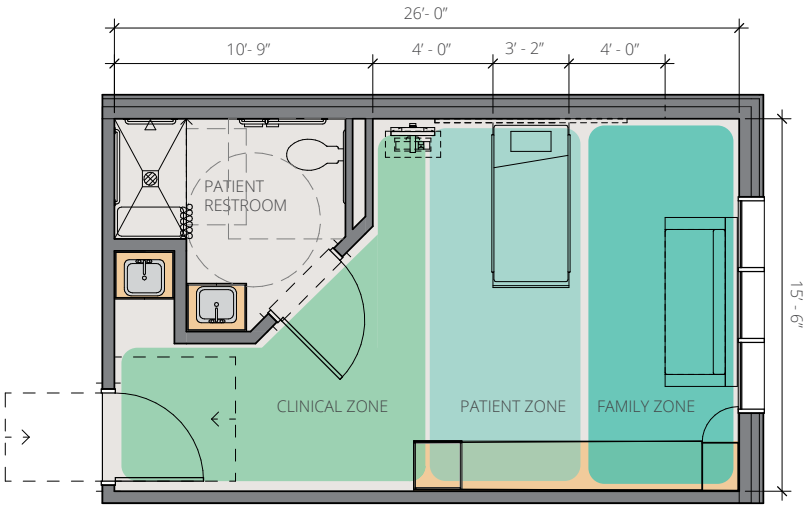
Code Considerations

The model codes that apply to healthcare environments are voluminous and in a constant state of review and update. The primary volumes referenced for this master plan include:

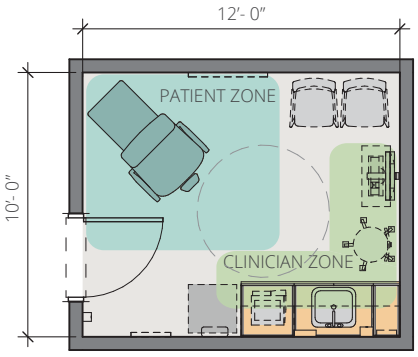
- National Fire Protection Association (NFPA) 101 Life Safety Code, 2012 Edition
- International Code Council (ICC) International Building Code (IBC), 2018 Edition
- Facilities Guideline Institute (FGI) Guidelines for the Design and Construction of Hospitals, 2018 Edition
- FGI Guidelines for the Design and Construction of Outpatient Facilities, 2018 Edition
- FGI Guidelines for the Design and Construction of Residential Health, Care and Support Facilities, 2018 Edition
- ICC/American National Standards Institute (ANSI) A117.1-2017 Standard for Accessible and Usable Buildings and Facilities

The above references define the code minimum compliances for the size, design and construction of healthcare facilities. In many cases industry standards recommend that the code be exceeded in some aspects for example:

For example the FGI Guidelines state that a hospital patient care room must have 120 SF of clear floor area around the bed, with a minimum of 3 feet clearance at the sides and foot of the bed. New hospitals are typically providing larger rooms to accommodate equipment, amenities, and family members. The example room below shows a typical contemporary patient room with zones for the caregiver, the patient, and the family. The clear floor area is roughly 200 SF, and the clearances on the sides are 4 feet between the bed and the couch, almost 5 feet between the bed and toilet room and more than 6 feet at the foot of the bed. The total SF area of this room including the toilet room is almost 400 SF. For the purposes of the program we assumed 350 SF per room.



Patient room example



Exam room example

For the clinic the typical exam room size is the main driver determining the overall size of the facility. The FGI guidelines establish a minimum clear floor area for a standard exam room of 80 SF, with a minimum clearance of 2 feet 8 inches at the sides and foot of the exam table or chair. In the example below clear floor area is roughly 86 SF, with nearly 4 feet of clearance at the foot of the chair. This 120 SF exam room is considered a minimum size to adequately provide effective communication between the caregiver and the patient while allowing a family member to participate in the care session.

Site Planning

Integrity

Professionalism

Dignity

Quality

Teamwork

Petersburg Medical Center

Site Planning

The Master Plan was tasked with determining the relative merits of building a replacement hospital at the existing hospital location, and at an undeveloped site away from the downtown core. The new numeric program was used as the basis for determining the size of the new facility. Several alternatives were generated with different locations of the various departments, patient wings, and clinic arrayed on the sites. The alternatives looked at one vs. multi story schemes, long radiating wings to maximize daylight vs. more compact arrangements to shorten walking distances, and various departmental adjacencies to enhance operative relationships. The alternatives were reviewed with hospital administration and department leaders and modified with input and insight from the participants. Two options for a greenfield site and one option for the downtown site were finalized and reviewed for potential costs.

