

## PLANNING DEPARTMENT STAFF ANALYSIS PLATTING

**DATE:** January 3, 2018

**CASE:** S12388

Conservation Subdivision of Lewis and Clark Subdivision, Lots 1 – 16 and Tract A, and a 60-month phasing plan with variances from AMC 21.07.060D.3.b.ii., *Internal Street Connectivity*, and AMC 21.08.030F.6.a., *Cul-de-Sacs*

**GRID:** SW2941

**SITE:** 70.05 acres

**LAND USE:** Undeveloped

**UTILITIES:** Private well and on-site septic system

**TOPO:** Slopes downhill to the southeast

**VEGETATION:** Spruce, birch, alder and undergrowth

**ZONING:** R-8 (low density residential, 4 acre) district

**COMPREHENSIVE PLAN:**  
Classification:

- “Limited Intensity, 0 – 1 dua” per the 2010 *Hillside District Plan Land Use Plan Map*
- Not identified in the 2001 *Anchorage 2020 Land Use Policy Map*
- “Large Lot Residential” in the 2017 *Anchorage 2040 Land Use Plan*

### SURROUNDING AREA

	NORTH	EAST	SOUTH	WEST
Zoning:	R-6; R-8; R-9	R-8	R-8	R-6; R-9
Land Use:	Single-Family Residential	Single-Family Residential	Undeveloped	Single-Family Residential

### AGENCY COMMENTS

1. Utility easements have been requested.
2. Long Range Planning provided comments which are attached.

3. Non-Motorized Transportation Coordinator:

- a. The 2010 Hillside District Plan identifies primary & secondary trail connections along Upper DeArmoun and Canyon Road, bordering this parcel. The proposed plat appears to have provided adequate Right of Way for future development of pathways within these roadways.
- b. Title 21.07.060.D.3.b.ii requires pedestrian easements from cul-de-sacs to the nearest adjacent street. The proposed Brownson Circle's nearest roadway of DeArmoun is an insignificant pedestrian connection only gaining minimal internal street connectivity, however a 10' Walkway Easement is requested within the proposed Lewis & Clark Circle, connecting the cul-de-sac to Canyon Road.

4. Private Development:

Roads: The proposed subdivision abuts the following right-of-way:

- To the north, Upper DeArmoun Road, a Glen Alps Service Area maintained right-of-way that is classified as a Class IC Neighborhood Collector in the current OSHP. Upper DeArmoun Road appears to be strip paved with a width of approximately 24-feet where it abuts the proposed subdivision.
- To the east, Canyon Road, a Glen Alps Service Area maintained right-of-way that is classified as a Class IC Neighborhood Collector in the current OSHP. The Municipality of Anchorage has an upcoming project that will upgrade Canyon Road.
- Internal to the subdivision, Lewis & Clark Circle, a proposed right-of-way located in the Glen Alps Service Area. Lewis & Clark Circle is not constructed.
- Internal to the subdivision, Brownson Circle, a proposed right-of-way located in the Glen Alps Service Area. Brownson Circle is not constructed.

Improvement Recommendations:

- Upper De Armoun Road appears to be strip paved with a width of approximately 24-feet where it abuts the proposed subdivision. This does not meet municipal requirements for shoulder width or pedestrian facilities. The existing level of improvement of Upper De Armoun Road is consistent with the level of improvement proposed for Canyon Road (also a Class IC Neighborhood Collector). As a result no road improvements are recommended at this time.

- Lewis & Clark Circle is not constructed where it is internal to the proposed subdivision. The petitioner shall construct to municipal standards a 20-foot wide strip paved street as shown on Typical Section No. 20-1 of the Municipality of Anchorage Standard Specifications.
- Brownson Circle is not constructed where it is internal to the proposed subdivision. The petitioner shall construct to municipal standards a 20-foot wide strip paved street as shown on Typical Section No. 20-1 of the Municipality of Anchorage Standard Specifications.

Subdivision Agreement Requirements: Prior to final plat approval the petitioner shall enter into a subdivision agreement with Private Development for the required public Class B area improvements, to include paved streets, traffic control devices, street signs, monuments, drainage facilities, utilities, and any Traffic Section improvement requirements.

Drainage: Prior to final plat approval, submit to Private Development for review and approval a project specific full drainage analysis and calculations. An analysis will be required to address storm runoff as a result of the proposed changes to infrastructure and to permeable / impermeable surface treatments. The analysis and plans shall present and illustrate respectively how drainage from this facility is being managed in relation to peripheral properties and right of way; demonstrate that post development drainage will not adversely impact adjacent properties or rights of way; and, measures to be taken in the event that excavation associated with the build-out of the property exposes subsurface flows. Drainage analysis and design shall conform to the Municipality of Anchorage Design Criteria Manual (DCM) and the Drainage Design Guidelines (DDG).

Plat Notes: Private Development recommends the following notes be added to the final plat:

- a. The property owner and utilities shall not raise, lower, or re-grade the property in a manner that will alter the drainage patterns from those shown on the approved grading and drainage plan without prior approval from Municipality of Anchorage Building Safety Office.
- b. Property owners and utilities shall not obstruct, impede, or alter drainage facilities (e.g. swales, ditches) in any way that will adversely impact adjacent properties or rights-of-way.

Department Recommendations: The Private Development Section has no objection to the proposed subdivision, subject to the above recommendations and conditions.

5. Addressing: Make the following drafting changes:
  - a. Platted Area/Proposed Street Names: LEWIS & CLARK CIRCLE is not an acceptable street name. Street names must be 10 characters or fewer, including spaces and excluding the prefix/suffix. Ampersands are not allowed on street signs.
  - b. Title Block: “..Block 1” of differs from the rest of the application
6. Municipal Traffic Division:
  - a. The traffic department recommends approval of this preliminary plat with the following comments:
    - This new subdivision is dedicating two new 60 foot rights of way for construction of two cul-de-sacs to support the proposed subdivision. The subdivision is zoned R-8 and all lots appear to meet the requirements for lot size and access to rights of way. It anticipated that the roads will be constructed under a subdivision agreement with municipality and will meet the standards of development for a Class B. Upper Dearmoun and Canyon Roads are classified as neighborhood collectors in the *Official Streets and Highway Plan*.
    - Add a plat note, identifying that all development within this subdivision meet all requirements for an Alternative Residential Subdivision (Conservation Subdivision) outline in AMC 21.08.070 B.4.
    - Add a plat note stating: “No direct access to Upper De Armoun and Canyon Roads for Lots 1-6, and 14, 15.”
    - Revise radius of curve at intersection of Lewis and Clark Circle with Upper Dearmoun Road to 30 feet for curve number C4 and C21. Design Criteria manual, Chapter 1, Section 1.9 requires 30 foot radius when at intersection between local and collector roadways.
    - Dedication of 30 feet of Right of Way along both Dearmoun and Canyon road as currently shown on Preliminary Plat.
    - A majority of these lots appear that they will have a difficult time of constructing driveways to future homes that will meet

municipal driveway standards for maximum grade based on existing contours shown on the plat.

- Provide right of way or access easement for access to public right of ways from cul-de-sac as required by 21.07.060 D.3.B.ii. Please review additional comments in regards to variance request below.
- Variance for Length of Cul-de Sac per 21.08.030 F.6.a: Traffic has no objections to this requested variance for the two cul-de-sacs shown on the preliminary plat.
- Variance for 10 foot pedestrian access from cul-de-sac bulbs: Traffic is not supportive of this variance to Title 21 based on the information provided in the application. Traffic agrees that existing contours and existing wetlands and streams limits the location of these easements. However, there are a couple of lots in the northwest and northeast sections of the subdivision that would support either an easement or right of way. The information provide in application was insufficient in addressing variance standards 3 and 4.

7. Alaska Department of Transportation has no comment.

8. Anchorage Water and Wastewater Utility:

- a. AWWU water and sanitary sewer are not available to this parcel.
- b. These parcels are located outside of AWWU's Water Service District.
- c. Wastewater facilities are to be in accordance with the Hillside District Plan (HDP) adopted per AO2010-22. This property is located outside the max perimeter of Public Sewerage per HDP.
- d. AWWU has no objection to this platting action.

9. On-Site Water and Wastewater Services:

- a. Provide to OSWWS, information to satisfy the requirements specified by AMC 21.15, AMC 15.55 and AMC 15.65 for each lot within this proposed subdivision. This information must include, but may not necessarily be limited to:
  - i. Soils testing, percolation testing, and ground water monitoring must be conducted to confirm the suitability for development using on-site wastewater disposal systems. Ground water monitoring must be conducted during a high ground water season in either the fall (October) or spring (May).

- ii. Areas designated for the original and replacement wastewater disposal system sites must be identified and must meet all criteria specified in AMC 15.65 including slope and slope setback requirements for each lot.
- iii. Topographical information must be submitted.

10. Watershed Management Services:

- a. There is a stream located on this plat and the stream protection setback will be as specified in AMC 21.07.020 or as specified in future adopted provisions of AMC 21. Portions of streams contained within mapped wetlands are subject to setbacks as described in the Anchorage Wetlands Management Plan.
- b. Maintain continuity of drainage from existing drainageways that currently drain across the subdivision. Drainageways may not be relocated without prior approval from MOA Private Development.
- c. Tract A will be preserved as open space by this subdivision. Tract A will be owned and maintained by the homeowners association and cannot be further subdivided, developed, or sold.

11. Right-of-Way Division:

- a. Suggest placing the title block in the conventional lower right corner of the plat, utilizing a break line for the existing reference monument location.
- b. Provide a legend item and identify the cross hatching and/or wetlands types and boundaries.
- c. Provide utility easements as required.
- d. Resolve with the MOA Traffic Departments the need for notes addressing the location, number, and size of the driveway entries to the street rights of way.
- e. Enter into a subdivision agreement to construct the required improvements to the interior and peripheral rights of way.

12. Community Council and Public Comments:

- a. This subdivision lies within the Hillside Community Council. The Chair of the Hillside Community Council provided comments. The Rabbit Creek Community Council also provided comments. Ten more written

comments were received from the public. All of the comments are attached.

## **STAFF ANALYSIS**

### **Proposal**

This is a request to subdivide 1 tract into 16 lots and 1 tract as a Conservation Subdivision (AMC 21.08.070B.). The petitioner is also requesting approval of a 60-month phasing plan consisting of three phases. The phasing plan will allow the developer more time to construct public infrastructure as development progresses. The petitioner is also seeking variances from AMC 21.07.060D.3.b.ii., *Internal Street Connectivity*, and AMC 21.08.030F.6.a., *Cul-de-Sacs*.

There are mapped wetlands, drainageways, and a stream within this subdivision. Three notes should be added to the plat to alert the public to the additional regulations that come with development within wetlands, drainageways, and streams. Plat notes are Watershed Management Services (WMS) and Planning's preferred method to identify wetlands, drainageways, and streams on plats. The reason for this is that easements dedicated on plats require a platting action to change the easement while wetlands, drainageways, and streams are ever changing. WMS and Planning are aware of instances where streams no longer exist on properties, but the plats still require stream protection setbacks of 50 feet on the properties.

### **AMC 21.08.070B. Conservation Subdivisions**

#### **1. Purpose**

**A conservation subdivision is an alternative type of residential development in which the lots are allowed to be smaller in area or narrower than otherwise required in the zoning district, but in which the overall number of lots does not exceed the maximum number of lots allowed in a conventional subdivision by the zoning district. Conservation subdivisions are intended to create a more compact residential development to preserve and maintain open areas, high value natural lands, and lands unsuitable for development, in excess of what would otherwise be required by this title.**

#### **2. Applicability**

**The conservation subdivision option may be used on any parcel with a minimum of at least two acres in any residential district in which single-family housing is permitted, provided that the proposal is consistent with the requirements in this section 21.08.070.**

This petition site contains more than 2 acres, and is eligible for a conservation subdivision.

#### **3. Conservation Design Process**

**Conservation subdivisions shall be approved through the procedure set forth in section 21.03.200, Subdivisions and Plats.**

This preliminary plat is being processed in accordance with AMC 21.03.200, *Subdivisions*.

**4. Reduction in Minimum Lot Area Allowed**

**Conservation subdivisions may include one or more lots that do not conform to the minimum lot size or lot width requirements of chapter 21.06, or the dimensional requirements of subsections 21.08.030K.1. and 2., provided that:**

- a. The amount of any reduction in minimum lot size shall be used for common open space, pursuant to subsection B.6. below;**

The minimum require lot area in the R-8 district is four acres. Lots 1 – 8 and 10 – 16 have less than four acres. The amount of reduction in these lots is required to be added to Tract A. The total amount of reduction in these lots is 22.58 acres and Tract A exceeds that amount with 22.965 acres.

- b. There shall be no more than one principal single-family structure per lot;**

There will be no more than one principal single-family structure on each lot.

- c. Front and rear setbacks interior to the subdivision are not less than half the depth required by the underlying zoning district, but side setbacks are not less than the width required by the underlying zoning district;**

The R-8 district has required front and rear setbacks of 25 feet. The front and rear setbacks may be reduced to 15.5 feet. The R-8 district has required side setbacks of 15 feet. The side setbacks will not and cannot be reduced.

- d. On any lot that is less than the minimum lot size of the underlying zoning district, the principal structure shall have a maximum floor area ratio of not more than 0.5;**

All of the lots, except Lot 9, have less than the minimum lot size in the R-8 district. The principal structure on each of these lots will have a floor area ratio of less than 0.5.

- e. In class A improvement areas, street sections shall have vertical curbs;**

The R-8 district is a Class B improvement area. Therefore, this standard is not applicable.

- f. Driveways shall have a maximum width of 14 feet at the curb;**

Driveways will have a maximum width of 14 feet.

- g. Where on-street parking is allowed, a minimum 20 foot separation distance between the curb returns of adjacent driveways shall be provided; and**

The application states that driveways will be separated from curb returns by 20 feet. There is ample space on each of the lots to meet this standard. Conformance with this standard will be reviewed at the time of building permitting.

- h. Common open space with level 4 Screening landscaping shall be provided along any lot line abutting a residential neighborhood where any adjoining lot is greater than 150% of the average lot size along that lot line of the conservation subdivision. In class B areas this abutting landscaped open space area shall be one hundred feet wide.**

Tract A is the common open space for this conservation subdivision. No level 4 screening landscaping is required because the residential lots adjoining the subdivision are less than 150% of the average lot size along that lot line of the conservation subdivision. Tract A is 100 feet wide, which is required in class B areas.

**5. Lot Coverage Allowed**

**The maximum lot coverage requirements for lots in a conservation subdivision, as set forth in chapter 21.06, may be increased by no more than 10 percent.**

The R-8 district's required maximum lot coverage is 5%, but this may be increased to a 5.5%.

**6. Minimum Open Space**

**The amount of lot size reduction of each lot shall, in total, be provided as common open space, except that under no circumstances shall the amount of common open space provided be less than 30 percent of the property shown on the subdivision plat. Open space shall be identified using the standards set forth in subsection 21.07.030D., Private Open Space, Standards, except that no portion of the land preserved as common open space may be located within the boundaries of an individual lot for residential development, or in a road right-of-way, and no portion of the land preserved as common open space may be less than 30 feet in its smallest dimension in class A districts or less than 100 feet in its smallest dimension in class B districts, or have less square footage than one-half of the square footage of the minimum lot size for that district. In order that all residents of a development have access, there should be, provided by the developer, a common pedestrian corridor leading into all common**

**open space. Common open space areas in class B improvement areas shall remain undisturbed.**

The minimum required open space is 24.1 acres. Tract A contains 22.965 acres, which is approximately one acre short of the requirement. The plat should be revised to meet the minimum required open space.

The smallest dimension of the open space tract is 100 feet because this is a Class B district. Lots 7 – 12 have direct access to Tract A. The remaining lots have access to Tract A from Lewis and Clark Circle.

**7. Dedication and Recording**

**The required common open space shall be preserved from development in perpetuity through the use of a deed restriction or easement, and shall be conveyed to a property owners' association or other organization with responsibility for maintenance of the open space and the ability to collect assessments or dues for such purpose. The applicant shall submit proof that:**

- a. **Such deed restriction or easement has been recorded at the district recorder's office; and**
- b. **The property owners' association or other organization has been established before any building or land use permits for construction in a conservation subdivision shall be issued.**

The homeowner's association documents creating the Lewis and Clark Homeowner's Association will be provided to the Planning Department.

**Variance Requests**

1. The petitioner is seeking a variance from AMC 21.08.030F.6.a., *Cul-de-Sacs*, to allow Lewis and Clark Circle to exceed the maximum 900-foot length permitted. The preliminary plat shows Lewis and Clark Circle as having 985 feet in length.
2. The petitioner is seeking a variance from AMC 21.07.060D.3.b.ii., *Internal Street Connectivity*, which requires a 10-foot wide trail easement to connect Brownson Circle to Upper DeArmoun Road.
3. The petitioner is seeking a variance from AMC 21.07.060D.3.b.ii., *Internal Street Connectivity*, which requires a 10-foot wide trail easement to connect Lewis and Clark Circle to Canyon Road. The petitioner withdrew this variance request at one point, but ultimately concluded that they wanted to go forward with the variance request.

**AMC 21.03.240G.3. Approval Criteria for Variances decided by the Platting Authority.**

- a. **There are special circumstances or conditions affecting the property such that the strict application of the provisions of the subdivision regulations would clearly be impractical, unreasonable, or undesirable to the general public.**

- Variance 1 The criterion is met. It is undesirable to require the Lewis and Clark Circle cul-de-sac to be shortened by 85 feet in order to meet the code requirement. The average slope of the land is approximately 12%, which is a special condition affecting the property. Furthermore, the shape of the lot is odd after dedicating the open space tract (Tract A). The subdivision, particularly the streets and the intersections, are designed to meet road grade safety standards. Lewis and Clark Circle has a single intersection with Upper DeArmoun Road that lines up with Jeanne Road. The road alignment keeps road grades to a minimum and limits cut and fill to the maximum extent possible.
- Variance 2 The criterion is met. The code requirement to provide a 10-foot trail easement connecting Brownson Circle to Upper DeArmoun is unreasonable. There is no need for a trail easement between Brownson Circle to Upper DeArmoun Road because the distance by street or trail is approximately the same and would benefit only two lots. The Non-Motorized Transportation Coordinator supports the granting of this variance from trail dedication.
- Variance 3 The criterion is not met. The code requirement to provide a 10-foot trail easement connecting Lewis and Clark Circle to Canyon Road is desirable to the public. The purpose of this code requirement is to promote internal street connectivity and walkability for pedestrians. The code states:

Whenever cul-de-sac streets are created, at least one 10 foot wide pedestrian access right-of-way or easement shall be provided, to the extent reasonably feasible, between each cul-de-sac head or street turnaround and the closest adjacent street or pedestrian walkway. This requirement shall not apply where it would result in damage to or intrusion into significant natural areas such as stream corridors, wetlands, and steep slope areas, or if the configuration of existing adjacent development prevents such a connection.

The connection between Lewis and Clark Circle and Canyon Road does not appear to "result in damage to or intrusion into significant natural areas" and would benefit the residents of the subdivision.

- b. **The granting of the specific variance will not be detrimental to the public welfare or injurious to other property in the area in which said property is situated.**

- Variance 1 The criterion is met. The granting of the variance from the length of a cul-de-sac street will not negatively impact neighboring property owners or the public. Lewis and Clark Circle will be constructed to Municipal street standards and the Anchorage Fire Department will have adequate fire ingress and egress to all of the lots.
- Variance 2 The criterion is met. The granting of the variance from providing a trail easement between Brownson Circle and Upper DeArmoun will not be detrimental to the public welfare. A trail easement would have no benefit for Lots 10, 14, 15, and 16. The distance saved by using the trail easement instead of the streets is only about 200 feet.
- Variance 3 The criterion is not met. The granting of the variance from the requirement for a trail easement between Lewis and Clark Circle and Canyon Road would force pedestrians to walk the long way around on Upper DeArmoun Road in order to go west on Canyon Road.

**c. Such variance will not have the effect of nullifying the intent and purpose of the subdivision regulations or the comprehensive plan of the municipality.**

- Variance 1 The criterion is met. The variance will not have the effect of nullifying the intent of the subdivision regulations or *Anchorage 2020*. The property owner is dedicating a 60-foot right-of-way for Lewis and Clark Circle and will be constructing the street to standards in the Design Criteria Manual.
- Variance 2 The criterion is met. The code requirement to provide a trail easement between Brownson Circle and Upper DeArmoun Road is unnecessary in this situation. The distance saved by providing a pedestrian shortcut is only about 200 feet for two lots.
- Variance 3 The criterion is not met. The intent of the subdivision regulations is to make neighborhoods more walkable by promoting pedestrian connections between subdivisions. The code requirement is intended to provide trail connections like the one between Lewis and Clark Circle and Canyon Road. This trail connection is approximately 2,200 feet shorter than walking the long way around.

**d. Undue hardship would result from strict compliance with specific provisions or requirements of the subdivision regulations.**

- Variance 1 The criterion is met. The variance from the maximum length of a cul-de-sac street is less than 100 feet. It is an undue hardship to

require the street to be shortened in order to meet the code requirement, especially when none of the reviewing agencies object to the granting variance.

- Variance 2 The criterion is met. Strict application of the subdivision regulations requires a trail easement between Brownson Circle and Upper DeArmoun Road. It would be an undue hardship to require the subdivider to provide the trail easement which has little to no benefit.
- Variance 3 The criterion is not met. Providing a long trail easement from Lewis and Clark Circle to Canyon Road is a hardship on the individual property owner of the lot, but that is outweighed by the overall public benefit of the trail connection.

#### **DEPARTMENT RECOMMENDATION**

- A. Approval of the variance from AMC 21.08.030F.6.a., *Cul-de-Sacs*, subject to recording a suitable plat within 60 months or any time extensions.
- B. Approval of the variance from 21.07.060D.3.b.ii., *Internal Street Connectivity*, for Brownson Circle, subject to recording a suitable plat within 60 months or any time extensions.
- C. Denial of the variance from 21.07.060D.3.b.ii., *Internal Street Connectivity*, for Lewis and Clark Circle.
- D. Approval of the Phasing Plan.
- E. Approval of the plat for 60 months subject to the following conditions:
1. Resolve utility easements.
  2. Resolve with the Non-Motorized Transportation Coordinator, the location of a 10-foot wide trail easement connecting Lewis and Clark Circle to Canyon Road and construction of a trail within the easement.
  3. Revise the plat to comply with AMC 21.08.070B.6., *Minimum Open Space*.
  4. Provide to On-Site Water and Wastewater Services, information to satisfy the requirements specified by AMC 21.15, AMC 15.55 and AMC 15.65 for each lot within this proposed subdivision. This information must include, but may not necessarily be limited to:
    - a. Soils testing, percolation testing, and ground water monitoring must be conducted to confirm the suitability for development

- using on-site wastewater disposal systems. Ground water monitoring must be conducted during a high ground water season in either the fall (October) or spring (May).
- b. Areas designated for the original and replacement wastewater disposal system sites must be identified and must meet all criteria specified in AMC 15.65 including slope and slope setback requirements for each lot.
  - c. Topographical information must be submitted.
5. Lewis and Clark Circle is not constructed where it is internal to the proposed subdivision. The petitioner shall construct to municipal standards a 20-foot wide strip paved street as shown on Typical Section No. 20-1 of the Municipality of Anchorage Standard Specifications.
  6. Brownson Circle is not constructed where it is internal to the proposed subdivision. The petitioner shall construct to municipal standards a 20-foot wide strip paved street as shown on Typical Section No. 20-1 of the Municipality of Anchorage Standard Specifications.
  7. Enter into a subdivision agreement with Private Development for the required public Class B area improvements, to include paved or gravel streets, traffic control devices, street signs, monuments, drainage facilities, utilities, and any Traffic Section improvement requirements.
  8. Submit to Private Development for review and approval a comprehensive site grading and drainage plan meeting the requirements of Project Management and Engineering Department Operating Policy and Procured No. 5 (available from Private Development) to resolve the need for drainage easements and drainage improvements and to demonstrate that all post development drainage patterns will not adversely impact adjacent properties or rights of way, and to include a suitable outfall. Any required drainage improvements shall be designed per the most current Design Criteria Manual (DCM).
  9. Submit homeowners' documents creating the Lewis and Clark Subdivision Homeowners Association to the Planning Department for review and approval prior to recording a final plat that addresses, but is not limited to the following: The final ownership of Tract A must be conveyed to the homeowners association.
  10. Make the following drafting changes:
    - a. Revise radius of curve at intersection of Lewis and Clark Circle with Upper DeArmoun Road to 30 feet for curve number C4 and C21. Design Criteria manual, Chapter 1, Section 1.9 requires 30

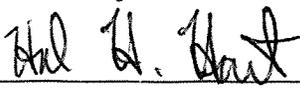
foot radius when at intersection between local and collector roadways.

- b. Platted Area/Proposed Street Names: LEWIS & CLARK CIRCLE is not an acceptable street name. Street names must be 10 characters or fewer, including spaces and excluding the prefix/suffix. Ampersands are not allowed on street signs.
- c. Title Block: Delete "Block 1"

11. Place the following notes on the plat:

- a. "Development of lots within this subdivision are subject to AMC 21.08.070B., *Conservation Subdivisions*, or as specified in future adopted provisions of AMC 21."
- b. "Tracts A is owned and maintained by the Lewis and Clark Homeowner's Association. Tract A is required open space that shall be preserved from development in perpetuity."
- c. "There are streams located within this subdivision and the stream setbacks will be as specified in AMC 21.07.020 or as specified in future adopted provisions of AMC 21. Portions of streams contained within mapped wetlands are subject to setbacks as described in the Anchorage Wetlands Management Plan."
- d. "Maintain continuity of drainage from existing drainageways that currently drain across the subdivision. Drainageways may not be relocated without prior approval from MOA Private Development."
- e. "This subdivision contains mapped wetlands subject to Corps of Engineers delineation review and approval. Prior to any disturbance within the wetlands, authorization is required from the U.S. Army Corps of Engineers-Regulatory Branch. Activities requiring authorization include, but are not limited to clearing, grubbing, excavation, grading or placement of fill."
- f. "Direct vehicular access is prohibited to Upper DeArmoun Road and Canyon Road from Lots 1, 2, 3, 4, 5, 6, 14, and 15."

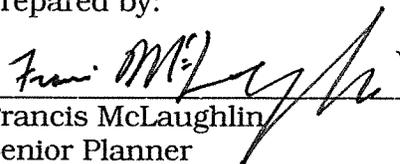
Reviewed by:



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Hal H. Hart, AICP  
Director  
Case S12388

Prepared by:

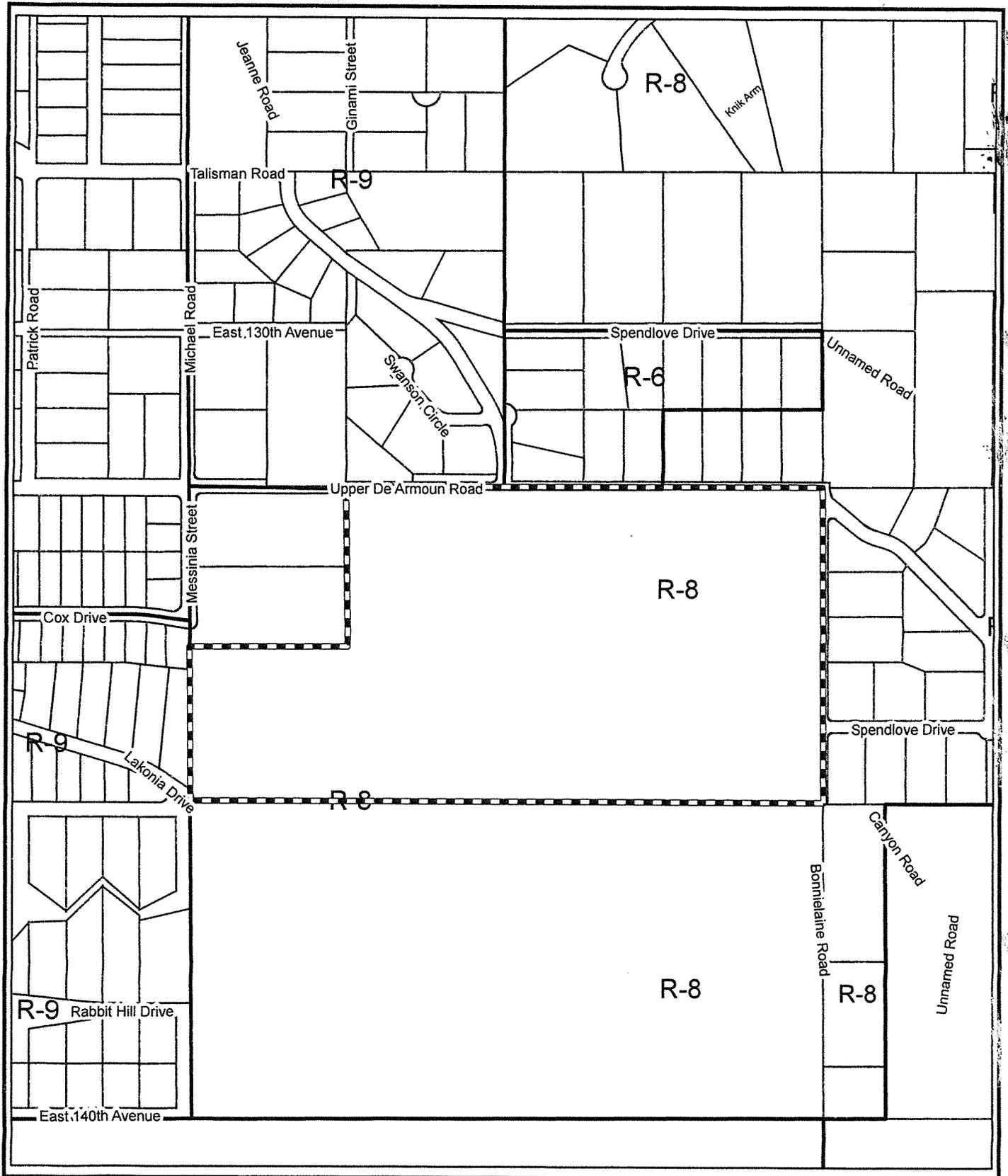


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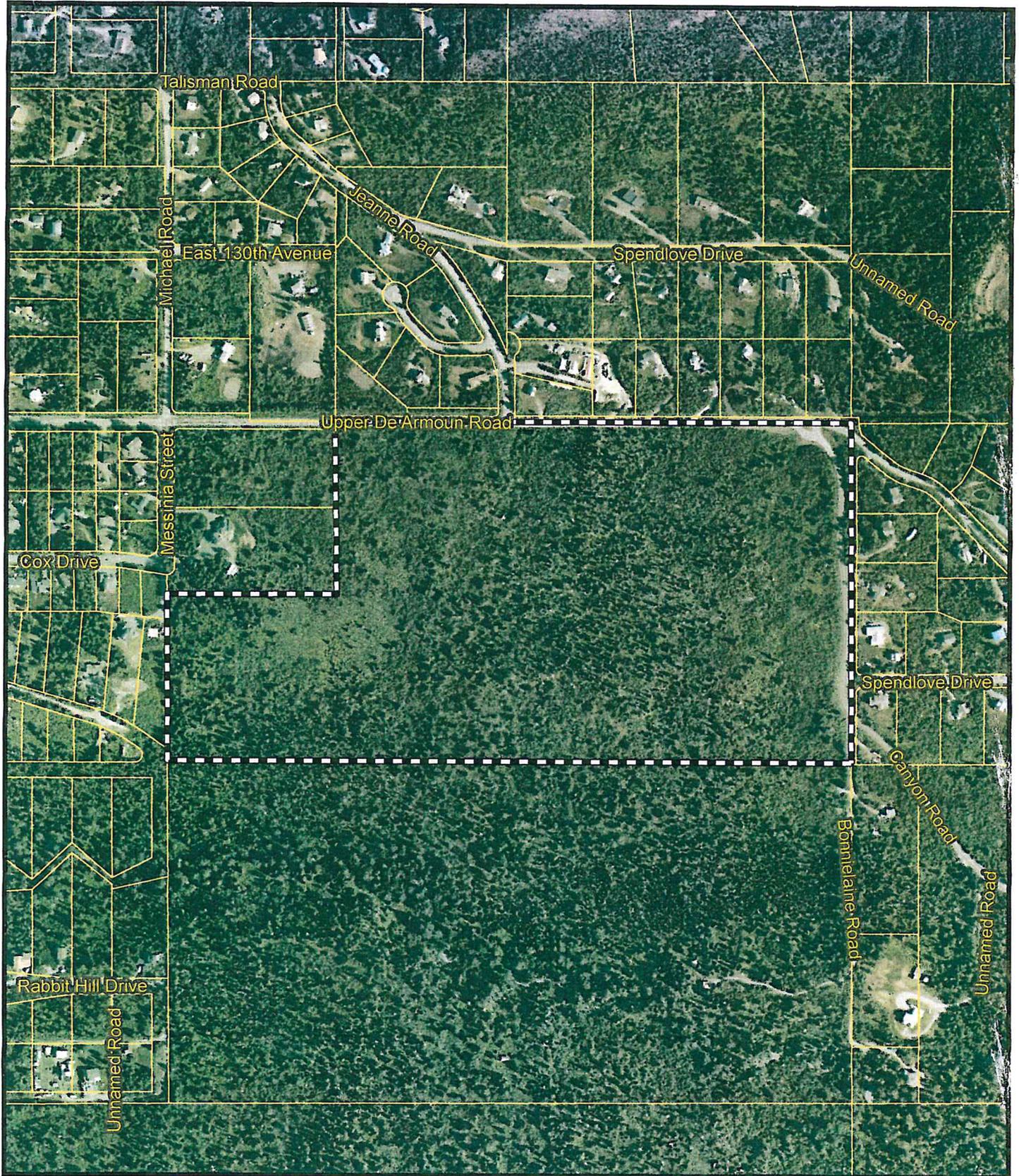
Francis McLaughlin  
Senior Planner



# Case #S12383



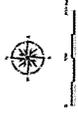
# Case # S12388



100 Scale  
Grid Map

# SW2941 Grid Map

- Parcel Line
- Dashed Parcel Line
- Subdivision Boundary
- Subdivision Addition
- Easement Line
- Road Centerline
- Section Line
- Railroad
- Water Way
- Road ROW
- Monument
- BLM Monument
- Witness Corner
- Bearing Break
- Lot Number
- Block Number
- Subdivision Name
- BLM Lot Number
- Section Number
- ADRFN

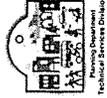


The BLM is a Federal Agency of the Department of the Interior. It is responsible for the management and conservation of the public lands and resources of the United States. The BLM is committed to providing a high quality of service to the public and to the States. The BLM is a leader in the development and implementation of policies and programs that protect and enhance the natural resources of the United States.



Department of the Interior  
Bureau of Land Management  
1950 North Lincoln Street  
Denver, Colorado 80202  
Phone: (303) 837-1400  
Fax: (303) 837-1401

BLM District Office  
1000 North Lincoln Street  
Denver, Colorado 80202  
Phone: (303) 837-1400  
Fax: (303) 837-1401



Petition site

MOA 1/4 Section Grid Map								
SE 1/4 Sec25 T12N R3W								
18-AUG-2004 GRID SW2941								
DISCUSSION	DATE	BY	DISCUSSION	DATE	BY	DISCUSSION	DATE	BY

# Application

# Application for Preliminary Plat

Municipality of Anchorage  
 Planning Department  
 PO Box 196650  
 Anchorage, AK 99519-6650



PETITIONER*		PETITIONER REPRESENTATIVE (IF ANY)	
Name (last name first)	Big Country Enterprises, LLC	Name (last name first)	S4 Group
Mailing Address	4700 E 147TH AVE ANCHORAGE AK 99516	Mailing Address	124 E 7th Avenue Anchorage, AK 99501
Contact Phone – Day	406-698-6969	Contact Phone – Day	306-8104
Evening		Evening	
Fax		Fax	
E-mail	toddbrownson@hotmail.com	E-mail	Tom@S4AK.com

\*Report additional petitioners or disclose other co-owners on supplemental form. Failure to divulge other beneficial interest owners may delay processing of this application.

PROPERTY INFORMATION			
Property Tax # (000-000-00-000): 017-073-06-000			
Site Street Address: UPPER DEARMOUN RD ANCHORAGE AK			
Current legal description: (use additional sheet if necessary) THE NORTH ONE-HALF OF THE SOUTHEAST ONE-QUARTER (N1/2 SE1/4) OF SECTION 25, TOWNSHIP 12 NORTH, RANGE 3 WEST, SEWARD MERIDIAN, LOCATED IN THE ANCHORAGE RECORDING DISTRICT, THIRD JUDICIAL DISTRICT, STATE OF ALASKA. EXCEPTING THEREFROM THE NORTHWEST ONE-QUARTER OF THE NORTHWEST ONE-QUARTER OF THE SOUTHEAST ONE-QUARTER (NW1/4 NW1/4 SE1/4) OF SECTION 25, TOWNSHIP 12 NORTH, RANGE 3 WEST, SEWARD MERIDIAN, LOCATED IN THE ANCHORAGE RECORDING DISTRICT, THIRD JUDICIAL DISTRICT, STATE OF ALASKA.			
Zoning:	R8	Acreage:	70.05 Acres
Underlying Plat #:		Grid #:	SW2941
# Lots:		# Tracts:	1
Total # parcels:			1

PROPOSED SUBDIVISION INFORMATION		
Proposed legal description: (use additional sheet if necessary) LOTS 1-16 & Tract A, LEWIS & CLARK SUBDIVISION		
# Lots:	17 16	# Tracts:
		1
Total # parcels:		18 17

I hereby certify that (I am)(I have been authorized to act for) owner of the property described above and that I petition to subdivide it in conformance with Title 21 of the Anchorage Municipal Code of Ordinances. I understand that payment of the application fee is nonrefundable and is to cover the costs associated with processing this application, and that it does not assure approval of the subdivision. I also understand that assigned hearing dates are tentative and may have to be postponed by Planning Department staff or the Platting Authority for administrative reasons.

