ASSEMBLY STANDING COMMITTEE
COMMITTEE OF THE WHOLE
THE CITY AND BOROUGH OF JUNEAU, ALASKA

February 22, 2016, 7:00 PM.
Municipal Building - Assembly Chambers

Assembly Worksession - No Public Testimony

I. ROLL CALL

II. APPROVAL OF AGENDA

III. APPROVAL OF MINUTES

A. **January 4, 2016 Committee of the Whole Meeting Minutes**

B. **February 1, 2016 Committee of the Whole Meeting Minutes**

IV. AGENDA TOPICS

A. **Juneau Hydro Sweetheart Creek and District Heating**

Duff Mitchell will provide a verbal presentation to the Assembly.

B. **Mendenhall River Reports**

Tom Mattice of CBJ Emergency Programs and Brett Nelson of Natural Resources Conservation Service (NRCS) will present information on the status of the Mendenhall River.

C. **Direction on the CBJ Annexation Petition**

Municipal Attorney Amy Mead will provide a verbal update to the Assembly on the issue of annexation.

D. **Amending CBJ Code Relating to Succession of Office and the Filling of Vacancies**

Municipal Attorney Amy Mead has provided an informative memo as a framework for her recommendations to the Assembly on the topic of Assembly vacancies and succession to office.

E. **Lands Management Plan**

The Committee of the Whole received a copy of the draft Lands Management Plan at its February 1, 2016 meeting and a cover letter and the plan can be found on-line at the following address: http://packet.cbjak.org/CoverSheet.aspx?ItemID=2384&MeetingID=386

The plan is before the committee for further discussion and questions. If the committee is satisfied with the plan, then a recommendation to forward the plan to the full Assembly for public hearing and adoption by ordinance is in order.

V. ADJOURNMENT

ADA accommodations available upon request: Please contact the Clerk's office 72 hours prior to any meeting so arrangements can be made to have a sign language interpreter present or an audiotape containing the Assembly's agenda made available. The Clerk's office telephone number is 586-5278, TDD 586-5351, e-mail: city.clerk@juneau.org

DRAFT

THE CITY AND BOROUGH OF JUNEAU, ALASKA
Assembly Committee Of The Whole Work Session Minutes

Monday, January 4, 2016

I. ROLL CALL

Deputy Mayor Jesse Kiehl called the meeting to order at 6:00 p.m. in the Assembly Chambers.

Assemblymembers Present: Mary Becker, Karen Crane, Debbie White, Loren Jones, Jesse Kiehl, Jerry Nankervis, Kate Troll and Maria Gladziszewski (telephonic)

Assemblymembers Absent: None

Staff present: Kim Kiefer, City Manager; Amy Mead, City Attorney, Mila Cosgrove, Deputy City Manager; Beth McEwen Acting Clerk

II. APPROVAL OF AGENDA

Hearing no objection, the agenda was approved as presented.

III. APPROVAL OF MINUTES

a. November 23, 2015 Assembly Committee of the Whole

Mayor Becker noted corrections to the minutes on page 4. Hearing no further corrections, the minutes of the November 23, 2015 Committee of the Whole meeting were approved as corrected.

IV. AGENDA TOPICS

A. Childcare Update - HEARTS (Hiring Educating And Retaining Teaching Staff) **Program and Association for the Education of Young Children (AEYC)**

Kim Kiefer explained that usually the Assembly only hears from these folks during the Assembly Finance Committee Budget review process and she felt it was important for the Assembly to hear from them before the next budget cycle. AEYC Executive Director Joy Lyon and Juneau Economic Development Council Executive Director Brian Holst gave a slide show presentation.

Ms. Lyon said they work to support the education of all young children and families in Juneau up to age 5. They support families through the Parents as Teachers program, Dolly Parton Imagination Library, and they work with the statewide partner T.H.R.E.A.D. to increase the quality and capacity of child care.

Ms. Lyon touched on why and how young children have an impact on the local economy and the health and education of the community. They also discussed how the HEARTS initiative and the zoning changes have made some progress on child care. They introduced data from a couple of recent studies released in October and November.

Mr. Holst explained the data from those studies and that the return of investment is highest for early childhood education. The vast majority of investment in education is during the K-5 years and post-secondary education, however the highest return on investment is from the money spent on the period covering pre-natal care to those children entering into kindergarten.

In November, the Alaska ACEs (Adverse Childhood Experiences) study was released. Ms. Lyon explained the ACEs study and its findings. The study identified 10 ACEs and looked at the national numbers vs. those of Alaskan residents to see what the costs are to our state.

The 10 ACEs in the study are identified as follows:

1. Physical abuse
2. Sexual abuse
3. Emotional abuse
4. Emotional neglect
5. Physical neglect
6. Witnessing domestic violence
7. Mental illness in the home
8. Family member incarceration
9. Alcohol/drug problems
10. Parental separation or divorce

She said that half of those experiences that cause trauma and toxic stress for children have to do with child abuse and neglect (#1-5 above). She said that the others are serious stressful problems that tend to be more detrimental, the younger the child is who is experiencing them. That is when we have the most opportunity to make changes and to modify or mitigate some of those negative outcomes. In Alaska, the study found that approximately 15% of children had two or more ACEs scores and a total of 40% of children under age 5 experienced at least one of the above adverse experiences. That translates in Juneau to approximately 300 children who had two or more ACEs.

Ms. Lyon then explained how those traumas affect the way infants and toddlers' brains grow. She demonstrated the pathways for the brain development experienced by children with and without ACEs and showed how early childhood teachers intervene right at the age/stage where children need it the most as they are developing their social and emotional life skills.

Mr. Holst explained the costs to society associated with the ACEs traumas. For those Alaskan adults who report four or more ACEs compared to zero ACEs, they are 49% more likely to be unemployed, 274% more likely to be unable to work, and 92% more likely to earn less than $20,000 annually. He then discussed a recent study done by the McDowell Group which showed the economic impacts of early care and learning in Alaska. To translate that study into Juneau numbers, it is the equivalent of approximately $25 million per year with 15% of workers who rely on or are enabled to work because there is child care available to them. That means approximately 2,500 adults in Juneau finding child care in some form which often times includes informal child care. Primarily, the burden for paying for child care falls to the parent. Although some assistance is available, the primary burden is on the parents.

In the Juneau Economic Plan, there is a section on preparing for the next generation workforce segment that contains three elements that speak to this issue of investing in early childhood education. Mr. Holst attended conferences on the national and statewide levels over the past year and reported that Juneau is the first and only municipality in Alaska that offers the HEARTS initiative. HEARTS tries to address the issue of being able to provide more opportunities for employment for child care workers and more opportunities for child care. The investment that the Assembly is making is approximately $90,000 per year which comes to an approximate cost of $37 per child. That is in large contrast to the investment that CBJ makes for children once they are enrolled in kindergarten.

Ms. Lyons explained that these are the same children CBJ will be paying for once they are enrolled in school and just by shifting some of those funds a little bit earlier, it can really save on special education costs, juvenile delinquency, and other issues.

She explained the HEARTS program and the successes it has had over the past few years. In its first year, the turn-over rate for childcare workers was almost 100%. Those lower turnover rates are also making a big difference in mitigating the ACEs that children encounter. The HEARTS initiative has helped to change the quality and stability in child care. The program helps provide stability through education support. The providers are not only having a better education base, but also staying to work with the children over the years. It doesn't quite fill the gap for a pre-school child care teacher vs. a Kindergarten teacher. The gap also doesn't account for the fact that many early child care workers have no health insurance or benefits.

Ms. Lyon said she appreciated hearing the conditional use permit changes that have been made to provide opportunities to have more child care programs within the community. The capacity is still a struggle. She said they have seen a decline over the past two years. Since July 2014, there are just over 450 program spaces and although Juneau has added two new centers since July, the greatest challenge for parents looking for child care is to find spaces for children under age two; currently there are only 100 spaces for that age group.

In looking ahead at what the next steps and goals are there are many organizations within Juneau working on a collective impact approach to address youth issues on a myriad of levels within the community. Ms. Lyon also said that they would hope that since CBJ is one of the largest employers in the community, CBJ would look at providing a child care facility that would be free or low cost to its employees and she would like to continue to explore that with the Assembly. Other solutions would be to have paid family leave, offer pre-K education to all children 3 years old and up, and provide home visiting services as well.

She suggested the Assembly increase the HEARTS funding. She said they are at capacity now with the current teachers and providers in place and to be able to promote the HEARTS program, the budget would need to increase.

Ms. Troll asked if there had been any discussion about the School District having more spaces available for possible child care solutions since class enrollment has decreased. Ms. Lyon said she was scheduled to meet with Superintendent Mark Miller in the near future and that the REACH program is also exploring options for use of school district facilities, especially for children with special needs.

B. Willoughby Arts Complex Update

Ms. Kiefer explained that the Assembly had provided funding for the Willoughby Arts Complex and it had been some time since the Assembly had received an update on this project. She said there had been some talk about changes to the partnership and she thought it was a good time for the Assembly to receive an update. Juneau Arts and Humanities Council (JAHC) Executive Director Nancy DeCherney and JAHC Boardmember Jeff Bush presented information to the committee.

Ms. DeCherney provided an overview of the project and how it had come about. She explained that over the years, there have been three McDowell studies done on the arts in Juneau. In 2007, the Assembly turned the Armory over to the JAHC to be turned into the current Juneau Arts and Culture Center (JACC). She said they got very busy and in 2011 the JAHC started to think about expanding the facility. In 2012, they came before the Assembly with a request to begin the process of expansion.

There were some tentative drawings done up and their plan was to expand into the parking lot between Centennial Hall and the JACC and construct a new theater and some additional spaces that could be used for the arts. At that time, the Assembly authorized $1 million from the 1% sales tax at that time.

Shortly after that, Perseverance Theater began to think that they needed a new space and in December 2012, they formed the PARTnership. It was similar to a condo association in which the building would be an owner occupied space and they would work together on constructing this building. They have been working together since that time. Perseverance received a grant from the Allan Foundation and another from the Rasmussen Foundation. The Assembly agreed to give permission for them to use that land and they have until 2018 to get the shovel in the ground. They have been steadily working since they received the $250,000 advance on the $1 million from the Assembly. They hired some consultants and a capital campaign manager and a program manager. It became evident that no progress could be done until they had a feasibility study completed. In Spring 2015, they asked the McDowell Group to do a study but this time, with an actual project in mind. They completed their study in November and the study on the project that they had in mind was based on consultation with the community and what the needs of the JAHC and Perseverance were. It included two theaters, a 199 seat theater for Perseverance, a 250-280 seat theater for the community, a black box, a café and a number of other bells and whistles.

At about that time, Perseverance felt they were taking on a project that was too big for what they have. They are a small organization and they have other major priorities and as the feasibility study was being completed Perseverance decided to withdraw from the PARTnership. She said that it was fortunate that it was happening at the same time as the feasibility study was being completed and the McDowell Group was able to shift gears quickly. JAHC Boardmember Paul Voelckers was able to adjust the program and space needs so the feasibility study that was presented reflected those changes. The executive summary provided to the Assembly shows the new project as one theater, large black box, a café, and a gallery. She said that now puts them at the point of being ready to go forward to work on the actual project.

Ms. DeCherney said last spring they received applications from eight architects and they did a preliminary architect selection process. They chose five Alaskan architects; three from Juneau, one from Anchorage and one from Fairbanks who will be part of the design competition.

They identified their next steps as:

1) Report to the Assembly COW per this presentation;
2) Capital Campaign committee revitalizing itself;
3) Community consultants coming back in March to make sure the project, as now planned, will serve the community as a whole;
4) Design selection will happen sometime this spring;
5) Target date for opening sometime in December 2019.

Mr. Bush explained that they are now at a cross roads. The feasibility looks good, the design is ready to go, and their fundraising plans are about to be implemented but they are now coming up against the current lease agreement with CBJ as it relates to the JACC but also as it relates to the ownership of the project in its entirety. He said the problem is that they need to identify the city's role in the ownership and operation of the building. He said from the fundraising perspective, it was always their belief and intention that it was going to be a privately owned/operated non-profit facility.

Additional discussion took place regarding the current lease agreement and it was clear there were many questions about how best to move forward. It was decided that the Mayor would ask an hoc group consisting of a few Assemblymembers, a few representatives of JAHC, the City Attorney and

other CBJ staff to identify what the issues are and how best to move forward. Maria Gladziszewski that she was involved in this process with the JAHC prior to her service on the Assembly and expressed a willingness to serve on the ad hoc group.

C. UAB Recommendation to Assembly on Biosolids

Utility Advisory Board (UAB) Chair Leon Vance and Vice-Chair Geoff Larson presented along with Engineering/Public Works Director Rorie Watt. Mr. Watt thanked the boardmembers for their hard work on this topic and thanked Mr. Vance for stepping into the Chair position after former Chair Scott Willis passed away last year. The loss of Mr. Willis, his knowledge and involvement have been keenly felt.

Mr. Vance said although the UAB doesn't typically appear before the Assembly, they were formed about ten years ago to broadly advise the Assembly on water and wastewater utility issues. Over the past year, the board was tasked with working on a potential solution for the most pressing problem in the wastewater utility – the bio-solids disposal issue. He said the board consists of seven members of the public with a diverse range of experience. Several of the members have served since the board was originally formed and one to two members of the board have many years of experience working directly with or in the CBJ water or wastewater utilities. The board spent many hours in public meetings and individual board members spent a great deal of their own time performing independent research as well as reviewing all the work done by staff. As part of the process, the board considered multiple options that are listed in the meeting packet. The board ultimately determined that all but two of the potential solutions were either not feasible in Juneau, or not economic, or just not technically feasible. He said the timeframe they are working with is fairly critical and the need is for right now/ yesterday/ASAP. The two options the board suggested are the "Dryer" approach or the "Monofill" approach. He said both approaches have advantages and disadvantages with the key points being that the dryer would have a higher up front capital cost and lower long-term operating cost, whereas the monofill would have the lower up front cost but higher long-term operating cost.

They are presenting both options and note that CBJ staff's preference is to go with the dryer approach as it provides CBJ with complete control of the entire process. He said the board has no reason to disagree with accentuating that particular point because the current precarious situation emphasizes the downside of not having complete control of all steps in the process.

Mr. Vance said that another charge for the UAB is to focus on the rate structure. He said as they were developing the rates last year, they were taking into account the capital costs that would be incurred if the Assembly chose to go with the dryer option.

Mr. Larson explained the historical context and the rate studies done and all the components that went into those studies. One of the specifics they did not have at the time they were doing the rate studies were the amounts involved in the capital expenditures. Depending on which option the Assembly choses to go with, either the dryer or the monofill option, that will make a difference on how the UAB does its rate study modeling and the amounts to be included in the ten year plan.

Assemblymembers asked many questions about the two options, including what the actual processes for each option were, how they work, how they could dispose of it and all the variables from point A to Z. Mr. Watt explained the two processes and answered questions related to the fuel prices and other expenses listed in the packet materials and how the dryer option compared to the monofill option and then also the potential for a combination of a monofill and dryer option. He explained that the UAB reviewed and calculated a multitude of options over the course of the last year and the materials in the packet are what were provided at the request of the UAB.

Mr. Watt also explained that there were two gentlemen who came forward with a proposal to contract directly with CBJ to do a monofill. He said it is an unusual situation in that CBJ doesn't have a readily available piece of land to use for a monofill. He said these gentlemen have identified a tract of land that they have an option to purchase. They would then go through the necessary permitting process and develop a mono-fil site.

Additional discussion took place about the particulars of each option. Assemblymembers expressed a desire to hear from Chris Gerondale and Spike Bicknell who were the ones to propose the monofill site. Mr. Bicknell explained their proposal and when they were initially looking at this, they were discussing a 10-year process with Mr. Watt. He explained the piece of land they were looking at was approximately 100 acres and would most likely have a 20-year capacity but their discussions were really only focused on a 10-year process. Mr. Gerondale explained that their monofill proposal gives CBJ the opportunity to save money over what they are currently doing now and would provide them time to determine and budget over the next few years for long term solutions. He provided an overview of their number projections vs. what was given to the Assembly by the UAB. They have identified two possible monofill locations, one is a 103 acre parcel and another is 73 acres.

Assemblymembers had a number of questions for Mr. Gerondale and Mr. Bicknell. Mr. Gerondale said if the Assembly chose their proposal, they anticipated a location either on South Douglas or Chichagof Island and that it would it would take approximately 12 months to put the whole thing in place including the required DEC permits and wetland mitigation plans.

After hearing from Mr. Bicknell and Mr. Gerondale, the Assembly then asked Finance Director Bob Bartholomew to give them an overview of where CBJ stands with respect to the overall bond indebtedness and how they may be able to fund the two possible scenarios. Mr. Bartholomew explained that last summer he provided a report to the Assembly about the status of the CBJ debt capacity. He said that since that time, he has been working with a financial advisor to come up with the capacity for general revenue bonds vs. all other types of bonds. At this time, there is a steep rate of pay off happening which is good for our future. CBJ does have the capacity to take on more debt but we will need to be judicious on where we will use it. He said his forecasts provided in August 2015 were too conservative but that we do need to continue to monitor things.

Mr. Bartholomew explained that this project would be relying on getting a DEC loan which is a federal loan that is filtered through DEC with a 1.5% interest rate over a 20-year period with a total proposed debt of $20 million. He said he'd have to do some additional figuring to come up with the full details to share with the Assembly but he'd send them the information in a follow-up email.

Assemblymembers expressed their various concerns with the proposals and the financial outlook. All agreed that a solution should be reached sooner rather than later. They asked for staff to bring back additional information related to the UAB review and information, clearer information on the 20 and 25 year options for dryer vs. monofill, a summary of the financial information as it relates to the utilities as well as a report from Mr. Bartholomew on the general debt service load for CBJ.

Chairman Kiehl expressed his thanks to everyone for coming and providing their reports and input.

V. STAFF REPORTS – None.

VI. COMMITTEE MEMBER / LIAISON COMMENTS AND QUESTIONS – None.

VII. ADJOURNMENT - There being no further business, the meeting adjourned at 9:01 p.m.

Submitted by Beth McEwen, Deputy Clerk

ASSEMBLY STANDING COMMITTEE
COMMITTEE OF THE WHOLE
THE CITY AND BOROUGH OF JUNEAU, ALASKA
MINUTES

February 1, 2016, 6:00 PM.
Municipal Building - Assembly Chambers

Assembly Worksession - No public testimony This meeting will immediately follow the Special Assembly Meeting in Executive Session to review candidates for City Manager - so start time may be later than 6 pm.

I. ROLL CALL

Deputy Mayor Jesse Kiehl called the meeting to order at 6:55 p.m. in the Assembly Chambers.

Assemblymembers Present: Mary Becker, Maria Gladziszewski, Loren Jones, Jesse Kiehl, Jerry Nankervis, Barbara Sheinberg (teleconference), Kate Troll and Debbie White.

Assemblymembers Absent: None.