Downtown Site

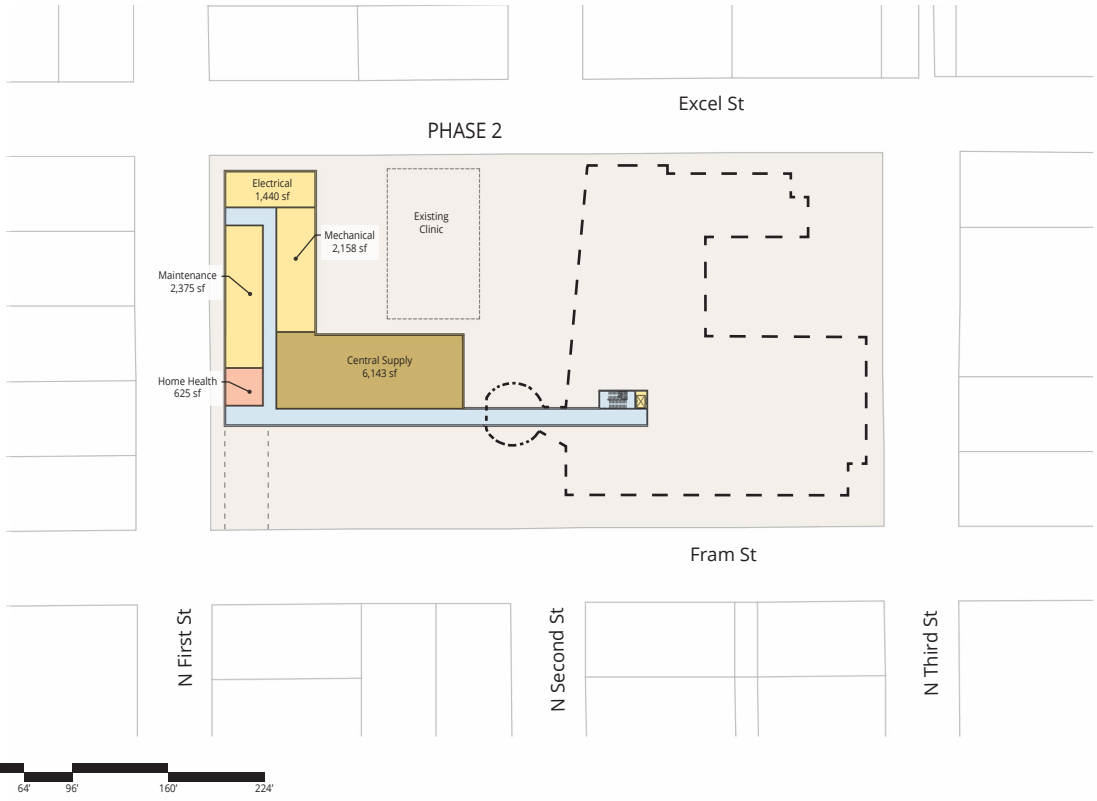
The downtown site presents many challenges and limitations. The single block occupied by the hospital is not large enough to support the expanded program. Annexation of the adjacent block to the east is proposed, as well as vacation of Second Street to provide enough building area. The existing hospital needs to remain in operation during construction so this requires that a large portion of the program be built and occupied on the adjacent block before demolition of the existing hospital can proceed. Because the site slopes significantly from southwest to northeast a stepped, multi-story solution with at grade entrances on 3 levels is required. A two-story structure will front First Street to the west, similar to the existing condition. A one-story structure will front Third Street. The facility will present one to two-story structures along Excel Street and Fram Street as it steps down from east to west.

The first phase of work will include demolition of existing structures on the adjacent annexed block, excavation, and construction of a two-story building with the lower floor completely underground on the east side and open to grade at the west side. The upper floor will house the acute patient wing, the long-term care SNF, and the emergency department. A centrally located nurse station will allow nighttime staff to monitor the long-term care wing, the acute care patient wing, and the corridor to the ER entry door. The lower floor will house admissions, administration, dietary, physical therapy, laboratory, radiology and surgery. Passenger and staff elevators will connect the two floors. The south end of Second Street will be closed to build a new main entry point for the hospital. During this first phase the existing functions of the hospital will remain operational including the ER.

The second phase of the work will include demolition of the existing hospital building but leave the existing clinic operating in place. Construction of new receiving, storage and maintenance space at the lower level will include an underground tunnel to the new hospital building to access the elevators for be topped by construction of a new clinic building above, connected to the new main entry point. Once the new clinic is opened the existing clinic will be demolished and the site developed for parking and landscaping.