Signature  Owner  Representative 10/25/2017  
 (Representatives must provide written proof of authorization) Date

Print Name  
 Thomas H. Dreyer

Accepted by: FM	Poster & Affidavit: 3 + affidavit	Fee: \$ 7,897.50	Case Number: 512388	Requested Meeting Date:
--------------------	--------------------------------------	---------------------	------------------------	-------------------------

COMPREHENSIVE PLAN INFORMATION	
Anchorage 2020 Urban/Rural Services: <input type="checkbox"/> Urban <input checked="" type="checkbox"/> Rural	
Anchorage 2020 Major Elements – site is within or abuts:	
<input type="checkbox"/> Major employment center	<input type="checkbox"/> Redevelopment/mixed use area <input type="checkbox"/> Town center
<input type="checkbox"/> Neighborhood commercial center	<input type="checkbox"/> Industrial reserve
<input type="checkbox"/> Transit - supportive development corridor	<input checked="" type="checkbox"/> District/area plan area: <u>HILLSIDE EAST</u>
Chugiak-Eagle River Land Use Classification:	
<input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Parks/open space	<input type="checkbox"/> Public lands/institutions <input type="checkbox"/> Town center
<input type="checkbox"/> Transportation/community facility <input type="checkbox"/> Alpine/slope affected	<input type="checkbox"/> Special study area <input type="checkbox"/> Development reserve
<input type="checkbox"/> Residential at _____ dwelling units per acre	<input type="checkbox"/> Environmentally sensitive area
Girdwood- Turnagain Arm Land Use Classification	
<input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Parks/open space	<input type="checkbox"/> Public lands/institutions <input type="checkbox"/> Resort
<input type="checkbox"/> Transportation/community facility <input type="checkbox"/> Alpine/slope affected	<input type="checkbox"/> Special study area <input type="checkbox"/> Reserve
<input type="checkbox"/> Residential at _____ dwelling units per acre <input type="checkbox"/> Mixed use	<input type="checkbox"/> Rural homestead

ENVIRONMENTAL INFORMATION (All or portion of site affected)	
Wetland Classification:	<input type="checkbox"/> None <input checked="" type="checkbox"/> "C" <input type="checkbox"/> "B" <input type="checkbox"/> "A"
Avalanche Zone:	<input checked="" type="checkbox"/> None <input type="checkbox"/> Blue Zone <input type="checkbox"/> Red Zone
Floodplain:	<input checked="" type="checkbox"/> None <input type="checkbox"/> 100 year <input type="checkbox"/> 500 year
Seismic Zone (Harding/Lawson):	<input type="checkbox"/> "1" <input checked="" type="checkbox"/> "2" <input type="checkbox"/> "3" <input type="checkbox"/> "4" <input type="checkbox"/> "5"

RECENT REGULATORY INFORMATION (Events that have occurred in last 5 years for all or portion of site)	
<input type="checkbox"/> Rezoning - Case Number:	
<input type="checkbox"/> Preliminary Plat <input type="checkbox"/> Final Plat - Case Number(s):	
<input type="checkbox"/> Conditional Use - Case Number(s):	
<input type="checkbox"/> Zoning variance - Case Number(s):	
<input type="checkbox"/> Land Use Enforcement Action for	
<input type="checkbox"/> Building or Land Use Permit for	
<input type="checkbox"/> Wetland permit: <input type="checkbox"/> Army Corp of Engineers <input type="checkbox"/> Municipality of Anchorage	

POTABLE WATER AND WASTE WATER DISPOSAL	
Potable Water provide by:	<input type="checkbox"/> Public utility <input type="checkbox"/> Community well <input checked="" type="checkbox"/> Private well
Wastewater disposal method:	<input type="checkbox"/> Public utility <input type="checkbox"/> Community system <input checked="" type="checkbox"/> Private on-site

APPLICATION REQUIREMENTS	
1 copy required:	<input checked="" type="checkbox"/> Signed application (original) <input checked="" type="checkbox"/> Watershed sign off form, completed <input checked="" type="checkbox"/> 8½" by 11" reduced copy of plat <input checked="" type="checkbox"/> Certificate to Plat
4 copies required:	<input checked="" type="checkbox"/> Subdivision drainage plan
9 copies required:	<input checked="" type="checkbox"/> Topographic map of platted area
45 copies required: (35 copies for a short plat)	<input type="checkbox"/> Signed application (copies) <input type="checkbox"/> Preliminary plat <input type="checkbox"/> Summary of community meeting(s) (not required for short plat)
(Additional information may be required)	
Additional required documents unless specifically waived by Platting Officer:	
<input type="checkbox"/> Soils investigation and analysis reports (4 copies)	Waived by _____



Land Surveying  
 Land Development Consultants  
 Subdivision Specialists  
 Construction Surveying

124 E 7th Avenue, Anchorage, Alaska 99501    www.S4AK.com    907-306-8104

November 9, 2017

**Lewis & Clark**  
 Conservation Subdivision Platting (with Phasing Plan) Application

**Platting Application Narrative**  
**Per 21.03.200.C.9 (a thru k)**

*This plat conforms to the applicable dimensional standards and measurements, chapters 21.07, Development, Design Standards and 21.08, Subdivision Standards, chapter 21.08.070.B. Conservation Subdivisions, and, to the maximum extent feasible:*

Lewis & Clark Subdivision conforms to Title 21.07, 21.08, and Conservation Subdivision Standards;

*a. Promotes the public health, safety and welfare:*

Lewis & Clark promotes the public health, safety, and welfare by providing roadways that provide access to each lot for police, fire apparatus, and ambulance services, and by providing utilities to each lot such as electricity, cable, natural gas, and telephone services, and by providing engineered locations on each lot for water wells and safe septic sewer systems.

*b. Mitigates the effects of incompatibilities between the land uses or residential densities in the subdivision and the land uses and residential densities in the surrounding neighborhood, including but not limited to visual, noise, traffic, and environmental effects:*

Lewis & Clark mitigates the effects of incompatibilities between land uses and residential densities by complying with the density limitations of the underlying R-8 zoning.

*c. Provides for the proper arrangement of streets in relation to existing or proposed streets:*

Lewis & Clark provides properly arranged streets by aligning with the existing Jeanne Road intersection to the north.

*d. Provides for adequate and convenient open spaces:*

Lewis & Clark is a Conservation Subdivision and provides over 30% of the area being developed as an open space greenbelt tract, labeled as Tract A on the preliminary plat.

*e. Provides for the efficient movement of vehicular and pedestrian traffic:*

Lewis & Clark provides efficient means of vehicular and pedestrian movement by providing roads developed as per current MOA design standards, and by connecting into De Armoun Road directly across the street from Jeanne Street.

*f. Ensures adequate and properly placed utilities:*

Lewis & Clark provides proper and adequate utility placement by providing all utilities designed to current utility company specifications.

*g. Provides access for firefighter apparatus:*

Lewis & Clark allows for effective access to firefighting apparatus by providing roads built per MOA regulations to support fire apparatus.

*h. Provides opportunities for recreation, light and air and avoids congestion:*

Lewis & Clark provides opportunities for recreation for the lot owners by creating access to the large private open space greenbelt tract.

*i. Facilitates the orderly and efficient layout and use of the land:*

Lewis & Clark facilitates orderly layout by utilizing the conservation subdivision standards and tracting out over 30% of the parcel into greenbelts, and utilizing the buildable areas for lots.

*j. Does not create a split-zoned lot:*

Lewis & Clark does not create any split-zoned tracts; all properties are commonly zoned.

*k. Furthers the goals and policies of the comprehensive development plan and conforms to the comprehensive development plan in the manner required by chapter 21.01.080, Comprehensive plan:*

Lewis & Clark Conservation Subdivision supports the comprehensive development plan as this area is classified as Residential .25 dwelling unitd per acre. Our proposed Lewis & Clark Subdivision has a density of 16 lots on 70 acres of land, which equals a density level of 0.24 dwelling units per acre.

### **Wetland Tracts**

Tract A as shown on the preliminary plat is the parcel that is the private open space greenbelt that includes class C wetlands, a stream, and other greenspace. Tract A is 22.965 acres in size, which is over 30% of the land being developed by this application.

### **Stream Setbacks**

The stream protection setback is 50' on either side of the stream.

### **Water Availability**

Mr. Dan Young of Terrasatt Environmental has compiled a report that is attached to this application. In summary, there is more than adequate water available for this development.

### **Septic & Soils Tests**

Mr. Steve Eng of Northrim Engineering is providing an updated soils analysis and testing that is attached to this application. In summary, all lots will have MOA approved septic sites.

### **Conservation Subdivision Standards**

Summary:

Lewis & Clark conforms with the regulations concerning Conservation Subdivisions as per 21.08.070.B. The amount of reduction of minimum lot sizes has been utilized within the open space Tract A. There is only one principle single-family house per lot, front and rear setbacks interior to the subdivision are more than half the depth required by the underlying zoning, the principle structures shall have a maximum floor area ratio of 0.5, driveways shall have a maximum width of 14', maximum lot coverage is increased by no more than 10% over the underlying zoning, which would bring it to 15%, and the minimum open space is 30%. The amount of any reduction in minimum lot size is used in the common private open space tract.

#### **AMC 21.08.070B. Conservation Subdivisions**

**1. Purpose**

**A conservation subdivision is an alternative type of residential development in which the lots are allowed to be smaller in area or narrower than otherwise required in the zoning district, but in which the overall number of lots does not exceed the maximum number of lots allowed in a conventional subdivision by the zoning district . Conservation subdivisions are intended to create a more compact residential development to preserve and maintain open areas, high value natural lands, and lands unsuitable for development, in excess of what would otherwise be required by this title.**

**2. Applicability**

**The conservation subdivision option may be used on any parcel with a minimum of at least two acres in any residential district in which single-family housing is permitted, provided that the proposal is consistent with the requirements in this section 21.08.070.**

This petition site contains more than 2 acres, and, therefore, is eligible for a conservation subdivision.

**3. Conservation Design Process**

**Conservation subdivision shall be approved through the procedure set forth in section 21.03.200, Subdivisions and Plats.**

This preliminary plat is being processed in accordance with AMC 21.03.200,

*Subdivisions.*

**4. Reduction in Minimum Lot Area Allowed**

**Conservation subdivisions may include one or more lots that do not conform to the minimum lot size or lot width requirements of chapter 21.06, or the dimensional requirements or subsections 21.08.030K.1. and 2., provided that:**

- a. The amount of any reduction in minimum lot size shall be used for common open space, pursuant to subsection B.6. below;**  
(See enclosed spreadsheet for details.)
- b. There shall be no more than one principal single-family structure per lot;**  
There will be no more than one principal single-family structure on each lot.
- c. Front and rear setbacks interior to the subdivision are not less than half the depth required by the underlying zoning district, but side setbacks are not less than the width required by the underlying zoning district;**  
The R-8 district has required front and rear setbacks of 25 feet. The front and rear setbacks may be reduced to 12.5 feet. The R-8 district has required side setbacks of 25 feet. The side setbacks will not and cannot be reduced.
- d. On any lot that is less than the minimum lot size of the underlying zoning district, the principal structure shall have a maximum floor area ratio of not more than 0.5;**  
All lots except lot 9 have less than the minimum required lot area. The principal structure on each of these lots will have a floor area ratio of less than 0.5.
- e. In class A improvement areas, street sections shall have vertical curbs;**  
The R-8 district is a Class B improvement area, and, therefore, this standard is not applicable.
- f. Driveways shall have a maximum width of 14 feet at the curb;**  
Driveways will have a maximum width of 14 feet.
- g. Where on-street parking is allowed, a minimum 20 foot separation distance between the curb returns of adjacent driveways shall be provided; and**  
The application states that driveways will be separated from curb returns by 20 feet. There is ample space on each of the lots to meet this standard. Conformance with this standard will be reviewed at the time of building permitting.
- h. Common open space with level 4 Screening landscaping shall be provided along any lot line abutting a residential neighborhood where any adjoin lot is greater than 150% of the average lot size along that**

**lot line of the conservation subdivision. In class B areas this abutting landscaped open space area shall be one hundred feet wide.**

The common open space for this conservation subdivision is within Tract A. The lots surrounding to the north and east are less than 150% of the average abutting lot sizes in Lewis & Clark. The area to the south is un-subdivided and abuts the Lewis & Clark Tract A greenbelt along its entirety. Also, Tract A exceeds the minimum required lot width of 100 feet in a Class B district. The south half of the western boundary also abuts our Tract A. The northern half of our western boundary may be applicable to the required screening easement.

**5. Lot Coverage Allowed**

**The maximum lot coverage requirements for lots in a conservation subdivision, as set forth in chapter 21.06, may be increased by no more than 10 percent.**

The R-8 district's required maximum lot coverage is 5%, but this may be increased to 15%.

**6. Minimum Open Space**

**The amount of lot size reduction of each lot shall, in total, be provided as common open space, except that under no circumstances shall the amount of common open space provided be less than 30 percent of the property shown on the subdivision plat. Open space shall be identified using the standard set forth in subsection 21.07.030D., Private Open Space, Standards, except that no portion of the land preserved as common open space may be located within the boundaries of any individual lot for residential development, or in a road right-of-way, and no portion of the land preserved as common open space may be less than 30 feet in its smallest dimension in class A districts or less than 100 feet in its smallest dimension in class B districts, or have less square footage than one-half of the square footage of the minimum lot size for that district. In order that all residents of a development have access, there should be, provided by the developer, a common pedestrian corridor leading into all common open space. Common open space areas in class B improvement areas shall remain undisturbed.**

The minimum required open space is 995,389 SF and Tract A exceeds the required amount with 1,000,365 SF. Residents & their friends will have direct access to Tract A from Lewis & Clark Circle.

**7. Dedication and Recording**

**The required common open space shall be preserved from development in perpetuity through the use of a deed restriction or easement, and shall be conveyed to property owners' association or other organization with responsibility for maintenance of the open space and the ability to collect assessments or dues for such purpose. The applicant shall submit proof that:**

- a. **Such deed restriction or easement has been recorded at the district recorder's office; and**
- b. **The property owners' association or other organization has been established before any building or land use permits for construction in a conservation subdivision shall be issued.**

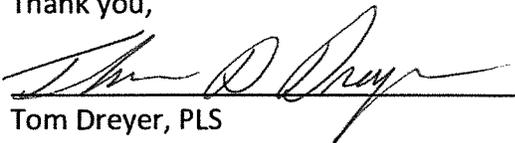
The homeowner's association documents creating the Lewis & Clark Homeowner's Association will be provided to the Planning Department

### Phasing Plan

This application is for a 60 month approval with a phasing plan. A phasing plan is attached to this application that shows 3 phases. The phasing development schedule is for phase one to be developed between one & five years after the approval date, and phase two & three to be developed at the same time or after phase one, from between one & five years from the approval date. This phasing will allow flexibility for the developer to respond to changing market conditions and sales opportunities.

If you have any questions or need further clarifications, please email me at [tom@s4ak.com](mailto:tom@s4ak.com).

Thank you,



---

Tom Dreyer, PLS  
S4 Group

Table 1

Lewis & Clark Conservation Subdivision Worksheet		11/9/2017			
Lot number	Acreage	Square Footage Area	Required SF by Title 21 underlying R-8 zoning	Lots under/over regular R-8 zoning	
1	1.16	50,529	174,240	-123,711	
2	1.33	58,079	174,240	-116,161	
3	1.75	76,191	174,240	-98,049	
4	2.38	103,817	174,240	-70,423	
5	3.66	159,527	174,240	-14,713	
6	2.82	123,056	174,240	-51,184	
7	3.31	144,097	174,240	-30,143	
8	2.02	87,894	174,240	-86,346	
9	5.25	228,735	174,240	54,495	
10	3.63	157,967	174,240	-16,273	
11	3.99	174,000	174,240	-240	
12	3.99	174,000	174,240	-240	
13	1.66	72,093	174,240	-102,147	
14	2.16	94,305	174,240	-79,935	
15	2.11	91,973	174,240	-82,267	
16	1.43	62,188	174,240	-112,052	
<b>Setbacks over 10%</b>				-66000	
<b>Tract A</b>	22.97	1,000,365			
<b>Net area total</b>	65.63	2,858,816	2,787,840	-995,389	SF Needed in Tr A
<b>Average per lot</b>	4.102				
<b>30% of net area</b>	19.69	857,645	-137,744	4,976	Left over
<b>30% of gross</b>	21.00	914,760			

# Application for Subdivision Variance

Municipality of Anchorage  
 Planning Department  
 PO Box 196650  
 Anchorage, AK 99519-6650



PETITIONER*		PETITIONER REPRESENTATIVE (IF ANY)	
Name (last name first)	Big Country Enterprises, LLC	Name (last name first)	S4 Group
Mailing Address	4700 E 147TH AVE ANCHORAGE AK 99516	Mailing Address	124 E 7th Avenue Anchorage, AK 99501
Contact Phone – Day	406-698-6969	Contact Phone – Day	306-8104
Evening		Evening	
Fax		Fax	
E-mail	toddbrownson@hotmail.com	E-mail	Tom@S4AK.com

\*Report additional petitioners or disclose other co-owners on supplemental form. Failure to divulge other beneficial interest owners may delay processing of this application.

**PROPERTY INFORMATION**

Property Tax # (000-000-00-000): 017-073-06-000

Site Street Address: UPPER DEARMOUN RD ANCHORAGE AK

Current legal description: (use additional sheet if necessary)  
 THE NORTH ONE-HALF OF THE SOUTHEAST ONE-QUARTER (N1/2 SE1/4) OF SECTION 25, TOWNSHIP 12 NORTH, RANGE 3 WEST, SEWARD MERIDIAN, LOCATED IN THE ANCHORAGE RECORDING DISTRICT, THIRD JUDICIAL DISTRICT, STATE OF ALASKA.  
 EXCEPTING THEREFROM THE NORTHWEST ONE-QUARTER OF THE NORTHWEST ONE-QUARTER OF THE SOUTHEAST ONE-QUARTER (NW1/4 NW1/4 SE1/4) OF SECTION 25, TOWNSHIP 12 NORTH, RANGE 3 WEST, SEWARD MERIDIAN, LOCATED IN THE ANCHORAGE RECORDING DISTRICT, THIRD JUDICIAL DISTRICT, STATE OF ALASKA.

**REQUEST**

The variance is for relief from the requirement to:

Title 21.08.030.F.6.a. The length of a cul-de-sac shall not exceed 900 feet.

Associated platting case number (if applicable):

I hereby certify that (I am)(I have been authorized to act for) owner of the property described above and that I am petitioning for an subdivision variance in conformance with Title 21 of the Anchorage Municipal Code of Ordinances. I understand that payment of the application fee is nonrefundable and is to cover the costs associated with processing this application, and that it does not assure approval of the variance. I understand that the burden of evidence to show compliance with the variance standards rests with me, the applicant.

Signature  Owner  Representative 10/25/2017  
 (Representatives must provide written proof of authorization) Date

Print Name Thomas H. Dreyer

Accepted by: \_\_\_\_\_ Poster & Affidavit: \_\_\_\_\_ Fee: \_\_\_\_\_ Case Number: \_\_\_\_\_

VARIANCE(S) REQUESTED FROM (CODE CITATIONS):	
AMC 21.08.030.F.6.a.	<i>Length of Cul-de-Sac</i>
AMC 21.	

SUBMITTAL REQUIREMENTS	
If associated with a preliminary plat application: <input checked="" type="checkbox"/> Signed application(original) and <input type="checkbox"/> Signed application (44 copies)	
If not associated with a preliminary plat application:	
1 copy required:	<input checked="" type="checkbox"/> Signed application(original)
44 copies required:	<input checked="" type="checkbox"/> Signed application (copies) <input checked="" type="checkbox"/> Variance narrative, addressing: <ul style="list-style-type: none"><li><input type="radio"/> The need for the variance</li><li><input type="radio"/> The effect of granting the variance</li><li><input type="radio"/> An analysis of how the proposal meets the variance standards below</li></ul> <input checked="" type="checkbox"/> Underlying plat <input checked="" type="checkbox"/> Proposed plot plan or site plan, to scale (new construction) <input type="checkbox"/> Topographic map of site <input type="checkbox"/> Photographs
<small>(Additional information may be required.)</small>	

VARIANCE STANDARDS
<p>The Platting Board may only grant a variance if the Board finds that <b>all</b> of the following 4 standards are substantially satisfied. Each standard must have a response in as much detail as it takes to explain how your property's condition satisfies the standard. The burden of proof rests with you.</p> <ol style="list-style-type: none"><li>1. There are special circumstances or conditions affecting the property such that the strict application of the provisions of the subdivision regulations would clearly be impractical, unreasonable, or undesirable to the general public;</li><li>2. The granting of the specific variance will not be detrimental to the public welfare or injurious to other property in the area in which such property is situated;</li><li>3. Such variance will not have the effect of nullifying the intent and purpose of the subdivision regulations or the comprehensive plan of the municipality; and</li><li>4. Undue hardship would result from strict compliance with specific provisions or requirements of the subdivision regulations. The applicant may supplement the form with supporting documents.</li></ol>



October 25, 2017

Subdivision Variance Narrative  
Lewis & Clark Conservation Subdivision

*The need for the variance:*

This is a variance request from Title 21.08.030.F.6.a, length of cul-de-sac. In R-8 zoning, the maximum cul-de-sac length is 900 feet, measured from the cul-de-sac radius point to the street intersection of the cross street. In consideration of the existing surrounding street system and topography, we are requesting a variance to allow the Lewis and Clark cul-de-sacs to be 985 feet in length and 996 feet in length, a distance of only 85 feet and 96 feet over the maximum. This design is allowing full access to each lot, and sensible lot dimension.

*The effect of granting this variance:*

The effect of granting this variance will allow us to responsibly subdivide this tract of land and provide responsibly designed roads that provide adequate access to the lots for the future homeowners.

*The four standards required to be substantially satisfied for Platting Board approval:*

- 1. *There are special circumstances or conditions affecting the property such that the strict application of the provisions of the subdivision regulations would clearly be impractical, unreasonable, or undesirable to the general public;*

Lewis & Clark is a unique in one way in that it is a Conservation Subdivision development according to Title 21. The hillside conditions that we are faced with are unique to this parcel in consideration of the surrounding street system, land that needs to be accessed, and the topography.

- 2. *The granting of the specific variance will not be detrimental to the public welfare or injurious to other property in the area in which such property is situated;*

This variance will not be detrimental or have any negative affect to other properties in the area, but rather will allow proper access to the lots that have been created considering the odd shape of the parcel.

*3. Such variance will not have the effect of nullifying the intent and purpose of the subdivision regulations or the comprehensive plan of the municipality;*

Keeping roadway construction that supplies proper access to the lots is in support of the Hillside District Plan and the 2040 Anchorage Comprehensive Plan. The HDP encourages efficient roadway designs that blend in as much as possible with the existing topography and provide the possibility for the future homeowners to build driveways in a safe manner..

*4. Undue hardship would result from strict compliance with specific provisions or requirements of the subdivision regulations;*

Strict compliance with the regulations would result in undue hardship and make it more difficult to access the corners of the parcel properly.

If you have any questions or need further clarifications, please email me at [tom@s4ak.com](mailto:tom@s4ak.com).

Thank you,



---

Tom Dreyer, PLS, petitioner's representative  
S4 Group

## McLaughlin, Francis D.

---

**From:** Todd Brownson <Todd@bigcountryak.com>  
**Sent:** Wednesday, December 6, 2017 3:24 PM  
**To:** McLaughlin, Francis D.  
**Cc:** 'tom@s4ak.com'; Paul and Susanne Gionet  
**Subject:** Lewis and Clark Subdivision, Case S12388

Mr. McLaughlin-

→ I wish to withdraw the variance request from AMC 21.07.060D.3.b.ii., *Internal Street Connectivity*, for Lewis and Clark Circle. Thank you!!



**Todd Brownson**  
**Big Country Enterprises, LLC**  
Phone: 907.406.0792  
Fax: 907.782.4243  
[www.bigcountryak.com](http://www.bigcountryak.com)

**McLaughlin, Francis D.**

---

**From:** Tom Dreyer <tom@s4ak.com>  
**Sent:** Tuesday, December 19, 2017 3:03 PM  
**To:** McLaughlin, Francis D.  
**Subject:** Lewis & Clark variance reinstatement

Francis,

Please retract our retraction of the request for a variance for the trail access to Canyon Road from Lewis & Clark Circle. It has come to my attention that the Hillside Community Council does now prefer that we do not make this connection. Regardless, the variance will allow proper dialog between the CC, the Platting Board, other concerned citizens in the area, the MOA Planning staff, and others. And this will allow the Platting Board to make the final decision on the issue. I apologize for the retraction, but I do believe this will better serve the conversation between all the parties.

Respectfully,

Tom Dreyer, PLS

S4 Group, LLC  
Tom Dreyer, PLS  
124 E 7th Avenue  
Anchorage, Ak 99501  
907-227-1847  
[tom@s4ak.com](mailto:tom@s4ak.com)

# Application for Subdivision Variance

Municipality of Anchorage  
 Planning Department  
 PO Box 196650  
 Anchorage, AK 99519-6650



PETITIONER*		PETITIONER REPRESENTATIVE (IF ANY)	
Name (last name first)	Big Country Enterprises, LLC	Name (last name first)	S4 Group
Mailing Address	4700 E 147TH AVE	Mailing Address	124 E 7th Avenue
	ANCHORAGE AK 99516		Anchorage, AK 99501
Contact Phone – Day	406-698-6969	Contact Phone – Day	306-8104
	Evening		Evening
Fax		Fax	
E-mail	toddbrownson@hotmail.com	E-mail	Tom@S4AK.com

\*Report additional petitioners or disclose other co-owners on supplemental form. Failure to divulge other beneficial interest owners may delay processing of this application.

## PROPERTY INFORMATION

Property Tax # (000-000-00-000): 017-073-06-000

Site Street Address: UPPER DEARMOUN RD ANCHORAGE AK

Current legal description: (use additional sheet if necessary)

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## REQUEST

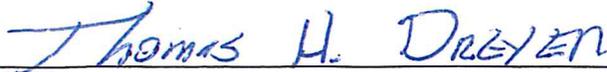
The variance is for relief from the requirement to:

Title 21.07.060.D.3.b.ii  
 Providing a pedestrian easement from cul-de-sac to the nearest adjacent street.

Associated platting case number (if applicable):

I hereby certify that (I am)/(I have been authorized to act for) owner of the property described above and that I am petitioning for an subdivision variance in conformance with Title 21 of the Anchorage Municipal Code of Ordinances. I understand that payment of the application fee is nonrefundable and is to cover the costs associated with processing this application, and that it does not assure approval of the variance. I understand that the burden of evidence to show compliance with the variance standards rests with me, the applicant.

  
 Signature       Owner     Representative      Date 11/9/17  
(Representatives must provide written proof of authorization)

  
 Print Name

Accepted by: \_\_\_\_\_ Poster & Affidavit: \_\_\_\_\_ Fee: \_\_\_\_\_ Case Number: \_\_\_\_\_

**VARIANCE(S) REQUESTED FROM (CODE CITATIONS):**

AMC 21.08.07.060.D.3.b.ii. Internal Street Connectivity

AMC 21.

**SUBMITTAL REQUIREMENTS**

If associated with a preliminary plat application:  Signed application(original) and  Signed application (44 copies)

If not associated with a preliminary plat application:

1 copy required:  Signed application(original)

44 copies required:  Signed application (copies)  
 Variance narrative, addressing:  
     The need for the variance  
     The effect of granting the variance  
     An analysis of how the proposal meets the variance standards below  
 Underlying plat  
 Proposed plot plan or site plan, to scale (new construction)  
 Topographic map of site  
 Photographs

(Additional information may be required.)

**VARIANCE STANDARDS**

The Platting Board may only grant a variance if the Board finds that **all** of the following 4 standards are substantially satisfied. Each standard must have a response in as much detail as it takes to explain how your property's condition satisfies the standard. The burden of proof rests with you.

1. There are special circumstances or conditions affecting the property such that the strict application of the provisions of the subdivision regulations would clearly be impractical, unreasonable, or undesirable to the general public;
2. The granting of the specific variance will not be detrimental to the public welfare or injurious to other property in the area in which such property is situated;
3. Such variance will not have the effect of nullifying the intent and purpose of the subdivision regulations or the comprehensive plan of the municipality; and
4. Undue hardship would result from strict compliance with specific provisions or requirements of the subdivision regulations. The applicant may supplement the form with supporting documents.

November 8<sup>th</sup>, 2017

## Subdivision Variance Narrative

from Title 21.07.060.D.3.b.ii  
Lewis & Clark Conservation Subdivision

### *The need for the variance:*

This is a variance request from Title 21.07.060.D.3.b.ii, requiring a 10' pedestrian access from the two cul-de-sacs to the nearest adjacent street.

### *The effect of granting this variance:*

The effect of granting this variance will allow us to continue with the design of the subdivision as submitted.

### *The four standards required to be substantially satisfied for Platting Board approval:*

1. *There are special circumstances or conditions affecting the property such that the strict application of the provisions of the subdivision regulations would clearly be impractical, unreasonable, or undesirable to the general public;*

Lewis & Clark is unique in one way in that it is a Conservation Subdivision development according to Title 21. The hillside conditions that we are faced with are unique to this parcel in consideration of the surrounding street system, land that needs to be accessed, and the topography.

2. *The granting of the specific variance will not be detrimental to the public welfare or injurious to other property in the area in which such property is situated;*

This variance will not be detrimental or have any negative affect to other properties in the area. The trials from the two cul-de-sac will only provide unneeded short cuts through this subdivision.

3. *Such variance will not have the effect of nullifying the intent and purpose of the subdivision regulations or the comprehensive plan of the municipality;*

There are trail plans along Rabbit Creek on the property to the south, and Upper DeArmoun & Canyon Road are also shown on the Trails Plan. Providing trail easements through Lewis & Clark are unnecessary.

*4. Undue hardship would result from strict compliance with specific provisions or requirements of the subdivision regulations;*

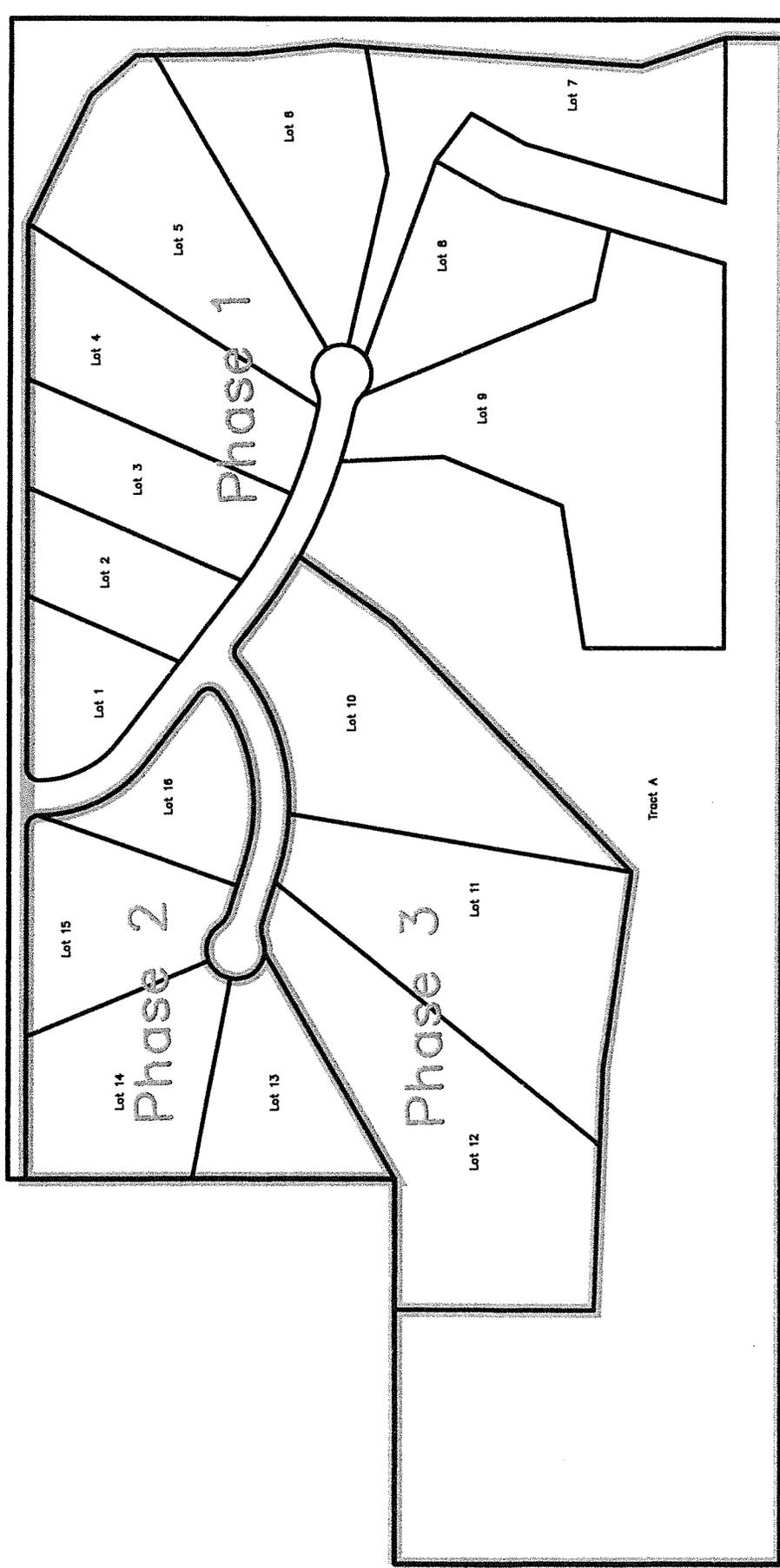
Strict compliance with the regulations would result in undue hardship due to allowing pedestrian easements that would run right along the future homeowners houses and back yards.

If you have any questions or need further clarifications, please email me at [tom@s4ak.com](mailto:tom@s4ak.com).

Thank you,

  
\_\_\_\_\_  
Tom Dreyer; PLS, petitioner's representative  
S4 Group

# Phasing Plan





Land Surveying  
Land Development Consultants  
Subdivision Specialists  
Construction Surveying

124 E 7th Avenue, Anchorage, Alaska 99501    www.S4AK.com    907-306-8104

October 25, 2017

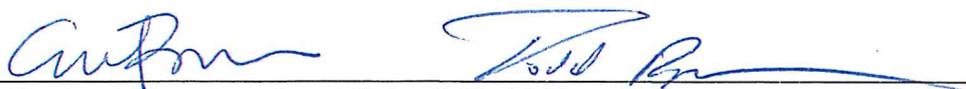
MOA Planning Department  
4700 Elmore Road  
Anchorage, Ak 99519

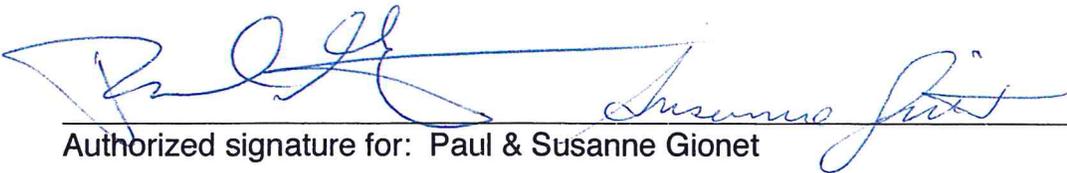
**Letter of Authorization  
for  
Lewis & Clark Subdivision**

Big Country Enterprises, LLC, the owner of the below listed parcel, does hereby authorize the S4 Group to represent them before the MOA for the subdividing of the parcel listed below:

The current legal description of the property is;

The N ½ of the SE ¼, Section 25, T12N, R3W, S.M., Alaska, excepting the NW ¼ of the NW ¼ of the SE ¼ of Section 25, T12N, R3W, S.M., Alaska, approx. 70 acres.

  
Authorized signature for: Elisha & Todd Brownson

  
Authorized signature for: Paul & Susanne Gionet

Thank you,

  
Tom Dreyer, PLS  
S4 Group  
Petitioner's representative



Land Surveying  
Land Development Consultants  
Subdivision Specialists  
Construction Surveying

124 E 7th Avenue, Anchorage, Alaska 99501 www.S4AK.com 907-306-8104

## Summary of Community Meeting – Hillside Community Council Project: Lewis & Clark Conservation Subdivision

**Date held:** 10/24/2017

**Location:** O'Malley Elementary School

**Subject:** Proposed Lewis & Clark R-8 Conservation Subdivision

Approximately 177 mailers were sent out by first class mail on October 3, 2017, which is 21 days before the Community meeting was held. The mailers had the date of the meeting, the location of the project, and an invitation to provide feedback at the meeting. There were about 50 people in attendance at the meeting.

