Appointment

From: Kenney, James [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=ce6ff86939e44da49
Sent: 7/27/2018 9:55:24 PM
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(FYDIBOHF23SPDLT)/cn=Recipients/cn=78e63acc248f41328768db82d95464c3-JBOWLES]; Grantham, Nancy [/o=ExchangeLabs/ou

Subject: Bi-Monthly EPA/State/Tribal Oil and Natural Gas Conference Call
Location: Dial: Ex. 6 Conference ID: Ex. 6

Start: 2/20/2019 6:00:00 PM
End: 2/20/2019 7:00:00 PM
Show Time As: Busy

Recurrence: Monthly

the third Wednesday of every 2 month(s) from 11:00 AM to 12:00 PM

The focus of the December call is on water-related oil and natural gas topics. We will hear from representatives with EPA's Office of Enforcement and Compliance Assurance on the following item:

1. The web-based oil and natural gas sector compliance assistance center.

To join the conference line, dial Ex. 6 Please provide the operator with the following conference ID: Ex. 6 You may join the call up to 15 minutes prior to the scheduled start time. If you need assistance during the call, use the following keypad commands on your phone: *0 - Operator assistance or *6 - Self mute/unmute.

If you have any questions about this particular call or would like to suggest topics for future calls, please contact me.
Sincerely,
Jim Kenney

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James C. Kenney | Senior Policy Advisor for Unconventional Oil and Gas | US EPA
Desk/Mobile: Ex. 6 | **Email:** kenney.james@epa.gov

Appointment

From: Kenney, James [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=ce6ff86939e44da4
Sent: 7/27/2018 9:54:36 PM
To: Kenney, James [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=ce6ff86939e44da4
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allison.mclaughlin@quinault.org; POI36871@Isletapueblo.com [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF
(FYDIBOHF23SPDLT)/cn=Recipients/cn=a75b55da3e3a4764ba38358bea9977ce-smountainfl]; cnaha@kewa-nsn.us [/o=Exchange
(FYDIBOHF23SPDLT)/cn=Recipients/cn=707b0f2bfb0546c1be35323fe0a5daac-inperce@ftb]; Boyd.Nystedt@enipc.org [/o=Excha
(FYDIBOHF23SPDLT)/cn=Recipients/cn=52ea500dc0b1486aa5bca2dd37d13679-tammy.parke]; jacob_pecos@pueblodecochiti.or
[/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=08c27fe955b84d8bb32ebbb74759
srydeen@nambepueblo.org [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=b014
(FYDIBOHF23SPDLT)/cn=Recipients/cn=5af0c478bdb34f009b3a3d3ea8921a8b-pstout@sfpueblo.com]; Ex. 6
(FYDIBOHF23SPDLT)/cn=Recipients/cn=cbf456b55b6e49da9e49c3f7c7086abe-atwobears@standingrock.org]; lvetter@standingr
(FYDIBOHF23SPDLT)/cn=Recipients/cn=c2428b5c0f79426995bb8512dd18910a-gwagner@3ri]; cwagon@easternshoshone.org; lv
(FYDIBOHF23SPDLT)/cn=Recipients/cn=f7184e4b5ccc4f5191aba63e8b86fe76-ashdw@nemon]; andy.werk@ftbelknap.org; pawil
Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=user81bfbd4a]; Harry Birdwell [harry.birdwell@clo.ok.gov]; Amy Ch
[/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=userab1280d9]; hannah.phan@iog
(FYDIBOHF23SPDLT)/cn=Recipients/cn=2fa5c9eb65dc497c81a8dc9ccdb1ffa7-Richardson, RobinH]; Bowles, Jack [/o=ExchangeLab
(FYDIBOHF23SPDLT)/cn=Recipients/cn=12a3c2ed7158417fb0bb1b1b72a8cfb0-Grantham, Nancy]

Subject: Bi-Monthly EPA/State/Tribe Oil and Natural Gas Conference Call
Attachments: FAQ.pdf
Location: Dial: Ex. 6, Conference ID: Ex. 6
Start: 10/17/2018 5:00:00 PM
End: 10/17/2018 6:00:00 PM
Show Time As: Busy

Recurrence: Monthly
the third Wednesday of every 2 month(s) from 11:00 AM to 12:00 PM

The focus of the October call is on water-related oil and natural gas topics. We will hear from representatives with EPA's Office of Water on the following items:

1. The Clean Water Act Produced Water Study, and
2. General updates related to the Safe Drinking Water Act Underground Injection Control Program.

To join the conference line, dial: Ex. 6. Please provide the operator with the following conference ID: Ex. 6 You may join the call up to 15 minutes prior to the scheduled start time. If you need assistance during the call, use the following keypad commands on your phone: *0 - Operator assistance or *6 - Self mute/unmute.

If you have any questions about this particular call or would like to suggest topics for future calls, please contact me.
Sincerely,
Jim Kenney
--
James C. Kenney | Senior Policy Advisor for Unconventional Oil and Gas | US EPA
Desk/Mobile: Ex. 6 **Email:** kenney.james@epa.gov

Bi-Monthly EPA/State/Tribe Oil and Natural Gas Conference Call
Frequently Asked Questions

1) What is the bi-monthly call schedule?
   - The first bi-monthly conference call took place on Wednesday, June 20, 2018 from 1-2 pm EDT. Conference calls occur every other month from 1-2 pm EDT on the third Wednesday of the month (i.e., August 15, 2018, October 17, 2018, December 19, 2018, February 20, 2019, etc.).

2) What will these conference calls cover?
   - The bimonthly conference calls will focus on topics related to responsible oil and natural gas exploration and development.

3) Who from my organization should participate?
   - The answer is to this question is likely agenda dependent. You will receive an agenda before each call that will help answer this question.

4) Can multiple individuals from my organization participate?
   - Yes. When practical, we ask that you gather the multiple individuals together and connect to the conference call using a single phone line.

5) Can I suggest agenda topics?
   - Yes. Please send suggested agenda topics for future calls to James Kenney (kenney.james@epa.gov).

6) Who is invited to these calls?
   - State and tribal representatives with oil and natural gas exploration and production interests. The conference calls are generally for state and tribal governments only.

7) Who from EPA will participate?
   - Depending on the agenda topic, representatives from EPA's program and regional offices.

8) What is the objective of these conference calls?
   - It is our hope that these conference calls will allow us to continue to build and improve relationships while finding meaningful solutions to various challenges. For additional background, please see the Oil and Natural Gas Roundtable Highlights document.

9) Do these conference calls replace various state and tribal calls with EPA program or regional offices?
   - No, these conference calls provide an additional opportunity for states, tribes and EPA to discuss topics related to onshore oil and natural gas exploration and production.

10) What else do I need to know?
   - During the conference calls, we are looking to hear from individual states and tribes on various topics. Please note that EPA is not seeking group consensus from states or tribes during these conference calls.

11) What if I have additional questions?
   - Please contact James Kenney, Senior Policy Advisor for Unconventional Oil and Natural Gas, at kenney.james@epa.gov or at Ex. 6

Message

From: DiPasquale, Nicholas [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=528CE4A1189C42B8B9A9139A25DBC320-NDIPASQU]
Sent: 9/6/2017 7:59:55 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]; Ben Grumbles [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=usereb77e807]
CC: Penman, Crystal [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=93662678a6fd4d4695c3df22cd95935a-Penman, Crystal]
Subject: RE: NACo

Will do. Thanks Lee.

Nicholas A. DiPasquale, Director
Chesapeake Bay Program Office
410 Severn Ave Suite 109
Annapolis, MD 21403
Tel:
Cell: **Ex. 6**
E-mail: dipasquale.nicholas@epa.gov
Web: http://www.chesapeakebay.net

From: Forsgren, Lee
Sent: Wednesday, September 06, 2017 3:56 PM
To: DiPasquale, Nicholas <dipasquale.nicholas@epa.gov>; Ben Grumbles <ben.grumbles@maryland.gov>
Cc: Penman, Crystal <Penman.Crystal@epa.gov>
Subject: RE: NACo

Nick,

Can you work with Ben Grumbles office, NaCo and Crystal to find a time that works for us to talk to NaCo?

Lee

D. Lee Forsgren
Deputy Assistant Administrator
Office Of Water
Environmental Protection Agency
1200 Pennsylvania Avenue, VW
Room 3219 WJCE
Washington, DC 20460

Phone: 202-564-5700
Forsgren.Lee@epa.gov

From: DiPasquale, Nicholas
Sent: Wednesday, September 6, 2017 3:39 PM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Subject: NACo

Hey Lee, just checking in. Let me know if you need any additional information. Thanks, nick

Nicholas A. DiPasquale, Director
Chesapeake Bay Program Office
410 Severn Ave Suite 109
Annapolis, MD 21403
Tel:
Cell: Ex. 6
E-mail: dipasquale.nicholas@epa.gov
Web: http://www.chesapeakebay.net

Message

From: Kathy Bishop -MDE- [kathy.bishop@maryland.gov]
Sent: 8/29/2017 4:02:16 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
CC: Ben Grumbles [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=usereb77e807]; Penman, Crystal [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=93662678a6fd4d4695c3df22cd95935a-Penman, Crystal]
Subject: Re: NACo Proposed Resolutions

Please call Ben on 410-537-4187. I'll send an invite fro a 15-min call.

Thanks,

--

Kathy Bishop
Executive Associate to the Secretary
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230
410.537.4187
Kathy.Bishop@Maryland.gov

On Tue, Aug 29, 2017 at 11:58 AM, Forsgren, Lee <Forsgren.Lee@epa.gov> wrote:

> Ben, 4:15 works for me. What do you think about 15 minutes? Do you want to call me or do you want me to call you. If you want me to call you what is the best number?
>
> Lee
>
> **From:** Ben Grumbles -MDE- [mailto:ben.grumbles@maryland.gov]
> **Sent:** Tuesday, August 29, 2017 11:44 AM
> **To:** Forsgren, Lee <Forsgren.Lee@epa.gov>
> **Cc:** Kathy Bishop <kathy.bishop@maryland.gov>
> **Subject:** Re: NACo Proposed Resolutions
>
> How about 4:15 today?
>
> Sent from my iPhone

On Aug 29, 2017, at 7:06 AM, Forsgren, Lee <Forsgren.Lee@epa.gov> wrote:

Ben

How about sometime between 4-5:30?

Lee

Sent from my iPhone

On Aug 28, 2017, at 10:56 PM, Ben Grumbles -MDE- <ben.grumbles@maryland.gov> wrote:

Yes. Is there a time tomorrow afternoon or early evening that might work?

Thanks.

Ben

Sent from my iPhone

On Aug 28, 2017, at 1:54 PM, Forsgren, Lee <Forsgren.Lee@epa.gov> wrote:

Ben,

We should talk then reach out to NaCo.

Lee

D. Lee Forsgren

Deputy Assistant Administrator

Office Of Water

Environmental Protection Agency

1200 Pennsylvania Avenue, VW

Room 3219 WJCE

Washington, DC 20460

Phone: 202-564-5700

Forsgren.Lee@epa.gov

From: DiPasquale, Nicholas
Sent: Monday, August 28, 2017 1:51 PM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Subject: FW: NACo Proposed Resolutions

Lee, see previous message. Scroll down to the resolution to see text highlighted in yellow that is inaccurate or incorrect. Thanks, Nick

Nicholas A. DiPasquale, Director

Chesapeake Bay Program Office

410 Severn Ave Suite 109

Annapolis, MD 21403

Tel: 410.267.5710

Cell: Ex. 6

E-mail: dipasquale.nicholas@epa.gov

Web: http://www.chesapeakebay.net

From: Power, Lucinda
Sent: Wednesday, July 19, 2017 4:12 PM

To: DiPasquale, Nicholas <dipasquale.nicholas@epa.gov>; Edward, James <edward.james@epa.gov>; Batiuk, Rich <Batiuk.Richard@epa.gov>; Bisland, Carin <bisland.carin@epa.gov>; Wenz, Tom <Wenz.Tom@epa.gov>; Miller, Linda <miller.linda@epa.gov>; McNally, Dianne <mcnally.dianne@epa.gov>
Subject: RE: NACo Proposed Resolutions

Nick,

Please see the highlighted information and responses below. Any quoted language is taken directly from the final recommendations document of the Local Planning Goals Task Force, unless otherwise noted: http://www.chesapeakebay.net/channel_files/23900/final_recommendations_of_the_local_planning_goals_task_force_wqgit_approved_12.19.16.pdf.

Thanks,

Lucinda

Lucinda Power

Implementation and Evaluation Team Leader

Chesapeake Bay Program Office

U.S. Environmental Protection Agency

(410) 267-5722

"Be the change you wish to see in the world." - Gandhi

From: DiPasquale, Nicholas
Sent: Wednesday, July 19, 2017 2:05 PM
To: Power, Lucinda <power.lucinda@epa.gov>; Edward, James <edward.james@epa.gov>; Batiuk, Rich <Batiuk.Richard@epa.gov>; Bisland, Carin

<bisland.carin@epa.gov>; Wenz, Tom <Wenz.Tom@epa.gov>; Miller, Linda <miller.linda@epa.gov>; McNally, Dianne <mcnally.dianne@epa.gov>
Subject: RE: NACo Proposed Resolutions

Lucinda, could you take a stab at highlighting the factual inaccuracies and inserting the relevant expectations language on local area planning goals. It says they are taking the resolutions up this Friday. Thanks, Nick

Nicholas A. DiPasquale, Director

Chesapeake Bay Program Office

410 Severn Ave Suite 109

Annapolis, MD 21403

Tel: 410.267.5710

Cell: Ex. 6

E-mail: dipasquale.nicholas@epa.gov

Web: http://www.chesapeakebay.net

From: Power, Lucinda
Sent: Wednesday, July 19, 2017 12:10 PM
To: DiPasquale, Nicholas <dipasquale.nicholas@epa.gov>; Edward, James <edward.james@epa.gov>; Batiuk, Rich <Batiuk.Richard@epa.gov>; Bisland, Carin <bisland.carin@epa.gov>; Wenz, Tom <Wenz.Tom@epa.gov>; Miller, Linda <miller.linda@epa.gov>; McNally, Dianne <mcnally.dianne@epa.gov>
Subject: FW: NACo Proposed Resolutions

FYI. The one relating to us is below (local planning goals) and can be found on pages 26-27 of the attached. Much of it is just factually incorrect.

Proposed Resolution on EPA's Imposition of Numeric Water Quality-Based Effluent Limitations on Local Governments

Issue: The U.S. Environmental Protection Agency (EPA) is imposing watershed-wide water quality standards on all localities within the Chesapeake Bay watershed, which will have implications on other counties across the nation when such standards are imposed in other watersheds.

LP: Incorrect. It might be helpful to provide some information on the process for developing water quality standards. Like…typically, a state, territory, or authorized tribe proposes water quality standards that EPA must then review and approve. If the proposed water quality standards do not meet the requirement of the Clean Water Act, EPA would specify changes that would make the standards approvable, or it may promulgate federal standards if necessary. Any federal-promulgated water quality standards are issued to a state, territory, or authorized tribe, not "localities."

Proposed Policy: NACo opposes U.S. EPA's efforts to implement localized numeric water quality-based effluent limitations or area pollution targets. NACo opposes any provisions of any watershed-wide strategy that penalizes local governments by withdrawing current forms of financial assistance or imposing monitoring, management or similar requirements on localities without providing sufficient resources to achieve water quality objectives.

LP: Incorrect. EPA expects the jurisdictions, working with their local partners, to develop local planning goals.

"The 2010 Bay TMDL established wasteload allocation (WLAs) and load allocations (LAs) for point sources and nonpoint sources of pollution, respectively. Point sources, in this context, include all sources subject to regulation under the National Pollutant Discharge Elimination System (NPDES) program (e.g., wastewater treatment facilities, some stormwater discharges and concentrated animal feeding operations). Local planning goals are

not WLAs and therefore are not directly applicable to NPDES permitting."

"EPA expects the jurisdictions to work closely with their respective local partners in the development and implementation of these local planning goals. It is up to each jurisdiction to decide how to track and report progress towards achievement of local planning goals through their two-year milestones and/or annual progress reporting to EPA. In no way do the planning goals supersede or modify, jurisdictions' obligations under statutes, regulations, policies, or executive orders. These recommendations do not establish any new requirement or rights for the jurisdictions or its local partners."

"Task Force members have expressed their concern that establishment of local planning goals could imply the subsequent delegation of responsibility for achieving those goals to the localities. The Task Force members also expressed concern that local, state and federal statutory and regulatory requirements could influence the implementation of local planning goals. Task Force members questioned whether local planning goals could subject localities to new or more stringent WLAs, permit limits, or other related enforcement by EPA. The Task Force, therefore, recommends that EPA directly address these questions and concerns in the Phase III WIP Expectations document. The Task Force requests EPA specify in the Phase III WIP Expectations document that in no way do the targets supersede or modify locality obligations under statutes or regulations, that local planning goals do not establish any new requirement or rights for localities, and that decisions regarding how local stakeholders may be involved in achieving local planning goals will remain with the jurisdiction."

From EPA's Interim Phase III WIP Expectations Document: "As a result of the work completed by the Partnership's Task Force, EPA expects the jurisdictions to work with their local and regional partners, stakeholders, and federal and state facilities to establish measurable local planning goals at a geographic scale below the state-major river basin and implement them through their Phase III WIPs. In and of themselves, these local planning goals do not supersede or modify any statutory or regulatory obligations of the local and regional partners; nor do the goals establish any new requirements or rights for those local and regional partners. Decisions regarding how local and regional stakeholders may be involved in developing and achieving local planning goals will remain with the jurisdiction."

Background: On June 15, 2014, Delaware, Maryland, New York, Pennsylvania, Virginia and West Virginia signed the Chesapeake Bay Watershed Agreement with the U.S. Environmental Protection Agency (EPA). The plan provides for collaboration across political boundaries to work toward restoration of the Bay.

By the end of 2018, the states of Virginia, Maryland, Pennsylvania, West Virginia, Delaware, New York and the District of Columbia are required to submit to the EPA their final "Phase 3" Chesapeake Bay Watershed Implementation Plans (WIP). The chief purpose of these plans will be to promulgate strategies for all states in the Chesapeake Bay watershed to implement all measures necessary to meet specific pollution reduction goals for the Chesapeake Bay by the year 2025.

LP: It might be helpful to clarify the actual 2025 goal under the Bay TMDL: "By 2025, have all practices and controls installed to achieve the Bay's dissolved oxygen, water clarity/submerged aquatic vegetation and chlorophyll a standards as articulated in the Chesapeake Bay TMDL document." These practices are expected to be *in place* by 2025.

As part of a watershed wide strategy for meeting Chesapeake Bay improvement goals, a Local Area Targets Task Force was convened to assess whether WIPs for the states should include local area targets (LATs). While the task force was still working to determine whether LATs should be included in state plans, EPA informed local governments that WIPs will include LATs, imposing specific numerical water pollution limits, regardless of the Task Force's recommendations. This imposition is counter to other Clean Water Act requirements which require "maximum extent practicable" measures.

LP: Incorrect. It was the Partnership's Water Quality Goal Implementation Team (WQGIT) that decided the Phase III WIPs would include local planning goals: "The Task Force recognizes the intent of the WQGIT that local planning goals should be established by each of the seven Chesapeake Bay jurisdictions at a scale below the state-major river basin. The Task Force further recognizes that due to the varied nature of local government structures (including soil & water conservation districts) across the Chesapeake Bay jurisdictions, one size will not fit all with regard to the development and implementation of local planning goals. Accordingly, the Task Force recommends that local goals be established in partnership with their local and regional partners, stakeholders and federal and state facilities, at a scale below the state-major river basin, using the options provided for "local" under Question #2. Providing such flexibility will allow the jurisdictions to design Phase III WIP planning and local engagement processes that are best suited to them and their partners."

Also, the Partnership refers to these are "local planning goals", not local area targets to avoid confusion with any regulatory mechanism. As a result, the Task Force changed its name to "Local Planning Goals Task Force".

Despite EPA's pronouncement, the LAT Task Force completed its work and recommended removal of LAT provisions from the Phase 3 Chesapeake Bay WIP. In the alternative, should LATs be imposed despite the Task Force's recommendation, the Task Force recommended that each individual state be permitted to determine how best to implement a LAT program in its jurisdiction since a one-size-fits-all approach is impractical. In accepting the LAT Task Force's recommendations, the EPA affirmed its pronouncement that LATs will be included in the WIP expectations document to be issued.

LP: Similar to my response above: "The Task Force recognizes the intent of the WQGIT that local planning goals should be established by each of the seven Chesapeake Bay jurisdictions at a scale below the state-major river basin. The Task Force further recognizes that due to the varied nature of local government structures (including soil & water conservation districts) across the Chesapeake Bay

jurisdictions, one size will not fit all with regard to the development and implementation of local planning goals. Accordingly, the Task Force recommends that local goals be established in partnership with their local and regional partners, stakeholders and federal and state facilities, at a scale below the state-major river basin, using the options provided for "local" under Question #2. Providing such flexibility will allow the jurisdictions to design Phase III WIP planning and local engagement processes that are best suited to them and their partners."

The establishment of LATs will have a significant and unintended financial consequence on local governments since the majority of costs to comply with watershed-wide clean up goals will fall on local governments. Adding specific LATs to stormwater management programs and wastewater treatment plant plans will be especially burdensome for counties of all sizes, especially if the federal government does not provide funding to meet these federal goals. President Trump's FY 2018 budget proposed to eliminate all Chesapeake Bay grant funding; this funding helps states and localities meet these federally determined goals.

The Chesapeake Bay clean-up efforts and EPA's imposition of LATs will serve as a model for other watershed-wide improvement programs across the country. Counties with watersheds feeding Long Island Sound, Albemarle Sound, Puget Sound, the Great Lakes, the Gulf of Mexico and others will be impacted when EPA's program is implemented in these areas.

LP: It was the Partnership's decision to include local planning goals as part of the Phase III WIP development and implementation processes.

Fiscal/Urban/Rural Impact: Rural, agricultural, and urban counties and cities in large watersheds and regional estuaries will be severely impacted by increased compliance costs, economic development impacts, and negative impacts on federal funding if EPA is successful in imposing watershed-wide water quality standards upon county governments and their citizens.

LP: Similar to my response above. EPA does not promulgate and "impose" water quality standards upon county governments and their citizens.

Sponsor(s): Ruby Brabo, Supervisor, King George County, Va.; Penny Gross, Supervisor,

Fairfax County, Va.; Paul Trampe, Supervisor, Spotsylvania County, Va.; Claire Collins,

Supervisor, Bath County, Va.; Erick Coolidge, Commissioner, Tioga County, Pa.; Todd Devlin, Commissioner, Prairie County, Mont.; and Russell Clark, Supervisor, Yuma County, Ariz.

Lucinda Power

Implementation and Evaluation Team Leader

Chesapeake Bay Program Office

U.S. Environmental Protection Agency

(410) 267-5722

"Be the change you wish to see in the world." - Gandhi

From: Hanson, Andrew
Sent: Wednesday, July 19, 2017 11:44 AM
To: Evalenko, Sandy <Evalenko.Sandy@epa.gov>; Rush, Alan <Rush.Alan@epa.gov>
Cc: Christensen, Damaris <Christensen.Damaris@epa.gov>; Bowles, Jack <Bowles.Jack@epa.gov>; Power, Lucinda <power.lucinda@epa.gov>; Hannon, Arnita <Hannon.Arnita@epa.gov>
Subject: NACo Proposed Resolutions

Hi Sandy and Alan –

Just a quick heads-up that the following proposed resolutions will be discussed at the **National Association of Counties** Annual Conference and Exposition this Friday.

Sandy, while there are several water-related resolutions here, the few directly relating to EPA would include:

Proposed Resolution on the EPA and the Corps' Waters of the U.S. Definition Rulemaking (currently in effect, renewal with new language proposed)

Proposed Resolution Supporting the Regulation of Certain Functional Wetlands within Section 404 of the Clean Water Act (new resolution)

Proposed Resolution Supporting Codification of EPA's Integrated Planning Framework and Related Demonstration Projects (currently in effect, renewal)

Proposed Resolution on EPA's Imposition of Numeric Water Quality-Based Effluent Limitations on Local Governments (currently in effect, renewal with new language proposed)

Alan, just one relating to your shop.

Proposed Resolution to Oppose EPA's Efforts to Tighten Ozone Air Quality Standards (currently in effect, renewal)

Other items of potential interest include:

Proposed Resolution on U.S. Army Corps of Engineers Section 404 Permits (expedite permit issuance)

Proposed Resolution Urging Congress to Provide Funding for Local Efforts to Address Sea Level Rise

Proposed Resolution on Compensatory Mitigation In-Lieu Fee Programs

Proposed Resolution in Opposition to Material Preference Legislation

Proposed Resolution on Supporting the Use of Woody Biomass as an Energy Source

Proposed Resolution to Allow Construction of the Keystone XL Pipeline

Proposed Resolution Supporting Counties' Ability to Join the "We Are Still In" Coalition of States and Cities Committing to the Paris Climate Accord

Proposed Resolution in Support of President Trump's Decision on the Paris Climate Accord

In most cases, final language will not be available until several days following the meeting. I will forward to you as soon as available.

Click here to complete a three question customer experience survey.

Click here to complete a three question customer experience survey.

Message

From: Helton, Sarah C. (59575) [schelton@michaelbeststrategies.com]
Sent: 8/15/2017 12:52:39 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
CC: Edwards, Crystal [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=0d40b5f15b2a4c438f44bbae579d829a-Edwards, Crystal]
Subject: Invitation to Speak - The Water Council Policy Event - September 6
Attachments: TWC_EPA_ Invite_Sept6_DC.pdf; TWC_EPA_ Invite_Sept6_DC.pdf

Good morning, Lee:

The Water Council would be honored if you can speak at its first policy event in Washington, DC on September 6, 2017 at the Capitol Visitor Center. The event will be on "Fostering Public-Private Innovations in the US Water Market – Wisconsin's Leadership."

The Water Council's policy event includes leaders from industry, education and research, and the government who will discuss safe drinking water, water infrastructure, and innovation in the water industry. Given the EPA Office of Water's significant role to ensure the quality of American's drinking water, we would be honored if you can speak on **September 6 at 9:45am about EPA's programs and initiatives as well as EPA's engagement with the public and private sectors to help ensure safe drinking water**. Other invited speakers on our safe drinking water panel include leaders from the National Science Foundation and A. O. Smith.

The Water Council, a 501(c)(3) organization headquartered in Milwaukee, WI, is a globally connected epicenter for water research, innovation, education, and business development. It serves as one of the leading water technology hubs in the world, convening global water leaders and supporting the public, private, and academic sectors to help find innovative solutions to critical global water challenges.

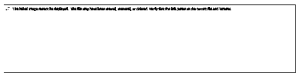
I have attached The Water Council's invitation that includes additional information about the event. If you are unable to speak, please let us know if someone else from the EPA's Office of Water is available to join us and speak.

I look forward to your response.

Thank you, Lee.

Sarah

Sarah C. Helton
Senior Advisor
E schelton@michaelbeststrategies.com
T 202.747.9575 | **M** Ex. 6 | **F** 202.347.1819



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Email Disclaimer

****

THE WATER COUNCIL

August 14, 2017

Dennis Lee Forsgren
Deputy Assistant Administrator
Office of Water
Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Dear Lee:

On behalf of The Water Council's Board of Directors, I would like to extend an invitation for you to speak at our event "Fostering Public-Private Innovations in the U.S. Water Market – Wisconsin's Leadership" on September 6, 2017. This event will be The Water Council's first policy focused event in Washington, D.C.

We would be honored if you can speak on September 6, 2017 on a panel at 9:45 am about safe drinking water, particularly about the EPA's regulatory programs and initiatives and its engagement with the public and private sectors to help ensure safe drinking water. Leadership from the National Science Foundation and A. O. Smith are also invited to present on this panel.

During this event, leaders in industry, education and research, and the government will also dive into issues on water infrastructure in addition to safe drinking water. We will discuss the role of water technology innovation and share how Wisconsin is leading the way.

Milwaukee and The Water Council are widely recognized as the leading water technology hub for economic, technology, and talent development in the world. The momentum of Wisconsin's blue economy continues to grow at a rapid pace, and as we expand our programming to include the newly launched ICE (Innovation Commercialization Exchange) Institute, developments from the world's water hub will continue to emerge and shape the way our businesses and universities connect on a global level.

We hope that you will be able to join us in Washington, D.C. on September 6. If you have any questions, please do not hesitate to contact me at (414) 988-8751 or damhaus@thewatercouncil.com.

Sincerely,

Dean Amhaus
President & CEO

THE WATER COUNCIL

August 14, 2017

Dennis Lee Forsgren
Deputy Assistant Administrator
Office of Water
Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Dear Lee:

On behalf of The Water Council's Board of Directors, I would like to extend an invitation for you to speak at our event "Fostering Public-Private Innovations in the U.S. Water Market – Wisconsin's Leadership" on September 6, 2017. This event will be The Water Council's first policy focused event in Washington, D.C.

We would be honored if you can speak on September 6, 2017 on a panel at 9:45 am about safe drinking water, particularly about the EPA's regulatory programs and initiatives and its engagement with the public and private sectors to help ensure safe drinking water. Leadership from the National Science Foundation and A. O. Smith are also invited to present on this panel.

During this event, leaders in industry, education and research, and the government will also dive into issues on water infrastructure in addition to safe drinking water. We will discuss the role of water technology innovation and share how Wisconsin is leading the way.

Milwaukee and The Water Council are widely recognized as the leading water technology hub for economic, technology, and talent development in the world. The momentum of Wisconsin's blue economy continues to grow at a rapid pace, and as we expand our programming to include the newly launched ICE (Innovation Commercialization Exchange) Institute, developments from the world's water hub will continue to emerge and shape the way our businesses and universities connect on a global level.

We hope that you will be able to join us in Washington, D.C. on September 6. If you have any questions, please do not hesitate to contact me at (414) 988-8751 or damhaus@thewatercouncil.com.

Sincerely,

Dean Amhaus
President & CEO

Message

From: Levine, Leonard [LLEVINE@gcwda.com]
Sent: 8/3/2017 3:00:12 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
CC: Burgin, Sara [sara.burgin@bracewell.com]
Subject: EPA-GCA Meeting August 2.

Lee

On behalf of Gulf Coast Authority, I want to thank you and the rest of the EPA staff for taking the time to meet with us yesterday. We hope EPA found the meeting as worthwhile as we did. I again want let you know that GCA is very interested in finding environmentally sound solutions for the management of produced waters and would like to remain engaged with EPA during the development of these solutions. We are also very willing to provide any assistance we can to help address this important issue.

Best regards

Leonard Levine P.E.
Technical Director
Gulf Coast Authority
910 Bay Area Blvd
Houston, TX 77058
llevine@gcwda.com
W (281)-226-1124
C Ex. 6
WWW. GCATX.ORG

Message

From: Helton, Sarah C. (59575) [schelton@michaelbeststrategies.com]
Sent: 8/18/2017 3:19:47 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
CC: Edwards, Crystal [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=0d40b5f15b2a4c438f44bbae579d829a-Edwards, Crystal]; Penman, Crystal [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=93662678a6fd4d4695c3df22cd95935a-Penman, Crystal]
Subject: RE: Invitation to Speak - The Water Council Policy Event - September 6

Thank you, Lee. I look forward to our discussion next week. I will coordinate with Crystal Penman on a time that works. Enjoy your weekend.
Sarah

Sarah C. Helton
Senior Advisor
T 202.747.9575 | michaelbeststrategies.com
Michael Best Strategies

From: Forsgren, Lee [mailto:Forsgren.Lee@epa.gov]
Sent: Friday, August 18, 2017 11:15 AM
To: Helton, Sarah C. (59575)
Cc: Edwards, Crystal; Penman, Crystal
Subject: RE: Invitation to Speak - The Water Council Policy Event - September 6

Sarah,

Crystal Penman who handles my schedule will get with you about times that might work for us to get together next week.

Regards,
Lee

D. Lee Forsgren
Deputy Assistant Administrator
Office Of Water
Environmental Protection Agency
1200 Pennsylvania Avenue, VW
Room 3219 WJCE
Washington, DC 20460
Phone: 202-564-5700
Forsgren.Lee@epa.gov

From: Helton, Sarah C. (59575) [mailto:schelton@michaelbeststrategies.com]
Sent: Friday, August 18, 2017 11:09 AM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Cc: Edwards, Crystal <Edwards.Crystal@epa.gov>
Subject: RE: Invitation to Speak - The Water Council Policy Event - September 6

Good morning, Lee:
I wanted to follow up to confirm you received our invitation to participate at The Water Council's water policy event in DC on September 6. Are you available to briefly talk next Monday afternoon or Tuesday about our invitation? I would like to answer any questions you have and provide you with additional details about The Water Council and our event on September 6. Again, we would be honored if you or one of your colleagues could participate!
Best,
Sarah

Sarah C. Helton
Senior Advisor
T 202.747.9575 | michaelbeststrategies.com
Michael Best Strategies

From: Helton, Sarah C. (59575)
Sent: Tuesday, August 15, 2017 8:53 AM
To: 'forsgren.lee@epa.gov'
Cc: 'Edwards.Crystal@epa.gov'
Subject: Invitation to Speak - The Water Council Policy Event - September 6

Good morning, Lee:

The Water Council would be honored if you can speak at its first policy event in Washington, DC on September 6, 2017 at the Capitol Visitor Center. The event will be on "Fostering Public-Private Innovations in the US Water Market – Wisconsin's Leadership."

The Water Council's policy event includes leaders from industry, education and research, and the government who will discuss safe drinking water, water infrastructure, and innovation in the water industry. Given the EPA Office of Water's significant role to ensure the quality of American's drinking water, we would be honored if you can speak on **September 6 at 9:45am about EPA's programs and initiatives as well as EPA's engagement with the public and private sectors to help ensure safe drinking water**. Other invited speakers on our safe drinking water panel include leaders from the National Science Foundation and A. O. Smith.

The Water Council, a 501(c)(3) organization headquartered in Milwaukee, WI, is a globally connected epicenter for water research, innovation, education, and business development. It serves as one of the leading water technology hubs in the world, convening global water leaders and supporting the public, private, and academic sectors to help find innovative solutions to critical global water challenges.

I have attached The Water Council's invitation that includes additional information about the event. If you are unable to speak, please let us know if someone else from the EPA's Office of Water is available to join us and speak.

I look forward to your response.

Thank you, Lee.

Sarah

Sarah C. Helton
Senior Advisor
E schelton@michaelbeststrategies.com
T 202.747.9575 | **M** Ex. 6 | **F** 202.347.1819

my bio | our firm | vCard

Email Disclaimer
****

Message

From: Helton, Sarah C. (59575) [schelton@michaelbeststrategies.com]
Sent: 8/18/2017 3:15:26 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
Subject: Automatic reply: Invitation to Speak - The Water Council Policy Event - September 6

I am out of the office from August 16 - 18 and will respond upon my return. If you have an urgent request, please call me at 202-747-9575.

Best,

Sarah Helton

Message

From: Don Parrish [donp@fb.org]
Sent: 7/28/2017 8:08:48 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
Subject: Do you have a minute to visit about a water quality standards question

Lee

Sorry to bother you again on another issue – but do you have a minute?

Don R Parrish
American Farm Bureau Federation®
Ex. 6
donp@fb.org

Message

From: Ben Grumbles -MDE- [ben.grumbles@maryland.gov]
Sent: 7/20/2017 7:52:03 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
Subject: WOTUS Letter to EPA and CoE
Attachments: MDE_WOTUS_Letter_to_EPA&CoE_07.18.17.pdf

Lee:
Happy to discuss. Thanks.
Ben

--
Click here
<http://www.doit.state.md.us/selectsurvey/TakeSurvey.aspx?agencycode=MDE&SurveyID=86M2956> to complete a three question customer experience survey.

Maryland
Department of
the Environment

Larry Hogan
Governor

Boyd Rutherford
Lieutenant Governor

Ben Grumbles
Secretary

July 18, 2017

The Honorable E. Scott Pruitt
Administrator
Environmental Protection Agency
1200 Pennsylvania Avenue NW
Washington, DC 20460

Mr. Douglas W. Lamont, P.E.
Senior Official Performing the Duties of the
Assistant Secretary of the Army for Civil Works
108 Army Pentagon
Washington, DC 20310-0108

Dear Administrator Pruitt and Mr. Lamont:

As Secretary of the Maryland Department of the Environment, Governor Larry Hogan has asked me to respond to your May 8, 2017 letter soliciting input on a proposal to revise the definition of waters of the United States (Clean Water Rule: Definition of "Waters of the United States: Final Rule, 80 Fed. Reg. 37,054 - June 29, 2015). Maryland Department of the Environment (MDE) appreciates the opportunity to provide perspectives on the definition of waters to be protected under the Clean Water Act (CWA) and also appreciates your intent to improve clarity and balance in current federal regulations and policies.

We are concerned that any potential rollback of environmental protections would have a negative impact on the progress that has been made, but we are also sensitive to the concerns expressed by the agricultural community regarding the previous administration's WOTUS policy.

With that in mind, we suggest that instead of reversing course, EPA conduct a full review of the previous administration's policy by bringing all stakeholders to the table to develop common sense, bipartisan solutions that protect our precious natural resources while ensuring that our robust agricultural sector is able to succeed.

For example, immediately upon taking office, Governor Hogan worked closely with the agricultural and environmental communities to develop enhanced Phosphorous Management Tool regulations, reflecting his commitment to seek innovative solutions to reduce sediment, nitrogen, and phosphorus pollution in Maryland's waterways and protect our most precious natural resource, the Chesapeake Bay.

In considering revisions to the definition of waters of the U.S., Maryland is focused on how such changes to reduce the scope of federal jurisdiction will or will not help advance the work we are doing in Maryland to protect and restore our waters, including the Chesapeake Bay. Maryland has comprehensive state laws in place to protect and restore waterways and wetlands within state boundaries. Currently, ephemeral streams (i.e., streams that have a bed and bank but no perennial flow and no contact with groundwater) are the only waterways which, as a matter of practice, Maryland has generally not considered jurisdictional under certain provisions of state law but which are currently considered jurisdictional under the CWA. A reduced scope of federal jurisdiction could also result in the loss of protection that is otherwise provided for under Section 401 of the CWA. This would occur in situations where the federal government is issuing a license or permit to a facility with a discharge to a water, but where that water is no longer considered a water of the United States under the CWA.

Protecting and restoring Maryland's waters, particularly drinking water sources and the Chesapeake Bay, are priorities of Governor Hogan. A total of $3 billion has been invested in the Chesapeake Bay since the Governor took office. Governor Hogan's fiscal year 2017 budget was the first in state history that did not divert funding dedicated for the restoration of the Chesapeake Bay to the general fund. This included investing $53 million in the Chesapeake and Atlantic Coastal Bays Trust Fund, the highest level of funding since the fund was established. In addition to state efforts, however, it is important to recall that the Chesapeake Bay is not only important to Maryland, but it is also the nation's largest estuary, with a 64,000 square mile watershed covering six states and the District of Columbia and home to nearly 18 million people. Protecting this resource cannot be accomplished by Maryland alone, but calls for a region-wide approach and a supportive federal role.

Regarding CWA coverage of wetlands, Maryland considers all tidal and nontidal wetlands (including "isolated" wetlands with no continuous surface connection to relatively permanent, standing, or continuously flowing bodies of water) to be jurisdictional under state law. Thus, a change in the federal definition of waters of the U.S. which might, for example, reduce the scope of federal jurisdiction to protect only wetlands that have a continuous surface connection with a relatively permanent, standing, or continuously flowing body of water would, for wetlands in Maryland, only change the extent to which a CWA Section 404 permit from the Army Corps of Engineers for dredge or fill activities would be required in addition to a state permit. Maryland would welcome thoughtful efforts to eliminate duplicative permitting requirement for wetlands within state boundaries.

Maryland does, however, have some concerns about issues which could arise for interstate waters, if an immediately upstream state has a much narrower definition of the scope of regulated waters and wetlands under state law than the immediately downstream state. In these cases, having a broader federal definition of CWA jurisdiction could help avoid complex interstate conflicts that might otherwise arise if the federal definition were too narrow. It is important that flowing waters that cross state borders be adequately protected from pollution under the upstream state's law (with provisions for the downstream state to weigh-in on discharge permits and standards) or, if not, be subject to federal jurisdiction so that the downstream state can, if need be, participate as a downstream state in the process of the permitting of discharges and the establishing of water quality standards for such a stream.

According to the Susquehanna River Basin Commission, in the Susquehanna River Basin alone there are eighty-three streams that cross state lines. Several streams traverse the state borders at multiple points, contributing to 91 total crossings. Of those 91 crossings, 45 streams flow from New York into

Pennsylvania, 22 from Pennsylvania into New York, 15 from Pennsylvania into Maryland, and nine from Maryland into Pennsylvania. Many streams are small, and 32 are small enough to be "unnamed."

It is important to Maryland to ensure that any upstream discharges of pollutants or nonpoint source inputs of pollutants do not result in violations of water quality standards in the Maryland portion of streams, and potentially impact sources of drinking water or the delivery of pollutants to the Chesapeake Bay. Ensuring that the federal interpretation of "relatively permanent" waters includes both perennial and intermittent streams is particularly important to Maryland. Similarly, Maryland would want to ensure that the definition of federally regulated wetlands was sufficiently broad to minimize situations where activities impacting unregulated wetlands in an upstream state could adversely impact Maryland water resources or cause Marylanders to suffer additional financial, health, or safety-related obligations as a result of an upstream wetland being unprotected.

In analyzing the impacts of the new EPA/Corps regulation, it will be important to consider not just the current situation with regard to state definitions of jurisdictional waters under state law, but also how those definitions may change if the federal definition of waters of the U.S. is narrowed. Some states have in place laws or executive orders that limit state agency authority to adopt environmental rules and regulations which are more stringent than federal law requires.

Maryland appreciates the challenge you have before you, to strike the right balance in ensuring that the Nation's waters are kept free from pollution, while at the same time promoting economic growth, minimizing regulatory uncertainty, increasing clarity and consistency, and showing due regard for the roles of Congress and the states under the Constitution. CWA jurisdiction is a confusing and complex issue but our nation has made great strides in protecting and restoring wetlands and waterways. This is in large part due to the efforts of states to put in place independent, state-level regulatory frameworks to advance the protection and restoration of their wetlands and waterways, with the federal government providing an important regulatory "backstop." We would also encourage EPA and the Corps to be mindful of the need for training, guidance, and continued financial support to state programs to ensure a smooth transition as we implement any new definition of waters covered by the CWA.

Thank you again for the opportunity to offer perspectives on these important issues. Maryland looks forward to working with EPA and the Corps in the true spirit of cooperative federalism.

Sincerely,

Ben Grumbles
Secretary

cc: Mark Belton, Secretary, Maryland Department of Natural Resources
Joseph Bartenfelder, Secretary, Maryland Department of Agriculture
Andrew Hanson, EPA Headquarters

Message

From: Ben Grumbles -MDE- [ben.grumbles@maryland.gov]
Sent: 8/1/2017 8:44:04 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
Subject: Re: Information

Calling now.
Thanks.
Ben

Sent from my iPhone

> On Aug 1, 2017, at 4:38 PM, Forsgren, Lee <Forsgren.Lee@epa.gov> wrote:
>
> Ben
>
> Can you call me regarding the State of MD suing EPA? Best number Ex. 6
>
> Lee
>
> Sent from my iPhone

--
Click here
<http://www.doit.state.md.us/selectsurvey/TakeSurvey.aspx?agencycode=MDE&SurveyID=86M2956> to complete a three question customer experience survey.

Message

From: Kyle W. Parker [KWParker@hollandhart.com]
Sent: 6/6/2018 9:02:57 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
CC: Goodin, John [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=3eac342f280a4b9db4079c81f66d1913-JGoodin]; Hough, Palmer [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=51cd0b0d81ac416fa265944d6e6575ce-PHough]; Penman, Crystal [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=93662678a6fd4d4695c3df22cd95935a-Penman, Crystal]
Subject: RE: Alaska Trip / Available to Visit
Attachments: ATT00001.txt

Great! We'll do whatever is convenient for you. I will reach-out to Palmer today to see what might work with your schedule. Safe travels. See you soon. All the best. – Kyle.

From: Forsgren, Lee <Forsgren.Lee@epa.gov>
Sent: Wednesday, June 6, 2018 1:01 PM
To: Kyle W. Parker <KWParker@hollandhart.com>
Cc: Goodin, John <Goodin.John@epa.gov>; Hough, Palmer <Hough.Palmer@epa.gov>; Penman, Crystal <Penman.Crystal@epa.gov>
Subject: RE: Alaska Trip / Available to Visit

Kyle,

Would love to try to meet with you if possible while we are in Alaska. However I will warn you that our schedule is already quite full. Perhaps we can carve out some time one evening for a chat but you might want to reach out to Palmer Hough who is handling logistics for the trip to see what might be possible.

Regards,
Lee

D. Lee Forsgren
Deputy Assistant Administrator
Office Of Water
Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Room 3219 WJCE
Washington, DC 20460
Phone: 202-564-5700
Forsgren.Lee@epa.gov

From: Kyle W. Parker [mailto:KWParker@hollandhart.com]
Sent: Wednesday, June 6, 2018 4:57 PM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Subject: Alaska Trip / Available to Visit

Good afternoon, Lee. When we visited in your office back in April, you mentioned that you would be making a trip to Alaska this summer. I understand that your trip is now set for later this month. If you have time, Keiran Wulff and I would welcome the opportunity to visit with you again regarding the Nanushuk development project. Since we were with you in DC, we've made significant progress in our engagements with the local community and state and federal regulatory agencies, and we would welcome the opportunity to update you on our plans. Please let me know if something might work for you to get-together while you are in the state. Thank you. I hope to see you soon. All the best. – Kyle.

Kyle W. Parker
Partner, Holland & Hart LLP
1029 W. 3rd Avenue, Suite 550, Anchorage, AK 99501
T Ex. 6
HOLLAND&HART

Message

From: Tracy Mehan [tmehan@awwa.org]
Sent: 4/16/2018 9:06:43 PM
To: Tracy Mehan [tmehan@awwa.org]
CC: DC Office [DL_DCOFFICE@awwa.org]; Communications [DL_COMMUNICATIONS@awwa.org]; David LaFrance [dlafrance@awwa.org]; Paula MacIlwaine [pmacIlwaine@awwa.org]; Kevin Mann [kmann@awwa.org]; Barb Martin [bmartin@awwa.org]; Kurt Vause [kurt.vause1@gmail.com]; Aurel Arndt [aurel.arndt@gmail.com]; David Weihrauch [DWeihrauch@cityofoxford.org]; John Sullivan [sullivanjp@bwsc.org]; Williams, James [james.williams@peerlessmidwest.com]; David Rager [David.Rager@live.com]; Nancy Quirk [NancyQu@greenbaywi.gov]; Patrick Kerr [pkerr@brwater.com]; mdeanedc@gmail.com; Ben Grumbles [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=usereb77e807]; Brenda Lennox [brenda.lennox@outlook.com]; Jeanne Bennett-Bailey [JeanneBennettBailey@outlook.com]; Gene Koontz [gkoontz@gfnet.com]; John Donahue [jdonahue@northparkwater.org]; Charles Murray [cmurray@fairfaxwater.org]; Lochhead, Jim S. [Jim.Lochhead@denverwater.org]; Rob Renner [rrenner@waterrf.org]; Brent Fewell [brent.fewell@earthandwatergroup.com]; jim.proctor@mcwane.com; Ken Maynard [kmaynard@awwa.org]; Grevatt, Peter [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=d3caa0c39ebe44cb9d3ae44da7543733-Grevatt, Peter]; Burneson, Eric [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=2cacb9a8d49f49af80531e9e2ccb9018-eburneso]; Sawyers, Andrew [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=49214552a00b4ab7b168ec0edba1d1ac-Sawyers, Andrew]; Ross, David P [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=119cd8b52dd14305a84863124ad6d8a6-Ross, David]; Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]; Nagle, Deborah [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=33888a2bbe8f48aeb4ad9cc54259fb4e-dnagle]; Bodine, Susan [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=8c2cc6086fcc44c3be6b5d32b262d983-Bodine, Sus]; fandes@btlaw.com; Diane VanDe Hei (vandehei@amwa.net) [vandehei@amwa.net]; 'hartnett@amwa.net' [hartnett@amwa.net]; brown@amwa.net; sgarcia@apwa.net; 'Eileen O'Neill' [eoneill@wef.org]; Tim Williams [twilliams@wef.org]; Steve Dye [sdye@wef.org]; Claudio Ternieden [cternieden@wef.org]; Pat Sinicropi [psinicropi@watereuse.org]; Adam Krantz (akrantz@nacwa.org) [akrantz@nacwa.org]; Nathan Gardner-Andrews [NGardner-Andrews@nacwa.org]; KSurfus@nacwa.org; Jason Isakovic [JIsakovic@nacwa.org]; cfinley@nacwa.org; Ariel Wittenberg [awittenberg@eenews.net]; Annie Snider [asnider@politico.com]; Saiyid, Amena [ASaiyid@bna.com]; sbruninga@bna.com; mgrena@bna.com; Schultz, David [dSchultz@bloombergenvironment.com]; Bill Teichmiller [teich4@ejwatercoop.com]; bpallasch@asce.org; Pawlow, Jon [Jon.Pawlow@mail.house.gov]; Couri, Jerry [JerryCouri@mail.house.gov]; Donaldson, Teri (EPW) [Teri_Donaldson@epw.senate.gov]; Stevens, Mae (Cardin) [Mae_Stevens@cardin.senate.gov]; Tim Worley [tworley@ca-nv-awwa.org]; Bonnifer Ballard [bballard@mi-water.org]; Mike Howe [mikehowe@austin.rr.com]; Peggy Guingona [peggy@fsawwa.org]; sryan@newwa.org; Ryan, John P. [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=0c934574ad3d4383bd08ae1aeec72fff-Ryan, John]; Gebhardt, Jim [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=d25752bcb8c741fd831dbc3429088987-Gebhardt, J]; Abhold, Kristyn [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=bfe730f27efa48beb8a6252c5ed0e71e-Abhold, Kri]; Brubaker, Sonia [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=6055e643e5154f25b83a5515161e1705-sbruba02]; Corr, Elizabeth [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=691e1abf082a4a5b8723cc9ac8d9bdf0-ecorr]; Frace, Sheila [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=ba25b075cb55480595d789b5e0765367-sfrace]; Gutierrez, Sally [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=5a028e53f9c9437dbf25957863b4e13e-Gutierrez, Sally]; Shanaghan, Peter [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=63bb2a6ab300454dbd58e2d3b9084cca-pshanagh]; Ames, George [/o=ExchangeLabs/ou=Exchange Administrative Group

(FYDIBOHF23SPDLT)/cn=Recipients/cn=23fe9bb4f8ed4843ae2ec8398703514c-games]; Chamberlain, Nick [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=b499d62de3c84c1eb010a14a477e7ade-Chamberlain, Nick]; Anderer, Kirsten [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=065ed70f5f8e4c49803b16363d4d0e00-Anderer, Kirsten]; Michael Curley [curley@eli.org]; Michael Curley [Ex. 6]laurie@isawwa.org; Tyler Converse [tyler.converse@cantonohio.gov]; Beard, Jim [jbeard@AtlantaGa.Gov]; Angela Montoya Bricmont (angela.bricmont@denverwater.org) [angela.bricmont@denverwater.org]; Sharma, Usha [Usha.Sharma@denverwater.org]; Melissa Meeker [mmeeker@werf.org]; thomas.liu@baml.com; Bower, Jeffrey D [jeffrey.bower@baml.com]; Richard Weiss (richard.weiss@morganstanley.com) [richard.weiss@morganstanley.com]; Lisa Daniels [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=userd571c471]; Jud Hill [ajudsonhill@gmail.com]; Garbutt, Andrew N [andrewgarbutt@KPMG.com]; Tester, Iain (US/Austin/CF) [iaintester@KPMG.com]; Alex Seleznyov [aseleznyov@Kpmg.Com]; Ziglar, Jim (US - Arlington) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=usera0b04026]; Paul Matthews [paul.matthews@tvwd.org]; Cregger, Helen [Helen.Cregger@moodys.com]; theodore.chapman@spglobal.com; Selting, Anne [anne.selting@spglobal.com]; D'Olier-Lees, Trevor [trevor.dolier-lees@spglobal.com]; Gander, Sue [sgander@NGA.ORG]; Buchheister, Bevin [bbuchheister@nga.org]; Schaefer, Alex [ASchaefer@NGA.ORG]; Michele Nellenbach [mnellenbach@bpcaction.org]; Beate Wright [bwright@waterrf.org]; belin@potomac.org; Tim A. Eder [TEder@mott.org]; Davis, Cameron [camdavis@geiconsultants.com]; Kathryn A. Buckner [kabuckner@cgli.org]; David Ullrich [david.ullrich@glslcities.org]; Cohen, Jacqueline [jackie.cohen@mail.house.gov]; Ken Kirk [Ex. 6] Eric Sapirstein [esap@ensresources.com]; Maureen Duffy [Maureen.Duffy@amwater.com]; Loyd Aldie Warnock [Aldie.Warnock@amwater.com]; Timothy J Leahy [Timothy.Leahy@amwater.com]; susan.story@amwater.com; sue.mccormick@glwater.org; Matt Ries [Matt.Ries@dcwater.com]; ghawkmoonshot@outlook.com; Hank Habicht [hank@suntowater.com]; David Zimmer [dzimmer@njib.gov]; Zimmer, David [ZimmerDT@cdmsmith.com]; Brown, Joe (Boozman) [Joe_Brown@boozman.senate.gov]; Rick Farrell [rfarrell@madisonassoc.com]; Massey, Karen [karen.massey@eiera.mo.gov]; McProuty, Timothy [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=8900fd307293420883a8157d9fa2b7fc-TMCPROUT]; Titus, Hala Z. [titushz@cdmsmith.com]; 'Dan McCarthy' [danmccarthywater@gmail.com]; Manweiler, Brooke [ManweilerBA@cdmsmith.com]; Gatfield, Saavan [saavan.gatfield@fitchratings.com]; SCOTT, DOUGLAS [douglas.scott@fitchratings.com]; Laity, Jim A. EOP/OMB [Ex. 6]; Dorjets, Vlad EOP/OMB [Vladik_Dorjets@omb.eop.gov]; McGartland, Al [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=5fe25fc1df634f9798675527e0070429-AMcGartl]; denise.kruger@gswater.com; ChiHo Sham [ChiHo.Sham@erg.com]; Ralph Jones [Ralph.Jones@cadmusgroup.com]; gene.fax@cadmusgroup.com; ian.kline@cadmusgroup.com; Behl, Betsy [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=d17d5a871e0244869ea996a9de657bcf-Betsy Behl]

Subject: RE: Water Costs and Affordability in the US: 1990-2015

Attachments: Message from DC1

See attachment for those of you who could not open the previous one.

GTM

From: Tracy Mehan
Sent: Monday, April 16, 2018 12:08 PM
To: Tracy Mehan <tmehan@awwa.org>
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Subject: Water Costs and Affordability in the US: 1990-2015

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American Water Works Association
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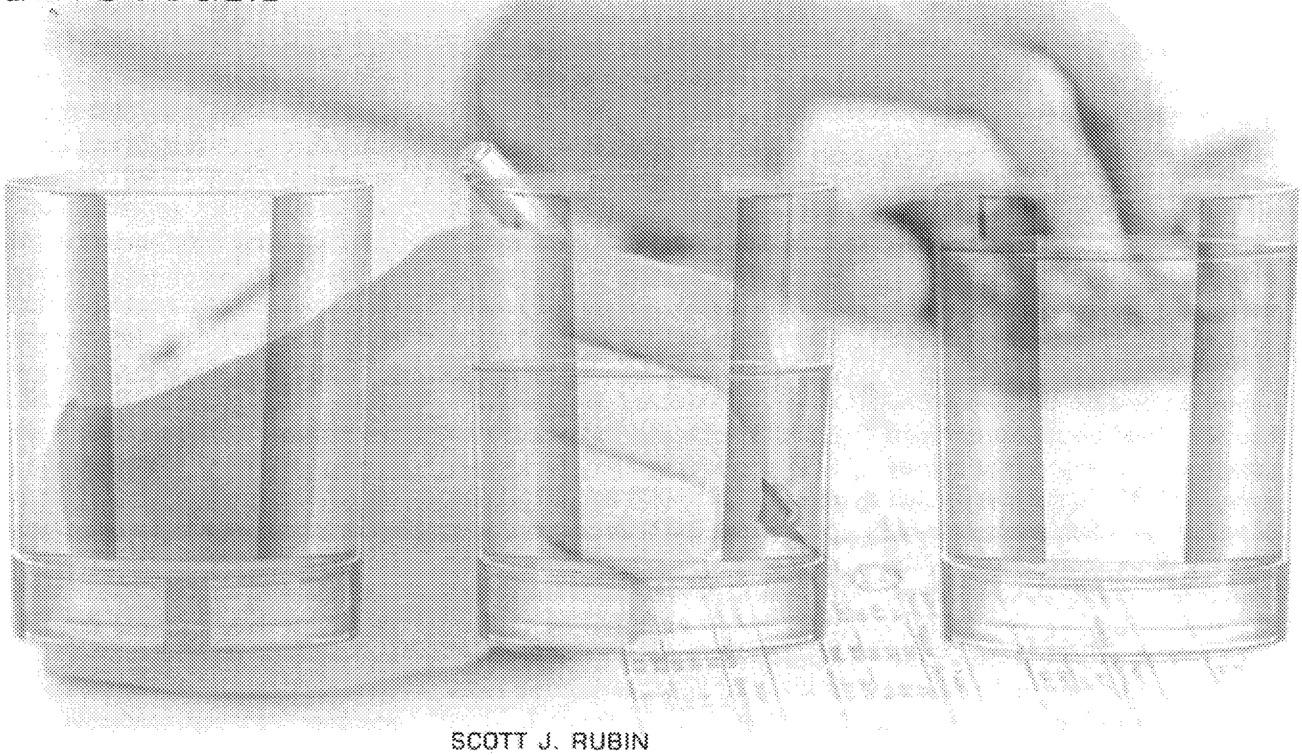
Message

From: ScannedDocument@awwa.org [ScannedDocument@awwa.org]
Sent: 4/16/2018 10:20:37 PM
To: Tracy Mehan [tmehan@awwa.org]
Subject: Message from DC1
Attachments: SDC118041617200.pdf

Feature Article



SCOTT J. RUBIN

Water Costs and Affordability in the United States: 1990 to 2015

NEARLY 25 YEARS AFTER THE D/DBP NEGOTIATIONS FOCUSED ATTENTION ON AFFORDABILITY, IT IS NOW A GOOD TIME TO EXAMINE HOW THE COST AND AFFORDABILITY OF WATER SERVICE IN THE UNITED STATES HAVE CHANGED.

Twenty-five years ago, the US Environmental Protection Agency (USEPA) conducted a negotiated rulemaking on disinfectants and disinfection byproducts (D/DBP) in drinking water. One important issue that arose during these negotiations was how to determine whether new regulations would be affordable. Up until that time, no one had conducted any rigorous analysis of water affordability, though one early paper had highlighted a growing concern with low-income households that were unable to afford water service in some communities (Saunders 1992). So, late one night during the negotiations, a few people huddled around a laptop computer in a hotel room and started looking at income distribution curves and other data that might help inform decisions about the affordability of water service in the United States. These efforts resulted in several informative presentations and one of the first papers focused on water affordability (Rubin 1994).

A few years later, the National Research Council issued a report on safe drinking water that included a discussion of affordability (National Research Council 1997). At around this same time, the Safe Drinking Water Act Amendments of 1996 included both specific affordability provisions and the state revolving fund program to help provide lower-cost capital to utilities. Since then, the water and wastewater industries' thinking about affordability has been shaped by a comprehensive study of water affordability programs (Saunders et al. 1998), the inclusion of a chapter on affordability in the fifth edition of the AWWA Manual M1, *Principles of Water Rates, Fees and Charges* (AWWA 2000), a report on affordability from the National Drinking Water Advisory Council (NDWAC 2003), and the publication of affordability guides by AWWA (2005) and the Water

Environment Federation (WEF 2007), as well as numerous papers, conference presentations, and reports.

While surveys of water rates have been conducted biennially for nearly 30 years (AWWA 2016, Duke & Montoya 1993), comprehensive studies examining the actual cost of water to consumers (that is, water bills) are much less frequent (Rubin 2005, 1998). The distinction is important, because as Chesnutt and Beecher (1998) noted, conservation programs can be expected to increase water rates (that is, the price per unit of water), but often result in lower bills for water service (that is, the total cost to the consumer). Indeed, this distinction has become even more critical in light of the significant decline in average household water consumption that has been observed for the past decade and longer (DeOreo & Mayer 2012, Coomes et al. 2010).

As we approach the 25th anniversary of the D/DBP negotiations that focused attention on affordability, it is an appropriate time to examine how the cost and affordability of water service in the United States have changed over the past 25 years.

CHANGES IN WATER PRICES

Water prices—the cost per unit of water—have tripled since 1990. According to data collected through biennial surveys, first by Ernst & Young and now by Raftelis Financial Consultants and AWWA, the typical cost in the United States for a residential customer to purchase 1,000 ft^3 of water increased from \$11.16/month in 1990 to \$34.61/month in 2016 (AWWA 2016, Duke & Montoya 1993). In contrast, overall consumer prices, as measured by the consumer price index and typical incomes as measured by median household income, have approximately doubled during the same period, as shown in Figure 1.

CHANGES IN WATER BILLS

As mentioned, there is an important difference between the per-unit price of water and the actual water bills customers receive. Over the past 25 years, two significant trends have affected customers' water bills. First, the typical household uses less water now than it did in the past; for example, Coomes et al. (2010) estimated that between 1978 and 2008, typical household water consumption declined by approximately 13%. While the exact sources of the decline are not known with certainty, the Coomes study suggested that multiple factors may have been at play, including the introduction of appliance and plumbing fixture efficiency standards, a reduction in the average number of people living in a household, drought conditions in some parts of the country, and increasing water prices.

In addition, data collected by the US Census Bureau show a dramatic increase in the percentage of customers in multi-family housing units (e.g., apartment buildings, condominiums) that receive a bill for water or wastewater service. Figure 2 provides an analysis of US census microdata from 1990 to 2015 using data compiled by the University of Minnesota (Ruggles et al. 2017). Figure 2 shows that during this 25-year period, there has been little change in the percentage of

FIGURE 1 Changes in residential water price, inflation, and median household income (1990–2016)

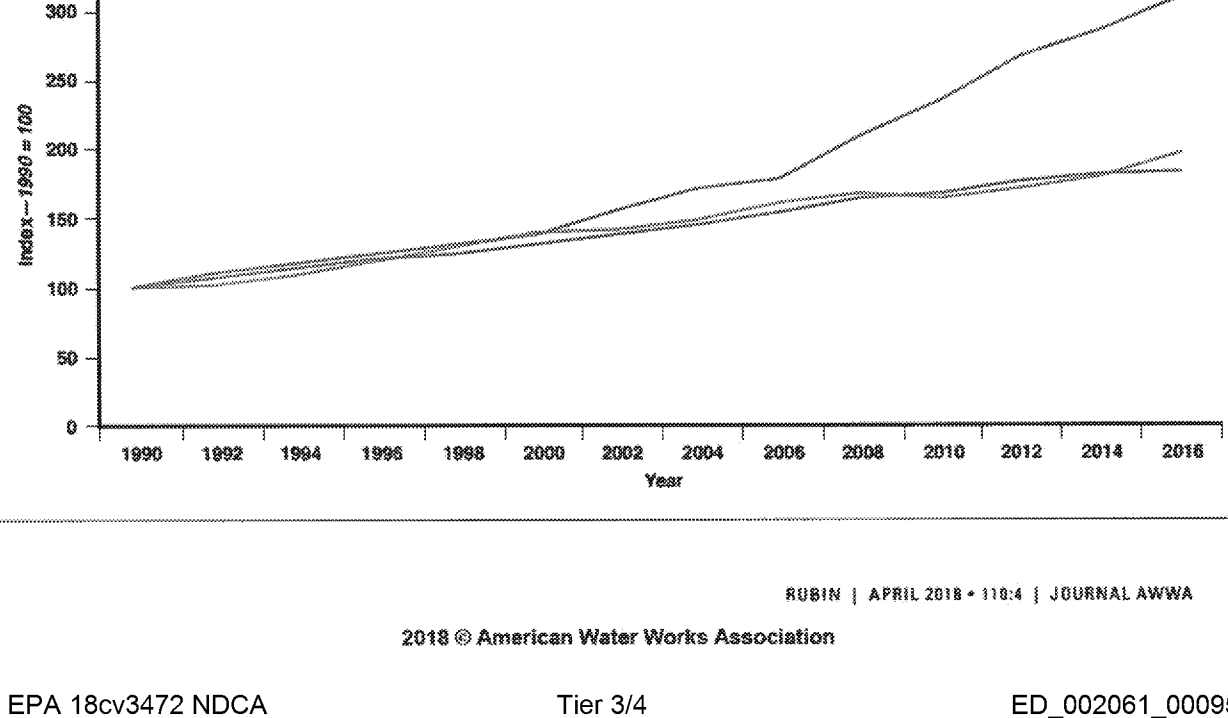
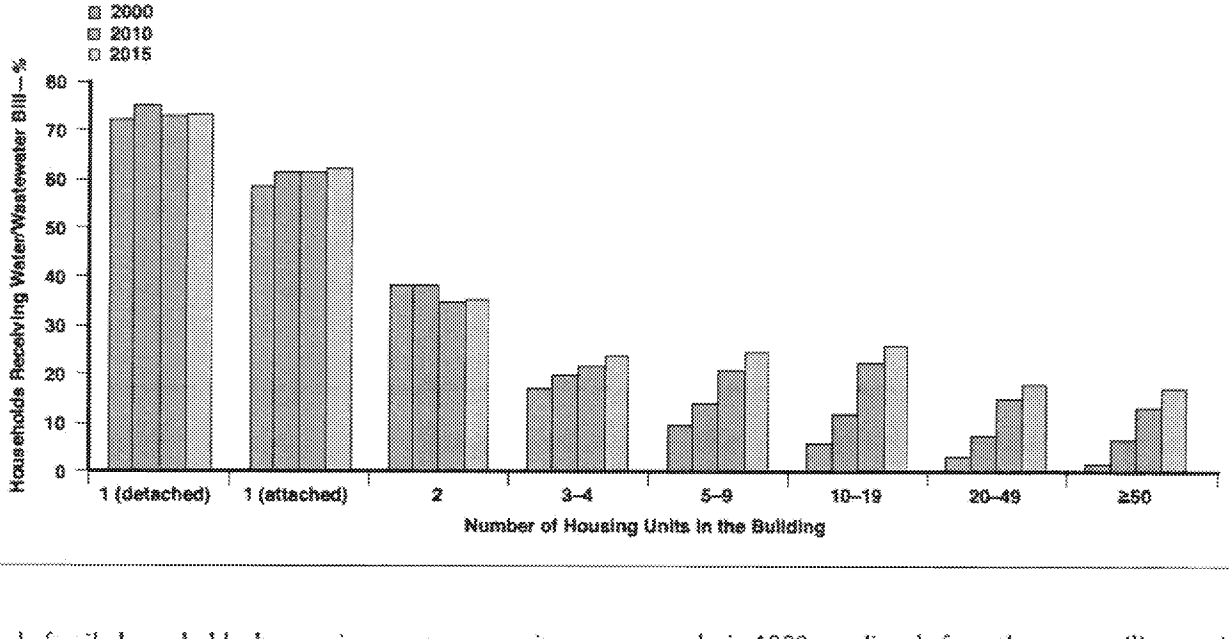


FIGURE 2 Percentage of households receiving water or wastewater bill by number of units in building (1990–2015)



single-family households that receive a water/wastewater bill, with the percentage remaining at about 70% for customers in detached houses and 60% for customers in single-family attached houses. In contrast, there has been a dramatic increase in the percentage of households in multi-unit buildings that receive a water/wastewater bill. Taking buildings with 50 or more units as an example, in 1990 only 2% of households said they received a water or wastewater bill; by 2015 that percentage had increased eight-fold, to 17%. Similar significant increases occurred between 1990 and 2015 for all households in buildings with five or more units.

Many households in multi-unit buildings do not receive water bills directly from the water utility providing service. Instead, their share of the building's water bill is determined through submetering or the use of ratio billing methods by building owners and operators. In a comprehensive study sponsored by USEPA and others, Mayer et al. (2004) estimated that increased submetering or other methods of billing consumers in multi-unit

FIGURE 3 Changes in residential water and wastewater bill, water price, inflation, and income (1990–2015)

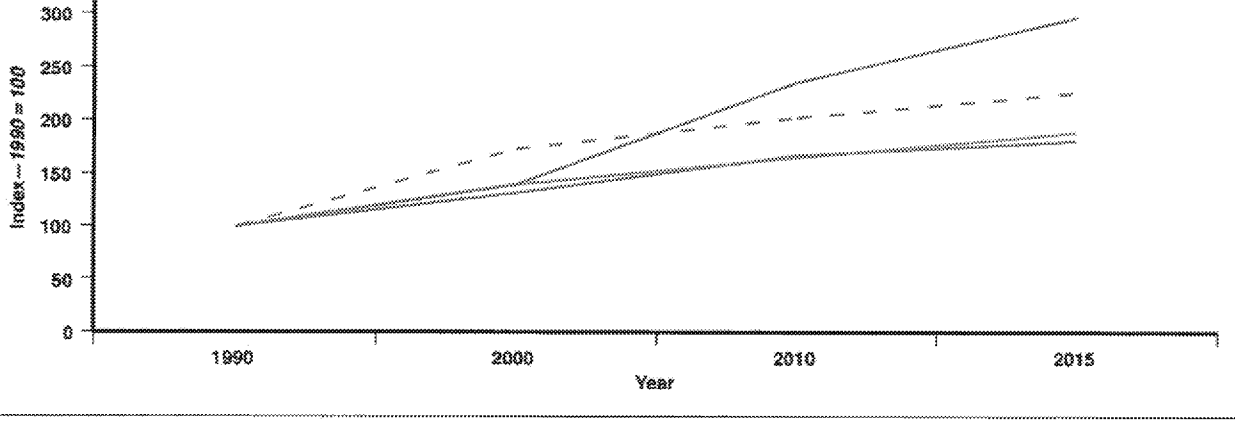
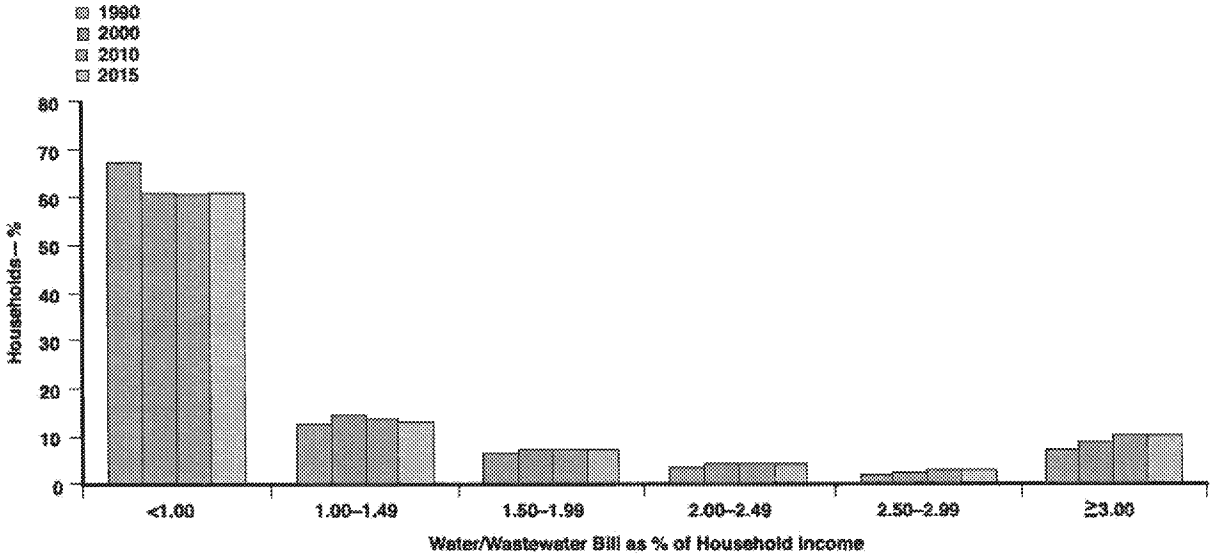


FIGURE 4 Water/wastewater bill for households in single-family buildings as a percent of income (1990–2015)



buildings could reduce water consumption by between 11 and 26%. This study was part of an effort by USEPA to promote submetering and other billing methods as a way to encourage water conservation in multi-unit buildings, and from the census data, it appears that these efforts have achieved some level of success.

The combination of declining consumption in single-family housing and the increased prevalence of direct billing in multi-unit buildings has contributed to declining per-household water usage. This affects utilities significantly, because even though water prices are increasing much faster than the rate of inflation, it does not necessarily follow that water bills (the product of the water price and water consumption) will exhibit the same trend.

An analysis of US census data provides a 25-year history of actual water bills that households reported receiving. Figure 3 reproduces the data from Figure 1 but adds a dashed line showing the increase in water/wastewater bills from 1990 to 2015 for households in single-family buildings. These are the households that are most likely to receive their water or wastewater bills directly from the utility rather than from a third party.

That is, between 1990 and 2015, while the price of water tripled (a compound annual increase of 4.5%), the average water/wastewater bill received by residential customers of water utilities increased by a more modest (but still substantial) 2.25 times (an annual increase of 3.3%). When compared with the rate of increase in general prices (1.8 times or 2.4% per year) and incomes (1.9 times or 2.6% annually), water bills increased by between 0.7 and 0.9% per year in excess of the increase in inflation and incomes, respectively.

The combination of declining consumption in single-family housing and the increased prevalence of direct billing in multi-unit buildings has contributed to declining per-household water usage.

CHANGES IN THE AFFORDABILITY OF WATER SERVICE

While water/wastewater bills increased faster than the increase in median incomes over this period, it does not necessarily follow that the same effect would occur for households with incomes higher or lower than the median. An analysis of US census data for households in single-family buildings shows that water costs as a percentage of income have been fairly stable, except for households with the lowest incomes.

Figure 4 shows that in 1990, 67% of households in single-family buildings had bills for water and wastewater that were less than 1% of their income. By 2000, that percentage had dropped to 61%, and it has remained at that level through 2015. At the opposite end of the figure, in 1990, 7% of households in single-family buildings had water/wastewater bills that totaled 3% or more of

their income; that percentage increased to 9% in 2000 and was more than 10% in 2015.

CONCLUSIONS

The water industry has seen many changes in the past 25 years, but some things have remained fairly constant. In the United States, most water consumers in single-family buildings continue to pay less than 1% of their income for water and wastewater service. At lower income levels, however, water and wastewater bills are increasingly burdensome as costs increase faster than incomes. Indeed, between 1990 and 2015, the percentage of households in single-family buildings that paid 3% or more of their income for water and wastewater increased by 40%, from 7.4% of households in 1990 to 10.5% of households in 2015.

The percentage increase, however, tells only part of the story. The number of households in single-family buildings that pay for water or wastewater increased dramatically during the 25-year period, from 47 million to 66 million households. Thus, in 1990 about 3.3 million households paid 3% or more of their income for water and wastewater. By 2015 the number of households devoting 3% or more of their income to water and wastewater had more than doubled to 6.8 million households.

Those in the water industry have greatly increased their understanding of the affordability of water services to lower-income customers. Those efforts, however, have not stopped the costs of water services from continuing to increase faster than incomes. If that trend continues, it can be expected that lower-income households will have even more difficulty paying their water and wastewater bills in full and on time. Consequently, water and wastewater utilities will need to remain vigilant in controlling costs, continue to evaluate the need for (and effectiveness of) affordability programs, and assess the adequacy of their customer service operations.

ABOUT THE AUTHOR

Scott J. Rubin is a consultant and attorney working exclusively on issues affecting the public utility industries. He was a member of the Disinfectants and Disinfection Byproducts Rule negotiated rulemaking in 1992 and 1993 when he was serving as chair of the Water Committee of the National Association of State Utility Consumer Advocates. He left government service in 1994 to open his own practice. During the past 25 years, he has conducted research and provided guidance on affordability and customer service issues for AWWA, the National Rural Water Association, the Water Research Foundation, and several utilities. Rubin can be reached at scott.j.rubin@gmail.com.

https://doi.org/10.1002/awwa.1062

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- Affordability Resource Community. AWWA web page. www.awwa.org/resources-tools/water-knowledge/affordability.aspx.
- Measuring Household Affordability for Water and Sewer Utilities. Teodoro, M.P., 2018. *Journal AWWA,* 110:1:13. Product No. JAW_0085712.
- Manual M1, *Principles of Water Rates, Fees and Charges* (7th ed.). AWWA, 2017. AWWA Catalog No. 30001-7E.

These resources have been supplied by Journal AWWA staff. For information on these and other AWWA resources, visit www.awwa.org.

Message

From: Bode, Denise A (53804) [dabode@michaelbeststrategies.com]
Sent: 5/7/2018 3:35:17 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
Subject: Re: Attendance at PFAS National leadership summit

Lee, Just in case, the names of the people that would like to attend from TRC are Mark Robbins and Elizabeth Denly. Thanks for your consideration! Best, D

Denise A. Bode
Partner
E dabode@michaelbeststrategies.com
T 202.844.3804 | M Ex. 6 | F 202.347.1819

my bio <http://www.michaelbeststrategies.com/dc/lawyer/denise-bode/> | our firm <http://www.michaelbeststrategies.com/> | vCard <http://www.michaelbest.com/People/Denise-Bode.vcf>
On 5/4/18, 5:07 PM, "Forsgren, Lee" <Forsgren.Lee@epa.gov> wrote:

Denise,

We will see what the art of the possible might be for the summit. At the very least we are going to have a number of follow on meetings around the country that you all might be perfectly suited for.

Regards,
Lee

D. Lee Forsgren
Deputy Assistant Administrator
Office Of Water
Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Room 3219 WJCE
Washington, DC 20460
Phone: 202-564-5700
Forsgren.Lee@epa.gov

-----Original Message-----
From: Bode, Denise A (53804) [mailto:dabode@michaelbeststrategies.com]
Sent: Friday, May 4, 2018 4:46 PM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Cc: Swanson, Kevin O (59578) <koswanson@michaelbeststrategies.com>
Subject: Attendance at PFAS National leadership summit
Importance: High

Hi Lee, nice to hear your presentation at the U.S. Chamber last week. Just in case you don't remember, we are outside counsel for Newtrient and so appreciate your good counsel for setting up a program to clean up dairy discharges!

Sounds like real progress is being made since we talked last. Sorry to ask you the question about attendance at the Summit, but our firm represents TRC, a national environmental consulting firm that cannot get a spot. TRC specializes in environmental remediation, as well as an emphasis in the energy sector. One area TRC has specialized in over the years is what is known as "liability transfers"; essentially where TRC "stands in the shoes" of their environmental clients for hazardous waste cleanup sites and becomes contractually responsible for the site (for a fee and with environmental insurance backstopping the transaction).

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Thanks for your consideration.

Best,
Denise

Denise A. Bode
Partner

E dabode@michaelbeststrategies.com<mailto:dabode@michaelbeststrategies.com>
T 202.844.3804 | M [Ex. 6] | F 202.347.1819
[/Users/denisebode/Library/Containers/com.microsoft.Outlook/Data/Library/Caches/Signatures/signature_1741113394]

my bio<http://www.michaelbeststrategies.com/dc/lawyer/denise-bode/> | our firm<http://www.michaelbeststrategies.com/> | vCard<http://www.michaelbest.com/People/Denise-Bode.vcf>

Message

From: Kyle W. Parker [KWParker@hollandhart.com]
Sent: 6/8/2018 4:01:12 PM
To: Hough, Palmer [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=51cd0b0d81ac416fa265944d6e6575ce-PHough]
CC: Curtis, Jennifer [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=79a6f9c1ad88499cadff270bae96ec45-Curtis, Jennifer]; LaCroix, Matthew [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=2903525a555b448c8d0111b8817dc9ad-LaCroix, Matthew]; Fordham, Tami [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=347c9ff04ed340568194c316fd05fa18-Fordham, Tami]; Allnutt, David [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=6e28f5bf9cbf4b8b9eda7751c2f10750-Allnutt, David]; Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
Subject: RE: Lee Forsgren / Alaska Visit
Attachments: ATT00001.txt

Good morning, Palmer. Monday, June 18 at 4:30P will work. Thank you for coordinating this for us. I look forward to seeing you soon. Best. – Kyle.

From: Hough, Palmer <Hough.Palmer@epa.gov>
Sent: Friday, June 8, 2018 6:46 AM
To: Kyle W. Parker <KWParker@hollandhart.com>
Cc: Curtis, Jennifer <Curtis.Jennifer@epa.gov>; LaCroix, Matthew <LaCroix.Matthew@epa.gov>; Fordham, Tami <Fordham.Tami@epa.gov>; Allnutt, David <Allnutt.David@epa.gov>; Forsgren, Lee <Forsgren.Lee@epa.gov>
Subject: RE: Lee Forsgren / Alaska Visit

Kyle

Lee's schedule during his upcoming Alaska visit is very tight but we have made time for him to meet with you on Monday June 18 from 4:30 to 5:00 PM at EPA's office in Anchorage. I'm cc'ing folks with the Anchorage office who will provide you with details about the exact location of the meeting room and provide any instructions for accessing the building. Lee lands in Anchorage at 3 PM on Monday but we think that gives him time to make the 4:30 with you.

Please let us know if that works for you.

Thanks, Palmer

From: Kyle W. Parker [mailto:KWParker@hollandhart.com]
Sent: Wednesday, June 06, 2018 5:13 PM
To: Hough, Palmer <Hough.Palmer@epa.gov>
Subject: Lee Forsgren / Alaska Visit

Palmer –

Lee Forsgren asked that I connect with you to see if there might be some time in his schedule during his coming Alaska visit to get-together so we can share an update on the proposed Oil Search / Nanushuk North Slope Oil Development Project. Keiran Wulff, the head of Oil Search, and I met with Lee in Washington, DC, back in April to discuss the program. While we were together in DC, Lee mentioned his Alaska visit, and Keiran extended an invitation to meet again during the trip. Please let me know if there might be some time in Lee's schedule to meet. Recognizing that Lee's schedule is likely pretty packed, we will make ourselves available to him whenever and wherever convenient. If Lee is

available for dinner one evening, we would also welcome the opportunity to have him join us to enjoy some Alaska salmon! Thank you for your assistance. I hope we can make something work. All the best. – Kyle.

Kyle W. Parker
Partner, Holland & Hart LLP
1029 W. 3rd Avenue, Sute 550, Anchorage, AK 99501
T Ex. 6
HOLLAND&HART

Message

From: Hough, Palmer [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=51CD0B0D81AC416FA265944D6E6575CE-PHOUGH]
Sent: 6/8/2018 2:45:54 PM
To: Kyle W. Parker [KWParker@hollandhart.com]
CC: Curtis, Jennifer [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=79a6f9c1ad88499cadff270bae96ec45-Curtis, Jennifer]; LaCroix, Matthew [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=2903525a555b448c8d0111b8817dc9ad-LaCroix, Matthew]; Fordham, Tami [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=347c9ff04ed340568194c316fd05fa18-Fordham, Tami]; Allnutt, David [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=6e28f5bf9cbf4b8b9eda7751c2f10750-Allnutt, David]; Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
Subject: RE: Lee Forsgren / Alaska Visit

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Thanks, Palmer

From: Kyle W. Parker [mailto:KWParker@hollandhart.com]
Sent: Wednesday, June 06, 2018 5:13 PM
To: Hough, Palmer <Hough.Palmer@epa.gov>
Subject: Lee Forsgren / Alaska Visit

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Kyle W. Parker
Partner, Holland & Hart LLP
1029 W. 3rd Avenue, Sute 550, Anchorage, AK 99501
T Ex. 6
HOLLAND&HART

Message

From: Bode, Denise A (53804) [dabode@michaelbeststrategies.com]
Sent: 5/9/2018 4:01:45 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
Subject: Re: PFAS National Leadership Summit

Thanks for trying, you guys are the best. D

Denise A. Bode
Partner
E dabode@michaelbeststrategies.com<mailto:dabode@michaelbeststrategies.com>
T 202.844.3804<tel:202.844.3804> | M Ex. 6 | F 202.347.1819<tel:202.347.1819>

[cid:image001.png@01D29BEB.5B4E8CA0]

my bio<http://www.michaelbeststrategies.com/Denise-Bode> | our firm<http://www.michaelbeststrategies.com/> | vCard<http://www.michaelbest.com/People/Denise-Bode.vcf>

On May 9, 2018, at 11:57 AM, Forsgren, Lee <Forsgren.Lee@epa.gov<mailto:Forsgren.Lee@epa.gov>> wrote:

Denise,

That is correct.

Lee
D. Lee Forsgren
Deputy Assistant Administrator
Office Of Water
Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Room 3219 WJCE
Washington, DC 20460
Phone: 202-564-5700
Forsgren.Lee@epa.gov<mailto:Forsgren.Lee@epa.gov>

-----Original Message-----
From: Bode, Denise A (53804) [mailto:dabode@michaelbeststrategies.com]
Sent: Wednesday, May 9, 2018 11:06 AM
To: Forsgren, Lee <Forsgren.Lee@epa.gov<mailto:Forsgren.Lee@epa.gov>>
Subject: FW: PFAS National Leadership Summit

Lee, I guess this is the response to our request. No one but associations and public officials will be included? Thanks, just need to report back. Best, D

Denise A. Bode
Partner
E dabode@michaelbeststrategies.com<mailto:dabode@michaelbeststrategies.com>
T 202.844.3804 | M Ex. 6 | F 202.347.1819

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On 5/8/18, 7:40 AM, "safewater" <safewater@epa.gov<mailto:safewater@epa.gov>> wrote:

Good Morning,

Thank you for your interest in this important issue.

As you are aware, EPA is convening this leadership summit to coordinate with our state and federal partners and national organizations to identify the most critical needs they have in addressing PFAS contamination and to identify the tools we can provide them to better protect public health. Because

space will be limited at the summit, EPA has limited the invitation to federal partners, states, territories, tribes and representatives from national organizations.

EPA, however, will provide the opportunity for the public to join in a portion of the meeting via streaming online. Details on how to access the event will be posted on www.epa.gov/pfas<http://www.epa.gov/pfas>. We will also be providing the public with the opportunity to send written input to EPA. Details on how to submit your input will be posted on www.epa.gov/pfas<http://www.epa.gov/pfas>.

We appreciate your thoughts and suggestions on how EPA can best help states and communities facing this issue. We will consider you and/or your organization's interest as we plan our next steps.

Thank you.

Sincerely,
EPA's Office of Ground Water and Drinking Water

Message

From: Bode, Denise A (53804) [dabode@michaelbeststrategies.com]
Sent: 5/4/2018 9:21:51 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
CC: Swanson, Kevin O (59578) [koswanson@michaelbeststrategies.com]; Grevatt, Peter [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=d3caa0c39ebe44cb9d3ae44da7543733-Grevatt, Peter]; Mclain, Jennifer [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=2bc5b268184348bbb383a56b0042b603-Jennifer Mclain]
Subject: Re: Attendance at PFAS National leadership summit

Thanks, Lee! Appreciate any magic, even folding chairs in the back!!! Best, D

Denise A. Bode
Partner
E dabode@michaelbeststrategies.com<mailto:dabode@michaelbeststrategies.com>
T 202.844.3804<tel:202.844.3804> | M [Ex. 6] | F 202.347.1819<tel:202.347.1819>

[cid:image001.png@01D29BEB.5B4E8CA0]

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On May 4, 2018, at 5:07 PM, Forsgren, Lee <Forsgren.Lee@epa.gov<mailto:Forsgren.Lee@epa.gov>> wrote:

Denise,

We will see what the art of the possible might be for the summit. At the very least we are going to have a number of follow on meetings around the country that you all might be perfectly suited for.

Regards,
Lee

D. Lee Forsgren
Deputy Assistant Administrator
Office Of Water
Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Room 3219 WJCE
Washington, DC 20460
Phone: 202-564-5700
Forsgren.Lee@epa.gov<mailto:Forsgren.Lee@epa.gov>

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From: Bode, Denise A (53804) [mailto:dabode@michaelbeststrategies.com]
Sent: Friday, May 4, 2018 4:46 PM
To: Forsgren, Lee <Forsgren.Lee@epa.gov<mailto:Forsgren.Lee@epa.gov>>
Cc: Swanson, Kevin O (59578)
<koswanson@michaelbeststrategies.com<mailto:koswanson@michaelbeststrategies.com>>
Subject: Attendance at PFAS National leadership summit
Importance: High

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Sounds like real progress is being made since we talked last. Sorry to ask you the question about attendance at the Summit, but our firm represents TRC, a national environmental consulting firm that cannot get a spot. TRC specializes in environmental remediation, as well as an emphasis in the energy sector. One area TRC has specialized in over the years is what is known as "liability transfers"; essentially where TRC "stands in the shoes" of their environmental clients for hazardous waste cleanup

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Thanks for your consideration.

Best,
Denise

Denise A. Bode
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T 202.844.3804 | M Ex. 6 | F 202.347.1819
[/Users/denisebode/Library/Containers/com.microsoft.Outlook/Data/Library/Caches/Signatures/signature_1741113394]

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Message

From: Bode, Denise A (53804) [dabode@michaelbeststrategies.com]
Sent: 5/4/2018 8:46:16 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
CC: Swanson, Kevin O (59578) [koswanson@michaelbeststrategies.com]
Subject: Attendance at PFAS National leadership summit
Attachments: image001.png

Importance: High

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Thanks for your consideration.

Best,
Denise

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[/Users/denisebode/Library/Containers/com.microsoft.Outlook/Data/Library/Caches/Signatures/signature_1741113394]

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Message

From: Smith, Brooks M. [Brooks.Smith@troutmansanders.com]
Sent: 5/29/2018 2:52:23 PM
To: Wood, Robert [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=b2676c137cf54db0a5d98df232901821-Wood, Robert]; Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
Subject: RE: CVS Pharma ELG Question

Perfect. I'll send a calendar invitation. Thanks, Brooks

Brooks M. Smith
troutman **sanders**
Direct: Ex. 6
brooks.smith@troutman.com

From: Wood, Robert <Wood.Robert@epa.gov>
Sent: Tuesday, May 29, 2018 10:24 AM
To: Smith, Brooks M. <Brooks.Smith@troutmansanders.com>; Forsgren, Lee <Forsgren.Lee@epa.gov>
Subject: RE: CVS Pharma ELG Question

Hi Brooks,

I'm available at 2PM this Thursday 5/31, would that work for you for a call?

Rob

Robert Wood, Director
Engineering and Analysis Division
U.S. EPA Office of Water
202-566-1822

From: Smith, Brooks M. [mailto:Brooks.Smith@troutmansanders.com]
Sent: Tuesday, May 29, 2018 8:04 AM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>; Wood, Robert <Wood.Robert@epa.gov>
Subject: RE: CVS Pharma ELG Question

Hi Lee and Rob, I hope you both had a great holiday. Rob, I know you've been out for a few weeks. Based on the emails below, would you have some time this week to talk by phone? Best, Brooks

Brooks M. Smith
troutman **sanders**
Direct: Ex. 6
brooks.smith@troutman.com

From: Smith, Brooks M.
Sent: Monday, May 14, 2018 5:32 PM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Cc: Wood, Robert <Wood.Robert@epa.gov>
Subject: RE: CVS Pharma ELG Question

Understood, will do. Rob, what works best for you over next week or two? Thanks, Brooks

Brooks M. Smith
troutman **sanders**
Direct: Ex. 6
brooks.smith@troutman.com

From: Forsgren, Lee [mailto:Forsgren.Lee@epa.gov]
Sent: Monday, May 14, 2018 1:40 PM
To: Smith, Brooks M. <Brooks.Smith@troutmansanders.com>
Cc: Wood, Robert <Wood.Robert@epa.gov>
Subject: RE: CVS Pharma ELG Question

Brooks,

We have had a couple of conversations internally and things are more complicated than I thought. Would suggest that you reach out to Rob Wood from my office and we can work through some of the complexities.

Regards,
Lee

D. Lee Forsgren
Deputy Assistant Administrator
Office Of Water
Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Room 3219 WJCE
Washington, DC 20460
Phone: 202-564-5700
Forsgren.Lee@epa.gov

From: Smith, Brooks M. [mailto:Brooks.Smith@troutmansanders.com]
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Subject: CVS Pharma ELG Question

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Sent: Tuesday, March 27, 2018 10:08 AM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Cc: Penman, Crystal <Penman.Crystal@epa.gov>; Campbell, Ann <Campbell.Ann@epa.gov>
Subject: RE: Pharma ELG Question

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Sent: Tuesday, March 13, 2018 12:48 PM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Subject: Pharma ELG Question

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Message

From: Wood, Robert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=B2676C137CF54DB0A5D98DF232901821-WOOD, ROBERT]
Sent: 5/29/2018 2:24:04 PM
To: Smith, Brooks M. [Brooks.Smith@troutmansanders.com]; Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
Subject: RE: CVS Pharma ELG Question

Hi Brooks,

I'm available at 2PM this Thursday 5/31, would that work for you for a call?

Rob

Robert Wood, Director
Engineering and Analysis Division
U.S. EPA Office of Water
202-566-1822

From: Smith, Brooks M. [mailto:Brooks.Smith@troutmansanders.com]
Sent: Tuesday, May 29, 2018 8:04 AM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>; Wood, Robert <Wood.Robert@epa.gov>
Subject: RE: CVS Pharma ELG Question

Hi Lee and Rob, I hope you both had a great holiday. Rob, I know you've been out for a few weeks. Based on the emails below, would you have some time this week to talk by phone? Best, Brooks

Brooks M. Smith
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Direct: Ex. 6
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Message

From: Tracy Mehan [tmehan@awwa.org]
Sent: 4/16/2018 4:08:05 PM
To: Tracy Mehan [tmehan@awwa.org]
CC: DC Office [DL_DCOFFICE@awwa.org]; Communications [DL_COMMUNICATIONS@awwa.org]; David LaFrance [dlafrance@awwa.org]; Paula MacIlwaine [pmacIlwaine@awwa.org]; Kevin Mann [kmann@awwa.org]; Barb Martin [bmartin@awwa.org]; Kurt Vause [kurt.vause1@gmail.com]; Aurel Arndt [Ex. 6]; David Weihrauch [DWeihrauch@cityofoxford.org]; John Sullivan [sullivanjp@bwsc.org]; Williams, James [james.williams@peerlessmidwest.com]; David Rager [David.Rager@live.com]; Nancy Quirk [NancyQu@greenbaywi.gov]; Patrick Kerr [pkerr@brwater.com]; mdeanedc@gmail.com; Ben Grumbles [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=usereb77e807]; Brenda Lennox [brenda.lennox@outlook.com]; Jeanne Bennett-Bailey [JeanneBennettBailey@outlook.com]; Gene Koontz [gkoontz@gfnet.com]; John Donahue [jdonahue@northparkwater.org]; Charles Murray [cmurray@fairfaxwater.org]; Lochhead, Jim S. [Jim.Lochhead@denverwater.org]; Rob Renner [rrenner@waterrf.org]; Brent Fewell [brent.fewell@earthandwatergroup.com]; jim.proctor@mcwane.com; Ken Maynard [kmaynard@awwa.org]; Grevatt, Peter [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=d3caa0c39ebe44cb9d3ae44da7543733-Grevatt, Peter]; Burneson, Eric [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=2cacb9a8d49f49af80531e9e2ccb9018-eburneso]; Sawyers, Andrew [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=49214552a00b4ab7b168ec0edba1d1ac-Sawyers, Andrew]; Ross, David P [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=119cd8b52dd14305a84863124ad6d8a6-Ross, David]; Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]; Nagle, Deborah [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=33888a2bbe8f48aeb4ad9cc54259fb4e-dnagle]; Bodine, Susan [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=8c2cc6086fcc44c3be6b5d32b262d983-Bodine, Sus]; fandes@btlaw.com; Diane VanDe Hei (vandehei@amwa.net) [vandehei@amwa.net]; 'hartnett@amwa.net' [hartnett@amwa.net]; brown@amwa.net; sgarcia@apwa.net; 'Eileen O'Neill' [eoneill@wef.org]; Tim Williams [twilliams@wef.org]; Steve Dye [sdye@wef.org]; Claudio Ternieden [cternieden@wef.org]; Pat Sinicropi [psinicropi@watereuse.org]; Adam Krantz (akrantz@nacwa.org) [akrantz@nacwa.org]; Nathan Gardner-Andrews [NGardner-Andrews@nacwa.org]; KSurfus@nacwa.org; Jason Isakovic [JIsakovic@nacwa.org]; cfinley@nacwa.org; Ariel Wittenberg [awittenberg@eenews.net]; Annie Snider [asnider@politico.com]; Saiyid, Amena [ASaiyid@bna.com]; sbruninga@bna.com; mgrena@bna.com; Schultz, David [dSchultz@bloombergenvironment.com]; Bill Teichmiller [teich4@ejwatercoop.com]; bpallasch@asce.org; Pawlow, Jon [Jon.Pawlow@mail.house.gov]; Couri, Jerry [JerryCouri@mail.house.gov]; Donaldson, Teri (EPW) [Teri_Donaldson@epw.senate.gov]; Stevens, Mae (Cardin) [Mae_Stevens@cardin.senate.gov]; Tim Worley [tworley@ca-nv-awwa.org]; Bonnifer Ballard [bballard@mi-water.org]; Mike Howe [mikehowe@austin.rr.com]; Peggy Guingona [peggy@fsawwa.org]; sryan@newwa.org; Ryan, John P. [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=0c934574ad3d4383bd08ae1aeec72fff-Ryan, John]; Gebhardt, Jim [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=d25752bcb8c741fd831dbc3429088987-Gebhardt, J]; Abhold, Kristyn [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=bfe730f27efa48beb8a6252c5ed0e71e-Abhold, Kri]; Brubaker, Sonia [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=6055e643e5154f25b83a5515161e1705-sbruba02]; Corr, Elizabeth [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=691e1abf082a4a5b8723cc9ac8d9bdf0-ecorr]; Frace, Sheila [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=ba25b075cb55480595d789b5e0765367-sfrace]; Gutierrez, Sally [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=5a028e53f9c9437dbf25957863b4e13e-Gutierrez, Sally]; Shanaghan, Peter [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=63bb2a6ab300454dbd58e2d3b9084cca-pshanagh]; Ames, George [/o=ExchangeLabs/ou=Exchange Administrative Group

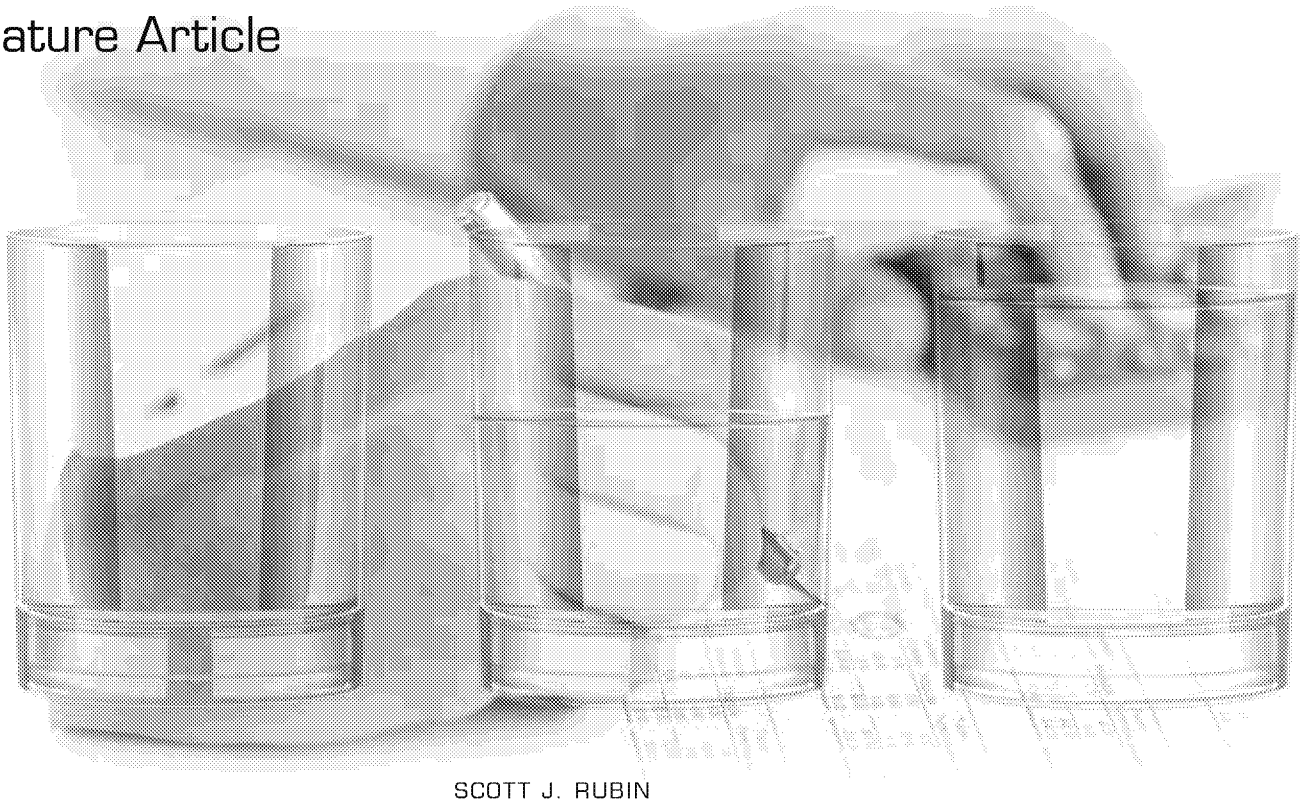
(FYDIBOHF23SPDLT)/cn=Recipients/cn=23fe9bb4f8ed4843ae2ec8398703514c-games]; Chamberlain, Nick [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=b499d62de3c84c1eb010a14a477e7ade-Chamberlain, Nick]; Anderer, Kirsten [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=065ed70f5f8e4c49803b16363d4d0e00-Anderer, Kirsten]; Michael Curley [curley@eli.org]; Michael Curley [mcurley7@me.com]; laurie@isawwa.org; Tyler Converse [tyler.converse@cantonohio.gov]; Beard, Jim [jbeard@AtlantaGa.Gov]; Angela Montoya Bricmont (angela.bricmont@denverwater.org) [angela.bricmont@denverwater.org]; Sharma, Usha [Usha.Sharma@denverwater.org]; Melissa Meeker [mmeeker@werf.org]; thomas.liu@baml.com; Bower, Jeffrey D [jeffrey.bower@baml.com]; Richard Weiss (richard.weiss@morganstanley.com) [richard.weiss@morganstanley.com]; Lisa Daniels [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=userd571c471]; Jud Hill [ajudsonhill@gmail.com]; Garbutt, Andrew N [andrewgarbutt@KPMG.com]; Tester, Iain (US/Austin/CF) [iaintester@KPMG.com]; Alex Seleznyov [aseleznyov@Kpmg.Com]; Ziglar, Jim (US - Arlington) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=usera0b04026]; Paul Matthews [paul.matthews@tvwd.org]; Cregger, Helen [Helen.Cregger@moodys.com]; theodore.chapman@spglobal.com; Selting, Anne [anne.selting@spglobal.com]; D'Olier-Lees, Trevor [trevor.dolier-lees@spglobal.com]; Gander, Sue [sgander@NGA.ORG]; Buchheister, Bevin [bbuchheister@nga.org]; Schaefer, Alex [ASchaefer@NGA.ORG]; Michele Nellenbach [mnellenbach@bpcaction.org]; Beate Wright [bwright@waterrf.org]; belin@potomac.org; Tim A. Eder [TEder@mott.org]; Davis, Cameron [camdavis@geiconsultants.com]; Kathryn A. Buckner [kabuckner@cgli.org]; David Ullrich [david.ullrich@glslcities.org]; Cohen, Jacqueline [jackie.cohen@mail.house.gov]; Ken Kirk [kenkirk733@gmail.com]; Eric Sapirstein [esap@ensresources.com]; Maureen Duffy [Maureen.Duffy@amwater.com]; Loyd Aldie Warnock [Aldie.Warnock@amwater.com]; Timothy J Leahy [Timothy.Leahy@amwater.com]; susan.story@amwater.com; sue.mccormick@glwater.org; Matt Ries [Matt.Ries@dcwater.com]; ghawkmoonshot@outlook.com; Hank Habicht [hank@suntowater.com]; David Zimmer [dzimmer@njib.gov]; Zimmer, David [ZimmerDT@cdmsmith.com]; Brown, Joe (Boozman) [Joe_Brown@boozman.senate.gov]; Rick Farrell [rfarrell@madisonassoc.com]; Massey, Karen [karen.massey@eiera.mo.gov]; McProuty, Timothy [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=8900fd307293420883a8157d9fa2b7fc-TMCPROUT]; Titus, Hala Z. [titushz@cdmsmith.com]; 'Dan McCarthy' [danmccarthywater@gmail.com]; Manweiler, Brooke [ManweilerBA@cdmsmith.com]; Gatfield, Saavan [saavan.gatfield@fitchratings.com]; SCOTT, DOUGLAS [douglas.scott@fitchratings.com]; Laity, Jim A. EOP/OMB [Ex. 6]; Dorjets, Vlad EOP/OMB [Ex. 6]; McGartland, Al [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=5fe25fc1df634f9798675527e0070429-AMcGartl]; denise.kruger@gswater.com; ChiHo Sham [ChiHo.Sham@erg.com]; Ralph Jones [Ralph.Jones@cadmusgroup.com]; gene.fax@cadmusgroup.com; ian.kline@cadmusgroup.com; Behl, Betsy [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=d17d5a871e0244869ea996a9de657bcf-Betsy Behl]

Subject: Water Costs and Affordability in the US: 1990-2015

Attachments: Cost of Water and Affordability 1990-2015 Scott Rubin.pdf

It's still cheap.

