Well and Septic Work Session Table of Contents

1.0 Work Session Information Summary

Code Summary (2.1-2.5)

Within current Seward city code, building permits cannot be issued without full utilities (roads, electricity, water, and sewer) to a parcel. Wells are currently not permitted and therefore Seward currently does not have any specific code around wells. Septic systems are currently permitted in city limits under certain conditions.

Other municipalities allow wells and septic systems under certain conditions, including Anchorage and Soldotna, whose code is included in this packet. Anchorage has a comprehensive well code and permitting process for wells.

Along with the Seward septic system code, Anchorage and Soldotna point to and rely on the Alaska Department of Environmental Conservation (DEC) for their regulations. Anchorage has additional requirements, as well.

Alaska DEC Minimum Separation Distance Requirements for Wells (2.6)

An excerpt from the Alaska Department of Environmental Conservation explaining the minimum distance required between drinking water sources and potential sources of contamination like septic systems.

Fire Department Summary (3.1)

The Fire Insurance/ISO Rating information is summarized. The Fire Suppression Rating Schedule factors are described in detail. Allowing housing development in areas where we don't have fire hydrants could negatively impact the rest of the community's insurance rates. The applicable portions of International Fire Code (IFC) are listed, including the allowance of in-home automatic sprinkler systems if hydrants are not present. Currently in the City of Seward, hydrants are spaced every 500'. In Soldotna, because of 2012 IFC, they are still required to have hydrants every 400-600' depending on the development, even those areas on wells and septic systems.

The Fire department enclosed information about how fast fires move/grow and their estimated response time to those situations for perspective. They do have mutual aid agreements with both Lowell Point and Bear Creek Fire Departments in which their tanker trucks could be accessed. They do not recommend purchasing a tanker truck as they are expensive and don't have a place to store it (indoors).

Attorney Summary (3.2)

The city would not have liability if there were not fire hydrants in the area. That being said, the city does require there to be in home sprinkler systems if hydrants aren't available. If the city

chooses to allow wells there are a number of issues and questions the code would need to specifically address and answer.

Community Development Summary (3.3)

If the council chooses to allow wells, there will need to be code implemented that considers both lot size and distance, as the placement of a well in conjunction with a septic system could heavily impact the development of a neighboring property.

Maps Properties without Utilities Summary (4.0)

There are a series of maps outlining the areas in Seward without utilities. Some of these properties are developable and some are not due to geography.

For Forest Acres Information (5.1-5.2)

The map shows the lots that were in the improvement district in recent years along with a cost breakdown by lot size for water, sewer, electricity, and roads. If the plat restriction were removed (see below) and wells were allowed, the property owners would still need to do an assessment district for electricity and improved roads. Estimated cost to install a well and septic are around $25,000 total.

Plat Restricted Lots (5.3-5.5)

These documents show the properties in Forest Acres that have a plat restriction of no septic systems and the process for getting that restriction removed if the property owners chose to do so.

Appendix Documents (6.1-6.3)

Historical Rezone of Forest Acres Area

Alaska Best Management Practices for Construction of Non-Public Water Wells

Feasibility Study: Forest Acres Subdivision Water & Sewer Special Improvements District

2.0 City Codes Pertaining to Water, Wells and Septic

2.1 City of Seward Current Septic Code

14.20.025 Construction of on-site system.

It shall be unlawful to construct or maintain any on-site sewage disposal system within the city of Seward unless the following conditions are met:

1. No public sewer is available within 200 feet of any property line or boundary upon which the structure to be serviced is located;
2. The proposed system meets at least the following minimum design criteria:
    a. A minimum lot size of one acre, or meets the minimum separation required between a private well as provided in subsection c., following;
    b. A minimum allowable percolation rate of 60 minutes/inch (MPI). Systems with less percolation than 60 MPI must be designed by an engineer registered in the State of Alaska;
    c. A minimum of 100 feet separation of any treatment or disposal system from a private well. Private sewer lines must be a minimum of 25 feet from a private well;
    d. A minimum septic tank size of 1,000 gallons for a three bedroom home and 250 gallons for each additional bedroom;
    e. Leach field capacity shall conform to the Manual of Septic Tank Practices, U.S. Department of Health, Education and Welfare.
3. Review and approval of the system by the city engineer;
4. System meets all requirements of the Alaska Department of Environmental Conservation as being adequate to protect the ground water and general public welfare;
5. The owner agrees to comply with section 14.20.010;
6. All construction methods and details for on-site sewage disposal systems shall follow standard accepted practice.

(Ord. 504, 1982; Ord. 610, 1988)

2.2 Soldotna Water Well Code

13.08.030 - Private water system—Permit required—Fee.

A. No person, firm or corporation shall construct any private water system which will be served directly or indirectly by the city water distribution system without obtaining a written permit from the city under and outlining conditions prescribed by the city. The fee for such permit shall be as prescribed by the city council.

B. Private wells not tied into the city distribution system will be subject to all state and borough regulations. Inspection by the city will not be required; however, for future reference, as-built data shall be made a part of the building permit documents.

C. There shall be no individual wells connected, directly or indirectly, to any line of the city water system.

(Ord. 276 § 1, 1982; Ord. 266 § 1 (part), 1982)

13.16.150 - Use of public water system—Duty of every owner of real property.

A. It shall be the duty of every owner of real property on which building water lines, wells or other water facilities are present, or will become present as part of new construction, to connect such property with the nearest public water in the city; provided, that such property abuts a public street, alley, water easement, right-of-way, or other utility corridor in which there is a water main, easement, if the public water system is within 300 feet of the property.

B. During initial construction of a property, and if a determination is made that public water mains are available within 300 feet and the city has taken over the operation, the owner will have 30 days to apply for a permit from the city as described in Section 13.12.030. After the permit is issued, the owner will have 90 days to hook up to the city system. If the owner is unable to comply with this requirement, a special request must be made to the city.

C. There is no requirement to abandon any existing wells within any given time frame. However, no new or replacement wells will be allowed when public water mains are within 300 feet of the subject property. All new or replacement wells shall be subject to the same conditions as Section 13.16.150(B) above.

(Ord. 652 § 2, 1997) (Ord. No. 2011-14, § 3, 5-11-2011)

2.3 Soldotna Septic Code

13.14.010 - Definitions.

A. The city's sanitary sewage system means the sanitary sewer system, the sewage treatment plant, all sewers, pipes, manholes, lift stations, holding tanks, and entry ways of any kind through which material may flow or be discharged into the sewage treatment plant.

B. Discharge means to dump, deposit, drop, release, insert, or otherwise allow any of the prohibited materials to enter into the sanitary sewage system.

C. Septic material means the contents of any septic tank disposal system containing the drainage from sinks and toilets and liquid-carried excrement, urine, and other related waste material from a dwelling, building, commercial or industrial establishment, including the contents of any pit, lagoon, or cesspool containing these waste materials.

(Ord. 320 § 1 (part), 1983)

13.14.020 - Disposal and discharge of septic material.

It is unlawful for a person, firm or corporation to dispose of septic material from a septic tank, holding tank, privy, or septic tank pumping vehicle, except at a site or facility for which a waste permit has been issued by the Department of Environmental Conservation of the State of Alaska for that disposal.

(Ord. 320 § 1 (part), 1983)

13.12.040 - Use of public sewer—Duty of every owner of real property.

A. It shall be the duty of every owner of real property on which a structure exists that is occupied by people on which building sewer lines, sewage drain fields, septic tanks, cesspools, cribs, privies or other sewage facilities are present, or will become present as part of new construction, to connect such property with the nearest public sewer in the city, provided that such property abuts a public street, alley, sewer easement, right-of-way, or other utility access corridor in which there is a public sewer main, if such public sewer system is within three hundred feet of the property from which the sewage is generated.

B. Once it has been determined that a public sewer has been made available and the city has taken over the operation, the owner will have thirty days to apply for a permit from the city as described in Section 13.12.030. After the permit is issued, the owner will have ninety days to hook up to the city system, and also to dispose of all septic tanks, privies or cesspools. If the owner is unable to comply with this requirement, a special request must be made to the city public works department for a time extension.

(Ord. 652 § 1, 1997; Ord. 320 § 2, 1983; Ord. 265 § 1 (part), 1982)

2.4 Anchorage Water Well Code

Chapter 15.55 - WATER WELLS

15.55.010 - Purpose.

The purpose of this chapter is to ensure sources utilized for potable water within the Municipality of Anchorage are constructed and maintained in such a manner as to provide a safe supply of water for domestic use.

(AO No. 96-98(S), § 1, 8-13-96; AO No. 2005-130, § 1, 1-1-06)

15.55.020 - Scope.

This chapter applies to all sources of potable water used by single-family residences within the municipality that are not licensed and/or regulated by the State of Alaska.

(AO No. 96-98(S), § 2, 8-13-96; AO No. 2005-130, § 1, 1-1-06)

15.55.030 - Definitions.

The following words, terms and phrases, when used in this chapter, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Abandoned well means a well whose use has been permanently discontinued and has not been properly decommissioned.

Animal containment area means any outdoor enclosure or group of enclosures containing one or more horse, mule, cow, lama, or similar sized animal; four or more dogs, sheep, goats, or swine, or similar sized animals; ten or more rabbits, fowl, ferrets, or other domesticated small animals.

Approved tank manufacturer means a firm manufacturing tanks approved by the development services department and holding a valid water and wastewater equipment manufacturer certificate issued by the same department.

Aquifer means a formation, group of formations or part of a formation that contains sufficient saturated permeable material to yield water to wells and springs.

Aquifer—Unconfined means a zone of water saturation where atmospheric pressure is freely communicated to the zone. Its upper limit is at atmospheric pressure and it has no upper confining layer.

Aquifer—Confined means a formation in which the groundwater is isolated from the atmosphere, at the point of discharge, by impermeable geologic formations. Confined

groundwater is generally subject to pressure greater than atmospheric and rises to a level above the upper limit of its aquifer.

Artesian well means a well in which the water from the confined source aquifer rises above the upper limit of the aquifer.

Bentonite means a montmorillinate aluminum silicate clay. Bentonite comes in the form of powder, granules, or chips.

Bentonite chips means ¼-inch to ¾-inch sized chips of bentonite approved by the NSF for the purpose of water well construction.

Bentonite granules means an eight to 20 mesh size bentonite clay approved by the NSF for the purpose of water well construction.

Bentonite slurry means a high solids mixture of bentonite particles and water with a consistency of 18 percent to 22 percent solids as measured with a marsh funnel.

Casing means the pipe made of material herein specified or otherwise approved by the development services department, installed in a well bore hole to prevent sidewall caving, to provide access to an aquifer, and provide protection from up-hole or surface contamination of the aquifer.

Certificate of on-site systems approval means a written confirmation signed by an engineer and the development services department certifying the on-site wastewater disposal system and/or well serving a single-family dwelling are functional and comply with all state and local regulations and codes. In the event of inconsistency among these regulations and codes, the most restrictive shall apply.

Certified groundwater professional means a groundwater professional certified by a nationally recognized organization.

Certified laboratory means a laboratory certified by the State of Alaska, 18 AAC 80.1100.

Certified pump installer means a person or firm holding a valid state contractor's license, business license, and a current pump installer's certificate issued by the development services department.

Certified well driller means a person or firm holding a valid state contractors license, business license, and a current well driller's certificate issued by the development services department.

Contaminant means any substance which, if introduced into a potable water source, would render the water unsafe for human or animal consumption.

Disinfection means a chemical or physical process utilized to eliminate pathogenic organisms from a potable water source or storage facility.

Domestic use means water used for residential and noncommercial use.

Drawdown means the distance between the static water level and the pumping water level in a well or an aquifer.

Drive shoe means a forged or tempered steel collar with a cutting edge, attached to the lower end of a casing string by threading or welding, to protect the bottom end of the casing as it is driven or otherwise forced into the bored hole.

Engineer means a professional civil engineer registered pursuant to Alaska Statute 8.08.

Flowing artesian well means a water well in which the water from the confined source aquifer flows naturally to the ground surface without benefit of mechanical lift equipment.

Groundwater means subsurface water permanently or seasonally occupying a zone of saturation.

Grout means a stable bentonite clay material that is NSF approved, in a slurry or granular form impervious to and capable of preventing the vertical movement or migration of water.

Hazardous substance means those substances which, because of quantity, concentration, or physical/chemical/infectious characteristics, may pose a threat to human health or to the environment when improperly treated, handled, stored and transported, and disposed of. Hazardous substances include those defined as hazardous under federal, state and municipal laws.

Holding tank means a watertight covered receptacle as required by AMC chapter 15.65 designed and built to receive and store domestic wastewater for disposal at another location.

Hydrogeologist means a certified professional geologist, licensed by the State of Alaska who practices groundwater science or a nationally certified groundwater professional.

Manure/animal excreta means solid waste from domesticated animals, and for the purposes of this chapter, shall also mean bedding or other materials contaminated by animal liquid or solid wastes.

Manure/animal excreta storage area means any area where such material is being stored temporarily or permanently or being composted.

NSF means National Sanitation Foundation.

On-site wastewater disposal system means any wastewater storage, treatment, or disposal system which serves a facility located on a lot which is not connected to a public sewer.

Out of service means has not been functional for 90 or more consecutive days. An example of non-functional wells includes wells without pumps, electrical power or appurtenances (including a surface discharge point).

Outer annular space means the void space between the side wall of the drilled bore hole and the outside casing wall.

Permit means a written document issued by the development services department permitting the construction and/or development of a subsurface potable water source.

Pitless adapter means a device attached to the well casing below ground level, constructed to permit the flow of water from the well easing.

Potable water means water which is satisfactory for drinking and culinary purposes.

Protective well radius means a prescribed horizontal distance between the well head and potential source of contaminants.

Public sewer means a sewage collection system operated by a public utility as defined in Alaska Statute 42.05.701.

Public water means a water distribution system which is operated by a public utility as defined in Alaska Statute 46.03.020.

Pump means a mechanical device used to recover water from a well or water collection system.

Recovery means the ability of the water in a well to return to its static level after being drawn down during a period of pumping.

Sanitary well seal means a mechanical seal installed on the top of the well which has been approved by the development services department.

Screen means a filtering device used to keep sediment from entering a water well.

Sealing or sealed means the act of providing a water tight seal between the casing and the well bore by means of an impervious material.

Septic disposal field means an absorption bed, deep or shallow absorption trench, seepage pit or mound system.

Septic tank means the water tight receptacle designed to receive domestic wastewater and allow the clarified liquids to be discharged into a subsurface soil absorption system.

Setback means distance from a water well to a defined object, point or location.

Static water level means the water level in a well has not been affected by withdrawal of groundwater.

Stick up means the portion of a well's casing extending above the surface of the ground.

Surface water means any persistent natural or man-made source of water, which is not directly attributable to a single rainfall or snowmelt event. Surface waters include all lakes, ponds, streams, springs, intermittent or seasonal flows, natural and artificial bodies of water and all of the water of the State of Alaska as defined in Alaska Statute 5.25.100(5).

Wastewater means water containing human excreta, food waste, wash water and other wastes commonly discharged into a water-carried sewage disposal system, and such diluting water as may have entered the waste disposal system. Wastewater does not mean liquids containing hazardous wastes as defined by federal, state or municipal law.

Water-carried sewage disposal system means a wastewater disposal system through which wastes are conveyed with the aid of water.

Water producing zone means a subsurface zone producing water and separated from another water bearing layer by at least five feet of silt or clay.

Water storage facilities means and shall include all water storage tank(s), pumps and piping used in the storage of potable water.

Water table means a groundwater surface within an aquifer where pressure is equal to the atmosphere.

Water well means a bored, drilled, or driven excavation utilized for the purpose of extracting groundwater from an aquifer for domestic use.

Well cap means a mechanical cover installed on the top of a well casing which may or may not be water tight.

Well decommissioning means the process or procedure by which production from a well has been discontinued and the well properly removed from service.

Well depth means the depth of the well as measured from ground surface.

Well drilling contractor means a certified well driller, as defined above.

Well log means a written report showing the property owner, location, and all pertinent information and data relative to the drilling and completion of the well.

Well pit means an excavation, opening, shaft or hole surrounding a well.

Well rehabilitation means subsurface improvements designed to alter well yield or the physical characteristics of an existing well.

Well test means a test conducted by a licensed well driller, a certified pump installer, a hydrogeologist, or an engineer to determine the sustained producing capability of the well and the recovery rate of the well.

Well yield means the sustained producing rate of a well determined by a well test.

(AO No. 96-98(S), § 3, 8-13-96; AO No. 2005-130, § 1, 1-1-06)

15.55.040 - Prohibited actions.

A. No person shall cause or permit the construction of a surface or subsurface water source for domestic purposes without holding a valid permit issued by the development services department in the name of the property owner for the specific property and construction proposed. The well drilling contractor shall have a copy of the valid permit at the site of the drilling operation.

B. No person shall cause or allow the placement of any refuse, trash, waste, or contaminated or hazardous substance into any existing or abandoned well or domestic water source.

C. The location of a well, on-site wastewater disposal system or subsurface drain, either separately or in combination with each other and other wells, on-site wastewater disposal systems or subsurface drains in the vicinity, shall not have the effect of prohibiting future residential use of an adjacent lot or parcel. The department may require an agreement and necessary easements with the owner of the affected property for the sharing of a well or other resolution of the problem. The agreement shall be recorded.

D. No person shall cause or allow the construction of a domestic water source violating the laws or regulations of the state or the municipality.

E. No person may cause the construction, installation or use of a cross connection between a domestic, active or decommissioned water well and a public water system.

F. No person shall allow a water supply well to remain out of service for more than 90 days without permanently decommissioning the well.

G. No person shall allow the waste of water by free-flowing wells, whether by surface discharge or into the lower strata underground, without putting it to beneficial use. Flow shall be sealed to the satisfaction of the development services department.

(AO No. 96-98(S), § 4, 8-13-96; AO No. 2005-130, § 1, 1-1-06)

15.55.050 - Permit for domestic water system.

A. Permit to drill. An application to drill a new or replacement well shall be submitted to the development services department by the property owner or his/her authorized agent prior to the commencement of drilling operations.

1. A permit issued under the terms of this chapter shall only be applicable for single-family residential wells.

2. A permit for domestic water source shall not be issued if there is no existing or permitted on-site wastewater disposal system or connection to public sewer service for the property available, scheduled and approved. A variance may be issued for the purposes of groundwater exploration wells constructed in accordance with the standards of this chapter.

3. A permit for a domestic water system shall expire one year from the date of issuance, but may be renewed for one additional year at the current renewal fee.

B. Application. The application shall be on a form provided by the development services department, and shall be signed by the property owner or property owner's agent attesting the well shall be sited, drilled and completed in accordance with standards and provisions in chapters 15.55 and 15.65 and State of Alaska, 18 AAC 80 and 72.

1. The applicant shall submit a site plan signed by the property owner or property owner's agent drawn on an 8½ by 11 inch sheet (or larger if necessary to comply with this chapter) to a scale not smaller than one inch to 50 feet. The site plan shall show the:

a. Legal description of the lot or parcel;

b. Location of the proposed well;

c. Lot lines, roads, rights-of-way and easements on or adjacent to the lot;

d. Location of all existing structures on the lot;

e. Measured distance to all existing water supply wells within 50 feet of the proposed well site and the location of all wells within 200 feet on the subject and adjacent properties;

f. All applicable protective well radii; and

g. The location or proposed location of all components shown in Table A-I, and areas containing hazardous waste or other potential pollutants within 150 feet of the proposed well.

C. Revocation, suspension and restriction of permits. The director may revoke, suspend, or otherwise restrict a permit, issued under this chapter upon any of the following grounds:

1. Any false statements set forth in the application;

2. Any violation of the express terms or provisions of the permit;

3. The commission of any act or omission violating the requirements of chapter 15.55; or

4. Failure to comply with state and federal regulations.

(AO No. 96-98(S), § 5, 8-13-96; AO No. 99-66(S), § 1, 5-11-99; AO No. 2005-130, § 1, 1-1-06)

15.55.055 - Certificate of on-site systems approval.

A. Prior to the transfer by gift, deed or contract of any ownership or use interest in a privately owned on-site water well, the transferor shall obtain a certificate of on-site systems approval from the development services department.

1. The requirements of this subsection A. do not apply to transfers between spouses, or to a family trust.

B. Upon request and subject to the provisions of this section, the development services department may issue or deny the issuance of a certificate of on-site systems approval for any dwelling or site served by a privately owned well.

C. Where an on-site well does not conform to state and/or municipal laws, but no material health hazard is posed by postponing correction of the well's defects, the development services department may issue a conditional certificate of on-site systems approval to extend the period of time for corrective action until weather conditions allow. This conditional certificate may be issued with conditions necessary to ensure the public health and safety are not endangered.

D. The development services department shall issue a certificate of on-site systems approval if the department finds information provided by an engineer demonstrates the system for which the certificate is sought conforms to all applicable provisions of chapter 15.55, regulations promulgated hereunder and applicable state statutes and regulations in effect at the time of original installation or at the time of any subsequent modification and does not presently create a health hazard.

E. The development services department may require a request for a certificate of on-site systems approval be on forms provided by the department.

F. All test procedures used to collect the information necessary to meet the requirements of this section shall be developed and modified jointly by the Anchorage Health Department and the development services department.

G. Before a certificate of on-site systems approval may be issued, drinking water from the well on the property shall be properly sampled and analyzed by a certified laboratory for levels of total coliform bacteria, other bacteria, arsenic and nitrate. The levels of total coliform and other bacteria shall conform to drinking water limits established in section 15.55.060K. For other contaminants, including arsenic and nitrate, the departments shall use current USEPA public drinking water standards as a guideline to trigger actions deemed necessary to protect the public health. If nitrates are present greater than 10.0 mg/l, the applicant shall comply with subsection H., below.

H. If sampling results from a well on a property requesting a certificate of on-site systems approval show the nitrate concentration in the well water is greater than 10.0 mg/l, the following steps shall be taken:

1. A visual inspection of the well bore, using a down hole camera, performed by a certified well driller or pump installer, or engineer shall be used to evaluate the integrity of the casing and the well is cased, without perforations, to the required depth.

2. An evaluation of the annular seal around the well casing shall be performed by a certified well driller, pump installer, or engineer in accordance with procedures established under subsection F. Fluorometric dye and water shall be introduced into a temporary basin dug into the ground surface surrounding the well casing stick up. Well water samples for laboratory analysis shall be collected for a minimum of 48 hours after dye is introduced and analyzed by a certified laboratory for the presence of the dye. Presence of the dye within 48 hours is evidence of an inadequate annular seal around the well casing. The annular seal shall be deemed satisfactory if dye cannot be detected within the first 48 hours of introduction.

3. If the annular seal around the casing is determined satisfactory through dye testing, the development services department may issue a certificate of on-site systems approval provided the well is cased and un-perforated to a minimum depth of 40 feet and meets all other well code construction standards in place at the time the well was originally constructed. If the well does not meet the minimum 40 feet easing depth, at the time approval is requested from the development services department, a certificate of on-site systems approval may be issued if the well is retrofitted with a pressure-grouted well liner installed to a minimum depth of 40 feet.

4. If water producing zones with greater than ten mg/l nitrates are found below the well casing and there are also other water producing zones with less than ten mg/l nitrates, the well shall be retrofitted to eliminate cross connection between the water producing zones.

5. If the well casing or annular seal around the casing are determined to be inadequate or unsatisfactory, or if cross connections between water producing zones are found, the well shall be repaired or modified to meet current well construction standards outlined in section 15.55.060 or the well shall be decommissioned in accordance with section 15.55.060L. After the well is brought up to applicable standards, the development services department may issue a certificate of on-site systems approval. The development services department may require additional monitoring.

6. Upon completion of any rehabilitative well work, the temporary basin created around the well casing for the dye test shall be filled with a bentonite slurry and re-graded to meet the standards in section 15.55.060C.2. The well shall also be disinfected in accordance with section 15.55.060G.1. and retested for nitrates.

(AO No. 86-21; AO No. 98-124, § 1, 8-18-98; AO No. 2005-130, § 1, 1-1-06; AO No. 2017-147, § 1, 11-21-17; AO No. 2018-118, § 2, 1-1-19)

15.55.060 - General standards for domestic wells.

A. Prohibited wells. Well pits are prohibited. The development services department may, at its discretion, allow an existing well pit to remain in use if it is shown the pit provides adequate protection against flooding.

B. Well location and minimum setbacks. The location of a well shall be at a site readily accessible year round for testing, repair or maintenance purposes. The minimum separation requirements between wells and other specified facilities or areas shall be:

TABLE A-1

SEPARATION OF WELL FROM:	MINIMUM SEPARATION DISTANCE IN FEET
Private sewer line	25
Curtain drain	25
Petroleum Hydrocarbon storage tank	25
Sewer trunk line	75
Any other source of potential contamination	75
Holding tank	75
Septic absorption field	100
Sewer manhole or cleanout	100
Septic tank	100
Animal containment areas	50
Manure/animal excreta storage areas	100

C. Well drilling. The commercial drilling of a well and subsequent rehabilitation or deepening operation shall be performed by a licensed well driller. Any drilling method used in the construction of a well shall meet the following requirements:

1. The well driller shall notify the development services department of the proposed date of commencement of any drilling or rehabilitation or deepening or decommissioning operation prior to the start of operation.

2. The ground surface surrounding the well for at least ten feet shall be sloped or contoured to allow surface water to drain away from the well.

3. The well driller shall exercise reasonable care during excavation or drilling operation to prevent contamination to any aquifer.

4. Organic drilling fluid may be used only if the fluid is approved for such use by the National Sanitation Foundation (NSF) or by an equivalent organization; these fluids are listed in NSF Standard 60 and NSF Standard 61 and in associated product listings described in these two standards.

5. Water used in the drilling process shall be obtained from a source providing potable water.

6. Water wells shall be drilled and cased with non-perforated pipe to a minimum depth of 40 feet, in unconsolidated materials and in bedrock. If bedrock is encountered at a depth greater than 20 feet and less than 40 feet, then the easing shall extend a minimum of 20 feet into the bedrock. Where it is necessary to case bedrock to meet these requirements, an oversized borehole shall be drilled from surface to the required depth into the bedrock. The resulting oversized borehole shall be grouted in accordance with section 15.55.060D.2.

7. A well completed in unconsolidated formations shall be constructed so water only enters the well from a single water producing zone.

D. Well casing. All casing shall be installed with NSF approved potable water materials in new or like new condition, free of pits or breaks. The following wall thickness shall be used, except all casing greater than the nominal size of six inches shall have a wall thickness of at least 0.250 inches:

TABLE A-2

NOMINAL SIZE (INSIDE DIAMETER) (INCHES)	OUTSIDE DIAMETER (INCHES)	WALL THICKNESS (INCHES)
4	4.50	0.237
5	5.50	0.244
5.5	6.00	0.245
6.125 (6 ⅛")	6.625 (6 ⅝")	0.250

1. Joints. All casing joints shall be screw-coupled or welded and shall be water tight. If welded joints are used, the weld shall be at least as thick as the thickness of the well casing.

2. Grouting. Grouting the outer annular space is necessary to prevent shallow non-potable water or surface waters from entering into a potable water aquifer. All wells shall be ground with bentonite slurry or granules as follows:

a. From the pitless adapter level to at least ten feet below the pitless adapter or, from the surface to a minimum 20 feet below the surface;

b. If bedrock is encountered as described in section 15.55.060C.6., the following grouting procedures shall be followed:

i. The permanent well casing shall be grouted from the bottom of the borehole up using high solids bentonite slurry (minimum 20 percent solids content). The oversized bore shall be stabilized to eliminate caving and sloughing.

ii. If the permanent casing is used as a tremie to place the grout by circulating from the up, a minimum one-inch annulus spacing from the bottom of the bore to surface shall be required.

iii. If a temporary casing is used to stabilize the oversized bore, it shall be removed upon completion of grouting procedures.

3. Pitless adapters. Pitless adapters shall be installed by a certified pump installer, a certified well driller or by an excavator under the supervision of a certified pump installer or well driller. The burial depth and type of pitless adapter installed shall be recorded on the pump installation log pursuant to section 15.55.060J. When installed, pitless adapters shall be one of the types approved by the development services department.

4. Well casing stick up. All well casing shall extend a minimum of 18 inches above the finished grade, with the ground sloped to drain away from the casing.

5. Well seal. The top of the casing shall be closed with a sanitary well seal of a type approved by the development services department.

6. Drive shoe. When the casing is driven or otherwise forced into the well bore, the bottom of the casing shall be protected from damage by the use of a drive shoe or mechanical device.

7. Perforating or slotting. Perforating or slotting of the casing utilized for the purpose of allowing water to enter the well from water producing zones encountered above the bottom of the casing shall not extend higher than 40 feet below the ground surface, unless it meets the requirements of section 15.55.060C.6.

E. Well accessories. The commercial installation of well accessories shall be performed by a certified well driller or certified pump installer.

F. Minimum water well production and testing. If the minimum sustained rate of production and recovery of a well is less than 150 gallons per day per bedroom, as determined by a well yield test and/or recovery test, water storage facilities shall be installed.