Staff present: Kim Kiefer, City Manager; Amy Mead, Municipal Attorney, Mila Cosgrove, Deputy City Manager; Laurie Sica, Municipal Clerk; Rob Steedle, Community Development Director; Rorie Watt, Engineering and Public Works Director; Bob Bartholomew, Finance Director; Greg Chaney, Lands and Resources Manager; Samantha Stoughtenger, WWTP Operations Superintendent.

II. APPROVAL OF AGENDA

Hearing no objections, the agenda was approved.

III. APPROVAL OF MINUTES

None.

IV. AGENDA TOPICS

A. **Ordinance 2016-02 An Ordinance Amending the Nuisance Code Relating to Marijuana in Residential Zones and Providing for a Penalty.**

Ms. Kiefer said this ordinance was introduced and set for public hearing on February 8, and this was the Assembly's opportunity to discuss any issues.

Mr. Nankervis said he was not in favor of making an offense of this ordinance a crime. He suggested a penalty or some other approach. Ms. Mead said that issue was not discussed by the committee and was a matter for the Assembly.

Ms. Becker asked if by stating "in residential areas," this could be a business done in people's homes.

Mr. Kiehl said the idea behind this was that hash oil or concentrate extraction could be done with butane, which had fire code implications. This is not about a dangerous location, but a dangerous activity. If this was a licensed marijuana business reviewed by the Fire Marshal, butane could be acceptable, and if not licensed, it would be limited regarding manufacturing techniques.

MOTION, by Becker, to remove "in residential areas" from the code. Hearing no objection, it was so ordered.

The Assembly discussed the penalties for violation of the code and the fine schedule. Mr. Nankervis said he was satisfied with the way the ordinance was written after hearing the discussion.

MOTION, by Gladziszewski, to refer Ordinance 2016-02 back to the Assembly, as amended. Hearing no objection, it was so ordered.

B. **Lands Management Plan**

Mr. Chaney provided a brief overview of the DRAFT Lands Management Plan. He spoke to changes adopted since the plan was last before the Lands and Resources Committee and how individual properties could be located on the map and in the associated tables.

Ms. Gladziszewski asked Mr. Chaney to double check the direction from the Parks and Recreation Advisory Committee regarding Pocket Park.

Mr. Nankervis asked if he should contact Mr. Chaney directly or at the next meeting with properties he believed should be disposed. Mr. Chaney said either way.

Ms. Troll asked if something says retain / dispose, this is a decision that has not been made and would still need to be made by the Assembly. Mr. Chaney said that was correct. Ms. Mead said this is a plan only and not binding.

Mr. Jones said he would like to see the Advisory Boards to the Assembly provide copies of the minutes where they took action on the recommendations included in the Lands Plan, so he could independently review the background on the recommendations. He said the Boards should be advising the Assembly directly rather than the staff.

C. **Quarry Management**

Mr. Watt said the rock quarry and gravel pit management was an important activity to provide products for public and private projects and keeping costs down. Engineering provides the planning, the permitting, the collection of royalties and the management of the pit, running interference with private businesses taking product. CBJ sought a private management firm to manage the quarry this summer as there was significant mediation to be done and we think it makes sense from a business decision to hire staff to manage the quarry instead.

Mr. Nankervis asked if there was enough revenue from the product sales to support the position. Mr. Watt said yes. He also said the quarry was at the end of a ten year conditional use permit, and the quarry needed to be re-permitted and another area of the pit needed to be opened, and this was significant work.

Mr. Watt responded to Ms. Becker regarding the type of skills needed. He said that he did need Assembly action tonight becuase the hiring would need to take place before the end of the fiscal year. He said that a persons with the right skill set has been identified.

MOTION, by Troll, to support the requested hire for FY16 and throughout the budget process, with the understanding that the hire would provide cost savings.

Ms. Becker spoke about her concern regarding the number of new positions being identified and going through the hiring process without going through the budget process.

Ms. Troll said she looked at this as taking advantage of a potential hire and saving funds being spent on contract management.

Hearing no objection, it was so ordered.

D. **Resolution 2741 A Resolution Urging the Alaska Legislature to Adopt a Balanced Sustainable, and Predictable State Budget Plan for FY2017 and Future Years.**

Ms. Kiefer said that Mr. Kevin Jardell, CBJ Lobbyist, had drafted this in conversation with Mr. Bartholomew and this was a time for questions prior to the February 8 Assembly meeting, where it would appear on the agenda.

Ms. Troll asked if the "comprehensive package" could be interpreted that CBJ supports a state-wide sales tax, and she wanted to make sure that didn't happen. Mr. Jardell said this resolution was patterned on the one adopted by the Alaska Municipal League. He cautioned the Assembly from getting into too many specifics. People are well aware that the community does not favor a statewide sales tax and there will be people ready to lobby against that. This resolution is an incremental one and it was useful for the local delegation to have this backing. For the other legislators, it was just another resolution. The main emphasis is to speak to the use of the permanent fund earnings, which is highly controversial now.

Mr. Nankervis said he did not recall that the Assembly as a body took a stand on this direction, including the statewide sales tax. He asked if this resolution would be seen as positive or negative. Mr. Jardell said that the local delegation would respect the local Assembly's opinion and that would be its major effect. If 150 communities weighed in that would be meaningful but to legislators outside of Juneau it may not have that much weight as an individual resolution.

Ms. Gladziszewski asked if AML made a statement on a statewide sales tax? Mr. Jardell said he thought it was the last option, and there was a preference against, but that the localities wanted to be able to weigh in on those decisions. Ms. Gladziszewski asked about an amendment to clarify the a local community could keep the sales tax it collected if a state sales tax was added. Mr. Jardell said that even if there was a 2% statewide sales tax, if it was part of an overall package, people may want to be able to weigh in and debate it.

Ms. Troll said she was comfortable with the wording and it was true that the Assembly had not taken a formal vote on the statewide sales tax. The main message that needs to be delivered is "take action" and the biggest piece is dealing with the permanent fund earnings, and if that piece was addressed in this session that would be significant.

Ms. Becker said that her concern was in section 1, because a comprehensive package of initiatives was vague and she did not know what all of those initiatives would be. Mr. Jardell said a comprehensive plan did not weigh in on specific measures, and that people would not read into it specific tools. She said this was an AML resolution which included things she did not support.

MOTION, by Becker, to delete section "to enact a comprehensive package of initiatives..."

Mayor Becker said it was not clear what the initiatives were that were proposed.

MOTION, by Ms. Troll, to amend to only delete the word "comprehensive."

Mr. Keihl said he could support that but not the removal of a package of initiatives. He said he had strong opinions on this but it would take a package or several approaches, including cuts, a variety of revenue pieces, and for us only to identify one, by name, and otherwise say a package is necessary, is the wiser approach. Some use of permanent fund earnings was where the money was because there was no way to solve the problem without it. This resolution calling for a package and some use of permanent fund earnings was reality.

Ms. Gladziszewski said the important part was to take action this year. She agreed that a package would include a variety of options that would not be palatable to all people.

Ms. Becker said she did not want to be tied to AML's list.

Hearing no objection, Resolution 2741 was amended to remove the word "comprehensive."

MOTION, by Gladziszewski, to forward resolution 2741 to the Assembly on February 8 as amended. Hearing no objection, it was so ordered.

E. **Financial Status of CBJ - "and how did we get here?"**

Mr. Bartholomew said his presentation was intended to prepare a foundation for future budget discussions. CBJ is currently in a strong, stable financial position. On February 10, the Finance Committee will look at a three year projection, to see what the future may hold. CBJ's financial position, with assets and liabilities, show that our assets are steadily growing, and the liabilities are staying relatively flat. We have sold and paid off debt, until 2015, when we recorded the unfunded pension liability. We are paying off a portion of the annual liability each year. There has been significant growth due to capital projects from federal, state, empowered boards and we have kept our debts flat. Spikes in revenues indicate years CBJ sells bonds and when there are large project funds received from the FAA for the airport. The biggest component of charges for services in revenues are charges at the hospital. The second highest income source is taxes. There has been a $16 million growth in taxes over eight years, which was slow and steady. Other revenue came from State and Federal sources. Over time revenues and expenses will balance, but they will not always match. Expenditures are slowly growing and a big piece is capital projects. The two biggest pieces of growth are in Bartlett and other enterprise funds combined. The largest expense is personnel services. The increase in 2016 is based on budget, not actuals, so when 2016 is over, the Personnel services will be lower than the graph is showing. There has been some growth in commodities and services, most of the growth is hospital equipment. Debt Service is slowly decreasing. He reviewed CIP Expenditures and funding sources and there is still strong revenue from the federal government and a commitment from sales taxes, which varies from $13 and $17 million a year, and there are specific 1% projects.The state has a five year moratorium on school bonds and major maintenance.

He explained the available fund balance and the growth reflects the action taken over the last two budget cycles, with cuts taken and the Federal government continuing to provide the payment in lieu of taxes (PILT funds). He explained the more restricted budget reserve, and said both of the funds were growing.

He said the CBJ is in a strong, stable financial position which was opportune given the state's financial situation. We can enter our two year budget cycle from a strong basis and adjust to what happens.
Barbara Sheinberg signed out of the meeting at 8:25 p.m.

F. **Biosolids Update**

Mr. Watt said the staff had tried to the accomplish tasks set by the Assembly. Information was taken to the Utility Advisory Board and he thanked the board members (four of which were present) for their tireless work. He said Mr. Chris Gerondale and Mr. Roscoe "Spike" Bicknell IV had spent an extraordinary amount of time tracking down information on the monofill concept for the Juneau Monofill Company (JMC), a private monofill proposer. They looked at a minimum of six properties. The economic assumptions from the UAB are the best information that they can provide. The ultimate decision belongs to the Assembly, and there is significant information in the packet. He believes the situation is ripe for a decision. There are two items in the red folder, one an update to the rate model in answer to some questions by Mr. Kiehl, and the other is more information about

green house gases in a monofil, in comparison to the dryer option. The monofil would create more greenhouse gases even with some gas recovery and flaring.

Mr. Watt summarized his recommendation. The best we can do for our rate payers is to pursue the dryer project. It has a high capital cost, but over the long haul, it does the best we can for the rate payers, especially over a longer horizon. The dryer gives us certainty for 20 years and the best profile, with a capital asset that is paid off and would continue to operate at the end of the 20 years. It allows CBJ to control the waste stream. The current situation is untenable and expensive and we need to get off interstate shipping of sludge as soon as possible.

Ms. White asked why local control was so important. Mr. Watt said that garbage collection and landfill were two main complaints from the public to staff at CBJ and CBJ doesn't have any control over these operations. If we contract out for disposal of biosolids, we can anticipate many issues, but we don't have perfect vision and over time, we would wish we had more control over a monofilling operation.

Mr. Nankervis said that when a service is contracted, the operator is on the hook to fix it. With the control comes fiscal responsibility. Mr. Watt gave a scenario that CBJ contracts for a monofil and several years in, the public determines that it doesn't like the option, then at that time we are locked in for a period of time. Mr. Watt said as the producer of the waste, the CBJ will always have a certain responsibility and obligation regarding the compliance with laws.

Mr. Kiehl said that since the proposal is no longer a dryer with a burner, what would be done with the pellets? Mr. Watt said the pellets have an energy value and some enterprising person could burn them for heat, a municipal facility could use them. It will be an inconsistent fuel and somewhat dirty, so there would be a higher maintenance cost to burn them, so he saw someone in the private sector being the user. They have a nutrient value as well and can be blended with soils and gravel to augment top soil. There is a high demand for topsoil in town. The amount of topsoil used for re-vegetation for highway projects provides ample demand.

Ms. White asked how many more employees would be needed to create the pellets. Mr. Watt said none. The dryer was an expensive piece of equipment, but easy to run. Wastewater operators will check on the dryer and he reviewed the operation, and thought this would be a wash with current operations.

Ms. Becker asked if there would be any solids that would not be used in the pellet production that would need disposal. He said there would be nothing left. Ms. Becker asked if anything would go to the landfill. Mr. Watt said that the landfill was always looking for free sources of soil as their daily cover, so the pellets could supplant that.

Ms. Troll asked about the monofil facility. Mr. Watt said that the project contemplated an unlined trench. Ms. Troll asked if there was a potential for metals and toxins over time. Mr. Watt said DEC would review leachates, gasses, vector attraction and there would be a constant monitoring requirement, and a post closure monitoring requirement, and it would be subject to a contract that would be signed once a permit and bonding was obtained. It would take some time to get to a working situation with a vendor. Ms. Troll asked if the permits and the contract would be the means to address issues. Mr. Watt said CBJ would be responsible, along with the contractor and the regulators, to address issues.

Ms. Gladziszewski asked about bond debt capacity and the current status. Mr. Bartholomew said there is capacity for about $20 million, and we are paying it off at about $20 million per year. He has done more analysis and was working on documenting the debt, so from the estimate from last June, to now, the State of Alaska is committed to paying a portion of our general bond debt, and that is expected to continue. He treated general bond debt and revenue bond debt the same in the last review but we will do more analysis on this. He believes that with the $20 million capacity and with no debt issued in 2016, there is about $40 million capacity and this is conservative. CBJ is well under our overall bond debt.

Mr. Kiehl asked about the monofil proposal, would this lock us into payments and would that be called debt? Mr. Bartholomew said currently construction contracts were considered liabilities, but not debt.

Mr. Nankervis asked specific questions about the numbers in the charts provided and the staff and other Assemblymembers discussed the details. Mr. Watt explained his 1/28/16 memo and the tables and the assumptions determined by CBJ, UAB and JMC. Mr. Watt said the UAB took a more conservative approach in their assumptions. The monofil concept has a third variation. He explained the reasoning behind the options for a dryer, status quo shipping, a monofill and monofill + dryer.

Ms. White asked about the need to refurbish the dryer in the future. Mr. Watt said there was a manufacturing center in North Carolina. He spoke about reinvestment in the future that would be needed. There will be a lifespan of up to 20, but if maintained, it can run longer. The cost of the project was the dryer and the building to house the dryer and at 20 years you would look at the process equipment only for maintenance / replacement. Ms. White asked how rebuilding the machine would be accomplished. Mr. Watt said that would be done by a mechanical contractor with custom made equipment to rebuild.

Mr. Kiehl said the committee had two options - to give direction to staff or to seek more information.

Ms. Gladziszewski thanked those present for all of the work and effort and for answering many questions. She said she was ready to move the dryer forward. She finally had enough information to be comfortable with that decision. No action was not an option.

Ms. White said she could not support that at this time.

Ms. Troll said shipping as status quo was not acceptable and said the city needed to make a decision. The UAB had done a good job digging in to the details. Work has been done to bring the price down. We show we can handle the cost at this time and from a financial standpoint, it is expensive but this is one of our primary responsibilities as a city government. Issues will still be our responsibility and we need to maintain control of the waste stream. She supported the dryer.

MOTION, by Jones, to accept the recommendation from the Public Works Director that the CBJ pursue the biosolids dryer.
Ms. Becker asked if the UAB was split on this decision. Mr. Watt said in the consideration of the conventional options, the UAB all agreed that the dryer was the best option. In the cover memo, the centrality of the board felt that the Assembly needs to make a decision to invest or not. A minority of the board support the monofil because they think a new technology will come on line in the future. The board has nuanced views on the matter. The board members present did not object with his summary.

Ms. Becker said that waiting for another option was appealing, but waiting took a chance as well, and control was also important to her. She liked the monofil idea but we could spend more money waiting for a process and we don't want to get into another lack of control situation so she supported the dryer.

Ms. White said she understood that the UAB was divided, costs can increase, and CBJ has bought down its debt, and needs to be careful due to the current state economy. We are encumbering future assemblies and we need to watch out for ourselves. The monofil option had some good possibilities for providing local jobs. The questions about backfill should have been asked of the other people in the room. We have a private contractor who has helped us over many months to come up with a solution and they have not been paid to do so and the Assembly has "blown them off."

Mr. Kiehl apologized and asked to take any questions from the Assembly for specific persons present.

Ms. Gladziszewski said she was open to hear from people who felt a monofil option was the way to go if they had not had an opportunity to speak.

Mr. Bicknell spoke to the figures in the information packet and said that the monofil option was proposed to buy the city some time.

Mr. Nankervis thanked everyone for their work on this project. He said he came in to this decision thinking he would go for the monofil because he liked the idea of local business involvement. He said the 30 year option though is to go with the dryer and this goes against his usual view of believing the private sector is the way to go. It had taken him time and study to arrive at the decision to support the dryer option and he had surprised himself.

Ms. Gladziszewski said she agreed that she had been a big dryer skeptic but the numbers spoke for themselves.

Roll call:
Aye: Becker, Jones, Gladziszewski, Kiehl, Nankervis, Troll.
Nay: White
Motion passed, 6 ayes, 1 nay.

V. COMMITTEE MEMBER / LIAISON COMMENTS AND QUESTIONS

None.

VI. ADJOURNMENT

There being no further business to come before the Committee, the meeting adjourned at 9:30 p.m.

Submitted by Laurie Sica, Municipal Clerk

2015

Juneau Jokulhlaup Inundation Report

3 November 2015

Alaska Silver Jackets

US Army Corps of Engineers

Contents

1. Introduction

a. Project Overview and Purpose

Glaciers in Alaska cover approximately 28,500 square miles. They are highly concentrated along the Pacific Coast and in the Southcentral part of the State. Flooding as a result of a Glacial lake outburst, also known as a Jökulhlaup (pronounced “Yah-cuh-laups”), is one unique hazard that can occur within a glaciated watershed. Jökulhlaups occur when a glacial dammed lake drains rapidly releasing a surge of water downstream. These outburst floods are a significant threat to people and infrastructure in mountain regions. A 1971 study identified 750 glacial dammed lakes in Southeast and Southcentral Alaska (Post and Mayo, 1971).

The most rapidly developing area in recent years within the City and Borough of Juneau (CBJ) and also the most densely populated residential area is the Mendenhall Valley, reaching from the Juneau Airport up to Mendenhall Lake and Glacier (FEMA, 2013). The Federal Emergency Management Agency (FEMA) recently completed an update to the National Flood Insurance Program (NFIP) maps that delineate the one-percent-annual-chance-flood for the Mendenhall River. These maps did not account for the floods resulting from glacial outburst events, or Jökulhlaups. Jökulhlaups have developed on the Mendenhall River in recent years that result in large flood flows being more likely to occur than previously estimated using the river gage period of recorded data. The first Jökulhlaup was observed in 2009 with Jökulhlaups occurring almost annually since this first event. In 2014 a Jökulhlaup within the Mendenhall basin resulted in a peak flow of 20,000 cfs out of Mendenhall Lake. This flood exceeded the estimated 100 year peak flow of 17,100 cfs calculated in the 2013 flood insurance study. The U.S. Army Corps of Engineers (USACE) in partnership with the State of Alaska Silver Jackets and the National Weather Service (NWS) initiated this investigation to model and map the flood inundation extents of Jökulhlaups corresponding to river stages measured at the U.S. Geological Survey (USGS) gage on the Mendenhall River. These inundation maps will provide stakeholders with estimated inundation extents for stage events less than the 100 year flood event and also for events much greater than the 100 year flood event.

