

AGENDA

MATANUSKA-SUSITNA BOROUGH

350 East Dahlia Avenue, Palmer, Alaska 99645 – 907-861-7874

PLATTING OFFICER

Fred Wagner

PLATTING CLERK

Theresa Taranto

PLATTING TECHNICIANS

Amy Otto-Buchanan

Matthew Goddard



PLATTING BOARD

Pio Cottini, District 1

Emmett Leffel, District 2

Eric Koan, District 3

Dan Bush, District 4

Linn McCabe, District 5

Sandra Krager, District 6

Alan Leonard, District 7

Amanda Salmon, Alternate A

Robert Hallford, Alternate B

PLATTING BOARD AGENDA

ASSEMBLY CHAMBERS

350 EAST DAHLIA AVENUE, PALMER

PLATTING BOARD MEETING

1:00 P.M.

March 16, 2023

Ways you can participate in Platting Board meetings:

IN PERSON

IN WRITING: You can submit written comments by email to platting@matsugov.us or by mail to Matanuska-Susitna Borough, Platting Division, 350 E. Dahlia Avenue, Palmer, AK 99645

TELEPHONIC TESTIMONY: (Audio only)

(We are having intermittent technical difficulties with our software; if you would like to submit comments, please submit comments to the email address above by the Wednesday before the meeting.)

- Dial 1-855-290-3803; you will hear “Joining conference” when you are admitted to the meeting.
- You will be automatically muted and able to listen to the meeting.
- When the Chair announces audience participation or a public hearing you would like to speak to, press *3; you will hear “Your hand has been raised.”
- When it is your turn to testify you will hear “Your line has been unmuted.”
- State your name for the record, spell your last name, and provide your testimony.

1. CALL TO ORDER

- A. Roll Call and Determination of Quorum (by Secretary)
- B. Pledge of Allegiance
- C. Approval of Agenda

2. APPROVAL OF MINUTES

- A. January 19, 2023

3. AUDIENCE PARTICIPATION & PRESENTATIONS

A. **PERSONS TO BE HEARD** (Three minutes per person for Items not scheduled for public hearing)

4. UNFINISHED BUSINESS

(None)

5. RECONSIDERATIONS/APPEALS

(No Reconsiderations/Appeals)

6. PUBLIC HEARINGS

- A. **HIDDEN ACRES:** The request is to create five lots from Tract A, Spring Hill, Plat # 2022-88 to be known as **Hidden Acres**, containing 24.20 acres +/- . The property is located south and east of N. Trunk Road, and directly west of N. Palmer Fishhook Road (Tax ID # 8294000T00A); within the SE ¼ Section 24, Township 18 North, Range 01 East, Seward Meridian, Alaska. In the Farm Loop Community Council and in Assembly District #2.
(Petitioner/Owner: Rocky Point Development LLC, Staff: Matthew Goddard, Case # 2023-006)

7. ITEMS OF BUSINESS & MISCELLANEOUS

8. PLATTING STAFF & OFFICER COMMENTS

- A. Adjudicatory (if needed)
- *Definition:* Law. To hear and settle an issue or a question regarding code.
- B. Upcoming Platting Board Agenda Items (Staff: Fred Wagner & Clerk: Theresa Taranto)
- April 6th and May 4th meetings will be at Station 6-2, Public Safety Building, 4568 Knik-Goose Bay Road, Wasilla.
 - Two cases on the agenda at this time:
 - Thunderbirds Lair
 - Alaska Vistas MSP
 - New Platting Member Alternate, Robert Hallford

9. BOARD COMMENTS

10. ADJOURNMENT

MINUTES

**MATANUSKA-SUSITNA BOROUGH
PLATTING BOARD MINUTES**

**REGULAR MEETING
JANUARY 19, 2023**

The regular meeting of the Matanuska-Susitna Borough Platting Board was held on JANUARY 19, 2023, at the Matanuska-Susitna Borough 350 E Dahlia Ave, Palmer, Alaska. Chair Leonard called the Meeting to order at 1:01 p.m.

1. CALL TO ORDER

A. ROLL CALL AND DETERMINATION OF QUORUM (by Administrative Specialist)

Platting Board members present and establishing a quorum:

Mr. Pio Cottini, District Seat #1
Mr. Emmett Leffel, District Seat #2
Mr. Eric Koan, District Seat #3
Mr. Dan Bush, District Seat #4
Ms. Linn McCabe, District Seat #5, Vice Chair
Mr. Sandra Kreger, District Seat #6,
Mr. Alan Leonard, District Seat #7, Chair

Platting Board members absent and excused were:

Ms. Amanda Salmon Alternate A

Staff in attendance:

Mr. Fred Wagner, Platting Officer
Ms. Theresa Taranto, Platting Clerk
Ms. Amy Otto-Buchanan, Platting Technician
Mr. Matthew Goddard, Platting Technician
Mr. Chris Curlin, Platting Technician

B. THE PLEDGE OF ALLEGIANCE

Platting member McCabe led the pledge of allegiance.

C. APPROVAL OF THE AGENDA

Chair Leonard inquired if there were any changes to the agenda.

GENERAL CONSENT: The agenda was approved unanimously

2. APPROVAL OF MINUTES

- January 5, 2023 minutes were approved unanimously

3. AUDIENCE PARTICIPATION & PRESENTATIONS *(Three minutes per person, for items not scheduled for public hearing)*
(There is no Audience Participation & Presentations)

4. UNFINISHED BUSINESS
(None)

5. RECONSIDERATIONS/APPEALS
(No Reconsiderations/Appeals)

**MATANUSKA-SUSITNA BOROUGH
PLATTING BOARD MINUTES**

**REGULAR MEETING
JANUARY 19, 2023**

6. PUBLIC HEARINGS

(None)

7. OLD BUSINESS

- A. **STELLA RIDGE MASTER PLAN:** The petitioner is requesting to bring the approved **Stella Ridge Master Plan** back for alterations. The original master plan was approved on April 1, 2021. The petitioner is proposing to remove the right of way between E. Pamela Drive and E. Harman Loop, and change this to a three phase master plan. The proposed master plan contains 60.00 acres +/- . The property is located south of the Little Susitna River, west of N. St Herman Street and directly north of E. Pamela Drive (Tax ID # 8295000T00B / T00A); within the SW ¼ Section 18, Township 18 North, Range 01 East, Seward Meridian, Alaska. In the Fishhook Community Council and in Assembly District #1. *(Petitioner/Owner: Jerry Harman, Staff: Matthew Goddard, Case # 2020-098)*

Chair Leonard read the statement regarding Ex-Parte & Interest on quasi-judicial action into the record; there was no objection noted by the platting board.

Theresa Taranto provided the mailing report:

- Stating that 12 public hearing notices were mailed out on December 29, 2022.

Staff gave an overview of the case:

- Staff recommends approval of the case with findings of fact and conditions of approval.

Platting member Cottini had questions for staff.

Chair Leonard invited the petitioner and/or the petitioner's representative to give a brief overview.

Craig Hanson, the petitioner's representative gave an overview of the case.

Chair Leonard opened the public hearing for public testimony.

There being no one to be heard, Chair Leonard closed the public hearing.

Chair Leonard invited Mr. Hanson, the petitioner's representative up for any questions for the board.

The board had no questions for Mr. Hanson.

MOTION: Platting Member McCabe made a motion to approve with 10 findings of fact and 10 conditions. Platting Member Leffel seconded the motion.

Discussion ensued

AMENDED

MOTION: Platting Member Bush made a motion to the conditions of approval to include condition 1 through 11 and delete condition number 6. Platting Member Leffel seconded the motion.

**MATANUSKA-SUSITNA BOROUGH
PLATTING BOARD MINUTES**

**REGULAR MEETING
JANUARY 19, 2023**

AMENDED

MOTION: The motion passed without objection.

VOTE: The motion passed without objection.

8. PLATTING STAFF & OFFICER COMMENTS

A. Adjudicatory (*if needed*)

B. Upcoming Platting Board Agenda Items

Platting Officer, Fred Wagner informed the board of upcoming items;

- Introduced Chris Curlin as new Platting Technician.
- Platting has a lot of backlog we are working on.
- No cases scheduled for next month and we should be back in full speed by mid spring.

BOARD COMMENTS

- Platting member Leffel – Have fun and see you in another month.
- Platting member Bush – I am still having trouble hearing; if they can turn up the volume.
- Platting member McCabe – Welcome to Chris and hope to see you around a month for the next hearing.
- Platting member Koan - No comment
- Platting member Cottini – Welcome Chris and we will see you next time, Thanks.
- Platting member Kreger – No comment and nice to meet you Chris.
- Chair Leonard – Welcome Chris

9. ADJOURNMENT

With no further business to come before the Platting Board, Chair Leonard adjourned the meeting at 1:19 pm.

ALAN LEONARD
Platting Board Chair

ATTEST:

THERESA TARANTO
Platting Board Clerk

6A

STAFF REVIEW AND RECOMMENDATIONS
PUBLIC HEARING
MARCH 16, 2023

PRELIMINARY PLAT: HIDDEN ACRES
LEGAL DESCRIPTION: SEC 24, T18N, R01E, SEWARD MERIDIAN AK
PETITIONERS: ROCKY POINT DEVELOPMENT, LLC
SURVEYOR/ENGINEER: KEYSTONE SURVEYING
ACRES: 24.20 ± PARCELS: 5
REVIEWED BY: MATTHEW GODDARD CASE #: 2023-006

REQUEST: The request is to create five lots from Tract A, Spring Hill, Plat # 2022-88 to be known as **HIDDEN ACRES**, containing 24.20 acres +/- . The petitioner is requesting a variance to MSB 43.20.320 Frontage for proposed Lot 5. The property is located south and east of N. Trunk Road, and directly west of N. Palmer Fishhook Road; within the SE ¼ Section 24, Township 18 North, Range 01 East, Seward Meridian, Alaska.

EXHIBITS

Vicinity Map and Aerial Photos
Variance Application
Geotechnical Report
Drainage Report
Wetland Deliniation Report
Section Line Easement Report
Site Visit Form

AGENCY COMMENTS

ADOT&PF
ADF&G
MSB Department of Public Works
MSB Development Services
Utilities

EXHIBIT A – 5 pgs
EXHIBIT B – 3 pgs
EXHIBIT C – 9 pgs
EXHIBIT D – 45 pgs
EXHIBIT E – 23 pgs
EXHIBIT F – 4 pgs
EXHIBIT G – 7 pgs

EXHIBIT H – 2 pgs
EXHIBIT I – 1 pg
EXHIBIT J – 16 pgs
EXHIBIT K – 1 pg
EXHIBIT L – 3 pgs

DISCUSSION: The proposed subdivision will create five lots ranging in sizes between 1.34 acres and 6.47 acres, with proposed lots 2 and 4 being flag lots. The petitioner originally applied for a variance form MSB 43.20.320 Frontage for Lot 5. Upon further review of the proposed Hidden Acres submittal, Platting staff determined that a variance was not required as all proposed lots will have sufficient frontage per code. All proposed lots would have access via a common access easement onto E. Olivewood Drive.

Access: Legal and physical access to the proposed lots are required pursuant to MSB 43.20.100 Access Required, MSB 43.20.120 Legal Access and MSB 43.20.140 Frontage. All proposed lots meet access requirements.

Variance Application: A variance application was submitted (**Exhibit B**) with criteria A, B, & C answered as required in MSB 43.15.075. Upon further review of the submitted Hidden Acres it was determined that a variance was not required as all proposed lots will have sufficient frontage.

Soils Report: A geotechnical report was submitted (**Exhibit C**), pursuant to MSB 43.20.281(A). Curtis Holler, PE, notes that this evaluation included logging 5 new testholes on the parent parcel, review of adjacent existing soils information, review of the provided topography information, review of aerial imagery, and our other observations at the site. The majority of the parent parcel contains gently rolling terrain, with its norther third in a northeast-southwest oriented shallow valley with a low, wet area. A few regions contain steep slopes exceeding 25% were found on the parcel and have been delineated on the attached drawing. Testholes showed near surface soils included thin organic mats over layers of silty loess topsoils typically extending down to 3'. Receiving soils under the topsoils were found to be consistently clean sands and gravels, with the exception of siltier soils in low lying areas not considered useable. Groundwater was encountered in Testholes 1 and 4 at depths of 8.5' and 10.2' respectively during the summer high season. Separation to surface water/wet areas, and areas with high groundwater will be a limiting factor for areas on some of the proposed lots.

The proposed lots have a few limitations on areas defined by MSB code as useable septic area or useable building area. Useable septic areas will be limited by setbacks to neighboring water wells, steep areas, lot lines, setbacks to a low/wet area, and easements. For useable building area, lot lines, utility easements, and ROW/PUE setbacks will be limiting factors. For all of the proposed lots, adequate unencumbered area exists to readily meet the code requirements. Based on the available soils and water table information, topography, MSB Title 43 Code definitions, and our observations at the site, each of the proposed lots as labeled 1-5 will each contain over 10,000 square feet of contiguous useable septic area, and an additional 10,000 square feet useable building area. Drainage report is at **Exhibit D**. Average Daily Traffic (ADT) Calculations are at **Exhibit C-4**. Preliminary Wetland Delineation Report is at **Exhibit E**. Section line easement determination is at **Exhibit F**.

Comments:

Alaska Department of Transportation and Public Facilities (**Exhibit H**) states that no direct access to Palmer-Fishhook Road will be granted. New utility lines for the proposed lots and any future development must be extended from Olivewood Dr. No new utility lines will be authorized or permitted within ADOT&PF's ROW on Palmer-Fishhook Road. Any future relocation of utilities on Lot 2 and Lot 3 must remain on Lots 2 and 3. Utility relocation will not be permitted into ADOT&PF ROW.

ADF&G Habitat Section (**Exhibit I**) notes there are currently no resident or anadromous fish water bodies present within the boundaries of the subject property. At this time, a fish habitat permit from ADF&G Habitat Section is not required.

MSB DPW (**Exhibit J**) There are multiple conditions that potentially limit sight distance along Olivewood Drive from the proposed driveway. DPW does not support approval of the proposed plat, which will confine

access to the five proposed lots to a single point, without verification that adequate sight distance exists, or can exist with additional clearing within the ROW. *Platting staff notes that the petitioner addressed this comment as shown at Exhibit J.*

According to the ADT estimate, Birch Forest Drive from Trunk Road to Oakwood Drive is warranted to be Residential Subcollector. It is currently classified as Residential. The petitioner's engineer should provide documentation certifying Birch Forest Drive meets Residential Subcollector standard. *Platting staff notes that this road is currently functioning as a Residential Subcollector and as such would not be the responsibility of the petitioner to certify/upgrade this road.*

Since these comments were made the petitioner did supply additional information (**Exhibit J-3**) in response to DPW's request for information.

At this time DPW does not support the request for a variance (**Exhibit J-14**).

Platting staff notes that upon further review of the proposed submittal, a variance request was not required as sufficient frontage exists for all proposed lots.

Development Services (**Exhibit K**) has no Comments.

Utilities: (Exhibit L) Enstar has no comments or recommendations. GCI has no comments or objections. MEA did not respond. MTA did not respond.

At the time of staff report write-up, there were no responses to the Request for Comments from US Army Corps of Engineers; Farm Loop Community Council; Fire Service Area #132 Greater Palmer Consolidated; Road Service Area #16 South Colony; MSB Emergency Services, Community Development, Assessments, Planning; MEA or MTA.

CONCLUSION: The preliminary plat of Hidden Acres is consistent with AS 29.40.070 Platting Regulations and MSB 43.15.016 Preliminary Plats. There were no objections from any federal or state agencies, or utilities. There was one objection to the variance request from MSB Department of Public Works. There were no objections to the plat from the public in response to the Notice of Public Hearing. Legal and physical access will exist to the proposed lots, consistent with MSB 43.20.100 Access Required, MSB 43.20.120 Legal Access and MSB 43.20.140 Physical Access. The petitioner has submitted a variance request to MSB 43.20.320 Frontage. A soils report was submitted, pursuant to MSB 43.20.218(A)(1).

FINDINGS OF FACT

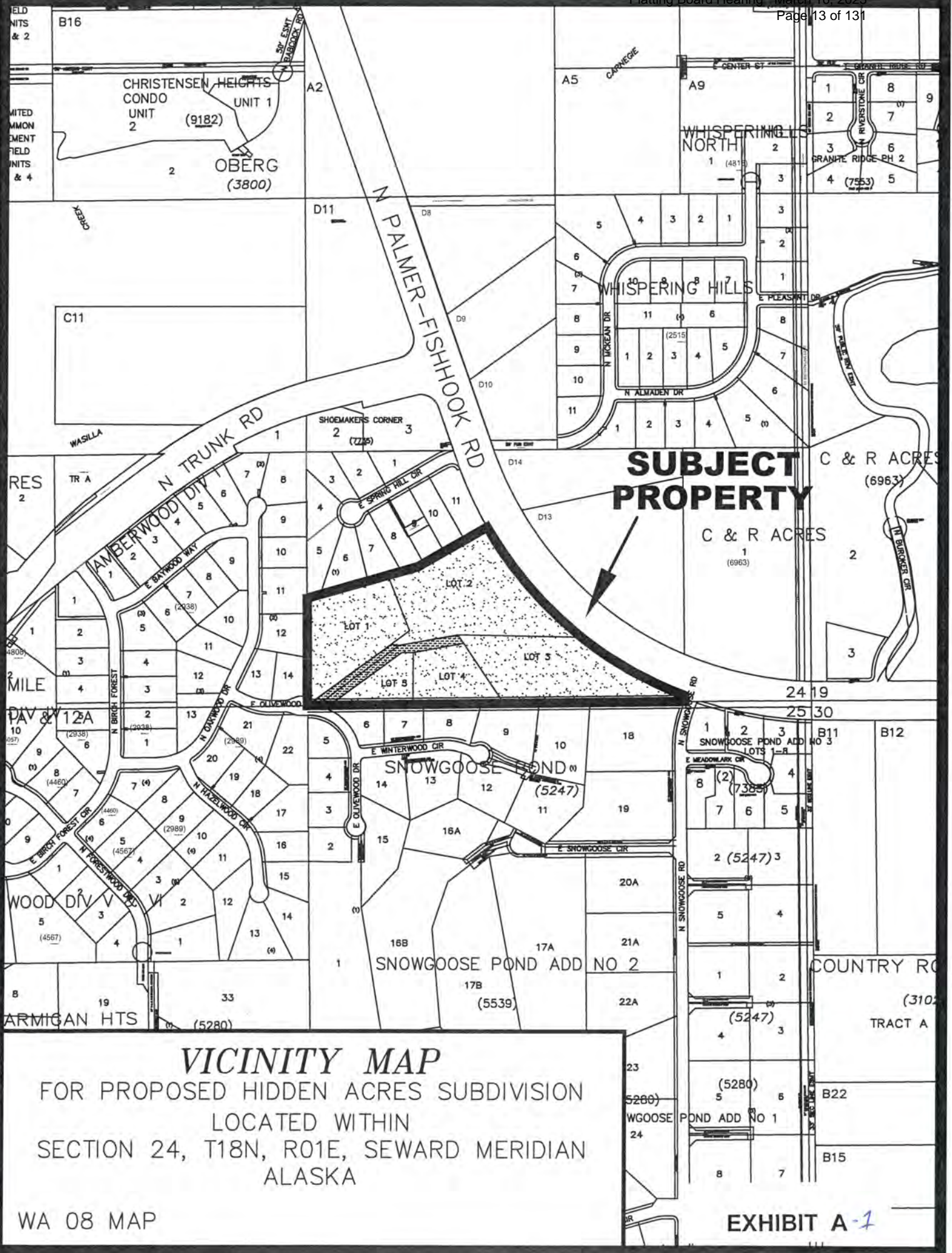
1. The plat of Hidden Acres is consistent with AS 29.40.070 Platting Regulations and MSB 43.15.016 Preliminary Plats.
2. A soils report was submitted, pursuant to MSB 43.20.281(A)(1)
3. A variance request was submitted by the petitioner for proposed lot 5. This request was from MSB 43.20.320 Frontage. Upon further review of the application, Platting staff determined that a variance was not required as all proposed lots meet the minimum requirements of code.
4. At the time of staff report write-up, there were no responses to the Request for Comments from US Army Corps of Engineers; Farm Loop Community Council; Fire Service Area #132 Greater Palmer Consolidated; Road Service Area #16 South Colony; MSB Emergency Services, Community Development, Assessments, Planning; MEA or MTA
5. A Section Line Easement determination was submitted showing the existence of Section Line Easements on the property.

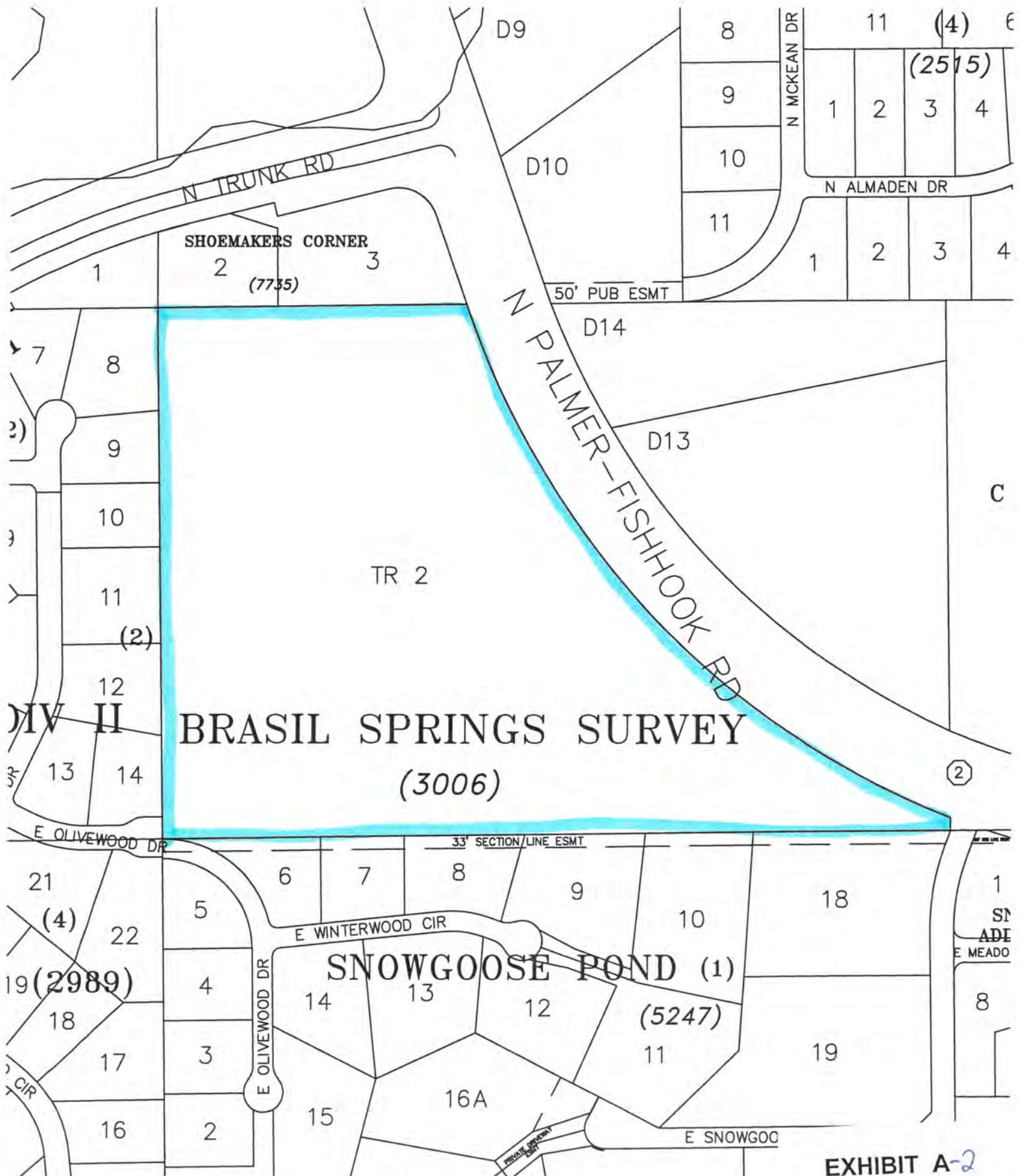
6. A Preliminary Wetland Delineation Report was supplied showing that wetlands are present on the property. Prior to the commencement of any work within these wetlands, Petitioner may need to obtain a wetlands permit for US Army Corps of Engineers.
7. ADOT&PF has noted that no access shall be granted to N. Palmer Fishhook Road.
8. At the time of staff report write-up, there were no responses to the Request for Comments from US Army Corps of Engineers; Community Council Fishhook; Fire Service Area #132 Greater Palmer Consolidated; Road Service Area #16 South Colony; MSB Emergency Services, Community Development, Assessments, Planning, Pre-Design Division or Development Services.
9. There were no objections from any federal or state agencies, Borough departments, or utilities.
10. There were no objections from the public in response to the Notice of Public Hearing.

RECOMMENDATIONS OF CONDITIONS OF APPROVAL

Suggested motion: I move to approve the preliminary plat of Hidden Acres, Section 24, Township 18 North, Range 01 East, Seward Meridian, Alaska, contingent on staff recommendations

1. Taxes and special assessments must be paid in full for the year of recording, pursuant to MSB 43.15.053(F) and AS 40.15.020. Pay taxes and special assessments (LIDs), by CERTIFIED FUNDS OR CASH.
2. Provide updated Certificate to Plat executed within seven (7) days of recording of plat and submit Beneficiary Affidavit for any holders of a beneficial interest.
3. Pay postage and advertising fees.
4. Provide a copy of the driveway permit/application to Platting Staff for all existing driveways.
5. Add a plat note stating no access shall be granted to N. Palmer Fishhook Road unless otherwise authorized by the permitting authority.
6. Show all easements of record on final plat.
7. Submit recording fees, payable to Department of Natural Resources (DNR).
8. Submit plat in full compliance with Title 43.



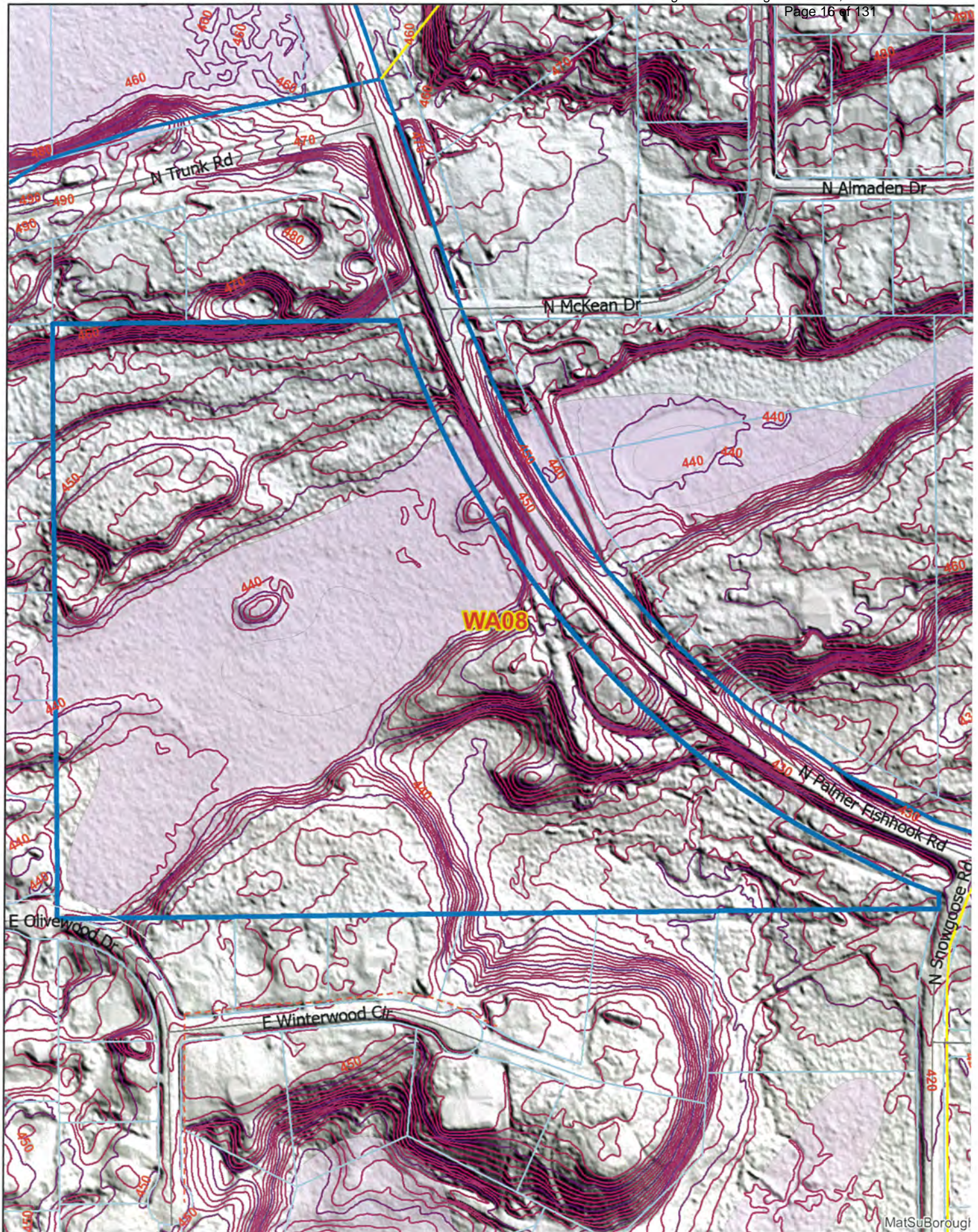


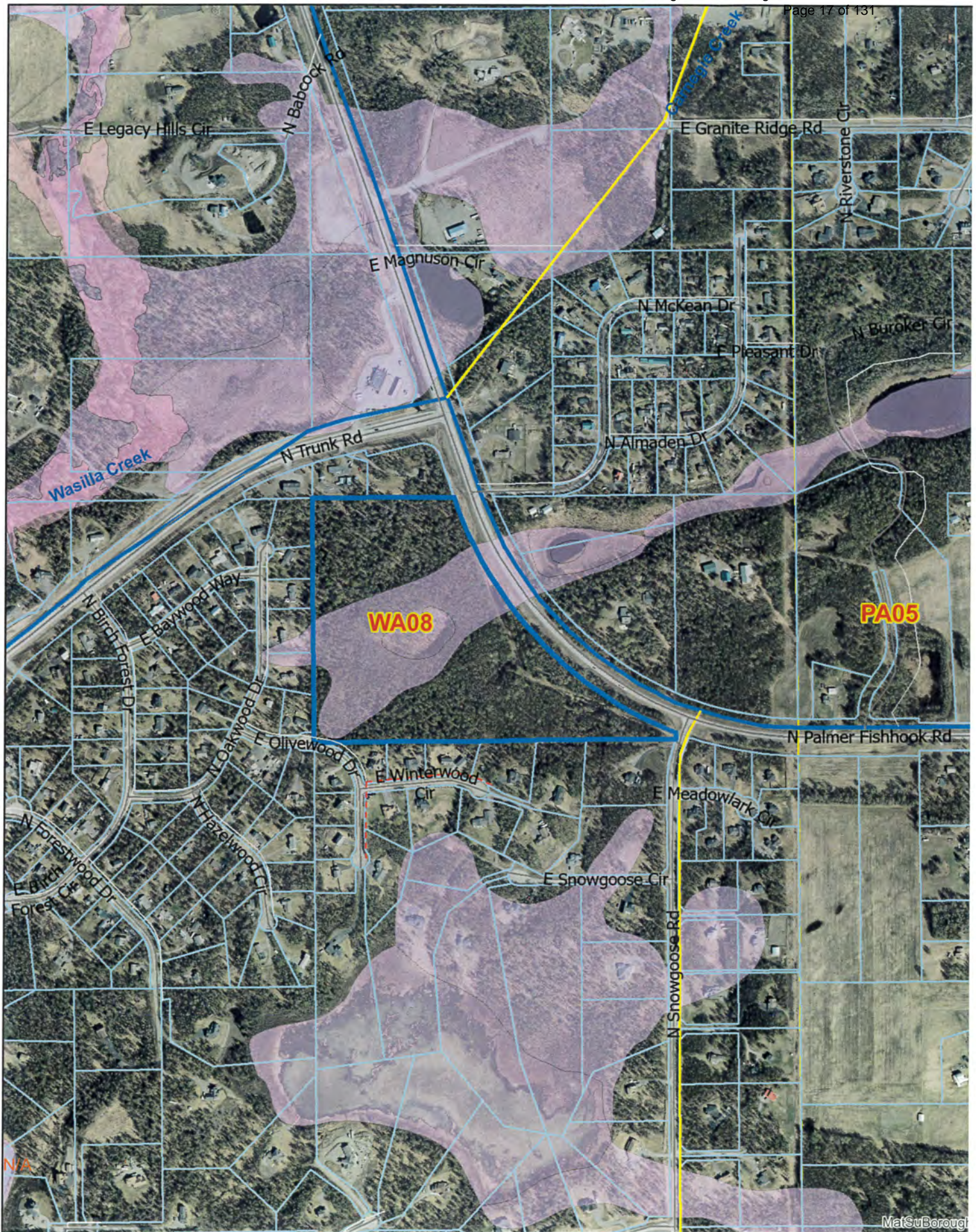


260 130 0 260 Feet

EXHIBIT A-3







650 325 0 650 Feet

EXHIBIT A-5



Matanuska-Susitna Borough
Telephone (907) 861-7874

350 East Dahlia Avenue
Palmer, Alaska 99645-6488

VARIANCE APPLICATION

This application is to the Matanuska-Susitna Borough Platting Board for a variance from the Subdivision Ordinance, Title 43. The application must include all of the information listed below. Incomplete applications will not be processed.