Presentation was provided by S4 Group, LLC to provide information and take questions and comments from meeting attendees. Presentation began at approximately 8:30 PM and questioning was completed at approximately 9:05 PM. The following is a brief summary of questioning and discussion:

- 1) Dianne Holmes –
  - a. Question: Will pedestrian access or trail be provided from end of cul-de-sac to Canyon Road?
  - b. Response: A public easement or trail will be provided at the noted location if required.
  - c. Question: Will the open space shown on proposed plat be public or private?
  - d. Response: In accordance with Title 21, the open space will be strictly private space to be maintained and enjoyed by members of the Home Owners Association residing within the subdivision.
  - e. Question: If application is submitted tomorrow, we will not have time to make comments.
  - f. Response: You will still have a couple weeks to make comments. Initial application will be submitted tomorrow.
  - g. Question: Will any lots have driveway access on Upper De Armoun?
  - h. Response: No. Only lot 7 will be allowed to have driveway access off of Canyon Road.
  - i. Question: What percentage of vegetation is required to remain?
  - j. Response: Will have to review code and get back to you.
- 2) Marc June – 8801 Upper De Armoun Road
  - a. Question: Have you submitted an application and what is the process?

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- b. Response: Application has not been submitted yet. Application will be submitted to Platting Board for approval.
  - c. Question: Are you seeking support from us tonight?
  - d. Response: While we would like your support, we are sharing information for a proposed application conforming to existing zoning and code requirements.
- 3) Lance Powell –
- a. Question: Next scheduled meeting for Hillside Community Council is in January 2018.
  - b. Question: Would the potential public use easement at the end of the cul-de-sac need to be marked?
  - c. Response: If easement is required, it is unclear about whether or not it needs to be marked. Further investigation of this issue will be completed.
  - d. Question: Is there a requirement for sidewalks?
  - e. Response: Sidewalks are not required.
  - f. Question: Who is responsible for approval of this application?
  - g. Response: Platting Board.
- 4) Pat Dougherty – 8520 Spendlove Drive
- a. Question: What constitutes a conservation subdivision?
  - b. Response: Conservation subdivision allows some latitude for lot dimensioning and lot sizes, but maintains the same overall density as allowed for in straight R-8 development. Additionally, requires 30% open space for use of residents of subdivision.
  - c. Question: What are the lot sizes?
  - d. Response: Lots range in size from 1.2 Acres to 6 Acres, with average size of 2.5 Acres.
  - e. Question: What is the smallest legal lot size allowed?
  - f. Response: 40,000 SF
- 5) Unknown Neighbor – Elaine?
- a. Question: Can public use walkway from end of cul-de-sac to Canyon Road?
  - b. Response: If access is required by code, it would be available for use by public.
  - c. Question: What are stream setbacks? What is setback distance from stream for septic?
  - d. Response: In accordance with code requirements.
- 6) Unknown Neighbor – Resides on Upper O’Malley
- a. Question: Will open space be Hydroseeded?
  - b. Response: No, open space will remain native vegetation.
- 7) Cliff Hyatt – 13035 Jeanne Road
- a. Question: What are building setbacks?
  - b. Response: Setbacks according to R-8 Zoning requirements.

- 8) Chris Alexander – 9000 Spendlove Drive
- a. Question: Is request for R-6 Rezone dead?
  - b. Response: Yes, if this R-8 Conservation Subdivision is approved.
- 9) Joan Priestly – 13101 Jeanne Road
- a. Question: Will the proposed subdivision require advanced treatment septic systems?
  - b. Response: No.
  - c. Question: Is the Jones – Vergason property included in this application?
  - d. Response: No.
  - e. Question: Is there a problem with emergency egress for proposed plan?
  - f. Response: Proposed plan has been reviewed by appropriate departments regarding this access / egress and there are no issues with proposed design.
  - g. Question: Will there be a Home Owners Association for subdivision?
  - h. Response: Yes. Open space will be owned, maintained, and enjoyed by members of Home Owners Association.
  - i. Question: Will Canyon Road that is currently located on the subject property be a liability for the subject property?
  - j. Response: We have been cooperating with the road design project.
  - k. Question: What is the status of the Army Corp of Engineers wetland study?
  - l. Response: Completed in 2014.
- 10) Rob Brown – 13688 Canyon Road
- a. Question: Does The Boutet Company have a contract for the Canyon Road project? Are you obstructing this process?
  - b. Response: We understand that The Boutet Company is moving forward with plans for an upgrade project to Canyon Road. We have been working closely with them for the last three years and are not obstructing the process.
  - c. Question: Do you have plans for a bus turn around?
  - d. Response: No. This will be in the hands of ASD.
- 11) Unknown Neighbor –
- a. Question: Are you required to post signs for public hearing?
  - b. Response: Yes.
- 12) Unknown Neighbor –
- a. Question: Are proposed walking / ski trails in Tract A open to public?
  - b. Response: No.
- 13) Ralph Warren – 7901 Upper De Armoun Road
- a. Question: Was an Army Corp of Engineers wetland study performed on the property?
  - b. Response: Yes, in 2014.
- 14) Unknown Neighbor –

- a. Question: What is the maximum number of lots? Will each lot have it's own well and septic?
- b. Response: 17. Yes.

**15) Eileen Frost – 12925 Jeanne Road**

- a. Question: Are you planning on making intersection improvements at Jeanne Road?
- b. Response: No.
  
- c. Question: Will proposed homes be similar in character to existing homes?
- d. Response: It is possible, however, increased cost of lots due to less density and less remaining land in Anchorage will likely attract higher end home construction.
  
- e. Question: We are concerned about increased light pollution.
- f. Response: There will not be any street lights.
  
- g. Question: What about the 10 Acres in corner at Messina and Upper De Armoun?
- h. Response: Not included in application.

**16) Unknown Neighbor –**

- a. Question: Are horses allowed in R-8 Zoning?
- b. Response: Yes.

**17) Unknown Neighbor –**

- a. Question: Who is responsible for poor condition of Upper De Armoun Road?
- b. Response: Municipality of Anchorage and GARSA.

**18) Carl Portman – 8831 Upper De Armoun Road**

- a. Question: Do you know what covenant requirements will be for subdivision?
- b. Response: Not yet.

**19) Bern Davis – 13101 Jeanne Road**

- a. Question: What are setbacks?
- b. Response: According to code.
  
- c. Question: This plan seems counter to Hillside District Plan.
- d. Response: This plan strictly conforms to code requirements of Title 21.



Project Name: Lewis + Clark Subdivision Case No.           

Meeting Type:  Concept  Pre-Application  Post-Application  Other

Meeting Requested by: SY Group Date: 10-18-17  
 Lead MOA Planner: Francis M. Time: 3:00pm

	NAME (please print)	COMPANY	PHONE	E-MAIL
1	Ryan Yelle	MOA - Planning	343-7935	YelleRS@muni.org
2	DAVE GREVIER	TRIAD Engineering	561-6537	davegrevier@triadlak.com
3	RANDY RIBBLE	MOA TRAFFIC	343-8415	RIBBLE_R@MOA.ak.gov
4	Elisha Brownson		406-0783	elishaglorv@gmail.com
5	TODD BROWNSON	BIG COUNTRY ENTERPRISES	406-0792	todd@bigcountryak.com
6	Tom Proyer	SY GROUP	227-1847	tom@SYAK.COM
7	Susanne Gionet	Big Country	951-999-1871	paulandsusanne@gmail.com
8	PAUL GIONET	Big Country	951-999-1872	same
9	Francis McLaughlin	MOA current Planning	343-8003	mcLaughlinfd@muni.org
10	BRANDON TELFORD	MOA PRIVATE DEVELOPMENT	343-8443	TelfordB@muni.org
11	Jason Moncrieff	MOA " "	343-8310	moncrieffj@muni.org
12	Dave Whitfield	MOA - Planning	8329	Whitfieldd@muni.org
13	Jon Cecil	MOA - Long Range	x3915	Cecilj@muni.org
14	Rebecca Carroll	MOA - On-site	x7908	carrollrm@muni.org
15	Deb WockenFuss	MOA - Onsite	7906	WockenFussDM@muni.org
16	Sharon Ferguson	MOA Planning	x7938	fergusonsh@muni.org
17	Kyle Cunningham	MOA WMS	x8026	CunninghamKb@muni.org

Notes: Grant Mathews TRIAD 720-6120 grantmathews@triadlak.com

# LEWIS & CLARK SUBDIVISION

## PRELIMINARY DRAINAGE IMPACT ANALYSIS

Owner/Developer:

Big Country Enterprises, LLC

Prepared By:

**TRIAD**  
ENGINEERING

P.O. Box 110890  
Anchorage, Alaska 99511  
(907) 561-6537

October 2017

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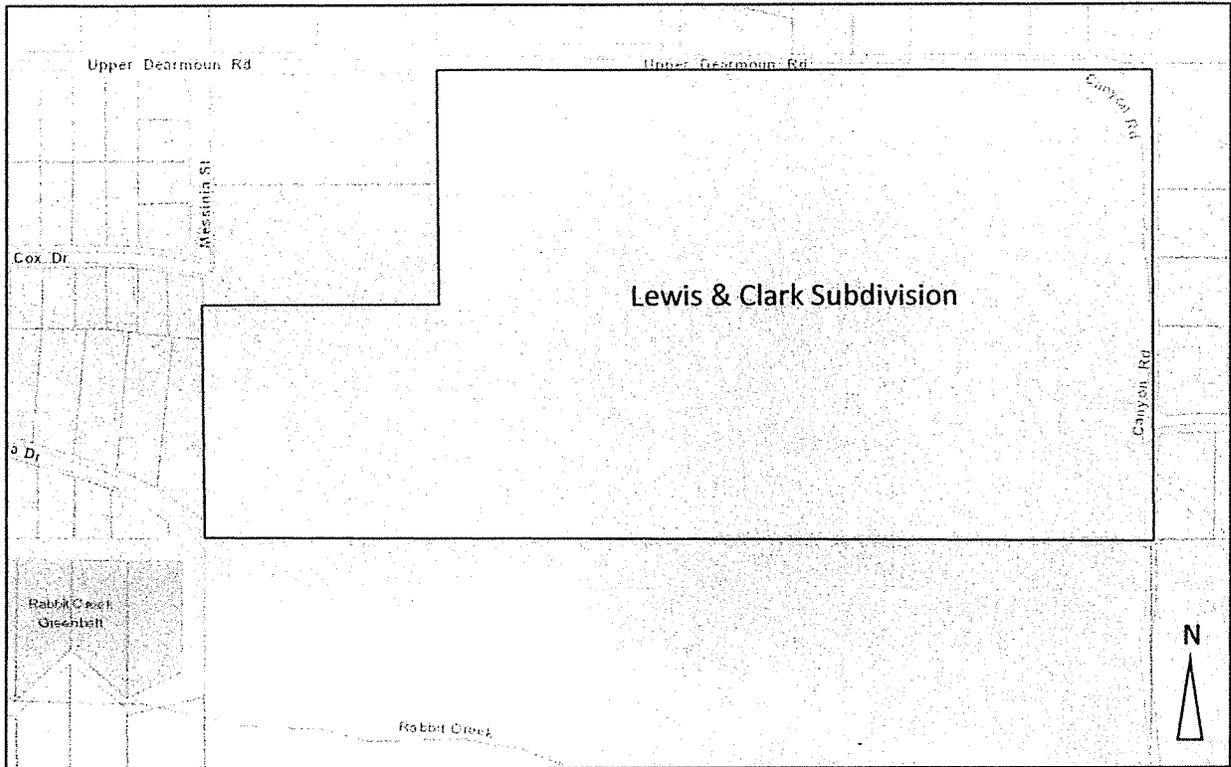
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# 1. Project Description

## a. Location

Lewis and Clark Subdivision is located south of Upper DeArmour Road and west of Canyon Road within the upper hillside area of Anchorage, Alaska. See the location map, below. Based on the geographic location of the site, a 2.0 orographic factor was used for this analysis (map attached in the Appendix).



Lewis and Clark Location Map

## b. Project Description

This project intends to develop the 70-acre parcel under the existing R-8 designation with residential, single-family housing. The pre-development conditions will be analyzed and compared to post-development conditions with a conceptual large-lot development. The project-area is currently heavily vegetated with mature trees and brush. Proposed road improvements have not been finalized but would consist of strip paved roads with roadside ditches to provide vehicular access to the residential lots.

## c. Analysis Description

The primary purpose of this analysis is to estimate and quantify pre and post development flow rates to determine the scale of additional runoff generated by developing the parcel under its current zoning designation of R-8. An analysis was completed for both the 10-year and 100-year storm events. The site must be able to safely convey the 10-year storm event as well as limit flood risk and downstream impacts to neighboring properties during the 100-year event.

## 2. Basin Characterization

### a. Pre-development conditions

The existing parcel is undeveloped and heavily vegetated. No underground storm drain facilities exist in the immediate vicinity of the project, and runoff in the area is conveyed with constructed drainage ditches and natural drainage ways.

On site drainage generally flows in a southwesterly direction via existing drainage ways that outfall to Rabbit Creek, south of the project. The slopes across the majority of the parcel are in the range of 5-20%. See Section 2.c. for conditions of the contributing offsite drainage area.

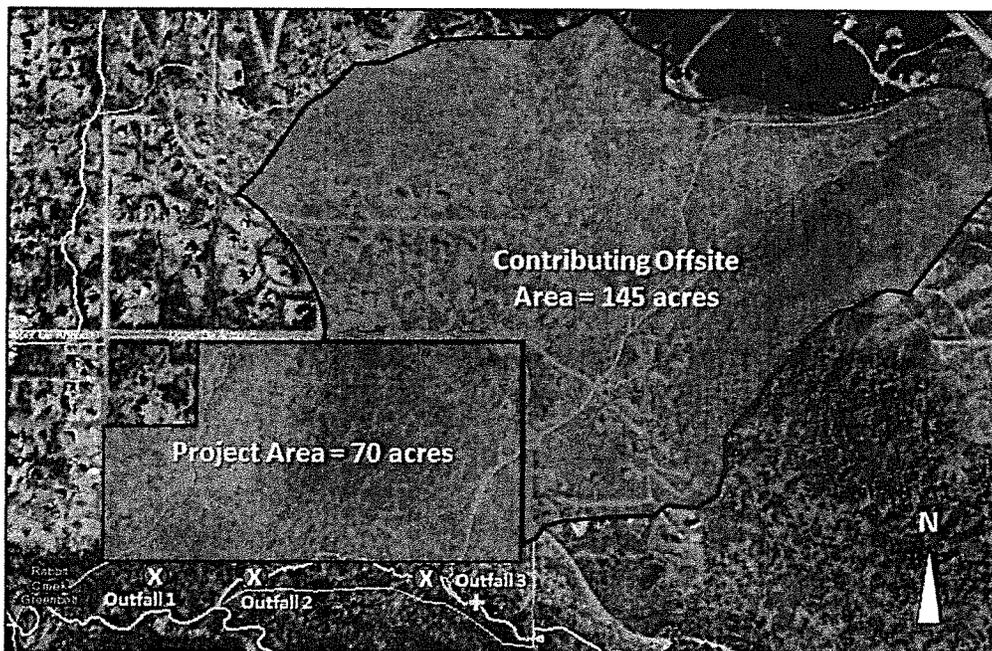
A pre-development watershed map is included in the report Appendix.

### b. Post-development conditions

Post-development conditions of the site were modeled under the current R-8 zoning designation with a conceptual layout of 17 large, single-family lots. Drainage will continue to flow in a southwesterly direction through existing wetlands and MOA-identified drainage ways and outfall to Rabbit Creek.

### c. Contributing offsite drainage

Approximately 145 acres to the northwest of the site drains into the project area. This is a substantial area that contributes significant off-site runoff upstream of the project. The area is partially developed with large-lot single-family homes and access roads. A major portion of the offsite drainage area is undeveloped with woods and steep subalpine slopes. Flows are captured by roadside ditches and two, 24" culverts cross DeArmoun Road and discharge this offsite runoff into the project area. These flows are conveyed through the site by natural drainage ways which outfall to Rabbit Creek. A watershed map is shown below.



Lewis and Clark Contributing Drainage Map

The contributing offsite area is more than double the size of the project area and generates significant flows that will be addressed in the final design of the subdivision.

**d. Floodways, floodplains, and wetlands**

No floodways or floodplains are known to exist within the project corridor. Approximately 8.5 acres of wetlands exist on site. These wetlands are anticipated to remain undeveloped. See the report Appendix for wetland mapping.

**e. Problem areas**

Glaciation concerns are present within this site as is common within hillside developments in the Anchorage area. While generally hard to predict, glaciation tends to occur at locations of shallow subsurface water flow which can vary seasonally. This shallow flow can be drawn to the surface by cold temperatures during the winter months. As the shallow subsurface water daylights it freezes and causes glaciation. To combat this issue, known locations of shallow groundwater flow discovered during the future installation of the roadway improvements will be over excavated and the excavation lined with rock. This process further insulates the subsurface water from cold weather and keeps it in a thawed state below ground.

**3. Pre-development Runoff Analysis**

**a. Watershed area**

Six total sub-basins make up the watershed area analyzed within this report, three offsite and three on site. The three offsite basins result in a total impervious area of 9.4 acres; the remaining 135.6 acres was modeled as woods in good condition.

The project area includes approximately 61.6 acres of brush and trees modeled as woods in good condition. The 8.5 acres of wetlands were also incorporated into the model.

**b. Summary of pre-development runoff.**

Totals provided in Table 1, below, are for the peak inflow, in cfs, for the summation of all contributing pre-development sub-basins.

**Table 1: Pre-development Peak Runoff Rates**

	10-Year [cfs]	100-Year [cfs]
<b>Outfall 1</b>	7.0	14.0
<b>Outfall 2</b>	13.9	38.0
<b>Outfall 3</b>	14.9	37.8
<b>Total</b>	35.8	89.8

Pre development analysis calculations are located within the Appendix.

**4. Post-development Runoff Analysis**

**a. Watershed area**

Total overall watershed area does not change between pre and post development conditions and the number of sub-basins does not change. On site, the impervious area increases with the development of single family homes and access roads. Under R-8 zoning approximately seventeen, large lots are proposed.

On a per lot basis, the impervious area was estimated at 5,000 square feet, and the grassed area was estimated at 10,000 square feet. 8.5 acres of wetlands are to be left undisturbed, and the remainder of the site was modeled as woods in good condition. See Table 1, below, for surface areas and type contributing to on site runoff.

**Table 2: Post-development Drainage Surface Area**

Zoning Designation	Impervious Area* [Acre]	Grassed Area [Acre]	Woods [Acre]	Wetlands [Acre]
R-8	2.6	3.3	55.5	8.5

\*Includes houses, paved driveways and access roads

Under post-development conditions, impervious area would make up less than 4% of the total 70 acres.

**b. Summary of post-development runoff**

Totals provided below are the summation of peak inflow, in cfs, for all post-development sub-basins.

**Table 3: Post-development Peak Runoff Rates**

	10-Year [cfs]	100-Year [cfs]
Outfall 1	6.9	14.3
Outfall 2	16.3	43.7
Outfall 3	12.9	31.8
<b>Total</b>	<b>36.1</b>	<b>89.8</b>

Post development analysis calculations are included in the Appendix.

**5. Conclusion**

As mentioned in Section 2.c., one of the primary concerns for this development will be the contributing offsite runoff from properties to the north and east of the project. This area includes single family homes, access roads and open space with a land-use similar to the proposed development. However, the offsite area is more than double the size of the project area. Properties upstream of the project generate a significant amount of the total runoff that flows through the site.

Runoff from both the offsite area and the project site will be collected and routed through vegetated drainage ways and directed to Rabbit Creek, closely matching the existing drainage path on site. No grading will be done outside of the property boundary, and MOA-identified drainage ways will remain in place downstream of the project. The overall existing drainage pattern of the surrounding area will not change or be negatively affected with the development of this parcel.

Developing the R-8 parcel with large-lot single family homes creates a minimal change in peak runoff, with an estimated total increase less than 1%. This minor increase can be safely managed by sizing drainage ways and culverts accordingly. Table 4, below, compares peak runoff for both the 10 and 100-year events. Note that the peak runoff comparison includes the flows that are generated offsite and drain through the project area.

**Table 4: Peak Flow Comparisons**

<b>10-Year, 24-Hour Peak Flow Sum</b>		
<b>Predev [cfs]</b>	<b>Postdev [cfs]</b>	<b>% Change</b>
35.8	36.1	+1%

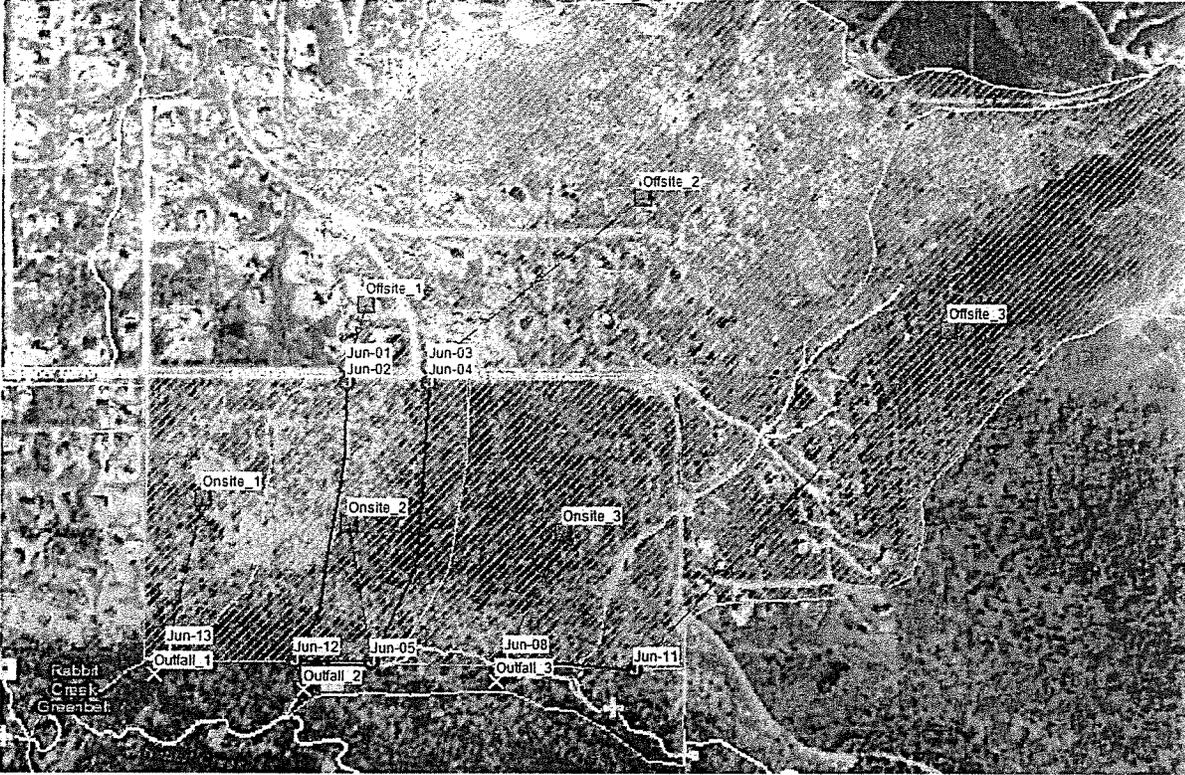
<b>100-Year, 24-Hour Peak Flow Sum</b>		
<b>Predev [cfs]</b>	<b>Postdev [cfs]</b>	<b>% Change</b>
89.8	89.8	0%

In general, the negligible increase in peak flow is not uncommon for large lot developments where much of the land remains naturally vegetated. The 4% increase to impervious area is not sufficient to substantially affect the predevelopment runoff rates. This development is anticipated to lengthen existing drainage paths by the construction of new roads, which increases the time of concentration and reduces peak flow rates, offsetting the effect of the additional impervious area.

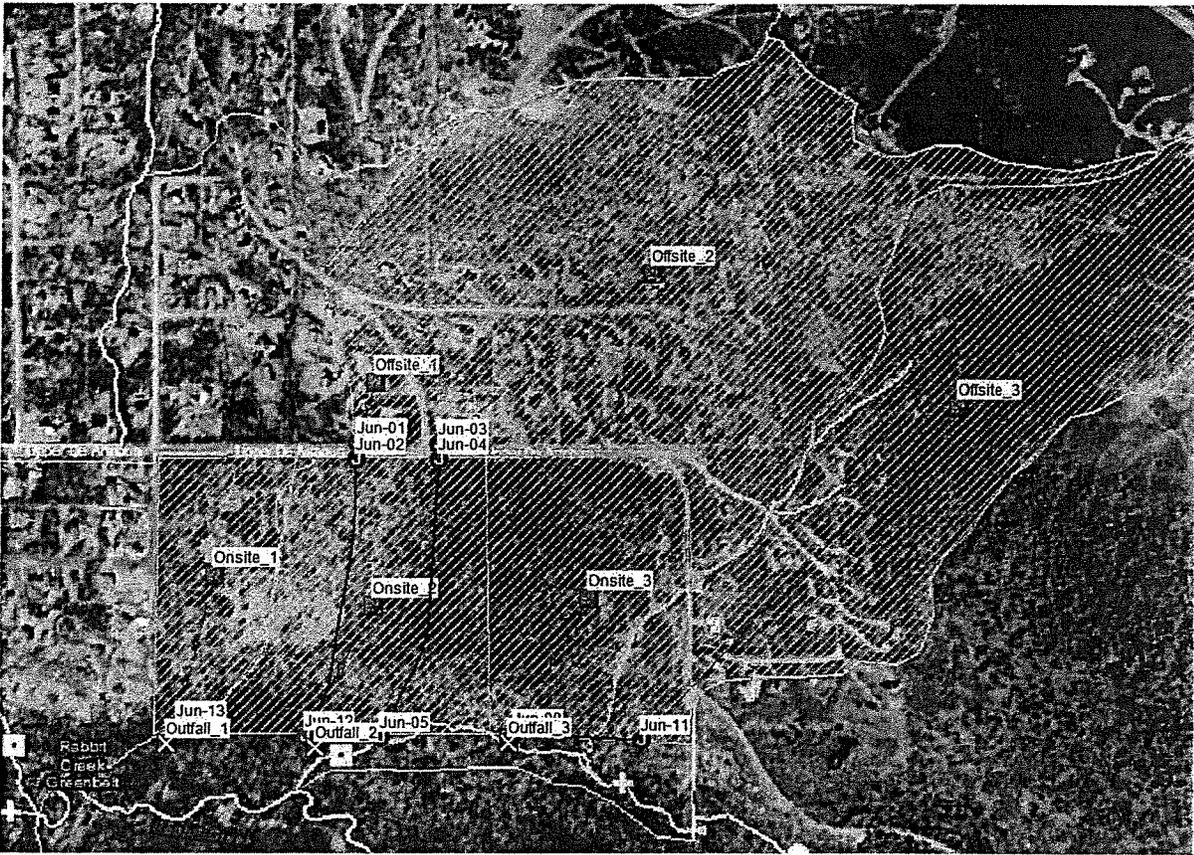
As proposed, the project site will remain at a low density with over 80% of the parcel predicted to stay heavily vegetated with brush and trees. Glaciation concerns will be addressed by keeping shallow ground water along the roadways below the ground surface. No adverse impacts to neighboring properties are anticipated by developing the parcel under the existing R-8 zoning designation.



b. Pre-development Watershed Map



c. Post-development Watershed Map



## d. Pre-development Calculations

### 10-Year, 24-Hour

#### Project Description

\*\*\*\*\*  
 File Name ..... Lewis&Clark Predev 10.24.17.SPF

#### \*\*\*\*\* Analysis Options \*\*\*\*\*

Flow Units ..... cfs  
 Subbasin Hydrograph Method. SCS TR-55  
 Time of Concentration..... SCS TR-55  
 Link Routing Method ..... Hydrodynamic  
 Storage Node Exfiltration.. Constant rate, free surface area  
 Starting Date ..... APR-13-2016 00:00:00  
 Ending Date ..... APR-14-2016 06:00:00  
 Report Time Step ..... 00:05:00

#### \*\*\*\*\* Element Count \*\*\*\*\*

Number of rain gages ..... 1  
 Number of subbasins ..... 6  
 Number of nodes ..... 12  
 Number of links ..... 9

#### \*\*\*\*\* Raingage Summary \*\*\*\*\*

Gage ID	Data Source	Data Type	Recording Interval
Rain Gage	10 YR	CUMULATIVE	6.00 min

#### \*\*\*\*\* Subbasin Summary \*\*\*\*\*

Subbasin ID	Total Area
	acres
Offsite_1	5.20
Offsite_2	100.00
Offsite_3	40.00
Onsite_1	15.00
Onsite_2	28.00
Onsite_3	36.00

#### \*\*\*\*\* Node Summary \*\*\*\*\*

Node ID	Element Type	Invert Elevation	Maximum Elev.	Ponded Area	External Inflow
		ft	ft	ft <sup>2</sup>	
Jun-01	JUNCTION	1110.60	1113.60	0.00	
Jun-02	JUNCTION	1108.94	1111.94	0.00	
Jun-03	JUNCTION	1145.73	1148.73	0.00	
Jun-04	JUNCTION	1143.86	1146.86	0.00	
Jun-05	JUNCTION	970.00	972.00	0.00	
Jun-08	JUNCTION	1022.00	1024.00	0.00	
Jun-11	JUNCTION	1100.00	1144.00	0.00	
Jun-12	JUNCTION	962.00	964.00	0.00	
Jun-13	JUNCTION	922.00	924.00	0.00	
Outfall_1	OUTFALL	920.00	922.00	0.00	
Outfall_2	OUTFALL	960.00	962.00	0.00	
Outfall_3	OUTFALL	1020.00	1022.00	0.00	

#### \*\*\*\*\* Link Summary \*\*\*\*\*

Link ID	From Node	To Node	Element Type	Length	Slope	Manning's
				ft	%	Roughness
Link-01	Jun-01	Jun-02	CONDUIT	39.0	4.2564	0.0130

Link-02	Jun-03	Jun-04	CONDUIT	41.5	4.5060	0.0130
Link-10	Jun-05	Jun-12	CHANNEL	60.0	13.3333	0.0320
Link-13	Jun-08	Outfall_3	CHANNEL	20.0	10.0000	0.0320
Link-17	Jun-12	Outfall_2	CHANNEL	20.0	10.0000	0.0320
Link-18	Jun-02	Jun-12	CHANNEL	1350.0	10.8844	0.0320
Link-19	Jun-04	Jun-05	CHANNEL	1350.0	12.8785	0.0320
Link-20	Jun-13	Outfall_1	CHANNEL	20.0	10.0000	0.0320
Link-23	Jun-11	Jun-08	CHANNEL	500.0	24.0000	0.0320

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Cross Section Summary  
\*\*\*\*\*

Link ID	Shape	Depth/ Diameter ft	Width ft	No. of Barrels	Cross Sectional Area ft <sup>2</sup>	Full Flow Hydraulic Radius ft	Design Flow Capacity cfs
Link-01	CIRCULAR	2.00	2.00	1	3.14	0.50	46.67
Link-02	CIRCULAR	2.00	2.00	1	3.14	0.50	48.02
Link-10	TRAPEZOIDAL	2.00	11.00	1	14.00	1.17	263.90
Link-13	TRAPEZOIDAL	2.00	11.00	1	14.00	1.17	228.55
Link-17	TRAPEZOIDAL	2.00	11.00	1	14.00	1.17	228.55
Link-18	TRAPEZOIDAL	1.00	7.00	1	5.00	0.67	58.60
Link-19	TRAPEZOIDAL	1.00	7.00	1	5.00	0.67	63.75
Link-20	TRAPEZOIDAL	2.00	11.00	1	14.00	1.17	228.55
Link-23	TRAPEZOIDAL	2.00	11.00	1	14.00	1.17	354.06

Runoff Quantity Continuity	Volume acre-ft	Depth inches
Total Precipitation .....	66.313	3.549
Surface Runoff .....	1.366	0.073
Continuity Error (%) .....	-0.000	

Flow Routing Continuity	Volume acre-ft	Volume Mgallons
External Inflow .....	0.000	0.000
External Outflow .....	13.648	4.447
Initial Stored Volume ....	0.000	0.000
Final Stored Volume .....	0.000	0.000
Continuity Error (%) .....	0.001	

\*\*\*\*\*  
Composite Curve Number Computations Report  
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Subbasin Offsite\_1  
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Soil/Surface Description	Area (acres)	Soil Group	CN
Woods, Fair	3.77	B	60.00
Paved parking & roofs	1.43	B	98.00
Composite Area & Weighted CN	5.20		70.45

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Subbasin Offsite\_2  
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Soil/Surface Description	Area (acres)	Soil Group	CN
Woods, Good	94.00	B	55.00
Paved parking & roofs	6.00	B	98.00
Composite Area & Weighted CN	100.00		57.58

-----  
Subbasin Offsite\_3  
-----

Soil/Surface Description	Area (acres)	Soil Group	CN
Woods, Good	37.00	B	55.00
Paved parking & roofs	3.00	B	98.00
Composite Area & Weighted CN	40.00		58.23

-----  
Subbasin Onsite\_1  
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Soil/Surface Description	Area (acres)	Soil Group	CN
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Woods, Good	11.79	C	70.00
Paved parking & roofs	0.59	C	98.00
Wetlands	2.62	-	90.00
Composite Area & Weighted CN	15.00		74.59

-----  
Subbasin Onsite\_2  
-----

Soil/Surface Description	Area (acres)	Soil Group	CN
Woods, Good	24.34	C	70.00
Paved parking & roofs	0.32	C	98.00
Wetlands	3.34	-	90.00
Composite Area & Weighted CN	28.00		72.71

-----  
Subbasin Onsite\_3  
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Soil/Surface Description	Area (acres)	Soil Group	CN
Woods, Good	32.75	C	70.00
Paved parking & roofs	0.55	C	98.00
Wetlands	2.70	-	90.00
Composite Area & Weighted CN	36.00		71.93

\*\*\*\*\*  
SCS TR-55 Time of Concentration Computations Report  
\*\*\*\*\*

Sheet Flow Equation  
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$$T_c = \{0.007 * ((n * L_f)^{0.8}) / ((P^{0.5}) * (S_f^{0.4}))\}$$

Where:

- Tc = Time of Concentration (hrs)
- n = Manning's Roughness
- Lf = Flow Length (ft)
- P = 2 yr, 24 hr Rainfall (inches)
- Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation  
-----

- V = 16.1345 \* (Sf<sup>0.5</sup>) (unpaved surface)
- V = 20.3282 \* (Sf<sup>0.5</sup>) (paved surface)
- V = 15.0 \* (Sf<sup>0.5</sup>) (grassed waterway surface)
- V = 10.0 \* (Sf<sup>0.5</sup>) (nearly bare & untilled surface)
- V = 9.0 \* (Sf<sup>0.5</sup>) (cultivated straight rows surface)
- V = 7.0 \* (Sf<sup>0.5</sup>) (short grass pasture surface)
- V = 5.0 \* (Sf<sup>0.5</sup>) (woodland surface)
- V = 2.5 \* (Sf<sup>0.5</sup>) (forest w/heavy litter surface)
- Tc = (Lf / V) / (3600 sec/hr)

Where:

- Tc = Time of Concentration (hrs)
- Lf = Flow Length (ft)
- V = Velocity (ft/sec)
- Sf = Slope (ft/ft)

Channel Flow Equation  
-----

$$V = (1.49 * (R^{2/3}) * (S_f^{0.5})) / n$$

$$R = A_q / W_p$$

$$T_c = (L_f / V) / (3600 \text{ sec/hr})$$

Where:

- Tc = Time of Concentration (hrs)
- Lf = Flow Length (ft)
- R = Hydraulic Radius (ft)
- Aq = Flow Area (ft<sup>2</sup>)
- Wp = Wetted Perimeter (ft)
- V = Velocity (ft/sec)
- Sf = Slope (ft/ft)
- n = Manning's Roughness

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Subbasin Offsite\_1  
-----

Sheet Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.40	0.00	0.00
Flow Length (ft):	150.00	0.00	0.00
Slope (%):	5.00	0.00	0.00
2 yr, 24 hr Rainfall (in):	2.52	0.00	0.00
Velocity (ft/sec):	0.11	0.00	0.00
Computed Flow Time (minutes):	23.20	0.00	0.00

Shallow Concentrated Flow Computations

	Subarea A	Subarea B	Subarea C
Flow Length (ft):	300.00	0.00	0.00
Slope (%):	8.00	0.00	0.00
Surface Type:	Grassed waterway	Unpaved	Unpaved
Velocity (ft/sec):	4.24	0.00	0.00
Computed Flow Time (minutes):	1.18	0.00	0.00

Total TOC (minutes): 24.38

Subbasin Offsite\_2

Sheet Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.80	0.00	0.00
Flow Length (ft):	150.00	0.00	0.00
Slope (%):	5.00	0.00	0.00
2 yr, 24 hr Rainfall (in):	2.52	0.00	0.00
Velocity (ft/sec):	0.06	0.00	0.00
Computed Flow Time (minutes):	40.39	0.00	0.00

Shallow Concentrated Flow Computations

	Subarea A	Subarea B	Subarea C
Flow Length (ft):	2000.00	1500.00	890.00
Slope (%):	27.00	10.00	8.00
Surface Type:	Woodland	Woodland	Grassed waterway
Velocity (ft/sec):	2.60	1.58	4.24
Computed Flow Time (minutes):	12.82	15.82	3.50