1. Well yield testing. Upon completion of a well, a well yield test shall be performed by a certified well driller or pump installer or a certified civil engineer or a hydrogeologist. The well yield test shall be performed by bailing, air lifting or by pumping. The well yield test shall accurately determine the well's sustained productivity from test data including, but not limited to, static water level, pumping water level, drawdown rate, recovery rate or any other information useful in determining the sustained producing rate. If the well's initial sustained production rate is less than one gallon per minute, the development services department may require additional testing by alternative methods.

2. Water quality testing. Drinking water from the well shall be properly sampled and analyzed by a certified laboratory for levels of total coliform bacteria, other bacteria, arsenic and nitrate. The results of this sampling shall be submitted to the development services department within 30 days of the completion of the well. The levels of total coliform and other bacteria shall conform to drinking water limits established in section 15.55.060K. For other contaminants, including arsenic and nitrate, the departments shall use the current USEPA public drinking water standards as a guideline to trigger actions deemed necessary to protect the public health. Such actions shall be taken in partnership by the Anchorage Health Department and the development services department and may include, but are not limited to, issuing a health advisory, discontinuation of the use of water from the well for drinking water, decommissioning of the well, or requiring water treatment. The above departments may require other contaminants to be analyzed if deemed necessary for the protection of public health.

G. Well disinfection. Wells shall be disinfected as follows:

1. New or deepened wells. Immediately after completion of drilling or deepening wells, the well shall be disinfected. After the well is flushed of drill cuttings, apply a chlorine compound proportioned to provide a concentration of at least 50 ppm as free chlorine to the entire volume of water in the well bore. The chlorine shall be introduced into the well in a manner which shall distribute it throughout the entire water depth. Allow the chlorinated water to remain in the well undisturbed for at least 24 hours.

2. Hydrofractured or redeveloped wells. While redeveloping or hydrofracturing wells and when possible, a free chlorine residual in the well of at least five ppm shall be maintained.

3. Pump work. On completion of pump installation work, a chlorine compound proportioned to provide a concentration of at least 50 ppm as free chlorine to the entire volume of water in the well bore shall be applied. After chlorine is introduced, water

shall be circulated in the well so it reaches all parts of the pumping equipment, inside and out. The chlorinated water shall remain in the well for at least one hour.

4. Flushing. After the required disinfection time has expired, the well shall be flushed of all chlorinated water before being placed in service.

H. Well identification. All wells shall be labeled with a durable form of construction information upon completion. The construction information source shall be secured to the well casing and contain the following information:

1. The name of the drilling contractor;

2. The date the well was completed;

3. The total depth;

4. The total depth of casing;

5. The location and type of well completion;

6. Static water level below the top of the casing;

7. Yield; and

8. Height of casing above finished grade.

I. Well logs and as-built. The certified well driller shall provide a well log to the development services department within 30 days of completion of the well. The well log shall include at least the following pertinent information:

1. The property owner's name;

2. The legal description and street address;

3. The method of drilling (rotary, cable tool, etc.);

4. A description, relative depth, and thickness of each soil stratum penetrated from the ground surface to the total depth;

5. The relative depth and thickness of each water bearing stratum (aquifer) penetrated;

6. The total depth drilled;

7. The length, diameter, wall thickness and type of casing used;

8. A description of the liner (if used) and the length and setting depth;

9. The depth and number of perforations, (if any) in the easing and/or liner;

10. The type and location of any screens used;

11. The static water level and drawdown level;

12. The well production test results including the method of testing;

13. The dates of commencement and completion of drilling operations;

14. The number and date of the well drilling permit issued by the development services department;

15. The name and address of the certified well driller; and

16. A description of the method of disinfection process used upon completion of the well.

J. Pump installation log. The certified pump installer or well driller shall provide a pump installation log to the development services department within 30 days of completion of the installation of a pump into a water well.

1. The pump installation log shall include at least the following pertinent information:

a. The property owner's name;

b. The legal description and street address of the property;

c. The date of the pump installation;

d. The manufacturer's name, model and size of the pump installed;

e. The depth from top of casing that the pump is installed;

f. The number and date of the well drilling permit issued by the development services department;

g. The name and address of the certified pump installer, or certified well driller or excavator; and

h. A description of the method of disinfection used.

K. Water quality standards. Water used for domestic purposes shall not contain concentrations exceeding the following ratios:

1. Total coliform bacteria—0 colonies per 100 ml.

2. Other bacteria—10 colonies per 100 ml.

L. Well decommissioning. Wells shall be decommissioned by a certified well driller or a certified pump installer in accordance with this subsection:

1. Permanent decommissioning. A well may be permanently decommissioned by one of the following methods:

a. Perforate the casing from the bottom to within five feet of the land surface, remove the top five feet, then pressure grout the entire length.

b. Withdraw the casing and fill the borehole with grout, or bentonite as the casing is being withdrawn.

c. Cut off the casing at a point two feet below ground level and fill the casing with a bentonite slurry pumped from the bottom up or with bentonite chips poured in a bridge free manner. The top of the cut off casing shall then be sealed with a 0.25 inch thick (or thicker) plate firmly welded to the top of the casing.

(AO No. 96-98(S), § 6, 8-13-96; AO No. 2005-130, § 1, 1-1-06; AO No. 2018-118, § 2, 1-1-19)

15.55.070 - General standards for potable water hauling and storage facilities.

A. When well productivity is less than the requirements of section 15.55.060E., water storage facilities shall be installed.

1. A permit to install water storage facilities shall be obtained from the development services department prior to installation. The permit application shall include:

a. The legal description of the property;

b. An as-built site plan or proposed site, plan meeting the requirements of subsection 15.55.050B.1. and including the location of the water storage facilities; and

c. The number of bedrooms served by the well and/or water storage facilities.

B. Location of buried water storage facilities. The location of buried water storage facilities shall be at a site readily accessible year round for testing, repair or maintenance purposes. The minimum separation requirement between buried water storage facilities and other specified facilities and areas shall be in accordance with Table A-1.

1. The ground surrounding the access of the storage tank shall be sloped or contoured to allow surface water to drain away.

C. Water storage facility specifications. Specifications and requirements for water storage tanks and facilities, for both interior and exterior applications are as follows:

1. Water storage tanks shall have National Sanitation Foundation (NSF) approval; or

2. Water storage tanks shall be designed by an engineer and manufactured by an approved tank manufacturer. Materials and coating used in construction shall be either U.S. Food and Drug Administration (FDA) or NSF approved food grade;

3. All components of water storage facilities shall comply with the latest adopted edition of the Uniform Plumbing Code, as amended where applicable; and

4. Water storage tanks shall have a minimum capacity of:

a. One thousand gallons for homes up to and including three bedrooms without wells or having a well producing less than 150 gallons per day. Each bedroom above three bedrooms shall add 250 gallons to the required capacity of the tank.

b. Five hundred gallons for homes with wells producing 150 gallons or more of water meeting the requirements of section 15.55.060K. per day but less than the requirement of section 15.55.060E.

5. An exterior water storage tank shall have a minimum of four feet of cover, or insulated to protect from freezing. Tanks buried with less than two feet of cover shall have calculations submitted by an engineer showing adequate measures have been taken to prevent the tank from freezing.

6. Access to water storage tanks shall be clearly and permanently marked "potable water."

7. Water delivery to water storage facilities shall be accomplished only by water haulers certified by the State of Alaska Department of Environmental Conservation (ADEC).

8. Homeowners may haul water to their own water storage facilities provided they obtain the water from a source approved by ADEC and use a tank approved by the development services department.

(AO No. 96-98(S), § 7, 8-13-96; AO No. 2005-130, § 1, 1-1-06)

15.55.080 - Well driller and pump installer certification.

A. It shall be unlawful for any person or company to engage in the business of drilling or deepening a water well for domestic use unless the person or company holds a well driller's certificate issued by the development services department.

B. It shall be unlawful for a person or company to engage in the business of installing, removing, or repairing a water well pump, or engage in any other subsurface activity on a water well for domestic use unless the person or company holds a valid pump installer certificate issued by the development services department.

C. A well driller's or pump installer's certificate shall be valid for a period of one calendar year and shall be renewed each subsequent year thereafter.

1. A certificate shall be issued by the development services department annually only when the well driller or pump installer has completed a training class conducted by the department within the past 24 months.

2. The certificate may be revoked by the development services department if the certificate holder is found guilty of or pleads guilty to an offense under this chapter. The period of revocation shall be according to the following schedule:

a. One offense within the previous five years shall result in a revocation of the certificate of one month.

b. Two offenses within the previous five years shall result in a revocation of the certificate of two months.

c. Three offenses within the previous five years shall result in a revocation of the certificate of six months.

d. More than three offenses within the previous five years shall result in permanent revocation of the certificate.

(AO No. 96-98(S), § 8, 8-13-96; AO No. 2005-130, § 1, 1-1-06)

2.5 Anchorage Septic Tank Code

15.65.205 - Septic tanks.

A. *Tank capacity.* A septic tank shall have a minimum working capacity, comprised of the volume of the septic tank below the bottom of the tank's discharge outlet, of 1,000 gallons plus 250 gallons for each bedroom over three.

B. Septic *tank location.*

1. *Separation distances.*

a. A septic tank shall not be located within five feet of a property line.

Exception: A reduced distance may be allowed if an engineer's evaluation demonstrates, to the satisfaction of the department, that such an encroachment would not increase the risk to the public health and environment, and not impact the ability to develop and maintain the adjacent property.

b. A septic tank shall not be located within ten feet of a water main or water service line.

Exception: For "Private" water systems, a reduced distance may be allowed if an engineer's evaluation demonstrates, to the satisfaction of the department, that such an encroachment would not increase the risk of contamination to the associated water system. For "Community" or "Public" water systems, a reduced separation is required to be approved by ADEC.

c. For a conventional foundation having a strip footing or a shallow foundation consisting of a concrete slab with thickened edge, a septic tank shall not be located within the foundation soil bearing prism established by a 45 degree plane extending down and outward from the bottom outside edge of the footing or thickened slab edge, or a minimum of ten feet from these types of foundations.

Exception: A septic tank may be located no less than five feet from a foundation supporting a storage-shed, greenhouse, agricultural building, shop, garage, carport, or similar structure having a total gross floor area of 600 square feet or less and having an eave height of ten feet or less.

d. For decks and stairs located more than thirty inches above grade, a septic tank shall not be located within five feet of an associated deck or stair support. For decks 30 inches or less above grade, a septic tank shall not be located under an associated deck support.

e. One hundred feet to surface water, measured along the path which overflowing wastewater would travel.

f. One hundred feet from a private well.

g. The separation distances required by 18 AAC 80 from public water supply systems.

2. *Pumping access.* A septic tank shall be installed only in an area that will be readily accessible for pumping.

3. *Driveway or parking area.* A septic tank shall not be buried under a driveway or parking area, unless the engineer provides a design, including calculations, demonstrating its structural and thermal integrity.

C. *Cover and insulation.* Tanks with two to four feet of cover shall be insulated with a minimum of two inches of approved insulation placed immediately above the top of the tank. Tanks with less than two feet of cover shall be insulated in accordance with an engineering report demonstrating protection from freezing and specifying the insulation requirements.

D. *Buoyancy forces.* A septic tank subject to buoyancy forces shall be anchored or ballasted as required to prevent flotation regardless of the liquid level in the tank.

E. *Watertight couplings.* All septic tanks shall be fitted with watertight couplings, approved by the department, at the pump-out attachments and on the inlet and outlet of the tank.

F. *Required cleanouts.* A septic tank, including the piping leading into and out of the tank, shall have all of the following:

1. A 20-inch (minimum) diameter manway riser serving the first compartment. The riser, including the cover, shall be insulated with four-inch minimum insulation extending 48 inches below grade or to the tank insulation. The insulation shall be of an approved type suitable for below grade applications. Exposed insulation above grade shall be protected from UV damage. The riser lid shall be secured to prevent unintended access. (Per § 4 of AO No. 2017-129, this subsection F.1. is effective May 1, 2019)

2. A four-inch diameter or larger standpipe with airtight cap providing effective access to each of the other compartments.

3. A cleanout installed one to four feet from the building foundation. If it is not practical to install a cleanout near the foundation because of an existing building, driveway, parking area, utilities, or other structure, one set of opposing cleanouts shall be installed on the upstream side of the tank within ten feet of the inlet.

4. One set of opposing cleanouts (aka; double cleanouts) installed on the downstream side of the tank within ten feet of the outlet. The opposing cleanouts shall be oriented such that the cleanout closest to the tank shall be to clean the line away from the septic tank, and the cleanout furthest from the tank shall be oriented to allow cleaning toward the septic tank. The cleanouts shall be located on undisturbed soil.

Exception: Pressurized distribution pipes do not require cleanouts.

G. Septic *tank decommissioning.* Septic tank decommissioning shall be in accordance with the current adopted version of the Uniform Plumbing Code.

H. Septic *tank material.* Septic tanks shall be constructed from durable, corrosion-resistant materials, including concrete, fiberglass, or plastic. Septic tanks constructed from steel shall be coated on both the interior and exterior with an approved polyurethane lining or superior material. (Per § 4 of AO No. 2017-129, this subsection H. is effective May 1, 2019)

(AO No. 2017-129, § 3, 1-23-18 and 5-1-19)

2.6 Alaska DEC Minimum Separation Distance Requirements for Wells

- Unless the department has approved a lesser minimum separation distance, a person who installs, modifies, or operates a source of drinking water associated with a private water system must meet the following minimum separation distances to a potential source of contamination:
    - at least 100 horizontal feet, measured nearest edge to nearest edge, to a wastewater treatment works, sewer line, sewer line cleanout, manhole, lift station, septic tank, wastewater holding tank, soil absorption system, disposal system, disposal sewer, pit privy, sanitary landfill, or other potential source of contamination such as animal byproducts, manure or waste, agricultural waste, sewage solids disposal sites, or biosolids storage areas;
    - at least 25 horizontal feet, measured nearest edge to nearest edge, to a private sewer line, sewer service line, or sump contained within a building;
    - at least 25 horizontal feet, measured nearest edge to nearest edge, to a land surface discharge or subsurface disposal area associated with drinking water treatment waste; in this paragraph, "drinking water treatment waste" includes reject water from reverse osmosis units and backwash water from filters and water softeners; and
    - at least 25 horizontal feet, measured nearest edge to nearest edge, to a fuel storage tank or line; the minimum separation distance to a fuel storage tank or line does not apply to
        - a tank or line that contains propane or natural gas; or
        - an above-ground storage tank or drum that, in the aggregate, has a storage capacity equal to or less than 500 gallons of petroleum products.
- Unless the department has approved a lesser separation distance, a person who installs, modifies, or operates a water holding tank associated with a private water system or a private water line must meet the following minimum separation distances to potential sources of contamination:
    - at least 10 horizontal feet, measured nearest edge to nearest edge, to a fuel storage tank or line; the minimum separation distance for a fuel storage tank or line does not apply to
        - a tank or line that contains propane or natural gas; or
        - an above-ground storage tank or drum that, in the aggregate, has a storage capacity of equal to or less than 500 gallons of petroleum products;
    - at least five horizontal feet, measured nearest edge to nearest edge, to a septic tank, treatment tank, holding tank, lift station, community sewer line, land surface discharge, or subsurface disposal area;

    - at least 12 horizontal inches, measured nearest edge to nearest edge, to a private sewer line;
    - at locations where a private water line must cross a private or community sewer line,
        - at least 12 vertical inches, measured nearest edge to nearest edge, with the private or community sewer line located below the private water line; and
        - at least nine feet, measured nearest edge to nearest edge, from the private water line joints to the private or community sewer line joints.
- A person who drills, installs, modifies, or operates a well serving a private water system must use a method equivalent to well protection or source water protection contained in 18 AAC 80 or the publicly identified approved best management practice as protective of a public water systems.
- A person who owns or is responsible for a well shall maintain it in accordance with 18 AAC 80.015(d) or decommission it in accordance with 18 AAC 80.015(e).

18 AAC 72.100

3. Department Input

3.1 Fire Department

Seward has adopted, with some exceptions, the International Fire Code (IFC) for fire prevention. The information below includes:

- Fire Insurance/ISO Rating
- Fire Suppression Rating Schedule (FSRS) Overview
- 2021 International Fire Code
- Hydrant Distance Information
- Fire Response Protocols and Timelines

Fire Insurance/ISO Rating

ISO-Insurance Services Organization-Grades are 1-10 with a 10 essentially no fire department and a 1 being the highest grade. We are a 3/3Y which is exceptional for a town our size. They grade us as a whole; they do not care about zoning or districts other than SMIC is considered an independent classification due to it's remoteness from the city hence the "Y" signifies. If we take on areas of the city with buildings and do not provide hydrants, then that is putting the rest of the community's insurance rates at jeopardy.

The Fire Suppression Rating Schedule (FSRS) Overview

The Fire Suppression Rating Schedule (FSRS) is a manual containing the criteria we use in reviewing the fire prevention and fire suppression capabilities of individual communities or fire protection areas. The schedule measures the major elements of a community's fire protection system and develops a numerical grading called a Public Protection Classification (PPC®).

Our FSRS employs nationally accepted standards developed by such organizations as the National Fire Protection Association (NFPA), the American Water Works Association (AWWA), and the Association of Public-Safety Communications Officials (APCO) International. When those organizations update their standards, the evaluation changes as well. The PPC program always provides a useful benchmark that helps fire departments and other public officials measure the effectiveness of their efforts — and plan improvements.

<u>How the FSRS works</u>

The FSRS lists a large number of items (facilities and practices) that a community should have to fight fires effectively. The schedule is performance based and assigns credit points for each item. Using the credit points and various formulas, we calculate a total score on a scale of 0 to 105.5.

To receive certain PPC ratings, a community must meet minimum criteria. After a community meets those criteria, the PPC rating depends on the community's score on the point scale. For more information, see:

- Minimum Facilities and Practices to Get a PPC Rating
- Minimum Criteria for Class 9
- Minimum Criteria for Class 8B
- Minimum Criteria for Class 8 or Better
- Scores and PPC Ratings

The FSRS considers three main areas of a community's fire suppression system: emergency communications, fire department (including operational considerations), and water supply. In addition, it includes a Community Risk Reduction section that recognizes community efforts to reduce losses through fire prevention, public fire safety education, and fire investigation.

Emergency Communications

A maximum of 10 points of a community's overall score is based on how well the fire department receives and dispatches fire alarms. Our field representatives evaluate:

- the emergency reporting system
- the communications center, including the number of telecommunicators
- computer-aided dispatch (CAD) facilities
- the dispatch circuits and how the center notifies firefighters about the location of the emergency

Fire Department

A maximum of 50 points of the overall score is based on the fire department. We review the distribution of fire companies throughout the area and checks that the fire department tests its pumps regularly and inventories each engine and ladder company's equipment according to NFPA 1901. We also review the fire company records to determine factors such as:

- type and extent of training provided to fire company personnel
- number of people who participate in training
- firefighter response to emergencies
- maintenance and testing of the fire department's equipment

Water Supply

A maximum of 40 points of the overall score is based on the community's water supply. This part of the survey focuses on whether the community has sufficient water supply for fire suppression beyond daily maximum consumption. We survey all components of the water supply system. We also review fire hydrant inspections and frequency of flow testing. Finally,

we count the number of fire hydrants that are no more than 1,000 feet from the representative locations.

Community Risk Reduction

The Community Risk Reduction section of the FSRS offers a maximum of 5.5 points, resulting in 105.5 total points available in the FSRS. The inclusion of this section for “extra points” allows recognition for those communities that employ effective fire prevention practices, without unduly affecting those who have not yet adopted such measures. The addition of Community Risk Reduction gives incentives to those communities who strive proactively to reduce fire severity through a structured program of fire prevention activities.

The areas of community risk reduction evaluated in this section include:

- fire prevention
- fire safety education
- fire investigation

2021 International Fire Code

Chapter 5, (Fire service features) of the IFC, Section 507.5.1, (Where required) is revised to read: "507.5.1 Where required. Where a portion of the facility or building hereafter constructed or moved into or within the City is more than 250 feet (76.20 meters) from a hydrant on a fire apparatus access road, as measured by an approved route around the exterior of the facility or building, on-site fire hydrants and mains shall be provided where required by the building official or fire chief." This section is further revised by deleting Exceptions 1 and 2.

507.1 Required Water Supply. An Approved water supply capable of supplying the required fire flow for fire protection shall be provided to premises on which facilities, buildings or portions of buildings are hereafter constructed or moved into or within the jurisdiction.

Chapter 5 (Fire service features) of the IFC, Section 507 (Fire protection water supplies) of the IFC, amend Section 507.1 by adding the following exceptions:

"Exception: In areas of the City not served by a water utility the following structures do not require a water supply:

1.Detached one- and two-family dwellings regulated by the International Residential Code and protected throughout by an approved automatic fire sprinkler system;

2.Structures accessory to detached one- and two-family dwellings and regulated by the International Residential Code having 3,000 square feet or less gross floor area;

3.Structures classified as a Group U occupancy in accordance with the International Building Code having 3,000 square feet or less gross floor area;

4. Structures classified as a Group U occupancy in accordance with the International Building Code in excess of 3,000 square feet of gross floor area and protected throughout by an approved automatic fire sprinkler system;

5. Buildings protected throughout by an approved automatic fire sprinkler system and constructed of Type I-A or I-B construction in accordance with the International Building Code;

6. Buildings protected throughout by an approved automatic fire sprinkler system and constructed of Type II-A construction when Type II-B construction is allowed based on occupancy classification, allowable height and allowable area in accordance with the International Building Code;

7. Buildings protected throughout by an approved automatic fire sprinkler system and constructed of Type III-A construction when Type III-B construction is allowed based on occupancy classification, allowable height and allowable area in accordance with the International Building Code; and

8. Buildings protected throughout by an approved automatic fire sprinkler system and constructed of Type V-A construction when Type V-B construction is allowed based on occupancy classification, allowable height and allowable area in accordance with the International Building Code."

Chapter 5, (Fire service features) of the IFC, Section 507.5.1, (Where required) is revised to read: "507.5.1 Where required. Where a portion of the facility or building hereafter constructed or moved into or within the City is more than 250 feet (76.20 meters) from a hydrant on a fire apparatus access road, as measured by an approved route around the exterior of the facility or building, on-site fire hydrants and mains shall be provided where required by the building official or fire chief." This section is further revised by deleting Exceptions 1 and 2.

Hydrant Distance Information

City of Seward fire hydrants are spaced every 500 feet (500').

Soldotna is on 2012 IFC and has no provisions, exemptions, or changes to Chapter 5, so hydrants are required every 400' or R-3 (single family dwellings) every 600'.

Fire Response Timelines and Protocols

<u>Mutual Aid Agreement with Bear Creek and Lowell Point</u>

The City of Seward has Automatic and Mutual aid agreements with Lowell Point and Bear Creek. That is dependent on whether their apparatus are not on another call, down for maintenance, or otherwise unavailable. They also must respond from their respective stations

which adds time to the response. The City of Seward should not look at buying a tanker, they are expensive for just a small portion of town that does not, or would not, have hydrants and we have nowhere to house another piece of apparatus.

Response Time:

Time is of the essence. We are short staffed mostly volunteer fire department. Volunteers have to respond from home, get the fire truck, respond, catch a hydrant, set up the fire truck for operation, pull hand lines, then fight the fire. See below where we are in the response window of 6-8 minutes if we are lucky.

Moment Zero: Ignition

In this example, we're going to look at a fire that begins on the stovetop. Nearly half of all house fires start here, and all it takes is a few seconds for a pot to boil over, spilling oil-laden contents onto the burner, where leftover fat or residue is able to catch fire – in just a few hundredths of a second, no less.

First 30 Seconds:

Once a flame occurs, fire is able to spread easily. Any splattered grease, fat, or residue on the stovetop will ignite, and any combustible materials (i.e. paper towels, paper or cardboard packaging, potholders, or dish towels) will begin to heat up, smolder, and burn. This introduces deadly smoke to the mix. At this point, extinguishing the fire with an appropriately-rated fire extinguisher, or smothering the flames to deprive them of oxygen is crucial. Remember to never use water on a cooking fire, as it can spread the flames.

30 Seconds to 1 Minute:

If the fire goes unnoticed after the first 30 seconds, it will grow higher and hotter. Both exposure to open flames and radiated heat will cause more combustible materials to set on fire, and it will continue to spread around the entire room. The larger the fire grows, the larger a plume of hot air and smoke that will rise up to and across the ceiling.

60 Seconds to 2 Minutes:

During this time, the hot plume of smoke is beginning to grow thicker and deeper beneath the ceiling, thus increasing carbon monoxide levels. It will quickly begin to spread outwards into hallways and adjacent rooms and will even begin traveling through the vents.

2 Minutes to 3 Minutes:

By now, the kitchen cabinets, wooden shelves, and countertops are being consumed by the fire. With so much combustible material being on fire, the temperature in the upper layer of hot gas

reaches 400 degrees Fahrenheit – hot enough to kill a person. The smoke is now dense enough that it is hanging just above the floor, and it is growing increasingly toxic.

3 Minutes to 4 Minutes:

It only takes 3.5 minutes for the heat from a fire to reach 1100 degrees Fahrenheit. Because this level of heat can cause all materials in the room to spontaneously catch fire, flashover occurs during this period of time. This means that everything is engulfed in flames and the oxygen is sucked out of the room, causing glass windows to shatter. Flames pour out of doorways and start to burn ceilings and walls, thus traveling to other areas of the home at a rapid speed.

4 Minutes to 5 Minutes:

Now, flames can be seen from the street, and the chance of escape or rescue may be impossible. The collapse of wooden floors and even the roof is inevitable. We have a full-blown house fire.

The speed with which flames can grow, spread, and engulf an entire home is incredible, but being aware of the power of fire can help you prepare safe evacuation routes for yourself and your loved ones, and to practice fire safety throughout your household.

Water Flow Information

Fire flow = length X width ÷ 3

This formula is most easily applied if the estimated square footage of the entire structure is used to determine an approximate fire flow for the total structure and is then reduced accordingly for various percentages of fire involvement.

The example shown below would illustrate how the formula can be applied to a single-family dwelling 60 feet long by 20 feet wide and one story high:

60 X 20 ÷ 3 X 1 (floor) = 400 gpm

100% involvement = 400 gpm
50% involvement = 200 gpm
25% involvement = 100 gpm

The quick-calculation formula indicates that if the dwelling were fully involved, it would require 400 gpm to effectively control the fire. If only half of the building were burning, 200 gpm would suffice, and 100 gpm should be sufficient if one-fourth of the building were involved.

Multi-Story Structures

In multi-story buildings, if more than one floor in the building is involved in fire, the fire flow should be based on the area represented by the number of floors actually burning. For example, the fire flow for a two-story building of similar dimensions as the previous example would be:

60 X 20 ÷ 3 X 2 (floors) = 800 gpm if fully involved

If other floors in a building are not yet involved but are threatened by possible extension of fire, they should be considered as interior exposures and 25 percent of the required fire flow of the fire floor should be added for exposure protection for each exposed floor above the fire floor to a maximum of five interior exposures. (A fire on the first floor would threaten the second floor and 25 percent should be added. A second-floor fire would probably not threaten the first floor, so no interior exposure would need to be calculated).

Exterior Exposures

Likewise, if exterior structures are being exposed to fire from the original fire building, 25 percent of the actual required fire flow for the building on fire should be added to provide protection for each exposure.

The following example shows how to apply calculations for exposures to our previous one-story dwelling with two separate exterior exposed structures:

60 X 20 ÷ 3 X 1 = 400 gpm
2 exposures: 400 gpm X (25% X 2) = 200 gpm
Total fire flow required = 600 gpm (for 100% involvement of the original fire area).

If the exposure becomes involved in fire (either additional floors of a multi-story building or adjacent structures), the exposure(s) should then be treated as a separate fire area and calculated separately, then added to the required fire flow for the original fire area.

In using the quick-calculation method to determine required fire flows, it is important to remember that the answers provided by this formula are approximations of the water needed to control the fire. The formula is geared to an offensive attack and its accuracy diminishes with defensive operations. Don't forget that you are estimating both the area of the building and the amount of fire involvement within the building.

Since firefighting is an inexact science to begin with, the use of the quick-calculation formula cannot be expected to determine the exact gpm that will be specifically required for full fire control. It has been found that as the amount of involvement reaches a stage where a defensive attack is necessary, the needed fire flow will be found to be slightly greater than required.

Seward Engine-2 carries 750 gallons and Engine-4 carries 1000 gallons. Just one nozzle flows 150gpm. That means pulling one attack line, there is 5 minutes of water flow, which is insufficient to extinguish a well-involved structure fire.

3.2 City Attorney and Staff

Sam Severin, City Attorney

The question from council, as I understand it, is whether the city has liability if it allows wells, which would then make for less fire hydrants or fire hydrants being farther away from residences.

This is compounded by concerns about lack of a tanker truck at the fire department.

The simple answer is no, there is no liability. I could have answered that spontaneously but am glad I paused. Kody had gone pretty far down the Quitberg argument previously. He explained that IFC 507, which is adopted in SCC 9.15.111, requires sprinkler systems in homes if there isn't a fire hydrant within a certain number of feet. That is the practical answer. There is already a built-in alternative.