Legal description of property: Spring Hill Tract A

RECEIVED

JAN 13 2023

PLATTING

An application for a variance from a requirement of Title 43 shall contain:

1. The preliminary plat to which the variance pertains or, if presented separately, a graphic representation of what the future platting project would entail;
2. A description of the variance requested including the code section reference;
3. Explain the special circumstances for the variance *on separate pages*, addressing criteria A, B, & C as required in MSB 43.15.075.
 - A. *The granting of the variance shall not be detrimental to the public health, safety or welfare, or injurious to adjacent property; and*
 - B. *The variance request is based upon conditions of the property that are atypical to other properties; and*
 - C. *Because of unusual physical surroundings, shape, or topographical conditions of the property for which the variance is sought, or because of the taking of a part of the property through condemnation or because of surrounding development or conditions, the strict application of MSB 43.20 shall result in undue substantial hardship to the owner of the property.*

I, Kevin Sorensen the owner (or owner's representative) of the above described property apply for a variance from Section 43.20. 320 of the Borough Code in order to allow:
In the event that Lot 5 is deemed to have not met the frontage requirement with 290 feet of frontage on a section line easement, allow a variance when sufficient and safe access is available.
(see attached)

(Variances from Road Design Standards are variances from MSB 43.20.140, described within the Subdivision Construction Manual).

**APPLICANT
OR
OWNER**

Name: Rocky Point Development Email: ksorensen@mtaonline.net
Mailing Address: PO Box 4136 Palmer, AK Zip: 99645
Signature: [Signature] Phone: (907) 232-5099

SURVEYOR

Name (FIRM): Keystone Surveying Email: garyl@mtaonline.net
Mailing Address: PO Box 2216 Palmer AK Zip: 99645
Contact Person: Gary LaRusso Phone: (907) 45-6780

EXHIBIT B-1

Description of Variance Request

This variance is requested for a situation where the proposed platting action is not clearly in conformity with, or at odds with, MSB 43.20.320 which requires 60 feet of frontage. The particular question is for proposed Lot 5 and whether it has 60 feet of frontage. In addition, the parent parcel, Spring Hill Tract A, and its development are impaired by existing conditions not of the petitioner's creation. With the variance Lot 5 will have sufficient and safe access.

A. The granting of the variance shall not be detrimental to the public health, safety and welfare, or injurious to adjacent properties.

1. DOT will not allow access to Spring Hill Tract A from the 1388 lineal feet of frontage on Palmer Fishhook Road and the Borough will not allow a road to access from Snow Goose Road. This leaves the only access for this twenty-four acre parcel is in a corner of the property at Olivewood Drive.
2. A Borough right-of-way anything more than approximately eighty feet of road right-of-way and a caul-de-sac would require constructing the road in wetlands that are under the jurisdiction of the U. S. Army Corp of Engineers. Public policy favors the conservation of wetlands.
3. The 1980 feet of section line easement on Spring Hill Tract A is a public right-of-way. A road cannot be built in that right-of way because on the east end Snow Goose Drive has insufficient intersection distance. On the west end the intersection with Olivewood Drive is at an angle that is neither safe nor legal. A road alignment to achieve an appropriate intersection with Olivewood and the section line easement would require constructing a road through the wetlands. This would also put a road at both the front and back of the homes on Winterwood Circle.
4. The variance will allow the 24 acre parcel to be subdivided into just five lots each with sufficient area for residential development. Each lot will have sufficient and safe access. There will only be one driveway off of Olivewood, that will have minimal impact on the surrounding area.

B. The variance request is based upon conditions of the property that are atypical to other properties.

1. DOT will not allow access to Spring Hill Tract A from the 1388 lineal feet of frontage on Palmer Fishhook Road and the Borough will not allow a road to access from Snow Goose Road.
2. For a Borough right-of-way anything more than approximately eighty feet of road right-of-way and a caul-de-sac would require construction in wetlands. Wetlands are under the jurisdiction of the U.S. Army Corp of Engineers. Public policy favors the conservation of wetlands.
3. The 1980 feet of section line easement on Spring Hill Tract A is a public right-of-way. A road cannot be built in that right-of way because on the east end Snow Goose Drive has insufficient intersection distance. On the west end the intersection with Olivewood Drive is at an angle that is neither safe nor legal.
4. Development and road construction on the property is constrained by wetlands, drainageway, overhead power line and buried fiber optic cable through the property, high water table, steep topography, proximity to wetlands and poor soils.
5. Despite having 1388 lineal feet of frontage on a State road and 1980 feet of frontage on an unconstructed public right of way and 65 feet (includes section line easement on adjoining

property) of frontage on Snowgoose Drive (total 3,373 lineal feet) access is restricted to a small corner of the 24 acre tract on Olivewood Drive. In aggregate this is a very unusual situation.

C. Because of unusual physical surroundings, shape, or topographical conditions of the property for which the variance is sought, or because of the taking of a part of the property through condemnation or because of surrounding development or conditions, the strict application of MSB 43.20 shall result in undue substantial hardship to the owner of the property.

1. DOT will not allow access to Spring Hill Tract A from the 1388 lineal feet of frontage on Palmer Fishhook Road and the Borough will not allow a road to access from Snow Goose Road. This leaves the only access for this twenty-four acre parcel is in a corner of the property at Olivewood Drive.
2. For a Borough right-of-way anything more than approximately eighty feet road right-of-way and a caul-de-sac would require construction in wetlands. Wetlands are under the jurisdiction of the U.S. Army Corp of Engineers. Public policy favors the conservation of wetlands.
3. The 1980 feet of section line easement on Spring Hill Tract A is a public right-of-way. A road cannot be built in that right-of way because on the east end Snow Goose Drive has insufficient intersection distance. On the west end the intersection with Olivewood Drive is at an angle that is neither safe nor legal.
4. Lot 5 will have 406 lineal feet of frontage on the section line easement which has a portion of the constructed Olivewood within it. It is not conclusive that the situation is a violation of MSB 43.20.320.
5. A driveway from the paved surface of Olivewood to Lot 5 could be constructed entirely in the right of way and a distance of approximately 20 feet to Lot 5 which is a distance commonly used for Borough driveways from the driving surface to the property line.
6. Lot 5 will have exclusive opportunity for an access from the southerly side of the common driveway for approximately 500 feet.
7. Lot 5 will have a sufficient and safe access.
8. Lots 4 and 5 are mostly a near level three acre area that is the most developable area in the entire tract. The remainder of the property is constrained by wetlands, drainageway, overhead power line and buried fiber optic cable through the property, high water table, proximity to wetlands and poor soils. It is a hardship to only be able to create a single lot of this prime area.



HOLLER ENGINEERING

Water, Wastewater & Soils Consulting

3375 N Sams Dr. Wasilla, Alaska 99654 • 376-0410

January 9, 2023

Fred Wagner
MSB Platting Officer
350 East Dahlia Avenue
Palmer, Alaska 99645

Re: *Hidden Acres Subdivision; Useable Areas, Roads and Drainage*
HE #22091

Dear Mr. Wagner:

At the request of the project owner, we have performed a soils review and related preliminary design work for the referenced proposed subdivision. The project will create 5 new lots from one existing parent parcel totaling 24.2 acres. Our soils evaluation included logging 5 new testholes on the parent parcel, review of adjacent existing soils information, review of the provided topography information, review of aerial imagery, and our other observations at the site. See the attached testhole location and topography map for details.

Topography. The project site forms an irregular/ incomplete rectangle shape west of and bordering N. Palmer-Fishhook Road south of N. Trunk Road. The majority of the parent parcel contains gently rolling terrain, with its northern third in a northeast-southwest oriented shallow valley with a low, wet area. A few regions containing steep slopes exceeding 25% were found on the parcel and have been delineated on the attached drawing. The total elevation differential indicated from the provided topographical map is approximately 34'.

Soils & Vegetation. The parent parcel contains a few small trails near N Palmer-Fishhook Road and one small unused structure near in the southeastern corner. The remainder of the project area appears to exist in a native state. The existing vegetation on primarily consists of mature growth spruce, cottonwood, or birch trees. Some small regions containing clusters of devils club or small willows exist throughout the project, and the wet area at the north has grasses. Five new testholes were dug on 6/30/22 near or along proposed new common lot lines in order to evaluate existing soils conditions. Near surface soils found in the testholes included thin organic mats over layers of silty loess topsoils typically extending down to 3'. Receiving soils under the topsoils were found to be consistently clean sands and gravels, with the exception of siltier soils in low lying areas not considered useable. A copy of the testhole logs and a location/topography map is attached.

Groundwater. Groundwater was encountered only in Testholes 1 and 4 at depths of 8.5' and 10.2' respectively during the summer high season. Separation to surface water/wet areas, and areas with high groundwater will be a limiting factor for areas on some of the proposed lots. However, each new lot will contain enough useable area to meet MSB Title 43 Code definitions.

Useable Areas. The proposed lots have a few limitations on areas defined by MSB code as *useable septic area* or *useable building area*. Useable septic areas will be limited by setbacks to neighboring water wells, steep areas, lot lines, setbacks to a low/wet area, and easements. For useable building area, lotlines, utility easements, and ROW/PUE setbacks will be limiting factors. For all of the proposed lots, adequate unencumbered area exists to readily meet the code requirements. Based on the available soils and water table information, topography, MSB Title 43 Code definitions, and our observations at the site, ***each of the proposed lots as labeled 1-5 will each contain over 10,000 square feet of contiguous useable septic area, and an additional 10,000 square feet of useable building area.***

Roads and Drainage. The proposed new lots, as labeled 1-5, will be accessed via a common access from the southwest. As no new road construction is proposed, no drainage plan is required. Construction of a future shared driveway will not alter drainage substantially. General existing drainage patterns have been indicated on the attached map.

Please do not hesitate to call with any questions you may have.

Sincerely,

Curtis Holler, PE

c: K. Sorenson, w/attachments





Notes:

1. Base drawing provided by surveyor.
2. 2' topography contours from surveyor.
3. Hatched areas have +25% grade.
4. Arrows denote apparent drainage patterns.
5. Testhole locations approximate.

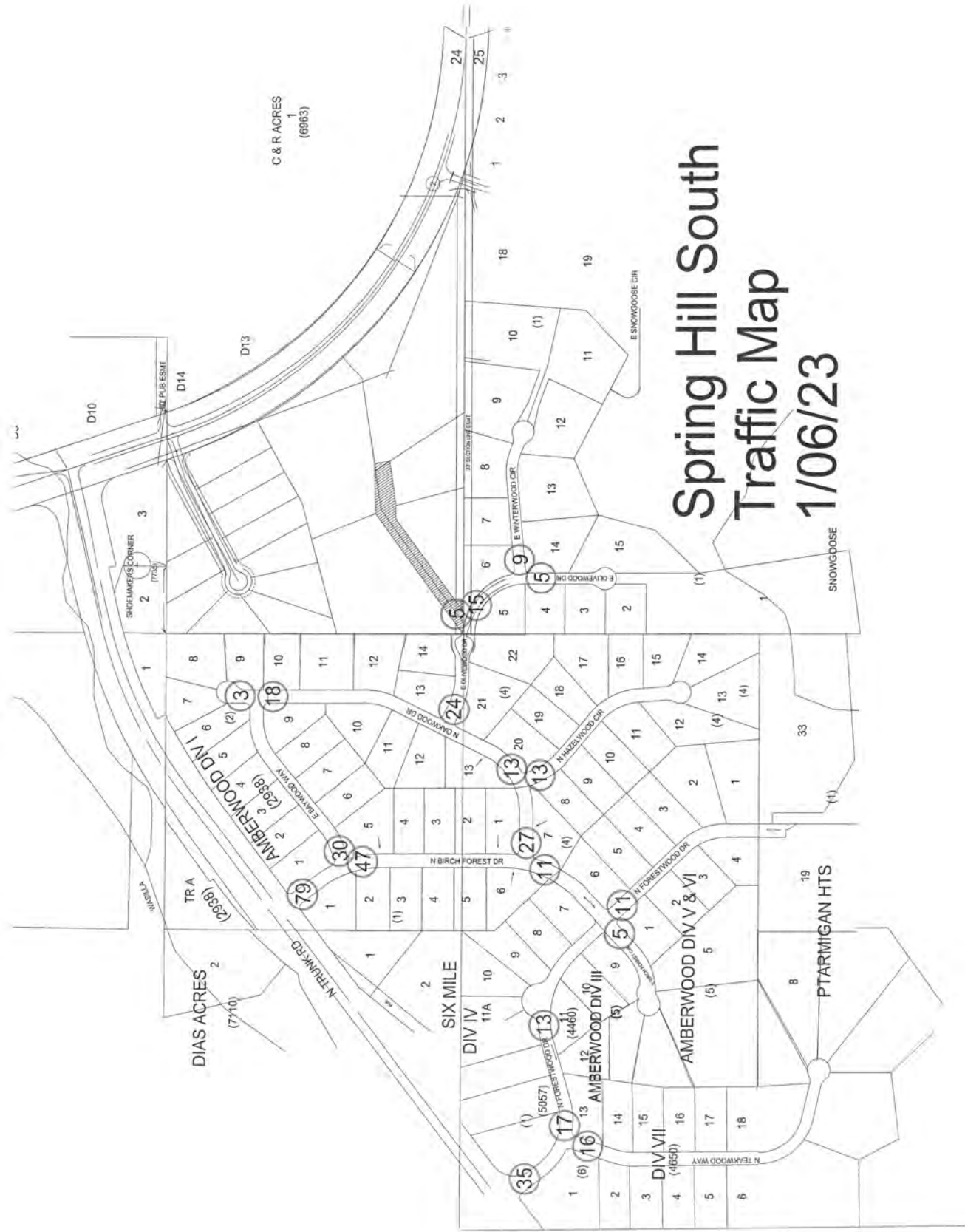


Hidden Acres Subdivision
Useable Area, Topography, and Drainage



22091 Scale: 1" = 150' 1/09/23

EXHIBIT C-3



Spring Hill South Traffic Map 1/06/23



HOLLER ENGINEERING

3375 N Sams Dr. Wasilla, Alaska 99654 376-0410

SOILS LOG / PERCOLATION TEST

TEST HOLE # 1 of 5

Performed For: Kevin Sorenson

Legal Description: Hidden Acres Subdivision



Depth, feet	Soil Type	Slope	Site Plan
1	OL, turf		See attached testhole & topo map
2	SM-ML, brown		
3			
4			
5	SM, blue, moist, dense, few gravels, consolidated.		
6			
7			
8			
9	SP-GP, light blue, Saturated, seeps @ 8.5'	WAS GROUNDWATER ENCOUNTERED? <u>Yes</u> IF YES, AT WHAT DEPTH? <u>8.5'</u> DEPTH AFTER MONITORING? <u>N/A</u>	Slope
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			

Reading	Date	Gross Time	Net Time	Depth to Water	Net Drop
N/A visual analysis only					

- PERCOLATION RATE _____ (min/inch) PERC HOLE DIAMETER _____

- TEST RUN BETWEEN ✓ FT AND _____ FT DEPTH

- COMMENTS: Testhole for subdivision only, for any other use contact Holler Engineering

- PERFORMED BY: J. Wilkins DATE: 6/30/22

EXHIBIT C-5



HOLLER ENGINEERING

3375 N Sams Dr. Wasilla, Alaska 99654 376-0410

SOILS LOG / PERCOLATION TEST

TEST HOLE # 2 of 5

Performed For: Kevin Sorenson

Legal Description: Hidden Acres Subdivision



Depth, feet

Soil Type

Slope

Site Plan

↑
N
↓

See attached testhole & topo map.

Slope

WAS GROUNDWATER ENCOUNTERED?

No

IF YES, AT WHAT DEPTH?

N/A

DEPTH AFTER MONITORING?

N/A

PERCOLATION TEST

Reading	Date	Gross Time	Net Time	Depth to Water	Net Drop
	N/A visual analysis only				

- PERCOLATION RATE _____ (min/inch) PERC HOLE DIAMETER _____

- TEST RUN BETWEEN _____ FT AND _____ FT DEPTH

- COMMENTS: Testhole for subdivision only, for any other use contact Holler Engineering

- PERFORMED BY: Wilkins

DATE: 6/30/22

EXHIBIT C-6

3375 N Sams Dr. Wasilla, Alaska 99654 376-0410

Seal



Slope

$$\begin{array}{c} \uparrow \\ N \\ I \end{array}$$

SP. GP, Olive gray, rock tag,
few 8" +, medium coarse
sands, sloughs

EXHIBIT C-7



HOLLER ENGINEERING

3375 N Sams Dr. Wasilla, Alaska 99654 376-0410



SOILS LOG / PERCOLATION TEST

TEST HOLE # 4 of 5

Performed For: Kevin Sorenson

Legal Description: Hidden Acres Subdivision

Depth, feet

Soil Type

Slope

Site Plan

$$\uparrow$$

$$N$$

$$I$$

See attached testhole & topo map

Slope

WAS GROUNDWATER ENCOUNTERED?

Yes

IF YES, AT WHAT DEPTH?

10.2'

DEPTH AFTER MONITORING?

N/A

PERCOLATION TEST

[illegible]

- PERCOLATION RATE _____ (min/inch) PERC HOLE DIAMETER _____

- TEST RUN BETWEEN FT AND FT DEPTH

- COMMENTS: Testhole for subdivision only, for any other use contact Holler Engineering

•

- PERFORMED BY: J. Williams

DATE: 6/30/22

EXHIBIT C-8



Hidden Acres Subdivision

DRAINAGE REPORT

Account Number: 8294000T00A
Parcel ID: 70195
TRS: S18N01E24
Site Address: 4836 N PALMER FISHHOOK RD
LAT 61.6294° LON -149.1897°



Civil Resources, LLC
3001 W Stonebridge Dr.
Wasilla, AK 99654
CRLLC Job No. 2106
December 30, 2022



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December 30, 2022

Introduction

Owner has developed Lots 1 – 11 with previous Phase 1 project and now proposes to develop Lots 12 - 16 with Phase 2 of this project. Improvements consist of private drive, drainage, and home improvements in the Matanuska-Susitna Borough (MSB). The site is located immediately south of North Trunk Road and North Palmer-Fishhook Road intersection. The watershed area is 931.8 acres with 878.3 acres, northeast and upstream from North Palmer – Fishhook Road being isolated and non-contributory to site drainage. Runoff from Basin A is captured and retained by a large natural depression and cannot reach the site for storm events less than or equal to the 10-Year 24-Hour. The major portion of site runoff flows to a natural depression located at the southwest corner. The depression volume will capture all runoff from the pre-development and post-development conditions without any water leaving the site for the 10-Year 24-Hour storm event. Portions of the natural depression may be jurisdiction waters of the United States (WOTUS). Runoff from two smaller areas, Basins C and D, leave the site with the potential of increasing downstream flow. Basin D was included in Phase 1, has no impervious improvements, and no-net increase of post development flow. Runoff from Basin C is part of this Phase 2 project and requires a detention basin to keep post-development flow from exceeding pre-development.

Land development activities increase runoff and requires responsible stormwater management facilities consisting of treatment, retention, detention, infiltration, and conveyance of stormwater to avoid adverse impact of adjoining, nearby, and downstream properties receiving water. The purpose of this report is to document those improvements will follow the following criteria in Table D-1¹:

1. Conveyance: Drainage ditches and non-regulated streams shall be designed for the 10-year storm 24-hour storm event. Regulated streams shall be designed for the 100-year 24-hour storm event.
 - a. All ditches and culverts must convey the peak flow from the 10-Year Storm Event with a minimum of 12-Inches (1-foot) freeboard below the top of fore slope (structural section hinge point) or maximum flow depth of 18" in a 30" deep ditch.
 - b. Flow capacity must be a minimum of 10% greater than the design flow.
2. Wetlands. Preserve the pre-development function of wetlands. For jurisdictional wetland areas, comply with United States Army Corps of Engineers wetlands development retention requirements.
3. Water Quality. Treat runoff generated by 0.50 inch of rainfall in a 24-hour period.
4. Erosion and Sediment Control. Control flows in conveyance channels so that transport of particles sized D50 and greater will not occur for the post-development peak flow.
5. Extended Detention. Provide 12 to 24 hours of detention for the post-development project runoff in excess of pre-development runoff volume for the 1-year, 24-hour storm.

¹ Matanuska-Susitna Borough, Public Works Department, Subdivision Construction Manual, July 19, 2022.

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6. Flood Hazard. Control peak flow to minimize downstream impacts.
 - a. Maintain the post-development project runoff peak flows from the 10-year, 24-hour storm to less than or equal to pre-development runoff peak flow at all project discharge points. Or,
 - b. Maintain the post-development project runoff peak flows to less than 1.10 times pre-development runoff peak flow at all project discharge points. Evaluate downstream until the project site area is less than 10% of the total upstream basin area and mitigate adverse impacts.
7. Flood Bypass. Compute post-development peak flow and delineate an unobstructed, overland flow path for runoff to overtop or bypass project conveyance routes for the post-development 100-year, 24-hour storm.
8. Drainage Easements. Easements are required for drainage facilities located outside of dedication right-of-way. Easements shall connect to right-of-way and be a minimum of 20' wide and 20' long. Easement for detention basins shall be 5' outside top of basin.
9. Utility Easements. Avoid locating drainage facilities in adjacent utility easements. Obtain approval from utilities when co-location is required.
10. Other Agency Requirement may include the following:
 - a. Floodplain Use Permit from MSB;
 - b. 404 Permit from U.S. Army Corps of Engineers;
 - c. Alaska Department of Fish and Game (ADFG) for fish/stream crossings; or
 - d. Storm Water Pollution Prevention Permit (SWPPP) from the Alaska Department of Environmental Control.

Maps and calculations supporting the findings and recommendations can be found in Appendices A and B. All storm events referenced herein have a 24-hour duration except those used in the Rational Method.

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Site Conditions

FEMA Flood Zone

Flood Insurance Rate Map 02170C7265E Effective Date 06/17/2011 designates the project site area outside the 0.2% annual chance floodplain (Zone 'X') or area with undetermined, but possible flooding (Zone 'D'). A Floodplain Use Permit is not required.

Waters of the United States

A Preliminary Wetland Delineation Report was prepared for Spring Hill Development, Palmer, AK by PND Engineers, Inc., September 2021. There are wetland or Jurisdictional Waters of the United States (WOTUS) within DEP2 on site. A 404 Permit is required from the United States Army Corps of Engineers prior to performing any disturbance or development in this area.



Figure 1 – Wetlands and Waters of the United States

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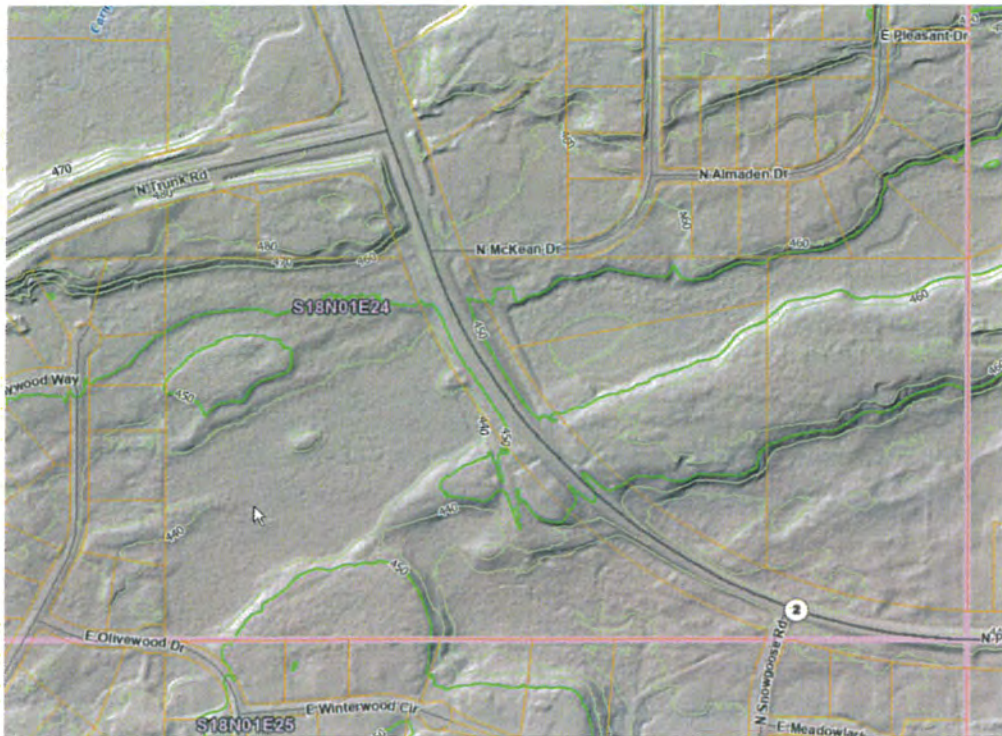


Figure 2 – Hillside Topography

Storm Water Pollution Prevention Plan (SWPPP)

Runoff from the site travels north and west to WOTUS. A storm water pollution prevention plan and notice of intent are REQUIRED.

Alaska Department of Fish and Game

There are no active streams or fish crossings for this site.

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Hydrology

Drainage Areas

Drainage areas and streams were delineated using HEC-HMS GIS tools² and the MSB 2019 Digital Elevation Model (DEM)³. Areas and streams were then adjusted based on review of contour maps and field observation.

Rainfall

Rainfall depths and intensities were taken from NOAA 14 Data Server⁴ and are summarized in the following table. No aerial reduction is applied. SCS Type I Rainfall Distribution is recommended by NOAA 14, TR-55, and MOA for use in this area of Alaska.

NOAA14 uses a regional influence approach for a variety of probability distribution functions and durations that is most suitable for the region. Distribution parameters and precipitation frequency estimates were analyzed for each duration based on the mean of the annual maximum series at each station and then regionally smoothed across durations to ensure consistency in precipitation frequency estimates.

Storms vary spatially having differing effects within the same region. One storm could produce a 2-inch rainfall in Palmer and 1-inch at the project site. But the next storm could reverse having 2-inches at the project site and 1-inch in Palmer. Both sites within the same region have similar probabilities even though the effects could be different for any one event. The precipitation frequency duration data published by NOAA is the best available information available for this site.

Table 1

Trunk-Palmer Fishhook							
24-Hour Depths in Inches				10-YR Intensity in Inches per Hour			
Frequency	1	10	100	5	10	15	30
Inches	1.12	2.39	4.29	2.59	1.74	1.36	0.90

Losses

Hydrologic Soil Groups (HSG) were given by the USDA/NRCS Data Server⁵. SCS Curve Numbers (CN) were taken from TR-55⁶ Tables 2-2a and 2c and MOA⁷ Table 4.4-3 and adjusted for non-

² Hydrologic Modeling System (HEC-HMS) Version 4.7.1, January 14, 2021.

³ 2019 LiDAR & Imagery Project, Matanuska-Susitna Borough.

⁴ NOAA Atlas 14 Volume 7 Version 2.0, Precipitation-Frequency Atlas of the United States, Alaska. NOAA, National Weather Service, Silver Spring, MD.

⁵ Custom Soil Resource Report for Matanuska-Susitna Valley Area, Alaska, USDA/NRCS, February 2, 2021.

⁶ Urban Hydrology for Small Watersheds, USDA/NRCS, Technical Release 55 (TR-55), June 1986, Update January 1999.

⁷ Anchorage Stormwater Manual, Volume 1, Chapter 4, December 2017.

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connected impervious area. The following tables summarize CN'S by hydrologic soil group and weighted CN'S for each type of land use.

Runoff is based on maximum future development for current zoning. It is reasonable to expect future runoff events to be greater than those in the past. For example, commercial properties could replace pervious gravel with impervious pavement having significantly greater runoff. Likewise, residential properties can replace forest with grass having greater runoff. Initial abstraction of rainfall and small depression storage are incorporated into calculations.