Total TOC (minutes): 72.53

Subbasin Offsite\_3

Sheet Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.80	0.00	0.00
Flow Length (ft):	150.00	0.00	0.00
Slope (%):	5.00	0.00	0.00
2 yr, 24 hr Rainfall (in):	2.52	0.00	0.00
Velocity (ft/sec):	0.06	0.00	0.00
Computed Flow Time (minutes):	40.39	0.00	0.00

Shallow Concentrated Flow Computations

	Subarea A	Subarea B	Subarea C
Flow Length (ft):	1500.00	500.00	0.00
Slope (%):	25.00	10.00	0.00
Surface Type:	Woodland	Unpaved	Unpaved
Velocity (ft/sec):	2.50	5.10	0.00
Computed Flow Time (minutes):	10.00	1.63	0.00

Total TOC (minutes): 52.03

Subbasin Onsite\_1

Sheet Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.80	0.00	0.00
Flow Length (ft):	150.00	0.00	0.00
Slope (%):	14.00	0.00	0.00

2 yr, 24 hr Rainfall (in):	2.52	0.00	0.00
Velocity (ft/sec):	0.09	0.00	0.00
Computed Flow Time (minutes):	26.76	0.00	0.00

Shallow Concentrated Flow Computations

	Subarea A	Subarea B	Subarea C
Flow Length (ft):	1200.00	0.00	0.00
Slope (%):	14.00	0.00	0.00
Surface Type:	Woodland	Unpaved	Unpaved
Velocity (ft/sec):	1.87	0.00	0.00
Computed Flow Time (minutes):	10.70	0.00	0.00
<hr/>			
Total TOC (minutes):	37.45		
<hr/>			

Subbasin Onsite\_2

Sheet Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.80	0.00	0.00
Flow Length (ft):	150.00	0.00	0.00
Slope (%):	13.00	0.00	0.00
2 yr, 24 hr Rainfall (in):	2.52	0.00	0.00
Velocity (ft/sec):	0.09	0.00	0.00
Computed Flow Time (minutes):	27.56	0.00	0.00

Shallow Concentrated Flow Computations

	Subarea A	Subarea B	Subarea C
Flow Length (ft):	1200.00	0.00	0.00
Slope (%):	13.00	0.00	0.00
Surface Type:	Woodland	Unpaved	Unpaved
Velocity (ft/sec):	1.80	0.00	0.00
Computed Flow Time (minutes):	11.11	0.00	0.00
<hr/>			
Total TOC (minutes):	38.67		
<hr/>			

Subbasin Onsite\_3

Sheet Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.80	0.00	0.00
Flow Length (ft):	150.00	0.00	0.00
Slope (%):	13.00	0.00	0.00
2 yr, 24 hr Rainfall (in):	2.52	0.00	0.00
Velocity (ft/sec):	0.09	0.00	0.00
Computed Flow Time (minutes):	27.56	0.00	0.00

Shallow Concentrated Flow Computations

	Subarea A	Subarea B	Subarea C
Flow Length (ft):	1100.00	0.00	0.00
Slope (%):	13.00	0.00	0.00
Surface Type:	Woodland	Unpaved	Unpaved
Velocity (ft/sec):	1.80	0.00	0.00
Computed Flow Time (minutes):	10.19	0.00	0.00
<hr/>			
Total TOC (minutes):	37.75		
<hr/>			

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Subbasin Runoff Summary  
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Subbasin ID	Total Precip in	Total Runoff in	Peak Runoff cfs	Weighted Curve Number	Time of Concentration days hh:mm:ss
Offsite_1	3.54	1.06	2.25	70.450	0 00:24:22
Offsite_2	3.54	0.45	4.60	57.580	0 01:12:31
Offsite_3	3.54	0.48	2.31	58.230	0 00:52:01
Onsite_1	3.54	1.30	7.02	74.590	0 00:37:27
Onsite_2	3.54	1.19	11.21	72.710	0 00:38:40
Onsite_3	3.54	1.14	13.77	71.930	0 00:37:45

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Node Depth Summary  
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Node ID	Average Depth Attained ft	Maximum Depth Attained ft	Maximum HGL Attained ft	Time of Max Occurrence days hh:mm	Total Flooded Volume acre-in	Total Time Flooded minutes	Retention Time hh:mm:ss
Jun-01	0.12	0.39	1110.99	0 10:15	0	0	0:00:00
Jun-02	0.04	0.16	1109.10	0 10:16	0	0	0:00:00
Jun-03	0.37	0.58	1146.31	0 11:15	0	0	0:00:00
Jun-04	0.15	0.23	1144.09	0 11:18	0	0	0:00:00
Jun-05	0.20	0.40	970.40	0 10:27	0	0	0:00:00
Jun-08	0.19	0.56	1022.56	0 10:25	0	0	0:00:00
Jun-11	35.53	42.13	1142.13	0 10:50	0	0	0:00:00
Jun-12	0.24	0.53	962.53	0 10:27	0	0	0:00:00
Jun-13	0.09	0.35	922.35	0 10:20	0	0	0:00:00
Outfall_1	0.09	0.32	920.32	0 10:20	0	0	0:00:00
Outfall_2	0.22	0.47	960.47	0 10:27	0	0	0:00:00
Outfall_3	0.18	0.49	1020.49	0 10:25	0	0	0:00:00

\*\*\*\*\*  
Node Flow Summary  
\*\*\*\*\*

Node ID	Element Type	Maximum Lateral Inflow cfs	Peak Inflow cfs	Time of Peak Inflow Occurrence days hh:mm	Maximum Flooding Overflow cfs	Time of Peak Flooding Occurrence days hh:mm
Jun-01	JUNCTION	2.24	2.24	0 10:15	0.00	
Jun-02	JUNCTION	0.00	2.25	0 10:15	0.00	
Jun-03	JUNCTION	4.60	4.60	0 11:15	0.00	
Jun-04	JUNCTION	0.00	4.60	0 11:15	0.00	
Jun-05	JUNCTION	11.19	12.26	0 10:25	0.00	
Jun-08	JUNCTION	13.67	16.45	0 10:21	0.00	
Jun-11	JUNCTION	2.31	2.31	0 10:49	0.00	
Jun-12	JUNCTION	0.00	13.96	0 10:25	0.00	
Jun-13	JUNCTION	6.94	6.94	0 10:20	0.00	
Outfall_1	OUTFALL	0.00	6.95	0 10:20	0.00	
Outfall_2	OUTFALL	0.00	13.91	0 10:27	0.00	
Outfall_3	OUTFALL	0.00	14.91	0 10:25	0.00	

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Outfall Loading Summary  
\*\*\*\*\*

Outfall Node ID	Flow Frequency (%)	Average Flow cfs	Peak Inflow cfs
Outfall_1	80.70	1.31	6.95
Outfall_2	86.08	5.38	13.91
Outfall_3	81.96	4.05	14.91
System	82.91	10.74	35.62

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Link Flow Summary  
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Link ID	Element Type	Time of Peak Flow Occurrence days hh:mm	Maximum Velocity Attained ft/sec	Length Factor	Peak Flow during Analysis cfs	Design Flow Capacity cfs	Ratio of Maximum /Design Flow	Ratio of Maximum Flow Depth	Total Time Surcharged minutes	Reported Condition
Link-01	CONDUIT	0 10:15	8.62	2.93	2.25	46.67	0.05	0.14	0	Calculated
Link-02	CONDUIT	0 11:15	10.10	2.81	4.60	48.02	0.10	0.20	0	Calculated
Link-10	CHANNEL	0 10:27	6.63	2.10	12.23	263.90	0.05	0.23	0	Calculated
Link-13	CHANNEL	0 10:25	7.03	5.68	14.91	228.55	0.07	0.26	0	Calculated
Link-17	CHANNEL	0 10:27	6.90	5.68	13.91	228.55	0.06	0.25	0	Calculated
Link-18	CHANNEL	0 10:16	2.02	1.00	2.19	58.60	0.04	0.34	0	Calculated
Link-19	CHANNEL	0 11:18	4.66	1.00	4.60	63.75	0.07	0.29	0	Calculated
Link-20	CHANNEL	0 10:20	5.70	5.68	6.95	228.55	0.03	0.17	0	Calculated
Link-23	CHANNEL	0 10:21	2.58	1.00	2.89	354.06	0.01	0.19	0	Calculated

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Highest Flow Instability Indexes



Tc = Time of Concentration (hrs)  
 Lf = Flow Length (ft)  
 V = Velocity (ft/sec)  
 Sf = Slope (ft/ft)

Channel Flow Equation

$$V = (1.49 * (R^{2/3}) * (Sf^{0.5})) / n$$

$$R = Aq / Wp$$

$$Tc = (Lf / V) / (3600 \text{ sec/hr})$$

Where:

Tc = Time of Concentration (hrs)  
 Lf = Flow Length (ft)  
 R = Hydraulic Radius (ft)  
 Aq = Flow Area (ft<sup>2</sup>)  
 Wp = Wetted Perimeter (ft)  
 V = Velocity (ft/sec)  
 Sf = Slope (ft/ft)  
 n = Manning's Roughness

Subbasin Offsite\_1

Sheet Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.40	0.00	0.00
Flow Length (ft):	150.00	0.00	0.00
Slope (%):	5.00	0.00	0.00
2 yr, 24 hr Rainfall (in):	2.52	0.00	0.00
Velocity (ft/sec):	0.11	0.00	0.00
Computed Flow Time (minutes):	23.20	0.00	0.00

Shallow Concentrated Flow Computations

	Subarea A	Subarea B	Subarea C
Flow Length (ft):	300.00	0.00	0.00
Slope (%):	8.00	0.00	0.00
Surface Type:	Grassed waterway	Unpaved	Unpaved
Velocity (ft/sec):	4.24	0.00	0.00
Computed Flow Time (minutes):	1.18	0.00	0.00

Total TOC (minutes): 24.38

Subbasin Offsite\_2

Sheet Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.80	0.00	0.00
Flow Length (ft):	150.00	0.00	0.00
Slope (%):	5.00	0.00	0.00
2 yr, 24 hr Rainfall (in):	2.52	0.00	0.00
Velocity (ft/sec):	0.06	0.00	0.00
Computed Flow Time (minutes):	40.39	0.00	0.00

Shallow Concentrated Flow Computations

	Subarea A	Subarea B	Subarea C
Flow Length (ft):	2000.00	1500.00	890.00
Slope (%):	27.00	10.00	8.00
Surface Type:	Woodland	Woodland	Grassed waterway
Velocity (ft/sec):	2.60	1.58	4.24
Computed Flow Time (minutes):	12.82	15.82	3.50

Total TOC (minutes): 72.53

Subbasin Offsite\_3

Sheet Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.80	0.00	0.00
Flow Length (ft):	150.00	0.00	0.00
Slope (%):	5.00	0.00	0.00
2 yr, 24 hr Rainfall (in):	2.52	0.00	0.00

Velocity (ft/sec):	0.06	0.00	0.00
Computed Flow Time (minutes):	40.39	0.00	0.00

Shallow Concentrated Flow Computations

	Subarea A	Subarea B	Subarea C
Flow Length (ft):	1500.00	500.00	0.00
Slope (%):	25.00	10.00	0.00
Surface Type:	Woodland	Unpaved	Unpaved
Velocity (ft/sec):	2.50	5.10	0.00
Computed Flow Time (minutes):	10.00	1.63	0.00

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Total TOC (minutes):	52.03		
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Subbasin Onsite\_1

Sheet Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.80	0.00	0.00
Flow Length (ft):	150.00	0.00	0.00
Slope (%):	5.00	0.00	0.00
2 yr, 24 hr Rainfall (in):	2.52	0.00	0.00
Velocity (ft/sec):	0.06	0.00	0.00
Computed Flow Time (minutes):	40.39	0.00	0.00

Shallow Concentrated Flow Computations

	Subarea A	Subarea B	Subarea C
Flow Length (ft):	1200.00	0.00	0.00
Slope (%):	13.00	0.00	0.00
Surface Type:	Grassed waterway	Unpaved	Unpaved
Velocity (ft/sec):	5.41	0.00	0.00
Computed Flow Time (minutes):	3.70	0.00	0.00

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Total TOC (minutes):	44.09		
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Subbasin Onsite\_2

Sheet Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.80	0.00	0.00
Flow Length (ft):	150.00	0.00	0.00
Slope (%):	5.00	0.00	0.00
2 yr, 24 hr Rainfall (in):	2.52	0.00	0.00
Velocity (ft/sec):	0.06	0.00	0.00
Computed Flow Time (minutes):	40.39	0.00	0.00

Shallow Concentrated Flow Computations

	Subarea A	Subarea B	Subarea C
Flow Length (ft):	1200.00	0.00	0.00
Slope (%):	13.00	0.00	0.00
Surface Type:	Grassed waterway	Unpaved	Unpaved
Velocity (ft/sec):	5.41	0.00	0.00
Computed Flow Time (minutes):	3.70	0.00	0.00

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Total TOC (minutes):	44.09		
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Subbasin Onsite\_3

Sheet Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.80	0.00	0.00
Flow Length (ft):	150.00	0.00	0.00
Slope (%):	13.00	0.00	0.00
2 yr, 24 hr Rainfall (in):	2.52	0.00	0.00
Velocity (ft/sec):	0.09	0.00	0.00
Computed Flow Time (minutes):	27.56	0.00	0.00

Shallow Concentrated Flow Computations

	Subarea A	Subarea B	Subarea C
Flow Length (ft):	1200.00	0.00	0.00
Slope (%):	13.00	0.00	0.00

Surface Type:	Grassed waterway	Unpaved	Unpaved
Velocity (ft/sec):	5.41	0.00	0.00
Computed Flow Time (minutes):	3.70	0.00	0.00

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Total TOC (minutes): 31.26

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Subbasin Runoff Summary  
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Subbasin ID	Total Precip in	Total Runoff in	Peak Runoff cfs	Weighted Curve Number	Time of Concentration days	hh:mm:ss
Offsite_1	4.96	2.04	5.01	70.450	0	00:24:22
Offsite_2	4.96	1.12	20.11	57.580	0	01:12:31
Offsite_3	4.96	1.16	10.38	58.230	0	00:52:01
Onsite_1	4.96	2.29	14.25	73.430	0	00:44:05
Onsite_2	4.96	2.26	28.49	73.100	0	00:44:05
Onsite_3	4.96	2.28	25.11	73.330	0	00:31:15

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Node Depth Summary  
\*\*\*\*\*

Node ID	Average Depth Attained ft	Maximum Depth Attained ft	Maximum HGL Attained ft	Time of Max Occurrence days	hh:mm	Total Flooded Volume acre-in	Total Time Flooded minutes	Retention Time hh:mm:ss
Jun-01	0.17	0.62	1111.22	0	10:15	0	0	0:00:00
Jun-02	0.06	0.24	1109.18	0	10:15	0	0	0:00:00
Jun-03	0.65	1.53	1147.26	0	10:55	0	0	0:00:00
Jun-04	0.26	0.54	1144.40	0	10:55	0	0	0:00:00
Jun-05	0.28	0.61	970.61	0	10:56	0	0	0:00:00
Jun-08	0.28	0.89	1022.89	0	10:20	0	0	0:00:00
Jun-11	0.18	0.42	1062.42	0	10:39	0	0	0:00:00
Jun-12	0.43	1.07	963.07	0	10:35	0	0	0:00:00
Jun-13	0.15	0.54	922.54	0	10:25	0	0	0:00:00
Outfall_1	0.14	0.48	920.48	0	10:25	0	0	0:00:00
Outfall_2	0.38	0.88	960.88	0	10:35	0	0	0:00:00
Outfall_3	0.26	0.74	1020.74	0	10:20	0	0	0:00:00

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Node Flow Summary  
\*\*\*\*\*

Node ID	Element Type	Maximum Lateral Inflow cfs	Peak Inflow cfs	Time of Peak Inflow Occurrence days	hh:mm	Maximum Flooding Overflow cfs	Time of Peak Flooding Occurrence days	hh:mm
Jun-01	JUNCTION	4.96	4.96	0	10:15	0.00		
Jun-02	JUNCTION	0.00	4.96	0	10:15	0.00		
Jun-03	JUNCTION	20.09	20.09	0	10:55	0.00		
Jun-04	JUNCTION	0.00	20.09	0	10:55	0.00		
Jun-05	JUNCTION	0.00	20.07	0	10:55	0.00		
Jun-08	JUNCTION	24.74	31.86	0	10:19	0.00		
Jun-11	JUNCTION	10.32	10.32	0	10:39	0.00		
Jun-12	JUNCTION	28.39	43.68	0	10:34	0.00		
Jun-13	JUNCTION	14.25	14.25	0	10:25	0.00		
Outfall_1	OUTFALL	0.00	14.25	0	10:25	0.00		
Outfall_2	OUTFALL	0.00	43.66	0	10:35	0.00		
Outfall_3	OUTFALL	0.00	31.79	0	10:20	0.00		

\*\*\*\*\*  
Outfall Loading Summary  
\*\*\*\*\*

Outfall Node ID	Flow Frequency (%)	Average Flow cfs	Peak Inflow cfs
Outfall_1	86.77	2.62	14.25
Outfall_2	91.21	12.77	43.66
Outfall_3	88.17	6.75	31.79
System	88.71	22.13	86.67

\*\*\*\*\*  
 Link Flow Summary  
 \*\*\*\*\*

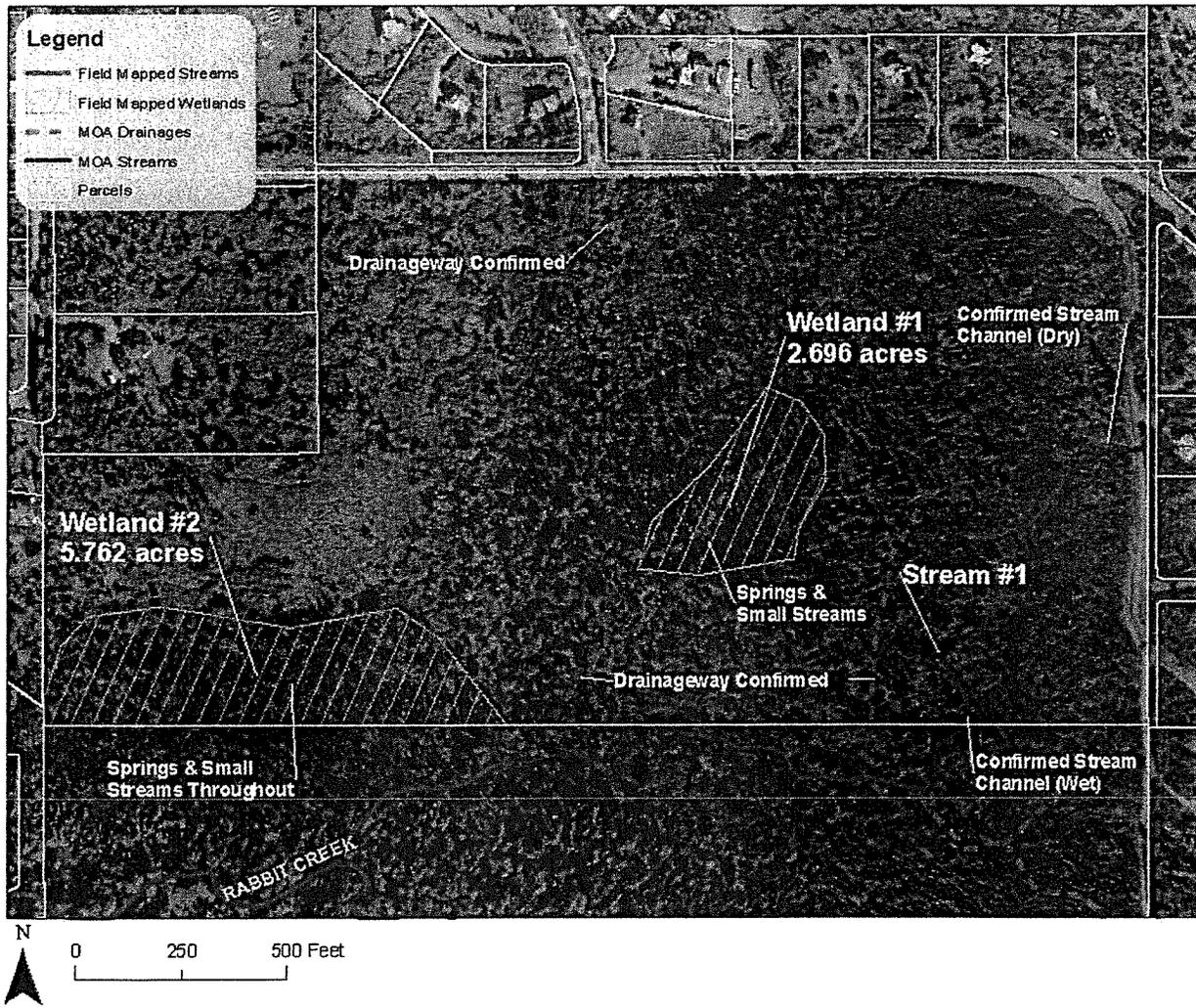
Link ID	Element Type	Time of Peak Flow Occurrence days hh:mm	Maximum Velocity Attained ft/sec	Length Factor	Peak Flow during Analysis cfs	Design Flow Capacity cfs	Ratio of Maximum /Design Flow	Ratio of Maximum Flow Depth	Total Time Surcharged minutes	Reported Condition
Link-01	CONDUIT	0 10:15	9.93	2.93	4.96	46.67	0.11	0.22	0	Calculated
Link-02	CONDUIT	0 10:55	12.29	2.81	20.09	48.02	0.42	0.52	0	Calculated
Link-10	CHANNEL	0 10:56	8.06	1.89	20.05	228.55	0.09	0.30	0	Calculated
Link-13	CHANNEL	0 10:20	8.45	5.68	31.79	228.55	0.14	0.41	0	Calculated
Link-17	CHANNEL	0 10:35	9.06	5.68	43.66	228.55	0.19	0.49	0	Calculated
Link-18	CHANNEL	0 10:15	2.31	1.00	4.92	63.50	0.08	0.61	0	Calculated
Link-19	CHANNEL	0 10:55	8.42	1.00	20.07	63.75	0.31	0.57	0	Calculated
Link-20	CHANNEL	0 10:25	6.95	5.68	14.25	228.55	0.06	0.26	0	Calculated
Link-23	CHANNEL	0 10:39	4.30	1.00	10.32	204.42	0.05	0.32	0	Calculated

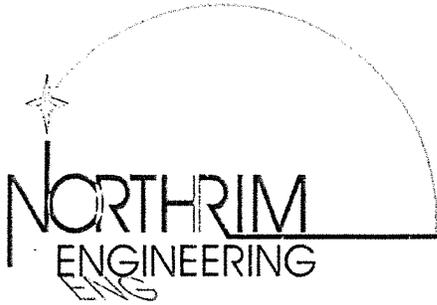
\*\*\*\*\*  
 Highest Flow Instability Indexes  
 \*\*\*\*\*  
 All links are stable.

WARNING 002 : Max/rim elevation (depth) increased to account for connecting conduit height dimensions for Node Jun-12.

Analysis began on: Wed Oct 25 08:59:07 2017  
 Analysis ended on: Wed Oct 25 08:59:09 2017  
 Total elapsed time: 00:00:02

f. Wetland Mapping





GEOTECHNICAL SOILS REPORT

FOR

LEWIS & CLARK SUBDIVISION

FOR S4 GROUP

ANCHORAGE, ALASKA

Submitted by:

NorthRim Engineering  
P.O. Box 770724  
Eagle River, AK 99577-0724  
(907) 694-7028

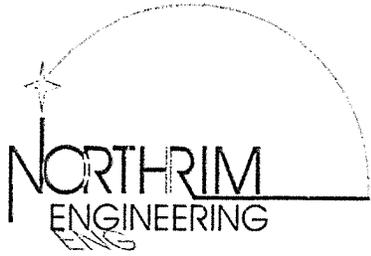
Steve Eng, PE, PH  
SteveEng.com

February, 2017

CIVIL

ENVIRONMENTAL

HYDROLOGY



Lewis & Clark Subdivision, February 2017

## SOILS SUMMARY

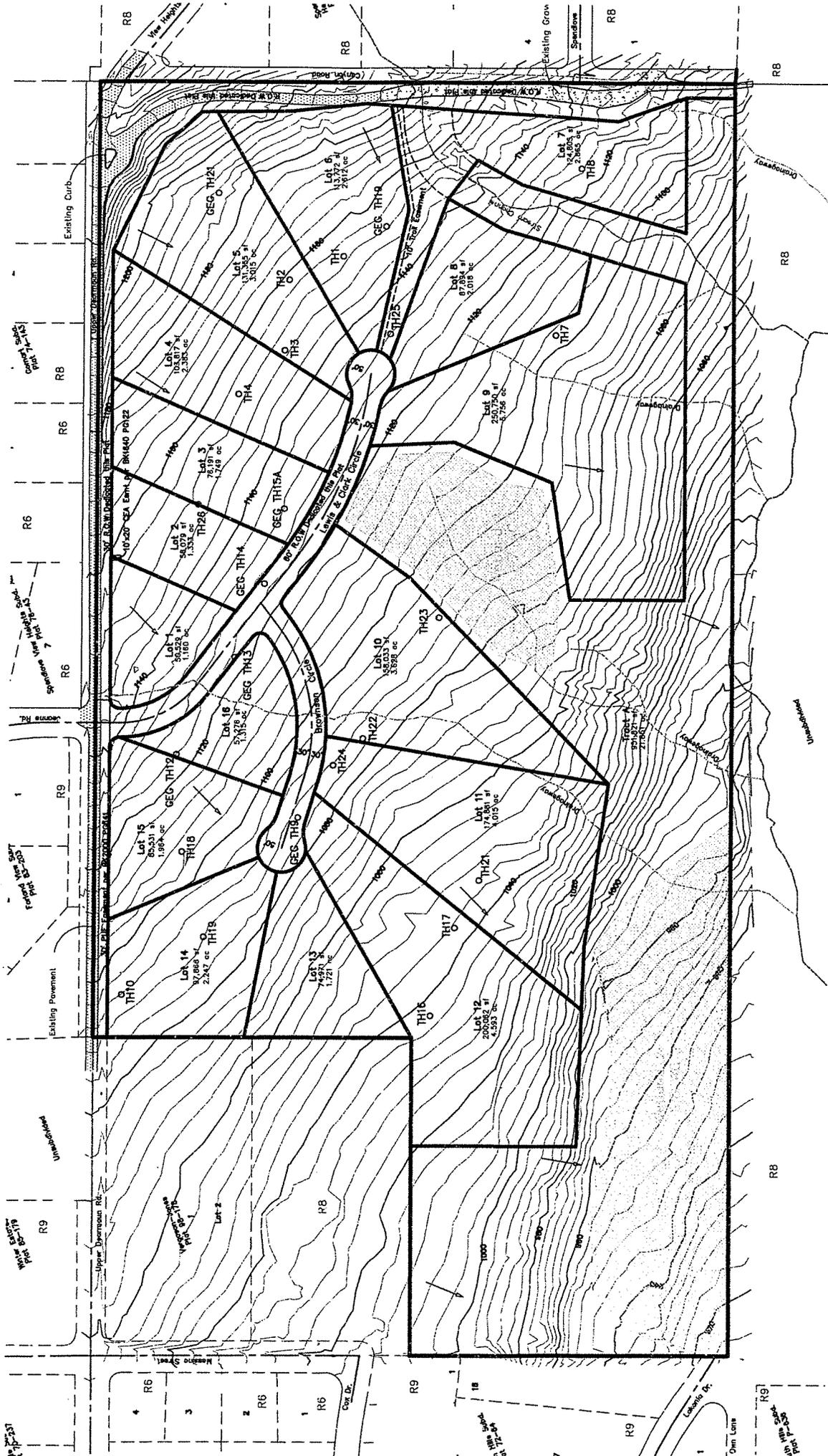
Lewis & Clark Subdivision is planned for the Upper De Armoun area. The proposed subdivision is surrounded by developed subdivisions. These surrounding subdivisions utilize on-site water wells and septic systems. Lewis and Clark Subdivision will also utilize on-site systems.

A large number of test holes have been completed the past several years within the proposed subdivision. Test holes were completed in the fall of 2016. Recent test hole logs are included in this soils report, as well as previous test holes. A location map for these test holes is included at the end of the report.

The soils in Lewis & Clark Subdivision have generally been found to be consistent with the soils in the surrounding subdivisions. The soils were placed as glacial till, and are predominately sand, silty sand, silts, and gravel. Bedrock was not encountered in the test holes. Groundwater is not an issue; all the test holes have adequate separation to groundwater. Most test holes exhibited no groundwater.

Drainages have been mapped for the subdivision. Drainages consist of small rills and seeps, associated with riparian vegetation. Several test holes required relocation after interference from these surface seeps.

The soils logs in this report have been found to be consistent with MOA requirements for on-site systems. We are prepared to complete additional drawings demonstrating that each lot has the prescribed area for on-site systems.





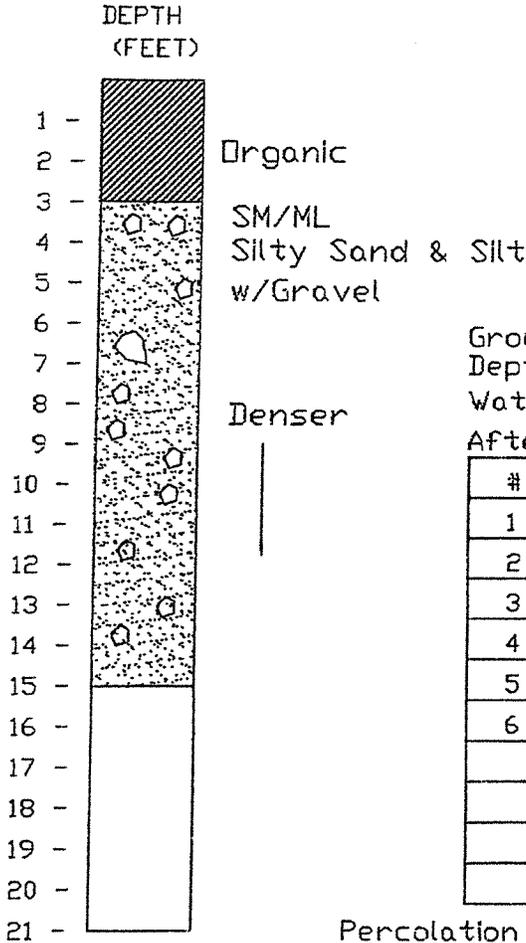
SOILS LOG - PERCOLATION TEST

Date Performed: 9/14/16

Performed For: Todd Brownson

Legal Description: Lewis & Clark S/D, Lot 6

T.H. Location: See Location Map



Groundwater? No  
Depth ---

Water Depth  
After Monitoring: None Date: 10/14/16

#	Date	Gross Time	Net Time	Depth	Net Drop
1	9/14	0	---	2'	---
2	9/14	30	30 min.	4.5'	2.5'
3	9/14	32	---	2'	---
4	9/14	62	30 min.	4.5'	2.5'
5	9/14	65	---	2'	---
6	9/14	95	30 min.	4.5'	2.5'

Percolation Rate 12 min./Inch Perc Hole Diameter 6"  
Test Run Between 4' and 5'

Comments: Presoaked.

Performed By NorthRim Eng. I SE CERTIFY THAT THIS TEST WAS Performed in Accordance with All State/Municipal Guidelines in Effect ON THIS DATE. DATE: 10/22/16

**NORTHRIM ENGINEERING**  
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Eagle River, Alaska 99577  
907.694.7028



TESTHOLE LOG  
GEOTECHNICAL

LEWIS & CLARK S/D  
LOT 9 - NORTH

TH1

Date: 10/22/16 SHEET: 1 of 26

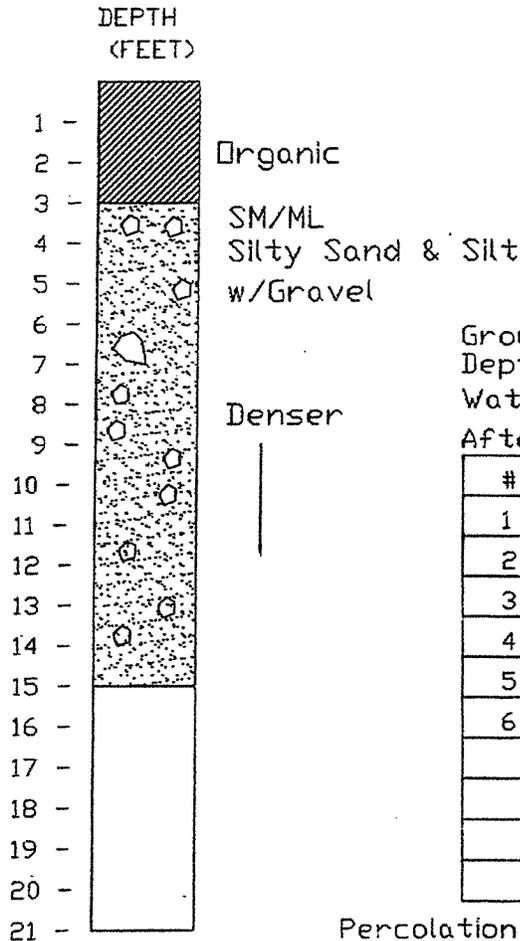


SOILS LOG - PERCOLATION TEST

Date Performed: 9/14/16

Performed For: Todd Brownson

Legal Description: Lewis & Clark S/D, Lot 5



T.H. Location: See Location Map

Groundwater? No  
 Depth --  
 Water Depth

After Monitoring: None Date: 10/14/16

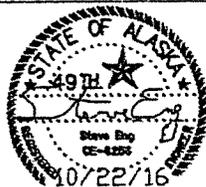
#	Date	Gross Time	Net Time	Depth	Net Drop
1	9/14	0	--	2'	--
2	9/14	30	30 min.	5'	3'
3	9/14	32	--	2'	--
4	9/14	62	30 min.	5'	3'
5	9/14	65	--	2'	--
6	9/14	95	30 min.	5'	3'

Percolation Rate 10 min./Inch Perc Hole Diameter 6'  
 Test Run Between 4' and 5'

Comments: Presoaked

Performed By NorthRim Eng. I SEE CERTIFY THAT THIS TEST WAS  
 Performed in Accordance with All State/Municipal Guidelines in Effect  
 ON THIS DATE. DATE: 10/22/16

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TESTHOLE LOG  
 GEOTECHNICAL

TH2

LEWIS & CLARK S/D  
 LOT 9 - NORTH

Date: 10/22/16 SHEET: 2 of 26



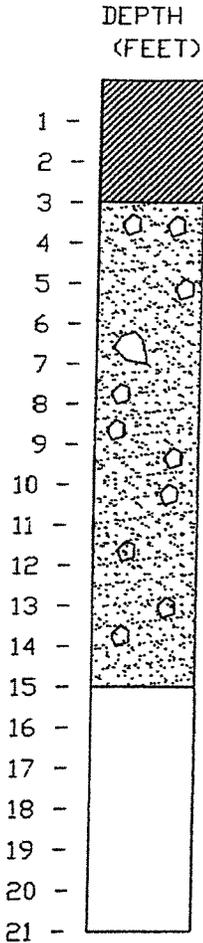
SOILS LOG - PERCOLATION TEST

Date Performed: 9/14/16

Performed For: Todd Brownson

Legal Description: Lewis & Clark S/D, Lot 5

T.H. Location: See Location Map



Organic  
SM/ML  
Silty Sand & Silt  
w/Gravel

Denser

Groundwater? No  
Depth --

Water Depth  
After Monitoring: None Date: 10/14/16

#	Date	Gross Time	Net Time	Depth	Net Drop
1	10/14	0	--	3'	--
2	10/14	30	30 min.	4.5'	1.5'
3	10/14	32	--	3'	--
4	10/14	62	30 min.	4.5'	1.5'
5	10/14	65	--	3'	--
6	10/14	95	30 min.	4.5'	1.5'

Percolation Rate 20 min./Inch Perc Hole Diameter 6"  
Test Run Between 4' and 5'

Comments: Presoaked

Performed By NorthRim Eng. I SE CERTIFY THAT THIS TEST WAS  
Performed in Accordance with All State/Municipal Guidelines in Effect  
ON THIS DATE. DATE: 10/22/16

<b>NORTH RIM ENGINEERING</b> PO Box 770724 Eagle River, Alaska 99577 907.694.7028		TESTHOLE LOG GEOTECHNICAL	TH3  Date: 10/22/16 SHEET: 3 of 26
		LEWIS & CLARK S/D LOT 10 - NORTH	

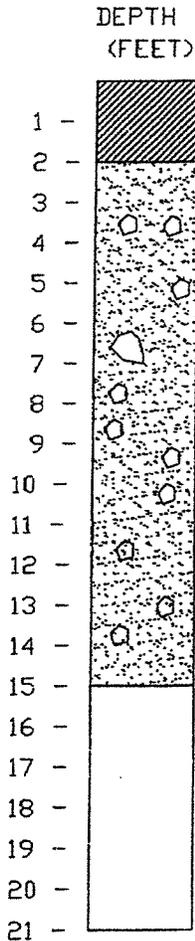


SOILS LOG - PERCOLATION TEST

Date Performed: 9/14/16

Performed For: Todd Brownson

Legal Description: Lewis & Clark S/D, Lot 4



Organic  
SM/ML  
Silty Sand & Silt  
w/Gravel

Denser

T.H. Location: See Location Map

Groundwater? No  
Depth --

Water Depth  
After Monitoring, None Date: 10/14/16

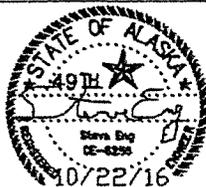
#	Date	Gross Time	Net Time	Depth	Net Drop
1	9/14	0	--	2.5'	--
2	9/14	30	30 min.	4.5'	2'
3	9/14	32	--	2.5'	--
4	9/14	62	30 min.	4.5'	2'
5	9/14	65	--	2.5'	--
6	9/14	95	30 min.	4.5'	2'

Percolation Rate 15 min./Inch Perc Hole Diameter 6'  
Test Run Between 4' and 5'

Comments: Presoaked

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Performed in Accordance with All State/Municipal Guidelines in Effect  
ON THIS DATE. DATE: 10/22/16

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907.694.7028



TESTHOLE LOG  
GEO TECHNICAL

TH4

LEWIS & CLARK S/D  
LOT 11 - NORTH

Date: 10/22/16 SHEET: 4 of 26



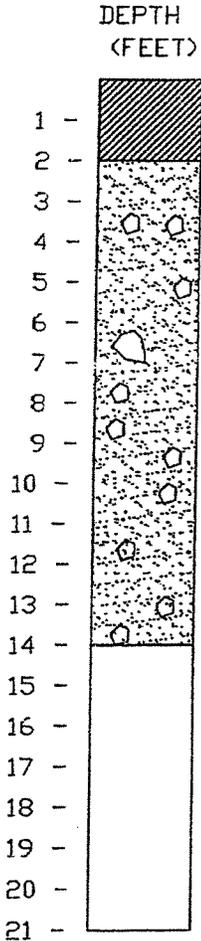
SOILS LOG - PERCOLATION TEST

Date Performed: 9/16/16

Performed For: Todd Brownson

Legal Description: Lewis & Clark S/D, Lot 9

T.H. Location: See Location Map



Organic  
SM/ML  
Silty Sand & Silt  
w/Gravel

Denser

Groundwater? No  
Depth --

Water Depth  
After Monitoring, None Date: 10/14/16

#	Date	Gross Time	Net Time	Depth	Net Drop
1	9/16	0	--	2.5'	--
2	9/16	30	30 min.	8.5'	6"
3	9/16	32	--	2.5'	--
4	9/16	62	30 min.	8.5'	6"
5	9/16	65	--	2.5'	--
6	9/16	95	30 min.	8.5'	6"

Percolation Rate 5 min./inch Perc Hole Diameter 6"  
Test Run Between 4' and 5'

Comments: Presoaked.