The purpose of this study was to model and map flood inundation on the Mendenhall River at varying river stages that meet the requirements described in the NOAA Partnered Guidelines for the Development of Advanced Hydrologic Prediction Service Flood Inundation Mapping (2011). The results of this project will be suitable for publishing on the NOAA Advanced Hydrologic Prediction Service inundation mapping web application.

This investigation was funded through the USACE Interagency Flood Risk Management Committee with in-kind support from both the City and Borough of Juneau and the National Weather Service.

b. Site Description

The City and Borough of Juneau, located in the First Judicial District of southeast Alaska, governs an area of over 2,700 square miles and has a population of 30,700 (2010 census). The

municipality is bordered to the east by British Columbia, Canada, to the north and northwest by Haines Borough, and to the south and southwest by the Tongass National Forest, an unincorporated area of Alaska (Figure 1).

Figure 1. Juneau vicinity map.

The area's climate is affected by warm, southerly winds which prevail over most of southeast Alaska. The mountainous terrain in the Juneau area results in highly variable differences in temperature and precipitation. The Mendenhall River basin is approximately 103 square miles with elevations that range from sea level to nearly 7,000 ft. A large portion of the upper basin is covered by glaciers while the valley floor is relatively flat with streets and housing developments. Muskeg and spruce forest cover most of the undeveloped regions of the valley. The Mendenhall River flows out of the terminus of Mendenhall Glacier at the northern edge of the valley and into Mendenhall Lake. Mendenhall Lake receives additional inflow from Nugget Creek, Steep Creek, and a few small tributaries. After exiting the lake, the river flows through the valley in a generally southward direction until it enters salt water in Fritz Cove. Montana Creek is a tributary that flows into the Mendenhall River approximately 2.5 miles upstream from Fritz Cove.

The mean annual precipitation at the Juneau Airport is 53 inches and includes 98 inches of snow. Mean annual precipitation in downtown Juneau (8 miles from the airport) is 94 inches; and mean annual precipitation near the source of Mendenhall Glacier is estimated to be greater than 220 inches. The highest average monthly precipitation occurs in the fall when regional storms dominate the weather patterns while the lowest precipitation occurs in late spring (USGS, 1999).

c. Flood History

Flooding on the Mendenhall River is generally contained within the banks for the entire 5.5 mile study reach from Fritz Cove upstream to Mendenhall Lake. Regional uplift combined with

channel incision are the likely reasons for the occurrence. The landscape in much of southeast Alaska is rising relative to sea-level as a result of tectonic activity and glacial rebound. Simultaneously, the rivers are incising into the rising landscape resulting in floodplains becoming 'detached' from adjacent channels. Neal and Host (1999) provide a detailed discussion of the topic in their report on the Mendenhall River. The channel upstream from the Back Loop Road Bridge appears to be stable based on a review of the USGS rating curve and comparisons of cross sections survey measurements spanning almost 20 years. This reach is not incised, and the river is still well connected to overbank areas during higher flows.

Between 2009 and 2014, the Mendenhall watershed experienced glacial outburst flooding events (Jökulhlaups) 1-2 times per year. There have been an estimated ten events occurring from 2009 through 2014. To date, these outburst floods have occurred between late May and September. Floods caused by heavy rains generally occur between July and October. Additional information on rainfall floods and peak discharge frequency information for rainfall events can be found in the recently published Flood Insurance Study (FEMA, 2013). Due to the lack of observed data and a limited understanding of the glacial basin lake size, a separate frequency curve for Jökulhlaup events is not available.

Jökulhlaups occur when a large amount of water (i.e. rainfall, snow melt, etc.) builds up within a closed basin adjacent to the Mendenhall Glacier. The ice of the glacier forms a dam, preventing water from flowing into Mendenhall Lake. At some point, the glacier lifts, and the impounded water escapes violently into Mendenhall Lake, raising the lake's water level, and increasing flows through the Mendenhall River. This unusual flooding mechanism has created record-level floods in recent years and is predicted to continue. The Jökulhlaup in July 2014 was the largest flood recorded since the river gage on the Mendenhall was installed in 1965. The Mendenhall River peaked at a stage of 11.85 feet with a peak flow of 20,000 cfs. This event caused flooding and property damages upstream of the back loop bridge. Field investigations revealed that a glacial dammed lake in the Suicide Basin area of the Mendenhall Glacier produced this Jökulhlaup.

A large flood occurred in late summer 1961, prior to installation of the river gage, with an estimated peak discharge of 27,000 cfs (Barnwell and Boning 1968). This 1961 event was well above the current 0.2 percent annual exceedance probability (500 year flood). A significant rain event occurred in 1961 with five inches of rain recorded over three days on Aug 12-14th 1961. The one day and three day rainfall recurrence interval were on the order of 2 and 10 years respectively for that rain event. The large orders of magnitude difference in recurrence interval between recorded rainfall and the estimated flood flows indicate that this 1961 flood could have been a result of a Jökulhlaup.

d. Previous Studies

Flood Insurance Study (FIS), 2013: The original FIS was completed by USACE in March 1977. Updates to the FIS were published in 1990, 2005, 2010 and the current effective study is dated August 2013. Northwest Hydraulic Consultants developed the hydraulic model that was utilized for the Mendenhall River floodplain analysis. This model was based on a 1999 USGS hydraulic model.

Hydrology, Geomorphology, and Flood Profiles of the Mendenhall River, Juneau, Alaska, 1999: This study was developed by USGS as Water-Resources Investigations Report 99-4150. Channel cross-sections were surveyed at 60 locations to define the hydraulic characteristics over a 5.5-mile reach of the river beginning at Mendenhall Lakes and extending to the river mouth. This study discussed uplift rates and the effect on flood profiles in the region.

Glacier Dammed Lakes and Outburst Floods in Alaska, 1971: The USGS published Hydrologic Investigations Atlas HA-455 in 1971 as a result of their study of glaciers in Alaska. This study provided an assessment of the outburst floods by mapping the extent of the glaciers, the location of glacier-dammed lakes, and delineating areas where outburst flooding was expected. This study identified nine glacier dammed lakes within the Mendenhall River Watershed.

e. Study Area Extents

The boundaries of the inundation mapping are shown in Figure 2 and extend from Mendenhall Lake downstream approximately 7.1 miles to the mouth of the river at Fritz Cove. Mapping does not extend upstream along Jordan Creek nor Montana Creek.

Figure 2. Mendenhall River study area and inundation mapping extents. Yellow lines indicate the extent of inundation mapping at upstream and downstream boundary locations.

2. Hydrology

a. Stream Gages

The USGS maintains a stage-discharge gage near the terminus of the Mendenhall Glacier at the north end Mendenhall Lake, USGS 15052500. The drainage area for this gage is 85.1 square miles. Daily data has been recorded starting in May 1965 through the present.

The USGS maintained a stage-discharge gage (USGS 15052800) on Montana Creek with daily data available from August 1965 through October 2012. This gage is still operated as a peak flow site with annual peaks recorded from 1966 through the present. The National Weather Service operates a real time river stage gage at the same site with flows estimated using the existing USGS rating curve.

b. Hydrologic and Steady Flow Data

As described in the NOAA mapping guidelines, inundation maps for this project are based on modeling scenarios that match specific river gage heights. The modeled scenarios and resulting maps are not related to the likelihood of occurrence or a specific return interval. Inundation maps were produced for flows on the Mendenhall River at even one foot intervals from a gage height of seven feet to a gage height of fifteen feet. Simulated flows for the Mendenhall River were established using the USGS rating curve from the Mendenhall Lake gage (#15052500). A gage height of seven feet was selected as the lower end for scenario mapping. This value is below the National Weather Service defined action stage of eight feet. The upper stage of 15 feet was selected as a conservative upper end estimate of potential Jökulhlaup flood events. A river stage of 15 feet at the gage corresponds to an event 50% greater than the Jökulhlaup flood in 2014. Rough estimates of peak outburst discharge using known empirical equations which relate the estimated basin volume to peak outburst flow (Hugel et. al, 2004) indicate that this upper stage of 15 feet (33,800 cfs) likely exceeds the largest glacial dammed lake release expected from Suicide basin. This empirical estimate contains a high level of uncertainty due to the lack of accurate mapping and dynamic nature of the changing glacial dammed lake basin, and could be improved with more accurate mapping and analysis. The upper stage of fifteen would also approximately equal the combination of the largest Jökulhlaups measured in 2014 with a concurrent 100 year rainfall flood.

Flows for the larger events were estimated using linear extrapolation of the existing rating curve above the published upper end 13 feet. Table 1 provides the steady flow data used for each model simulation. Montana Creek is a tributary that flows into the Mendenhall River. The 2013 flood insurance study assumed concurrent 100 year flows on both Montana Creek and Mendenhall River for mapping purposes. It was acknowledged in that report that this was conservative considering the difference in watershed sizes and that Mendenhall Lake significantly attenuates and lags peak flows on the Mendenhall River. Montana Creek peaks before the Mendenhall River for large rain events and will be in recession before the Mendenhall River reaches peak flow. For this project it was assumed that flows in Montana Creek were 10% of the flow in Mendenhall River up to a flow of 2100 cfs on Montana Creek. The 2013 FIS study determined that 2100 cfs was the 10 year, or 10% chance exceedance, flood for Montana Creek.

A downstream water surface elevation of 20 feet was used in the 2013 Flood Insurance Study. This boundary condition was considered reasonable and adopted for this study after an examining the sensitivity (see section 4e) of the inundation extents to changes in this value.

Table 1. Flows used for each inundation model simulation

Mendenhall Lake Gage Stage *NWS MNDA2 USGS 15052500* (FT)	Mendenhall River Simulated Discharge (CFS)	Montana Creek Simulated Discharge (CFS)	Downstream Tidal Elevation (FT)
7	5710	571	20
8	7850	785	20
9	10400	1040	20
10	13400	1340	20
11	16800	1680	20
12	20700	2070	20
13	25000	2100	20
14	29400	2100	20
15	33800	2100	20

No additional hydrologic analyses were completed for this study. Current flood frequency information can be found in the 2013 effective Flood Insurance Study. One suggestion for future hydrologic studies would be to examine peak discharge frequency for the Mendenhall River both with and without Jökulhlaup events.

3. Topographic Data (LiDAR) and Channel Survey

a. Vertical and Horizontal Control

The horizontal control was Alaska State Plane (ASP) Zone 1 in feet based on the North American Datum 83 (NAD83). The vertical datum used was Mean Lower Low Water (MLLW) 83-01 based on two NOAA benchmarks for tide station “945 2210, Juneau Gastineau Channel, Stephens Pass, Alaska”. The horizontal and vertical control for this project match the survey control established for the 2013 Flood Insurance Study.

b. Topographic LiDAR Data

Detailed topographic data was available for the project area. The City and Borough of Juneau acquired high resolution Light Detection and Ranging (LiDAR) and aerial photography data for the Mendenhall River area in 2013 (CBJ, 2013). This LiDAR data meets the FEMA accuracy requirements for floodplain mapping. The Alaska District surveyed channel cross-sections of the Mendenhall River and high water mark elevations under a contract with DOWL HKM. The LiDAR and survey information were used to develop cross-section and terrain data for the inundation analysis.

c. Survey

The LiDAR data was augmented by fifty-one cross-sections surveyed in April 2015 with an acoustic narrow beam fathometer transducer. Cross section locations were selected to match the original USGS locations for channel comparison. A replacement bridge was being constructed for the downstream Brotherhood Bridge at the time of the survey. Cross sections were not re-surveyed in the vicinity of the bridge. The older USGS cross section data was used in this area to estimate the channel bathymetry.

Thirty-two high water marks from the July 2014 Jökulhlaup, the flood of record, were also captured under the survey contract. The high water mark locations and cross-section locations are shown in Figure 3.

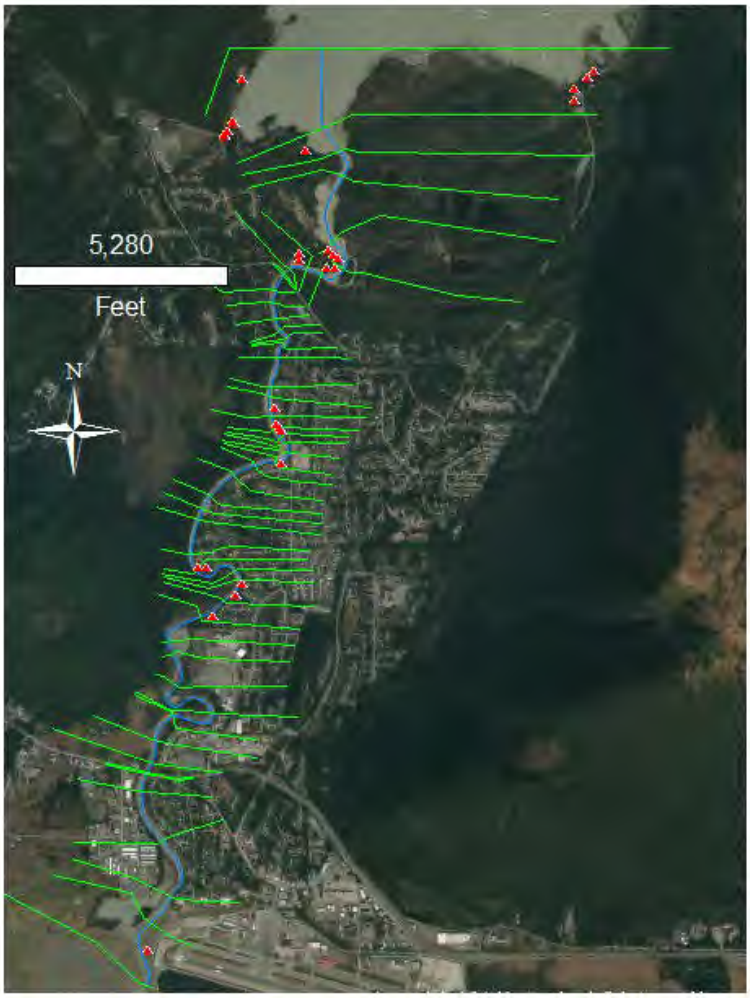


Figure 3. HEC-RAS cross sections (green) and high water mark (red) locations from the 2014 flood of record surveyed in 2015.

d. Previous Vertical Datums

Due to the rapid uplift in the Juneau area, NOAA updates the tidal MLLW datum every five years. Previous Mendenhall studies used the MLLW datum that was available at the time of the survey. Benchmarks from both the previous USGS project (1999) and from the original 1970's Flood Insurance study were recovered and surveyed to estimate vertical uplift in the Juneau area. Based on survey measurements for this study an estimated 1.4 and 1.8 feet of vertical uplift has occurred since the two previous (1990's and 1970's respectively) vertical datums were established.

4. Hydraulic Modeling

a. Introduction

Mendenhall River water surface elevations were calculated using the one-dimensional steady state model produced by the U.S. Army Corps of Engineers (HEC-RAS version 4.1.0). A one-dimensional model was considered suitable for this river due incised nature of a majority of the

river reach. In all scenarios the main channel carries a majority of the flow. Modeling and inundation mapping for the highest flow scenarios included additional effort to define ineffective flow areas in the overbank floodplains and to accurately define and include natural levees in the overbank areas.

The Mendenhall HEC-RAS model simulates the routing of steady state flows, extending from Mendenhall Lake to Fritz Cove the downstream boundary below the Mendenhall River Brotherhood Bridge. The downstream model boundary is controlled by tidal water levels in Gastineau Channel. A steady state model was considered adequate considering the short steep reach of river being model and the likely kinematic nature of the flood wave along this reach.

b. Topographic and Bathymetric Data

The HEC-RAS cross section data was developed by combining LiDAR elevation data collected in 2013 with surveyed channel cross sections acquired in April 2015. Bridge information was taken from the USGS HEC-RAS model and adjusted upwards based on the measured differences in vertical datums.

c. Model Development

The Mendenhall River was studied by detailed methods for FEMA as part of the 2013 Flood Insurance Study update. The detailed re-study of Mendenhall River was initiated by the USGS, and finalized with analyses conducted by Northwest Hydraulic Consultants (NHC). Fifty-seven cross-sections and two bridge structures were surveyed. The HEC-RAS model of Mendenhall River developed by the USGS and subsequently used by NHC for the 2013 FIS was used as the general basis for this study. Fifty-two cross-sections were re-surveyed for this study and much of the geometric data from the original model was reviewed and updated.

Initial manning “n” roughness coefficients were taken directly from the NHC model developed for the 2013 Flood Insurance Study update. Channel “n” values ranged from 0.025 to 0.060 and overbank “n” values ranged from 0.025 to 0.075. Through further analysis, adjustments were made to the roughness coefficients by splitting the reach into three sections based on the channel slope and flow characteristics (Figure 4). Channel “n” values were adjusted for each reach during the calibration to the 100-yr water surface elevation profile and 2014 high water mark elevations. The final “n” values are shown in Table 2.

Table 2. Manning “n” roughness coefficients

Location	Channel “n”	Overbank “n”
Upper: US boundary to Mendenhall Loop Rd bridge	0.037 - 0.045	0.1 - 0.15
Middle: Mendenhall Loop Rd bridge to the base of terminal moraine	0.04 - 0.05	0.08 - 0.15
Lower: Base of moraine to Fritz Cove	0.03 - 0.033	0.06 - 0.15

d. Calibration and Verification

The calibration process is used to estimate hydraulic parameters and refine model geometry to optimize model replication of the observed data under a range of flow scenarios. The HEC-RAS model was calibrated to closely match the current effective model used to develop the Flood Insurance Rate Maps. As shown in Figure 4, the current model matches the previous USGS/NHC model well below the Back Loop Bridge. The average absolute error downstream of the Back Loop Bridge was approximately 0.5 feet. Upstream of the back loop bridge, the current model estimates higher water surface elevations, on the order of 1 to 2.9 feet. This difference above the Back Loop Bridge is likely due to changes in the vertical datum due to regional uplift. Water surface elevations calculated using an older MLLW datum should be at least 1.8 feet lower in areas where the channel has not eroded. This difference is due to the glacial rebound in the area where the land is going upwards when compared to the MLLW datum. The upper reach of the river is resistant to erosion and has not degraded in response to the regional uplift. The models compare well downstream of the Back Loop Bridge, where the channel is erodible, and helps to strengthen the argument proposed by the USGS that the lower portions of the river degrade downwards at approximately the same rate as regional uplift.