Table 2

Rural SCS Runoff Curve Numbers (CN) (Imp Not Connected)						
HSG	IMP	A	B	C	D	TR-55
Infiltration (in/hr)		1.42	0.57	0.06	0.00	NRCS, Part 630 Tbl 7-2
Forrest		30	55	70	77	MOA Tbl 4.4-3
Grass/Pasture		39	61	74	80	Table 2-2c
R1 (1DU/AC)	20%	45	65	77	82	(1) and (4)
R2 (2DU/AC)	25%	47	66	77	82	(1) and (4)
R3 (3DU/AC)	30%	49	67	78	83	(1) and (4)
R4 (4DU/AC)	42%	53	70	80	84	(1) and (4)
COM	85%	89	92	94	95	(1)
IND	72%	81	88	91	93	(1)
Bare Ground		77	86	91	94	MOA Tbl 4.4-3
Pavement/IMP		98	98	98	98	MOA Tbl 4.4-3
Gravel		76	85	89	91	MOA Tbl 4.4-3
ROW	33%	50	68	78	83	(2)

Note: Hydrologic Soil Group 'C' is not found in this watershed/site.

Table 3

PRE LOSS SUMMARY						
HSG	A	B	C	D	TOTAL	CN
DA	ACRES					
A	0.0	861.1	0.0	17.2	878.3	62.0
B1	0.0	8.2	0.0	0.0	8.2	65.1
B2	0.0	23.8	0.0	5.5	29.3	61.8
C	0.0	12.8	0.0	0.0	12.8	55.0
D	0.0	3.2	0.0	0.0	3.2	63.2
Total	0.0	909.1	0.0	22.7	931.8	
POST LOSS SUMMARY						
HSG	A	B	C	D	TOTAL	CN
DA	ACRES					
A	0.0	861.1	0.0	17.2	878.3	62.0
B1	0.0	8.2	0.0	0.0	8.2	65.1
B2	0.0	23.8	0.0	5.5	29.3	63.2
C	0.0	12.8	0.0	0.0	12.8	57.4
D	0.0	3.2	0.0	0.0	3.2	63.2
Total	0.0	909.1	0.0	22.7	931.8	

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Time of Concentration

Time of concentration was computed using four different methods (Kirpich, NRCS Upland, NRCS Lag, and Manning's Equation). Manning's, Upland, and Kirpich all give comparable results. NRCS Lag gives a much higher travel time than the other three and will not be used. Kirpich gives a slightly shorter time than the other two and produces realistic slightly conservative results. Kirpich Equation is given as,

$$T_c = 0.0078 L^{0.77} S^{-0.385} \text{ in Minutes} \quad \text{EQ. 1}$$

Where:

L = Stream Length in feet;

S = Watercourse Slope in feet/feet.

Table 4 – Pre-Development Input Data

DA	Pre Acres	Length	Slope	Tc	V	CN		Notes
						PRE	POST	
A	878.3	14,715	0.0075	83.1	2.9	62.0	62.0	
B1	8.2	1,272	0.0300	7.4	2.9	65.1	65.1	
B2	29.3	2,760	0.0062	24.7	1.9	61.8	63.2	2
C	12.8	1,052	0.0209	7.3	2.4	55.0	57.4	2
D	3.2	373	0.0860	5.0	1.2	63.2	63.2	1
Total	3.2							
Max	878.3		0.0860	83.1	2.9	65.1	65.1	
Min	3.2		0.0062	5.0	1.2	55.0	57.4	

Note 1. Minimum Tc is 5 minutes.
Note2. DA'S B2 and C are large parcels. Assume four 1-AC houses on B2 and three on C.

Table 5. Post-Development Road Hydrology

Road Hydrology Using Rational Method (Q = CIA)										
From Node	To Node	Feature	Length	Grade	A	C	Tc	i	Q10	Qd
1	3	Ditch	239	0.5	0.8	0.36	5.0	2.60	0.7	0.8
2	3	Ditch	400	4.0	1.8	0.36	5.0	2.60	1.7	1.9
3	4	CUL1	400	4.0	2.6	0.36	5.0	2.60	2.4	2.7
Min			239	0.5	0.8	0.4	5.0	2.60	0.7	0.8
Avg			346	2.8	1.7	0.4	5.0	2.60	1.6	1.8
Max			400	4.0	2.6	0.4	5.0	2.60	2.4	2.7

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Transformation - Routing

Autodesk Hydraflow⁸ model is used to transform the Type I Hyetograph into runoff using the SCS Method. Basin area, curve number (CN), and time of concentration are entered for each area and routed to their respective outfalls. Results are summarized in the following figures and table.

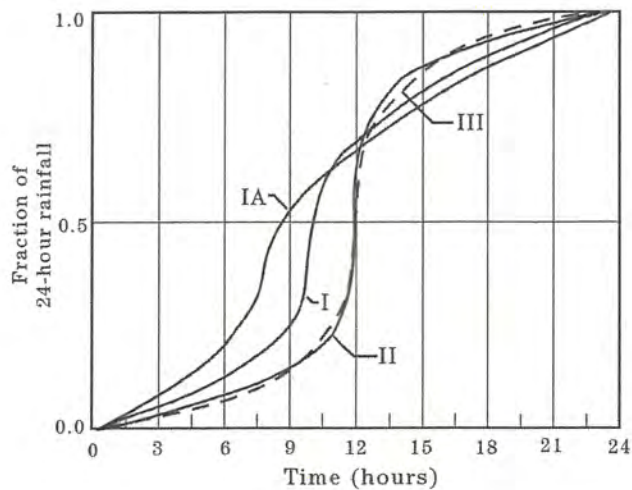


Figure 3. SCS 24-Hour Rainfall Distributions

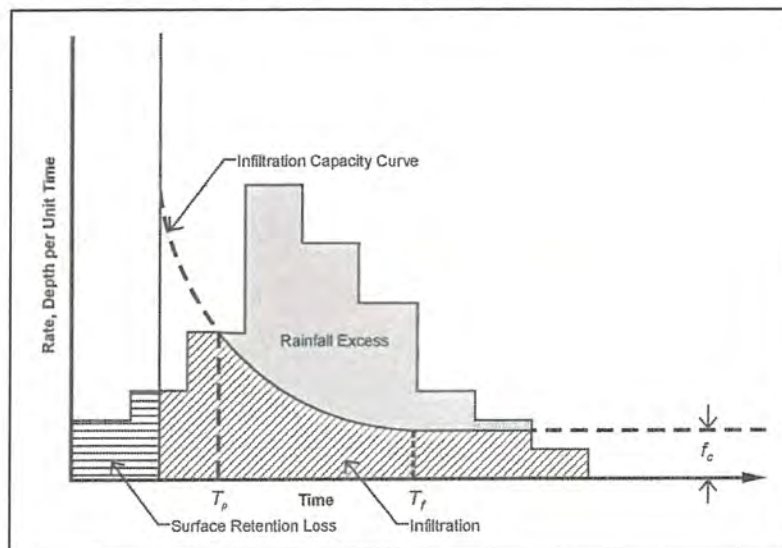


Figure 4. Rainfall - Runoff - Infiltration Relationship

⁸ Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 is an application for urban hydro systems engineering. It creates hyetographs from rainfall data, computes losses, and creates runoff hydrographs that can be added together at junctions, routed through channels, diverted at junctions, and routed through ponds. Pond sizing and routing is interactive within the application.

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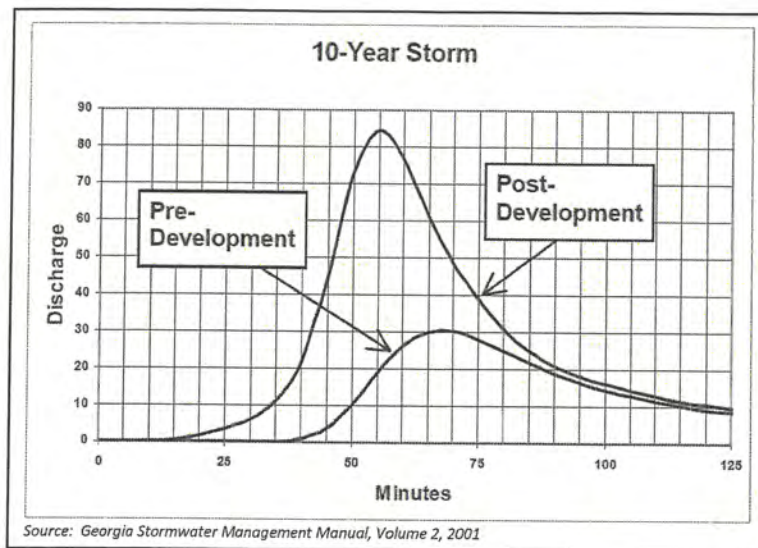


Figure 5. Comparison of Pre- and Post-Development
Runoff Hydrographs (Example)

Table 6

Pre- and Post- Development Flows and Volumes

PRE FLOW IN CFS					PRE VOLUME IN CU-FT			
OUTFALL	BASINS	1YR	10YR	100YR	OUTFALL	1YR	10YR	100YR
1	1	0.0	0.1	2.7	1	0	2,953	30,193
2	2	0.0	0.0	25.2	1	0	0	1,733,418
3	2	0.0	0.1	2.3	1	0	2,552	13,077
POST FLOW IN CFS					POST VOLUME IN CU-FT			
OUTFALL	BASINS	1YR	10YR	100YR	OUTFALL	1YR	10YR	100YR
1	1	0.0	0.1	4.1	1	0	4,577	35,763
2	2	0.0	0.0	26.1	1	0	0	1,801,057
3	2	0.0	0.1	2.3	1	0	2,552	13,077
POST FLOW INCREASE IN CFS					POST VOLUME INCREASE CU-FT			
OUTFALL	BASINS	1YR	10YR	100YR	OUTFALL	1YR	10YR	100YR
1	1	0.0	0.0	1.4	1	0	1,624	5,570
2	1	0.0	0.0	0.9	1	0	0	67,639
3	1	0.0	0.0	0.0	1	0	0	0

Snow Melt

Spring snow melt is an event that occurs every year with a daily runoff volume that could exceed the 10-year 24-hour rainfall volume when "ice-sealing" occurs. Ice sealing takes place

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when snow melts at a rate exceeding soil infiltrate causing a saturated soil condition. The saturated soil then freezes at night forming an impervious ice layer that reduces the amount of snow melt that can infiltrate into the ground. The phenomenon could last a few hours to two days until night freezing temperature hours are less than daytime warming hours. Even if it only occurs for one or two days, there is a real risk of property damage and traffic interruption if not properly addressed. The Municipality of Anchorage estimates this type of event occurs every five years and design for the 10-Year storm event is adequate to address snow melt⁹. The estimated snow melt during spring break-up is 0.5 inches per day¹⁰. The project has 10- and 100-year daily runoff amounts of 0.05 and 0.3 inches. In other words, it is likely the site will experience a greater and more frequent amount of runoff from snow melt than rainfall. Providing stormwater detention basins will help mitigate snow melt runoff.

⁹ Anchorage Stormwater Manual, Volume 1, December 2017, Section 8.1.

¹⁰ NEH Part 630, Chapter 630.1103, Eq. 11-5 for mean daily temperature of 40 Degree-F. Assumes minimum of 2' depth of snow. MOA has recorded 0.9 inches in 40 hours (Appendix D-6).

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Hydraulic and Stability Analyses

Ditches

Ditches were analyzed using Manning's Equation for a 30" deep V-Ditch having 3:1 gravel fore slope and 2:1 turf back slope. Results of detailed calculations for the 100-Year design flow are summarized in the following table.

Manning's Equation is,

$$V = (1.486R^{2/3}S^{1/2})/N \quad \text{EQ. 3}$$

$$Q = VA$$

Where;

V = Velocity, ft/s

A = area of flow, ft²

Q = quantity of flow, ft³/s

N = Manning friction coefficient

R = Hydraulic Radius, feet

S = Energy Slope (ft/ft)

Standard ditch consists of turf and Class II sub-base fill ($D_{50} = 1.5$ -inches). Ditches with D_{50} -Incipient Motion diameters greater than 1.5-inches risk erosion. These were designed for stabilized gravel/rock lining using the Isbash Equation¹¹ for channel banks on straight reach. Rock stabilization with diameters and gradation is shown in the following table. Turf Reinforcement Matt (TRM) is an acceptable alternative if approved by the Borough for use in right-of-way.

The Isbash Equation for critical incipient motion is,

$$D_{50} = 0.0191 Va^2 [\gamma_w/(\gamma_s - \gamma_w)]/\cos\phi \quad \text{EQ. 5}$$

Where:

Va = Average velocity in feet per second,

γ_w = Specific weight of water in pounds per cubic feet = 62.4,

γ_s = Specific weight of stone in pound per cubic feet = 156, and

ϕ = Bank Angle with horizontal

¹¹ Drainage Design Manual for Maricopa County, Hydraulic Open Channels, Pg. 6-51, EQ 6.34, December 14, 2018.

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Table 7 – Hydraulic Design Results

Road Hydrology Using Rational Method ($Q = CiA$)										
From Node	To Node	Feature	Length	Grade	A	C	Tc	i	Q10	Qd
1	3	Ditch	239	0.5	0.8	0.21	5.0	2.60	0.4	0.5
2	3	Ditch	400	4.0	1.8	0.21	5.0	2.60	1.0	1.1
3	4	CUL3	400	4.0	2.6	0.21	5.0	2.60	1.4	1.6
Min			239	0.5	0.8	0.2	5.0	2.60	0.4	0.5
Avg			346	2.8	1.7	0.2	5.0	2.60	1.0	1.0
Max			400	4.0	2.6	0.2	5.0	2.60	1.4	1.6

Table 8

DITCH / CHANNEL LINING STABILIZATION					
TYPE	D50	DMAX	DMIN	T	MATERIAL
UNITS	INCHES				
A	NATIVE GRASS/TURF/GRAVEL				
B	3.0	4.5	1.5	6.0	RIPRAP
C	6.0	9.0	3.0	12.0	RIPRAP
D	9.0	13.5	4.5	18.0	RIPRAP
E	12.0	18.0	6.0	24.0	RIPRAP

Culverts

Culvert crossings were analyzed using Autodesk Hydraflow¹² for HW/D = 1.0, a minimum grade of 1.0%, and are summarized in the following table.

Table 9

Minimum Culvert Diameters								
CULVERT	24HR	FLOW	Number	FLOW/PIPE	HW/D	DIAMETER		TYPE
NO.	YEAR	(CFS)		(CFS)		CALC	USE	RIPRAP
3	10	1.1	1	1.1	1.0	12	18	B
Note: Use calculated diameter for private road/drive. Use 18" diameter minimum for MSB Road crossing and 24" for DOT.								

¹² Hydraflow Express Extension for Autodesk Civil 3D Version 12 by Autodesk, Inc.
[Http://www.autodesk.com/civil3d-stormwater](http://www.autodesk.com/civil3d-stormwater).

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Outlet protection was computed using HEC-14/MOA¹³ riprap apron design and is summarized in the following figure and table.

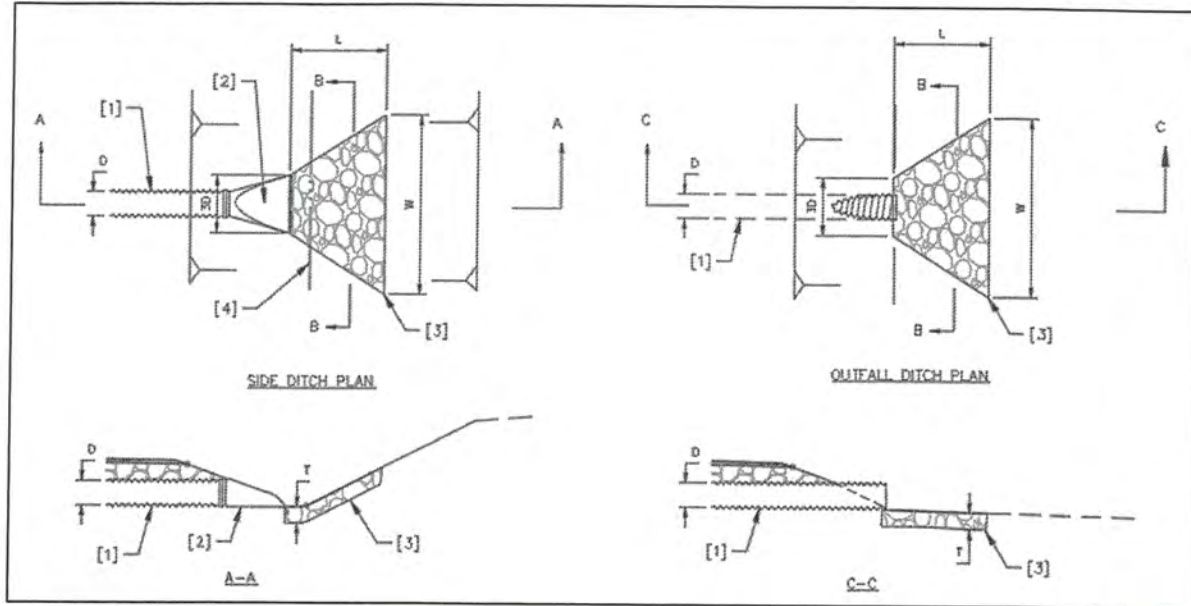


Figure 6

Table 10

OUTLET APRON					
D	A	B	C	D50	T
INCHES	FEET	FEET	FEET	INCHES	INCHES
6	1	5	2	1	2
12	2	8	4	2	4
18	3	11	6	2	4
24	4	14	8	3	6
30	5	17	10	4	8
>30	SPECIAL DESIGN				

First Flush Treatment

The term “first flush” has become common nomenclature in the stormwater management field. The concept behind this term is that pollutants that have collected on impervious surfaces will wash off during the first part of a storm event. The first portion of a given rain event will “flush” the impervious surface of its pollutants, resulting in stormwater runoff that contains more

¹³ HEC-14, Federal Highway Administration, FHWA-NHI-06-086, July 2006, Pg. 10-17, EQ 10.4. and Municipality of Anchorage Stormwater Manual (DRAFT), Volume 1, March 2015, Pg. 6-134, Par. 6.8.1.

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pollutants than runoff produced later in the storm. If the 24-hour 90th percentile historic rainfall event is selected, then capturing/treating the runoff associated with this amount for every rainfall event will prevent 90% of all pollutants from leaving the site. The first flush rainfall amount is 0.52-inches. Treating the runoff from this event by filtering or trapping will prevent 90% of all pollutants from entering Waters of the United States or public water supplies. All polluted runoff from impervious roads, roof tops, patios, walks, and drives will be filtered when flowing through turf and native vegetation before soaking into ground. There is no runoff from the first-flush rainfall event. Therefore, water quality treatment facilities are not needed. All runoffs including the first 0.25" of the 1-, 10-, and 100-year rainfall events are treated by turf filtration/soil infiltration prior to entering storage basins or leaving the site.

Stormwater Detention Basins

Detention basins are not required for this site.

Down Stream Impact Analysis

A downstream impact analysis is needed when the net increase in Post Development flow leaving the site is between 0 and 10 percent. There is no-net increase in post-development flow. Therefore, there are no adverse downstream impacts.

Erosion and Sediment Control

With the results of the 2020 Census coming in less than a year, it is expected that the Borough will reach the threshold that will qualify parts of the Borough and Cities of Wasilla and Palmer to apply for an MS4 permit.

- The MS4 permit is a 5-year National Pollutant Discharge Elimination System (NPDES) permit that is renewed every fifth year,
- The permit is governed by the EPA - Through the Alaska Department of Environmental Conservation (ADEC),
- The permit will have defined boundaries set up around Census Designated "Urbanized Areas,"
- The permit itself is a Best Management Practices Based Program, and
- The permit is an unfunded mandate by the Federal Government.

Given that clearing and grading over a site and constructing impervious surfaces causes increased runoff, property owners need to ensure that their individual activities do not injure their property, downstream neighbors, or pollute local waterways or ground water. Runoff controls aim to reduce the total amount of water that runs off and to reduce the pollutants in the runoff. Runoff controls include temporary measures during construction and permanent measures to improve water quality and control drainage. Groundwater recharge feeds many wells in the region, which could introduce above-ground pollutants into groundwater. Construct stormwater systems so contaminants are removed before they pollute surface waters or groundwater.

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Stormwater runoff from construction activities can have a significant impact on water quality. As stormwater flows over a construction site, it can pick up pollutants such as sediment, debris, and chemicals and transport these to a nearby storm sewer system or directly to a water body. Polluted stormwater runoff and sedimentation can harm or kill fish and other wildlife, destroy aquatic habitat, and cause stream bank erosion. It is the responsibility of the project owner, Homeowner's Association, or the Matanuska-Susitna Borough to keep and service all temporary and permanent erosion and sediment control facilities.

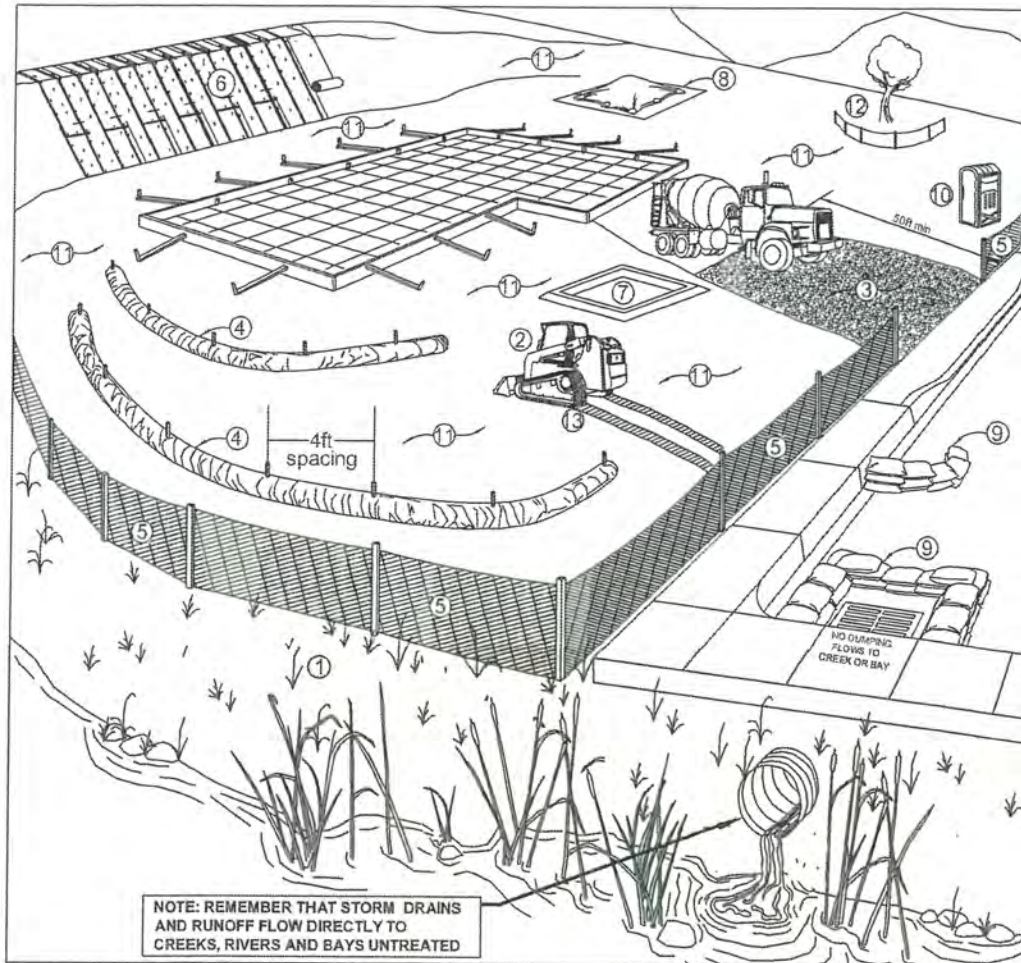


Figure 7. Best Management Practices

- (1) Check with your local planning and public works departments for creek setback requirements. Grading and/or building may be limited within Creekside buffers.
- (2) During grading phase, track-walk up and down slopes (not parallel to them).
- (3) Stabilize site entrance and temporary driveway – use 3-4" crushed rock for a minimum of 50' (or as far as possible) to prevent tracking soil offsite. This can be used in conjunction with a tire wash or rumble plates.

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- (4) Use straw wattles along contours of short slopes or slopes 3:1 or flatter, keyed into ground at least 3" deep (typically 25' apart).*
- (5) Install silt fence along contours as secondary measure to keep sediment onsite and to minimize vehicle and foot traffic beyond limits of site disturbance. Silt fencing must be keyed in.*
- (6) Install erosion control blankets (or equivalent) on any disturbed site with 3:1 slope or steeper, keyed into the ground at least 3".*
- (7) Construct a concrete washout site next to stabilized entrance. Clean as needed and remove at end of project.*
- (8) Cover all stockpiles and landscape material and berm properly with straw wattles or sandbags. Keep behind silt fence, away from water bodies. Hazardous materials and refuse must be kept in closed containers that are covered and use secondary containment, not directly on soil.*
- (9) Use pea-gravel bags, (or similar product) around drain inlets found both onsite and in gutter as a last line of defense.*
- (10) Place port-a-potty with secondary containment near stabilized site entrance, behind the curb and away from gutters, storm drain inlets, and water bodies.*
- (11) Cover all exposed soil with straw mulch and tackifier (or equivalent).*
- (12) Existing vegetation should be preserved as much as possible. Areas of disturbed soil/vegetation should be revegetated as soon as practical.*
- (13) Prevent equipment fluid leaks onto ground by placing drip pans or plastic tarps under equipment. Repair equipment, as necessary.*
- (14) Maintain all landscaping to ensure that vegetation is healthy and working as designed to prevent erosion and provide treatment to runoff.*
- (15) Keep the site clear of debris and trash to prevent these items from entering roadside ditches.*
- (16) Maintain channel/trail to facilitate drainage and access.*
- (17) Clear all ditches, culverts, and down-chutes of ice prior to Spring break-up.*

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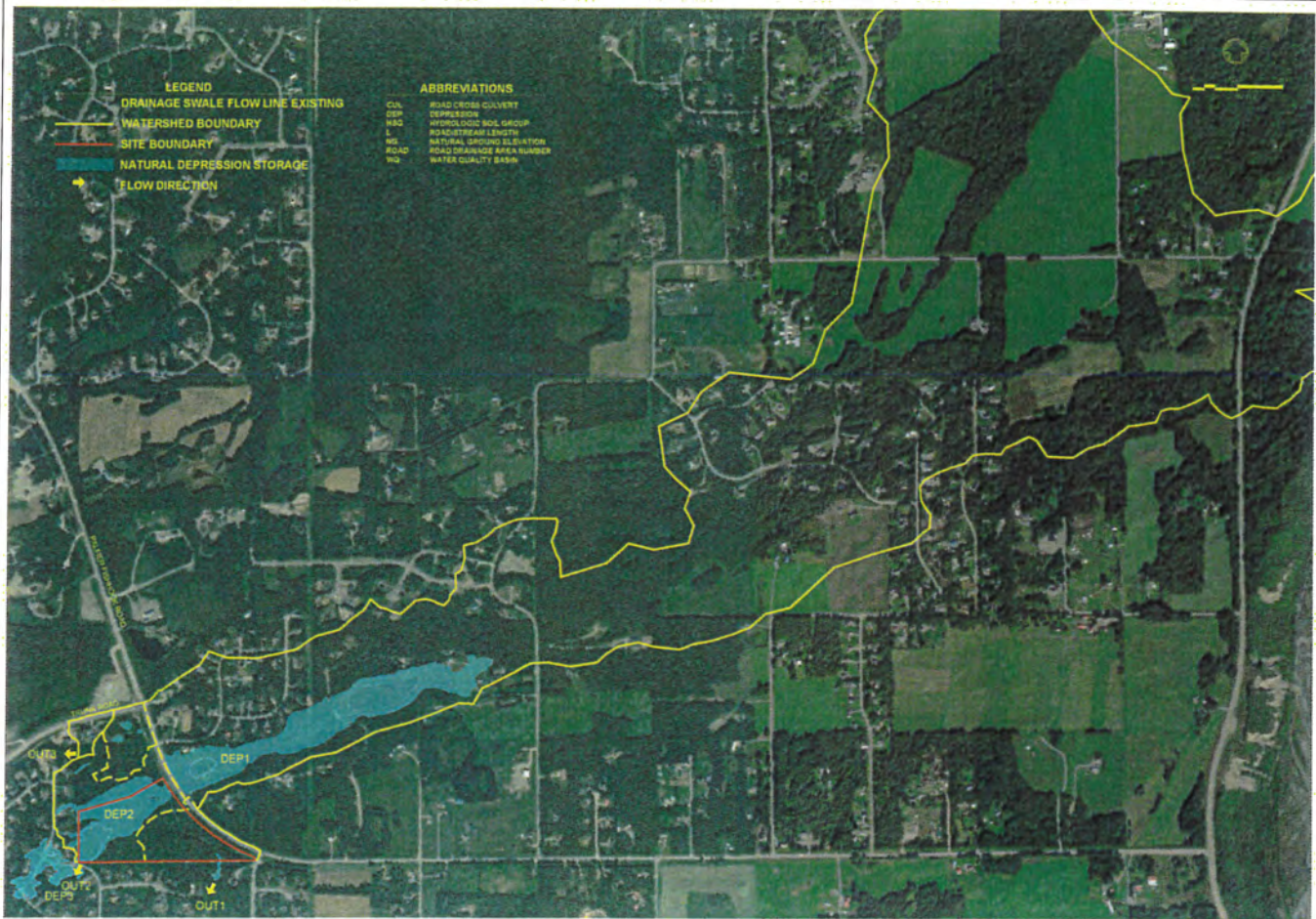
Conclusions and Recommendations

1. There are no public roads, culvert crossings, or ditches. Use 18" ditch and 12" culvert for private road/drive. Cut and fill slopes should not be steeper than 2H:1V.
2. Runoff from the first-flush storm soaks into ground. There is no need for water quality treatment facilities.
3. Ditches are stable for turf or gravel subbase material. Culvert outlets require rock riprap.
4. The post runoff from the 1-year 24-hour storm infiltrates into the ground. No detention storage is needed.
5. There is no net increase for the 10-Year 24-Hour post development storm. Detention basins or downstream adverse impact analyses are not required.
6. Runoff from the 100-Year 24-Hour storm event will pass unobstructed through the site.
7. Other Agency Requirements:
 - a. Floodplain Use Permit is not needed.
 - b. 404 Permit from U.S. Army Corps of Engineers is not required unless WOTUS is disturbed.
 - c. Verification from the Alaska Department of Fish and Game is not needed.
 - d. A Storm Water Pollution Prevention Plan is not required for this project if disturbed area is less than one acre.
8. Ditches will require periodic removal of sediment and vegetation. It is recommended they be inspected every five years and following major storm events.
9. Rock riprap shall be laid on graded filter material or filter fabric to prevent erosion of underlying soils. Filter is not needed for gravel mulch.
10. Building pad elevations shall be a minimum of 12" above adjacent ground within 10-feet of the building. Finished floor and all openings shall be a minimum of 6" above building pad.
11. Minimize disturbance of wetland areas that are not WOTUS.
12. As-Built drawings and certification may be required for drainage improvements prior to final acceptance by Borough.