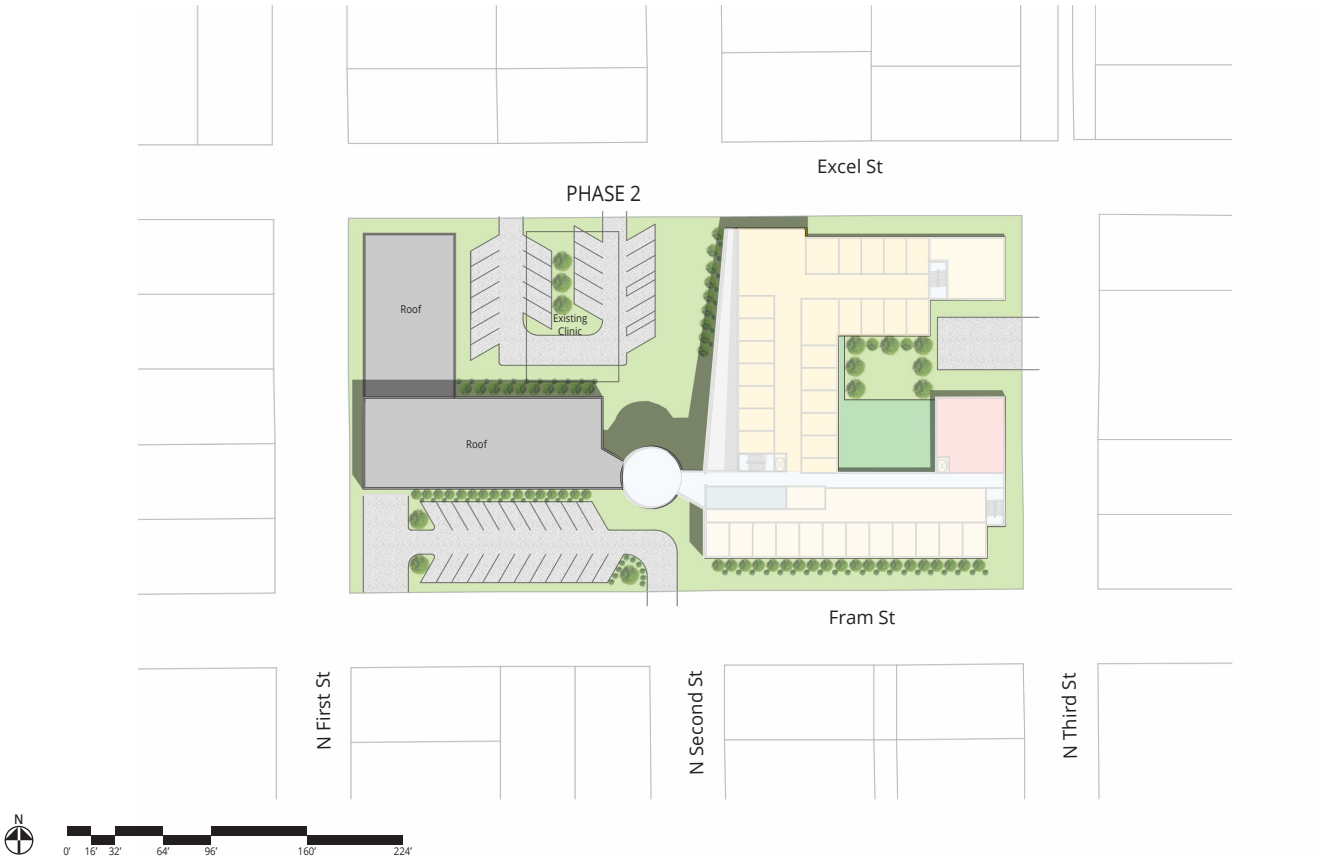
First Floor Plan - Phase 1

Second Floor Plan - Phase 1



Basement Plan - Phase 2

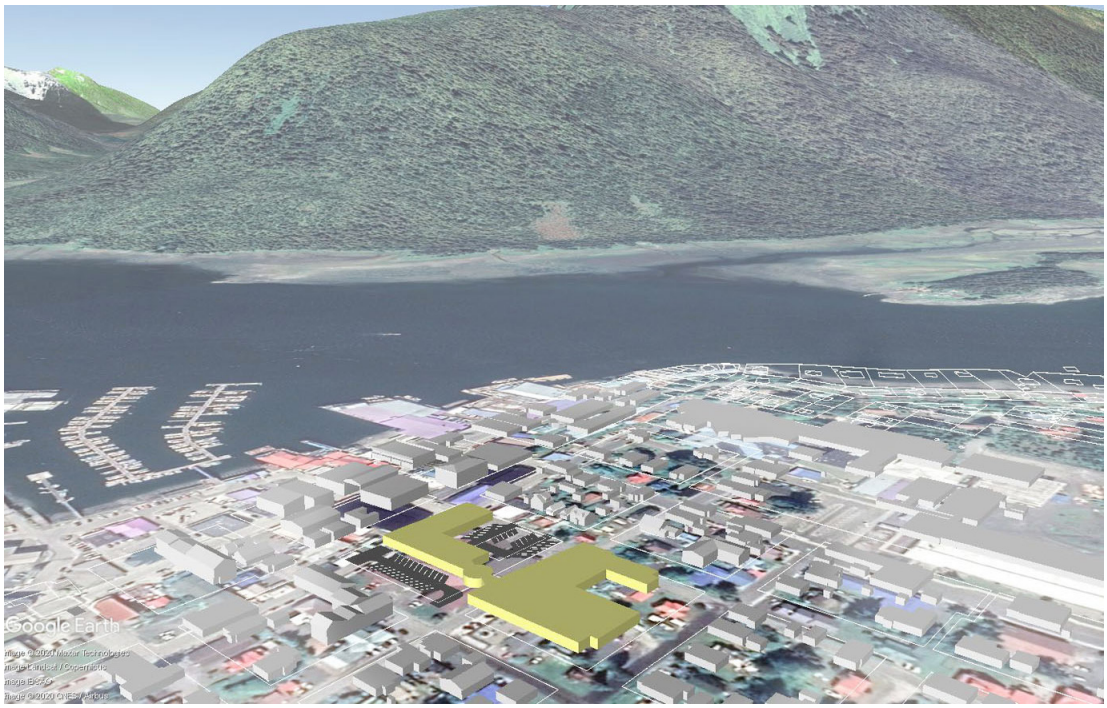
First Floor Plan - Phase 2



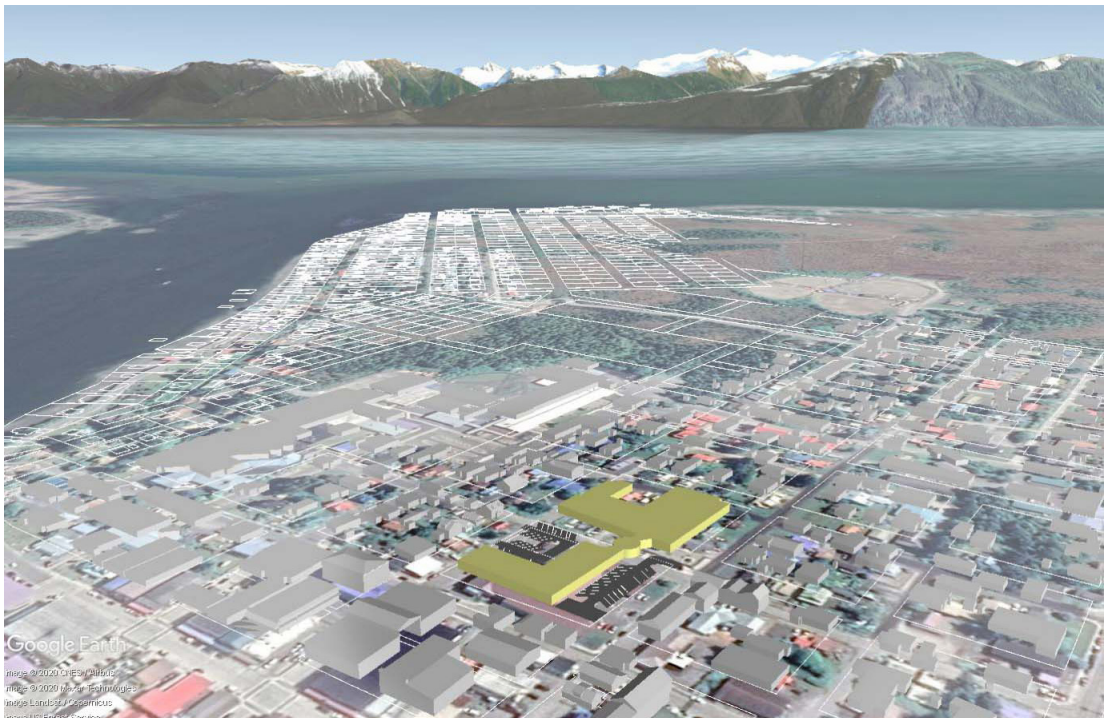
Second Floor Plan - Phase 2

Though faced with significant phasing and property acquisition challenges the downtown scheme does offer the opportunity for an enclosed courtyard for long-term care, and an elevated prospect for the long-term care day room for views to Petersburg Mountain. It also provides a clear separation between the hospital and the clinic and increases the amount of parking at the hospital. Some hospital staff have expressed strong concerns about the multilevel design and having physical therapy and surgery on a separate floor than the patient wing.