Performed By NorthRim Eng. I SE CERTIFY THAT THIS TEST WAS  
Performed in Accordance with All State/Municipal Guidelines in Effect  
ON THIS DATE. DATE: 10/22/16

<b>NORTH RIM ENGINEERING</b> PO Box 770724 Eagle River, Alaska 99577 907.694.7028	 10/22/16	TESTHOLE LOG GEOTECHNICAL	TH7  Date: 10/22/16 SHEET: 7 of 26
		LEWIS & CLARK S/D LOT 6 - NORTH	



SOILS LOG - PERCOLATION TEST

Date Performed: 9/16/16

Performed For: Todd Brownson

Legal Description: Lewis & Clark S/D, Lot 7

T.H. Location: See Location Map

DEPTH  
(FEET)  
1 -  
2 -  
3 -  
4 -  
5 -  
6 -  
7 -  
8 -  
9 -  
10 -  
11 -  
12 -  
13 -  
14 -  
15 -  
16 -  
17 -  
18 -  
19 -  
20 -  
21 -



Organic

SM/ML  
Silty Sand & Silt  
w/Gravel

Denser

Groundwater? No  
Depth ---

Water Depth

After Monitoring, None Date: 10/14/16

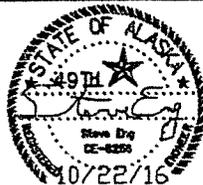
#	Date	Gross Time	Net Time	Depth	Net Drop
1	9/16	0	--	2.5'	--
2	9/16	30	30 min.	6.5'	4'
3	9/16	32	--	2.5'	--
4	9/16	62	30 min.	6.5'	4'
5	9/16	65	--	2.5'	--
6	9/16	95	30 min.	6.5'	4'

Percolation Rate 7.5 min./inch Perc Hole Diameter 6"  
Test Run Between 4' and 5'

Comments: Presoaked.

Performed By NorthRim Eng. I SE CERTIFY THAT THIS TEST WAS  
Performed in Accordance with All State/Municipal Guidelines in Effect  
ON THIS DATE. DATE: 10/22/16

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Eagle River, Alaska 99577  
907.694.7028



TESTHOLE LOG  
GEOTECHNICAL

LEWIS & CLARK S/D  
LOT 7 - NORTH

TH8

Date: 10/22/16 SHEET: 8 of 26



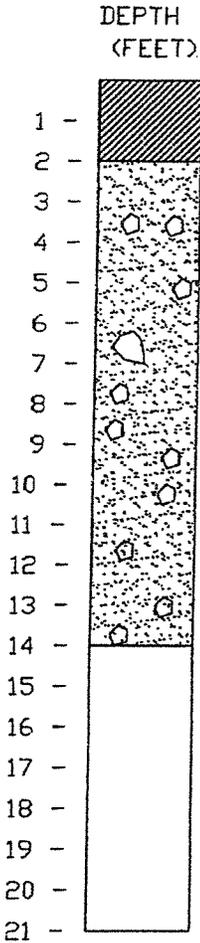
SOILS LOG - PERCOLATION TEST

Date Performed: 9/16/16

Performed For: Todd Brownson

Legal Description: Lewis & Clark S/D, Lot 15

T.H. Location: See Location Map



1 - Organic  
 2 - SM/ML  
 3 - Silty Sand & Silt  
 4 - w/Gravel  
 5 -  
 6 -  
 7 -  
 8 -  
 9 -  
 10 -  
 11 -  
 12 -  
 13 -  
 14 -  
 15 -  
 16 -  
 17 -  
 18 -  
 19 -  
 20 -  
 21 -

Denser

Groundwater? No  
 Depth ---

Water Depth  
 After Monitoring, None Date: 10/14/16

#	Date	Gross Time	Net Time	Depth	Net Drop
1	9/16	0	--	3'	--
2	9/16	30	30 min.	6.5'	3.5'
3	9/16	32	--	3'	--
4	9/16	62	30 min.	6.5'	3.5'
5	9/16	65	--	3'	--
6	9/16	95	30 min.	6.5'	3.5'

Percolation Rate 8.6 min./inch Perc Hole Diameter 6'  
 Test Run Between 3' and 4'

Comments: Presoaked

Performed By NorthRim Eng. I SEE CERTIFY THAT THIS TEST WAS  
 Performed in Accordance with All State/Municipal Guidelines in Effect  
 ON THIS DATE. DATE: 10/22/16

<b>NORTH RIM ENGINEERING</b> PO Box 770724 Eagle River, Alaska 99577 907.694.7028	 State Eng DE-6225 10/22/16	TESTHOLE LOG GEOTECHNICAL	TH9 Date: 10/22/16 SHEET: 9 of 26
		LEWIS & CLARK S/D LOT 14	

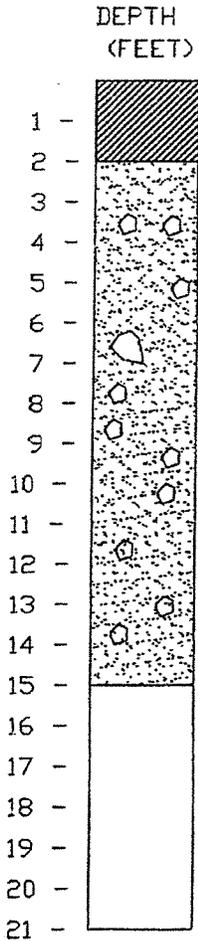


SOILS LOG - PERCOLATION TEST

Date Performed: 9/16/16

Performed For: Todd Brownson

Legal Description: Lewis & Clark S/D, Lot 15



T.H. Location: See Location Map

Groundwater? No

Depth --

Water Depth

After Monitoring None Date: 10/14/16

#	Date	Gross Time	Net Time	Depth	Net Drop
1	9/16	0	--	2'	--
2	9/16	30	30 min.	4.5'	2.5'
3	9/16	32	--	2'	--
4	9/16	62	30 min.	4.5'	2.5'
5	9/16	65	--	2'	--
6	9/16	95	30 min.	4.5'	2.5'

Percolation Rate 12 min./inch Perc Hole Diameter 6"  
Test Run Between 4' and 5'

Comments: Presoaked

Performed By NorthRim Eng. I SE CERTIFY THAT THIS TEST WAS Performed in Accordance with All State/Municipal Guidelines in Effect ON THIS DATE. DATE: 10/22/16

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Eagle River, Alaska 99577  
907.694.7028



TESTHOLE LOG  
GEOTECHNICAL

LEWIS & CLARK S/D  
LOT 15

TH10

Date: 10/22/16 SHEET: 10 of 25

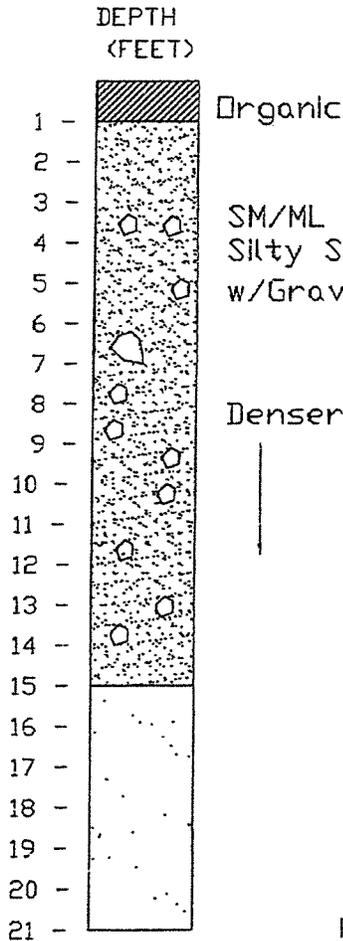


SOILS LOG - PERCOLATION TEST

Date Performed: 9/19/16

Performed For: Todd Brownson

Legal Description: Lewis & Clark S/D, Lot 13



T.H. Location: See Location Map

Groundwater? No  
 Depth --  
 Water Depth  
 After Monitoring, Dry Date: 10/14/16

#	Date	Gross Time	Net Time	Depth	Net Drop
1	9/19	0	--	2'	--
2	9/19	30	30 min.	8'	6'
3	9/19	32	--	2'	--
4	9/19	62	30 min.	8'	6'
5	9/19	65	--	2'	--
6	9/19	95	30 min.	8'	6'

Percolation Rate 5 min./inch Perc Hole Diameter 6'  
 Test Run Between 4' and 5'

Comments: Presoaked.

Performed By NorthRim Eng. I SE CERTIFY THAT THIS TEST WAS  
 Performed in Accordance with All State/Municipal Guidelines in Effect  
 ON THIS DATE. DATE: 10/22/16

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 Eagle River, Alaska 99577  
 907.694.7028



TESTHOLE LOG  
 GEOTECHNICAL  
 LEWIS & CLARK S/D  
 LOT 6 - SOUTH

TH16

Date: 10/22/16 SHEET: 16 of 26



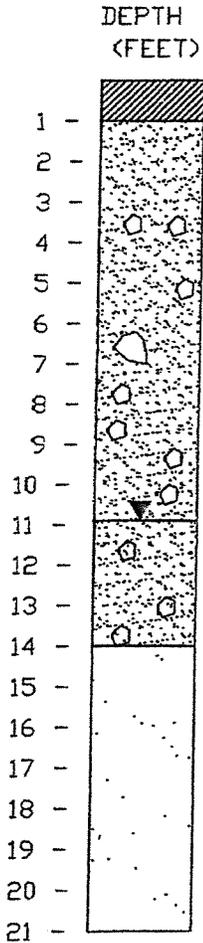
SOILS LOG - PERCOLATION TEST

Date Performed: 9/19/16

Performed For: Todd Brownson

Legal Description: Lewis & Clark S/D, Lot 13

T.H. Location: See Location Map



Organic

SM/ML  
Silty Sand & Silt  
w/Gravel

Denser

Groundwater? No  
Depth ---  
Water Depth  
After Monitoring, 11' Date: 10/14/16

#	Date	Gross Time	Net Time	Depth	Net Drop
1	9/19	0	--	2'	--
2	9/19	30	30 min.	5'	3'
3	9/19	32	--	2'	--
4	9/19	62	30 min.	5'	3'
5	9/19	65	--	2'	--
6	9/19	95	30 min.	5'	3'

Percolation Rate 10 min./inch Perc Hole Diameter 6"  
Test Run Between 4' and 5'

Comments: Presoaked.

Performed By NorthRim Eng. I [Signature] CERTIFY THAT THIS TEST WAS  
Performed in Accordance with All State/Municipal Guidelines in Effect  
ON THIS DATE. DATE: 10/22/16

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Eagle River, Alaska 99577  
907.694.7028



TESTHOLE LOG  
GEO TECHNICAL

LEWIS & CLARK S/D  
LOT 7 - SOUTH

TH17

Date: 10/22/16 SHEET: 17 of 28



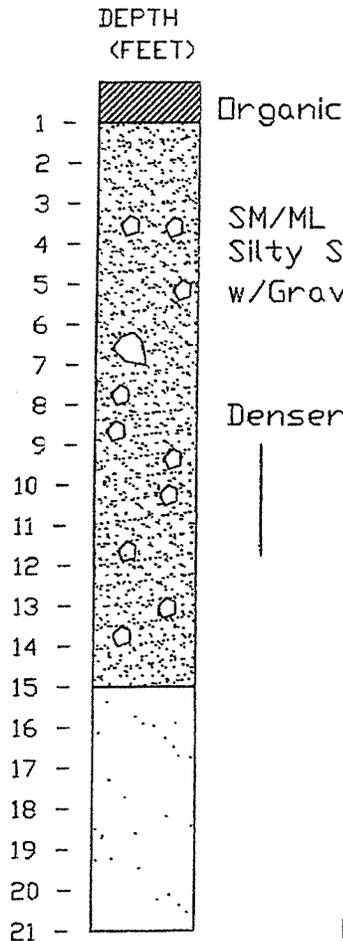
SOILS LOG - PERCOLATION TEST

Date Performed: 10/14/16

Performed For: Todd Brownson

Legal Description: Lewis & Clark S/D, Lot 12

T.H. Location: See Location Map



Groundwater? No  
 Depth ---  
 Water Depth  
 After Monitoring, Dry Date: 10/24/16

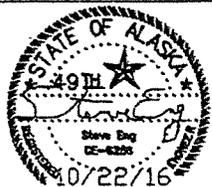
#	Date	Gross Time	Net Time	Depth	Net Drop
1	10/19	0	--	2"	--
2	10/19	30	30 min.	4"	2"
3	10/19	32	--	2"	--
4	10/19	62	30 min.	4"	2"
5	10/19	65	--	2"	--
6	10/19	95	30 min.	4"	2"

Percolation Rate 15 min./inch Perc Hole Diameter 6"  
 Test Run Between 3' and 4'

Comments: Presoaked

Performed By NorthRim Eng. I SE CERTIFY THAT THIS TEST WAS  
 Performed in Accordance with All State/Municipal Guidelines in Effect  
 ON THIS DATE. DATE: 10/22/16

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 Eagle River, Alaska 99577  
 907.694.7028



TESTHOLE LOG  
 GEOTECHNICAL

LEWIS & CLARK S/D  
 LOT 8 - SOUTH

TH21

Date: 10/22/10 SHEET: 21 of 26



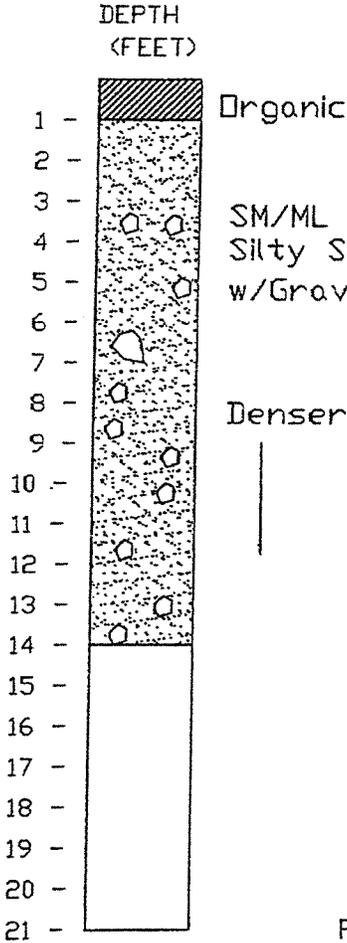
SOILS LOG - PERCOLATION TEST

Date Performed: 10/14/16

Performed For: Todd Brownson

Legal Description: Lewis & Clark S/D, Lot 11

T.H. Location: See Location Map



Groundwater? No  
 Depth ---  
 Water Depth  
 After Monitoring, Dry Date: 10/24/16

#	Date	Gross Time	Net Time	Depth	Net Drop
1	10/19	0	--	2'	--
2	10/19	30	30 min.	5'	3'
3	10/19	32	--	2'	--
4	10/19	62	30 min.	5'	3'
5	10/19	65	--	2'	--
6	10/19	95	30 min.	5'	3'

Percolation Rate 10 min./inch Perc Hole Diameter 6'  
 Test Run Between 3' and 4'

Comments: Presoaked

Performed By NorthRim Eng. I [Signature] CERTIFY THAT THIS TEST WAS  
 Performed in Accordance with All State/Municipal Guidelines in Effect  
 ON THIS DATE. DATE: 10/22/16

<b>NORTHRIM ENGINEERING</b> PO Box 770724 Eagle River, Alaska 99577 907.694.7028		TESTHOLE LOG	TH22
		GEOTECHNICAL LEWIS & CLARK S/D LOT 10 - SOUTH	
		Date: 10/22/16	SHEET: 22 of 26



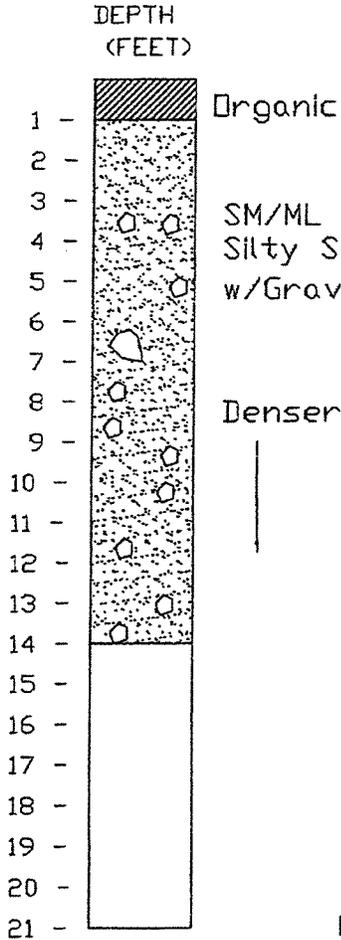
SOILS LOG - PERCOLATION TEST

Date Performed: 10/14/16

Performed For: Todd Brownson

Legal Description: Lewis & Clark S/D, Lot 10

T.H. Location: See Location Map



Groundwater? No  
 Depth ---  
 Water Depth  
 After Monitoring, Dry Date: 10/24/16

#	Date	Gross Time	Net Time	Depth	Net Drop
1	10/19	0	--	2'	--
2	10/19	30	30 min.	4.5'	2.5'
3	10/19	32	--	2'	--
4	10/19	62	30 min.	4.5'	2.5'
5	10/19	65	--	2'	--
6	10/19	95	30 min.	4.5'	2.5'

Percolation Rate 12 min./inch Perc Hole Diameter 6"  
 Test Run Between 3' and 4'

Comments: Presoaked.

Performed By NorthRim Eng. I [Signature] CERTIFY THAT THIS TEST WAS  
 Performed in Accordance with All State/Municipal Guidelines in Effect  
 ON THIS DATE. DATE: 10/22/16

<b>NORTH RIM ENGINEERING</b> PO Box 770724 Eagle River, Alaska 99577 907.694.7028		TESTHOLE LOG	TH23
		GEDTECHNICAL	
		LEWIS & CLARK S/D	Date: 10/22/16
		LOT 9 - SOUTH	SHEET: 23 of 26



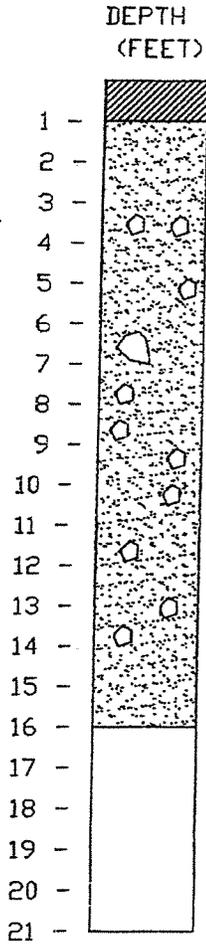
SOILS LOG - PERCOLATION TEST

Date Performed: 10/19/16

Performed For: Todd Brownson

Legal Description: Lewis & Clark S/D, Lot 12

T.H. Location: See Location Map



Organic  
SM/ML  
Silty Sand & Silt  
w/Gravel  
Denser

Groundwater? No  
Depth --  
Water Depth  
After Monitoring, Dry Date: 10/24/16

#	Date	Gross Time	Net Time	Depth	Net Drop
1	10/19	0	--	2'	--
2	10/19	30	30 min.	8'	6'
3	10/19	32	--	2'	--
4	10/19	62	30 min.	8'	6'
5	10/19	65	--	2'	--
6	10/19	95	30 min.	8'	6'

Percolation Rate 5 min./inch Perc Hole Diameter 6'  
Test Run Between 4' and 5'

Comments: Presoaked

Performed By NorthRim Eng. I [Signature] CERTIFY THAT THIS TEST WAS Performed in Accordance with All State/Municipal Guidelines in Effect ON THIS DATE. DATE: 10/22/16

**NORTHRIM ENGINEERING**  
PO Box 770724  
Eagle River, Alaska 99577  
907.694.7028



TESTHOLE LOG  
GEOTECHNICAL  
LEWIS & CLARK S/D  
LOT 11 - SOUTH

TH24  
Date: 10/22/16 SHEET: 24 of 26

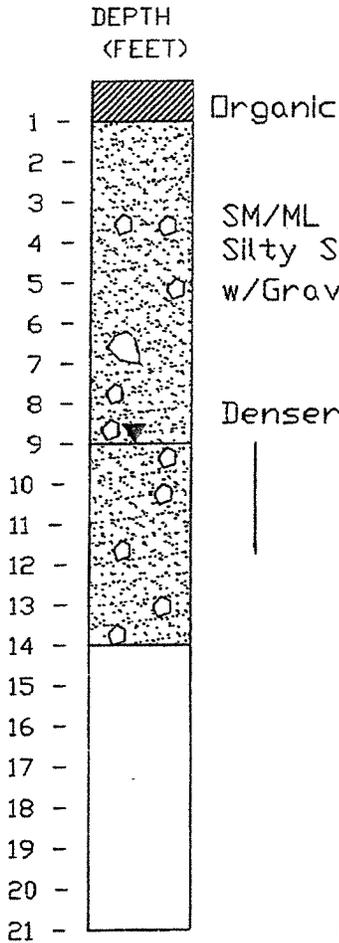


SOILS LOG - PERCOLATION TEST

Date Performed: 10/19/16

Performed For: Todd Brownson

Legal Description: Lewis & Clark S/D, Lot 7



T.H. Location: See Location Map

Groundwater? Yes  
Depth 9'

Water Depth  
After Monitoring, 9' Date: 10/24/16

#	Date	Gross Time	Net Time	Depth	Net Drop
1	10/19	0	--	2"	--
2	10/19	30	30 min.	4"	2"
3	10/19	32	--	2"	--
4	10/19	62	30 min.	4"	2"
5	10/19	65	--	2"	--
6	10/19	95	30 min.	4"	2"

Percolation Rate 15 min./inch Perc Hole Diameter 6'  
Test Run Between 3' and 4'

Comments: Presoaked.

Performed By NorthRim Eng. I [Signature] CERTIFY THAT THIS TEST WAS  
Performed in Accordance with All State/Municipal Guidelines in Effect  
ON THIS DATE. DATE: 10/22/16

<b>NORTHRIM ENGINEERING</b> PO Box 770724 Eagle River, Alaska 99577 907.694.7028		TESTHOLE LOG GEOTECHNICAL	TH25
		LEWIS & CLARK S/D LOT 5 - NORTH	Date: 10/22/10 SHEET: 25 of 26



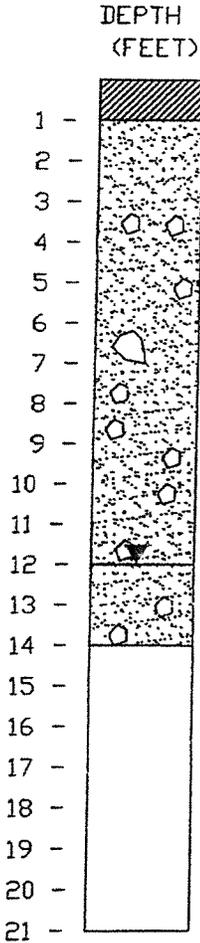
SOILS LOG - PERCOLATION TEST

Date Performed: 10/19/16

Performed For: Todd Brownson

Legal Description: Lewis & Clark S/D, Lot 2

T.H. Location: See Location Map



Organic

SM/ML  
Silty Sand & Silt  
w/Gravel

Denser

Groundwater? Yes  
Depth 9'

Water Depth  
After Monitoring, 9' Date: 10/24/16

#	Date	Gross Time	Net Time	Depth	Net Drop
1	10/19	0	--	2'	--
2	10/19	30	30 min.	4'	2'
3	10/19	32	--	2'	--
4	10/19	62	30 min.	4'	2'
5	10/19	65	--	2'	--
6	10/19	95	30 min.	4'	2'

Percolation Rate 15 min./inch Perc Hole Diameter 6"  
Test Run Between 3' and 4'

Comments: Presoaked

Performed By NorthRim Eng. I SEE CERTIFY THAT THIS TEST WAS  
Performed in Accordance with All State/Municipal Guidelines in Effect  
ON THIS DATE. DATE: 10/22/16

**NORTHRIM  
ENGINEERING**  
PO Box 770724  
Eagle River, Alaska 99577  
907.694.7028



TESTHOLE LOG  
GEOTECHNICAL

LEWIS & CLARK S/D  
LOT 12 - NORTHEAST

TH26

Date: 10/22/10 SHEET: 26 of 26



# GARNESS ENGINEERING GROUP, Ltd

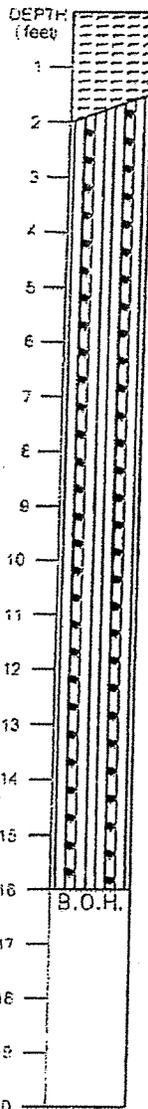
CIVIL & ENVIRONMENTAL ENGINEERS

11150 ROAD STATE 127 ANCHORAGE, AK 99507 \* PHONE (907) 357-4574 \* FAX (907) 336-0245 \* WEB SITE: www.garnesseng.com

## SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED LOT #7) Lot-12

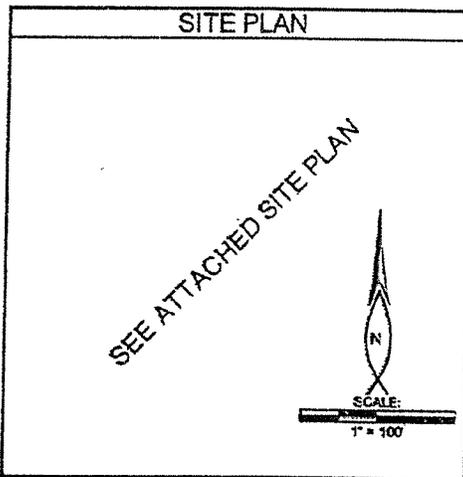
PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / SA GROUP DATE: 1/7/2015



### TEST HOLE #9

#### SOIL CLASSIFICATIONS

	GW		ORG
	GP		ML
	GM		CL
	GC		OL
	SW		MH
	SP		CH
	SM		OH
	SC		



DEPTH TO GROUNDWATER	DATE
DRY	1/7/2015
DRY	1/16/2015
DRY	4/17/2015

DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
1/8/2015	1	1:47	-	6"	-
	2	2:17	30	4-1/4"	1-3/4"
	3	2:17	-	6"	-
	4	2:47	30	4-1/2"	1-1/2"
	5	2:47	-	6"	-
	6	3:17	30	4-1/2"	1-1/2"

PERCOLATION RATE 20 (MIN./INCH) PERC. HOLE DIA. 6 (INCHES)

TEST RUN BETWEEN 4.5 FT. AND 5.5 FT.

A FOUR HOUR PRESOAK WAS PERFORMED:  YES  NO

LOGGED BY: JODY MAUS PERCOLATION TEST PERFORMED BY: DAVID GARNESS

COMMENTS: PERCOLATION READINGS ARE WITHIN 1/16 OF INCH.

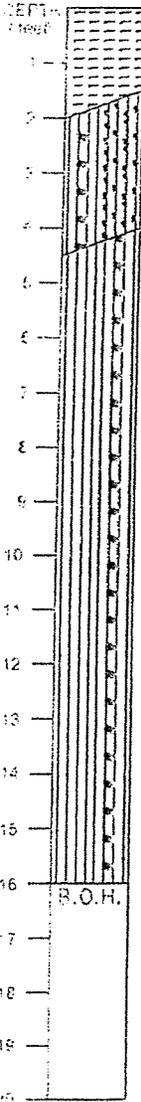
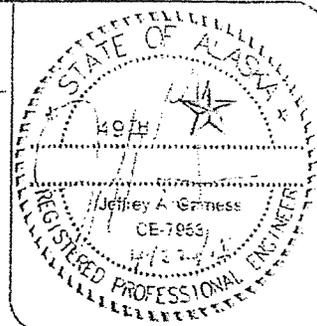
PERFORMED BY GEG, Ltd. I, JEFFREY A. GARNESS, CERTIFY THAT THIS WAS PERFORMED IN ACCORDANCE WITH ALL STATE AND MUNICIPAL GUIDELINES IN EFFECT ON THIS DATE: 4/22/15

# GARNESS ENGINEERING GROUP, Ltd

CIVIL & ENVIRONMENTAL ENGINEERS

## SOIL LOG - PERCOLATION TEST

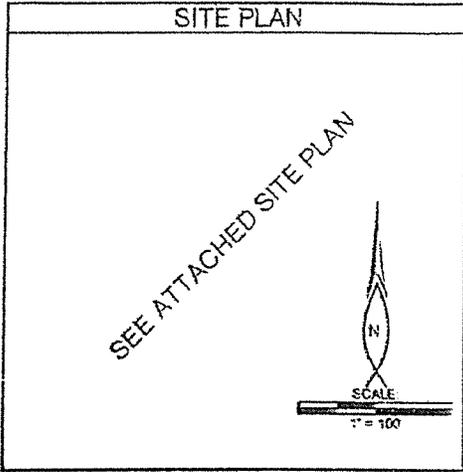
PERC. DESCRIPTION: LEWIS AND CLARK STD. (PROPOSED) - LOT-15/16  
 PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 1/2/2015



TEST HOLE #12  
 PAGE 1 OF 2

SOIL CLASSIFICATIONS

	GW		ORG
	GP		ML
	GM		CL
	GC		OL
	SW		MH
	SP		CH
	SH		OH
	SC		



DEPTH TO GROUNDWATER	DATE
DRY	1/2/2015
DRY	1/15/2015
DRY	4/17/2015

	DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
LOWER BENCH	1/2/2015	1/4" DROP IN 3 HOURS - DID NOT PERK (RC)				
	1/5/2015	DEEPEMED BENCH - RESET PERK - 1/8" DROP AFTER PRE-SOAK (DG)				

PERCOLATION RATE >120 (MIN./INCH) PERC. HOLE DIA. 6 (INCHES)  
 TEST RUN BETWEEN 4.5/6.5 FT. AND 5.5/7.5 FT.

A FOUR HOUR PRESOAK WAS PERFORMED:  YES  NO  
 LOGGED BY: JODY MAUS PERCOLATION TEST PERFORMED BY: ROB CAMPBELL/DAVID GARNESS

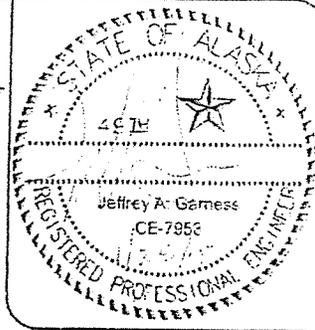
REMARKS: PERCOLATION READINGS ARE WITHIN 1/16 OF INCH.  
 PERFORMED BY GEG, Ltd. I, JEFFREY A. GARNESS, CERTIFY THAT THIS WAS PERFORMED IN ACCORDANCE WITH ALL STATE AND MUNICIPAL GUIDELINES IN EFFECT ON THIS DATE: 4/22/15

# GARNESS ENGINEERING GROUP, Ltd

CIVIL & ENVIRONMENTAL ENGINEERS

## SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT ~~17~~ 15/16)  
 PERFORMED FOR: BIG COUNTRY LLC / S4 GROUP DATE: SEE PAGE 1 OF 2



DEPTH (feet)  
 1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20

SEE PAGE 1 OF 2 FOR SOILS CLASSIFICATION

### TEST HOLE #12

PAGE 2 OF 2

#### SOIL CLASSIFICATIONS

	GW		ORG
	GP		ML
	GM		CL
	GC		OL
	SW		MH
	SP		CH
	SM		OH
	SC		

#### SITE PLAN

SEE ATTACHED SITE PLAN

SCALE  
1" = 100'

DEPTH TO GROUNDWATER	DATE
SEE PAGE 1 OF 2	

	DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
UPPER BENCH	1/14/2015	1	3:00	-	6"	-
		2	3:08	8	0"	6"
		3	3:08	-	6"	-
		4	3:17	9	0"	6"
		5	3:17	-	6"	-
		6	3:36	19	0"	6"
		7	3:36	-	6"	-
		8	3:55	20	0"	6"
		9	3:55	-	6"	-
		10	4:16	20	0"	6"

PERCOLATION RATE 3.3 (MIN./INCH) PERC. HOLE DIA. 6 (INCHES)

TEST RUN BETWEEN 2 FT. AND 3 FT.

A FOUR HOUR PRESOAK WAS PERFORMED:  YES  NO

SOILS LOGGED BY: SEE PAGE 1 OF 2 PERCOLATION TEST PERFORMED BY: ANDREW GRAY

COMMENTS: PERCOLATION READINGS ARE WITHIN 1/16 OF INCH.

PERFORMED BY GEG, Ltd. I, JEFFREY A. GARNESS, CERTIFY THAT THIS WAS PERFORMED IN ACCORDANCE WITH ALL STATE AND MUNICIPAL GUIDELINES IN EFFECT ON THIS DATE: 1/24/15

# GARNESS ENGINEERING GROUP, Ltd

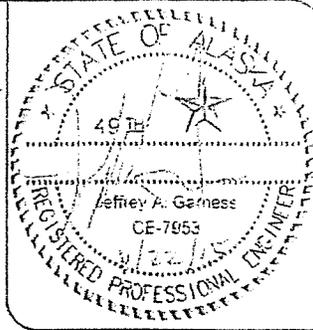
CIVIL & ENVIRONMENTAL ENGINEERS

1000 UNIVERSITY AVENUE, SUITE 1000, ANCHORAGE, ALASKA 99501 PHONE: (907) 562-4141 FAX: (907) 562-4142 WEBSITE: WWW.GARNESSGROUP.COM

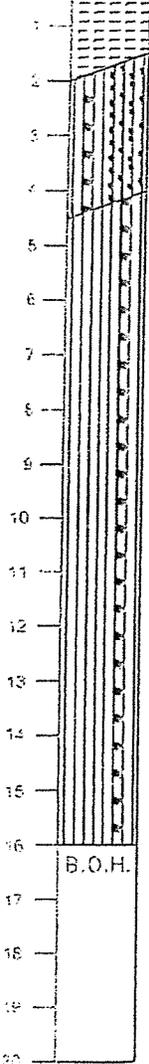
## SOIL LOG - PERCOLATION TEST

LEG. DESCRIPTION: LEWIS AND CLARK SQ. (PROPOSED - LOT 15) Lot-16

PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 1/2/2015



DEPTH (feet)



### TEST HOLE #13

PAGE 1 OF 2

#### SOIL CLASSIFICATIONS

	GW		ORG
	GP		ML
	GM		CL
	GC		OL
	SW		MH
	SP		CH
	SM		OH
	SC		

DEPTH TO GROUNDWATER	DATE
DRY	1/2/2015
DRY	1/15/2015
DRY	4/17/2015

SITE PLAN

SEE ATTACHED SITE PLAN

SCALE  
1" = 100'

	DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
LOWER BENCH	1/2/2015	1/4" DROP IN 3 HOURS - DID NOT PERK (RC)				
	1/5/2015	DEEPENED BENCH - RESET PERK - NO DROP DURING PRE-SOAK (DG)				

PERCOLATION RATE >120 (MIN./INCH) PERC. HOLE DIA. 6 (INCHES)

TEST RUN BETWEEN 4.5/6.5 FT. AND 5.5/7.5 FT.