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APPENDIX A – MAPS

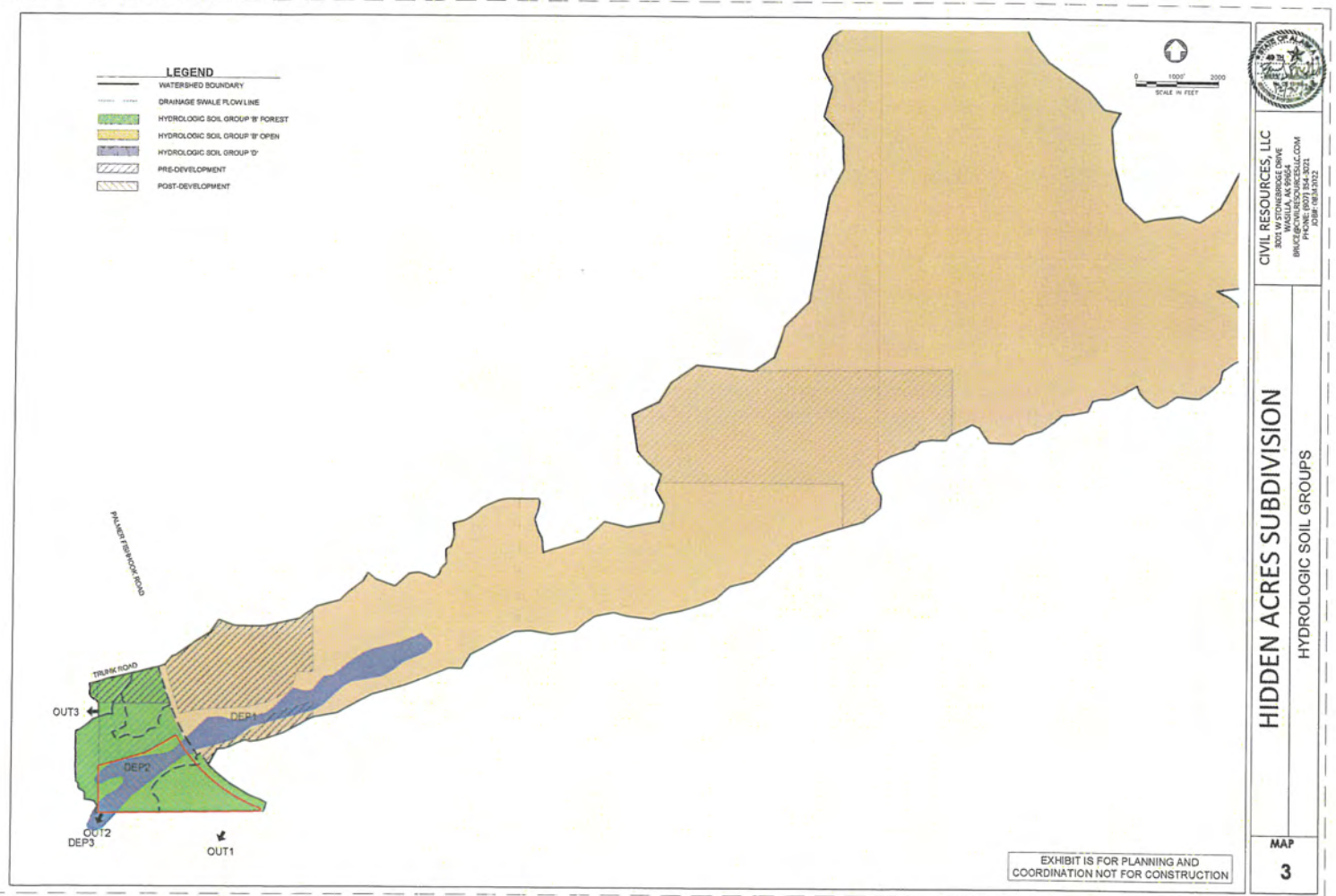


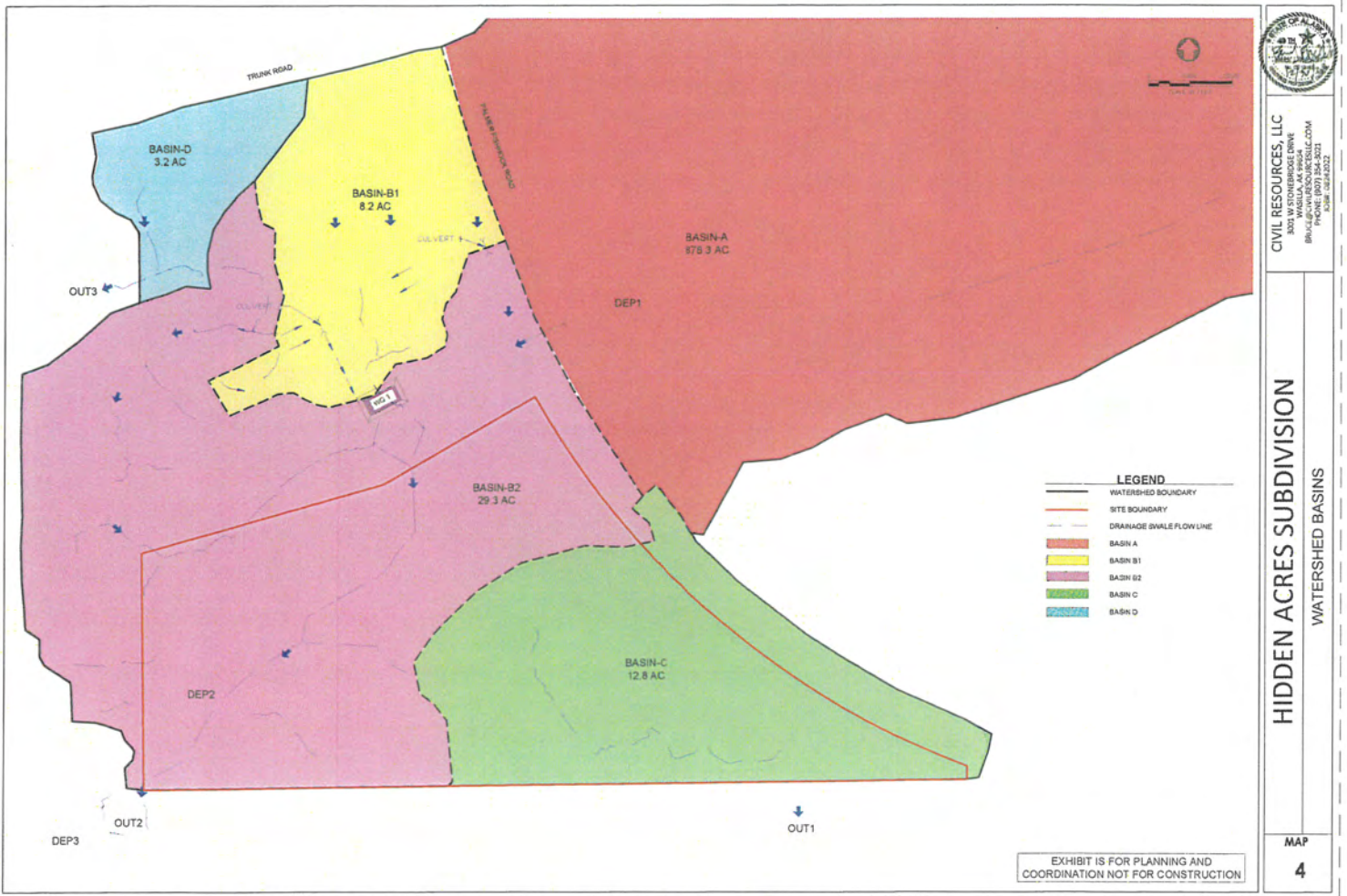
CIVIL RESOURCES, LLC
3001 W. STONERIDGE DRIVE
WAGULA, AL 36887
IBRUC (807) 554-3021
PUB. 08/24/2022

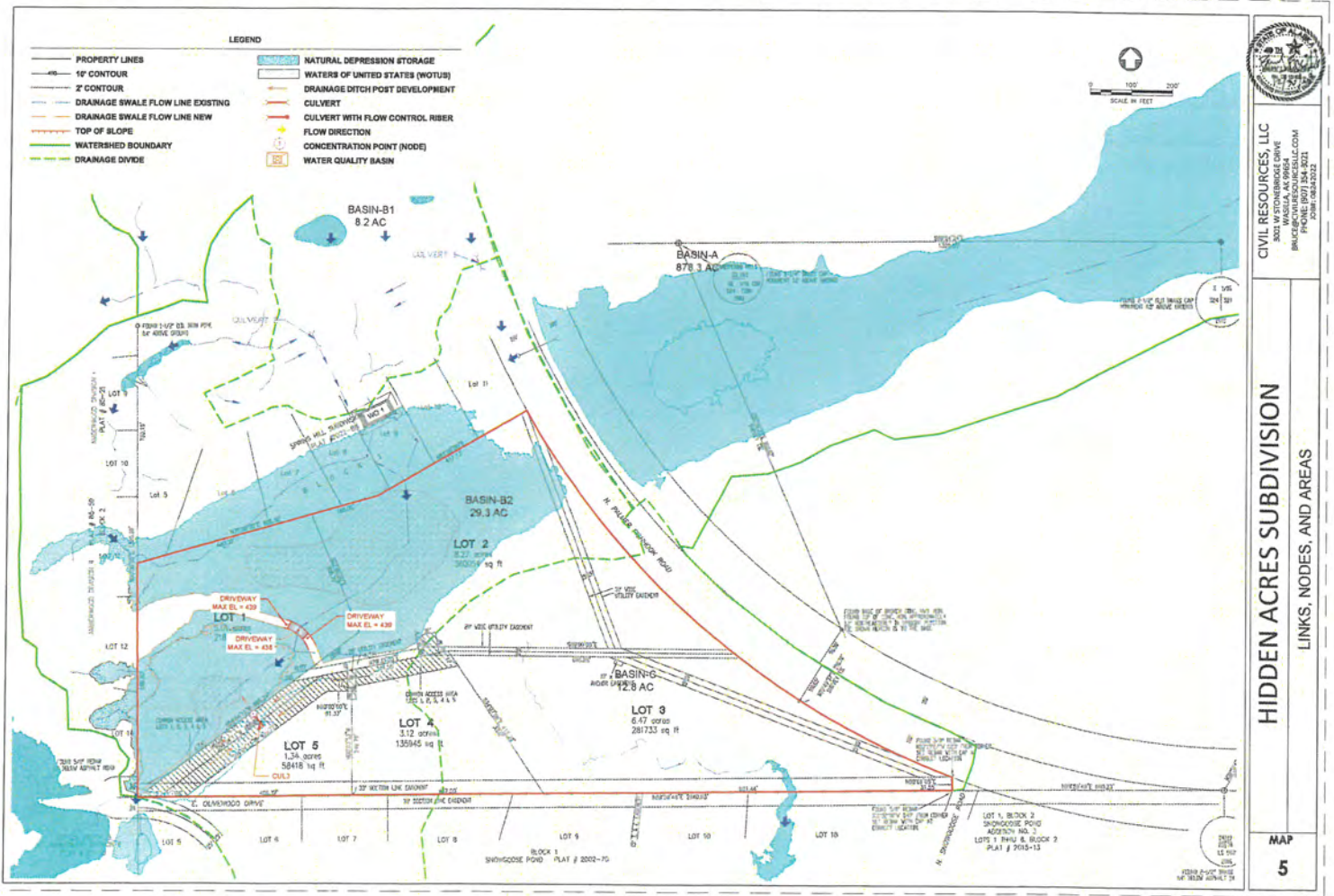
HIDDEN ACRES SUBDIVISION
WATERSHED AERIAL

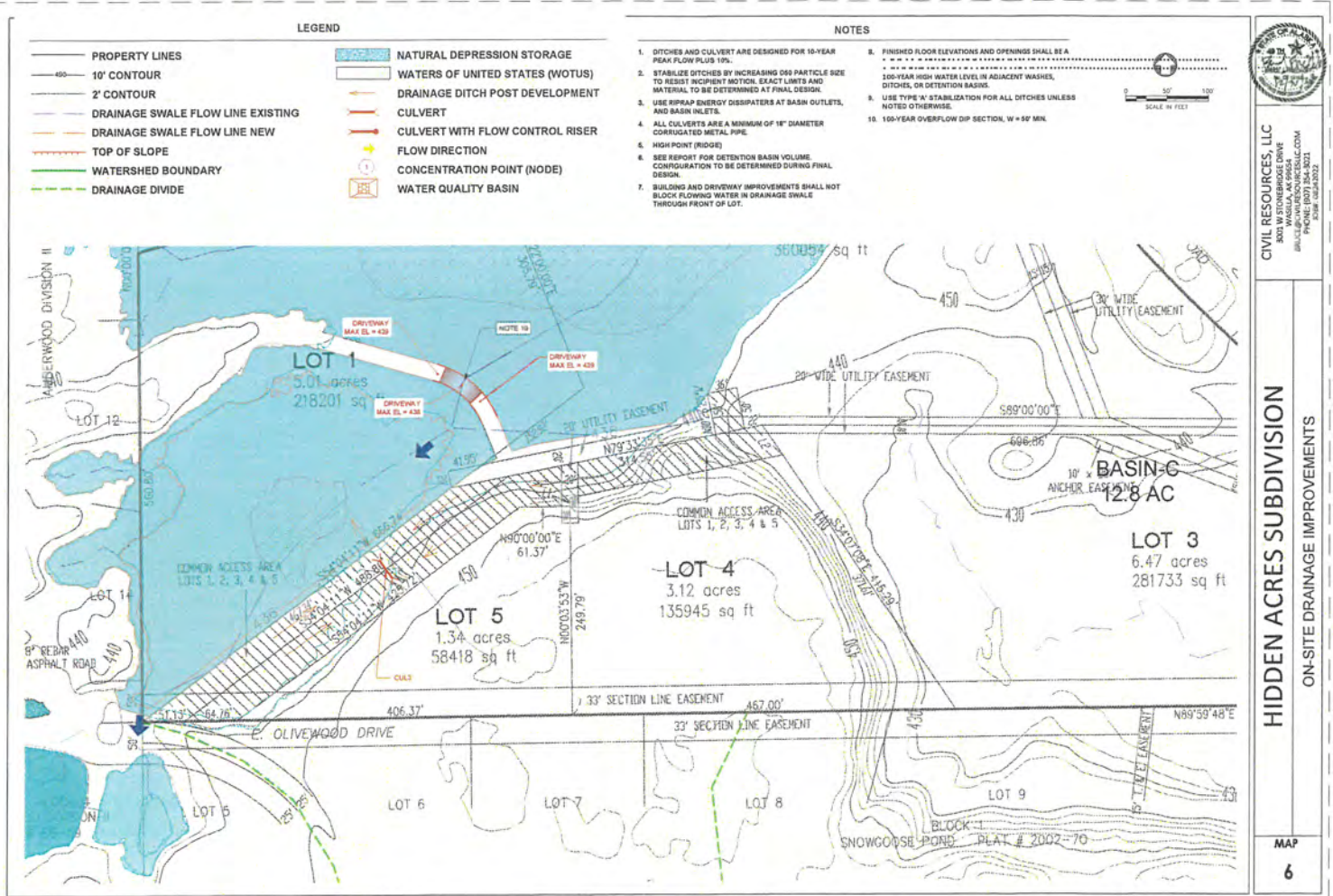
MAP
1











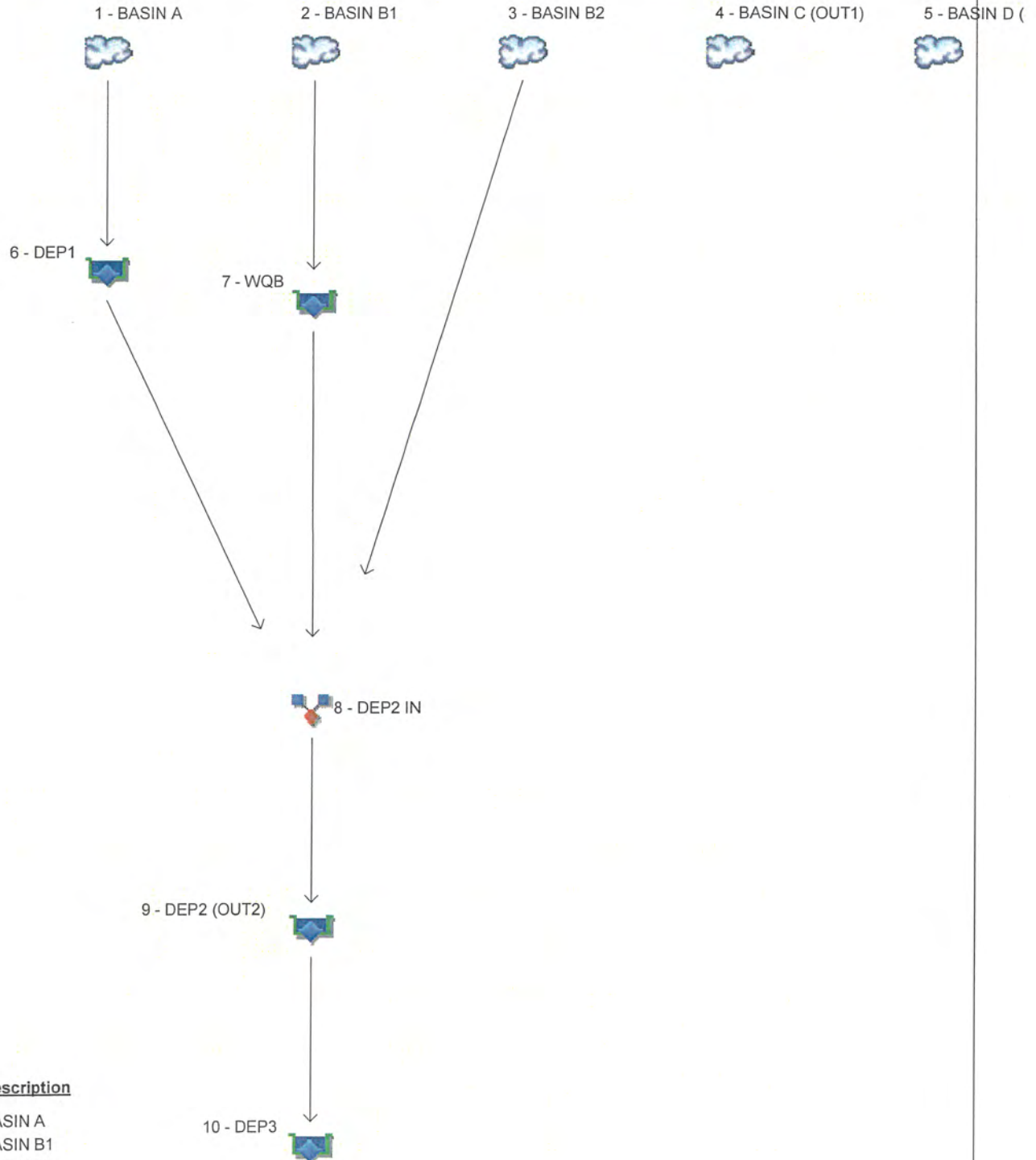
Civil Resources, LLC
Hidden Acres Drainage Report

December 30, 2022

APPENDIX B - CALCULATIONS

Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020



Legend

Hyd.	Origin	Description
1	SCS Runoff	BASIN A
2	SCS Runoff	BASIN B1
3	SCS Runoff	BASIN B2
4	SCS Runoff	BASIN C (OUT1)
5	SCS Runoff	BASIN D (OUT3)
6	Reservoir	DEP1
7	Reservoir	WQB
8	Combine	DEP2 IN
9	Reservoir	DEP2 (OUT2)
10	Reservoir	DEP3

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	----	0.000	----	----	----	13.83	----	----	155.99	BASIN A
2	SCS Runoff	----	0.002	----	----	----	0.270	----	----	6.053	BASIN B1
3	SCS Runoff	----	0.000	----	----	----	0.445	----	----	9.894	BASIN B2
4	SCS Runoff	----	0.000	----	----	----	0.085	----	----	2.659	BASIN C (OUT1)
5	SCS Runoff	----	0.000	----	----	----	0.061	----	----	2.284	BASIN D (OUT3)
6	Reservoir	1	0.000	----	----	----	0.000	----	----	26.78	DEP1
7	Reservoir	2	0.000	----	----	----	0.132	----	----	2.023	WQB
8	Combine	3, 6, 7	0.000	----	----	----	0.507	----	----	27.91	DEP2 IN
9	Reservoir	8	0.000	----	----	----	0.000	----	----	25.17	DEP2 (OUT2)
10	Reservoir	9	0.000	----	----	----	0.000	----	----	24.29	DEP3

Proj. file: PRE.gpw

Friday, 12 / 30 / 2022

EXHIBIT D-29

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.000	2	n/a	0	----	----	----	BASIN A
2	SCS Runoff	0.002	2	1440	13	----	----	----	BASIN B1
3	SCS Runoff	0.000	2	n/a	0	----	----	----	BASIN B2
4	SCS Runoff	0.000	2	n/a	0	----	----	----	BASIN C (OUT1)
5	SCS Runoff	0.000	1	n/a	0	----	----	----	BASIN D (OUT3)
6	Reservoir	0.000	2	n/a	0	1	440.00	0.000	DEP1
7	Reservoir	0.000	2	n/a	0	2	445.01	12.6	WQB
8	Combine	0.000	2	n/a	0	3, 6, 7	----	----	DEP2 IN
9	Reservoir	0.000	2	n/a	0	8	436.00	0.000	DEP2 (OUT2)
10	Reservoir	0.000	2	n/a	0	9	434.00	0.000	DEP3
PRE.gpw					Return Period: 1 Year			Friday, 12 / 30 / 2022	

EXHIBIT D-30

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	13.83	2	810	595,449	-----	-----	-----	BASIN A
2	SCS Runoff	0.270	2	606	7,737	-----	-----	-----	BASIN B1
3	SCS Runoff	0.445	2	774	18,999	-----	-----	-----	BASIN B2
4	SCS Runoff	0.085	2	1158	2,953	-----	-----	-----	BASIN C (OUT1)
5	SCS Runoff	0.061	1	746	2,552	-----	-----	-----	BASIN D (OUT3)
6	Reservoir	0.000	2	n/a	0	1	441.44	595,449	DEP1
7	Reservoir	0.132	2	1220	1,664	2	447.01	6,096	WQB
8	Combine	0.507	2	1218	20,664	3, 6, 7	-----	-----	DEP2 IN
9	Reservoir	0.000	2	n/a	0	8	436.07	20,664	DEP2 (OUT2)
10	Reservoir	0.000	2	n/a	0	9	434.00	0.000	DEP3
PRE.gpw					Return Period: 10 Year			Friday, 12 / 30 / 2022	

EXHIBIT D-31

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	155.99	2	662	3,272,492	-----	-----	-----	BASIN A
2	SCS Runoff	6.053	2	600	35,926	-----	-----	-----	BASIN B1
3	SCS Runoff	9.894	2	612	105,722	-----	-----	-----	BASIN B2
4	SCS Runoff	2.659	2	602	30,193	-----	-----	-----	BASIN C (OUT1)
5	SCS Runoff	2.284	1	599	13,077	-----	-----	-----	BASIN D (OUT3)
6	Reservoir	26.78	2	1466	2,183,027	1	444.13	2,488,847	DEP1
7	Reservoir	2.023	2	612	29,854	2	447.06	6,307	WQB
8	Combine	27.91	2	1440	2,318,604	3, 6, 7	-----	-----	DEP2 IN
9	Reservoir	25.17	2	1556	1,733,418	8	438.30	731,620	DEP2 (OUT2)
10	Reservoir	24.29	2	1630	1,537,341	9	436.29	246,424	DEP3
PRE.gpw					Return Period: 100 Year			Friday, 12 / 30 / 2022	EXHIBIT D-32

Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Friday, 12 / 30 / 2022

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	2.9904	0.1000	0.5697	-----
2	3.5749	0.1000	0.5466	-----
3	0.0000	0.0000	0.0000	-----
5	0.0000	0.0000	0.0000	-----
10	5.8204	0.1000	0.5483	-----
25	7.0285	0.1000	0.5421	-----
50	8.2357	0.1000	0.5468	-----
100	9.4919	0.1000	0.5519	-----

File name: SPRING HILL.IDF

$$\text{Intensity} = B / (T_c + D)^E$$

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	1.18	0.80	0.64	0.54	0.48	0.43	0.39	0.37	0.34	0.32	0.30	0.29
2	1.47	1.01	0.81	0.69	0.61	0.56	0.51	0.48	0.45	0.42	0.40	0.38
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	2.38	1.64	1.31	1.12	0.99	0.90	0.83	0.77	0.72	0.68	0.65	0.62
25	2.91	2.01	1.61	1.38	1.22	1.11	1.02	0.95	0.89	0.84	0.80	0.76
50	3.38	2.33	1.87	1.60	1.41	1.28	1.18	1.09	1.03	0.97	0.92	0.88
100	3.86	2.65	2.12	1.81	1.60	1.45	1.33	1.24	1.16	1.09	1.04	0.99

Tc = time in minutes. Values may exceed 60.

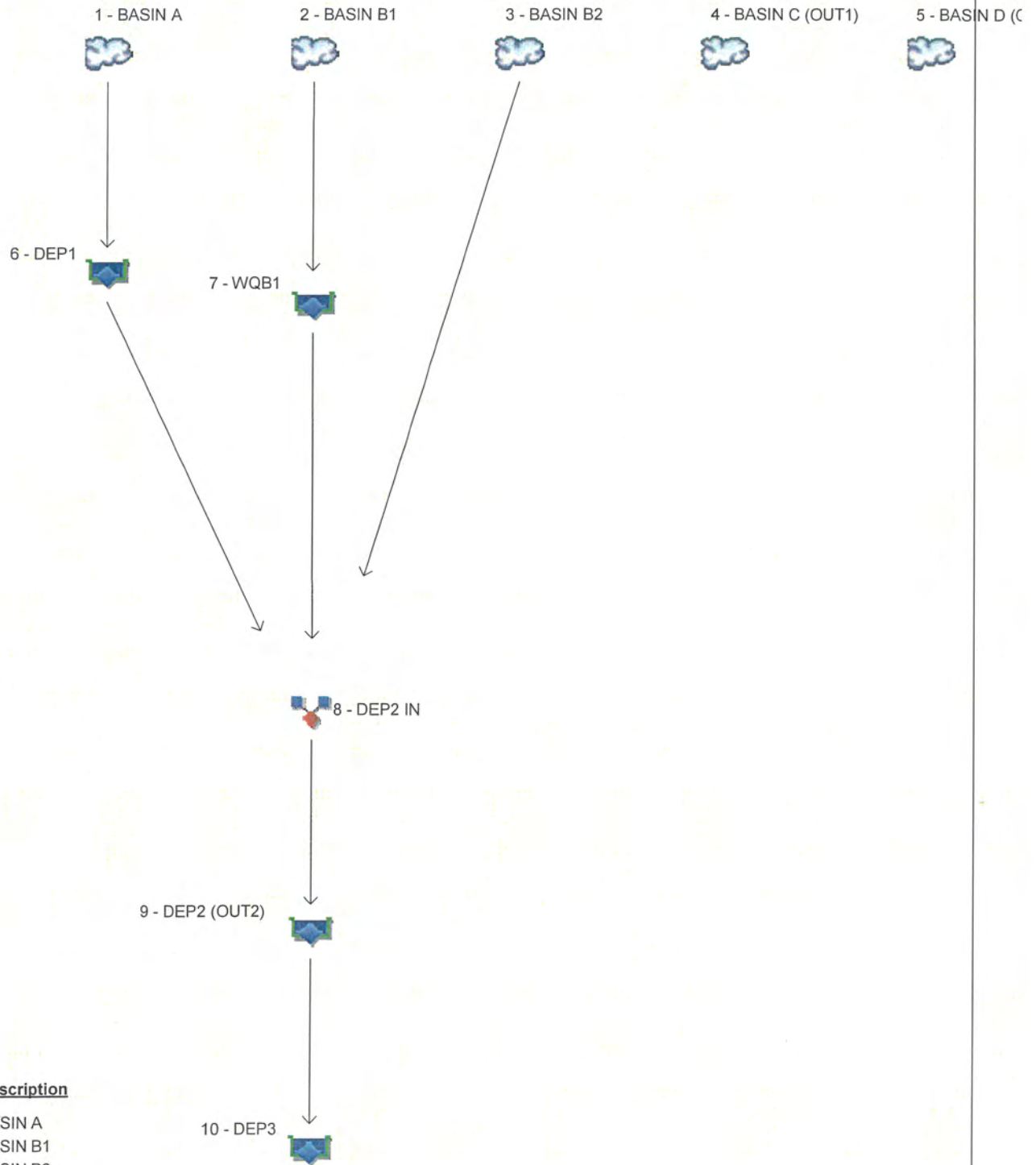
Precip. file name: C:\Users\bfrie\CRLLC\Projects\Spring Hill\CALC\SPRING HILL.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	1.12	1.45	1.72	1.95	2.39	3.05	3.64	4.29
SCS 6-Hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

EXHIBIT D-33

Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020



Legend

Hyd.	Origin	Description
1	SCS Runoff	BASIN A
2	SCS Runoff	BASIN B1
3	SCS Runoff	BASIN B2
4	SCS Runoff	BASIN C (OUT1)
5	SCS Runoff	BASIN D (OUT3)
6	Reservoir	DEP1
7	Reservoir	WQB1
8	Combine	DEP2 IN
9	Reservoir	DEP2 (OUT2)
10	Reservoir	DEP3