3D views of Downtown Scheme



Aerial view - Northwest



Aerial view - Northeast

Greenfield sites

The greenfield sites are much larger than the downtown site and offer greater flexibility in arranging the departments relative to each other, and allow for a single story solution. They can also accommodate more parking spaces to address more people driving to the hospital rather than walking. The sites are not consistently zoned for public use but this can be addressed in a public process with the borough planning division. The greenfield sites represent significant complications to site development with wetlands and muskeg that need to be re-mediated, but recent projects like the fire hall and library have navigated this challenge successfully.

The north Haugen site was chosen to study site plans for a new hospital. Any of the other three sites identified by the Borough would support similar solutions, with differences primarily in access to underground and overhead utilities and proximity to already developed roads.

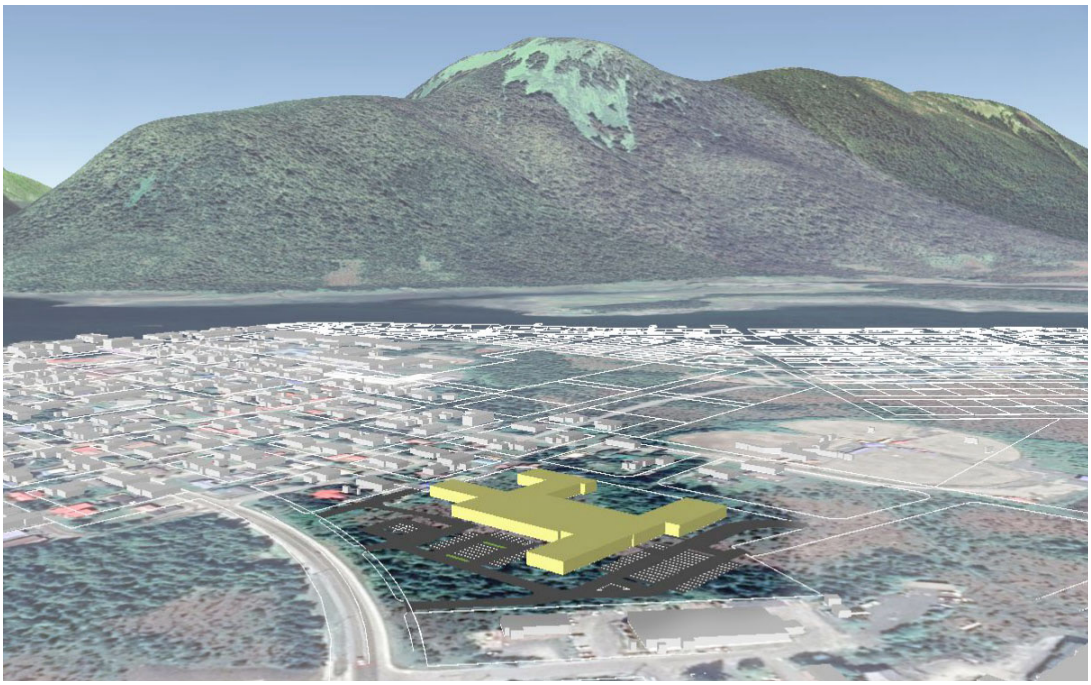
Greenfield Site 7A

This scheme arranges the clinic, administration, and maintenance support functions in a continuous bar on the east side of the site. A central ancillary core housing imaging, laboratory, surgery and physical therapy and dietary forms the spine of the new hospital. A public corridor provides access from the main entry next to the clinic to the ancillary services and on to the patient care wings. A staff corridor connects the patient wings to surgery and physical therapy, and also connects dietary with storage. The emergency room is located adjacent to acute care with its own entry that can serve as the secure nighttime entry when the hospital is locked after hours.

Parking is placed at the main entry to the hospital and adjacent to the clinic for staff and outpatients. A separate ambulance drive is provided with additional parking near the ER entrance. The Acute care and Long-term care wings form an exterior landscaped courtyard for the residents' use, and can include sheltered exterior space so the outdoors can be enjoyed in inclement weather. Daylight can reach virtually all of the interior space.