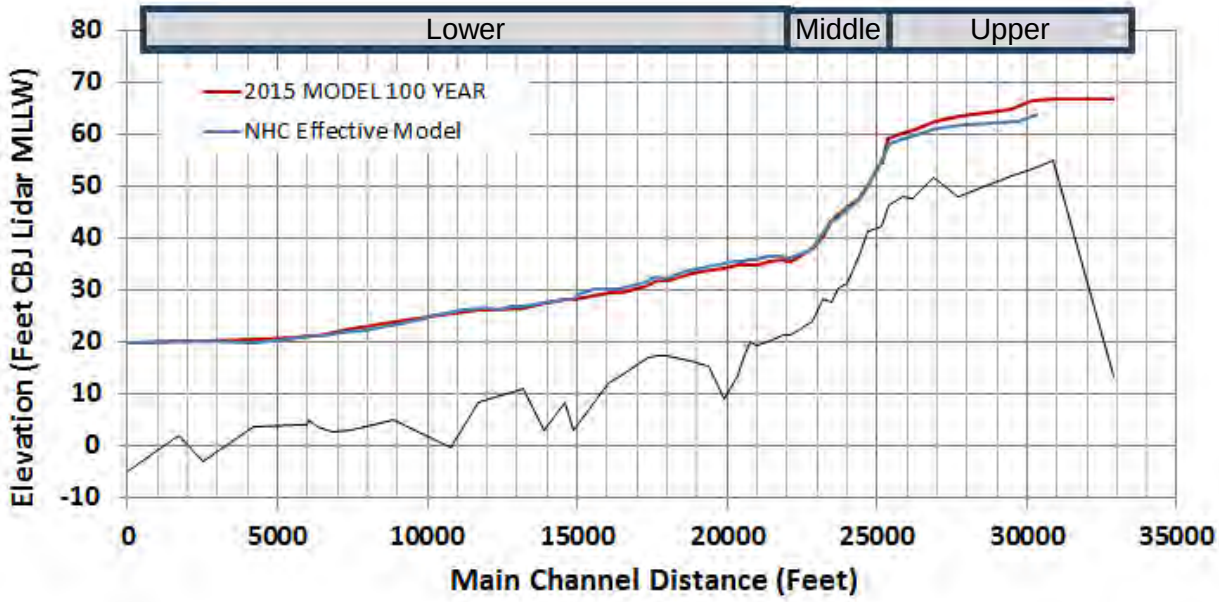


Figure 4. Water surface profile comparison between the existing HEC-RAS model and previous USGS/NHC HEC-RAS model.

The largest difference in simulated water surface elevations between the two models occurs at the upstream boundary, which both terminate at the edge of Mendenhall Lake. At this upstream boundary the model used for this report compares well to stages measured by the USGS gage. The differences between the current model and the previous USGS/NHC model are considered reasonable given the changes in vertical datum that have occurred over time and geometric differences as a result of newer model incorporating the most recent LiDAR data.

Inundation extents were compared between this study and the 2013 Flood Insurance Study for the 100 year event and were found to be similar upstream of the Back Loop Bridge despite the difference in the two modeled elevations through this reach. The 2013 Flood Insurance Study

adopted the older 1990 mapping for areas above the Back Loop Bridge. This explains why the two water surface profiles are different but still produce inundation mapping that is consistent above the Back Loop Bridge. Hydraulic models using different vertical datums should still produce similar inundated areas when each is mapped on topography with a vertical datum that matches the vertical datum used for each model respectively. This will be true despite using different in vertical datums.

The model was then verified using 20 high water marks and oblique aerial photographs from the flood of record that occurred in 2014 (Figure 5 and 6). The surveyed high water marks may have certain inherent inaccuracies. High water marks on the Mendenhall River were collected approximately 9 months after the event based on photographs and first-hand accounts from local residents. Several of the high water marks were rated as excellent in the case where a homeowner marked peak stage at the time of the flood. The remaining marks were rated as fair to poor depending on how they were determined.

The model verified, with less than 0.5 foot difference between observed and modeled results for 15 of the high water marks and between 0.5 and 1 foot difference for three high water marks. The remaining two high water marks indicated by arrows in Figure 8 had errors greater than 1 foot. Both marks were initially rated as poor quality and nearby higher quality marks validate well against model results.

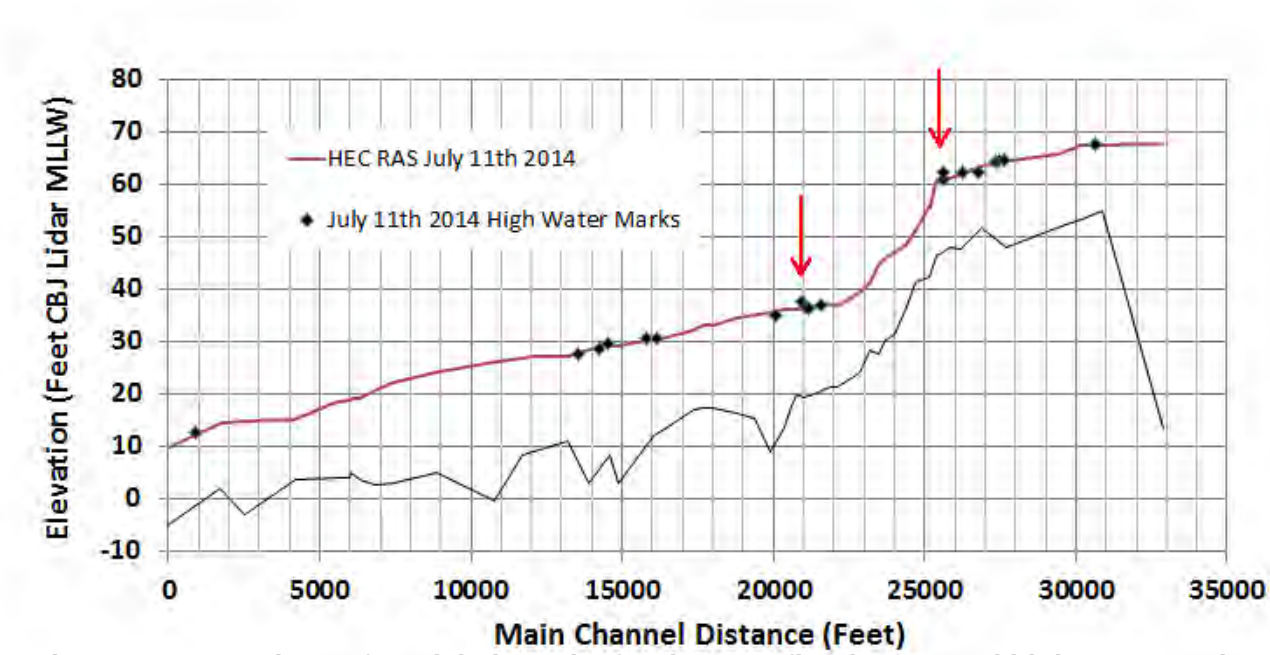


Figure 5. Comparison of modeled results for the 2014 flood event and high water marks surveyed in April, 2015. Red arrows highlight the two high water marks that were greater than 1.0 feet different than the HEC-RAS modeled water surface.

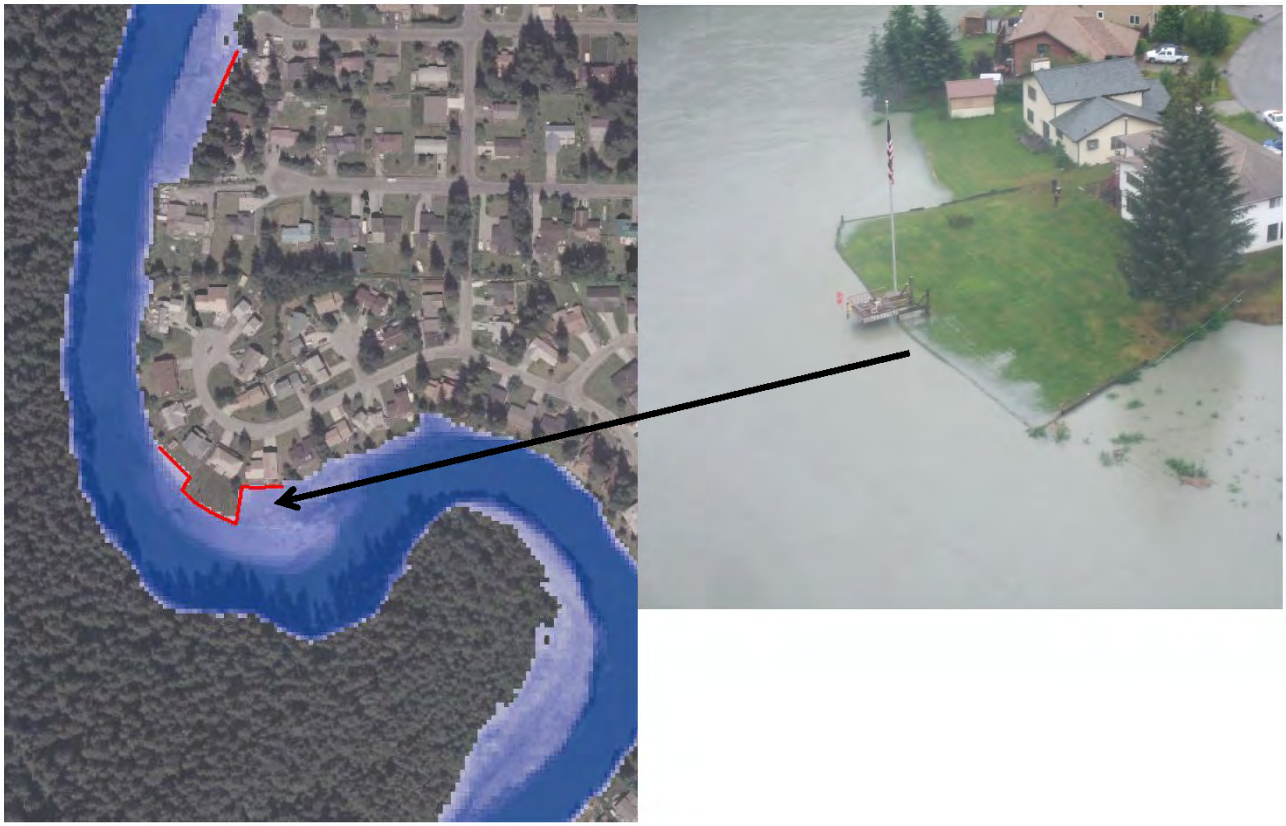


Figure 6. Example of modeled flood inundation extents from the 2014 flood event compared to oblique aerial photographs taken during the peak flow. Red lines show inundation extents based on oblique photographs taken during the peak flow in August 2014. Blue shading shows the HEC-RAS modeled flood extents for this event.

The model was also verified at the upper boundary by comparing the upper end of the existing USGS rating curve to the model generated rating curve. These two curves compares well at higher flows with the HEC-RAS supporting the linear extrapolation used to extend the USGS rating curve. Figure 7 shows a comparison of the two curves as well as estimated stage based on the 2014 flood of record. As expected this high flow model under predicts water surface elevations as lower flows due to calibration of roughness values at higher simulated flows. As river depths increase it is generally expected that manning's *'n'* values will decrease.

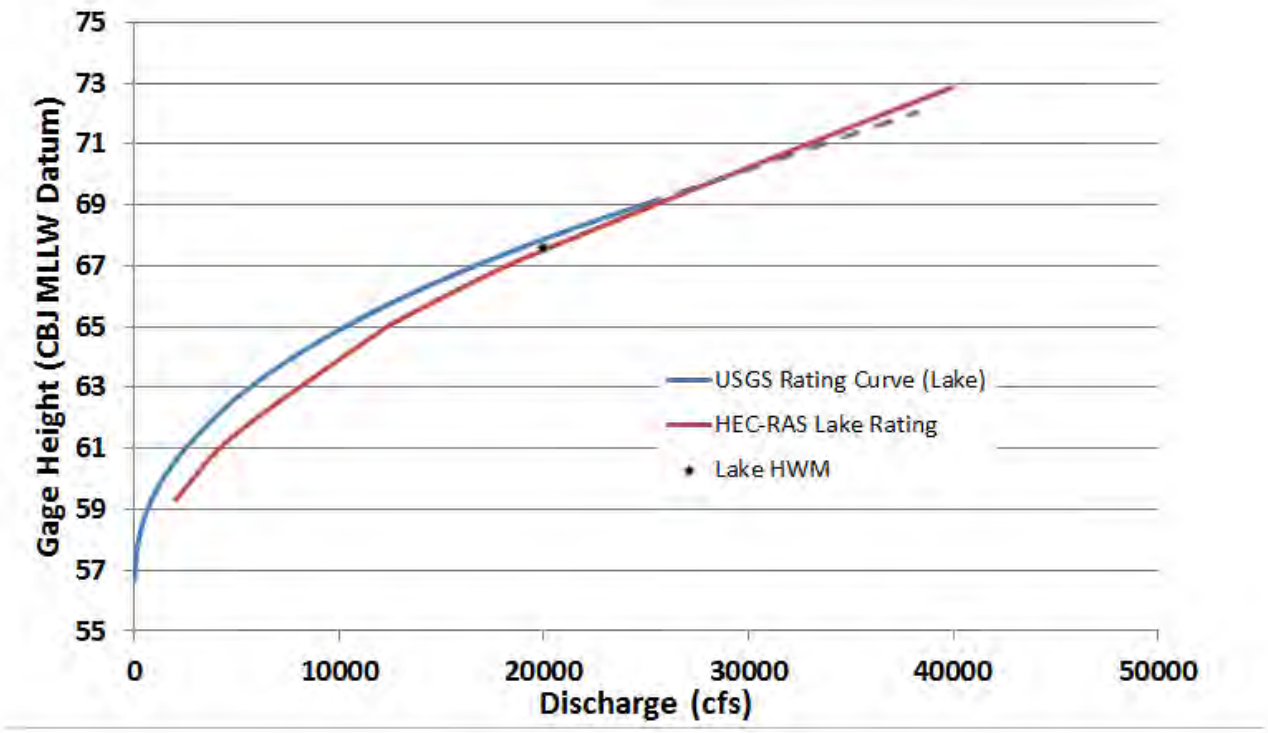


Figure 7. Comparison of USGS rating curve and hydraulic model rating curve.

e. Model Sensitivity to Boundary Conditions

Several model runs were performed to determine the sensitivity of flood inundation due to varying tributary flows from Montana Creek. A flow of 20,000 cfs was modeled for the Mendenhall River with five model runs completed varying Montana Creek flow from 300 to 3000 cfs. Results show that varying flow on Montana Creek results in changes to the water surface profile both in the upstream (~6000 feet) and downstream (~7500 feet) direction from the confluence of Montana Creek and Mendenhall River. The base case used for comparison was a flow of 20,000 cfs in the Mendenhall River and a flow of 2,100 cfs for Montana Creek. The Mendenhall River water surface profile was approximately 0.70 feet lower for the low flow scenario as compared to the base case and 0.30 feet higher for the high flow scenario. Figure 8 below shows the inundation extents for a flow of 20,000 cfs on the Mendenhall River combined with flows of 300 and 3,000 cfs respectively from Montana Creek. Due to channel incision along the lower reach of the Mendenhall River the inundation extent changes are relatively minor.

Figure 8. Inundation extents for a flow of 20,000 cfs on the Mendenhall River combined with 300 (blue) and 3,000 (red) cfs respectively on Montana Creek. The small areas in red show the difference between these two model simulations.

A sensitivity analysis was also performed to examine the influence of Fritz Cove tailwater elevation. The 2013 flood insurance study assumed a tailwater elevation of +20 feet MLLW. This value seems reasonable and was adopted for this study. Figure 9 shows the difference in flood inundation extents for a tailwater of +10 feet MLLW and +20 feet MLLW. The differences show flooding of low lying areas that are regularly inundated due to high coastal water levels. No significant flooding was identified between the two simulations. A downstream boundary condition of +20 feet MLLW was used for all subsequent model simulations.

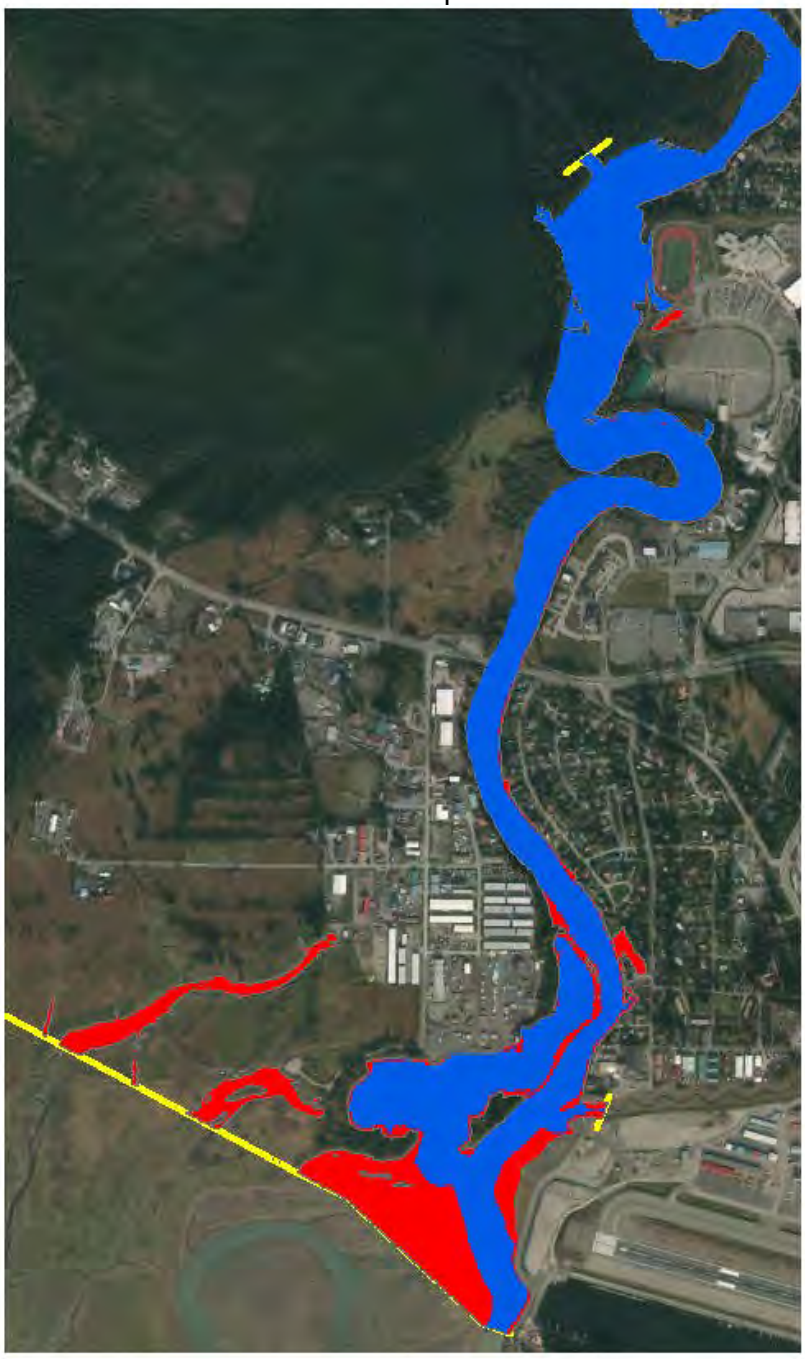


Figure 9. Inundation extents for a flow of 20,000 cfs on the Mendenhall River with varying tail water elevation of +10 MLLW (blue) and +20 MLLW (red).