The more lawyerly answer - municipalities … "enjoy immunity only for "planning" decisions; they remain potentially liable for "operational" decisions, that is, those which do not involve "policy considerations" and which comprise the "day-by-day operation [ ] of the [municipal] government."

There is a whole statutory scheme on this and a body of caselaw that explains it. The example I use often is police. The city can decide not to have a police department. That is no problem at all. If someone gets hurt and sues the city saying a police department would have prevented it, suit gets dismissed. City could just decide tomorrow that having the department is just a waste of money and that it would rather focus on sidewalk repair. No problem. But once it does have a police department, it must operate the department "non-negligently." Here, the city is free to decide that it wants to do a scheme that involves less fire hydrants. The decision would allow for development and is backstopped by the sprinkler requirement. So, it is within the realm of a reasonable policy decision. Now, if the city decides to have hydrants, there is some burden. For example, if someone struck a hydrant with a vehicle and the city knew it was broken, it would need to fix the hydrant. That is an "operational issue." Otherwise, there might be liability. But the decision to allow wells, would be at the policy level, not the operational level. Thus, the city enjoys immunity.

There is one caveat – a very obvious one. I am not aware of a state law dictating number of fire hydrants per capita or anything like that. I looked, and I highly doubt there is such a thing. We can just double check that one more time.

Kody has a number of concerns he pointed out to me regarding wells in the city. They kind of get into the engineering side of it – concerns that would likely be better addressed ultimately by an engineer, but questions that should be asked. Alex has also been kicking this around with us, so anyone feel free to chime in here.

Alex Foote – Staff Attorney

I agree with Sam. For a description of the general principals Sam described, I find the case *Barton v. City of Valdez*, 504 P.3d 910 (Alaska 2022) illustrative (some excerpts are included towards the end of this email).

I have not identified any statutory requirement for a specific number of hydrants per capita or area. It appears Alaska law contains specific provisions generally precluding liability in such situations. For instance, AS 09.65.070(c) limits liability for claims of negligence against firefighters acting in their official capacity: "[a]n action may not be maintained against an employee or member of a fire department operated and maintained by a municipality or village if the claim is an action for tort or breach of a contractual duty and is based upon the act or omission of the employee or member of the fire department in the execution of a function for which the department is established." In terms of liability for not providing hydrants in certain areas, AS 09.65.070 appears to again limit claims for this type of decision:

"(d) An action for damages may not be brought against a municipality or any of its agents, officers, or employees if the claim

(1) is based on a failure of the municipality, or its agents, officers, or employees, when the municipality is neither owner nor lessee of the property involved,

(A) to inspect property for a violation of any statute, regulation, or ordinance, or a hazard to health or safety;

(B) to discover a violation of any statute, regulation, or ordinance, or a hazard to health or safety if an inspection of property is made; or

(C) to abate a violation of any statute, regulation, or ordinance, or a hazard to health or safety discovered on property inspected;

(2) is based upon the exercise or performance or the failure to exercise or perform a discretionary function or duty by a municipality or its agents, officers, or employees, whether or not the discretion involved is abused; [or]

(3) is based upon the grant, issuance, refusal, suspension, delay, or denial of a license, permit, appeal, approval, exception, variance, or other entitlement, or a rezoning…"

Additionally, while the following Alaska Supreme Court case has been criticized in intervening years, it appears to remains good law, and is in accord with the statutory protections contained in AS 09.65.070: *City of Fairbanks v. Gilbertson*, 16 Alaska 590, 1957 WL 3596 (Terr. Alaska 1957)("A municipality is under no obligation to provide a fire department to protect the property of its residents, and hence is not liable for… failure to provide adequate fire fighting equipment, or failure to provide adequate water supply to extinguish fires"). From my perspective, in the absence of a statutory requirement regarding the number, type, or location of hydrants, the city would no more incur liability for deficiencies regarding same than a city that chose not to post a police officer on every street-corner.

General Discussion of Discretionary Function Immunity from Barton v. City of Valdez, 504 P.3d 910 (Alaska 2022)

"[T]he dividing line between planning and operational decisions may often be hard to discern." Because "almost any act, even driving a nail, involves some 'discretion' ... decisions made while

implementing a planning decision are not necessarily unprotected operational decisions." The distinction "depends on the particular circumstances" of the case."

"We recently applied this framework in *Haight v. City & Borough of Juneau*. In *Haigh, t*a teenager died in a motorized watercraft accident on Auke Lake, which was managed in part by the municipality. The teenager's mother sued the municipality, claiming that it negligently failed to take measures to ensure the safe operation of motorized watercraft on the lake. The municipality claimed that it was protected from suit by discretionary function immunity. We agreed. We concluded that "not regulating lake safety was a planning decision protected by discretionary function immunity" because it "involved basic policy considerations regarding allocation of scarce resources and which uses to allow." We also considered whether the municipality had nevertheless assumed the duty to regulate lake safety. Observing that state law did not require the municipality to regulate lake safety and that the municipality's own ordinances and land use plans did not address lake safety, we concluded that the municipality had not affirmatively assumed the duty to regulate. For that reason the municipality was immune from liability for its lack of safety regulation at the lake: "Unless dictated by a plan or regulation, the decision not to act is fundamentally discretionary, as are its consequences, because scarce resources mean that not every possible course of action can be funded and because of the threat of unpredictable and overwhelming liability."

"We have held multiple times, for instance, that the State's decision to not install a guardrail is one of policy. We similarly have found that decisions on whether to install sequential stop lights or traffic safety devices were policy decisions and not operational ones. By contrast, once a decision is made to abate a particular hazard, the decisions involved in implementing that policy are typically deemed operational. In *State v. Abbott* we affirmed a decision that the State was not entitled to immunity for inadequately sanding an icy curve despite a policy of "work[ing] overtime if necessary to keep sharp curves well sanded." We reasoned: Once the initial policy determination is made to maintain the highway through the winter by salting, sanding and plowing it, the individual district engineer's decisions as to how that decision should be carried out in terms of men and machinery is made at the operational level; it merely implements the basic policy decision."

Kody George – Staff Attorney

I think Alex and Sam addressed the liability question well. My thoughts weigh in towards a different question that follows: if the city were to allow wells, what kind of legal scheme should be adopted? From Alex's research, it is clear that liability can be incurred at the operational level once the policy is decided, so building a good framework for the policy is key to preventing liability once it's adopted.

Some considerations from other entities' well codes:

1. Many other well codes are housed in the “public health and safety” sections. What public health implications could allowing wells introduce that should be addressed in code?

a. Will the drawdown allow for saltwater intrusion on the City water system or freshwater supply?

b. Are there any potential contaminants (Arsenic is a notable one) that the code would need to require testing for?

c. Would the City require any periodic testing or proof of operation?

d. If taken to the extreme position (i.e. every property allowed to have a well installs a well) would there be any water supply issues? Any other foreseeable issues?

e. Will the City require setbacks from septic systems or wastewater lines?

f. Fire safety has been addressed somewhat below. Additional question is if the City would want to adopt any other/additional fire safety measures to protect against inability of fire department to adequately fight fires?

2. Will allowing wells increase any other operational costs for the City? What are the financial impacts now and ten years from now? Will those costs be adequately recaptured through the code or permit charges?

3. To reasonably change this policy, does the City need any additional studies or information such as a city wide water assessment?

4. Is there a way the City can shape either the code or permitting process to adequately address all of its concerns so as to limit liability when it implements the changed policy?

These questions aren’t meant to be a deterrent if the City wants to change its policy. I’m asking them now because these are the types of things we will want to know when we perform a review of the ordinance at the end of the line so that the policy is well thought through and can be shaped in a way to limit liability as Alex describes below.

3.3 Community Development

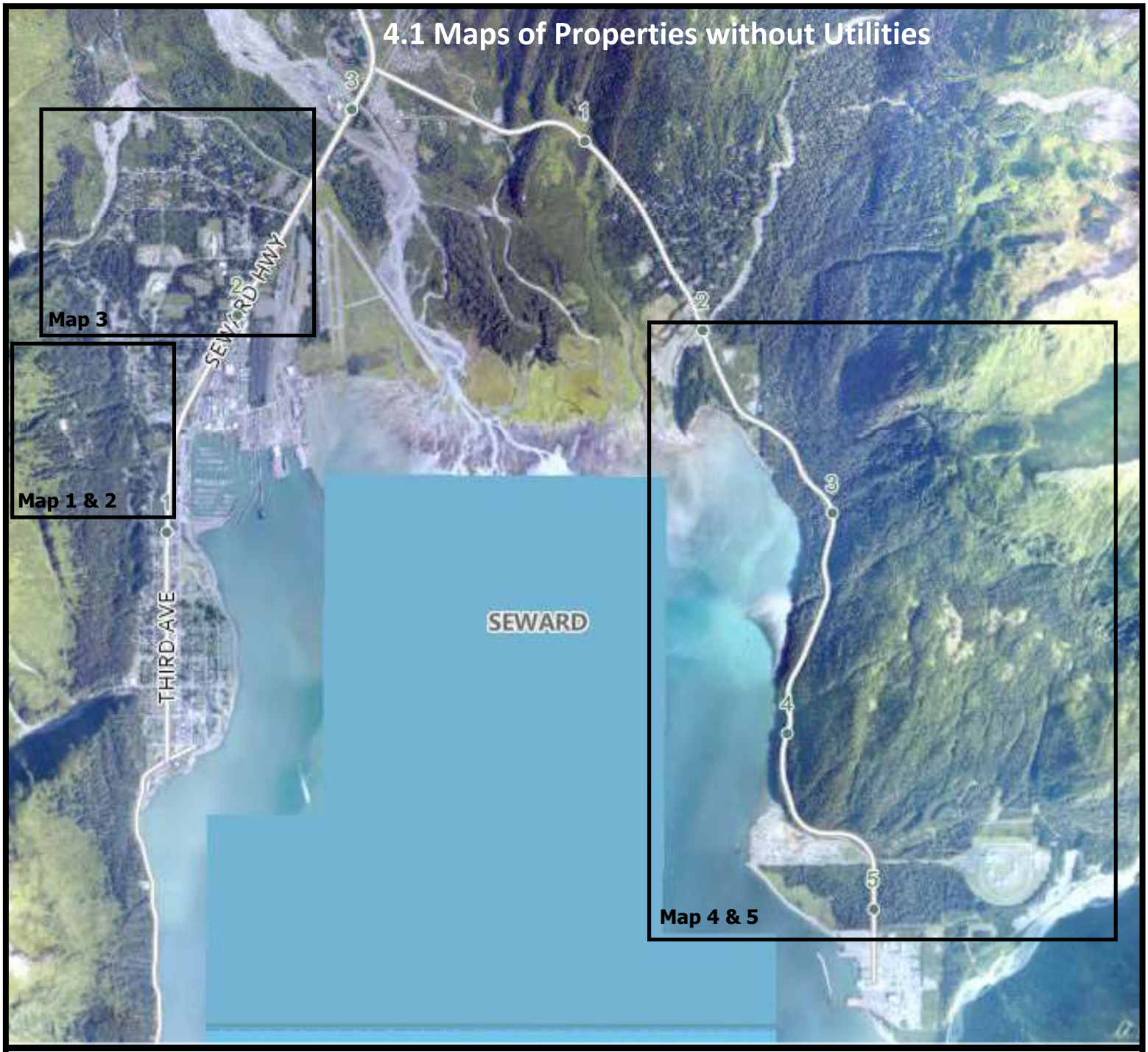
Our initial thought was to prefer allowances by lot size versus zoning district. Upon further research, if the City goes this route, it might be better to view this in the realm of distance vs. lot size.

Included in Section 2.7 is the Alaska DEC minimum separation distance required for wells. Our recommendation is to adhere to these guidelines.

However, using these guidelines still leaves the question of how (if there is a desire to do so) would the City handle the coordination between neighbors concerning where septic tanks and wells are placed.

For example, you need 100 feet distance between your well and any septic tank. That may be easy to do on one property, but if you put your septic tank within 100 feet of your property line, then you are impacting where your neighbor can put a well. This problem isn't solved with a minimum lot size, and it becomes more challenging to coordinate with neighbors for small lots.

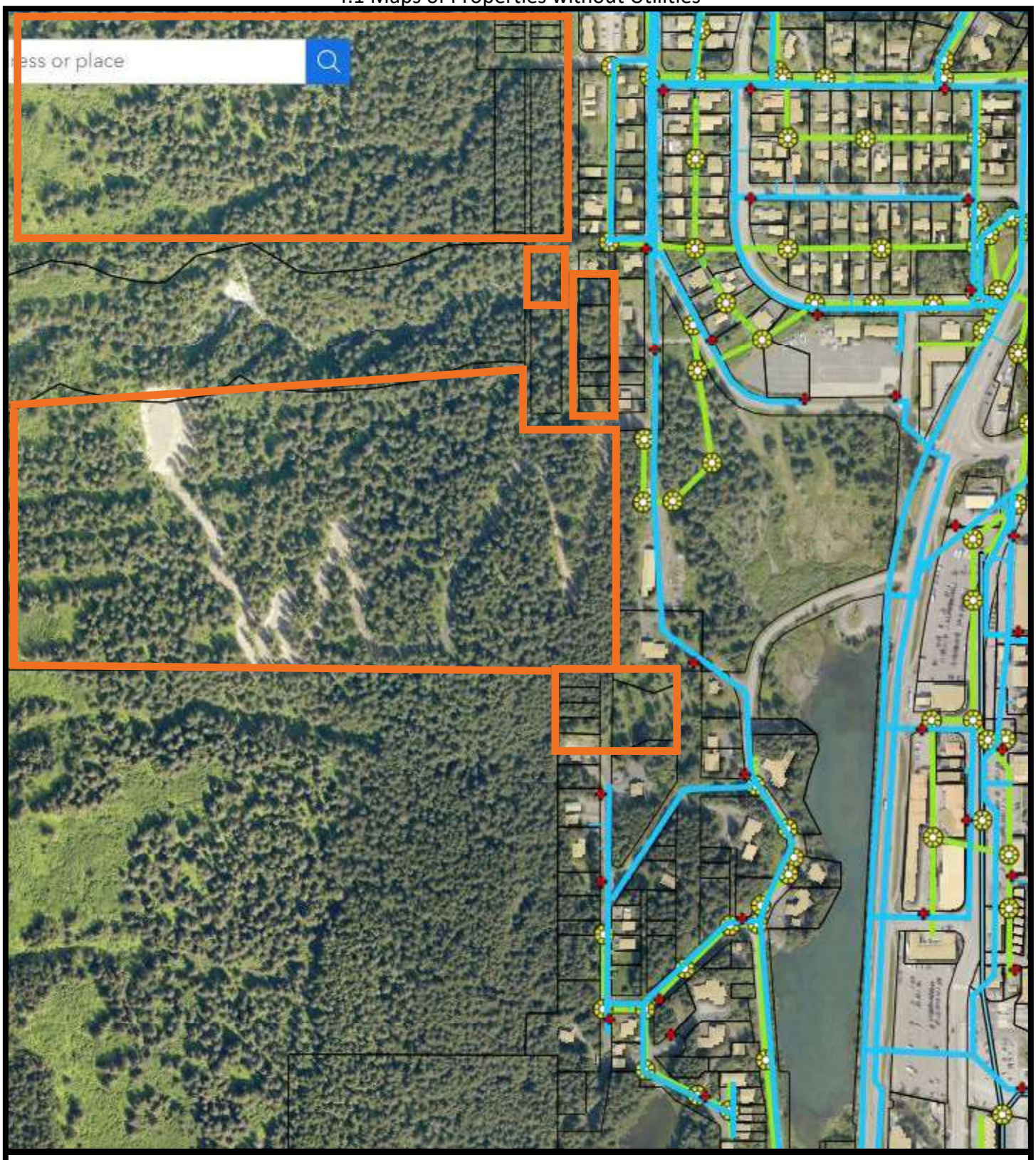
Language in Title 14 would be needed to address how the City would deal with those specific situations.



Context Map

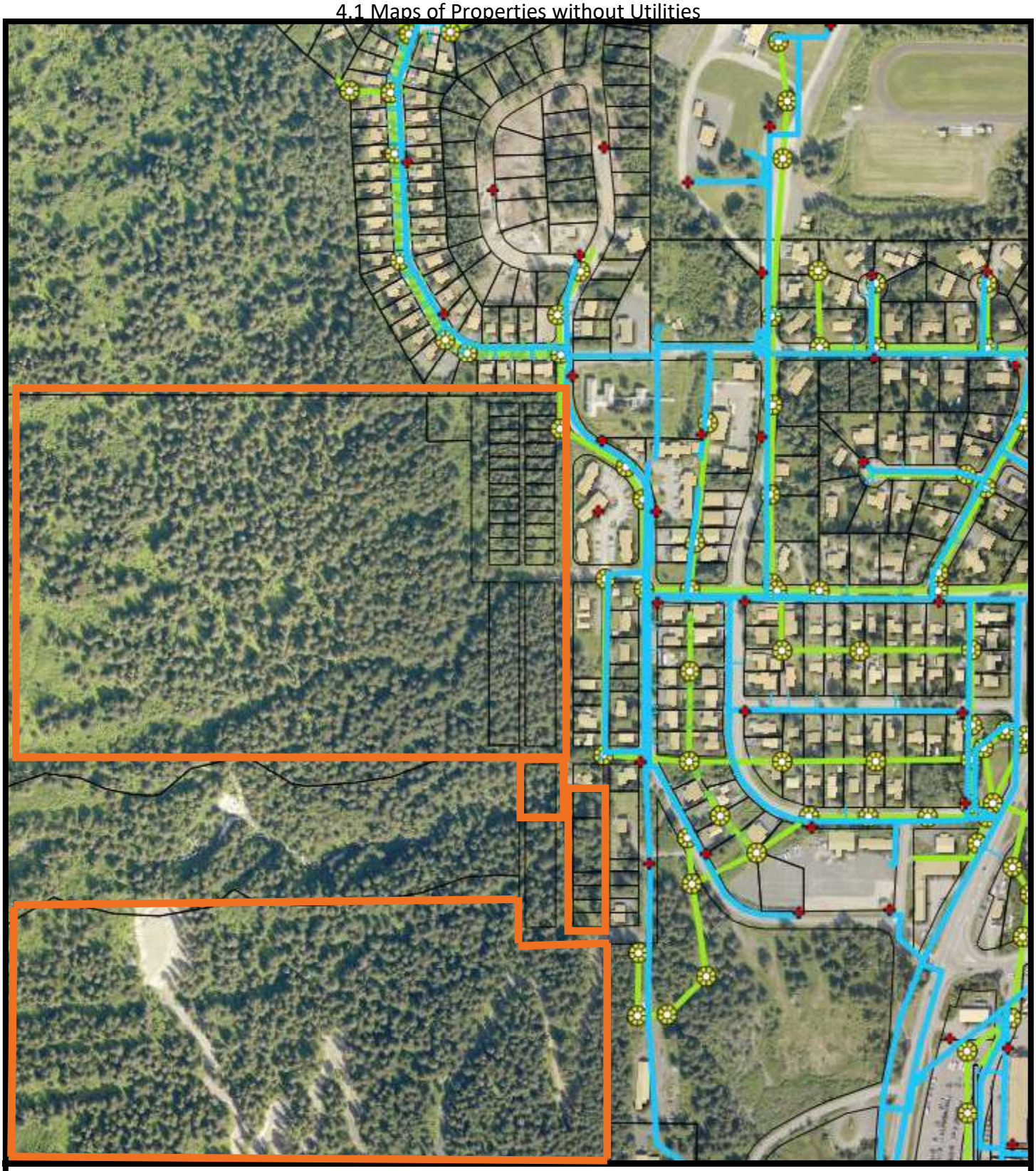
Properties without reasonable access to City water and sewer

N



Map 1

Properties without reasonable access to City water and sewer



Map 2

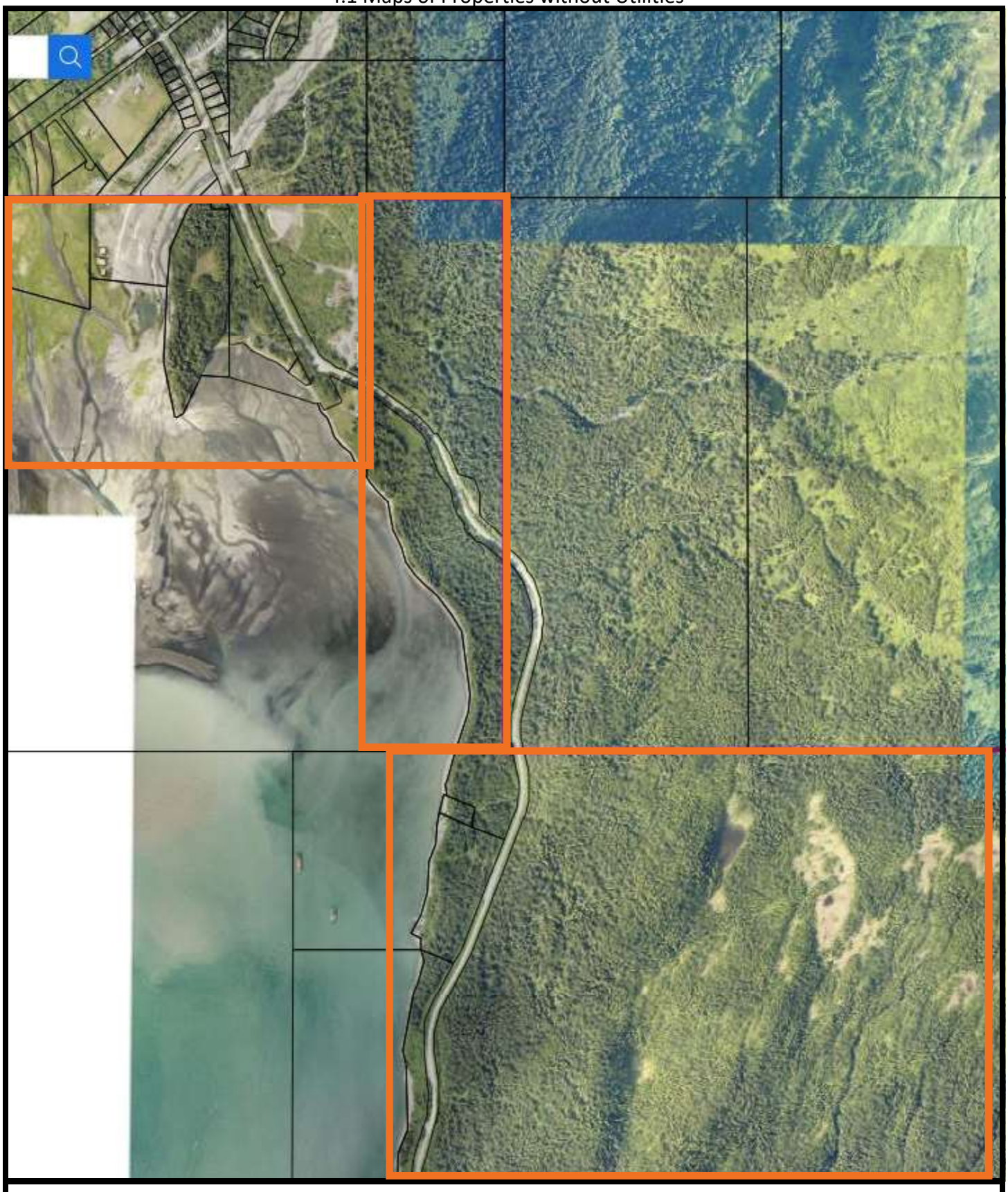
Properties without reasonable access to City water and sewer

N

Map 3

Properties without reasonable access to City water and sewer

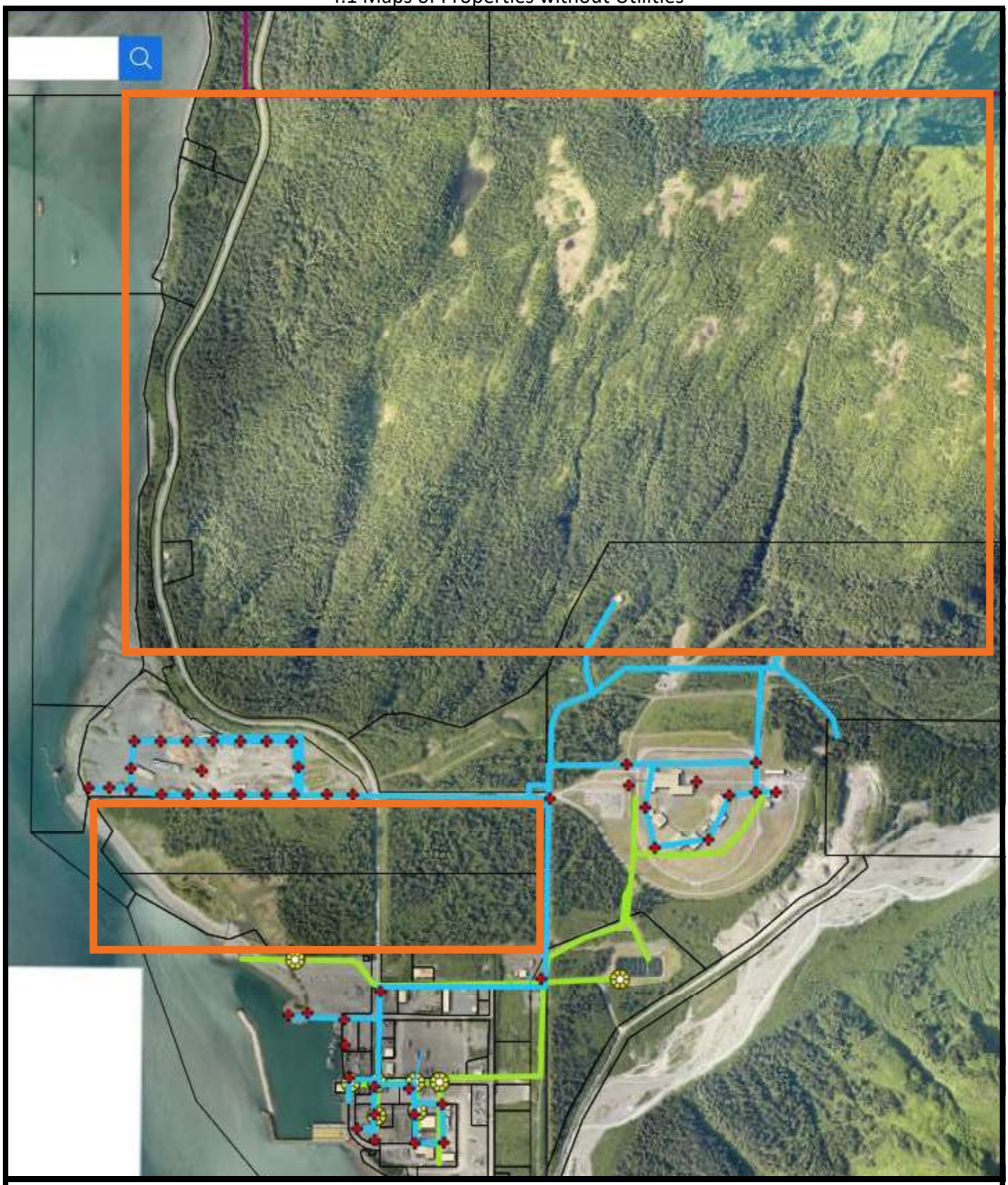
N



Map 4

Properties without reasonable access to City water and sewer

N



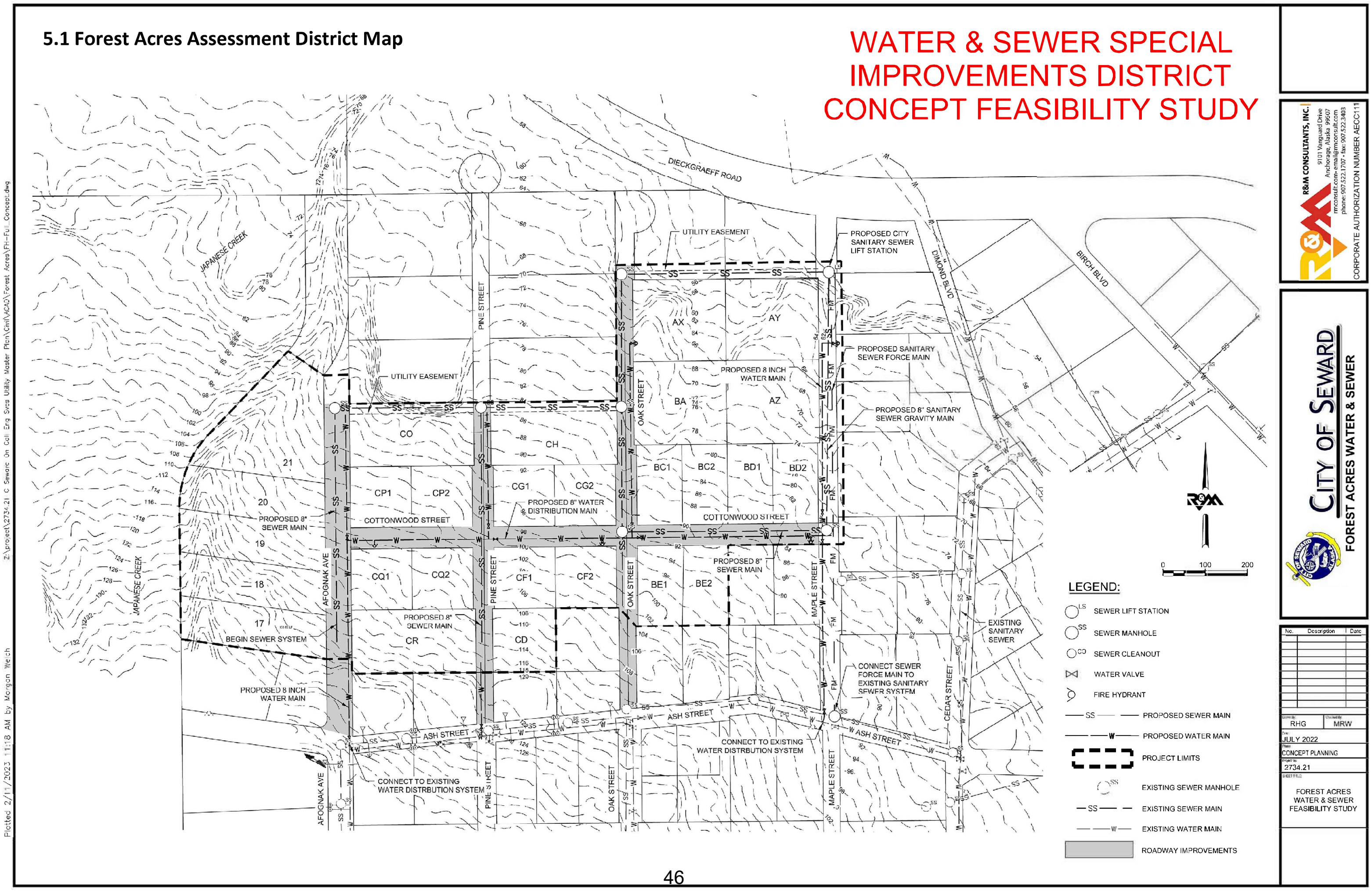
Map 5

Properties without reasonable access to City water and sewer

N

5.1 Forest Acres Assessment District Map

WATER & SEWER SPECIAL IMPROVEMENTS DISTRICT CONCEPT FEASIBILITY STUDY



DIECKGRAEFF ROAD
JAPANESE CREEK
UTILITY EASEMENT
PROPOSED CITY SANITARY SEWER LIFT STATION
DIMOND BLVD
BIRCH BLVD
PINE STREET
OAK STREET
PROPOSED 8 INCH WATER MAIN
PROPOSED SANITARY SEWER FORCE MAIN
PROPOSED 8" SANITARY SEWER GRAVITY MAIN
COTTONWOOD STREET
PROPOSED 8" WATER DISTRIBUTION MAIN
PROPOSED 8" SEWER MAIN
AFOGNAK AVE
MAPLE STREET
BEGIN SEWER SYSTEM
PROPOSED 8 INCH WATER MAIN
CONNECT SEWER FORCE MAIN TO EXISTING SANITARY SEWER SYSTEM
EXISTING SANITARY SEWER
CEDAR STREET
ASH STREET
CONNECT TO EXISTING WATER DISTRIBUTION SYSTEM
LEGEND:
SEWER LIFT STATION
SEWER MANHOLE
SEWER CLEANOUT
WATER VALVE
FIRE HYDRANT
PROPOSED SEWER MAIN
PROPOSED WATER MAIN
PROJECT LIMITS
EXISTING SEWER MANHOLE
EXISTING SEWER MAIN
EXISTING WATER MAIN
ROADWAY IMPROVEMENTS
R&M CONSULTANTS, INC.
9101 Vanguard Drive
Anchorage, Alaska 99507
CORPORATE AUTHORIZATION NUMBER AECC111
CITY OF SEWARD
FOREST ACRES WATER & SEWER
RHG
MRW
JULY 2022
CONCEPT PLANNING
2734.21
FOREST ACRES WATER & SEWER FEASIBILITY STUDY