A FOUR HOUR PRE-SOAK WAS PERFORMED:  YES  NO

LOGGED BY: JODY MAUS PERCOLATION TEST PERFORMED BY: ROB CAMPBELL/DAVID GARNESS

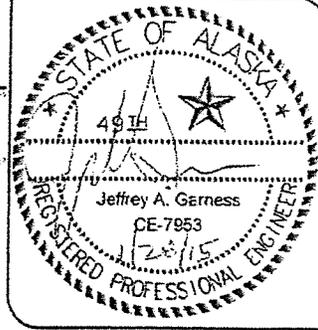
REMARKS: PERCOLATION READINGS ARE WITHIN 1/16 OF INCH.

PERFORMED BY GEG, LTD. I, JEFFREY A. GARNESS, CERTIFY THAT THIS WAS PERFORMED IN ACCORDANCE WITH ALL STATE AND MUNICIPAL GUIDELINES IN EFFECT ON THIS DATE: 4/22/15



# GARNESS ENGINEERING GROUP, Ltd

CIVIL & ENVIRONMENTAL ENGINEERS  
3724 E. T-LOOP ROAD SUITE 101 ANCHORAGE, AK 99553 \* PHONE (907) 337-6172 \* FAX (907) 338-3248 \* WEBSITE: www.garness-engineering.com



## SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 43) LOT-16

PERFORMED FOR: BIG COUNTRY LLC / S4 GROUP DATE: SEE PAGE 1 OF 2

### TEST HOLE #13

PAGE 2 OF 2

#### SOIL CLASSIFICATIONS

	GW		ORG
	GP		ML
	GM		CL
	GC		OL
	SW		MH
	SP		CH
	SM		OH
	SC		

#### SITE PLAN

SEE ATTACHED SITE PLAN

SCALE: 1" = 100'

DEPTH TO GROUNDWATER	DATE
SEE PAGE 1 OF 2	

DEPTH (feet)

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

SEE PAGE 1 OF 2 FOR SOILS CLASSIFICATION

	DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
UPPER BENCH	1/14/2015	1	3:05	-	6"	-
		2	3:35	30	1-3/4"	4-1/4"
		3	3:35	-	6"	-
		4	4:05	30	1-7/8"	4-1/8"
		5	4:05	-	6"	-
		6	4:35	30	1-7/8"	4-1/8"

PERCOLATION RATE 7.3 (MIN./INCH) PERC. HOLE DIA. 6 (INCHES)

TEST RUN BETWEEN 2 FT. AND 3 FT.

A FOUR HOUR PRESOAK WAS PERFORMED:  YES  NO

SOILS LOGGED BY: SEE PAGE 1 OF 2 PERCOLATION TEST PERFORMED BY: ANDREW GRAY

COMMENTS: PERCOLATION READINGS ARE WITHIN 1/16 OF INCH.

PERFORMED BY GEG, Ltd. I, JEFFREY A. GARNESS, CERTIFY THAT THIS WAS PERFORMED IN ACCORDANCE WITH ALL STATE AND MUNICIPAL GUIDELINES IN EFFECT ON THIS DATE: 1/29/15



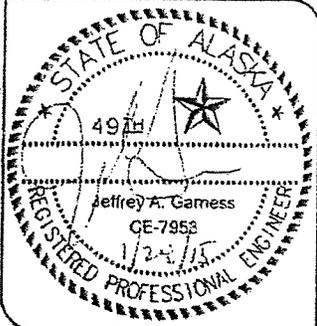


# GARNESS ENGINEERING GROUP, Ltd

CIVIL & ENVIRONMENTAL ENGINEERS  
 1701 F. THOMPSON ROAD SUITE 1011 ANCHORAGE, AK 99507 PHONE (907) 331-4177 FAX (907) 336-2246 WEBSITE: www.garncseng.com

## SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK SYD (PROPOSED - LOT 14) Lot 2  
 PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: SEE PAGE 1 OF 2



DEPTH (feet)  
 1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20

SEE PAGE 1 OF 2 FOR SOILS CLASSIFICATION

### TEST HOLE #14

PAGE 2 OF 2

#### SOIL CLASSIFICATIONS

	GW		ORG
	GP		ML
	GM		CL
	GC		OL
	SW		MH
	SP		CH
	SM		OH
	SC		

DEPTH TO GROUNDWATER	DATE
SEE PAGE 1 OF 2	

#### SITE PLAN

SEE ATTACHED SITE PLAN

SCALE  
1" = 100'

	DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
UPPER BENCH	1/14/2015	1	3:10	-	6"	-
		2	3:40	30	4-5/8"	1-3/8"
		3	3:40	-	6"	-
		4	4:10	30	5-1/4"	3/4"
		5	4:10	-	6"	-
		6	4:40	30	5-1/4"	3/4"

PERCOLATION RATE 40 (MIN./INCH) PERC. HOLE DIA. 6 (INCHES)

TEST RUN BETWEEN 2 FT. AND 3 FT.

A FOUR HOUR PRESOAK WAS PERFORMED:  YES  NO

SOILS LOGGED BY: SEE PAGE 1 OF 2 PERCOLATION TEST PERFORMED BY: ANDREW GRAY

COMMENTS: PERCOLATION READINGS ARE WITHIN 1/16 OF INCH.

PERFORMED BY GEG, Ltd. I, JEFFREY A. GARNISS, CERTIFY THAT THIS WAS PERFORMED IN ACCORDANCE WITH ALL STATE AND MUNICIPAL GUIDELINES IN EFFECT ON THIS DATE: 1/22/15



# GARNESS ENGINEERING GROUP, Ltd

CIVIL & ENVIRONMENTAL ENGINEERS

## SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT #) Lot-6

PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 1/8/2015

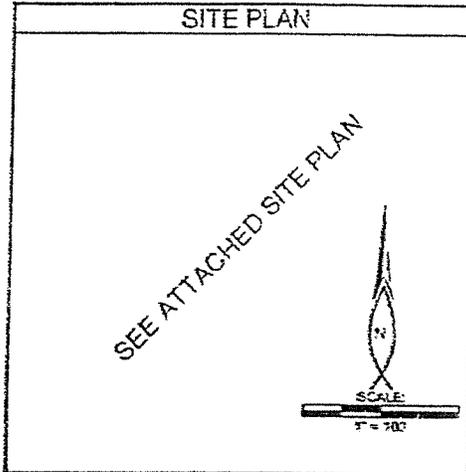


DEPTH (feet) **GRAVELS**

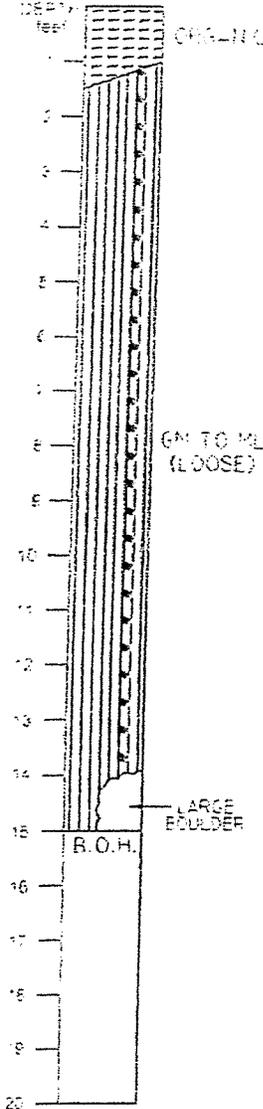
### TEST HOLE #19

#### SOIL CLASSIFICATIONS

	GW		ORG
	GP		ML
	GM		CL
	GC		OL
	SW		MH
	SP		CH
	SK		OH
	SC		



DEPTH TO GROUNDWATER	DATE
DRY	1/5/2015
DRY	1/15/2015
DRY	4/17/2015



DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
1/5/2015	1	3:50	-	6"	-
	2	4:00	10	1"	5"
	3	4:00	-	6"	-
	4	4:10	10	1"	5"
	5	4:10	-	6"	-
	6	4:20	10	1"	5"
	7	4:20	-	6"	-
	8	4:30	10	1"	5"
	9	4:30	-	6"	-
	10	4:40	10	1"	5"
	11	4:40	-	6"	-
	12	4:50	10	1"	5"

PERCOLATION RATE 2 (MIN./INCH) PERC. HOLE D.A. 6 (INCHES)

TEST RUN BETWEEN 6 FT. AND 7 FT.

A FOUR HOUR PRESOAK WAS PERFORMED:  YES  NO

LOGGED BY: JODY MAUS PERCOLATION TEST PERFORMED BY: ROB CAMPBELL

NOTE: PERCOLATION READINGS ARE WITHIN 1/16 OF INCH.

PERFORMED BY GEG, Ltd. I, JEFFREY A. GARNESS, CERTIFY THAT THIS WAS PERFORMED IN ACCORDANCE WITH ALL STATE AND MUNICIPAL GUIDELINES IN EFFECT ON THIS DATE: 4/22/15





DEPARTMENT OF THE ARMY  
ALASKA DISTRICT, U.S. ARMY CORPS OF ENGINEERS  
REGULATORY DIVISION  
P.O. BOX 6898  
JBER, ALASKA 99506-0898

JUN 05 2015

Regulatory Division  
POA-2015-285

Mr. Todd Brownson  
4700 East 147<sup>th</sup> Avenue  
Anchorage, Alaska 99516

Dear Mr. Brownson:

This letter is in response to your April 16, 2015, request for a Department of the Army (DA) jurisdictional determination for a parcel of land identified as Parcel Number 1707306000. The property is located within Section 25, T. 12 N., R. 3 W., Seward Meridian, USGS map Anchorage A-8; at Latitude 61.1009° N., Longitude 149.7160° W.; Lewis and Clark Subdivision, Municipality of Anchorage, in Anchorage, Alaska. Your project has been assigned number POA-2015-285, Rabbit Creek, which should be referred to in all correspondence with us.

Based on our review of the information you provided and available to our office, we have preliminarily determined the subject property contains waters of the U.S., and wetlands, under the Corps' regulatory jurisdiction. See the attached Preliminary Jurisdictional Determination (PJD) Form. Please sign and return the form to our office. A PJD is not appealable. At any time you have the right to request and obtain an Approved Jurisdictional Determination, which can be appealed. If it is your intent to request an Approved JD, do not begin work until one is obtained.

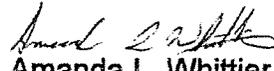
DA authorization is required if you propose to place dredged and/or fill material into waters of the U.S., including wetlands. Enclosed is an application for your use. You can refer to the sample drawing on our website at <http://www.poa.usace.army.mil/Portals/34/docs/regulatory/guidetodrawings2012.pdf>.

Section 404 of the Clean Water Act requires that a DA permit be obtained for the placement or discharge of dredged and/or fill material into waters of the U.S., including jurisdictional wetlands (33 U.S.C. 1344). The Corps defines wetlands as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

Nothing in this letter excuses you from compliance with other Federal, State, or local statutes, ordinances, or regulations.

If you have questions, please contact me via email at [Amanda.L.Whittier@usace.army.mil](mailto:Amanda.L.Whittier@usace.army.mil), by mail at the address above, by phone at (907) 753-5582, or toll free from within Alaska at (800) 478-2712. For more information about the Regulatory Program, please visit our website at <http://www.poa.usace.army.mil/Missions/Regulatory.aspx>.

Sincerely,

  
Amanda L. Whittier  
Project Manager

Enclosures

# Preliminary Jurisdictional Determination Form

This preliminary JD find that there "may be" waters of the United States on the subject project site that could be affected by the proposed activity based on the following information:

District Office	Alaska District Office	File/ORM #	POA-2015-285	PJD Date	May 27, 2015		
State	AK	City/County	Anchorage	Name and Address of Person Requesting PJD Mr. Todd Brownson 4700 East 147th Avenue Anchorage, Alaska 99516			
Nearest Waterbody	Rabbit Creek						
Project Location	Section(s) 25	Township 12	N				
Meridian	Seward	Range 3	W				
USGS Quad Map	Anchorage A-8	Latitude	61.1009	N	Longitude	149.7160	W
Subdivision Name, Block, Lot, Directions to Project Site	Lewis and Clark Subdivion						

Identify (Estimate) Amount of Waters in the Review Area <u>Non-Wetland Waters:</u> 4543 Linear ft <input type="text"/> Width <input type="text"/> Acres <input type="text"/> Perennial <input type="text"/>	Stream Flow	Name of Any Water Bodies on the Site Identified as Section 10 Waters: Tidal: <input type="text"/> Non-Tidal: <input type="text"/>
<u>Wetlands</u> 8.458 Acres Cowardin Class: Palustrine, emergent		<input checked="" type="checkbox"/> Office (Desk) Determination Date of Site Visit: <input type="text"/> <input type="checkbox"/> Field Determination

**SUPPORTING DATA: Data Review for Preliminary JD** (check all that apply - checked items should be included in case file and, where checked and requested, appropriately reference sources below)

- Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:
- Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - Office concurs with data sheets/delineation report.
  - Office does not concur with data sheets/delineation report.
- Data Sheet prepared by the Corps
- Corps navigable waters' study:
- USGS NHD Data.
- USGS 8 and 12 digit HUC maps.
- U.S. Geological Survey map(s) Cite quad name:
- USDA Natural Resources Conservation Service Soil Survey. Citation:
- National Wetlands Inventory map(s):
- State/Local Wetland Inventory map(s):
- FEMA/FIRM map(s):
- 100-year Floodplain Elevation:
- Photographs:
  - Aerial (Name & Date)
  - Other (Name & Date)
- Previous determination(s). File # and date of response letter:
- Other Information:

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

[Signature] 27 May 2015  
Signature and Date of Regulatory Project Manager  
(REQUIRED)

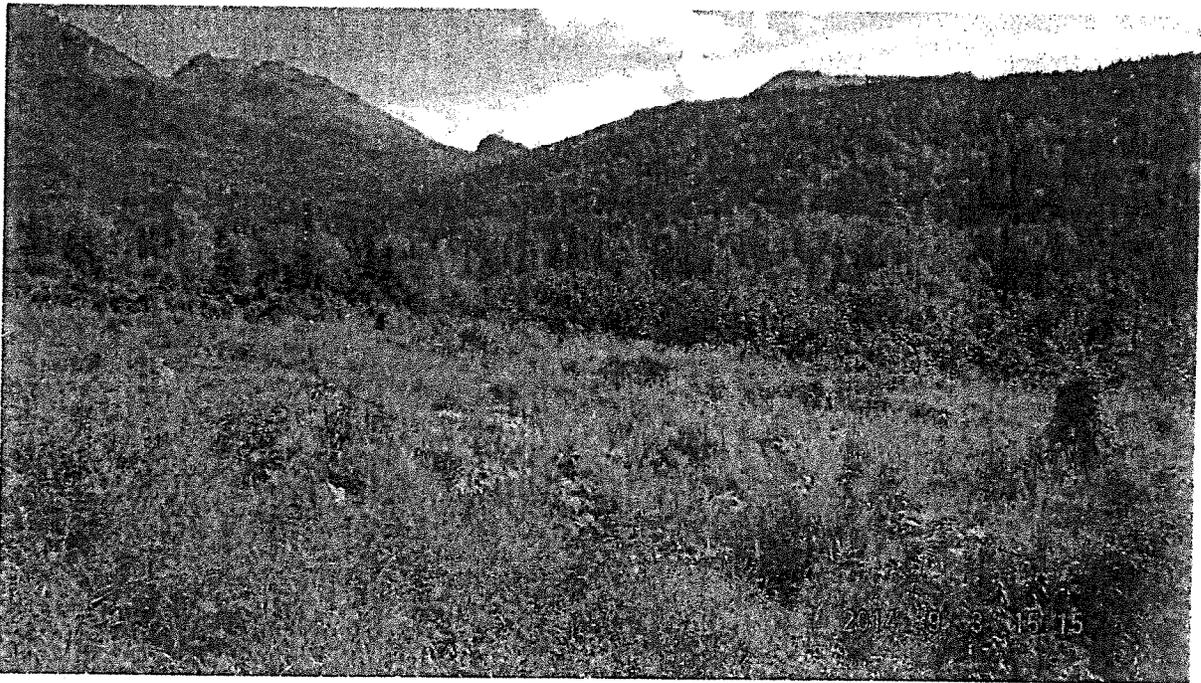
\_\_\_\_\_  
Signature and Date of Person Requesting Preliminary JD  
(REQUIRED, unless obtaining the signature is impracticable)

**EXPLANATION OF PRELIMINARY AND APPROVED JURISDICTIONAL DETERMINATIONS:** 1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time. 2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "preconstruction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.

# Preliminary Determination of Wetlands & Waters

MOA Parcel 1707306000;  
SEC 25, T12N, R3W, SM;  
SW corner of Upper DeArmoun Rd and Canyon Rd.

**Municipality of Anchorage, Alaska**



22 December 2014

Prepared by

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### Attachments

- 1 - Maps
- 2 - Data Sheets
- 3 - Pictures

## Introduction

This report summarizes a delineation of wetlands and waters performed by Patrick Athey of Hemlock Scientific, LLC at MOA Parcel 1707306000, located at the southwest corner of Upper Dearthmoun Rd and Canyon Rd., within the Hillside district of Anchorage, Alaska. The location of the parcel is illustrated in Map 1.

## Methods

Wetland determinations and boundary mapping was performed at the property during August and September of 2011. Field adjustment of wetland boundaries and mapping of additional wetlands were made in August 2012. Determination of wetlands and the boundaries of wetlands with non-wetlands were made according to the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region (Version 2.0) dated September 2007 and the 1987 Corps of Engineers Wetland Delineation Manual.

The primary tasks for the work included: 1) a review of existing maps and ecological data, 2) collection of field data at observation points to determine the presence or absence of wetlands, and 3) field delineation of the boundaries separating wetlands and uplands.

Existing data that was reviewed as part of this work included, USGS Topographic Series Maps, Municipality of Anchorage Wetland Atlas, Soil Survey of the Anchorage Area, Alaska published by the Natural Resources Conservation Service, and National Wetlands Inventory (NWI) Maps.

The methodology used for delineating wetlands is known as the triple parameter approach as described in the Alaska Regional Supplement. The premise of this approach is that the three essential characteristics of wetlands (hydrophytic vegetation, hydric soils, and wetland hydrology) must all be present to have a positive wetland determination. These methods were used to achieve accurate characterization of the wetland community at specific observation points and to correlate the findings with existing data (aerial photography, soils mapping, and other maps where these were available). The determination points were numbered sequentially (e.g., "DP-1") for tracking on wetland determination data forms published in the Alaska Regional Supplement. Completed Wetland Data Forms are included as Attachment 2. Photos of wetland features and site conditions encountered in the field investigation are provided in Attachment 3.

Soils were evaluated for hydric indicators by digging test pits and comparing the soil to the listed indicators provided in the Regional Guidance document. Soil colors were evaluated with a Munsell Soil Color Chart (Kollmogren, 1990). Observations were correlated with the soil type descriptions in the soil surveys were used to identify mapped soil types. Field conditions were compared to the published soil series mapping for the area, the *Soil Survey of Anchorage Area, Alaska* (NRCS, 2001). The NRCS soils are displayed in Map 3 along with the National Wetland Inventory (NWI) designations. Additionally, the location of field Determination Points (DPs) are provided on Map 3. The NRCS-mapped soil units on the property are summarized in Table 1.

Table 1. NRCS Soil Map Units

Symbol	Soil Unit Name <sup>1</sup>
412	Deception-Estelle-Kichatna complex, 20 to 45 percent slopes
414	Deception-Estelle-Kichatna complex, undulating and hilly
417	Doroshin peat, 0 to 7 percent slopes (listed hydric soil)
426	Jacobsen-Disappear-Doroshin complex, 3 to 7 percent slopes
427	Jacobsen-Disappear-Doroshin complex, 7 to 12 percent slopes
438	Moose River-Niklason complex, occasionally flooded, 0 to 3 percent slopes (listed hydric)

<sup>1</sup>From NRCS (2001).

Water must be present in order for wetlands to exist; however, it does not need to be present throughout the entire year. Wetland hydrology is considered to be present when there is permanent or periodic inundation or soil saturation for a significant period of time during the growing season, which is specified as two weeks or more by Alaska Regional Guidance. Indicators of wetland hydrology include areas of ponding or soil saturation, evidence of previous water inundation such as dry algae on bare soil, watermarks on soils or leaves, and drainage patterns among others. Where positive indicators are observed, it is assumed that wetland hydrology occurs for a significant period of the growing season. Test pits were inspected to confirm the presence of indicators below ground surface (e.g., saturation, high water table).

Dominant plant species were characterized in a 30-foot diameter circle centered at the soil pit. Within this circle, the cover of each plant species was estimated to obtain representative data of the vegetation components. The vegetation cover of each species and its assigned wetland indicator status were used to calculate indices of hydrophytic vegetation. Plant species were identified using regional plant guides, including Collet (2002), Dickenson (1999), Hulten (1968), Johnson, et al. (1995), Pratt (1989), Tande and Lipkin (2003), Viereck and Little (1972), among others. Plant species names used on data forms followed the nomenclature of Reed (1988) which also provides the wetland indicator status of the plants.

The geographic coordinates of wetland Determination Points (DPs), wetland boundaries, streams, and other features were recorded in the field with a handheld GPS unit.

The potential presence of wetlands was evaluated also by inspection of the Anchorage Wetland Management Plan mapping, which is presented in Map 4 along with the location of the DPs.

## Findings

Potential jurisdictional wetlands were found within the property as determined by a detailed evaluation of vegetation, soils, and hydrology at established determination points and supported with observations throughout the area. The boundaries of wetlands with adjacent uplands were flagged in the field and the positions recorded with a hand-held GPS unit.

The results of the field delineation are presented in Maps 5 through 8 (Attachment 1). Table 2 provides a summary of the wetlands and other aquatic features. A total of eight (8) wetland

polygons were identified and mapped on the subject property. Additionally, there are surface water features on the property including two ponds formed by beaver dams on Fire Creek and four other small streams.

Inspection of the property occurred during the normal growing season in southcentral Alaska during late August through early September 2014. The local precipitation patterns were consulted to determine if hydrology indicators observed at the site were representative of normal conditions. In this case, the climate records for Anchorage (National Weather Service at Anchorage) indicate above-average precipitation in the months from June through September 2014. During the time prior to the investigation, there was an excess more than 3.25 inches above normal for the cumulative precipitation annually and seasonally (Table 3).

These data are used to estimate general weather patterns that may exist at the investigation site, though it is important to note that precipitation patterns within the Anchorage area may vary somewhat depending upon altitude and geography. The inspections were done in August and early September, described as the wet season in southcentral Alaska by the Alaska Regional Manual (Corps, 2007). The observed conditions at the time of inspection are considered to represent the height of soil moisture accumulation near the end of wetter-than-normal growing season. Overall, the data support the observation that hydrology and soil moisture conditions observed during the field work are representative of normal environmental conditions for the area and the lack of saturation or high water tables was not due to abnormally low precipitation occurring prior to the inspection.

**Table 2. Summary of Wetlands and Other Aquatic Sites in Tract 40-A**

Habitat	Cowardin	Acres	Lineal Ft
Wetland			
Wetland #1	PFO4/EM1B	2.696	.
Wetland #2	PFO4/EM1C	5.762	.
Stream			
Rabbit Creek	R3US5	.	920
Stream 1	R3US5	.	144
<b>Total</b>		<b>8.458</b>	<b>1,064</b>

**Table 3. Cumulative Precipitation (Anchorage) for Field Inspection Dates**

Precipitation (In)	Observed	Normal	Departure
August 26, 2014			
Since Jun 1	8.29	5.71	3.21
Since Jan 1	12.15	8.95	3.2
September 3, 2014			
Since Jun 1	9.08	6.37	3.40
Since Jan 1	13.53	10.22	3.31
September 9, 2014			
Since Jun 1	10.30	6.90	3.40
Since Jan 1	13.53	10.22	3.31

The wetland hydrology indicators were evaluated carefully to consider the potential for false positive results, which could influence the accurate determination of wetland hydrology and wetlands. In particular, the lack of saturation was considered a very strong indicator of negative wetland hydrology. Conversely, the presence of saturation in the upper 12-inches of soil without an associated high water table was not considered a particularly strong indicator of wetland hydrology and was evaluated carefully with evidence of hydric soils and hydrophytic vegetation occurring at a particular location.

**Wetland #1** is located in the central part of the property and includes 2.696 acres of herbaceous and graminoid wetlands, springs, and small streams. The general habitat is open black spruce (*Picea mariana*; FACW) forest with open meadows. The soils are predominantly saturated organic histosol. Tree density in this wetland is sparse and numerous shrubs, herbs, and hydrophytic graminoid groundcover species occur. The wetland-associated moss *Sphagnum* spp. is prevalent in the wetland areas. The lack of *Sphagnum* was found to be a general indicator of non-hydric soil and non-wetland conditions on the parcel.

Soils in this wetland were found to consist of histosols and histic epipedons with a depleted underlying mineral substrate. The soils in this area are mapped by NRCS as Unit No. 427—Jacobsen-Disappear-Doroshin complex, 7 to 12 percent slopes, which is a listed hydric soil. The soil conditions observed in the field generally match the descriptions for these soil types. The boundary of Wetland #1 with adjacent uplands was determined through soil probing for soil saturation and changes in groundcover vegetation, including the presence of *Sphagnum* moss.

Table 4. Summary of Determination Point Data

Location ID	Vegetation	Hydrology	Soil	Wetland
DP-1	-	-	-	-
DP-2	X	-	-	-
DP-3	X	-	-	-
DP-4	X	-	-	-
DP-5	X	X	X	X
DP-6	X	X	X	X
DP-7	X	X	X	X
DP-8	X	-	-	-
DP-9	-	-	-	-
DP-10	X	-	-	-
DP-11	-	-	-	-
DP-12	-	-	-	-
DP-13	-	-	-	-
DP-15	-	-	-	-
DP-16	-	-	-	-
DP-17	X	-	-	-
DP-18	X	-	-	-
DP-19	-	-	-	-
DP-20	X	-	-	-
DP-21	X	X	X	X
DP-22	X	-	-	-
DP-23	X	X	X	X
DP-24	X	X	X	X
DP-25	-	-	-	-
DP-26	-	-	-	-

X – Positive Determination Result

The observations made in Wetland #1 are documented in data sheets for DP-5, -6, and -7; surrounding uplands are documented in data sheets for DP-8, DP-13, and DP-4. This wetland can be characterized as *Palustrine, Needle-Leaved Forested / Emergent Persistent, Saturated (PFO4/EM1B)* by the Cowardin system.

Wetland #1 is separated from Rabbit Creek and the Upper Pond by several hundred feet of non-wetlands on relatively steep gradient. Subsurface flow through the loam soils in downslope uplands likely provides a hydrological connection with Rabbit Creek.



**Wetland #1.**

**Wetland #2** is located in the south part of the property and includes 5.762 acres of seasonally flooded black spruce forest and emergent marsh on a sloping terrace that drains south to Rabbit Creek. Several springs emerge from the base of the slope separating the uplands to the north and flow as small streams to the south. Much of the area is densely wooded with black spruce, birch, and alder; some of the large spruce trees succumbed to beetle kill and litter the area, making foot access difficult. The emergent vegetation is characterized by bluejoint reed grass *Calamagrostis canadensis* (FAC) and sedges *Carex* spp. (most species are FAC, FACW, or OBL).

Soils in this wetland are histosols and histic epipedons with a depleted underlying mineral substrate. The area is mapped by NRCS as Unit No. 438—Moose River-Niklason complex, occasionally flooded, 0 to 3 percent, which is a listed hydric soil. The soil conditions observed in the field generally match the descriptions for these soil types.

This wetland can be characterized as *Palustrine, Needle-Leaved Forested / Emergent Persistent, Seasonally Flooded (PFO4/EM1C)* by the Cowardin system.

**Streams** are present on the property including the MOA-mapped Rabbit Creek tributary channel, which enters the parcel on the east side via a culvert beneath Canyon Rd. and extends south following the steep grade in the southeast corner of the parcel. A tributary of the creek was located near the south property line, identified as Stream #1 and was flowing with a small amount of discharge, estimated at less than 1 gallon per minute. Above the confluence with this tributary, the channel Rabbit Creek on the property was dry during the inspection.



**Wetland #2.**



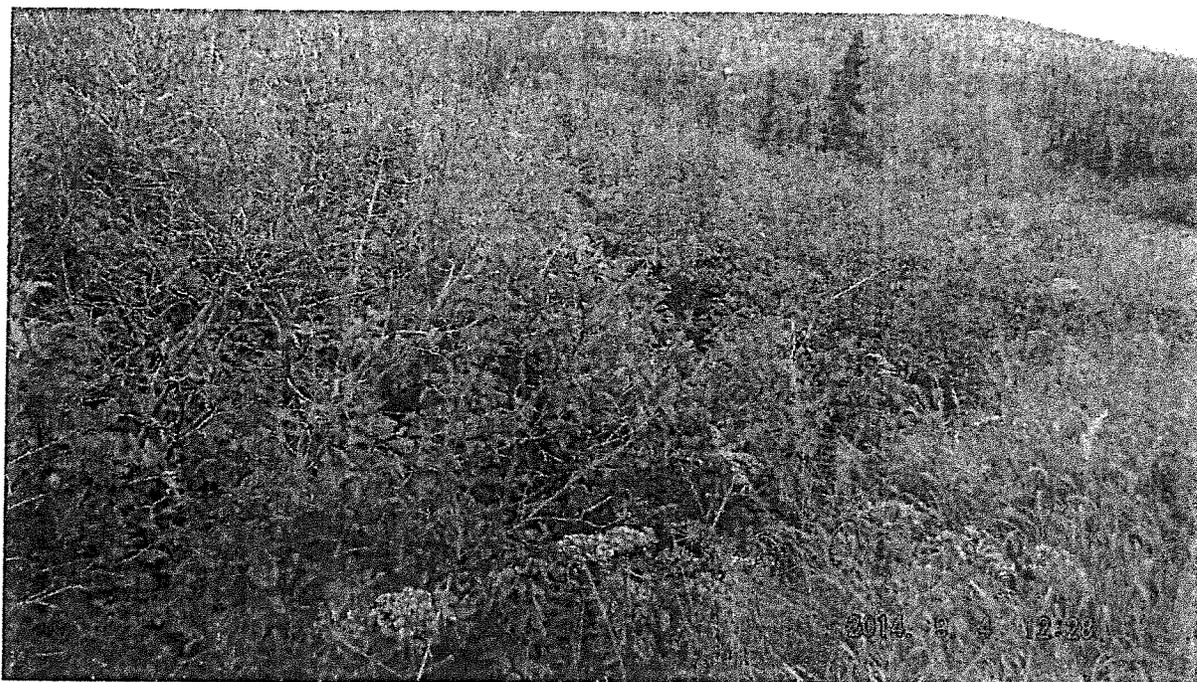
**Upland Bluejoint Reed Grass Vegetation at DP-9.**



**Upland Open Forest Vegetation at DP-20.**



**Stream #1**



**Rabbit Creek Tributary Channel (obscured in alder brush).**

## **Bibliography**

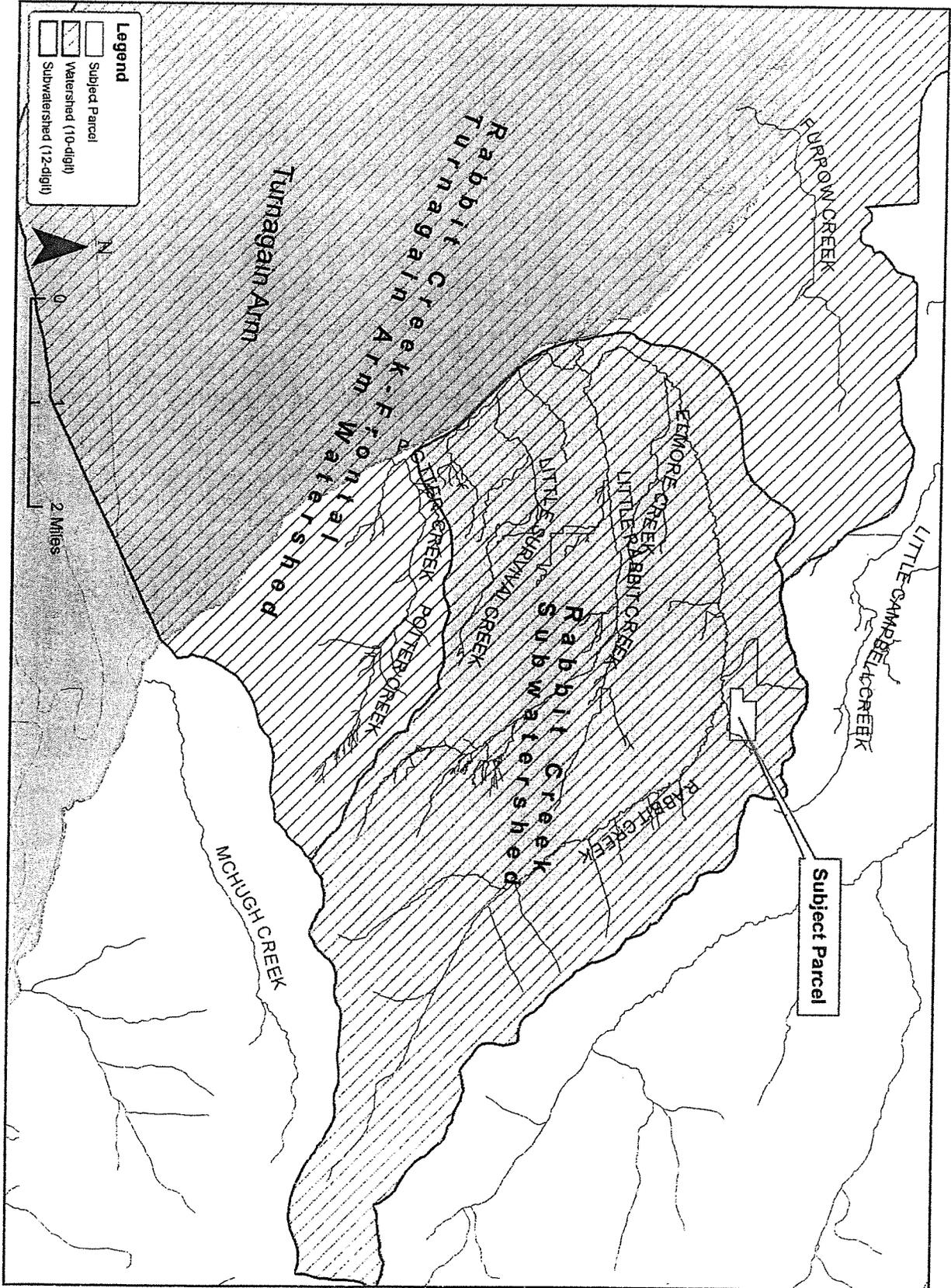
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**Attachment 1  
Maps**

MOA Parcel 1707306000





**Attachment 2  
Data Forms**

MOA Parcel 1707306000

## WETLAND DETERMINATION DATA FORM – Alaska Region

MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW

Project/Site: corner of Upper DeArmoun Rd and Canyon Rd. Borough/City: Anchorage Sampling Date: 8/26/2014

Applicant/Owner: \_\_\_\_\_ Sampling Point: DP-1

Investigator(s): Pat Athey Landform (hillside, terrace, hummocks, etc.): Mountain slope

Local relief (concave, convex, none): Concave Slope (%): \_\_\_\_\_

Subregion: Southcentral Lat: N 61.1007 Long: W 149.7162 Datum: NAD83

Soil Map Unit Name: 414—Deception-Estelle-Kichatna complex. undulating and hilly NWI classification: None Indicated

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ 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	No <u>X</u>	<b>Is the Sampled Area within a Wetland?</b> Yes _____ No <u>X</u>
Hydric Soil Present?	Yes	No <u>X</u>	
Wetland Hydrology Present?	Yes	No <u>X</u>	
Remarks: Site is located on a south-facing mountain slope in open spruce-birch forest and dense alder shrub growth. Much of the spruce has been beetle-killed and blown down, opening up the canopy for shrubs to thrive.			