EXHIBIT D-34

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	----	0.000	-----	-----	-----	13.83	-----	-----	155.99	BASIN A
2	SCS Runoff	----	0.002	-----	-----	-----	0.270	-----	-----	6.053	BASIN B1
3	SCS Runoff	----	0.000	-----	-----	-----	0.534	-----	-----	11.40	BASIN B2
4	SCS Runoff	----	0.000	-----	-----	-----	0.117	-----	-----	4.086	BASIN C (OUT1)
5	SCS Runoff	----	0.000	-----	-----	-----	0.061	-----	-----	2.284	BASIN D (OUT3)
6	Reservoir	1	0.000	-----	-----	-----	0.000	-----	-----	26.78	DEP1
7	Reservoir	2	0.000	-----	-----	-----	0.132	-----	-----	2.023	WQB1
8	Combine	3, 6, 7	0.000	-----	-----	-----	0.548	-----	-----	27.95	DEP2 IN
9	Reservoir	8	0.000	-----	-----	-----	0.000	-----	-----	26.11	DEP2 (OUT2)
10	Reservoir	9	0.000	-----	-----	-----	0.000	-----	-----	25.38	DEP3
EXHIBIT D-35											
Proj. file: POST.gpw								Friday, 12 / 30 / 2022			

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.000	2	n/a	0	-----	-----	-----	BASIN A
2	SCS Runoff	0.002	2	1440	13	-----	-----	-----	BASIN B1
3	SCS Runoff	0.000	2	n/a	0	-----	-----	-----	BASIN B2
4	SCS Runoff	0.000	2	n/a	0	-----	-----	-----	BASIN C (OUT1)
5	SCS Runoff	0.000	1	n/a	0	-----	-----	-----	BASIN D (OUT3)
6	Reservoir	0.000	2	n/a	0	1	440.00	0.000	DEP1
7	Reservoir	0.000	2	n/a	0	2	445.01	12.6	WQB1
8	Combine	0.000	2	n/a	0	3, 6, 7	-----	-----	DEP2 IN
9	Reservoir	0.000	2	n/a	0	8	436.00	0.000	DEP2 (OUT2)
10	Reservoir	0.000	2	n/a	0	9	434.00	0.000	DEP3
									EXHIBIT D-36
POST.gpw					Return Period: 1 Year			Friday, 12 / 30 / 2022	

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	13.83	2	810	595,449	-----	-----	-----	BASIN A
2	SCS Runoff	0.270	2	606	7,737	-----	-----	-----	BASIN B1
3	SCS Runoff	0.534	2	760	22,307	-----	-----	-----	BASIN B2
4	SCS Runoff	0.117	2	1096	4,577	-----	-----	-----	BASIN C (OUT1)
5	SCS Runoff	0.061	1	746	2,552	-----	-----	-----	BASIN D (OUT3)
6	Reservoir	0.000	2	n/a	0	1	441.44	595,449	DEP1
7	Reservoir	0.132	2	1220	1,664	2	447.01	6,096	WQB1
8	Combine	0.548	2	1216	23,971	3, 6, 7	-----	-----	DEP2 IN
9	Reservoir	0.000	2	n/a	0	8	436.09	23,971	DEP2 (OUT2)
10	Reservoir	0.000	2	n/a	0	9	434.00	0.000	DEP3
									EXHIBIT D-37
POST.gpw					Return Period: 10 Year			Friday, 12 / 30 / 2022	

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	155.99	2	662	3,272,492	-----	-----	-----	BASIN A
2	SCS Runoff	6.053	2	600	35,926	-----	-----	-----	BASIN B1
3	SCS Runoff	11.40	2	610	114,293	-----	-----	-----	BASIN B2
4	SCS Runoff	4.086	2	600	35,763	-----	-----	-----	BASIN C (OUT1)
5	SCS Runoff	2.284	1	599	13,077	-----	-----	-----	BASIN D (OUT3)
6	Reservoir	26.78	2	1466	2,183,027	1	444.13	2,488,847	DEP1
7	Reservoir	2.023	2	612	29,854	2	447.06	6,307	WQB1
8	Combine	27.95	2	1440	2,327,175	3, 6, 7	-----	-----	DEP2 IN
9	Reservoir	26.11	2	1522	1,801,057	8	438.30	665,448	DEP2 (OUT2)
10	Reservoir	25.38	2	1588	1,605,003	9	436.30	248,186	DEP3
									EXHIBIT D-38
POST.gpw					Return Period: 100 Year			Friday, 12 / 30 / 2022	

Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Friday, 12 / 30 / 2022

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	2.9904	0.1000	0.5697	-----
2	3.5749	0.1000	0.5466	-----
3	0.0000	0.0000	0.0000	-----
5	0.0000	0.0000	0.0000	-----
10	5.8204	0.1000	0.5483	-----
25	7.0285	0.1000	0.5421	-----
50	8.2357	0.1000	0.5468	-----
100	9.4919	0.1000	0.5519	-----

File name: SPRING HILL.IDF

$$\text{Intensity} = B / (T_c + D)^E$$

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	1.18	0.80	0.64	0.54	0.48	0.43	0.39	0.37	0.34	0.32	0.30	0.29
2	1.47	1.01	0.81	0.69	0.61	0.56	0.51	0.48	0.45	0.42	0.40	0.38
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	2.38	1.64	1.31	1.12	0.99	0.90	0.83	0.77	0.72	0.68	0.65	0.62
25	2.91	2.01	1.61	1.38	1.22	1.11	1.02	0.95	0.89	0.84	0.80	0.76
50	3.38	2.33	1.87	1.60	1.41	1.28	1.18	1.09	1.03	0.97	0.92	0.88
100	3.86	2.65	2.12	1.81	1.60	1.45	1.33	1.24	1.16	1.09	1.04	0.99

T_c = time in minutes. Values may exceed 60.

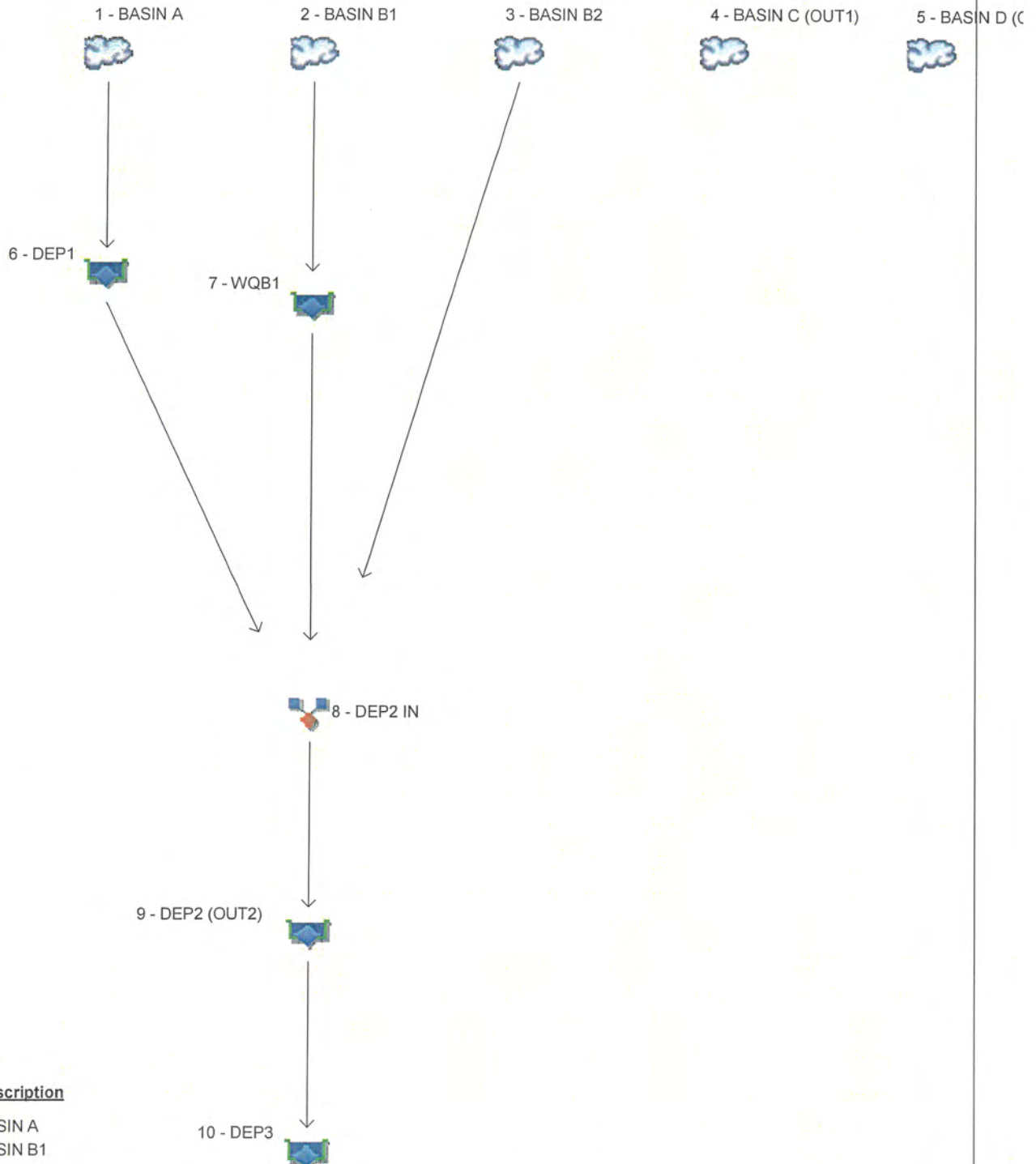
Precip. file name: C:\Users\bfrie\CRLLC\Projects\Spring Hill\CALC\SPRING HILL.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	1.12	1.45	1.72	1.95	2.39	3.05	3.64	4.29
SCS 6-Hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

EXHIBIT D-39

Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020



Legend

Hyd.	Origin	Description
1	SCS Runoff	BASIN A
2	SCS Runoff	BASIN B1
3	SCS Runoff	BASIN B2
4	SCS Runoff	BASIN C (OUT1)
5	SCS Runoff	BASIN D (OUT3)
6	Reservoir	DEP1
7	Reservoir	WQB1
8	Combine	DEP2 IN
9	Reservoir	DEP2 (OUT2)
10	Reservoir	DEP3

EXHIBIT D-40

Hydrograph Return Period Recap

Hydroflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	-----	0.000	-----	-----	-----	13.83	-----	-----	155.99	BASIN A
2	SCS Runoff	-----	0.002	-----	-----	-----	0.270	-----	-----	6.053	BASIN B1
3	SCS Runoff	-----	0.000	-----	-----	-----	0.534	-----	-----	11.40	BASIN B2
4	SCS Runoff	-----	0.000	-----	-----	-----	0.117	-----	-----	4.086	BASIN C (OUT1)
5	SCS Runoff	-----	0.000	-----	-----	-----	0.061	-----	-----	2.284	BASIN D (OUT3)
6	Reservoir	1	0.000	-----	-----	-----	0.000	-----	-----	26.78	DEP1
7	Reservoir	2	0.000	-----	-----	-----	0.132	-----	-----	2.023	WQB1
8	Combine	3, 6, 7	0.000	-----	-----	-----	0.548	-----	-----	27.95	DEP2 IN
9	Reservoir	8	0.000	-----	-----	-----	0.000	-----	-----	26.11	DEP2 (OUT2)
10	Reservoir	9	0.000	-----	-----	-----	0.000	-----	-----	25.38	DEP3
</											

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.000	2	n/a	0	-----	-----	-----	BASIN A
2	SCS Runoff	0.002	2	1440	13	-----	-----	-----	BASIN B1
3	SCS Runoff	0.000	2	n/a	0	-----	-----	-----	BASIN B2
4	SCS Runoff	0.000	2	n/a	0	-----	-----	-----	BASIN C (OUT1)
5	SCS Runoff	0.000	1	n/a	0	-----	-----	-----	BASIN D (OUT3)
6	Reservoir	0.000	2	n/a	0	1	440.00	0.000	DEP1
7	Reservoir	0.000	2	n/a	0	2	445.01	12.6	WQB1
8	Combine	0.000	2	n/a	0	3, 6, 7	-----	-----	DEP2 IN
9	Reservoir	0.000	2	n/a	0	8	436.00	0.000	DEP2 (OUT2)
10	Reservoir	0.000	2	n/a	0	9	434.00	0.000	DEP3
									EXHIBIT D -42
POST.gpw					Return Period: 1 Year			Friday, 12 / 30 / 2022	

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	13.83	2	810	595,449	----	----	----	BASIN A
2	SCS Runoff	0.270	2	606	7,737	----	----	----	BASIN B1
3	SCS Runoff	0.534	2	760	22,307	----	----	----	BASIN B2
4	SCS Runoff	0.117	2	1096	4,577	----	----	----	BASIN C (OUT1)
5	SCS Runoff	0.061	1	746	2,552	----	----	----	BASIN D (OUT3)
6	Reservoir	0.000	2	n/a	0	1	441.44	595,449	DEP1
7	Reservoir	0.132	2	1220	1,664	2	447.01	6,096	WQB1
8	Combine	0.548	2	1216	23,971	3, 6, 7	----	-----	DEP2 IN
9	Reservoir	0.000	2	n/a	0	8	436.09	23,971	DEP2 (OUT2)
10	Reservoir	0.000	2	n/a	0	9	434.00	0.000	DEP3
									EXHIBIT D-43
POST.gpw					Return Period: 10 Year			Friday, 12 / 30 / 2022	

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	155.99	2	662	3,272,492	-----	-----	-----	BASIN A
2	SCS Runoff	6.053	2	600	35,926	-----	-----	-----	BASIN B1
3	SCS Runoff	11.40	2	610	114,293	-----	-----	-----	BASIN B2
4	SCS Runoff	4.086	2	600	35,763	-----	-----	-----	BASIN C (OUT1)
5	SCS Runoff	2.284	1	599	13,077	-----	-----	-----	BASIN D (OUT3)
6	Reservoir	26.78	2	1466	2,183,027	1	444.13	2,488,847	DEP1
7	Reservoir	2.023	2	612	29,854	2	447.06	6,307	WQB1
8	Combine	27.95	2	1440	2,327,175	3, 6, 7	-----	-----	DEP2 IN
9	Reservoir	26.11	2	1522	1,801,057	8	438.30	665,448	DEP2 (OUT2)
10	Reservoir	25.38	2	1588	1,605,003	9	436.30	248,186	DEP3
									EXHIBIT D-44
POST.gpw					Return Period: 100 Year			Friday, 12 / 30 / 2022	

Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Friday, 12 / 30 / 2022

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	2.9904	0.1000	0.5697	-----
2	3.5749	0.1000	0.5466	-----
3	0.0000	0.0000	0.0000	-----
5	0.0000	0.0000	0.0000	-----
10	5.8204	0.1000	0.5483	-----
25	7.0285	0.1000	0.5421	-----
50	8.2357	0.1000	0.5468	-----
100	9.4919	0.1000	0.5519	-----

File name: SPRING HILL.IDF

$$\text{Intensity} = B / (T_c + D)^E$$

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	1.18	0.80	0.64	0.54	0.48	0.43	0.39	0.37	0.34	0.32	0.30	0.29
2	1.47	1.01	0.81	0.69	0.61	0.56	0.51	0.48	0.45	0.42	0.40	0.38
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	2.38	1.64	1.31	1.12	0.99	0.90	0.83	0.77	0.72	0.68	0.65	0.62
25	2.91	2.01	1.61	1.38	1.22	1.11	1.02	0.95	0.89	0.84	0.80	0.76
50	3.38	2.33	1.87	1.60	1.41	1.28	1.18	1.09	1.03	0.97	0.92	0.88
100	3.86	2.65	2.12	1.81	1.60	1.45	1.33	1.24	1.16	1.09	1.04	0.99

Tc = time in minutes. Values may exceed 60.

Precip. file name: C:\Users\bfrie\CRLLC\Projects\Spring Hill\CALC\SPRING HILL.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	1.12	1.45	1.72	1.95	2.39	3.05	3.64	4.29
SCS 6-Hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

EXHIBIT D-45

Preliminary Wetland Delineation Report

**Spring Hill Development
Palmer, AK**

September, 2021

Prepared For:

Kevin Sorenson
Rocky Point Development LLC

By:

PND Engineers, Inc.
1506 W 36TH Ave.
Anchorage, AK 99503



ENGINEERS, INC.

EXHIBIT E-1

Spring Hill Development
Palmer, AK

Preliminary Wetland Delineation Report

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APPENDICES

- A – Data Forms
- B – Soil Pit Photographs

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Preliminary Wetland Delineation Report

ACRONYMS AND ABBREVIATIONS

ACIS	Applied Climate Information System
APE	area of potential effect
CCS	CCE Early Learning
Data Forms	Alaska Region Wetland Determination Data Forms
FAC	facultative
FACU	facultative upland
FACW	facultative wetland
FGDC	Federal Geographic Data Committee
FT	Feet
GINA	Geographic Information Network of Alaska
GPS	global positioning system
NI	no indicator
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NWI	National Wetland Inventory
NWPL	National Wetland Plant List
OBL	obligate wetland
PEM	palustrine emergent
PFO	palustrine forested
PND	PND Engineers, Inc.
Regional Supplement	Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region (Version 2)
RTK	real-time kinematic
UPL	upland
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
WOTUS	waters of the U.S.

Spring Hill Development
Palmer, AK

Preliminary Wetland Delineation Report

1 Introduction

Kevin Sorenson requested the completion of a preliminary wetland delineation for his property near the intersection of Trunk Rd. and Palmer-Fishhook Rd. in Palmer, AK. The proposed development entails a residential neighborhood. To inform planning and design of the project, Mr. Sorenson contracted with PND Engineers, Inc. (PND) to conduct the preliminary wetland delineation.

1.1 Project Location

The proposed project is in Palmer, AK at approximately 61.6296755°N Latitude, 149.1894656°W Longitude, within Section 24, T18N R1E, Seward Meridian.

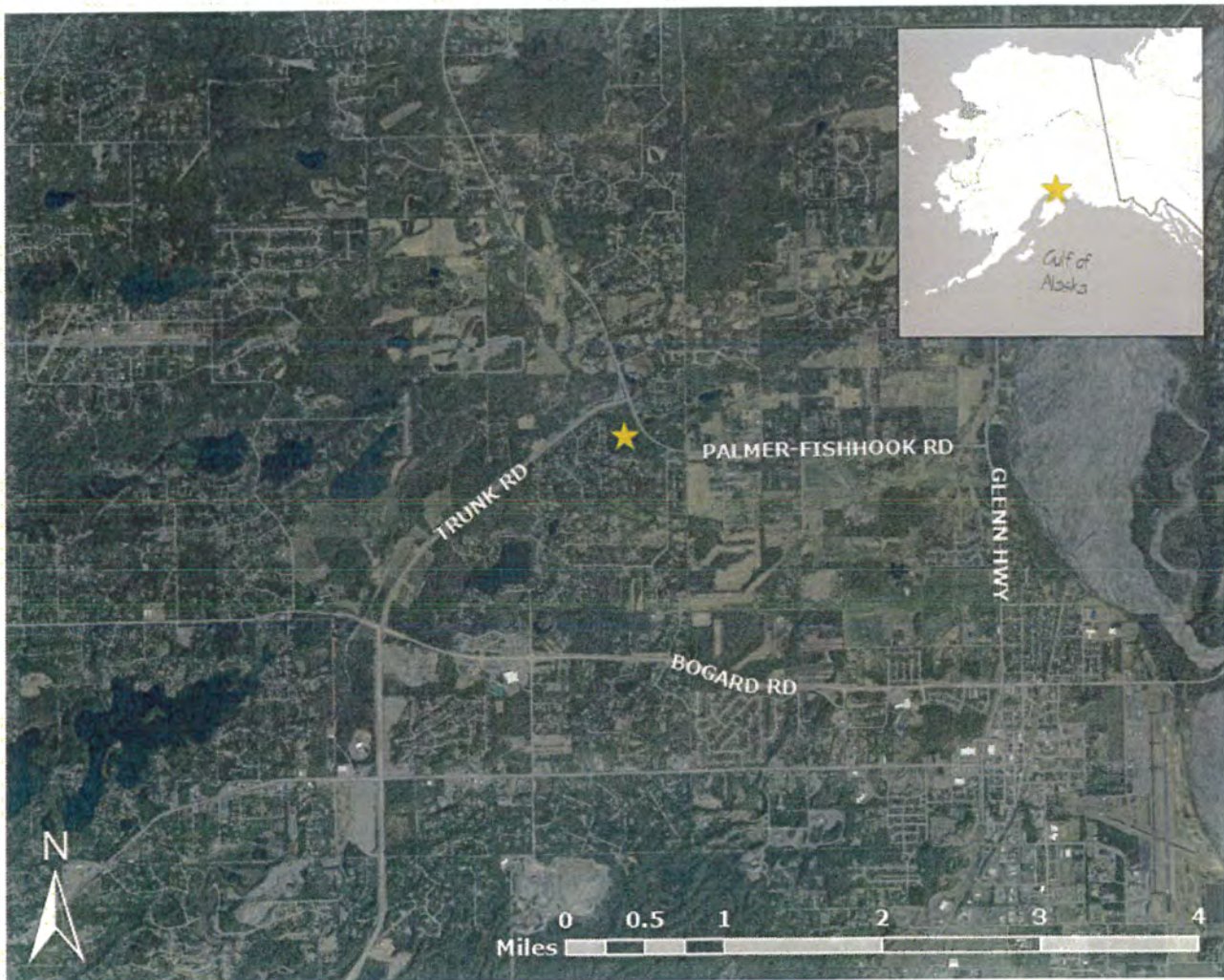


Figure 1. Project area (aerial image from MSB 2019).

Mapping focused on the central suspected wetlands and potential wetland areas to the south. The northern end of the property from about 200 ft inside of the property line was not mapped due to time constraints and a low likelihood of wetlands, as well as an area east of the power line cut, which will be discussed further later (see Figure 2).

Spring Hill Development
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Preliminary Wetland Delineation Report

2 Methods

2.1 Background Information Review

Prior to conducting the field investigation, PND reviewed existing data sources for information related to wetlands in the project area and vicinity. Data reviewed for the wetland delineation included aerial imagery (MSB 2019) and the National Wetland Inventory (NWI) maps and database (USFWS 2021). Additional wetlands data from Cook Inlet Wetlands Mapping (Gracz 2017), made available on the Matanuska-Susitna Borough (MSB) GIS Server, was reviewed for regional wetland mapping.

Natural Resources Conservation Service (NRCS) soil survey data (USDA, NRCS. 2021b) were accessed for the project site. Rainfall data, including accumulated precipitation for the Palmer Airport was accessed via AgACIS, a service from the Applied Climate Information System of the National Oceanic and Atmospheric Administration (NOAA) Regional Climate Centers (NOAA Regional Climate Centers 2017).

2.2 Wetland Determination

PND environmental scientist Brenna Hughes conducted a wetland determination survey on September 27, 2021. Wetland determinations were made using the three-parameter approach in accordance with the 1987 Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region (Ver. 2) (USACE 2007), referred to hereafter as the Regional Supplement.

The investigator walked the project area with the owner to view project area topography and prioritize proposed development sites. Detailed site information regarding hydrophytic vegetation, hydric soils, and wetland hydrology was catalogued for three data points. See Figure 2 for survey data point locations.

Findings were recorded on Alaska Region Wetland Determination Data Forms (Version 2) (referred to hereafter as Data Forms). Data recorded included site location, description, and wetland determination. Photos were taken of the general site conditions, as well as soil samples and pits. Data points and site features were recorded using handheld global positioning system (GPS) corrected to project datum using a real-time kinematic (RTK) base station established on a project survey control point. The Data Forms are included in Appendix A.

In order to meet the USACE definition of a wetland at least one primary indicator (or two secondary) is required for the three parameters; vegetation, soils, and hydrology.

2.2.1 Vegetation

Vegetation present in the sample areas was identified and noted on the Data Forms. Percent of absolute cover for each species by stratum (tree, sapling/shrub, or herb) was estimated per the Regional Supplement.

Plot sizes were fit to local topography or plant community distribution (as noted in the Data Forms). Dominance of each species was evaluated according to the protocol in the Regional Supplement. Wetland indicator status for each species was determined from the 2018 National Wetland Plant List (USACE 2021) or assumed to be upland if not in the list, per the instructions in the Regional Supplement. The indicator status categories are obligate wetland (OBL), facultative wetland (FACW), facultative (FAC), facultative upland (FACU), upland (UPL), or no indicator (NI). Plant species nomenclature is typically based on the Flora of Alaska (Ickert-Bond et al. 2019) with wetland ratings from the National Wetland Plant List (USACE 2021). Determination of wetland vegetation was typically made based on the Dominance Test or the Prevalence Index, unless stated otherwise.

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Preliminary Wetland Delineation Report

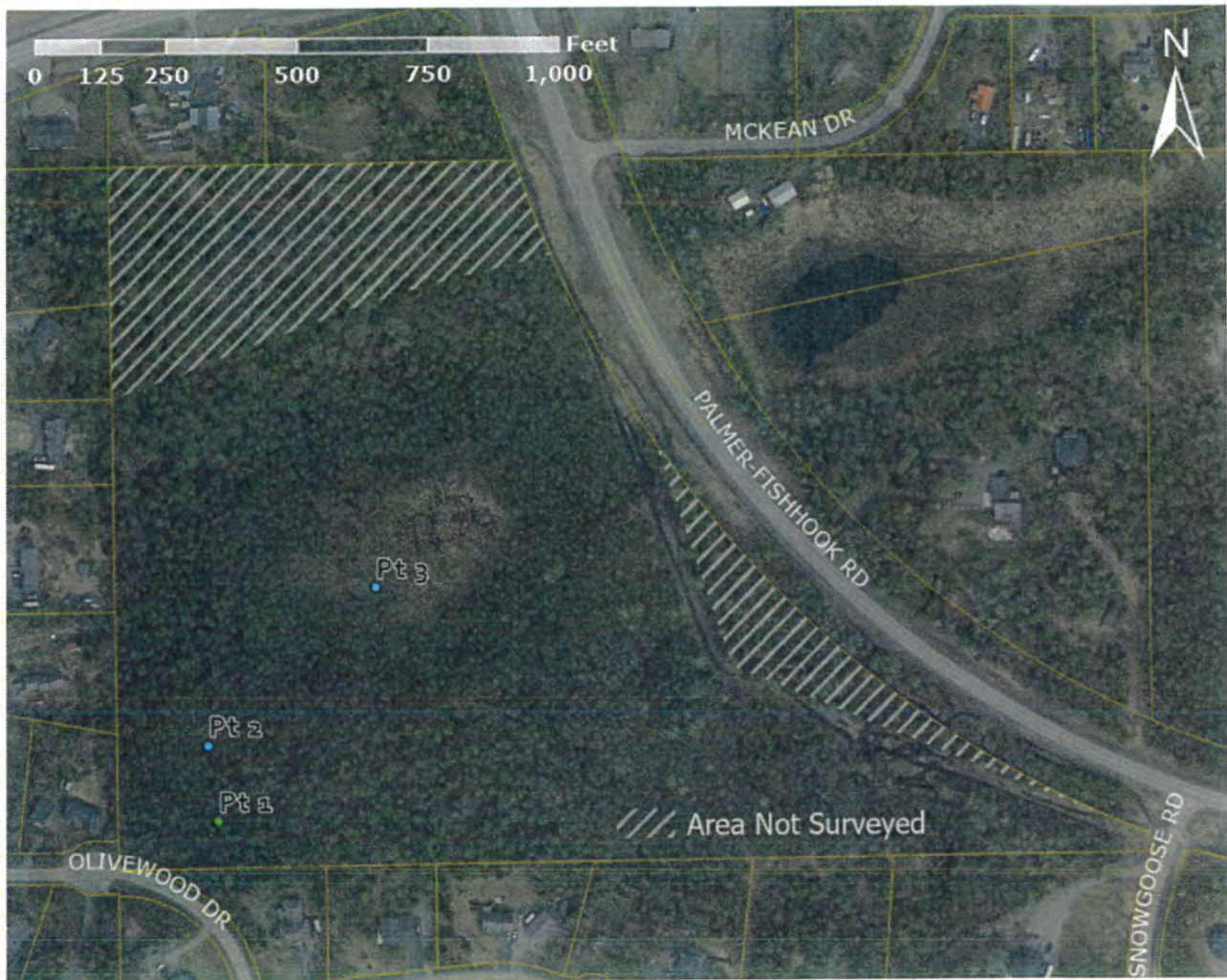


Figure 2. Sample point locations (aerial image from MSB 2019).

2.2.2 Soils

Soils were sampled by hand excavation to at least 18 - 24 inches in depth. Depth, color (by Munsell Color Chart, 2013), and texture of soil horizons were recorded on the Data Forms. Hydric soil indicators were evaluated based on the descriptions in the Regional Supplement. Determination of hydric soil was made based on the presence of one or more hydric soil indicator(s).

2.2.3 Hydrology

Hydrology was evaluated based on the descriptions of indicator features contained in the Regional Supplement. The occurrence of surface water as well as the depth to water table or soil saturation (where present) was recorded for each site. Additional primary or secondary indicators were noted where found. Determination of wetland hydrology was made based on the presence of at least one primary indicator or two or more secondary indicators.

2.3 Wetland Mapping

Test plot locations and wetland boundaries were surveyed using a handheld GPS tablet. Positional accuracy of field measurements agreed generally with MSB (2019) aerial imagery and was sufficient for the intent of

Spring Hill Development
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Preliminary Wetland Delineation Report

the survey and scope of this report. Digital parcel boundaries were acquired from the Mat-Su Borough (2021) and carry a disclaimer that the Borough is not responsible for any potential inaccuracies. The boundaries have not been verified by a surveyor.

Mapping focused on the central suspected wetlands and potential wetland areas to the south. The northern end of the property from about 200 ft inside of the property line was not mapped due to time constraints and a low likelihood of wetlands, as well as an area east of the power line cut (Figure 2). Adjacent housing developments and roads are also visible in the aerial imagery.



Figure 3. NWI boundaries (USFWS 2021) on aerial image (MSB 2019).

2.4 Wetland Classification

Wetlands found within the project area were classified based on the U.S. Fish and Wildlife Service (USFWS) classification system as described by Cowardin et al. (1979, FGDC 2013) and used in the NWI (USFWS 2021). This system is based on an evaluation of attributes such as vegetation class and hydrologic regime.

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3 Results

3.1 Background Information Review

The NWI indicated that saturated broad-leaved deciduous palustrine scrub-shrub wetlands were possibly present within the site (Figure 3). The Cook Inlet Wetlands Mapping (Gracz 2017) indicated that a spring fen was present and appeared to align better with visible clearings on modern aerial imagery than the NWI boundaries (Figure 4). Additionally, a drainageway wetland is shown surrounding and connecting the spring fen with adjacent wetlands. Gracz (2017) describes spring fens as peatlands in closed-basin depressions with groundwater as a likely source. Drainageways were described as peatlands formed by glacial meltwater channels.



Figure 4. Cook Inlet Wetlands Mapping boundaries (Gracz 2017) on aerial image (MSB 2019).