Sensitivity analysis of both the downstream boundary condition and tributary inflow was performed with the differences found to be minimal. The additional area mapped as inundated using these two assumptions was examined and no significant structures or roads are impacted. The conservative estimate for both flow on Montana Creek and downstream tailwater elevation were considered a reasonable trade off that allows for the use of a static steady state model to simulate flooding on the Mendenhall River.

f. Results

Overall the HEC-RAS model developed for this project matches both the model used to develop the current effective Flood Insurance Rate and measured high water marks from the flood of record that occurred in 2014. Figure 10 shows the inundation extents from this event. The extents were reviewed by the local community (NWS, USFS and CBJ) and were considered reasonable and consistent with the flooding observed during the event.

Figure 10. Modeled inundation shown from the July 11th 2014 flood event. The Mendenhall River gage had a peak stage of 11.85 feet and flow of 20,000 cfs.

5. Inundation Mapping

The calibrated hydraulic model was used to generate water surface profiles for a total of nine river stages at 1-foot intervals between seven feet and 15 feet at the USGS gage #15052500 and tributary inflow from Montana Creek.

Discharges for all profiles assumed no additional inflow from other tributaries or groundwater within the study reach. The discharges were assumed to be uniform and steady throughout.

a. Topographic Data

The terrain data used for the inundation mapping consisted of the LiDAR dataset described in Section 3. The vertical accuracy of the dataset meets or exceeds the 95% confidence level as determined by the USGS.

b. Processing Steps

The RASMapper extension of HEC-RAS v4.1.0 was used for the extraction of inundation boundary polygons and depth grids for each of nine modeled scenarios. All processes were projected into Alaska State Plane Zone 1 NAD83.

Lower portions of the Mendenhall River are connected by a storm drain network to adjacent low lying areas that might otherwise be considered ‘disconnected low lying areas’. This was taken into consideration during the mapping process with many low lying areas conservatively left as inundated. Areas that were obviously disconnected from the river were removed from the inundation mapping results. Observations from CBJ confirm that water levels in several manholes adjacent to the river were high and roughly matched the river water level during the 2014 flood event.

The flood-inundation areas were overlaid on high-resolution geo-referenced, aerial photographs of the study area. Bridge surfaces were removed from the inundated area if neither the lowest chord of the bridge and approaches were inundated.

c. Uncertainties and Limitations

This modeling and mapping project has certain uncertainties and limitations. The model was calibrated to a relatively high flow event (> than 100 year), but with any hydraulic model there is some uncertainty for flows that exceed the calibration and verification events.

Although the flood-inundation maps represent the boundaries of inundated areas with a distinct line, some uncertainty is associated with these maps. The flood boundaries shown were estimated based on water stages (water-surface elevations) and streamflow at an upstream river gage. Water-surface elevations along the Mendenhall River were estimated by steady-state hydraulic modeling assuming unobstructed flow. Unique factors may cause actual flood inundation extents to vary from the inundation boundaries shown. Additional areas may be flooded due to unanticipated conditions such as: changes in the streambed elevation, roughness or backwater from localized debris jams.

This model also has additional limitations resulting from conservative boundary conditions assumed to occur. If the downstream tide elevation is significantly lower than the +20 MLLW assumed for this projects the inundation extents at the downstream end will be significantly less. However, these areas are regularly flooded during high tides and there are no significant changes to flood impacts.

6. Summary

A series of estimated flood-inundation maps were developed in cooperation with the City and Borough of Juneau for the Mendenhall River. These maps, available through an online web portal, in conjunction with the real-time stage data from the Mendenhall River USGS stream gage and National Weather Service flood-stage forecasts, will help to guide the general public in taking individual safety precautions and will provide city officials with a tool to efficiently manage emergency flood operations and flood mitigation efforts.

The maps were developed by using the U.S. Army Corps of Engineers' HEC–RAS and HEC-GeoRAS programs to compute water-surface profiles and to delineate estimated flood-inundation areas for selected stream stages. The project included a re-survey of river cross sections and incorporated the latest topographic information into the modeling and mapping products. The inundation mapping has been calibrated and was then validated against a large flood event on the Mendenhall River. The inundation mapping results will provide a valuable tool to the residents of Juneau and to the City and Borough of Juneau Officials. The data is expected to be published on the National Weather Service (NWS) inundation mapping website and will be available for agency and public use. The maps show estimated flood-inundation areas overlaid on high resolution, georeferenced aerial photographs of the study area for stream stages between five and fifteen feet measured at the USGS Mendenhall River Gage.

7. Disclaimer for Flood Maps

The inundation maps developed in this study are not intended to replace the current effective FEMA NFIP maps. The extents shown are for information only purposes to predict at risk areas and provide a planning resource for the City and Borough of Juneau.

8. References

Barnwell, W.W., and Boning, C.W., 1968, Water resources and surficial geology of the Mendenhall Valley, Alaska: U.S. Geological Survey Hydrologic Investigations Atlas 259, 6 p., 1 sheet, scale 1:31,680.

City and Borough of Juneau(CBJ) and Watershed Sciences Incorporated, Juneau LiDAR and Orthophotos Technical Data Report – Final Delivery, 2013.

Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS), City and Borough of Juneau, Alaska, Effective August 19, 2013.

Huggel, C., W. Haeberli, A. Kääb, D. Bieri, and S. Richardson. 2004. An assessment procedure for glacial hazards in the Swiss Alps, Canadian Geotechnical Journal, 2004, 41(6): 1068-1083

Post, Austin, and Mayo, L.R., 1971, Glacier dammed lakes and outburst floods in Alaska: U.S. Geological Survey Hydrologic Investigations Atlas 455, 10 p., 3 sheets, scale 1:1,000,000.

U.S. Army Corps of Engineers Hydrologic Engineering Center River Analysis System, HEC-RAS version 4.1.0.

U.S. Geological Survey, Hydrology, Geomorphology, and Flood Profiles of the Mendenhall River, Juneau, Alaska, Water-Resources Investigations Report 99-4150, 1999.

U.S. Geological Survey, Glacier Dammed Lakes and Outburst Floods in Alaska, Hydrologic Investigations Atlas HA-455, 1971.

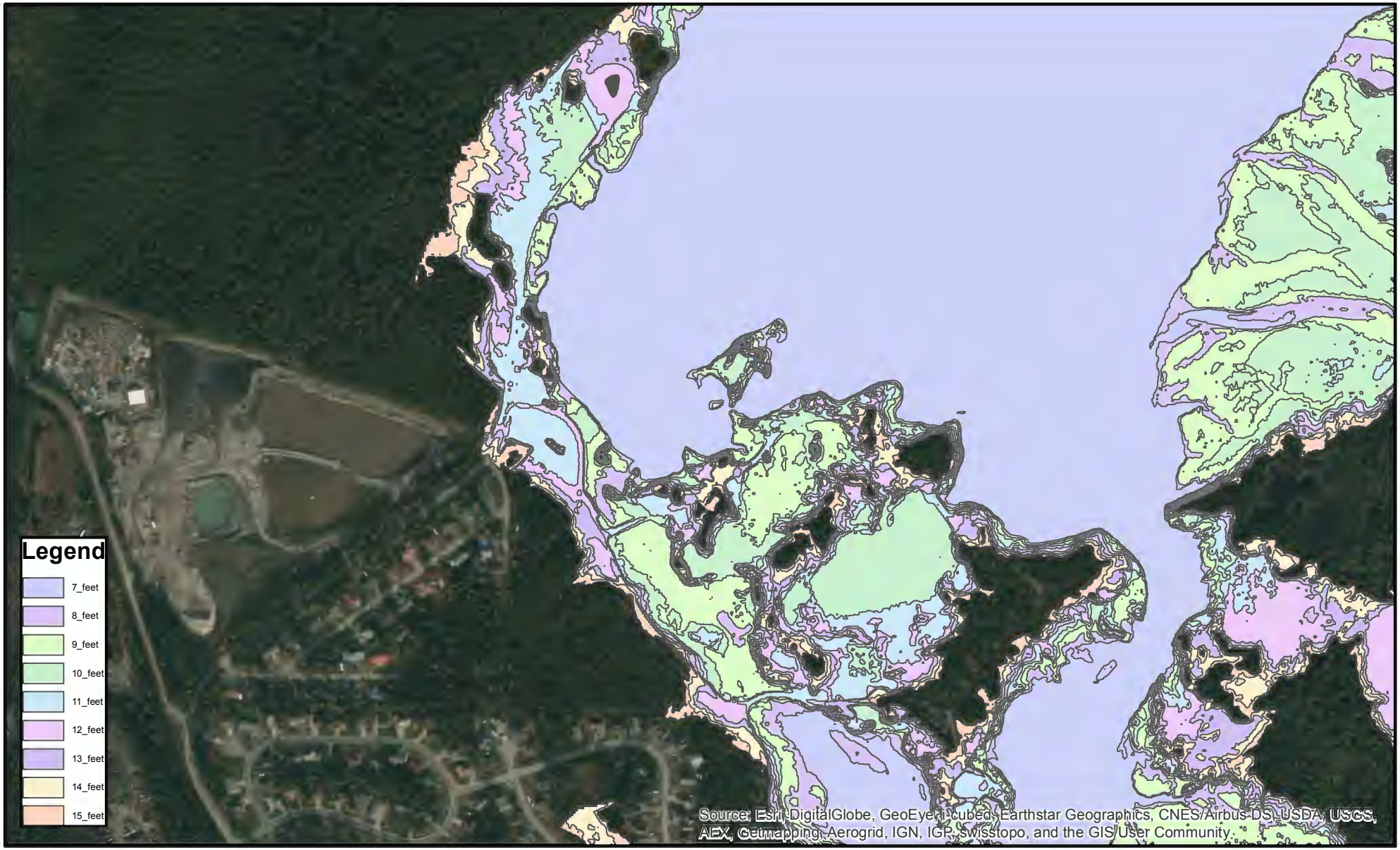
9. Appendix A. Mendenhall River High Water Marks

High water marks are from the July 2014 flood of record. Marks were established in April 2015 based on photographs during the event and resident accounts of water levels. All of the HWMs captured along the Mendenhall River are listed below. Additional HWMs were captured around the perimeter of Mendenhall Lake but were not included in the list below. A file containing survey information and pictures of each mark is also available.

	RIver Station	High Water Mark (HWM) Description	Quality	Surveyed Elevation FT CBJ MLLW	Model Diff. FT
HWM-1	925	Ground Elev on east side of third pier	Poor	12.7	-0.29
HWM-2	13525	Ground elevation back side of trees in picture. 9391 Rivercourt Way	Poor	27.5	0.28
HWM-3	14236	Top of step verified by land owner. 3339 Meander Way	Good	28.7	0.08
HWM-4	14535	Ground elevation at corner of fence line from property owner. 3401 Meander Way	Fair	29.5	-0.34
HWM-5	15800	Top of seventh step down from back porch. 3483 Meander Way	Fair	30.5	-0.16
HWM-7	16125	Top of retaining wall at river. 3487 Meander Way	Fair	30.8	-0.13
HWM-29	20050	Marker set by property owner. Black and orange tape at base. 3875 Killewich Dr.	Good	35.1	0.69
HWM-28	20950	Base of concrete block on bank located by property owner. 4215 Riverside Dr.	Poor	37.8	-1.57
HWM-30	21050	Brick set on ground at 2014 HW, by property owner. 4229 Marion Dr.	Good	36.6	-0.28
HWM-17	21150	Property owner located high water mark at time of survey. Mark perpetuated by blue electrical tape on net frame. 4233 Marion Dr.	Good	36.4	0.10
HWM-8	21550	0.13 above 3rd step from bottom. Verified by property owner. 4253 Marion Dr.	Fair	36.9	0.04
HWM-18a	25620	HWM on vent flange at back of garage. Garage raised 4/18/15. 9370 View Dr.	Good	60.8	0.10
HWM-18	25620	Pen mark on carsonite road marker	Poor	62.2	-1.30

		(estimated)			
HWM-13	26275	Top of 2nd step from deck (Likely High)	Fair	62.1	0.02
HWM-12	26800	Property owner located HWM at 4 inches below deck level. 9300 View Dr.	Fair	62.1	1.05
HWM-11	27325	Property owner located high water mark at time of survey. Described as two inches below floor elevation of playhouse. 9301 View Dr.	Fair	64.1	-0.25
HWM-10	27450	Top of third step from bottom. Verified by property owner and Eric Feldt. 9305 View Dr.	Fair	64.5	-0.50
HWM-31	27625	Nail set in tree at 2014 HW, by property owner. 9315 View Dr.	Good	64.5	-0.29
HWM-16a	30625	Top of bench seat	Fair	67.5	-0.07
HWM-16	30650	Top of barrier	Fair	67.6	-0.16

Mendenhall River Modeled Inundation Extents based on USGS Gage Elevation



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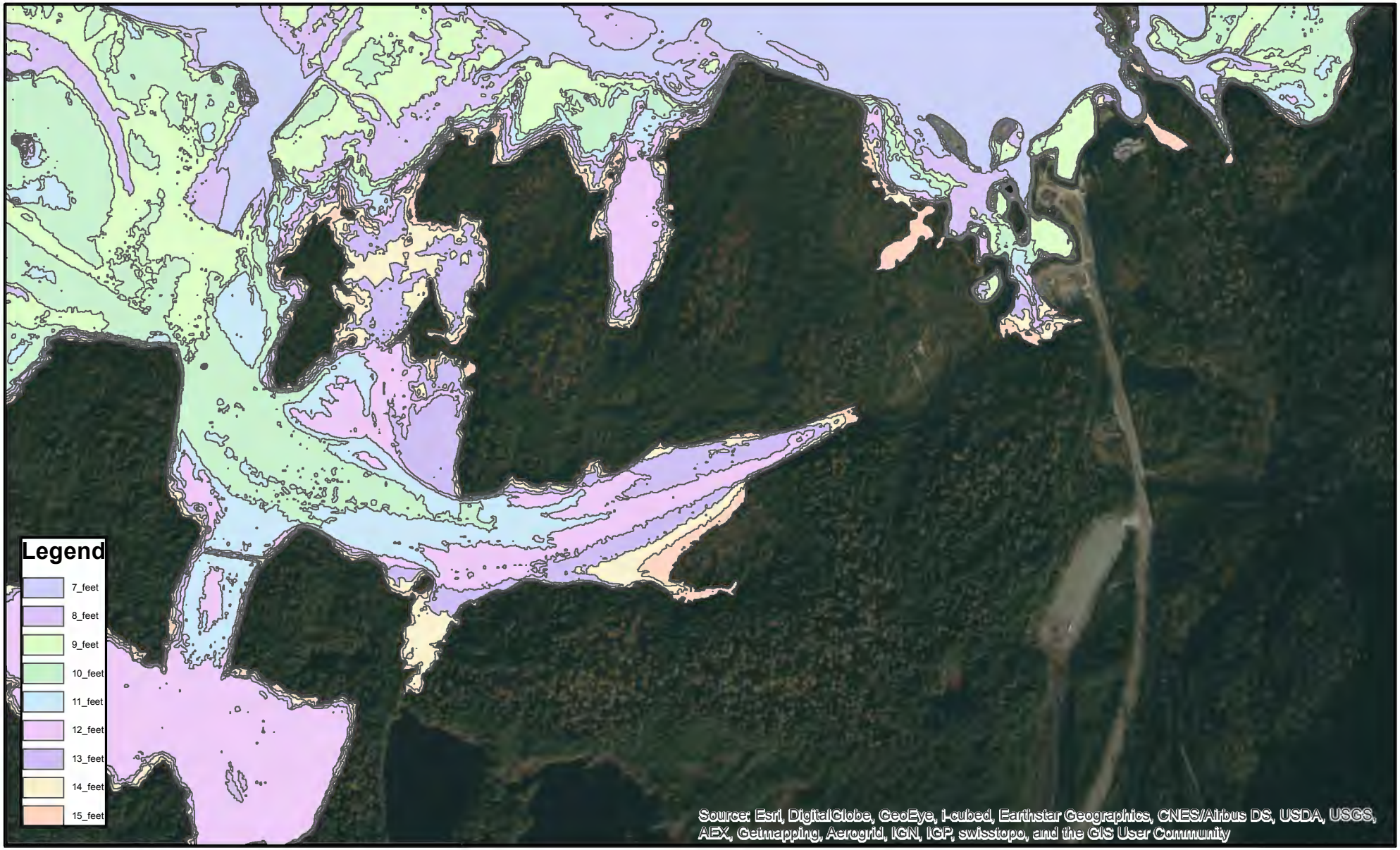
US Army Corps of Engineers

Mendenhall River Modeled Inundation Extents based on USGS Gage Elevation



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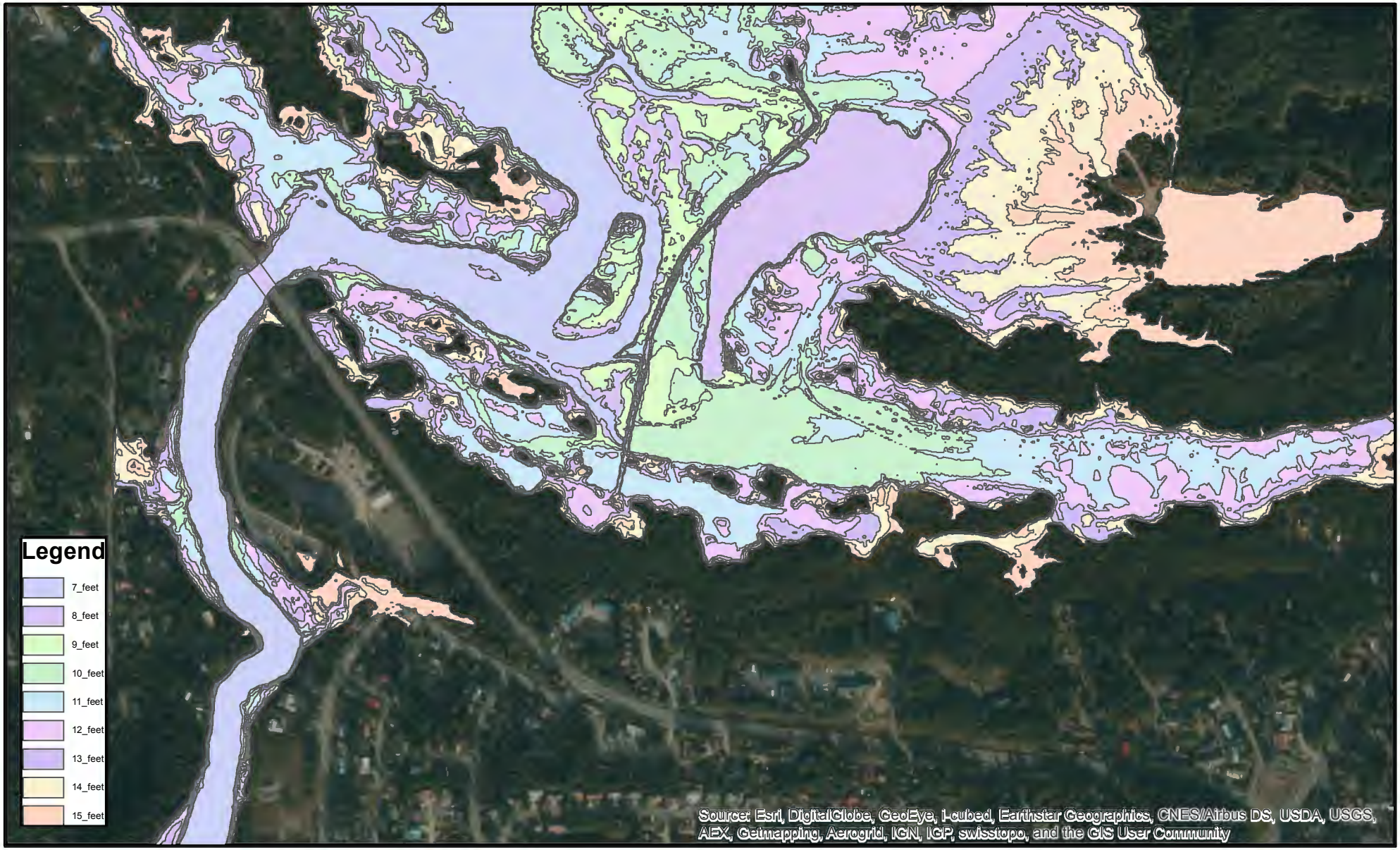