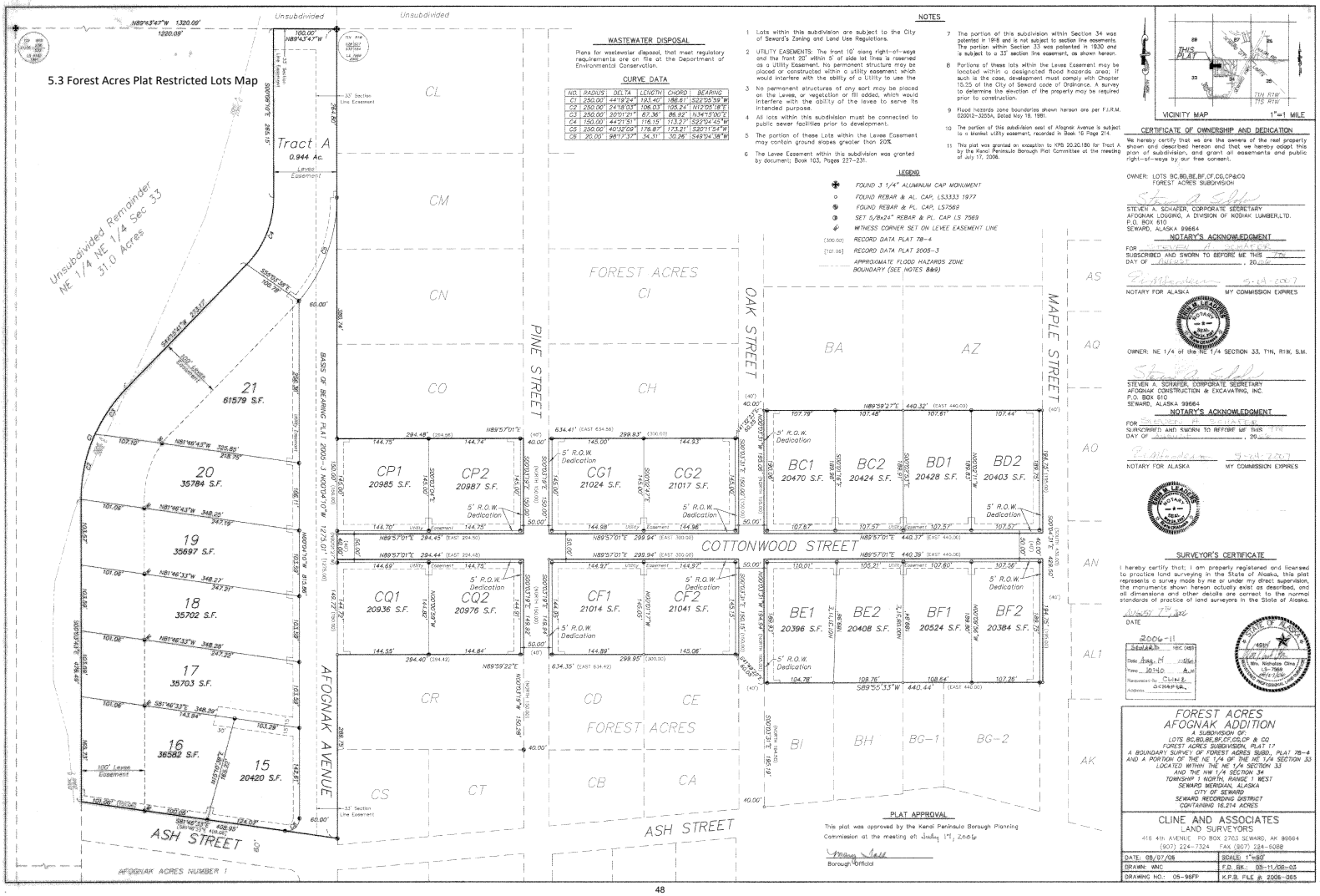
5.2 Forest Acres Utility Cost Breakdown

FOREST ACRES SPECIAL IMPROVEMENTS DISTRICT - WATER & SEWER FEASIBILITY STUDY
COST APPORTIONMENT METHOD 2
CONCEPTUAL COST ESTIMATE

Total Cost of Water Improvements	$ 1,478,320.00
Total Cost of Sewer Improvements	$ 1,258,660.00
Total Cost of Roadway Improvements	$ 895,201.63
Total Cost of Electrical Improvements	$ 213,179.51
Total Cost of Improvements	**$ 3,845,361.14**

Lot ID	Parcel ID	Street Address	Lot Size (Acres)	Lot Size % of Total Project	Water Service	Sewer Service	Roadway Service	Water Improvements Cost (Weighted)	Sewer Improvements Cost (Weighted)	Electrical Improvements Cost (Weighted)	Roadway Improvements Cost (Weighted)	Total Cost Per Parcel
17	14531032	2505 Afognak Ave	0.82	4.32%	X	X	X	$63,902.08	$54,407.02	$9,214.93	$43,307.69	$170,831.72
18	14531033	2507 Afognak Ave	0.82	4.32%	X	X	X	$63,902.08	$54,407.02	$9,214.93	$43,307.69	$170,831.72
19	14531034	2509 Afognak Ave	0.82	4.32%	X	X	X	$63,902.08	$54,407.02	$9,214.93	$43,307.69	$170,831.72
20	14531035	2601 Afognak Ave	0.82	4.32%	X	X	X	$63,902.08	$54,407.02	$9,214.93	$43,307.69	$170,831.72
21	14531036	2607 Afognak Ave	1.41	7.43%	X	X	X	$109,880.40	$93,553.54	$15,845.18	$74,468.10	$293,747.22
CR	14503504	2505 Pine St	1.03	5.43%	X	X	X	$80,267.24	$68,340.53	$11,574.85	$54,398.68	$214,581.30
CQ1	14503506	103 Cottonwood St	0.48	2.53%	X	X	X	$37,406.09	$31,848.01	$5,394.10	$25,350.84	$99,999.05
CQ2	14503507	2511 Pine St	0.48	2.53%	X	X	X	$37,406.09	$31,848.01	$5,394.10	$25,350.84	$99,999.05
CD	14503607	2502 Pine St	0.49	2.58%	X	X	X	$38,185.39	$32,511.51	$5,506.48	$25,878.99	$102,082.37
CF1	14503609	203 Cottonwood St	0.48	2.53%	X	X	X	$37,406.09	$31,848.01	$5,394.10	$25,350.84	$99,999.05
CF2	14503610	207 Cottonwood St	0.48	2.53%	X	X	X	$37,406.09	$31,848.01	$5,394.10	$25,350.84	$99,999.05
CP1	14503107	102 Cottonwood St	0.48	2.53%	X	X	X	$37,406.09	$31,848.01	$5,394.10	$25,350.84	$99,999.05
CG2	14503208	206 Cottonwood St	0.48	2.53%	X	X	X	$37,406.09	$31,848.01	$5,394.10	$25,350.84	$99,999.05
CP2	14503108	106 Cottonwood St	0.48	2.53%	X	X	X	$37,406.09	$31,848.01	$5,394.10	$25,350.84	$99,999.05
CG1	14503207	202 Cottonwood St	0.48	2.53%	X	X	X	$37,406.09	$31,848.01	$5,394.10	$25,350.84	$99,999.05
CO	14503103	2605 Afognak Ave	1.03	5.43%	X	X	X	$80,267.24	$68,340.53	$11,574.85	$54,398.68	$214,581.30
CH	14503205	2605 Oak St	1.03	5.43%	X	X	X	$80,267.24	$68,340.53	$11,574.85	$54,398.68	$214,581.30
AX	14503308	2610 Oak St	1.01	5.32%	X	X	X	$78,708.66	$67,013.53	$11,350.10	$53,342.40	$210,414.68
AY	14503311	2611 MAPLE ST	1.01	5.32%	X	X		$78,708.66	$67,013.53	$11,350.10	$0.00	$157,072.28
AZ	14503312	2607 Maple St	1.01	5.32%	X	X		$78,708.66	$67,013.53	$11,350.10	$0.00	$157,072.28
BA	14503307	2608 Oak St	1.01	5.32%	X	X	X	$78,708.66	$67,013.53	$11,350.10	$53,342.40	$210,414.68
BC1	14503314	302 Cottonwood St	0.47	2.48%	X	X	X	$36,626.80	$31,184.51	$5,281.73	$24,822.70	$97,915.74
BC2	14503315	306 Cottonwood St	0.47	2.48%	X	X	X	$36,626.80	$31,184.51	$5,281.73	$24,822.70	$97,915.74
BD1	14503316	310 Cottonwood St	0.47	2.48%	X	X	X	$36,626.80	$31,184.51	$5,281.73	$24,822.70	$97,915.74
BD2	14503317	312 Cottonwood St	0.47	2.48%	X	X	X	$36,626.80	$31,184.51	$5,281.73	$24,822.70	$97,915.74
BE1	14503709	303 Cottonwood St	0.47	2.48%	X	X	X	$36,626.80	$31,184.51	$5,281.73	$24,822.70	$97,915.74
BE2	14503710	307 Cottonwood St	0.47	2.48%	X	X	X	$36,626.80	$31,184.51	$5,281.73	$24,822.70	$97,915.74

5.3 Forest Acres Plat Restricted Lots Map



WASTEWATER DISPOSAL

Plans for wastewater disposal, that meet regulatory requirements are on file at the Department of Environmental Conservation.

CURVE DATA

NO.	RADIUS	DELTA	LENGTH	CHORD	BEARING
C1	250.00'	44°19'24"	193.40'	188.61'	S32°05'59"W
C2	250.00'	24°18'03"	106.03'	105.24'	N12°05'18"E
C3	250.00'	20°01'21"	87.36'	86.92'	N34°15'00"E
C4	150.00'	44°21'51"	116.15'	113.27'	S22°04'43"W
C5	250.00'	40°33'09"	176.87'	173.21'	S20°11'54"W
C6	20.00'	98°17'37"	34.31'	30.26'	S49°04'38"W

NOTES

1. Lots within this subdivision are subject to the City of Seward's Zoning and Land Use Regulations.
2. UTILITY EASEMENTS: The front 10' along right-of-ways and the front 20' within 5' of side lot lines is reserved as a Utility Easement. No permanent structure may be placed or constructed within a utility easement which would interfere with the ability of a Utility to use the intended purpose.
3. No permanent structures of any sort may be placed on the Levee, or vegetation or fill added, which would interfere with the ability of the levee to serve its intended purpose.
4. All lots within this subdivision must be connected to public sewer facilities prior to development.
5. The portion of these Lots within the Levee Easement may contain ground slopes greater than 20%.
6. The Levee Easement within this subdivision was granted by document; Book 103, Pages 227-231.
7. The portion of this subdivision within Section 34 was patented in 1918 and is not subject to section line easements. The portion within Section 33 was patented in 1930 and is subject to a 33' section line easement, as shown hereon.
8. Portions of these lots within the Levee Easement may be located within a designated flood hazards area; If such is the case, development must comply with Chapter 15.25 of the City of Seward code of Ordinance. A survey to determine the elevation of the property may be required prior to construction.
9. Flood hazards zone boundaries shown hereon are per F.I.R.M. 020012-3205A, Dated May 18, 1981.
10. The portion of this subdivision east of Afognak Avenue is subject to a blanket utility easement, recorded in Book 16 Page 214.
11. This plat was granted an exception to KPB 20.20.180 for Tract A by the Kenai Peninsula Borough Plat Committee at the meeting of July 17, 2006.

LEGEND

- FOUND 3 1/4" ALUMINUM CAP MONUMENT
- FOUND REBAR & AL. CAP, LS3333 1977
- FOUND REBAR & PL. CAP, LS7569
- SET 5/8x24" REBAR & PL. CAP LS 7569
- WITNESS CORNER SET ON LEVEE EASEMENT LINE
- (300.00) RECORD DATA PLAT 78-4
- [101.06] RECORD DATA PLAT 2005-3
- APPROXIMATE FLOOD HAZARDS ZONE BOUNDARY (SEE NOTES 8&9)

PLAT APPROVAL

This plat was approved by the Kenai Peninsula Borough Planning Commission at the meeting at: July 17, 2006

Borough Official

CERTIFICATE OF OWNERSHIP AND DEDICATION

We hereby certify that we are the owners of the real property shown and described hereon and that we hereby adopt this plan of subdivision, and grant all easements and public right-of-ways by our free consent.

OWNER: LOTS BC,BD,BE,BF,CF,CG,CP&CQ FOREST ACRES SUBDIVISION

STEVEN A. SCHAFER, CORPORATE SECRETARY
AFOGNAK LOGGING, A DIVISION OF KODIAK LUMBER,LTD.
P.O. BOX 610
SEWARD, ALASKA 99664

NOTARY'S ACKNOWLEDGMENT

FOR STEVEN A. SCHAFER
SUBSCRIBED AND SWORN TO BEFORE ME THIS 7TH DAY OF JULY, 2006

NOTARY FOR ALASKA — MY COMMISSION EXPIRES 9-24-2007

OWNER: NE 1/4 of the NE 1/4 SECTION 33, T1N, R1W, S.M.

STEVEN A. SCHAFER, CORPORATE SECRETARY
AFOGNAK CONSTRUCTION & EXCAVATING, INC.
P.O. BOX 610
SEWARD, ALASKA 99664

NOTARY'S ACKNOWLEDGMENT

FOR STEVEN A. SCHAFER
SUBSCRIBED AND SWORN TO BEFORE ME THIS 7TH DAY OF JULY, 2006

NOTARY FOR ALASKA — MY COMMISSION EXPIRES 9-24-2007

SURVEYOR'S CERTIFICATE

I hereby certify that; I am properly registered and licensed to practice land surveying in the State of Alaska, this plat represents a survey made by me or under my direct supervision, the monuments shown hereon actually exist as described, and all dimensions and other details are correct to the normal standards of practice of land surveyors in the State of Alaska.

7/14/06
DATE

2006-11
Seward Recording District — NRC 0451
Date: Aug. 14 2006
Time: 10:40 A.M.
Requested by: CLINE & ASSOCIATES
Address:

FOREST ACRES AFOGNAK ADDITION

A SUBDIVISION OF:
LOTS BC,BD,BE,BF,CF,CG,CP & CQ
FOREST ACRES SUBDIVISION, PLAT 17
A BOUNDARY SURVEY OF FOREST ACRES SUBD., PLAT 78-4
AND A PORTION OF THE NE 1/4 OF THE NE 1/4 SECTION 33
LOCATED WITHIN THE NE 1/4 SECTION 33
AND THE NW 1/4 SECTION 34
TOWNSHIP 1 NORTH, RANGE 1 WEST
SEWARD MERIDIAN, ALASKA
CITY OF SEWARD
SEWARD RECORDING DISTRICT
CONTAINING 16.214 ACRES

CLINE AND ASSOCIATES
LAND SURVEYORS
416 4th AVENUE PO BOX 2703 SEWARD, AK 99664
(907) 224-7324 FAX (907) 224-6088

DATE: 05/07/06	SCALE: 1"=80'
DRAWN: WNC	F.D. BK.: 05-11/06-03
DRAWING NO.: 05-98FP	K.P.B. FILE #: 2006-065

5.4 Plat Note Removal Process:

- The Borough ultimately will approve or deny a request to remove a plat note.

- The Borough will look to the City of Seward Planning and Zoning Commission for verification that they approve the plat note removal request.

- This means an application would need to be submitted to the Planning and Zoning Commission (similar to a Preliminary Plat application) for approval.

- Once the City of Seward Planning and Zoning Commission approves the request, then the applicant would submit the paperwork to “Request to Remove a Plat Note Restriction” to the Borough for their approval.

Kenai Peninsula Borough Planning Department
144 North Binkley Street
Soldotna, Alaska 99669-7520
Phone: 907-714-2200
Toll Free within the Kenai Peninsula Borough: 1-800-478-4441, extension 2200
Fax: 907-714-2378

Request to Remove a Plat Note Restriction

☐ Name: _____

☐ Address: _____

_____

☐ Phone: _____

☐ Email: _____

☐ Legal Description of Property for which the request to remove a plat note restriction is required*:

_____

_____

☐ Justification for Requesting Removal of the Plat Note Restriction: _____

_____

_____

_____

_____

☐ The recording fee is attached.

☐ I will pay the recording fee after the Planning Commission takes action on my request.

*The recording fee for the Planning Commission Resolution is separate from the plat note removal application fee. Checks for the recording fee must be made payable to the **Department of Natural Resources**. Planning staff is responsible for recording the Planning Commission resolution.*

_____ _____
Property Owner's/Owners' Signature(s) Date

***NOTE:** All owners within the subdivision will be notified of the request to remove the plat note restriction.

Revised 9/19/12

Request to Remove a Plat Note Restriction

General Procedures

1. A written request to remove a plat note restriction must be submitted to the Planning Department. The request must contain a full legal description (subdivision name, lot, and block number). All owners of the lot must sign the request.

2. Planning staff will review the submittal for completeness and schedule the request for Planning Commission review for the next available meeting. Scheduling this request is dependent on the meeting cut-off schedule and providing reasonable notice to the subdivision owners, applicable agencies, and/or interested parties.

3. All owners within the subdivision will be notified of the proposed plat note restriction removal.

4. If the Planning Commission approves removal of the plat note restriction, the Planning Department will file a resolution granting the request with the appropriate District Recorder.

5. The applicant(s) is/are responsible for submitting the application and recording fees to the Planning Department.

6. The State of Alaska Department of Natural Resources sets the recording fee for the resolution. The check for the recording fee is to be made payable to the *Alaska State Department of Natural Resources*.

Seward Planning & Zoning Commission

Special Meeting

June 19, 2007 *7:30 p.m.* *City Council Chambers*

Marianna Keil
Chair
Term Expires 02/10

Tom Smith
Vice-Chair
Term Expires 02/10

Margaret Anderson
Commissioner
Term Expires 02/09

Kevin Clark
Commissioner
Term Expires 02/09

Vacant
Commissioner
Term Expires 02/08

Sandie Roach'
Commissioner
Term Expires 02/10

Bob Hicks
Commissioner
Term Expires 02/08

Phillip Oates
City Manager

Vacant
Planner

Donna Glenz
Planning Assistant

Anne Bailey
Executive Liaison

1. **Call to Order**

2. **Opening Ceremony**

   A. Pledge of Allegiance

3. **Roll Call**

4. **Special Reports & Presentations**

   A. City Administration Report

      1. Reported Violations, Interpretation and Abatement

   B. Other Reports, Announcements & Presentations

      1. KPB Planning Commission Report – Tom Smith

5. **Citizens' Comments on any subject except those items scheduled for public hearing.** *[Those who have signed in will be given the first opportunity to speak. Time is limited to 2 minutes per speaker and **30 minutes** total time for this agenda item]*

6. **Approval of Agenda and Consent Agenda.** *[Approval of Consent Agenda passes all routine items indicated by asterisk (*). Consent Agenda items are not considered separately unless a Commissioner so requests. In the event of such a request, the item is returned to the Regular Agenda.]*

7. **Public Hearings** *[Limit comments to 5 minutes. Those who have signed in will be given the first opportunity to speak]*

   A. **Unfinished Business Items requiring a Public Hearing** – None

   B. **New Business Items requiring a Public Hearing**

      1. Resolution 2007-13, recommending City Council approval of amending the Land Use Plan and the rezoning of thirty (30) lots in the North Forest Acres area previously selected as the Long Term Care site and also known as Tract A, from Institutional (INS) to Rural Residential (RR) and Resource Management (RM)..... **Page 3**

8. **Unfinished Business** – None

9. **New Business** – None

10. **Informational Items and Reports** ***(No action required)***

   A. Adopted 2007 meeting schedule and supporting agenda statements ..... **Page 14**

   B. Approved Resolution 2007-08, P&Z Priorities List..... **Page 18**

   C. Public announcement of the June 22, 2007 Long Term Care Facility update by the City Manager and the Public Hearing Notice of Resolution 2007-060 authorizing the City Manager to proceed with land acquisition for the future Long Term Care Facility site..... **Page 20**

11. **Commission Comments**

12. **Citizens' Comments** *[Limit to 5 minutes per individual – Each individual has one opportunity to speak]*

13. **Commissions and Administration Response to Citizens' Comments**

14. **Adjournment**

Sponsored by: Applicant

CITY OF SEWARD, ALASKA
PLANNING AND ZONING COMMISSION
RESOLUTION 2007-13

A RESOLUTION OF THE SEWARD PLANNING AND ZONING COMMISSION OF THE CITY OF SEWARD, ALASKA, RECOMMENDING CITY COUNCIL APPROVAL OF AMENDING THE LAND USE PLAN AND REZONING OF LOTS 15, 16, 17, 18, 19, 20, 21, CP1, CP2, CG1, CG2, BC1, BC2, BD1, AND BD2, FOREST ACRES, AFOGNAK ADDITION; AND LOTS AZ, AY, BA, AX, CH, CI, CJ, CO, AND CN FOREST ACRES SUBDIVISION FROM INSTITUTIONAL (INS) TO RURAL RESIDENTIAL (RR) (24 PARCELS); TRACT A, FOREST ACRES, AFOGNAK ADDITION AND LOTS CM, CL, CK, AW, AND AV FROM INSTITUTIONAL (INS) TO RESOURCE MANAGEMENT (RM) (6 PARCELS)

WHEREAS, October 9, 2006 City Council Ordinance 2006-11 amended the Land Use Plan and rezoned the approximate 27.5 acre area then known as Forest Acres Tract A, Long Term Care Replat from Rural Residential (RR) and Resource Management (RM) to Institutional (INS) in preparation for the community's new Long Term Care facility; and

WHEREAS, this area is no longer the proposed development site of the Long Term Care facility; and

WHEREAS, the property owner has submitted a request that this area be returned to the previous zoning and Land Use Plan designations; and

WHEREAS, as required by Title 15 of Seward City Code, public notice and public hearing procedures for amending zoning and land use district designations, all property owners within three hundred (300) feet and in addition all local property owners who use the Forest Acres road network were notified of the proposed zoning and land use change, and the property was posted with public notice signs.

NOW, THEREFORE, BE IT RESOLVED by the Seward Planning and Zoning Commission that:

Section 1. The Commission recommends Ordinance 2007-xx be forwarded to City Council for approval.

Section 2. This resolution shall take effect immediately upon its adoption.

PASSED AND APPROVED by the Seward Planning and Zoning Commission this 19th day of June 2007.

THE CITY OF SEWARD, ALASKA

Marianna Keil, Chair

AYES:
NOES:
ABSENT:
ABSTAIN:

ATTEST:

Jean Lewis, CMC
City Clerk

(City Seal)

Sponsored by: Planning and Zoning Commission
Introduction Date:
Public Hearing Date:
Enactment Date:

CITY OF SEWARD, ALASKA
ORDINANCE 2007-XX

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF SEWARD, ALASKA, AMENDING THE LAND USE PLAN AND REZONING OF LOTS 15, 16, 17, 18, 19, 20, 21, CP1, CP2, CG1, CG2, BC1, BC2, BD1, AND BD2, FOREST ACRES, AFOGNAK ADDITION; AND LOTS AZ, AY, BA, AX, CH, CI, CJ, CO, AND CN FOREST ACRES SUBDIVISION FROM INSTITUTIONAL (INS) TO RURAL RESIDENTIAL (RR) (24 PARCELS); TRACT A, FOREST ACRES, AFOGNAK ADDITION AND LOTS CM, CL, CK, AW, AND AV FROM INSTITUTIONAL (INS) TO RESOURCE MANAGEMENT (RM) (6 PARCELS)

WHEREAS, October 9, 2006 City Council Ordinance 2006-11 amended the Land Use Plan and rezoned the approximate 27.5 acre area then known as Forest Acres Tract A, Long Term Care Preliminary Replat from Rural Residential (RR) and Resource Management (RM) to Institutional (INS) in preparation for the community's new Long Term Care facility; and

WHEREAS, this area is no longer the proposed development site of the Long Term Care facility; and

WHEREAS, the property owner has submitted a request that this area be returned to the previous Zoning and Land Use Plan designations; and

WHEREAS, the current zoning designation of the properties is Institutional (INS) and the Land Use Plan designation is Institutional (INS); and

WHEREAS, the official Zoning Map and Land Use Map described in SCC 15.01.030 will have to be amended from Institutional (INS) to Rural Residential (RR) and Resource Management (RM) in response to this zoning change; and

WHEREAS, the amount of the land being rezoned is approximately 27.5 acres, subdivided into thirty (30) individual, undeveloped lots; and

WHEREAS, the properties to the South and East are zoned Rural Residential, the properties to the West and North are zoned Resource Management; and

WHEREAS, providing land for residential development is supported in both the Comprehensive and Strategic Plans and will be beneficial for the community at large; and

WHEREAS, as required by Title 15 of Seward City Code, public notice and public hearing procedures for amending zoning and land use district designations, all property owners within three hundred (300) feet and in addition all local property owners who use the Forest Acres road network were notified of the proposed zoning and land use change, and the property was posted with public notice signs; and

WHEREAS, at the June 19, 2007 meeting the Planning and Zoning Commission held a public hearing and recommended City Council approval of the proposed zoning amendment included in this ordinance.