GTM



SCOTT J. RUBIN

Water Costs and Affordability in the United States: 1990 to 2015

NEARLY 25 YEARS AFTER THE D/DBP NEGOTIATIONS FOCUSED ATTENTION ON AFFORDABILITY, IT IS NOW A GOOD TIME TO EXAMINE HOW THE COST AND AFFORDABILITY OF WATER SERVICE IN THE UNITED STATES HAVE CHANGED.

Twenty-five years ago, the US Environmental Protection Agency (USEPA) conducted a negotiated rulemaking on disinfectants and disinfection byproducts (D/DBP) in drinking water. One important issue that arose during these negotiations was how to determine whether new regulations would be affordable. Up until that time, no one had conducted any rigorous analysis of water affordability, though one early paper had highlighted a growing concern with low-income households that were unable to afford water service in some communities (Saunders 1992). So, late one night during the negotiations, a few people huddled around a laptop computer in a hotel room and started looking at income distribution curves and other data that might help inform decisions about the affordability of water service in the United States. These efforts resulted in several informative presentations and one of the first papers focused on water affordability (Rubin 1994).

A few years later, the National Research Council issued a report on safe drinking water that included a discussion of affordability (National Research Council 1997). At around this same time, the Safe Drinking Water Act Amendments of 1996 included both specific affordability provisions and the state revolving fund program to help provide lower-cost capital to utilities. Since then, the water and wastewater industries' thinking about affordability has been shaped by a comprehensive study of water affordability programs (Saunders et al. 1998), the inclusion of a chapter on affordability in the fifth edition of the AWWA Manual M1. *Principles of Water Rates, Fees and Charges* (AWWA 2000), a report on affordability from the National Drinking Water Advisory Council (NDWAC 2003), and the publication of affordability guides by AWWA (2005) and the Water

Environment Federation (WEF 2007), as well as numerous papers, conference presentations, and reports.

While surveys of water rates have been conducted biennially for nearly 30 years (AWWA 2016, Duke & Montoya 1993), comprehensive studies examining the actual cost of water to consumers (that is, water bills) are much less frequent (Rubin 2005, 1998). The distinction is important, because as Chesnutt and Beecher (1998) noted, conservation programs can be expected to increase water rates (that is, the price per unit of water), but often result in lower bills for water service (that is, the total cost to the consumer). Indeed, this distinction has become even more critical in light of the significant decline in average household water consumption that has been observed for the past decade and longer (DeOreo & Mayer 2012, Coomes et al. 2010).

As we approach the 25th anniversary of the D/DBP negotiations that focused attention on affordability, it is an appropriate time to examine how the cost and affordability of water service in the United States have changed over the past 25 years.

CHANGES IN WATER PRICES

Water prices—the cost per unit of water—have tripled since 1990. According to data collected through biennial surveys, first by Ernst & Young and now by Raftelis Financial Consultants and AWWA, the typical cost in the United States for a residential customer to purchase 1,000 ft^3 of water increased from $11.16/month in 1990 to $34.61/month in 2016 (AWWA 2016, Duke & Montoya 1993). In contrast, overall consumer prices, as measured by the consumer price index and typical incomes as measured by median household income, have approximately doubled during the same period, as shown in Figure 1.

CHANGES IN WATER BILLS

As mentioned, there is an important difference between the per-unit price of water and the actual water bills customers receive. Over the past 25 years, two significant trends have affected customers' water bills. First, the typical household uses less water now than it did in the past; for example, Coomes et al. (2010) estimated that between 1978 and 2008, typical household water consumption declined by approximately 13%. While the exact sources of the decline are not known with certainty, the Coomes study suggested that multiple factors may have been at play, including the introduction of appliance and plumbing fixture efficiency standards, a reduction in the average number of people living in a household, drought conditions in some parts of the country, and increasing water prices.

In addition, data collected by the US Census Bureau show a dramatic increase in the percentage of customers in multi-family housing units (e.g., apartment buildings, condominiums) that receive a bill for water or wastewater service. Figure 2 provides an analysis of US census microdata from 1990 to 2015 using data compiled by the University of Minnesota (Ruggles et al. 2017). Figure 2 shows that during this 25-year period, there has been little change in the percentage of

FIGURE 1 Changes in residential water price, inflation, and median household income (1990–2016)

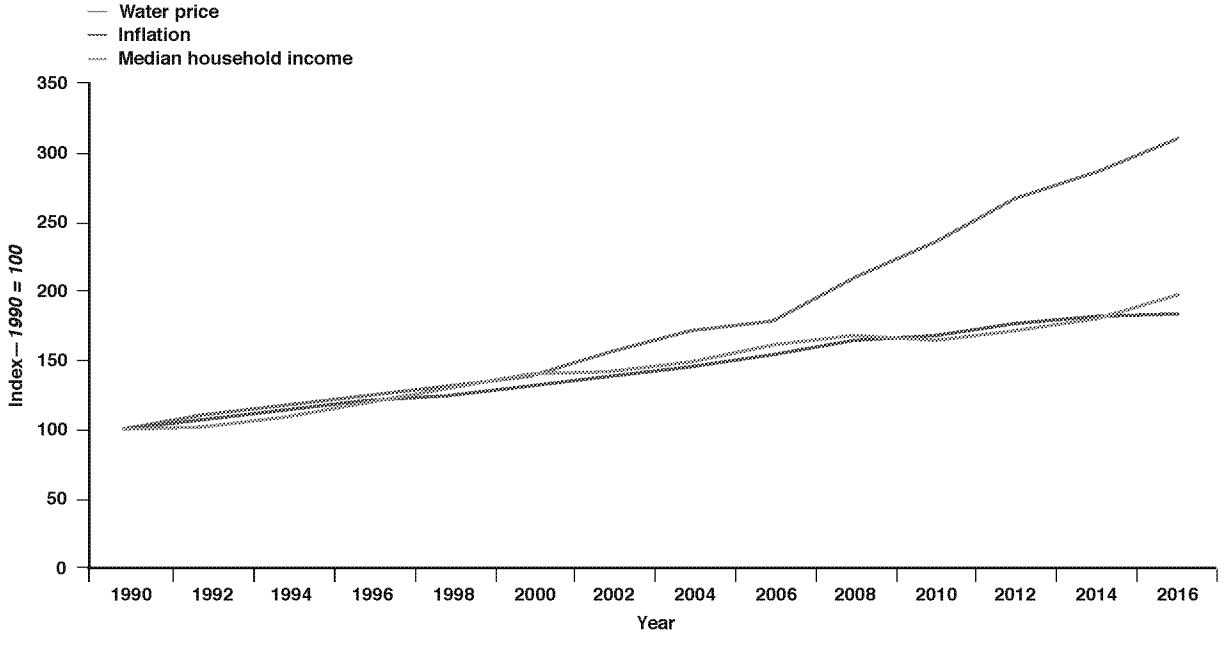
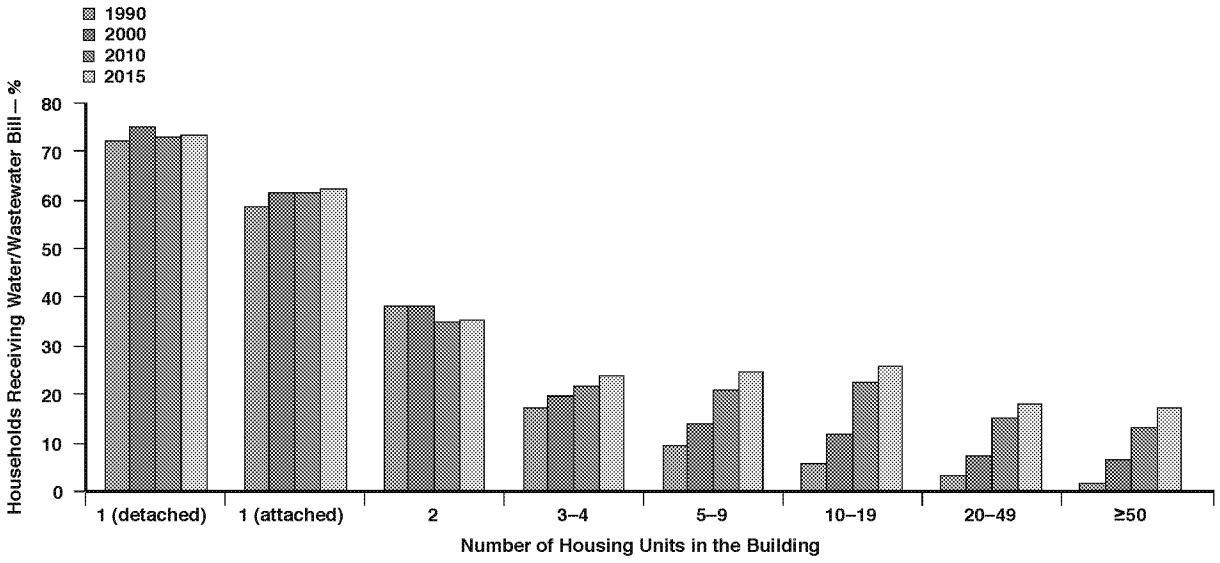


FIGURE 2 Percentage of households receiving water or wastewater bill by number of units in building (1990–2015)



single-family households that receive a water/wastewater bill, with the percentage remaining at about 70% for customers in detached houses and 60% for customers in single-family attached houses. In contrast, there has been a dramatic increase in the percentage of households in multi-unit buildings that receive a water/wastewater bill. Taking buildings with 50 or more units as an example, in 1990 only 2% of households said they received a water or wastewater bill; by 2015 that percentage had increased eight-fold, to 17%. Similar significant increases occurred between 1990 and 2015 for all households in buildings with five or more units.

Many households in multi-unit buildings do not receive water bills directly from the water utility providing service. Instead, their share of the building's water bill is determined through submetering or the use of ratio billing methods by building owners and operators. In a comprehensive study sponsored by USEPA and others, Mayer et al. (2004) estimated that increased submetering or other methods of billing consumers in multi-unit

FIGURE 3 Changes in residential water and wastewater bill, water price, inflation, and income (1990–2015)

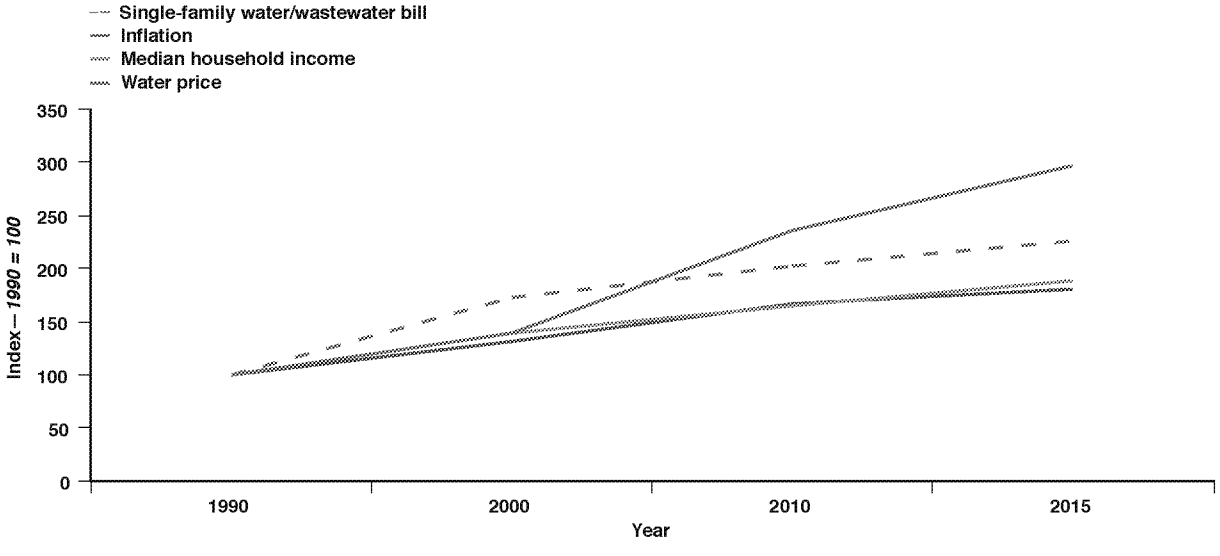
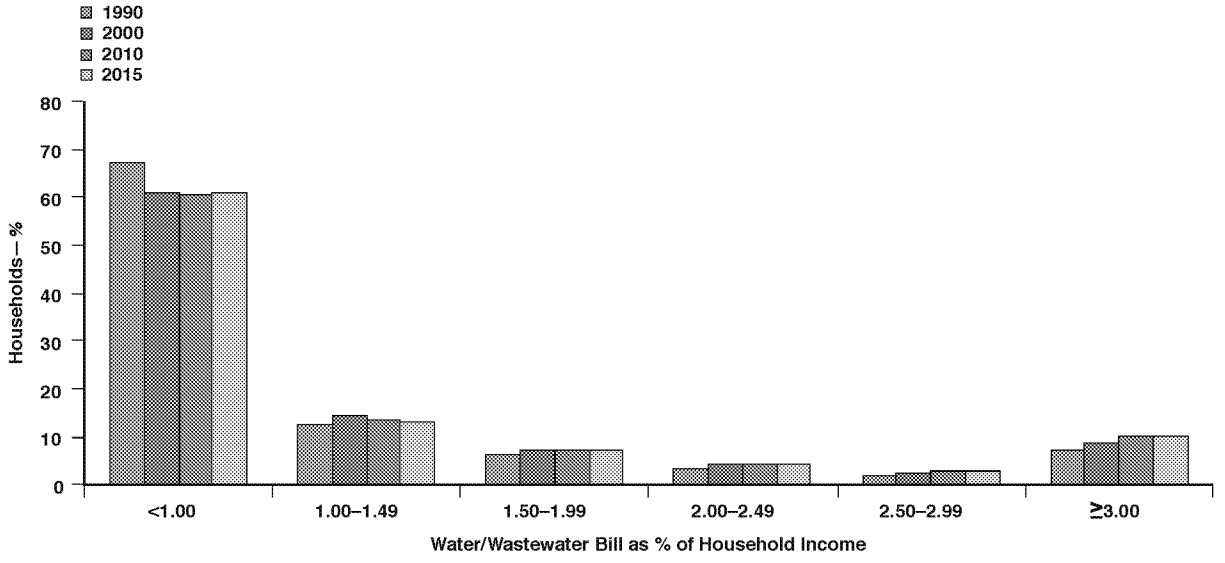


FIGURE 4 Water/wastewater bill for households in single-family buildings as a percent of income (1990–2015)



buildings could reduce water consumption by between 11 and 26%. This study was part of an effort by USEPA to promote submetering and other billing methods as a way to encourage water conservation in multi-unit buildings, and from the census data, it appears that these efforts have achieved some level of success.

The combination of declining consumption in single-family housing and the increased prevalence of direct billing in multi-unit buildings has contributed to declining per-household water usage. This affects utilities significantly, because even though water prices are increasing much faster than the rate of inflation, it does not necessarily follow that water bills (the product of the water price and water consumption) will exhibit the same trend.

An analysis of US census data provides a 25-year history of actual water bills that households reported receiving. Figure 3 reproduces the data from Figure 1 but adds a dashed line showing the increase in water/wastewater bills from 1990 to 2015 for households in single-family buildings. These are the households that are most likely to receive their water or wastewater bills directly from the utility rather than from a third party.

That is, between 1990 and 2015, while the price of water tripled (a compound annual increase of 4.5%), the average water/wastewater bill received by residential customers of water utilities increased by a more modest (but still substantial) 2.25 times (an annual increase of 3.3%). When compared with the rate of increase in general prices (1.8 times or 2.4% per year) and incomes (1.9 times or 2.6% annually), water bills increased by between 0.7 and 0.9% per year in excess of the increase in inflation and incomes, respectively.

The combination of declining consumption in single-family housing and the increased prevalence of direct billing in multi-unit buildings has contributed to declining per-household water usage.

CHANGES IN THE AFFORDABILITY OF WATER SERVICE

While water/wastewater bills increased faster than the increase in median incomes over this period, it does not necessarily follow that the same effect would occur for households with incomes higher or lower than the median. An analysis of US census data for households in single-family buildings shows that water costs as a percentage of income have been fairly stable, except for households with the lowest incomes.

Figure 4 shows that in 1990, 67% of households in single-family buildings had bills for water and wastewater that were less than 1% of their income. By 2000, that percentage had dropped to 61%, and it has remained at that level through 2015. At the opposite end of the figure, in 1990, 7% of households in single-family buildings had water/wastewater bills that totaled 3% or more of

their income; that percentage increased to 9% in 2000 and was more than 10% in 2015.

CONCLUSIONS

The water industry has seen many changes in the past 25 years, but some things have remained fairly constant. In the United States, most water consumers in single-family buildings continue to pay less than 1% of their income for water and wastewater service. At lower income levels, however, water and wastewater bills are increasingly burdensome as costs increase faster than incomes. Indeed, between 1990 and 2015, the percentage of households in single-family buildings that paid 3% or more of their income for water and wastewater increased by 40%, from 7.4% of households in 1990 to 10.5% of households in 2015.

The percentage increase, however, tells only part of the story. The number of households in single-family buildings that pay for water or wastewater increased dramatically during the 25-year period, from 47 million to 66 million households. Thus, in 1990 about 3.3 million households paid 3% or more of their income for water and wastewater. By 2015 the number of households devoting 3% or more of their income to water and wastewater had more than doubled to 6.8 million households.

Those in the water industry have greatly increased their understanding of the affordability of water services to lower-income customers. Those efforts, however, have not stopped the costs of water services from continuing to increase faster than incomes. If that trend continues, it can be expected that lower-income households will have even more difficulty paying their water and wastewater bills in full and on time. Consequently, water and wastewater utilities will need to remain vigilant in controlling costs, continue to evaluate the need for (and effectiveness of) affordability programs, and assess the adequacy of their customer service operations.

ABOUT THE AUTHOR

Scott J. Rubin is a consultant and attorney working exclusively on issues affecting the public utility industries. He was a member of the Disinfectants and Disinfection Byproducts Rule negotiated rulemaking in 1992 and 1993 when he was serving as chair of the Water Committee of the National Association of State Utility Consumer Advocates. He left government service in 1994 to open his own practice. During the past 25 years, he has conducted research and provided guidance on affordability and customer service issues for AWWA, the National Rural Water Association, the Water Research Foundation, and several utilities. Rubin can be reached at scott.j.rubin@gmail.com.

https://doi.org/10.1002/awwa.1062

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Message

From: McRae, Evelyn [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=DB7C8FE7E7C54C8A961B4BF75F73D4A3-MCRAE, EVELYN]
Sent: 5/16/2018 4:03:08 PM
To: Hisel-Mccoy, Sara [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=0641d449fe4e4444971b9f695b74f0b8-Sara Hisel-Mccoy]; OST FEDS [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=8a5fd04ed88d4a69876f5c58bf888754-OST FEDS]; OST Non-Federal Employees [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=eb08eaa8682b4bc8a4b921534fcd85d6-OST None Fe]; Farrelly.Joan@dol.gov; denise.keehner@maryland.gov; ideloatch@usgs.gov; Groman, Hazel [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=04679a1310bb40938313695703b15ec8-Groman, Hazel]; Goodin, John [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=3eac342f280a4b9db4079c81f66d1913-JGoodin]; Norris, Munsel [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=1a54a4d7779d4cabaff3a0470838ebf0-MNorri03]; Reid, Danesha [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=3ea49f7994634680a7c8b71663669278-dreid]; Frazer, Brian [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=572986d047624669891da90708433da1-Brian Frazer]; Blette, Veronica [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=acda7532589c4cc8a3d00f978953950c-Blette, Veronica]; Davies, Clive [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=6eca39ab66ea413993d7355fd46b1008-Davies, Clive]; Simbanin, Cynthia [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=01bd5b3eeec545eca7b93caff1efc5d7-Simbanin, Cynthia]; Simon, Roy [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=6cd6ce5f749a46f9a1768857ea08d860-rsimon]; Shah, Surabhi [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=8156913763b24dd1ba5112004f6ccacb-Shah, Surabhi]; Bissonette, Eric [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=995a4de608d74b6e87f766d9382849ef-Bissonette, Eric]; Mclain, Jennifer [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=2bc5b268184348bbb383a56b0042b603-Jennifer Mclain]; Howard, Christine [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=65a83c564c2443338d1fbca6910d9762-Howard, Chr]; Fields, Wanda [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=032acb02c1c34d629c6154b3b8cfcc65-WFields]; Almodovar, Lisa [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a482f8be961a41eb8d149b40f7cb8f4b-LAlmod02]; Yusuf, Istanbul [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=4db2f6c3869b4b668208ef60e08d7fe8-Yusuf, Istanbul]; OW-OGWDW-EVERYONE [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=07a3941911ef4d93be64e4ae91a7d471-OW-OGWDW-EVERYONE]; OW-IO All [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=ece5d2de8560432892a6679b68e76e53-OW-IO MOS-WPS-RMS]
CC: Licis, Sandy [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=05c3fe32197b4fdc996a1ad16e7fdde9-Licis, Sandy]; Bergman, Ronald [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=414bc52234334a149ba434b7f83b4dc3-rbergman]; Burneson, Eric [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=2cacb9a8d49f49af80531e9e2ccb9018-eburneso]; Best-Wong, Benita [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=6ee79b3d0fc0429b99f2c05481b0b957-bbestwon]; Fabiano, Claudia [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=379018d37bed472fb39492197665cfca-Fabiano, Claudia]; Robiou, Grace

[/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=1ee414fc6abd4a879a237f08b0836353-GRobiou1]; Kempic, Jeffrey [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=274ae714cbd24f8f896b76b20b669f36-jkempic]; Wirth, Karen [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=6cb2f2d08c2542c49803117590998a37-kwirth]; Khera, Rajiv [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=ade270454823489ca3661b7890525040-rkhera]; Corr, Elizabeth [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=691e1abf082a4a5b8723cc9ac8d9bdf0-ecorr]; Shanaghan, Peter [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=63bb2a6ab300454dbd58e2d3b9084cca-pshanagh]; McRae, Evelyn [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=db7c8fe7e7c54c8a961b4bf75f73d4a3-McRae, Evelyn]

Subject: Reminder: Evelyn Washington Ex. 6

Attachments: Evelyn Washington Flyer 2.docx

Ex. 6

Please bring a small dessert to share.

To contribute to a gift for Evelyn or sign a card, please contact:
Amber Erickson, 202.566.2984-3311M East, Lynn Zipf, 202.564.1509-3349K East
Colleen Flaherty, 202.564.5939-5233G West, Evelyn McRae, 202.566.1018-6105B West

-----Original Appointment-----
From: Hisel-Mccoy, Sara
Sent: Wednesday, May 09, 2018 5:20 PM
To: OST FEDS; OST Non-Federal Employees; Farrelly.Joan@dol.gov; denise.keehner@maryland.gov; ideloatch@usgs.gov; Groman, Hazel; Goodin, John; Norris, Munsel; Reid, Danesha; Frazer, Brian; Blette, Veronica; Davies, Clive; Simbanin, Cynthia; Simon, Roy; Shah, Surabhi; Bissonette, Eric; Mclain, Jennifer; Howard, Christine; Fields, Wanda; Almodovar, Lisa; Yusuf, Istanbul; OW-OGWDW-EVERYONE; OW-IO All
Cc: Licis, Sandy; Ronald Bergman; Burneson, Eric; Best-Wong, Benita; Claudia Fabiano; Grace Robiou; Kempic, Jeffrey; Wirth, Karen; Khera, Rajiv; Corr, Elizabeth; Shanaghan, Peter
Subject: Evelyn Washington Ex. 6
When: Thursday, May 24, 2018 2:00 PM-5:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: DCRoomWest6105AAssateague/DC-EPA-West-OST

All,

Ex. 6

Thanks,

Sara

Sara Hisel-McCoy, Director
Standards and Health Protection Division
Office of Water, Office of Science and Technology
US Environmental Protection Agency
1200 Pennsylvania Ave, NW
Washington, DC 20460
Tel: 202-566-1649
EPA West 6105D

Message

From: Bode, Denise A (53804) [dabode@michaelbeststrategies.com]
Sent: 5/23/2018 5:54:52 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
Subject: Regional PFAS Meetings
Attachments: image001.png

Who should I be working with to get our folks from TRC to timely request attending this upcoming meetings? Thanks and again sorry to bother. D

Denise A. Bode
Partner
E dabode@michaelbeststrategies.com<mailto:dabode@michaelbeststrategies.com>
T 202.844.3804 | M [Ex. 6] | F 202.347.1819
[/Users/denisebode/Library/Containers/com.microsoft.Outlook/Data/Library/Caches/Signatures/signature_1010580102]

my bio<http://www.michaelbeststrategies.com/dc/lawyer/denise-bode/> | our firm<http://www.michaelbeststrategies.com/> | vCard<http://www.michaelbest.com/People/Denise-Bode.vcf>

Message

From: Chung, David [DChung@crowell.com]
Sent: 6/7/2018 2:36:14 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
Subject: Follow-up from Freeport meeting

Lee –

I hope all is well on your end. I wanted to follow up with you regarding the April 27 meeting with Freeport McMoran during which we discussed WOTUS issues they are dealing with in AZ. We recall that you encouraged us to meet with the Corps to discuss Freeport's concerns. Unfortunately, Freeport is not succeeding in getting the Corps to respond to meeting requests. Is there any way you might be able to help us set up a meeting with Lt. Gen. Semonite and Ryan Fisher? The Freeport folks will be back in DC on June 26 and are hoping to meet with the Corps that afternoon.

Thank you for your time,

David Y. Chung
dchung@crowell.com
Direct: Ex. 6 Fax: 1.202.628.5116

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Message

From: Caravelli, Margaret [mcaravelli@balch.com]
Sent: 5/31/2018 10:24:58 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
Subject: Water Issues

Lee:
Thank you again for taking the time to chat with me regarding some basic questions related to EPA water related rulemakings, specifically 316(b).
Please let me know a date and time in the next few weeks that might work for you and/or the appropriate staff to have a meeting or phone call. Happy to work through your scheduler to arrange a time at your convenience.

Thank you in advance.

Regards,
Margaret

BALCH
& BINGHAM LLP

Margaret Caravelli, Partner, Balch & Bingham LLP
601 Pennsylvania Avenue, NW ◦ Suite 825 South ◦ Washington, DC 20004-2601
t: Ex. 6 f: (866) 237-7416 e: mcaravelli@balch.com
www.balch.com

Message

From: Levine, Leonard [LLEVINE@gcwda.com]
Sent: 2/15/2018 9:59:57 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
CC: Burgin, Sara [sara.burgin@bracewell.com]
Subject: POTW and Produced Water Issue

Lee
I just wanted to ask how things are progressing on two issues addressing produced water from on-shore oil and gas production. The first issue is the prohibition on sending wastewater to POTWs. The second issue that GCA is interested in, is giving properly designed POTWs the opportunity to treat these wastes under CWT regulations. Because of the importance of these issues to GCA we would appreciate an opportunity to have a short conference call with you about where EPA stands on these issues and to discuss how GCA might be able to provide to help.

Thank you,

Leonard Levine P.E.
Technical Director
Gulf Coast Authority
910 Bay Area Blvd
Houston, TX 77058
llevine@gcwda.com
W
C
Ex. 6
WWW. GCATX.ORG

Message

From: Mosites, Jean M. [JMosites@babstcalland.com]
Sent: 2/8/2018 10:08:28 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
CC: Campbell, Ann [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=b8c25a0c2fb648b6a947694a8492311e-Campbell, Ann]; Wood, Robert [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=b2676c137cf54db0a5d98df232901821-Wood, Robert]; Penman, Crystal [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=93662678a6fd4d4695c3df22cd95935a-Penman, Crystal]; Fotouhi, David [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=febaf0d56aab43f8a9174b18218c1182-Fotouhi, Da]; Neugeboren, Steven [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=cfd837ac503949a9820715b53ba921e6-SNEUGEBO]; Ross, David P [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=119cd8b52dd14305a84863124ad6d8a6-Ross, David]
Subject: RE: PGCC / ELG rule and PA conventional operators

Thank you, I appreciate the prompt response. Please let me know what times might work. Tomorrow and Monday are pretty flexible for me.

Regards,
Jean

From: Forsgren, Lee [mailto:Forsgren.Lee@epa.gov]
Sent: Thursday, February 08, 2018 4:56 PM
To: Mosites, Jean M. <JMosites@babstcalland.com>
Cc: Campbell, Ann <Campbell.Ann@epa.gov>; Wood, Robert <Wood.Robert@epa.gov>; Penman, Crystal <Penman.Crystal@epa.gov>; Fotouhi, David <Fotouhi.David@epa.gov>; Neugeboren, Steven <Neugeboren.Steven@epa.gov>; Ross, David P <ross.davidp@epa.gov>
Subject: RE: PGCC / ELG rule and PA conventional operators

Jean,

We would be happy to talk with you about non litigation related issues related to the Pennsylvania Oil and Gas operations. Ann Campbell or Crystal Penman will reach out to you to find a time that is convenient for everyone.

Regards,
Lee

D. Lee Forsgren

Deputy Assistant Administrator
Office Of Water
Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Room 3219 WJCE
Washington, DC 20460
Phone: 202-564-5700
Forsgren.Lee@epa.gov

From: Mosites, Jean M. [mailto:JMosites@babstcalland.com]
Sent: Thursday, February 8, 2018 4:50 PM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Subject: PGCC / ELG rule and PA conventional operators

Mr. Forsgren,
On behalf of PGCC, I would like to follow up on your letter of December 8, 2017, attached. I tried to call you, but the number on the letter may have a typographical error. I left a message for Robert Wood, the second contact name on the letter, but wanted to reach out to you in case we could talk tomorrow.

Please let me know if we could talk briefly about this letter and EPA's process on remand to which it refers.

EPA has reached out to at least one PGCC member, and according to publicly available records, there may be 50 or more conventional operators in Pennsylvania that have sent water to POTWs in the past few years. If possible, PGCC would like to coordinate information gathering on behalf of its members, most of which are very small businesses with very little staff and few resources.

Thank you,
Jean

Message

From: Mosites, Jean M. [JMosites@babstcalland.com]
Sent: 2/8/2018 9:55:58 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
Subject: Automatic reply: PGCC / ELG rule and PA conventional operators

I am out of the office for business today with limited access to email. If you need immediate assistance, please contact my assistant Andrea Zacchia at [Ex. 6] Thanks, Jean?

Message

From: Mosites, Jean M. [JMosites@babstcalland.com]
Sent: 2/8/2018 9:49:56 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
Subject: PGCC / ELG rule and PA conventional operators
Attachments: 2017 12 EPA response to aug petition.pdf

Mr. Forsgren,
On behalf of PGCC, I would like to follow up on your letter of December 8, 2017, attached. I tried to call you, but the number on the letter may have a typographical error. I left a message for Robert Wood, the second contact name on the letter, but wanted to reach out to you in case we could talk tomorrow.

Please let me know if we could talk briefly about this letter and EPA's process on remand to which it refers.

EPA has reached out to at least one PGCC member, and according to publicly available records, there may be 50 or more conventional operators in Pennsylvania that have sent water to POTWs in the past few years. If possible, PGCC would like to coordinate information gathering on behalf of its members, most of which are very small businesses with very little staff and few resources.

Thank you,
Jean

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

DEC - 8 2017

OFFICE OF WATER

Mr. David Clark, President
Pennsylvania Grade Crude Oil Coalition
Post Office Box 149
Mt. Jewett, Pennsylvania 16740

Dear Mr. Clark:

Thank you for your August 25, 2017, petition asking the U.S. Environmental Protection Agency to conduct rulemaking to reconsider the pretreatment standards for unconventional oil and gas (UOG) extraction facilities, finalized in June, 2016. Given the post-promulgation information referenced in your letter, you assert that the existing UOG rule is based on incorrect and incomplete facts, that the EPA failed to adequately consider the burden imposed on small businesses, that the basis for selecting the "zero discharge" option is not valid, and that the EPA failed to consider costs and non-water quality environmental impacts of the rule. In your petition and in your follow-up letter of November 6, 2017, you also asked the EPA for an administrative stay of the UOG rule or other relief from enforcement.

Your organization also filed a petition for review of the rule in the U.S. Court of Appeals for the Third Circuit on November 7, 2016. The EPA filed a motion (unopposed by your organization) for voluntary remand on August 31, 2017, which was granted by the Court on October 3, 2017. In the motion, the EPA discussed the post-promulgation information referenced in your letter, acknowledging that this information is inconsistent with the record for the rule. Further, the motion explained that the EPA requested the remand in order to consider any additional evidence relevant to the UOG rule, develop the record, and take any follow-up action as appropriate, including providing the public notice and an opportunity to comment as appropriate. Given that this remand was granted by the Court, and EPA is proceeding accordingly, this effectively addresses the request in your petition for reconsideration of the pretreatment standards.

Your letter also provides proposed remedies for the "errors" you have identified in the existing rule. The EPA will consider these remedies in determining the best course of action after the agency considers any additional evidence relevant to the UOG rule, in accordance with the remand. Furthermore, PGCC can raise any such remedies in any administrative process on remand.

Regarding your request for an administrative stay of the rule "until the rulemaking to reconsider the rule is complete," the EPA notes that there is no imminent need for such a stay. When the EPA first received the post-promulgation information indicating that some facilities were not meeting zero discharge during the time of rulemaking, the EPA extended the compliance deadline for such existing facilities from August 29, 2016 to August 29, 2019, the full three-year compliance period allowed for new pretreatment standards under the Clean Water Act. See 81 FR 88126. Accordingly, the Agency has sufficient time to consider the new information before any such facilities will be required to comply with the rule. Moreover, extending the date beyond three years for these operators would be inconsistent with the three-year statutory deadline for compliance with pretreatment standards in CWA section 307(b)(1). In

addition, there is no basis to stay the rule for "PA-defined operators" that were meeting zero discharge at the time of rulemaking as they were not sending wastewater to POTWs at the time of rulemaking, indicating that zero discharge is both available and economically achievable for these facilities.

Similarly, the EPA does not see a basis to stay the rule for new sources because, under the Clean Water Act, new sources are held to a standard at least as stringent as existing sources, and the vast majority of existing facilities do not send wastewater to a POTW and are required to meet zero direct discharge. In addition, there is no information in this petition to indicate that new sources in Pennsylvania are unable to meet the zero discharge requirement.

For these reasons, the EPA respectfully declines at this time to commit to a rulemaking to stay the 2016 rule, or to provide "enforcement relief" with respect to operators that are currently required to comply with the rule.

Again, thank you for your letter. If you have further questions, please contact me at (202) 564-5700 or you may contact Robert Wood, Director of Engineering and Analysis Division at (202) 566-1822 or wood.robert@epa.gov.

Sincerely,

D. Lee Forsgren

D. Lee Forsgren
Deputy Assistant Administrator

Message

From: Bill Warren [Ex. 6]
Sent: 1/27/2018 12:50:53 AM
To: Bill Warren [Ex. 6]
CC: Paul Wright [[redacted]]; Decanio Sr. (Cell) John [Ex. 6]; Sal Lobue [Ex. 6]; BillyMac [[redacted]]; Billy Warren (Cell) [[redacted]]; Joe Warren (Cell) [Ex. 6]; Cindy Warren (AOL) [[redacted]]; Jenny Caccavale (Cell) [Ex. 6]; Glenn Snodgrass [Ex. 6]; Davis Dave (Cell) [Ex. 6]; Donovan Dave Cell [ddonovan@nysbroadcasters.org]; Hollocher Bob & Julie [hollocher@sbcglobal.net]; Bill Schulze [Ex. 6]; Blaise Duffy [Ex. 6]; John Shackelford [jshackelford@riteaid.com]; [Ex. 6]; Tom Rudibush [TLR@dwgp.com]; Tom Warda [Ex. 6]; Smith Bruce Cell [Ex. 6]; Craig & Barbie Wagner [Ex. 6]; GDeutsch@afsc.com; Gansle Chris (Cell) [Ex. 6]; Leon (Cell) Doerner [Ex. 6]; Paul Kallan (Cell) [Ex. 6]; "Buzz" Bob Buzzell [Ex. 6]; Ike Harrison [Ex. 6]; John Bryson Sr. (Cell) [brysonj@jacksonlewis.com]; Dave Uhlman [Ex. 6]; Carl & Ann Biersack (Home) [Ex. 6]; Ken Glassmacher [KGlassma@nvrinc.com]; Alan Beverage (Cell) [Ex. 6]; regantj@corning.com [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=6cfa4e6acc9e4f529f01960cfd4c119c-regantj@corning.com]; Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]; [Ex. 6]; Eli & Tom Wochok [tmw@outlook.com]; Tom Becherer [Ex. 6]
Subject: A FUTILE AND STUPID GESTURE Official Trailer #1 (2018) Romantic Comedy M...

https://youtu.be/LA1TyoIEUUo

Sent from my iPad

Message

From: Ex. 6
Sent: 2/20/2018 2:43:25 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
CC: Ben Grumbles [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=usereb77e807]
Subject: Re: A Maryland Resident who has asked for help determining if her drinking water is safe

Ben,

Thank you Lee. Nice to meet you Ben.

Two more pieces of information to add. I moved to Annapolis in June after 30 years of urban life. I have been sick since then and have lost 40lbs and spent 20 days at Hopkins. Hopkins has been connecting the mystery illness to foreign travel. The other day we realized there was a lot of "stuff" in the water softener system I had installed and more alarmingly in the ice.

The house sits on the South River and the well is no more than 75 feet from the river.

How can I find out with 100% certainty what's in the water?

Lastly, I believe my house sits 100 yards from water line going to brand new houses. Is it possible to be connected to county water?

Thanks so much,

Ex. 6

Sent from my iPhone

Ex. 6

On Feb 20, 2018, at 9:10 AM, Forsgren, Lee <Forsgren.Lee@epa.gov> wrote:

> Ben,
>
> A friend reached out to me asking how she could determine if the lovely things discovered in her drinking water filter below are an indication that her drinking water is not safe. She is looking to have her water tested for contaminants but wants to know who might be appropriate organization to conduct such a test.

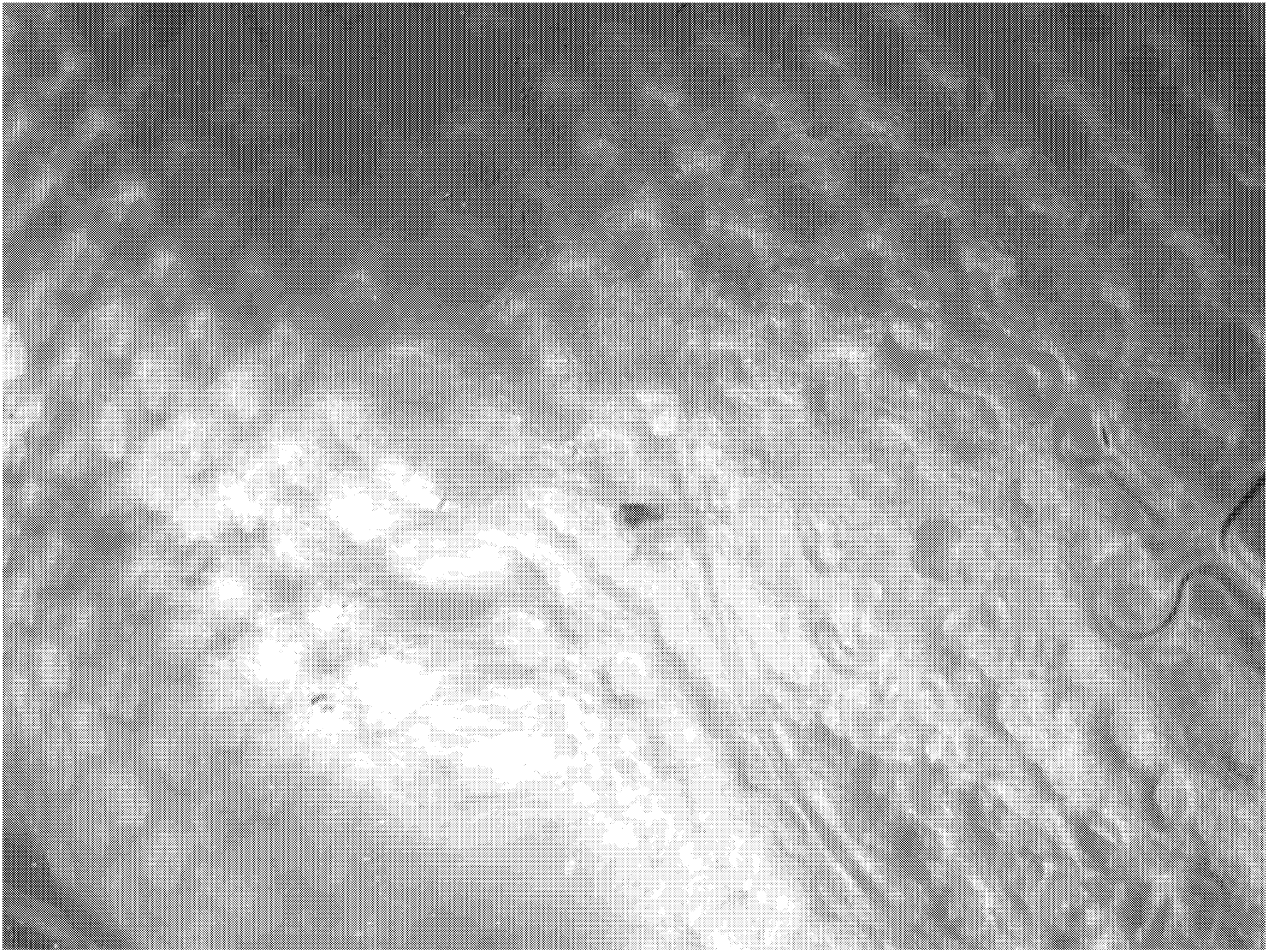
While that question is technically within both of our jurisdictions, but given our deference to "Federalism" I thought I would reach out to you and MDEC first since she lives near Annapolis. The person with the question's name is Ex. 6 I have added her on the cc line so that you or the appropriate person can reach out to her on an approved way to have her water tested.

If you could have MDEC reach out to Robin I would greatly appreciate it.

Thanks,
Lee

D. Lee Forsgren
Deputy Assistant Administrator
Office Of Water
Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Room 3219 WJCE
Washington, DC 20460
Phone: 202-564-5700
Forsgren.Lee@epa.gov

<IMG_9965.jpeg>



Message

From: Don Parrish [donp@fb.org]
Sent: 12/4/2017 6:06:13 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
Subject: FYI

Lee

Wanted to make sure you saw this.

View this email in your browser

Join the Waters Advocacy Coalition for a Hill briefing on **December 6th** at **10:30 AM**, where you will hear directly from small business owners about the burdens they would face under the 2015 WOTUS, review the latest WOTUS polling, and dive into the state perspective on EPA overreach.

Waters Advocacy Coalition
December 6, 2017 @10:30 a.m.
Hill Briefing: WOTUS In The Real World

WHEN:
Wednesday, December 6th, 10:30am

WHERE:
Rayburn 2322

RSVP:
watersadvocacy@gmail.com

The program will include:

An overview of the most recent polling from Morning Consult

Panel discussion with insights into the impact of WOTUS on farmers and small businesses

Keynote remarks from **Montana Attorney General Tim Fox**

Don R Parrish
American Farm Bureau Federation®
Ex. 6
donp@fb.org

Message

From: Smith, Brooks M. [Brooks.Smith@troutmansanders.com]
Sent: 3/13/2018 5:37:43 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
CC: Penman, Crystal [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=93662678a6fd4d4695c3df22cd95935a-Penman, Crystal]; Campbell, Ann [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=b8c25a0c2fb648b6a947694a8492311e-Campbell, Ann]
Subject: RE: Pharma ELG Question

Wonderful – thank you!

Brooks M. Smith
troutman **sanders**
Direct: Ex. 6
brooks.smith@troutman.com

From: Forsgren, Lee [mailto:Forsgren.Lee@epa.gov]
Sent: Tuesday, March 13, 2018 1:34 PM
To: Smith, Brooks M. <Brooks.Smith@troutmansanders.com>
Cc: Penman, Crystal <Penman.Crystal@epa.gov>; Campbell, Ann <Campbell.Ann@epa.gov>
Subject: RE: Pharma ELG Question

Brooks,

I would be happy to try to find a time to speak with you. Crystal Penman will do her best to find a time that works for all concerned.
Regards,
Lee

D. Lee Forsgren
Deputy Assistant Administrator
Office Of Water
Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Room 3219 WJCE
Washington, DC 20460
Phone: 202-564-5700
Forsgren.Lee@epa.gov

From: Smith, Brooks M. [mailto:Brooks.Smith@troutmansanders.com]
Sent: Tuesday, March 13, 2018 12:48 PM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Subject: Pharma ELG Question

Greetings Lee, I had the pleasure of seeing you a few times late last year, first at the annual VMA industry environmental conference in Richmond, and then at the NACWA clean water law conference down in Savannah.

I am dealing with an issue for our client, CVS, and I was hoping you might be willing/available to meet and brainstorm potential solutions. The specific issue involves some confusion over the older, existing effluent guidelines for the pharma manufacturing category (40 CFR Part 439), which we think can be resolved with some simple, clarifying guidance. This issue is not in any dispute or litigation – we're just hoping to have some clarification in order to avoid potential conflicts in the future.

Would you be willing to meet? If so, I'd be pleased to coordinate a time and send some background info on the issue. All my best, Brooks

Brooks M. Smith
Direct: Ex. 6
brooks.smith@troutman.com

troutman **sanders**
1001 Haxall Point, Suite 1500
Richmond, VA 23219
troutman.com

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Message

From: Smith, Brooks M. [Brooks.Smith@troutmansanders.com]
Sent: 3/13/2018 4:47:59 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
Subject: Pharma ELG Question

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I am dealing with an issue for our client, CVS, and I was hoping you might be willing/available to meet and brainstorm potential solutions. The specific issue involves some confusion over the older, existing effluent guidelines for the pharma manufacturing category (40 CFR Part 439), which we think can be resolved with some simple, clarifying guidance. This issue is not in any dispute or litigation – we're just hoping to have some clarification in order to avoid potential conflicts in the future.

Would you be willing to meet? If so, I'd be pleased to coordinate a time and send some background info on the issue. All my best, Brooks

Brooks M. Smith
Direct: Ex. 6
brooks.smith@troutman.com

troutman **sanders**
1001 Haxall Point, Suite 1500
Richmond, VA 23219
troutman.com

Message

From: Kelly Johnson [KAJohnson@hollandhart.com]
Sent: 10/27/2017 12:01:30 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
Subject: Re: Update?

Lee - Hope you had a good week. I wondered if you could send me a copy of EPA's comment letter to the Corps. Thank you. Kelly

On Sep 26, 2017, at 6:43 AM, Forsgren, Lee <Forsgren.Lee@epa.gov> wrote:

> Kelly,
> No. The Acting ASA Civil Works granted a 30 extension, at EPA's request, EPA will be will be submitting comments that have been thoroughly reviewed by Headquarters.
>
> Regards
> Lee
> **D. Lee Forsgren**
> Deputy Assistant Administrator
> Office Of Water
> Environmental Protection Agency
> 1200 Pennsylvania Avenue, VW
> Room 3219 WJCE
> Washington, DC 20460
> Phone: 202-564-5700
> Forsgren.Lee@epa.gov
>
> **From:** Kelly Johnson [mailto:KAJohnson@hollandhart.com]
> **Sent:** Tuesday, September 26, 2017 8:01 AM
> **To:** Forsgren, Lee <Forsgren.Lee@epa.gov>
> **Subject:** Update?
>
> Lee – Did Region 10 send the will effect letter yesterday? Just asking as we're meeting with Mary this morning and have a meeting at the WH this afternoon. Thanks. Kelly
>
> **Kelly A. Johnson**
> Holland & Hart LLP
> 975 F St., NW
> Suite 900
> Washington, DC 20004
>
> Phone: Ex. 6
> E-mail: kajohnson@hollandhart.com
>
> <image001.gif>

Message

From: Kelly Johnson [KAJohnson@hollandhart.com]
Sent: 10/13/2017 9:24:44 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
CC: Crowther, John J (GOV) [john.crowther@alaska.gov]
Subject: Re: AGDC

That would be perfect. Have a great weekend.

On Oct 13, 2017, at 4:12 PM, Forsgren, Lee <Forsgren.Lee@epa.gov> wrote:

> Kelly
>
> Had a great trip. Can we talk on Monday about this and other issues.
>
> Lee
>
> Sent from my iPhone
>
> On Oct 13, 2017, at 11:05 AM, Kelly Johnson <KAJohnson@hollandhart.com> wrote:
>
> > Lee – I hope you had a good trip to Alaska this week. Two issues: (1) please let me know if you have any questions about Governor Walker's letter to Administrator Pruitt on the Alaska pipeline project and (2) a meeting request. Officials from AGDC will be in DC the last week of October. They would like the opportunity to meet with you and provide you an update on the both the ASAP Project and the AK LNG Project and discuss any questions you may have for them. If you could have your assistant contact me about setting up a meeting time, I'd greatly appreciate it. Thanks. Kelly
> >
> > **Kelly A. Johnson**
> > Holland & Hart LLP
> > 975 F St., NW
> > Suite 900
> > Washington, DC 20004
> >
> > Phone: Ex. 6
> > E-mail: kajohnson@hollandhart.com
> >
> > <image001.gif>
> >
> >

Message

From: Kelly Johnson [KAJohnson@hollandhart.com]
Sent: 10/13/2017 3:04:19 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
CC: Crowther, John J (GOV) [john.crowther@alaska.gov]
Subject: AGDC

Lee – I hope you had a good trip to Alaska this week. Two issues: (1) please let me know if you have any questions about Governor Walker's letter to Administrator Pruitt on the Alaska pipeline project and (2) a meeting request. Officials from AGDC will be in DC the last week of October. They would like the opportunity to meet with you and provide you an update on the both the ASAP Project and the AK LNG Project and discuss any questions you may have for them. If you could have your assistant contact me about setting up a meeting time, I'd greatly appreciate it. Thanks. Kelly

Kelly A. Johnson
Holland & Hart LLP
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Phone: Ex. 6
E-mail: kajohnson@hollandhart.com

Message

From: Kelly Johnson [KAJohnson@hollandhart.com]
Sent: 10/17/2017 4:33:41 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
CC: Penman, Crystal [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=93662678a6fd4d4695c3df22cd95935a-Penman, Crystal]; Crowther, John J (GOV) [john.crowther@alaska.gov]
Subject: Meeting Request

Lee – Executives from the Alaska Gasline Development Corporation will be in Washington DC the week of October 30. They, along with Alaska Governor Walker's DC Director, John Crowther, would like to provide you with an update on the Alaska LNG Project and Alaska Stand Alone Pipeline. As you may know, the Alaska LNG Project is on the FAST-41 permitting dashboard. They have flexibility the week of October 30 so we can certainly accommodate your schedule. Thank you. Kelly

Kelly A. Johnson
Holland & Hart LLP
975 F St., NW
Suite 900
Washington, DC 20004

Phone: Ex. 6
E-mail: kajohnson@hollandhart.com

Message

From: Kelly Johnson [KAJohnson@hollandhart.com]
Sent: 10/6/2017 2:13:44 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
Subject: Letter from Governor Walker
Attachments: 10.04.17 EPA Administrator Scott Pruitt RE ARNI Designation.pdf

Mr. Forsgren – As Acting Assistant Administrator for the Office of Water, I thought you would be interested in the attached letter Alaska Governor Walker has sent to Administrator Pruitt. Kelly

STATE CAPITOL
P.O. Box 110001
Juneau, AK 99811-0001
907-465-3500
fax: 907-465-3532

550 West Seventh Avenue, Suite 1700
Anchorage, AK 99501
907-269-7450
fax 907-269-7461
www.Gov.Alaska.Gov
Governor@Alaska.Gov

Governor Bill Walker
STATE OF ALASKA

October 4, 2017

The Honorable Scott Pruitt
Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

Dear Administrator Pruitt:

I am writing this letter to ask for your assistance regarding a recent action taken by the US Environmental Protection Agency's Region 10 (EPA-R10) that could cause significant problems for Alaska's effort to develop North Slope natural gas resources, and possibly for other projects within our state.

On August 29, 2017, EPA-R10 sent a letter to the U.S. Army Corps of Engineers (ACOE) potentially designating the entire Yukon River basin (an area of 200,000 square miles, or almost three times the size of Oklahoma) as an Aquatic Resource of National Interest (ARNI). This letter was submitted during the comment period for Alaska Gasline Development Corporation's (AGDC) Alaska Stand Alone Pipeline (ASAP) Project Draft Supplemental Environmental Impact Statement (DSEIS), and formally initiates an elevation process between the EPA and the ACOE on the ASAP Section 404 permit process.

I have grave concerns, with not only the implications of EPA-R10's potential designation of this vast area of our state as an ARNI, but also with EPA-R10's recent opposition to some fundamental aspects of this critical energy infrastructure project.

First and foremost, in submitting the August 29th letter, EPA-R10 erroneously pre-judges the ACOE's determination of compliance with the Clean Water Act's Section 404 (b)(1) guidelines and alleges "extensive, unmitigated destruction and degradation" of wetlands and permafrost. These allegations are unfounded, disregard years of best-management practices on the North Slope, and ignore previous analyses and determinations in the original 2012 EIS for the ASAP project (to which EPA-R10 did not object). AGDC has worked with the ACOE and developed a project design that minimizes impacts to high value wetlands and permafrost, and would reclaim most of the impacted areas back to wetlands.

Although EPA-R10 cites changes to the project following the 2012 Final EIS, they fail to acknowledge that AGDC has proposed routing refinements to avoid impacts to high value wetlands where practicable. Avoidance has been proposed through the use of ice pads, snow pack, and ice roads. The main ground disturbing activity on the North Slope will be through burying the pipe in a five foot wide ditch, which would be stabilized through immediate and ongoing intensive revegetation and maintenance efforts. The natural drainage patterns will be maintained with a buried pipeline, and AGDC intends to reclaim and revegetate the disturbed wetlands area so that it returns

to a wetland condition. Similar to the Trans-Alaska Pipeline System (TAPS), which is buried on much of the North Slope, the pipeline would run parallel to sheet water flow. Existing cross drainages and hydrology will be maintained and managed, as has been demonstrated for TAPS. One only has to look at the success of TAPS, which has many miles of buried pipe on the North Slope, as an example of successful stabilization and water management within the ROW.

Second, this unfounded judgement of wetlands impacts has led EPA-R10 to take the position that significant portions of the proposed natural gas pipeline must be elevated on vertical supports above the tundra on the North Slope, in their opinion, to minimize impacts to wetlands. However, AGDC has demonstrated that an above-ground pipeline would be much more expensive and not practicable. A below-ground pipeline is preferred for all areas, including the North Slope, for engineering reasons (constructability, reliability), safety reasons (protection, cover, security), and environmental reasons (fewer impacts to caribou; wetlands impacts could be avoided, minimized, and mitigated). The State of Alaska, who owns the land on the North Slope, along with the North Slope Borough and local subsistence users, support the below-ground pipeline. The U.S. Bureau of Land Management analysis of subsistence impacts also favors the belowground option.

There is a very sound technical basis for placing the pipeline below ground. AGDC has dedicated a significant amount of time and resources to address potential issues associated with a buried pipeline being raised by EPA-R10. A team of engineers, natural resource specialists, geophysicists (including a geothermal modeler), and former Alyeska pipeline employees with prior North Slope pipeline experience developed construction and operational methodologies and techniques designed to mitigate impacts associated with the ASAP Project's buried pipeline:

- Gas will be conditioned to below freezing temperatures and will be compatible with Arctic ground temperatures.
- There are significant problems with operating a chilled natural gas pipeline above-ground in an environment where temperature extremes can range from 90 degrees above zero to 50 degrees below zero or colder.
- AGDC's engineering aims to avoid and minimize impacts to permafrost to the extent practicable. AGDC's thermal modeling takes into account impacts related to ground disturbance and initial clearing of vegetation. AGDC's intended revegetation efforts will be substantial and are well-characterized in its Revegetation Plan, developed by experts at the Alaska Department of Natural Resources Plant Materials Center.

Finally, EPA-R10 is challenging the project's proposed mitigation plan for disturbed wetlands. AGDC's proposed mitigation plan, which is based on preliminary guidance from the ACOE's Alaska Region, looks at each of the 60 watersheds traversed by the project and evaluates each watershed based on how much wetlands disturbance has already occurred within that watershed. If the sum of new and existing impacts to a watershed is well below a threshold of what the scientific literature deems significant impact to aquatic resources, then no mitigation would be required. If a watershed has seen significant disturbance and AGDC's impacts add to this disturbance, then mitigation would be required. Alaska contains 65 percent of the wetlands of the United States. As you are likely aware, almost all wetlands in our state are undisturbed, and accordingly, most of the wetlands traversed by our proposed pipeline are also undisturbed. As large and remote as Alaska is, and as many wetlands as it contains, it would not be practicable, nor environmentally justifiable, for this project to mitigate for all wetland impacts along the entire pipeline route.

After consultation with ACOE, AGDC has taken a watershed-level approach, as discussed in the 2008 Mitigation Rule. AGDC followed preliminary guidance from ACOE in developing the framework for its plan, and has proposed what it believes to be appropriate and practicable mitigation for this long, linear project through many remote and relatively undeveloped watersheds. AGDC performed and validated a detailed analysis of the National Land Cover Database and reviewed an extensive body of literature on watershed-level impacts to aquatic resources and functions associated with anthropogenic disturbance. The analyses and review of the literature indicates that all but three watersheds do not have existing substantive impacts, and one of these three watersheds has no project wetland impacts. As the majority of the project's wetlands impacts are not considered substantive to the relatively remote and undeveloped watersheds in which they exist, mitigation is neither appropriate nor practicable in most watersheds. In the two watersheds where the cumulative wetlands impacts to watersheds are substantive and where mitigation is appropriate and practicable, AGDC has proposed compensatory mitigation through the purchase of available mitigation credits to offset debits.

I would like to note that this action by EPA-R10 appears contrary to the intent of President Trump's August 15, 2017 Presidential Executive Order on Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure, which calls for "coordinated, consistent, predictable, and timely" environmental reviews by federal agencies. The EPA-R10 has had adequate opportunity to evaluate the project, and its recent actions appears to be an attempt to add significant risk or delay to this project. This is anything but "coordinated, consistent, predictable, and timely."

I request that you intervene with EPA Region 10 to review the basis of their designation of the entire Yukon River basin as an ARNI and their opposition to construction of a below-ground pipeline and AGDC's use of ACOE guidance to wetlands mitigation.

Sincerely,

Bill Walker
Governor

cc: The Honorable Lisa Murkowski, United States Senate
The Honorable Dan Sullivan, United State Senate
The Honorable Don Young, United States House of Representatives
The Honorable Andy Mack, Commissioner, Alaska Department of Natural Resources
The Honorable Larry Hartig, Commissioner, Alaska Department of Environmental Conservation
Keith Meyer, President, Alaska Gasline Development Corporation
John Crowther, Director of State and Federal Relations, Office of the Governor

Message

From: Kathy Bishop -MDE- [kathy.bishop@maryland.gov]
Sent: 10/16/2017 4:12:06 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
Subject: Out of Office Re: Tried calling your cell and got an intercept

Thank you for your message. I will be out of the office on Monday and Tuesday, Oct. 16-17. I will respond to your email when I return on Wednesday.

If you need immediate assistance, please contact Tracy Smith at 410-537-3893 or tracy.smith@maryland.gov.

To report an environmental or public health emergency, please call 1-866-MDE-GoTo.

--
Kathy Bishop
Executive Associate to the Secretary
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230
410.537.4187
Kathy.Bishop@Maryland.gov

Click here to complete a three question customer experience survey.

Message

From: Ben Grumbles -MDE- [ben.grumbles@maryland.gov]
Sent: 10/16/2017 3:33:31 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
CC: Kathy Bishop [kathy.bishop@maryland.gov]
Subject: Re: Tried calling your cell and got an intercept

Thanks Lee. Intercept because I went to Serbia Saturday and am still there till Wednesday. Back in the hood Wednesday night.

Kathy could you email Lee our press release on nutrient trading.

Best.
Ben

Sent from my iPhone

On Oct 16, 2017, at 4:24 PM, Forsgren, Lee <Forsgren.Lee@epa.gov> wrote:

> Ben,
>
> Got your voicemail from Friday when I got in this morning. Tried calling your cell at **Ex. 6** and got an intercept that the call could not be completed due to technical difficulties (called 3 times). Call me on my EPA cell at **Ex. 6**
>
> Love that trading!
>
> Lee
>
> **D. Lee Forsgren**
> Deputy Assistant Administrator
> Office Of Water
> Environmental Protection Agency
> 1200 Pennsylvania Avenue, VW
> Room 3219 WJCE
> Washington, DC 20460
> Phone: 202-564-5700
> Forsgren.Lee@epa.gov

Click here to complete a three question customer experience survey.

Message

From: Frank Richards [FRichards@agdc.us]
Sent: 10/19/2017 8:14:42 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
CC: Kelly Johnson (KAJohnson@hollandhart.com) [KAJohnson@hollandhart.com]; Crowther, John J (GOV) [john.crowther@alaska.gov]; Gene Therriault [GTherriault@agdc.us]
Subject: AGDC Letter to Administrator Pruitt
Attachments: 10.19.2017_AGDC Letter to Administrator Pruitt.pdf; 10.04.17 EPA Administrator Scott Pruitt RE ARNI Designation.pdf; ASAP Belowground Pipe - North Slope_12july2016.pdf; 2017-03-10_ASAP-22-RTA-ENV-DOC-00002.pdf; AKLNG-4020-YYY-YPW-DOC-00001 Below Ground Pipeline 2017 06 05_signed.pdf; 2016-11-10_DRAFT Wetlands Compensatory Mitigation Plan.pdf

Mr. Forsgren,

Attached is advanced copy of letter to Administrator Pruitt with supporting documents that we are sending today via FedEx. The materials provide detailed background of wetland analyses and construction processes used in Alaska. If we can provide any additional information please let me know.

Frank Richards

Frank T. Richards, P.E. | Senior V.P., Program Management | Alaska Gasline Development Corporation | **T** (Ex. 6 Ex. 6 | **C** Ex. 6 | Frichards@agdc.us

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Governor Bill Walker
STATE OF ALASKA

October 4, 2017

The Honorable Scott Pruitt
Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

Dear Administrator Pruitt:

I am writing this letter to ask for your assistance regarding a recent action taken by the US Environmental Protection Agency's Region 10 (EPA-R10) that could cause significant problems for Alaska's effort to develop North Slope natural gas resources, and possibly for other projects within our state.

On August 29, 2017, EPA-R10 sent a letter to the U.S. Army Corps of Engineers (ACOE) potentially designating the entire Yukon River basin (an area of 200,000 square miles, or almost three times the size of Oklahoma) as an Aquatic Resource of National Interest (ARNI). This letter was submitted during the comment period for Alaska Gasline Development Corporation's (AGDC) Alaska Stand Alone Pipeline (ASAP) Project Draft Supplemental Environmental Impact Statement (DSEIS), and formally initiates an elevation process between the EPA and the ACOE on the ASAP Section 404 permit process.

I have grave concerns, with not only the implications of EPA-R10's potential designation of this vast area of our state as an ARNI, but also with EPA-R10's recent opposition to some fundamental aspects of this critical energy infrastructure project.

First and foremost, in submitting the August 29th letter, EPA-R10 erroneously pre-judges the ACOE's determination of compliance with the Clean Water Act's Section 404 (b)(1) guidelines and alleges "extensive, unmitigated destruction and degradation" of wetlands and permafrost. These allegations are unfounded, disregard years of best-management practices on the North Slope, and ignore previous analyses and determinations in the original 2012 EIS for the ASAP project (to which EPA-R10 did not object). AGDC has worked with the ACOE and developed a project design that minimizes impacts to high value wetlands and permafrost, and would reclaim most of the impacted areas back to wetlands.

Although EPA-R10 cites changes to the project following the 2012 Final EIS, they fail to acknowledge that AGDC has proposed routing refinements to avoid impacts to high value wetlands where practicable. Avoidance has been proposed through the use of ice pads, snow pack, and ice roads. The main ground disturbing activity on the North Slope will be through burying the pipe in a five foot wide ditch, which would be stabilized through immediate and ongoing intensive revegetation and maintenance efforts. The natural drainage patterns will be maintained with a buried pipeline, and AGDC intends to reclaim and revegetate the disturbed wetlands area so that it returns

to a wetland condition. Similar to the Trans-Alaska Pipeline System (TAPS), which is buried on much of the North Slope, the pipeline would run parallel to sheet water flow. Existing cross drainages and hydrology will be maintained and managed, as has been demonstrated for TAPS. One only has to look at the success of TAPS, which has many miles of buried pipe on the North Slope, as an example of successful stabilization and water management within the ROW.

Second, this unfounded judgement of wetlands impacts has led EPA-R10 to take the position that significant portions of the proposed natural gas pipeline must be elevated on vertical supports above the tundra on the North Slope, in their opinion, to minimize impacts to wetlands. However, AGDC has demonstrated that an above-ground pipeline would be much more expensive and not practicable. A below-ground pipeline is preferred for all areas, including the North Slope, for engineering reasons (constructability, reliability), safety reasons (protection, cover, security), and environmental reasons (fewer impacts to caribou; wetlands impacts could be avoided, minimized, and mitigated). The State of Alaska, who owns the land on the North Slope, along with the North Slope Borough and local subsistence users, support the below-ground pipeline. The U.S. Bureau of Land Management analysis of subsistence impacts also favors the belowground option.

There is a very sound technical basis for placing the pipeline below ground. AGDC has dedicated a significant amount of time and resources to address potential issues associated with a buried pipeline being raised by EPA-R10. A team of engineers, natural resource specialists, geophysicists (including a geothermal modeler), and former Alyeska pipeline employees with prior North Slope pipeline experience developed construction and operational methodologies and techniques designed to mitigate impacts associated with the ASAP Project's buried pipeline:

- Gas will be conditioned to below freezing temperatures and will be compatible with Arctic ground temperatures.
- There are significant problems with operating a chilled natural gas pipeline above-ground in an environment where temperature extremes can range from 90 degrees above zero to 50 degrees below zero or colder.
- AGDC's engineering aims to avoid and minimize impacts to permafrost to the extent practicable. AGDC's thermal modeling takes into account impacts related to ground disturbance and initial clearing of vegetation. AGDC's intended revegetation efforts will be substantial and are well-characterized in its Revegetation Plan, developed by experts at the Alaska Department of Natural Resources Plant Materials Center.

Finally, EPA-R10 is challenging the project's proposed mitigation plan for disturbed wetlands. AGDC's proposed mitigation plan, which is based on preliminary guidance from the ACOE's Alaska Region, looks at each of the 60 watersheds traversed by the project and evaluates each watershed based on how much wetlands disturbance has already occurred within that watershed. If the sum of new and existing impacts to a watershed is well below a threshold of what the scientific literature deems significant impact to aquatic resources, then no mitigation would be required. If a watershed has seen significant disturbance and AGDC's impacts add to this disturbance, then mitigation would be required. Alaska contains 65 percent of the wetlands of the United States. As you are likely aware, almost all wetlands in our state are undisturbed, and accordingly, most of the wetlands traversed by our proposed pipeline are also undisturbed. As large and remote as Alaska is, and as many wetlands as it contains, it would not be practicable, nor environmentally justifiable, for this project to mitigate for all wetland impacts along the entire pipeline route.

After consultation with ACOE, AGDC has taken a watershed-level approach, as discussed in the 2008 Mitigation Rule. AGDC followed preliminary guidance from ACOE in developing the framework for its plan, and has proposed what it believes to be appropriate and practicable mitigation for this long, linear project through many remote and relatively undeveloped watersheds. AGDC performed and validated a detailed analysis of the National Land Cover Database and reviewed an extensive body of literature on watershed-level impacts to aquatic resources and functions associated with anthropogenic disturbance. The analyses and review of the literature indicates that all but three watersheds do not have existing substantive impacts, and one of these three watersheds has no project wetland impacts. As the majority of the project's wetlands impacts are not considered substantive to the relatively remote and undeveloped watersheds in which they exist, mitigation is neither appropriate nor practicable in most watersheds. In the two watersheds where the cumulative wetlands impacts to watersheds are substantive and where mitigation is appropriate and practicable, AGDC has proposed compensatory mitigation through the purchase of available mitigation credits to offset debits.

I would like to note that this action by EPA-R10 appears contrary to the intent of President Trump's August 15, 2017 Presidential Executive Order on Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure, which calls for "coordinated, consistent, predictable, and timely" environmental reviews by federal agencies. The EPA-R10 has had adequate opportunity to evaluate the project, and its recent actions appears to be an attempt to add significant risk or delay to this project. This is anything but "coordinated, consistent, predictable, and timely."

I request that you intervene with EPA Region 10 to review the basis of their designation of the entire Yukon River basin as an ARNI and their opposition to construction of a below-ground pipeline and AGDC's use of ACOE guidance to wetlands mitigation.

Sincerely,

Bill Walker
Governor

cc: The Honorable Lisa Murkowski, United States Senate
The Honorable Dan Sullivan, United State Senate
The Honorable Don Young, United States House of Representatives
The Honorable Andy Mack, Commissioner, Alaska Department of Natural Resources
The Honorable Larry Hartig, Commissioner, Alaska Department of Environmental Conservation
Keith Meyer, President, Alaska Gasline Development Corporation
John Crowther, Director of State and Federal Relations, Office of the Governor

October 19, 2017

The Honorable Scott Pruitt
Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

Administrator Pruitt:

On behalf of Governor Bill Walker, I am sending you additional detailed information to support the concerns raised in his October 4, 2017 letter to you. In his letter, Governor Walker asks for your assistance in resolving some critical issues raised by EPA Region 10 that could cause significant problems for our efforts to develop North Slope natural gas resources and that we believe are inconsistent with the priorities of President Trump.

In light of the complexity of these issues, I am enclosing several documents from our Alaska Stand Alone Pipeline (ASAP) project and our Alaska LNG project that will help you and your staff better understand our concerns:

1. The ASAP Belowground Pipeline Mode: Selection, Construction, Operation, and Maintenance on Alaska's North Slope. This report evaluates the constructability, operational reliability, and environmental issues with belowground and aboveground pipelines, and demonstrates why the belowground pipeline is preferred, and how agency concerns can be alleviated.

2. Analysis of Potential Indirect Impacts to Wetlands Related to Buried Pipeline Construction. This document provides an analysis of whether abutting or adjacent wetlands outside the construction right-of-way for the ASAP Project would be impacted by indirect thaw to permafrost.

3. Why Alaska's Natural Gas Pipeline Should Be Buried. This document summarizes and updates much of the information in the above documents for the Alaska LNG Project.

4. Draft Wetlands Compensatory Mitigation Plan. This document proposes a wetlands mitigation strategy for the ASAP Project that was developed using guidance from the regional office of the US Army Corps of Engineers that takes into account Alaska's vast and undeveloped wetlands acreage.

These documents comprise just a small portion of the information the Alaska Gasline Development Corporation has provided both the US Army Corps of Engineers as lead agency for the ASAP SEIS process, and to the Federal Energy Regulatory Commission for the Alaska LNG

Section 3 application. We would be happy to work with your staff if additional information is necessary or answer any questions they might have.

Sincerely,

Frank T. Richards, P.E.
Senior Vice President, Program Management

cc: Lee Forsgren, Deputy Assistant Administrator, EPA Office of Water
Chris Hladick, EPA Region 10 Administrator
John Crowther, Director of State and Federal Relations, D.C. Office of Governor Walker

Enclosures: *The ASAP Belowground Pipeline Mode: Selection, Construction, Operation, and Maintenance on Alaska's North Slope*

Analysis of Potential Indirect Impacts to Wetlands Related to Buried Pipeline Construction

Why Alaska's Natural Gas Pipeline Should Be Buried

Draft Wetlands Compensatory Mitigation Plan

Alaska Governor Bill Walker Letter to Administrator Pruitt, October 4, 2017

ASAP

Alaska's In-State Gas Pipeline

ALASKA STAND ALONE PIPELINE/*ASAP* PROJECT

DRAFT Wetlands Compensatory Mitigation Plan

ASAP-22-PLN-REG-DOC-00001

November 10, 2016

Alaska Gasline Development Corporation | 3201 C Street, Suite 200 | Anchorage, AK 99503 | P 907.330.6300 | F 907.330.6309 | www.agdc.us

REVISION HISTORY

Revision	Date	Comment	Approval	
			Company Preparing Report	AGDC
0	11/10/2016	Draft	AGDC	K Stevenson / M Thompson

ACRONYMS AND ABBREVIATIONS

ADF&G	Alaska Department of Fish and Game
ADNR-PMC	Alaska Department of Natural Resources – Plant Materials Center
ADPOT&PF	Alaska Department of Transportation and Public Facilities
AES	ASRC Energy Services
AGDC	Alaska Gasline Development Corporation
AKWAM	Alaska Wetland Assessment Method
AKLNG	Alaska LNG
ARR	Alaska Railroad
ASAP	Alaska Stand Alone Pipeline
ASA	Aquatic Site Assessment
ASRC	Arctic Slope Regional Corporation
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CMP	Wetland Compensatory Mitigation Plan
DA	Department of the Army
EED	Environmental Evaluation Document ENSTAR
EPA	United States Environmental Protection Agency
ERL	Environmental, Regulatory, and Land
FCI	Functional Capacity Index
FEIS	Final Environmental Impact Statement
ft	Foot / feet
GCF	Gas Conditioning Facility
HDD	Horizontal directional drilling
HGM	hydrogeomorphic
HUC	Hydrologic Unit
ILF	in-lieu fee
LEDPA	Least Environmentally Damaging Practicable Alternative
Mat-Su	Matanuska-Susitna
MSB	Matanuska-Susitna Borough

MMscfd	Million cubic feet per day
MP	Mile post
MRLC	Multi-Resolution Land Characteristics
NHD	National Hydrography Database
NWI	National Wetlands Inventory
NLCD	National Land Cover Database
PI	Point of Intersection
PRM	permittee-responsible mitigation
ROW	Rights-of-Way
SDA	Special Design Area
SEAL Trust	Southeast Alaska Land Trust
SEIS	Supplemental Environmental Impact Statement
SOA	State of Alaska
TAPS	Trans-Alaska Pipeline System
TCF	The Conservation Fund
TW	Temporary workspaces
USACE	United States Army Corps of Engineers
v	Version/Revision of the ASAP pipeline route alignment
WOUS	Waters of the United States

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FIGURES

1. INTRODUCTION

Compensatory mitigation is a critical tool in helping the federal government meet the longstanding national goal of no net loss of wetland acreage and function (33 Code of Federal Regulations (CFR) Parts 325 and 322; 40 CFR part 230). Compensatory mitigation is considered only after all appropriate and practicable steps have been taken to first avoid and then minimize adverse impacts to the aquatic ecosystem, pursuant to 40 CFR part 230 (i.e., Clean Water Act Section 404(b)(1) Guidelines). Compensatory mitigation can be carried out through four methods: restoration of an existing wetland or aquatic site, enhancement of an aquatic site's function, establishment of a new aquatic site, or preservation of an aquatic site (33 CFR Parts 325 and 332; 40 CFR part 230).

The 2008 Mitigation Rule, published by the United States Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (EPA), addresses compensatory mitigation for unavoidable losses of aquatic resources and functions at a project site (33 CFR Parts 325 and 332; 40 CFR part 230). The rule establishes performance standards, sets timeframes for decision making, and establishes equivalent requirements and standards for the three types of compensatory mitigation: mitigation banks, in-lieu fee (ILF) programs, and permittee-responsible mitigation (PRM) projects.

1.1 PURPOSE

This Wetland Compensatory Mitigation Plan (CMP) describes the procedures by which the Alaska Gasline Development Corporation (AGDC) will compensate for the unavoidable losses of Waters of the United States (WOUS), including wetlands, streams, and creeks within the project area impacted by the Alaska Stand Alone Pipeline (ASAP).

1.2 WATERSHED APPROACH TO COMPENSATORY MITIGATION

The ASAP Project will mitigate substantive impacts to wetlands within the watersheds it transects. Substantive impacts are those which would impact the aquatic functions of the watershed in a manner that is statistically significant and would require appropriate and practicable mitigation. Much literature has been produced on the impacts of development and urbanization on watersheds and the point at which development significantly impacts the attributes of the watershed's aquatic resources, such as water quality, bank erosion, sedimentation, aquatic habitat, biodiversity, and macroinvertebrate, fish, and plant communities.

The consensus among aquatic scientists and landscape ecologists is that statistically significant impacts to the aquatic resources and functions of a watershed occur once approximately 10% of land within a watershed is urbanized (Hilderbrand et al., 2010; Schueler et al., 2009; Booth and

Jackson 1997; Booth et al. 1996, Luchetti and Fuersteburg 1993; MWCOG 1992; Booth 1991; Weaver 1991; Limburg and Schmidt 1990; Steedmen 1988; Jones and Clark 1987; Klein 1979). The development of surfaces that are impervious to water (pavement, rooftops, storm drains, canals, etc.) and the introduction of compacted surfaces that reduce absorption of water (gravel roads, gravel pits, agricultural areas) can contribute to these impacts, although impervious surfaces are a larger contributor (Booth and Jackson 1997). An Impervious Cover Model developed from decades of aquatic system research has indicated that, "certain zones of stream quality exist, most notably at about 10% impervious cover, where sensitive stream elements are lost from the system" (Center for Watershed Protection 2016). Others have noted that urbanization begins to have an influence on some biological parameters within watersheds at slightly lower threshold levels, ranging between 5 and 10%, depending on the parameter (Baker and King 2010; Hilderbrand et al., 2010; Utz et al. 2009; Hicks and Larson 1997; May et al. 1997).

The ASAP Project is a long, linear project that crosses 60 10-digit hydrologic unit (HUC) areas, many of which contain very few impervious or compacted surfaces associated with urbanization, as the Project would be constructed and operated in several remote areas where human disturbance is minimal. To determine whether the impacts of the narrow ASAP alignment and related facilities might result in a substantive impact to aquatic resources and functions within the watersheds it transects, AGDC selected a conservative threshold of 7.5 percent of the aggregate existing land-cover impacts and new project wetlands impacts to determine where substantive impacts to aquatic resource functions in watersheds could potentially, thereby requiring mitigation. Rather than using only impervious cover (paved streets, building rooftops, storm drains) in its analysis of existing land impacts, AGDC opted to use a more conservative approach of including *all* disturbed or compacted areas associated with development, including agricultural lands, material sources, and gravel roads, without weighting by impact type. The levels of anthropogenic disturbance (urbanization) in each HUC are reported in this document so that it can be determined whether impacts to the aquatic environment are statistically significant for that watershed and thus require mitigation.

1.3 REGULATORY GUIDANCE FOR AVOIDANCE, MINIMIZATION, AND COMPENSATORY MITIGATION OF WETLAND IMPACTS

Where impacts within a watershed are deemed to be substantive based on the aggregate level of existing disturbance and new project wetlands impact (>7.5% development), appropriate and practicable compensatory mitigation would be applied by AGDC to replace functional losses of aquatic resources and functions. The feasibility and appropriateness of compensatory mitigation for a particular aquatic resource type is to be addressed on a case-by-case basis by district engineers (33 CFR Parts 325 and 332; 40 CFR part 230). The Council on Environmental Quality (CEQ) has defined mitigation to include: avoiding impacts, minimizing impacts, rectifying impacts, reducing impacts over time, and compensating for impacts (40 CFR 1508.20). The types of mitigation enumerated by the CEQ are compatible with the requirements of the CEQ Guideline. As a practical matter, they are combined by EPA to form three general types: avoidance, minimization and compensatory mitigation.

1. **Avoidance.** (see Section 2, below, for ASAP Project approach)

   40 CFR 230.10(a) allows permit issuance for only the least environmentally damaging practicable alternative. The thrust of this section on alternatives is avoidance of impacts. Section 230.10(a) requires that no discharge shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact to the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences. In addition, Section 230.10(a)(3) sets forth rebuttable presumptions that 1) alternatives for non-water dependent activities that do not involve special aquatic sites are available and 2) alternatives that do not involve special aquatic sites have less adverse impact on the aquatic environment. Compensatory mitigation may not be used as a method to reduce environmental impacts in the evaluation of the least environmentally damaging practicable alternatives for the purposes of requirements under Section 230.10(a).

2. **Minimization.** (see Section 2, below, for ASAP Project approach)

   40 CFR 230.10(d) states that appropriate and practicable steps to minimize adverse impacts will be required through project modifications and permit conditions. Subpart H of the Guidelines describes means of minimizing impacts of an activity.

3. **Compensatory Mitigation.** (see Sections 3 - 8, below, for ASAP Project approach)

   Appropriate and practicable compensatory mitigation is required for unavoidable adverse impacts which remain after all appropriate and practicable minimization has been required. Compensatory actions (e.g., restoration of existing degraded wetlands or creation of man-made wetlands) should be undertaken when practicable, in areas adjacent or continuous to the discharge site (on-site compensatory mitigation). If on-site compensatory mitigation is not practicable, off-site compensatory mitigation should be undertaken in the same geographic area if appropriate and practicable (i.e., in close proximity and, to the extent possible, the same watershed). In determining compensatory mitigation, the functional values lost by the resource to be impacted must be considered. Generally, in-kind compensatory mitigation is preferable to out-of-kind. There is continued uncertainty regarding the success of wetland creation or other habitat development. Therefore, in determining the nature and extent of habitat development of this type, careful consideration should be given to its likelihood of success. Because the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, restoration should be the first option considered.

A determination of what level of mitigation constitutes appropriate mitigation is based solely on the values and functions of the aquatic resource that will be impacted. Practicable mitigation is defined at Section 230.3(q) of the Guidelines. However, the level of mitigation determined to be appropriate and practicable under Section 230.10(d) may lead to individual permit decisions which do not fully meet this goal because the mitigation measures necessary to meet this goal are not feasible, not practicable, or would accomplish only inconsequential reductions in impacts. Consequently, it is recognized by EPA and USACE that the goal of no net loss of wetlands may not be

achieved in each and every permit action. In determining appropriate and practicable measures to offset unavoidable impacts to wetlands, mitigation measures must be appropriate to the scope and degree of those impacts and practicable in terms of cost, existing technology, and logistics in light of overall project purposes.

In evaluating Section 404/10 individual permit applications, information on all facets of a project, including mitigation, is typically gathered and reviewed at the same time. USACE usually makes a determination that potential impacts have been avoided to the maximum extent practicable. Remaining unavoidable impacts will then be mitigated to the extent appropriate and practicable by requiring steps to minimize impacts, and, finally, compensate for aquatic resource values. This sequence is considered satisfied where the proposed mitigation is in accordance with specific provisions of a USACE and EPA-approved comprehensive plan that ensures compliance with the compensation requirements of the Section 404(b)(1) Guidelines.

A primary goal of the 2008 Mitigation Rule, referenced above, was to improve the quality and success of compensatory mitigation. It emphasized the selection of compensatory mitigation sites on a watershed basis and established equivalent standards and a hierarchy for the three types of compensatory mitigation. A preference hierarchy for mitigation options was established under the 2008 Mitigation Rule to address risk and uncertainty and to address temporal losses of aquatic resource functions (CFR 33 Part 332.3(b); 40 CFR 230.93(b)). There exists a preference for mitigation banks and ILF programs over PRM projects under the rule unless the PRM is determined to be environmentally preferable. This hierarchy ensures federal agencies that mitigation options with the highest likelihood of success and greatest value to the watershed will be selected from the available choices.

There is generally a preference for use of mitigation bank credits when the permitted activity is in the service area of an approved bank with the appropriate types of credits available. However, in the absence of an approved bank, ILF programs have certain advantages over PRM: ILF programs generally involve large parcels, have access to appropriate scientific and technical expertise, may have a proven track record in establishing successful mitigation, and will generally have a more fully developed watershed approach developed through their required comprehensive planning framework. The federal government does not limit ILF programs to any particular impact type or size (33 CFR Parts 325 and 332; 40 CFR part 230).

2. AVOIDANCE AND MINIMIZATION OF WETLANDS

2.1 PROJECT DESCRIPTION

The ASAP Project is AGDC's in-state natural gas pipeline project designed to provide an affordable, long-term energy solution to Fairbanks, the Southcentral region, and to as many other Alaskan communities as possible. The buried 733-mile, 36-inch pipeline is proposed to deliver natural gas from Prudhoe Bay to Southcentral Alaska, where it will tie in to the existing ENSTAR system (Figure 1). A proposed 30-mile, 12-inch lateral pipeline will connect the Mainline to Fairbanks (Figure 2). The Project will cross three ecoregions: Norther, Interior, and Southcentral.

Figure 1. Alaska Stand Alone Pipeline Route

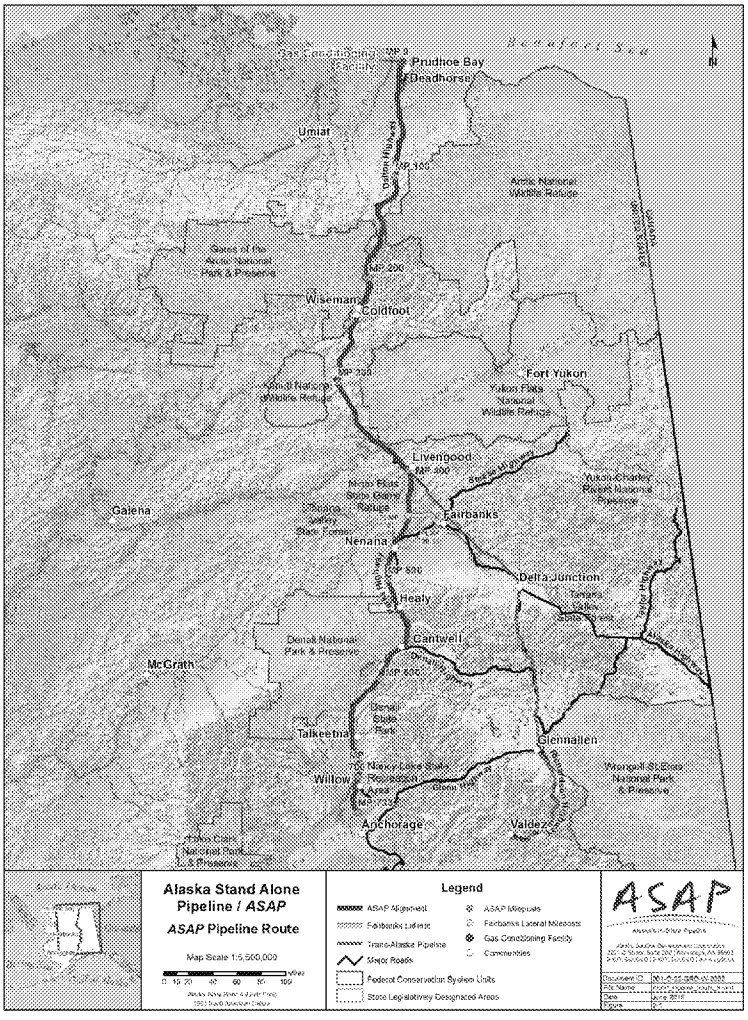
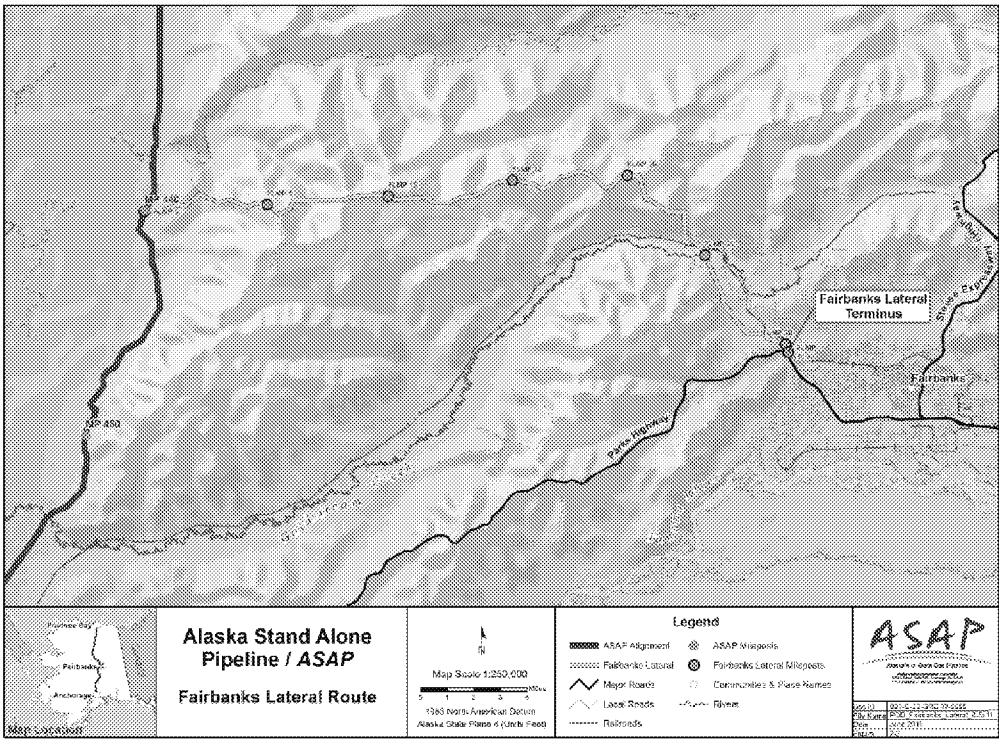


Figure 2. Fairbanks Lateral Route



The ASAP pipeline alignment will avoid and minimize impacts to wetlands where practicable. If impacts cannot be avoided or minimized, then mitigation for impacted wetlands will follow 40 CFR 230 Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material. AGDC designed the ASAP Project with a commitment to take appropriate and practicable steps to avoid and minimize impacts to aquatic sites where practicable, prior to the consideration of mitigation options.

AGDC will adhere to several traditional wetland protection measures, which include:

- Schedule pipeline construction across wetlands during the winter to the maximum extent practicable.
- Avoid and minimize ground-disturbing activity in wetland habitats
- Maintain existing hydrologic systems
- Re-establish vegetation that is typical of the general area
- Minimize the number of stream crossings
- Use existing bridges or Horizontal directional drilling (HDD) or other trenchless technology
- All fuel and lubricant stations would be surrounded by a berm of sufficient height to prevent discharge outside the berm.
- Contain fuel and lubricant spills during construction

- Implement procedures to limit spread of non-native invasive plants
- Temporary impact areas disturbed during construction activities would be kept as small as possible.
- Facilities would be situated so the permanent impact area would occupy as much upland habitat as can be used.
- Dust abatement measures would be implemented during construction to minimize dust deposition in wetlands.
- A stormwater pollution prevention plan and an erosion and sediment control plan would be used to prevent sediment deposition into adjacent wetlands.

2.2 ROUTE REFINEMENTS

A primary method by which the Project avoided and minimized wetland impacts was through the use of a color-coded (stoplight) categorization system to represent the functions and services of delineated waters and wetlands. ASAP staff used this representation of waters and wetlands to refine the pipeline route and site facilities, targeting uplands and avoiding higher value waters and wetlands where practicable. The stoplight categorization identified wetland categories for avoidance as follows:

- Red: Waters of the highest value such as streams, lakes, and ponds.
- Yellow: Wetlands of highest value.
- Green: Wetlands of slightly less value than highest value wetlands.

2.2.1 Alignment v5.0 (FEIS)

The prevalence of wetlands along the proposed route, the landscape position of the pipeline rights-of-way (ROW), and engineering constraints to some degree limited the potential for avoidance. As discussed previously in this document, design refinements provided for an incremental reduction in wetland impact.

The v5.0 alignment was evaluated using the latest light detection and ranging imagery and aerial photography overlaid with the v5.0 wetland mapping completed by Arctic Slope Regional Corporation Energy Services (AES). This information was incorporated into the ArcGIS reader to overlay route alignments with natural resources data. The v5.0 alignment was previewed for areas of conflicts with high-value wetlands: areas defined as emergent wetlands, anadromous fisheries, resident fisheries, open-water ponds, and lakes. The areas were noted by milepost (MP) for field review and verification. The field review team concentrated on avoiding and minimizing as much contact between the mainline and high-value wetland areas as possible.

Each route revision was documented using a Pipeline Route Refinement Form. Information and data related to cost, land, engineering, environmental/regulatory, construction, engineering facilities and hydraulics, operations & maintenance (O&M), and stakeholder relations were entered into

the forms. Each change form was reviewed and approved in writing by the AGDC Project Manager, AGDC Engineering Manager, ADGC Environmental, Regulatory, and Land (ERL) Manager, and the Michael Baker Jr. Pipeline Manager.

A logic decision tree process was used to help make ROW construction method decisions. Logic trees were developed for both winter and summer construction seasons. Consideration to avoid high-value wetlands was part of the decision tree process.