Scheme 7A Floor Plan

3D views of Scheme 7A



Aerial view - Northwest

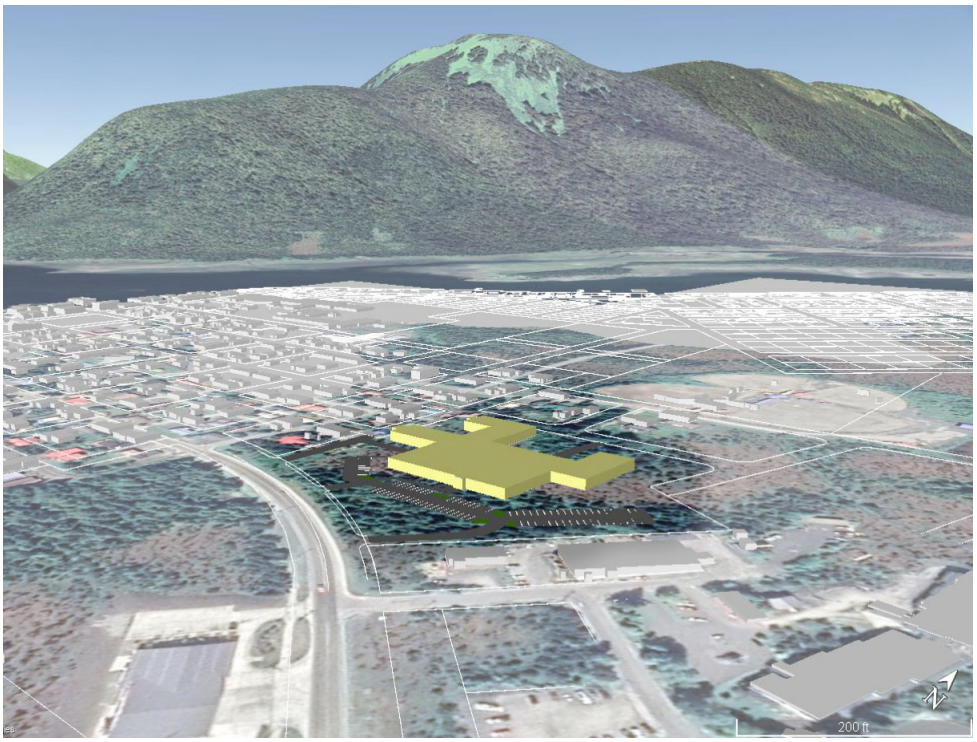
Aerial view - Northeast

Greenfield Site 7B

This scheme is similar to scheme 7A, but the clinic is moved to the front of the hospital creating a more compact design with shorter travel distances between departments. The compact design removes access to daylight from one side of the clinic and completely from imaging, though this can be mitigated with skylights or clerestory windows. The compact design allows more of the site to be developed for parking. The ER is still close to the nurse station for nighttime management, and the patient wings still have access to an exterior courtyard.

Scheme 7B Floor Plan

3D views of Scheme 7B



Aerial view - Northwest

Aerial view - Northeast

Budget

Integrity

Professionalism

Dignity

Quality

Teamwork

Petersburg Medical Center

Cost Estimates

A common benchmark to use for selecting building construction quality is to think of expected longevity. A 30-year building can be constructed at a lower cost than a 100-year building, but it may need major renovation at the end of its life. Major institutions and universities often pursue the 100-year benchmark, but they pay a significant premium for the choice. In the case of Petersburg Medical Center, we looked at creating a durable building that would approach the 50-year mark without need for major renovation. Mechanical equipment with moving parts by nature has a shorter life span, but these components can be overhauled or replaced without requiring major building modification. There is no textbook definition of what a 30 or 50 or 100-year building is, but the descriptor serves as handy framework for selecting construction methods and materials.

Construction Type Considerations

The International Building Code is written to allow increases in building height and area if it is constructed to a more fire-resistant standard. The allowable areas and height also vary by the occupancy type, with institutional 'I' medical occupancies being more restrictive than business 'B' occupancies. An 'I' occupancy is basically defined as inpatient areas and any areas that will be accessed by inpatients. A business 'B' occupancy is typically limited to outpatient areas only. For PMC the clinic, administration, and support services areas are eligible to be considered B occupancies. All other areas would be considered I since inpatients access physical therapy and imaging and the like.

Building fire resistance classifications are based on construction materials. The most fire-resistant buildings are classified as Type I and are typically made of reinforced concrete and steel. The least fire-resistant buildings are classified as Type V and are typically wood-framed construction. Types II, III, and IV are in between.

Type I buildings are generally more expensive than Type V buildings. Good practice suggests that a building should be designed to be no more fire resistant than is necessary to achieve the size of building needed. In healthcare this usually comes into play with medical clinics that can be classified as a business occupancy and be built to a lesser construction type.