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF SEWARD, ALASKA that:

Section 1. The official Land Use Map of the City is hereby amended by changing the land use designation of Lots 15, 16, 17, 18, 19, 20, 21, CP1, CP2, CG1, CG2, BC1, BC2, BD1, and BD2, Forest Acres, Afognak Addition; and Lots AZ, AY, BA, AX, CH, CI, CJ, CO, and CN Forest Acres Subdivision from Institutional (INS) to Rural Residential (RR) (24 PARCELS); and Tract A, Forest Acres, Afognak Addition and Lots CM, CL, CK, AW, AND AV From Institutional (INS) To Resource Management (RM) (6 PARCELS) (see attached map)

Section 2. The official Zoning Map of the City is hereby amended by changing the zoning designation of Lots 15, 16, 17, 18, 19, 20, 21, CP1, CP2, CG1, CG2, BC1, BC2, BD1, and BD2, Forest Acres, Afognak Addition; and Lots AZ, AY, BA, AX, CH, CI, CJ, CO, and CN Forest Acres Subdivision from Institutional (INS) to Rural Residential (RR) (24 PARCELS); and Tract A, Forest Acres, Afognak Addition and Lots CM, CL, CK, AW, AND AV From Institutional (INS) To Resource Management (RM) (6 PARCELS). (see attached map)

Section 4. This ordinance shall take effect ten (10) days following enactment.

ENACTED BY THE CITY COUNCIL OF THE CITY OF SEWARD, ALASKA, THIS __ DAY OF _____ 2007.

THE CITY OF SEWARD, ALASKA

Vanta Shafer, Mayor

AYES:
NOES:
ABSENT:
ABSTAIN:

ATTEST:

Jean Lewis, CMC
City Clerk

(City Seal)

P&Z Agenda Statement

Meeting Date:	June 19, 2007
Through:	Phillip Oates, City Manager
From:	Donna Glenz, Planning Assistant
Agenda Item:	Resolution 2007-13, recommending City Council approval of Ordinance 2007-__, which will amend the Land Use Plan and rezone 27.5 acres in the North Forest Acres area from Institutional (INS) to Rural Residential (RR) and Resource Management (RM)

BACKGROUND & JUSTIFICATION:

Attached for the Commission's review and recommendation to the Seward City Council is Resolution 2007-13 recommending City Council approval of Ordinance 2007-XX, which will amend the Land Use Plan and rezone Lots 15, 16, 17, 18, 19, 20, 21, CP1, CP2, CG1, CG2, BC1, BC2, BD1, and BD2, Forest Acres, Afognak Addition; and Lots AZ, AY, BA, AX, CH, CI, CJ, CO, and CN Forest Acres Subdivision from Institutional (INS) to Rural Residential (RR) (24 parcels); and Tract A, Forest Acres, Afognak Addition and Lots CM, CL, CK, AW, and AV From Institutional (INS) To Resource Management (RM) (6 parcels). (see attached maps).

On October 9, 2006 by Ordinance 2006-11 the Seward City Council amended the Land Use Plan and rezoned the approximate 27.5 acre area then known as Forest Acres Tract A, Long Term Care Preliminary Replat from Rural Residential (RR) and Resource Management (RM) to Institutional (INS) in preparation for the community's new Long Term Care facility. This area is no longer being considered as a development site for the facility and therefore the property owner has requested the zoning and land use plan be returned to the previous designations.

The property owner requested this rezone within the public hearing deadlines approved by the Planning and Zoning Commission to hold a scheduled special meeting on June 19, 2007.

The area requested for rezone contains approximately 27.5 acres and is subdivided into thirty (30) individual lots. Rural Residential zoning borders this area to the South and East while the area is boarder to the West and North by Resource Management zoning. Rural Residential areas to the South and East are designed for larger lots and single-family homes. Resource Management areas to the North and West are generally large undeveloped areas with no public services or utilities.

The Seward City Code §15.05.025 defines:
Rural residential district (RR) Intended to provide for stable, quiet, low density (one or two dwelling units per acre) detached single-family residential development, free from other uses except those which are both compatible and convenient to residents of such a district including

recreational, religious and educational facilities of an appropriate scale and design complementary to the neighborhood character.

Resource management district (RM) Lands which are generally undeveloped and cannot be precisely zoned due to inadequate information on the extension of public services and utilities; the suitability of the land to support commercial, residential, industrial or public uses; and other possible environmental consideration.

Recognizing the primary concern of all land use regulatory actions including zoning, is to promote public health, safety, and general welfare, as per SCC 15.01.010, administration recommends this rezone for several reasons:

1. This rezone will return twenty four (24) individual lots to Rural Residential zoning which will encourage low-density development in a quiet rural setting, a development option which is limited in City limits.
2. Rural Residential zoning requires a minimum lot size of 20,000 sq. ft. For point of reference, an acre has 43,560 sq. ft.
3. The opportunity to have livestock, particularly horses, is an attractive option for people and has initiated rezones to Rural Residential over the years in Forest Acres Subdivision. The Code has restrictions on livestock which prevent them from becoming a nuisance to neighboring property owners.
4. The 2020 Comprehensive Plan and the 1999 Strategic Plan encourage development of new housing in Seward.

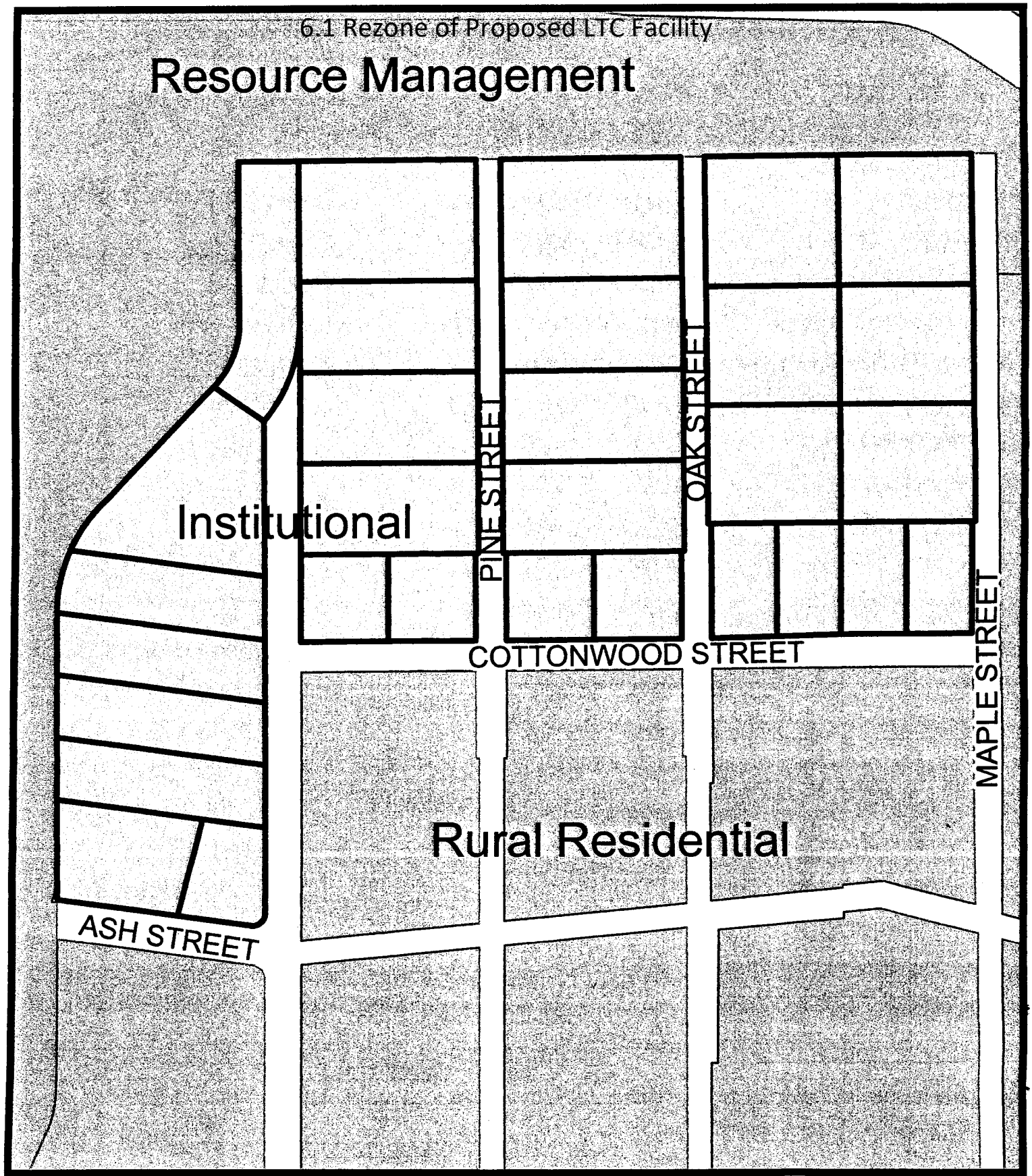
CONSISTENCY CHECKLIST: Yes No

1. *Comprehensive Plan (2020)* X ____
The Comprehensive Plan states "3.3.1 Encourage development of new housing in Seward". (page 22).

2. *Strategic Plan (1999)* X ____
The Strategic Plan "supports residential and commercial development inside the The City" (page 9)
As required by Seward City Code, property owners within three hundred (300) feet of the area and in addition all local property owners who use the Forest Acres road network were notified of the proposed rezone action in order to provide more opportunity for public involvement and the property was posted with public notice signs.

RECOMMENDATION:

Approve Resolution 2007-13, recommending City Council approval of the attached Ordinance 2007-XX, Amending the Land Use Plan and Rezoning from Institutional (INS) to Rural Residential (RR) and Resource Management (RM) approximate 27.5 acres of the north Forest Acres area. (as depicted on the attached maps)



North Forest Acres

Current Zoning & Land Use Map

0 130 260 Feet

N

Sheet No.

Alaska Map Company

City Council Ordinance 2007-XX	
Drawn By:	DGlenz
Checked by:	DGlenz
Date:	P & Z meeting June 19, 2007

North Forest Acres

Zoning & Land Use Map Amendment

0 145 290 Feet

N

Sheet No.

Alaska Map Company

City Council Ordinance 2007-XX

Drawn By:	DGlenz
Checked by:	DGlenz
Date:	P & Z meeting, June 19, 2007

Sponsored by: Planning and Zoning Commission
Introduction Date: 9/25/06
Public Hearing Date: October 10, 2006
Enactment Date: October 10, 2006

CITY OF SEWARD, ALASKA
ORDINANCE 2006-011

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF SEWARD, ALASKA, AMENDING THE LAND USE PLAN AND REZONING OF FOREST ACRES TRACT A, SEWARD LONG TERM CARE FACILITY SUBDIVISION (PRELIMINARY PLAT)

WHEREAS, the City of Seward has requested a rezone of Forest Acres Tract A, Seward Long Term Care Facility Subdivision (Preliminary Plat) from Rural Residential (RR) and Resource Management (RM) to Institutional (INS); and

WHEREAS, the single parcel known as Tract A, Seward Long Term Care Facility Subdivision (Preliminary Plat) is proposed to provide land for the development of the community Long Term Care (LTC) facility and other healthcare expansion opportunities; and

WHEREAS, the size of the land being rezoned is approximately 27.5 acres; and

WHEREAS, the properties to the South and East are zoned Rural Residential, the properties to the West and North are zoned Resource Management; and

WHEREAS, providing land for the development of the community health care needs is supported in both the Comprehensive and Strategic Plans and will be beneficial for the community at large; and

WHEREAS, the official Zoning Map and Land Use Map described in SCC 15.01.030 will have to be amended from Rural Residential (RR) and Resource Management (RM) to Institutional (INS) in response to this zoning and land use map change; and

WHEREAS, as required by Title 15 of Seward City Code, public notice and public hearing procedures for amending zoning and land use district designations, all property owners within three hundred (300) feet and in addition all local property owners who use the Forest Acres road network were notified of the proposed zoning and land use change, and the property was posted with public notice signs; and

WHEREAS, at the September 5, 2006 meeting, the Planning and Zoning Commission, held the public hearing and recommended City Council approval of the proposed zoning amendment included in this ordinance.

City of Seward, Alaska
Ordinance 2006-011

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF SEWARD, ALASKA that:

Section 1. Changing the land use designation of the Forest Acres, Tract A, Seward Long Term Care Facility (Preliminary Plat) from Rural Residential (RR) and Resource Management (RM) to Institutional (INS) hereby amends the official Land Use map of the City. (as displayed in attached preliminary replat)

Section 2. Changing the zoning designation of the Forest Acres, Tract A, Seward Long Term Care Facility (Preliminary Plat) from Rural Residential (RR) and Resource Management (RM) to Institutional (INS) hereby amends the official Zoning map of the City. (as displayed in attached preliminary replat)

Section 3. This ordinance shall take effect ten (10) days following enactment.

ENACTED BY THE CITY COUNCIL OF THE CITY OF SEWARD, ALASKA, this 9th day of October, 2006.

THE CITY OF SEWARD, ALASKA

Vanta Shafer

Vanta Shafer, Mayor

AYES: Dunham, Valdatta, Lorenz, Schafer, Bardarson, Thomas, Shafer
NOES: None
ABSENT: None
ABSTAIN: None

ATTEST:

Jean Lewis, CMC
City Clerk

(City Seal)

City of Seward
2007 Planning Zoning Commission
Meeting and Agenda Cut-Off Dates

Reminder: Per SCC2.30.220(a), the Commission shall meet at 7:30 p.m. in the council chambers on the 1st Tuesday of each month

Public Hearing Items Variance/CUP/Plat Reviews (3 weeks prior to meeting)	Non Public Hearing Notice Items (2 weeks prior to meeting)	Meeting Date
~~December 12, 2006~~	~~December 19, 2006~~	~~January 2, 2007~~
~~December 26, 2006~~	~~N/A~~	~~January 16, 2007~~
~~January 16~~	~~January 23~~	~~February 6~~
~~January 30~~	~~N/A~~	~~February 20~~
~~February 13~~	~~February 20~~	~~March 6~~
~~February 27~~	~~N/A~~	~~March 20~~
~~March 13~~	~~March 20~~	~~April 3~~
~~March 27~~	~~N/A~~	~~April 17~~
~~April 10~~	~~April 17~~	~~May 3~~
~~April 24~~	~~N/A~~	~~May 15~~
~~May 15~~	~~May 22~~	~~June 5~~
May 29	N/A	June 19
June 12	June 19	July 3
June 26	N/A	July 17
July 17	July 24	August 7
July 31	N/A	August 21
August 14	August 21	September 4
August 28	N/A	September 18
September 11	September 18	October 4
September 25	N/A	October 16
October 16	October 23	November 8
October 30	N/A	November 20
November 13	November 20	December 4
November 27	N/A	December 18
December 11	December 18	January 3, 2008
December 26	N/A	January 15, 2008

Memorandum

CITY OF SEWARD
COMMUNITY DEVELOPMENT

Date: January 4, 2007

To: Planning & Zoning Commission

From: Administration

Subject: 2007 - Planning & Zoning Meeting Schedule

This memo is to provide a schedule of the Planning & Zoning Commission Meetings for the calendar year 2007. Unless otherwise noted the P & Z regular meetings will begin at 7:30 p.m. **The "Scheduled Special Meetings" shall be held ONLY if a Public Hearing item is on the agenda otherwise the meeting will be held as a work session commencing at 6:30 pm.**

Month	Regular Meeting	Special P & Z Meeting for Public Hearings or scheduled Work Session
~~January~~	~~January 2nd~~	~~January 16th~~
~~February~~	~~February 6th~~	~~February 7th and 8th Community Values Meetings~~ ~~February 20th scheduled Work Session~~
~~March~~	~~March 6th~~	~~March 6th Flood Board~~ ~~March 20th~~
~~April~~	~~April 3rd~~	~~April 17th~~
~~May~~	~~May 3rd (Thursday)~~	~~May 15th (Borough Assembly in Seward May 1st)~~
~~June~~	~~June 5th~~	~~June 5th Flood Board~~ June 19th
July	July 3rd	July 17th
August	August 7th	August 21st
September	September 4th	September 4th w/s 6:30 joint with Flood Board September 18th
October	October 4th (Thursday)	October 16th (KPB & Local elections October 2nd)
November	November 8th (Thursday)	November 20th (National Election November 6th)
December	December 4th	December 4th w/s 6:30 joint with Flood Board December 18th

If you have questions or concerns, please call 224-4065 or email swilliams@cityofseward.net

P&Z Agenda Statement

Meeting Date: July 6, 2006

Through: Kirsten Vesel, Assistant City Manager

From: Donna Glenz, Acting Planner

Agenda Item: Approve the Revised 2006 P&Z meeting schedule, re-scheduling the third Tuesday of each month work session to a regular meeting.

BACKGROUND & JUSTIFICATION:

In December the Planning and Zoning Commission approved the regular scheduled meeting dates, the Public Hearing Cut-off dates, and the work sessions dates for the 2006 calendar year. The Commission has since held several discussions on scheduling a special meeting per month to hear Public Hearing Items and has requested a new schedule be adopted.

The Planning and Zoning Commission requested the regular work sessions scheduled for the third Tuesday of each month, (except June, July, and August), be approved as "scheduled special meetings", including the months of June, July, and August if a Public Hearing item was submitted by the required cut-off date.

Staff has re-scheduled the third Tuesday of each month work sessions to "scheduled special meetings" and has established the required three week cut-off dates for Public Hearing items on the attached Planning and Zoning Schedule. It is the understanding of staff, the Commission plans to conduct the "scheduled special meetings" as work sessions if a public hearing item is not available on the agenda for the "scheduled special meetings".

RECOMMENDATION:

Approve the revised 2006 Planning and Zoning meeting schedule, changing the *third* Tuesday of each month work sessions to "scheduled special meetings" if a Public Hearing item has been submitted by the required cut-off date and establishing the three week cut-off dates for Public Hearing items.

P&Z Agenda Statement

Meeting Date: December 5, 2006

From: D. Scott Williams, Planner

Agenda Item: Approve the 2007 P&Z meeting and work session schedule and the Rescheduling of the May 1, 2007; the October 2, 2007; and the November 6, 2007 Regular P & Z Meetings

---

BACKGROUND & JUSTIFICATION:

Each year in December the Planning and Zoning Commission approves the meeting dates for the coming year of the regularly scheduled Planning and Zoning meetings and scheduled special meeting/work sessions.

The regular May Planning & Zoning meeting is scheduled for Tuesday May 1, 2007; currently the Borough Assembly meeting is scheduled to meet in Seward Council Chambers on May 1, 2007. Due to the scheduled Assembly meeting it is recommended that the May P& Z Meeting be rescheduled to Thursday, May 3, 2007.

The regular October Planning & Zoning meeting is scheduled for Tuesday October 2, 2007; currently the City and Borough elections are scheduled for October 2, 2007. Due to the scheduled elections it is recommended that the October P& Z Meeting be rescheduled to Thursday, October 4, 2007.

The regular November Planning & Zoning meeting is scheduled for Tuesday November 6, 2007; currently the national election is scheduled November 6, 2007. Due to the scheduled election it is recommended that the November P& Z Meeting be rescheduled to Thursday, November 8, 2007.

RECOMMENDATION:

Approve the 2007 Planning and Zoning meeting and special meeting/work session schedule. Included is the rescheduling of the regular Planning & Zoning Meetings of Tuesday May 1, 2007 to Thursday May 3, 2007; the Tuesday October 2, 2007 to Thursday, October 4, 2007 and the November 6, 2007 to Thursday, November 8, 2007.

Sponsored by: Planning and Zoning Commission

CITY OF SEWARD, ALASKA
PLANNING AND ZONING COMMISSION
RESOLUTION 2007-08

A RESOLUTION OF THE SEWARD PLANNING AND ZONING COMMISSION RECOMMENDING THE PLANNING COMMISSION PRIORITIES FOR 2007

WHEREAS, the Seward City Council Rules of Procedure, adopted March 14, 1994, state that the Council should meet in an annual joint work session with the Commission every March to address areas of mutual concern; and

WHEREAS, the Commission and Council held a joint work session, updated and reviewed the Planning and Zoning 2006 Priorities List on March 27, 2007; and

WHEREAS, at the May 3, 2007 meeting the Planning and Zoning Commission requested the Priorities List be reviewed and presented in priority order; and

WHEREAS, at the June 5, 2007 meeting the Planning and Zoning Commission reviewed and approved the updated and revised List of Priorities for 2007; and

WHEREAS, the Planning Department have adequate staffing to accomplish the priorities listed below.

NOW, THEREFORE, BE IT RESOLVED by the Seward Planning and Zoning Commission that:

Section 1. The following revised and prioritized List of Priorities for 2007 is hereby approved:

PRIORITIES

1) Proper Staffing of the Planning Department

2) Municipal Lands Management Plan (1995) – Update in conjunction with the Capital Improvement Plan

3) City Land Disposal Policies and Procedures – Review and Update

4) Rewrite of Title 15 – Bring it up to date, clarify, eliminate inconsistencies

5) Planning Commission Rules of Procedure – Develop

6) Nash Road Bench Study

7) Enforcement – inclusive of the following but not exclusive of other enforcement issues Code Violations and CUP's (Adequate Staffing)

8) Annual Community Values Meeting

9) Flood Management

10) Two Lakes Park Replat

11) Waterfront Park Replat

FOLLOW PROGESS MADE BY OTHER ENTITIES

AARC Master Plan

Airport Master Plan

Parks and Recreation Master Plan (1993)

Section 2. This resolution shall take effect immediately upon its adoption.

PASSED AND APPROVED by the Seward Planning and Zoning Commission this 5th day of June, 2007.

THE CITY OF SEWARD, ALASKA

Tom Smith, Vice Chair

AYES: Anderson, Clark, Hicks, Roach', Smith
NOES: None
ABSENT: Hohl, Keil
ABSTAIN: None

ATTEST:

Jean Lewis
City Clerk, CMC

(City Seal)

Public Urged to Attend !!

Update on the Long-Term Care Facility

By: City Manager Phillip Oates
Friday, June 22, 2007 at Noon
City Council Chambers

SEWARD CITY COUNCIL
NOTICE OF PUBLIC HEARING
June 25, 2007

NOTICE IS HEREBY GIVEN that the Seward City Council will conduct a public hearing on the following items of business at its regular meeting of June 25, 2007.

Resolution 2007-060, Authorizing The City Manager To Proceed With The Acquisition Of Land (Griswold property), Comprising Approximately 9.11 (+/-) Acres Of The Southwest Corner Of The Unsubdivided Remainder Of U.S.S. 1864, As Reflected In The U.S.S. 1864 KPB Replat, Plat No. 2004-03, Inclusive Of Right-Of-Ways Of Approximately 1.11 (+/-) Acres Extending South From The Intersection Of Oak Street And Hemlock Street And Such Additional Right-Of-Ways To Provide Connecting Access To The 8 Acre Portion Of The Property, And Appropriating Funds For The Future Long Term Care Site For A Purchase Price Of $830,000.00.

Essential terms and conditions of leases and all other pertinent copies of public hearing documents are available for review at the city clerk office.

The public hearing will commence at 7:30 p.m., or as soon thereafter as business permits, in the City Council Chambers, City Hall, 410 Adams Street, Seward. All interested persons are invited to attend the meeting and participate in the discussion; or, written comments may be sent to the City of Seward, c/o City Clerk, P.O. Box 167, Seward, AK 99664, or e-mailed to clerk@cityofseward.net.

JD

Groundwater Protection Stakeholder Workgroup: Water Wells

Alaska Best Management Practices

CONSTRUCTION OF NON-PUBLIC WATER WELLS

Prepared by private and public stakeholders in conjunction with the authorities of the Alaska Department of Environmental Conservation, the Alaska Department of Natural Resources, and the Alaska Water Well Association.

Foreword

Dear Reader,

As a stakeholder of Alaska's groundwater, we have a responsibility to be good stewards of this shared natural resource. These Best Management Practices (BMPs) were designed for Alaskans who use, provide access to, or otherwise have a vested interest in Alaska's groundwater quality and quantity, with the intent of protecting our shared resource through proper construction, maintenance, and decommissioning of groundwater wells.

In 2012 the DEC began facilitating meetings with participation from representatives of different stakeholder groups to identify and address issues and concerns related to groundwater protection in Alaska. This stakeholder workgroup consisted of water well drillers, pump installers, hydrologists, engineers, state agency (i.e., DEC and DNR) staff, public water system owner/operators, water testing lab professionals, as well as private citizens. Meetings were held on a roughly monthly basis during the relatively slow off season. Minutes and results from the meetings were regularly shared with a broader group through email and a meeting web page.

The stakeholder workgroup thoughtfully developed BMPs over the course of approximately three (3) years taking into account Alaska's unique remoteness and natural conditions. These BMPs are intended to be applied to the construction of all non-public water wells and the maintenance or decommissioning of all wells and boreholes (public and non-public). The BMPs balance protecting groundwater and public health with practices that are economically sustainable and can be applied statewide. An additional outcome of the stakeholder workgroup meetings was a web site containing information compiled from across the state and nation as it relates to private drinking water wells, found at http://dec.alaska.gov/eh/dw/DWP/DWP_PrivateWells.html.

The BMPs for maintaining or decommissioning all wells are intended to provide easy access to, and clarify, methods as they apply to Alaska, by serving as an alternate DEC-approved method as described in 18 AAC 80.

Adequate protection of our groundwater resources relies on Alaskans recognizing its importance and can be accomplished through voluntary application of these BMPs.

Sincerely,

The Groundwater Protection and Water Wells Stakeholder Workgroup

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CONSTRUCTION OF NON-PUBLIC WELLS

1 Purpose

To provide best management practices that ensure non-public water system wells within the state of Alaska are constructed and maintained in such a manner as to provide a safe supply of water for domestic use and to protect the groundwater resource from contamination.

2 Disclaimer

Following these practices does not relieve the person responsible for the work from compliance with any state, federal, or local authorizations which are required for your project. All necessary authorizations/permits should be obtained before proceeding with the project.

3 Scope

These practices apply to construction of non-public water system wells used as sources of water, and associated observation or test wells, within the state of Alaska, except for groundwater monitoring wells that are installed, maintained, and decommissioned in accordance with a work plan approved by the Alaska Department of Environmental Conservation (ADEC) Division of Spill Prevention and Response or the ADEC Solid Waste Program. Water wells constructed prior to the date of establishment of these Best Management Practices should not be reviewed based on the omission of, or failure to perform or meet, any of the recommended practices contained herein, unless at that time, those practices were stated and established in local or State of Alaska regulations.

4 Updates and Alterations

Future changes to this document should be done after review and approval by a committee (similar to the original Groundwater Protection and Water Wells Stakeholder Workgroup) composed of representatives from the public, industry groundwater professionals, and appropriate state agency staffs.

5 Definitions

The words, terms and phrases, used herein have the meanings given to them in "Definitions for 'ALASKA BEST MANAGEMENT PRACTICES FOR MAINTAINING OR DECOMMISSIONING WATER WELLS AND BOREHOLES' and 'ALASKA BEST MANAGEMENT PRACTICES FOR THE CONSTRUCTION OF NON-PUBLIC WATER WELLS'", except where the context clearly indicates a different meaning.

6 Well Site Selection

The location for the well should be considered prior to drilling in order to ensure adequate and sustainable quantity and quality. Due diligence should be applied to ensure the following considerations are taken into account:

A. The well should be located in order to discourage ponding of water and contaminants near the well.

B. The well should be placed in an area that is not susceptible to damage from vehicles and equipment.

6 (Continued)

C. The well should be made visible from a close distance as to avoid damage and to be able to readily identify maintenance issues.

D. Future access to the well by equipment needed for pump service or eventual well repair or decommissioning should be considered in well site selection.

E. The minimum recommended separation distances between non-public water wells and other specified facilities or areas are listed in Table 1, below. When distances differ from federal, state, or local requirements, the greater distance should be used.

Table 1. Minimum Separation Distances

Potential Source of Contamination	**Minimum Separation Distance (feet)**
Private sewer line (including cleanout)	25*
Curtain drain	25
Petroleum hydrocarbon storage tank	25*
Public sewer system trunk line	75*
Any other source of potential contamination	75
Holding tank – wastewater	75*
Septic disposal field	100*
Public sewer system manhole or cleanout	100*
Septic tank	100*
Animal containment areas	50
Manure/animal excreta storage areas	100
Outhouse or pit privy	100

*Distances based on those provided for "Private" well types in Table 6 of the ADEC's "Installer's Manual for Conventional Onsite Domestic Wastewater Treatment and Disposal Systems" (August 2000).

7 Best Practices: Construction of Non-Public Water Wells

The commercial drilling of a non-public water well and subsequent well rehabilitation, redevelopment, or deepening operation should be performed by a well driller. Any well drilling method used in the construction of a well should meet the following requirements:

A. The ground surface surrounding the well for at least ten (10) feet should be sloped or contoured to allow surface waters and contaminants to drain away from the well.