2.2.2 Alignment v6.1 (Supplemental FEIS)

ASAP project engineers began work on revision v6.0 in 2013 and finalized the route changes in November of that year. The revision v6.0 route changes after the Final Environmental Impact Statement (FEIS) was completed on revision v5.0 continued the incremental reduction to wetland impacts. In late 2014, and at the direction of the AGDC Board of Directors, the ASAP project team worked collaboratively with members of the Alaska LNG (AKLNG) project team to agree upon a common alignment for the portions of the two routes that overlap. This effort used the best available engineering and environmental knowledge to avoid physical hazards, minimize impacts to wetlands and other resources, and take into account Supplemental Environmental Impact Statement (SEIS) scoping comments. The more significant changes are as follows:

- Near Toolik Lake, where a corner was transected to reduce length.
- In Minto area, where the alignment was moved from the flats lowlands to the ridgeline, reducing wetlands impact and reducing construction risk.
- Near Healy, where the alignment was moved to the west to avoid the more populated areas of Healy.
- Near Cantwell, where the line was moved to the east and up on the ridgeline to avoid going through the more populated areas of Cantwell.
- In Hurricane Gulch area, where the alignment was moved upslope to the east to provide a better crossing of Hurricane Gulch.
- Near the Alaska Veteran's Memorial, where the alignment was moved toward the west to reduce visual impact.
- After crossing the Chulitna River, where the alignment was moved further to the west to reduce visual impact.
- South of Talkeetna, where the alignment was moved both west and east to optimize stream crossings and reduce impacts to the more populated areas.

Tables 1 - 3 provide descriptions of alignment shifts that were made in early 2015, along with the reasons for the changes. The tables illustrate that many of the changes made were to avoid wetlands or to change stream/drainage crossings to minimize wetland impact and reduce possible erosion. The same considerations were applied to the layout of access roads and other off-ROW facilities.

Table 1. Mainline Alignment v6.1 Revisions

#	MILEPOST	REASON	PIPELINE CENTERLINE CHANGES
1	0.00 - 2.03	Reroute improves the routing out of the GCF and improves crossings of utility corridors.	Starting at milepost (MP) 0, the reroute leaves the GCF heading south. It then turns 90 degrees to the west and parallels a pipeline and associated access road for 2,500 ft. The reroute then turns south and crosses under pipelines and access road. It then turns southwest for 4,600 ft, where it crosses under a set of power lines. The reroute then heads south for about 1,000 ft where it goes between a snow fence and a well pad. The reroute then turns southwest for 1,200 ft and rejoins ASAP v6 at MP 2.03.
2	2.99 - 4.48	Reroute reduces potential impacts to fish habitat and avoids an actively eroding right bank of the Putuligayuk River.	At MP 2.99, the reroute heads southwest across the Putuligayuk River in a favorable crossing location approximately 400 ft further upstream than ASAP v6. The reroute then heads south-southwest where it crosses an aboveground pipe rack, the Spine Road, and a smaller local North Slope pipeline access road before rejoining ASAP v6 at MP 4.48.
3	6.32 - 11.01	Reroute avoids the lake near MP 7.3.	The reroute departs ASAP v6 at MP 6.32 and goes in a south-southwest direction for approximately 8,800 ft, bypassing several lakes that are crossed by the ASAP v6 alignment. The reroute then turns south for 3.25 miles rejoining ASAP v6 at MP 11.01.
4	26.34 - 48.68	Reroute shortens alignment and improves construction access.	The reroute moves closer to the Dalton Highway. This reroute begins at MP 26.34 and rejoins ASAP v6 at MP 48.68.
5	68.43 - 71.06	Reroute shortens alignment and improves construction access.	The reroute moves closer to the Dalton Highway. This reroute begins at MP 68.43 and rejoins ASAP v6 at MP 71.06.
6	71.94 - 78.09	Reroute moves the alignment onto the fall line and away from existing drainage near MP 72. Between MP 72 and MP 78.09, the AKLNG route was selected because the two routes were closely aligned.	This reroute moves the alignment, near MP 72, to the north by approximately 75 feet to avoid drainage issues. The reroute then follows the AKLNG route through the Sag. River floodplain. The reroute begins at MP 71.94 and rejoins ASAP v6 at MP 78.09.
7	82.05 - 83.76	Reroute avoids stream crossing at meander bends and beaded pools, and reduces crossing of wet areas. The reroute also improves routing down the fall line and along a ridge.	This reroute improves stream crossings and routing across hilly terrain. The reroute begins at MP 82.05 and rejoins ASAP v6 at MP 83.76.
8	84.28 - 85.52	Reroute reduces and improves stream crossings and avoids higher value wetlands. Reroute also reduces sidehill work.	The reroute is proposed to avoid higher value wetlands, remove cross-slopes, and improve constructability. The reroute begins at MP 84.28 and rejoins ASAP v6 at MP 85.52.
9	87.08 - 88.75	Reroute improves stream crossing and removes some sidehill work.	The reroute crosses the stream at a location with better streambank stability. South of the stream crossing, the route is moved east to avoid sidehill. The reroute begins at MP 87.08 and rejoins ASAP v6 at MP 88.75.
10	90.94 - 93.93	Reroute avoids larger and deeper beds of stream and improves constructability by crossing lower banks.	This reroute crosses further downstream than the ASAP v6. The reroute provides better bank stability. The reroute begins at MP 90.94 and rejoins ASAP v6 at MP 93.93.

Table 1. Mainline Alignment v6.1 Revisions

#	MILEPOST	REASON	PIPELINE CENTERLINE CHANGES
11	96.24 - 114.92	Reroute moves the alignment off of some sidehill. Portions of the AKLNG route were adopted because the two routes are closely aligned.	The reroute runs parallel to the ASAP v6 alignment, where it moves to the alignment to the top of a ridge at MP 101. The reroute begins at MP 96.24 and rejoins ASAP v6 at MP 114.92.
12	120.58 - 122.52	Reroute shortens the alignment and improves the crossing location of the Dalton Highway.	The reroute takes a straighter approach across an unnamed stream at MP 121.75. This shortens the length and improves the Dalton Highway crossing location. This reroute begins at MP 120.58 and rejoins ASAP v6 at MP 122.52.
13	124.19 - 138.34	Reroute straightens and shortens the alignment by more than 2 miles.	The reroute shortens the alignment by leaving v6 near MP 129, running southwest where it crosses TAPS and the Dalton Highway at a new location near MP 138.3. This reroute begins at MP 124.19 and rejoins ASAP v6 at MP 138.34.
14	146.39 - 147.25	Reroute reduces potential fish habitat impacts along ASAP v6 and improves construction access.	This reroute moves the Atigun River crossing to the western side of TAPS to reduce fish habitat impact, avoids a high bank on the northern side of the river, and improves construction access. The reroute begins at MP 146.39 and rejoins ASAP v6 at MP 147.25.
15	149.41 - 163.85	Reroute eliminates two Dalton Highway crossings. Portions of the AKLNG route were adopted because the two routes are closely aligned.	The reroute was selected to avoid two Dalton highway crossings. The reroute begins at MP 149.41 and rejoins ASAP v6 at MP 163.85.
16	164.54 - 164.84	Reroute moves away from unstable soils.	This reroute moves the alignment to the east to avoid an area of suspected slope instability at MP 164.68. The reroute begins at MP 164.54 and rejoins ASAP v6 at MP 164.84.
17	169.47 - 170.70	Reroute moves stream crossing to a wider area that has less scour potential and improves constructability. Portions of the AKLNG route were adopted because the two routes are closely aligned.	The reroute moves a stream crossing to a wider area with less scour potential. The reroute also improves the Dalton Highway crossing location. The reroute begins at MP 169.47 and rejoins ASAP v6 at MP 170.70.
18	171.43 - 173.37	Reroute improves constructability at the summit and the Dalton Highway crossing. Portions of the AKLNG route were adopted because the two routes are closely aligned.	The reroute moves further from the Dalton Highway at the summit. The reroute also adjusts the angle of the Dalton Highway crossing at MP 173.37. The reroute begins at MP 171.43 and rejoins ASAP v6 at MP 173.37.
19	175.46 - 176.13	Reroute moves away from suspected palsa located near MP 175.6.	This reroute moves the alignment to the east to avoid a suspected palsa. The reroute begins at MP 175.46 and rejoins ASAP v6 at MP 176.13.
20	176.38 - 176.62	Reroute moves the alignment away from the ADOT&PF graded area.	This reroute moves the alignment further upslope behind the ADOT&PF facility at Chandalar to avoid a graded area. The reroute begins at MP 176.38 and rejoins ASAP v6 at MP 176.62.
21	178.28 - 178.87	Reroute avoids sidehill slopes and straightens out the approach above Chandalar Shelf.	This reroute realigns the pipeline at the top of Chandalar Shelf. The reroute begins at MP 178.28 and rejoins ASAP v6 at MP 178.87.

Table 1. Mainline Alignment v6.1 Revisions

#	MILEPOST	REASON	PIPELINE CENTERLINE CHANGES
22	181.27 - 183.95	Reroute shortens floodplain crossings of the creek at MP 182.2 and the Dietrich River, and improves the location of the TAPS crossing. Portions of the AKLNG route were adopted because the two routes are closely aligned.	This reroute moves the creek crossing at MP 182.2 upstream. It then crosses the Dietrich River at a better location to shorten the floodplain width. In addition, the reroute also moves the TAPS crossings. This reroute begins at MP 181.27 and rejoins at MP 183.95.
23	185.13 - 196.30	Reroute moves the alignment further upslope away from Dalton Highway, improves the approach to Nutirwik Creek, and improves the Dalton Highway crossing. Portions of the AKLNG route were adopted because the two routes are closely aligned.	Starting at MP 185.13, this reroute moves the alignment further to the east (uphill) of the Dalton Highway on generally drier terrain. The reroute improves the approach to Nutirwik Creek at MP 189 and shortens the length of the Dalton Highway crossing at MP 194.85. The reroute begins at MP 185.13 and rejoins ASAP v6 at MP 196.30.
24	204.04 - 206.10	Reroute moves the Point of Intersection (PI) to near MP 204, north out of drainage and on to flatter ground. Portions of the AKLNG route were adopted because the two routes are closely aligned.	This reroute moves a PI bend to an area with less sidehill. This reroute begins at MP 204.04 and rejoins ASAP v6 at MP 206.1.
25	208.00 - 208.12	Reroute improves the Dalton Highway crossing.	The reroute changes the angle of a Dalton Highway crossing. This reroute begins at MP 208.00 and rejoins ASAP v6 at MP 208.12.
26	208.48 - 209.47	Reroute eliminates encroachment into the TAPS encroachment corridor.	The reroute moves the alignment away from the TAPS encroachment corridor at 208.65. The reroute begins at MP 208.48 and rejoins ASAP v6 at MP 209.47.
27	213.10 - 214.80	Reroute avoids palsas at the base of Sukakpak Mountain and improves the stream crossing near MP 214.8.	This reroute moves the alignment 200 feet east to avoid thaw-sensitive soils at the base of Sukakpak Mountain. The ASAP v6 alignment crosses multiple frost blisters (palsas), which may have massive ice beneath the ground surface. The stream crossing at MP 214.8 is also improved. The reroute begins at MP 213.10 and rejoins ASAP v6 at MP 214.80
28	220.71 - 229.58	Reroute avoids Native Allotment, high frost heave potential soils, gravel pit, three major river crossings, and river training structures.	This reroute moves the alignment away from a Native Allotment and gravel pit near MP 222. It also avoids three major river crossings, Middle Fork Koyukuk, and Hammond River. The reroute also avoids a pinch point between the Dalton Highway and TAPS between MP 228.25 and MP 229. Within this same milepost range, river training structures are avoided. The reroute begins at MP 220.71 and rejoins ASAP v6 at MP 229.58.
29	230.36 - 231.97	Reroute improves the crossing of Minnie Creek, and reduces the number of PIs and length.	This reroute improves the Minnie Creek crossing and straightens the alignment. The reroute begins at MP 230.36 and rejoins ASAP v6 at MP 231.97.
30	N/A	vacant	vacant

Table 1. Mainline Alignment v6.1 Revisions

#	MILEPOST	REASON	PIPELINE CENTERLINE CHANGES
31	240.80 - 251.30	Reroute avoids steep terrain south of Clara Creek, avoids braided channels on Slate Creek, runs the ridge between MP 243 and MP 245, improves the crossing of Rosie Creek, and improves the routing around the base of Cathedral Mountain. Portions of the AKLNG route were adopted because the two routes are closely aligned.	The reroute moves the Clara Creek crossing downstream closer to the Dalton Highway, which also avoids steep terrain. It also moves the Slate Creek crossing downstream to avoid crossing multiple channels in its floodplain. South of Slate Creek, the reroute follows a ridge approximately 2 miles to avoid wet terrain. The Rosie Creek crossing is moved upstream to avoid steep banks. A minor reroute around Cathedral Mountain helps to avoid wet terrain adjacent to the Dalton Highway. This reroute begins at MP 240.80 and rejoins ASAP v6 at MP 251.30.
32	252.69 - 253-41	Reroute avoids a small lake.	This reroute avoids a small lake. The reroute begins at MP 252.69 and rejoins ASAP v6 at MP 253.41.
33	255.54 - 256.07	Reroute reduces the stream crossing impact.	This reroute reduces the impact to Chapman Creek and potential bank restoration efforts. The reroute begins at MP 255.54 and rejoins ASAP v6 at MP 256.07.
34	257.26 - 258.61	Reroute avoids a pinch point between the highway, small lake, and gully.	This reroute moves the alignment to the west to avoid a pinch point between the highway, small lake, and gully near MP 258.
35	259.47 - 260.75	Reroute avoids suspected subsurface flow.	This reroute proposed to avoid suspected subsurface flow. The reroute begins at MP 259.47 and rejoins ASAP v6 at MP 260.75.
36	262.07 - 274.66	Reroute shortens the alignment, avoids a pinch point between TAPS and the Dalton Highway, avoids a fiber optic line and, removes two Dalton Highway crossings.	The reroute begins at MP 262 and stays east of the Dalton Highway and Grayling Lake. It avoids two highway crossings and a pinch point with TAPS, Dalton Highway, and a fiber optic line on the western side of the lake. The Jim River crossing was also adjusted. This reroute begins at MP 262.07 and rejoins ASAP v6 at MP 274.66.
37	282.26 - 282.77	Reroute improves the Prospect Creek stream crossing.	This reroute provides a wider, flatter crossing with less scour potential and less impact to fish habitat of Prospect Creek. The reroute begins at MP 282.26 and rejoins ASAP v6 at MP 282.77.
38	283.01 - 292.05	Reroute moves alignment onto fall line, and avoids wetter terrain and oxbow lakes. Portions of the AKLNG route were adopted because the two routes are closely aligned.	This reroute starts south of Prospect Creek and includes minor adjustments for terrain, avoids oxbow lakes, and adjusts the Bonanza Creek crossing. This reroute begins at MP 283.01 and rejoins ASAP v6 at MP 292.05.
39	297.46 - 298.72	Reroute aligns with fall line.	This reroute moves the alignment onto the fall line on either side of Fish Creek. This reroute begins at MP 297.46 and rejoins ASAP v6 at MP 298.72.
40	305.82 - 313.40	Reroute avoids Old Man Camp, avoids private property, moves TAPS crossing to an aboveground location, and moves the Dalton Highway crossing. Portions of the AKLNG route were adopted because the two routes are closely aligned.	This reroute avoids Old Man Camp at MP 306.5. It also avoids private property near MP 311. The buried TAPS crossing near MP 313.1 was relocated to near MP 311.5 where TAPS is aboveground. The Dalton Highway crossing is also moved to approximately 311.5. This reroute begins at MP 305.82 and rejoins ASAP v6 at MP 313.4.

Table 1. Mainline Alignment v6.1 Revisions

#	MILEPOST	REASON	PIPELINE CENTERLINE CHANGES
41	335.31 - 338.39	Reroute minimizes impact to wetlands and avoids a rock outcrop.	This reroute moves the alignment further to the west to avoid a large area of wet, boggy marsh. The reroute also avoids a rock outcrop located at MP 337.8. The reroute begins at MP 335.31 and rejoins ASAP v6 at MP 338.39.
42	340.29 - 341.24	Reroute removes an unnecessary PI.	This reroute removes an unnecessary PI, resulting in a slight adjustment. The reroute begins at MP 340.29 and rejoins ASAP v6 at MP 341.24.
43	342.25 - 342.36	Reroute improves the Dalton Highway crossing.	This realignment adjusts the crossing angle of the Dalton Highway. The reroute begins at MP 342.25 and rejoins ASAP v6 at MP 342.36.
44	348.16 - 356.65	Reroute moves the Dalton Highway crossing to a better location, avoids Native Allotments, avoids a wastewater treatment facility, and moves the alignment out of a highly incised stream channel. Portions of the AKLNG route were adopted because the two routes are closely aligned.	This reroute starts near MP 348 and moves the nearby Dalton Highway crossing further south. The reroute avoids a Native Allotment located near the Hot Spot Cafe at MP 353.5. South of MP 356, the alignment has been moved to the east to avoid a Native Allotment. The reroute begins at MP 348.16 and rejoins ASAP v6 at MP 356.65.
45	356.86 - 357.53	Reroute moves the Yukon River HDD exit point onto flatter terrain on the south bank.	This is a reroute of the Yukon River crossing due to detailed design completed for the Special Design Area (SDA). The reroute begins at MP 356.86 and rejoins ASAP v6 at MP 357.53.
46	358.30 - 358.59	This is a reroute of the Yukon River crossing due to detailed design completed for the SDA. The reroute begins at MP 356.86 and rejoins ASAP v6 at MP 357.53.	This reroute provides a perpendicular crossing with TAPS so that the alignment fits between the VSMs. The reroute begins at MP 358.30 and rejoins ASAP v6 at MP 358.59.
47	370.39 - 372.69	Reroute improves construction access to TAPS crossing. Portions of the AKLNG route were adopted because the two routes are closely aligned.	This reroute relocates the TAPS crossing to an open area where it is not pinched against the Dalton Highway to the south. This reroute begins at MP 370.39 and rejoins ASAP v6 at MP 372.69.
48	373.02 - 373.66	Reroute reduces sidehill slopes and encroachment onto TAPS encroachment corridor.	This reroute moves the alignment from a sidehill onto flatter terrain for ease of construction and moves further from TAPS. The reroute begins at MP 373.02 and rejoins ASAP v6 at MP 373.66.
49	388.27 - 388.65	Reroute improves stream crossing and avoids probable high-quality fish habitat.	This reroute avoids a meandering section of stream channel and narrow working area between meander and pipeline. Reroute also avoids probable high-quality fish habitat. The reroute begins at MP 388.27 and rejoins ASAP v6 at MP 388.65.
50	401.00 - 408.44	Reroute improves the Tolovana River crossing and moves the alignment east to drier terrain. Portions of the AKLNG route were adopted because the two routes are closely aligned.	This reroute starts near MP 401 and moves west further from TAPs, then to an improved Tolovana River crossing. From there, it moves upslope to reduce wet terrain. The reroute begins at MP 401.00 and rejoins ASAP v6 at MP 408.44.

Table 1. Mainline Alignment v6.1 Revisions

#	MILEPOST	REASON	PIPELINE CENTERLINE CHANGES
51	426.14 - 429.40	Reroute improves the Tatalina River crossing.	This reroute avoids an eroding cut bank and a bend of the Tatalina River. The reroute begins at MP 426.14 and rejoins ASAP v6 at MP 429.40.
52	434.47 - 437.54	Reroute avoids small lakes, adjusts the Chatnika River crossing, and avoids a private property south of the river. Portions of the AKLNG route were adopted because the two routes are closely aligned.	This reroute moves further away from a private parcel south of the Chatnika River. It also avoids two small lakes. The reroute begins at MP 434.47 and rejoins ASAP v6 at MP 437.54.
53	440.18 - 451.96	Reroute moves alignment away from Native Allotments and upslope to drier terrain. Portions of the AKLNG route were adopted because the two routes are closely aligned.	This reroute runs along the toe of the hills to avoid several Native Allotments and to run upslope in drier terrain. This reroute begins at MP 440.18 and rejoins ASAP v6 at MP 451.96.
54	452.82 - 462.76	Reroute minimizes impacts to wetlands and avoids private property.	This reroute generally runs on drier terrain and moves west to avoid several private parcels. The reroute begins at MP 452.82 and rejoins ASAP v6 at MP 462.76.
55	463.90 - 466.44	Reroute minimizes impact to wetlands and avoids private property.	This reroute moves the alignment to the west to avoid bisecting a large marshy area located at MP 465. Reroute then heads due south to avoid a private parcel at MP 466. The reroute begins at MP 463.90 and rejoins ASAP v6 at MP 466.44.
56	468.69 - 469.22	Reroute avoids Native Allotments.	This reroute moves the alignment east to avoid Native Allotments that cross the Parks Highway. The reroute begins at MP 468.69 and rejoins ASAP v6 at MP 469.22.
57	471.99 - 508.32	Reroute avoids private property and Native Allotments, and improves the Nenana River crossing. Portions of the AKLNG route were adopted because the two routes are closely aligned.	This reroute moves the alignment east to avoid impacting the private parcel at MP 473. The crossing of the Nenana River is also moved downstream. The reroute also avoids a series of private parcels and Native Allotments from MP 486.5 to MP 491 and from MP 493 to MP 495. After crossing the Parks Highway, the reroute follows drier terrain along the Nenana River floodplain on the eastern side of the Parks Highway. The reroute begins at MP 471.99 and rejoins ASAP v6 at MP 508.32.
58	509.27 - 527.91	Reroute avoids private property and Native Allotments in and around town of Healy. It also moves to a location that provides more space to cross the Healy Fault. Portions of the AKLNG route were adopted because the two routes are closely aligned. Reroute minimizes impacts to a nearby subdivision, as well as provides access to recreation and improves tourism.	This reroute follows drier terrain along the Nenana River floodplain on the eastern side of the Parks Highway to approximately MP 518. It crosses the highway and turns south to avoid the town of Healy, and improves the crossing at Dry Creek. After passing Otto Lake, it turns east to rejoin the ASAP v6 corridor near MP 525. This reroute begins at MP 509.27 and rejoins ASAP v6 at MP 527.91. The route does not impact Hilltop Road.
59	535.77 - 579.00	Reroute reduces sidehill, improves crossings of the Nenana and Jack rivers, relocates the Denali Fault crossing to a more accessible area, and avoids private property and Native Allotments. Portions of the AKLNG route were adopted because the two routes are closely aligned.	From MP 549 to MP 551, the reroute moves east out of a wetlands complex between the highway and Intertie. Starting at MP 555, the alignment is shifted closer to the highway bridge crossing the Nenana River. West of the river, near MP 556, the reroute turns south to the Denali Fault. After crossing the Denali Fault, the reroute heads southwest, crossing Reindeer Mountain and generally

Table 1. Mainline Alignment v6.1 Revisions

#	MILEPOST	REASON	PIPELINE CENTERLINE CHANGES
			following the Intertie to bypass Cantwell. The reroute crosses the Jack River adjacent to the old highway bridge alignment south of Cantwell. The reroute heads west to a crossing of the Parks Highway and the AK RR near MP 567. After crossing the railroad, the reroute continues southwest avoiding the Summit airstrip and then reconnects at MP 579. The reroute begins at MP 535.77 and ends at MP 579.
60	579.82 - 580.78	Reroute improves Middle Fork Chulitna River crossing and avoids probable high-quality fish habitat.	This reroute moves the Middle Fork Chulitna River crossing upstream to avoid probable high-quality fish habitat. The reroute begins at MP 579.82 and rejoins ASAP v6 at MP 580.78.
61	582.14 - 600.11	Reroute refines several stream crossings, straightens the alignment, and moves onto drier terrain. Portions of the AKLNG route were adopted because the two routes are closely aligned.	The reroute begins at MP 582 and changes the AK RR and Parks Highway crossings, then heads south to a new crossing of the East Fork Chulitna River. From there it generally follows the existing power lines from MP 584 to MP 590. Then it moves upslope, improving the stream crossing at Antimony Creek, Honolulu Creek, and Little Honolulu Creek. This reroute increases sidehill slopes between MP 590 and MP 597; however, it reduces crossings of string bogs. This reroute begins at MP 582.14 and rejoins ASAP v6 at MP 600.11.
62	602.58 - 603.00	Reroute moves railroad crossing onto drier ground.	This reroute moves the railroad crossing south onto drier ground. The reroute begins at MP 602.58 and rejoins ASAP v6 at MP 603.00.
63	606.17 - 607.00	Reroute avoids having to remove a beaver dam and potentially resulting in large-scale impacts on upstream wetlands.	This reroute moves the road crossing about 1,000 feet north along the Parks Highway. Construction at the current site would remove a beaver dam and potentially have large-scale impacts on upstream wetlands. The reroute begins at MP 606.17 and rejoins ASAP v6 at MP 607.
64	609.55 - 610.49	Reroute improves stream crossing.	The reroute moves the alignment off of a deeply incised channel to flatter, but wetter, terrain. This reroute begins at MP 609.55 and rejoins ASAP v6 at MP 610.49.
65	612.34 - 613.07	Reroute reduces impacts to wetlands.	The reroute moves the alignment onto drier terrain and avoids a wetland at MP 612.9. This reroute begins at MP 612.34 and rejoins ASAP v6 at MP 613.07.
66	616.55 - 617.41	Reroute straightens out the alignment and moves it onto a dry ridgeline.	This reroute moves the alignment onto a ridgeline, out of wet areas along ASAP v6. This reroute begins at MP 616.55 and rejoins ASAP v6 at MP 617.41.
67	623.98 - 667.09	Reroute reduces visual impacts to the Veterans Memorial, moves to drier terrain, and improves stream and river crossings. It avoids probable high-value spawning habitat. Portions of the AKLNG route were adopted because the two routes are closely aligned.	This reroute reduces the visual impacts of cutting an ROW close to the highway opposite the Veterans Memorial. The Chulitna River crossing is shifted upstream to a narrower section. The southern end of the reroute generally straightens the alignment and stays off of sidehill areas, and avoids boggy

Table 1. Mainline Alignment v6.1 Revisions

#	MILEPOST	REASON	PIPELINE CENTERLINE CHANGES
			areas around Trapper Creek. The reroute includes a realignment upstream by approximately 300 feet on Rabideux Creek MP 633. This reroute begins at MP 623.98 and rejoins ASAP v6 at MP 667.09.
68	669.01 - 670.86	Reroute avoids encroaching on a steep bluff by removing a PI.	This reroute moves the alignment off of a bluff area associated with the Susitna River floodplain. The reroute begins at MP 669.01 and rejoins ASAP v6 at MP 670.86.
69	671.87 - 672.43	Reroute avoids pool habitat in an anadromous fish stream.	This reroute avoids pool habitat in an anadromous fish stream. The reroute begins at MP 671.87 and rejoins ASAP v6 at MP 672.43.
70	673.97 - 678.16	Reroute avoids two Native Allotments and the Montana Creek State Recreational Area.	This reroute avoids the Montana Creek State Recreation Area (MP 675) and two Native Allotments at MP 674.75 and MP 677, respectively. The reroute increases the length and complexity, and adds two arterial road crossings. It increases the number of private parcels impacted but avoids impacting the Montana Creek State Recreation Area. It is not feasible to follow the railroad through the State Recreation Area. The Goose Creek stream crossing moves to the eastern side of the Parks Highway. This reroute begins at MP 673.97 and rejoins ASAP v6 at MP 678.16.
71	683.65 - 686.86	Reroute moves alignment out of a string bog and avoids bisecting private properties.	The reroute moves west out of a string bog between MP 685.5 and MP 686.2. Where possible, private parcels were avoided. The reroute also moves the crossings of Sheep Creek Slough and Caswell Creek slightly downstream at MP 684.15 and MP 686.3, respectively. The reroute begins at MP 683.65 and rejoins ASAP v6 at MP 686.86
72	688.64 - 6.92.24	Reroute avoids wetlands and lessens the impacts to private property.	This reroute avoids a large bog between MP 688.7 and MP 689.6. The reroute heads east from MP 689.6 crossing the highway to join the railroad ROW. It then follows the railroad south to rejoin ASAP v6 at MP 692.24. The reroute begins at MP 688.64 and rejoins ASAP v6 at MP 692.24.
73	698.00 - 700.07	Reroute avoids braided channels along Willow Creek.	This reroute moves the crossing of Willow Creek further downstream to avoid braided channels along ASAP v6. The reroute also moves the road crossing of Willow Creek Parkway 2,000 ft to the north. The reroute begins at MP 698 and rejoins ASAP v6 at MP 700.07. Many of the proposed roads in this area have been removed. Currently only one road accesses the alignment in this area.
74	706.78 - 712.11	Reroute avoids crossing wetlands and reduces overall wetland impacts.	This reroute avoids a wetland crossing and reduces overall wetland impacts. The reroute begins at MP 706.78 and rejoins ASAP v6 at MP 712.11.
75	716.80 - 718.33	Reroute reduces sidehill slopes.	This reroute moves the alignment to the west away from unstable soils and uneven terrain. The reroute begins at MP 716.80 and rejoins ASAP v6 at MP 718.33.

Table 1. Mainline Alignment v6.1 Revisions

#	MILEPOST	REASON	PIPELINE CENTERLINE CHANGES
76	404.89 - 434.47	Reroute increases amount of summer construction, reduces operations and maintenance costs, and reduces wetland impacts.	This reroute moves the alignment to the east to avoid the wetter terrain in and around the waterbodies of the Tolovana River, Vigor Creek, and Tatalina River. The reroute follows a north/south-running ridgeline on higher and drier terrain. The reroute will also allow for summer construction as opposed to currently scheduled winter construction. O&M will be easier on the ridge as opposed to ASAP v6. The reroute begins at MP 404.89 and rejoins ASAP v6 at MP 434.47.

Table 2. Fairbanks Lateral Revisions – v6.0 to v6.1

#	MILEPOST	REASON	PIPELINE CENTERLINE CHANGES
1	0 - 4.03	Reroute adjusts the alignment to avoid crossing a pond, wetlands, and other kettle lakes. Reroute more closely follows the proposed ASAP access road and fall line to the top of the ridge.	The alignment was adjusted to avoid crossing a pond, wetlands, and other kettle lakes. The reroute also improves routing to the east by following the proposed ASAP access road and staying on the fall line. This alternate moves the mainline tie-in south approximately 2,000 ft. This reroute begins at MP 0.00 and rejoins Fairbanks v4 at MP 4.03.
2	7.70 - 11.4	Reroute avoids military property.	The reroute avoids military property. It begins at MP 7.70 and rejoins Fairbanks v4 at MP 11.40.
3	18.84 - 20.21	Reroute uses more of the existing firebreak, reduces the elevation drop from the ridge to creek bottom, and improves construction access.	Reroute extends the alignment along the firebreak that parallels Old Murphy Dome Road, then turns south to cross Old Murphy Dome Road and down the fall line to rejoin the alignment. This reroute takes advantage of construction access within the firebreak. The reroute begins at MP 18.84 and rejoins Fairbanks v4 at MP 20.21.
4	21.21 - 22.38	Reroute avoids private property by following existing power lines.	The reroute avoids private property. This reroute begins at MP 21.21 and rejoins Fairbanks v4 at MP 22.39.
5	26.94 - 27.81	Reroute avoids developed areas, reducing the Class 2 pipeline length.	The reroute avoids developed areas, thus reducing length of Class 2 pipe required. This reroute begins at MP 26.94 and rejoins Fairbanks v4 at MP 27.81.

Table 3. Notable Off-ROW Revisions – v6.0 to v6.1

#	MILEPOST	REASON	PIPELINE CENTERLINE CHANGES
1	228 - 231	Material Source[a]	Configuration of material source boundary avoids impacts to viewshed, on the hillside across from Wiseman.
2	437-439	Material Source	Design avoids impacts of material sites to a state game refuge.
3	450 - 451	Access Road[b]	Redesign avoids impacts to wetlands, wildlife, and existing road alignment and nearby communities.
4	698 - 707	Construction Camp	Redesign avoids impact to Willow Creek State Rec Area, and minimizes impacts to lands used heavily for recreation and closer to the community.
5	704 - 710	Material Source	Redesign avoids impacts of these sites to recreation and the Willow community.

[a] 168 Material Source Investigation Areas have been culled to 89 delineated material site locations, which have now been incorporated into the Project Design. The material site boundaries are a small percentage of the Investigation Areas that were previously under consideration. The rationale for the configuration or removal of material sites in three notable locations is provided in this table.

[b] Access Road shapefiles were delivered on 1/30/15, manifesting additional refinements in this feature class. The fate of this one particular road was known prior to delivery of the final design files.

2.3 ROUTING ALTERNATIVES CONSIDERED

The following descriptions of avoidance and minimization for alternatives considered are broken into several sections. ASAP engineers considered both avoidance and minimization of wetlands in all design aspects of the project. In particular, the alignment of the project has been modified two times since the FEIS was issued in 2012. The alignment evaluated in the FEIS was v5.0, and the subsequent alignment revisions (referred to as v6.0 and v6.1) each cumulatively reduced wetland impacts. The description of the development of the alternatives for the Project will reside in the Supplemental FEIS prepared for the Project. This section presents the additional development of alternatives considered by AGDC for avoidance and minimization of wetlands to reduce impacts on jurisdictional resources while meeting the purpose and need for the Project.

2.3.1 Project 404(b)(1) Alternatives Analysis

The No-Build Alternative and several build alternatives were analyzed as a part of the FEIS associated with this Project. Avoidance and minimization of impacts on WOUS and wetlands, intertidal, and subtidal habitats was a specific goal of the alternatives analysis.

It was determined that the No-Build Alternative would not meet the purpose and need of the Project, as it does not do the following: (1) construct and operate a pipeline from the North Slope to the ENSTAR tie-in near Big Lake in Southcentral Alaska; (2) provide a long-term, stable supply of up to 500 million cubic feet per day (MMscfd) of natural gas from existing reserves within North Slope gas fields to markets in the Fairbanks and Cook Inlet areas by the most direct and shortest route possible; or (3) provide economic benefit to the State of Alaska through royalties and taxes. Therefore, the No-Build Alternative is not a practicable alternative to avoid impacts on WOUS and wetlands, intertidal, and subtidal habitats.

Major route alternatives were discussed in the FEIS and formed the basis of the alternatives that will be described in the SEIS. The Richardson Highway was the major route alternative compared with the Parks Highway Route, which was chosen as the preferred alternative. The Richardson Highway Route would be longer by 92 miles (845 miles long versus 733 miles) and would cross a greater number of streams (515 versus 419) and two mountain ranges. As a result of the increased length, the Richardson Highway Route Alternative would impact 23 percent more wetland features (730 versus 593 features), 35 percent more wetland habitat (1,735 versus 1,288 wetland acres), and a greater number of wetland acres of each wetland type than the Parks Highway Route that was studied in the Alternatives Analysis conducted by the State of Alaska. The Parks Highway Alternative was then modified into the proposed Project through ROW refinement and shortening by an additional 26 miles, resulting in further avoidance and minimization of WOUS impacts.

Route variations were also evaluated in the FEIS. These included the Fairbanks Route Variation, Alaska Intertie Route Variation, Denali National Park Route Variation, and several Alaska Railroad (ARR) Route Variations. Route variations were compared with the proposed Project to see if environmental impacts, including those to WOUS, would be reduced with the variation. The route variations are discussed later in this section.

Since completion of the FEIS project, changes have resulted in advancement of a pipeline that increased in diameter from 24 to 36 inches. The following discussion centers on the alternatives to be reconsidered in the SEIS and explains how, as an applicant for a 404 permit, the AGDC demonstrates that the proposed Project is the least environmentally damaging practicable alternative (LEDPA) for achieving the Project's purpose. The basis for the LEDPA determination is CFR Title 40, Section 230.10(a). No practicable alternative to the proposed Project exists that would have a less adverse impact on aquatic ecosystems and that does not have other significant adverse environmental consequences.

2.3.2 Alaska Intertie Route Variation

The Alaska Intertie Route Variation would include a route around the eastern side of Sugar Loaf Mountain, which was found to not be practicable for a variety of reasons, including rugged terrain, lack of road access, and significant engineering, construction, and maintenance challenges.

2.3.3 Denali National Park Route Variation

A revised 7.6 mile Denali National Park Route Variation is provided as an alternative to the 7.2 mile-long segment of the proposed Project between approximately MP 535.8 and 543. The Denali National Park Variation is described and evaluated in the ASAP Environmental Evaluation Document (EED) (AGDC 2016), and is displayed on the ASAP Interactive Webviewer at: http://asap-gas.agdc.us/interactivemap.html.

2.3.4 Alaska Railroad Route Variations

The following subsections explain route variations for the Alaska Railroad.

2.3.5 Curry Rail Route Variation

Although the Curry Rail Route Variation would be 3.5 miles shorter than the proposed Project route segment it would replace, it would require new impacts on 594 more acres of land. The Curry Rail Route Variation would cross approximately 64 streams, as opposed to 39 stream crossings for the segment of the proposed Project route that it would replace. The Curry Rail Route Variation would not be road accessible, and therefore would require access from the Parks Highway at the northern or southern ends or from the ARR. Therefore, the Curry Rail Route Variation would present construction and maintenance access issues and would not reduce impacts on WOUS over the proposed Project route.

2.3.6 Port MacKenzie Rail Route Variation

The 33.1-mile Port MacKenzie Rail Route Variation would replace a 30.6-mile segment of the proposed Project route. A 21.8-mile segment of this route variation would impact approximately 160 acres of wetlands compared with approximately 135.7 acres of wetlands along the proposed Project route. The 21.8-mile route variation would cross several more waterbodies than proposed Project route (v6.1). Additional unquantified wetland impacts and stream crossings would occur within the remaining 11.3-mile segment of this route variation from Willow to near Houston. Based upon this comparison, collocating the proposed Project pipeline with the Port MacKenzie Rail Extension Project would result in a 2.5-mile longer pipeline than v6.1, more wetland impacts, and a greater number of stream crossings than the segment of the proposed Project pipeline that would be replaced. Therefore, this proposed route variation would not result in greater avoidance of impacts.

2.4 ADDITIONAL AVOIDANCE

2.4.1 Ice Roads

Ice roads will be used in the Northern Ecoregion to avoid impacts associated with disturbing or filling wetlands. Approximately 23 miles of ice roads are planned to avoid wetlands impacts.

2.4.2 Ice Pads and Snow Packing

Ice pads and snow packing will be used during the process of trenching and burying the pipe in the Northern Ecoregion to avoid impacts associated with disturbing or filling wetlands. The ice or snow surface will allow heavy equipment to drive over the tundra to perform construction while only having a 5 ft wide impact.

2.4.3 Preferential Use of Uplands or Previously Disturbed Areas

AGDC has preferentially sited larger facilities, such as camps, pipe storage yards, and O&M facilities in previously disturbed areas, as noted in detail in the ASAP Environmental Evaluation Document (EED) (AGDC 2016). AGDC has also opted to use existing access roads and material sites

wherever practicable (AGDC 2016) to minimize disturbance to new wetlands. The project intends to use disturbed areas to the greatest extent practicable. Materials sites preferentially targeted disturbed areas and existing site use or expansion were possible.

Block valves would be located in non-WOUS locations to avoid impacts where the opportunity exists. As part of the design optimization, these valves are now included in the mainline footprint calculation versus being calculated as a separate fill component.

Limits of clearing, grubbing, and grading would be adjusted where feasible to avoid affecting WOUS habitats. Where clearing in WOUS could be avoided, limits to avoid impacts would be shown in the construction drawings and marked in the field. Excavated soils would be temporarily sidecast into the temporary construction easement. Upland locations would be used when available to avoid temporary impacts on WOUS. The number of miles of pipeline and lateral that would be suitable for upland sidecasting would be determined during later design stages. Excess spoil material, including vegetation, trees, and roots from clearings will be removed and placed in upland areas for permanent disposal. New material sites also preferentially targeted upland areas.

2.4.4 Open Water Avoidance

Waterbody crossings would avoid WOUS impacts by using trenchless technology such as HDD and aerial-crossing structures. WOUS impacts would be avoided at seven waterbodies via trenchless technology such as the HDD method. Impacts on WOUS would be avoided at 24 new or existing bridges, including access roads. The pipeline would use aerial crossings at the Putuligayuk River near MP 3.1, the Nenana River near MP 530.9, Lynx Creek at MP 536.7, the Nenana River near MP 558.6, the Susitna River at MP 673.5, and Montana Creek at MP 680.7.

Where ponds are crossed in winter (e.g., the North Slope), construction will occur using an isolated open-cut method and will be treated similar to trenching through a winter stream. ASAP will have a 5-foot-wide temporary impact to the pond. Where ponds are crossed in summer, ASAP will bore under them, similar to a crossing of TAPS. These sort of borings are shorter, shallower, and simpler than HDD crossings and do not require the same sort of HDD entry or exit pads. Corrections have been made to the footprint so that all pond crossings are treated consistently.

2.4.5 Material Sites (Borrow)

Materials sites (borrow) investigations avoided impacts significantly throughout the design process. Pipeline and ancillary facility and access road refinements have reduced the amount of fill material required and, in turn, the number of related material sites and access roads needed. Along with reduced fill requirements, desktop data analysis and field studies further reduced the impacts of material site development on wetlands. Further refinements were made to the numbers of sites needed, siting to limit haul distances, avoiding impacts on wetlands and established waterbodies, avoiding groundwater where possible, and reducing the overall number of quarry sites versus borrow sites. Available wetlands delineation data were used to adjust the boundaries of planned material sites to avoid wetland impacts, reflect the true size of development footprints, and reduce the

footprints to what is needed. A critical part of this process was a 2-day workshop to review potential material sites and provide the design and environmental teams an opportunity to discuss and understand ways to improve the material locations.

The number of material sites required has been reduced significantly throughout the planning process. The design team initially identified 168 potential source sites, and has since reduced the number to 89 potential material source sites. Refinements are ongoing, and further reductions are possible. Material sites would occupy approximately 5,252 acres (1,763 acres of wetlands and 3,489 acres of uplands).

Using existing material source sites, expanding existing sites over developing new ones, and using existing roads for access are all preferred. New sites would avoid wetlands where practicable, and access roads associated with these sites would be routed to avoid hauling material over difficult wetland or riverine terrains. Proximity to alignment also would reduce access road length.

2.4.6 Access Roads

Access roads have been designed to avoid WOUS where possible. The access roads would be located based on several factors, including access road slopes, existing roads, and delineated and wetlands. The grades to the material sites and pipeline cannot exceed 6 percent for any sustained period. After accounting for grade, the roadway design team used the ArcReader system to avoid high-value wetlands as much as possible. Then through the wetlands-viewing platform, field studies, and numerous revisions, access roads were refined to reduce the number, widths, and fill depths of access roads. Access roads were eliminated by identifying and removing duplicate roads, using only those access roads required, changing access road spacing along the mainline from 5 to 10 miles, reviewing each access road for need, and reviewing width and locations of all existing roads in the corridor. Table 4 shows the reduction in roadway length and number from an earlier version of the project considered (v6, December 2013) and the current version of the Project (v6.1, February 2015).

Table 4. Reduction in Length and Number of Access Roads from v6.0 to v6.1

CATEGORY	TOTAL MILEAGE			NUMBER OF ROADS		
	v6.0	v6.1	CHANGE	v6.0	v6.1	CHANGE
New Roads	301.8	174.4	-127.4	397	298	-99
Temporary Ice Roads	22.6	22.9	+0.3	24	23	-1

2.4.7 Collocation of Facilities

Several facilities will be collocated to further avoid impacts to wetlands. For instance, camps and pipe storage yards will be collocated at times to reduce the number of access roads required and associated disturbance.

2.5 ADDITIONAL MINIMIZATION

In some areas, project impacts to wetlands will be temporary, minimizing impacts to wetlands. Temporary impacts will not require compensatory mitigation as there will be no long-term impacts to wetlands in these areas. Clearing or trenching may be considered temporary impact if the degraded wetland plant community is able to revegetate promptly after construction and hydrologic function is not impacted, or if it returns. For instance, streams impacted by the Project will be temporary in nature.

Wetland crossings with soft sub-soils completed during the summer may be constructed using a push-pull technique, which requires excavation of the ditch from temporary mats (typically wood mats with approximate dimensions of 20 ft x 4 ft by 12 inches). Heavy equipment working on mats may use low ground-bearing equipment to reduce the wetland vegetation and soil disturbance. Ditch spoil can be placed on either side of the ditch on the mats because the pipeline will be strung and welded outside the wetland, and the pipe string will be pushed and pulled into place. Backfill of the pipeline is accomplished in a similar manner using excavators on mats. Placement of clean mats for construction access through a wetland is a protective measure that may be used in some areas and will not result in wetland degradation. In some areas, excavated material temporarily side-cast into wetlands will be underlain with geotextile, ice pads, or similar material to allow removal to the maximum extent practicable with the least damage to the underlying wetland vegetation.

2.5.1 Temporary Facilities

Temporary workspaces (TWs) and false rights-of-way (ROWs) would be used during construction to minimize impacts to wetlands. These facilities would accommodate activities such as walking, laying down materials, clearing vegetation above the root, and use of vehicles with low-pressure tires or tracks to minimize permanent impacts through wetlands through only a temporary (short-term) impact without the need for fill.

2.5.2 Revegetation

The ASAP Project design will incorporate revegetation procedures to be implemented immediately after construction to stabilize areas and prevent erosion, as well as to help regain partial hydrologic functions. The Alaska Department of Natural Resources - Plant Materials Center (ADNR - PMC) has worked with AGDC to produce a revegetation plan based around the different ecoregions of the Project. Specific procedures and recommended seed types and seed mixes are provided in this plan, attached to the ASAP EED (AGDC 2016).

Revegetation of impacted sites will begin as soon as onsite conditions allow, and in the same growing season as the disturbance unless conditions warrant additional time. The landowner, through the right-of-way agreements, will stipulate the approved method of revegetation and restoration upon project completion.

2.6 WATER CROSSINGS AND WATER MANAGEMENT

Identifying crossing modes for streams and waterbodies intercepted by the ASAP mainline and access roads has been a critical component of minimizing impacts. A major hydrologic design process was conducted to avoid and minimize crossing impacts and it consisted of field surveys, stream classification/characterization, a fish and wildlife habitat sensitivity analysis, and design of crossing techniques to minimize impacts.

All stream open cut or isolated open cut stream crossings would result in only a temporary impact to WOUS, with no permanent impacts expected. The Project would cross 245 waterbodies by isolated open-cut crossing methods (i.e., dam and pump or flume crossings) and 170 (includes multiple crossings of a waterbody) by open-cut methods. All workpads would be placed at least 50 ft from WOUS and waterbodies and within the temporary construction easement. No drilling materials would be sidecast into a WOUS. Streambank revegetation techniques will be defined for the stream cross cuts to help reduce erosion and to provide for restoration success. Revegetation techniques for streambanks are included in *Streambank Revegetation and Protection: A Guide for Alaska* (ADF&G 2005). Natural drainage patterns will be maintained using appropriate ditching, culverts, and other measures to prevent ponding or drying. Pipeline installation in wetlands will include measures to eliminate the potential for water flow within the trench (e.g., ditch plugs). All culverts in fish-bearing waters must be installed in accordance with a valid Alaska Department of Fish & Game Fish Habitat permit. Best Management Practices would be consulted to specify the proper use of culverts for surface flow.

Fish and wildlife habitat sensitivity analysis was conducted following 2014 data collection efforts. Field data were spatially analyzed in GIS and overlain upon various spatial data sets, including National Wetlands Inventory (NWI), Anadromous Waters Catalog, Alaska Freshwater Fish Inventory, National Hydrography Database (NHD), and aerial imagery. This effort generated detailed recommendations identifying the LEDPAs to current engineering plans. Where feasible, alignment route alternatives were identified where certain waterway crossings could be avoided entirely. In situations where complete avoidance was not possible or feasible, proximal crossing locations were identified where environmental impacts associated with in-stream construction efforts would be minimized. Where the alignment could not be adjusted, optimal construction seasons and modes to minimize impacts were identified. Table 5 lists some of the efforts associated with fish and aquatic habitat impact avoidance and minimization.

Table 5. Fish and Wildlife Avoidance and Minimization Measures

DATE	ACTION	DOCUMENT	ACTION FOCUS	PARTICIPANTS
Access Roads				
6/23/2014 –8/17/2014; 7/20/15 – 8/4/15	Field work	N/A	Collect data and analyze opportunities for avoidance and minimization.	Biologist/Engineer
8/17/2014 –10/01/2014; 8/4/15 – 10/1/2015	Data Analysis	N/A	Analyze field data using GIS to identify additional opportunities for avoidance and minimization.	Biologist
10/1/2014; 10/1/2015	Study report submitted to engineers	Access Roads Fish Habitat Study Report	Provide avoidance and minimization recommendations to engineers for review.	Biologist/Engineer
10/07/2014 – 10/15/2014; 10/07/15 – 10/15/2015	Avoidance and minimization discussion	N/A	Collaboratively identify locations where recommended adjustments to alignments and construction plans were feasible.	Biologist/Engineer
Pipeline Crossings				
7/15/2014 –8/17/2014; 7/12/2015 – 7/27/2015	Fieldwork	N/A	Collect data and analyze opportunities for avoidance and minimization.	Biologist/Engineer
8/17/2014 –12/01/2014; 7/27/2015 – 12/01/15	Data Analysis	N/A	Analyze field data using GIS to identify additional opportunities for avoidance and minimization.	Biologist
12/8/2014; 12/8/15	Study report submitted to engineers	Pipeline Crossings Fish Habitat Study Report	Provide avoidance and minimization recommendations to engineers for review.	Biologist/Engineer
12/08/2014 – 12/22/2014; 12/08/15 – 12/22/15	Alignment Discussion	N/A	Collaboratively identify locations where recommended alignment adjustments were feasible.	Biologist/Engineer
01/10/2015 –1/30/2015; 01/10/2016 – 1/30/2015	Mode Determination Table creation	Mode Determination Table	Provide mode and timing recommendations and assess feasibility.	Biologist/Engineer

A procedural method was developed in support of preliminary stream crossing mode determinations and is documented in a Pipeline Stream Crossing Construction Mode Determination Manual. This manual determines procedures to identify the design and construction complexity and potential for environmental or pipeline integrity impacts; it also identifies the environmentally preferred crossing mode for each stream classification and crossing modes that avoid and minimize impacts on aquatic resources. A pipeline crossing mode matrix (ASAP Pipeline Stream Crossing Mode Determination Decision Tree) was developed to aid in the selection of modes avoiding or minimizing impacts at stream crossings.

A Streambank Restoration Manual was developed by the Project to minimize the long-term impacts on waterbodies and their adjacent riparian zones crossed by the ASAP Mainline (AGDC 2015d,e). In addition site-specific stream crossing analyses and reports were developed to provide guidance for the design, construction, installation, maintenance, inspection, and performance evaluation of bank armoring and river training structures proposed for select stream crossings associated with the ASAP Mainline (AGDC 2015d,e). The manual proposes bank armoring protection methods intended to protect the existing streambanks and minimize impacts on their associated waters.

For all pipeline stream crossings, AGDC will continue its comprehensive permit strategy to avoid and minimize fill and armor below ordinary high water. The final streambank restoration plan for each stream will be contingent on the streambed and stream bank composition, stream velocity, stream depth, and the crossing mode for each site. AGDC will investigate the use of bioengineered bank restoration and stabilization to include tree revetments, root wads, coir rolls, and coir mat lifts as appropriate and practicable.

3. DETERMINATION OF SUBSTANTIVE WATERSHED IMPACTS

Urbanization and development are known to have a substantive impact on aquatic resources and functions once approximately 10 percent of land in a watershed is urbanized. Urbanization can begin to influence some biological parameters in watersheds when between 5 – 10 percent of land is impacted (see section 1.2, above). AGDC chose to use 7.5 percent of the aggregate existing land disturbance and new project wetlands disturbance as a watershed threshold to determine where statistically significant impacts to water resources and functions could potentially occur.

3.1 ESTIMATING ANTHORPOGENIC DISTURBANCE IN THE WATERSHED

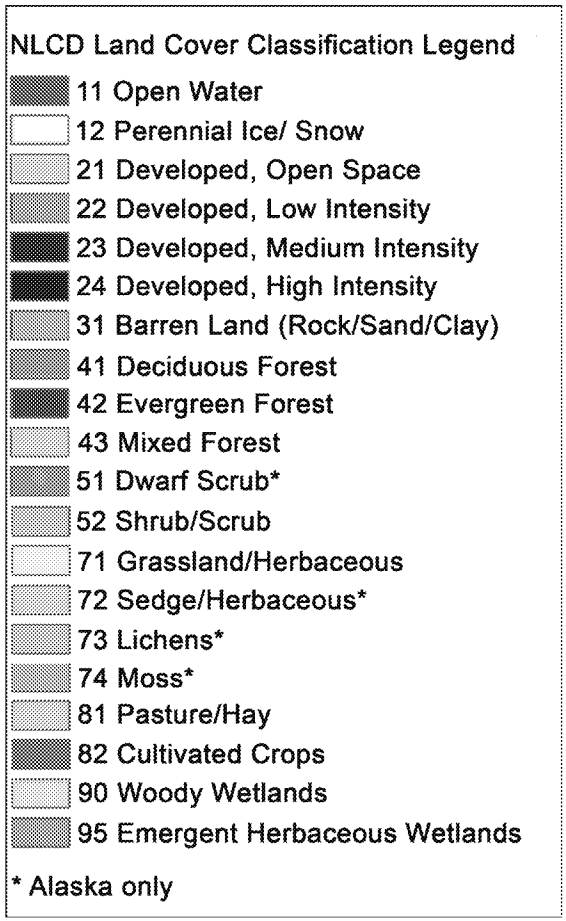
3.1.1 National Land Cover Database

The National Land Cover Database (NLCD 2011) for Alaska is the most recent land cover classification product created by the Multi-Resolution Land Characteristics (MRLC) Consortium. Using satellite sensors to detect land cover information over large areas, the NLCD consistently classifies land cover descriptions into 16 common categories at a spatial resolution of 30 square meters (Figure 3). The NLCD is a reliable dataset that has been used to define areas and categories of urbanization, including impervious surfaces, aquatic resources, and other spatial landscape-scale data (Hilderbrand et al. 2010; Utz et al. 2009). It has also been used by USACE to develop the ASAP Environmental Impact Statement (EIS) to describe the affected environment and environmental consequences associated with the ASAP Project (USACE 2012).

AGDC used the NLCD as a tool to assess whether anthropogenic land cover disturbances have reached the threshold of what is known to significantly impact aquatic functions or resources of the watershed. The ASAP Project footprint crosses 60 different 10-digit (HUC10) areas. The 10-digit HUC was recommended by the USACE Alaska District office of special projects. These 60 HUCs comprise over 12 million acres of wetland and upland.

Specific NLCD classifications were used as an indicator of anthropogenic disturbance (Figure 3). The classification codes for urban or rural development (Developed) and agricultural activity (Planted/Cultivated) indicate human-caused disturbances (Figures 4-7). A third classification (Barren) also contains some elements of anthropogenic disturbance, such as material sources or mining projects, but the vast majority of barren lands are naturally occurring, such as non-vegetated mountain tops or bare gravel bars along braided rivers (Figure 3, Figure 7). A limitation of the sensor is that it does not allow for human-impacted barren areas to be discriminated automatically in GIS. Therefore, a method that would account for the maximum possible anthropogenic disturbance within the NLCD's barren category was developed and validated (see section 3.12 and Appendix A). The result of this applied GIS method was a conservative overestimate of existing anthropogenic impacts within each HUC.

Figure 3. NLCD Land Cover Classifications



Class/Value	Classification Description
Water	
11	Open Water- areas of open water, generally with less than 25% cover of vegetation or soil.
12	Perennial Ice/Snow- areas characterized by a perennial cover of ice and/or snow, generally greater than 25% of total cover.
Developed	
21	Developed, Open Space- areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20% of total cover. These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.
22	Developed, Low Intensity- areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% percent of total cover. These areas most commonly include single-family housing units.
23	Developed, Medium Intensity - areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50% to 79% of the total cover. These areas most commonly include single-family housing units.
24	Developed High Intensity- highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80% to 100% of the total cover.
Barren	
31	Barren Land (Rock/Sand/Clay)- areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 15% of total cover.
Forest	
41	Deciduous Forest- areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species shed foliage simultaneously in response to seasonal change.
42	Evergreen Forest- areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species maintain their leaves all year. Canopy is never without green foliage.
43	Mixed Forest- areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75% of total tree cover.
Shrubland	
51	Dwarf Scrub- Alaska only areas dominated by shrubs less than 20 centimeters tall with shrub canopy typically greater than 20% of total vegetation. This type is often co-associated with grasses, sedges, herbs, and non-vascular vegetation.
52	Shrub/Scrub- areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional stage or trees stunted from environmental conditions.
Herbaceous	
71	Grassland/Herbaceous- areas dominated by gramanoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing.
72	Sedge/Herbaceous- Alaska only areas dominated by sedges and forbs, generally greater than 80% of total vegetation. This type can occur with significant other grasses or other grass like plants, and includes sedge tundra, and sedge tussock tundra.
73	Lichens- Alaska only areas dominated by fruticose or foliose lichens generally greater than 80% of total vegetation.
74	Moss- Alaska only areas dominated by mosses, generally greater than 80% of total vegetation.
Planted/Cultivated	
81	Pasture/Hay- areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20% of total vegetation.
82	Cultivated Crops - areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20% of total vegetation. This class also includes all land being actively
Wetlands	
90	Woody Wetlands- areas where forest or shrubland vegetation accounts for greater than 20% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.
95	Emergent Herbaceous Wetlands- Areas where perennial herbaceous vegetation accounts for greater than 80% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.

Figure 4. Fairbanks

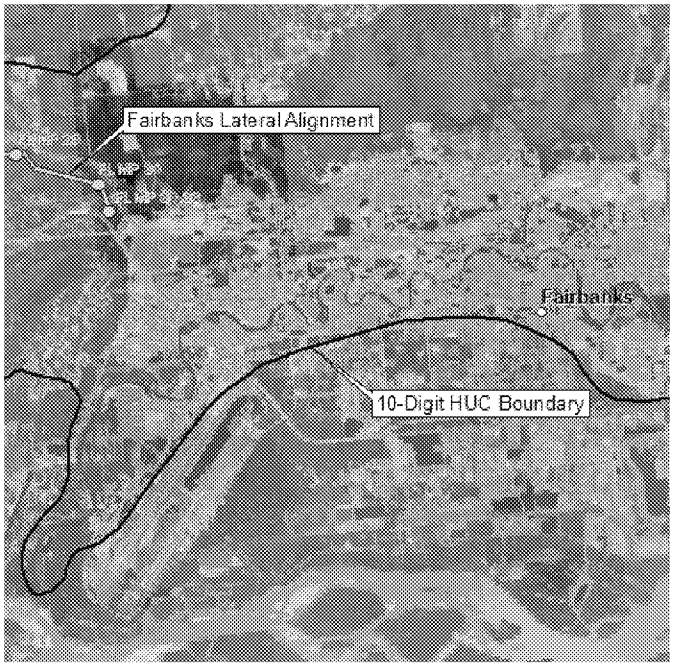


Figure 5. Rural Disturbance

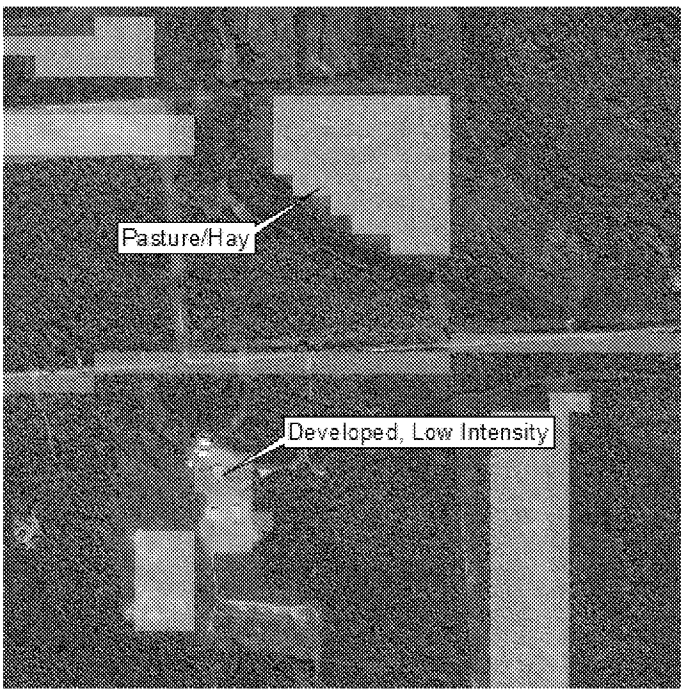


Figure 6. Urban Disturbance

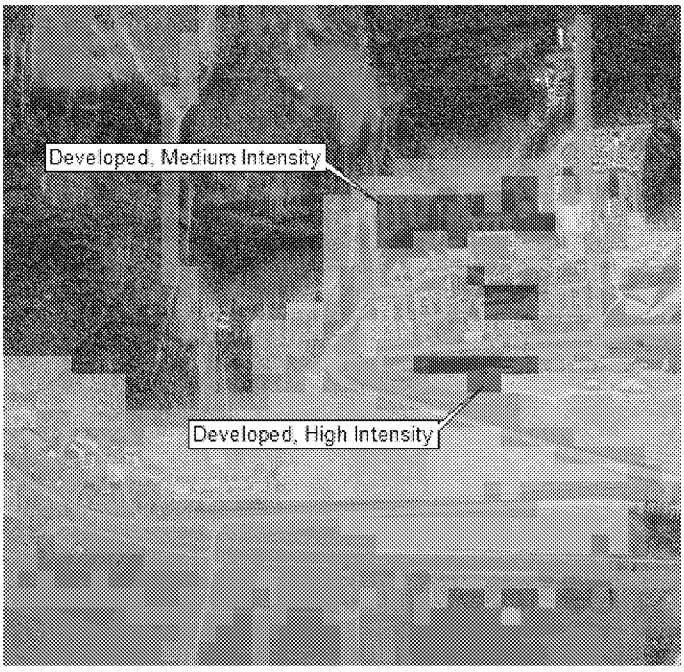
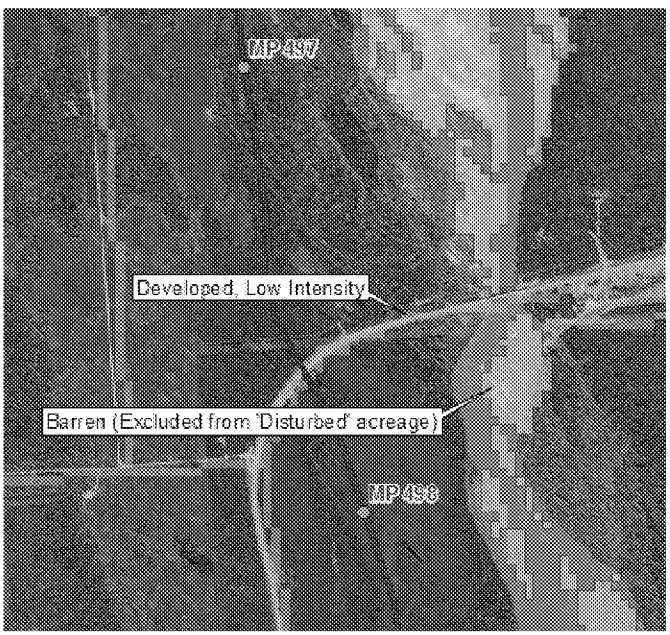


Figure 7. Excluded Barren



3.1.2 Accounting for Anthropogenic Disturbance in the Barren Classification of the NLCD

In many cases, barren land delineated by the NLCD represents natural features, such as bare gravel in streambeds and non-vegetated mountain tops. However, sensors also classify certain human-disturbed areas, such as gravel pits and mining areas, as barren land. The process of teasing the fewer disturbed barren areas from the much larger number of naturally occurring barren areas requires either a manual delineation of barren land in each area, or a method of identifying, validating, and applying the maximum possible percent increase in disturbed lands attributable to anthropogenic barren classified lands within a watershed. The latter was used to capture the maximum possible increase in human-disturbed lands associated with the NLCD's barren land classification (Appendix A), which resulted in a conservative overestimate of disturbed lands for most HUCs.

Details of the analysis are provided in Appendix A. Briefly, results from the validation (Appendix A) showed that anthropogenic disturbances within the barren NLCD GIS layer could result in as much as a 100 percent increase in total anthropogenic disturbance for a HUC-10 region. A multiplier for maximum possible additional Barren disturbance was applied to the auto-derived disturbances associated with Developed and Planted/Cultivated classifications to account for up to a 100 percent increase. This aggregate value describing the sum of the maximum possible existing human-disturbed acreage and the project wetland impact acreage was calculated and termed the maximum disturbed value, or d-value (Appendix A). Where the d-value was determined to be less than the established threshold of 7.5 percent, no mitigation would be proposed because the project would not produce a substantive impact to aquatic resources or functions in those HUC-10 watersheds.

3.1.3 Results

Three of the sixty HUC-10 watersheds contained disturbances where the d-value exceeded the 7.5 percent threshold (Figures 8-10). These HUCs are in the areas of Fairbanks (HUC 1908030609, d = 43.5%; Figure 9), the Matanuska-Susitna Borough (MSB) (HUC 1902050512, d = 8.2%; Figure 10), and the Anchorage Bowl (HUC 1902040108, d = 25.19%; Figure 10). The Anchorage Bowl HUC is included because one material site stretches into this more highly-developed HUC boundary. However, upon review of the wetlands data, only uplands / previously disturbed lands are impacted by the project in the Anchorage Bowl HUC. Therefore, no mitigation would be required in that watershed and only two out of the 60 HUCs crossed by the relatively narrow pipeline corridor would produce wetland impacts where the aggregate value of existing anthropogenic disturbance and project wetlands disturbance (d) was greater than 7.5 percent.

The two 10-digit HUCs requiring mitigation for substantive, unavoidable impacts to wetlands associated with the ASAP Project contain the urban centers of Palmer-Wasilla and the city of Fairbanks (Figures 9 and 10) where substantive anthropogenic impacts to wetlands have occurred. The acreage of wetlands impacts from the ASAP Project that would require mitigation in these HUCs are 70.85 acres of wetlands (MSB - HUC 1902050512) and 34.12 acres of wetlands (Fairbanks - HUC 1908030609). Mitigation banks and ILF providers possess credits that can be purchased by AGDC to offset substantive unavoidable wetlands impacts to these watersheds.

Figure 8. Northern Ecoregion 10-digit HUC Code Areas

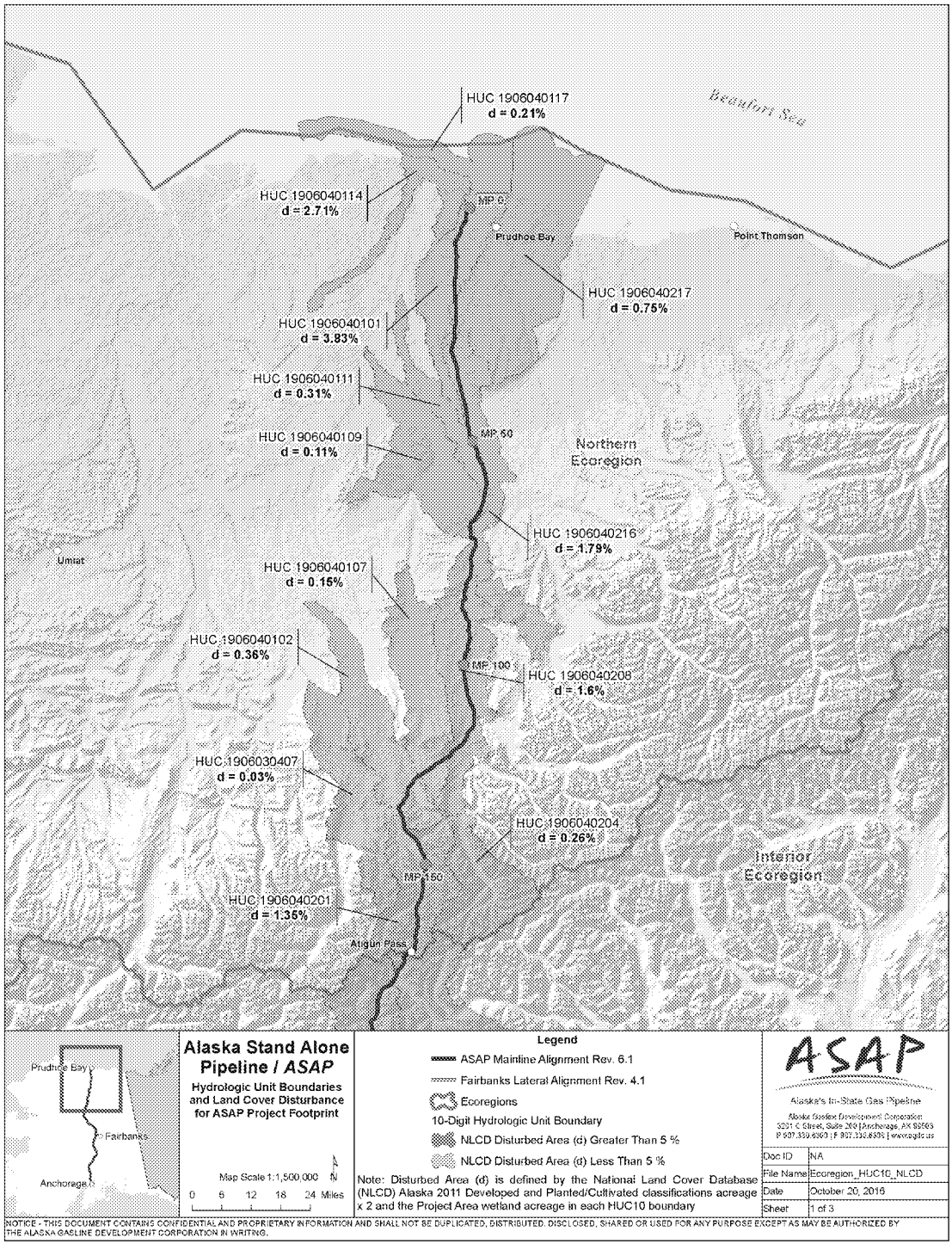


Figure 9. Interior Ecoregion 10-digit HUC Code Areas

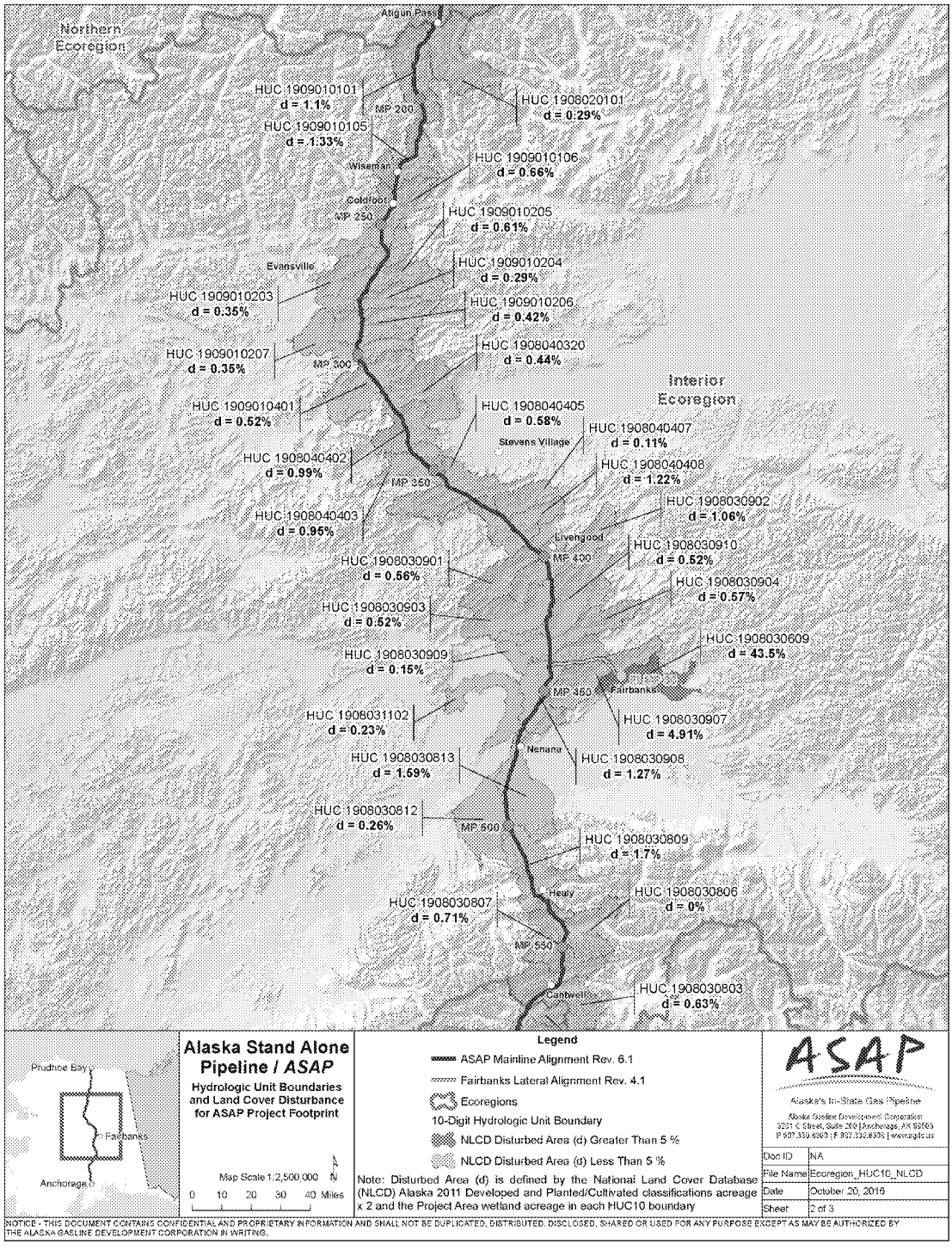
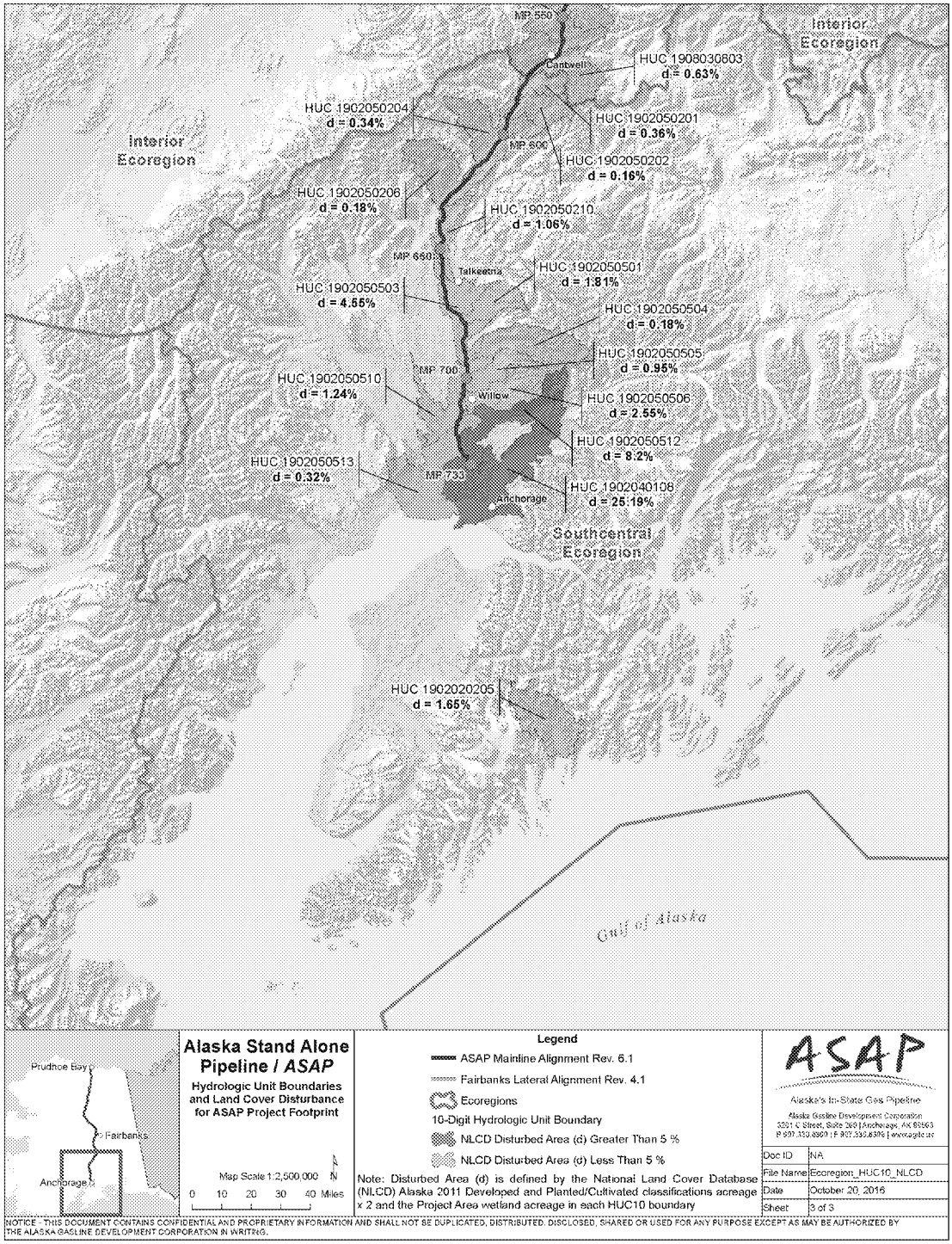


Figure 10. Southern Ecoregion 10-digit HUC Code Areas



The robust wetlands avoidance and minimization measures described in Section 2, above, have been applied to ASAP throughout project design, development, and refinement. The result is that the substantive impacts from the Project that will require compensatory mitigation are captured in two watersheds with notable anthropogenic land cover disturbance and impervious or compacted land surfaces.

There were no substantive watershed impacts to wetland resources or functions in the Northern Ecoregion (Figure 8), due to the avoidance and minimization measures implemented by the Project (Section 2) and due to the relative lack of urbanization in the area (Appendix A). Substantive impacts to wetlands occurred within watersheds in the Interior Ecoregion (34.12 acres) and the Southcentral Ecoregion (70.85 acres). A more detailed summary of these substantive impacts is provided by ecoregion, watershed, and hydrogeomorphic (HGM) classification, below (Table 6).

Table 6. Summary of Substantive Impacts (Acres) by HUC-10 Watershed

Ecoregion/ HUC10/ HGM Class	Acres of All Land Impacted	Acres of Wetland Impacted
Northern	**0.00**	**0.00**
Interior	**77.72**	**34.12**
HUC 1908030609	**77.72**	**34.12**
Depressional	*0.03*	*0.03*
Flat	*33.70*	*33.70*
Riverine	*0.39*	*0.39*
Upland	*43.60*	
Southcentral	**301.92**	**70.85**
HUC 1902040108	**22.58**	**0.00**
Upland	*22.58*	
HUC 1902050512	**279.34**	**70.85**
Depressional	*18.22*	*18.22*
Flat	*49.73*	*49.73*
Lacustrine Fringe	*0.13*	*0.13*
Open Water	*1.49*	*1.49*
Riverine	*1.28*	*1.28*
Upland	*208.49*	
Grand Total	**379.64**	**104.97**

Note: Substantive wetland impacts occur when the maximum disturbed value (d-value) of the HUC is > 7.5 percent (Figures 8-10), signifying where a statistically significant impact to aquatic resources and functions could occur and mitigation is needed.

4. SUMMARY OF AQUATIC SITE ASSESSMENT

The Aquatic Site Assessment (ASA) methodology developed by AGDC's wetlands consultants was presented to the Corps of Engineers in April 2014. At that time, AGDC received approval to move forward in performing the full assessment, which was delivered as an attachment to the ASAP EED (AGDC 2016). AGDC recognizes that while the ASA is suitable for use in PRM (which it is not proposing in this Compensatory Mitigation Plan), its methodology may not necessarily match the methodology for determining wetlands credits by a third party provider. Upon approval of this Compensatory Mitigation Plan, AGDC expects to revise its methodology for select areas to match that of the banks from which it expects to purchase credits.

The basis of the ASAP wetlands mitigation strategy stems from the methodology AGDC developed to determine wetland functions and services, along with the debits needed to compensate for unavoidable losses. The ASAP ASA (formerly termed Functional Assessment) is the product of multiple field sampling events and revisions to final wetlands mapping. The ASAP Project area spans three subregions of Alaska (Northern, Interior, Southcentral) from Prudhoe Bay to the ENSTAR tie-in near Big Lake. These three subregions were divided into the following six study areas to analyze data at a manageable spatial scale: Prudhoe Bay to Atigun Pass, Atigun Pass to Coldfoot, Coldfoot to Livengood, the Fairbanks Lateral, Livengood to Broad Pass, and Broad Pass to Wasilla.

To complete the functional assessment, all wetlands were classified by HGM classifications (depressional, slope, lacustrine fringe, flats, and riverine) according to the approach developed by Magee (1998), with technical contributions from G.G. Hollands. The Magee and Hollands approach (Magee 1998) was modified specifically for Alaska. The methodology was reviewed by the USACE at the beginning of the Project and in several reviews since that time. Each HGM class is anticipated to perform up to eight primary functions within the ecosystem: modify groundwater discharge, modify groundwater recharge, store storm- and floodwater, modify stream flow, modify water quality, export detritus, contribute to vegetation diversity, and contribute to fauna diversity.

To measure the presence and functional capacity of the eight individual functions listed above, a rapid field functional assessment data sheet was completed at each full data point (wetland) during the field delineation. The wetlands functional data were then incorporated into a model, based on the Magee and Hollands methodology (Magee 1988), which produces a Functional Capacity Index (FCI) score for each individual function. An FCI of 0.0 is assumed to indicate dysfunction or indicate that the wetland does not maintain a particular function. An FCI score of 1.00 indicates full function at the highest level possible. To estimate the overall functional capacity of an individual wetland, each of the eight FCI scores for each wetland can be averaged to generate an overall FCI for a particular wetland. This overall FCI score can then be multiplied by acreage to determine a calculation of wetland debit.

Because of the scale of the ASAP Project footprint and the relative remoteness of many of the wetlands, collecting field data for every wetland polygon was not practicable. Each HGM class across each subregion was expected to possess similar characteristics and perform functions mirroring those documented at the representative field collection points. Therefore, averaged FCI scores for each HGM class per subregion were averaged to produce final FCI scores for the subregion's HGM as a whole. To follow guidance provided by the USACE Alaska District, all open water habitats (ponds/lakes) and riverine systems were automatically assigned an FCI score of 1.00 (fully functioning at a high level). The final FCI scores were assigned to each similar HGM in the subregion. This approach allowed AGDC to effectively qualify wetlands functions across the entire Project area in a manner that was considered practicable given cost and time considerations.

To address Project impacts, AGDC used the overall final FCI scores to assign each wetland to a hierarchal system (Category I, II, III, or IV) that would allow AGDC to quantify Project debits. Any permittee-responsible restoration, enhancement, and/or creation credits would be calculated in a similar manner during mitigation design, and would be presented in a final mitigation plan prior to permit authorization.

- Category I - Highest functioning (includes Category I^+)
- Category II - Moderate to high functioning
- Category III - Moderate to low functioning (do not exist in Project area)
- Category IV - Degraded and low functioning (do not exist in Project area)

Very high quality wetlands were given a special designation of Category I^+ wetlands to indicate a highest value wetland (e.g., open water areas, wetlands containing endangered species) over Category I not as highly valued but still meeting the FCI scoring criteria for Category I. The Project Footprint overlaps wetland areas assigned as Category I^+/I, and Category II wetlands. No Category III or IV wetlands exist in the Project area.

The ASAP Aquatic Site Assessment assigned initial wetland function categories based on wetlands FCI scores (Table 7).

Table 7. Overall Final FCI Score and Category Relationship

FCI	CATEGORY
0.76 - 1.00	I
0.51 - 0.75	II
0.26 - 0.50	III
0 - 0.25	IV

Note: Category I includes I^+ wetlands

Additionally, all wetlands within 300 ft of an anadromous stream were elevated by one category to account for the additional riparian benefit they provide to anadromous streams. An example of this elevated ranking is identified in Table 8.

Table 8. Anadromous Buffer Determination

FCI SCORE	CATEGORY	IN ANADROMOUS BUFFER?	FINAL CATEGORY
0.51	II	Yes	I
0.51	II	No	II

To convert the impacted acreage of each wetland to a debit, AGDC multiplied the overall final FCI score and impacted wetland acreage, resulting in a debit that is correlated to the effective function of the impacted area. Table 9 presents an example calculation.

Table 9. Example Debit Calculation

IMPACT ACREAGE	FCI SCORE	DEBIT
10	0.50	5.0
10	0.78	7.8

5. WETLANDS DEBIT CALCULATION METHODOLOGY

As noted in Section 4, above, AGDC recognizes that its wetland debit methodology may not necessarily match the methodology of a third party provider to assess available credits. Upon approval of this Compensatory Mitigation Plan, however, AGDC expects to revise its methodology for select areas to match that of the banks from which it expects to purchase credits.

5.1 PARAMETERS FOR WETLANDS DEBIT ANALYSIS

The wetlands debit / credit analysis will use the following parameters to calculate debits: Debit Year, Ecoregion, and 10-Digit HUC code. For additional context as to particular wetland types associated with debits, the HMG classification can be provided upon request. However, the HGM classification is not used in the final tabulations of debits and offsetting credits.

5.1.1 Debit Year

The debit year and the corresponding season of impact were included in the wetlands debit analysis to establish a chronological process by which debits will be tabulated and offset by available credits for each ecoregion and HUC.

5.1.2 Ecoregion

The Northern Ecoregion was subdivided into 3 subregions at the request of the USACE for the purposes of wetlands debit / credit analysis: Arctic Coastal Plain (contains GCF area), Arctic Foothills, and Brooks Range. The Interior and Southcentral Ecoregions were not subdivided. The analysis of wetland debits by ecoregion will allow offsetting credits to be applied in that same ecoregion. This is particularly helpful in planning efforts of ILF providers with statewide coverage that intend to compartmentalize mitigation efforts into broader regions for better management.

5.1.3 10-digit HUC Code

HUC codes are assigned nationally to areas to describe the hydrogeographic flow of water. The HUC codes exist and can be displayed at scales ranging from broad to narrow. The greater the number of digits in the HUC code, the narrower the scale of the HUC as a geographic unit. The USACE has requested the use of 10-digit HUC codes for determination of compensatory mitigation needs.

Sixty 10-digit HUC code areas exists within the Project Footprint over three ecoregions:

- 13 in the Northern Ecoregion (Figure 8).
- 32 in the Interior Ecoregion (Figure 9).

- 15 in the Southcentral Ecoregion (Figure 10).

The analysis of wetland debits by HUC code will allow offsetting credits to be applied to wetlands in that same HUC code.

5.1.4 HGM Classification

The HGM classifications for wetlands provide context for which debits in each ecoregion are associated with wetlands types. The HGM classifications that can be provided upon request in the analysis are as follows: depressional, flat, lacustrine fringe, open water, riverine, slope. Data for upland areas also exists, but are typically not included in an analysis because they are not jurisdictional wetlands areas.

5.2 SUMMARY OF PROJECT WETLAND DEBITS

Project wetland debits were calculated using impacted acreages and FCI scores for HUCs in which the d-value was determined to be greater than 7.5 percent. A summary of wetland debits by HGM classification within each ecoregion and HUC-10 watershed is provided in Table 9. Total wetland debits were calculated as 0 for the Northern Ecoregion, 26.70 for the Interior Ecoregion, and 54.08 for the Southcentral Ecoregion.

Table 10. Summary of Wetland Debits by HUC-10 Watershed (AGDC Methodology)

Ecoregion/HUC10/HGM Class	Wetland Debits (AGDC ASA Scoring)
Northern	**0.00**
Interior	**26.70**
HUC 1908030609	**26.70**
Depressional	*0.02*
Flat	*26.29*
Riverine	*0.39*
Upland	*0.00*
Southcentral	**54.08**
HUC 1902040108	**0.00**
Upland	*0.00*
HUC 1902050512	**54.08**
Depressional	*14.40*
Flat	*36.80*
Lacustrine Fringe	*0.13*
Open Water	*1.49*
Riverine	*1.28*
Upland	*0.00*
Grand Total	**80.78**

6. MITIGATION OPTIONS AVAILABLE

6.1 MITIGATION BANKS (SELECTED)

Mitigation banks were selected as the preferred third party entity for applying compensatory mitigation in this plan. Banks sell credits to permittees to provide compensatory mitigation for impacts authorized by Department of the Army (DA) permits. Mitigation banks typically consist of large restoration or preservation projects that provide compensatory mitigation for a number of activities (33 CFR Parts 325 and 332; 40 CFR Part 230). There is a preference for the use of banks over other forms of mitigation because the mitigation is already accounted for in the bank. Mitigation banks are usually operated for profit by private entities and are governed by an approved instrument. When a permittee's compensatory mitigation requirements are satisfied by a mitigation bank, responsibility for ensuring that required compensation is completed and successfully shifts from the permittee to that bank (33 CFR Parts 325 and 332; 40 CFR Part 230).

Currently, there are three approved wetland mitigation banks with service areas that coincide with portions of the ASAP Project Footprint where wetland impacts occur: Pioneer Reserve (Lower Susitna River Watershed, MSB), Su Knik Bank (Lower Susitna River Watershed and a small subunit of the Southcentral Alaska region subwatershed, MSB), and Tanana Watershed Mitigation Bank (Fairbanks / Interior region). As credits from these banks may be used to offset ASAP Project debits, AGDC has reached out to these banks to determine whether sufficient credits are available to offset impacts. Preliminary discussions indicate that sufficient credits are available through these banks to meet the needs described in this plan. Therefore, upon approval of this plan by the Corps of Engineers, AGDC will move forward to secure these credits.

AGDC recognizes that banks use differing methodologies to determine their credit values. AGDC will match the methodology of the banks in their service areas where the Project wetland debits must be offset by mitigation bank credits.

6.2 ILF PROVIDERS (NOT SELECTED)

ILF providers were considered by AGDC, but were not selected for inclusion in this Compensatory Mitigation Plan because existing mitigation banks currently possess sufficient credits for watersheds where AGDC will offset substantive unavoidable wetlands impacts.

Mitigation through an ILF provider occurs when a permittee directs funds to an ILF sponsor that in return, sells compensatory mitigation credits. The federal government has acknowledged that ILF programs are important sources of compensatory mitigation because they can provide consol-

idated compensatory mitigation projects that have greater ecological benefits than small, geographically separated, permittee-responsible mitigation, they provide important ecological and sociological benefits by focusing primarily on the watershed needs, and they can site multiple compensatory mitigation projects in strategic locations in a watershed (CFR 33 Parts 325 and 322; 40 CFR 230).

It is recognized that ILF programs are usually not able to capitalize compensatory mitigation projects up-front. Instead, they must collect funds from permittees before they can secure a suitable site and develop and implement a compensatory mitigation project. For this reason, ILF programs, but not banks, are allowed to sell advance credits (although in the lower 48, some banks have been allowed to sell advance credits while enhancement or restoration work is on-going). Unless an ILF program has a surplus of credits available in a service area, the compensatory mitigation will take place after the permitted impacts have occurred. To help ensure that the collected funds are used in a timely manner to initiate compensatory mitigation projects, the federal government established a time limit of three growing seasons for fulfillment of advance credits (332.8(n)(4); 230.90(n)(4)) and required ILF programs to establish accounts to retain the collected funds. Those funds can only be used for the selection, design, acquisition, implementation and management of ILF projects with a small percentage allowed for administrative costs. However, both banks and ILF programs are held to the same mitigation and procedural requirements, including plan approval, performance standards, monitoring, adaptive management, and long-term stewardship.

The activities of restoration, establishment, enhancement, or preservation of aquatic resources become the responsibility of the ILF sponsor once credits are purchased. When a permittee's compensatory mitigation requirements are satisfied by an ILF program, responsibility for ensuring that required compensation is completed and successfully shifts from the permittee to the ILF sponsor (33 CFR Parts 325 and 332; 40 CFR Part 230).

ILF programs function by designating funds for activities, such as land preservation, conservation, restoration, or education. These activities are often developed in coordination with projects that impact adjacent lands and that require a purchase of credits to offset wetland debits. These debits are calculated through the use of a given methodology in an ASA (formerly 'Functional Assessment'). It has been common for ILF providers to use the ASA methodology in deriving credits that projects have also used to derive debits, thereby allowing for similar methodologies to be applied.

ILF programs are generally administered by state governments, local governments, and non-profit / non-governmental organizations. In Alaska, three approved ILF sponsors exist: The Conservation Fund (TCF) (serves the entire state), Great Land Trust (serves the Municipality of Anchorage), and Southeast Alaska Land Trust (SEAL Trust) (serves Southeast Alaska). TCF is the only ILF program with an approved instrument covering the entire state of Alaska. Great Land Trust and SEAL Trust are outside of the Project Service area, and would not be utilized for the Project. A fourth potential ILF sponsor that has not yet been approved is that of the State of Alaska (SOA) ADNR. An approved SOA instrument could potentially also cover the entire state.

6.2.1 The Conservation Fund

TCF currently operates in five distinct geographic service areas (Arctic, Interior, Southcentral, Southeast, and Southwest). When combined, these service areas cover the entire jurisdictional area of the USACE's Alaska District. Advanced credits are supplied by USACE to the sponsor, and the sponsor is then responsible for all operational and reporting requirements.

TCF is currently limiting the availability of credits and may not provide any for certain portions of their service area. AGDC anticipates that it will be able to purchase some credits from TCF. The TCF has previously used the Cowardin Classification - Acres approach around the state for various projects, as well as AKWAM in the Interior for Alaska Department of Transportation and Public Facilities (ADOT&PF) projects.

6.2.2 The Proposed State of Alaska ILF Program

The SOA ADNR is proposing a state-run ILF program that could be utilized by the ASAP Project. The program is in development. Currently the USACE is doing an informal review of the State's draft prospectus. Following receipt of comments, the ADNR expects to resubmit a revised version for a more formal review by the USACE and an interagency review team. Any mitigation identified on State of Alaska lands by this program would need to undergo a thorough internal review to assure that any restriction of rights of lands is in the best interest of the State and not encumbering any existing rights for adjacent or nearby land owners or users.

6.3 PERMITTEE RESPONSIBLE MITIGATION (PRM) (NOT SELECTED)

PRM was considered by AGDC, but was not selected for inclusion in this Compensatory Mitigation Plan because existing mitigation banks currently possess sufficient credits for watersheds where AGDC must offset substantive unavoidable wetlands impacts.

Permittee PRM includes the restoration, establishment, enhancement or preservation of wetlands undertaken by a permittee to compensate for wetland impacts resulting from a specific project. The permittee performs the mitigation after the permit is issued and is ultimately responsible for the implementation and success of mitigation. With PRM, the permittee maintains liability for the construction and long-term success of the site. PRM is to be managed under a watershed approach; the goal is to improve the quality and quantity of aquatic resources within the impacted watershed through the selection of compensatory mitigation sites and projects.

The Mitigation Rule identifies three types of PRM Projects in USACE preference:

1.) On-site and in-kind - PRM projects are managed in the same watershed, and within the same wetland habitat types.

2.) Off-site and in-kind - PRM projects are managed in a different watershed, with the same wetland habitat types.

3.) Off-site and out-of-kind - PRM projects are not located in the same watershed, and are out-of-kind habitat replacement. This third option is the least desirable option to USACE. The restoration or enhancement work is completed outside of the impact site and is not replacing in-kind impact habitat.

Each PRM project follows the requirements of the Mitigation Rule. They are individual developments standing on their own merits. The permittee provides detail-driven plans, and assures credits can be constructed at the site. USACE monitors for a minimum of five years to make sure the sites are performing as planned. The permittee retains the full responsibility for the protection and management of the PRM site (33 CFR 332.4(c)(2-14) with a long-term protection instrument that must be managed into perpetuity.

While PRM can be used in Alaska, it is often impracticable to restore wetlands as many of the locations are remote and have short growing seasons. This is especially true on the North Slope because it is a highly seasonal environment with a short growing season where terrain is dominated by permafrost-driven wetlands. In forested wetlands to the south, there are equally remote areas where it can still take many decades or even centuries to restore trees due to highly seasonal environments and short growing seasons. In many cases, PRM in Alaska may require staging or mobilizing equipment in remote areas over multiple seasons, possibly for several decades. Additionally, PRM may not be the most appropriate method based on the size of watershed and resources available there.

There are other regulatory challenges that could also limit use of PRM on the ASAP Project. For instance, the Alaska State Constitution contains provisions that could prohibit perpetual protection instruments. Other challenges could be that certain types of PRM fall under a compliance requirement (e.g., restoration or removal of existing culverts) and therefore can't be used for mitigation because they wouldn't contribute to a net gain. Several of these factors support the preference hierarchy established under the 2008 Mitigation Rule, which prefers the use of approved mitigation banks and ILF providers over PRM.

7. CONCLUSIONS

The ASAP Project is designed as a long, linear natural gas pipeline that will provide gas to Alaskan residents, businesses and other entities in the state. The Project will transect 60 HUC-10 watersheds in Alaska's Northern, Interior and Southcentral ecosystems. A narrow corridor and several off-ROW facilities are required for construction and operation of the pipeline, but will result in new unavoidable wetland impacts.

AGDC has implemented measures to avoid and minimize impacts to wetlands where practicable. Avoidance of open water areas and higher value wetlands were a priority, often through winter construction and routing the pipeline into upland areas. Minimization of wetlands impacts occurred by selectively routing the pipeline through areas in which fewer wetlands and lower value wetlands occurred. In some areas, minimization also occurred through the use of construction methods that would only have temporary impacts. Following wetland avoidance and minimization, remaining impacts will be offset through compensatory mitigation. AGDC has structured its compensatory mitigation using a watershed approach, applying appropriate and practicable mitigation to unavoidable project impacts.

Aquatic resources and functions of watersheds can be negatively impacted by development. Impacts associated with urbanization are substantive, or statistically significant, when approximately 10 percent of land cover in a watershed is developed and converted to impervious surfaces, compacted surfaces, agricultural land, barren land, or other type of land. Different types of anthropogenic land cover changes have been measured reliably for over 15 years using aerial photography, computer sensors, and GIS software and have been made publicly available for use through the NLCD. AGDC used the NLCD and its own GIS database to determine which HUC-10 watersheds have been substantively impacted by development and would be substantively impacted by the ASAP Project. It then measured its wetlands impacts in those HUC-10 watersheds to help structure appropriate and practicable mitigation for the substantive, unavoidable impacts of the Project.

The ASAP Project will not generate substantive impacts to watersheds in the Northern Ecoregion, but will generate substantive wetlands impacts to watersheds in the Interior Ecoregion (34.12 acres) and the Southcentral Ecoregion (70.85 acres). Using an FCI scoring methodology developed by its wetlands consultants, AGDC calculated its total wetland debits as 26.70 for the Interior Ecoregion and 54.08 for the Southcentral Ecoregion. However, AGDC recognizes the need to match its methodology to that of a third party provider. AGDC has preliminary confirmation that sufficient credits exist from banks in service areas where the Project must offset substantive unavoidable impacts to wetlands. AGDC intends to match the methodology of these providers and purchase the credits required to offset the substantive unavoidable impacts to wetlands in these watersheds.

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APPENDIX A

DATA VALIDATION AND ANALYSIS FOR EXISTING ANTHROPOGENIC DISTURBANCES AND PROJECT WETLANDS IMPACTS TO DERIVE A MAXIMUM DISTURBED VALUE (D-VALUE) FOR HUC-10 WATERSHEDS

Data Validation for Maximum Attributable Acreage of Anthropogenic Disturbance for the Barren Classification of the NLCD

Manual delineation of visually-confirmed anthropogenic disturbances within the barren layer of the NLCD was performed for 4 out of the 60 HUCs. One of the four HUC-10 watersheds that was specifically targeted was the unit containing the Usibelli Coal Mine. This HUC-10 watershed is likely to represent the highest level of anthropogenic disturbance for barren-classified land on a total acreage basis and on a percentage of land basis due to the high level of mining activity contained within a comparatively smaller HUC-10 watershed. This would represent a maximum anthropogenic barren value of land. For each of the four HUCs, the acreages of the visually-identifiable anthropogenic barren disturbances were added to the other acreages calculated for classifications associated with disturbance (Developed and Planted/Cultivated lands).