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

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. <u><i>Betula papyrifera</i> (Southcentral)</u>	<u>25</u>	<u>Yes</u>	<u>FAC</u>	Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A)  Total Number of Dominant Species Across All Strata: <u>6</u> (B)  Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
Total Cover: <u>25</u> 50% of total cover: <u>12.5</u> 20% of total cover: <u>5</u>				<b>Prevalence Index worksheet:</b>  Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = <u>0</u> FACW species _____ x 2 = <u>0</u> FAC species <u>165</u> x 3 = <u>495</u> FACU species <u>110</u> x 4 = <u>440</u> UPL species _____ x 5 = <u>0</u> Column Totals: <u>275</u> (A) <u>935</u> (B)
<b>Sapling/Shrub Stratum</b>				Prevalence Index = B/A = <u>3.39</u>
1. <u><i>Alnus viridis</i></u>	<u>75</u>	<u>Yes</u>	<u>FAC</u>	<b>Hydrophytic Vegetation Indicators:</b> <u>No</u> Dominance Test is >50% <u>No</u> Prevalence Index is ≤3.0 _____ Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) _____ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.
2. <u><i>Oplopanax horridus</i></u>	<u>25</u>	<u>Yes</u>	<u>FACU</u>	
3. <u><i>Rubus idaeus</i></u>	<u>10</u>	_____	<u>FACU</u>	
4. <u><i>Viburnum edule</i></u>	<u>10</u>	_____	<u>FACU</u>	
5. <u><i>Actaea rubra</i></u>	<u>5</u>	_____	<u>FAC</u>	
6. _____	_____	_____	_____	
Total Cover: <u>125</u> 50% of total cover: <u>62.5</u> 20% of total cover: <u>25</u>				
<b>Herb Stratum</b>				
1. <u><i>Calamagrostis canadensis</i></u>	<u>50</u>	<u>Yes</u>	<u>FAC</u>	
2. <u><i>Gymnocarpium dryopteris</i></u>	<u>25</u>	<u>Yes</u>	<u>FACU</u>	
3. <u><i>Urtica dioica</i></u>	<u>25</u>	<u>Yes</u>	<u>FACU</u>	
4. <u><i>Athyrium filix-femina</i></u>	<u>10</u>	_____	<u>FAC</u>	
5. <u><i>Galium boreale</i></u>	<u>10</u>	_____	<u>FACU</u>	
6. <u><i>Poa pratensis</i></u>	<u>5</u>	_____	<u>FACU</u>	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
Total Cover: <u>125</u> 50% of total cover: <u>62.5</u> 20% of total cover: <u>25</u>				
Plot size (radius, or length x width) <u>30-ft diameter</u> % Bare Ground _____ % Cover of Wetland Bryophytes <u>0</u> Total Cover of Bryophytes <u>25</u> (Where applicable)				<b>Hydrophytic Vegetation Present?</b> Yes _____ No <u>X</u>
Remarks: _____				

**SOIL**

Sampling Point: DP-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 <sup>1</sup>	Loc <sup>2</sup>		
+2-0	v dk gray brn 10YR3/2 black 10YR2/1	50 50					slightly decomposed plant material	
0-4	v dk gray 10YR3/1	100					silt loam, many fine roots, dry	
4-14	v dk gray 10YR3/1	100					silt loam & organics, dry, slightly greasy upon wetting	
14-26	grey brn 10YR5/2	100					silt loam, few med roots, dry, nonfriable	
26-30	brown 10YR5/3	100					silt loam w/ gravel & cobbles, dry; massive; firm	

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

**Hydric Soil Indicators:**

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

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

**Restrictive Layer (if present):**

Type: None  
Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes \_\_\_\_\_ No X

Remarks: Surface soil layer is very dark hue but does not exhibit hydric characteristics. The absence of redox indicators and lack of soil moisture during this wet season supports the finding of nonhydric soil.

**HYDROLOGY**

**Wetland Hydrology Indicators:**

**Secondary Indicators (2 or more required)**

**Primary Indicators (any one indicator is sufficient)**

- |   |  |  |
|---|--|--|
| <input type="checkbox"/> Surface Water (A1)       | <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Water-stained Leaves (B9)                     |
| <input type="checkbox"/> High Water Table (A2)    | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)   | <input type="checkbox"/> Drainage Patterns (B10)                       |
| <input type="checkbox"/> Saturation (A3)          | <input type="checkbox"/> Marl Deposits (B15)                       | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) |
| <input type="checkbox"/> Water Marks (B1)         | <input type="checkbox"/> Hydrogen Sulfide Odor (C1)                | <input type="checkbox"/> Presence of Reduced Iron (C4)                 |
| <input type="checkbox"/> Sediment Deposits (B2)   | <input type="checkbox"/> Dry-Season Water Table (C2)               | <input type="checkbox"/> Salt Deposits (C5)                            |
| <input type="checkbox"/> Drift Deposits (B3)      | <input type="checkbox"/> Other (Explain in Remarks)                | <input type="checkbox"/> Stunted or Stressed Plants (D1)               |
| <input type="checkbox"/> Algal Mat or Crust (B4)  |  | <input type="checkbox"/> Geomorphic Position (D2)                      |
| <input type="checkbox"/> Iron Deposits (B5)       |  | <input type="checkbox"/> Shallow Aquitard (D3)                         |
| <input type="checkbox"/> Surface Soil Cracks (B6) |  | <input type="checkbox"/> Microtopographic Relief (D4)                  |
|   |  | <input type="checkbox"/> FAC-Neutral Test (D5)                         |

**Field Observations:**

Surface Water Present? Yes \_\_\_\_\_ No X Depth (inches): \_\_\_\_\_  
 Water Table Present? Yes \_\_\_\_\_ No X Depth (inches): \_\_\_\_\_  
 Saturation Present? Yes \_\_\_\_\_ No X Depth (inches): \_\_\_\_\_  
 (includes capillary fringe)

Wetland Hydrology Present? Yes \_\_\_\_\_ No X

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

Remarks: The site lacks characteristics of wetland hydrology despite the seasonally high cumulative precipitation in the region. Cumulative total precipitation on August 26, 2014 was above normal with 8.29 inches since June 1st, compared to the normal of 5.71 inches, resulting in an excess of 3.21 inches. Since January 1st, the total was 12.15 inches, compared to the normal of 8.95 inches, resulting in an excess of 3.2 inches. The site is within the Rabbit Creek-Frontal Turnagain Arm Watershed (HUC 1902040107); Rabbit Creek Subwatershed (HUC 190204010701).

## WETLAND DETERMINATION DATA FORM – Alaska Region

MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW

Project/Site: corner of Upper DeArmon Rd and Canyon Rd. Borough/City: Anchorage Sampling Date: 8/26/2014

Applicant/Owner: \_\_\_\_\_ Sampling Point: DP-2

Investigator(s): Pat Athey Landform (hillside, terrace, hummocks, etc.): Mountain slope

Local relief (concave, convex, none): Concave Slope (%): \_\_\_\_\_

Subregion: Southcentral Lat: N 61.1006 Long: W 149.7162 Datum: NAD83

Soil Map Unit Name: 414—Deception-Estelle-Kichatna complex, undulating and hilly NWI classification: None Indicated

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ 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>X</u>	No	<b>Is the Sampled Area within a Wetland?</b>	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes	No <u>X</u>			
Wetland Hydrology Present?	Yes	No <u>X</u>			
Remarks: Site is located on a south-facing mountain slope at the edge of open spruce-birch forest and bluejoint-herb meadow downslope to the south. The vegetation mat is thick and despite the slopes there are no signs of erosion.					

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

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:														
1. <u><i>Picea mariana</i></u>	<u>5</u>	Yes	FACW	Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A)  Total Number of Dominant Species Across All Strata: <u>4</u> (B)  Percent of Dominant Species That Are OBL, FACW, or FAC: <u>75</u> (A/B)														
2. _____																		
3. _____																		
4. _____																		
Total Cover: <u>5</u>				<b>Prevalence Index worksheet:</b>  <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Total % Cover of:</th> <th style="width: 50%;">Multiply by:</th> </tr> </thead> <tbody> <tr> <td>OBL species _____</td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>5</u></td> <td>x 2 = <u>10</u></td> </tr> <tr> <td>FAC species <u>140</u></td> <td>x 3 = <u>420</u></td> </tr> <tr> <td>FACU species <u>55</u></td> <td>x 4 = <u>220</u></td> </tr> <tr> <td>UPL species _____</td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>200</u></td> <td>(A) <u>650</u> (B)</td> </tr> </tbody> </table> Prevalence Index = B/A = <u>3.25</u>	Total % Cover of:	Multiply by:	OBL species _____	x 1 = <u>0</u>	FACW species <u>5</u>	x 2 = <u>10</u>	FAC species <u>140</u>	x 3 = <u>420</u>	FACU species <u>55</u>	x 4 = <u>220</u>	UPL species _____	x 5 = <u>0</u>	Column Totals: <u>200</u>	(A) <u>650</u> (B)
Total % Cover of:	Multiply by:																	
OBL species _____	x 1 = <u>0</u>																	
FACW species <u>5</u>	x 2 = <u>10</u>																	
FAC species <u>140</u>	x 3 = <u>420</u>																	
FACU species <u>55</u>	x 4 = <u>220</u>																	
UPL species _____	x 5 = <u>0</u>																	
Column Totals: <u>200</u>	(A) <u>650</u> (B)																	
50% of total cover: <u>2.5</u> 20% of total cover: <u>1</u>																		
Sapling/Shrub Stratum	Absolute % Cover	Dominant Species?	Indicator Status	<b>Hydrophytic Vegetation Indicators:</b> Yes Dominance Test is >50% No Prevalence Index is ≤3.0 _____ Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) _____ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.														
1. <u><i>Alnus viridis</i></u>	<u>50</u>	Yes	FAC															
2. <u><i>Oplopanax horridus</i></u>	<u>25</u>	Yes	FACU															
3. <u><i>Ribes triste</i></u>	<u>10</u>		FAC															
4. <u><i>Cornus canadensis</i></u>	<u>10</u>		FACU															
5. <u><i>Rubus idaeus</i></u>	<u>5</u>		FACU															
6. _____																		
Total Cover: <u>100</u>																		
50% of total cover: <u>50</u> 20% of total cover: <u>20</u>																		
Herb Stratum	Absolute % Cover	Dominant Species?	Indicator Status	<b>Hydrophytic Vegetation Present?</b> Yes <u>X</u> No _____														
1. <u><i>Calamagrostis canadensis</i></u>	<u>75</u>	Yes	FAC															
2. <u><i>Heracleum maximum</i></u>	<u>10</u>		FACU															
3. <u><i>Plantago lanceolata</i></u>	<u>5</u>		FACU															
4. <u><i>Athyrium filix-femina</i></u>	<u>5</u>		FAC															
5. _____																		
6. _____																		
7. _____																		
8. _____																		
9. _____																		
10. _____																		
Total Cover: <u>95</u>																		
50% of total cover: <u>47.5</u> 20% of total cover: <u>19</u>																		
Plot size (radius, or length x width) <u>30-ft diameter</u> % Bare Ground _____																		
% Cover of Wetland Bryophytes <u>0</u> Total Cover of Bryophytes <u>10</u> (Where applicable)																		
Remarks:																		

**SOIL**

Sampling Point: DP-2

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 <sup>1</sup>		
0-4	black 10YR2/1	100					silt loam, no roots, moist, greasy, friable
4-15	v dk gray 10YR3/1	100					silt loam & organics, dry, slightly greasy upon wetting
15-23	grey bm 10YR5/2	100					silt loam, few med roots, dry, nonfriable
23-30	bm 10YR5/3	100					silt loam w/ gravel & cobbles, dry; massive; firm, slightly sticky and slightly plastic

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

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

**Restrictive Layer (if present):**  
 Type: None \_\_\_\_\_  
 Depth (inches): \_\_\_\_\_

**Hydric Soil Present?** Yes \_\_\_\_\_ No X

**Remarks:** The lower portion of the profile correlates with the mapped unit for this location, Deception-Estelle-Kichatna complex. The absence of redox indicators and lack of soil moisture during this wet season supports the finding of nonhydric soil. The surface accumulation of dark silt loam is likely due to the deposition of leaf matter with its accumulated dust in this high-productivity plant community

**HYDROLOGY**

Wetland Hydrology Indicators:	Secondary Indicators (2 or more required)
<b>Primary Indicators (any one indicator is sufficient)</b>	
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-stained Leaves (B9)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Salt Deposits (C5)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Microtopographic Relief (D4)
	<input type="checkbox"/> FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes \_\_\_\_\_ No X Depth (inches): \_\_\_\_\_

Water Table Present? Yes \_\_\_\_\_ No X Depth (inches): \_\_\_\_\_

Saturation Present? Yes \_\_\_\_\_ No X Depth (inches): \_\_\_\_\_  
 (includes capillary fringe)

**Wetland Hydrology Present?** Yes \_\_\_\_\_ No X

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

**Remarks:** The site lacks characteristics of wetland hydrology despite the seasonally high cumulative precipitation in the region. Cumulative total precipitation on August 26, 2014 was above normal with 8.29 inches since June 1st, compared to the normal of 5.71 inches, resulting in an excess of 3.21 inches. Since January 1st, the total was 12.15 inches, compared to the normal of 8.95 inches, resulting in an excess of 3.2 inches. The site is within the Rabbit Creek-Frontal Turnagain Arm Watershed (HUC 1902040107); Rabbit Creek Subwatershed (HUC 190204010701).

## WETLAND DETERMINATION DATA FORM – Alaska Region

MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW

Project/Site: corner of Upper DeArmoun Rd and Canyon Rd. Borough/City: Anchorage Sampling Date: 8/26/2014

Applicant/Owner: \_\_\_\_\_ Sampling Point: DP-3

Investigator(s): Pat Athey Landform (hillside, terrace, hummocks, etc.): Mountain slope

Local relief (concave, convex, none): Flat Slope (%): \_\_\_\_\_

Subregion: Southcentral Lat: N 61.1000 Long: W 149.7166 Datum: NAD83

Soil Map Unit Name: 427—Jacobsen-Disappear-Doroshin complex, 7 to 12 percent slopes NWI classification: None Indicated

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ 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>X</u>	No	<b>Is the Sampled Area within a Wetland?</b> Yes _____ No <u>X</u>
Hydric Soil Present?	Yes	No <u>X</u>	
Wetland Hydrology Present?	Yes	No <u>X</u>	
Remarks: Site is located on a south-facing mountain slope at the edge of open spruce-birch forest and bluejoint-herb meadow downslope to the south. The vegetation mat is thick and despite the slopes there are no signs of erosion.			

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

<u>Tree Stratum</u>	<u>Absolute % Cover</u>	<u>Dominant Species?</u>	<u>Indicator Status</u>	<u>Dominance Test worksheet:</u>																												
1. <u><i>Picea mariana</i></u>	<u>5</u>	<u>Yes</u>	<u>FACW</u>	Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A)																												
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>5</u> (B)																												
3. _____	_____	_____	_____																													
4. _____	_____	_____	_____																													
Total Cover: <u>5</u>				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>80</u> (A/B)																												
50% of total cover: <u>2.5</u> 20% of total cover: <u>1</u>																																
Sapling/Shrub Stratum				Prevalence Index worksheet:																												
1. <u><i>Alnus viridis</i></u>	<u>50</u>	<u>Yes</u>	<u>FAC</u>	<table style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: center; border-bottom: 1px solid black;">Total % Cover of:</th> <th colspan="2" style="text-align: center; border-bottom: 1px solid black;">Multiply by:</th> </tr> <tr> <td>OBL species</td> <td style="text-align: center;"><u>10</u></td> <td>x 1 =</td> <td style="text-align: center;"><u>10</u></td> </tr> <tr> <td>FACW species</td> <td style="text-align: center;"><u>11</u></td> <td>x 2 =</td> <td style="text-align: center;"><u>22</u></td> </tr> <tr> <td>FAC species</td> <td style="text-align: center;"><u>135</u></td> <td>x 3 =</td> <td style="text-align: center;"><u>405</u></td> </tr> <tr> <td>FACU species</td> <td style="text-align: center;"><u>60</u></td> <td>x 4 =</td> <td style="text-align: center;"><u>240</u></td> </tr> <tr> <td>UPL species</td> <td style="text-align: center;">_____</td> <td>x 5 =</td> <td style="text-align: center;"><u>0</u></td> </tr> <tr> <td>Column Totals:</td> <td style="text-align: center;"><u>216</u></td> <td>(A)</td> <td style="text-align: center;"><u>677</u> (B)</td> </tr> </table>	Total % Cover of:		Multiply by:		OBL species	<u>10</u>	x 1 =	<u>10</u>	FACW species	<u>11</u>	x 2 =	<u>22</u>	FAC species	<u>135</u>	x 3 =	<u>405</u>	FACU species	<u>60</u>	x 4 =	<u>240</u>	UPL species	_____	x 5 =	<u>0</u>	Column Totals:	<u>216</u>	(A)	<u>677</u> (B)
Total % Cover of:		Multiply by:																														
OBL species	<u>10</u>	x 1 =	<u>10</u>																													
FACW species	<u>11</u>	x 2 =	<u>22</u>																													
FAC species	<u>135</u>	x 3 =	<u>405</u>																													
FACU species	<u>60</u>	x 4 =	<u>240</u>																													
UPL species	_____	x 5 =	<u>0</u>																													
Column Totals:	<u>216</u>	(A)	<u>677</u> (B)																													
2. <u><i>Rubus idaeus</i></u>	<u>25</u>	<u>Yes</u>	<u>FACU</u>																													
3. <u><i>Rosa acicularis</i></u>	<u>10</u>	_____	<u>FACU</u>																													
4. <u><i>Cornus canadensis</i></u>	<u>10</u>	_____	<u>FACU</u>																													
5. _____	_____	_____	_____																													
6. _____	_____	_____	_____																													
Total Cover: <u>95</u>				Prevalence Index = B/A = <u>3.13</u>																												
50% of total cover: <u>47.5</u> 20% of total cover: <u>19</u>																																
Herb Stratum				Hydrophytic Vegetation Indicators:																												
1. <u><i>Calamagrostis canadensis</i></u>	<u>50</u>	<u>Yes</u>	<u>FAC</u>	Yes Dominance Test is >50% No Prevalence Index is ≤3.0 ___ Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain) <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.																												
2. <u><i>Equisetum arvense</i></u>	<u>25</u>	<u>Yes</u>	<u>FAC</u>																													
3. <u><i>Poa pratensis</i></u>	<u>10</u>	_____	<u>FACU</u>																													
4. <u><i>Carex laeviculmis</i></u>	<u>10</u>	_____	<u>FACW</u>																													
5. <u><i>Carex echinata</i></u>	<u>10</u>	_____	<u>OBL</u>																													
6. <u><i>Geocaulon lividum</i></u>	<u>5</u>	_____	<u>FACU</u>																													
7. <u><i>Geranium erianthum</i></u>	<u>5</u>	_____	<u>FACU</u>																													
8. <u><i>Sanguisorba canadensis</i></u>	<u>1</u>	_____	<u>FACW</u>																													
9. _____	_____	_____	_____																													
10. _____	_____	_____	_____																													
Total Cover: <u>116</u>				Hydrophytic Vegetation Present? Yes <u>X</u> No _____																												
50% of total cover: <u>58</u> 20% of total cover: <u>23.2</u>																																
Plot size (radius, or length x width) <u>30-ft diameter</u> % Bare Ground _____																																
% Cover of Wetland Bryophytes <u>0</u> Total Cover of Bryophytes <u>0</u> (Where applicable)																																
Remarks:																																

**SOIL**

Sampling Point: DP-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 <sup>1</sup>	Loc <sup>2</sup>		
+7-0	black 10YR2/1	50					wood debris and decomposed plant material	
	dk red brn 5YR3/4	50						
0-12	v dk gray 10YR3/1	100					silt loam, many fine roots, dry	
12-15	v dk gray 10YR3/1	100					silt loam, few med roots, dry, nonfriable	
15-29	brn 10YR5/3	50					silt loam w/ gravel & cobbles, dry; massive	
	v dk gray 10YR3/1	50						

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

Hydric Soil Indicators:			Indicators for Problematic Hydric Soils <sup>2</sup> :		
<input type="checkbox"/> Histosol or Histel (A1)	<input type="checkbox"/> Alaska Color Change (TA4) <sup>4</sup>	<input type="checkbox"/> Alaska Gleyed Without Hue 5Y or Redder Underlying Layer			
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Alaska Alpine Swales (TA5)	<input type="checkbox"/> Other (Explain in Remarks)			
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Alaska Redox With 2.5Y Hue				
<input type="checkbox"/> Thick Dark Surface (A12)					
<input type="checkbox"/> Alaska Gleyed (A13)	<sup>3</sup> One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.				
<input type="checkbox"/> Alaska Redox (A14)	<sup>4</sup> Give details of color change in Remarks.				
<input type="checkbox"/> Alaska Gleyed Pores (A15)					

Restrictive Layer (if present): Type: None Depth (inches): _____	Hydric Soil Present? Yes _____ No <u>X</u>
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Remarks: The lower portion of the profile correlates with the mapped unit for this location, Deception-Estelle-Kichatna complex. The absence of redox indicators and lack of soil moisture during this wet season supports the finding of nonhydric soil. The surface accumulation of dark silt loam is likely due to the deposition of leaf matter with its accumulated dust in this high-productivity plant community

**HYDROLOGY**

Wetland Hydrology Indicators:		Secondary Indicators (2 or more required)	
Primary Indicators (any one indicator is sufficient)			
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Water-stained Leaves (B9)	
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Drainage Patterns (B10)	
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Marl Deposits (B15)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Presence of Reduced Iron (C4)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Salt Deposits (C5)	
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	
<input type="checkbox"/> Algal Mat or Crust (B4)		<input type="checkbox"/> Geomorphic Position (D2)	
<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Shallow Aquitard (D3)	
<input type="checkbox"/> Surface Soil Cracks (B6)		<input type="checkbox"/> Microtopographic Relief (D4)	
		<input type="checkbox"/> FAC-Neutral Test (D5)	

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <u>X</u>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: The site lacks characteristics of wetland hydrology despite the seasonally high cumulative precipitation in the region. Cumulative total precipitation on August 26, 2014 was above normal with 8.29 inches since June 1st, compared to the normal of 5.71 inches, resulting in an excess of 3.21 inches. Since January 1st, the total was 12.15 inches, compared to the normal of 8.95 inches, resulting in an excess of 3.2 inches. The site is within the Rabbit Creek-Frontal Turnagain Arm Watershed (HUC 1902040107); Rabbit Creek Subwatershed (HUC 190204010701).

## WETLAND DETERMINATION DATA FORM – Alaska Region

MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW  
 Project/Site: corner of Upper DeArmour Rd and Canyon Rd. Borough/City: Anchorage Sampling Date: 8/26/2014  
 Applicant/Owner: \_\_\_\_\_ Sampling Point: DP-4  
 Investigator(s): Pat Athey Landform (hillside, terrace, hummocks, etc.): Mountain slope  
 Local relief (concave, convex, none): Flat Slope (%): \_\_\_\_\_  
 Subregion: Southcentral Lat: N 61.0994 Long: W 149.7174 Datum: NAD83  
 Soil Map Unit Name: 427—Jacobsen-Disappear-Doroshin complex, 7 to 12 percent slopes NWI classification: None Indicated  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ 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>X</u>	No	<b>Is the Sampled Area within a Wetland?</b>	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes	No <u>X</u>			
Wetland Hydrology Present?	Yes	No <u>X</u>			
Remarks: Site is located on a south-facing mountain slope in open spruce-birch forest and dense alder shrub growth. Much of the spruce has been beetle-killed and blown down, opening up the canopy for shrubs and herbs to colonize the area.					

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

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. <u><i>Betula papyrifera</i> (Southcentral)</u>	<u>5</u>	Yes	FAC	Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u>	(A)
2. _____				Total Number of Dominant Species Across All Strata: <u>5</u>	(B)
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>60</u>	(A/B)
4. _____				<b>Prevalence Index worksheet:</b>	
Total Cover: <u>5</u>				Total % Cover of:	Multiply by:
50% of total cover: <u>2.5</u>		20% of total cover: <u>1</u>		OBL species <u>10</u>	x 1 = <u>10</u>
Sapling/Shrub Stratum				FACW species <u>11</u>	x 2 = <u>22</u>
1. <u><i>Alnus viridis</i></u>	<u>50</u>	Yes	FAC	FAC species <u>155</u>	x 3 = <u>465</u>
2. <u><i>Rubus idaeus</i></u>	<u>25</u>	Yes	FACU	FACU species <u>90</u>	x 4 = <u>360</u>
3. <u><i>Rosa acicularis</i></u>	<u>10</u>		FACU	UPL species _____	x 5 = <u>0</u>
4. <u><i>Cornus canadensis</i></u>	<u>10</u>		FACU	Column Totals: <u>266</u>	(A) <u>857</u> (B)
5. _____				Prevalence Index = B/A = <u>3.22</u>	
6. _____				<b>Hydrophytic Vegetation Indicators:</b>	
Total Cover: <u>95</u>				Yes Dominance Test is >50%	
50% of total cover: <u>47.5</u>		20% of total cover: <u>19</u>		No Prevalence Index is ≤3.0	
Herb Stratum				Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)	
1. <u><i>Calamagrostis canadensis</i></u>	<u>75</u>	Yes	FAC	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
2. <u><i>Heracleum maximum</i></u>	<u>25</u>	Yes	FACU	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.	
3. <u><i>Equisetum arvense</i></u>	<u>25</u>		FAC		
4. <u><i>Taraxacum officinale</i></u>	<u>10</u>		FACU		
5. <u><i>Carex laeviculmis</i></u>	<u>10</u>		FACW		
6. <u><i>Carex echinata</i></u>	<u>10</u>		OBL		
7. <u><i>Geocaulon lividum</i></u>	<u>5</u>		FACU		
8. <u><i>Geranium erianthum</i></u>	<u>5</u>		FACU		
9. <u><i>Sanguisorba canadensis</i></u>	<u>1</u>		FACW		
10. _____					
Total Cover: <u>166</u>				<b>Hydrophytic Vegetation Present?</b>	
50% of total cover: <u>83</u>		20% of total cover: <u>33.2</u>		Yes <u>X</u> No _____	
Plot size (radius, or length x width) <u>30-ft diameter</u> % Bare Ground _____					
% Cover of Wetland Bryophytes <u>0</u> Total Cover of Bryophytes <u>0</u>					
(Where applicable)					
Remarks:					

**SOIL**

Sampling Point: DP-4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)									
Depth (inches)	Matrix		Redox Features			Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
	Color (moist)	%	Color (moist)	%					
+3-0	black 10YR2/1	100						decomposed plant material, roots, silt	
0-10	black 10YR2/1 v dk gray 10YR3/1	50 50						silt loam, many fine roots, dry	
12-15	v dk gray 10YR3/1	100						silt loam, few med roots, dry, nonfriable	
15-27	bm 10YR5/3	100						silt loam w/ gravel & cobbles, dry, massive	

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

**Hydric Soil Indicators:**

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

**Restrictive Layer (if present):**  
 Type: None  
 Depth (inches): \_\_\_\_\_

**Hydric Soil Present?** Yes \_\_\_\_\_ No X

**Remarks:** The lower portion of the profile correlates with the mapped unit for this location, Deception-Estelle-Kichatna complex. The absence of redox indicators and lack of soil moisture during this wet season supports the finding of nonhydric soil. The surface accumulation of dark silt loam is likely due to the deposition of leaf matter with its accumulated dust in this high-productivity plant community

**HYDROLOGY**

Wetland Hydrology Indicators:		Secondary Indicators (2 or more required)
<b>Primary Indicators (any one indicator is sufficient)</b>		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Water-stained Leaves (B9)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Marl Deposits (B15)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Salt Deposits (C5)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Algal Mat or Crust (B4)		<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Surface Soil Cracks (B6)		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	<b>Wetland Hydrology Present?</b> Yes _____ No <u>X</u>
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present? (includes capillary fringe)	Yes _____ No <u>X</u>	Depth (inches): _____	

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

**Remarks:** The site lacks characteristics of wetland hydrology despite the seasonally high cumulative precipitation in the region. Cumulative total precipitation on August 26, 2014 was above normal with 8.29 inches since June 1st, compared to the normal of 5.71 inches, resulting in an excess of 3.21 inches. Since January 1st, the total was 12.15 inches, compared to the normal of 8.95 inches, resulting in an excess of 3.2 inches. The site is within the Rabbit Creek-Frontal Turnagain Arm Watershed (HUC 1902040107); Rabbit Creek Subwatershed (HUC 190204010701).

## WETLAND DETERMINATION DATA FORM – Alaska Region

MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW

Project/Site: corner of Upper DeArmoun Rd and Canyon Rd. Brough/City: Anchorage Sampling Date: 8/26/2014

Applicant/Owner: \_\_\_\_\_ Sampling Point: DP-5

Investigator(s): Pat Athey Landform (hillside, terrace, hummocks, etc.): Mountain slope

Local relief (concave, convex, none): Concave Slope (%): \_\_\_\_\_

Subregion: Southcentral Lat: N 61.0992 Long: W 149.7196 Datum: NAD83

Soil Map Unit Name: 427—Jacobsen-Disappear-Doroshin complex, 7 to 12 percent slopes NWI classification: None Indicated

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ 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>X</u> No _____ Hydric Soil Present?                      Yes <u>X</u> No _____ Wetland Hydrology Present?            Yes <u>X</u> No _____	Is the Sampled Area within a Wetland?                      Yes <u>X</u> No _____
Remarks: Site is located on a south-facing mountain slope in open black spruce forest interspersed with sedge-grass meadows and small streams that emerge from the slopes, flow a short distance before re-entering the ground. Much of the spruce has been beetle-killed and blown down, opening up the canopy for shrubs and herbs to colonize the area.	

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

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:														
1. <u><i>Picea mariana</i></u>	<u>25</u>	<u>Yes</u>	<u>FACW</u>	Number of Dominant Species That Are OBL, FACW, or FAC: <u>6</u> (A)  Total Number of Dominant Species Across All Strata: <u>6</u> (B)  Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)														
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
Total Cover: <u>25</u> 50% of total cover: <u>12.5</u> 20% of total cover: <u>5</u>				<b>Prevalence Index worksheet:</b>  <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">Total % Cover of:</td> <td style="width: 50%; text-align: center;">Multiply by:</td> </tr> <tr> <td>OBL species <u>11</u></td> <td>x 1 = <u>11</u></td> </tr> <tr> <td>FACW species <u>51</u></td> <td>x 2 = <u>102</u></td> </tr> <tr> <td>FAC species <u>60</u></td> <td>x 3 = <u>180</u></td> </tr> <tr> <td>FACU species _____</td> <td>x 4 = <u>0</u></td> </tr> <tr> <td>UPL species _____</td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>122</u></td> <td>(A) <u>293</u> (B)</td> </tr> </table> Prevalence Index = B/A = <u>2.40</u>	Total % Cover of:	Multiply by:	OBL species <u>11</u>	x 1 = <u>11</u>	FACW species <u>51</u>	x 2 = <u>102</u>	FAC species <u>60</u>	x 3 = <u>180</u>	FACU species _____	x 4 = <u>0</u>	UPL species _____	x 5 = <u>0</u>	Column Totals: <u>122</u>	(A) <u>293</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>11</u>	x 1 = <u>11</u>																	
FACW species <u>51</u>	x 2 = <u>102</u>																	
FAC species <u>60</u>	x 3 = <u>180</u>																	
FACU species _____	x 4 = <u>0</u>																	
UPL species _____	x 5 = <u>0</u>																	
Column Totals: <u>122</u>	(A) <u>293</u> (B)																	
<b>Sapling/Shrub Stratum</b>				<b>Hydrophytic Vegetation Indicators:</b> Yes Dominance Test is >50% Yes Prevalence Index is ≤3.0 ___ Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.														
1. <u><i>Alnus viridis</i></u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>															
2. <u><i>Picea mariana</i></u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>															
3. <u><i>Dasiphora fruticosa</i></u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>															
4. <u><i>Vaccinium uliginosum</i></u>	<u>5</u>	_____	<u>FAC</u>															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
Total Cover: <u>35</u> 50% of total cover: <u>17.5</u> 20% of total cover: <u>7</u>																		
<b>Herb Stratum</b>																		
1. <u><i>Calamagrostis canadensis</i></u>	<u>25</u>	<u>Yes</u>	<u>FAC</u>															
2. <u><i>Sanguisorba canadensis</i></u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>															
3. <u><i>Deschampsia caespitosa</i></u>	<u>10</u>	_____	<u>FAC</u>															
4. <u><i>Equisetum fluviatile</i></u>	<u>10</u>	_____	<u>OBL</u>															
5. <u><i>Carex laeviculmis</i></u>	<u>5</u>	_____	<u>FACW</u>															
6. <u><i>Carex echinata</i></u>	<u>1</u>	_____	<u>OBL</u>															
7. <u><i>Parnassia palustris</i></u>	<u>1</u>	_____	<u>FACW</u>															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
10. _____	_____	_____	_____															
Total Cover: <u>62</u> 50% of total cover: <u>31</u> 20% of total cover: <u>12.4</u>																		
Plot size (radius, or length x width) <u>30-ft diameter</u> % Bare Ground _____ % Cover of Wetland Bryophytes <u>10</u> Total Cover of Bryophytes <u>10</u> (Where applicable)																		
Remarks: _____																		

**SOIL**

Sampling Point: DP-5

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 <sup>1</sup>	Loc <sup>2</sup>		
0-30	v dk gray brn 10YR3/2 black 10YR2/1	50 50					muck and plant debris, roots; saturated; greasy;	

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

<b>Hydric Soil Indicators:</b> <input checked="" type="checkbox"/> Histosol or Histel (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Alaska Gleyed (A13) <input type="checkbox"/> Alaska Redox (A14) <input type="checkbox"/> Alaska Gleyed Pores (A15)	<b>Indicators for Problematic Hydric Soils<sup>3</sup>:</b> <input type="checkbox"/> Alaska Color Change (TA4) <sup>4</sup> <input type="checkbox"/> Alaska Alpine Swales (TA5) <input type="checkbox"/> Alaska Redox With 2.5Y Hue  <sup>3</sup> One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present. <sup>4</sup> Give details of color change in Remarks.	<input type="checkbox"/> Alaska Gleyed Without Hue 5Y or Redder Underlying Layer <input type="checkbox"/> Other (Explain in Remarks)
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<b>Restrictive Layer (if present):</b> Type: Saturation Depth (inches): 0	<b>Hydric Soil Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
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Remarks: An area of groundwater discharge, small springs emerge from the slope and form streams that flow a short distance then seep back into the ground.

**HYDROLOGY**

<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators (any one indicator is sufficient)</b> <input checked="" type="checkbox"/> Surface Water (A1) <input checked="" type="checkbox"/> High Water Table (A2) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Surface Soil Cracks (B6)	<b>Secondary Indicators (2 or more required)</b> <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Water-stained Leaves (B9) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Salt Deposits (C5) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
<b>Field Observations:</b> Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): 4 Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): 0 Saturation Present? (includes capillary fringe) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): 0	<b>Wetland Hydrology Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	

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

Remarks: There has been an seasonally high cumulative precipitation in the region over the past growing season that likely contributes to the observed wetland hydrology. Cumulative total precipitation on August 26, 2014 was above normal with 8.29 inches since June 1st, compared to the normal of 5.71 inches, resulting in an excess of 3.21 inches. Since January 1st, the total was 12.15 inches, compared to the normal of 8.95 inches, resulting in an excess of 3.2 inches. The site is within the Rabbit Creek-Frontal Turnagain Arm Watershed (HUC 1902040107); Rabbit Creek Subwatershed (HUC 190204010701).

## WETLAND DETERMINATION DATA FORM – Alaska Region

MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW

Project/Site: corner of Upper DeArmount Rd and Canyon Rd. Borough/City: Anchorage Sampling Date: 8/26/2014

Applicant/Owner: \_\_\_\_\_ Sampling Point: DP-6

Investigator(s): Pat Athey Landform (hillside, terrace, hummocks, etc.): Mountain slope

Local relief (concave, convex, none): Concave Slope (%): \_\_\_\_\_

Subregion: Southcentral Lat: N 61.0994 Long: W 149.7196 Datum: NAD83

Soil Map Unit Name: 427—Jacobsen-Disappear-Doroshin complex. 7 to 12 percent slopes NWI classification: None Indicated

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ 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>X</u>	No	<b>Is the Sampled Area within a Wetland?</b>	Yes <u>X</u>	No _____
Hydric Soil Present?	Yes <u>X</u>	No			
Wetland Hydrology Present?	Yes <u>X</u>	No			

**Remarks:** Site is located on a south-facing mountain slope in open black spruce forest interspersed with sedge-grass meadows and small streams that emerge from the slopes, flow a short distance before re-entering the ground. Much of the spruce has been beetle-killed and blown down, opening up the canopy for shrubs and herbs to colonize the area.