B. The well driller should exercise care during excavation or drilling operation to prevent contamination to any aquifer.

C. Drilling fluid may be used only if the fluid is composed of materials and additives which are NSF/ANSI approved.

7 (Continued)

D. Water used in the drilling process should be potable water, if reasonably available, or water that will not result in a contaminated well.

E. Water wells drilled or driven in unconsolidated formations should be cased with non-perforated pipe to a minimum of thirty (30) feet BGS, unless local areal experience has demonstrated that there is no water or no water suitable for potable use at greater depths.

F. A well completed in unconsolidated formations should be constructed so water only enters the well from a single producing zone.

G. Water wells that encounter bedrock shallower than twenty (20) feet BGS should be cased to a minimum of thirty (30) feet BGS and grouted to a minimum of 30 feet BGS per Section 7.K. The local areal experience exception from Section 7.E may apply for use of shallow water.

H. Water wells that encounter bedrock at a depth greater than twenty (20) feet BGS and less than forty (40) feet BGS, should be cased a minimum of ten (10) feet into the bedrock. Where it is necessary to case bedrock, the cased borehole should be grouted in accordance with Section 7.K. The local areal experience exception from Section 7.E may apply for use of shallow water.

I. In bedrock wells that utilize liners, the outer casing should be grouted per Section 7.K. The liner should have a formation packer set a minimum of ten (10) feet below the outer casing drive shoe if it is less than forty (40) feet BGS. The annular space should be grouted, using a high solids bentonite grout slurry (minimum twenty percent (20%) solids content) or granules, up to a minimum of five (5) feet above the outer casing drive shoe.

J. The Federal Housing Administration (FHA) and the U.S. Department of Veteran's Affairs (VA) well construction standards for homes they finance require a minimum of forty (40) feet of well casing.

K. *Grouting*. Grouting the outer annular space is necessary to prevent shallow non-potable groundwater or waters on the land surface from entering into a potable water aquifer. All wells should be grouted with bentonite grout slurry or granules as follows:

1. Using the dry grout method, from the pitless adapter level to at least ten (10) feet below the pitless adapter or, from the surface to a minimum twenty (20) feet BGS.

2. For drive-point water wells, grouting should be done using the dry grout method.

3. If bedrock is encountered as described in Sections 7.G through 7.I, the following grouting procedures should be followed:

7.K.3 (Continued)

a. The permanent well casing should be grouted from the bottom of the borehole up using a high solids bentonite grout slurry (minimum twenty percent (20%) solids content) or granules. The oversized borehole should be stabilized to eliminate caving and sloughing.

b. If the permanent casing is used as a tremie to place the grout by circulating from the bottom up, a minimum one (1) inch annular space from the bottom of the borehole to surface should be used if possible.

c. If a temporary casing is used to stabilize the oversized borehole, it should be removed upon completion of grouting procedures.

L. *Well casing.* All casing should be installed with materials in new or like-new condition, free of pits or breaks.

1. Polyvinyl chloride (PVC) and high-density polyethylene (HDPE) casing should be NSF/ANSI approved.

2. Drive-point water wells should be constructed with steel pipe per Table 2, below.

3. The minimum wall thickness listed in Table 2, below, should be used, and all casing greater than the nominal size of eight (8) inches should have a minimum wall thickness of at least 0.250 inches:

Table 2. Minimum Well Casing Dimensions

Material	Nominal Size: Inside Diameter, I.D., Inches	Outside Diameter, O.D., Inches	Wall Thickness, Inches	Rating
Steel	1-1/4 (drive pipe)	1.66	0.140	Schedule 40
	2 (drive pipe)	2.375	0.154	Schedule 40
	4	4.5	0.237	Schedule 40
	5 (casing)	5.563	0.237	Schedule 40
	5 (liner)	5.563	0.188	Schedule 20
	6	6.625 (6 5/8")	0.250	Schedule 30
	8	8.625 (8 5/8")	0.250	Schedule 20
PVC	4	4.5	0.248	Schedule 40
HDPE	4	4.5	0.265	125 psi

4. *Joints.* All casing joints should be screw-coupled, welded, or glued, and should be watertight.

a. Welded joints should be at least as thick as the thickness of the well casing and should consist of a minimum of two (2) welding passes.

7.L.4 (Continued)

b. All glue bonding materials should be NSF/ANSI approved.

5. *Well casing stick up.* All well casing should extend a minimum of two (2) feet above the finished grade, with the ground sloped to drain away from the casing if possible, unless local conditions suggest a different height, less or greater but at least one (1) foot above finished grade, to protect the well from freezing or flooding.

6. *Perforating or slotting.* Perforating or slotting of the casing utilized for the purpose of allowing water to enter the well from producing zones encountered above the bottom of the casing should not extend higher than thirty (30) feet BGS. The local areal experience exception from Section 7.E may apply for use of shallow water.

7. *Drive shoe.* When the casing is driven or otherwise forced into the borehole, the bottom of the casing should be protected from damage by the use of a drive shoe.

M. *Well screen*. Where geologic conditions are such that the well must be completed to draw from a sandy aquifer, or where greater water production is desired, installation of a well screen should be considered to control sand pumping by the production well pump. The commercial installation of well accessories should be performed by a well driller or pump installer and includes the following:

1. Premium quality well screens should consist of v-wire wrapped, welded construction, of stainless steel or plastic.

2. An accessory consisting of slotted PVC, HDPE, or steel pipe may be adequate.

3. The well screen assembly should include a minimum of two (2) feet of equivalent sized riser pipe topped with an appropriate well packer and having a closed bottom.

4. The slot or opening size should be selected to hold back at least the largest 30% to 50% of the aquifer grains, depending on the size uniformity of the aquifer grains.

5. Where formation material is extremely fine – too fine for a well screen commonly used in Alaska, a pre-packed well screen or filter pack completion may be necessary. Those options are best utilized under the guidance of a groundwater professional.

6. Drive-point water wells should consist of stainless steel wire-wrapped construction and should be installed in locations as described in Section 6.

N. *Well disinfection.* Wells should be disinfected as follows:

7.N (Continued)

1. *New, rehabilitated, or deepened wells.* Immediately after completion of drilling, rehabilitating, deepening, or servicing a well, the well should be disinfected. After the well is flushed of drill cuttings, apply a chlorine compound proportioned to provide a concentration of at least fifty (50) parts per million (ppm) as free chlorine to the entire volume of water in the well and borehole. The chlorine should be introduced into the well in a manner which should distribute it throughout the entire water depth. Allow the chlorinated water to remain in the well undisturbed for at least six (6) hours.

2. *Hydrofractured (as done by "well fracturing") or redeveloped wells.* While redeveloping or hydrofracturing wells, and when possible, a free chlorine residual in the well of at least five (5) ppm should be maintained.

3. *Flushing.* After the required disinfection time has elapsed, the well should be flushed of all chlorinated water before being placed into service.

O. *Well seal.* If no further work is to be done on the well, the top of the casing should be closed with a sanitary well cap or watertight well seal of a type approved by the State and NSF/ANSI.

P. *Well identification.* All wells should be labeled with a durable form of construction information upon completion. The construction information source should be secured to the well casing and contain the following information:

1. The name of the well driller, pump installer, and business affiliations;
2. The date the well was completed;
3. The total well depth;
4. The total depth of casing;
5. The location and type of well completion;
6. Static water level (SWL) below the top of the casing;
7. Well yield; and
8. Height of casing above finished grade.

Q. *Well log (Record of Construction) and as-built.* The well driller should provide a well log to the owner within thirty (30) days of completion of the well. The well log is an important record that should be carefully filed and kept with other important property documents. To assist, a form is available from the Alaska Department of Natural Resources (ADNR), http://dnr.alaska.gov/, 907-269-8400. The well log should include at least the following pertinent information:

1. The property owner's name;
2. Drilling fluid/circulation method;
3. The legal description and street address;
4. The method of drilling (rotary, cable tool, etc.);

7.Q (Continued)

5. A description, relative depth, and thickness of each formation layer penetrated from the ground surface to total borehole depth;
6. The relative depth and thickness of each water bearing formation layer (aquifer) penetrated;
7. The total depth drilled;
8. Grout depth and description;
9. The length, diameter, wall thickness and type of casing used;
10. A description of the liner (if used) and the length and setting depth;
11. The depth and number of well perforations, (if any) in the casing and/or liner;
12. The type and location of any well screens used;
13. The SWL and drawdown (DD) level;
14. Well development method;
15. The well yield test data and results, including the method of testing;
16. Anticipated use;
17. The dates of commencement and completion of drilling operations;
18. The name and address of the well driller; and
19. A description of the method of disinfection process used upon completion of the well.

8 Best Practices: Installation of Water Pumps for Non-Public Water Wells

A. *Pitless adapters.* Pitless adapters should be installed by a pump installer, a well driller or by an excavator under the supervision of a pump installer or well driller. The burial depth and type of pitless adapter installed should be recorded on the pump install log. When installed, pitless adapters should be one of the types approved by NSF/ANSI.

B. *Well seal.* The top of the casing should be closed with a sanitary well cap or watertight well seal of a type approved by the State and NSF/ANSI.

C. *Pump (aka well pump)*. The pump intake should be located beneath the maximum anticipated water pumping level at the maximum desired pumping rate and the pump should be sized to meet the maximum desired pumping rate and total dynamic head requirement of the water system.

    1. If well capability does not meet the maximum desired pumping rate (which usually occurs during the peak water demand periods of 6:00 AM to 8:00 AM and 6:00 PM to 8:00 PM), additional water storage facilities and/or water use reduction measures should be considered.

D. *Riser pipe.* It should be made of galvanized steel, PVC or HDPE.

E. *Well cable.* It should be rated for water submersion and sized to safely accommodate the voltage, current flow, and distance from the pump motor to the power source. Submersible well cable is not suitable for underground burial.

8 (Continued)

F. *Well yield testing*. Upon completion of a well, if the estimated producing rate assessed during drilling appears to be less than three (3) gallons per minute (GPM), a well yield test of adequate duration should be performed to verify the estimated long-term capacity, taking into account possible fluctuations due to seasonal differences or by other causes. The test should be performed by, or under the direction of, a groundwater professional using one or more of the following practices and by recording the following data measurements:

1. Bailing, air lift, submersible pumping, or recovery rate measurement procedures.

2. Record accurate measurements of the following:

    a. Well production or pumping rate (in GPM);
    b. SWL;
    c. Pumping water level or DD from SWL;
    d. Duration of pumping (elapsed time);
    e. Recovery rate; and
    f. Any other information useful in determining the estimated producing rate.

3. If at the time of the well yield test, the minimum estimated producing rate and/or recovery rate of a well is less than one-hundred and fifty (150) gallons per day (GPD) per bedroom of the household to be supplied, water storage facilities should be considered. If the non-public water well is to be used for purposes other than domestic household support, it is the owner's responsibility to determine the adequacy of the well for its intended use.

G. *Pump work.* Upon completion of pump installation work, a chlorine compound proportioned to provide a concentration of at least fifty (50) ppm as free chlorine to the entire volume of water in the well and borehole should be applied. After chlorine is introduced, water should be circulated in the well so it reaches all parts of the pump equipment, inside and out. The chlorinated water should remain in the well for at least six (6) hours.

H. *Flushing.* After the required disinfection time has expired, the well should be flushed of all chlorinated water before being placed into service.

I. *Pump install log (Record of Commissioning).* The pump install log is an important record that should be carefully filed and kept with other important household documents. The pump installer or well driller should provide a pump install log to the owner within thirty (30) days of completion of the installation of a pump into a water well. The pump install log should include at least the following pertinent information:

1. The property owner's name;
2. The legal description and street address of the property;

8.I (Continued)

3. The date of the pump installation;
4. The manufacturer's name, model, size and voltage of the pump installed;
5. The depth from the top of casing that the pump is installed;
6. The name and address of the pump installer, well driller or excavator; and
7. A description of the method of disinfection used.

9 Initial Water Sampling and Corrective Actions

Water samples should be collected from the well and analyzed in order to establish baseline water quality as well as to identify potential water quality issues prior to putting the well into service. Sampling should be done by, or under the guidance of, a groundwater professional using a water testing State-certified laboratory.

A. *Water quality testing.* Drinking water from the well should be properly sampled and subsequently analyzed for levels of total coliform, other bacteria, arsenic and nitrates. The levels of total coliform and other bacteria should conform to drinking water limits established in Alaska Administrative Code 18 AAC 80. For other contaminants, including arsenic and nitrates, the groundwater professional should use the current United States Environmental Protection Agency (USEPA) public drinking water standards as a guideline to trigger actions deemed necessary to protect public health.

B. *Water quality standards.* Water used for domestic purposes should not contain concentrations exceeding the following ratios:

1. Total coliform – 0 colonies per 100 milliliters (mL).
2. Other bacteria – 10 colonies per 100 mL.
3. Nitrates – 10 milligrams per liter (mg/L)
4. Arsenic – 0.010 mg/L (10 micrograms per liter, μg/L)

C. If sampling results show the nitrate concentration in the well water greater than 10.0 mg/L, the following steps should be taken:

1. A visual inspection of the well and borehole, using a down-hole camera, performed by a groundwater professional should be used to evaluate the integrity of the casing and if the well is cased, without well perforations, to the total well depth or depth of obstruction.

2. An evaluation of the sanitary ground seal in the annular space around the well casing should be performed by a groundwater professional.

3. If producing zones with greater than 10.0 mg/L nitrates are found below the well casing and there are also other producing zones with less than 10.0 mg/L nitrates, the well should be retrofitted to eliminate cross-connection between the producing zones.

9.C (Continued)

4. If the well casing or sanitary ground seal in the annular space around the well casing is determined to be inadequate or unsatisfactory, or if cross-connections between producing zones are found, the well should be repaired or modified to meet current well construction practices or the well should be decommissioned in accordance with the "ALASKA BEST MANAGEMENT PRACTICES FOR MAINTAINING OR DECOMMISSIONING WATER WELLS AND BOREHOLES".

10 Well Decommissioning

Wells should be decommissioned in accordance with the "ALASKA BEST MANAGEMENT PRACTICES FOR MAINTAINING OR DECOMMISSIONING WATER WELLS AND BOREHOLES".

11 Important Considerations

In order to maximize the protection of Alaska's aquifers and drinking water, it is highly recommended any action taken to construct a well follow the best management practices laid out in this document. If you reside in a municipality, borough, or other organized area, please check with your local government for any additional guidance, regulations, or requirements.

A. Do not place, or allow the placement of, any refuse, trash, waste, or contaminated or hazardous substance into any existing or abandoned well or water source, and deter others from doing the same.

B. The location of a well, on-site wastewater disposal system or subsurface drain, either separately or in combination with each other and other wells, on-site wastewater disposal systems or subsurface drains in the vicinity, should not have the effect of prohibiting future use of an adjacent lot or parcel. To ensure that the well is properly located with respect to the surrounding land owners, prior to installation of a well, obtain an agreement and necessary easements with the owner(s) of any affected adjoining property for the sharing of a well or other possible and unforeseeable problems. The agreement should be recorded and carefully filed and kept with other important household documents.

C. Do not cause or allow the construction, installation or use of a cross-connection between a public water system and a non-public water system well, be it active, abandoned, or improperly decommissioned.

D. Well pits should not be used in new construction in order to avoid the possibility of flooding and inadvertently contaminating the aquifer. It is important that existing well pits be properly maintained and have adequate protection against flooding.

E. Free-flowing wells of any kind, whether by surface or underground discharge, cause water to be wasted and should be avoided and/or remediated. A high priority should be

11.E (Continued)

placed on addressing and resolving any problem with free-flowing wells under the guidance of a groundwater professional experienced in the remedy of such conditions.

12 References (the most recent version should be referenced)

Alaska Administrative Code 11 AAC 93, *Water Management*.

Alaska Administrative Code 18 AAC 80, *Drinking Water*.

Alaska Department of Environmental Conservation (ADEC), Division of Spill Prevention and Response, Contaminated Sites Program, *Monitoring Well Guidance*.

Alaska Statute, 46.15 *Water Use Act*.

ANSI/AWWA A100, Water Wells, and Appendix to ANSI/AWWA Standard A100 (*Decommissioning of Test Holes, Partially Completed Wells, and Abandoned Completed Wells*).

Great Lakes – Upper Mississippi River Board (GLUMRB) of State and Provincial Public Health and Environmental Managers, Ten States Standards, *Recommended Standards for Water Works*.

Municipality of Anchorage (MOA), Water and Wastewater System Codes, Chapter 15.55 *Water Wells*.

National Ground Water Association (NGWA), May 2014, ANSI/NGWA-01-14, *Water Well Construction Standard*.

Private Drinking Water Wells & Systems, http://dec.alaska.gov/eh/dw/DWP/DWP_PrivateWells.html, web site hosted by Alaska Department of Environmental Conservation (ADEC).

Sterrett, Robert. J., 2007, *Groundwater and Wells*, 3rd ed., Johnson Screens, New Brighton, Minnesota, 812 pp.

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT (HUD), Home Ownership Center (HOC), *Appraisal & Property Requirements, Water Systems*.

U.S. DEPARTMENT OF VETERANS AFFAIRS (VA), *Minimum Property Requirements (MPRs), Water Supply and Sanitation Facilities*.

CONSTRUCTION OF NON-PUBLIC WELLS

Appendix

A. Definitions
   See "Definitions for 'ALASKA BEST MANAGEMENT PRACTICES FOR MAINTAINING OR DECOMMISSIONING WATER WELLS AND BOREHOLES' and 'ALASKA BEST MANAGEMENT PRACTICES FOR THE CONSTRUCTION OF NON-PUBLIC WATER WELLS'"

BMP DEFINITIONS

Definitions for
"ALASKA BEST MANAGEMENT PRACTICES FOR MAINTAINING OR DECOMMISSIONING WATER WELLS AND BOREHOLES"
and
"ALASKA BEST MANAGEMENT PRACTICES FOR THE CONSTRUCTION OF NON-PUBLIC WATER WELLS"

1 Purpose

To provide definitions to words, terms, and phrases used in the best management practices in which this document is referenced.

2 Updates and Alterations

Future changes to this document should be done after review and approval by a committee (similar to the original Groundwater Protection and Water Wells Stakeholder Workgroup) composed of representatives from the public, industry groundwater professionals, and appropriate state agency staffs.

3 Definitions

The following words, terms, and phrases have the meanings given to them in this document, except where the context clearly indicates a different meaning.

AAC—Alaska Administrative Code.

Abandoned—a water well or borehole whose use has been discontinued and that has not been properly decommissioned or maintained in accordance with "Alaska Best Management Practices for Maintaining or Decommissioning Water Wells and Boreholes."

ADEC—Alaska Department of Environmental Conservation.

ADNR—Alaska Department of Natural Resources.

Air lift ("airlift")—the use of compressed air to remove (lift) a fluid or material from a borehole or excavation.

Animal containment area—any outdoor enclosure or group of enclosures containing one (1) or more horse, mule, cow, lama, or similar sized animal; four (4) or more dogs, sheep, goats, or swine, or similar sized animals; ten (10) or more rabbits, fowl, ferrets, or other domesticated small animals.

Annular space ("annulus")—the void space between the outside of the well casing and the side wall of the drilled borehole, between two casings or between a casing and a liner.

Annulus ("annular space")—the void space between the outside of the well casing and the side wall of the drilled borehole, between two casings or between a casing and a liner.

ANSI—American National Standards Institute.

BMP DEFINITIONS

Arsenic—a metallic element (heavy metal) that even at low levels over a relatively long period of time can have long-term (chronic) health effects. Arsenic occurs naturally in rocks and soil, but other sources may be from industrial and agricultural uses.

ASTM—American Society for Testing and Materials.

Aquifer—a formation, a group of formations, or part of a formation that is sufficiently saturated and permeable to yield significant quantities of water to wells and springs.

Aquifer—unconfined ("unconfined aquifer")—a condition of the aquifer in which atmospheric pressure is freely communicated to the aquifer and where the aquifer has no upper confining layer. The static water level within the aquifer is at atmospheric pressure and does not rise above the aquifer's upper limit.

Aquifer—unconsolidated ("unconsolidated aquifer")—a type of aquifer that is primarily composed of loose grains of sediment (e.g., silt, sand, gravel, or combinations).

Aquifer—confined ("artesian")—a condition of the aquifer in which it is isolated from the atmosphere by a confining layer or group of confining layers. The static water level in a confined aquifer is generally subject to pressure greater than atmospheric and rises to a level above the aquifer's upper limit.

Aquifer—consolidated ("bedrock")—a type of aquifer that is primarily composed of solidified groups of grains of sediment (e.g., siltstone, sandstone, conglomerate, or combinations), or solid crystalline rock with fractures, cracks, or voids (e.g., limestone, volcanic rock, etc.).

Aquitard ("confining layer")—a layer in the subsurface that may store water but is not permeable, which may include permafrost; and therefore, does not yield water to a well or spring.

Artesian—a confined aquifer condition in which the static water level in a well or borehole is above the aquifer's upper limit; to be differentiated from *flowing* artesian (see definition for "flowing artesian").

Bacteria (*singular*: bacterium)—a microorganism that comes in a variety of shapes. Some bacteria in drinking water can cause short-term (acute) health effects. See also definitions for "coliform bacteria", "fecal coliform", and "total coliform".

Bailing—the use of a cylindrical pipe device (with a bottom valve) suspended on a line to remove fluid or material from a borehole or excavation.

Bentonite—a naturally occurring montmorillonite aluminum silicate clay. As a commercial product bentonite comes in the form of powder, granules (8- to 20-mesh size), chips (¼ inch to ¾ inch size), or pellets (¼ inch to ½ inch size) approved by NSF/ANSI for use as grout in water wells.

BMP DEFINITIONS

Bentonite grout slurry—a high-solids mixture of bentonite particles and water with a consistency of 18 percent to 30 percent solids.

Best Management Practices—Those practices proven effective through research and field applications in Alaska.

BGS—below ground surface; "BLS" is also used, which means "below land surface."

BMP—Best Management Practice.

Borehole ("wellbore")—a hole bored into the ground and intended to be constructed for extraction of water, for water exploration, for cathodic protection, for geotechnical holes and wells, or for a ground source heat pump installation.

Bridge-free—the manner by which sealing materials are placed in a well or borehole, such that individual particles are allowed to settle to the full intended depth without prematurely clumping or sticking.

Casing ("pipe")—pipe made of material herein specified as ASTM A-53 Grade B (ASTM A-53B) steel or NSF/ANSI approved PVC or HDPE installed in a well borehole to prevent sidewall caving, to provide access to an aquifer, and to provide protection from up-hole or surface contamination of the aquifer.

Caving ("sloughing")—to fall or collapse into a borehole.

Certified laboratory—a laboratory certified by the State of Alaska.

Coliform bacteria—a set of bacteria that are found in the digestive systems of warm-blooded animals, in soil, on plants, and in surface water. Some coliform bacteria in drinking water can cause short-term (acute) health effects. See also definitions for "bacteria", "fecal coliform", and "total coliform".

Confined aquifer ("aquifer—confined"; "artesian")—a condition of the aquifer in which it is isolated from the atmosphere by a confining layer or group of confining layers. The static water level in a confined aquifer is generally subject to pressure greater than atmospheric and rises to a level above the aquifer's upper limit.

Confining layer ("aquitard")—a layer in the subsurface that may store water but is not permeable, which may include permafrost; and therefore, does not yield water to a well or spring.

Consolidated aquifer ("aquifer—consolidated"; "bedrock")—a type of aquifer that is primarily composed of solidified groups of grains of sediment (e.g., siltstone, sandstone, conglomerate, or combinations), or solid crystalline rock with fractures, cracks, or voids (e.g., limestone, volcanic rock, etc.).

BMP DEFINITIONS

Contaminant—a physical, chemical, biological, or radiological substance or material in water that, in sufficient quantity, makes water unfit for human consumption.

Contamination—the presence of a contaminant, or group of contaminants.

Cross-connection—joining of two or more zones, areas, or systems.

Cross-contamination—a cross-connection with a contaminated substance.

Cuttings ("drill cuttings")—the loose material derived from the original (in place) material by the drilling process.

DD—drawdown.

Decommission—to fill or plug a well so that it is rendered unproductive and does not produce water or serve as a channel for water movement or for the movement of contaminants.

Discharge—a release, emission, or pouring forth of fluid or material.

Disinfection—a process that inactivates pathogenic organisms in water by chemical oxidants or equivalent agents.

Domestic use—water not used for a public water system.

Drawdown (DD)—the distance between the static water level and the pumping water level in a well or an aquifer; will vary with the pumping rate.

Drill cuttings ("cuttings")—the loose material derived from the original (in place) material by the drilling process.

Drilling fluid—a freshwater or air based liquid used during the drilling operation to circulate materials (cuttings) from the borehole.

Drive-point (also called "sand-point"; "well-point") water well—a shallow (usually less than 50 feet deep) small-diameter water well (1-1/4-inch to 2-inch nominal inside diameter) consisting of coupling-connected pipe fitted with a perforated or screened section and a steel point at the end, and driven into the ground.

Drive shoe—a forged or tempered steel collar with a cutting edge, attached to the lower end of a casing string by threading or welding, to protect the bottom end of the casing as it is driven, rotated, or otherwise forced into the borehole.

Dry grout method—the method of grouting the annular space outside of the casing by keeping bentonite granules (NSF/ANSI approved) pooled around the casing in a cone-shaped depression so they follow the casing as it is driven.

BMP DEFINITIONS

Engineer ("groundwater professional")—a licensed professional civil, mechanical, or environmental engineer registered pursuant to Alaska Statue 8.08. Considered here as a "groundwater professional" when has demonstrated work experience and/or educational background in groundwater issues and construction.

EPA ("USEPA")—United States Environmental Protection Agency.

Fecal coliform—a type of coliform bacteria included in total coliform that originates in feces from warm-blooded animals. Some fecal coliform in drinking water can cause short-term (acute) health effects, such as Escherichia coli (E. coli), and may also be an indicator of the presence of other pathogens. See also definitions for "bacteria", "coliform bacteria", and "total coliform".

FHA—Federal Housing Administration.

Filter pack ("sand pack"; "gravel pack")—the development of a well by the addition of sand or gravel, in the annulus outside of a well screen or a slotted liner, to stop or slow the production of finer material from the aquifer and/or to improve the well production by allowing the use of a larger screen or liner slot size; sometimes placed inside the well casing or liner to stop or slow the production of finer material from the aquifer.

Flowing artesian—a confined aquifer condition in which the static water level in a well or borehole is above the ground surface or the top of well casing; to be differentiated from an artesian condition that is not *flowing* (see definition for "artesian").

Formation—a layer, or group of layers, of sediment or rock within the subsurface that can be unconsolidated, consolidated, or a combination.

Formation packer—a device which prevents water flow within the annular space between the surrounding formation and the well casing or liner.

Free chlorine—a chlorine by itself; as a separate element; not bound with other elements in a compound.

Free chlorine residual—that chlorine remaining after part of the original amount has been removed by the process.

GPD—gallons per day.

GPH—gallons per hour.

GPM—gallons per minute.

Gravel pack ("filter pack")—a type of filter pack.

BMP DEFINITIONS

Groundwater—any water, except capillary moisture, beneath the land surface or beneath the bed of a stream, lake, reservoir, or other body of surface water, regardless of the formation in which the water stands, flows, percolates, or otherwise moves.

Groundwater professional—well drillers, pump installers, hydrogeologists, geologists, and engineers with demonstrated work experience and/or educational background in groundwater issues and water well construction.

Grout—a stable bentonite clay material that is NSF/ANSI approved, in a slurry or granular form impervious to and capable of preventing the vertical movement or migration of water.

Grouting or grouted—the act of installing grout.

Hazardous substance—those substances that, because of quantity, concentration, or physical/chemical/infectious characteristics, may pose a threat to human health or to the environment when treated, handled, stored and transported, and/or disposed of. Hazardous substances include those defined as hazardous under federal, state and municipal laws.

Holding tank—a watertight covered receptacle designed and built to receive and store domestic wastewater for disposal at another location.

Human consumption—the use of water for drinking, bathing, showering, cooking, dishwashing, maintaining oral hygiene, and other similar uses.

Hydrogeologist ("groundwater professional")—a professional geologist, certified and licensed by the State of Alaska pursuant to Alaska Statute 08.02.011, who practices groundwater science.

Intake—opening in a well or pump into which water enters or is drawn.

Liner—casing, of a smaller size, installed inside another casing; may be slotted or perforated adjacent to the water producing zone(s).

Manure/animal excreta—solid waste from domesticated animals, and for the purposes of these practices, shall also mean bedding or other materials contaminated by animal liquid or solid wastes.

Manure/animal excreta storage area—any area where such material is being stored, temporarily or permanently, or being composted.

Microorganism ("microbe")—a small (often microscopic) life form such as bacteria, algae, diatoms, parasites, plankton, and fungi. Some may cause disease.

Monitoring well ("observation well")—an existing or abandoned water well, or a newly cased excavation or opening into the ground constructed by digging, boring, drilling, driving, jetting or other methods for the purpose of determining the physical, chemical, biological, or radiological properties of groundwater.