Results from the validation showed that anthropogenic disturbance within the barren NLCD layer could result in as little as a 12 percent increase and much as a 100 percent increase in total anthropogenic disturbance in a HUC. As expected, the HUC containing the Usibelli Coal Mine had the greatest level of anthropogenic disturbance associated with the barren layer in the NLCD (100 percent increase).

Application of the Validated NLCD methodology

Based on the data validation described above for the barren classification, a multiplier for maximum possible additional disturbance was applied to the auto-derived disturbances associated with Developed and Planted/Cultivated classifications to account for up to a 100 percent increase. This resulted in a conservative overestimate of the existing disturbed land for each HUC. Once the multiplier was applied, the resulting acreage was added to the wetland impact acreage associated with the ASAP project within each HUC. This aggregate value describing the sum of the maximum possible existing human-disturbed acreage and the project wetland impact acreage was calculated and termed the maximum disturbed value, or d-value (Appendix A).

Where the d-value was determined to be less than the established threshold of 7.5%, no mitigation would be proposed, as impacts from the ASAP Project would not produce a substantive impact to aquatic resources and functions in those HUC-10 watersheds.

Data Table – (Validation applied to derive D-value)

HUC10	Total Acres in HUC10	Total Acres of NLCD Disturbed in HUC10	Inside Project Area Acres of Upland on NLCD Disturbed	Inside Project Area Total Acres of Upland	Inside Project Area Acres of Wetland on NLCD Disturbed	Inside Project Area Total Acres of Wetland	Inside Project Area Total Acres of NLCD Disturbed	Inside Project Area Total Acres	Percentage of Total NLCD Disturbed in HUC10 (x2)	Avoided (Aggregate of Existing Disturbance and Project Wetlands Impact)
1902020205	223,263.59	1,841.10	18.92	23.06	0.00	0.00	18.92	23.06	1.65%	1.65%
1902040108	371,605.81	46,803.66	0.00	22.58	0.00	0.00	0.00	22.58	25.19%	25.19%
1902050201	84,796.94	120.69	1.04	183.61	0.28	60.35	1.32	243.97	0.28%	0.36%
1902050202	115,058.34	73.46	0.54	152.63	0.07	41.21	0.61	193.83	0.13%	0.16%
1902050204	236,563.79	374.40	19.35	751.35	0.95	54.45	20.30	805.80	0.32%	0.34%
1902050206	205,639.45	177.86	6.98	314.40	3.08	15.19	10.06	329.59	0.17%	0.18%
1902050210	89,891.09	458.88	6.66	542.01	0.00	35.99	6.66	578.00	1.02%	1.06%
1902050501	106,758.52	961.57	22.51	153.85	0.53	8.94	23.05	162.79	1.80%	1.81%
1902050503	184,116.91	4,154.63	35.06	463.19	1.89	62.92	36.94	526.11	4.51%	4.55%
1902050504	227,433.70	189.20	0.23	31.44	0.00	27.97	0.23	59.41	0.17%	0.18%
1902050505	101,977.46	469.06	8.84	59.25	1.19	28.41	10.03	87.66	0.92%	0.95%
1902050506	163,996.22	2,075.55	3.57	29.31	0.00	35.40	3.57	64.71	2.53%	2.55%
1902050510	178,798.12	1,078.78	16.00	337.56	2.13	60.32	18.12	397.88	1.21%	1.24%
1902050512	265,476.53	10,851.97	23.37	208.49	0.25	70.85	23.62	279.34	8.18%	8.20%
1902050513	322,803.36	509.21	0.00	266.51	0.00	22.64	0.00	289.15	0.32%	0.32%
1906030407	236,174.05	30.66	0.00	0.21	0.00	15.15	0.00	15.36	0.03%	0.03%
1906040101	187,842.88	3,253.69	79.78	125.44	12.52	699.72	92.30	825.16	3.46%	3.83%
1906040102	222,064.09	375.01	0.68	125.38	0.38	39.52	1.06	164.90	0.34%	0.36%
1906040107	207,629.77	121.02	0.02	20.80	0.13	59.76	0.15	80.56	0.12%	0.15%
1906040109	263,489.33	112.42	0.12	35.42	0.15	56.69	0.27	92.11	0.09%	0.11%
1906040111	92,400.52	41.06	0.01	0.01	0.21	200.52	0.22	200.54	0.09%	0.31%
1906040114	107,395.15	1,442.91	31.14	64.63	0.74	21.94	31.88	86.57	2.69%	2.71%

HUC10	Total Acres in HUC10	Total Acres of NLCD Disturbed in HUC10	Inside Project Area Acres of Upland on NLCD Disturbed	Inside Project Area Total Acres of Upland	Inside Project Area Acres of Wetland on NLCD Disturbed	Inside Project Area Total Acres of Wetland	Inside Project Area Total Acres of NLCD Disturbed	Inside Project Area Total Acres	Percentage of Total NLCD Disturbed in HUC10 (%)	a-value (aggregate of Existing Disturbance and Project Wetland Impact)
1906040117	145,949.30	124.10	27.41	29.66	11.02	71.90	38.43	101.56	0.17%	0.21%
1906040201	213,684.57	1,191.74	27.27	409.59	82.21	582.18	109.48	991.77	1.12%	1.35%
1906040204	241,007.35	231.97	0.65	95.25	0.61	167.75	1.26	263.01	0.19%	0.26%
1906040208	200,383.87	1,179.66	1.02	325.70	1.08	844.48	2.10	1,170.17	1.18%	1.60%
1906040216	237,666.23	1,656.56	33.07	56.91	8.12	959.27	41.19	1,016.18	1.39%	1.79%
1906040217	516,566.67	1,805.86	10.36	16.16	1.11	252.37	11.47	268.53	0.70%	0.75%
1908020101	247,417.74	292.27	6.22	57.40	0.27	121.36	6.49	178.76	0.24%	0.29%
1908030609	142,189.00	30,906.10	26.31	43.60	0.07	34.12	26.38	77.72	43.47%	43.50%
1908030803	248,009.14	724.00	2.92	208.84	1.25	118.57	4.16	327.42	0.58%	0.63%
1908030806	144,188.13	0.00	0.00	11.42	0.00	4.04	0.00	15.46	0.00%	0.00%
1908030807	232,569.15	706.35	26.49	761.67	0.64	230.94	27.13	992.61	0.61%	0.71%
1908030809	229,037.39	1,769.93	28.32	424.18	0.75	356.02	29.07	780.21	1.55%	1.70%
1908030812	226,587.29	269.76	3.55	103.18	0.52	39.91	4.07	143.09	0.24%	0.26%
1908030813	232,274.66	1,754.41	0.73	285.10	0.02	183.85	0.74	468.94	1.51%	1.59%
1908030901	186,588.06	483.29	83.98	242.25	0.47	75.25	84.45	317.50	0.52%	0.56%
1908030902	237,482.90	1,225.08	0.79	177.86	0.01	65.05	0.80	242.91	1.03%	1.06%
1908030903	219,440.69	571.69	0.00	148.27	0.00	1.64	0.00	149.91	0.52%	0.52%
1908030904	169,966.06	456.52	0.00	131.79	0.00	56.64	0.00	188.44	0.54%	0.57%
1908030907	211,445.93	5,178.24	17.26	176.92	1.07	16.70	18.33	193.61	4.90%	4.91%
1908030908	176,458.90	1,009.56	0.74	541.32	0.00	229.78	0.74	771.10	1.14%	1.27%
1908030909	129,953.87	58.92	3.59	253.90	2.74	81.58	6.34	335.48	0.09%	0.15%
1908030910	268,992.41	660.91	0.81	426.63	0.25	88.34	1.06	514.96	0.49%	0.52%
1908031102	176,810.78	183.69	14.10	113.06	0.39	48.18	14.48	161.24	0.21%	0.23%
1908040320	221,418.48	420.17	3.47	69.07	1.32	145.50	4.80	214.57	0.38%	0.44%

HUC10	Total Acres in HUC10	Total Acres of NLCD Disturbed in HUC10	Inside Project Area Acres of Upland on NCLD Disturbed	Inside Project Area Total Acres of Upland	Inside Project Area Acres of Wetland on NCLD Disturbed	Inside Project Area Total Acres of Wetland	Inside Project Area Total Acres of NLCD Disturbed	Inside Project Area Total Acres	Percentage of Total NLCD Disturbed in HUC10 (x2)	d value (aggregate of Existing Disturbance and Project Wetlands Impact)
1908040402	148,913.21	652.05	35.05	126.10	11.73	187.51	46.78	313.60	0.88%	0.99%
1908040403	136,709.45	624.08	51.84	569.96	0.31	52.08	52.15	622.05	0.91%	0.95%
1908040405	239,405.30	653.55	33.31	327.97	0.00	89.61	33.31	417.58	0.55%	0.58%
1908040407	101,685.23	53.71	4.87	26.10	0.00	1.06	4.87	27.16	0.11%	0.11%
1908040408	196,349.32	1,126.95	57.86	426.21	4.61	138.75	62.47	564.96	1.15%	1.22%
1909010101	222,058.86	1,047.92	33.13	368.21	15.01	362.52	48.14	730.73	0.94%	1.10%
1909010105	163,211.85	902.20	28.33	296.71	6.89	365.99	35.23	662.70	1.11%	1.33%
1909010106	243,953.22	625.09	28.58	402.52	6.62	361.62	35.20	764.13	0.51%	0.66%
1909010203	167,946.33	218.20	2.16	71.44	0.63	153.69	2.80	225.13	0.26%	0.35%
1909010204	74,995.50	88.09	0.18	54.31	0.11	44.84	0.30	99.15	0.23%	0.29%
1909010205	241,561.47	568.42	24.16	192.20	0.21	343.40	24.37	535.60	0.47%	0.61%
1909010206	222,919.64	381.18	21.84	174.77	1.03	169.61	22.87	344.39	0.34%	0.42%
1909010207	187,946.32	293.26	19.53	168.20	0.26	74.74	19.79	242.94	0.31%	0.35%
1909010401	243,006.96	554.06	20.92	104.76	3.45	168.22	24.36	272.98	0.46%	0.52%
	12,041,926.83			**12,330.33**		**8,907.01**		**21,237.34**		

NLCD 'Disturbed' area includes NLCD classifications for Developed and Planted/Cultivated; Maximum possible human-caused Barren land is accounted for by the "x2" multiplier

'Project Area' includes all components in the Project Footprint except existing roads that are IMPACT_404 = 'Not a project component'

Additional Project Wetlands Disturbance is the acreage of Wetlands impact inside the Project area that is not already accounted for by NLCD Disturbed

ASAP

Alaska's In-State Gas Pipeline

ALASKA STAND ALONE PIPELINE/*ASAP* PROJECT

Analysis of Potential Indirect Impacts to Wetlands Related to Buried Pipeline Construction

ASAP-22-RTA-ENV-DOC-00002
March 10, 2017

Alaska Gasline Development Corporation | 3201 C Street, Suite 200 | Anchorage, AK 99503 | P 907.330.6300 | F 907.330.6309 | www.agdc.us

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REVISION HISTORY

REV. NO.	APPROVED DATE	REVISION DESCRIPTION	FUNCTIONAL OR PROJECT MANAGER APPROVAL
A	1/4/2017		
B	2/17/2017		
B1	3/10/2017	Minor tech edits	

ACRONYMS AND ABBREVIATIONS

AGDC	Alaska Gasline Development Corporation
ASAP	Alaska Stand Alone Pipeline
bgs	Below ground surface
CRREL	Cold Regions Research and Engineering Laboratory
ft	feet / foot
GIS	Geographic Information System
HDD	horizontal directionally drilled
HGM	hydrogeomorphic
in	inch
m	meters
MAGT	mean annual ground temperature
MP	milepost
PHMSA	Pipeline Hazardous Material Safety Administration
ROW	right-of-way
RSP	Revegetation and Stabilization Plan
SEB	surface energy balance
SEIS	Supplemental Environmental Impact Statement
SPCO	State Pipeline Coordinator's Office
TAPS	Trans-Alaska Pipeline System
TAZ	Thaw Affected Zone
USACE	U.S. Army Corps of Engineers
USDOT	U.S. Department of Transportation

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1. INTRODUCTION

1.1 PURPOSE

The USACE Alaska District, in coordination with the USACE Cold Regions Research and Engineering Laboratory (CRREL), has requested that AGDC provide an analysis of whether abutting or adjacent wetlands outside the construction ROW would be impacted by indirect thaw to permafrost in undisturbed areas over the life of the project. This report provides an analysis and additional modeling to address this question.

1.2 CONSTRUCTION OF ASAP THROUGH PERMAFROST REGIONS

The Alaska Gasline Development Corporation (AGDC) has proposed to construct and operate the Alaska Stand Alone Pipeline (ASAP) as a means to transport natural gas from Prudhoe Bay to Southcentral Alaska. ASAP will require the construction of a 733-mile long, 36-inch diameter pipeline that will be buried, except at select fault crossings, bridged stream crossings, and block valve locations. The pipeline will be constructed in different permafrost regions, as generally noted in Jorgenson et al. (2008). A review of literature and geotechnical data helped to determine mainline milepost ranges for three permafrost zones, as follows:

- Continuous Permafrost: MP 0 – MP 168
- Discontinuous Permafrost: MP 168 – MP 634
- Sporadic Permafrost: MP 634 – MP 733

AGDC provided the USACE with a *Joint Application for Permit – Revised* that included typical drawings depicting pipeline engineering for different modes, seasons, and regions (AGDC 2015). The pipeline construction right-of-way (ROW) width has been proposed as a nominal 120ft-wide corridor that will also include wider areas for special design, side slope cut-and-fill, and temporary workspace. The pipeline will be revegetated following construction and maintained during the operational phase (AGDC 2016a,b). The permanent ROW has been proposed as a nominal 53ft-wide corridor that will also include wider areas for maintaining the stability of the ROW that is impacted during construction.

1.3 DIRECT IMPACTS TO WETLANDS AND UPLANDS

Direct impacts to wetlands were reported to the USACE for ASAP in the *Joint Application for Permit – Revised* (AGDC 2015) and in an *Environmental Evaluation Document* (AGDC 2016a). Direct impacts to wetlands were avoided and minimized to the extent practicable and will be mitigated through procedures described in its *Draft Wetlands Compensatory Mitigation Plan*. Direct impacts to wetlands will total 8,907.0 acres, of which 7,573.2 acres will be attributed to permanent

impacts to freshwater wetlands (temporary impacts to freshwater wetlands and all impacts to intertidal / subtidal wetlands tabulated separately). The Project will also directly impact 12,330.3 acres of uplands. The ASAP Project Footprint comprising all permanent and temporary direct impacts to wetlands and uplands will be 21,237.3 acres.

1.4 THE POTENTIAL FOR INDIRECT IMPACTS TO WETLANDS THROUGH PERMAFROST THAW

As noted above, the USACE Alaska District, in coordination with the USACE Cold Regions Research and Engineering Laboratory (CRREL), has requested that AGDC provide an analysis of whether abutting or adjacent wetlands outside the construction ROW would be impacted by indirect thaw to permafrost in undisturbed areas over the life of the project. During pipeline construction, ground disturbing activities within the ROW that would impact the organic layer, such as clearing, grading, grubbing, compression, or the use of a gravel work pad, can affect surface albedo, vertical and lateral heat flux or transfer, and subsequently, thaw of permafrost. Roads and facility pads are of lesser concern because thicker gravel pads required for these facilities have insulative properties that mitigate against thaw.

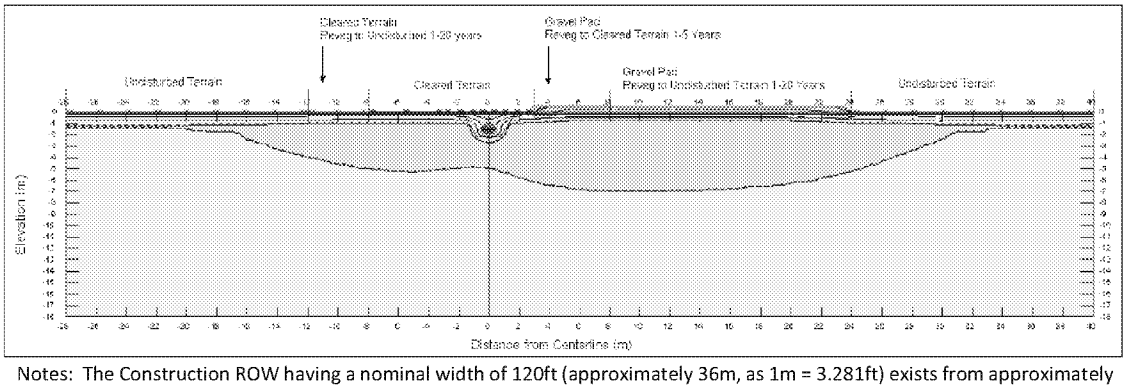
The buried ASAP pipeline was designed to receive gas from a conditioning facility at 30°F and operate at ambient ground temperatures that would range from 8°F to 30°F on the North Slope within the continuous permafrost zone (AGDC 2016a). The pipeline will operate at slightly warmer ground temperatures in the more southerly discontinuous and sporadic permafrost regions. Indirect thaw of permafrost outside the area of direct impact has the potential to occur. The driver for this indirect thaw is a change in heat balance that could result from disturbance of the organic layer within the ROW during construction (e.g., damage to or compression of the organic layer, vegetative clearing, and gravel pad placement, if applicable).

AGDC intends to institute a comprehensive monitoring program and will employ several mitigative measures to offset and minimize indirect impacts to wetlands, including a revegetation program that allows for the recolonization of the ROW by native species in non-sensitive areas and the immediate revegetation of the ROW through re-seeding in sensitive areas (AGDC 2016e). The program will employ continual detection and field maintenance activities (AGDC 2016b,e) and the use of thermosyphons or additional ditch plugs (described in AGDC 2016b) in select areas (AGDC 2016c; see also Section 7, below). Thermosyphons would be used in select areas of discontinuous permafrost where greater permafrost stability near the surface is required; field monitoring crews observing issues such as slumping or reports of suspected thaw by in-line inspection may lead to thermosyphon placement. Thermosyphons have been used historically for areas along the TAPS ROW and for other projects, such as the Alpine horizontal directionally drilled (HDD) crossing of the Colville River. Additional ditch plugs could be used where newly identified water management efforts are required. In rare instances, where thaw or slumping are identified around permanent facilities that cannot be moved (e.g., block valves) and where a power supply is available, a stationary active refrigeration unit may be employed.

AGDC's initial geothermal modeling shows that with revegetating the ROW in discontinuous permafrost terrain, the indirect permafrost thaw affected zone (TAZ) over a period of 30 years will be limited to less than 10m (35ft) beyond the directly impacted area (AGDC 2016c; Figure 1). USACE CRREL have agreed that these modeling procedures are sound and have generally agreed with the approach and results (personal communication with Kevin Bjella, USACE CRREL, as noted in Meeting Minutes from a USACE / AGDC Supplemental Environmental Impact Statement (SEIS) Progress Meeting on November 29, 2016). A robust monitoring program and other mitigative options and monitoring could further limit indirect thaw (see Section 7 for mitigative options and AGDC 2016b for monitoring program details). It is important to note, therefore, that limited indirect thaw to permafrost beneath a wetland will not necessarily result in an indirect impact to that wetland's function or value (i.e., limited, acute permafrost impact does not necessarily equate to wetland impact).

The mechanism by which indirect wetlands impacts could potentially occur would be through thaw settlement (vertical subsidence) of lands that would create a slight downward vertical ground surface displacement and a possible avenue for drainage of surface water from perennially or intermittently saturated soils. An approximately 1m thaw settlement estimate was based on approximately 5m of thaw depth below the undisturbed active layer in discontinuous permafrost terrain with an assumed 20% thaw strain. A 20% thaw strain (thaw settlement per thaw depth) of maximum subsidence is a reasonable expectation as to what would actually be observed in the field (as noted in personal communication with Kevin Bjella, USACE CRREL, as noted in Meeting Minutes from a USACE / AGDC SEIS Progress Meeting on November 29, 2016). This estimate is based on geotechnical data, permafrost modeling, knowledge of soil, hydrologic, and vegetative characteristics along the ROW, experience and engineering judgment. The potential for wetlands to be indirectly impacted due to subsidence and subsequent drainage of saturated soils varies according to region and permafrost type.

Figure 1. ROW Thaw Depth for Discontinuous Permafrost (in meters)



Notes: The Construction ROW having a nominal width of 120ft (approximately 36m, as 1m = 3.281ft) exists from approximately -12m to 24m on the lateral plane, above.

1.4.1 Continuous Permafrost (MP 0 to MP 168)

The area of continuous permafrost traversed by the pipeline (MP 0 to MP 168), is of smaller concern for indirect impacts to wetlands than in discontinuous permafrost for several reasons. First, the direct impact width will be much smaller on Alaska's North Slope due to mitigative measures that can be implemented in this region, such as the use of ice roads and ice workpads. The main impact will be through burying the pipe in a 5ft wide ditch. Trench spoils and refill would result in 32ft of direct impact to wetlands, a much narrower direct impact corridor than in discontinuous regions.

The area is characterized as a continuous permafrost region with an active layer thickness of around 2ft (24 inches) (AGDC 2016b). Since the sub-freezing pipe will be surrounded by perennially frozen soils, the cold ground temperature will limit lateral thaw. Where the pipe is relatively warm (30°F at MP 0) the active layer depth near the trench would increase somewhat. Geothermal modeling shows that this increased active layer depth would diminish rapidly within 20ft laterally from the trench centerline (see Section 2.3.1 and Figure 6, below). The pipe would become cooler with increased distance from MP 0. The soils in the impacted area adjacent to the trench will re-freeze in winter and will remain frozen for approximately three-quarters of the year. The soils directly around the sub-freezing pipe will remain frozen throughout the year.

Third, being surrounded by perennially frozen soils and relatively flat terrain means that even if thaw and subsidence did occur, saturated soils would not necessarily be able to drain, especially if in a flatter area. Drainage of wetlands would be hindered by surrounding permafrost. To keep water from flowing into and along the area where the pipe is buried, pipeline engineers intend to use common engineering practices for buried pipelines in wet areas, including ditch plugs and surface crowning, as needed (AGDC 2016 a,b,d). These practices will limit the flow of water along the pipe and help to maintain wetlands adjacent to directly impacted areas.

1.4.2 Discontinuous Permafrost (MP 168 to MP 634)

The area of discontinuous permafrost traversed by the pipeline (MP 168 to MP 634) is characterized by wide variability in the physical environment, including permafrost presence and active layer depth. Similar to the other permafrost regions, the variability in terrain unit classification also varies widely. Terrain units are subsets of land area classified by soil types that can often be characterized as either thaw-stable or thaw-unstable material. For most of this region, the pipe would cool to ambient ground temperature or cooler due to Joule-Thomson cooling.

The area of discontinuous permafrost is variable in elevation, slope, ground temperature, and wetlands type. Certain wetland types are also often associated with permafrost presence or absence. Delineated wetlands can be classified as low, medium, or high potential for permafrost to be present beneath them. Thus, the potential for indirect impacts to permafrost, thaw settlement, and subsurface drainage of wetlands is also highly variable in this region. Several years after construction, the

area beneath vegetation in the indirect TAZ would be able to hold more water than before construction, but this would not necessarily impact wetland functions or values in the TAZ.

1.4.3 Sporadic Permafrost (MP 634 to MP 733 and FLMP 0 to FLMP 30)

The area of sporadic permafrost (often referred to as a 'no permafrost' area) traversed by the mainline (MP 634 to MP 733) is characterized by a general lack of permafrost or by sporadic, patchy permafrost areas. There is a very low probability of permafrost occurring in this region and therefore indirect impacts to wetlands due to permafrost thaw, thaw settlement, and drainage are not likely to occur. The Fairbanks Lateral traverses approximately 99% uplands, further reducing the possibility for indirect impacts to wetlands.

1.5 OVERALL APPROACH

The USACE has requested that AGDC report where indirect impacts to wetlands could potentially occur outside of the pipeline ROW. AGDC has developed methodology to provide this information to the USACE. AGDC will use a screening approach to eliminate areas where there is a low likelihood for impacts to occur to wetlands outside the Project ROW (Figure 2). AGDC has applied these screens, or filters, through a GIS-based approach (Attachment 2) that will remove areas where wetlands have a low likelihood of being directly impacted. The resulting areas not eliminated through this process are a subset of potentially susceptible pipeline segments within which wetlands could be indirectly impacted by additional permafrost thaw.

Figure 2. Route Application Methodology

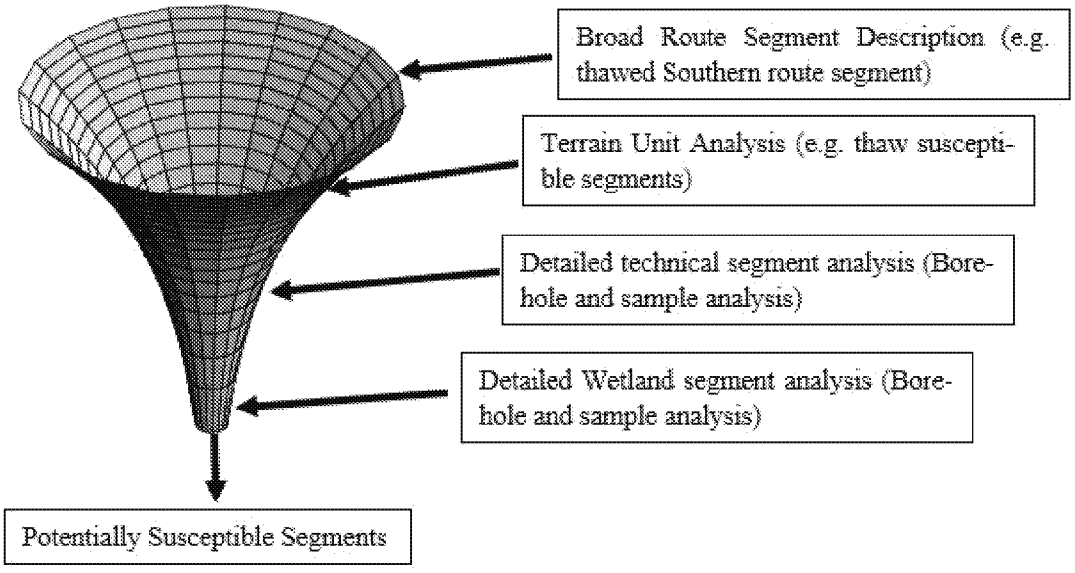
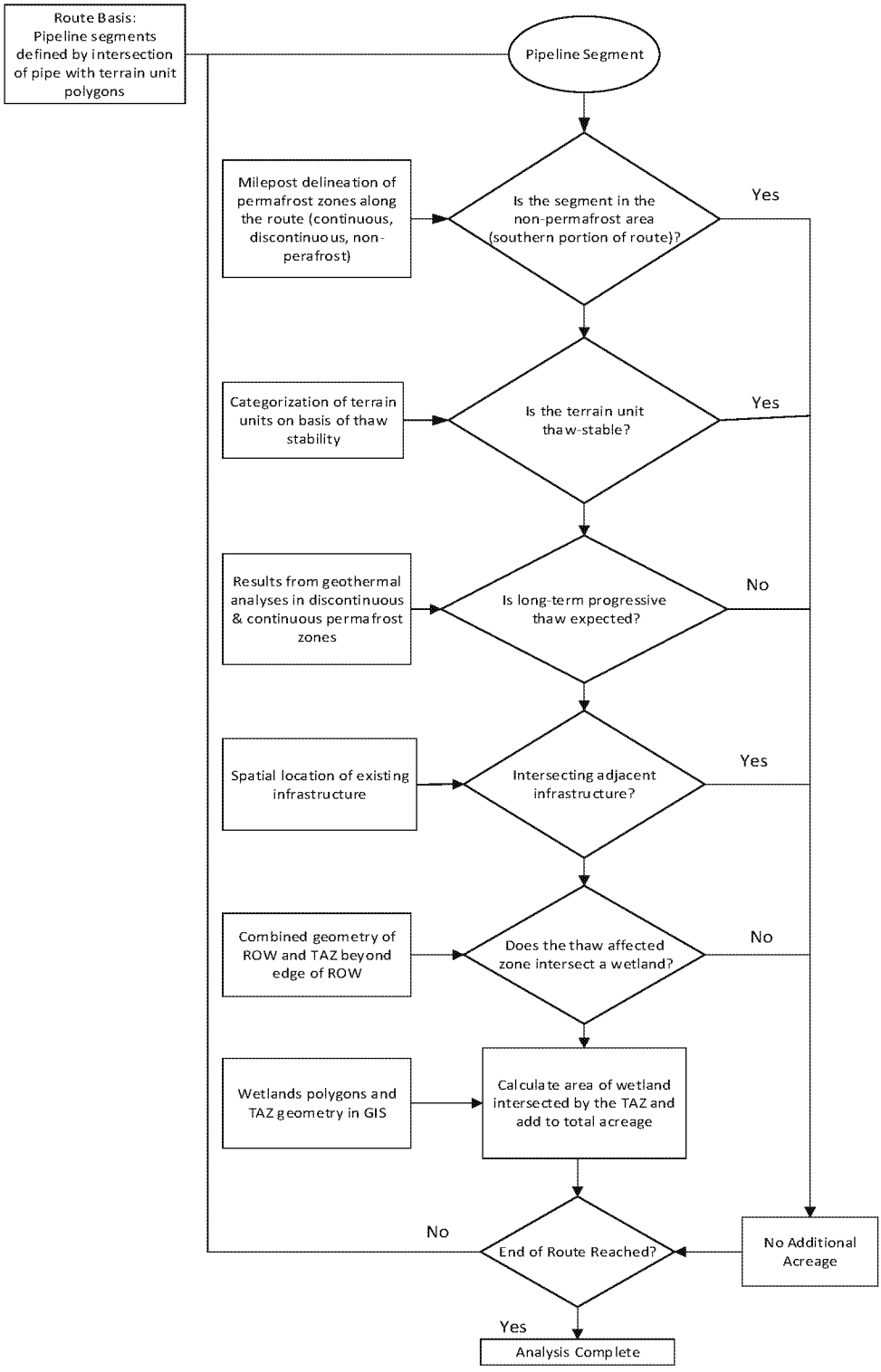


Figure 3 shows a detailed Route Assessment Methodology Flowchart used to determine the areas in which wetlands outside of the pipeline ROW could be impacted indirectly by construction over a 30-year period. It is discussed generally in this section, but in greater detail in Section 3.

The methodology begins by determining whether the route segment is in an area characterized by continuous, discontinuous, or sporadic permafrost. It then categorizes terrain unit data within the ROW on the basis of thaw-stability. Results from geothermal analysis determine whether long-term thaw is expected. The spatial location of existing infrastructure (roads, railroads, powerline, TAPS Crossings, etc.) bisecting the pipeline ROW and the indirect TAZ is then assessed to determine where permafrost is already thawed by existing infrastructure or where the permafrost is preserved with thick, insulative gravel pads near existing infrastructure.

Next, the methodology explores whether the defined TAZ could indirectly impact a wetland. The area of wetlands potentially affected are then assessed to tabulate a total wetlands impact acreage. This resulting acreage of potential indirect wetland impacts is then be categorized by wetland type to provide greater detail to the reader.

Figure 3. Route Assessment Methodology Flowchart



2. GEOTHERMAL ANALYSIS OF ROW

Geothermal analysis has been used to evaluate the effect of thermal disturbance from construction and operations on long-term thaw depths along the ASAP ROW (AGDC 2016c; Attachment 1). Geothermal analysis accounts for several important variables affecting soil temperatures including, soil material properties (such as thermal conductivity, soil moisture content, and latent heat), thermal boundary conditions (such as energy exchange at the ground surface and heat transfer between the operating pipe and the surrounding soil), and phase change and the associated latent heat of soil moisture.

In the context of route thaw settlement, geothermal analysis provides a quantitative method to determine long-term thaw depths both below the disturbed ROW and below the pipe, if any. For the pipe, the resultant thaw depth allows further analyses to evaluate potential pipe thaw settlement as required for assessing pipeline integrity. For the ROW, the geothermal analyses enable evaluation of thermal disturbance effects from construction and operations along the route and, of particular focus, the potential effect on route wetlands. It is this latter effect that is the focus of the current study with respect to wetlands outside the ROW.

The principal tool for geothermal analysis on the Project is TEMP/W, a commercial finite element program for heat transfer with the ability to evaluate the effects of phase change in the soils. It simulates the heat transfer within the ROW cross-section to determine long-term thaw depth. The modeled domain is discretized into small areal extents (finite elements) which individually evaluate the localized heat transfer within this area. When assembled, the individual elements collectively can model extensive regimes with varying constraints and conditions. Input data, simulation methodology, and results for thaw depth and ROW settlements for these finite element analyses are described in this chapter.

2.1 ROW CONSTRUCTION MODES

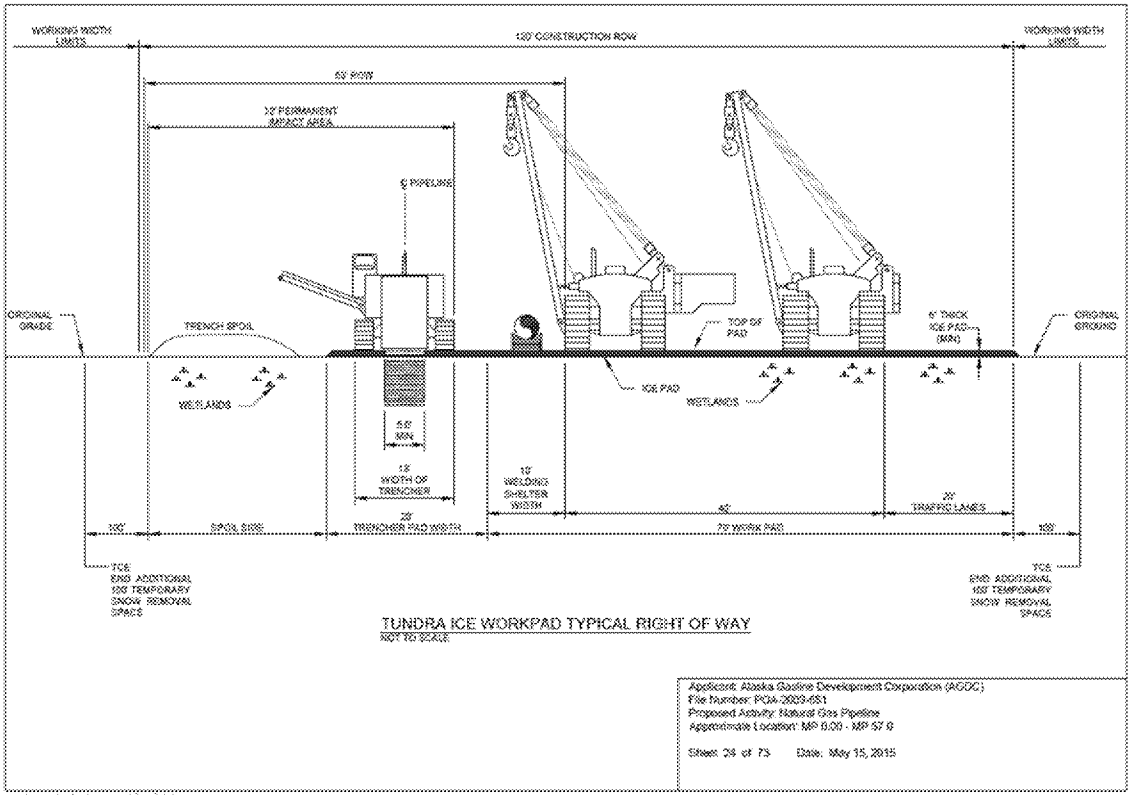
The ASAP report entitled *Design Basis - Pipeline* (AGDC 2016d) describes considerations given to the varying terrain and climatic conditions along the ROW, as well as additional considerations such as seasonal constrains and construction scheduling. Several ditch and ROW configurations or 'modes' were defined to accommodate these anticipated conditions along the proposed alignment. These construction modes were developed and intended to ensure long-term integrity of the pipeline and to protect nearby foreign structures and the environment.

2.1.1 Continuous Permafrost

For the North Slope (Arctic Costal Plane), which is underlain by continuous permafrost, an ice pad will be used in lieu of a gravel pad, which is typical for North Slope construction. The pipeline

ROW configuration is planned to be 120ft wide, nominally, although the direct impact to wetlands will only be 32ft wide (AGDC 2015; Figure 4). This includes a 90ft wide ice pad thick enough to support construction traffic on one side of the pipe centerline, and an adjacent area for trench spoil. After the construction season, the ice road will be allowed to naturally thaw and, as is typical, negligible effect on the tundra is expected.

Figure 4. Construction ROW for Continuous Permafrost

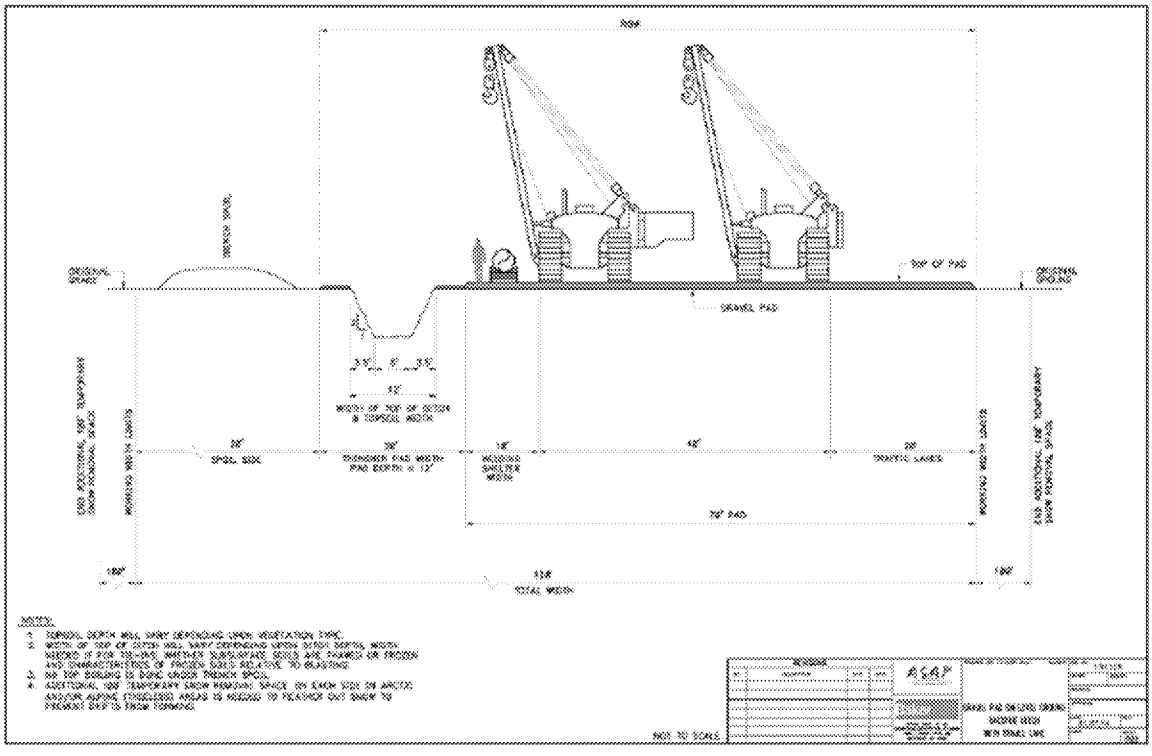


2.1.2 Discontinuous Permafrost

The typical pipeline ROW configuration in discontinuous permafrost is planned to be 120ft wide, nominally, as depicted in AGDC 2015 and in Figure 5. This includes an 18in thick, 70ft wide gravel pad on one side of the pipe centerline, and a 30ft wide cleared area for trench spoil, each setback 10ft from either side of the pipe centerline. After one construction season, the permanent ROW is planned to be 53ft wide and centered over the pipe. The remainder of the pad outside of the permanent ROW will be scarified by ripping (i.e., cultivation), which will aerate the surface of the land and prepare it as a seedbed for natural colonization of vegetation (AGDC 2016e). With time, grasses and shrubs and eventually trees (in originally treed areas along the route) will revegetate the ROW. After three years, re-seeding with a prescribed seed mix will be considered if minimum ground cover standards are not met, per the ASAP Revegetation Plan (AGDC 2017). Any young

trees colonizing the permanent 53ft Mainline ROW would be cleared during operations, while those beyond the 53ft ROW to the edge of the 120ft temporary construction ROW would be allowed to grow unhindered. This process of scarifying and revegetating would maintain the integrity of the land and would be less damaging than gravel removal.

Figure 5. Construction ROW for Discontinuous Permafrost



2.1.3 Sporadic Permafrost

In areas of sporadic or no permafrost in upland areas, the typical construction ROW configuration is to grade the surface. The working surface is 120ft wide and is configured similar to Figure 5 without the addition of the gravel pad.

2.2 DEVELOPMENT OF THE GEOTHERMAL MODEL

Modeling subsurface geothermal conditions requires establishment of an overall geothermal modeling approach, definition of the domain geometry, assembly of several material properties and boundary conditions, and proper model calibration. Geothermal modeling was undertaken to answer specific questions that arose as a result of an engineering design and/or a change to thermal conditions such as construction disturbance and operational conditions. Once the main objective of

a geothermal analysis was established, it was necessary to undertake the modeling effort to meet the specified objectives.

The modeling procedure to determine the effects of the construction disturbance and pipeline operating conditions on the subsurface through time during the design life was described in detail in Chapter 3.2 "Modeling Subsurface Geothermal Conditions" in *Identification and Evaluation of Time-Dependent Route GeoHazards* (AGDC 2016c). To accurately model the subsurface change for any segment along the pipeline, the report lists the data that must be assembled:

- Establish the domain geometry.
- Define soil material properties.
- Specify initial temperature conditions.
- Define thermal boundary conditions.
- Determine maximum simulation time.

Using these data, a further step is required to ensure that the model will accurately reflect the segment conditions:

- Calibrate the geothermal model to reproduce existing undisturbed conditions then apply variation to boundary conditions to simulate effects of construction and/or operations.

For this study, these same steps were followed for the two ROW models examined. The analysis for continuous permafrost was evaluated specifically for MP 0 because the gas treatment plant discharges gas continuously at 30°F, which represents the worst-case scenario for continuous permafrost. South of MP0, the pipe will lose heat to the soil and will have a temperature close to that of the ambient soil temperature, so deepening of active layer depth near the trench will be less south of MP0 than at MP0.

The models were not evaluated for any specific milepost route segment, but utilize reasonably conservative values for subsurface conditions susceptible to thaw settlement. Each step for this study is examined further:

- **Establish the Domain geometry** – the domain geometry is based on the construction mode assigned for the segment. The construction mode itself is determined by the nature of the surface features (rolling tundra, hilly, swampy…) as well as by the season designated for construction of the segment. The construction modes of interest for this report include the construction mode using only an ice road (typical on the North Slope and called the North Slope Model) and a mode using a gravel pad more typical in the area of discontinuous permafrost (termed the Discontinuous Model). The basis for the Discontinuous Model is detailed in AGDC 2016c - Appendix B, "Expected Long-Term Thaw Depths in Warm Permafrost on the ASAP ROW - Technical Memorandum" while the Basis for the North Slope Model is detailed in Attachment 1 of this report.

- **Define soil material properties** – the soil properties used for the analysis of the subsurface strata are generally developed using the route database. For the North Slope Model and Discontinuous Model, the subsurface soils were chosen as typical soils susceptible to thaw settlement. The subsurface soils were accordingly considered to be composed of a single stratum of this thaw susceptible material to depth.

- **Specify initial temperature conditions** – consistent with the soil material properties, the in situ thermal state of the subsurface is generally developed using the route database. For this analysis, since the focus was on potential settlement, the in situ condition of the sub-surface was considered to be initially frozen to depth.

- **Define thermal boundary conditions** – the thermal boundary conditions employed a full surface energy balance (SEB) methodology, with the input definition of the various elements of the SEB (described in detail in Chapter 3.2.5 "Ground Surface Boundary Condition" of AGDC 2016c) consistent with the route region under investigation. The SEB datasets are defined to simulate an annual variation of the region based on available climatic data from adjacent climate and weather stations. The input conditions for the SEB models are not the same, therefore – those for the North Slope Model with a construction mode utilizing an ice pad, typical of the proposed construction on the arctic plain, utilized an SEB dataset consistent with the North Slope climate. The Discontinuous Model used an SEB dataset consistent with the discontinuous permafrost region in the Fairbanks area and is described further in Chapter 3.3 of Appendix B of AGDC 2016c, while the North Slope SEB model is described in detail in Attachment 1 of this report.

- **Determine maximum simulation time** – the simulations for both models were extended to 30 years after startup. As noted below, the startup of the simulations actually predates operational startup to more accurately reflect the in situ subsurface thermal conditions.

- **Calibrate the geothermal model** - to reproduce existing undisturbed conditions, some items of the SEB model can be varied so as to better reflect the in situ subsurface conditions, as described in Chapter 3.5 of AGDC 2016c. Typically, an SEB data element pertaining to the snow cover (i.e. snow conductivity) is varied within a typical range to match the mean annual ground temperature (MAGT) of the route segment being investigated. The calibration was separately carried out for the North Slope Model and Discontinuous Model to reflect the unique conditions of those regions. The calibration of the Discontinuous Model is described further in Chapter 3.4 and 3.5 of Appendix B of AGDC 2016c, while the North Slope calibration is described in detail in Attachment 1 of this report.

  Each model with the calibrated SEB datasets for the in situ conditions were then run for a period of time before construction so as to establish the annual subsurface variation throughout the Domain that corresponds to the in situ condition. To model construction,

the SEB dataset is changed accordingly to reflect changes in the surface albedo and vegetative cover and, as appropriate, additional infill material such as that for a gravel workpad.

After the construction period, the pipe temperature is defined as an additional thermal boundary condition. The pipe temperature varies throughout the year, found through a separate pipeline hydraulic analysis. (For the current study, the pipe temperature has a minimal effect on the subsurface conditions at the edge of the ROW for the ASAP pipeline). Additionally, the effect of revegetation may be introduced during the operational period.

2.3 GEOTHERMAL MODEL RESULTS

2.3.1 Long-Term Thaw Depths in Continuous Permafrost

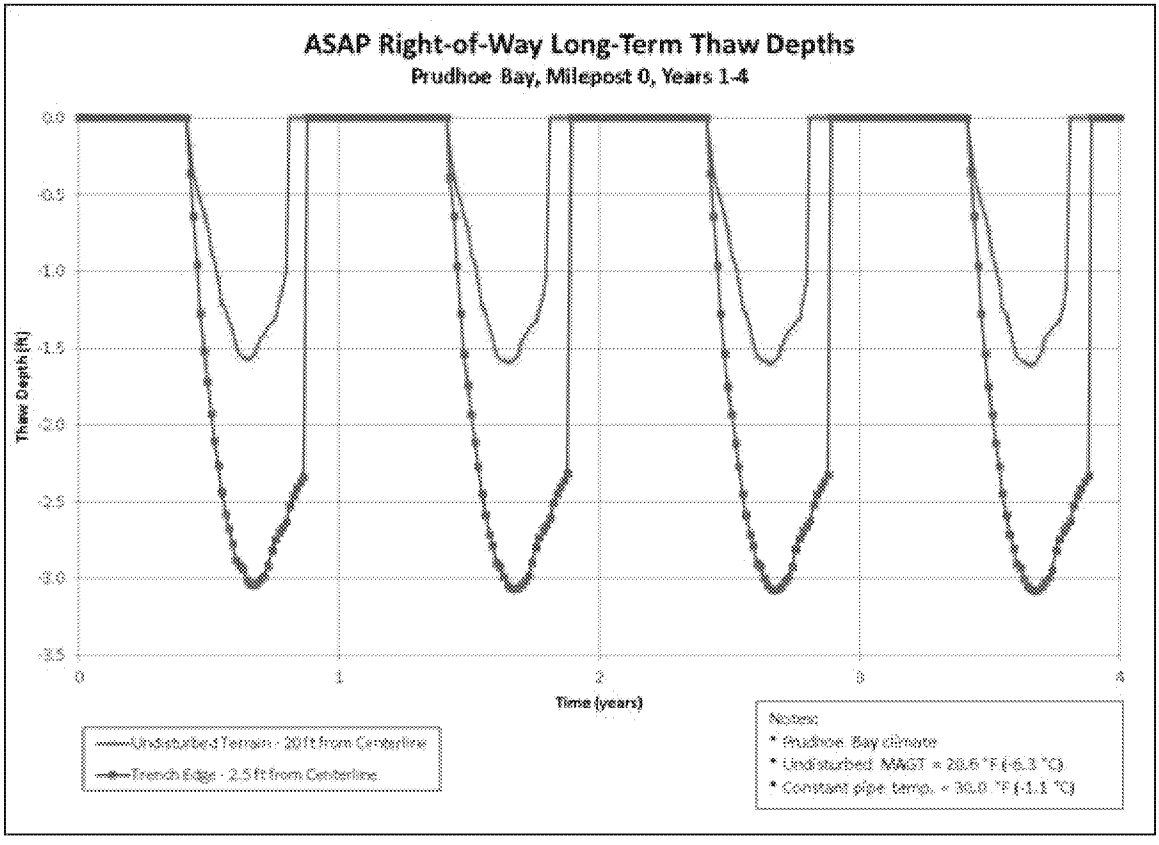
Geothermal modeling was completed to assess the long-term thaw depths in continuous permafrost where ground surface disturbance of the tundra terrain will be minimized by the use of ice workpads. With the tundra protected from construction disturbance, there is no expected change of the thermal regime on or adjacent to the ROW, with the exception of the ground disturbance at the pipeline trench. Additional ground warming will occur from the pipeline itself where the mean annual pipeline temperature (MAPT) is warmer than the mean annual ground temperature (MAGT) in undisturbed terrain. The gas treatment plant will supply gas into the pipeline at a constant temperature of 30 °F year-round causing the largest temperature contrast between MAPT and MAGT in continuous permafrost to occur at the pipeline inlet at milepost 0 (MP 0). For this reason, geothermal modeling to assess long-term thaw depths in continuous permafrost was performed at MP 0, details of which are provided in Attachment 1 of this report.

The geothermal modeling showed that at MP 0, deepening of the active layer in the undisturbed soils near the trench reaches maximum within a year or two after construction. Thereafter, the ground temperatures vary seasonally in periodic steady-state and progressive long-term thaw deepening does not occur. In addition, the active layer at the edge of the pipe trench is expected to be about 3.1ft deep as compared to an active layer depth of about 1.6ft in undisturbed tundra terrain. Beyond 20ft from the pipe centerline, modeling showed that the pipe and trench have practically no influence on the active layer depth.

Figure 6 shows the active layer depths from the geothermal modeling over the first four years of the simulation at the trench edge (2.5ft from pipe centerline) and at 20ft from the pipe centerline. This figure shows that the increase in active layer depth at the edge of the trench occurs in the first year and does not deepen in subsequent years. There is no long-term progressive thaw or ongoing active layer deepening beyond 20ft from the trench. In all areas (undisturbed and disturbed), summer warming causes thaw from the ground surface that deepens through the summer and into the early fall (Figure 6). During the fall when air temperatures descend below freezing, active layer freezeback occurs downward from the ground surface (not shown on Figure 6) and upward from the permafrost (as shown on Figure 6 by the decreasing thaw depth after a maximum thaw depth is

reached). The final part of the active layer to refreeze is at a depth of about 1 foot in undisturbed terrain (as shown for the data at 20ft from the pipe centerline in Figure 6). At the trench edge, the expected active layer freezeback is at a depth of about 2.3ft.

Figure 6. Expected Active Layer Depths Near-Pipe and in Undisturbed Terrain in Continuous Permafrost (MP 0)



2.3.2 Long-Term Thaw Depths in Discontinuous Permafrost

Geothermal modeling results to estimate long-term thaw depths in discontinuous permafrost are discussed further in Appendix B of AGDC 2016c. Figure 7 from that report (showing the expected 30-year thaw depth across the ROW in warm permafrost) is reproduced in this report as Figure 1 (note the figure axes are in meters). The thermal influence of the gravel pad extends beyond the edge of gravel pad by about 33ft in the case without an organic layer below the gravel pad which is the conservative case (the thermal influence extends beyond the edge of the gravel pad by about 26ft with an organic layer beneath the gravel pad). To be conservative in the route evaluation, an

edge distance of 35ft on both sides of the ROW was used in the evaluation of all route segments that were determined to have a potential thaw settlement impact on wetlands.

2.4 ASSOCIATED THAW SETTLEMENT IN THE DISCONTINUOUS MODEL

The progression of the thaw depth for the Discontinuous Model is shown in Figure 9 of Appendix B of the *Time-Dependent Route Geohazards* report (AGDC 2016c) and is reproduced in Figure 1 in this document, above, for the governing case of a gravel workpad without an organic layer beneath the gravel pad. As shown in Figure 1, the thaw depth at the end of the 30-year analysis for the gravel pad is 25ft below ground surface while the thaw depth for the cleared terrain (but without a gravel pad) is 18ft beneath the ground surface (note that diagrams may be in feet or meters). The active layer extends 6ft below the surface, so the depth of thaw below the active layer is 19ft and 12ft for the two sides, respectively. A value of 20% for the thaw strain is used as a reasonably conservative value, resulting in an estimate of 3.8ft and 2.4ft of thaw settlement for the two sides, respectively, at the end of the design life.

The thaw settlement builds gradually, *i.e.* the time progression of thaw settlement over the design life follows the thaw depth progression, multiplied by the thaw strain of 20%. (In the case of layered strata, the thaw strain would vary by a function of depth but in this homogeneous scenario the progression is straightforward). Thus, to evaluate the progression of thaw settlement with time, Figure 9 of Appendix B of the *Time-Dependent Route Geohazards* report (AGDC 2016c) is used with the vertical scale multiplied by 0.20. It can be seen that the thaw depth, and thus the thaw settlement, progresses over the design life with a diminishing slope as time progresses. As high ice contents are found in the upper level of the permafrost table, a high thaw strain is likely to be seen at the start of the Project. However, monitoring and mitigative actions during operations are designed to be effective in blocking consequential damages.

2.5 SECTION SUMMARY

To summarize, geothermal analyses were conducted to evaluate the effect of construction disturbance, and further operational conditions, on the ASAP ROW. The focus of this study was to define the lateral extent of the thermal change and, in particular, that extent beyond the established ROW. With the evaluation of the progression of the thermal effect with time, and using a reasonably conservative value of thaw strain, the amount of concomitant thaw settlement could also be estimated.

Two models were developed for this investigation. A model for the Discontinuous Permafrost region, using climatic conditions appropriate and calibrated for the Fairbanks region was previously developed and described in Appendix B of AGDC 2016c. An additional model for the North Slope, which utilizes an ice road instead of a gravel pad to support construction, was also developed and

described in detail in Attachment 1 of this report. Both models followed identical approaches for data development, subsurface modeling, climatic definition, and model calibration.

The model for the Discontinuous Permafrost region results in a thermal impact outside the ROW of a maximum of 33ft for the case of the gravel pad without an organic layer beneath the pad. It is this evaluation that results in a conservative criterion of the use of 35ft on both sides of the ROW as the basis for further route evaluation, described further in Chapter 3.

3. ROUTE APPLICATION

3.1 OVERVIEW

The geothermal evaluations that were conducted and reported in Chapter 2 utilized properties of the subsurface to find a conservative estimate of the thaw depth beneath the ROW and the associated thaw settlement. Subsurface properties can vary considerably along the ROW meaning that the conservative evaluation is not generally applicable. Some sections of the route are already thawed while other frozen sections have soils that are not susceptible to subsequent settlement upon thawing. As shown in Chapter 2, the very cold subsurface conditions of the arctic plain limit thaw settlement concerns even when thaw susceptible materials are present.

In the case of the identification of those route segments that may cause a detrimental thermal impact, ASAP used a stepped approach to identify those potentially problematic route segments. The approach, detailed below in Chapter 3.2, utilizes an increasingly fine screen to determine which route segments can be eliminated from the evaluation. The remaining route segments, i.e. those route segments that could not be eliminated based on any of the criteria for elimination, are then considered potentially problematic route segments. The process is depicted graphically in Figure 3, and described further in this Chapter. Note that the methodology allows for increasingly finer analysis of the route segments as they proceed down the funnel – such analysis depends, accordingly, on increasingly finer route segment data. The process both focuses further field determinations on those potentially problematic segments as well as determining the types of data that must be recovered. ASAP sees this as a continuing mission throughout design and continuing into Operations. Thus, the conservative evaluation discussed at this stage of ASAP design could be expected to be further refined as the project progresses and new data, whether from AGDC field investigations or incorporated from other relevant sources, is added to the project geodatabase and wetlands investigations.

3.1.1 Terrain Units

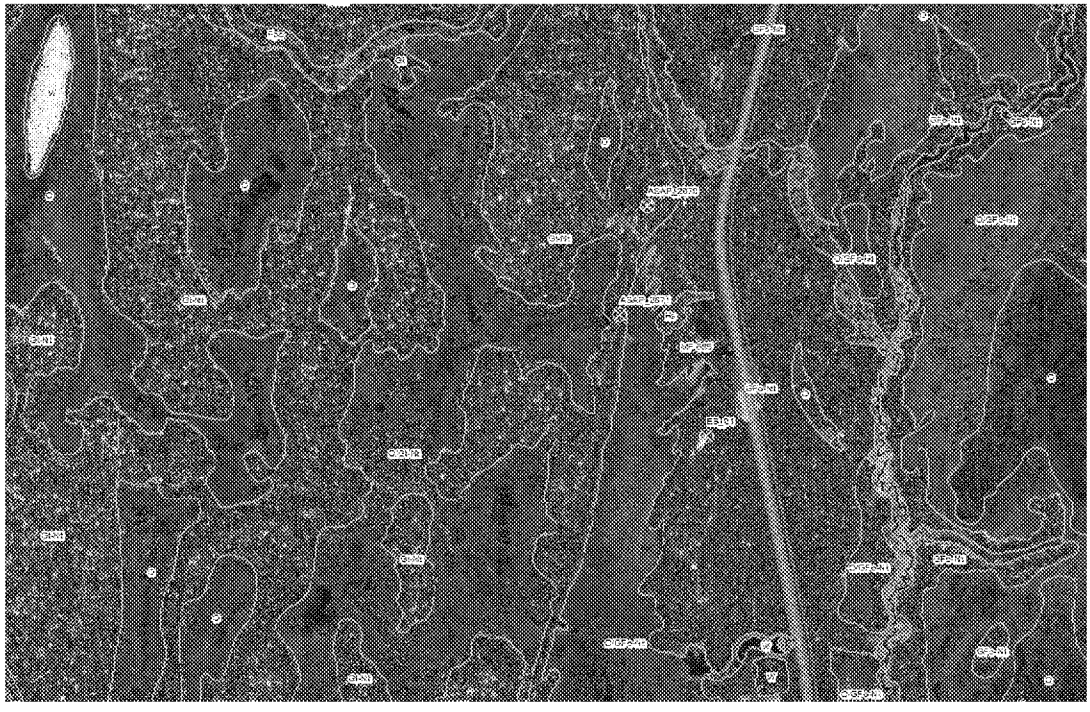
Terrain units are a mainstay of the technical route analysis and summarized further here – a more detailed description is contained in Chapter 7 of the *Time-Dependent Route Geohazards* report (AGDC 2016c).

Terrain units describe the morphology of a route area and consist of individual landforms that together, comprise the subsurface characterization. The depth or thickness of these landforms are generally described down to a prescribed distance below ground surface (bgs) although they can be extended, based on further borehole evaluations to the depth of the borehole. Two dimensional geological cross sections or 3D fence diagrams can then be created along the alignment.

Engineering data, such visual soil descriptions, soils laboratory data, ground temperature measurements, and groundwater depth measurements are then related to specific landforms and terrain units. These are documented in the ASAP geotechnical database library for use in further engineering analysis. A GIS geospatial database is used to illustrate terrain units, borehole locations, LiDAR, orthoimagery, and other data pertinent to the pipeline corridor. The GIS forms an integral part of the geohazard identification, evaluation and avoidance of pipeline route hazards in the design process.

The data can be expected to be increasingly refined and detailed as the project matures. All data used for design and all analyses have been subjected to rigorous subject matter expert review. A typical Terrain Unit map is shown in Figure 7.

Figure 7. Terrain Unit Map Example



3.2 ROW EVALUATION METHODOLOGY

As described earlier, the ROW evaluation methodology employs a series of refinements that are designed to eliminate potentially non-susceptible segments. The remaining segments at the end of the analysis are considered potentially susceptible to thermal impact of wetlands.

The analysis starts with what are considered the easiest determinations to apply to the pipeline, such as the determination as to the route delineation in the discontinuous permafrost region, the consensus area of focus. With this determination, no further data is required to refine the deliberation concerning those deleted segments. The next step is based on the evaluation of the Terrain Units, which are described in Chapter 3.1.1. The route geotechnical evaluation concluded at this point. The summary of that evaluation is discussed further in Chapter 4. Results of this evaluation, again based solely on geotechnical evaluations, were then further analyzed for wetlands impacts.

The Terrain Unit Technical evaluation was based on a segment by segment breakdown of the route into those Terrain Units that intersected the ROW. The Project geodatabase provided the terrain unit takeoff with a series of pipeline segments defined by the intersection of the pipeline centerline with each terrain unit polygon along the route. For each of these pipeline segments the, "thaw settlement potential" was identified for each landform/physiographic region combination, (from the terrain unit properties table of June 28, 2014 in Attachment 1), to determine the worst case thaw settlement potential (low, moderate or high) for each pipeline segment.

The procedure is detailed below:

1. Physiographic regions
   - Each segment was assigned a number from 1 to 7 for each of the 7 physiographic regions encountered along the route.

2. Route Terrain Unit / Physiographic Region combinations
   - The Terrain Units were uniformly formatted for processing.
   - All unique physiographic region number and terrain unit combinations from the route were associated and tabulated.

3. Terrain Unit / Physiographic Region combinations
   - Terrain unit/physiographic region combinations were compared against the available combinations from the geotechnical summary.
   - The description to a category of low, moderate, or high were uniformly formatted
     - Example: "Low to Moderate (High if excess ice in voids and fractures)" would be "Moderate, i.e. the more conservative description is retained.
   - Terrain unit/physiographic region combinations that were not specifically covered in the ASAP terrain units spreadsheet were assigned assumed thaw settlement categories.

i. Terrain units were assumed to have similar thaw settlement categorization to terrain units in adjacent physiographic regions.
ii. Terrain units with similar descriptions were assumed to have similar thaw settlement categorization.

- An expanded list of thaw settlement categories for terrain units and physiographic regions was compiled.

4. Apply Terrain Unit / Physiographic Region to Route
   - The thaw settlement category for each Landform of each terrain unit in each segment was selected based on the previously evaluated Terrain Unit/Physiographic value (1 = low, 2 = moderate, 3 = high).
   - The thaw settlement category for each segment was assigned based on Landform (i.e. the worst subsurface layer regardless of strata thickness).

Terrain Unit determinations that were inconsistent with the other terrain unit conventions were evaluated separately.

3.3 POTENTIAL REFINEMENTS

As was noted earlier, there are a series of refinements that could be used as additional data, and analyses utilizing that data, are utilized. These refinements include:

- Additional borehole and soil sample data to refine the soil index properties that are used in the geothermal determination (esp. the soil moisture content).
- Additional geothermal analysis of climatic variations along the ROW.
- Additional geothermal analysis of varying vegetative cover along the ROW.
- Refinement of wetlands data in site specific locations.

Each of these effects could be expected to further eliminate those route segments which are potentially susceptible and/or to refine the extent of the thaw settlement effects, as determined by this analysis using the existing data.

4. RESULTS OF TERRAIN UNIT EVALUATION FOR THAW SUSCEPTIBILITY

4.1 EVALUATION METHODOLOGY

Following the flowchart presented in Figure 3, above, the route segments south of the discontinuous zone (i.e., south of MP 634), were screened out and excluded from the wetlands analysis since the

subsurface is generally considered to be thawed and thus is not susceptible to thaw subsidence (Table 1). Similarly, route segments north of MP 168 were screened out and excluded from the study since the analysis in the areas of continuous permafrost conducted for this study and reported in AGDC 2016c, were found not to have a thermal impact outside of the ROW (Table 1). The remaining 466 miles were evaluated for potential thermal impact based on their Terrain Unit classification and the corresponding evaluation table of their thaw settlement potential (Table 1).

4.2 EVALUATION RESULTS

The Project GIS is the repository for the information that is spatially linked to the route and facility areas. It includes a spatial description of the Terrain Units along the route and was queried to find the intersection of the route with those Terrain Units using the methodology described in this document.

The results showed that for the 466 miles of the pipeline within the discontinuous region, 191.4 miles possessed a high thaw susceptibility potential, 65.5 miles possessed a moderate thaw susceptibility potential, and 178.3 miles possessed a low thaw susceptibility potential. The remaining approximately 31 miles were uncategorized and thus were conservatively assumed to have a high thaw susceptibility potential. These results are summarized below.

The 178.3 miles of pipeline ROW that possess a low thaw susceptibility potential were screened from further wetlands analysis (Table 1). The 287.7 miles that were categorized as having high or moderate thaw susceptibility potential (Table 1) were carried forward for analysis of potential indirect impacts to wetlands using further GIS queries and site-specific determinations, as reported in Chapter 5 and Attachment 2.

Table 1. Mileage of Thaw Susceptible and Non-Susceptible Land Traversed by the ASAP Mainline

CATEGORY	MILEAGE
Total Mainline Route Length	733
Excluded North of MP 168 (Continuous Permafrost)	-168
Excluded South of MP 634 (South of Discontinuous Demarcation)	-129
Excluded Low Thaw Susceptibility Terrain Units	-178.3
Remaining Potential Thaw Susceptibility	**287.7**

5. WETLANDS INDIRECT IMPACT EVALUATION

Surface water provides an important positive feedback that enhances permafrost degradation when water is impounded in subsiding depressions. In addition, groundwater in the active layer or within permafrost delivers heat and is often surrounded by thawed zones (Jorgenson, et. al, 2010). AGDC tasked its wetlands subject matter experts with evaluating which wetlands types would be generally associated with already thawed permafrost and to use this to screen areas that would be indirectly impacted by potential permafrost thaw, potential subsidence, and potential drainage.

Based on prior geothermal modeling (AGDC 2016c), there is a potential for indirect lateral permafrost thaw within a conservative 35ft TAZ on either side of the ROW due to vegetation removal within the ROW. This thaw has been modeled to extend down to a maximum 1 meter (3.3ft) bgs, however this thaw depth will be extremely variable. Therefore, it is assumed for the purposes of this study that an approximately 8 inches (or 20% of maximum) subsidence of underlying soils is possible across the entire 35ft buffer. Based on this assumption, the area within the TAZ was reviewed for potential impacts to wetlands experiencing an 8in subsidence within the TAZ.

5.1 WETLANDS APPROACH

AGDC provided its wetlands subject matter experts with a geodatabase describing terrain units with moderate or high potential for discontinuous permafrost thaw within the indirect TAZ. Qualifying areas were then evaluated for wetlands, screening out types that are generally associated with thawed permafrost. Wetlands that generally would maintain a deeper active zone or thaw bulb, under existing conditions were expected to have a low probability of experiencing an effect from subsidence because the affected areas under them would already be thawed within the interval of analysis. Wetlands types that were screened through this analysis included lakes, ponds, riverine wetlands, and wetlands with a Cowardin class that had a hydrologic modifier, indicating a permanently, semi-permanently, or seasonally flooded water regime. AGDC's wetlands subject matter experts then removed any remaining wetlands with a depressional hydrogeomorphic (HGM) class, as these also generally indicate existing thaw. Finally, uplands were screened from further analysis with the exception of those having a localized potential for impact to abutting and qualifying wetlands. Flat and slope wetlands having a saturated hydrologic modifier comprised the majority of wetland types within the indirect TAZ and were carried forward in the analysis.

The TAZ was subdivided among similar ecological units in order to evaluate wetlands within the same regional conditions. From north to south these regions included: Brooks Range (MP 168 to MP 250), Yukon (MP 250 to MP 356), Fairbanks area (MP 357 to MP 454), Broad Pass (MP 454 MP 608); and South Central (MP 608 to MP 634).

Permafrost thickness was taken into account in potential impact scenarios with respect to the potential to dewater wetlands. Thicker permafrost is generally expected toward the northern sections of the discontinuous permafrost study area (MP 168 to MP 454), and thinner permafrost is generally expected in more southerly areas from MP 454 to MP 634. The presence of standing water and shallow groundwater was also considered due to the potential of these sources to exacerbate permafrost thaw through a more efficient heat transfer process (Jorgenson et al. 2010). AGDC's wetlands scientists similarly considered the potential ponded water effect that may result in the subsidence depression.

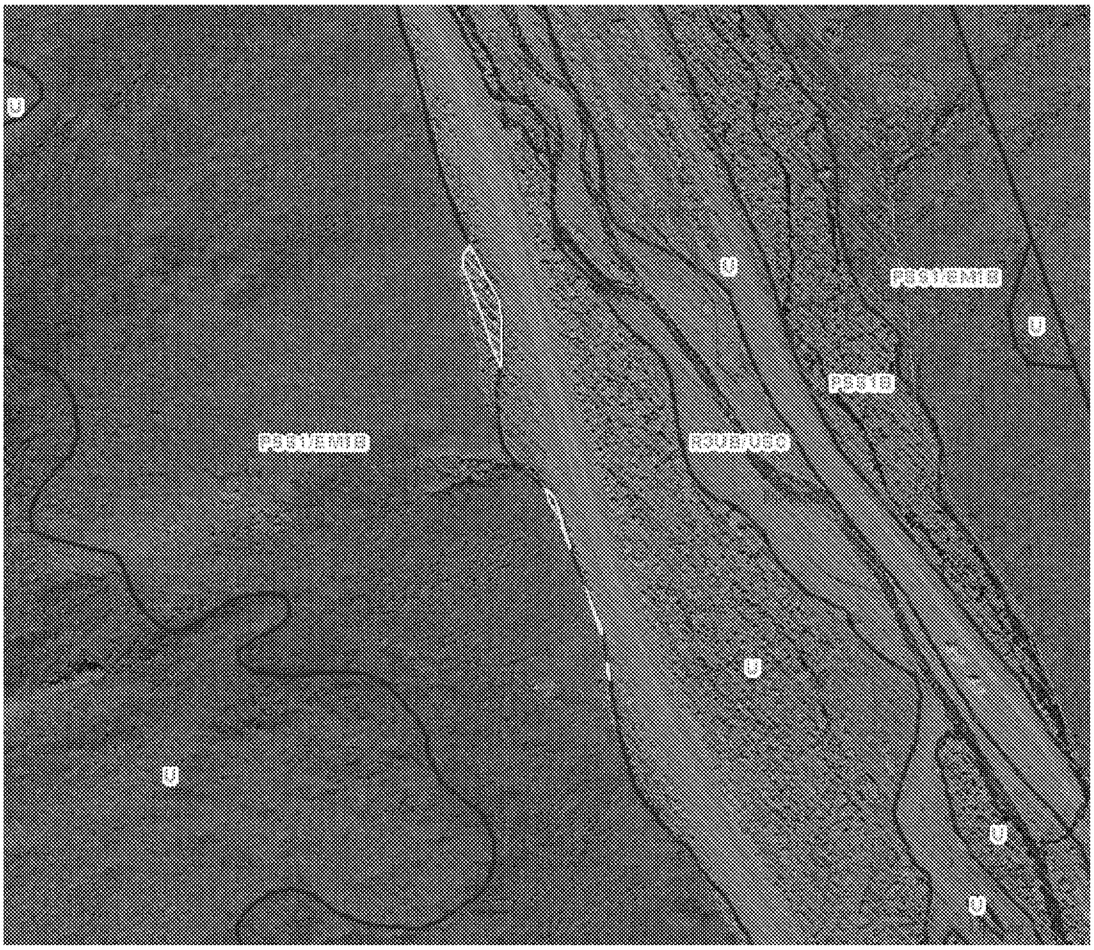
AGDC's wetlands subject matter experts have considerable field experience in the ASAP pipeline corridor, documenting that many parts of the study area are overlain by histic epipedons, which are fairly thick saturated organics over low chroma mineral soils. These soils occur primarily in scrub shrub and forested areas but also encroach in to mixed shrub and emergent wetlands. Emergent wetlands in the corridor tend to be underlain by histosols, which are thick saturated organics (fibric/histic/hemic). Emergent wetlands tend to hold more water than shrub and forested wetlands. The consultants further used vegetation signatures and Cowardin wetlands mapping to assist in determining the expected soil profile within the TAZ in order to better estimate the potential for ponding impacts and their extent. LiDAR data was also evaluated in potentially impacted areas to assist in determining the potential for surface water and the direction of shallow subsurface water flow.

The study was designed as a high-level analysis for the purposes of evaluating impacts to wetlands on a large scale, so there is a potential for some localized effects outside this level of analysis. Descriptions and visual examples are provided, below, to provide representations of these potential impacts and areas of anticipated thawing within the indirect TAZ.

5.2 BROOKS RANGE (MP 168 TO MP 250)

This area, shown in Figure 8, is not expected to result in indirect impacts to wetlands in the TAZ. This area has moderate potential for permafrost thaw and encroaches slightly into the abutting area of low potential were wetlands exist (note that some slight mapping irregularities exist between the wetlands scientists and the terrain unit modelers).

Figure 8. Moderate Potential for Permafrost Thaw in Wetlands of the Brooks Range Area (MP 168 – 250)



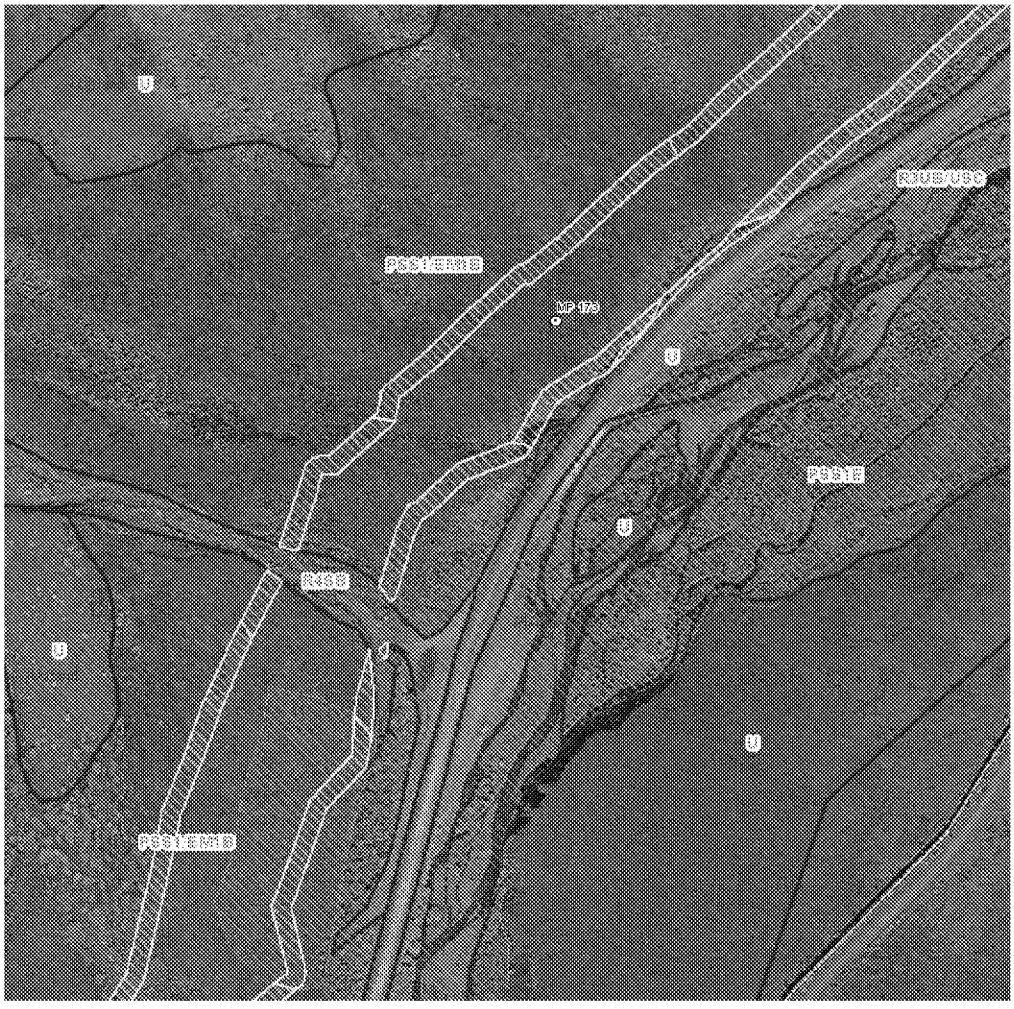
5.2.1 Brooks MP 173

This area represents mixed Scrub Shrub/ Emergent wetlands slope wetlands along the Brooks Range, and adjacent to the upstream side of the Dalton Highway (Figure 9). The wetlands within the TAZ are newly forming wetlands with fairly well-drained gravelly soils. The hydric soil indicator used is problematic soils with low carbon content described in the 2007 Supplement (Page 88, USACE 2007). The profile generally consists of 4 to 5 inches of organics underlain by course gravels that are a result of old alluvial fans at the toe of slopes.

Over time, wetlands have begun to form in these areas due to large hydrologic input and soil development that affords prevalence of hydrophitic vegetation. Field evidence showed shallow ponding and flowing water exists immediately below the organic surface; the slope toward the road allows the water to run downward to the road ditch were it is captured and directed along the road

to culverts discharging to the adjacent river. While thaw settlement is expected along the upslope side of the TAZ, no ponding is anticipated due to the soil profile make up. However, for the downslope side of the TAZ, settlement could result in increasing the size of the existing roadway ditch and adding hydrology to the wetlands associated with that downstream area. For portions of the downstream side that are separated from the road ditch, the effects are expected to resemble the upstream side.

Figure 9. Downslope Area for Wetlands



5.2.2 Brooks MP 184

This area, shown in Figure 10, is very similar to the area at MP 173, with the exception of the soils being generally more indicative of Histic Epipedons. The vegetation has a much smaller component of emergent grasses and sedges and is typically a little drier in the subsurface because it does not receive as much water as areas that are associated with alluvial fans. These areas appear to be much

older, and the hydric soils have been given time to fully develop. The difference in these areas is that the upslope side settlement could result in ponding over time due to the poor drainage of the soils. The downstream side could experience the same effect. Linear drainage down the ROW could be mitigated through ditch plugs or some other mechanism found to be appropriate and practicable for the design.

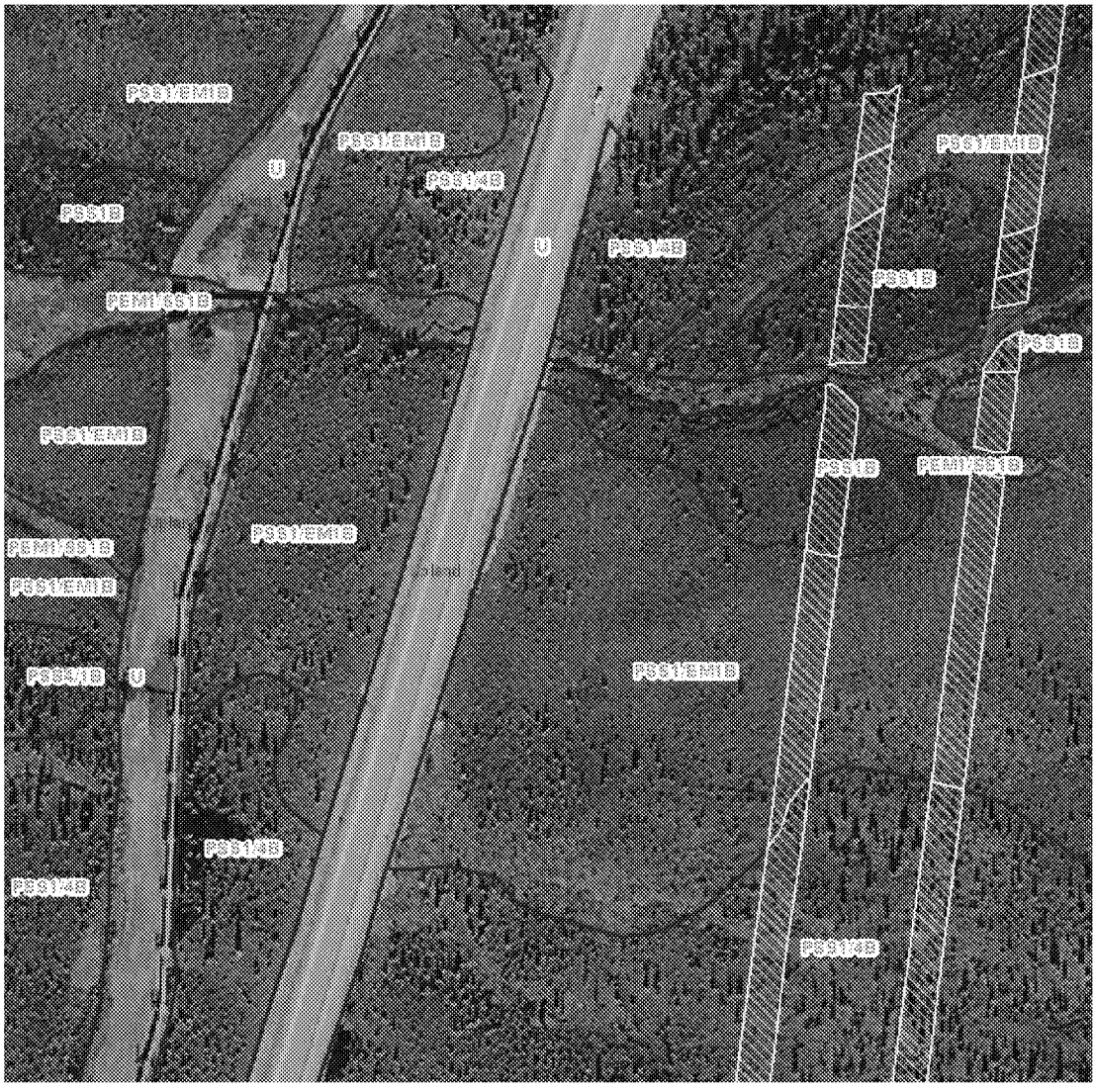
Figure 10. Brooks MP 184 Area

5.2.3 Brooks MP 219

Figure 11 is an example of a flat wetlands with a mixed vegetative makeup. While subsidence here is expected, long term results are not be expected to alter the overall makeup of the wetland. The adjacent TAPS provides a good analogy to what a similar ROW clearing would have on the nearby uncleared area. There does not appear to be a significant change to the surrounding area around TAPS over the nearly 50 years it has been operating. There could be a slight effect at the edge of

the ROW, as appears to be visualized along TAPS, but the overall habitat has not changed. Should current climate trends, coupled with ROW clearing, result in impacts suggested by Smith and Riseborough (2010) (which are not observed in TAPS), then potentially mirroring what TAPS has done may be beneficial in mitigating potential impacts.

Figure 11. Flat Wetlands with Mixed Vegetative Makeup at Brooks MP 219 Area



5.2.4 Brooks MP 234

This area, shown in Figure 12, is similar to the area presented at MP 173, with increasing the hydrology around the Dalton Highway ditch; however, the ponding could last longer and result in additional permafrost thaw over time because flat wetlands with poorly drained soils would be

expected to hold water longer. Emergent wetlands could form along this area due a change in the hydrology. It is possible that effect of the dust shadow from the Highway could offset increased hydrologic impacts.

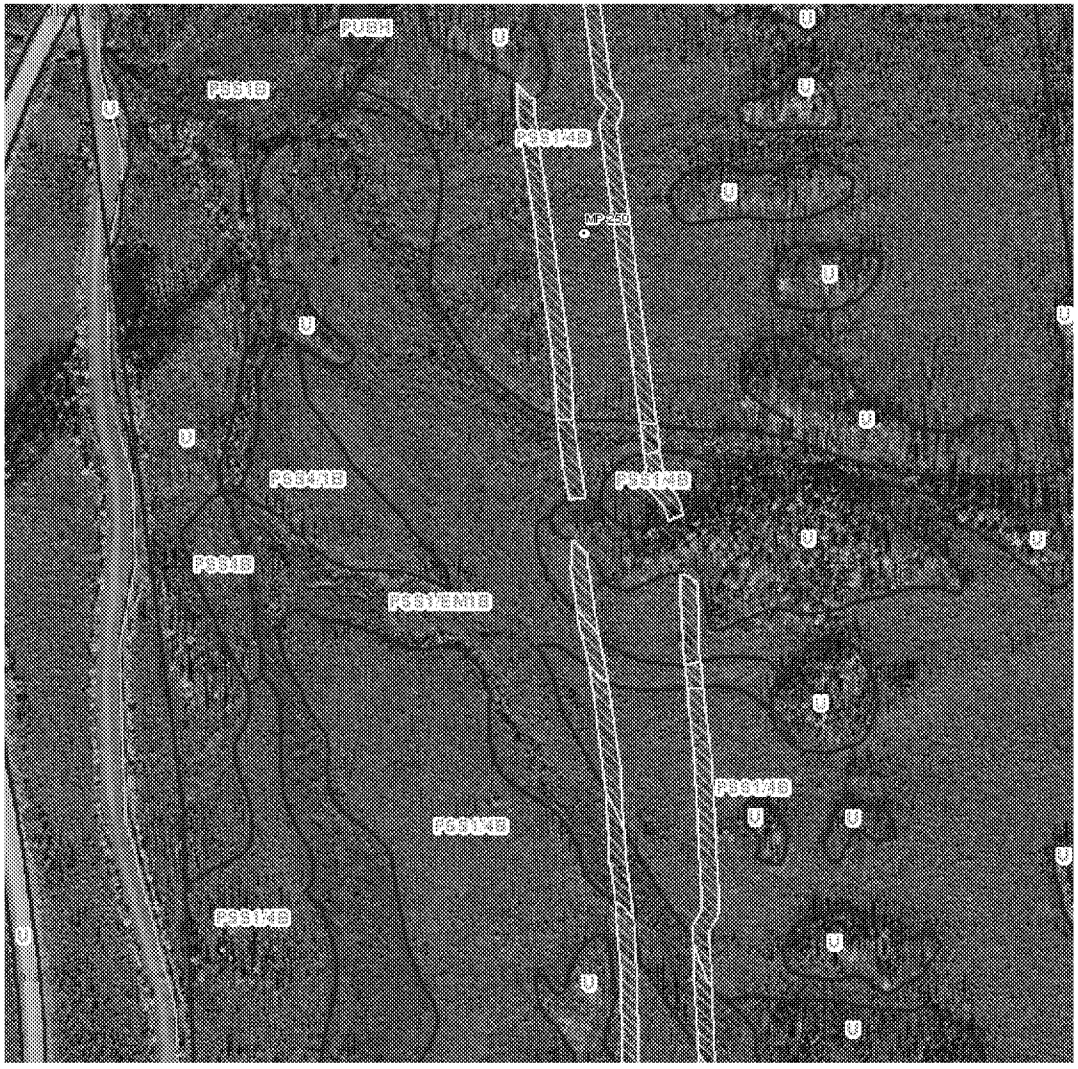
Figure 12. Brooks MP 234 Area

5.3 YUKON MP 250 TO MP356

5.3.1 Yukon MP 250

This area, shown in Figure 13, may experience significant drying along the edge of the ROW due to dryer soil conditions being better drained than the area at Brooks MP 219. The predominant deciduous scrub/shrub wetlands indicate the presence of a dryer soil profile. As evidenced along TAPS there appears to be a clear indication of taller shrubs and trees potentially developing over time at this location. The dryer soils and re-establishment of vegetation could, over time, afford a re-establishment of permafrost here. This may have been what limited the habitat change evidenced around TAPS.

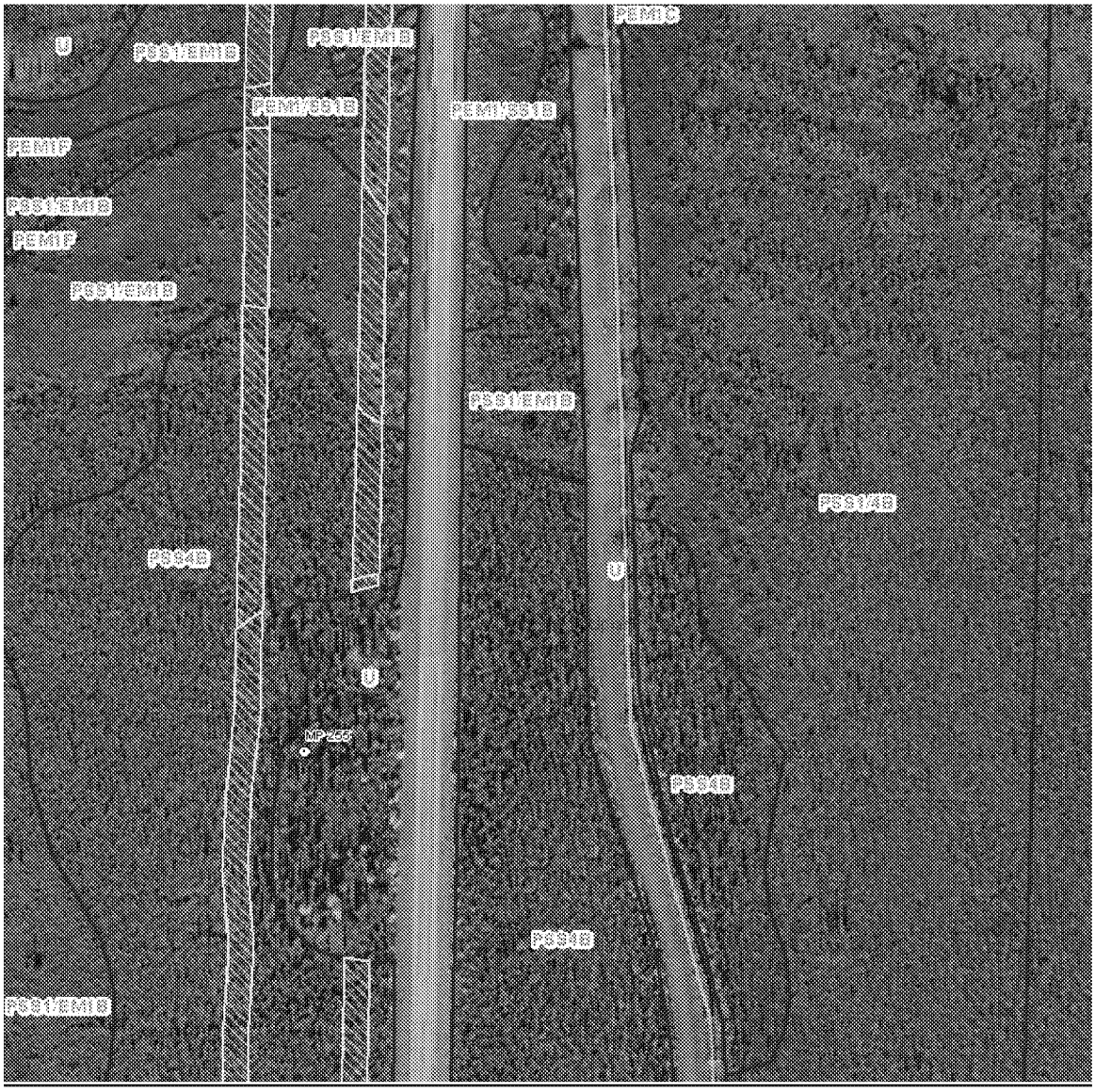
Figure 13. Yukon MP 250-356



5.3.2 Yukon MP 255

This area, shown in Figure 14, is dominated by taller evergreen shrubs (PSS4B). Although the area is very similar to that at MP 250, TAPS does not show the effect of potential habitat change immediately adjacent to the ROW. The taller evergreen shrubs in the area may encroach slightly into the mixed wetlands abutting the PSS4B, but overall, no significant habitat change is anticipated.

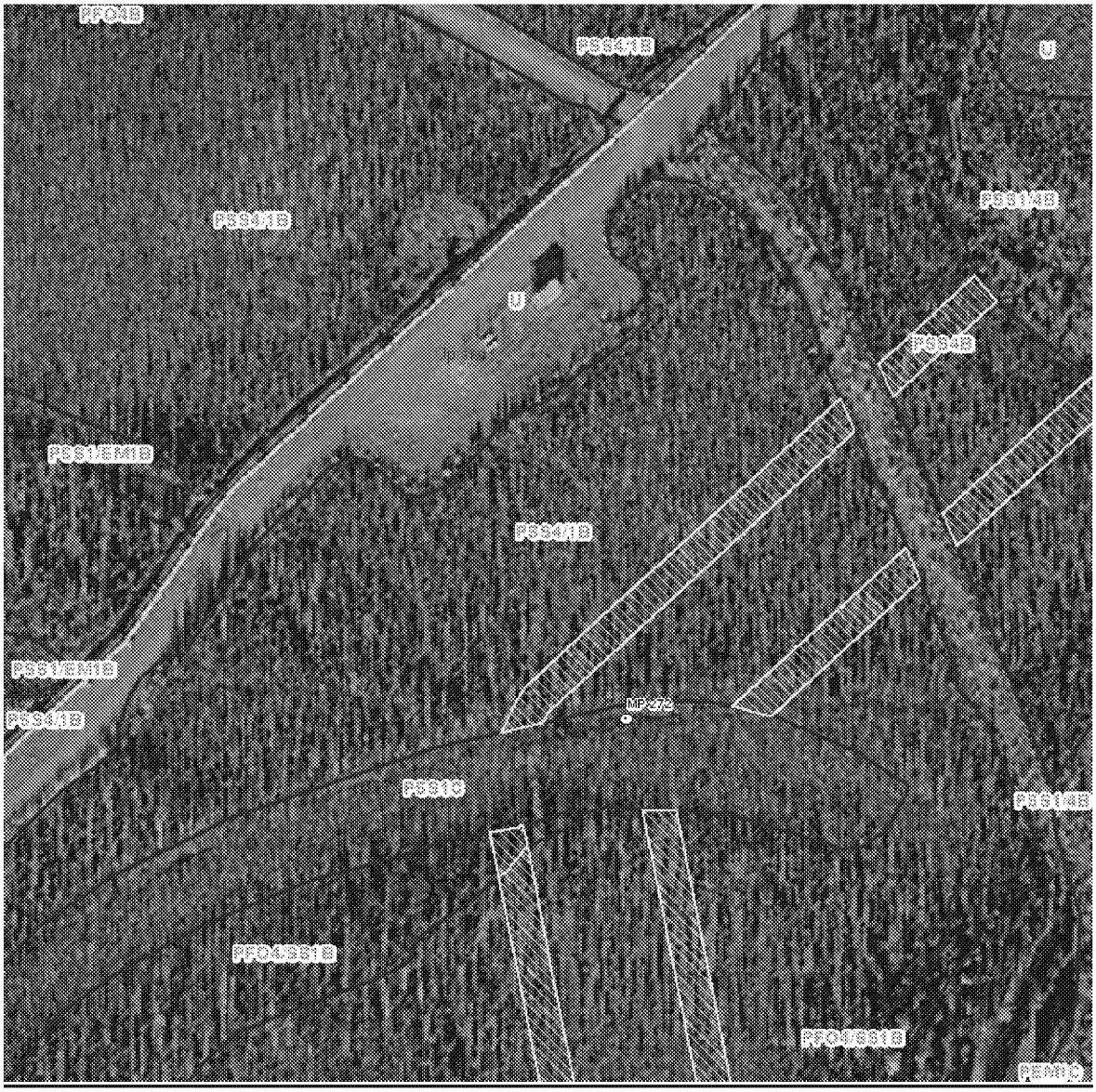
Figure 14. Taller Evergreen Shrubs Near Yukon MP 255 Area



5.3.3 Yukon MP 272

This area, shown in Figure 15, is very similar to MP 255. However, as seen along the increased cleared area near TAPS facilities, there appears to be no change in habitat adjacent to the ROW. This evidence strengthens the likelihood that ASAP ROW clearing would not result in significant impacts to the adjacent indirect TAZ.

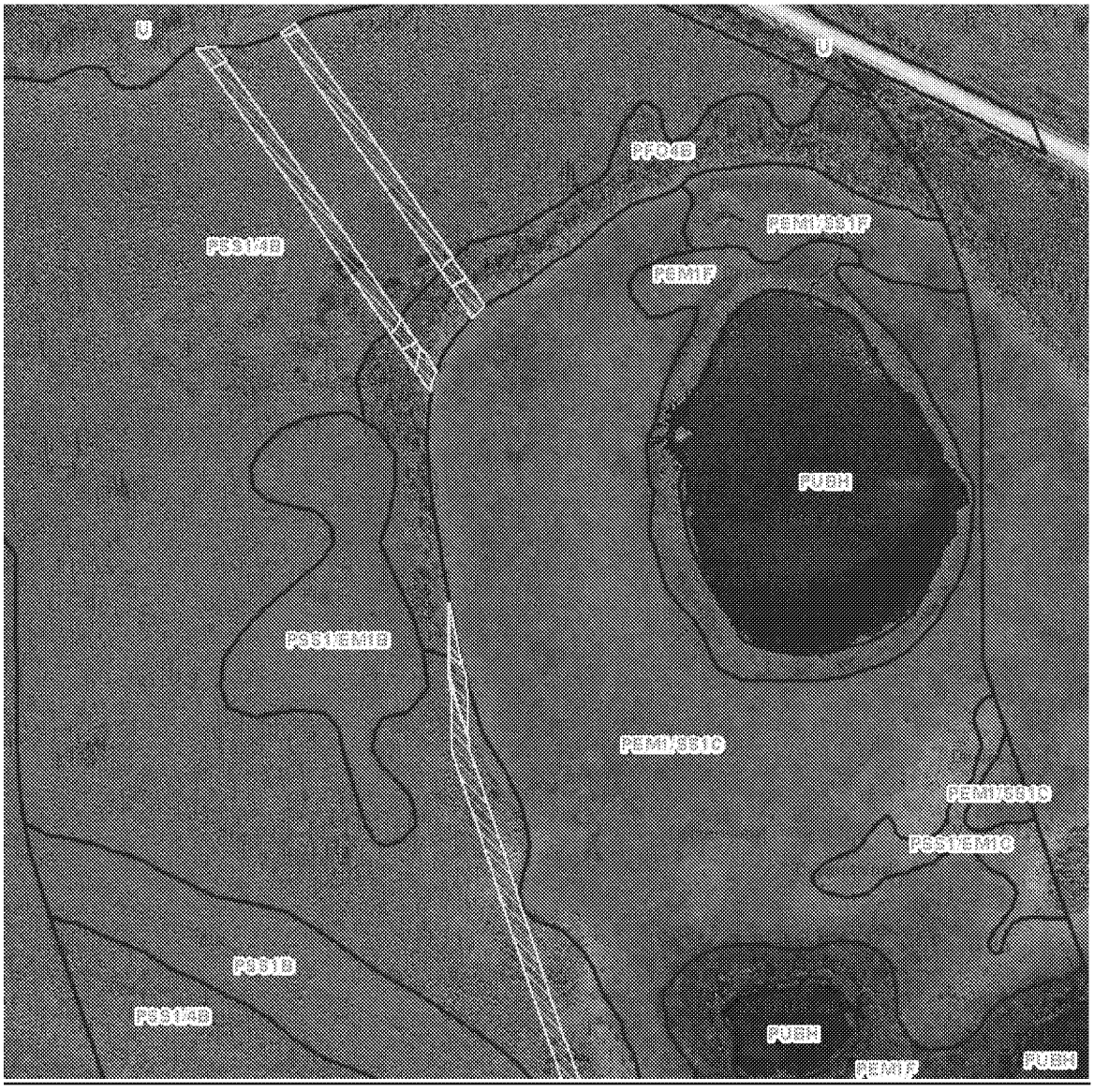
Figure 15. Yukon MP 272



5.3.4 Yukon MP 355

For areas in which the indirect TAZ is abutting a depressional wetland with increased hydrology (Figure 16), there is the potential for expanding the depressional wetland within the TAZ. This would appear to ultimately enlarge these habitats and increase the overall function and services provided by the current dryer shrub wetlands. The effect would be very limited and likely only occur at the edge of the two habitats.