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Palmer, AK

Preliminary Wetland Delineation Report

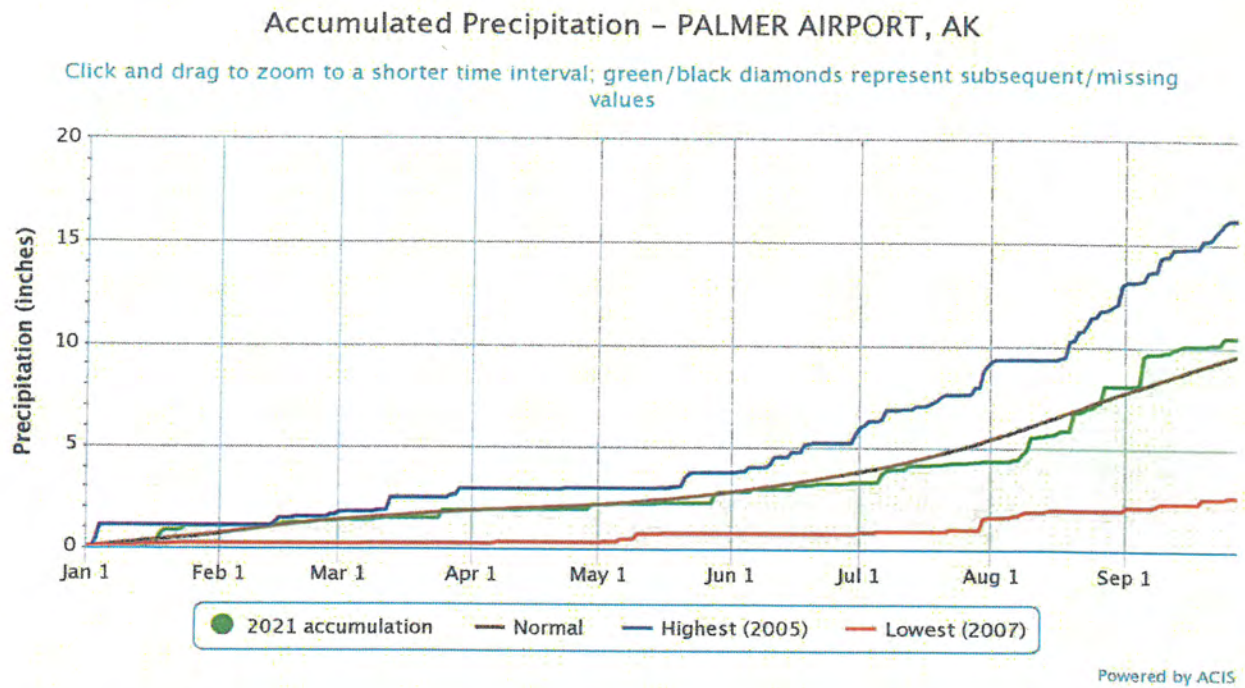


Figure 5. Precipitation year-to-date at Palmer Airport (NOAA Regional Climate Centers 2017).

Rainfall data for the project area was accessed via AgACIS as described in Section 2.1. Accumulation was generally aligned with normal conditions for the area with recent slightly elevated rainfall (Figure 5, NRCS 2020).

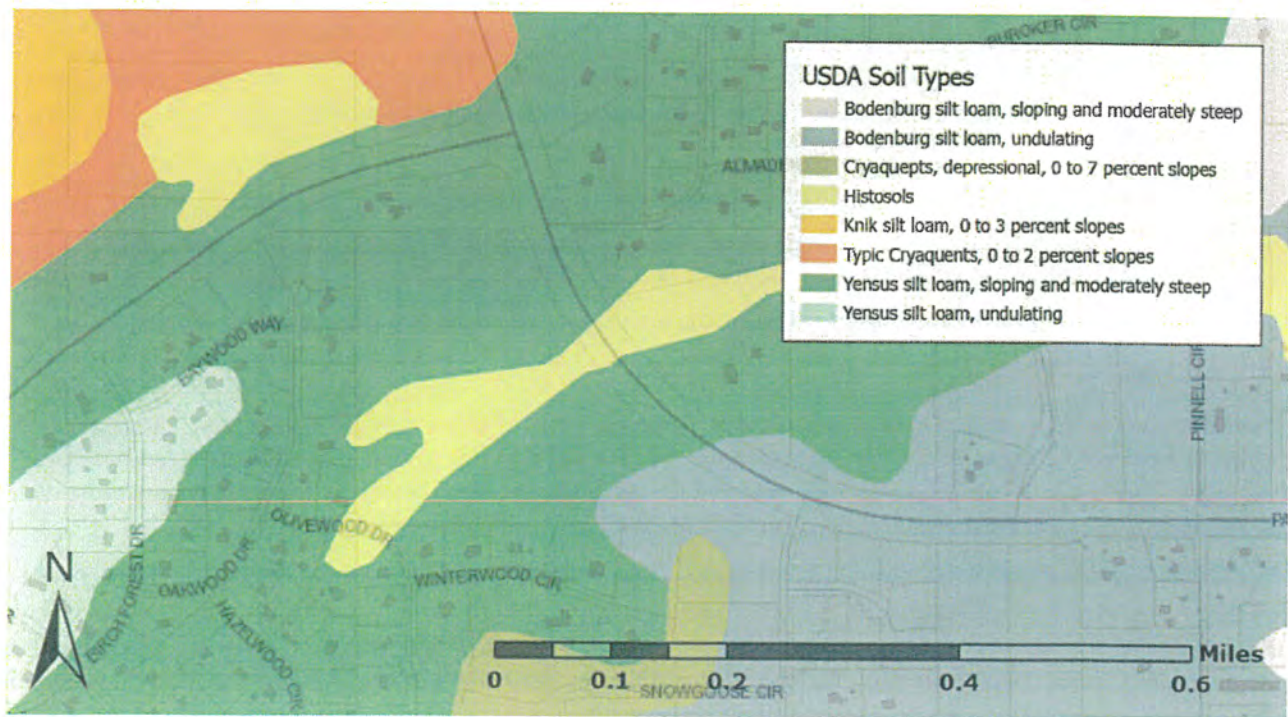


Figure 6. Project Area Soils Map

Spring Hill Development
Palmer, AK

Preliminary Wetland Delineation Report

Soils at each of the sample sites were mapped as unit 141 – “Histosols”. Soils of this type are dominated by organic materials without the presence of permafrost. Surrounding soils were mapped as unit 213 – “Yensus silt loam, sloping and moderately steep”, relatively young (having weak profile development), wet soils forming in poorly drained depressions in cold regions.



Figure 7. Delineated wetland boundaries displayed on aerial image (MSB 2019).

3.2 Delineated Wetlands

The wetland determination identified and classified two (2) wetland areas within the property. The Seasonally Flooded/Saturated Persistent Palustrine Emergent Wetland (PEM1E) agreed well with the mapped spring fen, although slightly larger in extent. The mapped drainageway area was primarily found to be uplands, with the exception of a small Saturated Broad-Leaved Deciduous Forested Wetland (PFO1B).

Two additional areas of apparent wetland vegetation were seen along a heavily-eroded trail through the power-line right-of-way. The area is regularly disturbed by four-wheeler traffic, causing water to pond heavily in low sections of the trail. However, the verges of the trail show signs of wetland-adapted grasses. The areas were not delineated, as no development is currently planned for this area and survey time was limited, but are noted as additional information without wetland classifications.

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Preliminary Wetland Delineation Report

Figure 7 displays delineated wetland boundaries. Digital boundary files of the delineated wetland areas and waters were provided as an addendum to this report. Table 1 summarizes details of delineated wetlands.

Table 1 – Details of delineated wetlands

Type	Classification	Area
PEM1E	Seasonally Flooded/Saturated Persistent Palustrine Emergent	1.90 acres
PFO1B	Saturated Broad-Leaved Deciduous Forested	0.23 acres

3.2.1 Vegetation

The largest wetland in the project area was an emergent wetland (PEM1E) heavily dominated by *Calamagrostis canadensis* (bluejoint) with *Equisetum sylvaticum* (woodland horsetail) present. No scrub-shrub stratum was present in this wetland, but heavily stunted *Betula neoalaskana* (Alaska paper birch) and *Picea glauca* (white spruce) were present. Although *C. canadensis* was present throughout the site, the high density and large growth form within these wetland areas was used as a guideline for placing wetland boundaries, in conjunction with other factors. On initial inspection, this site lacked wetland vegetation by the prevalence or dominance tests due to the presence of birch and white spruce in the forest stratum. However, when morphological adaptations were considered the vegetation was classified as hydrophytic.

The smaller forested wetland (PFO1B) was dominated by bluejoint grass and *Carex lyngbyei* (Lyngbye's sedge) with an upper canopy of Alaska paper birch and stunted white spruce. These characteristics were also found on some of the verges of the emergent wetland, with Lyngbye's sedge occasionally found where the emergent wetland transitioned to closed forest canopy.

Alaska paper birch is prevalent throughout the upland forested areas, with white spruce forming the minority of the tree strata. Forested areas also had prevalent *Rosa acicularis* (prickly rose), *Viburnum edule* (high-bush cranberry), bluejoint, *Cornus canadensis* (bunchberry dogwood), *Gymnocarpium dryopteris* (western oakfern), and *Athyrium filix-femina* (common ladyfern).

There was significant overlap in species (especially Alaska paper birch, white spruce, bluejoint, and field horsetail) between wetland and upland sites. Mapping distinctions throughout the project area were largely delineated based on ratios of vegetation types and the presence or absence of key species (i.e., prickly rose was absent from wetlands and Lyngbye's sedge was absent from uplands).

3.2.2 Soils

Soils at sample points 2 and 3 (within the delineated wetlands) had a distinct hydrogen sulfide smell, a primary indicator of hydric soils. A soil sampling auger was used at intervals around the PEM1E wetland area to assist in determining the boundary between wetland and adjacent upland.

The upland sample point, point 1, had silty sand in with roots penetrating to approximately 5 inches depth.

3.2.3 Hydrology

Soil pits at points 2 and 3 (within the delineated wetlands) showed soils saturated throughout, with the addition of a high water table and some surface waters in depressions at point 3. All three are primary indicators of wetland hydrology. Additional primary and secondary indicators were assessed as indicated on the data forms.

Sample point 1 (the upland data point) was lacking all primary and secondary indicators of wetland hydrology.

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3.3 Additional Waters

In addition to the delineated wetlands, a drainageway originates from a spring on the southeastern corner of the property. One clearly artificial cistern lies just to the northwest of the visible spring origin, with a second circular pond nearby that may also be artificial in origin. The spring itself surfaces about 50 feet to the southeast and feeds a small stream or drainageway that continues off the property.



Figure 8. Additional waters of the U.S. in the project area displayed on aerial image (MSB 2019).

4 Conclusion

PND identified and delineated adjacent boundaries of two potentially jurisdictional wetlands and additional potential waters of the U.S. during field visits to the project study area in September, 2021. Total acreage of wetlands delineated was approximately 2.1 acres. Based on the study results, each of the areas preliminarily meet the wetland determination criteria established by the USACE 1987 Wetland Delineation Manual and the Regional Supplement. This report does not make any determination regarding USACE jurisdiction over these wetlands.

Impacts to these areas which cannot be avoided may require authorization by Department of the Army permit and mitigation according to USACE regional policies and practices.

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Palmer, AK

Preliminary Wetland Delineation Report

5 References

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Appendix A – Data Forms

WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: Spring Hill parcel Borough/City: Matsu Borough Sampling Date: 9/27/21
Applicant/Owner: Kevin Sorenson Sampling Point: Pl 1
Investigator(s): Brenna Hughes Landform (hillside, terrace, hummocks, etc.): slope base
Local relief (concave, convex, none): none Slope (%): ~2%
Subregion: Cook Inlet Lat: 61.028555 Long: -149.192432 Datum: WGS84
Soil Map Unit Name: Histosols NWI classification: Upland
Are climatic / hydrologic conditions on the site typical for this time of year? Yes Y No (If no, explain in Remarks.)
Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes Y No
Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u> </u> No <u>N</u>	Is the Sampled Area within a Wetland?	Yes <u> </u> No <u>N</u>
Hydric Soil Present?	Yes <u> </u> No <u>N</u>		
Wetland Hydrology Present?	Yes <u> </u> No <u>N</u>		
Remarks: <u>Local weather recently slightly elevated precipitation, see project documentation</u>			

VEGETATION – Use scientific names of plants. List all species in the plot.

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Betula neolascana</u>	<u>55</u>	<u>Y</u>	<u>FACU</u>
2. <u>Picea glauca</u>	<u>10</u>	<u>N</u>	<u>FACU</u>
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>

Total Cover: 865
50% of total cover: 325 20% of total cover: 13

Sapling/Shrub Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Rosa acicularis</u>	<u>5</u>	<u>Y</u>	<u>FACU</u>
2. <u>Viburnum edule</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>
3. <u>Cornus canadensis</u>	<u>3</u>	<u>N</u>	<u>FACU</u>
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>
5. <u> </u>	<u> </u>	<u> </u>	<u> </u>
6. <u> </u>	<u> </u>	<u> </u>	<u> </u>

Total Cover: 818
50% of total cover: 9 20% of total cover: 3.6

Herb Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Calamagrostis canadensis</u>	<u>80</u>	<u>Y</u>	<u>FAC</u>
2. <u>Athyrium filix-femina</u>	<u>5</u>	<u>N</u>	<u>FAC</u>
3. <u>Gymnocarpium dryopteris</u>	<u>5</u>	<u>N</u>	<u>FACU</u>
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>
5. <u> </u>	<u> </u>	<u> </u>	<u> </u>
6. <u> </u>	<u> </u>	<u> </u>	<u> </u>
7. <u> </u>	<u> </u>	<u> </u>	<u> </u>
8. <u> </u>	<u> </u>	<u> </u>	<u> </u>
9. <u> </u>	<u> </u>	<u> </u>	<u> </u>
10. <u> </u>	<u> </u>	<u> </u>	<u> </u>

Total Cover: 890
50% of total cover: 45 20% of total cover: 18

Plot size (radius, or length x width) 20' x 20' % Bare Ground N/A
% Cover of Wetland Bryophytes N/A Total Cover of Bryophytes
(Where applicable)

Remarks: Typical for surrounding forest in most flat areas and hillsides

Dominance Test worksheet:

Number of Dominant Species
That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant
Species Across All Strata: 4 (B)

Percent of Dominant Species
That Are OBL, FACW, or FAC: 25% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>85</u>	x 3 = <u>255</u>
FACU species <u>88</u>	x 4 = <u>352</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>813</u> (A)	<u>607</u> (B)

Prevalence Index = B/A = 3.51

Hydrophytic Vegetation Indicators:

- ☒ Dominance Test is >50%
☒ Prevalence Index is ≤3.0
☒ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
☒ Problematic Hydrophytic Vegetation¹ (Explain)

¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic
Vegetation
Present? Yes No N

SOIL

Sampling Point: Pt 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-5	7.5 YR 3/2	100					silty sand w/ roots	
5-18	7.5 YR 3/2.5	100					silty sand	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☒ Histosol or Histel (A1)
- ☒ Histic Epipedon (A2)
- ☒ Hydrogen Sulfide (A4)
- ☒ Thick Dark Surface (A12)
- ☒ Alaska Gleyed (A13)
- ☒ Alaska Redox (A14)
- ☒ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils³:

- ☒ Alaska Color Change (TA4)⁴
- ☒ Alaska Alpine Swales (TA5)
- ☒ Alaska Redox With 2.5Y Hue

- ☒ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ☒ Other (Explain in Remarks)

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

⁴Give details of color change in Remarks.

Restrictive Layer (if present):

Type: N/A
Depth (inches): _____

Hydric Soil Present? Yes _____ No N

Remarks:

Smells of forest loam

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☒ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☒ Water Marks (B1)
- ☒ Sediment Deposits (B2)
- ☒ Drift Deposits (B3)
- ☒ Algal Mat or Crust (B4)
- ☒ Iron Deposits (B5)
- ☒ Surface Soil Cracks (B6)
- ☒ Inundation Visible on Aerial Imagery (B7)
- ☒ Sparsely Vegetated Concave Surface (B8)
- ☒ Marl Deposits (B15)
- ☒ Hydrogen Sulfide Odor (C1)
- ☒ Dry-Season Water Table (C2)
- ☒ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☒ Water-stained Leaves (B9)
- ☒ Drainage Patterns (B10)
- ☒ Oxidized Rhizospheres along Living Roots (C3)
- ☒ Presence of Reduced Iron (C4)
- ☒ Salt Deposits (C5)
- ☒ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☒ Shallow Aquitard (D3)
- ☒ Microtopographic Relief (D4)
- ☒ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No N Depth (inches): _____
Water Table Present? Yes _____ No N Depth (inches): _____
Saturation Present? Yes _____ No N Depth (inches): _____
(includes capillary fringe)

Wetland Hydrology Present? Yes _____ No N

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: Spring Hill Parcel Borough/City: MAT-SU Borough Sampling Date: 9/27/21
Applicant/Owner: Kevin Sorenson Sampling Point: Pt 2
Investigator(s): B. Hughes Landform (hillside, terrace, hummocks, etc.): N/A
Local relief (concave, convex, none): slightly concave Slope (%): N/A
Subregion: Cook Inlet Lat: 61.628944 Long: -149.192536 Datum: NAD83
Soil Map Unit Name: Histosols NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes Y No (If no, explain in Remarks.)
Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes Y No
Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>Y</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>Y</u> No <u> </u>
Hydric Soil Present?	Yes <u>Y</u> No <u> </u>	
Wetland Hydrology Present?	Yes <u>Y</u> No <u> </u>	
Remarks:		

VEGETATION – Use scientific names of plants. List all species in the plot.

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2 / 3</u> (A) Total Number of Dominant Species Across All Strata: <u>4 / 4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50 / 75</u> (A/B)	
1. <u>Betula neolaskana</u>	<u>30</u>	<u>Y</u>	<u>FACU</u>		
2. <u>Picea glauca - morph adapt. (stunted)</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>		
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
Total Cover: <u>40</u>				Prevalence Index worksheet: Total % Cover of: OBL species <u>25</u> x 1 = <u>25</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>40</u> x 3 = <u>120</u> FACU species <u>40</u> x 4 = <u>160</u> UPL species <u>0</u> x 5 = <u>0</u> Column Totals: <u>205</u> (A) <u>205</u> (B) Prevalence Index = B/A = <u>2.90</u>	
50% of total cover: <u>20</u> 20% of total cover: <u>8</u>					
Sapling/Shrub Stratum					
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is >50% (<u>Y</u> w/ morph. adapt) <input checked="" type="checkbox"/> Prevalence Index is ≤3.0 <input checked="" type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input checked="" type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
5. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
6. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
Total Cover: <u>0</u>					
50% of total cover: <u> </u> 20% of total cover: <u> </u>					
Herb Stratum					
1. <u>Calamagrostis canadensis</u>	<u>40</u>	<u>Y</u>	<u>FAC</u>		
2. <u>Carex lasiocarpa</u>	<u>25</u>	<u>Y</u>	<u>OBL</u>		
3. <u>Gymnocarpium dryopteris</u>	<u>3</u>	<u>N</u>	<u>FACU</u>		
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
5. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
6. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
7. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
8. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
9. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
10. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
Total Cover: <u>68</u>				Hydrophytic Vegetation Present? Yes <u>Y</u> No <u> </u>	
50% of total cover: <u>34</u> 20% of total cover: <u>13.6</u>					
Plot size (radius, or length x width) <u>20' x 20'</u> % Bare Ground <u>0</u>					
% Cover of Wetland Bryophytes <u>N/A</u> Total Cover of Bryophytes <u> </u>					
Remarks: <u>Stunted spruce & several dead birch</u>					

SOIL

Sampling Point: PL 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features		Type ¹	Loc ²	Texture	Remarks
	Color (moist)	%	Color (moist)	%				
0-24	7.5 YR 1/2	90	7.5 YR 2/4	10	C	PL	siltysand	Fe conc. on roots root & veg mat ~ 30%, roots up to 2", crumbling

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☒ Histosol or Histel (A1)
☒ Histic Epipedon (A2)
☒ Hydrogen Sulfide (A4)
☒ Thick Dark Surface (A12)
☒ Alaska Gleyed (A13)
☒ Alaska Redox (A14)
☒ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils³:

- ☒ Alaska Color Change (TA4)⁴
☒ Alaska Alpine Swales (TA5)
☒ Alaska Redox With 2.5Y Hue

- ☒ Alaska Gleyed Without Hue 5Y or Redder
 Underlying Layer
☒ Other (Explain in Remarks)

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

⁴Give details of color change in Remarks.

Restrictive Layer (if present):

Type: N/A
 Depth (inches): _____

Hydric Soil Present? Yes Y No _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☒ Surface Water (A1)
☒ High Water Table (A2)
☒ Saturation (A3)
☒ Water Marks (B1)
☒ Sediment Deposits (B2)
☒ Drift Deposits (B3)
☒ Algal Mat or Crust (B4)
☒ Iron Deposits (B5)
☒ Surface Soil Cracks (B6)
☒ Inundation Visible on Aerial Imagery (B7)
☒ Sparsely Vegetated Concave Surface (B8)
☒ Marl Deposits (B15)
☒ Hydrogen Sulfide Odor (C1)
☒ Dry-Season Water Table (C2)
☒ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☒ Water-stained Leaves (B9)
☒ Drainage Patterns (B10)
☒ Oxidized Rhizospheres along Living Roots (C3)
☒ Presence of Reduced Iron (C4)
☒ Salt Deposits (C5)
☒ Stunted or Stressed Plants (D1)
☒ Geomorphic Position (D2)
☒ Shallow Aquitard (D3)
☒ Microtopographic Relief (D4)
☒ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No N Depth (inches): _____
 Water Table Present? Yes _____ No N Depth (inches): _____
 Saturation Present? Yes Y No _____ Depth (inches): 0-24
 (includes capillary fringe)

Wetland Hydrology Present? Yes Y No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: Spring Hill Parcel Borough/City: Matsu Borough Sampling Date: 9/27/21
Applicant/Owner: Kevin Sorenson Sampling Point: Pt. 3
Investigator(s): B. Hughes Landform (hillside, terrace, hummocks, etc.): N/A
Local relief (concave, convex, none): none Slope (%): 0
Subregion: Cook Inlet Lat: 61.629744 Long: -149.190678 Datum: NAD83
Soil Map Unit Name: Histosols NWI classification: R5S1B

Are climatic / hydrologic conditions on the site typical for this time of year? Yes Y No (If no, explain in Remarks.)
Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes Y No
Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>Y</u> No <u> </u>	Is the Sampled Area within a Wetland?	Yes <u>Y</u> No <u> </u>
Hydric Soil Present?	Yes <u>Y</u> No <u> </u>		
Wetland Hydrology Present?	Yes <u>Y</u> No <u> </u>		
Remarks:			

VEGETATION – Use scientific names of plants. List all species in the plot.

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2 / 4</u> (A)
1. <u>Picea glauca (stunted)</u>	<u>20</u>	<u>Y</u>	<u>FACU / FAC</u>	
2. <u>Betula neoalaskana (stunted)</u>	<u>10</u>	<u>Y</u>	<u>FACU / FAC</u>	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50% / 100% (A/B)</u>
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Prevalence Index worksheet: Total % Cover of: Multiply by: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>110</u> x 3 = <u>330</u> FACU species <u>30</u> x 4 = <u>120</u> UPL species <u>0</u> x 5 = <u>0</u> Column Totals: <u>140</u> (A) <u>450</u> (B) Prevalence Index = B/A = <u>3.2</u>
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
Total Cover: <u>30</u>				
50% of total cover: <u>15</u> 20% of total cover: <u>6</u>				
Sapling/Shrub Stratum				
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
6. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
Total Cover: <u> </u>				
50% of total cover: <u> </u> 20% of total cover: <u> </u>				
Herb Stratum				Hydrophytic Vegetation Indicators: <u>N</u> Dominance Test is >50% (<u>Y</u> w/ morph adapt.) <u>N</u> Prevalence Index is ≤3.0 <u>Y</u> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.
1. <u>Calamagrostis canadensis</u>	<u>100</u>	<u> </u>	<u>FAC</u>	
2. <u>Equisetum sylvaticum</u>	<u>10</u>	<u> </u>	<u>FAC</u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
6. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
9. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
10. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
Total Cover: <u>110</u>				Hydrophytic Vegetation Present? Yes <u>Y</u> No <u> </u>
50% of total cover: <u>55</u> 20% of total cover: <u>22</u>				
Plot size (radius, or length x width) <u>20' x 20'</u> % Bare Ground <u>N/A</u>				
% Cover of Wetland Bryophytes <u> </u> Total Cover of Bryophytes <u> </u> (Where applicable)				
Remarks: <u>Additional dead & dying trees</u>				

SOIL

Sampling Point: Pl. 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
1-4	veg mat							
4-8	2.5Y 4/2	90	7.5YR 3/10	10	C	PL	sand w/ fine gravel	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils ³ :	
<input checked="" type="checkbox"/> Histosol or Histel (A1)		<input checked="" type="checkbox"/> Alaska Color Change (TA4) ⁴	<input checked="" type="checkbox"/> Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
<input checked="" type="checkbox"/> Histic Epipedon (A2)		<input checked="" type="checkbox"/> Alaska Alpine Swales (TA5)	
<input checked="" type="checkbox"/> Hydrogen Sulfide (A4)		<input checked="" type="checkbox"/> Alaska Redox With 2.5Y Hue	<input checked="" type="checkbox"/> Other (Explain in Remarks)
<input checked="" type="checkbox"/> Thick Dark Surface (A12)			
<input checked="" type="checkbox"/> Alaska Gleyed (A13)		³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.	
<input checked="" type="checkbox"/> Alaska Redox (A14)		⁴ Give details of color change in Remarks.	
<input checked="" type="checkbox"/> Alaska Gleyed Pores (A15)			

Restrictive Layer (if present):

Type: N/A
Depth (inches): _____

Hydric Soil Present? Yes ☒ No _____

Remarks: Soil color taken from auger plugs as shoveled holes were too watery for intact sample

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

<input checked="" type="checkbox"/> Surface Water (A1)	<input checked="" type="checkbox"/> Inundation Visible on Aerial Imagery (B7)
<input checked="" type="checkbox"/> High Water Table (A2)	<input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input checked="" type="checkbox"/> Saturation (A3)	<input checked="" type="checkbox"/> Marl Deposits (B15)
<input checked="" type="checkbox"/> Water Marks (B1)	<input checked="" type="checkbox"/> Hydrogen Sulfide Odor (C1)
<input checked="" type="checkbox"/> Sediment Deposits (B2)	<input checked="" type="checkbox"/> Dry-Season Water Table (C2)
<input checked="" type="checkbox"/> Drift Deposits (B3)	<input checked="" type="checkbox"/> Other (Explain in Remarks)
<input checked="" type="checkbox"/> Algal Mat or Crust (B4)	
<input checked="" type="checkbox"/> Iron Deposits (B5)	
<input checked="" type="checkbox"/> Surface Soil Cracks (B6)	

Secondary Indicators (2 or more required)

<input checked="" type="checkbox"/> Water-stained Leaves (B9)
<input checked="" type="checkbox"/> Drainage Patterns (B10)
<input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input checked="" type="checkbox"/> Presence of Reduced Iron (C4)
<input checked="" type="checkbox"/> Salt Deposits (C5)
<input checked="" type="checkbox"/> Stunted or Stressed Plants (D1)
<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input checked="" type="checkbox"/> Shallow Aquitard (D3)
<input checked="" type="checkbox"/> Microtopographic Relief (D4)
<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ☒ No _____ Depth (inches): ~6"
Water Table Present? Yes ☒ No _____ Depth (inches): 0-18
Saturation Present? Yes _____ No _____ Depth (inches): 0-18
(includes capillary fringe)

Wetland Hydrology Present? Yes ☒ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Appendix B – Soil Pit Photographs



Figure B-1. Soil pit 01 (photographed after re-filling).



Figure B-2. Soil pit 02.



Figure B-3. Soil pit 03.

GARY LORUSSO

KEYSTONE SURVEYING AND MAPPING

P.O. Box 2216

Palmer, Alaska 99645

Email: garyl@mtaonline.net

Phone: (907) 376-7811

SECTION LINE EASEMENT REPORT

TOWNSHIP 18 NORTH, RANGE 01 EAST
PORTIONS OF SECTIONS 24 & 25,

RECEIVED
JAN 23 2023
PLATTING

PROPOSED HIDDEN ACRES

The section line between Sections 24 & 25, Township 18 North, Range 01 East was shown the following plats:

SPRING HILL – PLAT# - 2022-88

SNOWGOOSE POND – PLAT# -2002-70

These plats contain a Dedication Certificate. If there was not a Section Line easement prior to creation of these plats, then a dedicated one existed after the recordation of the plats. The plats show the Section Line Easement as being 33' in width. These lands were not Patented to the State of Alaska. They were entered by and Patented to:

PATENT #1078847 – THOMAS WOODERD BRAZIL – ENTERED 09/05/1929

PATENT #1082256 – ELWYN C. LAMP – ENTERED 05/19/1930

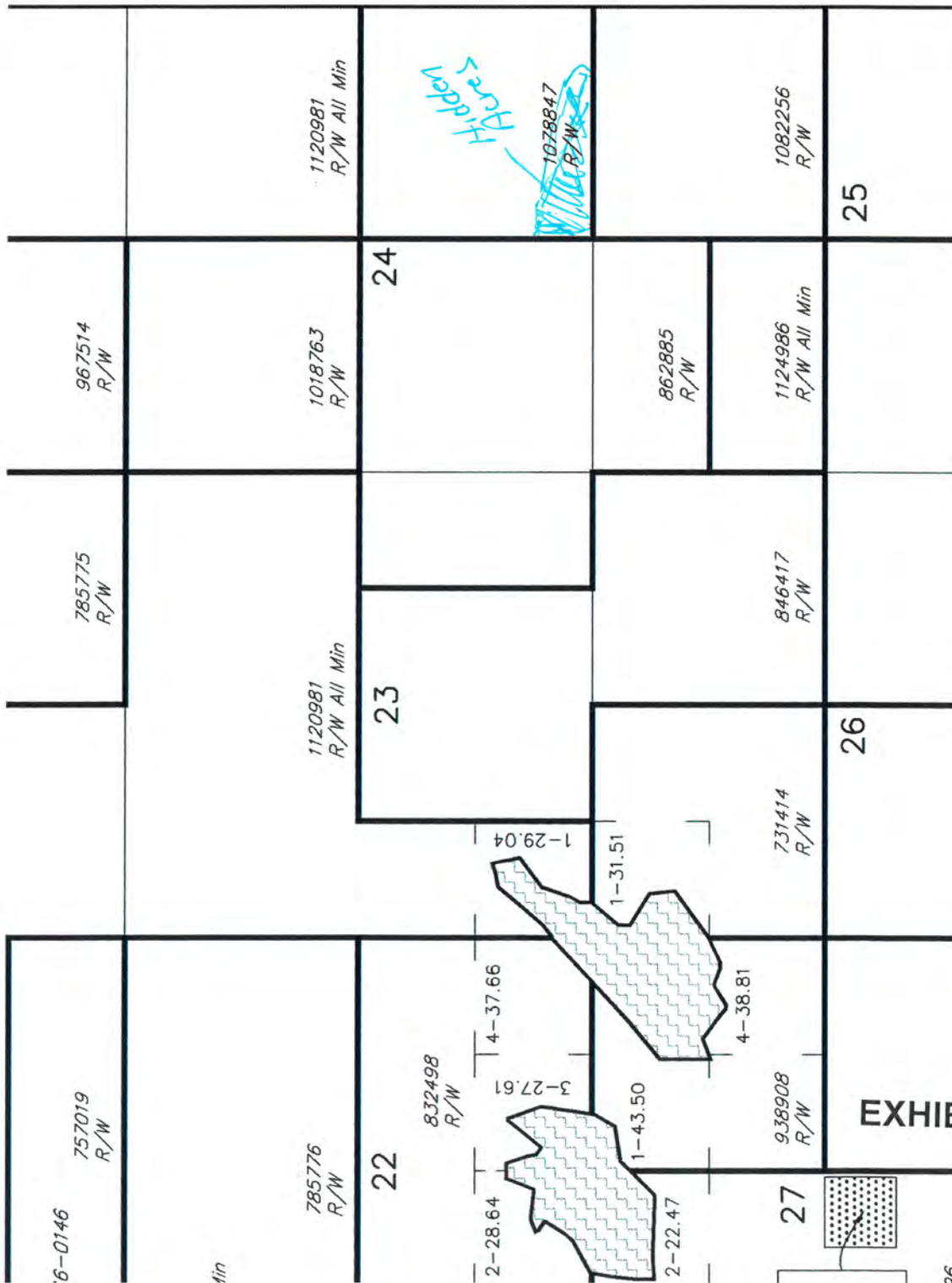
The original G.L.O. survey of these Sections was approved in 1915.