BMP DEFINITIONS

Nitrate—a chemical compound that, for very young children, taking in high levels in drinking water over a relatively short period of time can cause serious health effects. Sources of nitrates may be natural, but may also include fertilizers, animal feed lots, manures, sewage, septic systems, industrial wastewater, sanitary landfills, and garbage dumps.

Non-public water [system] well—a water well that does not meet the definition given for a "public water system well". This includes wells used for the following purposes: private or domestic water supply; livestock or irrigation; recreational purposes; ground source heat pump return, injection, or vertical loops; industrial process water, or machine or process cooling water; dewatering wells; or dam or levee relief wells.

NSF—National Sanitation Foundation.

Observation well ("monitoring well")—an existing or abandoned water well, or a newly cased excavation or opening into the ground constructed by digging, boring, drilling, driving, jetting or other methods for the purpose of determining the physical, chemical, biological, or radiological properties of groundwater.

On-site wastewater disposal system—any wastewater storage, treatment, or disposal system that serves a facility located on a lot which is not connected to a public sewer.

Pathogen—an infectious biological agent, such as a virus or bacterium, that causes disease or illness.

PPM—parts per million.

Pipe ("casing")—the steel pipe made of material herein specified as ASTM A-53 Grade B (ASTM A-53B) and NSF/ANSI approved PVC or HDPE installed in a well borehole to prevent sidewall caving, to provide access to an aquifer, and to provide protection from up-hole or surface contamination of the aquifer.

Pitless adapter—an NSF/ANSI approved device attached to the well casing, constructed to permit the flow of water from the well casing.

Permafrost—a thick subsurface layer of soil that remains frozen throughout the year.

Permeable—describes the ability for fluids to pass through an aquifer or soils.

Permeability—a measure of a rock or soil's ability to transmit fluid which is a function of porosity, surface area and tortuosity or connectedness of pore space(s).

Potable water—water suitable for human consumption.

Producing zone ("water zone")—the zone of the aquifer that yields water to the well, and is an interval which is usually open to the aquifer (e.g., uncased, screened, perforated, slotted, etc.).

BMP DEFINITIONS

Production (producing) rate—the volume per unit of time (usually GPM) at which a water well gives/yields/produces water.

Protective well radius ("setback"; "separation distance")—a set of prescribed horizontal distances around a water well in which there should be no potential sources of contamination; separation distances may vary depending on the potential source of contamination.

Public sewer system—a sewer system as defined in Alaska Statute 46.03.900, and operated by a public utility as defined in Alaska Statute 42.05.990.

Public water system (PWS)—a water system as defined by ADEC regulations 18 AAC 80, and does not include a private or domestic (non-public) water system.

Public water system (PWS) well—a water well constructed for the purpose of providing water to a "public water system".

Pump ("well pump")—a mechanical device used to recover water from a well or water collection system.

Pump install log ("Record of Commissioning")—a written report or completed form showing all pertinent information and data on pump installation, replacement, repair, or service as specified herein; see ADNR for suggested format.

Pump installer ("groundwater professional")—a contractor, licensed as a construction contractor pursuant to Alaska Statues, or an employee thereof, who works on well pump installation and service; may also be a well driller. Considered here as a "groundwater professional" when has demonstrated work experience and/or educational background in groundwater issues and construction.

Record of Decommissioning ("well decommissioning log")—a written report or completed form showing all pertinent information and data on the decommissioning of the well or borehole as specified herein; see ADNR for suggested format.

Record of Commissioning ("pump install log")—a written report or completed form showing all pertinent information and data on pump installation, replacement, repair, or service as specified herein; see ADNR for suggested format.

Record of Construction ("well log")—a written report or completed form showing pertinent information and data relative to the drilling and completion of the well as specified herein; see ADNR for suggested format.

Recovery—the ability of the water in a well to return to its static level after being drawn down during a period of pumping.

Riser ("riser pipe")—the pipe extending from the well pump to the point of discharge from the well casing.

Sand pack ("filter pack")—a type of filter pack.

Sand pumping—the movement of sand from a formation into the wellbore during water production/flow or well development.

Sanitary ground seal—a subsurface grout seal between the well casing and the borehole wall or surrounding material.

Sanitary well cap ("well seal")—a securely fastened and vented well cap with a gasket, attached to the top of a well casing or pipe sleeve, that prevents insects, dirt, or incidental water or other liquid from entering the well under normal conditions, that allows air to flow in and out of the well, and that is NSF/ANSI approved.

Sealing or sealed—the act of providing a watertight seal between the casing and the borehole, or surrounding material, by means of installing an impervious grout material.

Septic disposal field—an absorption bed, deep or shallow absorption trench, seepage pit, or mound system.

Septic tank—the water tight receptacle designed to receive domestic wastewater and allow the clarified liquids to be discharged into a subsurface soil absorption system.

Separation distance ("setback"; "protective well radius")—a set of prescribed horizontal distances around a water well in which there should be no potential sources of contamination; separation distances may vary depending on the potential source of contamination.

Setback ("separation distance"; "protective well radius")—a set of prescribed horizontal distances around a water well in which there should be no potential sources of contamination; separation distances may vary depending on the potential source of contamination.

Sloughing ("caving")—to fall or collapse into a borehole.

Static water level (SWL)—the level relative to a measuring point (i.e. the top of well casing or ground surface) at which the water stands in or above the well when no pumping or flow is occurring, or has recently occurred.

Stick up—the portion of a well's casing extending above the surface of the ground or floor.

Submersible pump—a complete well pump and motor assembly placed under the water level to pump water up the well to the discharge point.

Surface water—any persistent natural or man-made source of water that is not directly attributable to a single rainfall or snowmelt event. Surface waters include all lakes, ponds,

streams, springs, intermittent or seasonal flows, natural and artificial bodies of water and all of the water of the State of Alaska as defined in Alaska Statue 46.03.900.

SWL—static water level.

Test well—a well constructed for the purpose of testing the viability of an aquifer, such as yield, specific capacity, and quality, to be used for water supply. A test well may be converted to a water well.

TOC—top of casing.

Total coliform—a measure of the presence of coliform bacteria that is used as an indicator of the possible presence of harmful coliform bacteria, such as fecal coliform. See also definitions for "bacteria", "coliform bacteria", and "fecal coliform".

Total dynamic head—the head (pressure) produced by a well pump usually described in feet.

Tremie—

1. (*noun*) A three-part equipment assemblage consisting of a hopper, pipe, and lifting apparatus used for the purpose of installing material such as filter pack, backfill, or grout into an excavated space, borehole, well, or annular space;
2. (*verb*) To install material through a tremie pipe.

Unconfined aquifer ("aquifer—unconfined")—a condition of the aquifer in which atmospheric pressure is freely communicated to the aquifer and where the aquifer has no upper confining layer. The static water level within the aquifer is at atmospheric pressure and does not rise above the aquifer's upper limit.

Unconsolidated aquifer ("aquifer—unconsolidated")—a type of aquifer that is primarily composed of loose grains of sediment (e.g., silt, sand, gravel, or combinations).

USEPA ("EPA")—United States Environmental Protection Agency.

VA—United States Department of Veteran's Affairs.

Wastewater—water containing human excreta, food waste, wash water and other wastes commonly discharged into a water-carried sewage disposal system, and such diluting water as may have entered the waste disposal system. Wastewater does not mean liquids containing hazardous wastes as defined by federal, state, or municipal law.

Water storage facilities—includes water storage tank(s), pumps and piping used in the storage of potable water.

Water storage tank—a watertight covered receptacle designed and built to receive and store clean and/or potable water.

BMP DEFINITIONS

Water table—a groundwater surface within an unconfined aquifer where the water pressure is equal to atmospheric pressure.

Water well ("well")—an excavation, opening, shaft, or hole constructed for the purpose of water extraction.

Water well driller ("well driller"; "groundwater professional")—a contractor, licensed as a construction contractor per Alaska Statutes, or an employee thereof, who works on the construction of water wells; may also perform pump installation and service work.

Water zone ("producing zone")—the zone of the aquifer that yields water to the well, and is an interval which is usually open to the aquifer (e.g., uncased, screened, perforated, slotted, etc.).

Watertight well seal ("well seal")—a device that is securely attached to the top of a well casing or pipe sleeve that prevents the entrance of water even when submerged, such as by flood water.

Well ("water well")—an excavation, opening, shaft, or hole constructed for the purpose of water extraction.

Well cable—the electrical cable extending from the submerged well pump that passes through the well seal and is attached to the surface electrical source.

Well decommissioning log ("Record of Decommissioning")—a written report or completed form showing all pertinent information and data on the decommissioning of the well or borehole as specified herein; see ADNR form for suggested format.

Well depth—the depth of the completed well as measured from the top of casing, unless specified otherwise.

Well driller ("water well driller"; "groundwater professional")—a contractor, licensed as a construction contractor per Alaska Statutes, or an employee thereof, who works on the construction of water wells; may also perform pump installation and service work.

Well fracturing—a water well stimulation technique used to improve the flow of water into a low-yield well by injecting potable water under pressure into the well (also called "hydraulic fracturing", "hydrofracturing", "hydrofracking, or "fracking"), or using explosives in a well (also called "explosive fracturing", "explofracturing", "explofracking", "well shooting", or "well blasting"), to open fractures in the surrounding bedrock aquifer.

Well log ("Record of Construction")—a written report or completed form showing all pertinent information and data relative to the drilling and completion of the well as specified herein; see ADNR for suggested format.

Well packer—a device attached to a liner, drop pipe, or well screen riser to prevent flow within the annular space.

BMP DEFINITIONS

Well perforation(s) (casing, pipe or liner perforation)—a slot(s) cut into the casing to allow water to move through the well, or to allow seal material to fill the annular space; before-wellbore-installation slot cutting methods include gas torch, plasma arc, and machine milling; after-wellbore-installation slot cutting methods include using a downhole perforation tool and explosive perforation charges.

Well pit—an excavation, opening, shaft or hole surrounding a well.

Well pump ("pump")—a mechanical device used to recover water from a well or water collection system.

Well redevelopment—subsurface well work designed to improve well yield; example procedures include: surging (air or mechanical surge block), over-pumping ("rawhiding"); back-flush/rawhide cycling, jetting (air or water), chemical treatments, and well fracking.

Well rehabilitation—subsurface well work designed to repair, improve and/or rejuvenate the physical features of a well; examples include: perforations, lining, swaging, re-drilling, scraping and cleanouts, install screens, pull and reinstall screens, install and filter-pack smaller screens inside existing screens or perforations, chemical treatments and well fracking.

Well screen(s)—a filtering device(s) installed in a well to prevent excess sediment from entering and allow water to move through the well while keeping out most sand and gravel; most commonly used types are V-wire wrapped continuous slot, pipebased, and shutter screens.

Well seal—a "watertight well seal" or "sanitary well cap".

Well yield test ("pump test")—a test to determine the producing capability of the well, drawdown and recovery rate/time of the well.

Well yield—the producing rate of a well on a given date as determined by a well test; often described as a rate in gallons per minute (GPM) with the amount of drawdown (DD) at that rate.

Wellbore ("borehole")—a hole bored into the ground and intended to be constructed for extraction of water, for water exploration, for cathodic protection, for geotechnical holes and wells, or for a ground source heat pump installation.

FEASIBILITY STUDY

FOREST ACRES SUBDIVISION WATER & SEWER SPECIAL IMPROVEMENTS DISTRICT

CONTRACT NO. 117846
TASK NO. 21

PREPARED BY:

R&M CONSULTANTS, INC.
9101 VANGUARD DRIVE
ANCHORAGE, AK 99507

PREPARED FOR:

CITY OF SEWARD
P.O. BOX 167
SEWARD, AK 99664

FEBRUARY 2023

Introduction

Property owners in the Forest Acres Subdivision area of Seward have recently submitted a petition for a utility special improvements district to bring public water and sewer services to their property. The property owners intend to bring the project to city council in March 2023. R&M was tasked with evaluating the feasibility and cost of extending city water and sewer mains to the area. Also identified were approximate limits of roadway improvements and electrical service extensions. A list of participating benefited property owners and estimated construction cost per parcel is attached. Multiple improvement cost apportionment methods are considered.

Design

Water and sewer mains will be constructed throughout the study area. Drawings for water & sewer main extensions are attached, identifying the routing of water distribution and sanitary sewer collection mains. The proposed sanitary sewer system will be designed to gravity flow assisted by a sanitary sewer lift station. This plan prioritizes the use of existing rights-of-way for utility installation however several utility easements are anticipated for the sewer main routing.

A new sanitary sewer lift station located at the end of Maple Street is required. Proposed water mains will connect to the existing water distribution system at two locations to improve distribution system redundancy and avoid dead-end water mains as possible. Pressure reducing valves may be required depending on city system operating pressures.

Existing roadways in the improvements study area are not constructed to current design standards. Estimates in this study includes approximate costs to improve local roadways with a basic gravel surfaced roadway section and other standard design features. This work would occur concurrently with utility construction. Power and communications extension costs were provided by the City of Seward electric utility and are included.

Project Cost Apportionment

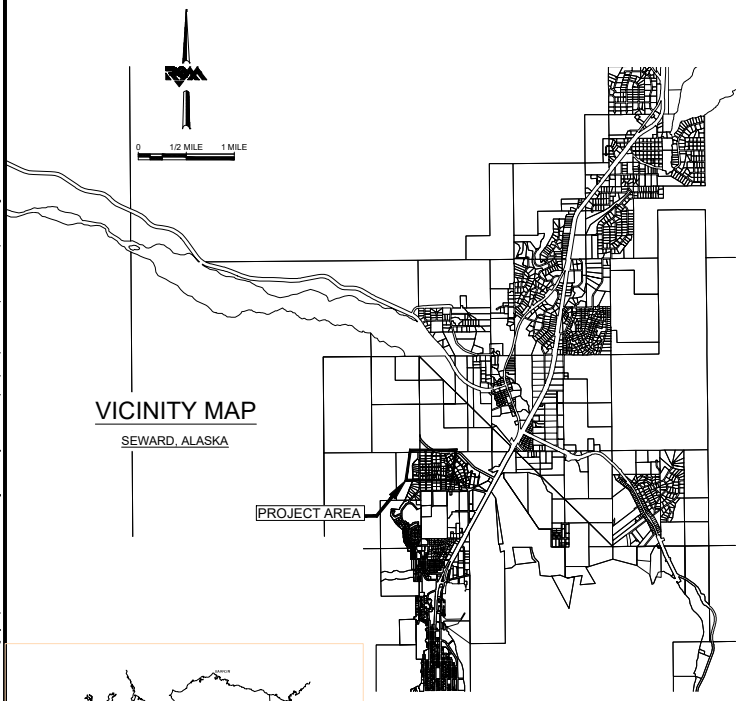
The assessment for each benefited property will be computed based on the selected method of apportionment. Assessment values will be impacted by the final engineering design, number of benefited participating property owners, and total estimated cost of improvements. The allocated cost will be assessed (charged) to each benefited property by means of a special assessment lien. The assessment may be reduced if supplemental funding is provided by other sources. The following methods for cost apportionment are included for consideration:

1. Front Feet of Parcel
2. Square Feet of Parcel
3. Assessed Tax Value (current Kenai Peninsula Borough data including land & improvements)
4. Average Cost per Parcel between study participants

An estimate of per parcel cost is attached to this study. All participating properties within the study area will receive water and sewer improvements and improved roadways. The following parcels will not be assessed roadway construction costs: 2607 Maple – Lot AZ and 2611 Maple – Lot AY per prior direction that roadways are already improved. Other design optimizations and cost estimate revisions can occur during project design development as more information becomes available.

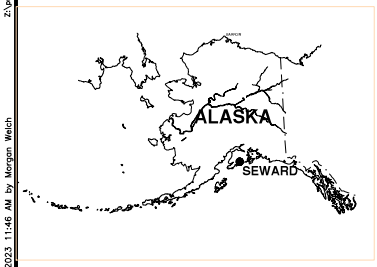
Summary

New homes in the area should be designed and placed on their respective parcels compatible with the future water & sewer extension designs. The final project cost apportionment method has not yet been selected. Costs may include engineering, administration, financing and interest costs, and construction. Topographic survey, geotechnical activities, and final design engineering are required prior to bidding & construction.



VICINITY MAP

SEWARD, ALASKA

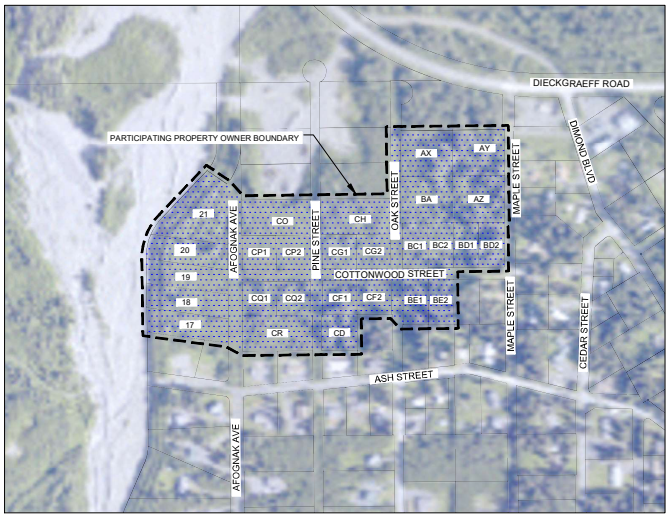


SHEET INDEX	
SHEET NO.	SUBJECT
1	COVER SHEET & SHEET INDEX
2	WATER AND SEWER CONCEPT PLAN

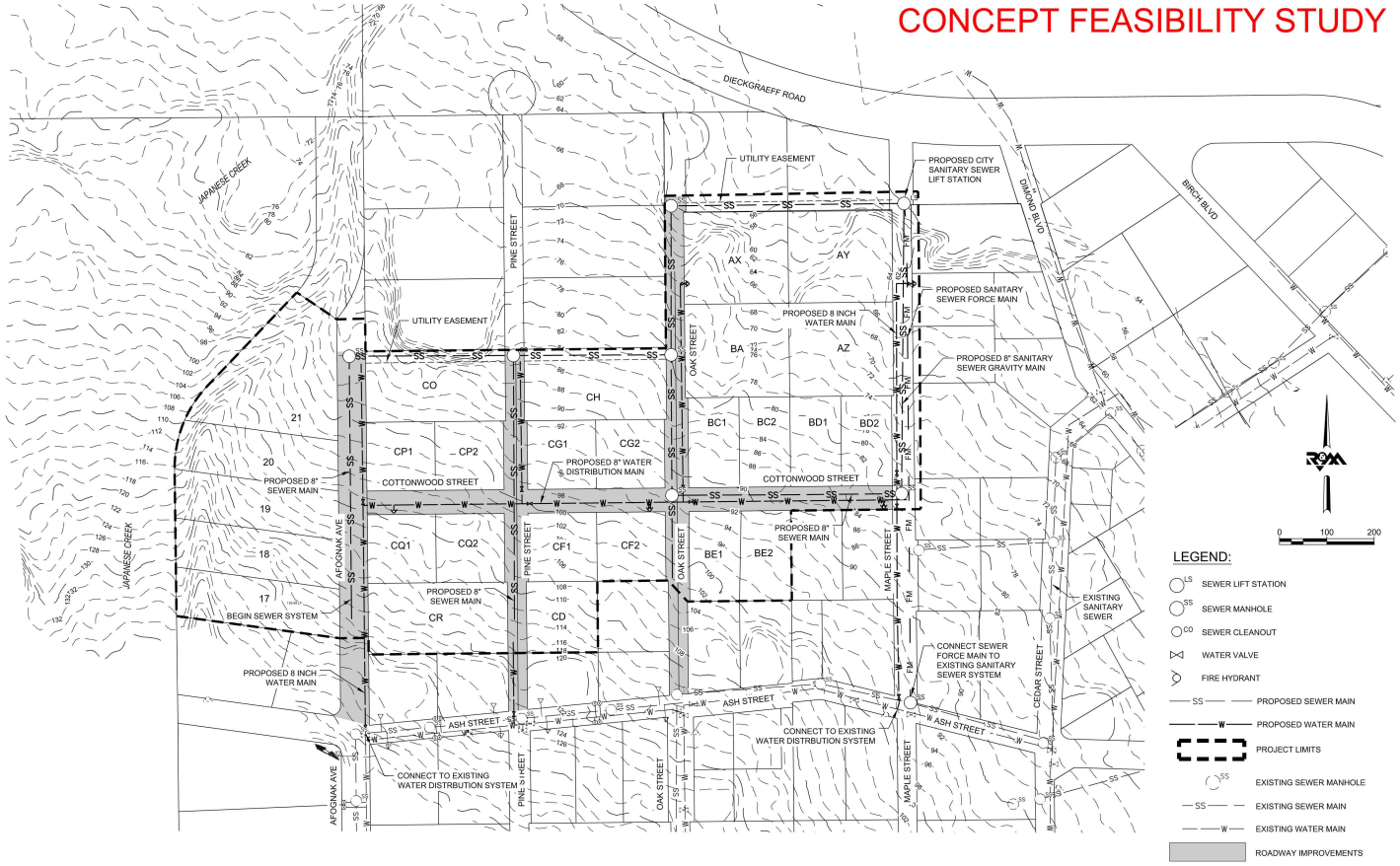
CITY OF SEWARD

FEASIBILITY CONCEPT STUDY

FOREST ACES SUBDIVISION
WATER AND SEWER
SPECIAL IMPROVEMENTS DISTRICT
FEBRUARY 2023



WATER & SEWER SPECIAL IMPROVEMENTS DISTRICT CONCEPT FEASIBILITY STUDY



R&M CONSULTANTS, INC.
9101 Vanguard Drive
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CORPORATE AUTHORIZATION NUMBER AECC111

CITY OF SEWARD

FOREST ACRES WATER & SEWER

No.	Description	Date

Drawn By: RHG
Checked By: MRW
Date: JULY 2022
Status: CONCEPT PLANNING
Project No.: 2734.21
SHEET TITLE: FOREST ACRES WATER & SEWER FEASIBILITY STUDY

CITY OF SEWARD

R&M CONSULTANTS, INC.

Forest Acres Area - Feasibility Study for Special Improvement District

CONCEPT COST ESTIMATE: WATER, SEWER, ROADWAY IMPROVEMENTS

February 2023

SCHEDULE A WATER IMPROVEMENTS	$	1,478,320
SCHEDULE B SEWER IMPROVEMENTS	$	1,258,660
SCHEDULE C ROADWAY IMPROVEMENTS	$	895,202
ELECTRIC AND COMMUNICATIONS IMPROVEMENTS	$	213,180
Engineer's Estimate	**$**	**3,845,361**

Number of Parcels Served by Improvement District 27 See parcel list

SURVEY, GEOTECHNICAL ACTIVITIES, AND FINAL ENGINEERING DESIGN MUST BE PERFORMED TO CONFIRM ENGINEER'S ESTIMATES.

CITY OF SEWARD
R&M CONSULTANTS, INC.

Forest Acres Area - Feasibility Study for Special Improvement District

COST TO CONSTRUCT WATER IMPROVEMENTS

February 2023

SCHEDULE A						
ITEM NO.	**SPEC. NO.**	**WORK DESCRIPTION**	**UNIT**	**ESTIMATED QUANTITY**	**UNIT BID PRICE**	**TOTAL BID PRICE**
A- 1		Furnish and Install 8-inch PVC Water Main	LF	4,102	$ 185.00	$ 758,870.00
A- 2		Furnish and Install 8-inch Gate Valve	EA	14	$ 5,000.00	$ 70,000.00
A- 3		Trench Excavation and Backfill	LF	4,102	$ 60.00	$ 246,120.00
A- 4		Pipe Bedding	LF	4,102	$ 40.00	$ 164,080.00
A-5		Furnish and Install Fire Hydrant Assembly	EA	5	$ 10,000.00	$ 50,000.00
A-6		Connect to Existing Water Main	LS	3	$ 5,000.00	$ 15,000.00
A-7		Construction Survey Measurement	LS	1	$ 25,000.00	$ 25,000.00
A-8		Furnish and Install 1-inch Residential Water Service	EA	27	$ 5,000.00	$ 135,000.00
A-9		Furnish and Install Anode	EA	19	$ 750.00	$ 14,250.00

Subtotal Conceptual Construction Cost $ 1,478,320
SCHEDULE A Base Bid: $ 1,478,320

CITY OF SEWARD
R&M CONSULTANTS, INC.

Forest Acres Area - Feasibility Study for Special Improvement District

COST TO CONSTRUCT SEWER IMPROVEMENTS
February 2023

SCHEDULE B						
ITEM NO.	**SPEC. NO.**	**WORK DESCRIPTION**	**UNIT**	**ESTIMATED QUANTITY**	**UNIT BID PRICE**	**TOTAL BID PRICE**
B- 1		Furnish and Install 8-inch PVC Sewer Gravity Main	LF	4,164	$ 150.00	$ 624,600.00
B- 2		Trench Excavation and Backfill	LF	4,164	$ 35.00	$ 145,740.00
B- 3		Pipe Bedding	LF	4,164	$ 30.00	$ 124,920.00
B- 4		Furnish and Install Sanitary Sewer Manhole	EA	7	$ 10,000.00	$ 70,000.00
B- 5		Furnish and Install Residential Sewer Service	EA	27	$ 4,000.00	$ 108,000.00
B- 6		Connect to Existing Sanitary Sewer Manhole	EA	1	$ 5,000.00	$ 5,000.00
B- 7		Furnish and Install Sewer Lift Station	EA	1	$ 75,000.00	$ 75,000.00
B- 8		Furnish and Install 3-inch HDPE Sewer Force Main	LF	1,054	$ 100.00	$ 105,400.00

Subtotal Conceptual Construction Cost $ 1,258,660
SCHEDULE B Base Bid : $ 1,258,660

CITY OF SEWARD
R&M CONSULTANTS, INC.

Forest Acres Area - Feasibility Study for Special Improvement District

COST TO CONSTRUCT ROADWAY IMPROVEMENTS

February 2023

SCHEDULE C						
ITEM NO.	**SPEC. NO.**	**WORK DESCRIPTION**	**UNIT**	**ESTIMATED QUANTITY**	**UNIT BID PRICE**	**TOTAL BID PRICE**
C- 1		Roadway Construction	LF	3,761	$ 238.02	$ 895,201.63

Subtotal Conceptual Construction Cost	**$**	**895,202**
SCHEDULE C Base Bid :	**$**	**895,202**

Notes: 1. Basic rural roadway section assumed. Design criteria and existing site conditions to be verified in design

City of Seward

P.O. Box 167

Seward, AK 99664

Phone: 907-224-4073

Estimate

WO4239

Estimate Date: 05/25/2022

Agent:

To:

Forest Acres Subdivision

Forest Acres

Tel:

Fax:

WO#4329

Forest Acres Subdivision

Item Code	Quantity	UM	Price	Extended Amount
40035	14.00	Each	2,000.00	28,000.00
25KVA (Underground: Single Phase 7.2 / 12.5kV 120/240V)				
16003	14.00	Each	495.00	6,930.00
UM1-7CT				
16006	7.00	Each	595.00	4,165.00
UM1-9CS				
UM6-6	14.00	Each	22.15	310.10

Component Item code	Component Item Description	Quantity	UM
Kit Item Code: UM6-6			
75019-6B3	#6 Solid Copper Wire	350.00	Foot
60008-6W5	Ground Rod - 5/8" X 8'	14.00	Each
20072-1C7	Ground Rod Clamp	14.00	Each

Comment: These kit components are according to current kit schema.