Figure 16. Yukon MP 355

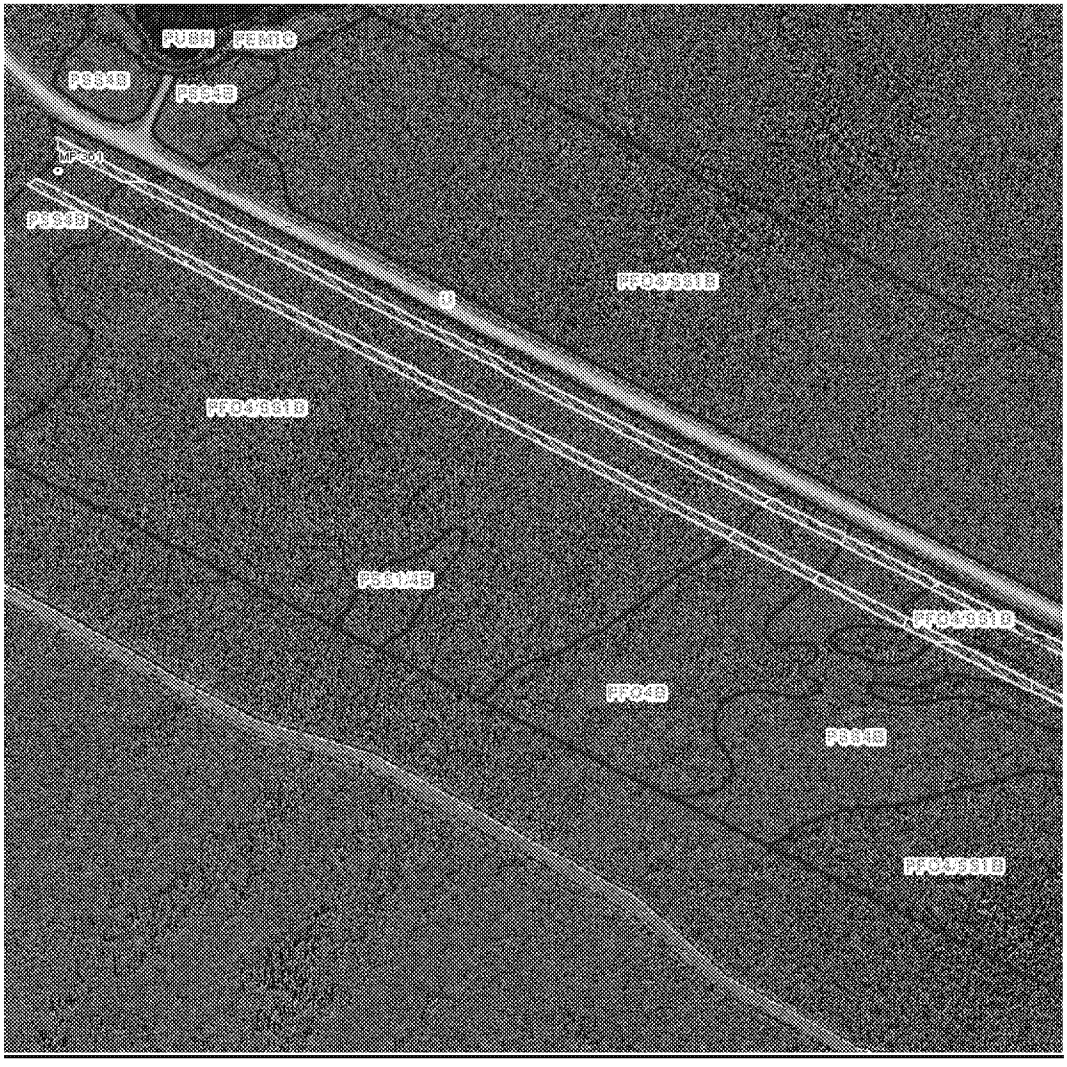


5.4 BROADER FAIRBANKS REGION (MP 357 TO 454)

5.4.1 Broader Fairbanks Region MP 361

This area, shown in Figure 17, is very similar to Yukon MP 255 except that the vegetation is composed of a forested wetland dominated by black spruce. Similar effects are anticipated in that the dryer subsurface that affords taller vegetation, and this area should not experience significant indirect impacts. The TAPS ROW in the frame seems to strengthen this prediction in that the forested side of TAPS does not exhibit a vegetative change. The shorter shrub side of TAPS does appear to exhibit a small local change in vegetation, so a similar result could occur for ASAP. No wetland conversion is anticipated.

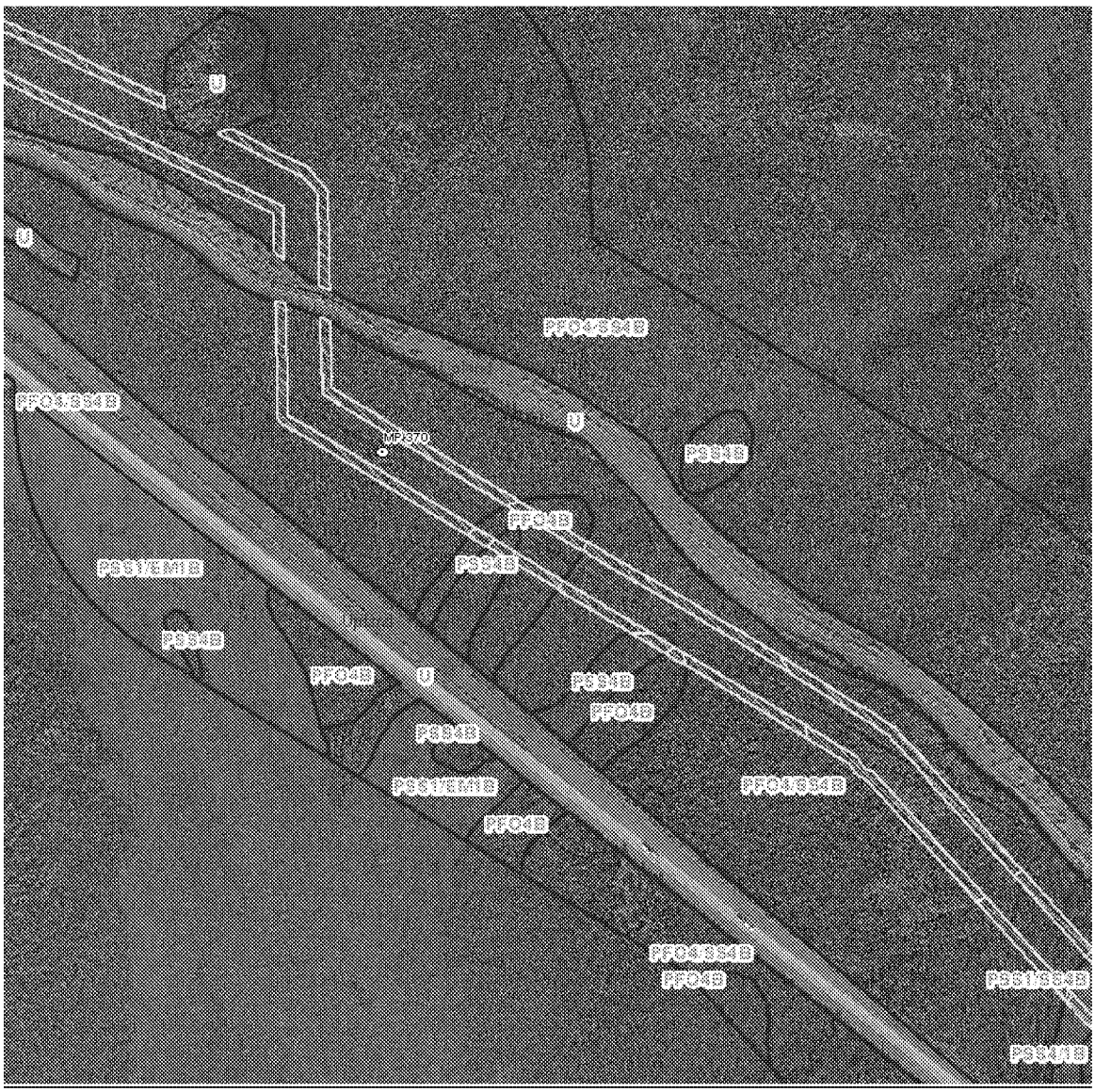
Figure 17. Broader Fairbanks Region MP 361



5.4.2 Broader Fairbanks Region MP 370

This area, depicted in Figure 18, shows a transition zone along TAPS where the pipeline goes underground. Note that the heated TAPS line does not appear to present a lateral effect on the surrounding taller flat shrub and forested wetlands. Therefore, the ASAP ROW clearing and cold gas pipeline should similarly not result in significant effects to wetlands. Also note the thin cleared ROW currently present along the TAZ; this area shows no significant impact to adjacent wetlands.

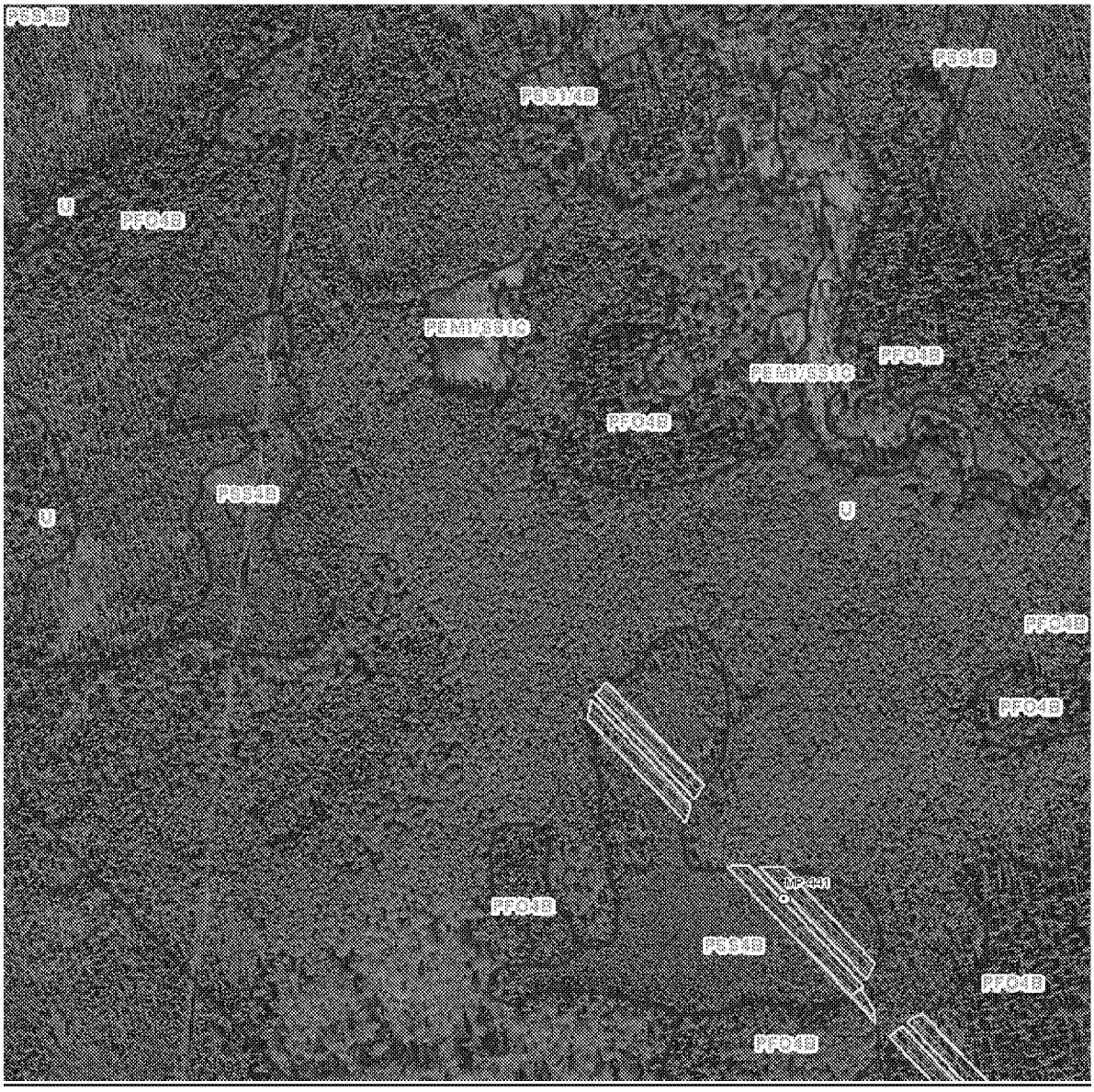
Figure 18. Broader Fairbanks Region MP 370



5.4.3 Broader Fairbanks Region MP 441

This ASAP pipeline transects taller shrub habitat in this area, and no substantial impacts to adjacent vegetation are expected in the indirect TAZ (Figure 19). As evidenced by the adjacent cut ROW in Figure 19, the impacts would be localized within the actual ROW.

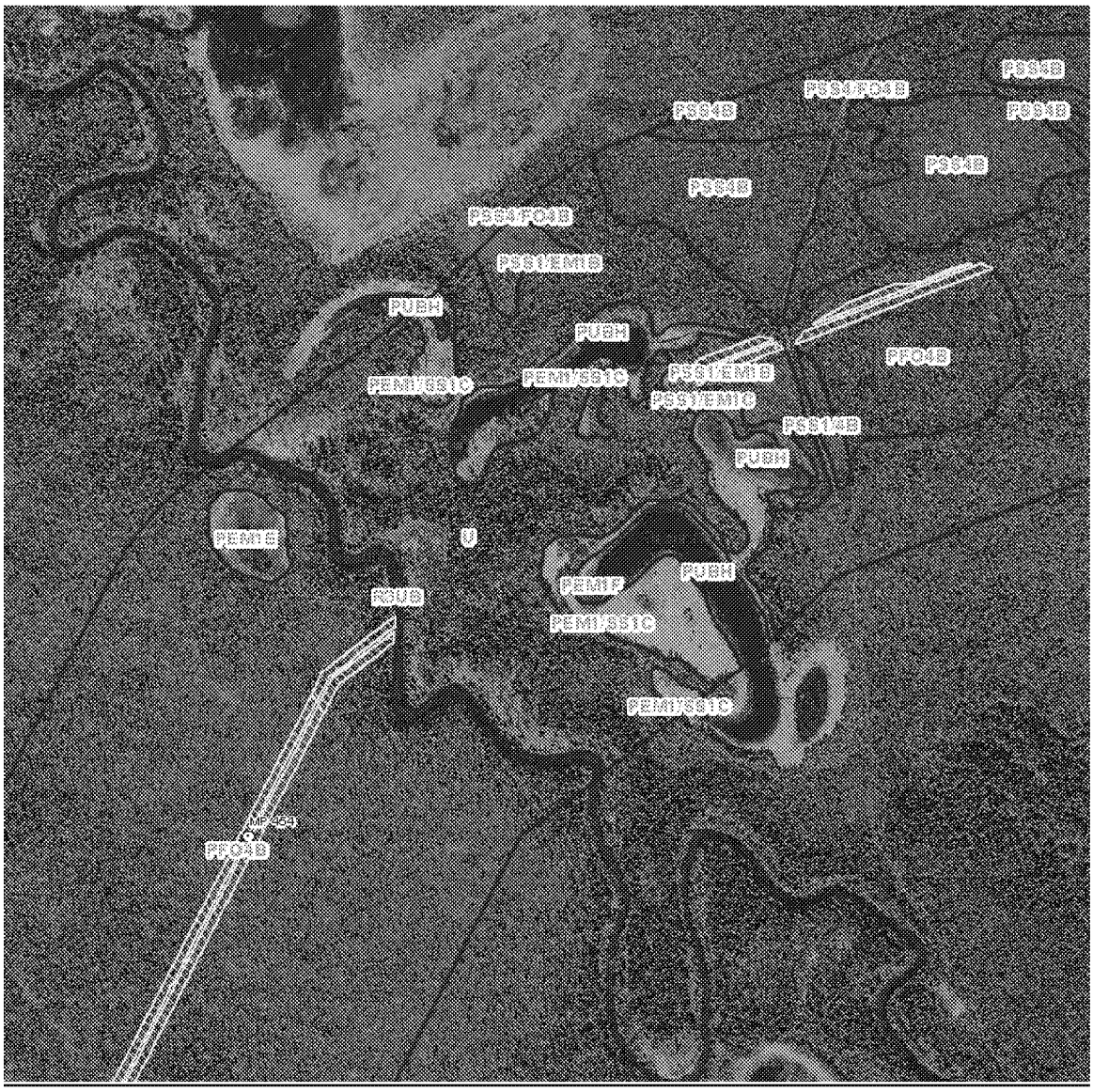
Figure 19. Broader Fairbanks Region MP 441



5.4.4 Broader Fairbanks Region MP 454

In areas, such as near MP 454 (Figure 20), where the TAZ encounters larger rivers and streams, there exists a potential for localized bank sloughing due to thaw depression. This could occur only on banks that are not depressed wetlands, or wetlands with a very wet hydrologic regime. As the extent of the thaw bulb around the hydrologic feature is unknown, the analysis remains conservative, analyzing the TAZ up to the edge of the mapped feature, when in fact the presence of the thaw bulb could result in the removal of the TAZ.

Figure 20. Broader Fairbanks Region MP 454



5.5 BROAD PASS (MP 454 TO 608)

5.5.1 Broad Pass MP 455

This area is dominated by forested wetlands composed of black spruce; however, they have small inclusions of shrubs and emergent vegetation (Figure 21). As shown in previous examples, areas composed of taller shrubs and forest are not likely to experience any significant impacts due to a thaw depression forming. However, there could be localized impacts in the emergent and shrub layers. These intermixed layers could indicate that soil conditions have wetter inclusions; if that is true, then ponding could occur and result in additional thaw. However, if soils are fairly well drained, then these inclusions may be altered to have taller shrubs, as seen along TAPS. The relict survey line ROW clearing appears to indicate the latter is true and that the area would not experience significant vegetative or hydrologic alteration adjacent to the ROW.

Figure 21. MP 455

5.5.2 Broad Pass MP 475

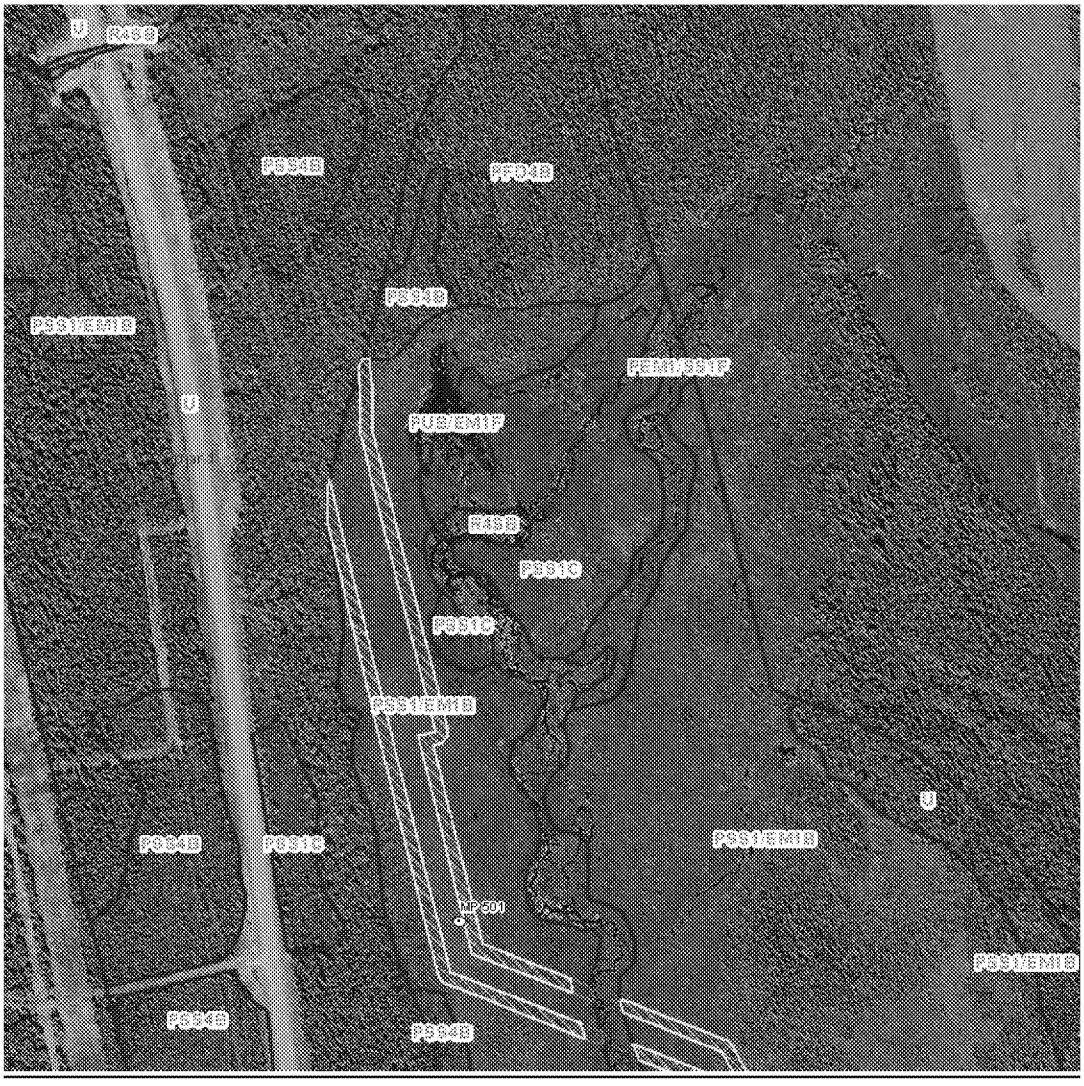
As shown along MP 454, this area may experience bank sloughing form a depression forming in the flat wetlands adjacent to the river (Figure 22). It is unlikely that significant indirect impacts would be observed if the river thaw bulb extends into the TAZ.

Figure 22. Broad Pass MP 475 Area

5.5.3 Broad Pass MP 501

It is possible that some minor upland conversion could be experienced in the TAZ in this area. Dominant saturated wetlands and a more persistent saturation to the surface are seen in the adjacent PSS4B wetlands (in the bottom left) associated with the clearing (Figure 23). It appears that, in the presence of significant surface impact, the water conditions could spread toward the upland edge and saturate the area to the point that wetlands may begin to form. While the localized change may be significant, the effect on the overall area would appear to be negligible. Additionally, some minor sloughing could occur where the TAZ crosses small water conveyances in wet depressions.

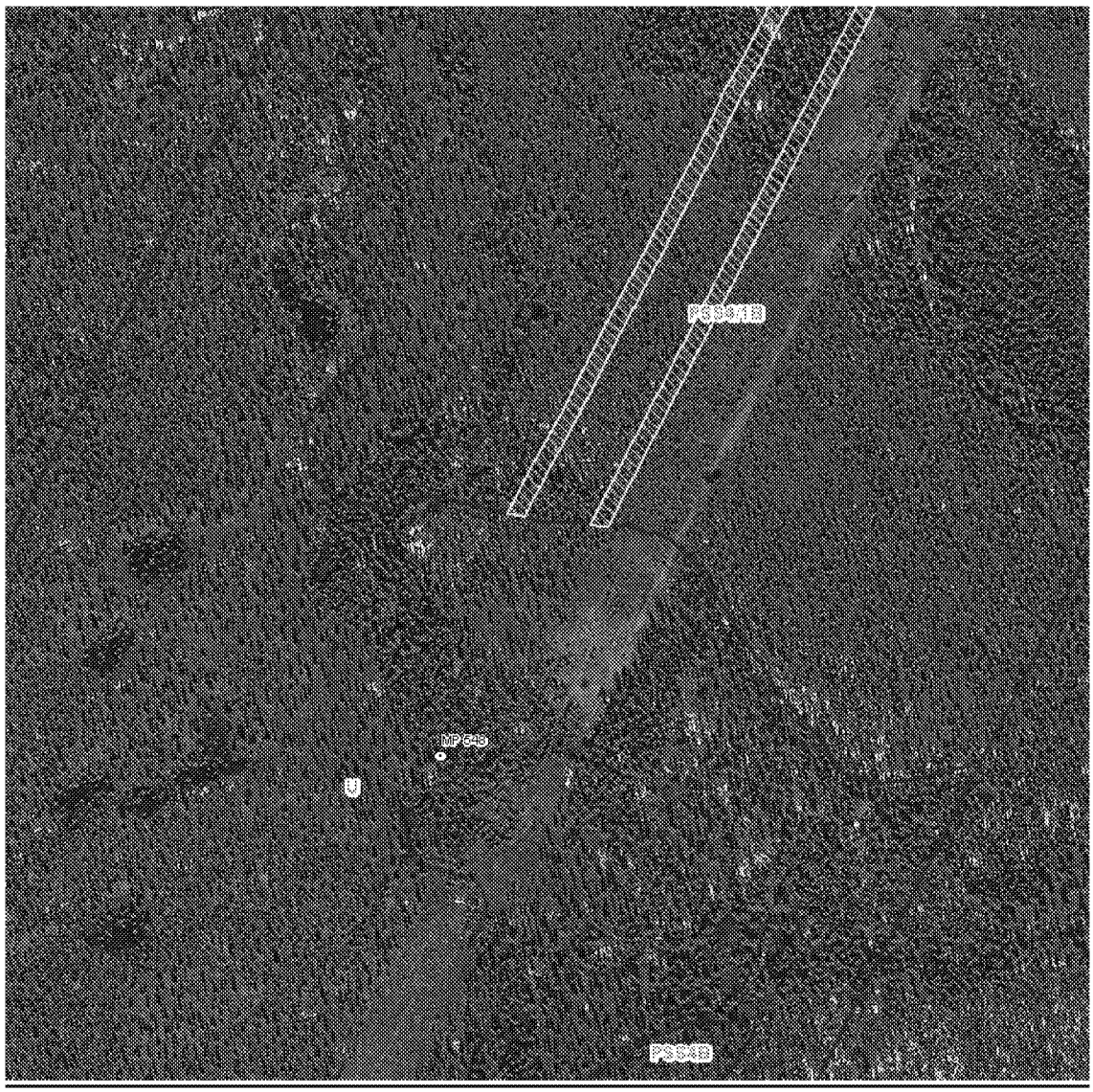
Figure 23. Broad Pass MP 501 Area



5.5.4 Broad Pass MP 548

As the TAZ moves south, there appears to be larger areas where thaw depressions are less likely. Figure 24 depicts an area very similar to other areas where the presence of adjacent ROW clearing appears to substantiate the expectation that no significant impacts would occur in areas with taller vegetation. However, near inclusions with near surface persistent saturation, additional thaw could be experienced. This would result in ponded inclusions and the establishment of emergent vegetation. Based on Figure 24, such instances do not appear to be wide-spread and are likely to be more the result of clearing associated with significant ground disturbance.

Figure 24. Broad Pass MP 548 Area



5.6 SOUTHCENTRAL MP 608 TO 634

5.6.1 Southcentral MP 613

Habitats crossed by the TAZ in the Southcentral region are very sporadic and are composed of larger scrub shrub and emergent inclusion within large upland complexes or near areas where a low probability of permafrost thaw is expected (Figure 25). Impacts in these areas most likely include ponding and sloughing of upland soils, which would expand the wetland inclusion slightly. Some persistent thawing due to water collecting in ponded areas may occur.

Figure 25. Southcentral MP 613

6. RESULTS AND FINAL ROUTE SUMMARY

AGDC directed its geothermal and wetlands subject matter experts to evaluate the potential for impacts to an indirect TAZ over a 30-year life of project. The analysis, described in detail above and in Attachments 1 and 2, resulted in the tabulation of a maximum 1,037.20 acres of wetlands that have the potential to be indirectly impacted by thawing permafrost, assuming subsidence and drainage of wetlands for all areas (Table 2). Case studies for other projects, such as TAPS, give reason to believe that actual indirect impacts to wetlands in the TAZ will be much lower than the maximum possible extent reported here.

This evaluation does not take into account continual monitoring efforts (AGDC 2016b), field investigations and activities, and mitigative options (see Section 7) that will occur during the Operations and Maintenance phase of the Project. These activities would further avoid and minimize potential indirect thaw to permafrost under wetlands. Additional impacts to permafrost that are projected as the result of climate change are also not included in these results; however, these are discussed in a separate report, entitled, 'Effect of Climate Warming on Expected Long-Term Thaw Depths on the ASAP Right-of-Way, Alaska Stand-Alone Pipeline Project' (Matrix Solutions 2017).

Table 2 provides a breakdown of potential indirect impacts within the TAZ by Cowardin classification code, terrain unit type and thaw settlement potential.

Table 2. Potential Indirect Impacts within the TAZ by Cowardin Code, Terrain Unit, and Thaw Settlement Potential

Cowardin Code	Primary Terrain Unit	Thaw Settlement Potential	Acres
PEM	C	High	0.11
PEM	Cs	High	0.08
PEM	Elx	High	0.98
PEM	Fp	Moderate	0.14
PEM	Fpa	Moderate	0.13
PEM	Fpb	Moderate	0.87
PEM	Fpm	Moderate	0.50
PEM	Fpt(ft)	Moderate	0.07
PEM	Fpt-Ca	Moderate	0.93
PEM	Fs	High	28.52
PEM	Fs(ft)	High	1.63
PEM	Fss	High	0.15
PEM	Lt	High	0.17
PEM	O	High	1.13
PFO	Unavailable	Yes - No Terrain Unit Data	5.19
PFO	C	High	0.15
PFO	Ell	High	23.12
PFO	Elx	High	34.02

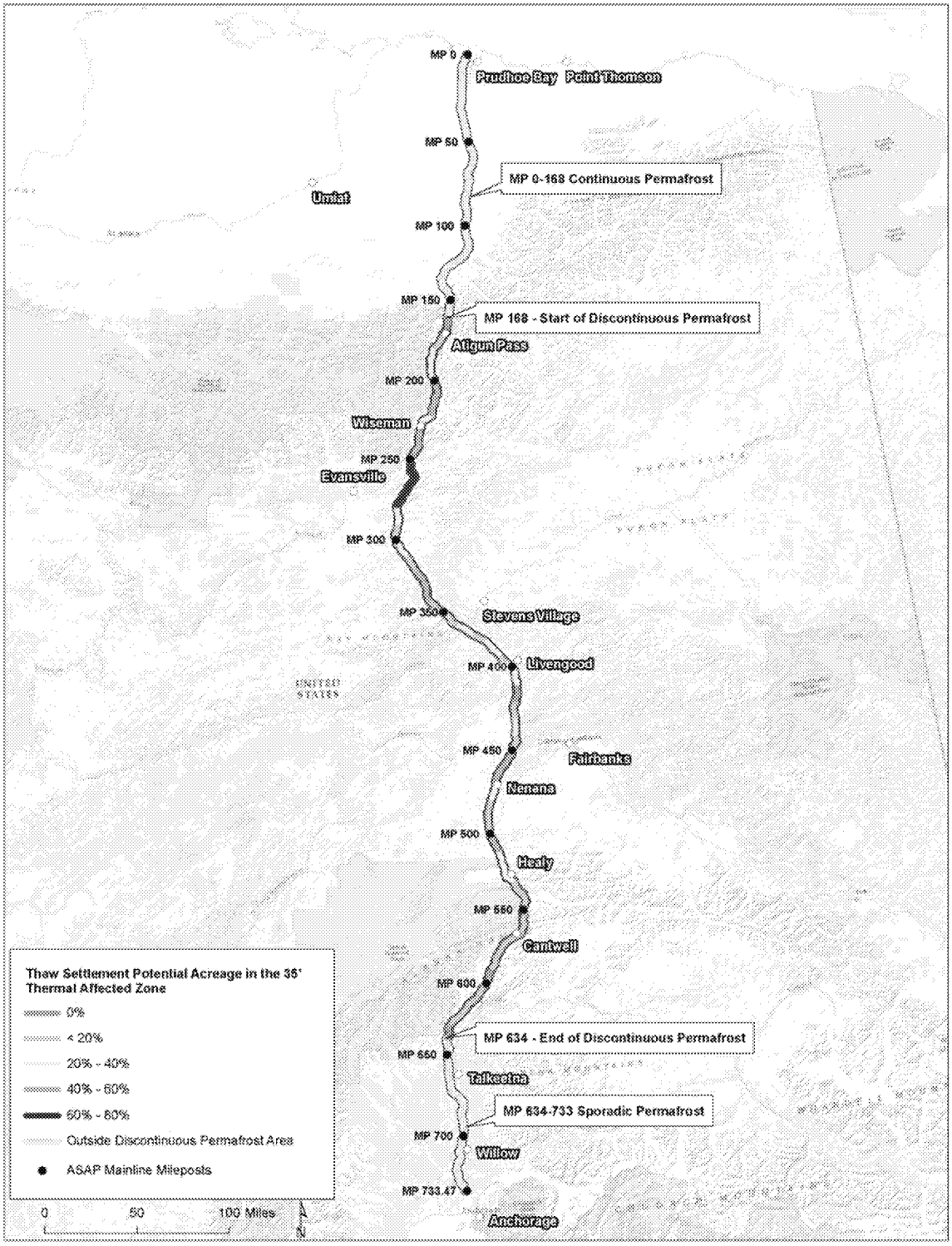
Cowardin Code	Primary Terrain Unit	Thaw Settlement Potential	Acres
PFO	Fp(ft)	Moderate	0.01
PFO	Fpa	High	0.13
PFO	Fpa	Moderate	1.97
PFO	Fpab-Ca	Moderate	0.26
PFO	Fpab-Rc	Moderate	4.08
PFO	Fpb	Moderate	3.13
PFO	Fpm	Moderate	2.28
PFO	Fps	Moderate	21.57
PFO	Fpt	Moderate	0.39
PFO	Fpt(ft)	Moderate	0.02
PFO	Fpt-Ca	Moderate	0.70
PFO	Fs	High	49.52
PFO	Fsf	High	4.93
PFO	Fsf(ft)	High	1.20
PFO	Fss	High	36.46
PFO	Fssa	High	5.35
PFO	Lt	High	0.13
PFO	O	High	0.80
PSS	Unavailable	Yes - No Terrain Unit Data	13.68
PSS	C	High	39.37
PSS	Ca	High	3.02
PSS	Cg	High	7.75
PSS	Cl	Moderate	1.43
PSS	Cm	Moderate	5.92
PSS	Cmx	High	0.24
PSS	Cs	High	29.48
PSS	Ell	High	5.99
PSS	Elx	High	69.49
PSS	F(fa)	High	0.09
PSS	Ffs	High	5.13
PSS	Fp	Moderate	2.66
PSS	Fp(ft)	Moderate	0.59
PSS	Fpa	High	15.58
PSS	Fpa	Moderate	8.67
PSS	Fpab	Moderate	0.47
PSS	Fpab-Ca	Moderate	11.78
PSS	Fpab-Rc	Moderate	0.11
PSS	Fpb	Moderate	20.98
PSS	Fpm	Moderate	7.50
PSS	Fpt	Moderate	1.30
PSS	Fpt(ft)	Moderate	11.19
PSS	Fpt-Ca	Moderate	30.31
PSS	Fpt-Ho	Moderate	14.29
PSS	Fpt-Rc	Moderate	10.26
PSS	Fpw	High	0.31

Cowardin Code	Primary Terrain Unit	Thaw Settlement Potential	Acres
PSS	Fs	High	396.03
PSS	Fs(fa)	High	0.66
PSS	Fs(ft)	High	1.41
PSS	Fsf	High	3.11
PSS	Fsf(ft)	High	0.45
PSS	Fss	High	38.94
PSS	Fssa	High	16.52
PSS	GU	High	7.54
PSS	Hs	High	0.02
PSS	Lt	High	0.67
PSS	O	High	23.39
		TOTAL	**1,037.20**

This table shows the acreage within the Thaw Affected Zone where wetlands have a thaw potential and terrain units have a high or moderate thaw settlement potential. In the absence of terrain unit data, the wetlands alone indicate thaw potential. The data are grouped by Cowardin Code.

The areas of land having thaw settlement potential, equating to a total of 1,037.2 acres within the TAZ, were found to be concentrated more heavily in some portions of the route than in others in the discontinuous permafrost region. To display this graphically, the area of land having thaw settlement potential inside the TAZ was divided by the total area of the TAZ in 10-mile increments between MP 160 and MP 640; the resulting percentages of thaw settlement potential in the discontinuous permafrost region were then mapped in 10-mile segments (Figure 26). The area with the highest percentage of thaw settlement potential (60 - 80%) existed between MP 250 – 280. Areas with moderately high percentage of thaw settlement potential (40 – 60%) existed between the ranges of MP 200 – 220, MP 240 – 250, MP 320 – 340, MP 450 – 470, and MP 500 – 510.

Figure 26. Relative Indirect Thaw Settlement Potential for Discontinuous Permafrost



7. MITIGATIVE OPTIONS

The following procedures may be employed to ensure that ROW integrity is maintained through all phases of the pipeline – Design, Construction and Operations. The following sections describe how each phase is deployed to undertake this mission so as to ensure integrity for the life of the project, employing, as required, mitigative measures for potential thermal impacts outside the ROW.

7.1 DESIGN

At this earliest phase of the project, the procedures for alignment selection are the most important to ensure minimal impact to the environment. Two guiding principles of special interest in the routing guidelines include the requirements to minimize routing through streambeds and wetlands. A large number of the latest rerouted segments in the current alignment are directly attributable to review of route wetlands and moves to adjacent segments that have no, or lessened, wetlands impact.

Another routing guideline of importance in this discussion is choice of routing segments that avoid, or minimize the impact of, potential geohazards; that is, hazards presented to the pipe and/or ROW by naturally occurring route features or those that may be altered by the project. Some of these geohazards are evident from surface traits such as earthquake fault traces and potential slope stability areas. Others, however, and as discussed in this report, as well as AGDC 2016c, are based on subsurface traits and are only discovered after detailed route evaluation and Terrain Unit identification. In many areas, the presence of subsurface frozen soils can be discerned based on the type of vegetative cover and this is a key element of project alignment studies. However, to quantify the magnitude of the hazard, subsurface investigations are conducted to find the frozen extent and the index properties of the soil regime to evaluate the impact.

These route investigations are ongoing throughout design and even into construction as will be seen in the succeeding section. As these investigations continue, potential impact areas are further evaluated and estimates refined to be more site specific. In the meantime, the project makes conservative bounding assumptions. In other words, the route evaluation based on conservative evaluations is further refined as design progresses.

Nevertheless, it is impractical, if not impossible, to avoid every route segment that may be susceptible to greater impacts from project activities and that may further impact wetlands outside the limits of the ROW. In this event, it is important to recognize the potential impact and guard against it using active design measures. The two most important design mitigative measures in this regard are revegetation and adequate surface water control.

7.1.1 Revegetation

Revegetation is the primary method for stabilization of frozen subsurface soils. The design of an active revegetation plan to restore the ground surface characteristics to the in situ condition, or an analogous condition would impede subsurface thaw. In this regard, a *Revegetation Plan* (AGDC 2016e) has been developed for the Project through efforts of the State of Alaska's Plant Material Center. The plan describes appropriate seed mixes and best practices for revegetation and soil stabilization based on the climate zones of the project.

7.1.2 Best Practice for Surface Water Control

The other design item to mitigate thaw depth progression and settlement is to employ active measures to intercept surface water flow and prevent sheetflow across and down the ROW. Surface water can be a serious erosional measure that can accelerate ROW settlement and impede other mitigative measures. The measures to control sheetflow at this time are identified, although their specific placement and sizing along the ROW requires site-specific definition during final design and even into the later project phases of Construction and Operations as discussed in succeeding sections. It is evident from experience and review of trial trenching programs that inattention to this design aspect can lead to serious erosional problems that become increasingly difficult to rectify. This topic is described in greater detail in AGDC 2016b.

7.1.3 Temperature Control

Another potential design that might be considered in some specific areas is temperature control. The most common method of temperature control along the ROW limits would be the use of thermosyphons (a.k.a. heat pipes) if the local climate is conducive to their use as described in AGDC 2016b,c. thermosyphons can mitigate thawing and stabilize thaw settlement by freezing the recently thawed ground. For the most part, however, this option is more effectively employed during Operations where site-specific monitoring can designate according site-specific requirements.

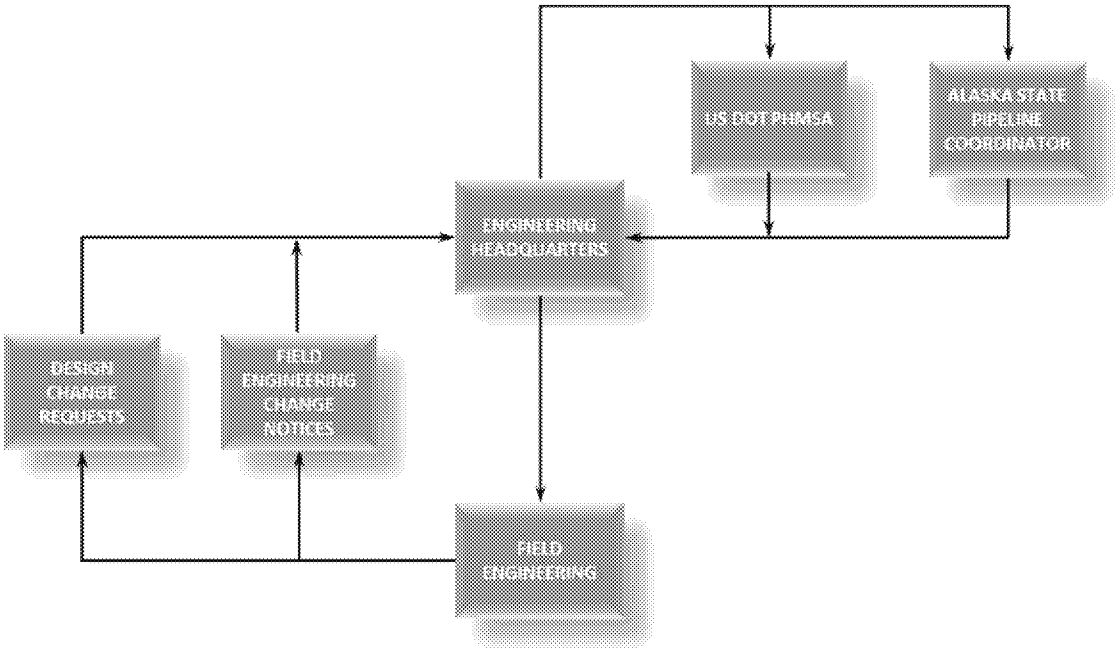
7.2 CONSTRUCTION

While the goal of the design process is to identify as accurately as possible areas where thaw settlement may be an issue, it is acknowledged there could be instances where installation conditions differ from those anticipated by design, thus requiring site-specific considerations. To address this potential scenario, the use of a field design change procedure to evaluate such areas in a timely fashion is employed. This follows the experience of TAPS Construction, as well as current North Slope Construction practices.

7.2.1 Field Design Change Procedure

A schematic of the design change control system is presented in Figure 27. This system is established to specify lines of communication, including communication with government review agencies where needed and as noted in the Figure. Depending on the circumstances of the route condition uncovered, the actionable review agency and the appropriate response procedures would differ. For issues related to pipe integrity, the USDOT PHMSA would be considered a key agency and, accordingly, issues such as a localized karst condition under the pipe centerline would require coordination with PHMSA and perhaps active coordination with the SPCO. For issues related to water crossings or ROW conditions involving wetlands, several agencies would need to be consulted.

Figure 27. Design Change Control System



7.2.2 Potential Mitigative Options during Construction

For Construction, the alignment is already well established, so rerouting outside of the detailed final alignment is not a viable option. The mitigative options are then limited to those physical measures which could be adopted during the Construction phase including:

- Micro Reroute – in some cases, the field conditions encountered might be very site specific and limited. In this case, potential reroute of the ROW pad within the lateral limits of the construction ROW, could limit expected disturbance.

- Overexcavate and replace thaw unstable material – this technique may be a viable method in some locations; the material would be excavated and removed, and foreign material imported, requiring the mining and importation of additional select fill material to backfill the removed material. This technique could be employed in areas where very high displacement strains in near surface soils are evident, such as massive ice in a near surface strata but below the active layer.

The following options would be considered in extraordinary and specific conditions since they would certainly require new materials, increased field scrutiny, and additional construction delay. Nevertheless, they are included here for completeness:

- Install localized thermosyphons, which are passive heat pipes designed for installation in select locations along the edge of the ROW to provide a thermal curtain and limit impact. Their use is discussed and depicted in AGDC 2016b,c.
- Install localized active refrigeration, such as a mechanically driven equipment that would refrigerate sections of the ground around permanent facilities where a power supply is available (e.g., use of a design similar to TAPS Pump 1 brine system)
- Workpad insulation.

7.3 OPERATIONS

The active evaluation of potential hazards to the ROW and potentially beyond the ROW, do not end with Construction. Active monitoring will be required throughout the design life, with a special focus on the early years of Operations for ROW thermal impacts since, as seen in Chapter 2. The thermal impact of the more egregious segments requiring focus should be readily evident during the early years after Construction, while the impact should level off after continued Operations.

7.3.1 Right-of-Way Monitoring Program

For operations, the evaluation of the current state of the ROW surface using monitoring information largely supplants the predictive methodologies used during the design process, and the direct evaluation of the ROW during Construction as it is being altered.

Monitoring and intervention during operations are needed to ensure ROW integrity. Even for a well-executed design based on good design tools and good input data, the overall probability of criteria exceedance for the entire pipeline ROW over the design life is non-negligible and requires continued scrutiny. Monitoring is for all hazards and not just for settlement. Unusual conditions can occur along the alignment that are more severe than selected for design, such as unexpected

high water conditions or adjacent landowner activity. A project must be prepared for all eventualities during operation.

Operating experience for TAPS has clearly shown the need for such monitoring and intervention. Linewalks are an integral, and required, part of any pipeline operational plan. In the arctic especially, personnel are instructed to be aware of such surface features that may portend surface movement or other threats to integrity such as evidence of change in surface water drainage patterns, sloughing or mounding of soil, or open lateral cracking in the soil. All areas which have been mitigated during Operations will continue to be monitored for any additional issues.

7.3.2 Potential Mitigative Options during Construction

Many of the options available during Construction are also available during Operations. There is a distinct advantage in employing such options during Operations in that site-specific direct evidence is available to guide the type and extent of the options.

Surface-leveling is one possible form of intervention/mitigation that can be employed should the ROW need to be elevated from a settlement condition. New backfill material is placed in the area to be re-leveled. Care must be employed, however, to ensure that the surface characteristics are not adversely affected to further advance thaw progression.

7.4 SUMMARY

The mitigation measures employed during operations of the pipeline to mitigate thaw settlement are believed to either reduce or eliminate the impacts to wetlands in the thaw-affected zones on the outside edge of the pipeline right of way. Further, direct monitoring and mitigative options, outlined in this section, can further reduce wetlands impacts.

8. CONCLUSIONS

Ground surface disturbances during construction can cause changes in heat energy balance that could impact wetlands indirectly, outside of the project ROW. At the request of the USACE, AGDC directed its subject matter experts to carry out additional geothermal and thaw depth modeling, as well as additional wetlands analysis, to determine where changes to surface heat energy balance could occur and where wetlands could potentially be impacted within an indirect TAZ.

In continuous permafrost terrain at MP 0 the gas treatment plant will deliver gas with a year-round constant gas temperature of 30°F, which is slightly warmer than the local mean annual ground temperature of about 21°F. This will warm the permafrost around the pipe at MP 0 and will cause the active layer depth to increase in the vicinity of the pipe in this area. Ground surface disturbance

at the trench on the North Slope will also contribute to slightly warmer permafrost temperatures in the vicinity of the trench. Geothermal modelling showed that the maximum annual thaw depth (active layer depth) above the pipe and at the edge of the trench (2.5ft from pipe centerline) is expected to be about 3.1ft. For comparison, the model-computed active layer depth in undisturbed terrain was 1.6ft. At MP 0 the maximum active layer depth at distances from the centerline of 5ft, 10ft and 20ft are 2.3ft, 1.9ft, and 1.7ft, respectively. The model showed that beyond 20ft from the pipe centerline, the pipe and trench have practically no influence on the active layer depth.

In discontinuous permafrost terrain, the thermal influence of the gravel pad extends beyond the edge of gravel pad by about 26ft and 33ft in the cases with and without an organic layer below the gravel pad, respectively. For assessment of indirect impacts to wetlands, a conservative distance of 35ft adjacent to the ROW was used to define an indirect TAZ. Minimal or negligible indirect impacts were expected in the more southerly sporadic permafrost area.

Existing terrain unit classifications and their thaw settlement susceptibilities, along with other geophysical data, were used as part of the methodology for determining potential wetland impacts in discontinuous permafrost. AGDC's geothermal subject matter experts assigned conservative set of criteria to terrain unit classifications with respect to thaw susceptibility to focus subsequent wetlands analyses on where thaw susceptible soils would potentially occur in the indirect TAZ. AGDC documented where a high or moderate thaw settlement potential exists under wetlands. Within the indirect TAZ, AGDC's wetlands subject matter experts applied a conservative set of criteria to further delineate which wetlands were susceptible to be impacted through subsidence or drainage as a result of indirect permafrost thaw.

Based on this comprehensive analytical screening process, AGDC's geothermal and wetlands subject matter experts determined that, without monitoring or mitigation, a maximum of 1,037.20 acres of wetlands could potentially be indirectly impacted over a 30-year period by thawed permafrost resulting from ground disturbance during construction of ASAP. However, an extensive monitoring program and mitigative options are planned to ensure that, like other belowground pipelines, any indirect impacts to permafrost and wetlands are minimized and avoided to the extent practicable.

Additional impacts to permafrost that are projected as the result of climate change are discussed in a separate report, entitled, 'Effect of Climate Warming on Expected Long-Term Thaw Depths on the ASAP Right-of-Way, Alaska Stand-Alone Pipeline Project' (Matrix Solutions 2017).

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ATTACHMENT 1 - EXPECTED LONG-TERM THAW DEPTHS IN COLD PERMAFROST ON THE ASAP RIGHT-OF-WAY, ALASKA STAND ALONE PIPELINE

Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

TECHNICAL MEMORANDUM

TO: Keith Meyer, Pipeline Engineering Manager, Alaska Gas Development Corp.
Scott Lust, Pipeline Engineer, Alaska Gas Development Corp.

FROM: Ron Coutts, Senior Geological Engineer, Matrix Solutions Inc.

RE: Expected Long-Term Thaw Depths in Warm Permafrost on the ASAP Right-of-Way, Alaska Stand-Alone Pipeline Project

DATE: July 12, 2016

1. INTRODUCTION

Thermal modeling was undertaken to determine the expected 30-year thaw depths across the ASAP pipeline right-of-way (ROW). In addition it was also necessary to assess thaw beyond the edge of the ROW in adjacent undisturbed terrain.

It is understood that information presented in this report will be passed along for review by the U.S. Army Corps of Engineers.

2. TECHNICAL OVERVIEW

Long-term ground temperatures, as characterized by mean annual ground temperature (MAGT), are a result of heat energy exchange between the ground and the above ground environment at the ground surface. The significant energy exchange components at the ground surface are solar radiation, longwave radiation emitted from the ground and snow surface, convective heat transfer with atmospheric air, and evapotranspiration from surface water evaporation and plant transpiration.

Ground surface properties such as summer and winter albedo (surface reflectivity) and evapotranspiration factor affect the net energy flux at the ground surface. For example, summer and winter albedo values, which each range from 0 to 1, affect the amount of solar radiation that is absorbed at the ground and snow surfaces respectively. An albedo value of 0.85 for snow represents 85% reflectance of solar radiation, and correspondingly, 15% absorption of solar radiation at the snow surface. Evapotranspiration factor, which also ranges from 0 to 1, quantifies the degree to which

latent heat energy at the ground surface is intercepted to vaporize water by evaporation or by plant transpiration.

A surface energy balance (SEB) model for heat energy exchange at the ground surface developed by Hwang, 1976, was used to determine the net heat energy flux at ground surface nodes in a geothermal modeling finite element analysis (FEA) of heat transfer in the soil. The FEA tool used was TEMP/W (Geo-Slope 2016).

Ground surface properties of summer albedo and evapotranspiration factor were varied in the SEB model to simulate ground surface disturbances such as tree clearing, the gravel pad surface on the pipeline right- of-way (ROW), and revegetation of ground surfaces disturbed during construction and which are beyond the permanent ROW width.

This technical memo summarizes the geothermal model setup and long-term (30-year) thaw depth results calculated from geothermal modeling. The model conditions are representative of a warm permafrost area near Fairbanks with a mean annual ground temperature of 31.1°F and with ground surface disturbances on the ROW from tree clearing and gravel pad placement.

3. GEOTHERMAL MODEL SETUP

3.1 Domain Geometry

As shown in Figure 1, the typical pipeline ROW configuration in discontinuous permafrost is planned to be 120ft wide. This includes an 18in thick, 70ft wide gravel pad on one side of the pipe centerline, and a 30ft wide cleared area for trench spoil, each setback 10ft from the pipe centerline. After one construction season, the permanent ROW is planned to be 53ft wide and centered over the pipe. With time, grasses and shrubs and eventually trees (in originally treed areas along the route) will revegetate the ROW. Young trees growing on the permanent 53ft ROW will be cleared while those beyond the 53ft ROW to the edge of the 120ft temporary construction ROW will grow unhindered.

Figure 2 shows the entire geothermal modeling domain representing the typical ROW cross-section described above. Figure 3 shows a closer view of the soil types and boundary conditions over the 120ft wide construction ROW. Note that the length units in these figures are in meters, not feet, as it was necessary to perform the modeling in metric units due to current limitations in the TEMP/W add-in module that computes the surface energy balance flux boundary conditions at the ground surface.

Undisturbed terrain was modeled using an 8in thick organic peat layer overlaying a fine-grained and ice- rich mineral soil. Cleared terrain occurs on the ROW where trees were cleared and the organics layer is preserved. Equipment operating on the spoil side of the ROW during construction will compress the organic layer somewhat. To simulate this disturbance, the organic soil properties were modified to represent compressed organic peat. The 18in thick gravel pad was modeled as either being placed directly on top of the organic layer (having 'buried' organic soil properties), or, as a bounding case, with no organic layer below the gravel pad. The 36in pipe was buried with 3 feet of cover depth above the pipe.

The finite element mesh over the entire domain geometry is shown in Figure 4 and included 4721 nodes and 4621 elements. The highest temperature gradients within the modeling domain are near the pipe and downward from the ground surface. In these areas a higher node/element mesh density was used as shown in Figure 5.

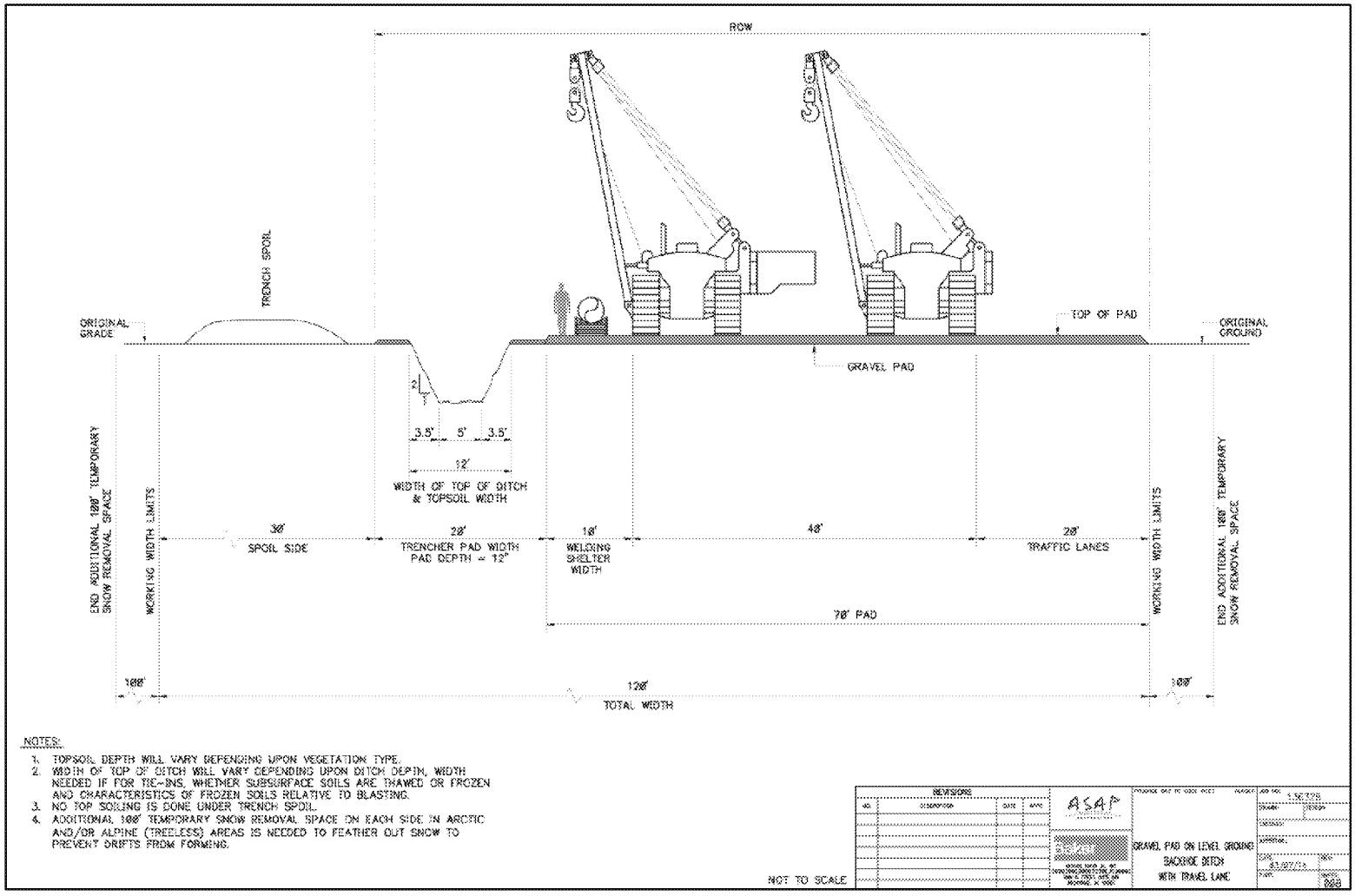

Figure 1 Typical ROW in Discontinuous Permafrost

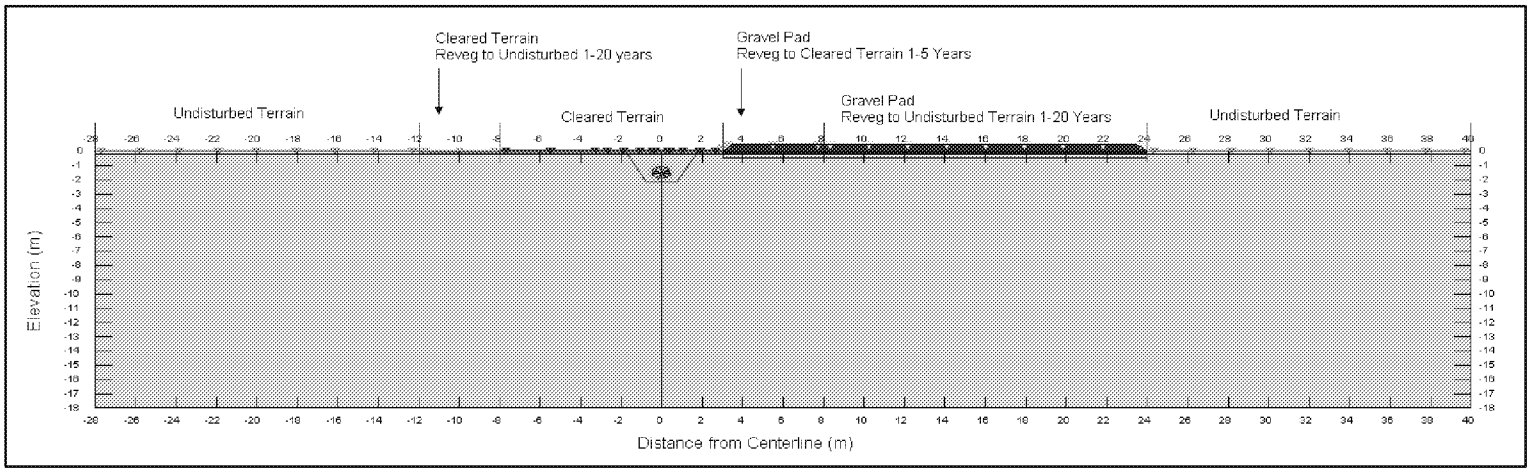

Figure 2 Geothermal Modeling Domain

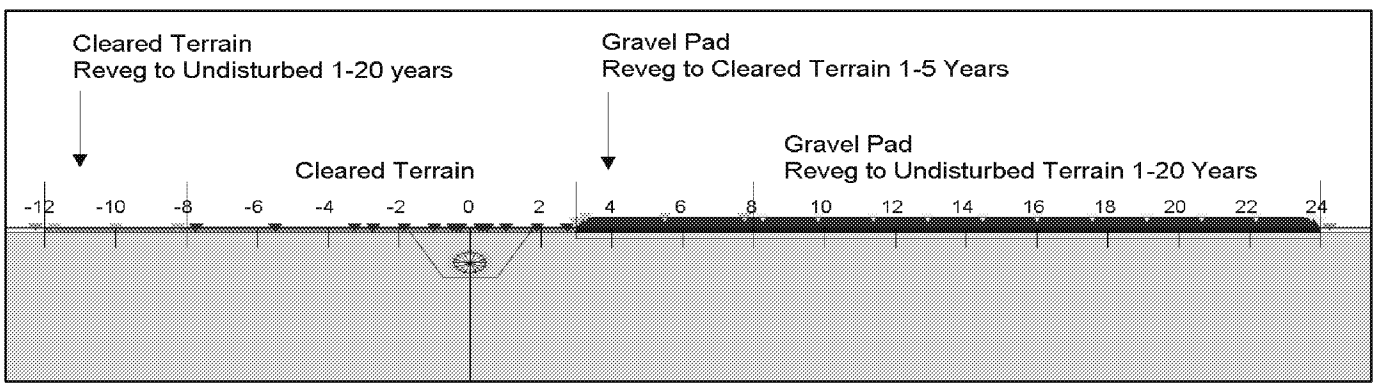

Figure 3 Soil Types and Boundary Conditions

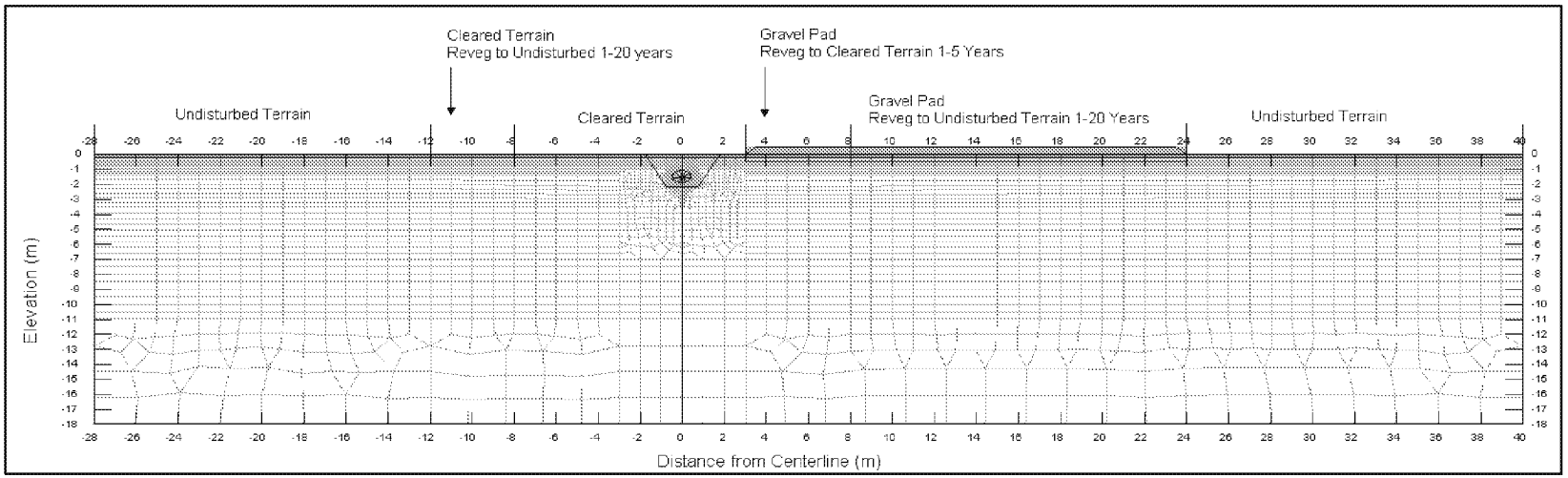

Figure 4 Finite Element Mesh

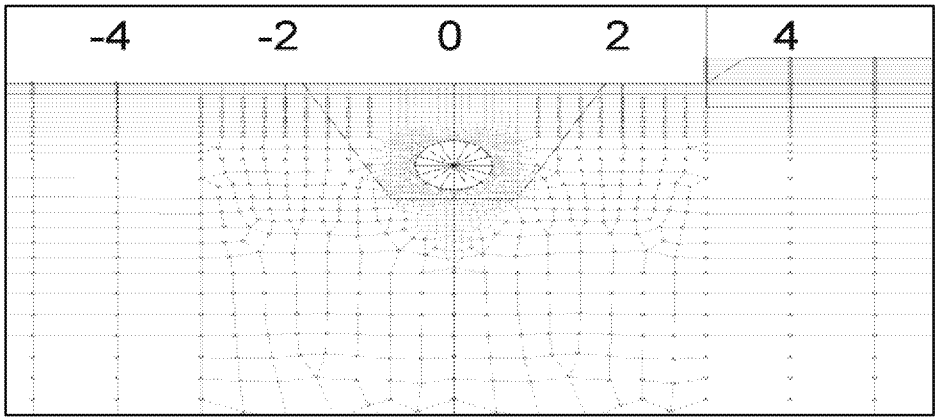

Figure 5 Finite Element Mesh near Pipe

3.2 Material Properties

Table 1 shows soil property parameters for water saturated fine-grained mineral soil at two moisture contents, for organic soils which are undisturbed, compressed and buried, and for the gravel pad material. For the modeling reported herein, 35% moisture content was used for the fine-grained mineral soil which is representative of ice-rich permafrost.

A constant snow thermal conductivity of 0.29 W/m-°C was used for all analyses and was determined by model calibration as discussed later.

Table 1 Soil Properties

Parameter	Sat. Silt & Clay Soil w=35%	Sat. Silt & Clay Soil w=25%	Organic Soil w=200%	Compressed Organic Soil w=150%	Gravel Pad w=10%	Buried Organic Soil w=140%	Unit	Description
Gs	2.67	2.67	1.4	1.4	2.67	1.4	--	specific gravity of solids
n	0.48	0.40	0.76	0.70	0.25	0.66	m3/m3	porosity
S	1.00	1.00	0.90	0.90	0.80	1.00	m3/m3	saturation
w	0.35	0.25	2.04	1.50	0.10	1.40	g/g	gravimetric water content
A	0.100	0.100	0.050	0.050	0.030	0.050	--	unfrozen water content at -1 C
B	-0.300	-0.300	-0.700	-0.700	-0.700	-0.700	--	unfrozen water content function exponent
Ku	1.20	1.40	0.40	0.43	2.70	0.60	J/(s*m*C)	unfrozen thermal conductivity of soil
Kf	2.00	2.00	0.90	0.87	3.20	2.90	J/(s*m*C)	frozen thermal conductivity of soil
L	3.34E+08	3.34E+08	3.34E+08	3.34E+08	3.34E+08	3.34E+08	J/m3	latent heat of water
Cw	4.197E+06	4.197E+06	4.19E+06	4.197E+06	4.197E+06	4.197E+06	J/(m3*C)	heat capacity of water
Ss	0.17	0.17	0.4	0.4	0.17	0.4	--	specific heat capacity of solids
Cu/Cw	0.696	0.651	0.828	0.741	0.540	0.810	--	unfrozen heat capacity of soil relative to water
Cf/Cw	0.463	0.457	0.482	0.449	0.440	0.495	--	frozen heat capacity of soil relative to water
pdry	1350	1550	340	390	2000	450	kg/m3	dry density of soil
pwat	1000	1000	1000	1000	1000	1000	kg/m3	density of water
theta	0.48	0.40	0.68	0.63	0.20	0.66	--	volumetric water content of soil
Ku	103.7	121.0	34.6	37.2	233.3	51.8	kJ/(d*m*C)	unfrozen thermal conductivity
Kf	172.8	172.8	77.8	75.2	276.5	250.6	kJ/(d*m*C)	frozen thermal conductivity
Cu	2915	2724	3467	3103	2260	3390	kJ/(m3*C)	unfrozen heat capacity
Cf	1938	1913	2018	1878	1842	2072	kJ/(m3*C)	frozen heat capacity
L	3.34E+05	3.34E+05	3.34E+05	3.34E+05	3.34E+05	3.34E+05	kJ/m3	latent heat of water

3.3 Climate Data

Table 2 provides mean monthly climate normals for Fairbanks. These data were used in the surface energy balance model to determine the net heat energy flux into or out of the ground surface at each node in the thermal model at each time step.

Table 2 Fairbanks Climate Data

Month	Air Temp (°C)	Air Temp (°F)	Wind Speed (km/h)	Wind Speed (mph)	Solar Radiation (W/m^2)	Solar Radiation ($BTU/hr/ft^2$)	Snow Depth (cm)	Snow Depth (ft)
January	-23.9	-11.0	4.7	2.9	7.7	2.4	46.2	1.52
February	-19.4	-2.9	6.1	3.8	34.4	10.9	58.0	1.90
March	-12.8	9.0	7.9	4.9	103.6	32.8	50.8	1.67
April	-1.4	29.5	10.4	6.5	182.6	57.9	25.7	0.84
May	8.4	47.1	12.2	7.6	227.6	72.1	0.0	0.00
June	14.7	58.5	11.2	7.0	248.9	78.9	0.0	0.00
July	15.4	59.7	10.4	6.5	216.0	68.5	0.0	0.00
August	12.4	54.3	9.7	6.0	156.4	49.6	0.0	0.00
September	6.4	43.5	9.7	6.0	92.0	29.2	0.0	0.00
October	-3.2	26.2	8.6	5.3	39.7	12.6	4.0	0.13
November	-15.6	3.9	6.1	3.8	13.6	4.3	18.1	0.59
December	-22.1	-7.8	5.0	3.1	2.9	0.9	32.3	1.06

3.4 Boundary Conditions

At the ground surface, the net heat energy flux into or out of the ground was calculated at each ground surface node of the finite element model at each time step using a surface energy balance model based on Hwang, 1976.

Ground surface properties for undisturbed terrain, the cleared ROW terrain, and the gravel pad surface are shown in Table 3. Ground surface disturbance for the cleared terrain was simulated by varying the summer albedo and evapotranspiration factors. These values have been shown to reproduce the long- term thaw depths observed at the Fairbanks Surface Disturbance Test site (Linell 1973 and Douglas et. al. 2008), however those results are beyond the scope of this document.

The side boundaries and bottom boundaries were zero-flux boundaries. As such, the geothermal model calculated the temperatures at these boundaries. The side boundaries are far enough away from the thermal disturbance of the ROW that there is no horizontal heat transfer at the sides of the modeling domain. A small non-zero geothermal heat flux could have been included at the bottom boundary, however it was not because it does not significantly affect the calculated temperatures at the relatively small scale depths here, which are on the order of tens of feet. In addition, the geothermal heat flux is very small relative to the net heat flux from energy exchange at the ground surface. Including the geothermal flux would therefore add unnecessary complexity to the model.

To simulate revegetation on the ROW, ground surface properties of summer albedo and evapotranspiration factor were linearly varied over a specified time period from their values during construction to their long-term values. For example, the cleared terrain on the spoil side of the ROW outside of the 53ft permanent ROW was simulated to revegetate from cleared terrain (during construction) to undisturbed terrain over an elapsed time period from 1 to 20 years. Similarly, the gravel pad outside of the 53ft permanent ROW was simulated to revegetate to undisturbed terrain over the same time period, 1 to 20 years. The gravel pad within the permanent 53ft ROW was simulated to revegetate to cleared terrain over a time period from 1 to 5 years. The cleared terrain on the spoil side of

the ROW and above the pipe trench was simulated to remain unchanged as cleared terrain throughout the entire simulation period of 30 years.

Table 3 Ground Surface Properties

Terrain	Summer Albedo	Winter Albedo	Evapotransp Factor
Undisturbed (trees)	0.65	0.85	0.65
Cleared	0.08	0.85	0.30
Gravel Pad	0.07	0.85	0.20

Pipe temperature boundary conditions were obtained from hydraulics modeling (Baker, 2015) from ASAP pipeline milepost 440 near Fairbanks. The maximum, minimum and average pipe temperatures at MP440, used in the modeling reported herein, were 22.7°F, 42.4 °F and 32.4°F, respectively. From previous thaw depth analyses for pipe integrity, it was observed that the pipe temperatures from this set of hydraulics runs may be warm by 2°F to 3°F, which may have been the result of some conservatism in the hydraulics analysis regarding maximum gas throughput. In any event, the pipe temperatures may be slightly conservative for the thaw depth analysis presented herein but are inconsequential to maximum thaw depths on the ROW which are too far from the pipe to be influenced by it.

3.5 Model Calibration

The geothermal model was calibrated such that it would reproduce a MAGT of 31.1°F (-0.5°C) in undisturbed terrain. This is representative of warm permafrost in the Fairbanks area.

A series of one-dimensional (1D) model runs using an undisturbed soil profile was performed. For each run, a constant (time-invariant) snow thermal conductivity was used and the model was run to periodic steady-state (approximately 10 years). This technique was used to find the snow thermal conductivity value such that the model would produce the target MAGT, in this case 31.1°F for Fairbanks.

4. ROW THAW DEPTH RESULTS

If present, the top layer of organic peat soils provides an insulative layer in permafrost environments. To assess the insulative effect of preserving the organic soil layer beneath the gravel pad, a pair of two- dimensional (2D) geothermal modeling runs were performed with and without a buried organic layer below the gravel pad.

Figure 6 shows the 30-year thaw depth profile across the ROW for the case with a buried organic layer beneath the gravel pad. The edge of the gravel pad is located 24m (80ft) from the pipe centerline. As shown in the figure, the 30-year thaw depth rises towards the edge of the gravel pad and tapers to the active layer depth of the undisturbed terrain at about 32m (105ft) from the pipe centerline, or about 8m (26ft) from the edge of the gravel pad.

Figure 7 shows the 30-year thaw depth profile across the ROW for the case where the organic layer is not present beneath the gravel pad. In this case the 30-year thaw depth beneath the gravel pad is somewhat deeper, and the influence of the gravel pad thaw extents to about 34m (112ft) from the pipe centerline, or about 10m (33ft) beyond the edge of the gravel pad, which is about 2m (7ft) farther than in the case where the organic layer below the gravel pad was present.

Comparison of Figure 6 and Figure 7 shows that the 30-year thaw depths on the spoil side of the ROW are the same in both cases and as one might expect, the presence of the organic layer below the gravel pad does not affect thaw depth on the spoil side of the ROW.

Figure 8 shows the variation with time of the deepest thaw depth on each side of the ROW. As stated earlier, the cleared terrain on the spoil side of the ROW outside of the permanent 53ft cleared ROW was simulated to revegetate to undisturbed terrain over years 1 to 20. The gravel pad within the 53ft cleared ROW on the gravel pad side of the ROW was simulated to revegetate to a cleared terrain state over years 1 to 5. Outside the 53ft cleared ROW, the gravel pad was simulated to revegetate to undisturbed terrain (treed) over years 1 to 20. As shown in Figure 8 the maximum 30-year thaw depths on the spoil and gravel pad side of the ROW were calculated to be nominally 18ft and 22ft, respectively.

Figure 9 shows the same thaw depth information as Figure 8 for the case where no organic layer was present beneath the gravel pad. In this case, the 30-year thaw depth is unchanged at 18ft as mentioned earlier. Beneath the gravel pad, the 30-year maximum thaw depth increased to nominally 25ft, an increase of about 3ft from the case where an organic layer was present beneath the gravel pad.

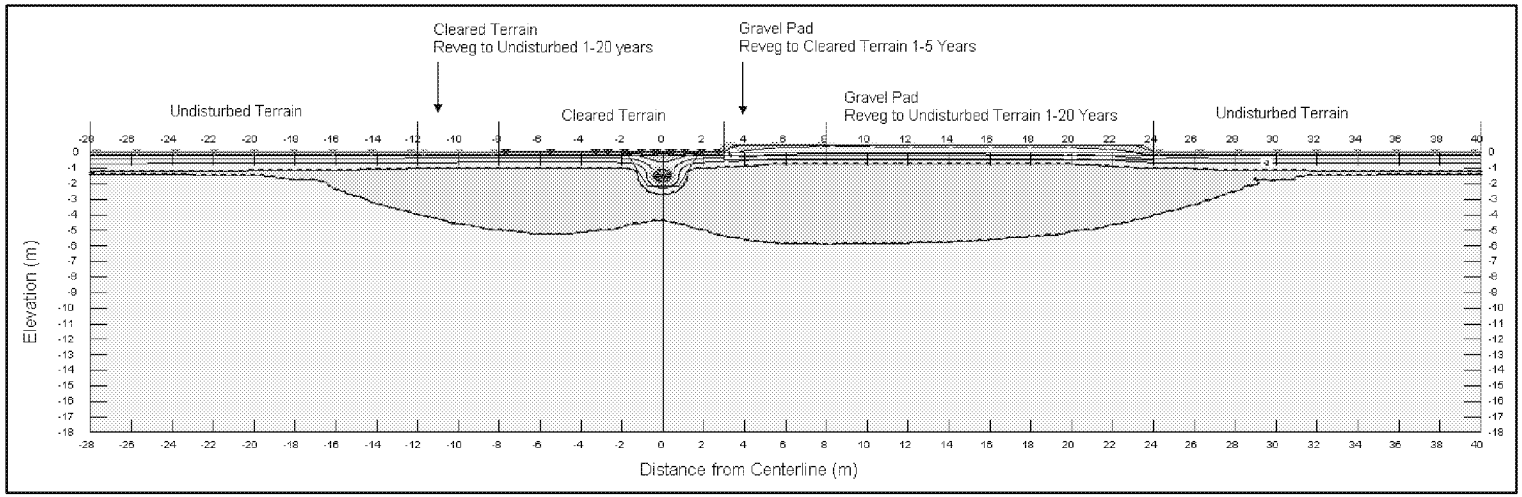

Figure 6 ROW 30-Year Thaw Depth Profile for Case with Buried Organic Layer below Gravel Pad

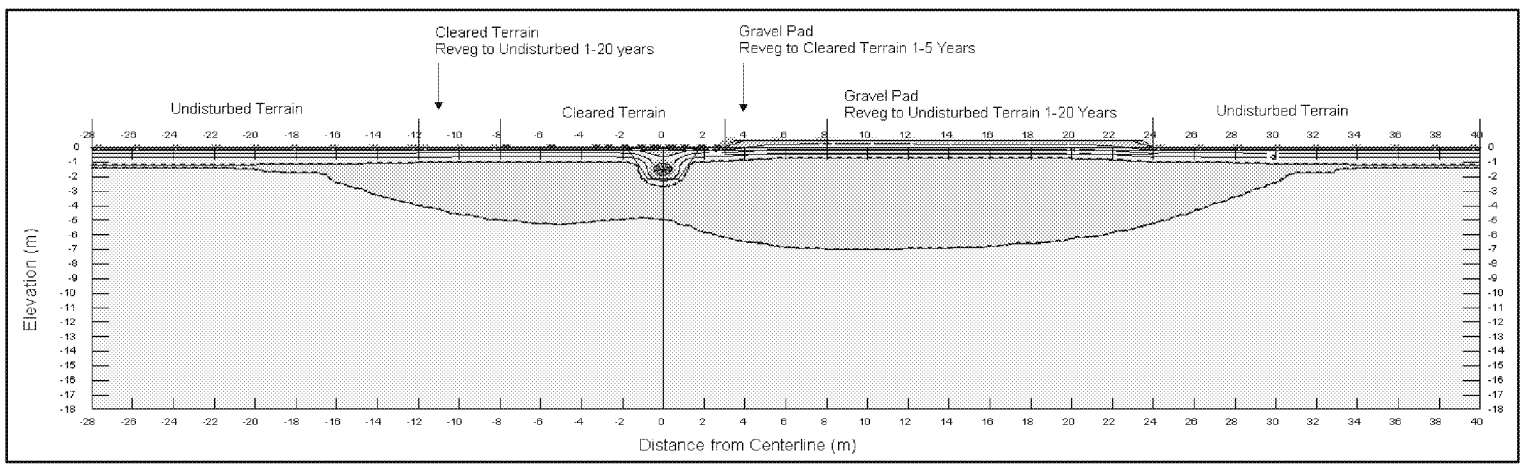

Figure 7 ROW 30-Year Thaw Depth Profile for Case without Buried Organic Layer below Gravel Pad

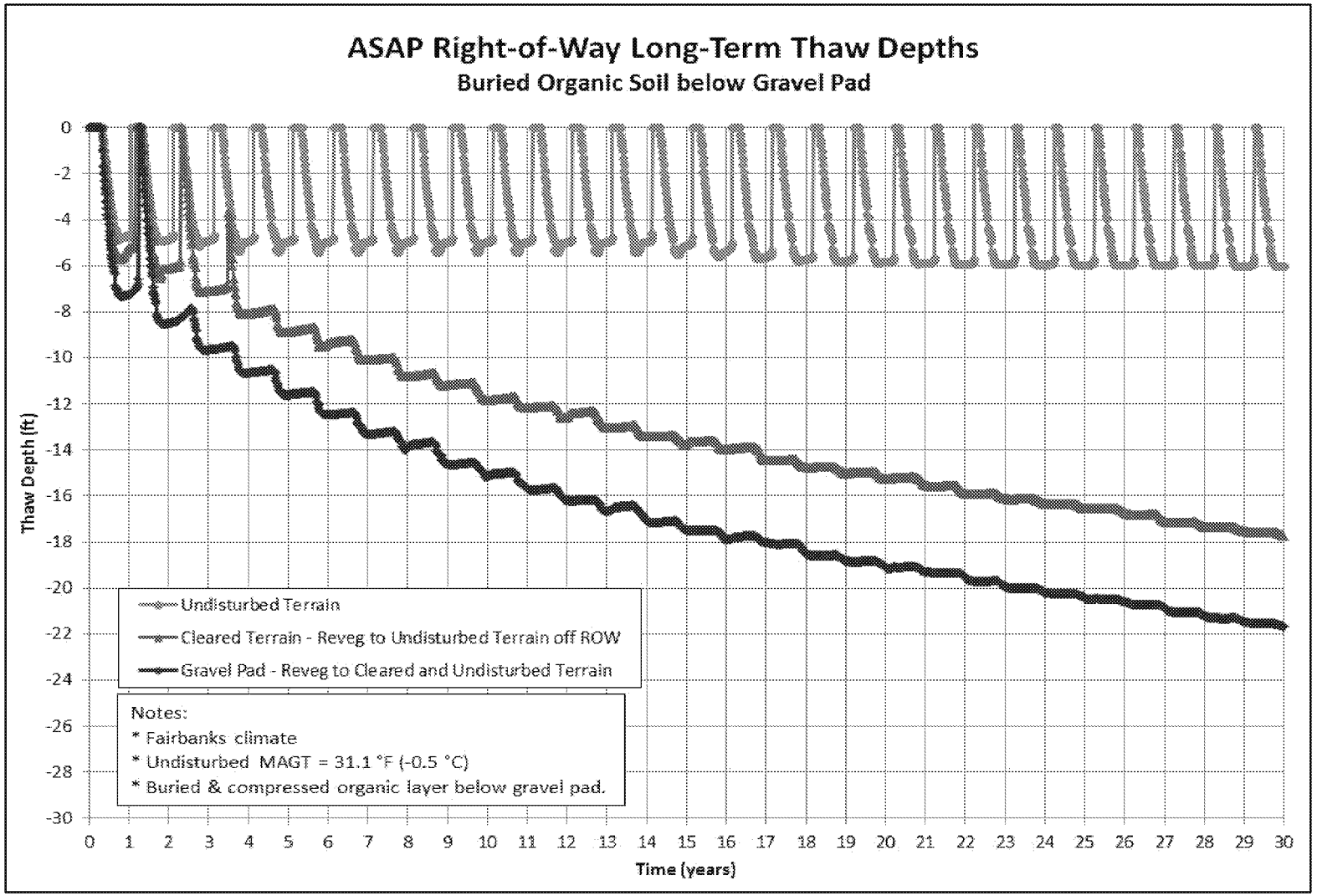

Figure 8 ROW Thaw Depths for Case with Buried Organic Layer below Gravel Pad

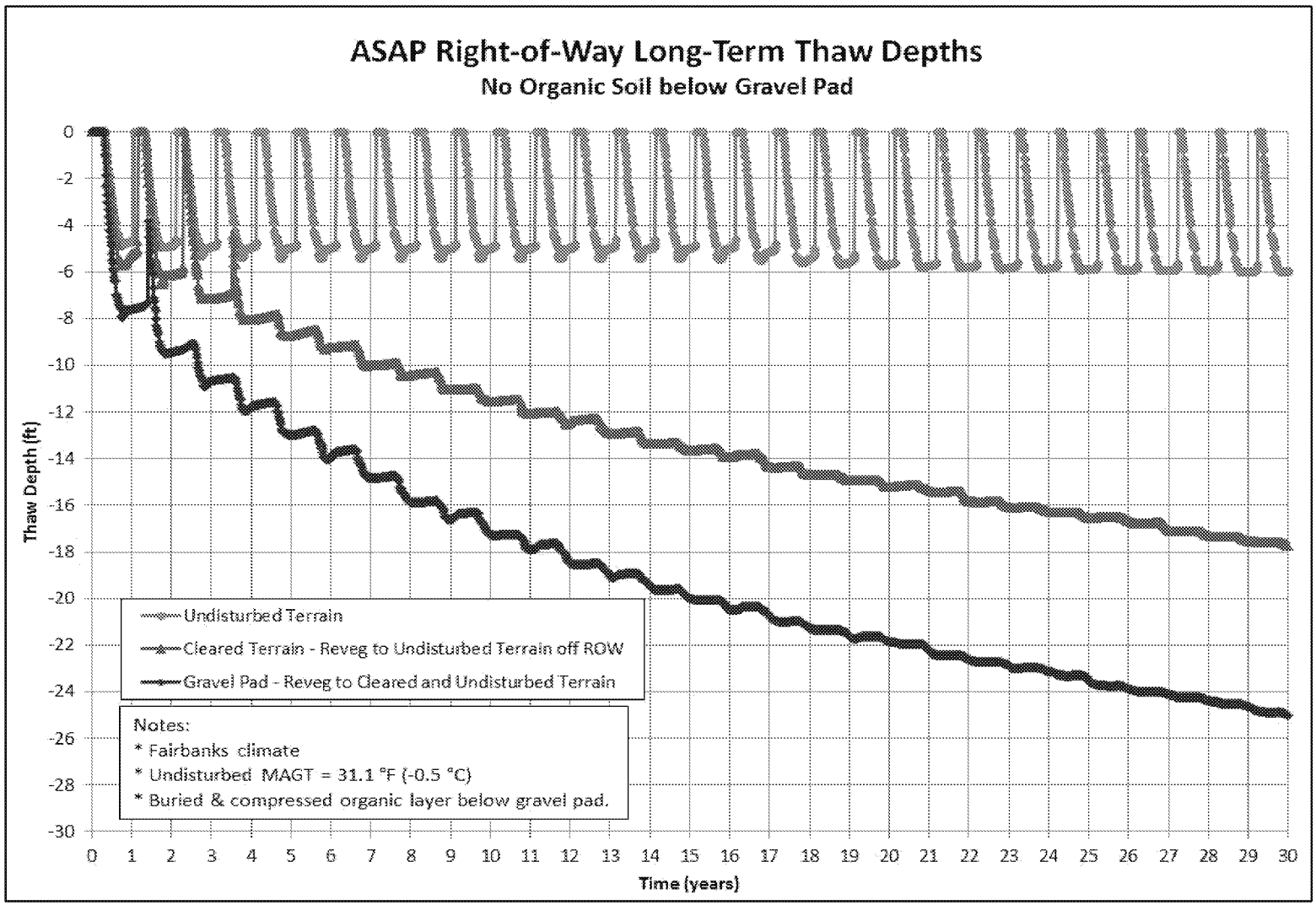

Figure 9 ROW Thaw Depths for Case without Organic Layer below Gravel Pad

5. CONCLUSIONS

The following conclusions were drawn from the thaw depth modeling results presented herein:

- Disturbances to the ground surface during construction and subsequent pipeline operations cause changes to the surface heat energy balance and a corresponding increase to net heat energy flux into the ground at the ground surface. The increase in net energy flux into the ground causes long- term progressive thaw depth deepening that does not freeze back over the winter seasons.

- It is reasonable to expect deeper thaw depth beneath the 18in thick gravel pad compared to the thaw depth beneath cleared terrain. This is a result of higher net energy influx from the gravel pad caused by higher solar radiation absorption and less evapotranspiration of the gravel pad surface compared to the vegetated surface of cleared terrain. For cleared terrain, the 30-year thaw depth was calculated to be 18ft whereas beneath the gravel pad the 30-year thaw depth was calculated to be 22ft to 25ft with and without an organic layer below the gravel pad, respectively.

- The thermal influence of the gravel pad extends beyond the edge of gravel pad by about 26ft and 33ft in the cases with and without an organic layer below the gravel pad, respectively.

6. CLOSURE

We trust that this technical memo suits your present requirements. If you have any questions or comments, please call the undersigned at 403-727-0260.

Yours truly,

MATRIX SOLUTIONS INC.

Ron Coutts, M.Sc., P.Eng. (AB) Senior Geological Engineer

7. REFERENCES

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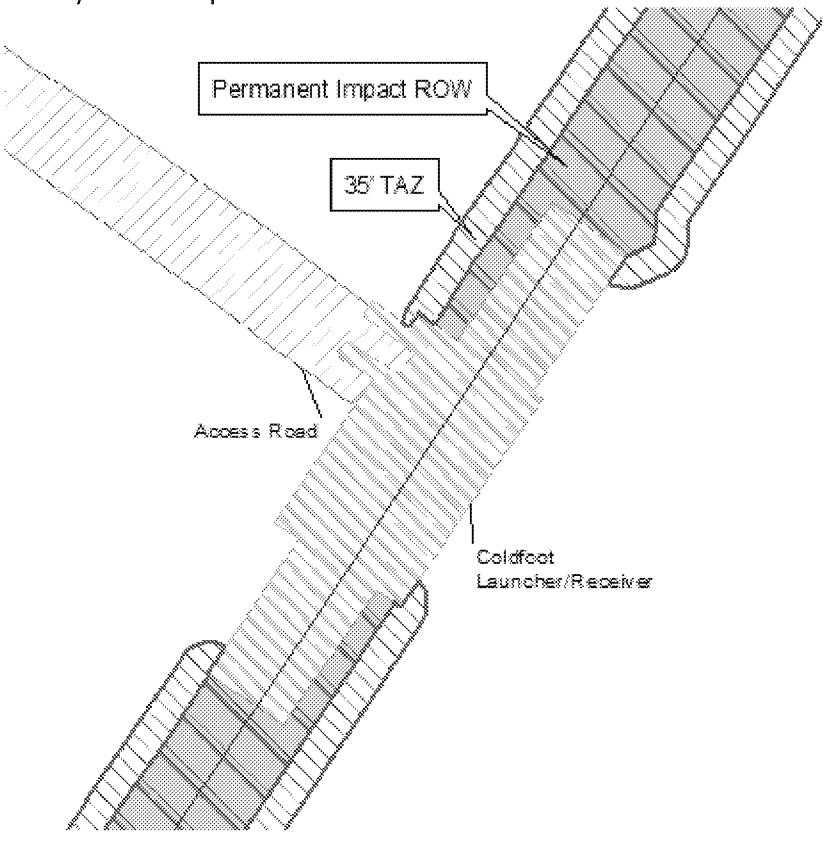
ATTACHMENT 2 – THAW AFFECTED ZONE GIS METHODOLOGY OVERVIEW

Thaw Affected Zone (TAZ) GIS Methodology Overview

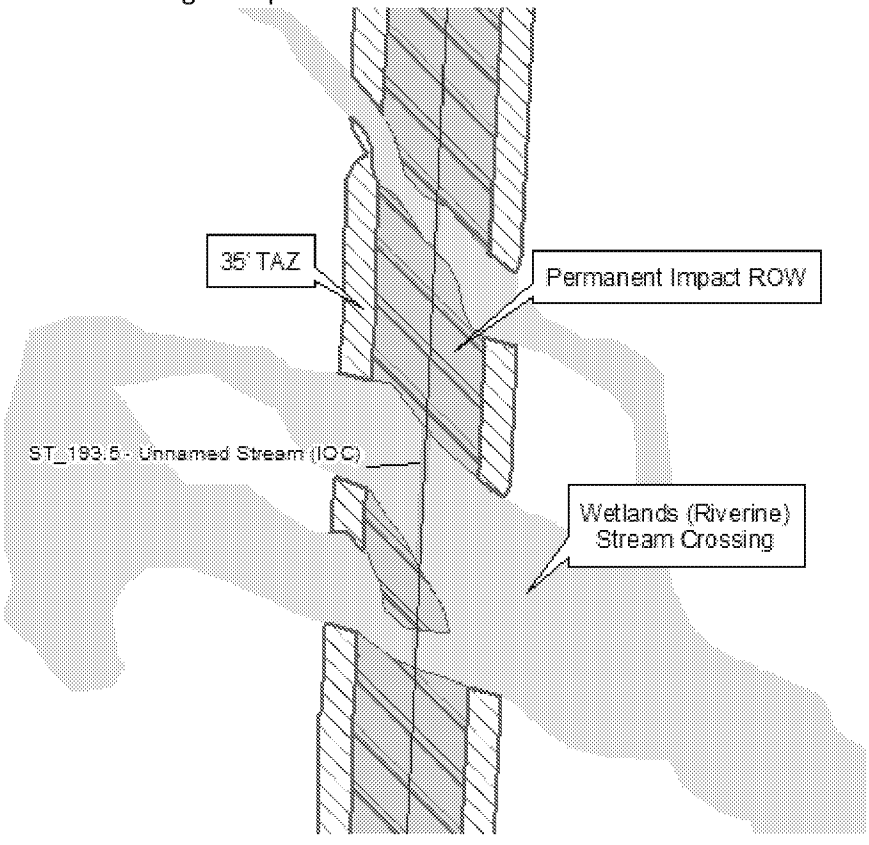
The area of interest is the ASAP Mainline from MP 168-634 and excludes the Fairbanks Lateral. The 35ft indirect Thaw Affected Zone (TAZ) was generated on the outer edge of direct Permanent impact areas within the project ROW. These impact areas included Permanent Construction Impact and HDD Entry/Exit Pad categories. Facility Pads in the ROW (Coldfoot Launcher/Receiver, Fairbanks Lateral Tie-In) did not require generation of a TAZ due to adequate pad thickness, so any TAZ adjacent to facility pads outside the ROW was removed. As the acreage of the facility pads and the Permanent Impact ROW have already been accounted for in the direct wetlands impact footprint, the indirect TAZ never overlaps these areas.

Facility Pad example:



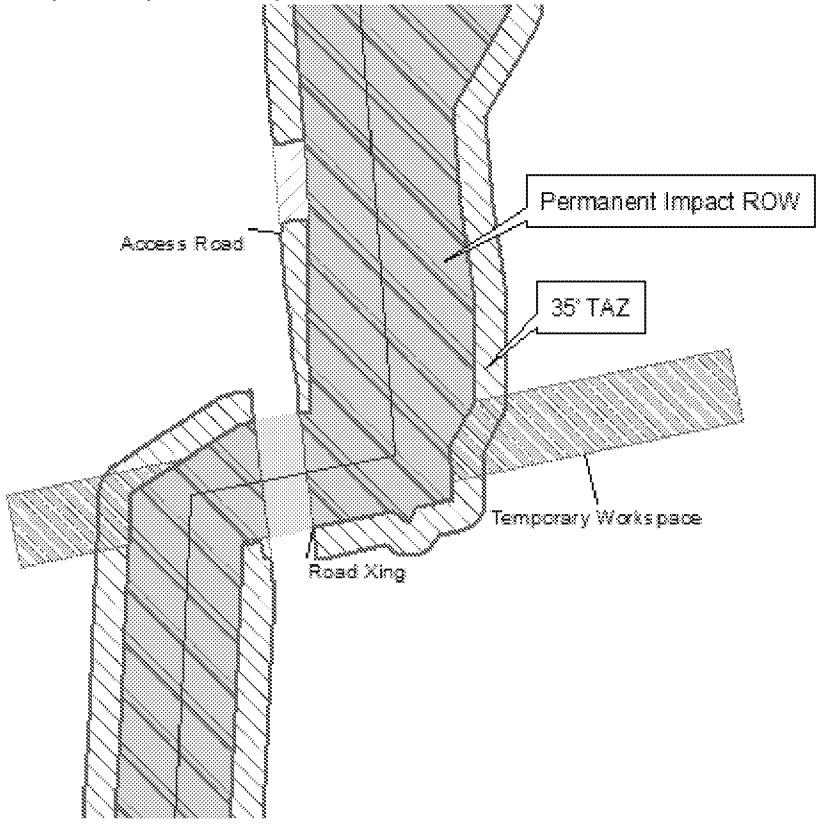
There is no TAZ applied to stream crossing features, which exist as 5' trenches (open cut or isolated open cut), bridges, and horizontal directionally drilled (HDD) crossings. These areas were excluded by trimming in GIS using the wetlands delineation definition for stream crossings. This is the same technique that was used to develop stream crossing features for the project footprint. Any wetlands layer 'ATTRIBUTE' that started with 'R' represented a stream crossing. These included HGM CLASS 'Riverine' and Cowardin codes 'Intermittent', 'Lower Perennial', 'Upper Perennial', or 'Unknown Perennial'.

Stream Crossing example:



Temporary Impact features in the project footprint ROW do not generate a TAZ. These include temporary workspaces, temporary construction impacts (e.g., matting) and HDD false ROW features. Any temporary direct impact to wetlands was previously calculated for these features. However, any adjacent TAZ from a permanent impact was allowed to overlap these features; this is due to ongoing thermal impacts after the area has been temporarily impacted.