The Section Line Easements are correctly shown on both of the above mentioned plats.

Gary LoRusso



EXHIBIT F-1





SDMS ALASKA

+

SPATIAL DATA MANAGEMENT SYSTEM

Alaska Case Retrieval Enterprise System (ACRES)

Case Abstract for: AKA 007515

CASE DATA

Case Serial Num: AKA 007515	FRC Site Code: SEA
Case Type: 251101 He Original	Accession Num: -
Case Status: Closed	Box Num: - (of) -
Case Status Actn: Case Closed	Disp Date: -
Case Status Date: 25-JUL-1977	Location Code: -
SM Acres: 0.0000	Abnd Yr: -
Claim Name: -	

CUSTOMER DATA

Cust ID: 000024339	Interest Relationship: Applicant
Customer Name: LAMP ELWYN C	Percent Interest: 0.0000
Customer Address: Withheld	

ADMINISTRATIVE/STATUS ACTION DATA

Date	Code Description:	Remarks	Doc ID	Ofc	Emp	Doc Img *
19-MAY-1930	001 Application Filed	APPLICATION RECEIVED	-	PSA	BED	--
27-MAR-1936	879 Patent Issued	-	PA0001082256	AJA	BED	Not Available
25-JUL-1977	970 Case Closed	TITLE TRSF	-	PSA	BED	--
27-AUG-1992	996 Converted To Prime	-	-	940	BKM	--

FINANCIAL ACTION DATA

Date	Code/Description	Ofc	Emp	Money Amt	Acct Adv	Asmt Yr
NO FINANCIAL ACTIONS FOUND						

GENERAL REMARKS

No Case Remarks found

GEOGRAPHIC NAMES

No Geonames found

LAND DESCRIPTION

Mr Twp Rng Sec Aliquot Survey ID Tr Blk Lot Di Bor NR LS Acres

28 018 N 001 E 025 NE - - - AA 170 07 PA 160.0000 [MTP \(/perl-bin/scanned_images/mtp/disp_image_pdf.pl?mtr=S018N001E\) TWPLAT \(/perl-bin/scanned](#)

Doc ID: PA0001082256 27-Mar-1936 USR: 754

Total Case Acres: 160.0000

EXHIBIT F-3



SDMS ALASKA

+

SPATIAL DATA MANAGEMENT SYSTEM

Alaska Case Retrieval Enterprise System (ACRES)

Case Abstract for: AKA 007362

CASE DATA

Case Serial Num: AKA 007362
Case Type: 256700 He Alaska
Case Status: Closed
Case Status Actn: Case Closed
Case Status Date: 12-NOV-1935
SM Acres: 0.0000
Claim Name: -

FRC Site Code: SEA
Accession Num: -
Box Num: - (of) -
Disp Date: -
Location Code: -
Abnd Yr: -

CUSTOMER DATA

Cust ID: 000002598
Customer Name: BRAZIL THOMAS WOORDERD
Customer Address: Withheld

Interest Relationship: Applicant
Percent Interest: 0.0000

ADMINISTRATIVE/STATUS ACTION DATA

Date	Code Description:	Remarks	Doc ID	Ofc	Emp	Doc Img *
05-SEP-1929	001 Application Filed	APPLICATION RECEIVED	-	DAL	GDH	--
06-SEP-1929	001 Application Filed	APPLICATION RECEIVED	-	PSA	BLH	--
04-OCT-1935	879 Patent Issued	-	PA0001078847	PSA	BLH	Not Available
12-NOV-1935	970 Case Closed	TITLE TRSF	-	DAL	GDH	--
27-AUG-1992	996 Converted To Prime	-	-	940	BKM	--

FINANCIAL ACTION DATA

Date	Code/Description	Ofc	Emp	Money Amt	Acct Adv	Asmt Yr
NO FINANCIAL ACTIONS FOUND						

GENERAL REMARKS

No Case Remarks found

GEOGRAPHIC NAMES

No Geonames found

LAND DESCRIPTION

Mr Twp Rng Sec Aliquot Survey ID Tr Blk Lot Di Bor NR LS Acres
28 018 N 001 E 024 SE - - - AA 170 07 PA 160.0000 [MTP \(/perl-bin/scanned_images/mtp/disp_image_pdf.pl?mtr=S018N001E\) TWPLAT \(/perl-bin/scanned](#)
Doc ID: PA0001078847 04-Oct-1935

Total Case Acres: 160.0000

EXHIBIT F-4

SITE VISIT REPORT

Case Name: Hidden Acres	Date: 03/02/2023 Time: 9:15am
Owner: Rocky Point Development, LLC.	Case Number: 2023-006
Surveyor/Engineer: Keystone Surveying	Tax ID #: 8294000T00A
Subdivision: Spring Hill	Regarding:

SITE CONDITIONS

Weather: Cool	Temperature: 15° F
Wind: None	
General Site Condition: Snowy	

Personnel on site: Fred Wagner Platting Officer, Amy Otto-Buchanan Platting Specialist, Matthew Goddard Platting technician, & Chris Curling, Platting Technician.

Equipment in use: Camera

Current phase of work: Pre-hearing

Reason for Visit/Remarks: (See attached photos)

Signed By: 

Date: 3/2/2023

EXHIBIT G-1

Platting Board Hearing Map Page

The map displays a series of lots, with Lot 1 being the largest and shaded area. Lot 1 is bounded by E Olivewood Dr to the north, N Snowgoose Rd to the east, and a curved boundary to the south. Lots 2 through 5 are located to the west of Lot 1. Lots 6 through 11 are located to the north of Lot 1. Lots 12 through 15 are located to the east of Lot 1. Lots 16 through 20 are located to the south of Lot 1. Lots 21 through 25 are located to the west of Lot 1. The map includes a legend for photo locations and a title block for 'C & R ACRES'.

LOT 1

LOT 2

LOT 3

LOT 4

LOT 5

LOT 6

LOT 7

LOT 8

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PHOTO #1

EXHIBIT G-3

03.02.2023

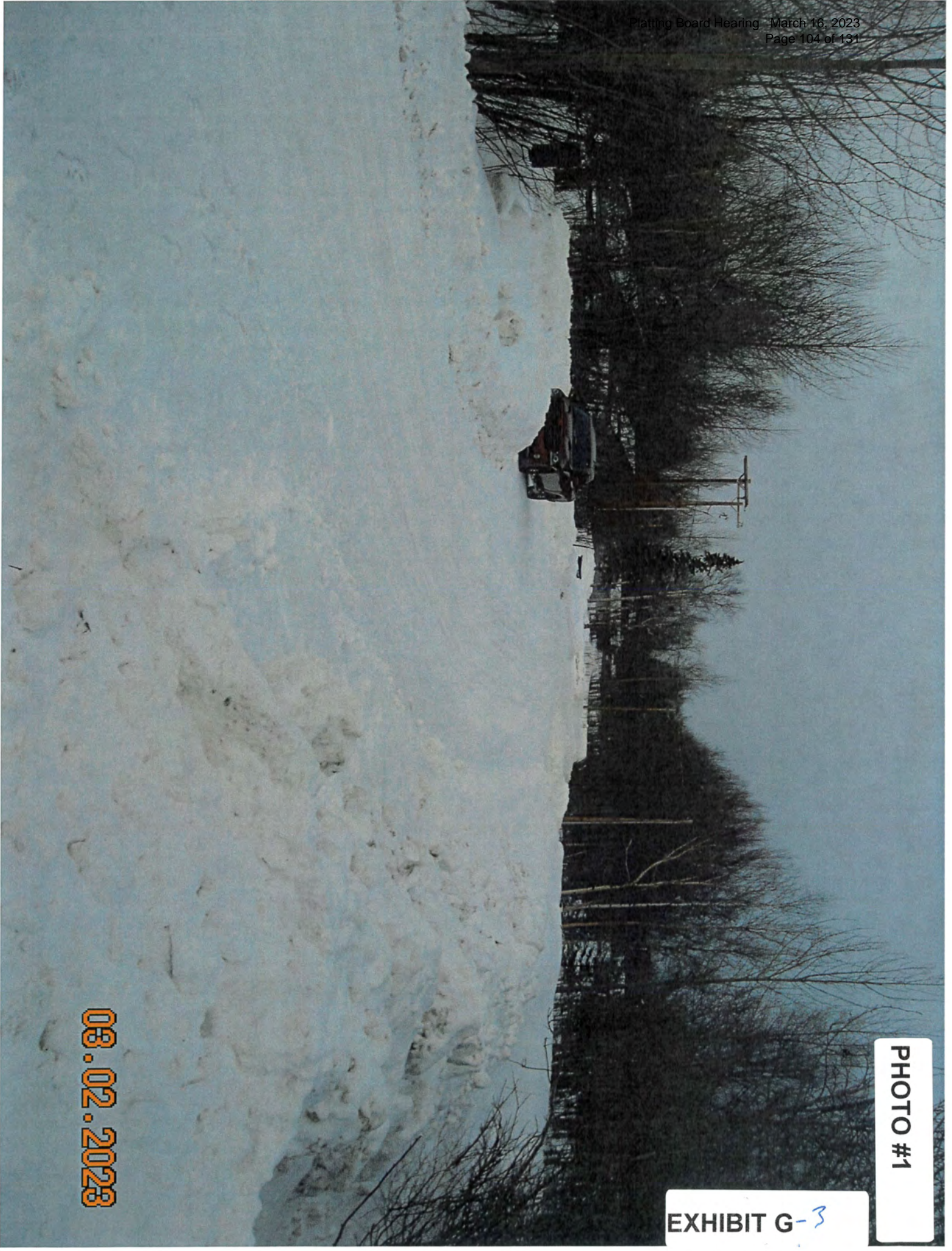


PHOTO #2

EXHIBIT G-4

03.02.2023



PHOTO #3

EXHIBIT G-5

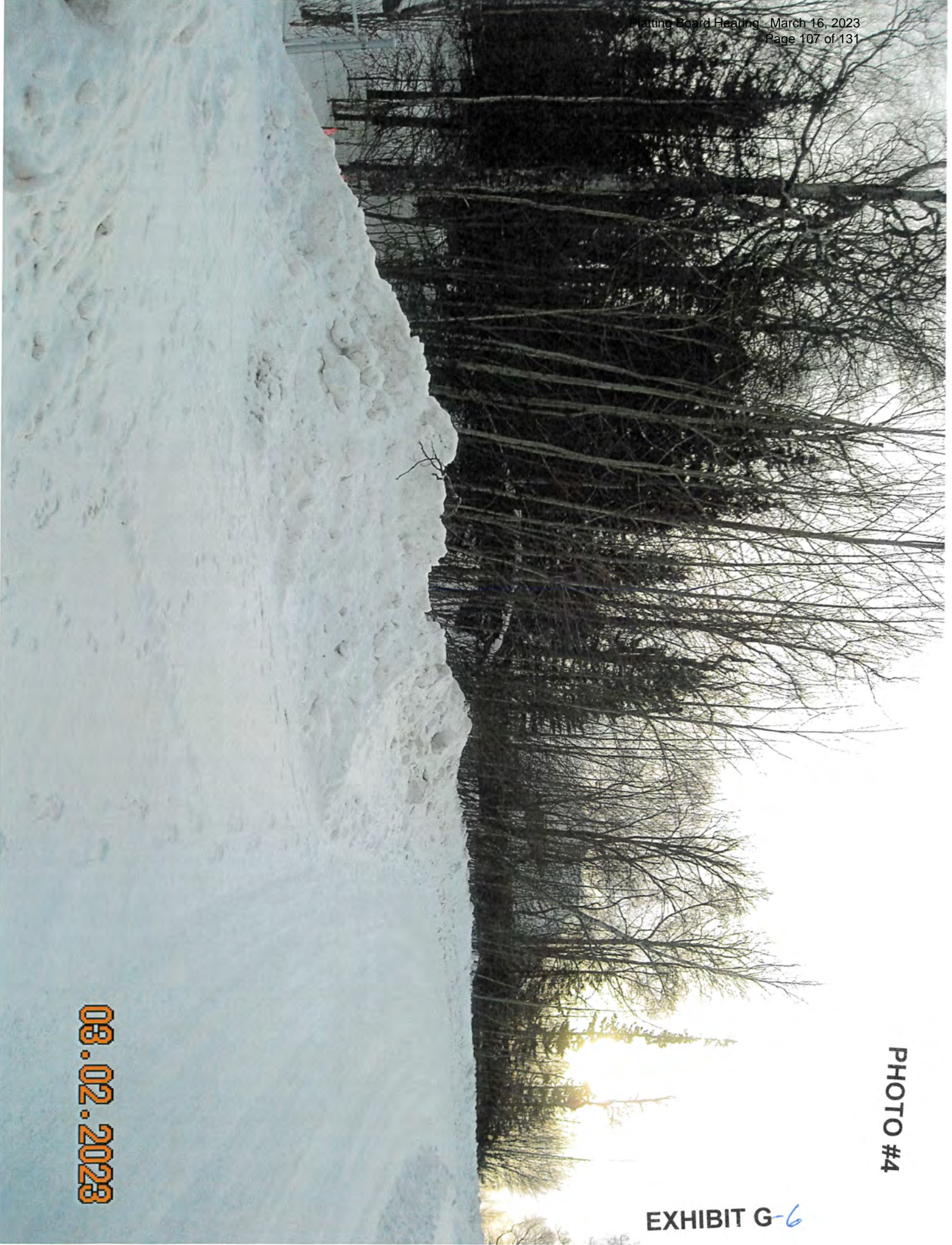
03.02.2023



PHOTO #4

EXHIBIT G-6

08.02.2023



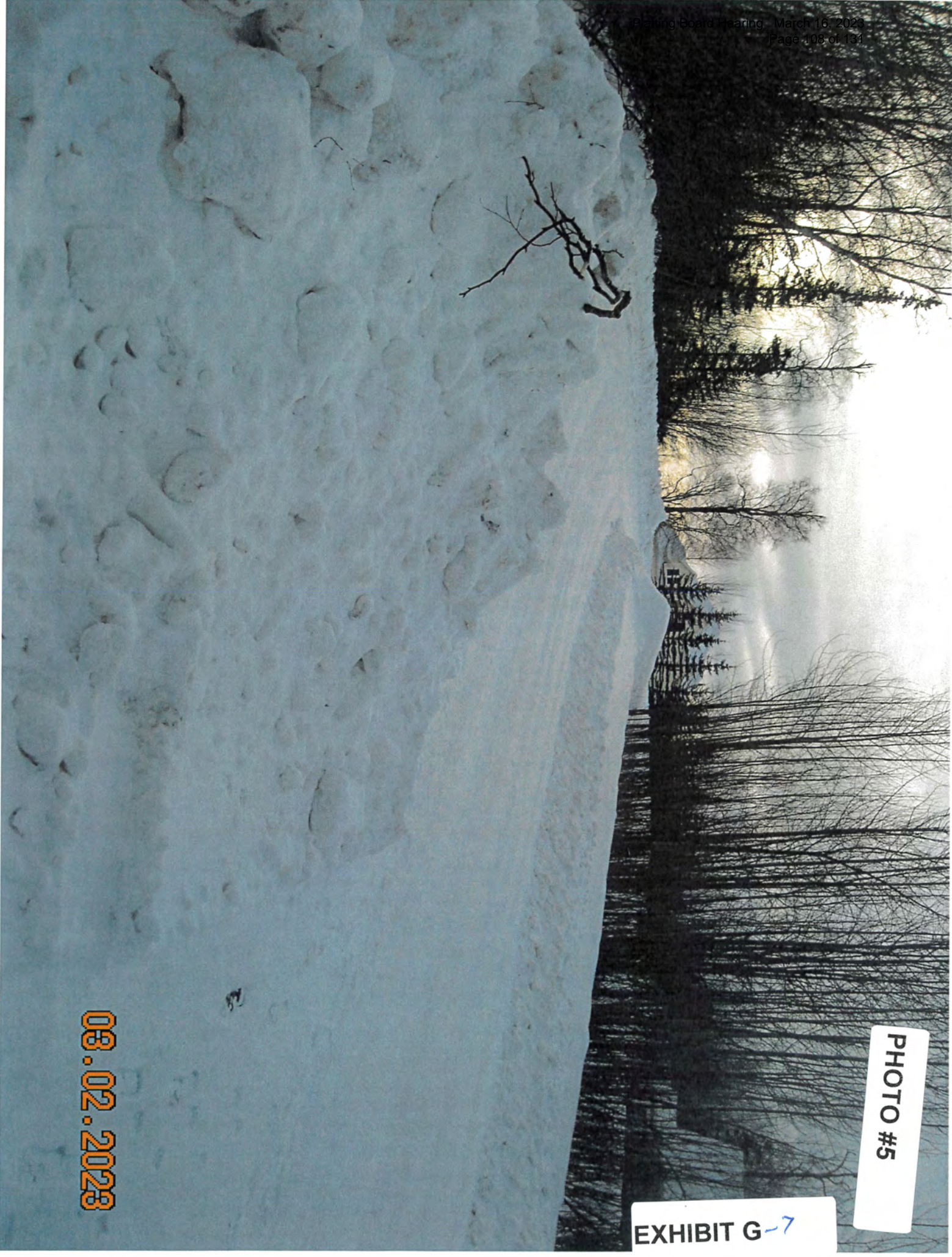


PHOTO #5

03.02.2023

EXHIBIT G-7



THE STATE
of **ALASKA**
GOVERNOR MICHAEL J. DUNLEAVY

Department of Transportation and Public Facilities

Program Development and Statewide Planning
Anchorage Field Office

4111 Aviation Avenue
P.O. Box 196900
Anchorage, AK 99519-6900
Main number: 907-269-0520
Fax number: 907-269-0521
Website: dot.state.ak.us

February 17, 2023

Fred Wagner, Platting Officer
Matanuska-Susitna Borough
350 East Dahlia Avenue
Palmer, Alaska 99645

Re: Plat Review

Dear Mr. Wagner:

The Alaska Department of Transportation and Public Facilities (DOT&PF) has reviewed the following plats and have no comments:

- **2023-008 Swiss Castle 2023 AOB**
- **2023-002 Seldon Rd Ext Ph. 2 ROW Acquisition**

The Alaska Department of Transportation and Public Facilities (DOT&PF) has reviewed the following plats and has the following comments:

- **2023-006 WA08 Hidden Acres MG**
 - No direct access to Palmer-Fishhook Road will be granted. All proposed lots must take access from common access area onto Olivewood Drive as shown on proposed plat. Future subdivision and development should be developed to also take access from the platted common access area.
 - New utility lines for the proposed lots and any future development must be extend from Olivewood Dr. No new utility lines will be authorized or permitted within DOT&PF's ROW on Palmer-Fishhook Road.
 - Any future relocation of utilities on Lot 2 and Lot 3 must remain on Lots 2 and 3. Utility relocation will not be permitted into DOT&PF ROW.
 -
- **2023-007 MO15 Thunderbird's Lair AOB**
 - No objection to the proposed plat.
 - The applicant will need to apply for a driveway permit/approach road review for access onto the Parks Highway for the development of E Scoter Drive, E Merganser Dr, S Gadwell Street, and access from the Section Line Easements. Future subdivision and development should be designed to utilize internal circulation to these common accesses to the Parks Highway and Section Line Easements. No additional access to the Parks

"Keep Alaska Moving through service and infrastructure."

EXHIBIT H-1

Highway will be permitted for future subdivided lots. Please note future high-volume development of these properties may require the removal of E Scoter Dr and the utilization of frontage roads to the Parks Highway Access Development Permit points. These points can be found at DOT&PF's online Parks Hwy ADP mapper: <https://akdot.maps.arcgis.com/apps/MapSeries/index.html?appid=aa663dbc755843b4be3c3eca3d0093b5>. Driveway permits and Approach Road Review can be applied for at DOT&PF's online ePermits website: <https://dot.alaska.gov/row/Login.po>. Please contact DOT&PF's ROW division at 1-800-770-5263 to speak with a regional permit officer if you have any questions.

- Development of roads to access Tracks A-H shall include utility easements for future installation/build out of distribution systems and service lines to serve each property. Multiple connections to existing utilities with the Park Highway ROW will not be permitted.

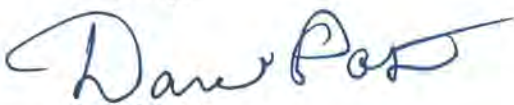
All properties accessing DOT&PF roads must apply to Right of Way for a driveway permit and/or approach road review, subject to provisions listed in 17 AAC 10.020. Any previously issued access permits become invalid once the property undergoes a platting action and must be reissued.

We recommend the petitioner verify all section line easements and DOT&PF road rights-of-way adjacent to their property. For assistance, the petitioner may contact the Engineering group within the Right of Way section in DOT&PF at (907) 269-0700. The petitioner is liable to remove any improvements within the easements and rights-of-way that impede the operation and maintenance of those facilities even if they are not shown on the plat, so it is in the petitioner's best interest to identify the exact locations and widths of any such easements or rights-of-way before they improve the property.

If any section line easements or road rights-of-way exist within the bounds of their plat, we recommend the petitioner dedicate them. If there is an existing right-of-way or easement, the petitioner is unable to develop that portion of the property yet continues to pay property taxes on it; dedicating will remove that cost to the petitioner.

If there are any questions regarding these comments please feel free to contact me at (907) 269-0512 or david.post@alaska.gov.

Sincerely,



David Post
Surface Transportation Manager

cc: Scott Thomas, P.E., Regional Traffic Engineer, Traffic Safety and Utilities, DOT&PF
Brad Sworts, MSB Transportation Manager
Jacob Ciufo, P.E., Regional Hydrologist, DOT&PF
Sean Baski, Chief, Highway Design, DOT&PF
Matt Walsh, Property Management Supervisor, Right of Way, DOT&PF
Devki Rearden, Engineering Associate, DOT&PF

Matthew Goddard

From: Moenaert, Crystal L (DFG) <crystal.moenaert@alaska.gov>
Sent: Tuesday, February 7, 2023 11:32 AM
To: Matthew Goddard
Subject: RFC Hidden Acres (MG) - ADF&G Habitat Section comments

[EXTERNAL EMAIL - CAUTION: Do not open unexpected attachments or links.]

Good Afternoon,

The ADF&G Habitat section has reviewed the RFC packet and associated documents for the request to subdivide Tract A, Spring Hill, Plat #2022-88. Currently there are no resident or anadromous fish water bodies present within the boundaries of the subject property. At this time, a fish habitat permit from the ADF&G Habitat Section is not required. Should fish presence be discovered, please notify the ADF&G Habitat section at 907-861-3200.

Thank you for the opportunity to comment.

Sincerely,

Crystal Moenaert

Habitat Biologist 2

ADF&G Habitat Section

1801 S Margaret Drive, Suite 6

Palmer AK 99645

Ph: 907-861-3204

[ADF&G Habitat Section Permits Link](#)



Matthew Goddard

From: Jamie Taylor
Sent: Thursday, March 2, 2023 3:08 PM
To: Matthew Goddard
Cc: Daniel Dahms; Tammy Simmons; Brad Sworts
Subject: RE: RFC Hidden Acres (MG)

Hi Matthew,

Variance:

DPW does not support approval of the variance based on the information that has been provided. We have requested from the petitioner supporting information for the claim in the variance request that constructing a borough standard road to access the lots would impact the wetlands. A plan drawing showing the extents of wetlands and the footprint of a borough standard road vs the footprint of a borough standard driveway (as proposed) would be sufficient.

Sight Distance:

Multiple conditions exist (vertical & horizontal alignment, vegetation, etc.) which potentially limit sight distance along Olivewood Drive from the proposed driveway. DPW does not support approval of the proposed plat, which will confine access to the five proposed lots to a single point, without verification that adequate sight distance exists (or can exist with additional clearing within the ROW). We have requested the petitioner provide sight distance measurements in accordance with the driveway code (MSB 11.12.050(A)(9)).

Access/ADT:

According to the ADT estimate, Birch Forest Drive from Trunk Road to Oakwood Drive is warranted to be Residential Subcollector. It is currently classified as Residential. The petitioner's engineer should provide documentation certifying Birch Forest Drive meets Residential Subcollector standard.

Thank you,

Jamie Taylor, PE (she/her)
Civil Engineer
Matanuska-Susitna Borough
Department of Public Works
t: 907-861-7765 c: 907-355-9810
jamie.taylor@matsugov.us
<http://www.matsugov.us/>

From: Matthew Goddard <Matthew.Goddard@matsugov.us>
Sent: Wednesday, February 1, 2023 5:06 PM
To: kristina.huling@alaska.gov; Eisenman, Mark E (DOT) <mark.eisenman@alaska.gov>; david.post@alaska.gov; Percy, Colton T (DFG) <colton.percy@alaska.gov>; sarah.myers@alaska.gov; stark@mtaonline.net; mothers@mtaonline.net; StephanieNowersDistrict2@gmail.com; regpagemaster@usace.army.mil; pamela.j.melchert@usps.gov; Margie Cobb <Margie.Cobb@matsugov.us>; Eric Phillips <Eric.Phillips@matsugov.us>; Brad Sworts <Brad.Sworts@matsugov.us>; Jamie Taylor <Jamie.Taylor@matsugov.us>; Elaine Flagg <Elaine.Flagg@matsugov.us>; Daniel Dahms <Daniel.Dahms@matsugov.us>; Tom Adams <Tom.Adams@matsugov.us>; Charlyn Spannagel <Charlyn.Spannagel@matsugov.us>; Katrina Kline <katrina.kline@matsugov.us>; MSB Farmers

<MSB.Farmers@matsugov.us>; Permit Center <Permit.Center@matsugov.us>; Andy Dean <Andy.Dean@matsugov.us>; Planning <MSB.Planning@matsugov.us>; Alex Strawn <Alex.Strawn@matsugov.us>; Fred Wagner <Frederic.Wagner@matsugov.us>; John Aschenbrenner <John.Aschenbrenner@matsugov.us>; mearow@mea.coop; row@mtasolutions.com; andrew.fraiser@enstarnaturalgas.com; James Christopher <James.Christopher@enstarnaturalgas.com>; row@enstarnaturalgas.com; ospdesign@gci.com; msb.hpc@gmail.com
Subject: RFC Hidden Acres (MG)

Hello,

The following link is a request to subdivide Tract A, Spring Hill, Plat #2022-88.

Please ensure all comments are submitted by **February 21, 2023** so they can be incorporated in the staff report that will be presented to the Platting Board.

[Hidden Acres](#)

Thank you,

Matthew Goddard
Platting Technician
Matthew.Goddard@matsugov.us
(907) 861-7881

Matthew Goddard

From: Holler Engineering <holler@mtaonline.net>
Sent: Friday, March 3, 2023 12:07 PM
To: Matthew Goddard
Cc: Kevin Sorensen; Gary LoRusso; Jamie Taylor
Subject: PW variance concerns for Hidden Acres proposed subdivision
Attachments: 240 ft to right.jpg; 280 ft to left.jpg; Area estimates affected by road vs driveway.pdf

[EXTERNAL EMAIL - CAUTION: Do not open unexpected attachments or links.]

Hi Matthew-

This email will try to address concerns raised by Jamie Taylor in her email to you dated March 3rd. Her discussion items are retained verbatim in blue below, with responses in red:

“Variance: DPW does not support approval of the variance based on the information that has been provided. We have requested from the petitioner supporting information for the claim in the variance request that constructing a borough standard road to access the lots would impact the wetlands. A plan drawing showing the extents of wetlands and the footprint of a borough standard road vs the footprint of a borough standard driveway (as proposed) would be sufficient.” See attached sketches. Using a similar alignment, it is clear that substantially more mapped wetlands area would be affected by constructing either a short CDS road, or a longer road extending back into the property to a CDS. There are several reasons why: 1 Road and CDS footprints are wider than driveways, generally with wider foreslopes. 2 Roads have vertical and horizontal limits which are far more restrictive than driveways; this limits the ability of a road to form fit to the existing surface within the easement or ROW. 3 Roads typically are centered within the area, while a driveway need only fit within the area. In this particular case, I drew a typical short CDS and estimated the minimum footprint that would be required. Then that footprint was compared to the footprint of the existing, survey located driveway edge, including an estimation of the foreslopes on the northwest side. The difference for these options was approximately 6900 ft², with the CDS taking up far more area. Using the same methodology for a longer road and CDS, there was an area of increased use of roughly 16,000 ft²; note that the portion of the driveway past about 300’ is estimated, not surveyed. See the attached file with 2 sketches. If a road or short CDS were to be constructed, it is likely the project could support substantially more than 5 lots.