Grounding Assembly

15003-2A3	14.00	Each	24.86	348.04
15KV LB Elbow #2 (Part number: LE215AB00T)				
55047	46.00	Each	18.16	835.36
4" - 24R 90D PVC				
55040	59.00	Each	4.41	260.19
2" - 24R 90D PVC				
55063	5,000.00	Foot	3.25	16,250.00
2" PVC - 10' pieces (Part number: Schedule 40 - 10' Pieces)				
55064	3,000.00	Foot	2.85	8,550.00
4" PVC (Part number: Schedule 40 - 10' Pieces)				
75048	3,500.00	Foot	3.10	10,850.00

Item Code	Quantity	UM	Price	Extended Amount
350 MCM USE Triplex - "Wesleyan"				
75001	5,500.00	Foot	2.35	12,925.00
#2 220 Mil Concentric Neutral Jacketed				
15037	22.00	Each	195.00	4,290.00
Secondary Pedestal - Heavy Duty (Part number: Pencell #AGNS-14HP)				
15034	7.00	Each	274.00	1,918.00
Primary Pedestal - Single Phase 30x26x18 (Part number: CW326-18TH-CHU)				
LABOR1	8.00	Hourly	66.06	528.48
Labor Engineer - Field				
LABOR2	640.00	Hourly	86.86	55,590.40
Labor Crew - Lineman				
LABOR2.1	160.00	Hourly	99.64	15,942.40
Labor Crew - Foreman				
#504	20.00	Hourly	20.00	400.00
Pickup Truck				
#537	20.00	Hourly	20.00	400.00
Pickup Truck				
#535	20.00	Hourly	75.00	1,500.00
Digger / Derrick				
#512	80.00	Hourly	65.00	5,200.00
Backhoe - Case 580SK				
#519	80.00	Hourly	75.00	6,000.00
Excavator - Volvo ECR				
#541	80.00	Hourly	75.00	6,000.00
Mini Excavator - Volvo ECR58D				
#517	20.00	Hourly	15.00	300.00
Equipment Trailer				

Sub Total:	187,492.97
OH:	25,686.54
Quote Total in USD currency:	213,179.51
Deposit:	0.00
Balance Due:	**213,179.51**

FOREST ACRES SPECIAL IMPROVEMENT DISTRICT WATER & SEWER SERVICE FEASIBILITY STUDY							
R&M CONSULTANTS, INC.							
CONCEPTUAL DESIGN AND COST ESTIMATES							
				FEASIBILITY STUDY			
Lot	**Parcel ID**	**Street Address**	**Size of Lot**	**WATER**	**SEWER**	**REMARKS**	**Owner Contact**
17 18 19	14531032 14531033 14531034	2505 Afognak Ave 2507 Afognak Ave 2509 Afognak Ave	.82 acre .82 acre .82 acre	City	City		Dale & Shelia Skinner-Not currently inAK Dale's cell: 808-343-0327 daleskinner7@gmail.com
CR	14503504	2505 Pine St	1.03 acre	City	City		N/A – Did not assist
CQ1	14503506	103 Cottonwood St	.48 acre	City	City		Jennifer Grischuk - Not currently in AK 617-365-3080 jgrischuk@gmail.com
CQ2	14503507	2511 Pine St	.48 acre	City	City		Trevor Kreznar - Not currently in AK 845-701-1793 tkreznar@gmail.com
CD	14503607	2502 Pine St	.49 acre	City	City		Exit Glacier Guides -Ryan Fisher and Brendan Ryan Ryan's cell 907-491-0552 egglamgmt@gmail.com
CF1	14503609	203 Cottonwood St	.48 acre				Exit Glacier Guides -Ryan Fisher and Brendan Ryan Ryan's cell 907-491-0552 egglamgmt@gmail.com
CF2	14503610	207 Cottonwood St	.48 acre				Exit Glacier Guides -Ryan Fisher and Brendan Ryan Ryan's cell 907-491-0552 egglamgmt@gmail.com
CP1 CG2	14503107 14503208	102 Cottonwood St 206 Cottonwood St	.48 acre .48 acre	City	City		Julia Savage – Not currently in AK 401-524-2127 juliamsavage@gmail.com
CP2 CG1	14503108 14503207	106 Cottonwood St 202 Cottonwood St	.48 acre .48 acre	City	City		Mike Graves - Currently in AZ 907-841-1977 cubdriver2001@yahoo.com
CO	14503103	2605 Afognak Ave	1.03 acre	City (See remarks)	City	Residential grinder sewage pump station required to connect to city sewer main	Mike Graves - Currently in AZ 907-841-1977 cubdriver2001@yahoo.com
CH	14503205	2605 Oak St	1.03 acre	City (See remarks)	City	Residential grinder sewage pump station required to connect to city sewer main	Mike Graves - Currently in AZ 907-841-1977 cubdriver2001@yahoo.com
AX	14503308	2610 Oak St	1.01 acre	City	City		Isaac Sleadd and Aleah Greene Isaac: imsleadd@gmail.com Aleah: aleahgreene@gmail.com Currently in Antarctica, can call out and email
BA	14503307	2608 Oak St	1.01 acre	City	City		Molly Ledford - Back to Seward in Spring 864-350-3514 mollyledford4@gmail.com
AZ	14503312	2607 Maple St	1.01 acre	City (See remarks)	City	easement across parcel "BA" required to connect to city sewer	Anneliese Kupfrian 714-356-5562 on.uh.lease@gmail.com
BC1	14503314	302 Cottonwood St	.47 acre	City	City		Not Sold
BC2	14503315	306 Cottonwood St	.47 acre	City	City		Eliza Woodworth and Jaz Odhner Eliza's cell 978-420-7362 ewoodwor@alumni.risd.edu Jaz: odhnerjaz@yahoo.com
BD1	14503316	310 Cottonwood St	.47 acre	City	City		Not Sold
BD2	14503317	312 Cottonwood St	.47 acre	City	City		Not Sold
BE1	14503709	303 Cottonwood St	.47 acre	City	City		James Carlberg – Not currently in AK 612-910-4316 james.pt.carlberg@gmail.com
BE2	14503710	307 Cottonwood St	.47 acre	City	City		Kathy Repko - Currently in Utah 801-450-1894 colkrepko@gmail.com
AY	14503311	2611 MAPLE ST	1.01	City	City		Quitber Kevin, 610 Saratoga Dr. Green River, WY 82935
20	14531035	2601 Afognak Ave	0.82	City	City		Moebus Craig A, 4 Wall ST Fredericksburg, VA 22405
21	14531036	2607 Afognak Ave	1.41	City	City		Afognak Construction & Excavating Inc. PO Box 610 Seward, AK 99664
							Total Participating Parcels = 27

FOREST ACRES SPECIAL IMPROVEMENTS DISTRICT - WATER & SEWER FEASIBILITY STUDY						
CONCEPTUAL COST ESTIMATE SUMMARY						
Lot ID	**Parcel ID**	**Street Address**	**Per Parcel Cost (Method 1)**	**Per Parcel Cost (Method 2)**	**Per Parcel Cost (Method 3)**	**Per Parcel Cost (Method 4)**
17	14531032	2505 Afognak Ave	$110,091.58	$170,831.72	$268,322.03	$145,073.23
18	14531033	2507 Afognak Ave	$110,091.58	$170,831.72	$268,322.03	$145,073.23
19	14531034	2509 Afognak Ave	$110,091.58	$170,831.72	$268,322.03	$145,073.23
20	14531035	2601 Afognak Ave	$113,298.13	$170,831.72	$268,322.03	$145,073.23
21	14531036	2607 Afognak Ave	$110,091.58	$293,747.22	$351,316.54	$145,073.23
CR	14503504	2505 Pine St	$159,258.69	$214,581.30	$128,923.50	$145,073.23
CQ1	14503506	103 Cottonwood St	$153,914.44	$99,999.05	$87,829.13	$145,073.23
CQ2	14503507	2511 Pine St	$153,914.44	$99,999.05	$87,829.13	$145,073.23
CD	14503607	2502 Pine St	$160,327.54	$102,082.37	$88,634.91	$145,073.23
CF1	14503609	203 Cottonwood St	$154,983.29	$99,999.05	$87,829.13	$145,073.23
CF2	14503610	207 Cottonwood St	$154,983.29	$99,999.05	$87,829.13	$145,073.23
CP1	14503107	102 Cottonwood St	$153,914.44	$99,999.05	$87,829.13	$145,073.23
CG2	14503208	206 Cottonwood St	$153,914.44	$99,999.05	$87,829.13	$145,073.23
CP2	14503108	106 Cottonwood St	$153,914.44	$99,999.05	$87,829.13	$145,073.23
CG1	14503207	202 Cottonwood St	$153,914.44	$99,999.05	$87,829.13	$145,073.23
CO	14503103	2605 Afognak Ave	$159,258.69	$214,581.30	$128,923.50	$145,073.23
CH	14503205	2605 Oak St	$161,396.39	$214,581.30	$128,923.50	$145,073.23
AX	14503308	2610 Oak St	$207,356.95	$210,414.68	$127,311.96	$145,073.23
AY	14503311	2611 MAPLE ST	$154,809.56	$157,072.28	$189,465.27	$109,265.17
AZ	14503312	2607 Maple St	$158,001.51	$157,072.28	$189,465.27	$109,265.17
BA	14503307	2608 Oak St	$210,563.50	$210,414.68	$127,311.96	$145,073.23
BC1	14503314	302 Cottonwood St	$114,366.98	$97,915.74	$87,023.36	$145,073.23
BC2	14503315	306 Cottonwood St	$114,366.98	$97,915.74	$87,023.36	$145,073.23
BD1	14503316	310 Cottonwood St	$114,366.98	$97,915.74	$87,023.36	$145,073.23
BD2	14503317	312 Cottonwood St	$114,366.98	$97,915.74	$174,046.73	$145,073.23
BE1	14503709	303 Cottonwood St	$117,573.53	$97,915.74	$87,023.36	$145,073.23
BE2	14503710	307 Cottonwood St	$112,229.28	$97,915.74	$87,023.36	$145,073.23

Notes:

Apportionment Method 1 - Front Feet - Linear Feet of Property Line fronting a right-of-way containing water & sewer Mains

Apportionment Method 2 - Square Feet - Property Size

Apportionment Method 3 - Assessed Tax Value (Current KPB online resource - https://gis.kpb.us/map

Apportionment Method 4 - Equal Split (Average Cost)

*Parcel AY and AZ excluded from roadway construction costs

FOREST ACRES SPECIAL IMPROVEMENTS DISTRICT - WATER & SEWER FEASIBILITY STUDY

COST APPORTIONMENT METHOD 1

CONCEPTUAL COST ESTIMATE

Total Cost of Water Improvements	$ 1,478,320.00
Total Cost of Sewer Improvements	$ 1,258,660.00
Total Cost of Roadway Improvements	$ 895,201.63
Total Cost of Electrical Improvements	$ 213,179.51
Total Cost of Improvements	**$ 3,845,361.14**

Lot ID	Parcel ID	Street Address	Lot Front Feet (LF)	Fronted Property Line (LF) % of Total Project	Water Service	Sewer Service	Roadway Service	Water Improvements Cost (Weighted)	Sewer Improvements Cost (Weighted)	Electrical Improvements Cost (Weighted)	Roadway Improvements Cost (Weighted)	Total Cost Per Parcel
17	14531032	2505 Afognak Ave	103	2.79%	X	X	X	$41,186.63	$35,066.81	$5,939.27	$27,898.87	$110,091.58
18	14531033	2507 Afognak Ave	103	2.79%	X	X	X	$41,186.63	$35,066.81	$5,939.27	$27,898.87	$110,091.58
19	14531034	2509 Afognak Ave	103	2.79%	X	X	X	$41,186.63	$35,066.81	$5,939.27	$27,898.87	$110,091.58
20	14531035	2601 Afognak Ave	106	2.87%	X	X	X	$42,386.24	$36,088.17	$6,112.26	$28,711.46	$113,298.13
21	14531036	2607 Afognak Ave	103	2.79%	X	X	X	$41,186.63	$35,066.81	$5,939.27	$27,898.87	$110,091.58
CR	14503504	2505 Pine St	149	4.03%	X	X	X	$59,580.65	$50,727.71	$8,591.76	$40,358.56	$159,258.69
CQ1	14503506	103 Cottonwood St	144	3.90%	X	X	X	$57,581.30	$49,025.44	$8,303.45	$39,004.25	$153,914.44
CQ2	14503507	2511 Pine St	144	3.90%	X	X	X	$57,581.30	$49,025.44	$8,303.45	$39,004.25	$153,914.44
CD	14503607	2502 Pine St	150	4.06%	X	X	X	$59,980.52	$51,068.16	$8,649.43	$40,629.42	$160,327.54
CF1	14503609	203 Cottonwood St	145	3.92%	X	X	X	$57,981.17	$49,365.89	$8,361.11	$39,275.11	$154,983.29
CF2	14503610	207 Cottonwood St	145	3.92%	X	X	X	$57,981.17	$49,365.89	$8,361.11	$39,275.11	$154,983.29
CP1	14503107	102 Cottonwood St	144	3.90%	X	X	X	$57,581.30	$49,025.44	$8,303.45	$39,004.25	$153,914.44
CG2	14503208	206 Cottonwood St	144	3.90%	X	X	X	$57,581.30	$49,025.44	$8,303.45	$39,004.25	$153,914.44
CP2	14503108	106 Cottonwood St	144	3.90%	X	X	X	$57,581.30	$49,025.44	$8,303.45	$39,004.25	$153,914.44
CG1	14503207	202 Cottonwood St	144	3.90%	X	X	X	$57,581.30	$49,025.44	$8,303.45	$39,004.25	$153,914.44
CO	14503103	2605 Afognak Ave	149	4.03%	X	X	X	$59,580.65	$50,727.71	$8,591.76	$40,358.56	$159,258.69
CH	14503205	2605 Oak St	151	4.08%	X	X	X	$60,380.39	$51,408.62	$8,707.09	$40,900.29	$161,396.39
AX	14503308	2610 Oak St	194	5.25%	X	X	X	$77,574.81	$66,048.16	$11,186.59	$52,547.39	$207,356.95
AY	14503311	2611 MAPLE ST	194	5.25%	X	X		$77,574.81	$66,048.16	$11,186.59	$0.00	$154,809.56
AZ	14503312	2607 Maple St	198	5.36%	X	X		$79,174.29	$67,409.98	$11,417.24	$0.00	$158,001.51
BA	14503307	2608 Oak St	197	5.33%	X	X	X	$78,774.42	$67,069.52	$11,359.58	$53,359.98	$210,563.50
BC1	14503314	302 Cottonwood St	107	2.89%	X	X	X	$42,786.11	$36,428.62	$6,169.92	$28,982.32	$114,366.98
BC2	14503315	306 Cottonwood St	107	2.89%	X	X	X	$42,786.11	$36,428.62	$6,169.92	$28,982.32	$114,366.98
BD1	14503316	310 Cottonwood St	107	2.89%	X	X	X	$42,786.11	$36,428.62	$6,169.92	$28,982.32	$114,366.98
BD2	14503317	312 Cottonwood St	107	2.89%	X	X	X	$42,786.11	$36,428.62	$6,169.92	$28,982.32	$114,366.98
BE1	14503709	303 Cottonwood St	110	2.98%	X	X	X	$43,985.72	$37,449.99	$6,342.91	$29,794.91	$117,573.53
BE2	14503710	307 Cottonwood St	105	2.84%	X	X	X	$41,986.37	$35,747.71	$6,054.60	$28,440.60	$112,229.28

FOREST ACRES SPECIAL IMPROVEMENTS DISTRICT - WATER & SEWER FEASIBILITY STUDY

COST APPORTIONMENT METHOD 2

CONCEPTUAL COST ESTIMATE

Total Cost of Water Improvements	$ 1,478,320.00
Total Cost of Sewer Improvements	$ 1,258,660.00
Total Cost of Roadway Improvements	$ 895,201.63
Total Cost of Electrical Improvements	$ 213,179.51
Total Cost of Improvements	**$ 3,845,361.14**

Lot ID	Parcel ID	Street Address	Lot Size (Acres)	Lot Size % of Total Project	Water Service	Sewer Service	Roadway Service	Water Improvements Cost (Weighted)	Sewer Improvements Cost (Weighted)	Electrical Improvements Cost (Weighted)	Roadway Improvements Cost (Weighted)	Total Cost Per Parcel
17	14531032	2505 Afognak Ave	0.82	4.32%	X	X	X	$63,902.08	$54,407.02	$9,214.93	$43,307.69	$170,831.72
18	14531033	2507 Afognak Ave	0.82	4.32%	X	X	X	$63,902.08	$54,407.02	$9,214.93	$43,307.69	$170,831.72
19	14531034	2509 Afognak Ave	0.82	4.32%	X	X	X	$63,902.08	$54,407.02	$9,214.93	$43,307.69	$170,831.72
20	14531035	2601 Afognak Ave	0.82	4.32%	X	X	X	$63,902.08	$54,407.02	$9,214.93	$43,307.69	$170,831.72
21	14531036	2607 Afognak Ave	1.41	7.43%	X	X	X	$109,880.40	$93,553.54	$15,845.18	$74,468.10	$293,747.22
CR	14503504	2505 Pine St	1.03	5.43%	X	X	X	$80,267.24	$68,340.53	$11,574.85	$54,398.68	$214,581.30
CQ1	14503506	103 Cottonwood St	0.48	2.53%	X	X	X	$37,406.09	$31,848.01	$5,394.10	$25,350.84	$99,999.05
CQ2	14503507	2511 Pine St	0.48	2.53%	X	X	X	$37,406.09	$31,848.01	$5,394.10	$25,350.84	$99,999.05
CD	14503607	2502 Pine St	0.49	2.58%	X	X	X	$38,185.39	$32,511.51	$5,506.48	$25,878.99	$102,082.37
CF1	14503609	203 Cottonwood St	0.48	2.53%	X	X	X	$37,406.09	$31,848.01	$5,394.10	$25,350.84	$99,999.05
CF2	14503610	207 Cottonwood St	0.48	2.53%	X	X	X	$37,406.09	$31,848.01	$5,394.10	$25,350.84	$99,999.05
CP1	14503107	102 Cottonwood St	0.48	2.53%	X	X	X	$37,406.09	$31,848.01	$5,394.10	$25,350.84	$99,999.05
CG2	14503208	206 Cottonwood St	0.48	2.53%	X	X	X	$37,406.09	$31,848.01	$5,394.10	$25,350.84	$99,999.05
CP2	14503108	106 Cottonwood St	0.48	2.53%	X	X	X	$37,406.09	$31,848.01	$5,394.10	$25,350.84	$99,999.05
CG1	14503207	202 Cottonwood St	0.48	2.53%	X	X	X	$37,406.09	$31,848.01	$5,394.10	$25,350.84	$99,999.05
CO	14503103	2605 Afognak Ave	1.03	5.43%	X	X	X	$80,267.24	$68,340.53	$11,574.85	$54,398.68	$214,581.30
CH	14503205	2605 Oak St	1.03	5.43%	X	X	X	$80,267.24	$68,340.53	$11,574.85	$54,398.68	$214,581.30
AX	14503308	2610 Oak St	1.01	5.32%	X	X	X	$78,708.66	$67,013.53	$11,350.10	$53,342.40	$210,414.68
AY	14503311	2611 MAPLE ST	1.01	5.32%	X	X		$78,708.66	$67,013.53	$11,350.10	$0.00	$157,072.28
AZ	14503312	2607 Maple St	1.01	5.32%	X	X		$78,708.66	$67,013.53	$11,350.10	$0.00	$157,072.28
BA	14503307	2608 Oak St	1.01	5.32%	X	X	X	$78,708.66	$67,013.53	$11,350.10	$53,342.40	$210,414.68
BC1	14503314	302 Cottonwood St	0.47	2.48%	X	X	X	$36,626.80	$31,184.51	$5,281.73	$24,822.70	$97,915.74
BC2	14503315	306 Cottonwood St	0.47	2.48%	X	X	X	$36,626.80	$31,184.51	$5,281.73	$24,822.70	$97,915.74
BD1	14503316	310 Cottonwood St	0.47	2.48%	X	X	X	$36,626.80	$31,184.51	$5,281.73	$24,822.70	$97,915.74
BD2	14503317	312 Cottonwood St	0.47	2.48%	X	X	X	$36,626.80	$31,184.51	$5,281.73	$24,822.70	$97,915.74
BE1	14503709	303 Cottonwood St	0.47	2.48%	X	X	X	$36,626.80	$31,184.51	$5,281.73	$24,822.70	$97,915.74
BE2	14503710	307 Cottonwood St	0.47	2.48%	X	X	X	$36,626.80	$31,184.51	$5,281.73	$24,822.70	$97,915.74

FOREST ACRES SPECIAL IMPROVEMENTS DISTRICT - WATER & SEWER FEASIBILITY STUDY

COST APPORTIONMENT METHOD 3

CONCEPTUAL COST ESTIMATE

Total Cost of Water Improvements	$ 1,478,320.00
Total Cost of Sewer Improvements	$ 1,258,660.00
Total Cost of Roadway Improvements	$ 895,201.63
Total Cost of Electrical Improvements	$ 213,179.51
Total Cost of Improvements	**$ 3,845,361.14**

Lot ID	Parcel ID	Street Address	Lot Value	Tax Value %	Water Service	Sewer Service	Roadway Service	Water Improvements Cost (Weighted)	Sewer Improvements Cost (Weighted)	Electrical Improvements Cost (Weighted)	Roadway Improvements Cost (Weighted)	Total Cost Per Parcel
17	14531032	2505 Afognak Ave	$33,300.00	6.75%	X	X	X	$99,732.69	$84,913.65	$14,381.84	$69,293.85	$268,322.03
18	14531033	2507 Afognak Ave	$33,300.00	6.75%	X	X	X	$99,732.69	$84,913.65	$14,381.84	$69,293.85	$268,322.03
19	14531034	2509 Afognak Ave	$33,300.00	6.75%	X	X	X	$99,732.69	$84,913.65	$14,381.84	$69,293.85	$268,322.03
20	14531035	2601 Afognak Ave	$33,300.00	6.75%	X	X	X	$99,732.69	$84,913.65	$14,381.84	$69,293.85	$268,322.03
21	14531036	2607 Afognak Ave	$43,600.00	8.83%	X	X	X	$130,580.94	$111,178.23	$18,830.28	$90,727.08	$351,316.54
CR	14503504	2505 Pine St	$16,000.00	3.24%	X	X	X	$47,919.61	$40,799.35	$6,910.19	$33,294.34	$128,923.50
CQ1	14503506	103 Cottonwood St	$10,900.00	2.21%	X	X	X	$32,645.24	$27,794.56	$4,707.57	$22,681.77	$87,829.13
CQ2	14503507	2511 Pine St	$10,900.00	2.21%	X	X	X	$32,645.24	$27,794.56	$4,707.57	$22,681.77	$87,829.13
CD	14503607	2502 Pine St	$11,000.00	2.23%	X	X	X	$32,944.73	$28,049.55	$4,750.76	$22,889.86	$88,634.91
CF1	14503609	203 Cottonwood St	$10,900.00	2.21%	X	X	X	$32,645.24	$27,794.56	$4,707.57	$22,681.77	$87,829.13
CF2	14503610	207 Cottonwood St	$10,900.00	2.21%	X	X	X	$32,645.24	$27,794.56	$4,707.57	$22,681.77	$87,829.13
CP1	14503107	102 Cottonwood St	$10,900.00	2.21%	X	X	X	$32,645.24	$27,794.56	$4,707.57	$22,681.77	$87,829.13
CG2	14503208	206 Cottonwood St	$10,900.00	2.21%	X	X	X	$32,645.24	$27,794.56	$4,707.57	$22,681.77	$87,829.13
CP2	14503108	106 Cottonwood St	$10,900.00	2.21%	X	X	X	$32,645.24	$27,794.56	$4,707.57	$22,681.77	$87,829.13
CG1	14503207	202 Cottonwood St	$10,900.00	2.21%	X	X	X	$32,645.24	$27,794.56	$4,707.57	$22,681.77	$87,829.13
CO	14503103	2605 Afognak Ave	$16,000.00	3.24%	X	X	X	$47,919.61	$40,799.35	$6,910.19	$33,294.34	$128,923.50
CH	14503205	2605 Oak St	$16,000.00	3.24%	X	X	X	$47,919.61	$40,799.35	$6,910.19	$33,294.34	$128,923.50
AX	14503308	2610 Oak St	$15,800.00	3.20%	X	X	X	$47,320.62	$40,289.36	$6,823.82	$32,878.16	$127,311.96
AY	14503311	2611 MAPLE ST	$31,700.00	6.42%	X	X		$94,940.73	$80,833.72	$13,690.82	$0.00	$189,465.27
AZ	14503312	2607 Maple St	$31,700.00	6.42%	X	X		$94,940.73	$80,833.72	$13,690.82	$0.00	$189,465.27
BA	14503307	2608 Oak St	$15,800.00	3.20%	X	X	X	$47,320.62	$40,289.36	$6,823.82	$32,878.16	$127,311.96
BC1	14503314	302 Cottonwood St	$10,800.00	2.19%	X	X	X	$32,345.74	$27,539.56	$4,664.38	$22,473.68	$87,023.36
BC2	14503315	306 Cottonwood St	$10,800.00	2.19%	X	X	X	$32,345.74	$27,539.56	$4,664.38	$22,473.68	$87,023.36
BD1	14503316	310 Cottonwood St	$10,800.00	2.19%	X	X	X	$32,345.74	$27,539.56	$4,664.38	$22,473.68	$87,023.36
BD2	14503317	312 Cottonwood St	$21,600.00	4.38%	X	X	X	$64,691.47	$55,079.12	$9,328.76	$44,947.36	$174,046.73
BE1	14503709	303 Cottonwood St	$10,800.00	2.19%	X	X	X	$32,345.74	$27,539.56	$4,664.38	$22,473.68	$87,023.36
BE2	14503710	307 Cottonwood St	$10,800.00	2.19%	X	X	X	$32,345.74	$27,539.56	$4,664.38	$22,473.68	$87,023.36

FOREST ACRES SPECIAL IMPROVEMENTS DISTRICT - WATER & SEWER FEASIBILITY STUDY

COST APPORTIONMENT METHOD 4

CONCEPTUAL COST ESTIMATE

Total Cost of Water Improvements	$ 1,478,320.00
Total Cost of Sewer Improvements	$ 1,258,660.00
Total Cost of Roadway Improvements	$ 895,201.63
Total Cost of Electrical Improvements	$ 213,179.51
Total Cost of Improvements	**$ 3,845,361.14**

Lot ID	Parcel ID	Street Address			Water Service	Sewer Service	Roadway Service	Water Improvements Cost (Weighted)	Sewer Improvements Cost (Weighted)	Electrical Improvements Cost (Weighted)	Roadway Improvements Cost (Weighted)	Total Cost Per Parcel
17	14531032	2505 Afognak Ave			X	X	X	$54,752.59	$46,617.04	$7,895.54	$35,808.07	$145,073.23
18	14531033	2507 Afognak Ave			X	X	X	$54,752.59	$46,617.04	$7,895.54	$35,808.07	$145,073.23
19	14531034	2509 Afognak Ave			X	X	X	$54,752.59	$46,617.04	$7,895.54	$35,808.07	$145,073.23
20	14531035	2601 Afognak Ave			X	X	X	$54,752.59	$46,617.04	$7,895.54	$35,808.07	$145,073.23
21	14531036	2607 Afognak Ave			X	X	X	$54,752.59	$46,617.04	$7,895.54	$35,808.07	$145,073.23
CR	14503504	2505 Pine St			X	X	X	$54,752.59	$46,617.04	$7,895.54	$35,808.07	$145,073.23
CQ1	14503506	103 Cottonwood St			X	X	X	$54,752.59	$46,617.04	$7,895.54	$35,808.07	$145,073.23
CQ2	14503507	2511 Pine St			X	X	X	$54,752.59	$46,617.04	$7,895.54	$35,808.07	$145,073.23
CD	14503607	2502 Pine St			X	X	X	$54,752.59	$46,617.04	$7,895.54	$35,808.07	$145,073.23
CF1	14503609	203 Cottonwood St			X	X	X	$54,752.59	$46,617.04	$7,895.54	$35,808.07	$145,073.23
CF2	14503610	207 Cottonwood St			X	X	X	$54,752.59	$46,617.04	$7,895.54	$35,808.07	$145,073.23
CP1	14503107	102 Cottonwood St			X	X	X	$54,752.59	$46,617.04	$7,895.54	$35,808.07	$145,073.23
CG2	14503208	206 Cottonwood St			X	X	X	$54,752.59	$46,617.04	$7,895.54	$35,808.07	$145,073.23
CP2	14503108	106 Cottonwood St			X	X	X	$54,752.59	$46,617.04	$7,895.54	$35,808.07	$145,073.23
CG1	14503207	202 Cottonwood St			X	X	X	$54,752.59	$46,617.04	$7,895.54	$35,808.07	$145,073.23
CO	14503103	2605 Afognak Ave			X	X	X	$54,752.59	$46,617.04	$7,895.54	$35,808.07	$145,073.23
CH	14503205	2605 Oak St			X	X	X	$54,752.59	$46,617.04	$7,895.54	$35,808.07	$145,073.23
AX	14503308	2610 Oak St			X	X	X	$54,752.59	$46,617.04	$7,895.54	$35,808.07	$145,073.23
AY	14503311	2611 Maple St			X	X		$54,752.59	$46,617.04	$7,895.54	$0.00	$109,265.17
AZ	14503312	2607 Maple St			X	X		$54,752.59	$46,617.04	$7,895.54	$0.00	$109,265.17
BA	14503307	2608 Oak St			X	X	X	$54,752.59	$46,617.04	$7,895.54	$35,808.07	$145,073.23
BC1	14503314	302 Cottonwood St			X	X	X	$54,752.59	$46,617.04	$7,895.54	$35,808.07	$145,073.23
BC2	14503315	306 Cottonwood St			X	X	X	$54,752.59	$46,617.04	$7,895.54	$35,808.07	$145,073.23
BD1	14503316	310 Cottonwood St			X	X	X	$54,752.59	$46,617.04	$7,895.54	$35,808.07	$145,073.23
BD2	14503317	312 Cottonwood St			X	X	X	$54,752.59	$46,617.04	$7,895.54	$35,808.07	$145,073.23
BE1	14503709	303 Cottonwood St			X	X	X	$54,752.59	$46,617.04	$7,895.54	$35,808.07	$145,073.23
BE2	14503710	307 Cottonwood St			X	X	X	$54,752.59	$46,617.04	$7,895.54	$35,808.07	$145,073.23