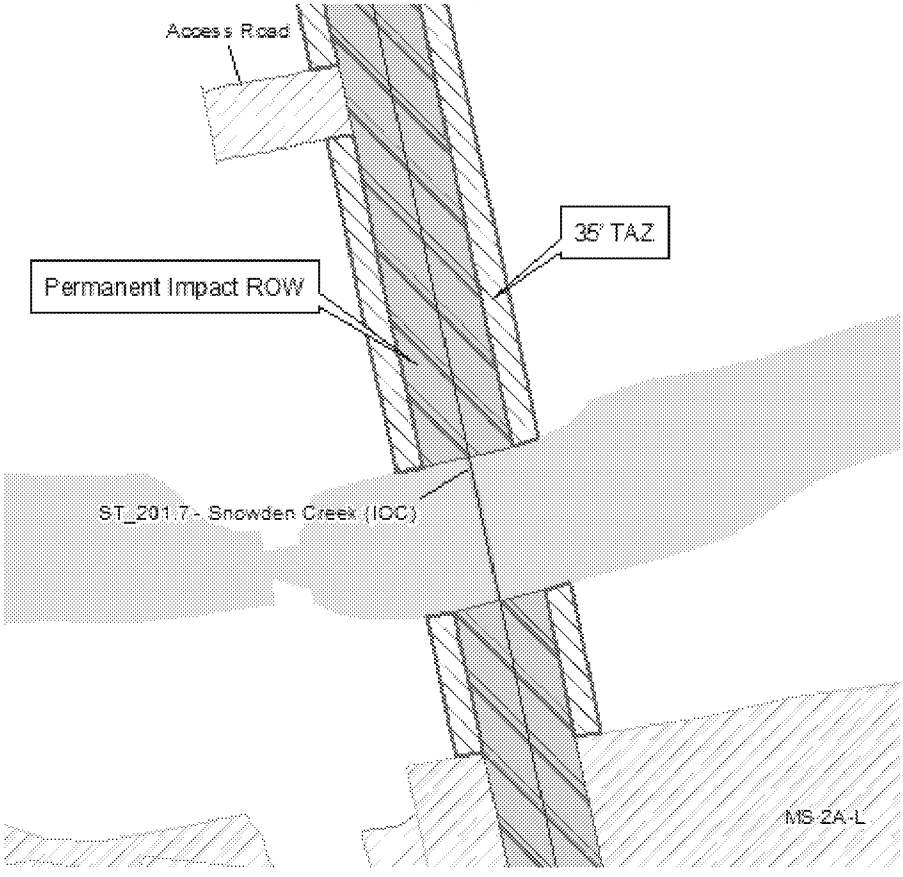
Temporary Workspace example:



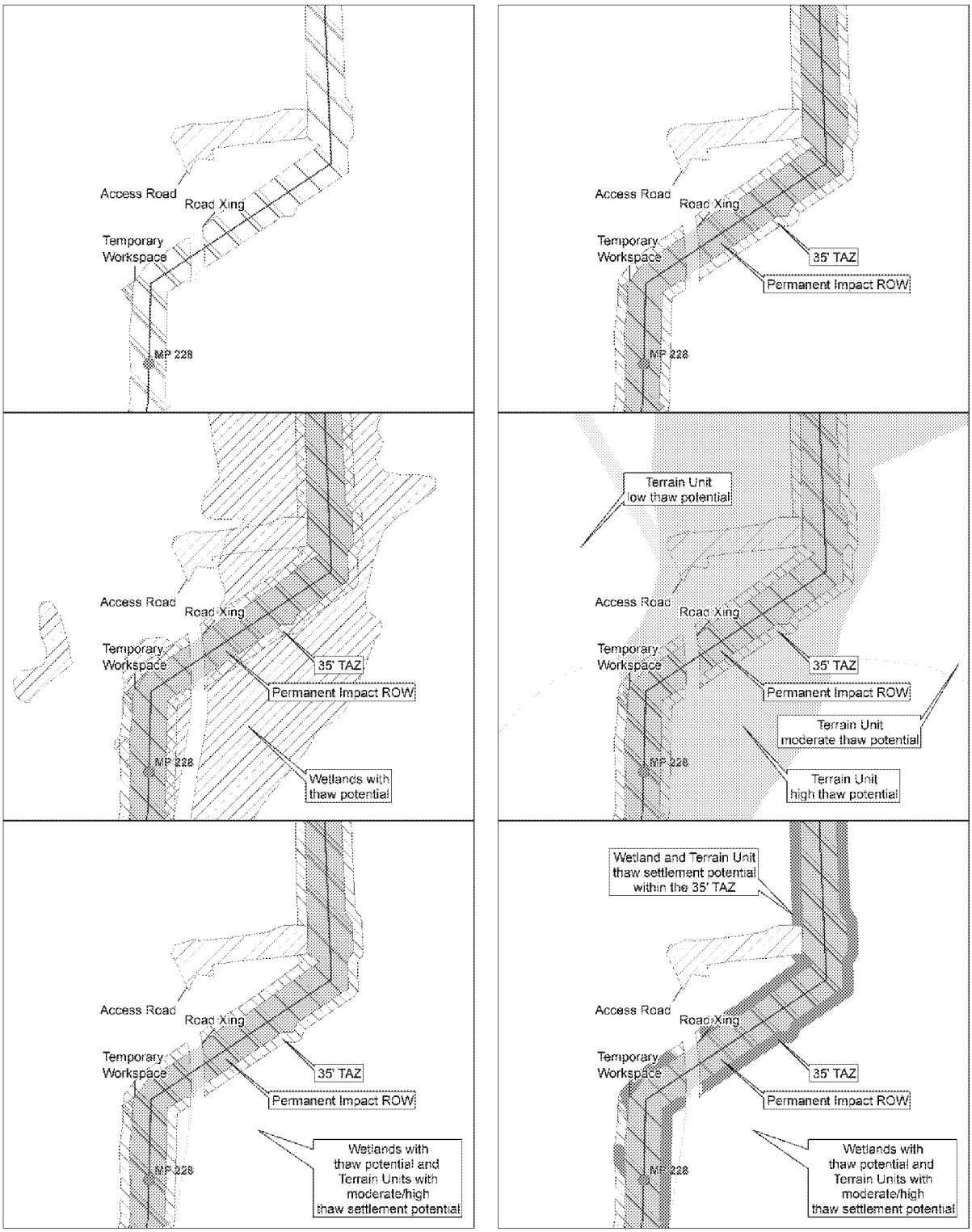
Existing road crossings (e.g., Dalton Highway, Parks Highways) and existing Access Roads have been removed from the TAZ.

Other permanent impact features include new access roads, camps, pipe storage yards (PSYs), material sources and railroad sidings. These do not require and indirect TAZ per the rationale described in the main body of the report. In locations where these features overlap the ROW TAZ, the TAZ area has been removed. The direct impact for these overlapping areas has already been accounted for in previous calculations.

Access Road and Material Source example:



Thaw Affected Zone GIS Analysis Steps:



June 5, 2017

WHY ALASKA'S NATURAL GAS PIPELINE SHOULD BE BURIED

SUMMARY

The Alaska Gasline Development Corporation (AGDC) has proposed to develop a buried natural gas pipeline that will span approximately 800-miles from Prudhoe Bay to Southcentral Alaska. The priority Alaska LNG project mainline is a 42-inch diameter controlled temperature pipeline that will deliver liquefied natural gas (LNG) to foreign markets and meet in-state gas needs. The smaller option for the transport of in-state gas is the 36-inch diameter Alaska Stand Alone Pipeline (ASAP) project. Both projects are involved in separate National Environmental Policy Act (NEPA) processes. The Federal Energy Regulatory Commission (FERC) is the lead agency for the Alaska LNG Environmental Impact Statement (EIS). The U.S. Army Corps of Engineers (USACE) completed a final EIS in 2012 for the ASAP project and is now leading a supplemental EIS effort. AGDC has proposed both projects as having buried pipelines.

The ASAP final EIS characterized the pipeline as almost entirely belowground (BG) and did not consider an aboveground (AG) option as an alternative, with no objections by the lead or cooperating agencies at that time. Years later, after additional engineering, planning, and expense on behalf of AGDC, two cooperating agencies demanded the USACE consider an AG alternative. AGDC provided a cost analysis demonstrating the AG mode would be much more expensive and not practicable. AGDC also provided a technical and environmental analysis showing the BG alternative would be preferred for all areas, including the North Slope, for engineering reasons (constructability, reliability), safety reasons (protection, cover, security), and environmental reasons (fewer impacts to caribou; wetlands impacts could be mitigated). AGDC has demonstrated that through comprehensive monitoring, maintenance, and mitigation programs, the environmental impacts of the BG mainline will be less than or equal to those of an AG pipe. AGDC is concerned the cooperating agencies involved with the ASAP project, may not be considering the full range of reasons AGDC proposed to bury the pipeline and, instead, have focused on a single issue for selection of the project alternative on the North Slope. AGDC's full evaluation of the engineering, safety and security, cost, and all environmental information will support a decision to permit a buried pipeline on the North Slope and the remainder of the pipeline. The concerns discussed for the ASAP project are also relevant for the FERC led Alaska LNG project.

ACTION REQUESTED

The USACE and FERC should consider the full range of reasons AGDC proposed to bury the pipeline instead of focusing on a single issue for selection of the project mode on the North Slope. Full evaluation of the engineering, safety and security, cost, and all environmental information will support a decision to permit a buried pipeline on the North Slope.

1. BACKGROUND

The Alaska Gasline Development Corporation (AGDC) is an independent public corporation owned by the State of Alaska. AGDC has proposed two options for development of a natural gas pipeline that will help to commercialize Alaska's vast North Slope natural gas resources – a priority project that provides options for transporting gas to foreign markets, but also allows for in-state use (the Alaska LNG project), and a backup project that provides gas only to in-state markets (the Alaska Stand Alone Pipeline (ASAP) project).

The Alaska LNG project and the ASAP project face challenges in terms of construction cost and schedule. For both the $40 billion priority project (Alaska LNG) and the $10 billon backup project (ASAP), AGDC has proposed a buried natural gas pipeline from Prudhoe Bay to Southcentral Alaska that would span approximately 800-miles and take approximately three years to construct. In the case of Alaska LNG, the mainline is a 42-inch diameter temperature-controlled natural gas pipeline. The mainline from Prudhoe Bay to Southcentral Alaska is proposed as buried at a depth of at least 30 inches below the surface for the entire length of each project, except at major fault crossings, select bridge crossings, or block valves. For ASAP, it is a 36-inch diameter pipeline. Both gas pipeline options are cold temperature pipelines, unlike the Trans-Alaska Pipeline System (TAPS). TAPS is buried for many miles, including on the North Slope, and is a hot oil pipeline.

1.1 THE NATIONAL ENVIRONMENTAL POLICY ACT PROCESS

Both the Alaska LNG project and the ASAP project are engaged in separate National Environmental Policy Act (NEPA) processes. The NEPA process is overseen by a lead federal agency and several cooperating agencies to develop a document that characterizes environmental resources and evaluates environmental impacts of a project.

The Federal Energy Regulatory Commission (FERC) leads the Environmental Impact Statement (EIS) for the Alaska LNG project. The USACE Alaska District leads the EIS and supplemental EIS for the ASAP project. Noteworthy is the ASAP Final EIS, published in 2012, did not consider an AG mode as an alternative, and there were no objections from the lead or cooperating agencies to a BG pipeline at that time. This was followed by additional years of costly design and planning for a BG pipeline.

USACE published a full EIS without any mention of the need to elevate the pipeline above grade. During the supplemental EIS process (2014-2017), however, cooperating agency staff from the U.S. Fish and Wildlife Service (USFWS) Fairbanks field office and Environmental Protection Agency (EPA) Anchorage office, demanded an alternative analysis of an AG pipe, even though this was not the reason for the supplemental EIS. The reasons for the development of a supplemental EIS were a new conceptual design around barging in large modules to a port at Prudhoe Bay and making gas more available in-state through the transportation of lean natural gas. There were potential marine impacts at the northern port and socioeconomics impacts along the route, but USFWS and EPA took this as opportunity to delay the NEPA process by requesting the lead agency (USACE) provide a full analysis of an AG pipeline alternative. The cooperating agencies demanded an environmental impacts comparison of AG versus BG pipelines for the North Slope region, for the continuous/discontinuous permafrost region, and for the entire pipeline route. The two

cooperating agencies have stated that burying the pipeline on the North Slope of Alaska (the first 60 miles) and potentially other areas to the south would have detrimental impacts to wetlands and arctic/subarctic habitat that would be difficult to recover. The USACE, as the lead federal agency, capitulated to the demands of the cooperating agencies and required AGDC to carry out a full analysis of the AG mode for a forthcoming draft supplemental EIS, resulting in lost time and resources. To have this occur in the supplemental EIS process without cause (i.e., negligible change to pipeline design for the supplemental EIS) is inconsistent with what was acceptable in the EIS for pipeline design. Although the USACE did not issue a Record of Decision (ROD) after the final EIS, AGDC acted upon the potential options put forward in the final EIS, continued with additional years of planning, and design for the BG mode leading up to the supplemental EIS.

At the request of the USACE, AGDC provided a cost analysis of the AG mode, demonstrating it would be much more expensive and not practicable. AGDC also provided a technical and environmental analysis showing the BG mode would be preferred for all areas, including the North Slope, for engineering reasons (constructability, reliability), safety reasons (protection, cover, security), and environmental reasons (fewer impacts to caribou; wetlands impacts could be mitigated). AGDC then provided additional technical reports related to the potential for slumping, permafrost degradation, wetlands impacts, and the influence of climate change.

AGDC is concerned the agencies preparing to issue a draft supplemental EIS may not be considering the full range of reasons AGDC proposed to bury the pipeline and, instead, have focused on a single issue for selection of the project alternative on the North Slope (see section 1.2). AGDC feels full evaluation of the engineering, safety, security, cost, and all environmental information will support a decision to permit a buried pipeline on the North Slope and the remainder of the pipeline.

The concerns discussed for the ASAP project are also relevant for the FERC lead EIS for the Alaska LNG project, as cooperating agencies for that project are likely to also request advancement of an AG mainline alternative for full analysis.[1] AGDC's analyses are thorough, and when considered in their entirety rather than focusing on a single issue, are sufficient for screening-level decision making to evaluate the pipeline alternative.

1.2 A BELOWGROUND PIPELINE WILL NOT BE MORE ENVIRONMENTALLY HARMFUL THAN AN ABOVEGROUND PIPELINE

The USFWS and the EPA have raised concerns over buried pipelines, especially on the North Slope, claiming the construction of a buried pipeline would create large channels of open water over the pipeline and an eroded or unstable area that would likely never recover and would revegetate

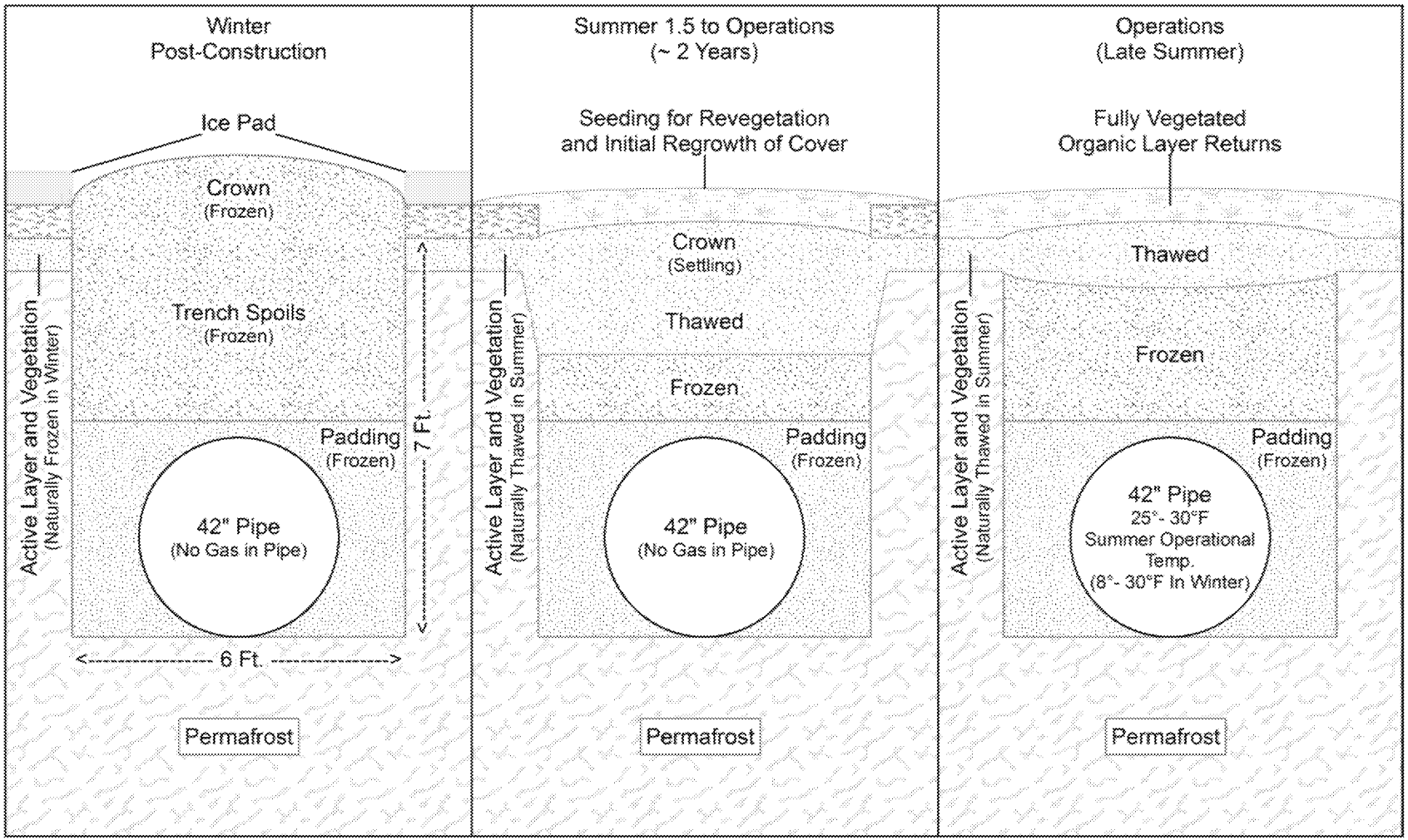
[1] For the Alaska LNG Project, the associated Point Thomson Transmission Line (PTTL) and Prudhoe Bay Transmission Line (PBTL) are designed as AG lines. The Point Thomson line runs east-to-west across the North Slope and is perpendicular to sheet water flow, which runs north-to-south in the same direction of the mainline, which is buried. The PTTL and PBTL are approximately 1-mile long pipelines and are fully contained within the Prudhoe Bay Unit. For these reasons, these supporting lines are proposed as aboveground, while the approximately 800-mile mainline is proposed as buried.

poorly. Comments from USFWS and EPA errantly suggest a BG pipeline might lead to long-term, non-correctable, and non-mitigatable impacts to the terrain.

AGDC has analyzed wetlands impacts, and has also modeled terrain units to evaluate the potential for slumping and drainage in discontinuous permafrost. AGDC proposes to mitigate any potential slumping in thaw-sensitive areas through use of strain based design. AGDC's analyses also take into account and model thermal degradation associated with ground disturbance and also models potential impacts of climate change. AGDC's Revegetation Plan (ASAP) and Restoration Plan (Alaska LNG) describe how impacted terrain will be stabilized and revegetated to the satisfaction of the landowner. AGDC has also explained how the corporation intends to implement a maintenance cycle standard to monitor, detect, and correct any potential issues related to water or erosion. AGDC has requested the agencies look not only to its own analyses, but also to the example of the buried sections of the Trans-Alaska Pipeline System (TAPS) as a stable example of a pipeline representing a more than worst-case scenario (hot oil vs. cold gas).

Some results from AGDC's technical reports are summarized in Attachment 1, while other additional reports have been submitted to the USACE. Through these technical reports, AGDC has demonstrated that the BG mode (Figure 1) is the preferred design for reasons related to engineering constructability, operational reliability, and to health, safety, security and the environment (HSSE). AGDC has proposed numerous measures to avoid, minimize and mitigate environmental impacts associated with the project, and use of a buried pipeline is critical to reducing overall environmental impacts, as demonstrated in Figure 1.

Figure 1. Construction, Operation, and Maintenance of the Buried Alaska LNG Pipeline in North Slope Permafrost (MP0 – MP60)



2. DESIGN FACTOR EVALUATIONS FOR THE NORTH SLOPE – WHY THE BELOWGROUND MODE WAS SELECTED

Several factors were considered in the analysis and selection of the pipeline mode, including: safety and security, operational reliability, available line pipe technology, logistics and schedule, engineering design and constructability, environmental impacts, and cost. Following a review of both design modes, AGDC selected the BG mode as the preferred option for the North Slope. The Design Factor Evaluation is summarized in Table 1.

Table 1. Aboveground & Belowground Design Factor Evaluation Summary - North Slope

FACTOR	ABOVEGROUND (AG) MODE	BELOWGROUND (BG) MODE
Pipeline Safety & Security	• Would result in a higher likelihood of staff safety incidents; greater exposure from more complex logistics, longer to construct. • More susceptible to accidental damage (e.g., accidental bullet strike) and rupture. • More susceptible to terrorism or sabotage. • VSMs and snow accumulation may cause increased risk or hindrance to cross-country winter travelers.	• Would result in a lower likelihood of staff safety incidents. • Reduced probability to rupture due to accidental damage from external impact. • Less likely to be struck or sabotaged due to buried mode. • No risk to winter travelers.
Operational Reliability	• Potential for significant hydrocarbon liquid dropout during winter shutdown; slugging issue and longer restart time impacts gas delivery. • The pipe supports are designed to generally minimize thaw settlement or frost heave. Large settlements, should they occur, can be detected visually. • Maintenance work requires only access to pipeline (no digging). • Pipe may be more susceptible to corrosion due to the need for insulated jacketing, which can trap water. • May attract lightning once the pipe moves upward in elevation towards Atigun.	• No liquid dropout potential because gas remains at BG soil temperature and never reaches the critical temperature at which heavier hydrocarbons in the gaseous phase convert to liquid. • Potential for settlement and frost heave remediation during operations. • The position of buried piping would be monitored using in-line inspection tools containing an inertial measurement unit. The position data from each tool run can be compared to previous passes to determine whether excessive displacement has occurred. • Maintenance work could require construction of access roads, maintenance area workpads and excavation of the pipe. • Buried pipe will not attract lightning.
Line Pipe Technology	• Requires step-out technology for high pressure and toughness. • -50°F + environment, increases schedule risk (limited procurement options globally) and pipeline integrity risk (TAPS used 3 mainline pipe suppliers).	• BG line pipe is proven technology, and does not require low temperature steel requirements.

FACTOR	ABOVEGROUND (AG) MODE	BELOWGROUND (BG) MODE
Logistics and Schedule	• More complex logistics due to higher pipe tolerance and a more exacting installation process; installation of VSMs is time consuming. • Increased logistical challenges related to transport and storage of materials. • Increased logistical challenges related to training or scheduling of experienced welders to install pipe at 7ft, as required by North Slope ordinance. • Possibly two construction seasons (1 for VSMs, one for pipeline).	• Easier logistics of installation – chain trencher over ice pad; rigid side walls, easy welding / balancing; use of padding. • Fewer materials to ship. • One construction season.
Engineering Design and Constructability	• Challenging line pipe weld qualification program. • Induction bends may be needed at expansion loops, road crossings, and pipe rack crossings. • Insulation and jacketing needed to reduce the effects of heat transfer; these jackets can trap water and may make the pipe more susceptible to corrosion. • Pipe rack jumpers are needed to cross existing pipelines, primarily in the northernmost portion of the pipeline; can be complicated. • No cathodic protection required. • All AG pipelines must be modeled for susceptibility to WIV; can be mitigated through with balancing with weights/tuning mechanisms. • Susceptible to VSM movement from heaving and pinpoint pipe stress; cut and replaced VSMs that have heaved require continued monitoring and maintenance; can be mitigated somewhat with longer VSMs.	• Requires implementation of procedures required for impact avoidance and stabilization in permafrost areas. • Potential need for import of thaw stable backfill materials, ditch plugs, and other mitigation methods to ensure trench stabilization. • Increased reclamation efforts during operations. • BG construction can be completed sooner than the AG. Maintaining snow-free trench with multiple crews between trench and backfill will be challenging. • Potentially no need for induction bends except at gas treatment facility tie-in. • No need for insulation, as the gas will be operated below freezing to avoid thawing permafrost and ambient soil temperatures remain above the critical temperature year round. • No need for jumpers, as the pipeline will be buried under the existing pipelines and will cross them near mid-span between supports, where feasible. • Cathodic protection required for BG pipelines. • WIV is not a consideration for BG pipelines.
Environmental Impacts	• VSMs reduce pipeline impact to wetlands. • Increased direct/indirect impacts to subsistence activities and users. • Communities and non-government organizations express concern over impacts to subsistence activities and pipe in viewshed. • Low susceptibility to erosion; low to moderate level of stabilization effort required. • Major permanent visual resource impacts from ground and air – the AG pipeline will impact viewshed at ground observer height of 7–12 ft.	• Pipeline impacts to the organic layer minimized to 5-6 ft. wide; Mitigatable impacts to waters and wetlands • Minimal direct/indirect impacts to subsistence activities or users. • No pipe in the viewshed. • Erosion concerns mitigated with proper design, geotechnical information and water management/revegetation plans. • Increased stabilization efforts expected in first 5 years. • Minor long-term visual resource impacts – surface disturbance initially; revegetation.
Cost	• Higher capital expenditure (CAPEX) – significant cost upfront • Higher permanent materials cost; driven mostly by mainline pipe and vertical support system. • Transportation cost of materials will be substantial. • Higher staffing cost due to greater installation time will be substantial.	• Lower CAPEX – fewer materials and ease of installation. • Some added cost and logistics for select bedding/ padding material.

2.1 PIPELINE SAFETY AND SECURITY

2.1.1 CONSTRUCTION PHASE SAFETY AND SECURITY

Construction and personnel safety risk increases with an AG mode. This is a direct correlation with the increase in vehicle and equipment traffic and usage required to haul and install at least 5,000 vertical support members (VSMs) and horizontal support members (HSMs) prior to installation of the AG pipeline. The AG pipe must be hoisted, balanced, and secured at a height of at least seven feet to allow for wildlife passage, as required by North Slope Borough ordinance. The increased traffic and handling and extended construction season associated with AG construction would result in an increased probability for staff safety incidents.

2.1.2 OPERATIONAL PHASE SAFETY AND SECURITY

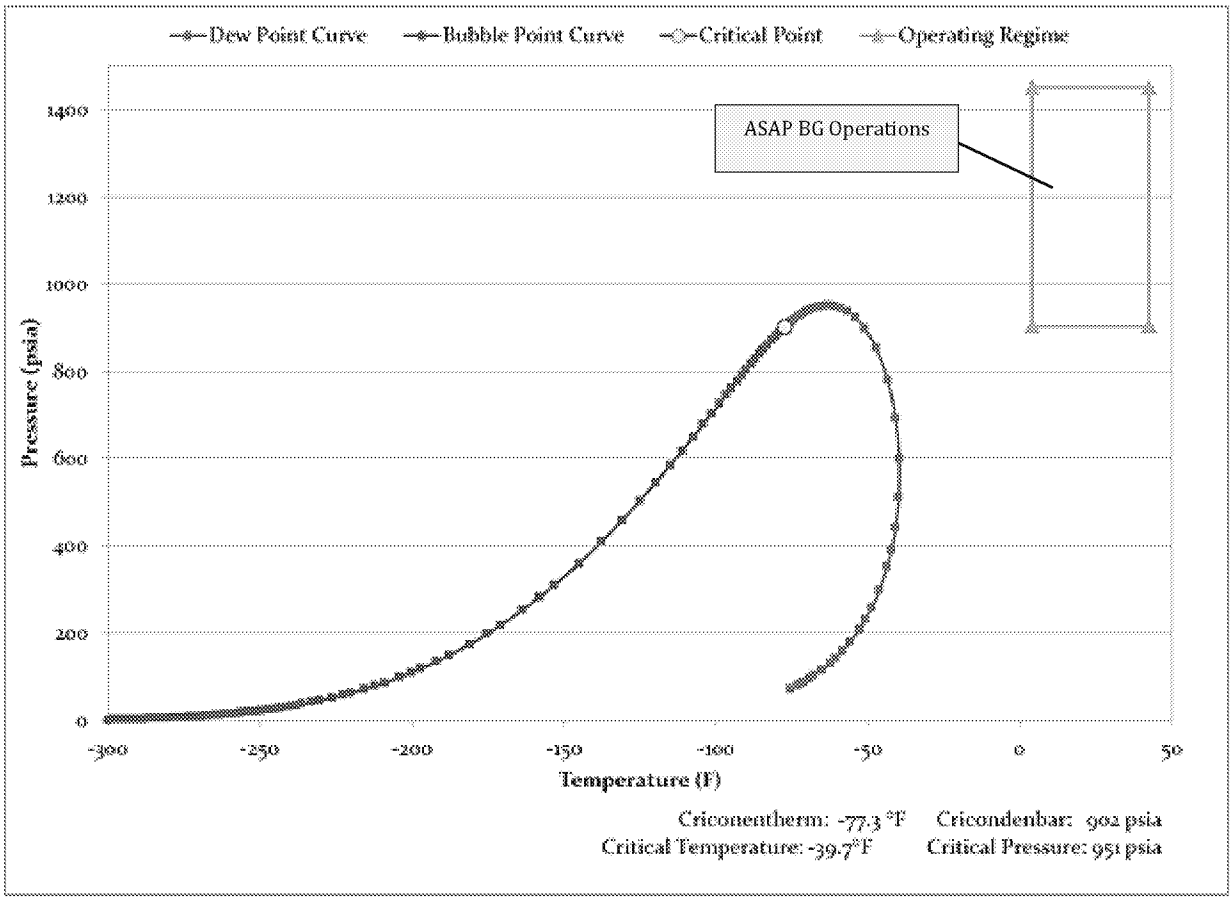
BG pipeline design and operations for natural gas transmission have proven reliability as it pertains to pipeline integrity and security. In the unlikely event of a BG pipeline failure, the intact sections adjacent to ruptures are restrained and in the event of ignition, protected from the effects of thermal radiation by the surrounding soil beyond the ends of the rupture. A near-vertical flame is typical of a relatively short BG pipeline failure.

The AG pipe is less secure than the BG mode, and it is more vulnerable to accidental and intentional damage (i.e., sabotage). An AG line could explode or leak if it is hit by accidental or intentional bullet strikes (a concern that arose in public meetings over the development of the Point Thomson Project). The pipe and VSMs are vulnerable to strikes from aircraft and ground-based vehicles. The AG pipe is also more vulnerable to terrorism attacks. Rupture of the AG gas transmission pipeline could cause significant damage to the support structures, along with consequent service disruption, potentially requiring mobilization of a significant reconstruction effort.

2.2 OPERATIONAL RELIABILITY

The phase envelope is a significant consideration in natural gas pipeline mode evaluation on the North Slope because of the potential for the transported gas to transition from a single-phase (gas) to two phases (gas-liquid). There is no chance of two-phase flow as long as the pressure and temperature conditions within the pipeline remain outside of the gas phase envelope in all instances (e.g., the BG scenario, as BG temperatures will never get cold enough). However, in the event of a prolonged shutdown during winter that resulted in a pressure drop, the AG mode would subject the pipeline to hydrocarbon liquid dropout at cold ambient temperatures (Figure 2). This would subsequently lead to substantial pooling of liquids at low elevations or at low spots and bends in the pipe.

Figure 2. Phase Envelope Diagram (ASAP Example)



BG temperatures will never be low enough to put the pipeline at risk of hydrocarbon liquid dropout and severe mechanical disruption (e.g., it can never move completely from the green box, representing operational pressure/temperature, to inside the red/blue phase envelope, during which liquid dropout occurs). Reduced pressure during prolonged shut down during a cold winter in the aboveground (AG) mode would put the pipeline at risk of moving inside the phase envelope, causing extensive pooling of liquids and severe mechanical disruption.

Should this scenario occur for the AG design, condensate formation inside the GCF and the pipeline will occur. The volume of condensate yielded can be predicted by analyzing the gas phase compositions upstream and downstream of a potential condensation location and determining the gallons of liquids per thousand standard cubic feet of gas for the liquefiable components in each stream.

The pipeline facilities (gas treatment/compressor stations) and pipeline are not designed to manage a liquid volume load from the mainline. Hydrocarbon liquid dropout in the AG pipeline could result in an extended shutdown due to the difficulty in cleaning, drying, and restarting a blocked pipeline. In contrast, a winter shutdown of the BG pipeline would never result in hydrate formation since the winter ground temperature is warmer than the temperature at which single-phase gas can become a two-phase gas-liquid combination.

2.3 LINE PIPE TECHNOLOGY

The BG case design temperature is colder than the winter soil temperature at the depth of the buried pipe. The AG case design temperature of -50ºF is due to the winter air ambient temperature. At this temperature or below, special operational measures, such as lowering pipeline pressure, may be required. Pipe sources may be limited to large Longitudinal Submerged Arc Welded (LSAW) pipe manufacturers due to the large diameter, wall thickness, grade strength and low temperature design requirements of the pipe. For AG pipe, the number of potential manufacturers will be even more limited due to pipe specifications requiring increased wall thickness, and lower temperature design capabilities.

2.4 ENGINEERING DESIGN AND CONSTRUCTABILITY

For the AG mode, the VSM installation process is extremely costly, time consuming, and would require increased logistical efforts, material handling challenges, and additional schedule risk. When compared with the BG case, the AG case would require a substantial increase in barge shipping and domestic highway truck traffic for hauling additional materials, such as VSMs, HSMs, slides, guides, and anchors. AG installation is also likely to result in greater personnel and scheduling challenges, including the need for more out-of-state labor or more in-state labor training. The AG mode would require a separate weld qualification program, in addition to that for the mainline for workers and installation of VSMs structures noted above.

The BG case would require the use of an ice pad for transport of the pipe on heavy equipment, including a chain trencher, sidebooms, and trucks (see Figure A1-1 in Attachment 1). A trencher running over an ice pad would cut a 5 to 6 foot wide trench through the soil to minimize impacts of construction. Bedding and padding would be installed against vertical sidewalls. Soils would be scraped back into the trench and crowned with additional spoil. Winter construction would result in a lower probability of staff safety incidents. Attachment 1 provides the details of Planning, Construction, Operation, and Maintenance Procedures.

Former Alyeska Pipeline Service Company staff recommend crowning the surface of the filled trench with soil in winter to an elevation slightly above the surface of the tundra. The goal is to have an even-lying surface at the impacted area over the pipe in summer, once processes of thawing, natural gravity compaction, and some drainage have occurred so that stabilization through revegetation and maintenance can proceed. After installation, the pipe would be monitored as part of the field surveillance program to address slumping, heaving, or ponding issues, employing the maintenance cycle standard of "Monitor, Detect, Correct" to ensure that these conditions are addressed in a timely manner.

The AG mode would require installation of the pipe on more than 5,000 VSMs, similar to what TAPS uses in its aboveground sections, to support the large diameter pipeline above the tundra. This assumes a single VSM structure. If a dual VSM structure is required (two vertical support members at every location) this number could increase to over 10,000 VSMs. If an AG mode was required for more than just the North Slope (first 60 miles), the need for VSMs would be much greater.

The VSM installation process required for an AG mode is more costly, more time consuming, and more complex than the BG mode. Increased and more complicated logistical efforts include additional material handling challenges, more barge, rail, and highway truck traffic, additional schedule and safety risk, more challenging welding and balancing procedures, and increased structural challenges and risks related to wind or frost heaving, leading to VSM movement.

Complex welding and balancing procedures are required for the AG mode because pipe tolerances are much more exacting. AG installation would be more complicated, would take longer, and would potentially result in personnel and scheduling challenges to ensure additional experience was applied to the pipeline installation process. For these reasons, it is possible that the AG mode could add an additional year to pipe installation and disrupt the project-wide construction schedule.

2.4.1 WIND INDUCED VIBRATION

The AG mode would be required to address Wind Induced Vibration (WIV), a phenomena in which wind damages a linear structure by forcing it to vibrate at its natural frequency. WIV famously lead to the destruction of the Tacoma Narrows Bridge in 1940, and there have been some instances of pipelines impacted by WIV failures on the North Slope. AG pipelines must be modeled for their susceptibility to WIV. The effects of WIV are mitigated by placing appropriate weights and tuning structures on or near the center of the span between the VSMs. AG pipelines on the North Slope that possess a north-south alignment are typically more susceptible to WIV than pipelines with an east-west alignment, because the prevailing winds blow in an east-west direction in the Kuparuk and Alpine areas. BG pipelines are not susceptible to WIV, and do not require weight or tuning structure setting, monitoring, or maintenance.

2.4.2 FROST HEAVING AND THAW SETTLEMENT

The AG pipeline would be susceptible to uplift bending if the VSM support structure moved due to frost heave. VSM holes can extend from the surface down to a 15-20ft depth and can collect water when open or while they are settling. VSMs also conduct heat between the air and the ground. In certain conditions these processes can exacerbate frost heaving and lead to VSM upheaval. VSM upheaval is usually mitigated during the design phase of the project by utilizing geotechnical information and predicting how much VSM embedment is required to reduce movement. Engineers typically add additional VSM length below grade to mitigate against vertical movement.

When a VSM moves upward after pipeline installation, the conventional maintenance solution is to drill and set two more VSMs on either side of the heaving VSMs (this requires ice road access on both sides of the pipe) and then provide support at grade while the pipe is lowered onto the HSM. Additional maintenance will still be required for the heaving VSM, as it will probably continue to heave and will need to be cut to keep from impacting the pipeline. VSMs in wet areas also have a tendency to settle and drop in elevation. In an AG scenario, thaw settlement that causes a VSM to drop in elevation could place stress on the pipe and the adjacent VSMs.

BG pipelines are susceptible to frost heaving and settlement, but because VSMs are not used in the BG mode, there are no issues related to open holes collecting water or having long, metal posts conduct heat between the ground and the air. Based on geotechnical data, AGDC engineers and contractors believe the risk of BG pipe heaving is very low for the first 60 miles. For the BG mode, long, continuous segments of pipe surface area are supported by the ground. This allows the BG pipe to tolerate moderate heaving and exhibit flexibility better than an AG pipe, which is supported by pipe shoes, which are relatively short when compared to the length of the pipe span. The BG pipe is bedded with thaw-stable, non-frost susceptible materials and will operate at below-freezing temperatures of approximately 8-30ºF in winter and 25-30ºF in summer (Figure 1). This helps to mitigate against permafrost degradation, pipe thaw settlement, and surface slumping. Pipeline integrity will be monitored regularly through the use of inline inspection devices (smart pigs).

2.5 LOGISTICS AND SCHEDULE

North of the Brooks Range, the end of the winter season is late April or early May. This yields a duration from early January to late April for pipeline construction of up to 120 days. An AG design would require installation of VSMs at approximately 5,000 locations. It is possible an AG design could require two winter seasons: the first for installation of VSMs and the second for the installation of the pipe. This would impact cost, schedule, and simultaneous operations with other mainline spreads, camp space, and logistics.

For BG design only one winter season would be required. The winter section lengths were planned to allow as much time as possible between the completion of the pipe laying and the end of season dates, allowing adequate time to complete coating, cathodic protection, lowering-in, bedding, padding, backfill, tie-ins, and cleanup.

The civil contractor will construct an ice work pad on the Right of Way (ROW) prior to pipe stringing. Frost packing of the ROW with tundra-legal equipment could begin in November, but on tundra ice pad construction is assumed to start in early or mid-December. The ice pad crew will ensure that enough ROW is prepared ahead of the pipe lay crew. The entire section is flat terrain and will be constructed during the winter pipe lay season.

2.6 ENVIRONMENTAL IMPACT

2.6.1 SOILS AND HYDROLOGY

The BG mode requires specific procedures for adequately controlling soil erosion along the constructed pipeline. AGDC is working with the Alaska Department of Natural Resources (ADNR) Plant Materials Center to develop specific revegetation procedures in a Revegetation and Erosion Stabilization Plan for the Project. Implementation of these specific procedures will help to reduce soil erosion and improve stability through revegetation and other means.

The BG mode also requires specific procedures for adequately managing water along the constructed pipeline, including surface water and subsurface hydrologic flow. ASAP has retained the services of individuals with over 30 years of experience stabilizing and maintaining TAPS on

the North Slope to assist in the development of these procedures. Based on the recommendations of these individuals, AGDC's goal is to maintain natural surface water flow patterns with as little change as possible.

AGDC's goal will be to maintain a stable surface and to manage water and drainage within the ROW during operations and maintenance. AGDC will apply a programmatic maintenance cycle standard of 'Monitor, Detect, Correct' to its soil stabilization and water management efforts during the operations and maintenance phase of the project so any potential issues related to erosion, slumping, ponding, or inadequate drainage can be addressed in a timely manner.

2.6.2 PERMAFROST

Impacts to North Slope permafrost will be minimized by:

- Constructing in winter and restricting impacts to the organic layer to a very small footprint (a 5 to 6 ft. wide trench will be dug and filled with thaw stable bedding and padding, the pipe, and trench spoils in winter).
- Use of ice pads, frost packing, and ice roads during winter construction to avoid unneeded disturbance to the organic layer.
- Reducing the pipe dormancy period to only two years and maintaining a year-round operational temperature of the pipe that is below freezing for the first 60 miles (see Figure 1).
- Maintaining existing surface water channels in their natural flow path to avoid water seepage into the area of the filled trench.
- Seeding the first summer after construction with a mixture of annuals and native seeds to regrow the organic layer and replace a vegetative covering as soon as possible.
- Instituting a programmatic maintenance cycle standard of 'Monitor, Detect, Correct' for hydrology.

2.6.3 WETLANDS, VEGETATION, AND LAND

The overall acreage impact to wetlands and vegetation on the North Slope due to the pipeline would be greater for the BG design than the AG design because of trenching, in comparison with the "posthole footprint" that would result from VSM installation under the AG option. However, in the BG mode, a route was selected to avoid wetlands of higher functional values whenever possible. Upland areas were targeted, and open water areas were avoided where possible.

Seeding and revegetation for the BG mode will be done with approved seed mixes that include native species and other annuals. As noted above, AGDC will work with the ADNR Plant Materials Center to develop a specific plan for revegetation and stabilization that will provide specific information on seed mixes, mulches, hydro seed applications, clearing, maintenance, and

monitoring. Upon completion of use of the ROW, AGDC will be required by lease stipulation to restore the land to the satisfaction of ADNR.

2.6.4 ENDANGERED SPECIES AND OTHER FAUNA

Habitat for eiders and other waterfowl is potentially impacted by the AG and the BG design. The BG design would have more impacts to wetlands, but the difference in how waterfowl would use the area over or under the pipe is unknown and may be negligible. The BG alignment was specifically selected to minimize impacts to existing ponds and other higher value wetlands. It is not known if the visual perception of an AG pipeline or disturbance from a BG pipeline could deter birds or fragment habitat, or even be used as a means of navigation from the air. The AG pipeline would be expected to result in some minimal nighttime bird strikes resulting in mortality or injury.

While habitat is often only discussed or mapped 2-dimensionally, the reality is habitat is the 3-dimensional space that fauna occupy or use. Behavior and habitat use by waterfowl and other fauna could conceivably be even more impacted by an AG pipe and VSMs (visual disturbance, strikes, shading and plant growth, snow accumulation or blockage, and long-wave radiation impacts on snow); whereas the BG design would be a revegetated corridor maintained for operation.

Wildlife migration and subsistence users would not be impacted substantially by the BG mode, but the AG mode could potentially impact wildlife migration and subsistence activities. Subsistence users have previously commented on the impacts of proposed AG features on the North Slope. Transcripts from the TAPS renewal Draft EIS Public Hearing in Barrow, Alaska recorded North Slope Borough (NSB) Mayor George Ahmaogak's public testimony, as he spoke on behalf of the NSB in regard to his concern about additional AG features that could impact wildlife on the North Slope. Mayor Ahmaogak commented that:

> "Caribou migration patterns were altered, changed by construction of the Trans-Alaska Pipeline system and the associated Dalton Highway. Studies, scientific studies utilizing radio collars on caribou indicated that to a great extent, these obstacles continue to impede the free movement of the affected North Slope herds... Subsistence users in our communities of Nuiqsut and Anaktuvuk Pass have long noted these changes and they have to cope with the absence of game in traditional harvest areas." (BLM TAPS renewal hearing)

An additional AG feature on the North Slope in the same vicinity of TAPS and the Dalton Highway could potentially impact caribou behavior and movement. Burying the pipeline on the North Slope is likely to reduce impacts to wildlife migration and movement, particularly caribou. Surprisingly, the Center for Biological Diversity expressed concerns over the AG design impacting caribou over the first 6 miles of the route during the DEIS, citing "adverse impacts" to large migratory mammals. Their comments also mentioned that the AG portion of the pipeline on the North Slope could "delay caribou movements" and that it might disturb herds or individuals. They also stated:

> "The Bureau of Land Management has identified numerous potential adverse effects of less extensive pipelines and also indicates that onshore gas activities, especially roads, can displace

caribou and reduce caribou densities for miles. Snow drifts under a pipeline can block or interrupt caribou movements." (Center for Biological Diversity comment on ASAP DEIS)

Furthermore, the USFWS reviewed the ASAP Project during the EIS review period and published the results of its evaluation in a formal legal document, termed a Biological Opinion (BiOp), dated July 10, 2012. In its BiOp, the USFWS specifically identified and described the AG and the BG mode on the North Slope, including geographic and design features of each. The BiOp expressed no concern over impacts associated with use of the BG mode through permafrost areas, nor did it reference any expected impacts to water, soils, or endangered species habitat. To the contrary, the USFWS stated that the proposed design is, "not likely to adversely affect Steller's eiders" and is, "not likely to jeopardize the continued existence of spectacled eiders or polar bears, and is not likely to destroy or adversely modify polar bear critical habitat" (USACE FEIS). However, during the ASAP Supplemental EIS process years later (2014-2017), the USFWS has made many comments requesting an AG pipe, contributing to significant delay in completing the NEPA process and resulting in the USACE carrying forward several AG alternatives in the Draft Supplemental EIS. Similar comments have been made by USFWS and EPA staff to FERC for the Alaska LNG Project, and AGDC expects that these cooperating agencies will attempt to persuade FERC to carry forward AG alternatives.

2.6.5 OTHER ENVIRONMENTAL IMPACTS

A BG pipe mode would also reduce viewshed impacts to human residents. An AG pipeline for 60 miles is a substantial 30+ year permanent viewshed impact compared with a BG trench that will be stabilized, in part, through revegetation. Snowdrifts caused by the AG mode and VSMs also can present an impediment and a safety hazard to hunters or other travelers traversing the tundra by snowmachine.

2.7 COST

The AG mode will have a higher installation cost than the BG mode and will substantially increase the Project's capital expenditures (CAPEX) (Table 1). The higher costs associated with the AG mode are associated with increased amounts of materials, material transportation and handling, and more staffing time due to a longer installation process. These higher costs associated with the AG pipe would be passed on to consumers (residents, businesses, government entities, and projects) through higher tariffs and burner tip rates, whereas the BG gas would provide cheaper gas for Alaskans.

3. WHY THE ABOVEGROUND PIPELINE MODE WAS NOT SELECTED

The AG pipe option was not selected for the first 60 miles of the pipeline on the North Slope. The engineering reasons for not selecting this option lie in challenges to constructability, increased operational risk, more complex logistics, and higher project costs. Other considerations are the security of the AG line, impacts to visual resources, public comments on impacts to subsistence species, such as caribou, environmental impacts to aquatic habitat, and impacts to non-aquatic wildlife during both construction and operations.

The AG procedure requires more equipment, more material, more temporary support infrastructure, and more time to construct than the relatively simpler process of trenching, bedding, padding, and covering with backfill. There is also increased time and effort required for balancing the VSMs and aligning the pipe on the VSMs.

In the AG design that was not selected for the North Slope component of the project, the pipeline is supported at intervals by engineered structures, typically constructed of steel or concrete. The impacts of WIV and frost heaving of VSMs create unique challenges. The vertical separation of the pipe from the subsurface eliminates consideration for geohazards resulting from changes in subsurface support, such as thaw settlement. The support structure is typically a round structural member with embedment designed to resist axial and longitudinal loadings transmitted to the support from the pipeline. The pipe itself, not being constrained by surrounding soil, is thus free to expand and contract in response to such loadings as operational changes in temperature. Consequently, the longitudinal stresses induced in the pipeline are relatively small, provided the supports are spaced appropriately. However, the displacement of the pipe on the supports must be accounted for by installation of expansion loops.

This type of installation is typical on the North Slope of Alaska where hot, buried pipelines could disrupt the permafrost conditions. It was also the solution of choice for TAPS to mitigate the effect of thaw settlement; approximately half of its length is aboveground (greater than 400 miles). Natural gas pipelines, which typically run chilled or near ambient temperature, have less of a technical requirement to avoid burial.

The technical disadvantages to the AG scenario include flow assurance considerations for the natural gas product to ensure there is no liquid dropout that could collect and cause internal corrosion. The pipe material may be subject to low temperatures from the ambient conditions, and may require special fracture control provisions. There are also well-known disadvantages for its use which may be more pronounced for Alaska LNG or ASAP, especially if used along the Dalton Highway Corridor: the configuration is highly visible, must allow for passage beneath the pipe, must allow for lateral variations in the ROW to accommodate expansion loops, and would be subject to additional security concerns.

4. ATTACHMENT 1. BELOWGROUND PIPELINE PLANNING, CONSTRUCTION, MONITORING, AND MAINTENANCE PROCEDURES FOR ALASKA'S NORTH SLOPE

1. PRE-CONSTRUCTION PLANNING

1.1 GEOHAZARD AVOIDANCE AND SPECIAL DESIGN AREA ENGINEERING

The pipeline route and design were developed and refined in consideration of extensive hydrologic, geologic, and geotechnical data. AGDC has developed a robust geotechnical program where engineers have acquired a significant body of information that will continually be supplemented up through construction to best inform the engineering design team. This information was utilized in evaluation of the BG and AG modes and the route alignment. As part of this program, engineers have acquired and reviewed:

- Orthorectified aerial photography (approx. 3,733 sq. mi.).
- Digital Elevation Modeling (DEM) derived from LiDAR surveys (approx. 2,079 sq. mi.).
- Terrain unit mapping.
- Borehole soils data (including access to over 10,000 discrete boreholes).
- Permafrost investigations and ground temperature monitoring.
- Geohazard Evaluation and Mitigation Analysis Reports (GEMARs) covering topics such as Hydrotechnics, Soil Geochemistry, Unique Soil Structure, Surface Fault Rupture, Tectonics and Seismicity, Landslides (slope stability), Erosion and Buoyancy, Freezing of Thawed Soils and Thawing of Frozen Soils.
- Assessments of potentially active tectonic faults.
- Trip reports from multiple field reconnaissance investigations or site visits.

These engineering reviews were important for long-term soil stabilization, pipeline integrity, avoiding burial of the pipe in areas sensitive to thaw degradation, and burial of the pipe in areas susceptible to seismic disturbance or major fault movements. Special design areas included fault crossings, water crossings and pinch points (e.g. Atigun Pass, Denali commercial area). AGDC engineers also worked with the Alaska Division of Geological and Geophysical Surveys (DGGS) and supported their efforts to identify and assess of geologic hazards along the pipeline route, although the majority of these potential hazards were south of the Brooks Range.

Conditions have been identified through AGDC's geotechnical program that may cause ditch displacement and subsequent pipe curvature and distress. This requires experience in identification of those surface characteristics that have been shown to contribute to potential route hazards, followed by an extensive subsurface investigation program to identify the remaining hazard, and, finally, analytical design tools to quantify the effect on pipe behavior. As the samples recovered from the boreholes are processed by soil laboratories, the results feed into the projects' respective geospatial information system (GIS) and geotechnical databases, and then are used in the evaluation of route hazards. The process of route threat identification, evaluation, and avoidance is an ongoing process for which many aspects will continue throughout the operational life of the Project.

1.2 AVOIDANCE OF HIGH VALUE WETLANDS

While approximately 83 percent of the North Slope is considered wetlands; these wetlands vary in their intrinsic value based on the function they provide in the ecosystem. The current pipeline route used aerial photography and approved wetland field survey methods to delineate wetlands,

develop an aquatic site assessment to rank functions and values of wetlands, and to route the pipeline around open water and higher value wetlands where possible.

1.3 WATERWAYS ANALYSIS

AGDC's waterways engineers have spent several summers of field work assessing flow and stream bank characteristics of the streams along the pipeline route. The reason for this work is that it will be important for AGDC construction engineers to maintain existing surface water flow following burial of the pipe in winter. AGDC plans to carry out work on the North Slope in winter when water is frozen, and then work in the years following construction to ensure minimal disruption to surface water flow patterns, ensuring that water does not get directed into the trench and instead continues in its naturally flowing direction towards larger waterbodies.

2. CONSTRUCTION OF THE BELOWGROUND PIPE

2.1 ICE ROADS, ICE PADS, AND FROST PACKING

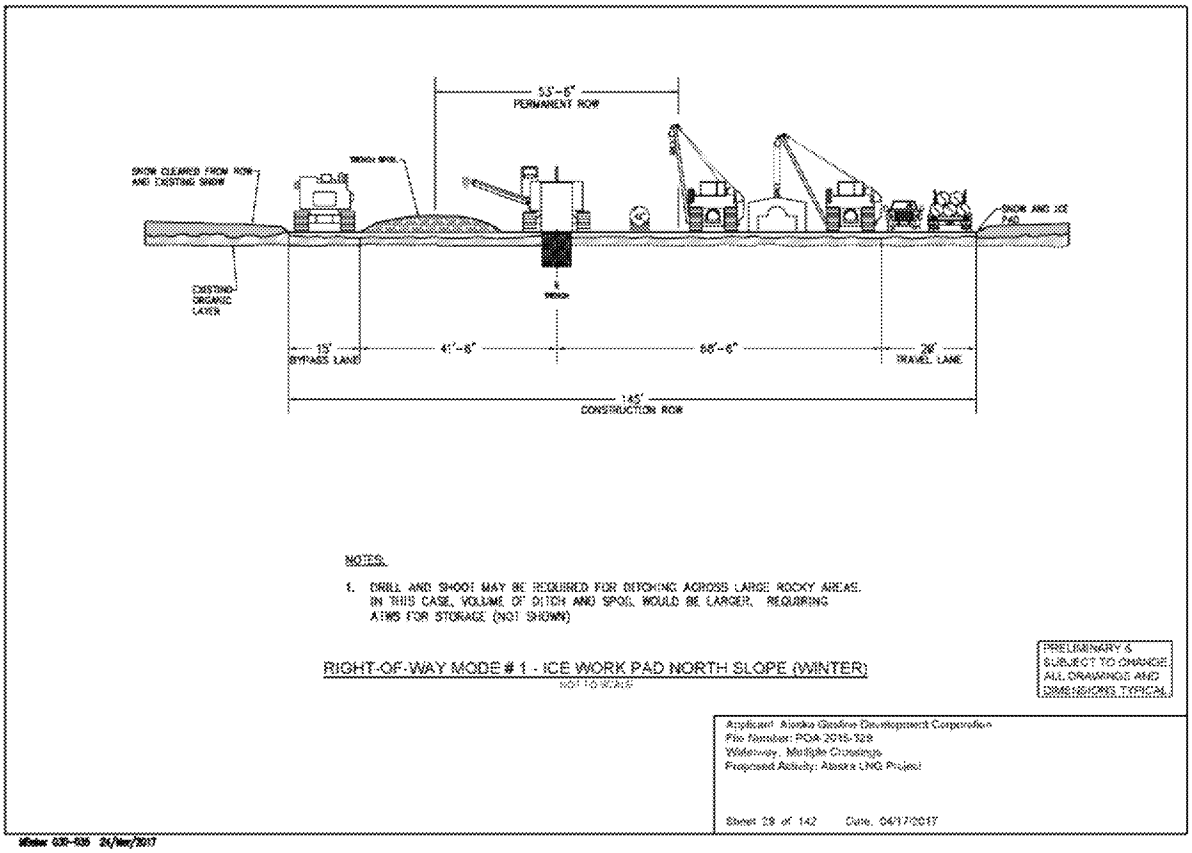
Mitigation measures will be used during pipeline construction on the North Slope to protect high value wetlands and avoid disturbing the organic layer and permafrost. Ice roads and pads will be constructed in order to provide a flat, stable working surface and move heavy equipment along the pipeline route on the North Slope. Frost packing (use of condensed snow as a driving surface) will also be used in some areas, where possible.

2.2 TRENCHING AND PIPE INSTALLATION

Heavy equipment working over an ice workpad (trencher, sidebooms, and trucks) will work north-to-south to dig a 5ft-wide trench to the desired depth (generally, 6ft.), casting spoils to the opposite side of the trench. Heavy equipment and trucks will drive on the working side of the trench, which will be protected by an ice pad and result in no impact to wetlands from transportation. A trencher, which is not compatible with large cobble or boulder areas, can be used because of the presence of a uniform deposit of fine-grained soils within trench depth on the ACP. The trencher will drive over an ice pad while digging the trench. Trench spoils will be cast onto the spoils side of the trench (opposite the working side of the trench), onto either ice, frost packing, or snow. Soils will be backfilled into the trench after installation (see below for more detail).

It is unlikely that the entire volume of trench spoils will be able to be immediately removed from the snowpack on the spoils side of the trench. A thin layer of spoils is likely to remain on the spoils side of the trench. Some of this material may be used to repair slumped areas or re-inforce crowns that will be re-seeded and revegetated after spring thaw. Any remaining trench spoil lying on the spoil side of the trench may ultimately be removed in a future winter or may be revegetated. Upon digging the trench, construction teams will assess surficial and subsurface hydrology, as well as the potential for erosion and ponding. Engineers will use this information to inform their decisions for placing ditch plugs or other subsurface hydrologic control measures where possible.

Figure A1-1 Pipeline Construction on Alaska's North Slope



Installation of the buried Alaska LNG pipeline on the North Slope in winter would occur using a 6-ft wide chain trencher operating over an ice pad. The rigidity of the frozen soils and the soil type would allow workers in and out of the ditch without need for expanding the side slopes of the ditch.

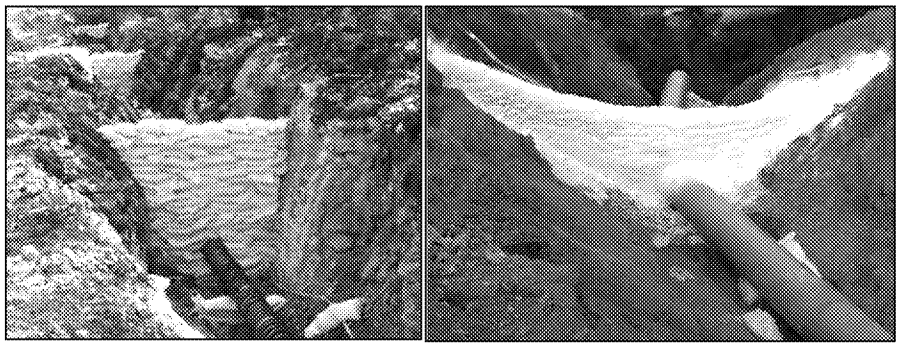
2.2.1 THAW-STABLE BEDDING AND PADDING MATERIAL

After trenching is completed, non-native bedding and padding material will be added. This material will be mined to meet project specifications. The bedding material will be thaw-stable in order to provide required structural support to the pipeline and avoid settlement.

2.2.2 DITCH PLUG INSTALLATION

Ditch plugs are designed to stop water flow through the trench line and therefore mitigate against undesired waterflow or seepage; they can be made from different types of materials (Figure A1-2). Ditch plugs are typically installed on each side of an excavated water crossing and in other locations along the ROW as required and directed by the owner's ROW inspector. They are useful in avoiding French drain effects, and can be used to direct and inhibit the flow of water. Experts who formerly worked on TAPS with Alyeska Pipeline Service Company have recommended a higher number of ditch plugs for the gas pipeline than was used on TAPS to help control water and reduce ponding. Ditch plugs will also be used in the trench on either side of stream crossings to ensure water does not penetrate into the ditch.

Figure A1-2. Ditch Plugs Made from Different Types of Material



Examples of different types of ditch plugs used for water management in buried pipeline construction

2.2.3 DITCH BACKFILLING

The pipeline will be placed within the trench during the same winter construction season in which it is dug. The pipe will be padded with thaw-stable material, and the remaining portion of the trench will be filled with native trench spoils or other select backfill. Per federal regulation, at least 30 inches of normal soil cover must be used to cover the pipe. During construction, soil will be replaced soon after the pipeline section is laid down to reduce the introduction of snow or rain into the trench. Seeding of the backfilled trench will be monitored after construction to confirm that the reseeded ditch line supports continued long-term plant populations and that fill above the pipe does not erode.

2.2.4 CROWNING

The excess trench material will be used in trench crowning (a very slight mounding over the pipe), contouring terrain, and other stabilization and mitigation efforts. Some of the excess spoil material overlaying existing vegetation may be hauled off to disposal sites, or it may be seeded or left in place, depending on Project operational and maintenance needs at that time. The slope of the crown over the trench is critical to stabilizing soils and directing ponding, thereby mitigating some potential impacts related to erosion and drainage. In crowning, the native material that is replaced over the trench is almost near to flat.

Crowning is a procedure that is important for both soil stabilization and water management. It is characterized as a mild mounding of trench spoils above the pipeline trench to an appropriate finish grade that will help to direct moisture away from the top of the pipe and mitigate against slumping. Crowning promotes movement of water along a desired vertical and horizontal gradient. As the ditch soils thaw in spring, the extra weight and height of soil will compact the soil below and bring the surface above the pipeline near to flat.

- Options available to direct flow from the crowned trench line include:
- Installation of wattles (intentional depressions) at an angle and at predetermined spacing along the crowned trench line based on slope angle to direct flow away from the ditch line.
- Installation of flexible piping to carry offsite and upgradient water across the ditch line to vegetated downslope areas.

- Periodic installation of armored flow breaks in the crowned section to transfer water from one side of the ditch line to the other for storm drainage.
- Use of native fill berms to direct flow away from the crowned ditch at specified intervals based on slope.
- Construction of drainage channels to direct flow from the construction area.
- Installation of permanent culverts in some areas.
- Development of earthen ditch blocks used to retain or direct water.
- Use of gravel or gabion channels or swales.

2.2.5 TERRAIN CONTOURING

Terrain contouring is a procedure that is important for both soil stabilization and water management. It is the use of excess ditch spoils and/or other materials to contour surrounding terrain in an effort to control or reduce erosion through the control of hydrologic movement, as needed to promote preferential surface and subsurface flows. Material sites, camp sites, ice roads and pads, temporary-use areas, and temporary access roads will be re-contoured and restored to an acceptable condition as required by applicable permits. Generally, revegetation of disturbed areas is planned for long-term stabilization.

2.2.6 CLEANUP

Following pipe installation, ditch backfilling, and hydrotesting, crews will perform cleanup, including leveling of the pipeline ROW and shaping of a crown over the pipeline ditch, as required. Crews will dispose of remaining scrap materials, timber, or other debris. Wood debris will be disposed of, and scrap materials and rubbish will be hauled to designated waste accumulation locations, incinerated, hauled to a permitted landfill for disposal, or some combination. Crews will be equipped with dozers, front-end loaders, and dump trucks to facilitate clearing and construction ROW cleanup. Snow pad areas will require a summer cleanup check to verify that construction materials were removed from the construction ROW. Remaining debris will be removed using low-ground-pressure vehicles to minimize disturbance to surface vegetation.

2.2.7 DORMANT PERIOD

The BG pipe and surrounding material (bedding/padding, trench spoils, crown) and permafrost will remain frozen in place up through spring/summer melt (Figure 1). At that time, the crown and back-filled trench spoils will settle over the pipe and the thaw-stable bedding. The surrounding permafrost will melt slightly around the portion of the trench that thaws (Figure 1). The pipe will lay dormant at ambient temperature for approximately two years without any flow of gas while construction and testing of the GCF and pipeline occur and are completed.

3. POST-CONSTRUCTION MONITORING AND MAINTENANCE

3.1 EXPERIENCED PERSONNEL AND PRECEDENT

AGDC has retained the services of engineers and environmental scientists with 30 years of experience in stabilizing soils and managing hydrologic issues associated with other buried pipelines in Alaska, including some on the North Slope. These experts include Pipeline and Civil Maintenance (P&CM) engineers for Alyeska Pipeline Service Company and other experts who have experience with TAPS, a pipeline that has several belowground sections on the North Slope. These experts have first-hand knowledge and experience implementing successive-year soil stabilization and water management techniques and assessing needs to mitigate against erosion. These individuals have contributed to the development of stabilization measures for the first five years after construction and to the long-term maintenance planning efforts for the gasline.

3.2 TRENCH STABILIZATION

Monitoring and re-stabilization will occur in the years after construction of the pipeline to ensure resulting environmental impacts are minimized and that any unexpected impacts are addressed through additional required action. Stabilization of the backfilled ditch may be a multi-year process in some areas, particularly areas with fine-grained, ice-rich soils. Rehabilitation, especially in ice-rich soils, may require trench maintenance and long-term thermal stabilization activities before the habitat achieves stability.

3.3 EROSION CONTROL

Storm drainage design at the surface above the pipe will help to control flow along the crowned ditch and the project. The crown is not likely to remain more than 1 to 2 years after the annual freeze-thaw cycle because of resulting settlement. Temporary and permanent erosion and sediment control procedures and drainage controls will be designed to work in concert to provide acceptable erosion and sediment control for the project.

Erosion control measures for ditch excavations performed through stream beds and banks will be applied as soon as the backfill is placed into the ditch to complete pipe coverage. Specific materials to use for erosion control of the bed and banks will be determined on a case-by-case basis and identified in the construction plans for each crossing.

The project will develop appropriate methods to respond to local conditions based on existing terrain, geology, hydrology, slope, disturbed area, thermal regime, climate, and other factors in the final design and relevant plans.

3.4 REVEGETATION

Areas that are impacted by construction will be re-seeded with natural vegetation to improve stabilization of soils and minimize erosion around the pipe. AGDC has worked with the ADNR Plant Materials Center to develop a specific Revegetation and Erosion Stabilization Plan.

Soil stabilization procedures were developed through consultation with former P&CM engineers and scientists with first-hand experience in implementing successive-year soil stabilization techniques and assessing needs to mitigate against erosion for buried Arctic pipelines. Procedures for ensuring soil stabilization include geohazard avoidance and special design area engineering, use of engineered material for bedding and padding, soil replacement and stabilization at installation, crowning, terrain contouring, armoring, revegetation, fertilization, control of non-native plants, and through monitoring and maintenance for several years after construction. Seeding and revegetation would be done with approved seed mixtures of annuals and native species and re-shaping of the ditch spoil after initial thawing would be done to prevent any ponding due to thaw slump.

Spring seeding of the impacted area promotes vegetative growth and the stability of soils to minimize erosion around the pipeline. Seeding of the disturbed corridor will be conducted in consultation with the BLM and State of Alaska and will adhere to the ADNR Plant Materials Center Revegetation Manual for Alaska (Wright, 2009). The methods and procedures outlined in the manual provide specific regional information for revegetation of disturbed areas with native plants to limit the potential for colonization by invasive species. A Non-native Invasive Plant Prevention Plan will also be developed and consulted to limit the potential for colonization by invasive species.

Seed mixes will be developed for different geographic areas and fertilizers applied at an optimum rate per acre. Hand methods, hydroseeding, and aerial seeding will be employed to stabilize surfaces as required and will be identified in more specific planning documents leading up to construction.

AGDC will continue to re-seed and monitor the success of vegetation as necessary while the ROW is being used for maintenance during operations. As required by the ROW lease, upon completion of use, the lands will be restored to the satisfaction of the landowner.

3.4.1 FERTILIZATION

The application of fertilizer will be conducted in consultation with ADNR. Standard practices and planning will be followed so that adequate volume, type, and quality of fertilizer are used where needed. Ground-disturbed areas may be fertilized, if appropriate, as construction progresses. Erosion control measures will be applied on top of the seed and fertilizer application. As project development proceeds, specific uses will be determined. Fertilizers will be used sparingly in areas where invasive plants are known to exist in order to limit their infiltration.

3.4.2 CONTROL OF NON-NATIVE PLANTS

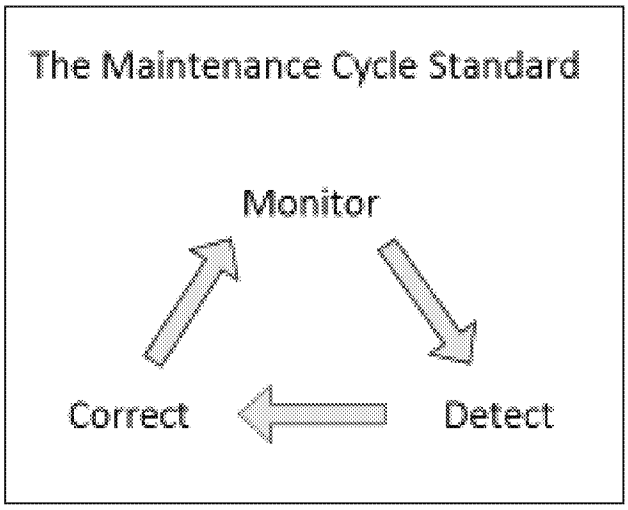
Procedures will be developed in consultation with ADNR to control the introduction and spread of non-native invasive plants during pre-construction, construction, and monitoring phases of the project. Invasive plants can be introduced from the use of airports (particularly at gravel airstrips), material sites, and temporary-use areas, such as Pipe Storage Yards (PSYs) and camps. Control of invasive plants is likely to be a requirement of ROW lease stipulations to restore land to the satisfaction of different land owners.

3.4.3 OPERATIONS AND FIELD SURVEILLANCE

When a gasline is fully constructed and when testing and operations begin, the pipeline will transport gas at below-freezing temperatures (8-30ºF) on the North Slope (Figure 1). Soils and water will be monitored regularly after installation of the pipe following the programmatic maintenance cycle standard of "Monitor, Detect, Correct" (see Figure A1-3). Where depressions or slumping occurs in spring/summer, additional ditch spoil will be placed to flatten the surface and reduced the amount of standing water. For the first several years after construction soil stabilization efforts will focus strongly on control of erosion through revegetation per the methods above and water management. If, after several years of revegetation efforts, plant cover does not sufficiently return to stabilize soils, ASAP will consider alterations to the methodologies of its revegetation procedures in consultation with ADNR to encourage additional growth.

AGDC will monitor the pipeline in the years after construction to determine where modifications may be needed to ensure proper water management. Crews will document and inspect areas of ponding water over the pipe and recommend site-specific improvements in subterranean infrastructure or water flow to ensure that prolonged ponding is limited or reduced. Additional improvements may be added in certain areas, depending on the level of moisture, drying, and settling that occurs over and around the pipe.

Figure A1-3. Programmatic Maintenance Cycle Standard



It is possible that some ponding could occur along the route in areas directly over the trench intermittently during the first spring after soils thaw, but will then drain as temperatures warm surrounding soils near the surface. The north-to-south configuration of the pipeline means that the direction of sheet water flow will be directed by the downward gravitational gradient of the terrain, moving from higher elevations near the Brooks Range foothills, north to the lower elevations of the coastal areas near the Beaufort Sea. The pipe, running parallel to this flow gradient, will generally not inhibit the slow movement of groundwater along this gradient. The lack of a mound, or high-slope crown, over the trench will keep water from ponding in trenches on either side of the mound.

The low or nearly-flat, sloped crown will encourage proper drainage, and in some instances, initial ponding directly over the trench in areas where subsidence occurs. Historic knowledge from experts who have worked on TAPS and North Slope buried pipelines believe the initial temporary impacts associated with constructing the pipeline will be manageable with regard to stabilization, especially for a below-freezing temperature pipe. Based on the recommendations of experts in BG pipe erosion control and water management, increased stabilization efforts will be required for the first 5 years following construction.

REVISION HISTORY

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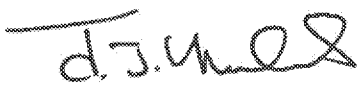
Approver Signature				
Modification(s) Description		AKLNG-4020-YYY-YPW-DOC-00001		

ASAP

Alaska's In-State Gas Pipeline

ALASKA STAND ALONE PIPELINE/*ASAP* PROJECT

The ASAP Belowground Pipeline Mode: Selection, Construction, Operation, and Maintenance on Alaska's North Slope

ASAP-22-RTA-DDD-DOC-00066

July 12, 2016

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REVISION HISTORY

Revision	Date	Comment	Approval	
			Company Preparing Report	AGDC
0	3/24/2015		AGDC	K Stevenson / M Thompson
1	7/12/2016	Admin corrections	AGDC	K.Stevenson

ACRONYMS AND ABBREVIATIONS

%	Percent
ACP	Arctic Coastal Plain
ADEC	Alaska Department of Environmental Conservation
ADNR	Alaska Department of Natural Resources
AGDC	Alaska Gasline Development Corporation
AG	Aboveground
ASAP	Alaska Stand Alone Pipeline
BG	Belowground
BiOP	Biological Opinion
BLM	Bureau of Land Management
CAPEX	Capital Expenditure
CFR	Code of Federal Regulations
DEIS	Draft Environmental Impact Statement
DOT	Department of Transportation
EIS	Environmental Impact Statement
EPA	United State Environmental Protection Agency
ERL	Environment, Regulatory, and Land
FEIS	Final Environmental Impact Statement
FWS	Fish and Wildlife Service
GCF	Gas Conditioning Facility

GEMAR	Geohazard Evaluation and Mitigation Analysis Report
GIS	Geographical Information System
HDD	Horizontal Directional Drilling
HSM	Horizontal Support Member
HSSE	Health, Safety, Security, and Environment
LiDAR	Light Detection and Ranging
LSAW	longitudinal Submerged Arc Welded
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NSB	North Slope Borough
P&CM	Pipeline and Civil Maintenance
Put	Putuligayuk
ROD	Record of Decision
ROW	Right-of-Way
Sag	Sagavanirktok
SEIS	Supplemental Environmental Impact Statement
SHPO	State Historic Preservation Office
TAPS	Trans-Alaska Pipeline System
US	United States
USACE	United States Army Corps of Engineers
VSM	Vertical Support Member
WBS	Work Breakdown Structure

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EXECUTIVE SUMMARY

The Alaska Stand Alone Pipeline (ASAP) Project has proposed to construct a buried natural gas pipeline in winter along the first 60 miles of its route on Alaska's North Slope (AGDC, 2015a). The pipeline will transect the Arctic Coastal Plain (ACP) from a gas conditioning facility (GCF) near Prudhoe Bay to the foothills of the Brooks Range in an area characterized by continuous permafrost and Arctic tundra. ASAP will be oriented in a north-to-south direction along the west side of the Dalton Highway, and the first 60 miles of the pipeline will operate at below-freezing temperatures year-round.

The United States (US) Fish and Wildlife Service (FWS), the US Environmental Protection Agency (EPA), and the US Army Corps of Engineers (USACE) have raised questions about whether burying the pipe belowground in permafrost might lead to the degradation of that permafrost, cause pipe slumping or structural issues, erode soils, cause large swaths of perennial ponded water over the pipe, or accelerate climate change in the Arctic. ASAP has undertaken a comprehensive evaluation of aboveground (AG) and belowground (BG) modes for its pipeline on the North Slope, and will demonstrate through this report a summary of its findings that indicate that the BG mode is the preferred option for reasons related to engineering constructability, operational reliability, and to health, safety, security and the environment (HSSE). ASAP will further demonstrate through this report that the structural and environmental concerns raised by the agencies can be alleviated by mitigating impacts through a set of standards and proven procedures developed for engineering design, construction, stabilization, and monitoring, as they have been for other buried North Slope pipeline projects.

1. INTRODUCTION

1.1 PROJECT BACKGROUND

The ASAP Project is the Alaska Gas Development Corporation's (AGDC's) in-state natural gas pipeline project designed to provide an affordable, long-term energy solution to Fairbanks, the Southcentral region, and to as many other Alaskan communities as possible. The 733-mile, 36-inch pipeline is proposed to deliver natural gas from Prudhoe Bay to Southcentral Alaska, where it will tie in to the existing ENSTAR system. A proposed 30-mile, 12-inch lateral pipeline will connect the mainline to Fairbanks.

1.2 ASAP'S ENVIRONMENTAL IMPACT STATEMENT (EIS) EVALUATION

An Environmental Impact Statement (EIS) was prepared for the ASAP Project in 2012 when the ASAP Project was proposed as buried on the North Slope, with the exception of the first 6 miles (USACE 2012a,b). Today, these first 6 miles are also proposed as buried. Public scoping and agency review of the ASAP Project occurred during the EIS process, pursuant to the National Environmental Policy Act (NEPA). Agencies and the general public were provided with the opportunity to review and comment on the approximately 54 miles of North Slope BG pipe, and several agencies contributed to the Draft EIS (DEIS) and Final EIS (FEIS) evaluation of the Project (USACE 2012a,b).

The USACE received very few comments on AG or BG pipe mode or design during the DEIS and FEIS. One comment that was made during the DEIS comment period came from the Center for Biological Diversity, which expressed concerns over the AG design impacting caribou over the first 6 miles of the route, citing "adverse impacts" to large migratory mammals. Their comments also mentioned that the AG portion of the pipeline on the North Slope could "delay caribou movements" and that it might disturb herds or individuals. They also stated:

> *The Bureau of Land Management has identified numerous potential adverse effects of less extensive pipelines and also indicates that onshore gas activities, especially roads, can displace caribou and reduce caribou densities for miles. Snow drifts under a pipeline can block or interrupt caribou movements. (Center for Biological Diversity comment in DEIS - USACE, 2012a).*

Furthermore, the USFWS reviewed the ASAP Project during the EIS review period and published the results of its evaluation in a formal legal document, termed a Biological Opinion (BiOp), dated July 10, 2012. The BiOp was included as an appendix of the FEIS (USACE 2012b), and the National Marine Fisheries Service (NMFS) provided a letter of concurrence. In its BiOp, the USFWS specifically identified and described the AG and the BG mode on the North Slope, including geographic and design features of each (USACE 2012b). The BiOp expressed no concern over impacts

associated with use of the BG mode through permafrost areas, nor did it reference any expected impacts to water, soils, or endangered species habitat. To the contrary, the USFWS stated that the proposed design is "not likely to adversely affect Steller's eiders" and is "not likely to jeopardize the continued existence of spectacled eiders or polar bears, and is not likely to destroy or adversely modify polar bear critical habitat" (USACE 2012b).

1.3 SETTING

The Arctic environment of the North Slope creates unique challenges for pipeline design in a relatively remote working environment, including cold temperatures, permafrost, and the hydrology of the ACP.

1.3.1 Temperature

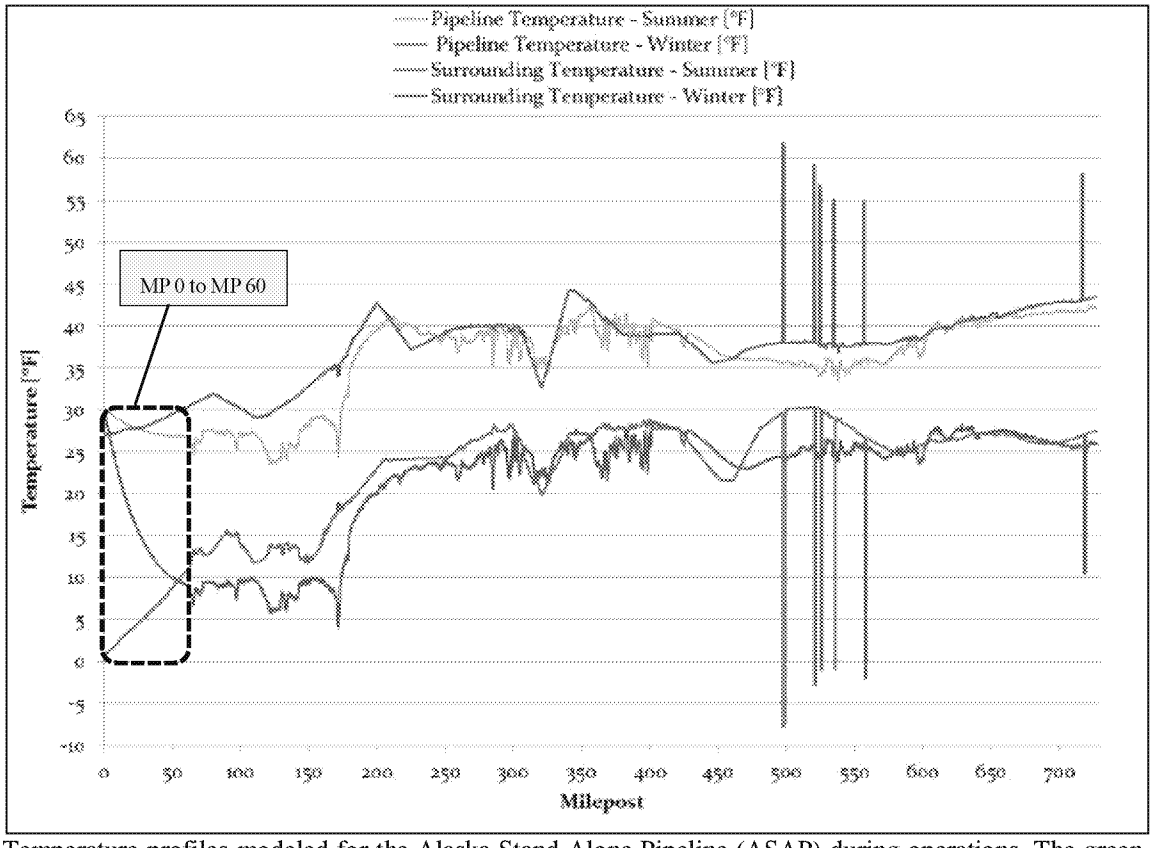
The area north of the Brooks Range is a cold weather environment with seasonal temperature averages generally ranging from -15°F in winter to +35°F in the summer (WRCC 2016). The cold and warm weather extremes north of the Brooks Range can range from -60°F in winter to +85°F in summer, depending on location (WRCC 2016).

1.3.2 Continuous Permafrost and the Active Layer

The ACP is characterized as having shallow underlying continuous permafrost, except within major active stream and river systems and thaw bulbs beneath water bodies (AGDC 2014; 2015b). Permafrost underlies all areas of the North Slope of Alaska except beneath some deep lakes and river channels (Streletskiy et al. 2014). Continuous permafrost on the North Slope or on the ACP is perennially frozen soil that ranges from less than 650ft to more than 1950 ft thick (Osterkamp et al. 1985). Permafrost underlies an active layer of soil that thaws each year and holds vegetation. Active layer thickness generally ranges from 1 – 2 ft on the North Slope (Streletskiy et al. 2014; Zhang et al. 1997). The thickness of the active layer increases from the Arctic coast to the foothills of the Brooks Range and is directly proportional to summer air temperatures and thawing index (Zhang et al., 1997); however, there is large spatial variability owing to differences in soil types and associated organic layers. The active layer becomes thinner as distance from the Sagavanirktok ('Sag') River and other major waterbodies increases (BLM 2002b).

On the ACP, most of the pipelines existing between the production fields and the central processing facilities over permafrost are warm or hot pipelines and are supported AG by vertical support members (VSMs). These systems include multi-phase production lines, water injection lines, and other liquid lines, all of which generally must remain warm in order to operate. Warm or hot pipelines buried in thaw-unstable, perennially frozen subsurface would transfer heat to the ground, causing thermal degradation of the permafrost, leading to pipe thaw settlement (thaw beneath the pipe), surface slumping (thaw in the active layer and fill above the pipe), potential pipe integrity issues, and disruption of surface water flow. In contrast to these warm or hot pipelines, the proposed ASAP BG pipeline would operate at below-freezing temperatures year-round (8 – 30°F in winter; 25 – 30 °F in summer) on the North Slope (Figure 1) and would transport a gaseous product with low heat transfer properties.

Figure 1. Projected Pipeline and Surrounding Temperatures for ASAP During Operations



Temperature profiles modeled for the Alaska Stand Alone Pipeline (ASAP) during operations. The green and red lines represent the modeled temperature inside the pipe during operations in summer and winter, respectively. The purple and blue lines represent the modeled temperature on the outside of the pipe during operations during summer and winter, respectively. The first 60 miles are highlighted by the black dashed box.

1.3.3 Hydrology of the Arctic Coastal Plain

1.3.3.1 A Low Precipitation Environment

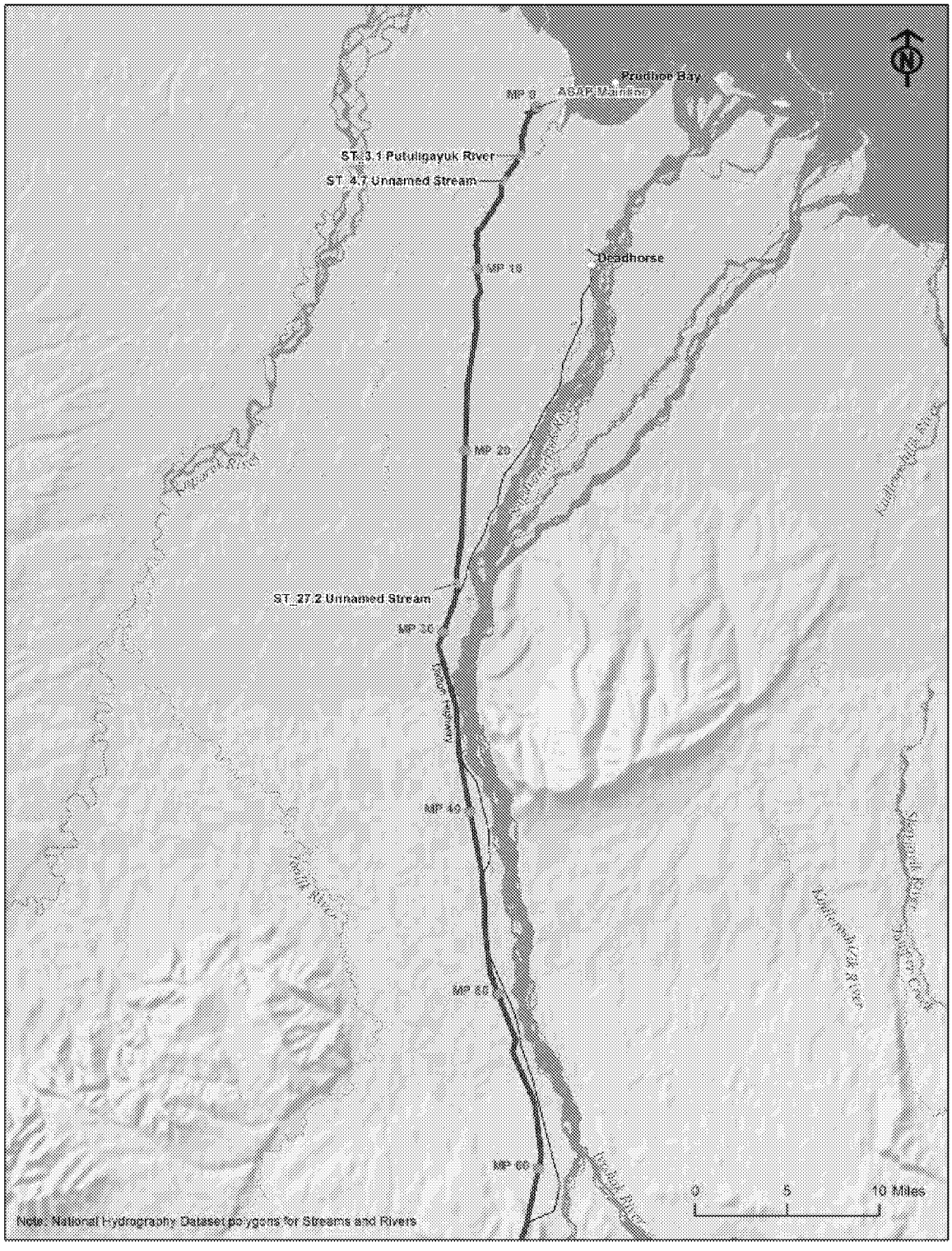
The ACP and the North Slope receive a limited amount of precipitation each year. Barrow, Prudhoe Bay, and Nuiqsut each average less than 5 inches of rainfall per year (WRCC 2016). Barrow and Prudhoe Bay receive less than 35 inches of snowfall per year (WRCC 2016).

1.3.3.2 A Low-Gradient Environment

The ACP is a wetland environment because the area is generally flat and lies at a low elevation, allowing little movement of rain or snowmelt runoff, except that which is channeled off of the Brooks Range into major systems running south-to-north, like the Sag or Colville Rivers, which both drain into the Beaufort Sea. Floods are generally reflected in the larger waterbodies on the North Slope as there are no significant elevation changes.

The underlying continuous permafrost on the ACP keeps water from draining downward, so most water either ponds or moves very slowly in a lateral fashion over time down very mild gravitational gradients (i.e., sheet water flow) until it reaches a major stream draining into the Arctic Ocean or slowly drains there itself. Because of this very mild gradient and the low elevation of the ACP, only three waterbodies on the ACP fit the USACE's wetlands criteria for a stream in the first 60 miles (Figure 2; AGDC, 2015a). These streams and other waterbodies on the North Slope that are crossed by the ASAP mainline appear incapable of producing significant erosional energy.

Figure 2. Mainline Stream Crossings for Waterbodies Fitting USACE's Wetlands Criteria for a Stream



The ASAP Mainline crosses only 3 waterbodies fitting the USACE wetlands criteria for a stream for the first 60 miles on the pipeline route on the North Slope.

1.3.4 Climate Change

Climate is complex in a place as expansive and geographically diverse as Alaska. There are many natural drivers of climate, including the effects of multiple pressure systems (e.g., Siberian High, Arctic High, and Aleutian Low Pressure Systems), the Circumpolar Vortex (a persistent, large-scale cyclonic circulation in the middle and upper troposphere centered over the Polar region of the Northern Hemisphere where it surrounds the Polar Highs and exists as part of the Polar Front), ocean currents and oscillating sea surface temperatures (regulators of atmospheric temperature through the physical exchange of heat, water, and momentum), and climatic cycles or climatic events of varying durations (e.g., the 20−30-year Pacific Decadal Oscillation cycle; the 5-year El Niño-Southern Oscillation cycle; the 1−2-year El Niño and LaNiña events) (see summaries in Stevenson et al. 2012; Alessa et al. 2011).

Long-term climatic data sets from weather stations around Alaska are useful for studying short- and long-term trends in climate. Climatic cycles or patterns and the interplay between them can be identified and interpreted through statistical analyses and represented graphically. However, several cautions must be taken in analyzing long-term climatic data in order to avoid reporting misleading or erroneous conclusions, including referencing correct time scales, applying appropriate starting and ending reference dates, or using appropriate statistical approaches in the analysis and interpretation of climate data, as these factors can all influence outcomes (Stevenson et al. 2012; Alessa et al. 2011; Bone et al. 2010).

Global climate models that have been developed in part and used by University of Alaska climate scientists have indicated that a 5-9°F degree raise in temperature is expected for the Arctic over the next century (ICIA 2004). This is consistent with North Slope data trends in past decades, which have shown patterns towards increasing air temperature and decreasing precipitation. For instance, in Barrow, Alaska temperature increased from 1956 to 2006 (a 50-year period) by +3.2°F, and annual precipitation decreased by -1.28 inches (Alessa et al, 2011). An analysis of Barrow temperatures with separate starting and ending reference dates from 1949 – 2009 (a 60-year period) showed an increase of +4.5°F (Stevenson et al. 2012).

Permafrost temperature and thickness have also changed since the 1980s, reflecting increasing air temperature, snow depth, and longer periods of ice-free conditions on the Arctic Ocean near coastal locations. Permafrost data for Alaska's North Slope has been compiled, characterized and mapped in detail (USFWS, 2015). Multi-decadal data show that permafrost temperature is changing along a north-south bioclimatic gradient with temperatures currently ranging from 15.8 to 21.2°F at Coastal Plain sites and 21.2 to 24.8°F at Foothills sites (Streletskiy et al. 2014). Variations in the length of thaw season and thawing index are major factors that influence permafrost temperatures during the summer, and interactions of wind, microrelief, vegetation, and especially seasonal snow cover are major factors affecting temperatures of permafrost and ground surface temperature in winter (Zhang et al. 1997; Marchand 1996). Inter- and intra-annual variability in ambient air temperature and depth of snow cover will ultimately influence temperatures at the ground surface, in the active layer, and at the surface of permafrost. However, the result is that the integrity of the

permafrost at the depth of pipe burial (~6 ft) will be maintained because the North Slope portion of the pipeline will operate at temperatures as low as 8°F and will never exceed 30°F.

Global climate model predictions for the Arctic over the next century (ICIA 2004) are not expected to substantially impact ASAP operations on the North Slope because ASAP is a BG pipeline buried in at least 6ft of permafrost and operating at below-freezing temperatures. The permafrost on the North Slope is expected to continue warming, but increases in the active layer are not substantial enough to impact pipeline integrity in the next century due to the ASAP's design (see Sections 2 and 3, below, for design factor evaluations and specifics regarding engineering design, construction, operation, monitoring, and maintenance).

1.4 SCOPE

The North Slope segment of the ASAP pipeline is considered to be the first 60 miles, from the GCF to the Brooks Range Foothills (this is approximately the current Trans-Alaska Pipeline System (TAPS) Pump Station 2, or the base of the Foothills).

The scope of this report is to provide information on:

- ASAP's evaluation of design factors for the BG and AG modes for the first 60 miles of the mainline includes:
  - Safety & Security
  - Operational Reliability
  - Line Pipe Technology
  - Engineering Design and Constructability
  - VSM Movement
  - Logistics and Schedule
  - Environmental Impacts
  - Cost
- A description of construction, operation, and maintenance of the selected BG mainline includes:
  - Pipe Burial
  - Freezing and Thawing
  - Construction Methods
  - Mitigation Measures
  - Maintenance and Monitoring
  - ASAP Contractor Experience
  - Overview of ASAP's Plans for Soil Stabilization and Revegetation
  - Overview of ASAP's Plans for Water Management
- Evaluation and Selection of the Season of Construction

2. DESIGN FACTOR EVALUATIONS FOR ABOVEGROUND AND BELOWGROUND MODES

Several factors were considered in the analysis and selection of the pipeline mode, including: safety and security, operational reliability, available line pipe technology, logistics and schedule, engineering design and constructability, environmental impacts, and cost. Following a review of both design modes, the ASAP Project selected the BG mode as the preferred option for the North Slope.

2.1 PIPELINE SAFETY AND SECURITY

2.1.1 Construction Phase Safety and Security

Construction and personnel safety risk increases with an AG mode. This is a direct correlation with the increase in vehicle and equipment traffic and usage required to haul and install at least 5,000 VSMs and Horizontal Support Members (HSMs) prior to installation of the AG pipeline. The AG pipe must be hoisted, balanced, and secured at a height of at least 7ft to allow for wildlife passage, as required by North Slope Borough ordinance. The increased traffic and handling and extended construction season associated with AG construction would result in an increased probability for staff safety incidents.

2.1.2 Operational Phase Safety and Security

BG pipeline design and operations for natural gas transmission have proven reliability as it pertains to pipeline integrity and security. In the unlikely event of a BG pipeline failure, the intact sections adjacent to ruptures are restrained and in the event of ignition, protected from the effects of thermal radiation by the surrounding soil beyond the ends of the rupture. A near-vertical flame is typical of a relatively short BG pipeline failure.

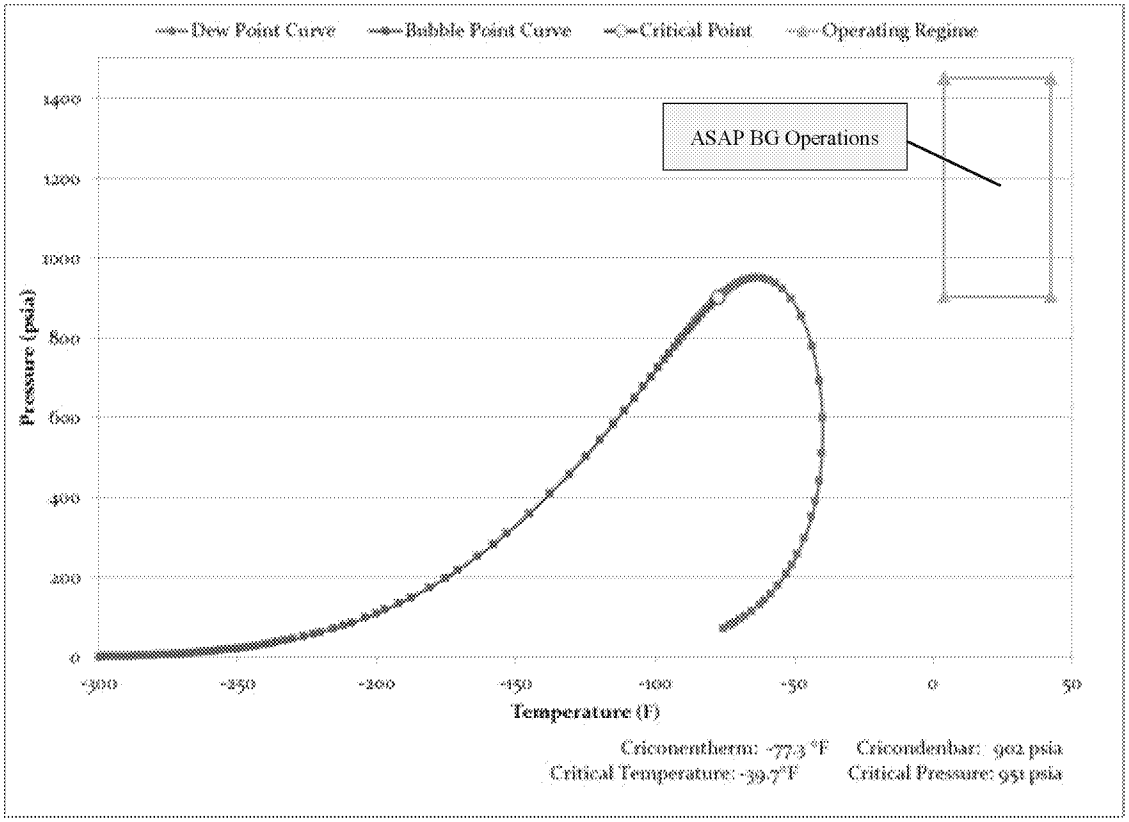
The AG pipe is less secure than the BG mode, and it is more vulnerable to accidental and intentional damage (i.e., sabotage). An AG line could explode or leak if it is hit by accidental or intentional bullet strikes (a concern that arose in public meetings over Point Thomson development). The pipe and VSMs are vulnerable to strikes from aircraft and ground-based vehicles. The AG pipe is also more vulnerable to terrorism attacks. Rupture of the AG gas transmission pipeline could cause significant damage to the support structures, along with consequent service disruption, potentially requiring mobilization of a significant reconstruction effort.

2.2 OPERATIONAL RELIABILITY

The phase envelope is a significant consideration in natural gas pipeline mode evaluation on the North Slope because of the potential for the transported gas to transition from a single-phase (gas)

to two phases (gas-liquid). There is no chance of two-phase flow as long as the pressure and temperature conditions within the pipeline remain outside of the gas phase envelope in all instances (e.g., the BG scenario, as BG temperatures will never get cold enough). However, in the event of a prolonged shutdown during winter that resulted in a pressure drop, the AG mode would subject the pipeline to hydrocarbon liquid dropout at cold ambient temperatures (Figure 3). This would subsequently lead to substantial pooling of liquids at low elevations or at low spots and bends in the pipe.

Figure 3. ASAP Phase Envelope Diagram



Belowground (BG) temperatures will never be low enough to put the pipeline at risk of hydrocarbon liquid dropout and severe mechanical disruption (e.g., it can never move completely from the green box, representing operational pressure / temperature, to inside the red/blue phase envelope, during which liquid dropout occurs). Reduced pressure during prolonged shut down during a cold winter in the aboveground (AG) mode would put the pipeline at risk of moving inside the phase envelope, causing extensive pooling of liquids and severe mechanical disruption.