The code limits the height and area of buildings relative to construction type and occupancy. The height and area limits can be increased if there is open space around the building and if the building is equipped with a fire sprinkler system. For PMC the maximum 75% increase is assumed for open frontage around the building, plus a 300% increase for fire sprinkler protection for a single-story building, or 200% increase for a multi-story building. Excerpt from IBC Table 503 showing the height and area limits for different construction types and occupancies I-2 and B is provided below:

TABLE 503
ALLOWABLE BUILDING HEIGHTS AND AREAS[a, b]
Building height limitations shown in feet above grade plane. Story limitations shown as stories above grade plane.
Building area limitations shown in square feet, as determined by the definition of "Area, building," per story

GROUP		TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
	HEIGHT (feet)	UL	160	65	55	65	55	65	50	40
		STORIES(S) AREA (A)								
I-2	S	UL	4	2	1	1	NP	1	1	NP
	A	UL	UL	15,000	11,000	12,000	NP	12,000	9,500	NP
B	S	UL	11	5	3	5	3	5	3	2
	A	UL	UL	37,500	23,000	28,500	19,000	36,000	18,000	9,000

The simplest way to select a construction type is to determine the most restrictive occupancy designation and design the entire building with a construction type that allows the total area and height of the building. In PMC's case, the most restrictive occupancy is 'I-2' Institutional hospital, and the total desired area is roughly 80,000 SF for the Greenfield sites, and 96.000 SF for the downtown site. To build the entire hospital as I-2 it would be necessary to use a minimum construction Type I-B because the next lower construction type II-A would only allow a maximum of 78,750 (15,000 x 1.75 x 3 = 78,750 SF.) The allowable area would be less for the downtown site because it is multi-story (15,000 x 1.75 x 2 = 52,500.)

A more nuanced approach is to select different construction types for the I-2 inpatient and B outpatient areas and essentially build them as separate buildings. Using a rough division of inpatient vs. outpatient of 50,000 SF for 'I-2' inpatient and 30,000 SF for outpatient 'B', the required construction types could be significantly different.

For the hospital 'I-2' 50,000 SF occupancy a construction type of V-A is nearly sufficient, allowing for a total area of 49,875 SF for a single-story building (9,500 x 1.75 x 3 = 49,875). Type HT (Heavy Timber) construction would allow for up to 63,000 SF. Since the B 30,000 SF occupancy is less restrictive it could be constructed as Type V-B (9,000 x 1.75 x 3 = 47,250.)

For the above scenario using Type V construction the I-2 and B buildings can be connected but they should be laid out as distinct separate buildings, and the connection point between them will need to be constructed as a 2-hour rated fire wall with 90-minute rated fire doors.

For the purpose of the cost estimate we used the conservative assumption that the building will use steel and concrete materials consistent with Type I construction. As the design moves forward there may be opportunities to reduce costs by dividing and sizing program to qualify for the less expensive Type V construction.

Narrative Descriptions

NAC Architecture and our consultants assembled descriptive narratives of the building and system components to serve as the basis of the cost estimates. Strategies to achieve minimum Gold LEED equivalency or better will be explored during design. Below is a summary of some of the basic assumptions underlying the cost estimating. More detailed system narratives are included in the appendix.

Conventional construction methods were assumed as the base line, A steel-framed structure with concrete slabs and footings was selected as it is expected to be more cost-effective than a concrete or timber framed building, and easier to modify in the future with additional equipment loads.

Building envelope materials were selected for long life, thermal performance, and rain management. Interior materials were selected for durability appropriate for a hospital environment, clean ability, and aesthetic effect.

Plumbing systems will be hospital grade for distribution piping and fixtures. Heating and ventilation systems will meet ASHRAE standards for each type healthcare environment, DDC controlled, with an emphasis on incorporating high efficiency, sustainable solutions.

Electrical power will be provided with normal and critical distribution per hospital and clinic requirements, with two emergency power generators and automatic transfer switches to enable rapid changeover when normal power is disrupted. Interior lighting fixtures will be LED type with color temperature selected to enhance visual examination and tied to occupancy sensors to shut off when not in use. Fire alarm system will be addressable.

Information Technology pathways will be distributed throughout, supported by a generous server room and distribution closets connected with fiber optic cable. Category 6A cable runs will be provided to all workstations. Wi-Fi system will provide wireless connectivity throughout the facility.

Local Conditions

Key to the cost estimating effort is incorporating adjustment factors unique to the region and economy. We consulted with Borough representatives and residents familiar with construction in Petersburg to get a better understanding of the unique local challenges. We confirmed the relatively temperate climate allows for year-round construction, something less common in more northern Alaska locations. There is a concrete batch plant on the island, but most other materials will need to be procured from outside and delivered by barge. The pool of local trades is capable but limited so most of the labor will come from outside Petersburg, with associated housing and per diem costs.

Our civil engineer consulted with an Alaska based geotechnical engineer familiar with muskeg to better understand strategies for managing the excavation of the material. The basic assumption is that no more muskeg will be removed than can be replaced the same day with structural fill in order to mitigate impacts to existing ground water flow or introduce sudden changes in the water table at adjacent properties.

Cost Estimate Structure

Below is the summary cost estimate for the three options explored in the master plan. Detailed cost estimate breakdowns are included in the appendix.