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Mendenhall River Modeled Inundation Extents based on USGS Gage Elevation

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Mendenhall River Modeled Inundation Extents based on USGS Gage Elevation

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US Army Corps of Engineers

Design Concept

for

Streambank and Shoreline Protection

for the Meander Way bend of the

Mendenhall River

near

Juneau, Alaska

Prepared by the
Natural Resources Conservation Service
US Department of Agriculture
Palmer, Alaska

July 2015

Table of Contents

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
Palmer, Alaska
July 2015

CONCEPTUAL DESIGN REPORT

Job: Juneau Streambank and Shoreline Protection
Location: Juneau, Alaska
Phase: Conceptual Design

Introduction

In the winter of 2015, the City and Borough of Juneau contacted NRCS regarding flooding and streambank erosion on the Mendenhall River caused by high flows during the past few years. At the current rate of erosion, at least several homes will be at imminent risk with only a few more flood events. A site investigation and survey was conducted in early March 2015, as soon as winter conditions thawed enough to allow adequate inspection and surveying. The city requested that NRCS provide assistance with a conceptual design, cost estimates, and potential funding opportunities. This report attempts to evaluate alternatives for remedies to streambank erosion. It does not address flooding concerns.

History

In 2011, significant glacial outburst flooding (or Jökulhlaup) began to impact the Mendenhall River and Juneau residents. Glacier retreat has progressed to the point where glacial meltwater from Suicide Glacier is continually dammed up behind the Mendenhall Glacier (see Figure 1). When adequate head is developed in Suicide Basin, meltwater is forced under and through the Mendenhall Glacier, and released into Mendenhall Lake and the Mendenhall River. Agencies including the University of Alaska, National Weather Service, and US Geological Survey have cooperated with the City and Borough to install instrumentation to monitor Suicide Basin water levels, in order to provide warning of impending flooding once lake levels begin to drop. Glacial outbursts since 2011 have typically occurred in July. Stream gauging has shown that outburst flows can increase river flows from a July monthly mean of approximately 3,000 cfs, to flows exceeding 16,000 cfs. These flow increases occur in a matter of hours, with a duration of several days. Such magnitude of flows, combined with their rapid rate of rise and fall, have caused significant bank erosion in some areas.

Figure 1: Mendenhall River Overview (Google Earth Image)

Field Investigation

Field activities were conducted from March 3-4, 2015. City and Borough employees, as well as some affected residents, showed NRCS personnel the sites where significant erosion occurred, as well as areas of past inundation. High water lines were noted, at flooding areas as well as streambank erosion sites.

Some streambank stabilization measures have been constructed in the past on the Mendenhall River. A riprap revetment has been installed at a sharp river bend near Postal Way and Riverbend Elementary School (see Figure 2 and Figure 3). This measure appears to have been effective in protecting the streambank from significant erosion. There is a possibility that streambank incision (downcutting of the stream bottom) has or will jeapordize the toe of this rock revetment, but no surveying or investigation was performed to evaluate the rock toe integrity.

Figure 2: Existing streambank protection and area of concern near Postal Way and Clinton Drive

Figure 3 shows the existing riprap revement on the Postal Way river bend. Other, similar riprap revetments have also been constructed at other sites on the river.

Figure 3: Existing riprap near Postal Way

Also shown in Figure 2 is a narrow area vulnerable to breaching. This area is as narrow as 12' wide at one location, and is expected to breach in the very near future. Such breach could allow river flows to bypass the river bend adjacent to Postal Way, creating a new flow path with a steeper grade. Such breach would likely also cause river flows to then be directed toward the streambank adjacent to Clinton Drive. This could potentially result in bank erosion near Clinton Drive, and also initiate further incision of the river bed due to the loss of stream length. Over time, the incision would travel upstream, with the potential to jeopardize upstream sites.

However, this erosion has progressed to the point where it may be difficult to prevent the eventual meander breach. At this point in time, the only real option may be to address the effects of the breach after it occurs. There is a possibility that, with quick action, sheet pile and riprap could be installed at the point of impending breach to prevent or forestall the breach. Such action would be best suited for a design-build situation, in order to facilitate the required timeframe. It may prove to be far less costly to prevent the meander breach that it would be to address upstream and downstream erosion that could result from the breach. However, with shrinking budgets at all levels of government, it can be difficult to convince budget managers to allocate funds to prevent future problems, when even immediate needs cannot be met.

Upstream, the river bend near Meander Way has suffered significant erosion. Some limited areas of riprap protection have been constructed at this location (see Figure 4). This riprap has slowed erosion, but as it is installed in very limited sections to provide protection for a specific home or homes, the rock riprap has been subject to some

degradation/dislodging near the beginning and end of the riprap extents. Streambank protection measures can prove difficult to maintain on such a small scale, and projects typically need to span at least several hundred feet to be effective. Still, the localized treatment appears to have provided a good degree of streambank protection for specific homes. Nevertheless, a significant section of the river bend streambank has been eroded, and the majority of the Meander Way bend is extremely vulnerable to further erosion.

After evaluating damage and threatened infrastructure, NRCS immediately assessed how the situation fit with existing NRCS programs and funding opportunities. While many sites have legitimate flooding and erosion concerns, there are nevertheless limitations to what NRCS has the authority and programs to address. One site, namely the outer bank of the Mendenhall River adjacent to Meander Way, was determined to be potentially eligible for NRCS assistance, based on the proximity to homes, erosion rate, and funding criteria. While there is no guarantee of funds availability, the City and NRCS are taking prudent steps to seek solutions to the erosion, before streambank loss has progressed to the point where homes, infrastructure, and properties are considered a total loss.

Figure 4: Streambank erosion of the Meander Way bend of the Mendenhall River, March 2015

NRCS conducted a topographic survey of the Meander Way bend of the Mendenhall River (Figure 5). The site was surveyed using survey-grade GPS equipment. Survey points were collected of the eroded bank, river bottom, and structure locations. Using this data, topography was determined for use in evaluating alternatives. Two samples of bank materials were collected for potential analysis of geotechnical/engineering properties, in determining slope stability, compaction, unit weights, etc.

Figure 5: Plan view of Meander Way bend of the Mendenhall River streambank erosion site

Conditions affecting design alternatives

From the site investigation and review of applicable literature, the following points were important considerations affecting design alternatives:

1. Comparing past aerial photography to current photos, the planform or lateral stability of the river appears to be relatively static. This is a positive trend from an erosion treatment standpoint. However, this trend may not continue with further changes in glacier conditions and peak flows, incision, and the potential of meander cutoff near Postal Way.
2. Channel incision on the Mendenhall River is occurring, as a result of land surface uplift due to deglaciation and/or tectonics, as well as the removal of sediment from flows by Mendenhall Lake (Neal 2009). Incision rates of 0.1 feet per year have been estimated (Neal 2007). In addition, the recent hydrologic changes brought about by glacial outbursts is likely accelerating the channel incision.
3. A mat of peat with roots and tree trunks is present near the stream bottom (see Figure 6). This layer has been eroded downstream of the Meander Way bend, but is still mostly intact upstream, covered with alluvial gravels and boulders. In the Meander Way area, this peat layer is exposed, and is decomposing and eroding, resulting in channel incision. A significant 6.5' head cut exists where this mat is

exposed, as shown in Figure 6. This head cut is likely to continue upstream as the peat degrades and erodes.

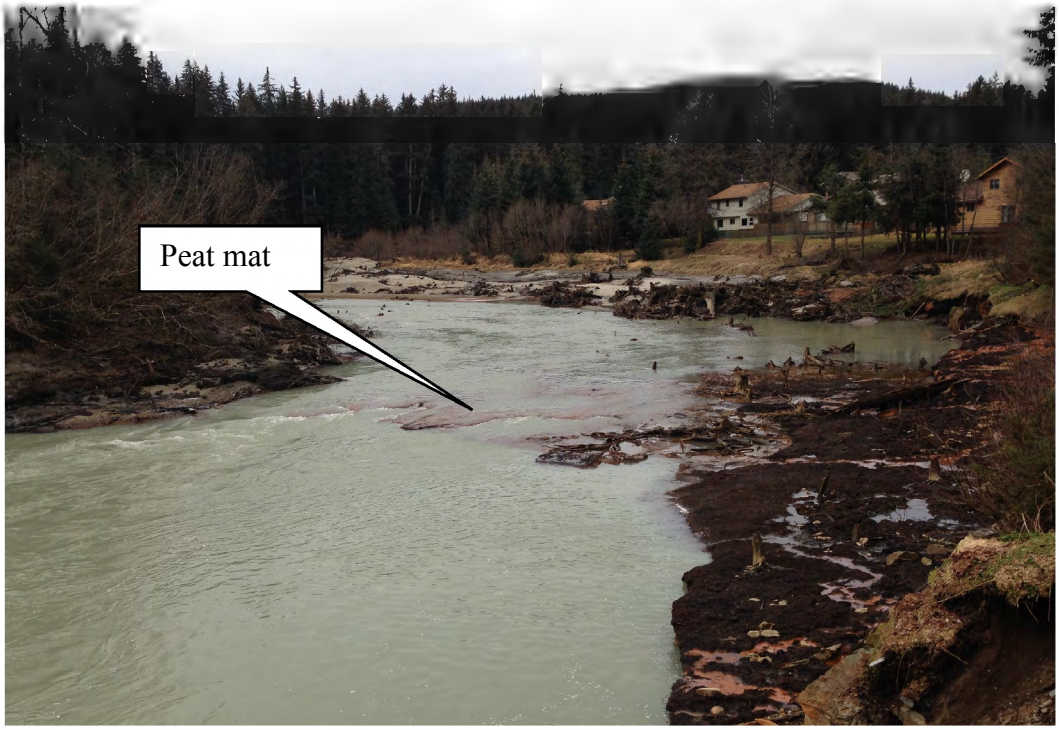


Figure 6: Peat mat at Meander Way bend of Mendenhall River

4. As the channel incision progresses, from uplift, moss mat deterioration, glacial outbursts, or other causes, erosion at the toe of the streambank will continue. Without the implementation of some type of streambank protection measures, property and infrastructure near specific portions of the river will eventually be threatened or destroyed. The Meander Way bend appears to be the area with the most immediate need of attention.
5. There is a practical limit to the amount of overall channel incision that will occur, as the base level of the river, which is sea level, limits the elevation to which the river may incise. Nevertheless, the limit of incision, as well as vertical channel stability, has apparently not yet been reached.
6. Further incision combined with surrounding uplift will serve to further disconnect the river from its floodplain, likely exacerbating streambank erosion.
7. Topographic survey and assessment of 800 feet of streambank near Meander Way was completed. Approximately 300 feet of streambank was badly eroded and in need of immediate protection. In order to effectively install measures that would address the erosion, at least an additional 350 feet of streambank would likely need to be included, for a total of 650 feet of treatment. These are preliminary estimates, and would likely need to be adjusted as additional data collection and design work is completed.
8. There are up to 8 homes that could be affected by the erosion on the outer streambank of the Meander Way bend of the Mendenhall River. A cursory review of Borough assessment records show that individual residential property values along Meander Way likely exceed $300,000. Therefore, there is conservatively $2.4 million worth of property at risk, not including the

infrastructure beyond the homes that could eventually be compromised, such as streets, water, sewer, etc.

The recent glacial outbursts, and the likelihood of further changes to Mendenhall River hydrology have created a very dynamic situation in the river. This supports the adoption of a "do-nothing" alternative. Until some equilibrium and stability is observed in the system, there are many unknowns. Treatment designs will require estimations regarding flow rates, flood levels, incision, etc. Design and construction based on unpredicted or under-predicted changes in stream conditions could result in inadequate treatment or failure of installed practices.

Nevertheless, a number of homes, and if left untreated, other critical infrastructure and businesses, are currently threatened. As such, a do-nothing alternative, while possibly a prudent option, will not be a "no cost" alternative. Therefore, information shown below attempts to explain some erosion treatment alternatives, and analyze the merits, shortcomings, and cost of each.

Design Alternatives

The following design concepts were considered as alternatives to address the erosion at the Meander Way site:

1. Bioengineered streambank
2. Sheet pile wall
3. Riprap revetment
4. Sheet pile wall/riprap revetment combination
5. No action

Each alternative is discussed below.

1. Bioengineered streambank – log crib
   A log cribs typically uses a rock toe, overlain with logs or timbers, and infilled with soil, gravel, cobbles, etc. (see Figure 7). Willows and other water-loving vegetation are established in the log crib. A significant rock toe would be imperative to the success of such an installation on the Mendenhall River.

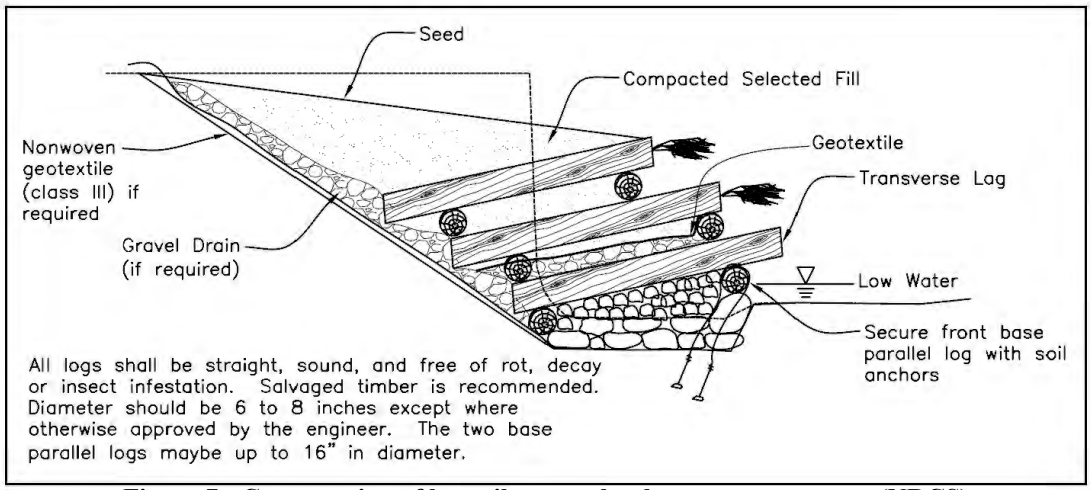


Figure 7: Cross-section of log crib streambank treatment concept (NRCS)

Advantages:

- habitat provided is usually fish-friendly
- treatment can be more natural-like in appearance and aesthetically pleasing

Disadvantages:

- treatment is not as resistant to high flow velocities as other treatment techniques
- practice lifespan can be relatively short when timber or woody debris or rootwads are incorporated

Recommendation: This option is not recommended, as the nearly annual occurrence of extreme flows due to glacial outbursts since 2011 would subject the treatment to high velocities and shears. Such treatment would not likely survive recurrence of such conditions on an annual basis. This treatment approach is also not commonly used with bank heights of 25' or more that exist in the Meander Way bend. The treatment method typically require flatter bank slopes than could be tolerated, given the limited distance between the eroded streambank and the existing homes. This treatment option, however, may have merit at other sites on the Mendenhall River.

Cost Estimate: Costs can vary widely depending on the exact type of bioengineered treatment installed. Material would be relatively inexpensive, but labor costs would be significant. As the treatment option is not recommended, no cost estimate for this option was developed.

2. Bioengineered streambank – mechanically stabilized earth (MSE) wall

This alternative would consist of layers of polyethylene geogrid overlain with compacted soil backfill. Each layer is wrapped at the slope edge to retain the soil. A wall face of hard material such as rock is required to protect the soil and geogrid from damage and erosion by debris impact and river flow. Due to their short lifespan in flowing water, gabions is not recommended as a facing material.

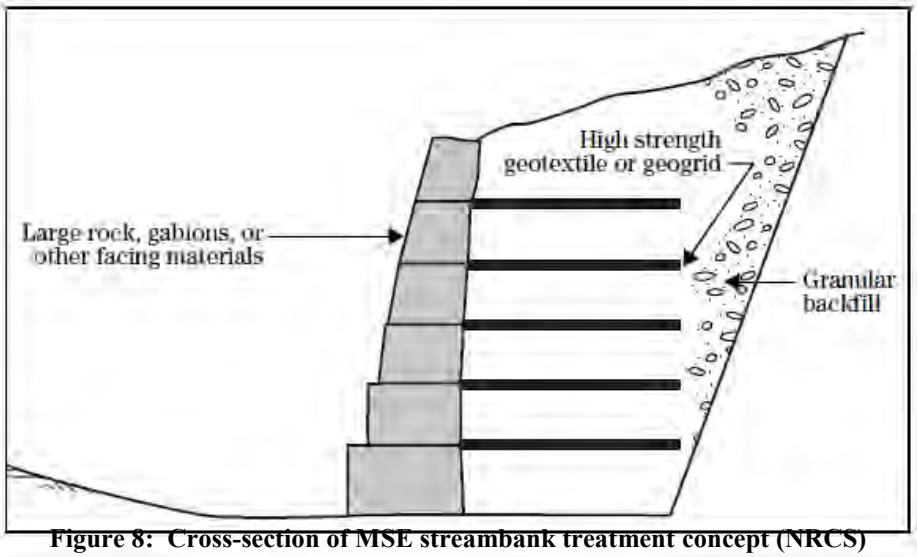


Figure 8: Cross-section of MSE streambank treatment concept (NRCS)

Advantages:

- Treatment is resistant to high flow velocities
- Steep streambank slopes are possible, conserving lot space
- Life-span of practice is usually significant, and can be prolonged with proper maintenance

Disadvantages:

- Though stability of the bank is achieved with stabilized earthfill, some type of hard facing would be necessary to protect the soil from debris and erosion. Such facing alone can be as expensive as other treatment methods, even without considering the cost of installing the mechanically stabilized earthfill.
- Installation of the mechanically stabilized earthfill could prove difficult near the toe, as river levels and saturated conditions could be problematic. Scheduling and completion of work would be critical. Though these challenges can also exist with other alternatives, they are somewhat more critical with this alternative.
- Treatment is often not viewed as aesthetically pleasing, due to the hard facing
- The hard facing typically has a lower habitat value for desired species such as salmon

Recommendation: This option is not recommended, due to its high relative cost. The annual high water levels experienced since glacial outbursts began would require the facing of the MSE wall to be extended to nearly the top of the streambank. This would likely increase costs above other acceptable alternatives.