Should this scenario occur for the AG design, condensate formation inside the GCF and the pipeline will occur. The volume of condensate yielded can be predicted by analyzing the gas phase compositions upstream and downstream of a potential condensation location and determining the gallons of liquids per thousand standard cubic feet of gas for the liquefiable components in each stream.

The ASAP GCF and pipeline are not designed to manage a liquid volume load from the mainline. Hydrocarbon liquid dropout in the AG pipeline could result in an extended shutdown due to the difficulty in cleaning, drying, and restarting a blocked pipeline. In contrast, a winter shutdown of

the BG pipeline would never result in hydrate formation since the winter ground temperature is warmer than the temperature at which single phase gas can become a two-phase gas-liquid combination.

2.3 LINE PIPE TECHNOLOGY

The BG case design temperature of 5°F is colder than the winter soil temperature at the depth of the buried pipe. The AG case design temperature of -50°F is due to the arctic winter air ambient temperature. At this temperature or below, special operational measures, such as lowering pipeline pressure, may be required. Pipe sources may be limited to large longitudinal Submerged Arc Welded (LSAW) pipe manufacturers due to the large diameter, wall thickness, grade strength and low temperature design requirements of the pipe. For AG pipe, the number of potential manufacturers will be even more limited due to pipe specifications requiring increased wall thickness and lower temperature design capabilities.

2.4 ENGINEERING DESIGN AND CONSTRUCTABILITY

For the AG mode, the VSM installation process is extremely costly, time consuming, and would require increased logistical efforts, material handling challenges, and additional schedule risk. When compared with the BG case, the AG case would require a substantial increase in barge shipping and domestic highway truck traffic for hauling additional materials, such as VSMs, HSMs, slides, guides, and anchors. AG installation is also likely to result in greater personnel and scheduling challenges, including the need for more out-of-state labor or more in-state labor training. The AG mode would require a separate weld qualification program, in addition to that for the mainline for workers and installation of VSMs structures noted above.

The BG case would require the use of an ice pad for transport of the pipe on heavy equipment, including a chain trencher, sidebooms, and trucks (see Section 3 and Figure 4, below, for more detailed construction information). A trencher running over an ice pad would cut a 5-ft wide trench through the soil to minimize impacts of construction. Bedding and padding would be installed against vertical sidewalls. Soils would be scraped back into the trench and crowned with additional spoil. Winter construction would result in a lower probability of staff safety incidents.

Former Alyeska Pipeline Service Company staff recommend crowning the surface of the filled trench with soil in winter to an elevation slightly above the surface of the tundra. The goal is to have an even-lying surface at the impacted area over the pipe in summer, once processes of thawing, natural gravity compaction, and some drainage have occurred so that stabilization through revegetation and maintenance can proceed. After installation, the pipe would be monitored as part of the field surveillance program to address slumping, heaving, or ponding issues, employing the maintenance cycle standard of "Monitor, Detect, Correct" to ensure that these conditions are addressed in a timely manner.

The AG mode would require installation of the pipe on more than 5,000 VSMs, similar to what TAPS uses in its aboveground sections, to support the large diameter pipeline above the tundra.

This assumes a single VSM structure. If a dual VSM structure is required (two vertical support members at every location) this number could increase to over 10,000 VSMs.

The VSM installation process required for an AG mode is more costly, more time consuming, and more complex than the BG mode. Increased and more complicated logistical efforts include additional material handling challenges, more barge, rail, and highway truck traffic, additional schedule and safety risk, a more challenging welding and balancing procedures, and increased structural challenges and risks related to wind or frost heaving, leading to VSM movement.

Complex welding and balancing procedures are required for the AG mode because pipe tolerances are much more exacting. AG installation would be more complicated, would take longer, and would potentially result in personnel and scheduling challenges to ensure additional experience was applied to the pipeline installation process. For these reasons, it is possible that the AG mode could add an additional year to pipe installation and disrupt the project-wide construction schedule.

2.4.1 Wind Induced Vibration

The AG mode would be required to address wind induced vibration (WIV), a phenomena in which wind damages a linear structure by forcing it to vibrate at its natural frequency. WIV famously lead to the destruction of the Tacoma Narrows bridge in 1940, and there have been some instances of pipelines impacted by WIV failures on the North Slope. AG pipelines must be modeled for their susceptibility to WIV. The effects of WIV are mitigated by placing appropriate weights and tuning structures on near the center of the span between the VSMs. AG pipelines on the North Slope that possess a north-south alignment are typically more susceptible to WIV than pipelines with an east-west alignment, because the prevailing winds blow in an east-west direction in the Kuparuk and Alpine areas. BG pipelines are not susceptible to WIV, and do not require weight or tuning structure setting, monitoring, or maintenance.

2.4.2 Frost Heaving and Thaw Settlement

The AG pipeline would be susceptible to uplift bending if the VSM support structure moved due to frost heave. VSM holes can extend from the surface down to a 15-20ft depth and can collect water when open or while they are settling. VSMs also conduct heat between the air and the ground. In certain conditions these processes can exacerbate frost heaving and lead to VSM upheaval. VSM upheaval is usually mitigated during the design phase of the project by utilizing geotechnical information and predicting how much VSM embedment is required to reduce movement. Engineers typically add additional VSM length below grade to mitigate against vertical movement.

When a VSM moves upward after pipeline installation, the conventional maintenance solution is to drill and set two more VSMs on either side of the heaving VSMs (this requires ice road access on both sides of the pipe) and then provide support at grade while the pipe is lowered onto the HSM. Additional maintenance will still be required for the heaving VSM, as it will probably continue to heave and will need to be cut to keep from impacting the pipeline. VSMs in wet areas also

have a tendency to settle and drop in elevation. In an AG scenario, thaw settlement that causes a VSM to drop in elevation could place stress on the pipe and the adjacent VSMs.

BG pipelines are susceptible to frost heaving and settlement, but because VSMs are not used in the BG mode, there are no issues related to open holes collecting water or having long, metal posts conduct heat between the ground and the air. Based on geotechnical data, ASAP engineers believe the risk of BG pipe heaving is very low for the first 60 miles. For the BG mode, long, continuous segments of pipe surface area are supported by the ground. This allows the BG pipe to more easily tolerate moderate heaving and exhibit flexibility better than an AG pipe, which is supported by pipe shoes, which are relatively short when compared to the length of the pipe span. The BG pipe is bedded with thaw-stable, non-frost susceptible materials and will operate at below-freezing temperatures of 8 – 30°F in winter and 25 – 30°F in summer (Figure 1). This helps to mitigate against permafrost degradation, pipe thaw settlement, and surface slumping. Pipeline integrity will be monitored regularly through the use of inline inspection devices (smart pigs).

2.5 LOGISTICS AND SCHEDULE

North of the Brooks Range, the end of the winter season is late April or early May. This yields a duration from early January to late April for pipeline construction of up to 120 days. An AG design would require installation of VSMs at approximately 5,000 locations. It is possible that an AG design could require two winter seasons: the first for installation of VSMs and the second for the installation of the pipe. This would impact cost, schedule, and simultaneous operations with other mainline spreads, camp space, and logistics.

For BG design only one winter season would be required. The winter section lengths were planned to allow as much time as possible between the completion of the pipe laying and the end of season dates, allowing adequate time to complete coating, cathodic protection, lowering-in, bedding, padding, backfill, tie-ins and cleanup.

The civil contractor will construct an ice work pad on the ROW prior to pipe stringing. Frost packing of the ROW with tundra-legal equipment could begin in November, but on tundra ice pad construction is assumed to start in early or mid-December. The ice pad crew will ensure that enough ROW is prepared ahead of the pipe lay crew. The entire section is flat terrain and will be constructed during the winter pipe lay season.

2.6 ENVIRONMENTAL IMPACT

2.6.1 Soils and Hydrology

The BG mode requires specific procedures for adequately controlling soil erosion along the constructed pipeline (see Section 3, below). ASAP is working with the Alaska Department of Natural Resources (ADNR) Plant Materials Center to develop specific revegetation procedures in a Revegetation and Erosion Stabilization Plan for the Project. Implementation of these specific procedures will help to reduce soil erosion and improve stability through revegetation and other means.

The BG mode also requires specific procedures for adequately managing water along the constructed pipeline, including surface water and subsurface hydrologic flow (see Section 3, below). ASAP has retained the services of individuals with over 30 years of experience stabilizing and maintaining TAPS on the North Slope to assist in the development of these procedures. Based on the recommendations of these individuals, the ASAP goal is to maintain natural surface water flow patterns with as little change as possible.

ASAP's goal will be to maintain a stable surface and to adequately manage water and drainage within the ROW during operations and maintenance. ASAP will apply a programmatic maintenance cycle standard of "Monitor, Detect, Correct" to its soil stabilization and water management efforts during the operations and maintenance phase of the Project so that any potential issues related to erosion, slumping, ponding, or inadequate drainage can be addressed in a timely manner.

2.6.2 Permafrost

Impacts to North Slope permafrost will be minimized by:

- Constructing in winter and restricting impacts to the organic layer to a very small footprint (a 5-ft wide trench will be dug and filled with thaw stable bedding and padding, the pipe, and trench spoils in winter).
- Use of ice pads, frost packing, and ice roads during winter construction to avoid unneeded disturbance to the organic layer.
- Reducing the pipe dormancy period to only two years and maintaining a year-round operational temperature of the pipe that is below freezing for the first 60 miles (see Figure 1).
- Maintaining existing surface water channels in their natural flow path to avoid water seepage into the area of the filled trench.
- Seeding the first summer after construction with a mixture of annuals and native seeds to regrow the organic layer and replace a vegetative covering as soon as possible.
- Instituting a programmatic maintenance cycle standard of "Monitor, Detect, Correct" for hydrology

2.6.3 Wetlands, Vegetation, and Land

The overall acreage impact to wetlands and vegetation on the North Slope due to the pipeline would be greater for the BG design than the AG design because of trenching, in comparison with the "posthole footprint" that would result from VSM installation under the AG option. However, in the BG mode, a route was selected to avoid wetlands of higher functional values whenever possible. Upland areas were targeted, and open water areas were avoided where possible.

Seeding and revegetation for the BG mode will be done with approved seed mixes that include native species and other annuals. As noted above, ASAP will work with the ADNR Plant Materials Center to develop a specific plan for revegetation and stabilization that will provide specific information on seed mixes, mulches, hydroseed applications, clearing, maintenance and monitoring. Upon completion of use of the ROW, ASAP will be required by lease stipulation to restore the land to the satisfaction of ADNR.

2.6.4 Endangered Species and Other Fauna

Habitat for eiders and other waterfowl is potentially impacted by the AG and the BG design. The BG design would have more impacts to wetlands, but the difference in how waterfowl would use the area over or under the pipe is unknown and may be negligible. The BG alignment was specifically selected to minimize impacts to existing ponds and other higher value wetlands. It is not known if the visual perception of an AG pipeline or disturbance from a BG pipeline could deter birds or fragment habitat, or even be used as a means of navigation from the air. The AG pipeline would be expected to result in some minimal nighttime bird strikes resulting in mortality or injury.

While habitat is often only discussed or mapped 2-dimensionally, the reality is that habitat is the 3-dimensional space that fauna occupy or use. Behavior and habitat use by waterfowl and other fauna could conceivably be even more impacted by an AG pipe and VSMs (visual disturbance, strikes, shading and plant growth, snow accumulation or blockage, and long-wave radiation impacts on snow); whereas the BG design would be a revegetated corridor maintained for operation.

Wildlife migration and subsistence users would not be impacted substantially by the BG mode, but the AG mode could potentially impact wildlife migration and subsistence activities. Subsistence users have previously commented on the impacts of proposed AG features on the North Slope. Transcripts from the TAPS renewal Draft EIS Public Hearing in Barrow Alaska (Bureau of Land Management [BLM], 2002a) recorded North Slope Borough (NSB) Mayor George Ahmaogak's public testimony, as he spoke on behalf of the NSB in regard to his concern about additional AG features that could impact wildlife on the North Slope. Mayor Ahmaogak commented that:

> "Caribou migration patterns were altered, changed by construction of the Trans-Alaska Pipeline system and the associated Dalton Highway. Studies, scientific studies utilizing radio collars on caribou indicated that to a great extent, these obstacles continue to impede the free movement of the affected North Slope herds… Subsistence users in our communities of Nuiqsut and Anaktuvuk Pass have long noted these changes and they have to cope with the absence of game in traditional harvest areas." (BLM, 2002a)

An additional AG feature on the North Slope in the same vicinity of TAPS and the Dalton Highway could potentially impact caribou behavior and movement. Burying the pipeline on the North Slope is likely to reduce impacts to wildlife migration and movement, particularly caribou (Smith and Cameron, 1992; Lawhead et al., 2006). A BG pipe mode would also reduce viewshed impacts to human residents. An AG pipeline for 60 miles is a substantial 30+ year permanent viewshed impact compared with a BG trench that will be stabilized, in part, through revegetation. Snowdrifts caused

by the AG mode and VSMs also can present an impedance and a safety hazard to hunters or other travelers traversing the tundra by snowmachine.

As stated above, the USFWS reviewed the ASAP Project and its potential impacts in its published BiOp, dated July 10, 2012, and determined that the proposed design "is not likely to adversely affect Steller's eiders" and "is not likely to jeopardize the continued existence of spectacled eiders or polar bears, and is not likely to destroy or adversely modify polar bear critical habitat".

2.7 COST

The AG mode will have a higher installation cost than the BG mode and will substantially increase the Project's capital expenditures (CAPEX) (Table 1). The higher costs associated with the AG mode are associated with increased amounts of materials, material transportation and handling, and more staffing time due to a longer installation process. These higher costs associated with the AG pipe would be passed on to consumers (residents, businesses, government entities, and projects) through higher tariffs and burner tip rates, whereas the BG gas would provide cheaper gas for Alaskans.

2.8 SUMMARY OF DESIGN FACTOR EVALUATIONS

The design factors evaluations described above for the AG and BG modes are summarized in Table 1, below.

Table 1. ASAP Aboveground & Belowground Design Factor Evaluation Summary

FACTOR	ABOVEGROUND (AG) MODE	BELOWGROUND (BG) MODE
Pipeline Safety & Security	▪ Would result in a higher likelihood of staff safety incidents; greater exposure from more complex logistics, longer to construct. ▪ More susceptible to accidental damage (e.g., accidental bullet strike) and rupture. ▪ More susceptible to terrorism or sabotage. ▪ VSMs and snow accumulation may cause increased risk or hindrance to cross-country winter travelers.	▪ Would result in a lower likelihood of staff safety incidents. ▪ Reduced probability to rupture due to accidental damage from external impact. ▪ Less likely to be struck or sabotaged due to buried mode. ▪ No risk to winter travelers.
Operational Reliability	▪ Potential for significant hydrocarbon liquid dropout during winter shutdown; slugging issue and longer restart time impacts gas delivery. ▪ The pipe supports are designed to generally minimize thaw settlement or frost heave. Large settlements, should they occur, can be detected visually. ▪ Maintenance work requires only access to pipeline (no digging). ▪ Pipe may be more susceptible to corrosion due to the need for insulative jacketing, which can trap water. ▪ May attract lightning once the pipe moves upward in elevation towards Atigun.	▪ No liquid dropout potential because gas remains at BG soil temperature and never reaches the critical temperature at which heavier hydrocarbons in the gaseous phase convert to liquid. ▪ Potential for settlement and frost heave remediation during operations. ▪ The position of buried piping would be monitored using in-line inspection tools containing an inertial measurement unit. The position data from each tool run can be compared to previous passes to determine whether excessive displacement has occurred. ▪ Maintenance work could require construction of access roads, maintenance area workpads and excavation of the pipe. ▪ Buried pipe will not attract lightning.
Line Pipe Technology	▪ Requires step-out technology for high pressure & toughness. ▪ -50°F + environment, increases schedule risk (limited procurement options globally) and pipeline integrity risk (TAPS used 3 mainline pipe suppliers).	▪ BG line pipe is proven technology, and it doesn't require low temperature steel toughness requirements.
Logistics and Schedule	▪ More complex logistics due to higher pipe tolerance and a more exacting installation process; installation of VSMs is time consuming. ▪ Increased logistical challenges related to transport and storage of materials. ▪ Increased logistical challenges related to training or scheduling of experienced welders to install pipe at 7ft, as required by North Slope ordinance. ▪ Possibly two construction seasons (1 for VSMs, one for pipeline).	▪ Easier logistics of installation – chain trencher over ice pad; rigid side walls, easy welding / balancing; use of padding. ▪ Fewer materials to ship. ▪ One construction season.

FACTOR	ABOVEGROUND (AG) MODE	BELOWGROUND (BG) MODE
Engineering Design and Constructability	▪ Challenging line pipe weld qualification program. ▪ Induction bends may be needed at expansion loops, road crossings, and pipe rack crossings. ▪ Insulation and jacketing needed to reduce the effects of heat transfer; these jackets can trap water and may make the pipe more susceptible to corrosion. ▪ Pipe rack jumpers are needed to cross existing pipelines, primarily in the northernmost portion of the pipeline; can be complicated. ▪ No cathodic protection required. ▪ All AG pipelines must be modeled for susceptibility to WIV; can be mitigated through with balancing with weights / tuning mechanisms. ▪ Susceptible to VSM movement from heaving and pinpoint pipe stress; cut and replaced VSMs that have heaved require continued monitoring and maintenance; can be mitigated somewhat with longer VSMs.	▪ Requires implementation of procedures required for impact avoidance and stabilization in permafrost areas. ▪ Potential need for import of thaw stable backfill materials, ditch plugs, and other mitigation methods to ensure trench stabilization. ▪ Increased reclamation efforts during operations. ▪ BG construction can be completed sooner than the AG. Maintaining snow-free trench with multiple crews between trench and backfill will be challenging. ▪ Potentially no need for induction bends except at gas treatment facility tie-in. ▪ No need for insulation, as the gas will be operated below freezing to avoid thawing permafrost and ambient soil temperatures remain above the critical temperature year round. ▪ No need for jumpers, as the pipeline will be buried under the existing pipelines and will cross them near mid-span between supports, where feasible. ▪ Cathodic protection required for BG pipelines. ▪ WIV is not a consideration for BG pipelines. ▪ Frost heaving is a minor concern; long segments of pipe have more surface area resting on the ground.
Environmental Impacts	▪ VSMs reduce pipeline impact to wetlands. ▪ Increased direct / indirect impacts to subsistence activities and users. ▪ Communities and non-government organizations express concern over impacts to subsistence activities and pipe in viewshed. ▪ Low susceptibility to erosion; low to moderate level of stabilization effort required. ▪ Major permanent visual resource impacts from ground and air – the AG pipeline will impact viewshed at ground observer height of 7–12ft.	▪ Pipeline impacts to the organic layer minimized to 5ft wide; Mitigatable impacts to waters and wetlands ▪ Minimal direct / indirect impacts to subsistence activities or users. ▪ No pipe in the viewshed. ▪ Erosion concerns mitigated with proper design, geotechnical information and water management / revegetation plans. ▪ Increased stabilization efforts expected in first 5 years. ▪ Minor long-term visual resource impacts – surface disturbance initially; revegetation.
Cost	▪ Higher capital expenditure (CAPEX) – significant cost upfront ▪ Higher permanent materials cost; driven mostly by mainline pipe and vertical support system. ▪ Transportation cost of materials will be substantial. ▪ Higher staffing cost due to greater installation time will be substantial	▪ Lower CAPEX – fewer materials and ease of installation. ▪ Some added cost and logistics for select bedding/ padding material.

3. THE BELOWGROUND PIPELINE MODE (SELECTED)

The BG pipe option was evaluated for constructability, safety, security, as well as proposed avoidance, mitigation, and stabilization measures in permafrost areas. The ASAP pipeline is projected to operate at 32°F or colder temperature over the first construction spread and function as an ambient temperature pipeline. In the case of ASAP, the gas will enter the pipe in permafrost areas at below freezing temperature and will remain below freezing for the first 175 miles of the pipeline (Figure 1).

3.1 PRE-CONSTRUCTION PLANNING

3.1.1 Geohazard Avoidance and Special Design Area Engineering

The ASAP Project route and pipeline design were developed and refined in consideration of extensive hydrologic, geologic, and geotechnical data. ASAP has developed a robust geotechnical program where engineers have acquired a significant body of information that will continually be supplemented up through construction to best inform the engineering design team. This information was utilized in evaluation of the BG and AG modes and the route alignment. As part of this program, ASAP engineers have acquired and reviewed:

- Orthorectified aerial photography (approximately 3,733 sq. mi.)
- Digital elevation modeling (DEM) derived from LiDAR surveys (approximately 2,079 sq. mi.)
- Terrain unit mapping
- Borehole soils data (including access to over 10,000 discrete boreholes)
- Permafrost investigations and ground temperature monitoring
- Geohazard Evaluation and Mitigation Analysis Reports (GEMARs) covering topics such as Hydrotechnics, Soil Geochemistry, Unique Soil Structure, Surface Fault Rupture, Tectonics and Seismicity, Landslides (slope stability), Erosion and Buoyancy, Freezing of Thawed Soils and Thawing of Frozen Soils
- Assessments of potentially active tectonic faults
- Trip reports from multiple field reconnaissance investigations or site visits

These engineering reviews were important for long-term soil stabilization, pipeline integrity, avoiding burial of the pipe in areas sensitive to thaw degradation, and burial of the pipe in areas susceptible to seismic disturbance or major fault movements. Special design areas included fault crossings, water crossings and pinch points (e.g. Atigun Pass, Denali commercial area). ASAP also worked with the Alaska Division of Geological and Geophysical Surveys (DGGS) and supported their efforts to identify and assess of geologic hazards along the ASAP pipeline route, although the majority of these potential hazards were south of the Brooks Range.

Conditions have been identified through ASAP's geotechnical program that may cause ditch displacement and subsequent pipe curvature and distress. This requires experience in identification of those surface characteristics that have been shown to contribute to potential route hazards, followed by an extensive subsurface investigation program to identify the remaining hazard, and, finally, analytical design tools to quantify the effect on pipe behavior. As the samples recovered from the boreholes are processed by soil laboratories, the results feed into the projects' respective geospatial information system (GIS) and geotechnical databases, and then are used in the evaluation of route hazards. The process of route threat identification, evaluation, and avoidance is an ongoing process for which many aspects will continue throughout the operational life of the project.

3.1.2 Avoidance of High Value Wetlands

Most of the North Slope is considered wetlands. However, wetlands vary in their intrinsic value based on the function they provide in the ecosystem. The ASAP Rev 6.1 route used aerial photography and approved wetland field survey methods to delineate wetlands, develop an aquatic site assessment to rank functions and values of wetlands, and to route the pipeline around open water and higher value wetlands where possible.

3.1.3 Waterways Analysis

ASAP's waterways engineers have spent several summers of field work assessing flow and stream bank characteristics of the streams along the ASAP pipeline route. The reason for this work is that it will be important for ASAP construction engineers to maintain existing surface water flow following burial of the pipe in winter. ASAP plans to carry out work on the North Slope in winter when water is frozen, and then work in the years following construction to ensure minimal disruption to surface water flow patterns, ensuring that water does not get directed into the trench and instead continues in its naturally flowing direction towards larger waterbodies.

3.2 CONSTRUCTION OF THE BELOWGROUND PIPE

3.2.1 Ice Roads, Ice Pads, and Frost Packing

Mitigation measures will be used during pipeline construction on the North Slope to protect high value wetlands and avoid disturbing the organic layer and permafrost. Ice roads and pads will be constructed in order to provide a flat, stable working surface and move heavy equipment along the pipeline route on the North Slope. Frost packing (use of condensed snow as a driving surface) will also be used in some areas, where possible.

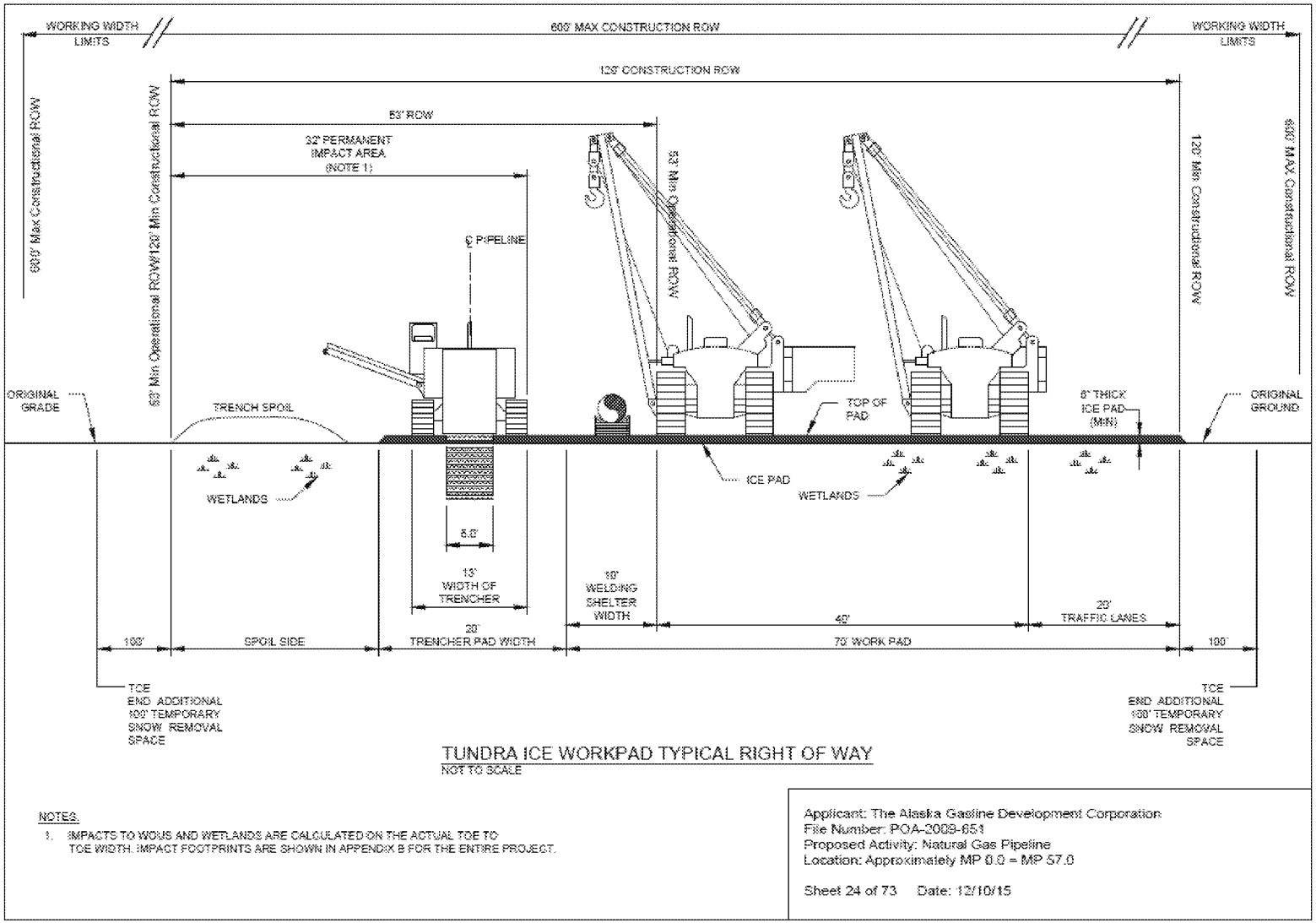
3.2.2 Trenching and Pipe Installation

Heavy equipment working over an ice workpad (trencher, sidebooms and trucks) will work north-to-south to dig a 5ft-wide trench to the desired depth (generally, 6ft.), casting spoils to the opposite side of the trench (Figure 4). Heavy equipment and trucks will drive on the working side of the trench, which will be protected by an ice pad and result in no impact to wetlands from transportation (Figure 4). A trencher, which is not compatible with large cobble or boulder areas, can be used

because of the presence of a uniform deposit of fine-grained soils within trench depth on the ACP. The trencher will drive over an ice pad while digging the trench. Trench spoils will be cast onto the spoils side of the trench (opposite the working side of the trench), onto either ice, frost packing or snow. Soils will be backfilled into the trench after installation (see below for more detail).

It is unlikely that the entire volume of trench spoils will be able to be immediately removed from the snowpack on the spoils side of the trench. A thin layer of spoils is likely to remain on the spoils side of the trench. Some of this material may be used to repair slumped areas or re-inforce crowns that will be re-seeded and revegetated after spring thaw. Any remaining trench spoil lying on the spoil side of the trench may ultimately be removed in a future winter or may be revegetated. Therefore, ASAP reported an additional 27ft of permanent wetlands impact beyond the 5ft-wide trench (32ft total wetlands impact for North Slope) to the USACE in its Joint Application for Permit (404/10) (AGDC, 2015a). However, the organic layer and vegetative matting will be removed only from a 5 foot-wide section where trenching will occur. Upon digging the trench, construction teams will assess surficial and subsurface hydrology, as well as the potential for erosion and ponding. Engineers will use this information to inform their decisions for placing ditch plugs or other sub-surface hydrologic control measures where possible.

Figure 4. ASAP Pipeline Construction on Alaska's North Slope



Installation of the BG pipe on the North Slope in winter would occur using a 5-ft wide chain trencher operating over an ice pad. The rigidity of the frozen soils and the soil type would presumably allow workers in and out of the ditch without need for expanding the side slopes of the ditch.

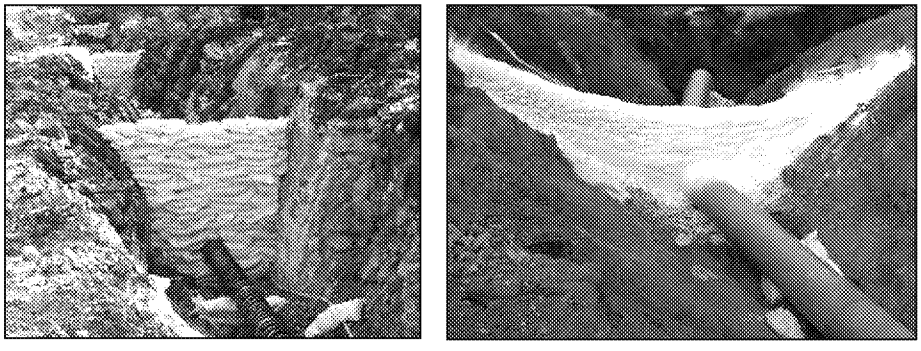
3.2.3 Thaw-stable Bedding and Padding Material

After trenching is completed, non-native bedding and padding material will be added. This material will be mined to meet project specifications. The bedding material will be thaw-stable in order to provide required structural support to the pipeline and avoid settlement.

3.2.4 Ditch Plug Installation

Ditch plugs are designed to stop water flow through the trench line and therefore mitigate against undesired waterflow or seepage; they can be made from different types of materials (Figure 5). Ditch plugs are typically installed on each side of an excavated water crossing and in other locations along the ROW as required and directed by the owner's ROW inspector. They are useful in avoiding French drain effects, and can be used to direct and inhibit the flow of water. Experts who formerly worked on TAPS with Alyeska Pipeline Service Company have recommended a higher number of ditch plugs on ASAP than was used on TAPS to help control water and reduce ponding. Ditch plugs will also be used in the trench on either side of stream crossings to ensure water does not penetrate into the ditch.

Figure 5. Ditch Plugs Made from Different Types of Materials



Examples of different types of ditch plugs used for water management in buried pipeline construction

3.2.5 Ditch Backfilling

The pipeline will be placed within the trench during the same winter construction season in which it is dug. The pipe will be padded with thaw-stable material, and the remaining portion of the trench will be filled with native trench spoils or other select backfill. Per federal regulation, at least 30 inches of normal soil cover must be used to cover the pipe. During construction, soil will be replaced soon after the pipeline section is laid down to reduce the introduction of snow or rain into the trench. Seeding of the backfilled trench will be monitored after construction to confirm that the reseeded ditch line supports continued long-term plant populations and that fill above the pipe does not erode.

3.2.6 Crowning

The excess trench material will be used in trench crowning (a very slight mounding over the pipe), contouring terrain, and other stabilization and mitigation efforts. Some of the excess spoil material overlaying existing vegetation may be hauled off to disposal sites, or it may be seeded or left in place, depending on Project operational and maintenance needs at that time. The slope of the crown over the trench is critical to stabilizing soils and directing ponding, thereby mitigating some potential impacts related to erosion and drainage. In crowning, the native material that is replaced over the trench is almost near to flat.

Crowning is a procedure that is important for both soil stabilization and water management. It is characterized as a mild mounding of trench spoils above the pipeline trench to an appropriate finish grade that will help to direct moisture away from the top of the pipe and mitigate against slumping. Crowning promotes movement of water along a desired vertical and horizontal gradient. As the ditch soils thaw in spring, the extra weight and height of soil will compact the soil below and bring the surface above the pipeline near to flat.

- Options available to direct flow from the crowned trench line include:
- Installation of wattles (intentional depressions) at an angle and at predetermined spacing along the crowned trench line based on slope angle to direct flow away from the ditch line.
- Installation of flexible piping to carry offsite and upgradient water across the ditch line to vegetated downslope areas.
- Periodic installation of armored flow breaks in the crowned section to transfer water from one side of the ditch line to the other for storm drainage.
- Use of native fill berms to direct flow away from the crowned ditch at specified intervals based on slope.
- Construction of drainage channels to direct flow from the construction area.
- Installation of permanent culverts in some areas.
- Development of earthen ditch blocks used to retain or direct water.
- Use of gravel or gabion channels or swales.

3.2.7 Terrain Contouring

Terrain contouring is a procedure that is important for both soil stabilization and water management. It is the use of excess ditch spoils and/or other materials to contour surrounding terrain in an effort to control reduce erosion through the control of hydrologic movement, as needed to promote preferential surface and subsurface flows. Material sites, camp sites, ice roads and pads, temporary-use areas, and temporary access roads will be re-contoured and restored to an acceptable condition as required by applicable permits. Generally, revegetation of disturbed areas is planned for long-term stabilization.

3.2.8 Cleanup

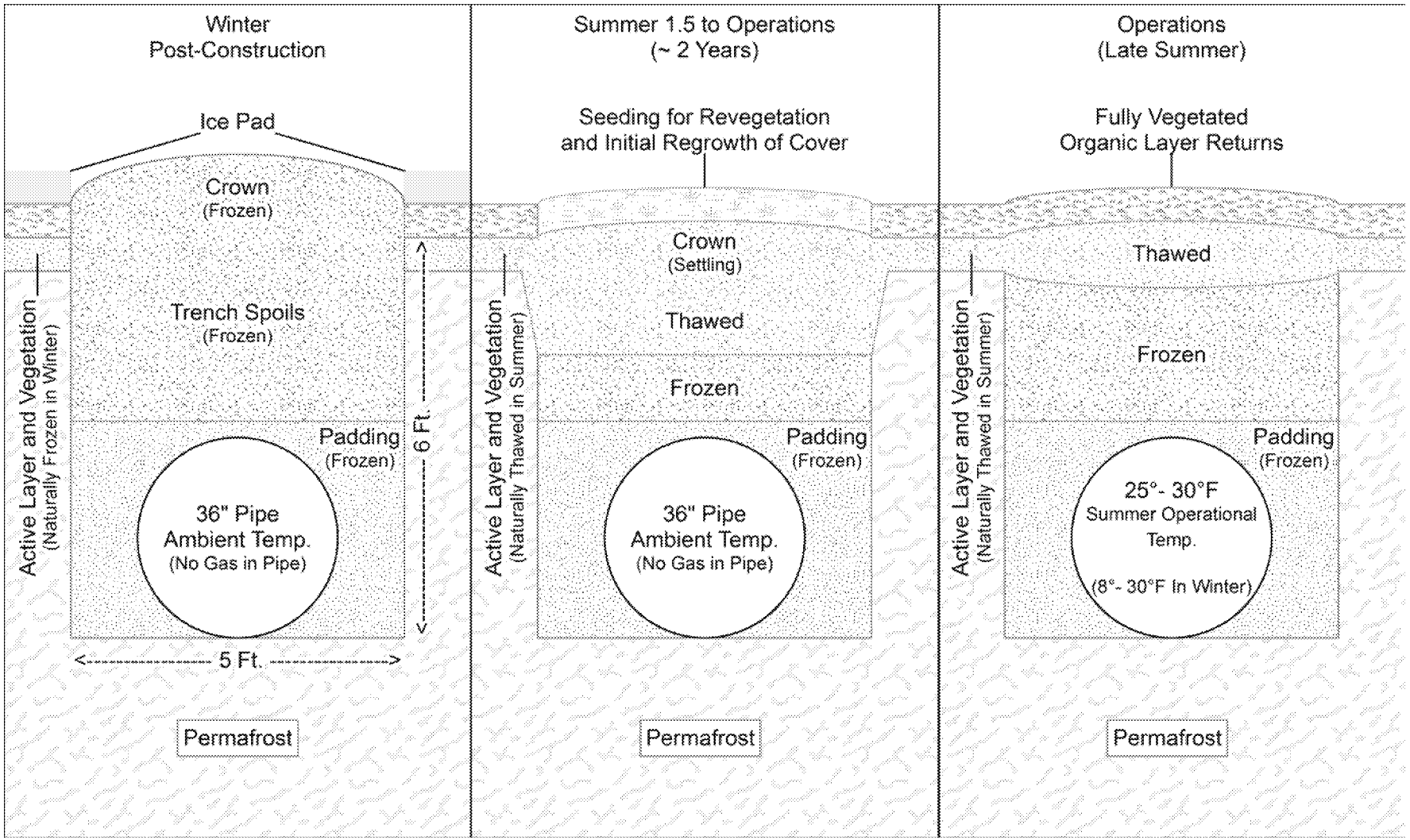
Following pipe installation, ditch backfilling, and hydrotesting, crews will perform cleanup, including leveling of the pipeline ROW and shaping of a crown over the pipeline ditch, as required. Crews will dispose of remaining scrap materials, timber, or other debris. Wood debris will be disposed of, and scrap materials and rubbish will be hauled to designated waste accumulation locations, incinerated, hauled to a permitted landfill for disposal, or some combination. Crews will be equipped with dozers, front-end loaders, and dump trucks to facilitate clearing and construction ROW cleanup. Snow pad areas will require a summer

cleanup check to verify that construction materials were removed from the construction ROW. Remaining debris will be removed using low-ground-pressure vehicles to minimize disturbance to surface vegetation.

3.2.9 Dormant Period

The BG pipe and surrounding material (bedding/padding, trench spoils, crown) and permafrost will remain frozen in place up through spring/summer melt (Figure 6). At that time, the crown and back-filled trench spoils will settle over the pipe and the thaw-stable bedding. The surrounding permafrost will melt slightly around the portion of the trench that thaws (Figure 6). The pipe will lay dormant at ambient temperature for approximately two years without any flow of gas while construction and testing of the GCF and pipeline occur and are completed.

Figure 6. Construction, Operation, and Maintenance of the ASAP Belowground Pipe in North Slope Permafrost (MP0 – MP60)



3.3 POST-CONSTRUCTION MONITORING AND MAINTENANCE

3.3.1 Experienced Personnel and Precedent

The ASAP Project has retained the services of engineers and environmental scientists with 30 years of experience in stabilizing soils and managing hydrologic issues associated with other buried pipelines in Alaska, including some on the North Slope. These experts include Pipeline and Civil Maintenance (P&CM) engineers for Alyeska Pipeline Service Company and other experts who have experience with TAPS, a pipeline that has several belowground sections on the North Slope. These experts have first-hand knowledge and experience implementing successive-year soil stabilization and water management techniques and assessing needs to mitigate against erosion. These individuals have contributed to the development of stabilization measures for the first five years after construction and to the long-term maintenance planning efforts for ASAP.

3.3.2 Trench Stabilization

Monitoring and re-stabilization will occur in the years after construction of the pipeline to ensure resulting environmental impacts are minimized and that any unexpected impacts are addressed through additional required action. Stabilization of the backfilled ditch may be a multi-year process in some areas, particularly areas with fine-grained, ice-rich soils. Rehabilitation, especially in ice-rich soils, may require trench maintenance and long-term thermal stabilization activities before the habitat achieves stability.

3.3.3 Erosion Control

Storm drainage design at the surface above the pipe will help to control flow along the crowned ditch and the Project. The crown is not likely to remain more than 1 to 2 years after the annual freeze-thaw cycle because of resulting settlement. Temporary and permanent erosion and sediment control procedures and drainage controls will be designed to work in concert to provide acceptable erosion and sediment control for the project.

Erosion control measures for ditch excavations performed through stream beds and banks will be applied as soon as the backfill is placed into the ditch to complete pipe coverage. Specific materials to use for erosion control of the bed and banks will be determined on a case-by-case basis and identified in the construction plans for each crossing.

The Project will develop appropriate methods to respond to local conditions based on existing terrain, geology, hydrology, slope, disturbed area, thermal regime, climate, and other factors in the final design and relevant plans.

3.3.4 Revegetation

Areas that are impacted by construction will be re-seeded with natural vegetation to improve stabilization of soils and minimize erosion around the pipe. ASAP will work with the ADNR Plant Materials Center to develop a specific Revegetation and Erosion Stabilization Plan.

Soil stabilization procedures were developed through consultation with former P&CM engineers and scientists with first-hand experience in implementing successive-year soil stabilization techniques and assessing needs to mitigate against erosion for buried Arctic pipelines. Procedures for ensuring soil stabilization include geohazard avoidance and special design area engineering, use of engineered material for bedding and padding, soil replacement and stabilization at installation, crowning, terrain contouring, armoring, revegetation, fertilization, control of non-native plants, and through monitoring and maintenance for several years after construction. Seeding and revegetation would be done with approved seed mixtures of annuals and native species and re-shaping of the ditch spoil after initial thawing would be done to prevent any ponding due to thaw slump.

Spring seeding of the impacted area promotes vegetative growth and the stability of soils to minimize erosion around the pipeline. Seeding of the disturbed corridor will be conducted in consultation with the BLM and State of Alaska and will adhere to the ADNR Plant Materials Center Revegetation Manual for Alaska (Wright, 2009). The methods and procedures outlined in the manual provide specific regional information for revegetation of disturbed areas with native plants to limit the potential for colonization by invasive species. A Non-native Invasive Plant Prevention Plan will also be developed and consulted to limit the potential for colonization by invasive species.

Seed mixes will be developed for different geographic areas and fertilizers applied at an optimum rate per acre. Hand methods, hydroseeding, and aerial seeding will be employed to stabilize surfaces as required and will be identified in more specific planning documents leading up to construction.

ASAP will continue to re-seed and monitor the success of vegetation as necessary while the ROW is being used for maintenance during operations. As required by the ROW lease, upon completion of use, the lands will be restored to the satisfaction of the landowner.

3.3.5 Fertilization

The application of fertilizer will be conducted in consultation with ADNR. Standard practices and planning will be followed so that adequate volume, type, and quality of fertilizer are used where needed. Ground-disturbed areas may be fertilized, if appropriate, as construction progresses. Erosion control measures will be applied on top of the seed and fertilizer application. As project development proceeds, specific uses will be determined. Fertilizers will be used sparingly in areas where invasive plants are known to exist in order to limit their infiltration.

3.3.6 Control of Non-Native Plants

Procedures will be developed in consultation with ADNR to control the introduction and spread of non-native invasive plants during pre-construction, construction, and monitoring phases of the Project. Invasive plants can be introduced from the use of airports (particularly at gravel airstrips), material sites, and temporary-use areas, such as pipe storage yards (PSYs) and camps. Control of invasive plants is likely to be a requirement of ROW lease stipulations to restore land to the satisfaction of different land owners.

3.3.7 Operation of the Belowground Pipe

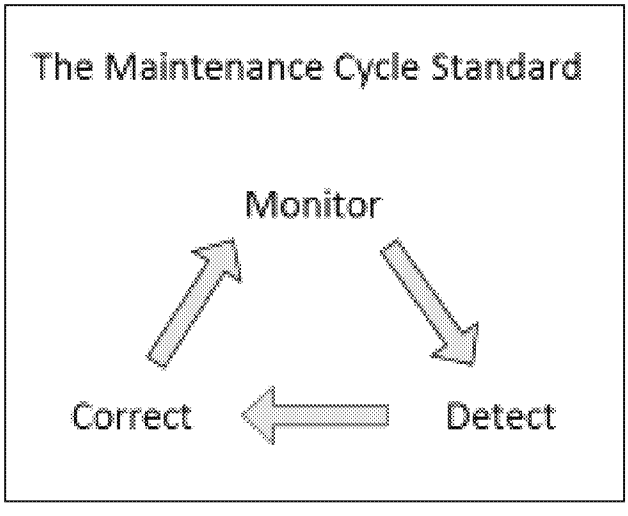
When ASAP completes construction and testing and begin operations, it will transport gas and operate at below freezing temperatures (8 - 30°F) on the North Slope (Figure 1, Figure 6). No compressors will be required, as all compression for 500MMscfd will come from the GCF. ASAP will transport gas along its route through the North Slope region and ACP en-route to customers in Fairbanks, the Southcentral region, and other Alaskan communities.

3.3.8 ASAP Field Surveillance Program

Soils and water will be monitored regularly after installation of the pipe following the programmatic maintenance cycle standard of "Monitor, Detect, Correct" (Figure 7). Where depressions or slumping occurs in spring / summer, additional ditch spoil will be placed to flatten the surface and reduced the amount of standing water. For the first several years after construction soil stabilization efforts will focus strongly on control of erosion through revegetation per the methods above and water management. If, after several years of revegetation efforts, plant cover does not sufficiently return to stabilize soils, ASAP will consider alterations to the methodologies of its revegetation procedures in consultation with ADNR to encourage additional growth.

ASAP will monitor the pipeline in the years after construction to determine where modifications may be needed to ensure proper water management. Crews will document and inspect areas of ponding water over the pipe and recommend site-specific improvements in subterranean infrastructure or water flow to ensure that prolonged ponding is limited or reduced. Additional improvements may be added in certain areas, depending on the level of moisture, drying, and settling that occurs over and around the pipe.

Figure 7. Programmatic Maintenance Cycle Standard for ASAP



It is possible that some ponding could occur along the route in areas directly over the trench intermittently during the first spring after soils thaw, but will then drain as temperatures warm surrounding soils near the surface. The north-to-south configuration of the pipeline means that the direction of sheet water flow will be directed by the downward gravitational gradient of the terrain, moving from higher elevations near the Brooks Range foothills, north to the lower elevations of the coastal areas near the Beaufort Sea. The pipe, running parallel to this flow gradient, will generally not inhibit the slow movement of groundwater along

this gradient. The lack of a mound, or high-slope crown, over the trench will keep water from ponding in trenches on either side of the mound.

The low or nearly-flat, sloped crown will encourage proper drainage, and in some instances, initial ponding directly over the trench in areas where subsidence occurs. Historic knowledge from experts who have worked on TAPS and North Slope buried pipelines believe the initial temporary impacts associated with constructing the pipeline will be manageable with regard to stabilization, especially for a below-freezing temperature pipe. Based on the recommendations of experts in BG pipe erosion control and water management, increased stabilization efforts will be required for the first 5 years following construction.

4. THE ABOVEGROUND PIPELINE MODE (NOT SELECTED)

The AG pipe option was not selected by ASAP for the first 60 miles of the pipeline on the North Slope. The engineering reasons for not selecting this option lie in challenges to constructability, increased operational risk, more complex logistics, and a resulting higher project costs. Other HSSE considerations are the security of the AG line, impacts to visual resources, public comments on impacts to subsistence species, such as caribou, environmental impacts to aquatic habitat, and impacts to non-aquatic wildlife during both construction and operations.

The AG procedure requires more equipment, more material, more temporary support infrastructure, and more time to construct than the relatively simpler process of trenching, bedding, padding, and covering with backfill. There is also increased time and effort required for balancing the VSMs and aligning the pipe on the VSMs.

In the AG design that was not selected for the North Slope component of the project, the pipeline is supported at intervals by engineered structures, typically constructed of steel or concrete. The impacts of WIV and frost heaving of VSMs create unique challenges. The vertical separation of the pipe from the subsurface eliminates consideration for geohazards resulting from changes in subsurface support, such as thaw settlement. The support structure is typically a round structural member with embedment designed to resist axial and longitudinal loadings transmitted to the support from the pipeline. The pipe itself, not being constrained by surrounding soil, is thus free to expand and contract in response to such loadings as operational changes in temperature. Consequently, the longitudinal stresses induced in the pipeline are relatively small, provided the supports are spaced appropriately. However, the displacement of the pipe on the supports must be accounted for by installation of expansion loops.

This type of installation is typical on the North Slope of Alaska where hot, buried pipelines could disrupt the permafrost conditions. It was also the solution of choice for TAPS to mitigate the effect of thaw settlement; approximately half of its length is aboveground (>400 miles). Natural gas pipelines, which typically run chilled or near ambient temperature, have less of a technical requirement to avoid burial.

The technical disadvantages to the AG scenario include flow assurance considerations for the natural gas product to ensure there is no liquid dropout that could collect and cause internal corrosion. The pipe material may be subject to low temperatures from the ambient conditions, and may require special fracture control provisions. There are also well-known disadvantages for its use which may be more pronounced for ASAP, especially if used along the Dalton Highway Corridor: the configuration is highly visible, must allow for passage beneath the pipe, must allow for lateral variations in the ROW to accommodate expansion loops, and would be subject to additional security concerns.

5. CONSTRUCTION SEASON

5.1 WINTER CONSTRUCTION (SELECTED)

The ASAP Project selected winter season construction for a natural gas pipeline on the North Slope. Construction on the North Slope is proposed to occur using ice roads and frost packing to minimize the impacts of vehicles and heavy equipment, which would require gravel roads and pads and increased permanent impact to prolific wetlands in this region. Ice roads and frost packing will mitigate against additional permanent impacts that would otherwise result from road and pad construction.

Winter construction will result in a 5-ft wide trench, from which the organic layer and permafrost will be removed down to approximately 6 ft. The pipe and padding material will be added, and the trench will be backfilled with native material. Some native material will be left on the spoils side of the trench, creating a total wetlands impact corridor width of 32ft. The is material will be used in stabilization of the trench and additional mild crowning if slumping occurs, prior to revegetation (AGDC, 2015a). The fine soils on the North Slope allow for use of the chain trenching technology (Figure 4), creating a greater ease of logistics in winter for this linear project, and accelerating the speed at which construction can occur (AGDC, 2015a).

5.2 SUMMER CONSTRUCTION (NOT SELECTED)

Environmental impacts to the sensitive tundra from operating vehicles in summer far outweighs the winter use of ice pads and ice roads. Environmental impacts in the Northern ecoregion are generally limited in winter to the width of the impact associated with placing and covering the pipe. In summer, however, impacts would be substantially greater. Costs and schedule would also increase, as gravel roads or clearers and graders would be needed.

6. CONCLUSION

The ASAP Project compiled and reviewed available information on the safety and security, operability, available line pipe technology, logistics, constructability, environmental impacts, and costs associated with the construction and operation of a natural gas pipeline in Arctic Alaska. It developed a robust geotechnical and engineering program, and it analyzed a significant body of data and information to support its assessment of pipeline design mode. ASAP determined that a BG mode is preferable to an AG mode for several reasons related to engineering constructability, operational reliability, and reasons related to HSSE. The BG mode results in a safer and more secure design with a high degree of constructional and operational integrity that will ease logistics of construction and operational maintenance. The BG design uses available technology to avoid and minimize environmental impacts, and it uses proven mitigation methods developed by staff with over 30 years of experience in water management and erosion control for BG Arctic pipelines. In the BG mode, efforts towards stabilization of lands through erosion control, such as revegetation, and water management will occur by implementing a proven programmatic maintenance cycle standard that is expected to require an increased effort in the first 5 years after construction.

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Message

From: Levine, Leonard [LLEVINE@gcwda.com]
Sent: 9/15/2017 7:04:38 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
CC: Burgin, Sara [sara.burgin@bracewell.com]
Subject: Follow up On GCA meeting with EPA regarding UOG ELG

Lee
I realize you are all most likely pretty busy dealing with hurricane response, but we just wanted to touch base and see if there is anything else GCA can do to help EPA progress on resolving the UOG ELG and POTW issues. In case you are wondering, the GCA facilities all came through Harvey with only very minor damage.
Regards

Leonard Levine P.E.
Technical Director
Gulf Coast Authority
910 Bay Area Blvd
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llevine@gcwda.com
W
C (Ex. 6
WWW. GCATX.ORG

Message

From: Kelly Johnson [KAJohnson@hollandhart.com]
Sent: 9/26/2017 12:01:15 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
Subject: Update?

Lee – Did Region 10 send the will effect letter yesterday? Just asking as we're meeting with Mary this morning and have a meeting at the WH this afternoon. Thanks. Kelly

Kelly A. Johnson
Holland & Hart LLP
975 F St., NW
Suite 900
Washington, DC 20004

Phone: **Ex. 6**
E-mail: kajohnson@hollandhart.com

Message

From: Kelly Johnson [KAJohnson@hollandhart.com]
Sent: 9/18/2017 11:53:14 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
CC: Crowther, John J (DNR) [john.crowther@alaska.gov]; Penman, Crystal [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=93662678a6fd4d4695c3df22cd95935a-Penman, Crystal]; Frank Richards [FRichards@agdc.us]; gtherriault@agdc.us
Subject: RE: ARNI Designations - Alaska
Attachments: 2017-09-18_Letter_Forgsen-signed.pdf

Lee –

Thanks again for your assistance. I've attached a letter from Frank Richards, Senior VP for AGDC, that details AGDC's concerns with the "may affect" letter from Region 10 concerning the Yukon River drainage. You'll find attached a map of Alaska which shows the far reaching impact an ARNI designation would have in Alaska. We look forward to talking to you about the ARNI issue this week and meeting with you next week to talk about the LNG Pipeline and other EPA issues.

Crystal – Let me know what will work for Lee's schedule and we can get a call and meeting arranged.

Kelly

From: Forsgren, Lee [mailto:Forsgren.Lee@epa.gov]
Sent: Monday, September 18, 2017 3:54 PM
To: Kelly Johnson
Cc: Crowther, John J (DNR); Penman, Crystal
Subject: RE: ARNI Designations - Alaska

Crystal find some time next week and for a call this week.

From: Kelly Johnson [mailto:KAJohnson@hollandhart.com]
Sent: Monday, September 18, 2017 11:43 AM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Cc: Crowther, John J (DNR) <john.crowther@alaska.gov>; Penman, Crystal <Penman.Crystal@epa.gov>
Subject: RE: ARNI Designations - Alaska

Lee – Looking forward to working with you on this issue. I'll be forwarding you some information today which will explain the AGDC projects and the problems posed by Region 10's "may affect" letter. As I noted in my email, AGDC wants to ensure that Region 10 not take any further action until AGDC / State of Alaska have had a chance to explain to you why the ARNI designation is inappropriate and problematic. The EPA Region 10 Administrator's "will effect" letter is due on September 25 – or a week from today. I will follow-up with Crystal about a time for us to chat this week. I'd also like to set up a meeting for next week when I have some of the AGDC executives in Washington DC to introduce you to the AGDC projects and talk about some of the issues EPA has raised (unfortunately, the ARNI isn't the only one). Kelly

---

From: Forsgren, Lee [mailto:Forsgren.Lee@epa.gov]
Sent: Monday, September 18, 2017 9:13 AM
To: Greenwalt, Sarah; Kelly Johnson; Dravis, Samantha
Cc: Crowther, John J (DNR); Wagner, Kenneth; Penman, Crystal
Subject: RE: ARNI Designations - Alaska

Kelly,

I would be happy to speak to you regarding the issue. If you could contact Crystal Penman she can find a time for us to chat.

Regards,
Lee

D. Lee Forsgren
Deputy Assistant Administrator
Office Of Water
Environmental Protection Agency
1200 Pennsylvania Avenue, VW
Room 3219 WJCE
Washington, DC 20460
Phone: 202-564-5700
Forsgren.Lee@epa.gov

From: Greenwalt, Sarah
Sent: Monday, September 18, 2017 8:42 AM
To: Kelly Johnson <KAJohnson@hollandhart.com>; Dravis, Samantha <dravis.samantha@epa.gov>
Cc: Crowther, John J (DNR) <john.crowther@alaska.gov>; Wagner, Kenneth <wagner.kenneth@epa.gov>; Forsgren, Lee <Forsgren.Lee@epa.gov>
Subject: RE: ARNI Designations - Alaska

Kelly –

Thank you for that further clarification. Lee Forsgren is our Deputy Assistant Administrator in the Office of Water, and familiar with Region 10. He and Ken will be well-suited to discussing this issue with you.

Best,

Sarah A. Greenwalt
Senior Advisor to the Administrator
for Water and Cross-Cutting Issues

U.S. Environmental Protection Agency
Work: 202-564-1722 | Cell: Ex. 6
Greenwalt.Sarah@epa.gov

From: Kelly Johnson [mailto:KAJohnson@hollandhart.com]
Sent: Friday, September 15, 2017 5:04 PM
To: Dravis, Samantha <dravis.samantha@epa.gov>
Cc: Crowther, John J (DNR) <john.crowther@alaska.gov>; Greenwalt, Sarah <greenwalt.sarah@epa.gov>; Wagner, Kenneth <wagner.kenneth@epa.gov>
Subject: RE: ARNI Designations - Alaska

Sam - Many thanks for passing me on.

Sarah / Ken – AGDC is putting together information on the particular concerns with the ARNI designation for the Yukon River drainage and I'll get that to you as soon as possible. In the interim, we would like to ensure that Region 10 not take any further action until AGDC / State of Alaska have had a chance to explain to you why the ARNI designation is inappropriate and problematic. On August 29, Region 10 sent a "may affect" letter pursuant to the CWA Section 404(q) MOU between EPA and the Corps. I have attached a copy of that letter. Under the CWA Section 404(q) MOU, the EPA Region 10 Administrator would need to send a "will effect" letter by September 25. AGDC believes it can resolve / address the concerns in the August 29 "may affect" letter so that the "will effect" letter will not be necessary. Thanks so much for your assistance and don't hesitate to contact me. Kelly

---

From: Dravis, Samantha [mailto:dravis.samantha@epa.gov]
Sent: Friday, September 15, 2017 12:55 PM
To: Kelly Johnson
Cc: Crowther, John J (DNR); Greenwalt, Sarah; Wagner, Kenneth
Subject: Re: ARNI Designations - Alaska

Ken Wagner and Sarah Greenwalt are the appropriate individuals. Sarah and Ken, can you reach out and follow up on this? Thank you!

Sent from my iPad

On Sep 14, 2017, at 8:10 AM, Kelly Johnson <KAJohnson@hollandhart.com> wrote:

> Samantha – My advance apologies for this out of the blue email but I believe you've had to deal with some Alaska issues during your tenure at EPA. Holland & Hart represents the Alaska Gasline Development Corporation, an entity of the State of Alaska, seeking to construct a natural gas pipeline through Alaska. The permitting for this project (which is included on the Fast-41 Permitting Dashboard) has been ongoing for a number of years. We have run into a situation where EPA Region 10 has indicated that they believe the Yukon River drainage system (approximately 1/4 of the State) may be an Aquatic Resource of National Importance (ARNI) under the Clean Water Act. AGDC (and I believe the Administration of Governor Walker) strongly disagrees with such a designation. We would like to meet with someone at EPA headquarters to detail the reasons why we believe such a designation is inappropriate. Who would you suggest I coordinate with? I've cc: John Crowther who works in the State of Alaska's DC office since he's been assisting on AGDC issues. Thank you. Kelly

Kelly A. Johnson
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Washington, DC 20004

Phone: Ex. 6
E-mail: kajohnson@hollandhart.com

HOLLAND&HART
THE LAW OUT WEST

September 18, 2017

Mr. D. Lee Forsgren
Deputy Assistant Administrator
Office of Water, Environmental Protection Agency
1200 Pennsylvania Avenue, NW, Room 3219 WJCE
Washington, D.C. 20460

Re: Yukon River Basin Aquatic Resource of National Interest (ARNI) Designation

Mr. Forsgren:

Thank you so much for your offer of assistance regarding a recent action taken by the US Environmental Protection Agency (EPA) that could cause significant problems for Alaska's effort to develop North Slope natural gas resources, and possibly for other projects within our state.

On August 29, 2017, the EPA sent a letter to the US Army Corps of Engineers (ACOE) designating the entire Yukon River basin as an Aquatic Resource of National Interest (ARNI). This letter was submitted during the comment period for Alaska Gasline Development Corporation's (AGDC) ASAP Project Draft Supplemental Environmental Impact Statement (DSEIS), and formally initiates an elevation process between the EPA and the ACOE on the ASAP 404 permit process.

This elevation process is set out in Section 404(q) of the Clean Water Act, and implemented through a 1992 MOU between the EPA and the ACOE. EPA's August 29 letter is the first step, and notifies the ACOE that the project "may result in substantial and unacceptable impacts to aquatic resources of national interest." If the issues are not resolved, this must be followed up within 25 days with a letter, signed by EPA's Region 10 Administrator, determining if the project "will" have these impacts in order for the elevation process to proceed.

We have significant concerns with this process:

- The Yukon ARNI encompasses the entirety of the Yukon River watershed in the United States, approximately 200,000 square miles stretching from the US/Canada border to the east, to the end of the Yukon Delta at the Bering Sea. To put the size of the Yukon ARNI in perspective, the State of California is only 164,000 square miles. A map of the watershed is enclosed with this letter.

- There is no law, regulation or even guidance, including the MOU, that defines the term ARNI or the boundaries of an ARNI determination.

- While the ARNI is supposed to be a temporary designation, there is concern that once an ARNI has been designated, the designation could live on and be used by project opponents. The designation only causes confusion, and can be misinterpreted by special interests to oppose projects.

- The recent EPA letter acknowledges the ACOE call for comment is for a Draft Supplemental Environmental Impact Statement to a Final EIS EPA previously participated in. However, EPA's recent action effectively reverses its position on the ASAP project from its formal acceptance of the 2012 FEIS issued by the ACOE.

Alternative 1 for the DSEIS, which is supported by the State of Alaska, was formulated following a wetland evaluation process proposed by the ACOE. This process is designed to determine if a proposed activity will contribute to significant degradation of waters of the United States. Despite the detailed knowledge and experience ACOE has overseeing projects in Alaska, EPA appears to brush their knowledge aside and express support for Alternative 2. This alternative would require extensive segments of the proposed pipeline to be elevated using vertical support members despite sound, rational and technical analyses by AGDC that highlight that burial of the natural gas pipeline is the most safe and secure construction alternative. This alternative is contrary to input from local subsistence resource users, and the State of Alaska as a substantial owner of the proposed project right-of-way.

Importantly, this action by EPA appears contrary to the intent of President Trump's August 15, 2017 Presidential Executive Order on Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure, which calls for "coordinated, consistent, predictable, and timely" environmental reviews by federal agencies. The EPA action also is inconsistent with the position of Administrator Pruitt who has called for close collaboration with states and interest in developing natural resources to power and protect the world. The EPA has had adequate opportunity to evaluate the project (as it accepted the 2012 FEIS) and its actions now appear to call for an entirely new EIS. This is anything but "coordinated, consistent, predictable, and timely."

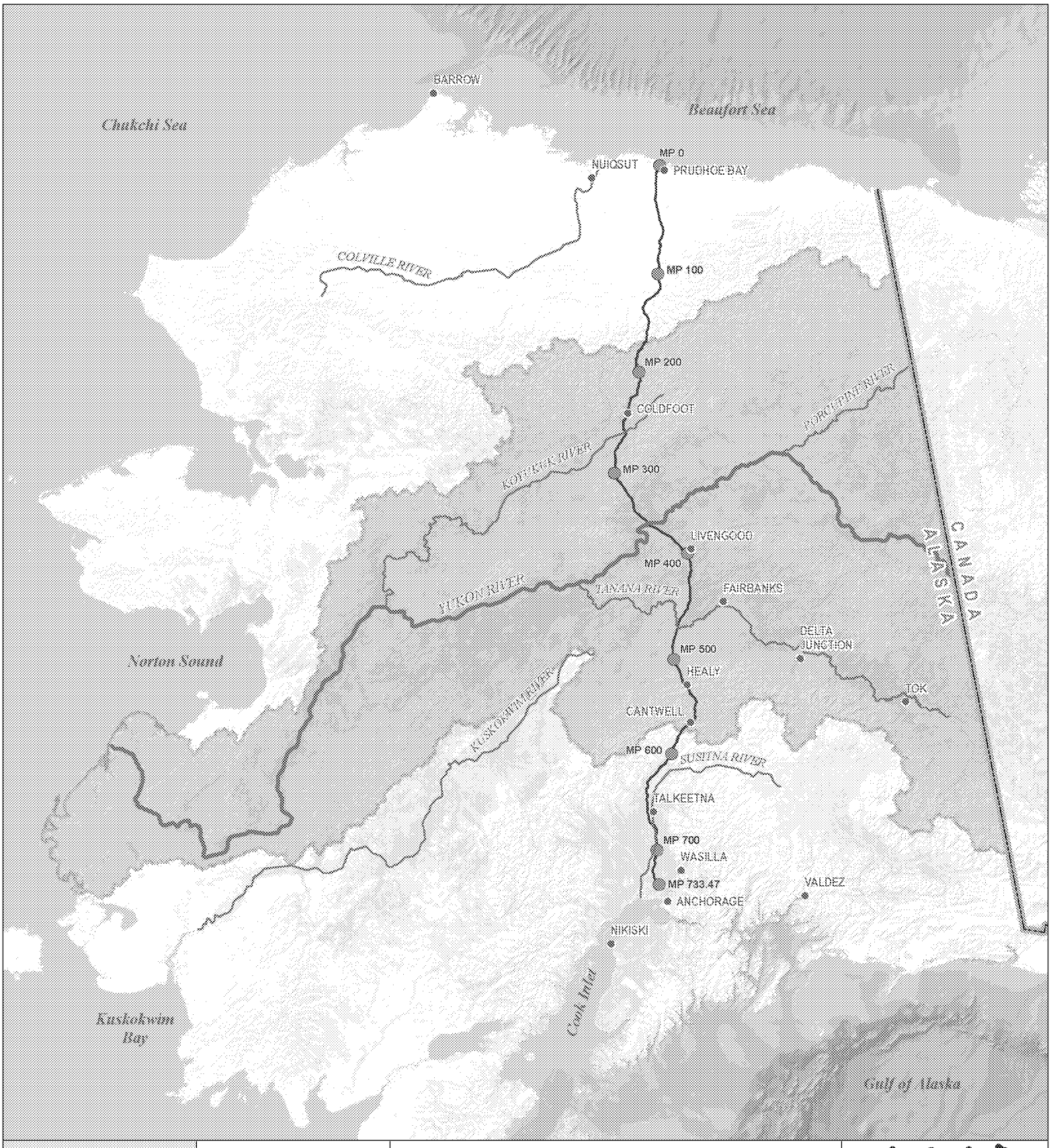
In addition, the State of Alaska is concerned that the ARNI decision will have broad-reaching impacts to all development activities in the Yukon River basin, including the proposed Alaska LNG gas pipeline, and any infrastructure projects, whether they be airports, schools, roads, or water and sewer systems requiring fill to be placed in wetlands. This could impact public safety, increase costs, and set a terrible precedent that the State of Alaska will have to endure for the foreseeable future.

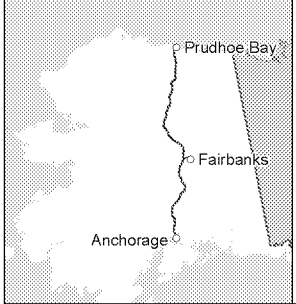
AGDC requests that EPA headquarters intervene with Region 10 to review both the basis for the "may affect" letter on the ASAP project and the potential impacts of designating the Yukon River drainage as an ARNI, and determine whether this decision can be negated.

Sincerely,

Frank T. Richards, P.E.
Senior Vice President, Program Management

Cc: Senator Lisa Murkowski
Senator Dan Sullivan
Representative Don Young
Commissioner Andy Mack, Alaska Department of Natural Resources
Commissioner Larry Hartig, Alaska Department of Environmental Conservation
John Crowther, Alaska Governor's Washington DC Office





Alaska Stand Alone Pipeline / *ASAP*

Yukon River Basin

Map Scale 1:7,000,000

0 20 40 60 80 100 Miles

N

Legend

- ASAP Mainline Mileposts (MP)
- ASAP Mainline Alignment Rev. 6.1
- Major Rivers
- Yukon River Basin

Note: Yukon River Basin area developed from HUC4 Hydrologic Unit Boundaries within the State of Alaska.

ASAP

Alaska's In-State Gas Pipeline

Alaska Gasline Development Corporation
3201 C Street, Suite 200 | Anchorage, AK 99503
P 907.330.6300 | F 907.330.6309 | www.agdc.us

Doc ID	N/A
File Name	Yukon River ARNI
Date	September 11, 2017
Sheet	1 of 1

Message

From: Kelly Johnson [KAJohnson@hollandhart.com]
Sent: 9/21/2017 10:08:42 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
Subject: thank you so much

For taking the time to talk to me and the folks from the Alaska Gasline Development Corporation. We greatly appreciate your assistance. Don't hesitate to contact me if you need anything and I look forward to actually meeting you. Have a great evening. Kelly

Kelly A. Johnson
Holland & Hart LLP
975 F St., NW
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Washington, DC 20004

Phone: Ex. 6
E-mail: kajohnson@hollandhart.com

Message

From: Kathy Bishop -MDE- [kathy.bishop@maryland.gov]
Sent: 10/19/2017 5:41:25 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
Subject: Fwd: Tried calling your cell and got an intercept
Attachments: MDE_PressRelease_ 10-2017.pdf

MDE's Nutrient Trading press release is attached.

--
Kathy Bishop
Executive Associate to the Secretary
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230
410.537.4187
Kathy.Bishop@Maryland.gov

---------- Forwarded message ----------
From: **Ben Grumbles -MDE-** <ben.grumbles@maryland.gov>
Date: Mon, Oct 16, 2017 at 11:33 AM
Subject: Re: Tried calling your cell and got an intercept
To: "Forsgren, Lee" <Forsgren.Lee@epa.gov>
Cc: Kathy Bishop <kathy.bishop@maryland.gov>

Thanks Lee. Intercept because I went to Serbia Saturday and am still there till Wednesday. Back in the hood Wednesday night.

Kathy could you email Lee our press release on nutrient trading.

Best.
Ben

Sent from my iPhone

On Oct 16, 2017, at 4:24 PM, Forsgren, Lee <Forsgren.Lee@epa.gov> wrote:

> Ben,
>
> Got your voicemail from Friday when I got in this morning. Tried calling your cell at Ex. 6 Ex. 6 and got an intercept that the call could not be completed due to technical difficulties (called 3 times). Call me on my EPA cell at Ex. 6

Love that trading!

Lee

D. Lee Forsgren

Deputy Assistant Administrator

Office Of Water

Environmental Protection Agency

1200 Pennsylvania Avenue, VW

Room 3219 WJCE

Washington, DC 20460

Phone: 202-564-5700

Forsgren.Lee@epa.gov

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Maryland
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Larry Hogan, Governor
Boyd Rutherford, Lt. Governor

Ben Grumbles, Secretary
Horacio Tablada, Deputy Secretary

FOR IMMEDIATE RELEASE

Media contact: Jay Apperson

jay.apperson@maryland.gov
410-537-3003

MARYLAND PROPOSES REGULATIONS FOR FASTER, BETTER CHESAPEAKE BAY RESTORATION

Proposed rule would establish credit exchange program to provide greater flexibility, cost reductions in Bay cleanup

BALTIMORE (Oct. 11, 2017) – The Maryland Department of the Environment has proposed regulations to establish the Maryland Water Quality Trading Program and accelerate the restoration of the Chesapeake Bay while bringing economic benefits to Maryland. The regulations are proposed under Maryland environmental law to ensure enforcement and accountability under the federal Clean Water Act.

The proposed regulations are designed to provide greater flexibility and reduce costs in achieving Maryland's goals under its blueprint to meet federal pollution limits for the Bay. The voluntary program would establish a marketplace for private sector participation in meeting Bay cleanup goals.

Nutrient and sediment credit trading offer attractive alternatives to more costly traditional approaches for improving water quality and have the potential to achieve results more quickly and at a lower cost, accelerating efforts to restore and improve water quality. The trading program that would be established by the proposed regulations expands opportunities for all sources by giving them access to a water quality marketplace and flexibility in meeting and maintaining their pollution limits by acquiring credits generated from load reductions in local watersheds in Maryland's portion of the Chesapeake Bay watershed.

"Maryland is a leader in reducing greenhouse gases and is now poised to make similar gains for clean water with nutrient credit trading," said Maryland Environment Secretary Ben Grumbles. "We can speed up the cleanup of the Chesapeake Bay and reduce the cost of restoration with innovative partnerships and regulatory safeguards."

The proposed regulations were developed with significant input from the Maryland Water Quality Trading Advisory Committee. Earlier this year, the Maryland Departments of the Environment and Agriculture published a draft "Maryland Trading and Offset Policy and Guidance Manual" in consultation with the Advisory Committee.

In 2010, the U.S. Environmental Protection Agency established the Chesapeake Bay Total Maximum Daily Load (TMDL), with pollution limits and load allocations for the pollutants nitrogen, phosphorus and sediment. Maryland developed a Watershed Implementation Plan, or blueprint, that allocates pollution loads for the wastewater, stormwater, septic, agricultural and forest sectors.

The Maryland Water Quality Trading Program will allow agricultural sources that have reduced their pollution beyond the required "baseline" to produce credits that can be purchased by counties or municipalities to meet Bay cleanup requirements to reduce polluted stormwater runoff. The cost of reducing nitrogen could be as low as $200 per pound in the agriculture sector, compared to an estimated $3,800 per pound for urban retrofits to reduce stormwater runoff.

The proposed regulations include mechanisms for the Department of the Environment to certify credits for trading. The certification process relies heavily on EPA Chesapeake Bay Program modeling tools, expert panel reviews of Best Management Practices and other technical and policy support. The Department of the Environment's review would include limits on the geography within which a trade can take place and evaluate expected improvements in water quality.

The Department of the Environment submitted the proposed regulations yesterday to the Administrative Executive and Legislative Review (AELR) Committee for a 15-day review. The Department expects to submit proposed regulations for publication in the *Maryland Register* in November. A public comment period would follow that publication.

###

Message

From: Kelly Johnson [KAJohnson@hollandhart.com]
Sent: 9/21/2017 8:58:02 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
Subject: RE: Conference Call

It almost seems like it was hacked.

From: Forsgren, Lee [mailto:Forsgren.Lee@epa.gov]
Sent: Thursday, September 21, 2017 4:57 PM
To: Kelly Johnson
Subject: RE: Conference Call

Great! I am so sorry that our conference line is not working well. It might be operator error on my part but it still was not working.

From: Kelly Johnson [mailto:KAJohnson@hollandhart.com]
Sent: Thursday, September 21, 2017 4:55 PM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Subject: RE: Conference Call

Yes – will do

From: Forsgren, Lee [mailto:Forsgren.Lee@epa.gov]
Sent: Thursday, September 21, 2017 4:55 PM
To: Kelly Johnson; Penman, Crystal
Subject: RE: Conference Call

I am having the same troubles that you are. Can we talk at 5:15 and you call me at 202-564-0311.

D. Lee Forsgren

Deputy Assistant Administrator
Office Of Water
Environmental Protection Agency
1200 Pennsylvania Avenue, VW
Room 3219 WJCE
Washington, DC 20460
Phone: 202-564-5700
Forsgren.Lee@epa.gov

From: Kelly Johnson [mailto:KAJohnson@hollandhart.com]
Sent: Thursday, September 21, 2017 4:42 PM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>; Penman, Crystal <Penman.Crystal@epa.gov>
Subject: Conference Call

Lee – AGDC is anxious to speak to you this afternoon. The conference number we have Call in Ex. 6 passcode Ex. 6 does not seem to be working. Are you still available for a call? We can use my conference call #. Kelly

Kelly A. Johnson
Holland & Hart LLP
975 F St., NW
Suite 900
Washington, DC 20004

Phone: Ex. 6
E-mail: kajohnson@hollandhart.com

Message

From: Kelly Johnson [KAJohnson@hollandhart.com]
Sent: 9/21/2017 8:32:31 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
Subject: RE: ARNI Designations Conference call

Lee – We can't get the call in # to work.

-----Original Appointment-----
From: Forsgren, Lee [mailto:Forsgren.Lee@epa.gov]
Sent: Tuesday, September 19, 2017 9:30 AM
To: Forsgren, Lee; Kelly Johnson; gtherriault@agdc.us
Subject: Fwd: ARNI Designations Conference call
When: Thursday, September 21, 2017 4:30 PM-5:15 PM (UTC-05:00) Eastern Time (US & Canada).
Where: Call in Ex. 6 passcode Ex. 6

FYI

Sent via my iPhone

Begin forwarded message:

From: "Forsgren, Lee" <Forsgren.Lee@epa.gov>
Date: September 19, 2017 at 5:52:35 AM AKDT
To: Frank Richards <FRichards@agdc.us>, "gtherriault@agdc.us" <gtherriault@agdc.us>
Subject: FW: ARNI Designations Conference call

We did not have a lot of options for a call this week and this was the only option that didn't require you to do a 5 am call. I'm still working on a meeting for next week.

-----Original Appointment-----
From: Forsgren, Lee [mailto:Forsgren.Lee@epa.gov]
Sent: Tuesday, September 19, 2017 9:30 AM
To: Forsgren, Lee; Kelly Johnson
Subject: ARNI Designations Conference call
When: Thursday, September 21, 2017 4:30 PM-5:15 PM (UTC-05:00) Eastern Time (US & Canada).
Where: Call in Ex. 6 passcode Ex. 6

<< File: mime-attachment.ics >> << File: ATT00001.htm >>

Message

From: Helton, Sarah C. (59575) [schelton@michaelbeststrategies.com]
Sent: 9/22/2017 9:38:01 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
CC: Penman, Crystal [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=93662678a6fd4d4695c3df22cd95935a-Penman, Crystal]; Thomas, Latosha [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a405bd473fff4b80b3065d03d9b48eb9-LaThomas]; Drinkard, Andrea [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=808a6b7b65bf447f93dad2f510feaf61-ADRINKAR]; Dean Amhaus (DAmhaus@thewatercouncil.com) [DAmhaus@thewatercouncil.com]; mjensen@thewatercouncil.com; Schreibel, Thomas B (57936) [tbschreibel@michaelbeststrategies.com]
Subject: Thank you - The Water Council

Lee:

On behalf of The Water Council, thank you for participating as a key panelist at The Water Council's first water policy event, "Fostering Public-Private Innovations in the US Water Market – Wisconsin's Leadership" on September 6.

Your participation and commentary was invaluable and a great contribution to the event's success. We appreciate your thoughtful insight and remarks about the hurricanes' impacts on drinking water and wastewater systems, the administration's priorities on infrastructure and the important role for industry and private-public partnerships, and EPA's research and investments. We look forward to continuing these conversations with you and your team at EPA.

Please consider The Water Council a resource for you, particularly as the administration advances its initiatives on water infrastructure.

And a thank you to your team- they were wonderful to work with as we prepared for The Water Council's event.

Again, thank you and enjoy your weekend.

Sarah

Sarah C. Helton
Principal
E schelton@michaelbeststrategies.com
T 202.747.9575 | **M** Ex. 6 | **F** 202.347.1819

my bio | our firm | vCard

of its contents, is strictly prohibited. If you have received this communication in error, please return it to the sender immediately and delete the original message and any copy of it from your computer system. If you have any questions concerning this message, please contact the sender.

Message

From: Kelly Johnson [KAJohnson@hollandhart.com]
Sent: 9/22/2017 1:29:08 PM
To: Forsgren, Lee [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a055d7329d5b470fbaa9920ce1b68a7d-Forsgren, D]
Subject: Re: thank you so much

I'll call in 5. Thanks.

On Sep 22, 2017, at 7:04 AM, Forsgren, Lee <Forsgren.Lee@epa.gov> wrote:

> Kelly,
>
> Can you call me this morning 202-564-0311. It is kind of important and has come up since we talked yesterday.
>
> Lee
>
> **D. Lee Forsgren**
> Deputy Assistant Administrator
> Office Of Water
> Environmental Protection Agency
> 1200 Pennsylvania Avenue, VW
> Room 3219 WJCE
> Washington, DC 20460
> Phone: 202-564-5700
> Forsgren.Lee@epa.gov

From: Kelly Johnson [mailto:KAJohnson@hollandhart.com]
Sent: Thursday, September 21, 2017 6:09 PM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Subject: thank you so much

For taking the time to talk to me and the folks from the Alaska Gasline Development Corporation. We greatly appreciate your assistance. Don't hesitate to contact me if you need anything and I look forward to actually meeting you. Have a great evening. Kelly

Kelly A. Johnson
Holland & Hart LLP
975 F St., NW
Suite 900
Washington, DC 20004

Phone: Ex. 6
E-mail: kajohnson@hollandhart.com

<image001.gif>

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 8/29/2017 8:29:58 PM
To: Ben Grumbles -MDE- [ben.grumbles@maryland.gov]; Penman, Crystal [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=93662678a6fd4d4695c3df22cd95935a-Penman, Crystal]
CC: Kathy Bishop [kathy.bishop@maryland.gov]; DiPasquale, Nicholas [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=528ce4a1189c42b8b9a9139a25dbc320-ndipasqu]
Subject: RE: NACo Proposed Resolutions

Ben,

Per our call today we need to see if we can set up a call with the folks from NACO next week. I would hope that Crystal Penman and Kathy can work with Nicolas DiPasquale to find a time that works for both of us next week.

Look forward to working with you on this.

Lee

D. Lee Forsgren

Deputy Assistant Administrator
Office Of Water
Environmental Protection Agency
1200 Pennsylvania Avenue, VW
Room 3219 WJCE
Washington, DC 20460
Phone: 202-564-5700
Forsgren.Lee@epa.gov

From: Ben Grumbles -MDE- [mailto:ben.grumbles@maryland.gov]
Sent: Tuesday, August 29, 2017 11:44 AM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Cc: Kathy Bishop <kathy.bishop@maryland.gov>
Subject: Re: NACo Proposed Resolutions

How about 4:15 today?

Sent from my iPhone

On Aug 29, 2017, at 7:06 AM, Forsgren, Lee <Forsgren.Lee@epa.gov> wrote:

> Ben
>
> How about sometime between 4-5:30?
>
> Lee
>
> Sent from my iPhone
>
> On Aug 28, 2017, at 10:56 PM, Ben Grumbles -MDE- <ben.grumbles@maryland.gov> wrote:

Yes. Is there a time tomorrow afternoon or early evening that might work?

Thanks.
Ben

Sent from my iPhone

On Aug 28, 2017, at 1:54 PM, Forsgren, Lee <Forsgren.Lee@epa.gov> wrote:

> Ben,
>
> We should talk then reach out to NaCo.
>
> Lee
>
> **D. Lee Forsgren**
> Deputy Assistant Administrator
> Office Of Water
> Environmental Protection Agency
> 1200 Pennsylvania Avenue, VW
> Room 3219 WJCE
> Washington, DC 20460
> Phone: 202-564-5700
> Forsgren.Lee@epa.gov

From: DiPasquale, Nicholas
Sent: Monday, August 28, 2017 1:51 PM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Subject: FW: NACo Proposed Resolutions

Lee, see previous message. Scroll down to the resolution to see text highlighted in yellow that is inaccurate or incorrect. Thanks, Nick

Nicholas A. DiPasquale, Director
Chesapeake Bay Program Office
410 Severn Ave Suite 109
Annapolis, MD 21403
Tel: 410.267.5710
Cell: Ex. 6
E-mail: dipasquale.nicholas@epa.gov
Web: http://www.chesapeakebay.net

From: Power, Lucinda
Sent: Wednesday, July 19, 2017 4:12 PM
To: DiPasquale, Nicholas <dipasquale.nicholas@epa.gov>; Edward, James <edward.james@epa.gov>; Batiuk, Rich <Batiuk.Richard@epa.gov>; Bisland, Carin <bisland.carin@epa.gov>; Wenz, Tom <Wenz.Tom@epa.gov>; Miller, Linda <miller.linda@epa.gov>; McNally, Dianne <mcnally.dianne@epa.gov>
Subject: RE: NACo Proposed Resolutions

Nick,

Please see the highlighted information and responses below. Any quoted language is taken directly from the final recommendations document of the Local Planning Goals Task Force, unless otherwise noted: http://www.chesapeakebay.net/channel_files/23900/final_recommendations_of_the_local_planning_goals_task_force_wggit_approved_12.19.16.pdf.

Thanks,
Lucinda

Lucinda Power
Implementation and Evaluation Team Leader
Chesapeake Bay Program Office
U.S. Environmental Protection Agency
(410) 267-5722

"Be the change you wish to see in the world." - Gandhi

From: DiPasquale, Nicholas
Sent: Wednesday, July 19, 2017 2:05 PM
To: Power, Lucinda <power.lucinda@epa.gov>; Edward, James <edward.james@epa.gov>; Batiuk, Rich <Batiuk.Richard@epa.gov>; Bisland, Carin <bisland.carin@epa.gov>; Wenz, Tom <Wenz.Tom@epa.gov>; Miller, Linda <miller.linda@epa.gov>; McNally, Dianne <mcnally.dianne@epa.gov>
Subject: RE: NACo Proposed Resolutions

Lucinda, could you take a stab at highlighting the factual inaccuracies and inserting the relevant expectations language on local area planning goals. It says they are taking the resolutions up this Friday. Thanks, Nick

Nicholas A. DiPasquale, Director
Chesapeake Bay Program Office
410 Severn Ave Suite 109
Annapolis, MD 21403
Tel: 410.267.5710
Cell: Ex. 6
E-mail: dipasquale.nicholas@epa.gov
Web: http://www.chesapeakebay.net

From: Power, Lucinda
Sent: Wednesday, July 19, 2017 12:10 PM
To: DiPasquale, Nicholas <dipasquale.nicholas@epa.gov>; Edward, James <edward.james@epa.gov>; Batiuk, Rich <Batiuk.Richard@epa.gov>; Bisland, Carin <bisland.carin@epa.gov>; Wenz, Tom <Wenz.Tom@epa.gov>; Miller, Linda <miller.linda@epa.gov>; McNally, Dianne <mcnally.dianne@epa.gov>
Subject: FW: NACo Proposed Resolutions

FYI. The one relating to us is below (local planning goals) and can be found on pages 26-27 of the attached. Much of it is just factually incorrect.

Proposed Resolution on EPA's Imposition of Numeric Water Quality-Based Effluent Limitations on Local Governments

Issue: The U.S. Environmental Protection Agency (EPA) is imposing watershed-wide water quality standards on all localities within the Chesapeake Bay watershed, which will have implications on other counties across the nation when such standards are imposed in other watersheds.

LP: Incorrect. It might be helpful to provide some information on the process for developing water quality standards. Like…typically, a state, territory, or authorized tribe proposes water quality standards that EPA must then review and approve. If the proposed water quality standards do not meet the requirement of the Clean Water Act, EPA would specify changes that would make the standards approvable, or it may promulgate federal standards if necessary. Any federal-promulgated water quality standards are issued to a state, territory, or authorized tribe, not "localities."

Proposed Policy: NACo opposes U.S. EPA's efforts to implement localized numeric water quality-based effluent limitations or area pollution targets. NACo opposes any provisions of any watershed-wide strategy that penalizes local governments by withdrawing current forms of financial assistance or imposing monitoring, management or similar requirements on localities without providing sufficient resources to achieve water quality objectives.

LP: Incorrect. EPA expects the jurisdictions, working with their local partners, to develop local planning goals.

"The 2010 Bay TMDL established wasteload allocation (WLAs) and load allocations (LAs) for point sources and nonpoint sources of pollution, respectively. Point sources, in this context, include all sources subject to regulation under the National Pollutant Discharge Elimination System (NPDES) program (e.g., wastewater treatment facilities, some stormwater discharges and concentrated animal feeding operations). Local planning goals are not WLAs and therefore are not directly applicable to NPDES permitting."

"EPA expects the jurisdictions to work closely with their respective local partners in the development and implementation of these local planning goals. It is up to each jurisdiction to decide how to track and report progress towards achievement of local planning goals through their two-year milestones and/or annual progress reporting to EPA. In no way do the planning goals supersede or modify, jurisdictions' obligations under statutes, regulations, policies, or executive orders. These recommendations do not establish any new requirement or rights for the jurisdictions or its local partners."

"Task Force members have expressed their concern that establishment of local planning goals could imply the subsequent delegation of responsibility for achieving those goals to the localities. The Task Force members also expressed concern that local, state and federal statutory and regulatory requirements could influence the implementation of local planning goals. Task Force members questioned whether local planning goals could subject localities to new or more stringent WLAs, permit limits, or other related enforcement by EPA. The Task Force, therefore, recommends that EPA directly address these questions and concerns in the Phase III WIP Expectations document. The Task Force requests EPA specify in the Phase III WIP Expectations document that in no way do the targets supersede or modify locality obligations under statutes or regulations, that local planning goals do not establish any new requirement or rights for localities, and that decisions regarding how local stakeholders may be involved in achieving local planning goals will remain with the jurisdiction."

From EPA's Interim Phase III WIP Expectations Document: "As a result of the work completed by the Partnership's Task Force, EPA expects the jurisdictions to work with their local and regional partners, stakeholders, and federal and state facilities to establish measurable local planning goals at a geographic scale below the state-major river basin and implement them through their Phase III WIPs. In and of themselves, these local planning goals do not supersede or modify any statutory or regulatory obligations of the local and regional partners; nor do the goals establish any new requirements or rights for those local and regional partners. Decisions regarding how local and regional stakeholders may be involved in developing and achieving local planning goals will remain with the jurisdiction."

Background: On June 15, 2014, Delaware, Maryland, New York, Pennsylvania, Virginia and West Virginia signed the Chesapeake Bay Watershed Agreement with the U.S. Environmental Protection Agency (EPA). The plan provides for collaboration across political boundaries to work toward restoration of the Bay.

By the end of 2018, the states of Virginia, Maryland, Pennsylvania, West Virginia, Delaware, New York and the District of Columbia are required to submit to the EPA their final "Phase 3" Chesapeake Bay Watershed Implementation Plans (WIP). The chief purpose of these plans will be to promulgate strategies for all states in the Chesapeake Bay watershed to implement all measures necessary to meet specific pollution reduction goals for the Chesapeake Bay by the year 2025.

LP: It might be helpful to clarify the actual 2025 goal under the Bay TMDL: "By 2025, have all practices and controls installed to achieve the Bay's dissolved oxygen, water clarity/submerged aquatic vegetation and chlorophyll a standards as articulated in the Chesapeake Bay TMDL document." These practices are expected to be *in place* by 2025.

As part of a watershed wide strategy for meeting Chesapeake Bay improvement goals, a Local Area Targets Task Force was convened to assess whether WIPs for the states should include local area targets (LATs). While the task force was still working to determine whether LATs should be included in state plans, EPA informed local governments that WIPs will include LATs, imposing specific numerical water pollution limits, regardless of the Task Force's recommendations. This imposition is counter to other Clean Water Act requirements which require "maximum extent practicable" measures.

LP: Incorrect. It was the Partnership's Water Quality Goal Implementation Team (WQGIT) that decided the Phase III WIPs would include local planning goals: "The Task Force recognizes the intent of the WQGIT that local planning goals should be established by each of the seven Chesapeake Bay jurisdictions at a scale below the state-major river basin. The Task Force further recognizes that due to the varied nature of local government structures (including soil & water conservation districts) across the Chesapeake Bay jurisdictions, one size will not fit all with regard to the development and implementation of local planning goals. Accordingly, the Task Force recommends that local goals be established in partnership with their local and regional partners, stakeholders and federal and state facilities, at a scale below the state-major river basin, using the options provided for "local" under Question #2. Providing such flexibility will allow the jurisdictions to design Phase III WIP planning and local engagement processes that are best suited to them and their partners."

Also, the Partnership refers to these are "local planning goals", not local area targets to avoid confusion with any regulatory mechanism. As a result, the Task Force changed its name to "Local Planning Goals Task Force".

Despite EPA's pronouncement, the LAT Task Force completed its work and recommended removal of LAT provisions from the Phase 3 Chesapeake Bay WIP. In the alternative, should LATs be imposed despite the Task Force's recommendation, the Task Force recommended that each individual state be permitted to determine how best to implement a LAT program in its jurisdiction since a one-size-fits-all approach is impractical. In accepting the LAT Task Force's recommendations, the EPA affirmed its pronouncement that LATs will be included in the WIP expectations document to be issued.

LP: Similar to my response above: "The Task Force recognizes the intent of the WQGIT that local planning goals should be established by each of the seven Chesapeake Bay jurisdictions at a scale below the state-major river basin. The Task Force further recognizes that due to the varied nature of local government structures (including soil & water conservation districts) across the Chesapeake Bay jurisdictions, one size will not fit all with regard to the development

and implementation of local planning goals. Accordingly, the Task Force recommends that local goals be established in partnership with their local and regional partners, stakeholders and federal and state facilities, at a scale below the state-major river basin, using the options provided for "local" under Question #2. Providing such flexibility will allow the jurisdictions to design Phase III WIP planning and local engagement processes that are best suited to them and their partners."

The establishment of LATs will have a significant and unintended financial consequence on local governments since the majority of costs to comply with watershed-wide clean up goals will fall on local governments. Adding specific LATs to stormwater management programs and wastewater treatment plant plans will be especially burdensome for counties of all sizes, especially if the federal government does not provide funding to meet these federal goals. President Trump's FY 2018 budget proposed to eliminate all Chesapeake Bay grant funding; this funding helps states and localities meet these federally determined goals.

The Chesapeake Bay clean-up efforts and EPA's imposition of LATs will serve as a model for other watershed-wide improvement programs across the country. Counties with watersheds feeding Long Island Sound, Albemarle Sound, Puget Sound, the Great Lakes, the Gulf of Mexico and others will be impacted when EPA's program is implemented in these areas.

LP: It was the Partnership's decision to include local planning goals as part of the Phase III WIP development and implementation processes.

Fiscal/Urban/Rural Impact: Rural, agricultural, and urban counties and cities in large watersheds and regional estuaries will be severely impacted by increased compliance costs, economic development impacts, and negative impacts on federal funding if EPA is successful in imposing watershed-wide water quality standards upon county governments and their citizens.

LP: Similar to my response above. EPA does not promulgate and "impose" water quality standards upon county governments and their citizens.

Sponsor(s): Ruby Brabo, Supervisor, King George County, Va.; Penny Gross, Supervisor,
Fairfax County, Va.; Paul Trampe, Supervisor, Spotsylvania County, Va.; Claire Collins,
Supervisor, Bath County, Va.; Erick Coolidge, Commissioner, Tioga County, Pa.; Todd Devlin, Commissioner, Prairie County, Mont.; and Russell Clark, Supervisor, Yuma County, Ariz.

Lucinda Power

Implementation and Evaluation Team Leader
Chesapeake Bay Program Office
U.S. Environmental Protection Agency
(410) 267-5722

"Be the change you wish to see in the world." - Gandhi

From: Hanson, Andrew
Sent: Wednesday, July 19, 2017 11:44 AM
To: Evalenko, Sandy <Evalenko.Sandy@epa.gov>; Rush, Alan <Rush.Alan@epa.gov>
Cc: Christensen, Damaris <Christensen.Damaris@epa.gov>; Bowles, Jack <Bowles.Jack@epa.gov>; Power, Lucinda <power.lucinda@epa.gov>; Hannon, Arnita <Hannon.Arnita@epa.gov>
Subject: NACo Proposed Resolutions

Hi Sandy and Alan –

Just a quick heads-up that the following proposed resolutions will be discussed at the **National Association of Counties** Annual Conference and Exposition this Friday.

Sandy, while there are several water-related resolutions here, the few directly relating to EPA would include:

Proposed Resolution on the EPA and the Corps' Waters of the U.S. Definition Rulemaking (currently in effect, renewal with new language proposed)
Proposed Resolution Supporting the Regulation of Certain Functional Wetlands within Section 404 of the Clean Water Act (new resolution)
Proposed Resolution Supporting Codification of EPA's Integrated Planning Framework and Related Demonstration Projects (currently in effect, renewal)
Proposed Resolution on EPA's Imposition of Numeric Water Quality-Based Effluent Limitations on Local Governments (currently in effect, renewal with new language proposed)

Alan, just one relating to your shop.

Proposed Resolution to Oppose EPA's Efforts to Tighten Ozone Air Quality Standards (currently in effect, renewal)

Other items of potential interest include:

Proposed Resolution on U.S. Army Corps of Engineers Section 404 Permits (expedite permit issuance)
Proposed Resolution Urging Congress to Provide Funding for Local Efforts to Address Sea Level Rise
Proposed Resolution on Compensatory Mitigation In-Lieu Fee Programs
Proposed Resolution in Opposition to Material Preference Legislation
Proposed Resolution on Supporting the Use of Woody Biomass as an Energy Source

Proposed Resolution to Allow Construction of the Keystone XL Pipeline
Proposed Resolution Supporting Counties' Ability to Join the "We Are Still In" Coalition of States and Cities Committing to the Paris Climate Accord
Proposed Resolution in Support of President Trump's Decision on the Paris Climate Accord

In most cases, final language will not be available until several days following the meeting. I will forward to you as soon as available.

Click here to complete a three question customer experience survey.

Click here to complete a three question customer experience survey.

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 8/29/2017 3:58:33 PM
To: Ben Grumbles -MDE- [ben.grumbles@maryland.gov]
CC: Kathy Bishop [kathy.bishop@maryland.gov]; Penman, Crystal [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=93662678a6fd4d4695c3df22cd95935a-Penman, Crystal]
Subject: RE: NACo Proposed Resolutions

Ben, 4:15 works for me. What do you think about 15 minutes? Do you want to call me or do you want me to call you. If you want me to call you what is the best number?

Lee

From: Ben Grumbles -MDE- [mailto:ben.grumbles@maryland.gov]
Sent: Tuesday, August 29, 2017 11:44 AM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Cc: Kathy Bishop <kathy.bishop@maryland.gov>
Subject: Re: NACo Proposed Resolutions

How about 4:15 today?

Sent from my iPhone

On Aug 29, 2017, at 7:06 AM, Forsgren, Lee <Forsgren.Lee@epa.gov> wrote:

> Ben
>
> How about sometime between 4-5:30?
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> Lee
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> Sent from my iPhone
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> On Aug 28, 2017, at 10:56 PM, Ben Grumbles -MDE- <ben.grumbles@maryland.gov> wrote:
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> > Yes. Is there a time tomorrow afternoon or early evening that might work?
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> > Ben
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> > On Aug 28, 2017, at 1:54 PM, Forsgren, Lee <Forsgren.Lee@epa.gov> wrote:
> >
> > > Ben,
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> > > We should talk then reach out to NaCo.
> > >
> > > Lee
> > >
> > > **D. Lee Forsgren**

Deputy Assistant Administrator
Office Of Water
Environmental Protection Agency
1200 Pennsylvania Avenue, VW
Room 3219 WJCE
Washington, DC 20460
Phone: 202-564-5700
Forsgren.Lee@epa.gov

From: DiPasquale, Nicholas
Sent: Monday, August 28, 2017 1:51 PM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Subject: FW: NACo Proposed Resolutions

Lee, see previous message. Scroll down to the resolution to see text highlighted in yellow that is inaccurate or incorrect. Thanks, Nick

Nicholas A. DiPasquale, Director
Chesapeake Bay Program Office
410 Severn Ave Suite 109
Annapolis, MD 21403
Tel: 410.267.5710
Cell: [redacted]
E-mail: dipasquale.nicholas@epa.gov
Web: http://www.chesapeakebay.net

From: Power, Lucinda
Sent: Wednesday, July 19, 2017 4:12 PM
To: DiPasquale, Nicholas <dipasquale.nicholas@epa.gov>; Edward, James <edward.james@epa.gov>; Batiuk, Rich <Batiuk.Richard@epa.gov>; Bisland, Carin <bisland.carin@epa.gov>; Wenz, Tom <Wenz.Tom@epa.gov>; Miller, Linda <miller.linda@epa.gov>; McNally, Dianne <mcnally.dianne@epa.gov>
Subject: RE: NACo Proposed Resolutions

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Thanks,
Lucinda

Lucinda Power
Implementation and Evaluation Team Leader
Chesapeake Bay Program Office

U.S. Environmental Protection Agency
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Sent: Wednesday, July 19, 2017 2:05 PM
To: Power, Lucinda <power.lucinda@epa.gov>; Edward, James <edward.james@epa.gov>; Batiuk, Rich <Batiuk.Richard@epa.gov>; Bisland, Carin <bisland.carin@epa.gov>; Wenz, Tom <Wenz.Tom@epa.gov>; Miller, Linda <miller.linda@epa.gov>; McNally, Dianne <mcnally.dianne@epa.gov>
Subject: RE: NACo Proposed Resolutions

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Nicholas A. DiPasquale, Director
Chesapeake Bay Program Office
410 Severn Ave Suite 109
Annapolis, MD 21403
Tel: 410.267.5710
Cell: [redacted] Ex. 6
E-mail: dipasquale.nicholas@epa.gov
Web: http://www.chesapeakebay.net

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changes that would make the standards approvable, or it may promulgate federal standards if necessary. Any federal-promulgated water quality standards are issued to a state, territory, or authorized tribe, not "localities."