Cost Element		Greenfield Scheme 7A		Greenfield Scheme 7B		Downtown Scheme	
		Building	Site	Building	Site	Building	Site
		72,463 SF	325,000 SF	80,170 SF	325,000 SF	95,414 SF	142,000 SF
Direct Costs							
Construction		**$ 31,436,581**	**$ 5,482,655**	**$ 33,420,923**	**$ 5,223,434**	**$ 38,965,197**	**$ 5,236,493**
Margins & Adjustments							
Location Factor	25.0%	$ 7,859,145	$ 1,370,664	$ 8,355,231	$ 1,305,859	$ 9,741,299	$ 1,309,123
General Conditions	7.5%	$ 2,947,179	$ 513,999	$ 3,133,211	$ 489,697	$ 3,652,987	$ 490,921
Design Contingency - Building	8.0%	$ 3,379,432		$ 3,592,749		$ 4,188,759	
Design Contingency - Site	15.0%		$ 1,105,097		$ 1,052,848		$ 1,055,481
MEP Market Contingency	2.6%	$ 1,173,561		$ 1,253,535		$ 1,439,339	
Contractor's OH & Profit	7.5%	$ 3,509,692	$ 635,431	$ 3,731,673	$ 605,388	$ 4,349,069	$ 606,902
Escalation to NTP	8.4%	$ 4,225,670	$ 765,059	$ 4,492,936	$ 728,887	$ 5,236,279	$ 730,709
Per Diem Imported Labor	2.5%	$ 1,363,282	$ 246,823	$ 1,449,505	$ 235,153	$ 1,689,323	$ 235,741
Total Cost		**$ 55,894,542**	**$ 10,119,727**	**$ 59,429,763**	**$ 9,641,265**	**$ 69,262,252**	**$ 9,665,370**
Total Estimated Construction Cost		**$ 66,014,269**		**$ 69,071,028**		**$ 78,927,622**	
Indirect Costs*	40.0%	$ 26,405,708		$ 27,628,411		$ 31,571,049	
Total Project Cost		**$ 92,419,977**		**$ 96,699,440**		**$ 110,498,670**	

* Indirect Costs include non-construction project related expenses such as site surveys, geotechnical investigation, design fees, plan review and permit fees, inspections, finance cost, moving expenses, and furniture, fixtures, and equipment. Indirect costs on hospitals can range from 30% to 50% .

The cost estimate was built using the site diagrams and the project consultant narratives to define the construction quality level, using well known Seattle area costs for hospital and clinic construction to define the direct basic construction cost model. Then standard margins and adjustments were applied to determine the anticipated 'bid' total estimated construction cost that would be realized in Petersburg. These margins and adjustments include:

- **Location Factor –** This is an overall adjustment to convert Seattle pricing to Petersburg and reflects the cost of shipping, labor rates and other premiums typically experienced in the area.
- **General Conditions –** These are the overall daily costs the general contractor experiences on a project and includes things like job trailers, storage, temporary water and power, and onsite supervision. 7.5% is an industry standard.
- **Design Contingency Building –** This factor addresses the unknowns at this point. We don't have a design yet and this allows for items that have not been identified yet to be incorporated into the project. This is applied only to the building costs. 8% is on the low side for a project in pre-design.
- **Design Contingency Site –** This factor is a high percentage reflecting the unknowns at this point regarding which site will be selected and how difficult it will be to develop. It acknowledges the risk that wetlands and muskeg represent.
- **MEP Market Contingency –** This factor addresses past experience that mechanical, electrical and plumbing trade costs in SE Alaska are generally higher than the overall location factor will cover.
- **Contractor's OH & Profit –** This is a standard factor the general contractor will carry to cover the cost of their office overhead and targeted profit. 7.5% is an industry standard.
- **Escalation to NTP –** All of the numbers in the cost model are based on today's dollars. The contractor will price the project based on the dollar value at the time they receive a Notice to Proceed with construction. The 8.4% represents anticipated inflation from today to a potential start of construction in mid-2021.
- **Per Diem Imported Labor –** This factor accounts for the housing and food costs for outside laborers to reside in Petersburg during construction.

The total estimated bid cost for both site and building for each scheme is highlighted in yellow on the summary table.

Indirect Costs

In addition to the direct costs of construction there are indirect costs associated with any project. As noted at the bottom of the table these include surveys, consultant design fees, permit and inspection fees, moving fees, and notably the cost of furniture and medical equipment which can be significant. Depending on how much medical furniture and equipment can be reused (exam tables, CT, X-ray, etc.) the premium for indirect costs can vary from 30% to 50%. These total project costs will be factored in to the funding requests as the project moves forward.