Cost Estimate: As the treatment option is not recommended, no cost estimate for this option was developed.

3. Sheet pile wall

This alternative consists of driving steel sheet pile at the bank toe. Piles would be driven to a depth well below the stream bottom, and would act as a cantilever retaining wall. Due to the relatively high stream bank, two offset cantilever sheet pile walls would likely be necessary, with considerable distance between the walls (see Figure 9). Riprap would be placed on the portion of streambank between the two walls to prevent erosion. With proper placement and sheet pile selection, tie-back anchors could possibly be avoided, to achieve lower costs. Further investigation of subsurface conditions would be necessary in order to determine the potential presence of large rocks and boulders that could prevent or hinder pile driving. In addition, some existing rock on the stream bank and/or stream bed would likely need to be removed and/or relocated to allow pile driving.

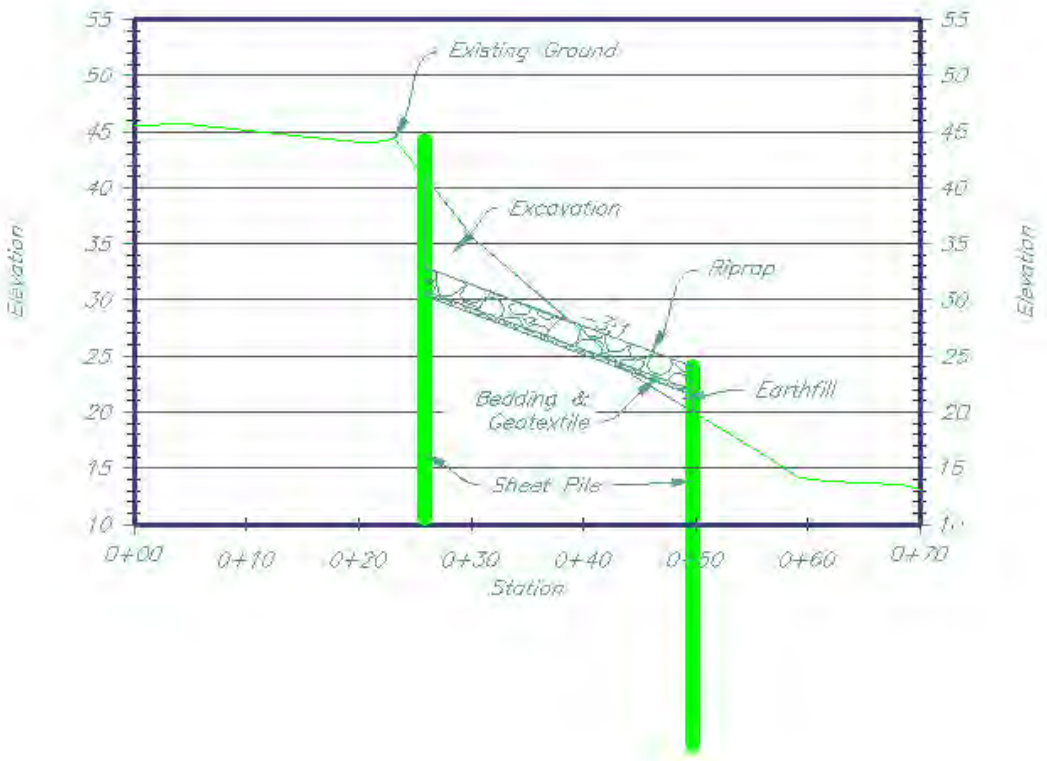


Figure 9: Cross-section of sheet pile wall streambank treatment concept

Advantages:

- Treatment is resistant to high flow velocities
- Vertical walls conserve lot/property space
- Life-span of practice is usually significant, and can be prolonged with proper maintenance

Disadvantages:

- Vibration or driving of piles can be a nuisance to neighboring properties
- Treatment is often not viewed as aesthetically pleasing
- The sheet pile typically has a lower habitat value for desired species such as salmon
- Two sheet pile walls plus riprap would be quite costly, in comparison to other alternatives.

Recommendation: This option is not recommended, due to its high relative cost.

Cost Estimate: This treatment option, though not recommended, is estimated to cost $3.0 million.

4. Riprap Revetment

This alternative would consist of grading the streambank to a stable slope, and placing geotextile, bedding, and rock riprap on the bank. The lower extents of the rock placement would need to be to at least the stream bottom, and likely lower to account for potential scour (see Figure 10). This is a proven method of streambank protection, and has been used in many instances in Alaska, as well as on the Mendenhall River both upstream and downstream of the Meander Way site.

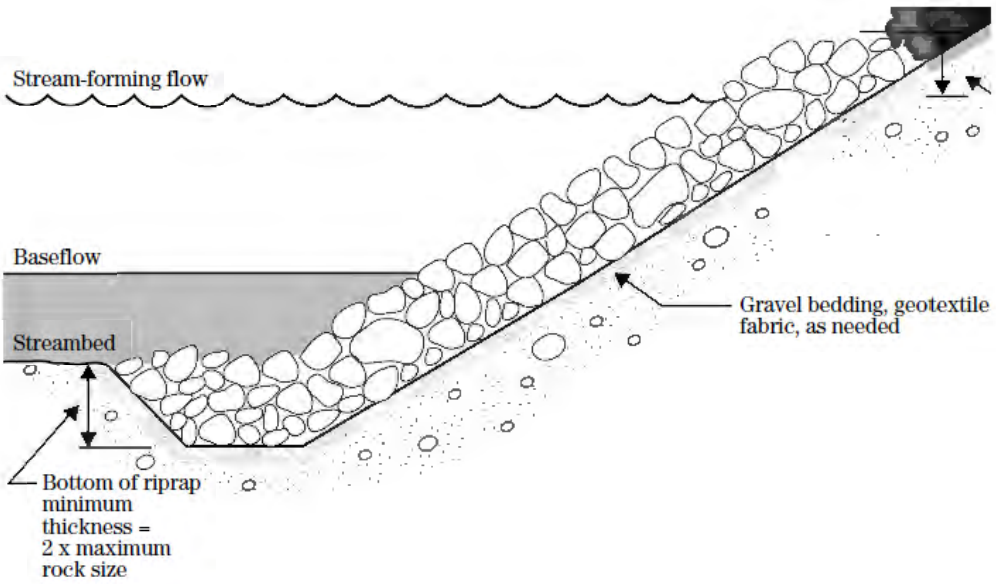


Figure 10: Cross-section of riprap streambank treatment concept (NRCS)

Advantages:

- Proven, effective method for addressing streambank erosion, and has been utilized on other reaches of the Mendenhall River
- With proper rock sizing, riprap can withstand extreme flow velocities and high shear stress
- Life-span of rock riprap is usually significant, and can be prolonged with proper maintenance

Disadvantages:

- High cost of hauling and placing rock, considering the bank geometry and scour hole present
- In order to achieve a stable slope on which to place rock, additional property will be impacted (loss of portions of back yards), which will likely be viewed as a negative by property owners. Near the deepest scour hole, the top of riprap placement will likely be extremely close to a few homes.
- Treatment is often not viewed as aesthetically pleasing
- Riprap typically has a lower habitat value for desired species such as salmon

Cost Estimate: Assuming there are local quarries that can provide adequately sized rock, a total project cost of $1.5 million could be expected.

Recommendation: Due to the steepness of the eroded bank, close proximity to existing homes, and significant scour at the streambank toe, a considerable volume of rock will be required with this option. The volume of rock placed in the streambed, to protect from scour and provide a launchable toe, may be problematic regarding fish habitat permitting. Several homes in the treatment area would have rock riprap placed very near to their foundations. While the option is potentially feasible, a riprap/sheet pile combination as discussed below

may be a better alternative, though at a somewhat higher cost. Nevertheless, the riprap alternative appears to be a viable option.

5. Sheet pile wall/riprap revetment combination
This alternative could consist of a combination of the riprap and sheet pile alternatives. A steel sheet pile wall would be placed at the toe of the bank, followed by placing rock riprap protection on the slope. This option requires significantly less rock than the riprap-only option, and possibly avoids the use of a costly tie-back system in the sheet pile wall.

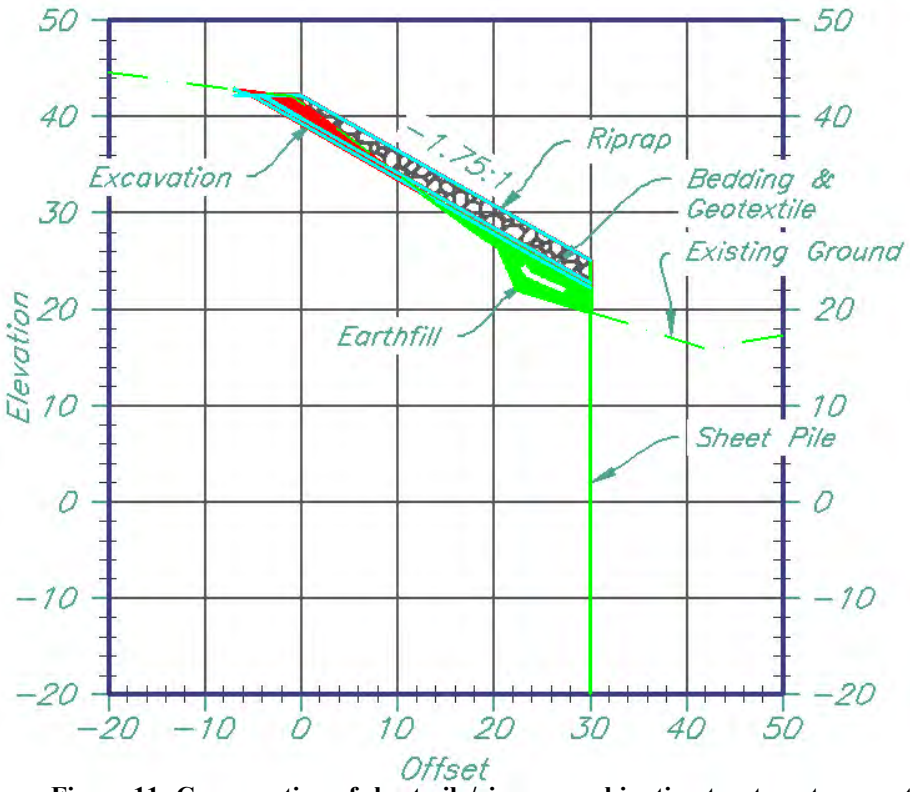


Figure 11: Cross-section of sheet pile/riprap combination treatment concept

Advantages:

- Proven, effective method for addressing streambank erosion
- With proper rock sizing, sheet pile and riprap can withstand extreme flow velocities and high shear stress
- Life-span of treatment is usually significant, and can be prolonged with proper maintenance
- Somewhat less property is likely impacted with this method versus using riprap alone

Disadvantages:

- High cost of driving piles and hauling and placing rock
- Vibration or driving of piles can be a nuisance to neighboring properties
- Treatment is often not viewed as aesthetically pleasing
- Riprap typically has a lower habitat value for desired species such as salmon

Cost Estimate: This treatment option is estimated to cost $2.1 million.

Recommendation: This option appears to be one of the most promising treatment methods to address the erosion on the Meander Way river bend of the Mendenhall River. The cost would be somewhat higher than the riprap-only option, but by placing sheet pile rather than riprap at the toe, there may be less chance of erosion and maintenance needs at the toe. In addition, there is less impact to the adjacent homes, with respect to placement of riprap near house foundations.

6. No action
   This alternative would leave the streambank in its current condition, with no additional treatment installed. Continued erosion would almost certainly occur. Eventually, erosion would progress to the point where at least some homes on Meander Way would become unsafe for occupancy, and would need to be moved or condemned. While the rate of erosion is uncertain, it is conceivable that erosion could progress to such a point within 5 years. Given the nature of sharp outside river bends, the hydraulic energy present in glacial outburst flows, and the erodible insitu materials present in the streambank, the erosion in the Meander Way bend could progress to the point where even the street and municipal utilities are in jeopardy.

Conclusions

To protect homes and infrastructure near Meander Way, a combination system of sheet pile and rock riprap are suggested to address streambank erosion. There is admittedly some degree of risk associated with applying any type treatment to the streambank, given the apparent instability and continued evolution of the river. Such risk can be somewhat reduced by applying more conservative design assumptions. Conservative design assumptions typically result in increased project costs.

While fish-friendly alternatives were considered, the high shear stress that is likely experienced on this river bend warrants the installation of more traditional hardened treatment methods. Softer treatments could be considered and incorporated in other areas of the river with lower shear stresses, in order to continue to provide adequate habitat for important aquatic species. The occurrence of glacial outbursts since 2011 has subjected the river banks to an unprecedented frequency of high water levels, to the extent that at least the historic 50-year flood flow has been experienced on nearly an annual basis since 2011. Many soft bank treatments can withstand short intervals of high water if they are of low frequency, say five or ten years apart. However, given the recent hydrologic changes, the increased flood frequency is likely to be too severe to allow soft treatments to be effective against erosion, especially for high bank stress areas such as outer river bends.

Habitat permitting will be an important part of any proposed on the Mendenhall River, and buy-in from the Alaska Department of Fish and Game will be important to pursue during the planning stages of any project. Input from ADF&G regarding the permitting of any selected alternative should be sought before significant effort and expense is incurred developing proposals and designs. Should the city choose to pursue streambank stabilization suggested herein, this report could be provided to ADF&G to begin a dialogue regarding allowable approaches to addressing the erosion.

Cost estimates and values of affected infrastructure presented herein are admittedly of very preliminary nature, and were not analyzed in great detail. Nevertheless, at first glance, installation of streambank protection for a small group of homes appears to be only marginally justifiable from an economic standpoint. However, if left untreated, continued migration of the erosion, both laterally and longitudinally, could have much larger long-term economic impacts that could justify pursuit of the suggested alternative. Through leveraging of potential funding sources for the project, the City and Borough could potentially implement a project that would provide adequate protection to homes and infrastructure along Meander Way.

The Emergency Watershed Protection (EWP) program, which is a federal program managed by NRCS, is potentially applicable to the Meander Way erosion. The program provides both financial and technical assistance in design and construction of projects that reduce watershed impairment. There are a number of criteria that must be met in order to be eligible for the EWP program, but the information gathered in preparation of this report shows that that the Meander Way site would likely fit the program. Funding is not guaranteed, and is typically more common for Presidentially-declared disasters. Nevertheless, projects similar in nature have been implemented in the past using the EWP program. Should the City and Borough of Juneau wish to pursue EWP funding in addressing the erosion problem, a request of that nature should be submitted in writing to NRCS, within 60 days after the next significant flood event or glacial outburst.

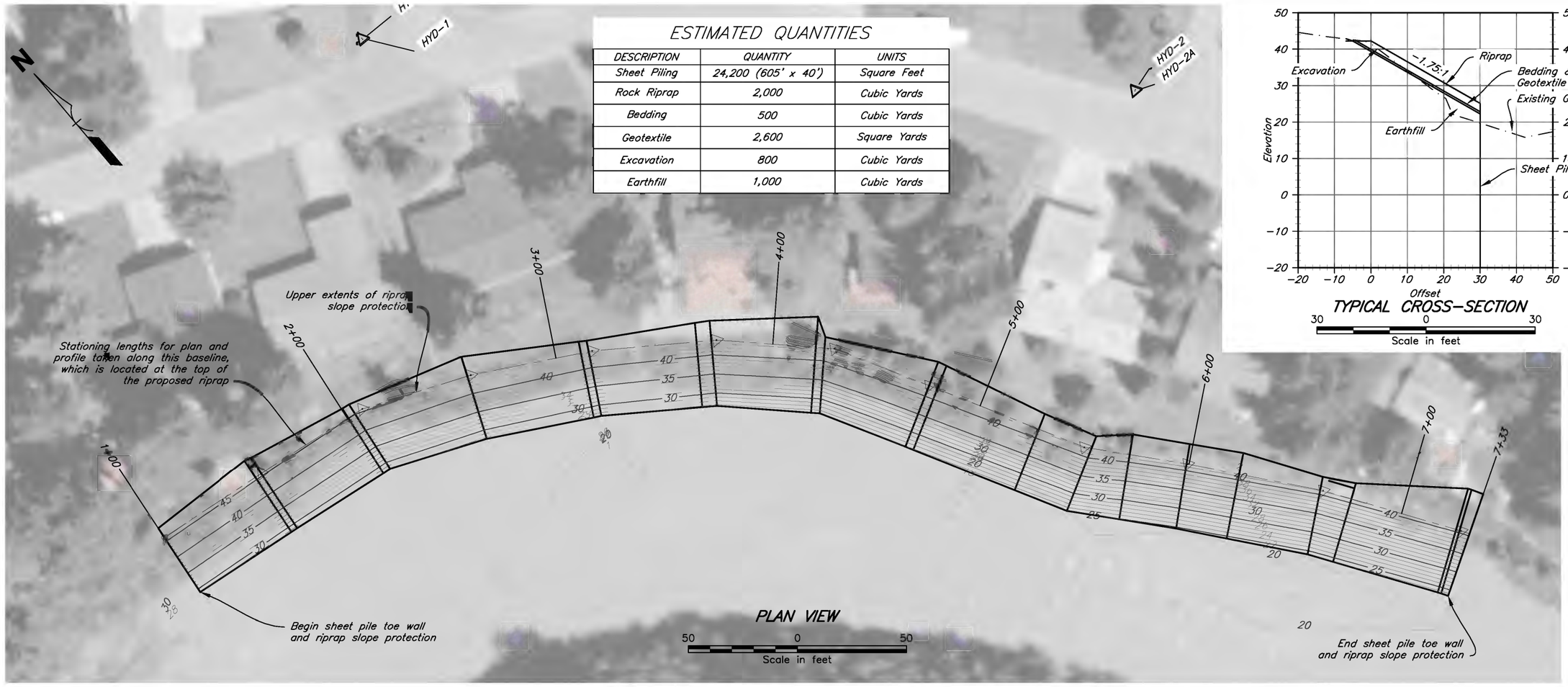
References

1. U.S. Department of Agriculture-Natural Resources Conservation Service, August 2007, Stream Restoration Design Handbook, National Engineering Handbook, Part 654, Washington, DC
2. U.S. Department of Agriculture-Natural Resources Conservation Service, April 2009, Stream Restoration Planning and Design, Fluvial System Stabilization and Restoration – Field Guide, Washington, D.C.
3. Neal, Edward G, 2009, Channel Incision and Water-Table Decline Along a Recently Formed Proglacial Stream, Mendenhall Valley, Southeastern Alaska, Studies by the US Geological Survey in Alaska, 2007: US Department of Interior-US Geological Survey, Professional Paper 1760-E
4. Neal, Edward G and Host, Randy H, Hydrology, 1999, Geomorphology, and Flood Profiles of the Mendenhall River, Juneau, Alaska, US Department of Interior-US Geological Survey, Water-Resources Investigations Report 99-4150, Anchorage, AK
5. Alaska Department of Fish and Game – Habitat and Restoration Division, September 1999, Guidelines for Bank Stabilization on the Mendenhall River, Technical Report No. 99-3, Douglas, AK