Proposed Policy: NACo opposes U.S. EPA's efforts to implement localized numeric water quality-based effluent limitations or area pollution targets. NACo opposes any provisions of any watershed-wide strategy that penalizes local governments by withdrawing current forms of financial assistance or imposing monitoring, management or similar requirements on localities without providing sufficient resources to achieve water quality objectives.

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the state-major river basin. The Task Force further recognizes that due to the varied nature of local government structures (including soil & water conservation districts) across the Chesapeake Bay jurisdictions, one size will not fit all with regard to the development and implementation of local planning goals. Accordingly, the Task Force recommends that local goals be established in partnership with their local and regional partners, stakeholders and federal and state facilities, at a scale below the state-major river basin, using the options provided for "local" under Question #2. Providing such flexibility will allow the jurisdictions to design Phase III WIP planning and local engagement processes that are best suited to them and their partners."

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Sent: Wednesday, July 19, 2017 11:44 AM
To: Evalenko, Sandy <Evalenko.Sandy@epa.gov>; Rush, Alan <Rush.Alan@epa.gov>
Cc: Christensen, Damaris <Christensen.Damaris@epa.gov>; Bowles, Jack <Bowles.Jack@epa.gov>; Power, Lucinda <power.lucinda@epa.gov>; Hannon, Arnita <Hannon.Arnita@epa.gov>
Subject: NACo Proposed Resolutions

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Click here to complete a three question customer experience survey.

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 8/29/2017 11:06:47 AM
To: Ben Grumbles [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=usereb77e807]
Subject: Re: NACo Proposed Resolutions

Ben

How about sometime between 4-5:30?

Lee

Sent from my iPhone

On Aug 28, 2017, at 10:56 PM, Ben Grumbles -MDE- <ben.grumbles@maryland.gov> wrote:

> Yes. Is there a time tomorrow afternoon or early evening that might work?
>
> Thanks.
> Ben
>
> Sent from my iPhone
>
> On Aug 28, 2017, at 1:54 PM, Forsgren, Lee <Forsgren.Lee@epa.gov> wrote:
>
> > Ben,
> >
> > We should talk then reach out to NaCo.
> >
> > Lee
> >
> > **D. Lee Forsgren**
> > Deputy Assistant Administrator
> > Office Of Water
> > Environmental Protection Agency
> > 1200 Pennsylvania Avenue, VW
> > Room 3219 WJCE
> > Washington, DC 20460
> > Phone: 202-564-5700
> > Forsgren.Lee@epa.gov
> >
> > **From:** DiPasquale, Nicholas
> > **Sent:** Monday, August 28, 2017 1:51 PM
> > **To:** Forsgren, Lee <Forsgren.Lee@epa.gov>
> > **Subject:** FW: NACo Proposed Resolutions

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Subject: FW: NACo Proposed Resolutions

Ben,

We should talk then reach out to NaCo.

Lee

D. Lee Forsgren
Deputy Assistant Administrator
Office Of Water
Environmental Protection Agency
1200 Pennsylvania Avenue, VW
Room 3219 WJCE
Washington, DC 20460
Phone: 202-564-5700
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From: Power, Lucinda
Sent: Wednesday, July 19, 2017 4:12 PM
To: DiPasquale, Nicholas <dipasquale.nicholas@epa.gov>; Edward, James <edward.james@epa.gov>; Batiuk, Rich <Batiuk.Richard@epa.gov>; Bisland, Carin <bisland.carin@epa.gov>; Wenz, Tom <Wenz.Tom@epa.gov>; Miller, Linda <miller.linda@epa.gov>; McNally, Dianne <mcnally.dianne@epa.gov>
Subject: RE: NACo Proposed Resolutions

Nick,

Please see the highlighted information and responses below. Any quoted language is taken directly from the final recommendations document of the Local Planning Goals Task Force, unless otherwise noted: http://www.chesapeakebay.net/channel_files/23900/final_recommendations_of_the_local_planning_goals_task_force_wqgit_approved_12.19.16.pdf.

Thanks,
Lucinda

Lucinda Power
Implementation and Evaluation Team Leader
Chesapeake Bay Program Office
U.S. Environmental Protection Agency
(410) 267-5722

"Be the change you wish to see in the world." - Gandhi

From: DiPasquale, Nicholas
Sent: Wednesday, July 19, 2017 2:05 PM
To: Power, Lucinda <power.lucinda@epa.gov>; Edward, James <edward.james@epa.gov>; Batiuk, Rich <Batiuk.Richard@epa.gov>; Bisland, Carin <bisland.carin@epa.gov>; Wenz, Tom <Wenz.Tom@epa.gov>; Miller, Linda <miller.linda@epa.gov>; McNally, Dianne <mcnally.dianne@epa.gov>
Subject: RE: NACo Proposed Resolutions

Lucinda, could you take a stab at highlighting the factual inaccuracies and inserting the relevant expectations language on local area planning goals. It says they are taking the resolutions up this Friday. Thanks, Nick

Nicholas A. DiPasquale, Director
Chesapeake Bay Program Office
410 Severn Ave Suite 109
Annapolis, MD 21403
Tel: 410.267.5710
Cell: Ex. 6
E-mail: dipasquale.nicholas@epa.gov
Web: http://www.chesapeakebay.net

From: Power, Lucinda
Sent: Wednesday, July 19, 2017 12:10 PM
To: DiPasquale, Nicholas <dipasquale.nicholas@epa.gov>; Edward, James <edward.james@epa.gov>; Batiuk, Rich <Batiuk.Richard@epa.gov>; Bisland, Carin <bisland.carin@epa.gov>; Wenz, Tom <Wenz.Tom@epa.gov>; Miller, Linda <miller.linda@epa.gov>; McNally, Dianne <mcnally.dianne@epa.gov>
Subject: FW: NACo Proposed Resolutions

FYI. The one relating to us is below (local planning goals) and can be found on pages 26-27 of the attached. Much of it is just factually incorrect.

Proposed Resolution on EPA's Imposition of Numeric Water Quality-Based Effluent Limitations on Local Governments

Issue: The U.S. Environmental Protection Agency (EPA) is imposing watershed-wide water quality standards on all localities within the Chesapeake Bay watershed, which will have implications on other counties across the nation when such standards are imposed in other watersheds.

LP: Incorrect. It might be helpful to provide some information on the process for developing water quality standards. Like…typically, a state, territory, or authorized tribe proposes water quality standards that EPA must then review and

approve. If the proposed water quality standards do not meet the requirement of the Clean Water Act, EPA would specify changes that would make the standards approvable, or it may promulgate federal standards if necessary. Any federal-promulgated water quality standards are issued to a state, territory, or authorized tribe, not "localities."

Proposed Policy: NACo opposes U.S. EPA's efforts to implement localized numeric water quality-based effluent limitations or area pollution targets. NACo opposes any provisions of any watershed-wide strategy that penalizes local governments by withdrawing current forms of financial assistance or imposing monitoring, management or similar requirements on localities without providing sufficient resources to achieve water quality objectives.

LP: Incorrect. EPA expects the jurisdictions, working with their local partners, to develop local planning goals.

"The 2010 Bay TMDL established wasteload allocation (WLAs) and load allocations (LAs) for point sources and nonpoint sources of pollution, respectively. Point sources, in this context, include all sources subject to regulation under the National Pollutant Discharge Elimination System (NPDES) program (e.g., wastewater treatment facilities, some stormwater discharges and concentrated animal feeding operations). Local planning goals are not WLAs and therefore are not directly applicable to NPDES permitting."

"EPA expects the jurisdictions to work closely with their respective local partners in the development and implementation of these local planning goals. It is up to each jurisdiction to decide how to track and report progress towards achievement of local planning goals through their two-year milestones and/or annual progress reporting to EPA. In no way do the planning goals supersede or modify, jurisdictions' obligations under statutes, regulations, policies, or executive orders. These recommendations do not establish any new requirement or rights for the jurisdictions or its local partners."

"Task Force members have expressed their concern that establishment of local planning goals could imply the subsequent delegation of responsibility for achieving those goals to the localities. The Task Force members also expressed concern that local, state and federal statutory and regulatory requirements could influence the implementation of local planning goals. Task Force members questioned whether local planning goals could subject localities to new or more stringent WLAs, permit limits, or other related enforcement by EPA. The Task Force, therefore, recommends that EPA directly address these questions and concerns in the Phase III WIP Expectations document. The Task Force requests EPA specify in the Phase III WIP Expectations document that in no way do the targets supersede or modify locality obligations under statutes or regulations, that local planning goals do not establish any new requirement or rights for localities, and that decisions regarding how local stakeholders may be involved in achieving local planning goals will remain with the jurisdiction."

From EPA's Interim Phase III WIP Expectations Document: "As a result of the work completed by the Partnership's Task Force, EPA expects the jurisdictions to work with their local and regional partners, stakeholders, and federal and state facilities to establish measurable local planning goals at a geographic scale below the state-major river basin and implement them through their Phase III WIPs. In and of themselves, these local planning goals do not supersede or modify any statutory or regulatory obligations of the local and regional partners; nor do the goals establish any new requirements or rights for those local and regional partners. Decisions regarding how local and regional stakeholders may be involved in developing and achieving local planning goals will remain with the jurisdiction."

Background: On June 15, 2014, Delaware, Maryland, New York, Pennsylvania, Virginia and West Virginia signed the Chesapeake Bay Watershed Agreement with the U.S. Environmental Protection Agency (EPA). The plan provides for collaboration across political boundaries to work toward restoration of the Bay.

By the end of 2018, the states of Virginia, Maryland, Pennsylvania, West Virginia, Delaware, New York and the District of Columbia are required to submit to the EPA their final "Phase 3" Chesapeake Bay Watershed Implementation Plans (WIP). The chief purpose of these plans will be to promulgate strategies for all states in the

Chesapeake Bay watershed to implement all measures necessary to meet specific pollution reduction goals for the Chesapeake Bay by the year 2025.

LP: It might be helpful to clarify the actual 2025 goal under the Bay TMDL: "By 2025, have all practices and controls installed to achieve the Bay's dissolved oxygen, water clarity/submerged aquatic vegetation and chlorophyll a standards as articulated in the Chesapeake Bay TMDL document." These practices are expected to be *in place* by 2025.

As part of a watershed wide strategy for meeting Chesapeake Bay improvement goals, a Local Area Targets Task Force was convened to assess whether WIPs for the states should include local area targets (LATs). While the task force was still working to determine whether LATs should be included in state plans, EPA informed local governments that WIPs will include LATs, imposing specific numerical water pollution limits, regardless of the Task Force's recommendations. This imposition is counter to other Clean Water Act requirements which require "maximum extent practicable" measures.

LP: Incorrect. It was the Partnership's Water Quality Goal Implementation Team (WQGIT) that decided the Phase III WIPs would include local planning goals: "The Task Force recognizes the intent of the WQGIT that local planning goals should be established by each of the seven Chesapeake Bay jurisdictions at a scale below the state-major river basin. The Task Force further recognizes that due to the varied nature of local government structures (including soil & water conservation districts) across the Chesapeake Bay jurisdictions, one size will not fit all with regard to the development and implementation of local planning goals. Accordingly, the Task Force recommends that local goals be established in partnership with their local and regional partners, stakeholders and federal and state facilities, at a scale below the state-major river basin, using the options provided for "local" under Question #2. Providing such flexibility will allow the jurisdictions to design Phase III WIP planning and local engagement processes that are best suited to them and their partners."

Also, the Partnership refers to these are "local planning goals", not local area targets to avoid confusion with any regulatory mechanism. As a result, the Task Force changed its name to "Local Planning Goals Task Force".

Despite EPA's pronouncement, the LAT Task Force completed its work and recommended removal of LAT provisions from the Phase 3 Chesapeake Bay WIP. In the alternative, should LATs be imposed despite the Task Force's recommendation, the Task Force recommended that each individual state be permitted to determine how best to implement a LAT program in its jurisdiction since a one-size-fits-all approach is impractical. In accepting the LAT Task Force's recommendations, the EPA affirmed its pronouncement that LATs will be included in the WIP expectations document to be issued.

LP: Similar to my response above: "The Task Force recognizes the intent of the WQGIT that local planning goals should be established by each of the seven Chesapeake Bay jurisdictions at a scale below the state-major river basin. The Task Force further recognizes that due to the varied nature of local government structures (including soil & water conservation districts) across the Chesapeake Bay jurisdictions, one size will not fit all with regard to the development and implementation of local planning goals. Accordingly, the Task Force recommends that local goals be established in partnership with their local and regional partners, stakeholders and federal and state facilities, at a scale below the state-major river basin, using the options provided for "local" under Question #2. Providing such flexibility will allow the jurisdictions to design Phase III WIP planning and local engagement processes that are best suited to them and their partners."

The establishment of LATs will have a significant and unintended financial consequence on local governments since the majority of costs to comply with watershed-wide clean up goals will fall on local governments. Adding specific LATs to stormwater management programs and wastewater treatment plant plans will be especially burdensome for counties of all sizes, especially if the federal government does not provide funding to meet these federal goals.

President Trump's FY 2018 budget proposed to eliminate all Chesapeake Bay grant funding; this funding helps states and localities meet these federally determined goals.

The Chesapeake Bay clean-up efforts and EPA's imposition of LATs will serve as a model for other watershed-wide improvement programs across the country. Counties with watersheds feeding Long Island Sound, Albemarle Sound, Puget Sound, the Great Lakes, the Gulf of Mexico and others will be impacted when EPA's program is implemented in these areas.

LP: It was the Partnership's decision to include local planning goals as part of the Phase III WIP development and implementation processes.

Fiscal/Urban/Rural Impact: Rural, agricultural, and urban counties and cities in large watersheds and regional estuaries will be severely impacted by increased compliance costs, economic development impacts, and negative impacts on federal funding if EPA is successful in imposing watershed-wide water quality standards upon county governments and their citizens.

LP: Similar to my response above. EPA does not promulgate and "impose" water quality standards upon county governments and their citizens.

Sponsor(s): Ruby Brabo, Supervisor, King George County, Va.; Penny Gross, Supervisor, Fairfax County, Va.; Paul Trampe, Supervisor, Spotsylvania County, Va.; Claire Collins, Supervisor, Bath County, Va.; Erick Coolidge, Commissioner, Tioga County, Pa.; Todd Devlin, Commissioner, Prairie County, Mont.; and Russell Clark, Supervisor, Yuma County, Ariz.

Lucinda Power
Implementation and Evaluation Team Leader
Chesapeake Bay Program Office
U.S. Environmental Protection Agency
(410) 267-5722

"Be the change you wish to see in the world." - Gandhi

From: Hanson, Andrew
Sent: Wednesday, July 19, 2017 11:44 AM
To: Evalenko, Sandy <Evalenko.Sandy@epa.gov>; Rush, Alan <Rush.Alan@epa.gov>
Cc: Christensen, Damaris <Christensen.Damaris@epa.gov>; Bowles, Jack <Bowles.Jack@epa.gov>; Power, Lucinda <power.lucinda@epa.gov>; Hannon, Arnita <Hannon.Arnita@epa.gov>
Subject: NACo Proposed Resolutions

Hi Sandy and Alan –

Just a quick heads-up that the following proposed resolutions will be discussed at the **National Association of Counties** Annual Conference and Exposition this Friday.

Sandy, while there are several water-related resolutions here, the few directly relating to EPA would include:

Proposed Resolution on the EPA and the Corps' Waters of the U.S. Definition Rulemaking (currently in effect, renewal with new language proposed)
Proposed Resolution Supporting the Regulation of Certain Functional Wetlands within Section 404 of the Clean Water Act (new resolution)
Proposed Resolution Supporting Codification of EPA's Integrated Planning Framework and Related Demonstration Projects (currently in effect, renewal)

Proposed Resolution on EPA's Imposition of Numeric Water Quality-Based Effluent Limitations on Local Governments (currently in effect, renewal with new language proposed)

Alan, just one relating to your shop.

Proposed Resolution to Oppose EPA's Efforts to Tighten Ozone Air Quality Standards (currently in effect, renewal)

Other items of potential interest include:

Proposed Resolution on U.S. Army Corps of Engineers Section 404 Permits (expedite permit issuance)
Proposed Resolution Urging Congress to Provide Funding for Local Efforts to Address Sea Level Rise
Proposed Resolution on Compensatory Mitigation In-Lieu Fee Programs
Proposed Resolution in Opposition to Material Preference Legislation
Proposed Resolution on Supporting the Use of Woody Biomass as an Energy Source
Proposed Resolution to Allow Construction of the Keystone XL Pipeline
Proposed Resolution Supporting Counties' Ability to Join the "We Are Still In" Coalition of States and Cities Committing to the Paris Climate Accord
Proposed Resolution in Support of President Trump's Decision on the Paris Climate Accord

In most cases, final language will not be available until several days following the meeting. I will forward to you as soon as available.

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 9/5/2017 2:47:36 PM
To: Ben Grumbles [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=usereb77e807]
Subject: RE: Accepted: NACo Proposed Resolutions Conference call @ Tue Sep 5, 2017 12pm - 12:30pm (EDT) (Forsgren, Lee)

Ben,

Sorry to have to reschedule today's call with NaCo but I have pressing Hurricane Harvey meeting that I have to be at the same time. My sincerest apologies.

Lee

-----Original Appointment-----
From: Google Calendar [mailto:calendar-notification@google.com] **On Behalf Of** ben.grumbles@maryland.gov
Sent: Wednesday, August 30, 2017 11:15 AM
To: Forsgren, Lee
Subject: Accepted: NACo Proposed Resolutions Conference call @ Tue Sep 5, 2017 12pm - 12:30pm (EDT) (Forsgren, Lee)
When: Tuesday, September 5, 2017 12:00 PM-12:30 PM (UTC-05:00) Eastern Time (US & Canada).
Where: Call in Ex. 6 passcode Ex. 6

ben.grumbles@maryland.gov has accepted this invitation.

NACo Proposed Resolutions Conference call

When Tue Sep 5, 2017 12pm – 12:30pm Eastern Time

Where Call in Ex. 6 passcode Ex. 6 (map)

Calendar Forsgren, Lee

Who
- Forsgren, Lee - organizer
- ben.grumbles@maryland.gov - creator, optional
- DiPasquale, Nicholas
- kathy.bishop@maryland.gov - optional

Invitation from Google Calendar

You are receiving this courtesy email at the account forsgren.lee@epa.gov because you are an attendee of this event.

To stop receiving future updates for this event, decline this event. Alternatively you can sign up for a Google account at https://www.google.com/calendar/ and control your notification settings for your entire calendar.

Forwarding this invitation could allow any recipient to modify your RSVP response. Learn More.

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Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 8/9/2017 6:00:32 PM
To: Bode, Denise A (53804) [dabode@michaelbeststrategies.com]
Subject: Re: Thank you and follow up!

Denise,

I have already contacted Ken so why don't we both reach out to him in a week or so to follow up.

Lee

Sent from my iPhone

> On Aug 9, 2017, at 5:37 AM, Bode, Denise A (53804) <dabode@michaelbeststrategies.com> wrote:
>
> Lee, Sarah and Byron, We really appreciate the productive meeting. With Vermont as our first target, we will work to flesh out next steps with the state in preparation for further industry, state and federal discussions.
>
> Lee, you mentioned that we should reach out to Ken Wagner on this as well, and just wondered if you want to initiate those conversations, or if you want us to reach out directly?
>
> Sarah, we are sorry to miss you but hope to catch up at your convenience.
>
> We had very productive meetings on the hill with Senate EPW including Susan Bodine, House Energy and Commerce Counsel, Tom Hassenboehler, House and Senate Ag Committee staffs and members of Congress from Wisconsin and Vermont.
>
> Thanks again, for your time and looking forward to deploying more technology in dairy country to clean up the environment!
>
> D
> Denise A. Bode
> Partner
> E dabode@michaelbeststrategies.com<mailto:dabode@michaelbeststrategies.com>
> T 202.844.3804 | M Ex. 6 | F 202.347.1819
> [cid:C74ACF97-4D14-4F67-9D76-02A7E994BE81]
>
> my bio<http://www.michaelbeststrategies.com/dc/lawyer/denise-bode/> | our firm<http://www.michaelbeststrategies.com/> | vCard<http://www.michaelbest.com/People/Denise-Bode.vcf>
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>
> <64B8A5FB-1FB1-4B74-89D6-75000E3BBCD7[28].png>
> <About Newtrient -- 20896270 v1.PDF>
> <Newtrient Market Opportunity.pdf>

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 7/19/2017 2:17:11 AM
To: Ben Grumbles [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=usereb77e807]
Subject: Re: NEW DECISION - CWA 303(d) LISTING

Good point. We won't do anything public.

Sent from my iPhone

On Jul 18, 2017, at 8:53 PM, Ben Grumbles -MDE- <ben.grumbles@maryland.gov> wrote:

> My own view: As a general rule, EPA should tout any favorable decision in a lawsuit against its boss. In a sense, this is an example of the Agency defending the Bay TMDL against attacks by others who want to see the TMDL supplemented with other, local TMDLs.
>
> Ben
>
> Sent from my iPhone
>
> On Jul 18, 2017, at 8:39 PM, Ben Grumbles -MDE- <ben.grumbles@maryland.gov> wrote:
>
> > Thanks Lee and congrats again for being appointed as Deputy Assistant Administrator for Water. I don't know of us doing anything on this good news but I'm cc'ing Lee Currey, my Director of Water and Science (including TMDLs) in case he knows. Great to connect two Lees, steeped in water, wetlands, and environmental protection.
> >
> > Best.
> > Ben
> >
> > Sent from my iPhone
> >
> > On Jul 18, 2017, at 5:29 PM, Forsgren, Lee <Forsgren.Lee@epa.gov> wrote:
> >
> > > Ben,
> > >
> > > It was great to see you this morning at ECOs. As always you make very good points on how we need to improve the program.
> > >
> > > On another pressing note. Are you all going to put out a press release on this decision? We were considering doing so but don't want to do something if you all don't think it is appropriate.
> > >
> > > Let me know what you all want to do.
> > >
> > > Lee
> > >
> > > **D. Lee Forsgren**
> > > Deputy Assistant Administrator

Office Of Water
Environmental Protection Agency
1200 Pennsylvania Avenue, VW
Room 3219 WJCE
Washington, DC 20460
Phone: 202-564-5700
Forsgren.Lee@epa.gov

From: Fotouhi, David
Sent: Tuesday, July 18, 2017 11:39 AM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>; Greenwalt, Sarah <greenwalt.sarah@epa.gov>
Subject: Fwd: NEW DECISION - CWA 303(d) LISTING

FYI. Let me know if you have any questions.

Sent from my iPhone

Begin forwarded message:

> **From:** "Glazer, Thomas" <glazer.thomas@epa.gov>
> **Date:** July 18, 2017 at 11:37:15 AM EDT
> **To:** OGC Immediate Office Support <OGCFrontOfficeSupportStaff@epa.gov>, OGC Immediate Office MGMT <OGC_Immediate_Office_MGMT@epa.gov>
> **Cc:** "Schroer, Lee" <schroer.lee@epa.gov>, "Neugeboren, Steven" <Neugeboren.Steven@epa.gov>
> **Subject: NEW DECISION - CWA 303(d) LISTING**
>
> Favorable decision denying a challenge by Maryland environmental groups to EPA's approval of Maryland's 2012 303(d) list. Specifically, Plaintiffs argued that EPA improperly delisted waterbody segments that received TMDLs through the Chesapeake Bay TMDL process because they also required "local TMDLs." The Court rejected their claims as moot because EPA had subsequently reiterated its approval (with a more robust record) thirty five months later when it acted on Maryland's 2014 list.
>
> Tom Glazer
> USEPA Office of General Counsel
> Water Law Office
> 7426N WJC North
> (202) 564-0908

<2017.07.18 memorandum opinion.pdf>

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Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 7/19/2017 2:14:43 AM
To: Ben Grumbles [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=usereb77e807]
CC: Lee Currey -Mde- [lee.currey@maryland.gov]
Subject: Re: NEW DECISION - CWA 303(d) LISTING

Lee

Great to connect with you. We probably should get to know each other regardless of what we collectively decide to do in this case.

Lee

Sent from my iPhone

On Jul 18, 2017, at 8:40 PM, Ben Grumbles -MDE- <ben.grumbles@maryland.gov> wrote:

> Thanks Lee and congrats again for being appointed as Deputy Assistant Administrator for Water. I don't know of us doing anything on this good news but I'm cc'ing Lee Currey, my Director of Water and Science (including TMDLs) in case he knows. Great to connect two Lees, steeped in water, wetlands, and environmental protection.
>
> Best.
> Ben
>
> Sent from my iPhone
>
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>
> > Ben,
> >
> > It was great to see you this morning at ECOs. As always you make very good points on how we need to improve the program.
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> > On another pressing note. Are you all going to put out a press release on this decision? We were considering doing so but don't want to do something if you all don't think it is appropriate.
> >
> > Let me know what you all want to do.
> >
> > Lee
> >
> > **D. Lee Forsgren**
> > Deputy Assistant Administrator
> > Office Of Water
> > Environmental Protection Agency
> > 1200 Pennsylvania Avenue, VW
> > Room 3219 WJCE

Washington, DC 20460
Phone: 202-564-5700
Forsgren.Lee@epa.gov

From: Fotouhi, David
Sent: Tuesday, July 18, 2017 11:39 AM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>; Greenwalt, Sarah <greenwalt.sarah@epa.gov>
Subject: Fwd: NEW DECISION - CWA 303(d) LISTING

FYI. Let me know if you have any questions.

Sent from my iPhone

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> **Date:** July 18, 2017 at 11:37:15 AM EDT
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> **Cc:** "Schroer, Lee" <schroer.lee@epa.gov>, "Neugeboren, Steven" <Neugeboren.Steven@epa.gov>
> **Subject: NEW DECISION - CWA 303(d) LISTING**
>
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>
> Tom Glazer
> USEPA Office of General Counsel
> Water Law Office
> 7426N WJC North
> (202) 564-0908

<2017.07.18 memorandum opinion.pdf>

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 7/18/2017 9:29:18 PM
To: Ben Grumbles -MDE- [ben.grumbles@maryland.gov]
Subject: FW: NEW DECISION - CWA 303(d) LISTING
Attachments: 2017.07.18 memorandum opinion.pdf; ATT00001.htm

Ben,

It was great to see you this morning at ECOs. As always you make very good points on how we need to improve the program.

On another pressing note. Are you all going to put out a press release on this decision? We were considering doing so but don't want to do something if you all don't think it is appropriate.

Let me know what you all want to do.

Lee

D. Lee Forsgren
Deputy Assistant Administrator
Office Of Water
Environmental Protection Agency
1200 Pennsylvania Avenue, VW
Room 3219 WJCE
Washington, DC 20460
Phone: 202-564-5700
Forsgren.Lee@epa.gov

From: Fotouhi, David
Sent: Tuesday, July 18, 2017 11:39 AM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>; Greenwalt, Sarah <greenwalt.sarah@epa.gov>
Subject: Fwd: NEW DECISION - CWA 303(d) LISTING

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> **Cc:** "Schroer, Lee" <schroer.lee@epa.gov>, "Neugeboren, Steven" <Neugeboren.Steven@epa.gov>
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Tom Glazer
USEPA Office of General Counsel
Water Law Office
7426N WJC North
(202) 564-0908

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

BLUE WATER BALTIMORE, et al., Plaintiffs, v. SCOTT PRUITT,[1] Administrator, United States Environmental Protection Agency, Defendant.	Civil Action No. 16-452 (RBW)

MEMORANDUM OPINION

The plaintiffs, Blue Water Baltimore, Chester River Association, Gunpowder Riverkeeper, Midshore Riverkeeper Conservancy, Potomac Riverkeeper Network, and Waterkeepers Chesapeake, all non-profit environmental organizations dedicated to protecting local watersheds[2] in Maryland, bring this action against Scott Pruitt, in his official capacity as the Administrator of the United States Environmental Protection Agency (the "EPA"), challenging the EPA's approval of Maryland's 2012 Integrated Report of Surface Water Quality (the "2012 Integrated Report") under the Administrative Procedure Act (the "APA"), 5 U.S.C. §§ 701–06 (2012). See Complaint ("Compl.") ¶¶ 1, 4–11, 16. Currently before the Court is the EPA's Motion to Dismiss, which seeks dismissal of the Complaint on the grounds of mootness, lack of standing, and failure to state a claim upon which relief may be granted. See Gov't's Mot.

[1] Pursuant to Federal Rule of Civil Procedure 25(d), Scott Pruitt has been automatically substituted as the defendant in this matter.

[2] Watersheds are "region[s] or area[s] bounded peripherally by a divide and draining ultimately to a particular water course or body of water." Watershed, Merriam-Webster, https://www.merriam-webster.com/dictionary/watershed (last visited June 26, 2017).

at 1. Upon careful consideration of the parties' submissions,[3] the Court concludes that it must grant the EPA's motion and dismiss the plaintiffs' Complaint.

I. BACKGROUND

A. Statutory Background: The Clean Water Act

Congress enacted the Clean Water Act "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." 33 U.S.C. § 1251(a) (2012). One of the Act's objectives is to regulate pollutants by implementing water quality standards. See id. § 1313(d)(1). States initially establish the quality standards for the waters within their jurisdictions, which the EPA either approves or disapproves. See id. § 1313(c). States must also identify waters that cannot meet the required standards. Id. § 1313(d)(1)(A).

"Each State shall establish . . . the total maximum daily load" of pollutants for the waters not meeting the quality standards (the "impaired waters"). Id. § 1313(d)(1)(C). The total maximum daily loads establish the "level necessary to implement the applicable water quality standards with seasonal variations and a margin of safety," id. § 1313(d)(1)(C), and "take into account critical conditions for stream flow, loading, and water quality parameters," 40 C.F.R. § 130.7(c)(1). Each state identifies its impaired waters and establishes their total maximum daily loads by submitting biennially an Integrated Report to the EPA that classifies the state's waters into one of several categories. See § 1313(d)(2); 40 C.F.R. § 130.7(d)(1); see also EPA, Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act (July 29, 2005) ("2006 Guidance") at 6.

[3] In addition to the filings already identified, the Court considered the following submissions in reaching its decision: (1) the Memorandum in Support of EPA's Motion to Dismiss ("Gov't's Mem."); (2) the Plaintiffs' Response in Opposition to EPA's Motion to Dismiss ("Pls.' Opp'n"); and (3) the EPA's Reply in Support of Motion to Dismiss ("Gov't's Reply").

The state must allow for public participation in the Integrated Report drafting and submission process, which "includes providing access to the decision-making process, seeking input from and conducting dialogue with the public, assimilating public viewpoints and preferences, and demonstrating that those viewpoints and preferences have been considered by the decision-making official." 40 C.F.R. § 25.3(b). Once the state has provided "ample opportunity for interested and affected parties to communicate their views," id., it submits its Integrated Report to the EPA, which has thirty days to approve or disapprove the listings of impaired waters and their total maximum daily loads, id. § 130.7(d)(2). Approved Integrated Reports are implemented by the state, but if an Integrated Report is disapproved, the EPA has thirty days to "identify [the impaired] waters in [the s]tate and establish" their total maximum daily loads. Id.

B. The Chesapeake Bay Program

Congress amended the Clean Water Act in 1987 to improve the water quality of the Chesapeake Bay through a coordinated effort between the Bay's surrounding states and the federal government, known as the Chesapeake Bay Program (the "Bay Program"). See Water Quality Act of 1987, Pub. L. No. 100-4, § 117, 101 Stat. 7 (1987). Under the Bay Program, the EPA "had primary responsibility" and "was the final decision-maker" for the Bay Total Maximum Daily Load. Frequent Questions about the Chesapeake Bay TMDL: Developing the Bay TMDL, EPA, https://www.epa.gov/chesapeake-bay-tmdl/frequent-questions-about-chesapeake-bay-tmdl (last visited June 28, 2017).[4] The Bay Total Maximum Daily Load, which

[4] The Court will take judicial notice of the information on the EPA's website regarding the development of the Chesapeake Bay total maximum daily load, see Farah v. Esquire Magazine, 736 F.3d 528, 534 (D.C. Cir. 2013) (stating that a court may consider "matters of which it may take judicial notice" in resolving a motion to dismiss), because "[c]ourts in this jurisdiction have frequently taken judicial notice of information posted on official public websites of government agencies," Pharm. Research & Mfrs. of Am. v. U.S. Dep't of Health and Human Servs., 43 F. Supp. 3d 28, 33 (D.D.C. 2014) (taking judicial notice of a page on the FDA's website).

was finalized in 2010, covers ninety-two watershed segments, fifty-three of which are located in Maryland. See Compl., Exhibit ("Ex.") F (Chesapeake Bay Total Maximum Daily Load for Nitrogen, Phosphorus and Sediment ("Bay Total Maximum Daily Load")) at 1, 2-15. "[W]here both local [total maximum daily loads] and [ ] Bay [Total Maximum Daily Load] have already been developed or established . . . , the more stringent of the [total maximum daily loads] will apply." Id., Ex. F (Bay Total Maximum Daily Load) at 2-6.

C. Maryland's Integrated Reports

Maryland released its draft version of the 2012 Integrated Report (the "2012 Draft Report") to the public on February 13, 2012, Compl., Ex. L (2012 Draft Report) at 1, which determined that the Bay Total Maximum Daily Load covering the fifty-three Maryland watershed segments had established total maximum daily loads for 139 listings that Maryland had previously classified as impaired, see id., Ex. M (Feb. 13, 2012 MDE, Facts About: Maryland's 2012 Integrated Report ("2012 Facts")) at 2 (noting that "in December 2010, the Environmental Protection Agency (EPA), in cooperation with the Bay states, completed the Chesapeake Bay Total Maximum Daily Load, establishing a pollution diet (for nutrients and sediments) for the watershed and effectively addressing 139 of Maryland's impairment listings"). As a result of this determination, the 2012 Draft Report moved these 139 listings from Category 5, which are impaired waters requiring a total maximum daily load, to Category 4a, which are impaired waters that do not require a total maximum daily load because one has already been established, in this case by the Bay total maximum daily load. See id., Ex. L (2012 Draft Report) at 107; id., Ex. M (2012 Facts) at 2; id., Ex. O (March 23, 2012 MDE, Revised Facts About: Maryland's 2012 Integrated Report ("2012 Revised Facts")) at 2.

Maryland held a public meeting on March 12, 2012, to receive comments on the 2012 Draft Report. Id., Ex. O (2012 Revised Facts) at 2. "After several of the [p]laintiff groups objected to the lack of clear disclosure or explanation of the proposed de-listing, [Maryland] agreed to hold a second public meeting on April 19, 2012, to discuss the groups' concerns about the de-listing, and extended the public comment period to April 26, 2012." Id. ¶ 82. Maryland also posted a revised fact sheet to its website. See id., Ex. O (2012 Revised Facts) at 2 (noting that the Bay Total Maximum Daily Load "established individual [total maximum daily loads] for [fifty-three] of Maryland's tidal tributary segments and caused 139 of Maryland's tidal nutrient and sediment impairment listings to be moved from Category 5 (impaired, requires a TMDL) to Category 4a (impaired, TMDL established)[, which] represents a major step forward in bringing the Chesapeake Bay into water quality compliance"). Maryland submitted its 2012 Integrated Report to the EPA on July 23, 2012, id., Ex. R (July 23, 2012 Maryland Department of the Environment, Maryland's Final Draft 2012 Integrated Report of Surface Water Quality ("2012 Final Report")) at 1, and the EPA approved it on November 9, 2012, see id., Ex. A (November 9, 2012 Letter from Jon M. Capacasa, Director of the EPA's Water Protection Division, to Marie Halka, Acting Director of Maryland Department of the Environment ("2012 Capacasa Letter")) at 1.

Maryland submitted its 2014 Integrated Report to the EPA on April 16, 2015. Id., Ex. U (2014 Integrated Report) at 1. That report reiterates that "[w]ith the approval of the Chesapeake Bay [Total Maximum Daily Load], 139 of Maryland's water body-designated use-pollutant combinations were moved from Category 5 to Category 4a" because the Total Maximum Daily Load "will fully address any local water quality impairments." Id., Ex. U (2014 Final Report) at 113. The EPA approved Maryland's 2014 Integrated Report on October 16, 2015. See id., Ex.

V (Oct. 16, 2015 Letter from Jon M. Capacasa, the EPA's Region III Director, to D. Lee Currey, Director of Maryland Department of the Environment ("2015 Capacasa Letter")) at 1.

D. This Civil Action

The plaintiffs filed this civil action on March 8, 2016. See id. at 1. Their Complaint alleges three violations of the APA. First, the plaintiffs allege that the "EPA's approval of Maryland's removal of the [fifty-three] waters from its impaired waters list for 2012" was arbitrary and capricious because the waters were removed "without adequate public notice, opportunity for comment, or explanation." Id. ¶¶ 105–06. Second, the plaintiffs allege that the EPA's approval of the reclassification of these fifty-three water bodies in the 2012 Integrated Report contravenes the Clean Water Act's requirements regarding impaired waters. Id. ¶ 108. Third, the plaintiffs allege that the EPA's approval of the reclassification of the fifty-three water bodies in the 2012 Integrated Report "violated [the] public participation requirements under the Clean Water Act." Id. ¶¶ 110–12. As noted earlier, the EPA requests dismissal of the plaintiffs' claims on the grounds that they are moot, the plaintiffs lack standing to pursue them, and "the Complaint fails to state a claim that [the] EPA's approval was arbitrary and capricious." Gov't's Mem. at 1.

II. STANDARD OF REVIEW

Federal district courts are courts of limited jurisdiction, Kokkonen v. Guardian Life Ins. Co., 511 U.S. 375, 377 (1994), and "[a] motion for dismissal under [Federal Rule of Civil Procedure] 12(b)(1) 'presents a threshold challenge to the court's jurisdiction.'" Morrow v. United States, 723 F. Supp. 2d 71, 75 (D.D.C. 2010) (Walton, J.) (quoting Haase v. Sessions, 835 F.2d 902, 906 (D.C. Cir. 1987)). Thus, a district court is obligated to dismiss a claim if it "lack[s] . . . subject matter jurisdiction." Fed. R. Civ. P. 12(b)(1). Because "it is presumed that a

cause lies outside [a federal court's] limited jurisdiction," Kokkonen, 511 U.S. at 377, the plaintiff bears the burden of establishing by a preponderance of the evidence that a district court has subject matter jurisdiction, see Lujan v. Defs. of Wildlife, 504 U.S. 555, 561 (1992).

In deciding a motion to dismiss based upon lack of subject matter jurisdiction, the district court "need not limit itself to the allegations of the complaint." Grand Lodge of the Fraternal Order of Police v. Ashcroft, 185 F. Supp. 2d 9, 14 (D.D.C. 2001). Rather, "a court may consider such materials outside the pleadings as it deems appropriate to resolve the question [of] whether it has jurisdiction to hear the case." Scolaro v. D.C. Bd. of Elections & Ethics, 104 F. Supp. 2d 18, 22 (D.D.C. 2000); see also Jerome Stevens Pharms., Inc. v. FDA, 402 F.3d 1249, 1253 (D.C. Cir. 2005). Additionally, a district court must "assume the truth of all material factual allegations in the complaint and 'construe the complaint liberally, granting [the] plaintiff the benefit of all inferences that can be derived from the facts alleged.'" Am. Nat'l Ins. Co. v. FDIC, 642 F.3d 1137, 1139 (D.C. Cir. 2011) (quoting Thomas v. Principi, 394 F.3d 970, 972 (D.C. Cir. 2005)). However, "the [p]laintiff's factual allegations in the complaint . . . will bear closer scrutiny in resolving a 12(b)(1) motion than resolving a 12(b)(6) motion for failure to state a claim." Grand Lodge, 185 F. Supp. 2d at 13–14 (citation and internal quotation marks omitted).

III. ANALYSIS

A. Whether the Plaintiffs' Claims are Moot

As a threshold matter, the Court must determine whether the plaintiffs' claims are moot. "[A] case becomes moot 'when the issues presented are no longer live or the parties lack a legally cognizable interest in the outcome,'" Conservation Force, Inc. v. Jewell, 733 F.3d 1200, 1204 (D.C. Cir. 2013) (quoting Larsen v. U.S. Navy, 525 F.3d 1, 3 (D.C. Cir. 2008)), or if "intervening events make it impossible to grant the prevailing party effective relief," Burlington

N. R.R. Co. v. Surface Transp. Bd., 75 F.3d 685, 688 (D.C. Cir. 1996). "Corrective action by an agency is one type of subsequent development that can moot a previously justiciable issue." Nat. Res. Def. Council v. U.S. Nuclear Regulatory Comm'n, 680 F.2d 810, 814 (D.C. Cir. 1982). Because the Court may only decide "actual cases or controversies" under Article III of the Constitution, Iron Arrow Honor Soc'y v. Heckler, 464 U.S. 67, 70 (1983); La. Envtl. Action Network v. Browner, 87 F.3d 1379, 1382 (D.C. Cir. 1996), entertaining a moot case would amount to the Court "ignor[ing] this basic limitation upon the duty and function of the Court, and . . . disregard[ing] principles of judicial administration long established and repeatedly followed," Local No. 8-6, Oil, Chem. & Atomic Workers Int'l Union, AFL-CIO v. Missouri, 361 U.S. 363, 367–68 (1960) (footnote omitted).

In Theodore Roosevelt Conservation Partnership v. Salazar, the District of Columbia Circuit held that a challenge regarding a Bureau of Land Management ("Bureau") Record of Decision that was superseded by a subsequent Bureau Record of Decision was moot. See 661 F.3d 66, 79 (D.C. Cir. 2011). In that case, the Bureau released a Record of Decision in 2000 "authorizing significant expansion of natural gas development in [Western Wyoming]." Id. at 70. Thereafter, natural gas development increased faster than predicted, and wildlife populations declined. Id. After oil and gas companies proposed a new development plan, the Bureau released a new Record of Decision in September 2008. Id. at 70–71. An environmental organization brought suit challenging several Bureau actions, including its alleged "fail[ure] to enforce the 2000 Record of Decision." Id. at 72. The district court entered summary judgment in favor of the Bureau on all counts after concluding, among other things, that the challenge regarding the 2000 Record of Decision was moot. Id. at 71–72, 78. The District of Columbia Circuit affirmed, holding, in relevant part, that the plaintiff's allegation that the Bureau "fail[ed]

to enforce the 2000 Record of Decision" was moot because "that Record of Decision no longer exists; the Bureau's 2008 Record of Decision superseded the 2000 Record of Decision 'in its entirety.'" Id. at 79 (quoting the 2008 Record of Decision). Further, the Circuit determined that no relief could be granted to the plaintiff because it could "neither invalidate, nor require the Bureau to adhere to, a Record of Decision that has 'disappeared into the regulatory netherworld.'" Id. (quoting Nw. Pipeline Corp. v. FERC, 863 F.2d 73, 77 (D.C. Cir. 1988)); see also id. ("We are not going to invalidate a valid Record of Decision to remedy the alleged non-enforcement of an earlier Record of Decision which has no current force or effect.").

The EPA argues that this case is also moot because the plaintiffs only challenge the 2012 Integrated Report, see Compl. ¶ 1, which "was superseded by [the] EPA's approval of Maryland's 2014 [Integrated Report] in October 2015," Gov't's Mem. at 16. According to the EPA, because the plaintiffs did not file their Complaint until five months after the EPA approved Maryland's 2014 Integrated Report, the 2012 Report was no longer in effect. Id. The plaintiffs reject the proposition that the 2014 Integrated Report superseded the 2012 Integrated Report because the EPA would have to "'annul, make void, or repeal by taking the place of' the improper impairment identifications" to actually supersede water body reclassifications in the 2012 Integrated Report, and according to plaintiffs, no such action occurred because the EPA "approved the very same arbitrary identifications in 2014, based on the very same rationale." Pls.' Opp'n at 10 (quoting supersede, Black's Law Dictionary (10th ed. 2014)).

The Court rejects the plaintiffs' position and agrees with the EPA that the 2014 Integrated Report superseded the 2012 Integrated Report, thus mooting the plaintiffs' challenge to the reclassifications in the 2012 Integrated Report. In the EPA's own guidance regarding the submission of Integrated Reports, it makes clear that an Integrated Report's list of impaired

waters, "once approved[,] . . . is a new list that replaces the previous list." 2006 Guidance at 57 (emphasis added).[5] The EPA also states that water segments previously classified as impaired "should be accounted for in subsequent submissions." Id. Because a subsequent Integrated Report "replaces the previous" Integrated Report, that subsequent Integrated Report clearly "supersede[s]" the previous one because it "repeal[s] by taking the place of" it. See supersede, Black's Law Dictionary.

Moreover, the EPA's decision to address the reclassification of the fifty-three water bodies and the movement of the 139 listings from Category 5 to Category 4a in both the 2012 and 2014 Integrated Reports makes clear that the current 2014 Integrated Report replaced the previous 2012 Integrated Report as to these listings. The EPA stated in its approval of the 2014 Report that "[t]o the extent that [the 2012 and other] prior lists have been incorporated into the 2014 [Integrated Report], [the] EPA's rationale for approving those lists remains operative." Compl., Ex. V (Capacasa 2015 Letter) at 2. Upon its review of both the 2012 and 2014 Integrated Reports, the Court finds that the 2014 Integrated Report clearly incorporated the 2012 reclassification and de-listing decisions at issue. Compare id., Ex. R (2012 Final Report) at 50 (stating that the Bay Total Maximum Daily Load "addressed [fifty-three] distinct water body segments (in Maryland) with nutrient and/or sediment impairments . . . [and] 139 of Maryland's water body-designated use-pollutant combinations were moved from Category 5 to Category 4a") with id., Ex. U (2014 Final Report) at 113 (stating that the Bay Total Maximum Daily Load "addressed nutrient and sediment impairments in [fifty-three] distinct water body segments in

[5] The EPA has supplemented its 2006 Integrated Report Guidance with subsequent memoranda. See Memorandum from EPA on Information Concerning 2016 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions at 1 (Aug. 13, 2015) ("[The] EPA recommends that the States prepare their 2016 [Integrated Reports] consistent with previous [Integrated Report] guidance including [the] EPA's 2006 [Integrated Report] Guidance, which is supplemented by [the] EPA's 2008, 2010, 2012, and 2014 [Integrated Report] memos.").

Maryland . . . [and] 139 of Maryland's water body-designated use-pollutant combinations were moved from Category 5 to Category 4a"). Therefore, the 2014 Integrated Report replaced, and thus superseded the 2012 Integrated Report with regard to these decisions. See Theodore Roosevelt, 661 F.3d at 79 (holding that the plaintiff's challenge to the Bureau's alleged failure to enforce the 2000 Record of Decision was moot because "the Bureau's 2008 Record of Decision superseded the 2000 Record of Decision in its entirety" (citations and internal quotation marks omitted)).

The Court is not persuaded by the plaintiffs' argument that because the 2014 Integrated Report did not "ma[k]e any change to the 139 identifications," it did not supersede the 2014 Integrated Report. Pls.' Opp'n at 10. The plaintiffs are correct that the 2014 Integrated Report need only "annul, make void, or repeal by taking the place of" the 2012 Integrated Report in order to supersede it. See supersede, Black's Law Dictionary. But, a decision may be superseded by a subsequent decision based on the same rationale because the subsequent decision replaces the prior decision, rendering it void. See void, Black's Law Dictionary (defined as "[o]f no legal effect; to null"). By approving the 2014 Integrated Report, which reiterated the rationale stated in the 2012 Integrated Report regarding the reclassification and de-listings at issue, the EPA "replace[d] the previous list," see 2006 Guidance at 57, which rendered the 2012 Integrated Report as having no further legal effect.

As noted earlier, the plaintiffs filed their Complaint challenging the 2012 Integrated Report in March 2016, see Compl. at 1, five months after the EPA approved the 2014 Integrated Report on October 16, 2015, see id., Ex. V (Capacasa 2015 Letter) at 1. Thus, like the 2008 Record of Decision in Theodore Roosevelt, the 2014 Integrated Report replaced, and therefore superseded, the 2012 Integrated Report. See 661 F.3d at 79; see also Am. Canoe Ass'n v. EPA,

30 F. Supp. 2d 908, 917 (E.D. Va. 1998) (stating that an Integrated Report is "superse[ded] by the next [Integrated Report]"). Accordingly, the Court finds that the plaintiffs' challenges to the 2012 Integrated Report are moot.[6]

B. Whether the Plaintiffs' Claims Are Capable of Repetition Yet Evading Review

The plaintiffs contend that even if their claims are technically moot, they satisfy the "capable of repetition[,] yet evading review" exception to mootness. Pls.' Opp'n at 11. To satisfy this exception, a party must demonstrate two things: "(1) the challenged action is in its duration too short to be fully litigated prior to its cessation or expiration, and (2) there [is] a reasonable expectation that the same complaining party would be subjected to the same action again." Clarke v. United States, 915 F.2d 699, 704 (D.C. Cir. 1990) (alteration in original) (quoting Murphy v. Hunt, 455 U.S. 478, 482 (1982)). "[The Circuit] has held that agency actions of less than two years' duration cannot be 'fully litigated' prior to cessation or expiration, so long as the short duration is typical of the challenged action." Del Monte Fesh Produce Co. v. United States, 570 F.3d 316, 322 (D.C. Cir. 2009); see also Burlington, 75 F.3d at 690 ("[B]oth Supreme Court and circuit precedent hold that orders of less than two years' duration ordinarily evade review."). However, this mootness exception "will not revive a dispute which became moot before the action commenced," Renne v. Geary, 501 U.S. 312, 320 (1991), and "[a] litigant cannot credibly claim his case 'evades review' when he himself has delayed its disposition," Armstrong v. FAA, 515 F.3d 1294, 1296 (D.C. Cir. 2008).

[6] Alternatively, the EPA argues that the plaintiffs' claims are moot because the public-participation process for the 2014 Integrated Report cured the procedural defects of the 2012 Integrated Report. See Gov't's Mem. at 17. The Court need not address this argument, having already concluded that the plaintiffs' challenge to the 2012 Integrated Report is moot.

In American Canoe Ass'n, the United States District Court for the Eastern District of Virginia addressed whether the American Canoe Association's challenge of the EPA's 1996 Integrated Report for Virginia evaded review when that report was subsequently replaced by the partially approved and partially disapproved 1998 Integrated Report. See 30 F. Supp. 2d at 915–16. That court noted that "the time available for review of the new 1998 list appears to be less than two years" because there were only fourteen and a half months for judicial review between the EPA's approval of Virginia's two Integrated Reports. Id. at 916. Therefore, the court determined that "the challenged action [t]here—the submission of the [1996 Integrated Report]—ha[d] too short a life to be fully litigated prior to its supersession by the next [Integrated Report]." Id. at 917.

The United States District Court for the District of Maryland also addressed the issue of mootness regarding Maryland's 1996 Integrated Report. See Sierra Club v. EPA, 162 F. Supp. 2d 406, 412 n.4 (D. Md. 2001). The Sierra Club filed suit in 1997, id. at 409 n.2, challenging the 1996 Integrated Report, which Maryland submitted on November 13, 1996, id. at 412 n.4. Maryland then submitted the 1998 Integrated Report on August 7, 1998. Id. Accounting for the thirty days the EPA has to approve or disapprove the report, and then another sixty days of notice to the EPA before a citizen group can instigate a suit, the District of Maryland held that "the time available for judicial review of any given list [wa]s far less than two years," which was not long enough to fully litigate the matter. Id. (citing Am. Canoe Ass'n, 30 F. Supp. 2d at 916). Further, the District of Maryland also found that the action was capable of repetition because the alleged inadequacies from the 1996 Integrated Report were encompassed "in toto" in the 1998 Integrated Report, exposing the plaintiffs to the same alleged harm. Id.

Here, the Court concludes that the plaintiffs' challenge to the 2012 Integrated Report did not evade review because more than two years elapsed between the EPA's approval of the 2012 and 2014 Integrated Reports. The EPA approved Maryland's 2012 Integrated Report on November 9, 2012, see Compl., Ex. A (2012 Capacasa Letter) at 1, and it did not approve the 2014 Integrated Report until October 16, 2015, see id., Ex. V (2015 Capacasa Letter) at 1. Thus, because approximately thirty-five months elapsed between the approval of the 2012 and 2014 Integrated Reports, the 2012 Integrated Report did not evade review. See Burlington, 75 F.3d at 690 ("[O]rders of less than two years' duration ordinarily evade review.").

This case is therefore distinguishable from Sierra Club and American Canoe Ass'n, where in both cases less than two years elapsed before the challenged Integrated Reports were replaced by subsequent Integrated Reports. See 162 F. Supp. 2d at 412 n.4; 30 F. Supp. 2d at 916. Further, the plaintiffs have offered no explanation for failing to bring suit during the thirty-five months between the EPA's approval of Maryland's 2012 and 2014 Integrated Reports. "Having pursued [their challenge] in so leisurely a fashion, [the plaintiffs] made it impossible for [the Court] to say the [2012 Integrated Report] was too short-lived to be reviewed by this [C]ourt." Armstrong, 515 F.3d at 1296. Thus, because the plaintiffs failed to initiate this case during the thirty-five-month period between the EPA's approval of the 2012 and 2014 Integrated Reports, their claims did not evade judicial review.[7]

IV. CONCLUSION

For the foregoing reasons, the Court concludes that the plaintiffs' challenges to the EPA's approval of Maryland's 2012 Integrated Report are moot because the 2014 Integrated Report

[7] Because challenges must both evade review and be capable of repetition to be exempt from the mootness doctrine, see Del Monte, 570 F.3d at 322, and because the Court has determined that the plaintiffs' claims did not evade review, the Court need not determine whether their claims are also capable of repetition.

superseded the 2012 Integrated Report. Furthermore, the plaintiffs have failed to show that their challenges are both "capable of repetition, yet evading review" because more than two years elapsed between the EPA's approvals of Maryland's 2012 and 2014 Integrated Reports. Accordingly, the Court must grant the EPA's motion to dismiss.[8]

SO ORDERED this 18th day of July, 2017.[9]

REGGIE WALTON
United States District Judge

[8] In their opposition, the plaintiffs request "an opportunity to amend their Complaint" if the Court finds that their claims are moot. Pls.' Opp'n at 21. However, the District of Columbia Circuit has made clear that parties seeking to amend a complaint must "fil[e] a motion for leave to amend [their] complaint and attach[] a proposed amended complaint" to that filing, and that a "bare request in an opposition to a motion to dismiss—without any indication of the particular grounds on which amendment is sought—does not constitute a motion within the contemplation of Rule 15(a)." Rollins v. Wackenhut Servs., Inc., 703 F.3d 122, 131 (D.C. Cir. 2012) (quoting Belizan v. Hershon, 434 F.3d 579, 582 (D.C. Cir. 2006)). Accordingly, the plaintiffs' request in their opposition "is an improper vehicle for bringing . . . [their] request for leave to amend before the Court, and therefore, the Court need not address it further at this time." Massaquoi v. District of Columbia, 81 F. Supp. 3d 44, 55 (D.D.C. 2015) (Walton, J.) (citing Belizan, 434 F.3d at 582).

[9] The Court will contemporaneously issue an Order consistent with this Memorandum Opinion.

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 7/27/2017 8:59:21 PM
To: Don Parrish [donp@fb.org]
Subject: RE: Senate Report

Sure! Call me at Ex. 6

From: Don Parrish [mailto:donp@fb.org]
Sent: Thursday, July 27, 2017 4:57 PM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Subject: RE: Senate Report

Can you visit now?

Don R Parrish
American Farm Bureau Federation®
Ex. 6
donp@fb.org

From: Forsgren, Lee [mailto:Forsgren.Lee@epa.gov]
Sent: Thursday, July 27, 2017 4:57 PM
To: Don Parrish
Subject: RE: Senate Report

Thanks Don. Just got back to the office, got your voicemail. Will try to give you a call tomorrow.

Lee

D. Lee Forsgren
Deputy Assistant Administrator
Office Of Water
Environmental Protection Agency
1200 Pennsylvania Avenue, VW
Room 3219 WJCE
Washington, DC 20460
Phone: 202-564-5700
Forsgren.Lee@epa.gov

From: Don Parrish [mailto:donp@fb.org]
Sent: Thursday, July 27, 2017 4:51 PM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Subject: Senate Report

https://www.epw.senate.gov/public/_cache/files/9/9/99dc0f4b-50a8-4b9e-a604-cb720e7f19bc/1C09C14A8FD18AB786684EB1E6538262.wotus-committee-report-final1.pdf

Don R Parrish
American Farm Bureau Federation®
Ex. 6
donp@fb.org

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 7/27/2017 8:56:54 PM
To: Don Parrish [donp@fb.org]
Subject: RE: Jody Gallaway Testimony before EPW Committee

Thanks.

From: Don Parrish [mailto:donp@fb.org]
Sent: Thursday, July 27, 2017 4:55 PM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Subject: Jody Gallaway Testimony before EPW Committee

Mr. Forsgren

Ms. Gallaway's Testimony is attached to my statement and starts on about page 7.

https://www.epw.senate.gov/public/_cache/files/1/1/11b774d9-bfd8-4774-bd4a-75ae802ba6bb/E9EB4052EDA31E1F0C722EC9D55F2605.parrish-testimony.pdf

Don R Parrish
American Farm Bureau Federation®
Ex. 6
donp@fb.org

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 8/14/2017 8:34:44 PM
To: Don Parrish [donp@fb.org]
CC: Penman, Crystal [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=93662678a6fd4d4695c3df22cd95935a-Penman, Crystal]
Subject: RE: Are you back in the Office

Let me see what Crystal can work out.

From: Don Parrish [mailto:donp@fb.org]
Sent: Monday, August 14, 2017 3:37 PM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Subject: RE: Are you back in the Office

We need to meet about the Missouri NNC as soon as you are available.

Don R Parrish
American Farm Bureau Federation®
Ex. 6
donp@fb.org

From: Forsgren, Lee [mailto:Forsgren.Lee@epa.gov]
Sent: Monday, August 14, 2017 3:35 PM
To: Don Parrish
Subject: Re: Are you back in the Office

I am back am slammed until next week. Pretty flexible then.

Sent from my iPhone

On Aug 14, 2017, at 3:07 PM, Don Parrish <donp@fb.org> wrote:

> I would like to set up a meeting when you have a minute. Thanks
>
> *Don R Parrish*
> *American Farm Bureau Federation®*
> Ex. 6
> *donp@fb.org*

Message

From: Forsgren, Lee [Forsgren.Lee@epa.gov]
Sent: 8/1/2017 8:38:44 PM
To: Ben Grumbles [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=usereb77e807]
Subject: Information

Ben

Can you call me regarding the State of MD suing EPA? Best number Ex. 6

Lee

Sent from my iPhone

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 6/20/2017 5:04:12 PM
To: Ben Grumbles -MDE- [ben.grumbles@maryland.gov]
Subject: Contact information

Ben,

I am now a seasoned EPA veteran of two days (well more like 1.5).

My new contact information is as follows:

Phone direct: 202-564-0311
EPA Cell phone number: **Ex. 6**
Main Office of Water Number: 202-564-5700

Email: Forsgren.lee@epa.gov

Look forward to continuing to work with you.

Regards,
Lee

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 6/20/2017 1:46:32 PM
To: Ben Grumbles -MDE- [ben.grumbles@maryland.gov]
CC: Shapiro, Mike [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=2c70af880ba747b5a8b6baa45a040125-MShapiro]
Subject: RE: Welcome Aboard and WOTUS too

Ben,

This did find me at EPA and I am also looking forward to working with you as well.

Will make certain that the message you sent on behalf of the State of Maryland are considered.

Regards,
Lee

-----Original Message-----
From: Ben Grumbles -MDE- [mailto:ben.grumbles@maryland.gov]
Sent: Monday, June 19, 2017 9:45 PM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Subject: Welcome Aboard and WOTUS too

Lee:

I hope this email finds you and your new email address at EPA. Looking forward to working with you!

FYI. While the state of Maryland did not submit state-specific comments on the WOTUS rule by midnight tonight, we have worked closely with the Environmental Council of the States and the Association of Clean Water Administrators to shape their comments on behalf of all states. Those national comments were submitted today.

Regarding Maryland specific comments, I do hope to send a letter soon which shares some thoughts for EPA and the Army Corps

Basic message: We support proposed Trump Administration regulatory reforms at the federal level to increase clarity, consistency, and predictability. We welcome the removal of duplicative permitting requirements for wetlands within state boundaries caused by confusing or overlapping federal requirements. While our comprehensive state protections for wetlands and waterways in Maryland should not be adversely affected, we do have some concerns as a "downstream state"
that federal reforms not reduce upstream protections for interstate waters and wetlands. For example, there are 83 streams in the Susquehanna River Basin that cross state lines, with 15 streams that flow from Pennsylvania into Maryland. Small waters and wetlands and groundwater originating upstream may affect our ability to protect and restore the Chesapeake Bay, including water quality standards and total maximum daily load safeguards. We also support greater authorization and empowerment of states to assume from the Army Corps of Engineers regulatory permitting authority and to receive training and implementation guidance.

Best.
Ben
Maryland Department of the Environment
410-537-4187

--
Click here
<http://www.doit.state.md.us/selectsurvey/TakeSurvey.aspx?agencycode=MDE&SurveyID=86M2956> to complete a three question customer experience survey.

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 6/6/2018 9:00:31 PM
To: Kyle W. Parker [KWParker@hollandhart.com]
CC: Goodin, John [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=3eac342f280a4b9db4079c81f66d1913-JGoodin]; Hough, Palmer [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=51cd0b0d81ac416fa265944d6e6575ce-PHough]; Penman, Crystal [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=93662678a6fd4d4695c3df22cd95935a-Penman, Crystal]
Subject: RE: Alaska Trip / Available to Visit

Kyle,

Would love to try to meet with you if possible while we are in Alaska. However I will warn you that our schedule is already quite full. Perhaps we can carve out some time one evening for a chat but you might want to reach out to Palmer Hough who is handling logistics for the trip to see what might be possible.

Regards,
Lee

D. Lee Forsgren

Deputy Assistant Administrator
Office Of Water
Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Room 3219 WJCE
Washington, DC 20460
Phone: 202-564-5700
Forsgren.Lee@epa.gov

From: Kyle W. Parker [mailto:KWParker@hollandhart.com]
Sent: Wednesday, June 6, 2018 4:57 PM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Subject: Alaska Trip / Available to Visit

Good afternoon, Lee. When we visited in your office back in April, you mentioned that you would be making a trip to Alaska this summer. I understand that your trip is now set for later this month. If you have time, Keiran Wulff and I would welcome the opportunity to visit with you again regarding the Nanushuk development project. Since we were with you in DC, we've made significant progress in our engagements with the local community and state and federal regulatory agencies, and we would welcome the opportunity to update you on our plans. Please let me know if something might work for you to get-together while you are in the state. Thank you. I hope to see you soon. All the best. – Kyle.

Kyle W. Parker

Partner, Holland & Hart LLP
1029 W. 3rd Avenue, Suite 550, Anchorage, AK 99501
T Ex. 6

HOLLAND&HART

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 5/9/2018 3:56:41 PM
To: Bode, Denise A (53804) [dabode@michaelbeststrategies.com]
Subject: RE: PFAS National Leadership Summit

Denise,

That is correct.

Lee
D. Lee Forsgren
Deputy Assistant Administrator
Office Of Water
Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Room 3219 WJCE
Washington, DC 20460
Phone: 202-564-5700
Forsgren.Lee@epa.gov

-----Original Message-----
From: Bode, Denise A (53804) [mailto:dabode@michaelbeststrategies.com]
Sent: Wednesday, May 9, 2018 11:06 AM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Subject: FW: PFAS National Leadership Summit

Lee, I guess this is the response to our request. No one but associations and public officials will be included? Thanks, just need to report back. Best, D

Denise A. Bode
Partner
E dabode@michaelbeststrategies.com
T 202.844.3804 | M [Ex. 6] | F 202.347.1819

my bio <http://www.michaelbeststrategies.com/dc/lawyer/denise-bode/> | our firm <http://www.michaelbeststrategies.com/> | vCard <http://www.michaelbest.com/People/Denise-Bode.vcf>
On 5/8/18, 7:40 AM, "safewater" <safewater@epa.gov> wrote:

Good Morning,

Thank you for your interest in this important issue.

As you are aware, EPA is convening this leadership summit to coordinate with our state and federal partners and national organizations to identify the most critical needs they have in addressing PFAS contamination and to identify the tools we can provide them to better protect public health. Because space will be limited at the summit, EPA has limited the invitation to federal partners, states, territories, tribes and representatives from national organizations.

EPA, however, will provide the opportunity for the public to join in a portion of the meeting via streaming online. Details on how to access the event will be posted on www.epa.gov/pfas. We will also be providing the public with the opportunity to send written input to EPA. Details on how to submit your input will be posted on www.epa.gov/pfas.

We appreciate your thoughts and suggestions on how EPA can best help states and communities facing this issue. We will consider you and/or your organization's interest as we plan our next steps.

Thank you.

Sincerely,
EPA's Office of Ground Water and Drinking Water

Email Disclaimer

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Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 6/7/2018 9:11:46 PM
To: Chung, David [DChung@crowell.com]
Subject: RE: Follow-up from Freeport meeting

David,

I am back. Call me on my direct line anytime.

Lee

From: Chung, David [mailto:DChung@crowell.com]
Sent: Thursday, June 7, 2018 4:35 PM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Subject: RE: Follow-up from Freeport meeting

Lee – thanks for your response. I just tried calling your direct line but couldn't get through. Please let me know if you have time to chat today or tomorrow about this.

David Y. Chung
dchung@crowell.com
Direct: Ex. 6 Fax: 1.202.628.5116

crowell moring
www.crowell.com
1001 Pennsylvania Avenue NW
Washington, DC 20004

From: Forsgren, Lee [mailto:Forsgren.Lee@epa.gov]
Sent: Thursday, June 7, 2018 11:03 AM
To: Chung, David
Subject: Re: Follow-up from Freeport meeting

Dave,

Perhaps we can talk later today.

Lee

Sent from my iPhone

On Jun 7, 2018, at 10:36 AM, Chung, David <DChung@crowell.com> wrote:

Lee –

I hope all is well on your end. I wanted to follow up with you regarding the April 27 meeting with Freeport McMoran during which we discussed WOTUS issues they are dealing with in AZ. We recall that you encouraged us to meet with the Corps to discuss Freeport's concerns. Unfortunately, Freeport is not succeeding in getting the Corps to respond to meeting requests. Is there any way you might be able to help us set up a meeting with Lt. Gen. Semonite and Ryan Fisher? The Freeport folks will be back in DC on June 26 and are hoping to meet with the Corps that afternoon.

Thank you for your time,

David Y. Chung
dchung@crowell.com
Direct: Ex. 6 Fax: 1.202.628.5116

<image001.png>
www.crowell.com
1001 Pennsylvania Avenue NW
Washington, DC 20004

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Attorney Work Product

==========

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 6/7/2018 3:03:05 PM
To: Chung, David [DChung@crowell.com]
Subject: Re: Follow-up from Freeport meeting

Dave,

Perhaps we can talk later today.

Lee

Sent from my iPhone

On Jun 7, 2018, at 10:36 AM, Chung, David <DChung@crowell.com> wrote:

> Lee –
>
> I hope all is well on your end. I wanted to follow up with you regarding the April 27 meeting with Freeport McMoran during which we discussed WOTUS issues they are dealing with in AZ. We recall that you encouraged us to meet with the Corps to discuss Freeport's concerns. Unfortunately, Freeport is not succeeding in getting the Corps to respond to meeting requests. Is there any way you might be able to help us set up a meeting with Lt. Gen. Semonite and Ryan Fisher? The Freeport folks will be back in DC on June 26 and are hoping to meet with the Corps that afternoon.
>
> Thank you for your time,
>
> David Y. Chung
> dchung@crowell.com
> Direct Ex. 6 | Fax: 1.202.628.5116
>
> <image001.png>
> www.crowell.com
> 1001 Pennsylvania Avenue NW
> Washington, DC 20004
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> ==========

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 5/14/2018 5:40:04 PM
To: Smith, Brooks M. [Brooks.Smith@troutmansanders.com]
CC: Wood, Robert [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=b2676c137cf54db0a5d98df232901821-Wood, Robert]
Subject: RE: CVS Pharma ELG Question

Brooks,

We have had a couple of conversations internally and things are more complicated than I thought. Would suggest that you reach out to Rob Wood from my office and we can work through some of the complexities.

Regards,
Lee

D. Lee Forsgren
Deputy Assistant Administrator
Office Of Water
Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Room 3219 WJCE
Washington, DC 20460
Phone: 202-564-5700
Forsgren.Lee@epa.gov

From: Smith, Brooks M. [mailto:Brooks.Smith@troutmansanders.com]
Sent: Monday, May 14, 2018 1:15 PM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Subject: CVS Pharma ELG Question

Hi Lee, I'm just circling back from our very productive meeting in late March to see if there is any news on your end. Thanks so much for looking into this. Best, Brooks

Brooks M. Smith
troutman **sanders**
Direct: Ex. 6
brooks.smith@troutman.com

From: Smith, Brooks M.
Sent: Tuesday, March 27, 2018 10:08 AM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Cc: Penman, Crystal <Penman.Crystal@epa.gov>; Campbell, Ann <Campbell.Ann@epa.gov>
Subject: RE: Pharma ELG Question

Hello Lee, I look forward to seeing you on Friday. I'll be joined by an in-house environmental lawyer from CVS, Liz Ash.

We'd like to discuss the effluent guidelines for the Pharmaceutical Manufacturing Category in 40 CFR Part 439 and their applicability (or non-applicability) to certain small-scale, patient-specific preparations of a drug that are compounded by a compounding pharmacist. These activities occur at CVS's Coram and Omnicare operations (both of which are pharmacies). Generally, instruments and equipment used in this kind of compounding process are cleaned, after which any de minimis amount of residual drugs left on the instruments may be washed down the sink. EPA has identified equipment and instrument wash water as a potential source of wastewater for purposes of Subpart D (mixing, compounding, or formulating), which might be read to apply to CVS's activities. However, EPA's regulations and guidance are less clear regarding whether such equipment and instrument wash water is a process water subject to the regulations under Part 439, particularly in de minimis amounts. We believe that in our particular scenario, EPA did not intend for Part 439 to apply. We'd be most grateful for any guidance, direction or clarification that EPA can provide on this issue.

We'll be prepared to explain all of this in more detail when we meet.

Best, Brooks

Brooks M. Smith
troutman **sanders**
Direct Ex. 6
brooks.smith@troutman.com

From: Forsgren, Lee [mailto:Forsgren.Lee@epa.gov]
Sent: Tuesday, March 13, 2018 1:34 PM
To: Smith, Brooks M. <Brooks.Smith@troutmansanders.com>
Cc: Penman, Crystal <Penman.Crystal@epa.gov>; Campbell, Ann <Campbell.Ann@epa.gov>
Subject: RE: Pharma ELG Question

Brooks,

I would be happy to try to find a time to speak with you. Crystal Penman will do her best to find a time that works for all concerned.
Regards,
Lee

D. Lee Forsgren
Deputy Assistant Administrator
Office Of Water
Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Room 3219 WJCE
Washington, DC 20460
Phone: 202-564-5700
Forsgren.Lee@epa.gov

From: Smith, Brooks M. [mailto:Brooks.Smith@troutmansanders.com]
Sent: Tuesday, March 13, 2018 12:48 PM

To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Subject: Pharma ELG Question

Greetings Lee, I had the pleasure of seeing you a few times late last year, first at the annual VMA industry environmental conference in Richmond, and then at the NACWA clean water law conference down in Savannah.

I am dealing with an issue for our client, CVS, and I was hoping you might be willing/available to meet and brainstorm potential solutions. The specific issue involves some confusion over the older, existing effluent guidelines for the pharma manufacturing category (40 CFR Part 439), which we think can be resolved with some simple, clarifying guidance. This issue is not in any dispute or litigation – we're just hoping to have some clarification in order to avoid potential conflicts in the future.

Would you be willing to meet? If so, I'd be pleased to coordinate a time and send some background info on the issue. All my best, Brooks

Brooks M. Smith
Direct Ex. 6
brooks.smith@troutman.com

troutman **sanders**
1001 Haxall Point, Suite 1500
Richmond, VA 23219
troutman.com

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Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 3/21/2018 2:01:55 PM
To: Kelly Johnson [KAJohnson@hollandhart.com]
CC: Penman, Crystal [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=93662678a6fd4d4695c3df22cd95935a-Penman, Crystal]
Subject: Re: Snow Day

Great

Sent from my iPhone

On Mar 21, 2018, at 10:00 AM, Kelly Johnson <KAJohnson@hollandhart.com> wrote:

> I'll send a scheduler / call in number once I resolve a few technical issues with my laptop. Should be in 15 minutes or so.
>
> On Mar 21, 2018, at 9:45 AM, Forsgren, Lee <Forsgren.Lee@epa.gov> wrote:
>
> > Please
> >
> > Sent from my iPhone
> >
> > On Mar 21, 2018, at 9:35 AM, Kelly Johnson <KAJohnson@hollandhart.com> wrote:
> >
> > > That would be great. Do you want me to set up a conference call line for us?
> > >
> > > On Mar 21, 2018, at 9:32 AM, Forsgren, Lee <Forsgren.Lee@epa.gov> wrote:
> > >
> > > > Kelly
> > > >
> > > > Why don't we see about a call at 2:00 pm?
> > > >
> > > > Lee
> > > >
> > > > Sent from my iPhone
> > > >
> > > > On Mar 21, 2018, at 9:19 AM, Kelly Johnson <KAJohnson@hollandhart.com> wrote:
> > > >
> > > > > It's certainly strange to have a spring snow day in DC.
> > > > > Frank Richards, Sr VP of Permitting from AGDC, did make it to DC last night in anticipation of the FERC technical session on the Alaska LNG Project scheduled for Thursday morning. He'll be working out of

the Alaska Governor's DC office today. We would like to talk to you about wetlands issues associated with the Project so, if you have time today for a conference call in lieu of our scheduled meeting, let me know and I'll get something set up.
Thanks for your assistance.
Kelly

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 1/12/2018 12:16:53 PM
To: Ben Grumbles [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=usereb77e807]
Subject: Re: Waters of the United States

That works fine.

Sent from my iPhone

On Jan 11, 2018, at 11:10 PM, Ben Grumbles -MDE- <ben.grumbles@maryland.gov> wrote:

> Thanks Lee.
> Sorry I didn't back to you today. Will reach out tomorrow/Friday.
> Hope all is well.
> Ben
>
> Sent from my iPhone
>
> On Jan 11, 2018, at 3:22 PM, Forsgren, Lee <Forsgren.Lee@epa.gov> wrote:
>
> > Ben,
> >
> > Can you give me a call re WOTUS Federalism engagement on WOTUS? Call me on my EPA cell at Ex. 6
> >
> > Regards,
> > Lee
> >
> > **D. Lee Forsgren**
> > Deputy Assistant Administrator
> > Office Of Water
> > Environmental Protection Agency
> > 1200 Pennsylvania Avenue, VW
> > Room 3219 WJCE
> > Washington, DC 20460
> > Phone: 202-564-5700
> > Forsgren.Lee@epa.gov

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 1/11/2018 8:22:07 PM
To: Ben Grumbles [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=usereb77e807]
Subject: Waters of the United States

Ben,

Can you give me a call re WOTUS Federalism engagement on WOTUS? Call me on my EPA cell at Ex. 6

Regards,
Lee

D. Lee Forsgren
Deputy Assistant Administrator
Office Of Water
Environmental Protection Agency
1200 Pennsylvania Avenue, VW
Room 3219 WJCE
Washington, DC 20460
Phone: 202-564-5700
Forsgren.Lee@epa.gov

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 2/20/2018 4:22:40 PM
To: Ben Grumbles -MDE- [ben.grumbles@maryland.gov]
CC: Ex. 6
Subject: RE: A Maryland Resident who has asked for help determining if her drinking water is safe

Thanks Ben!!! I owe you one.

From: Ben Grumbles -MDE- [mailto:ben.grumbles@maryland.gov]
Sent: Tuesday, February 20, 2018 9:43 AM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Cc: Ex. 6
Subject: Re: A Maryland Resident who has asked for help determining if her drinking water is safe

Thanks Lee. We will follow up right away.
Ben
MDE

Sent from my iPhone

On Feb 20, 2018, at 9:10 AM, Forsgren, Lee <Forsgren.Lee@epa.gov> wrote:

> Ben,
>
> A friend reached out to me asking how she could determine if the lovely things discovered in her drinking water filter below are an indication that her drinking water is not safe. She is looking to have her water tested for contaminants but wants to know who might be appropriate organization to conduct such a test.
>
> While that question is technically within both of our jurisdictions, but given our deference to "Federalism" I thought I would reach out to you and MDEC first since she lives near Annapolis. The person with the question's name (Ex. 6 I have added her on the cc line so that you or the appropriate person can reach out to her on an approved way to have her water tested.
>
> If you could have MDEC reach out to Robin I would greatly appreciate it.
>
> Thanks,
> Lee

D. Lee Forsgren
Deputy Assistant Administrator
Office Of Water
Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Room 3219 WJCE
Washington, DC 20460
Phone: 202-564-5700
Forsgren.Lee@epa.gov

<IMG_9965.jpeg>

Click here to complete a three question customer experience survey.

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 11/30/2017 10:08:15 PM
To: Kelly Johnson [KAJohnson@hollandhart.com]
Subject: RE: AGDC Letter to Administrator Pruitt

After your 4:30 would work great!

From: Kelly Johnson [mailto:KAJohnson@hollandhart.com]
Sent: Thursday, November 30, 2017 5:01 PM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Subject: RE: AGDC Letter to Administrator Pruitt

That would be great. I have conference calls scheduled for 3:00 and 4:30 tomorrow but will be otherwise available if you want to call at your convenience.

From: Forsgren, Lee [mailto:Forsgren.Lee@epa.gov]
Sent: Thursday, November 30, 2017 4:59 PM
To: Kelly Johnson
Subject: Re: AGDC Letter to Administrator Pruitt

Kelly

Can we talk later in the day on Friday ?
Lee

Sent from my iPhone

On Nov 30, 2017, at 4:41 PM, Kelly Johnson <KAJohnson@hollandhart.com> wrote:

> Lee – I hope you're having an enjoyable fall. When you have a moment, I'd appreciate an opportunity to give you a quick update on the Alaska LNG Project. I can be reached at Ex. 6
> Ex. 6 Thanks. Kelly
>
> **From:** Forsgren, Lee [mailto:Forsgren.Lee@epa.gov]
> **Sent:** Thursday, October 19, 2017 4:26 PM
> **To:** Frank Richards
> **Cc:** Greenwalt, Sarah; Fotouhi, David
> **Subject:** RE: AGDC Letter to Administrator Pruitt
>
> Frank,
>
> We greatly appreciate the State of Alaska's input on this important project.
>
> Regards,
> Lee
>
> **D. Lee Forsgren**
> Deputy Assistant Administrator
> Office Of Water
> Environmental Protection Agency

1200 Pennsylvania Avenue, VW
Room 3219 WJCE
Washington, DC 20460
Phone: 202-564-5700
Forsgren.Lee@epa.gov

From: Frank Richards [mailto:FRichards@agdc.us]
Sent: Thursday, October 19, 2017 4:15 PM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Cc: Kelly Johnson (KAJohnson@hollandhart.com) <KAJohnson@hollandhart.com>; Crowther, John J (GOV) <john.crowther@alaska.gov>; Gene Therriault <GTherriault@agdc.us>
Subject: AGDC Letter to Administrator Pruitt

Mr. Forsgren,

Attached is advanced copy of letter to Administrator Pruitt with supporting documents that we are sending today via FedEx. The materials provide detailed background of wetland analyses and construction processes used in Alaska. If we can provide any additional information please let me know.

Frank Richards

Frank T. Richards, P.E. | Senior V.P., Program Management | Alaska Gasline Development Corporation | **T** (907) 330 6352 | **C** (Ex. 6) FRichards@agdc.us

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 12/4/2017 6:44:49 PM
To: Don Parrish [donp@fb.org]
Subject: RE: FYI

Thanks Don.

From: Don Parrish [mailto:donp@fb.org]
Sent: Monday, December 4, 2017 1:06 PM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Subject: FYI

Lee

Wanted to make sure you saw this.

View this email in your browser

Join the Waters Advocacy Coalition for a Hill briefing on **December 6th** at **10:30 AM**, where you will hear directly from small business owners about the burdens they would face under the 2015 WOTUS, review the latest WOTUS polling, and dive into the state perspective on EPA overreach.

Waters Advocacy Coalition
December 6, 2017 @10:30 a.m.
Hill Briefing: WOTUS In The Real World

WHEN:
Wednesday, December 6th, 10:30am

WHERE:
Rayburn 2322

RSVP:
watersadvocacy@gmail.com

The program will include:

An overview of the most recent polling from Morning Consult

Panel discussion with insights into the impact of WOTUS on farmers and small businesses

Keynote remarks from **Montana Attorney General Tim Fox**

Don R Parrish
American Farm Bureau Federation®
Ex. 6
donp@fb.org

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 2/20/2018 2:10:00 PM
To: Ben Grumbles [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=usereb77e807]
CC: Ex. 6
Subject: A Maryland Resident who has asked for help determining if her drinking water is safe

Ben,

A friend reached out to me asking how she could determine if the lovely things discovered in her drinking water filter below are an indication that her drinking water is not safe. She is looking to have her water tested for contaminants but wants to know who might be appropriate organization to conduct such a test.

While that question is technically within both of our jurisdictions, but given our deference to "Federalism" I thought I would reach out to you and MDEC first since she lives near Annapolis. The person with the question's name is Ex. 6 Ex. 6 I have added her on the cc line so that you or the appropriate person can reach out to her on an approved way to have her water tested.

If you could have MDEC reach out to Robin I would greatly appreciate it.

Thanks,
Lee

D. Lee Forsgren
Deputy Assistant Administrator
Office Of Water
Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Room 3219 WJCE
Washington, DC 20460
Phone: 202-564-5700
Forsgren.Lee@epa.gov

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 11/8/2017 10:35:50 PM
To: Chung, David [DChung@crowell.com]
CC: Penman, Crystal [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=93662678a6fd4d4695c3df22cd95935a-Penman, Crystal]; Campbell, Ann [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=b8c25a0c2fb648b6a947694a8492311e-Campbell, Ann]
Subject: RE: Invitation to speak at upcoming Edison Electric Institute meeting (December 6)

David

I would be interested in doing the event if possible. I will however warn you that my schedule is pretty full for that week. Crystal Penman handles my schedule and will see if it is possible.

Regards,
Lee

D. Lee Forsgren
Deputy Assistant Administrator
Office Of Water
Environmental Protection Agency
1200 Pennsylvania Avenue, VW
Room 3219 WJCE
Washington, DC 20460
Phone: 202-564-5700
Forsgren.Lee@epa.gov

From: Chung, David [mailto:DChung@crowell.com]
Sent: Wednesday, November 8, 2017 2:43 PM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Subject: Invitation to speak at upcoming Edison Electric Institute meeting (December 6)

Lee –

I hope all is well on your end. I really enjoyed your presentation at the National Mining Association's Fall Environment Committee meeting last month. Are you willing to give a similar presentation at an EEI Water Resources meeting on the afternoon of December 6? The idea would be for you to kick off the meeting at 130 pm with about a 20-25 minute discussion of WOTUS (e.g., rulemaking milestones, where the Step 2 rule may be headed, what the delay rulemaking entails, etc.).

Rich Bozek, EEI's Director of Environmental and Health & Safety policy, should be calling or emailing you shortly with a formal invitation, but I wanted to give you a head's up in advance.

Best regards,

David Y. Chung

dchung@crowell.com
Direct Ex. 6 | Fax: 1.202.628.5116

Crowell & Moring LLP | www.crowell.com
1001 Pennsylvania Avenue NW
Washington, DC 20004

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 3/12/2018 3:26:45 PM
To: Kelly Johnson [KAJohnson@hollandhart.com]
CC: Penman, Crystal [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=93662678a6fd4d4695c3df22cd95935a-Penman, Crystal]; Campbell, Ann [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=b8c25a0c2fb648b6a947694a8492311e-Campbell, Ann]
Subject: RE: AGDC

Kelly,

Speaking to Mr. Richards regarding mitigation in Alaska is very timely. Let Crystal Penman see if we can find a time that works. I will warn you that my schedule the week is absolutely crazy but we will try.

Lee

From: Kelly Johnson [mailto:KAJohnson@hollandhart.com]
Sent: Monday, March 12, 2018 11:15 AM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Subject: AGDC

Lee – Hope you're doing well and that your 2018 is off to a great start. Frank Richards from AGDC will be in town next week. He wanted to get together with you to talk about wetlands mitigation issues. Are you in DC? Do you have time to meet on Wednesday? Thanks. Kelly

Kelly A. Johnson
Holland & Hart LLP
975 F St., NW
Suite 900
Washington, DC 20004

Phone: Ex. 6
E-mail: kajohnson@hollandhart.com

HOLLAND&HART
THE LAW OUT WEST

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 10/27/2017 12:07:13 PM
To: Kelly Johnson [KAJohnson@hollandhart.com]
Subject: Re: Update?

Call me at Ex. 6

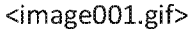
Sent from my iPhone

On Oct 27, 2017, at 8:02 AM, Kelly Johnson <KAJohnson@hollandhart.com> wrote:

> Lee - Hope you had a good week. I wondered if you could send me a copy of EPA's comment letter to the Corps. Thank you. Kelly
>
> On Sep 26, 2017, at 6:43 AM, Forsgren, Lee <Forsgren.Lee@epa.gov> wrote:
>
> > Kelly,
> > No. The Acting ASA Civil Works granted a 30 extension, at EPA's request, EPA will be will be submitting comments that have been thoroughly reviewed by Headquarters.
> >
> > Regards
> > Lee
> >
> > **D. Lee Forsgren**
> > Deputy Assistant Administrator
> > Office Of Water
> > Environmental Protection Agency
> > 1200 Pennsylvania Avenue, VW
> > Room 3219 WJCE
> > Washington, DC 20460
> > Phone: 202-564-5700
> > Forsgren.Lee@epa.gov
>
> **From:** Kelly Johnson [mailto:KAJohnson@hollandhart.com]
> **Sent:** Tuesday, September 26, 2017 8:01 AM
> **To:** Forsgren, Lee <Forsgren.Lee@epa.gov>
> **Subject:** Update?
>
> Lee – Did Region 10 send the will effect letter yesterday? Just asking as we're meeting with Mary this morning and have a meeting at the WH this afternoon. Thanks. Kelly

Kelly A. Johnson
Holland & Hart LLP
975 F St., NW
Suite 900
Washington, DC 20004

Phone: Ex. 6
E-mail: kajohnson@hollandhart.com



Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 11/6/2017 4:26:29 PM
To: Don Parrish [donp@fb.org]
CC: Greenwalt, Sarah [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=6c13775b8f424e90802669b87b135024-Greenwalt,]; Penman, Crystal [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=93662678a6fd4d4695c3df22cd95935a-Penman, Crystal]
Subject: RE: Meeting Invite

Don,

I will definitely do it just have to check on Sarah's availability.

Lee

From: Don Parrish [mailto:donp@fb.org]
Sent: Monday, November 6, 2017 11:24 AM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Cc: Greenwalt, Sarah <greenwalt.sarah@epa.gov>; Penman, Crystal <Penman.Crystal@epa.gov>
Subject: Re: Meeting Invite

Thanks. I am traveling this week - but will keep a close check if you need anything.

Don

Sent from my iPhone

On Nov 6, 2017, at 9:57 AM, Forsgren, Lee <Forsgren.Lee@epa.gov> wrote:

> Don,
>
> Let me check with Sarah to check on her availability but I will be there.
>
> Lee
>
> Sent from my iPhone
>
> On Nov 6, 2017, at 10:36 AM, Don Parrish <donp@fb.org> wrote:
>
> > Lee
> >
> > The Waters Advocacy Coalition would like to invite you to our meeting on November 16th at 2:00 p.m.
> >
> > We meet at Edison Electric Institute @ 701 Pennsylvania AVE.
> >
> > We are very interested in hearing your thoughts on all things water.

Don Parrish

Sent from my iPhone

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 10/16/2017 2:10:38 PM
To: Kelly Johnson [KAJohnson@hollandhart.com]
Subject: RE: Catch Up

Perfect

-----Original Message-----
From: Kelly Johnson [mailto:KAJohnson@hollandhart.com]
Sent: Monday, October 16, 2017 9:59 AM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Subject: Re: Catch Up

There is a break from 10:30 to 11:00 and then after you're done so depending on your arrival I'll make sure to track you down.

> On Oct 16, 2017, at 9:56 AM, Forsgren, Lee <Forsgren.Lee@epa.gov> wrote:
>
> Grab me there we need to talk.
>
> Sent from my iPhone
>
>> On Oct 16, 2017, at 9:32 AM, Kelly Johnson <KAJohnson@hollandhart.com> wrote:
>>
>> FYI - I'm attending the NMA Environment Committee meeting (the majority of my clients are actually mining companies) so, hopefully, I can introduce myself. Thanks.
>>
>

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 10/13/2017 8:12:28 PM
To: Kelly Johnson [KAJohnson@hollandhart.com]
CC: Crowther, John J (GOV) [john.crowther@alaska.gov]
Subject: Re: AGDC

Kelly

Had a great trip. Can we talk on Monday about this and other issues.

Lee

Sent from my iPhone

On Oct 13, 2017, at 11:05 AM, Kelly Johnson <KAJohnson@hollandhart.com> wrote:

> Lee – I hope you had a good trip to Alaska this week. Two issues: (1) please let me know if you have any questions about Governor Walker's letter to Administrator Pruitt on the Alaska pipeline project and (2) a meeting request. Officials from AGDC will be in DC the last week of October. They would like the opportunity to meet with you and provide you an update on the both the ASAP Project and the AK LNG Project and discuss any questions you may have for them. If you could have your assistant contact me about setting up a meeting time, I'd greatly appreciate it. Thanks. Kelly

Kelly A. Johnson
Holland & Hart LLP
975 F St., NW
Suite 900
Washington, DC 20004

Phone: Ex. 6
E-mail: kajohnson@hollandhart.com

<image001.gif>

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 10/6/2017 4:32:31 PM
To: Kelly Johnson [KAJohnson@hollandhart.com]
Subject: RE: Letter from Governor Walker

Thanks Kelly. We received this letter through normal channels but I appreciate you flagging it for me.

Regards,
Lee

From: Kelly Johnson [mailto:KAJohnson@hollandhart.com]
Sent: Friday, October 6, 2017 10:14 AM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Subject: Letter from Governor Walker

Mr. Forsgren – As Acting Assistant Administrator for the Office of Water, I thought you would be interested in the attached letter Alaska Governor Walker has sent to Administrator Pruitt. Kelly

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 10/16/2017 4:12:02 PM
To: Ben Grumbles [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=usereb77e807]
CC: Kathy Bishop [kathy.bishop@maryland.gov]
Subject: Re: Tried calling your cell and got an intercept

Call me then Conrad!

Sent from my iPhone

On Oct 16, 2017, at 11:34 AM, Ben Grumbles -MDE- <ben.grumbles@maryland.gov> wrote:

> Thanks Lee. Intercept because I went to Serbia Saturday and am still there till Wednesday. Back in the hood Wednesday night.
>
> Kathy could you email Lee our press release on nutrient trading.
>
> Best.
> Ben
>
> Sent from my iPhone
>
> On Oct 16, 2017, at 4:24 PM, Forsgren, Lee <Forsgren.Lee@epa.gov> wrote:
>
> > Ben,
> >
> > Got your voicemail from Friday when I got in this morning. Tried calling your cell at Ex. 6 Ex. 6 and got an intercept that the call could not be completed due to technical difficulties (called 3 times). Call me on my EPA cell at Ex. 6
> >
> > Love that trading!
> >
> > Lee
> >
> > **D. Lee Forsgren**
> > Deputy Assistant Administrator
> > Office Of Water
> > Environmental Protection Agency
> > 1200 Pennsylvania Avenue, VW
> > Room 3219 WJCE
> > Washington, DC 20460
> > Phone: 202-564-5700
> > Forsgren.Lee@epa.gov

Click here to complete a three question customer experience survey.

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 10/16/2017 2:24:17 PM
To: Ben Grumbles [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=usereb77e807]
Subject: Tried calling your cell and got an intercept

Ben,

Got your voicemail from Friday when I got in this morning. Tried calling your cell at Ex. 6 and got an intercept that the call could not be completed due to technical difficulties (called 3 times). Call me on my EPA cell at Ex. 6

Ex. 6

Love that trading!

Lee

D. Lee Forsgren

Deputy Assistant Administrator
Office Of Water
Environmental Protection Agency
1200 Pennsylvania Avenue, VW
Room 3219 WJCE
Washington, DC 20460
Phone: 202-564-5700
Forsgren.Lee@epa.gov

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 10/3/2017 12:48:17 PM
To: Kelly Johnson [KAJohnson@hollandhart.com]
Subject: Call me

Kelly,

Can you call me a[Ex. 6] Need some information.
Regards,
Lee

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 9/21/2017 10:29:53 PM
To: Kelly Johnson [KAJohnson@hollandhart.com]
Subject: Re: thank you so much

Will do.

Sent from my iPhone

On Sep 21, 2017, at 6:09 PM, Kelly Johnson <KAJohnson@hollandhart.com> wrote:

> For taking the time to talk to me and the folks from the Alaska Gasline Development Corporation. We greatly appreciate your assistance. Don't hesitate to contact me if you need anything and I look forward to actually meeting you. Have a great evening. Kelly
>
> **Kelly A. Johnson**
> Holland & Hart LLP
> 975 F St., NW
> Suite 900
> Washington, DC 20004
>
> Phone: Ex. 6
> E-mail: kajohnson@hollandhart.com
>
> <image001.gif>
>
>

Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 9/25/2017 12:25:50 PM
To: Kelly Johnson [KAJohnson@hollandhart.com]
Subject: RE: thank you so much

Kelly,
I am still working the issue. Will let you know if we need any information.

Lee

D. Lee Forsgren
Deputy Assistant Administrator
Office Of Water
Environmental Protection Agency
1200 Pennsylvania Avenue, VW
Room 3219 WJCE
Washington, DC 20460
Phone: 202-564-5700
Forsgren.Lee@epa.gov

From: Kelly Johnson [mailto:KAJohnson@hollandhart.com]
Sent: Monday, September 25, 2017 8:24 AM
To: Forsgren, Lee <Forsgren.Lee@epa.gov>
Subject: RE: thank you so much

Lee – I hope you had a good weekend. I'm back in DC. If anything comes up on the AGDC issues, please don't hesitate to let me know. Kelly

Kelly A. Johnson
Holland & Hart LLP
975 F St., NW
Suite 900
Washington, DC 20004

Phone: Ex. 6
E-mail: kajohnson@hollandhart.com

From: Forsgren, Lee [mailto:Forsgren.Lee@epa.gov]
Sent: Friday, September 22, 2017 10:16 AM
To: Kelly Johnson
Subject: Re: thank you so much

Kelly

Will call you back. I think we are moving back in the right direction.

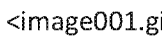
Lee

Sent from my iPhone

On Sep 22, 2017, at 9:33 AM, Kelly Johnson <KAJohnson@hollandhart.com> wrote:

> # is Ex. 6
>
> On Sep 22, 2017, at 7:04 AM, Forsgren, Lee <Forsgren.Lee@epa.gov> wrote:
>
> > Kelly,
> >
> > Can you call me this morning Ex. 6 It is kind of important and has come up since we talked yesterday.
> >
> > Lee
> >
> > **D. Lee Forsgren**
> > Deputy Assistant Administrator
> > Office Of Water
> > Environmental Protection Agency
> > 1200 Pennsylvania Avenue, VW
> > Room 3219 WJCE
> > Washington, DC 20460
> > Phone: 202-564-5700
> > Forsgren.Lee@epa.gov
>
> **From:** Kelly Johnson [mailto:KAJohnson@hollandhart.com]
> **Sent:** Thursday, September 21, 2017 6:09 PM
> **To:** Forsgren, Lee <Forsgren.Lee@epa.gov>
> **Subject:** thank you so much
>
> For taking the time to talk to me and the folks from the Alaska Gasline Development Corporation. We greatly appreciate your assistance. Don't hesitate to contact me if you need anything and I look forward to actually meeting you. Have a great evening. Kelly
>
> **Kelly A. Johnson**
> Holland & Hart LLP
> 975 F St., NW
> Suite 900
> Washington, DC 20004
>
> Phone: Ex. 6

E-mail: kajohnson@hollandhart.com



Message

From: Forsgren, Lee [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A055D7329D5B470FBAA9920CE1B68A7D-FORSGREN, D]
Sent: 9/19/2017 11:00:55 PM
To: Don Parrish [donp@fb.org]
Subject: Re: Question

Will call.

Sent from my iPhone

On Sep 19, 2017, at 3:39 PM, Don Parrish <donp@fb.org> wrote:

> Perfect -
>
> **Ex. 6**
>
> Don
>
> Sent from my iPhone
>
> On Sep 19, 2017, at 6:29 PM, Forsgren, Lee <Forsgren.Lee@epa.gov> wrote:
>
> > Could do a short call (10 minutes or so) tomorrow at 10:00 am EDT.
> >
> > Sent from my iPhone
> >
> > On Sep 19, 2017, at 12:37 PM, Don Parrish <donp@fb.org> wrote:
> >
> > > Just let me know when you might be able to do a short call … in the next couple of days. And thanks for the quick response.
> > >
> > > *Don R Parrish*
> > > *American Farm Bureau Federation®*
> > > **Ex. 6**
> > > *donp@fb.org*
> > >
> > > ---
> > >
> > > **From:** Forsgren, Lee [mailto:Forsgren.Lee@epa.gov]
> > > **Sent:** Tuesday, September 19, 2017 3:34 PM
> > > **To:** Don Parrish
> > > **Subject:** Re: Question
> > >
> > > Am on travel and boarding a plane. Won't be available until after midnight your time.
> > >
> > > Sent from my iPhone
> > >
> > > On Sep 19, 2017, at 2:25 PM, Don Parrish <donp@fb.org> wrote:
> > >
> > > > Do you have a minute to talk? Thanks.
> > > >
> > > > *Don R Parrish*

American Farm Bureau Federation®

Ex. 6

donp@fb.org