“Sight Distance: Multiple conditions exist (vertical & horizontal alignment, vegetation, etc.) which potentially limit sight distance along Olivewood Drive from the proposed driveway. DPW does not support approval of the proposed plat, which will confine access to the five proposed lots to a single point, without verification that adequate sight distance exists (or can exist with additional clearing within the ROW). We have requested the petitioner provide sight distance measurements in accordance with the driveway code (MSB 11.12.050(A)(9)).” We visited the site earlier today and positioned a Subaru with a 3.5’ target on the windshield center as approaching from both sides. Photos were taken from a measured 3.5’ height, 17’ back from the Olivewood Drive westbound lane center. The 2 photos are attached. In the case of SD to the left, the vehicle is positioned with the target at 280’. To the right, the target is at 240’. Based on our measurements and observations, sight distance is adequate, which was also our perception operating into and out of the driveway in question.

“Access/ADT: According to the ADT estimate, Birch Forest Drive from Trunk Road to Oakwood Drive is warranted to be Residential Subcollector. It is currently classified as Residential. The petitioner’s engineer should provide documentation certifying Birch Forest Drive meets Residential Subcollector standard.” In driving this section the road readily meets basic RSC requirements for grade and curvatures. The road is paved just over 20’ in width with adequate shoulders. Most of the section is a fill construction, with well adequate

ditches and snow storage. Based on past experiences, the intersection with N Trunk Road meets ADOT standards for approach intersections. Sight distance was essentially unrestricted and more than adequate at each of the 3 intersections, which all have minimal grades. Based on our wintertime observations and measurements, the road would meet RSC standards as it exists. Based on the lot count analysis, the additional 5 new lots will comprise only 5/79 or 6% of the traffic at Trunk, and 5/38 or 13% at the beginning of the section in question. Whatever the existing certification, more than half of the road section in question appears to already be serving in a RSC capacity, providing access for more than 40 existing lots.

Hopefully the above input will be helpful to resolve these concerns. Please do not hesitate with any additional questions or concerns you may have.

Thanks,

Curt Holler PE
Holler Engineering
3375 N Sams Drive
Wasilla, AK 99654-4306
(907) 376-0410 Fax 376-0610

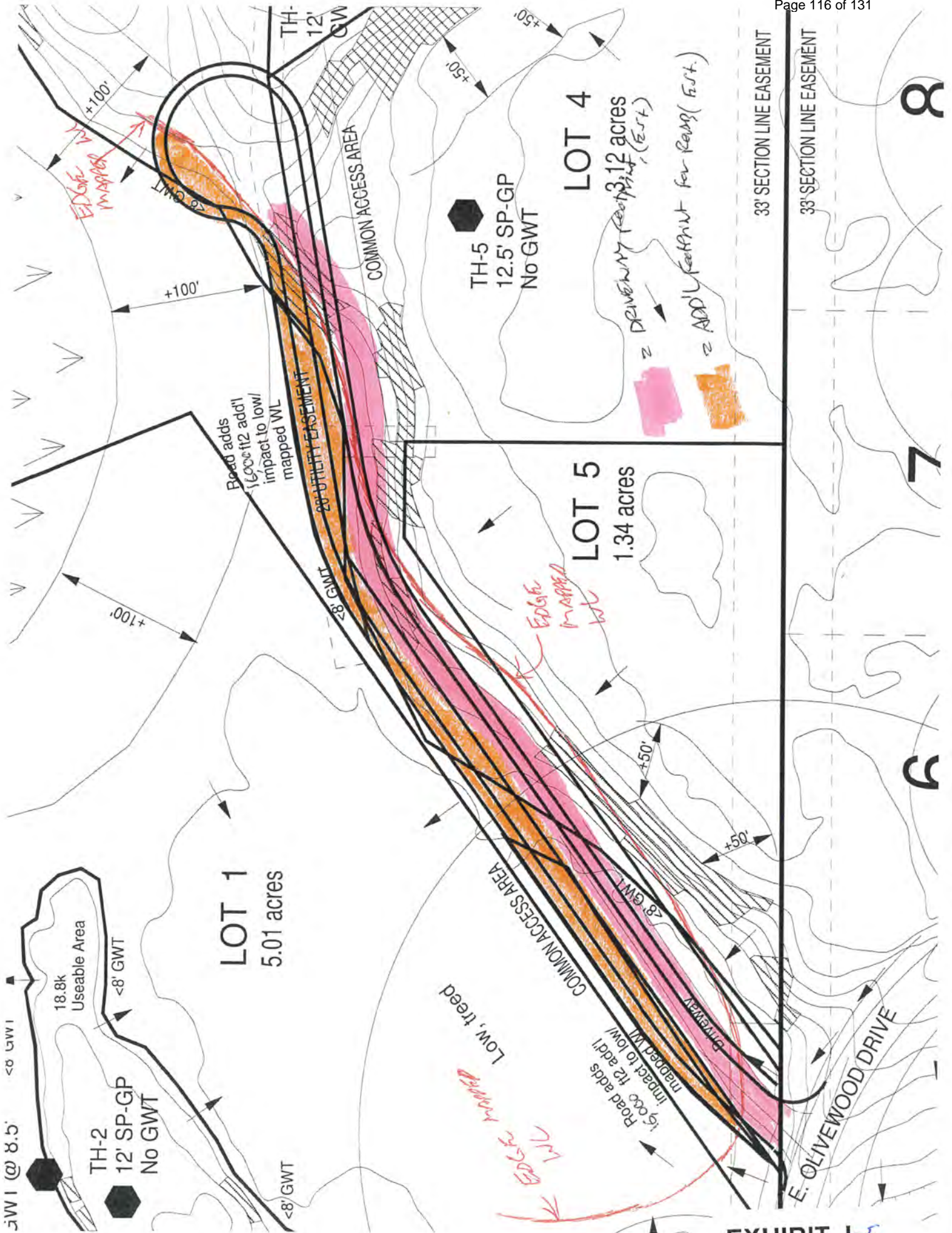
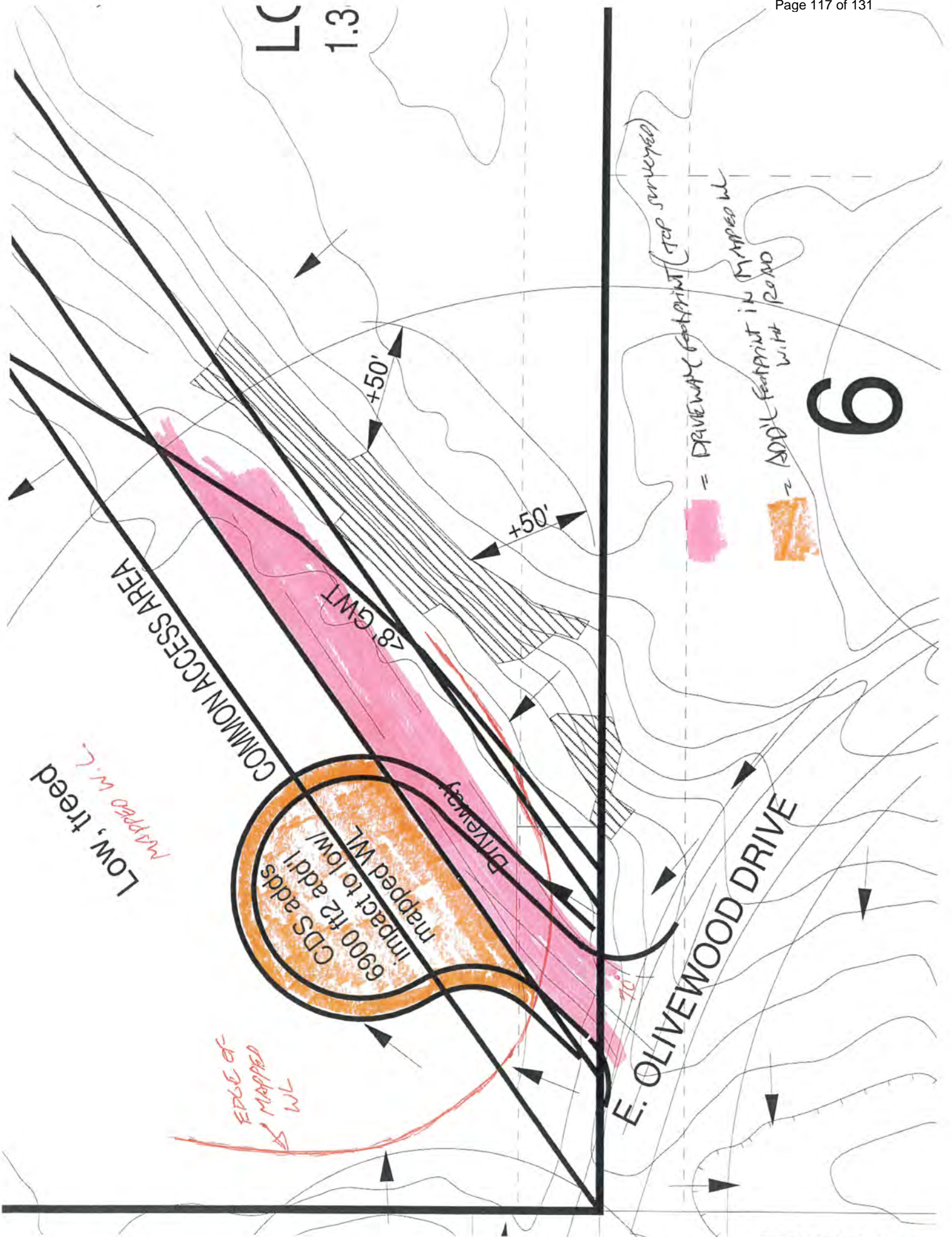


EXHIBIT J-5





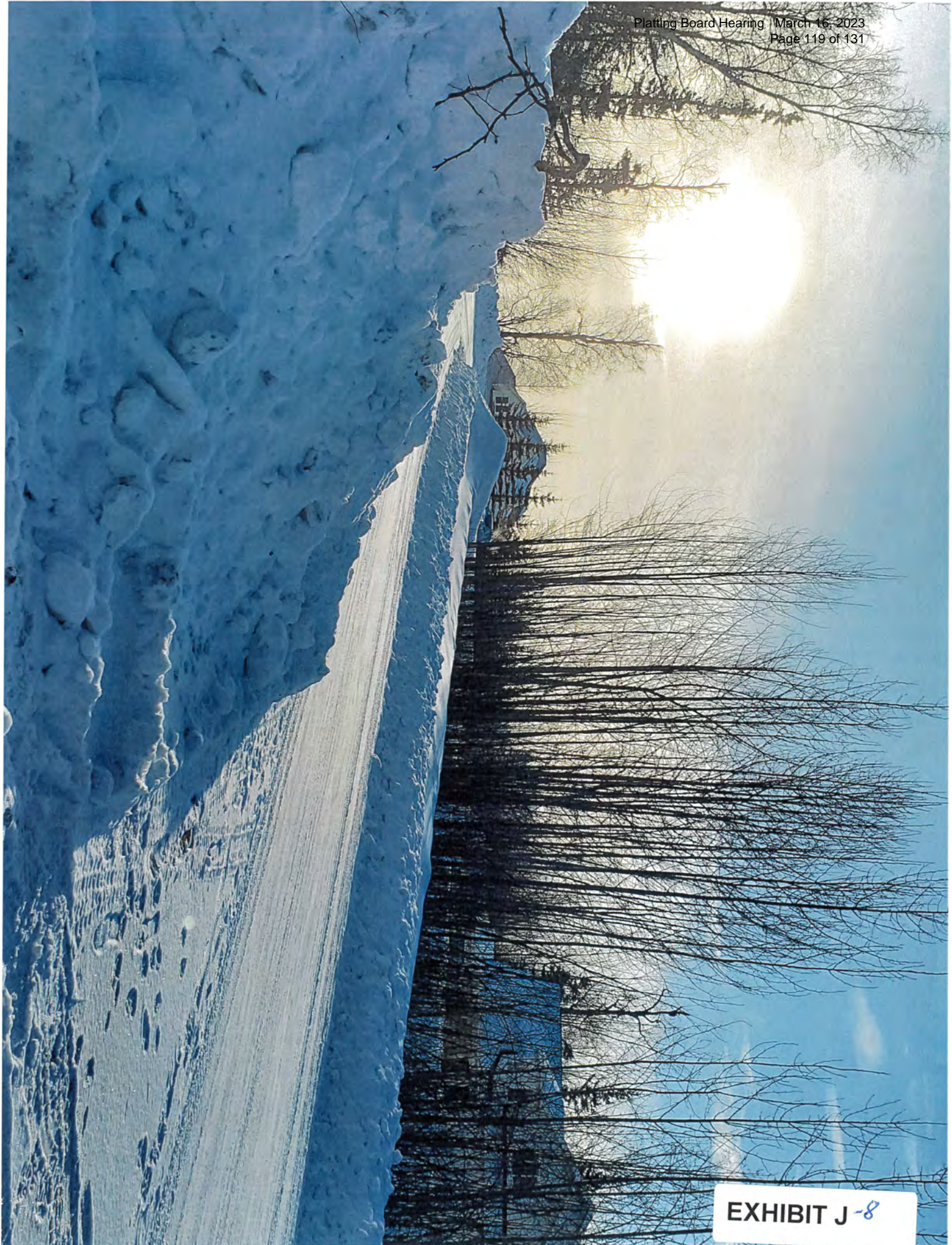


EXHIBIT J -8

Matthew Goddard

From: Holler Engineering <holler@mtaonline.net>
Sent: Friday, March 3, 2023 3:54 PM
To: Jamie Taylor; Matthew Goddard
Cc: Kevin Sorensen; Gary LoRusso; Daniel Dahms; Brad Sworts
Subject: Re: PW variance concerns for Hidden Acres proposed subdivision
Attachments: Updated area sketch 2021 WL map.pdf

[EXTERNAL EMAIL - CAUTION: Do not open unexpected attachments or links.]

Hello Jamie-

Okay, found the 2021 PND report and map you wanted, printed the photo map on page 7 to a layer in the drawing and traced that onto the same sketches, attached. Using this map there would be no difference in affected wetlands, although one area comes close to the short CDS clearing limits, and utilities may encroach if they ran around the perimeter of the CDS. The petitioner explained he thought these road options *would* encounter the 2021 areas when he prepared the variance request, but this seems to show otherwise.

Not sure why this matters much. The variance request is just for reduced frontage onto a ROW, and the constructed driveway provides entirely adequate access. It seems like PW would want to support it and not have a whole new road and CDS to maintain. Instead, there would be a simple shared driveway just like those required on many other plats, with about zero maintenance.

Let me know if there is anything else you would like.

Thanks,

Curt

From: [Jamie Taylor](#)
Sent: Friday, March 03, 2023 1:07 PM
To: [Holler Engineering](#) ; [Matthew Goddard](#)
Cc: [Kevin Sorensen](#) ; [Gary LoRusso](#) ; [Daniel Dahms](#) ; [Brad Sworts](#)
Subject: RE: PW variance concerns for Hidden Acres proposed subdivision

Hi Curt –

A Preliminary Wetland Delineation Report, prepared by PND in September 2021, identified two wetland areas on the subject parcel. Those are the wetland boundaries I would like to see in comparison to the footprints of the road and driveway.

Thank you,
Jamie

From: Holler Engineering <holler@mtaonline.net>
Sent: Friday, March 3, 2023 12:07 PM
To: Matthew Goddard <Matthew.Goddard@matsugov.us>
Cc: Kevin Sorensen <ksoren@mtaonline.net>; Gary LoRusso <garyl@mtaonline.net>; Jamie Taylor <Jamie.Taylor@matsugov.us>
Subject: PW variance concerns for Hidden Acres proposed subdivision

[EXTERNAL EMAIL - CAUTION: Do not open unexpected attachments or links.]

Hi Matthew-

This email will try to address concerns raised by Jamie Taylor in her email to you dated March 3rd. Her discussion items are retained verbatim in blue below, with responses in red:

“Variance: DPW does not support approval of the variance based on the information that has been provided. We have requested from the petitioner supporting information for the claim in the variance request that constructing a borough standard road to access the lots would impact the wetlands. A plan drawing showing the extents of wetlands and the footprint of a borough standard road vs the footprint of a borough standard driveway (as proposed) would be sufficient.” See attached sketches. Using a similar alignment, it is clear that substantially more mapped wetlands area would be affected by constructing either a short CDS road, or a longer road extending back into the property to a CDS. There are several reasons why: 1 Road and CDS footprints are wider than driveways, generally with wider foreslopes. 2 Roads have vertical and horizontal limits which are far more restrictive than driveways; this limits the ability of a road to form fit to the existing surface within the easement or ROW. 3 Roads typically are centered within the area, while a driveway need only fit within the area. In this particular case, I drew a typical short CDS and estimated the minimum footprint that would be required. Then that footprint was compared to the footprint of the existing, survey located driveway edge, including an estimation of the foreslopes on the northwest side. The difference for these options was approximately 6900 ft², with the CDS taking up far more area. Using the same methodology for a longer road and CDS, there was an area of increased use of roughly 16,000 ft²; note that the portion of the driveway past about 300’ is estimated, not surveyed. See the attached file with 2 sketches. If a road or short CDS were to be constructed, it is likely the project could support substantially more than 5 lots.

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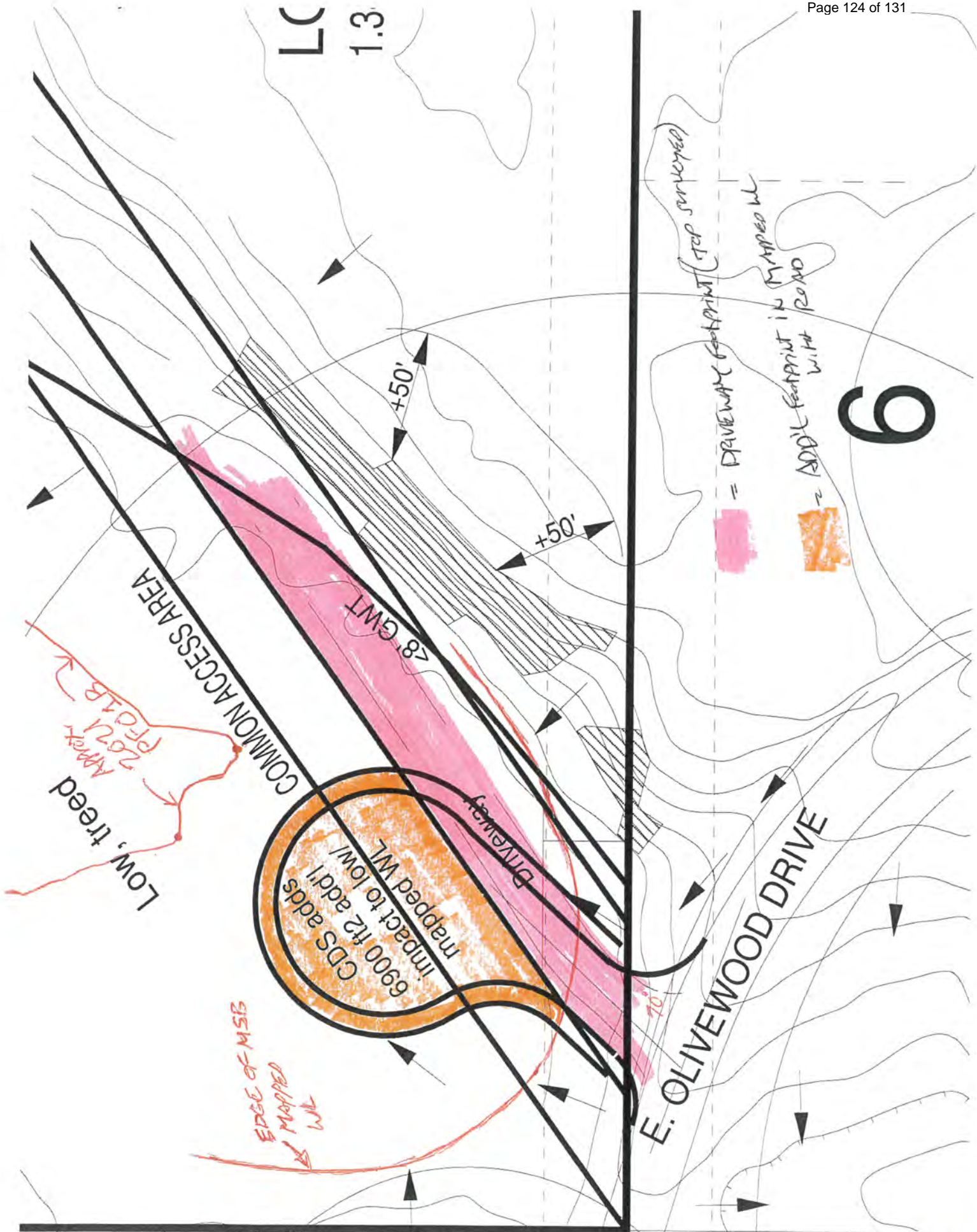
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Hopefully the above input will be helpful to resolve these concerns. Please do not hesitate with any additional questions or concerns you may have.

Thanks,

Curt Holler PE
Holler Engineering
3375 N Sams Drive
Wasilla, AK 99654-4306
(907) 376-0410 Fax 376-0610





6

Matthew Goddard

From: Jamie Taylor
Sent: Monday, March 6, 2023 12:20 PM
To: Matthew Goddard; Daniel Dahms
Cc: Brad Sworts
Subject: RE: PW variance concerns for Hidden Acres proposed subdivision

I will need to discuss with Daniel and Brad before changing our comments, so I would say they stand as written for now.
Jamie

From: Matthew Goddard <Matthew.Goddard@matsugov.us>
Sent: Monday, March 6, 2023 8:02 AM
To: Jamie Taylor <Jamie.Taylor@matsugov.us>; Daniel Dahms <Daniel.Dahms@matsugov.us>
Subject: FW: PW variance concerns for Hidden Acres proposed subdivision

Good morning Jamie,

Does this updated alter your comments sent over March 2, 2023 or do they stand as written?
Sorry for this one being a last-minute crunch. I do appreciate your help though.

Matthew Goddard
Platting Technician
907-861-7881
Matthew.Goddard@matsugov.us

From: Holler Engineering <holler@mtaonline.net>
Sent: Friday, March 3, 2023 3:54 PM
To: Jamie Taylor <Jamie.Taylor@matsugov.us>; Matthew Goddard <Matthew.Goddard@matsugov.us>
Cc: Kevin Sorensen <ksoren@mtaonline.net>; Gary LoRusso <garyl@mtaonline.net>; Daniel Dahms <Daniel.Dahms@matsugov.us>; Brad Sworts <Brad.Sworts@matsugov.us>
Subject: Re: PW variance concerns for Hidden Acres proposed subdivision

[EXTERNAL EMAIL - CAUTION: Do not open unexpected attachments or links.]

Hello Jamie-

Okay, found the 2021 PND report and map you wanted, printed the photo map on page 7 to a layer in the drawing and traced that onto the same sketches, attached. Using this map there would be no difference in affected wetlands, although one area comes close to the short CDS clearing limits, and utilities may encroach if they ran around the perimeter of the CDS. The petitioner explained he thought these road options *would* encounter the 2021 areas when he prepared the variance request, but this seems to show otherwise.

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Let me know if there is anything else you would like.

Thanks,

Curt

From: [Jamie Taylor](#)
Sent: Friday, March 03, 2023 1:07 PM
To: [Holler Engineering](#) ; [Matthew Goddard](#)
Cc: [Kevin Sorensen](#) ; [Gary LoRusso](#) ; [Daniel Dahms](#) ; [Brad Sworts](#)
Subject: RE: PW variance concerns for Hidden Acres proposed subdivision

Hi Curt –

A Preliminary Wetland Delineation Report, prepared by PND in September 2021, identified two wetland areas on the subject parcel. Those are the wetland boundaries I would like to see in comparison to the footprints of the road and driveway.

Thank you,
Jamie

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Sent: Friday, March 3, 2023 12:07 PM
To: Matthew Goddard <Matthew.Goddard@matsugov.us>
Cc: Kevin Sorensen <ksoren@mtaonline.net>; Gary LoRusso <garyl@mtaonline.net>; Jamie Taylor <Jamie.Taylor@matsugov.us>
Subject: PW variance concerns for Hidden Acres proposed subdivision

[EXTERNAL EMAIL - CAUTION: Do not open unexpected attachments or links.]
Hi Matthew-

This email will try to address concerns raised by Jamie Taylor in her email to you dated March 3rd. Her discussion items are retained verbatim in blue below, with responses in red:

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Thanks,

Curt Holler PE
Holler Engineering
3375 N Sams Drive
Wasilla, AK 99654-4306
(907) 376-0410 Fax 376-0610

Matthew Goddard

From: Permit Center
Sent: Thursday, February 2, 2023 1:56 PM
To: Matthew Goddard
Subject: RE: RFC Hidden Acres (MG)

No Comments

Thank you,

Jennifer Monnin, CFM
Permit Technician
350 E Dahlia Ave
Palmer, AK 99645
Jennifer.monnin@matsugov.us
907-861-7822

From: Matthew Goddard <Matthew.Goddard@matsugov.us>
Sent: Wednesday, February 1, 2023 5:06 PM
To: kristina.huling@alaska.gov; Eisenman, Mark E (DOT) <mark.eisenman@alaska.gov>; david.post@alaska.gov; Percy, Colton T (DFG) <colton.percy@alaska.gov>; sarah.myers@alaska.gov; stark@mtaonline.net; mothers@mtaonline.net; StephanieNowersDistrict2@gmail.com; regpagemaster@usace.army.mil; pamela.j.melchert@usps.gov; Margie Cobb <Margie.Cobb@matsugov.us>; Eric Phillips <Eric.Phillips@matsugov.us>; Brad Sworts <Brad.Sworts@matsugov.us>; Jamie Taylor <Jamie.Taylor@matsugov.us>; Elaine Flagg <Elaine.Flagg@matsugov.us>; Daniel Dahms <Daniel.Dahms@matsugov.us>; Tom Adams <Tom.Adams@matsugov.us>; Charlyn Spannagel <Charlyn.Spannagel@matsugov.us>; Katrina Kline <katrina.kline@matsugov.us>; MSB Farmers <MSB.Farmers@matsugov.us>; Permit Center <Permit.Center@matsugov.us>; Andy Dean <Andy.Dean@matsugov.us>; Planning <MSB.Planning@matsugov.us>; Alex Strawn <Alex.Strawn@matsugov.us>; Fred Wagner <Frederic.Wagner@matsugov.us>; John Aschenbrenner <John.Aschenbrenner@matsugov.us>; mearow@mea.coop; row@mtasolutions.com; andrew.fraiser@enstarnaturalgas.com; James Christopher <James.Christopher@enstarnaturalgas.com>; row@enstarnaturalgas.com; ospdesign@gci.com; msb.hpc@gmail.com
Subject: RFC Hidden Acres (MG)

Hello,

The following link is a request to subdivide Tract A, Spring Hill, Plat #2022-88.

Please ensure all comments are submitted by **February 21, 2023** so they can be incorporated in the staff report that will be presented to the Platting Board.

[Hidden Acres](#)

Thank you,

Matthew Goddard
Platting Technician
Matthew.Goddard@matsugov.us
(907) 861-7881



ENSTAR Natural Gas Company
A DIVISION OF SEMCO ENERGY
Engineering Department, Right of Way Section
401 E. International Airport Road
P. O. Box 190288
Anchorage, Alaska 99519-0288
(907) 277-5551
FAX (907) 334-7798

February 2, 2023

Matanuska-Susitna Borough, Platting Division
350 East Dahlia Avenue
Palmer, AK 99645-6488

To whom it may concern:

ENSTAR Natural Gas Company has reviewed the following preliminary plat and has no comments or recommendations.

- **HIDDEN ACRES**
(MSB Case # 2023-006)

If you have any questions, please feel free to contact me at 334-7944 or by email at james.christopher@enstarnaturalgas.com.

Sincerely,

A handwritten signature in cursive script that reads "James Christopher".

James Christopher
Right of Way & Compliance Technician
ENSTAR Natural Gas Company

EXHIBIT L-1

Matthew Goddard

From: OSP Design Group <ospdesign@gci.com>
Sent: Monday, February 20, 2023 6:04 PM
To: Matthew Goddard
Cc: OSP Design Group
Subject: RE: RFC Hidden Acres (MG)
Attachments: RFC Packet.PDF; Agenda Plat.pdf

[EXTERNAL EMAIL - CAUTION: Do not open unexpected attachments or links.]

Matthew,

In review GCI has no comments or objections to the plat, attached is the signed plat for your records.

Thanks,

MIREYA ARMESTO

GCI | Technician II, GIS Mapping

m: 907-744-5166 | w: www.gci.com

From: Matthew Goddard <Matthew.Goddard@matsugov.us>
Sent: Wednesday, February 1, 2023 5:06 PM
To: kristina.huling@alaska.gov; Eisenman, Mark E (DOT) <mark.eisenman@alaska.gov>; david.post@alaska.gov; Percy, Colton T (DFG) <colton.percy@alaska.gov>; sarah.myers@alaska.gov; stark@mtaonline.net; mothers@mtaonline.net; StephanieNowersDistrict2@gmail.com; regpagemaster@usace.army.mil; pamela.j.melchert@usps.gov; Margie Cobb <Margie.Cobb@matsugov.us>; Eric Phillips <Eric.Phillips@matsugov.us>; Brad Sworts <Brad.Sworts@matsugov.us>; Jamie Taylor <Jamie.Taylor@matsugov.us>; Elaine Flagg <Elaine.Flagg@matsugov.us>; Daniel Dahms <Daniel.Dahms@matsugov.us>; Tom Adams <Tom.Adams@matsugov.us>; Charlyn Spannagel <Charlyn.Spannagel@matsugov.us>; Katrina Kline <katrina.kline@matsugov.us>; MSB Farmers <MSB.Farmers@matsugov.us>; Permit Center <Permit.Center@matsugov.us>; Andy Dean <Andy.Dean@matsugov.us>; Planning <MSB.Planning@matsugov.us>; Alex Strawn <Alex.Strawn@matsugov.us>; Fred Wagner <Frederic.Wagner@matsugov.us>; John Aschenbrenner <John.Aschenbrenner@matsugov.us>; mearow@mea.coop; row@mtasolutions.com; andrew.fraiser@enstarnaturalgas.com; James Christopher <James.Christopher@enstarnaturalgas.com>; row@enstarnaturalgas.com; OSP Design Group <ospdesign@gci.com>; msb.hpc@gmail.com
Subject: RFC Hidden Acres (MG)

[EXTERNAL EMAIL - CAUTION: Do not open unexpected attachments or links.]

Hello,

The following link is a request to subdivide Tract A, Spring Hill, Plat #2022-88.

Please ensure all comments are submitted by **February 21, 2023** so they can be incorporated in the staff report that will be presented to the Platting Board.

[Hidden Acres](#)

Thank you,

Matthew Goddard

Platting Technician

Matthew.Goddard@matsugov.us

EXHIBIT L-3