ATTACHMENT A – Conceptual Design Drawing and Cost Estimates

ESTIMATED QUANTITIES

DESCRIPTION	QUANTITY	UNITS
Sheet Piling	24,200 (605' x 40')	Square Feet
Rock Riprap	2,000	Cubic Yards
Bedding	500	Cubic Yards
Geotextile	2,600	Square Yards
Excavation	800	Cubic Yards
Earthfill	1,000	Cubic Yards



PLAN VIEW

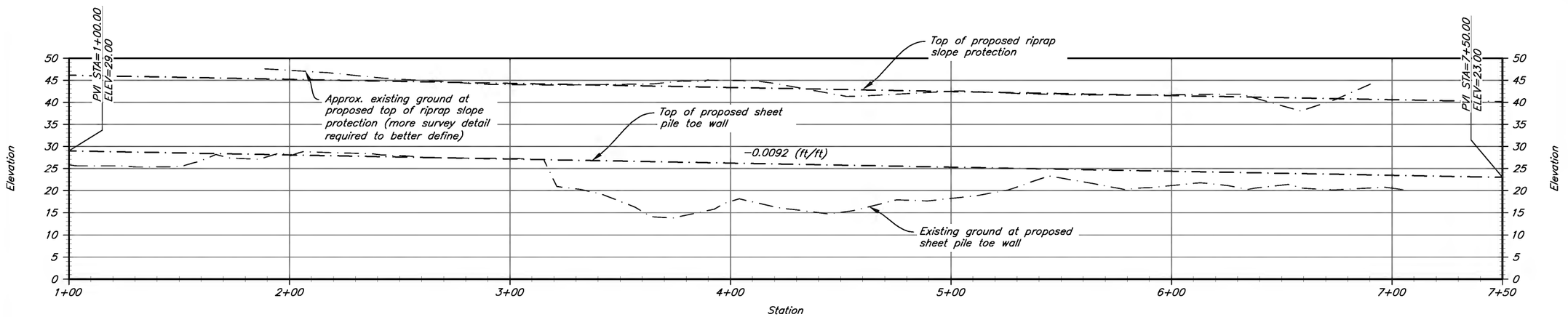
50 0 50

Scale in feet

TYPICAL CROSS-SECTION

30 0 30

Scale in feet



PROFILE VIEW

SCALE: Horiz. 1"=50'
Vert. 1"=25'

Designed L STEINKE 01JUL2015
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Approved

PLAN AND PROFILE

Juneau EWP

Mendenhall River Meander Way Streambank Protection

CITY & BOROUGH OF JUNEAU ALASKA

USDA United States Department of Agriculture

Natural Resources Conservation Service

File Name
SEE LEFT BORDER

Drawing Name
SAME AS FILE NAME

Sheet 1 of 1

Mendenhall Prelim3_1_1_6392.sv$.dwg 2-PLAN AND PROFILE 7/30/2015 3:34PM

Juneau/Mendenhall River Meander Way Streambank Protection Cost Estimates (from conceptual design)												
			Stepped Sheet Piling with Riprap			Riprap			Sheet Piling/Riprap Combination			
Bid Item	**Description**	**Units**	**Quantity**	**Unit Cost**	**Total Cost**	**Quantity**	**Unit Cost**	**Total Cost**	**Quantity**	**Unit Cost**	**Total Cost**	
1	Mobilization/Demobilization	each	1.0	$ 100,000.00	$ 100,000	1.0	$ 100,000.00	$ 100,000	1.0	$ 100,000.00	$ 100,000	
2	Pollution Control	lump sum	1.0	$ 30,000.00	$ 30,000	1.0	$ 30,000.00	$ 30,000	1.0	$ 30,000.00	$ 30,000	
3	Critical Path Scheduling	lump sum	1.0	$ 10,000.00	$ 10,000	1.0	$ 10,000.00	$ 10,000	1.0	$ 10,000.00	$ 10,000	
4	Contractor Quality Control	lump sum	1.0	$ 15,000.00	$ 15,000	1.0	$ 15,000.00	$ 15,000	1.0	$ 15,000.00	$ 15,000	
5	Construction Surveys	lump sum	1.0	$ 50,000.00	$ 50,000	1.0	$ 50,000.00	$ 50,000	1.0	$ 50,000.00	$ 50,000	
6	Clearing (existing rock and vegetation)	lump sum	1.0	$ 25,000.00	$ 25,000	1.0	$ 25,000.00	$ 25,000	1.0	$ 25,000.00	$ 25,000	
7	Excavation, Unclassified	cubic yards	2,000.0	$ 30.00	$ 60,000	1,200.0	$ 30.00	$ 36,000	800.0	$ 30.00	$ 24,000	
8	Earthfill, compacted	cubic yards	500.0	$ 50.00	$ 25,000	500.0	$ 50.00	$ 25,000	1,000.0	$ 50.00	$ 50,000	
9	Sheet Piling	square feet	40,414.0	$ 50.00	$ 2,020,700	0.0	$ -	$ -	24,200.0	$ 50.00	$ 1,210,000	
10	Riprap with Bedding and Geotextile	cubic yards	1,750.0	$ 200.00	$ 350,000	5,000.0	$ 200.00	$ 1,000,000	2,000.0	$ 200.00	$ 400,000	
11	Testing, Rock Riprap and Bedding	each	4.0	$ 4,000.00	$ 16,000	8.0	$ 4,000.00	$ 32,000	4.0	$ 4,000.00	$ 16,000	
12	Seeding	lump sum	1.0	$ 10,000.00	$ 10,000	1.0	$ 10,000.00	$ 10,000	1.0	$ 10,000.00	$ 10,000	
					$ -			$ -			$ -	
				Subtotal:	$ 2,711,700		Subtotal:	$ 1,333,000		Subtotal:	$ 1,940,000	
				Contingency:	$ 271,170		Contingency:	$ 133,300		Contingency:	$ 194,000	
				Grand Total:	**$ 2,982,870**		**Grand Total:**	**$ 1,466,300**		**Grand Total:**	**$ 2,134,000**	

CITY/BOROUGH OF JUNEAU
ALASKA'S CAPITAL CITY

Law Department
City & Borough of Juneau

MEMORANDUM

TO: Mayor and Assembly
Kim Kiefer, Manager
Mila Cosgrove, Deputy Manager

FROM: Amy Gurton Mead, Municipal Attorney

DATE: February 18, 2016

SUBJECT: Amending CBJ Code Relating to Succession of Office and the Filling of Vacancies

The first section of this memorandum repeats information provided to you in December, but I am including it again because it provides the framework for my recommendations:

Relevant Provisions of CBJ Charter and Current Code

1. Vacancies

Charter Section 3.2 states that "The assembly shall be composed of nine assemblymembers, one of whom shall be the mayor." Charter Section 3.6, which requires the assembly to provide, by ordinance, for the filling of vacancies on the assembly, makes no distinction between the mayor and other assemblymembers.[1] Thus, CBJ 11.40.040 controls the filling of all vacancies on the assembly, including a vacancy in the mayor's office:

> A vacancy on the assembly shall be filled by the assembly which shall elect by majority vote of the remaining members a qualified resident of the election district from which the vacancy arose to be the acting assemblymember until the next regular election or until a successor is elected and qualified to fill the remainder of the unexpired term. The person elected by the assembly receives the same salary as the assemblymember succeeded he or she succeeds.

2. Deputy Mayor Succession

Charter Section 3.5, Organization, states that immediately following certification of an election, the assembly "shall elect from its membership a deputy mayor…." Section 3.5 also requires the assembly to "provide by ordinance for the interim order of succession of its members to the office of deputy mayor."

[1] State law does distinguish between the two. *See* AS 29.20.170 and 29.20.280. These provisions do not apply to the City and Borough. (AS 29.10.200).

"Interim succession" is partially addressed at CBJ 11.15.015, which specifies that the member with most seniority succeeds to the office of deputy mayor when there is an "absence" (as opposed to vacancy) "from the municipality or an assembly meeting of the mayor and the deputy mayor." According to the legislative history, that code section was not intended to be anything more than a temporary measure when both the mayor and elected deputy mayor were both unavailable to preside. The Manager's Report for Ordinance 77-39, An Ordinance Amending CBJ 11.15 to Provide for the Interim Order of Succession to the Office of Deputy Mayor" states:

> This ordinance, as drafted, provides a succession to the office of Deputy Mayor. It was prepared as a result of your instruction at a previous Committee of the Whole meeting caused by a problem when both the Mayor and the Deputy Mayor were out of the city at the same time.[2]

Understanding CBJ 11.15.015 as providing only a temporary solution for those times when an acting mayor is needed and both the mayor and deputy mayor are unavailable is consistent with the plain language of that section in light of the Charter. CBJ 11.15.015 is only triggered by the temporary "absence" of the mayor and deputy mayor, not vacancies in those offices. (*Compare* Charter Section 3.6, providing that an assemblymember's office becomes "vacant upon the assemblymember's death, resignation, removal from office for any manner authorized by law or by this Charter, by forfeiture of office, or upon a determination in a manner as provided by ordinance that the assemblymember is medically incapacitated," with CBJ 11.15.015, which is triggered "During the absence from the municipality or an assembly meeting of the mayor and deputy mayor…".)

CBJ Charter Section 3.9 provides: "The deputy mayor shall succeed to the office of mayor when a vacancy occurs in that office. The deputy mayor shall perform the duties and exercise the powers of the mayor when the mayor is absent or unable, as determined by the assembly, to perform the duties of the office."

Neither the Charter nor the Code address the process to be used when the deputy mayor succeeds to the mayoral seat: specifically, what happens when the mayoral seat is filled at the next regular election if the deputy mayor's term is not over at the same time, or what happens when the Assembly calls a special election mid-term?

Recommendations

In my December 3, 2015, memorandum, I made the following recommendations:

1. Amend CBJ 11.15.015 to allow for broader applicability. Though the Charter clearly suggests it was the intention that the assembly adopt an "interim succession" process for deputy mayor in the broad sense, the actual ordinance that was adopted is limited. I recommended that

[2] The ordinance was revised in 1981 (Ordinance 81-73) by amending what was a complicated succession methodology with the simpler "seniority" rule. According to the legislative history, however, the purpose of the ordinance remained the same.

the ordinance be amended to provide for an interim succession process not only for those occasions when the seated mayor and deputy mayor are both unable to preside at some given meeting, but in situations where the deputy mayor must succeed to the office of mayor in accordance with Charter Section 3.9.

2. Amend CBJ 11.10.040 to provide a process for filling a mayoral vacancy by specifically articulating what happens to the deputy mayor's seat once the deputy mayor succeeds.

To assist you in articulating what direction you would like the amending ordinance to take, I'm including below the state statute on the filling of a vacancy in the office of mayor and a few examples of similar provisions from other communities.

As to the question before you, as to those jurisdictions whose code provides for a deputy mayor, some require the deputy mayor (or assemblymember succeeding to office of mayor) to step down upon succession, while others provide that the succession is temporary until a permanent replacement is seated. Either process would be permissible under CBJ Charter as section 3.9 is silent as to whether the succession is permanent or temporary.

1. **AS 29.20.280. Vacancy in the office of mayor** (*see* subsection b):

(a) The governing body shall, by two-thirds concurring vote, declare the office of mayor vacant only when the person elected

(1) fails to qualify or take office within 30 days after election or appointment;
(2) unless excused by the governing body, is physically absent for 90 consecutive days;
(3) resigns and the resignation is accepted;
(4) is physically or mentally unable to perform the duties of office;
(5) is convicted of a felony or of an offense involving a violation of the oath of office;
(6) is convicted of a felony or misdemeanor described in AS 15.56;
(7) is convicted of a violation of AS 15.13;
(8) no longer physically resides in the municipality; or
(9) if a member of the governing body in a second class city, misses three consecutive regular meetings and is not excused.

(b) A vacancy in the office of mayor occurring six months before a regular election shall be filled by the governing body. The person appointed serves until the next regular election when a successor is elected to serve the balance of the term. If a member of the governing body is appointed mayor, the member shall resign the seat on the governing body. If a vacancy occurs more than six months before a regular election, the governing body shall call a special election to fill the unexpired term.

(c) Notwithstanding (b) of this section, a vacancy in the office of mayor of a second class city shall be filled by and from the council. A mayor appointed under this subsection serves the balance of the term to which appointed, except the mayor may serve only while a member of the council.

The Kenai Peninsula Borough simply adopts the state statute. (*See* Kenai Peninsula Borough Code 2.04.080.)

2. **Municipality of Anchorage: Section 7.02. - Filling vacancies in elective office** (*see* subsection (c)):

(a) If a vacancy occurs on the school board, the remaining members shall appoint a qualified person to fill the vacancy within 30 days. The person appointed shall serve until the next regular election, at which time a successor shall be elected to serve the balance of the term. If less than 30 days remain in a term when a vacancy occurs, the vacancy shall not be filled. However, if at any time, the membership is reduced to fewer than a quorum, the remaining members, within seven days, shall appoint a number of qualified persons sufficient to constitute a quorum.

(b) If a vacancy occurs on the assembly, the remaining members may appoint a qualified person to fill the vacancy within 30 days. The person appointed shall serve until the next regular or special election, at which time a successor shall be elected to serve the balance of the term. If the vacancy occurs more than six months before the next regular election, the assembly shall provide for a special election to fill the vacancy not more than 60 days after the occurrence of the vacancy. If less than 30 days remain in a term when a vacancy occurs, the vacancy shall not be filled. However, if at any time, the membership is reduced to fewer than a quorum, the remaining members, within seven days, shall appoint a number of qualified persons sufficient to constitute a quorum.

(c) A vacancy in the office of mayor shall be filled at a regular or special election held not less than 90 days from the time the vacancy occurs. If less than 90 days remain in the term when the vacancy occurs, the vacancy shall not be filled. When a vacancy occurs in the office of mayor, the chair of the assembly shall serve as acting mayor until a successor is elected and takes office. The acting mayor has the veto power, but may not vote on assembly action. The assembly by ordinance shall provide for further succession to the office of acting mayor.

3. **Yakutat**

2.16.050 Vacancy in the Office of Mayor.

A vacancy in the office of Mayor occurring within six months before a regular election shall be filled by the Assembly. The person designated shall serve until the next regular election and until a successor is elected and qualified to serve the balance of the term. If an Assembly member is chosen, he shall resign his Assembly seat. If a vacancy occurs more than six months before a regular election, the Assembly shall call a special election to fill the unexpired term.

2.16.060 Mayor pro tempore.

The Assembly shall annually appoint a Mayor pro tempore from among its members. Should the office of the Mayor become vacant, or if the existing Mayor is disabled or unable to act, the Mayor pro tempore shall serve until the new Mayor resumes his official duties or until a new Mayor is qualified. During any such service, the attendance of the Mayor pro tempore at an

Assembly meeting shall be counted for the purposes of a quorum, and he may vote in the meeting as he normally would as a member of the Assembly.

2.16.070 Succession to office of Mayor and Mayor pro tempore.

Should both the Mayor and Mayor pro tempore be absent or unable to perform the duties of the office of Mayor, the order of interim succession shall be determined as follows:

A. The Assembly member with the longest total period of tenure in office shall assume the office of Mayor pro tempore.

B. Should more than one Assembly member have the same total period of tenure in office, that Assembly member who received the largest plurality at the last election at which such Assembly members were elected shall assume the office of Mayor pro tempore.

4. **Haines Borough: 2.16.040 Vacancy in the Office of Mayor and Skagway Borough Code 3.01.040 Vacancy in the Office of Mayor**

Both codes read as follows:

. . .

B. A vacancy in the office of mayor occurring within six months before a regular election shall be filled by the assembly. The person appointed serves until the next regular election when a successor is elected to serve the balance of the term. If a member of the assembly is appointed mayor, the member shall resign the seat on the assembly. If a vacancy occurs more than six months before a regular election, the assembly shall call a special election to fill the unexpired term.

5. Fairbanks North Star Borough: 2.04.080 Vacancy.

A vacancy in the office of the borough mayor occurring within six months prior to a regular election shall be filled by the assembly. The person designated shall serve until the next regular election and until a successor is elected and has qualified. If an assemblyperson is chosen, he shall resign his assembly seat. If a vacancy occurs more than six months before a regular election, the assembly shall call a special election to fill the unexpired term.

6. Matanuska-Susitna Borough Code: 2.08.080 Vacancy in the office of mayor.

(A) A vacancy in the office of the mayor occurring within 180 calendar days prior to a regular election shall be filled by appointment by the assembly. The person appointed shall serve until the next regular election and until a successor is elected to serve the balance of the term. If an assembly member is appointed the assembly member shall resign the assembly seat. If a vacancy occurs more than 180 calendar days before a regular election, the assembly shall call a special election to fill the unexpired term.

. . .

Current CBJ Code

11.10.040 - Vacancies.

A vacancy on the assembly shall be filled by the assembly which shall elect by majority vote of the remaining members a qualified resident of the election district from which the vacancy arose to be the acting assemblymember until the next regular election or until a successor is elected and qualified to fill the remainder of the unexpired term. The person elected by the assembly receives the same salary as the assemblymember succeeded he or she succeeds.

(Charter 1970, § 3.6; CBJ Code 1970, § 11.10.030; Serial No. 70-30, § 1, 1970)

11.15.015 - Interim succession to office of deputy mayor.

During the absence from the municipality or an assembly meeting of the mayor and the deputy mayor, the assemblymember present with the longest period of current consecutive service on the assembly shall succeed to the office of deputy mayor. Where two or more assemblymembers shall have the same length of current consecutive service, the assemblymember who received the most votes at the most recent election at which all such assemblymembers stood for election shall be the assemblymember with the longest length of service for purpose of this section.

(Serial No. 81-73, § 1, 1981)