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

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. <u><i>Picea mariana</i></u>	10	Yes	FACW	Number of Dominant Species That Are OBL, FACW, or FAC: <u>5</u> (A)	
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>5</u> (B)	
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)	
4. _____	_____	_____	_____	<b>Prevalence Index worksheet:</b>	
Total Cover: <u>10</u>				Total % Cover of:	
50% of total cover: <u>5</u> 20% of total cover: <u>2</u>				OBL species	<u>15</u> x 1 = <u>15</u>
Sapling/Shrub Stratum				FACW species	<u>35</u> x 2 = <u>70</u>
1. <u><i>Dasiphora fruticosa</i></u>	25	Yes	FAC	FAC species	<u>102</u> x 3 = <u>306</u>
2. <u><i>Alnus viridis</i></u>	10	Yes	FAC	FACU species	_____ x 4 = <u>0</u>
3. <u><i>Betula nana</i></u>	10	_____	FAC	UPL species	_____ x 5 = <u>0</u>
4. <u><i>Vaccinium uliginosum</i></u>	5	_____	FAC	Column Totals:	<u>152</u> (A) <u>391</u> (B)
5. <u><i>Ledum groenlandicum</i></u>	5	_____	FAC	Prevalence Index = B/A = <u>2.57</u>	
6. <u><i>Empetrum nigrum</i></u>	5	_____	FAC	<b>Hydrophytic Vegetation Indicators:</b>	
Total Cover: <u>60</u>				Yes Dominance Test is >50%	
50% of total cover: <u>30</u> 20% of total cover: <u>12</u>				Yes Prevalence Index is ≤3.0	
Herb Stratum				____ Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)	
1. <u><i>Calamagrostis canadensis</i></u>	25	Yes	FAC	____ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
2. <u><i>Arctagrostis latifolia</i></u>	25	Yes	FACW	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.	
3. <u><i>Sanguisorba canadensis</i></u>	10	_____	FACW		
4. <u><i>Equisetum fluviatile</i></u>	10	_____	OBL		
5. <u><i>Carex laeviculmis</i></u>	5	_____	FACW		
6. <u><i>Carex echinata</i></u>	5	_____	OBL		
7. <u><i>Geocaulon lividum</i></u>	1	_____	FACU		
8. <u><i>Mertensia paniculata</i></u>	1	_____	FACU		
9. _____	_____	_____	_____		
10. _____	_____	_____	_____		
Total Cover: <u>82</u>					
50% of total cover: <u>41</u> 20% of total cover: <u>16.4</u>					
Plot size (radius, or length x width) <u>30-ft diameter</u> % Bare Ground _____					
% Cover of Wetland Bryophytes <u>10</u> Total Cover of Bryophytes <u>10</u> (Where applicable)				Yes <u>X</u> No _____	
Remarks:					



## WETLAND DETERMINATION DATA FORM – Alaska Region

MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW

Project/Site: corner of Upper DeArmour Rd and Canyon Rd. Borough/City: Anchorage Sampling Date: 8/26/2014

Applicant/Owner: \_\_\_\_\_ Sampling Point: DP-7

Investigator(s): Pat Athey Landform (hillside, terrace, hummocks, etc.): Mountain slope

Local relief (concave, convex, none): Concave Slope (%): \_\_\_\_\_

Subregion: Southcentral Lat: N 61.0992 Long: W 149.7207 Datum: NAD83

Soil Map Unit Name: 427—Jacobsen-Disappear-Doroshin complex. 7 to 12 percent slopes NWI classification: None Indicated

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ 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>X</u> No _____ Hydric Soil Present?                    Yes <u>X</u> No _____ Wetland Hydrology Present?          Yes <u>X</u> No _____	<b>Is the Sampled Area within a Wetland?</b> Yes <u>X</u> No _____
<b>Remarks:</b> Site is located on a south-facing mountain slope in open black spruce forest interspersed with sedge-grass meadows and small streams that emerge from the slopes, flow a short distance before re-entering the ground. Much of the spruce has been beetle-killed and blown down, opening up the canopy for shrubs and herbs to colonize the area.	

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

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:														
1. <u><i>Picea mariana</i></u>	10	Yes	FACW	Number of Dominant Species That Are OBL, FACW, or FAC: <u>5</u> (A)  Total Number of Dominant Species Across All Strata: <u>5</u> (B)  Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)														
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
Total Cover: <u>10</u> 50% of total cover: <u>5</u> 20% of total cover: <u>2</u>				<b>Prevalence Index worksheet:</b>  <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: right;">Total % Cover of:</td> <td style="width: 50%; text-align: left;">Multiply by:</td> </tr> <tr> <td>OBL species <u>15</u></td> <td>x 1 = <u>15</u></td> </tr> <tr> <td>FACW species <u>35</u></td> <td>x 2 = <u>70</u></td> </tr> <tr> <td>FAC species <u>105</u></td> <td>x 3 = <u>315</u></td> </tr> <tr> <td>FACU species <u>2</u></td> <td>x 4 = <u>8</u></td> </tr> <tr> <td>UPL species _____</td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>157</u></td> <td>(A) <u>408</u> (B)</td> </tr> </table> Prevalence Index = B/A = <u>2.59</u>	Total % Cover of:	Multiply by:	OBL species <u>15</u>	x 1 = <u>15</u>	FACW species <u>35</u>	x 2 = <u>70</u>	FAC species <u>105</u>	x 3 = <u>315</u>	FACU species <u>2</u>	x 4 = <u>8</u>	UPL species _____	x 5 = <u>0</u>	Column Totals: <u>157</u>	(A) <u>408</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>15</u>	x 1 = <u>15</u>																	
FACW species <u>35</u>	x 2 = <u>70</u>																	
FAC species <u>105</u>	x 3 = <u>315</u>																	
FACU species <u>2</u>	x 4 = <u>8</u>																	
UPL species _____	x 5 = <u>0</u>																	
Column Totals: <u>157</u>	(A) <u>408</u> (B)																	
<b>Sapling/Shrub Stratum</b>				<b>Hydrophytic Vegetation Indicators:</b> Yes Dominance Test is >50% Yes Prevalence Index is ≤3.0 ___ Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.														
1. <u><i>Alnus viridis</i></u>	25	Yes	FAC															
2. <u><i>Picea mariana</i></u>	10	Yes	FACW															
3. <u><i>Dasiphora fruticosa</i></u>	10	_____	FAC															
4. <u><i>Betula nana</i></u>	10	_____	FAC															
5. <u><i>Vaccinium uliginosum</i></u>	5	_____	FAC															
6. <u><i>Ledum groenlandicum</i></u>	5	_____	FAC															
Total Cover: <u>65</u> 50% of total cover: <u>32.5</u> 20% of total cover: <u>13</u>																		
<b>Herb Stratum</b>																		
1. <u><i>Calamagrostis canadensis</i></u>	25	Yes	FAC															
2. <u><i>Deschampsia caespitosa</i></u>	25	Yes	FAC															
3. <u><i>Sanguisorba canadensis</i></u>	10	_____	FACW															
4. <u><i>Equisetum fluviatile</i></u>	10	_____	OBL															
5. <u><i>Carex laeviculmis</i></u>	5	_____	FACW															
6. <u><i>Carex echinata</i></u>	5	_____	OBL															
7. <u><i>Geocaulon lividum</i></u>	1	_____	FACU															
8. <u><i>Mertensia paniculata</i></u>	1	_____	FACU															
9. _____	_____	_____	_____															
10. _____	_____	_____	_____															
Total Cover: <u>82</u> 50% of total cover: <u>41</u> 20% of total cover: <u>16.4</u>																		
Plot size (radius, or length x width) <u>30-ft diameter</u> % Bare Ground _____ % Cover of Wetland Bryophytes <u>10</u> Total Cover of Bryophytes <u>10</u> (Where applicable)				<b>Hydrophytic Vegetation Present?</b> Yes <u>X</u> No _____														
<b>Remarks:</b>																		

**SOIL**

Sampling Point: DP-7

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 <sup>1</sup>			
0-30	v dk gray brn 10YR3/2	50					muck and plant debris, roots; saturated; greasy;	
	black 10YR2/1	50						

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

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

<b>Restrictive Layer (if present):</b> Type: <u>Saturation</u> Depth (inches): <u>0</u>	<b>Hydric Soil Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
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Remarks: An area of groundwater discharge, small springs emerge from the slope and form streams that flow a short distance then seep back into the ground.

**HYDROLOGY**

Wetland Hydrology Indicators:	Secondary Indicators (2 or more required)
<b>Primary Indicators (any one indicator is sufficient)</b> <input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Water-stained Leaves (B9) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Salt Deposits (C5) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)

<b>Field Observations:</b> Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>4</u> Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>0</u> Saturation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0</u> (includes capillary fringe)	<b>Wetland Hydrology Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: There has been an seasonally high cumulative precipitation in the region over the past growing season that likley contributes to the observed wetland hydrology. Cumulative total precipitation on August 26, 2014 was above normal with 8.29 inches since June 1st, compared to the normal of 5.71 inches, resulting in an excess of 3.21 inches. Since January 1st, the total was 12.15 inches, compared to the normal of 8.95 inches, resulting in an excess of 3.2 inches. The site is within the Rabbit Creek-Frontal Turnagain Arm Watershed (HUC 1902040107); Rabbit Creek Subwatershed (HUC 190204010701).

**WETLAND DETERMINATION DATA FORM – Alaska Region**

MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW  
 Project/Site: corner of Upper DeArmoun Rd and Canyon Rd. Borough/City: Anchorage Sampling Date: 8/26/2014  
 Applicant/Owner: \_\_\_\_\_ Sampling Point: DP-8  
 Investigator(s): Pat Athey Landform (hillside, terrace, hummocks, etc.): Mountain slope  
 Local relief (concave, convex, none): Convex Slope (%): \_\_\_\_\_  
 Subregion: Southcentral Lat: N 61.0987 Long: W 149.7210 Datum: NAD83  
 Soil Map Unit Name: 412—Deception-Estelle-Kichatna complex, 20 to 45 percent slopes NWI classification: None Indicated  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ 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>X</u>	No	<b>Is the Sampled Area within a Wetland?</b>		
Hydric Soil Present?	Yes	No <u>X</u>		Yes _____	No <u>X</u>
Wetland Hydrology Present?	Yes	No <u>X</u>			
Remarks: Site is located on a small knob along a south-facing mountain slope within open spruce-birch forest and bluejoint-herb meadow downslope. The location is slightly upslope of a major topographic break that runs east-west along the property, with the area further downslope to the south becoming dense black spruce forest and wet.					

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

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. <u><i>Betula papyrifera</i> (Southcentral)</u>	<u>25</u>	Yes	FAC	Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u>	(A)
2. <u><i>Picea glauca</i></u>	<u>1</u>		FACU	Total Number of Dominant Species Across All Strata: <u>5</u>	(B)
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>60</u>	(A/B)
4. _____				<b>Prevalence Index worksheet:</b>	
Total Cover: <u>26</u>				Total % Cover of:	
50% of total cover: <u>13</u> 20% of total cover: <u>5.2</u>				OBL species _____ x 1 = <u>0</u>	
<b>Sapling/Shrub Stratum</b>				FACW species <u>26</u> x 2 = <u>52</u>	
1. <u><i>Cornus canadensis</i></u>	<u>75</u>	Yes	FACU	FAC species <u>60</u> x 3 = <u>180</u>	
2. <u><i>Alnus viridis</i></u>	<u>10</u>		FAC	FACU species <u>103</u> x 4 = <u>412</u>	
3. <u><i>Vaccinium vitis-idaea</i></u>	<u>10</u>		FAC	UPL species _____ x 5 = <u>0</u>	
4. <u><i>Oplopanax horridus</i></u>	<u>5</u>		FACU	Column Totals: <u>189</u> (A) <u>644</u> (B)	
5. _____				Prevalence Index = B/A = <u>3.40</u>	
6. _____				<b>Hydrophytic Vegetation Indicators:</b>	
Total Cover: <u>100</u>				Yes Dominance Test is >50%	
50% of total cover: <u>50</u> 20% of total cover: <u>20</u>				No Prevalence Index is ≤3.0	
<b>Herb Stratum</b>				___ Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)	
1. <u><i>Sanguisorba canadensis</i></u>	<u>25</u>	Yes	FACW	___ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
2. <u><i>Geocaulon lividum</i></u>	<u>10</u>	Yes	FACU	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.	
3. <u><i>Calamagrostis canadensis</i></u>	<u>10</u>	Yes	FAC		
4. <u><i>Rhinanthus minor</i></u>	<u>5</u>		FACU		
5. <u><i>Equisetum arvense</i></u>	<u>5</u>		FAC		
6. <u><i>Phleum pratense</i></u>	<u>5</u>		FACU		
7. <u><i>Heracleum maximum</i></u>	<u>1</u>		FACU		
8. <u><i>Mertensia paniculata</i></u>	<u>1</u>		FACU		
9. <u><i>Carex mertensii</i></u>	<u>1</u>		FACW		
10. _____					
Total Cover: <u>63</u>				<b>Hydrophytic Vegetation Present?</b>	
50% of total cover: <u>31</u> 20% of total cover: <u>12.6</u>				Yes <u>X</u>	No _____
Plot size (radius, or length x width) <u>30-ft diameter</u> % Bare Ground _____					
% Cover of Wetland Bryophytes <u>0</u> Total Cover of Bryophytes <u>5</u>					
(Where applicable)					
Remarks:					

**SOIL**

Sampling Point: DP-8

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 <sup>1</sup>	Loc <sup>2</sup>		
+5-0	black 10YR2/1	50					silt, roots, wood debris and decomposed plant matter	
	dk red brn 5YR3/4	50						
0-5	black 10YR2/1	50					silt loam w/ gravel; many fine roots; dry	
	v dk gray 10YR3/1	50						
5-23	v pale brn 10YR7/3	50					silt loam w/ gravel & cobbles, dry; massive; firm	
	brown 10YR5/3	50						

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

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

**Restrictive Layer (if present):**  
 Type: None  
 Depth (inches): \_\_\_\_\_

**Hydric Soil Present?** Yes \_\_\_\_\_ No X

**Remarks:** The lower portion of the profile correlates with the mapped unit for this location, Deception-Estelle-Kichatna complex. The washed-out coloration of the lower profile is likely from remnant ash layers that leached down through underlying brown silt loam soil. The absence of redox indicators and lack of soil moisture during this wet season supports the finding of nonhydric soil.

**HYDROLOGY**

Wetland Hydrology Indicators:	Secondary Indicators (2 or more required)
<b>Primary Indicators (any one indicator is sufficient)</b>	<input type="checkbox"/> Water-stained Leaves (B9)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Salt Deposits (C5)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Microtopographic Relief (D4)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes \_\_\_\_\_ No X Depth (inches): \_\_\_\_\_

Water Table Present? Yes \_\_\_\_\_ No X Depth (inches): \_\_\_\_\_

Saturation Present? Yes \_\_\_\_\_ No X Depth (inches): \_\_\_\_\_  
 (includes capillary fringe)

**Wetland Hydrology Present?** Yes \_\_\_\_\_ No X

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

**Remarks:** The site lacks characteristics of wetland hydrology despite the seasonally high cumulative precipitation in the region. Cumulative total precipitation on August 26, 2014 was above normal with 8.29 inches since June 1st, compared to the normal of 5.71 inches, resulting in an excess of 3.21 inches. Since January 1st, the total was 12.15 inches, compared to the normal of 8.95 inches, resulting in an excess of 3.2 inches. The site is within the Rabbit Creek-Frontal Turnagain Arm Watershed (HUC 1902040107); Rabbit Creek Subwatershed (HUC 190204010701).

**WETLAND DETERMINATION DATA FORM – Alaska Region**

MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW

Project/Site: corner of Upper DeArmoun Rd and Canyon Rd. Borough/City: Anchorage Sampling Date: 8/26/2014

Applicant/Owner: \_\_\_\_\_ Sampling Point: DP-9

Investigator(s): Pat Athey Landform (hillside, terrace, hummocks, etc.): Mountain slope

Local relief (concave, convex, none): Convex Slope (%): \_\_\_\_\_

Subregion: Southcentral Lat: N 61.0996 Long: W 149.7245 Datum: NAD83

Soil Map Unit Name: 426—Jacobsen-Disappear-Doroshin complex, 3 to 7 percent slopes NWI classification: None Indicated

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ 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	No <u>X</u>	<b>Is the Sampled Area within a Wetland?</b> Yes _____ No <u>X</u>
Hydric Soil Present?	Yes	No <u>X</u>	
Wetland Hydrology Present?	Yes	No <u>X</u>	
Remarks: Site is located on a south-facing mountain slope in open bluejoint reed grass-herb meadow. The site is exposed with trees and high shrubs absent.			

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

<u>Tree Stratum</u>	<u>Absolute % Cover</u>	<u>Dominant Species?</u>	<u>Indicator Status</u>	<u>Dominance Test worksheet:</u>
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>2</u> (B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50</u> (A/B)
4. _____	_____	_____	_____	<b>Prevalence Index worksheet:</b>
Total Cover: <u>0</u>				Total % Cover of:
50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				OBL species _____ x 1 = <u>0</u>
<u>Sapling/Shrub Stratum</u>				FACW species _____ x 2 = <u>0</u>
1. <u>Rubus idaeus</u>	<u>25</u>	<u>Yes</u>	<u>FACU</u>	FAC species <u>105</u> x 3 = <u>315</u>
2. _____	_____	_____	_____	FACU species <u>31</u> x 4 = <u>124</u>
3. _____	_____	_____	_____	UPL species _____ x 5 = <u>0</u>
4. _____	_____	_____	_____	Column Totals: <u>136</u> (A) <u>439</u> (B)
5. _____	_____	_____	_____	Prevalence Index = B/A = <u>3.22</u>
6. _____	_____	_____	_____	<b>Hydrophytic Vegetation Indicators:</b>
Total Cover: <u>25</u>				<u>No</u> Dominance Test is >50%
50% of total cover: <u>12.5</u> 20% of total cover: <u>5</u>				<u>No</u> Prevalence Index is ≤3.0
<u>Herb Stratum</u>				____ Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
1. <u>Calamagrostis canadensis</u>	<u>100</u>	<u>Yes</u>	<u>FAC</u>	____ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
2. <u>Equisetum sylvaticum</u>	<u>5</u>	_____	<u>FAC</u>	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.
3. <u>Heracleum maximum</u>	<u>5</u>	_____	<u>FACU</u>	
4. <u>Gymnocarpium dryopteris</u>	<u>1</u>	_____	<u>FACU</u>	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
Total Cover: <u>111</u>				<b>Hydrophytic Vegetation Present?</b> Yes _____ No <u>X</u>
50% of total cover: <u>55.5</u> 20% of total cover: <u>22.2</u>				
Plot size (radius, or length x width) <u>30-ft diameter</u>	% Bare Ground _____			
% Cover of Wetland Bryophytes <u>0</u>	Total Cover of Bryophytes <u>0</u>			
(Where applicable)				
Remarks:				

**SOIL**

Sampling Point: DP-9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)									
Depth (inches)	Matrix		Redox Features			Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
	Color (moist)	%	Color (moist)	%					
+1-0	dk gray bm 10YR4/2	100						silt, roots, wood debris and decomposed plant matter	
0-7	black 10YR2/1 v dk gray 10YR3/1	50 50						silt loam w/ cobbles, few med roots; dry	
7-31	pale bm 10YR6/3 yel brown 10YR6/3	10 90						silt loam w/ gravel & cobbles, dry, massive; firm	

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

**Hydric Soil Indicators:**

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

**Restrictive Layer (if present):**  
 Type: None  
 Depth (inches): \_\_\_\_\_

**Hydric Soil Present?** Yes \_\_\_\_\_ No X

**Remarks:** The lower portion of the profile correlates with the mapped unit for this location, Deception-Estelle-Kichatna complex. The washed-out coloration of the lower profile is likely from remnant ash layers that leached down through underlying brown silt loam soil. The absence of redox indicators and lack of soil moisture during this wet season supports the finding of nonhydric soil.

**HYDROLOGY**

Wetland Hydrology Indicators:		Secondary Indicators (2 or more required)
<b>Primary Indicators (any one indicator is sufficient)</b>		<input type="checkbox"/> Water-stained Leaves (B9)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Marl Deposits (B15)	<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Salt Deposits (C5)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Algal Mat or Crust (B4)		<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Microtopographic Relief (D4)
<input type="checkbox"/> Surface Soil Cracks (B6)		<input type="checkbox"/> FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	<b>Wetland Hydrology Present?</b> Yes _____ No <u>X</u>
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present? (includes capillary fringe)	Yes _____ No <u>X</u>	Depth (inches): _____	

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

**Remarks:** The site lacks characteristics of wetland hydrology despite the seasonally high cumulative precipitation in the region. Cumulative total precipitation on August 26, 2014 was above normal with 8.29 inches since June 1st, compared to the normal of 5.71 inches, resulting in an excess of 3.21 inches. Since January 1st, the total was 12.15 inches, compared to the normal of 8.95 inches, resulting in an excess of 3.2 inches. The site is within the Rabbit Creek-Frontal Turnagain Arm Watershed (HUC 1902040107); Rabbit Creek Subwatershed (HUC 190204010701).

## WETLAND DETERMINATION DATA FORM – Alaska Region

MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW

Project/Site: corner of Upper DeArmount Rd and Canyon Rd. Borough/City: Anchorage Sampling Date: 8/26/2014

Applicant/Owner: \_\_\_\_\_ Sampling Point: DP-10

Investigator(s): Pat Athey Landform (hillside, terrace, hummocks, etc.): Mountain slope

Local relief (concave, convex, none): Convex Slope (%): \_\_\_\_\_

Subregion: Southcentral Lat: N 61.1000 Long: W 149.7256 Datum: NAD83

Soil Map Unit Name: 426—Jacobsen-Disappear-Doroshin complex, 3 to 7 percent slopes NWI classification: None Indicated

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ 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>X</u>	No	<b>Is the Sampled Area within a Wetland?</b>		
Hydric Soil Present?	Yes	No <u>X</u>		Yes _____	No <u>X</u>
Wetland Hydrology Present?	Yes	No <u>X</u>			
Remarks: Site is located on a south-facing mountain slope in open bluejoint reed grass-herb meadow. The site is partially exposed with trees and high shrubs occurring at the edge of the plot.					

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

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)	
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>3</u> (B)	
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>66.6</u> (A/B)	
4. _____	_____	_____	_____	Prevalence Index worksheet:	
Total Cover: <u>0</u>				Total % Cover of:	
50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				OBL species _____ x 1 = <u>0</u>	
Sapling/Shrub Stratum				FACW species _____ x 2 = <u>0</u>	
1. <u>Rubus idaeus</u>	<u>25</u>	<u>Yes</u>	<u>FACU</u>	FAC species <u>115</u> x 3 = <u>345</u>	
2. <u>Alnus viridis</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>	FACU species <u>31</u> x 4 = <u>124</u>	
3. _____	_____	_____	_____	UPL species _____ x 5 = <u>0</u>	
4. _____	_____	_____	_____	Column Totals: <u>146</u> (A) <u>469</u> (B)	
5. _____	_____	_____	_____	Prevalence Index = B/A = <u>3.21</u>	
6. _____	_____	_____	_____	Hydrophytic Vegetation Indicators:	
Total Cover: <u>35</u>				Yes Dominance Test is >50%	
50% of total cover: <u>17.5</u> 20% of total cover: <u>7</u>				No Prevalence Index is ≤3.0	
Herb Stratum				___ Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)	
1. <u>Calamagrostis canadensis</u>	<u>100</u>	<u>Yes</u>	<u>FAC</u>	___ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
2. <u>Equisetum sylvaticum</u>	<u>5</u>	_____	<u>FAC</u>	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.	
3. <u>Heracleum maximum</u>	<u>5</u>	_____	<u>FACU</u>		
4. <u>Gymnocarpium dryopteris</u>	<u>1</u>	_____	<u>FACU</u>		
5. _____	_____	_____	_____		
6. _____	_____	_____	_____		
7. _____	_____	_____	_____		
8. _____	_____	_____	_____		
9. _____	_____	_____	_____		
10. _____	_____	_____	_____		
Total Cover: <u>111</u>					
50% of total cover: <u>55.5</u> 20% of total cover: <u>22.2</u>					
Plot size (radius, or length x width) <u>30-ft diameter</u> % Bare Ground _____					
% Cover of Wetland Bryophytes <u>0</u> Total Cover of Bryophytes <u>0</u> (Where applicable)					
Remarks:					

**SOIL**

Sampling Point: DP-10

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 <sup>1</sup>	Loc <sup>2</sup>		
+2-0	dk gray bm 10YR4/2	100					silt, roots, wood debris and decomposed plant matter	
0-10	v pale bm 10YR7/2	20					ash and silt loam; many fine, med roots; dry	
	yel brown 10YR6/3	80						
7-31	pale bm 10YR6/3	10					silt loam w/ gravel & cobbles, dry, massive; firm	
	yel brown 10YR6/3	90						

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

**Hydric Soil Indicators:**

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

**Restrictive Layer (if present):**  
 Type: None  
 Depth (inches): \_\_\_\_\_

**Hydric Soil Present?** Yes \_\_\_\_\_ No X

**Remarks:** The profile correlates with the mapped unit for this location, Deception-Estelle-Kichatna complex. The absence of redox indicators and lack of soil moisture during this wet season supports the finding of nonhydric soil.

**HYDROLOGY**

Wetland Hydrology Indicators:		Secondary Indicators (2 or more required)
Primary Indicators (any one indicator is sufficient)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Water-stained Leaves (B9)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Marl Deposits (B15)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Salt Deposits (C5)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Algal Mat or Crust (B4)		<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Surface Soil Cracks (B6)		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	<b>Wetland Hydrology Present?</b> Yes _____ No <u>X</u>
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present? (includes capillary fringe)	Yes _____ No <u>X</u>	Depth (inches): _____	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			

**Remarks:** The site lacks characteristics of wetland hydrology despite the seasonally high cumulative precipitation in the region. Cumulative total precipitation on August 26, 2014 was above normal with 8.29 inches since June 1st, compared to the normal of 5.71 inches, resulting in an excess of 3.21 inches. Since January 1st, the total was 12.15 inches, compared to the normal of 8.95 inches, resulting in an excess of 3.2 inches. The site is within the Rabbit Creek-Frontal Turnagain Arm Watershed (HUC 1902040107); Rabbit Creek Subwatershed (HUC 190204010701).

## WETLAND DETERMINATION DATA FORM – Alaska Region

MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW

Project/Site: corner of Upper DeArmoun Rd and Canyon Rd. Borough/City: Anchorage Sampling Date: 8/26/2014  
 Applicant/Owner: \_\_\_\_\_ Sampling Point: DP-11  
 Investigator(s): Pat Athey Landform (hillside, terrace, hummocks, etc.): Mountain slope  
 Local relief (concave, convex, none): Convex Slope (%): \_\_\_\_\_  
 Subregion: Southcentral Lat: N 61.1010 Long: W 149.7251 Datum: NAD83  
 Soil Map Unit Name: 426—Jacobsen-Disappear-Doroshin complex, 3 to 7 percent slopes NWI classification: None Indicated  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ 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	No <u>X</u>	<b>Is the Sampled Area within a Wetland?</b>	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes	No <u>X</u>			
Wetland Hydrology Present?	Yes	No <u>X</u>			
Remarks: Site is located on a south-facing mountain slope in open bluejoint reed grass-herb meadow. The site is partially exposed with trees and high shrubs occurring at the edge of the plot.					

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

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)	
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>4</u> (B)	
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50</u> (A/B)	
4. _____	_____	_____	_____	Prevalence Index worksheet:	
Total Cover: <u>0</u>				Total % Cover of:	
50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				OBL species	x 1 = <u>0</u>
Sapling/Shrub Stratum				FACW species	x 2 = <u>0</u>
1. <u>Rubus idaeus</u>	<u>25</u>	<u>Yes</u>	<u>FACU</u>	FAC species	x 3 = <u>345</u>
2. <u>Alnus viridis</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>	FACU species	x 4 = <u>164</u>
3. <u>Sorbus scopulina</u>	<u>10</u>	<u>Yes</u>	<u>FACU</u>	UPL species	x 5 = <u>0</u>
4. _____	_____	_____	_____	Column Totals:	<u>156</u> (A) <u>509</u> (B)
5. _____	_____	_____	_____	Prevalence Index = B/A = <u>3.26</u>	
6. _____	_____	_____	_____	Hydrophytic Vegetation Indicators:	
Total Cover: <u>45</u>				No Dominance Test is >50%	
50% of total cover: <u>23</u> 20% of total cover: <u>9</u>				No Prevalence Index is ≤3.0	
Herb Stratum				Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)	
1. <u>Calamagrostis canadensis</u>	<u>100</u>	<u>Yes</u>	<u>FAC</u>	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
2. <u>Equisetum sylvaticum</u>	<u>5</u>	_____	<u>FAC</u>	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.	
3. <u>Heracleum maximum</u>	<u>5</u>	_____	<u>FACU</u>		
4. <u>Gymnocarpium dryopteris</u>	<u>1</u>	_____	<u>FACU</u>		
5. _____	_____	_____	_____		
6. _____	_____	_____	_____		
7. _____	_____	_____	_____		
8. _____	_____	_____	_____		
9. _____	_____	_____	_____		
10. _____	_____	_____	_____		
Total Cover: <u>111</u>					
50% of total cover: <u>56</u> 20% of total cover: <u>22</u>					
Plot size (radius, or length x width) <u>30-ft diameter</u> % Bare Ground _____					
% Cover of Wetland Bryophytes <u>0</u> Total Cover of Bryophytes <u>0</u> (Where applicable)					
Remarks:					

**SOIL**

Sampling Point: DP-11

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 <sup>1</sup>	Loc <sup>2</sup>		
+2-0	black 10YR2/1 dk red brn 5YR3/4	50 50						wood debris and decomposed plant material
0-8	black 10YR2/1 white 10YR 81 v pale brn 10YR7/2	50 20 20						charcol, ash, and silt loam; many fine, med roots; dry
8-25	pale brn 10YR6/3 yel brown 10YR6/3	10 90						silt loam w/ gravel & cobbles, dry; massive; firm

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

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

**Restrictive Layer (if present):**  
 Type: None  
 Depth (inches): \_\_\_\_\_

**Hydric Soil Present?** Yes \_\_\_\_\_ No X

Remarks: The absence of redox indicators and lack of soil moisture during this wet season supports the finding of nonhydric soil.

**HYDROLOGY**

Wetland Hydrology Indicators:		Secondary Indicators (2 or more required)	
Primary Indicators (any one indicator is sufficient)			
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Water-stained Leaves (B9)	
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Drainage Patterns (B10)	
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Marl Deposits (B15)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Presence of Reduced Iron (C4)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Salt Deposits (C5)	
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	
<input type="checkbox"/> Algal Mat or Crust (B4)		<input type="checkbox"/> Geomorphic Position (D2)	
<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Shallow Aquitard (D3)	
<input type="checkbox"/> Surface Soil Cracks (B6)		<input type="checkbox"/> Microtopographic Relief (D4)	
		<input type="checkbox"/> FAC-Neutral Test (D5)	

**Field Observations:**

Surface Water Present? Yes \_\_\_\_\_ No X Depth (inches): \_\_\_\_\_

Water Table Present? Yes \_\_\_\_\_ No X Depth (inches): \_\_\_\_\_

Saturation Present? Yes \_\_\_\_\_ No X Depth (inches): \_\_\_\_\_  
 (includes capillary fringe)

**Wetland Hydrology Present?** Yes \_\_\_\_\_ No X

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

Remarks: The site lacks characteristics of wetland hydrology despite the seasonally high cumulative precipitation in the region. Cumulative total precipitation on August 26, 2014 was above normal with 8.29 inches since June 1st, compared to the normal of 5.71 inches, resulting in an excess of 3.21 inches. Since January 1st, the total was 12.15 inches, compared to the normal of 8.95 inches, resulting in an excess of 3.2 inches. The site is within the Rabbit Creek-Frontal Turnagain Arm Watershed (HUC 1902040107); Rabbit Creek Subwatershed (HUC 190204010701).

## WETLAND DETERMINATION DATA FORM – Alaska Region

MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW

Project/Site: corner of Upper DeArmour Rd and Canyon Rd. Borough/City: Anchorage Sampling Date: 9/3/2014

Applicant/Owner: \_\_\_\_\_ Sampling Point: DP-12

Investigator(s): Pat Athey Landform (hillside, terrace, hummocks, etc.): Mountain slope

Local relief (concave, convex, none): Concave Slope (%): \_\_\_\_\_

Subregion: Southcentral Lat: N 61.1002 Long: W 149.7213 Datum: NAD83

Soil Map Unit Name: 427—Jacobsen-Disappear-Doroshin complex. 7 to 12 percent slopes NWI classification: None Indicated

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ 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	No <u>X</u>	<b>Is the Sampled Area within a Wetland?</b>	Yes _____	No <u>X</u>
Hydic Soil Present?	Yes	No <u>X</u>			
Wetland Hydrology Present?	Yes	No <u>X</u>			
Remarks: Site is located on a south-facing mountain slope in closed shrub-scrub of alder and red elder.					

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

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. <u><i>Alnus viridis</i></u>	10	Yes	FAC	Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A)
2. _____				Total Number of Dominant Species Across All Strata: <u>6</u> (B)
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50</u> (A/B)
4. _____				<b>Prevalence Index worksheet:</b>
Total Cover: <u>10</u>				Total % Cover of: _____ Multiply by: _____
50% of total cover: <u>5</u> 20% of total cover: <u>2</u>				OBL species _____ x 1 = <u>0</u>
Sapling/Shrub Stratum				FACW species _____ x 2 = <u>0</u>
1. <u><i>Alnus viridis</i></u>	75	Yes	FAC	FAC species <u>140</u> x 3 = <u>420</u>
2. <u><i>Sorbus scopulina</i></u>	25	Yes	FACU	FACU species <u>81</u> x 4 = <u>324</u>
3. <u><i>Ribes triste</i></u>	5		FAC	UPL species _____ x 5 = <u>0</u>
4. _____				Column Totals: <u>221</u> (A) <u>744</u> (B)
5. _____				Prevalence Index = B/A = <u>3.36</u>
6. _____				<b>Hydrophytic Vegetation Indicators:</b>
Total Cover: <u>105</u>				<u>No</u> Dominance Test is >50%
50% of total cover: <u>53</u> 20% of total cover: <u>21</u>				<u>No</u> Prevalence Index is ≤3.0
Herb Stratum				____ Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
1. <u><i>Calamagrostis canadensis</i></u>	50	Yes	FAC	____ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
2. <u><i>Mertensia paniculata</i></u>	25	Yes	FACU	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.
3. <u><i>Mertensia paniculata</i></u>	10	Yes	FACU	
4. <u><i>Chamerion angustifolium</i></u>	10		FACU	
5. <u><i>Urtica dioica</i></u>	10		FACU	
6. <u><i>Gymnocarpium dryopteris</i></u>	1		FACU	
7. _____				
8. _____				
9. _____				
10. _____				
Total Cover: <u>106</u>				
50% of total cover: <u>53</u> 20% of total cover: <u>21</u>				
Plot size (radius, or length x width) <u>30-ft diameter</u> % Bare Ground _____				
% Cover of Wetland Bryophytes <u>0</u> Total Cover of Bryophytes <u>0</u> (Where applicable)				
Remarks:				

**SOIL**

Sampling Point: DP-12

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 <sup>1</sup>	Loc <sup>2</sup>		
+10- +4	dk gray bm 10YR4/2	100					silt, roots, wood debris and decomposed plant matter	
+4-0	black 10YR2/1	50					silt loam, many fine roots, dry	
	v dk gray 10YR3/1	50						
0-11	dk gray bm 10YR4/2	100					gravelly silt loam; few med roots; dry	
11-17	v pale bm 10YR7/3	50					silt loam w/ gravel & cobbles, dry; loose	
	brown 10YR5/3	50						

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

**Hydric Soil Indicators:**

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

**Restrictive Layer (if present):**  
 Type: None  
 Depth (inches): \_\_\_\_\_

**Hydric Soil Present?** Yes \_\_\_\_\_ No X

Remarks: The absence of redox indicators and lack of soil moisture during this wet season supports the finding of nonhydric soil.

**HYDROLOGY**

Wetland Hydrology Indicators:		Secondary Indicators (2 or more required)
Primary Indicators (any one indicator is sufficient)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Water-stained Leaves (B9)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Marl Deposits (B15)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Salt Deposits (C5)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Algal Mat or Crust (B4)		<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Surface Soil Cracks (B6)		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	<b>Wetland Hydrology Present?</b> Yes _____ No <u>X</u>
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present? (includes capillary fringe)	Yes _____ No <u>X</u>	Depth (inches): _____	

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

Remarks: The site lacks characteristics of wetland hydrology despite the seasonally high cumulative precipitation in the region. Cumulative total precipitation on September 3, 2014 was above normal with 9.08 inches since June 1st, compared to the normal of 6.37 inches, resulting in an excess of 2.71 inches. Since January 1st, the total was 12.31 inches, compared to the normal of 9.61 inches, resulting in an excess of 2.7 inches. The site is within the Rabbit Creek-Frontal Turnagain Arm Watershed (HUC 1902040107); Rabbit Creek Subwatershed (HUC 190204010701).

## WETLAND DETERMINATION DATA FORM – Alaska Region

MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW

Project/Site: corner of Upper DeArmon Rd and Canyon Rd. Borough/City: Anchorage Sampling Date: 9/3/2014

Applicant/Owner: \_\_\_\_\_ Sampling Point: DP-13

Investigator(s): Pat Athey Landform (hillside, terrace, hummocks, etc.): Mountain slope

Local relief (concave, convex, none): Convex Slope (%): \_\_\_\_\_

Subregion: Southcentral Lat: N 61.0989 Long: W 149.7192 Datum: NAD83

Soil Map Unit Name: 427—Jacobsen-Disappear-Doroshin complex, 7 to 12 percent slopes NWI classification: None Indicated

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ 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	No	<u>X</u>	<b>Is the Sampled Area within a Wetland?</b>	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes	No	<u>X</u>			
Wetland Hydrology Present?	Yes	No	<u>X</u>			
Remarks: Site is located on a south-facing mountain slope in open spruce forest and dense alder shrub growth. Much of the spruce has been beetle-killed and blown down, opening up the canopy for shrubs and herbs to colonize the area.						

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

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. <u><i>Picea mariana</i></u>	<u>25</u>	Yes	<u>FACW</u>	Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A)  Total Number of Dominant Species Across All Strata: <u>8</u> (B)  Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50</u> (A/B)
2. <u><i>Alnus viridis</i></u>	<u>10</u>	Yes	<u>FAC</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
Total Cover: <u>35</u>				<b>Prevalence Index worksheet:</b>  Total % Cover of: _____ Multiply by: OBL species _____ x 1 = <u>0</u> FACW species <u>75</u> x 2 = <u>150</u> FAC species <u>35</u> x 3 = <u>105</u> FACU species <u>104</u> x 4 = <u>416</u> UPL species _____ x 5 = <u>0</u> Column Totals: <u>214</u> (A) <u>671</u> (B)
50% of total cover: <u>18</u> 20% of total cover: <u>7</u>				
Sapling/Shrub Stratum				
1. <u><i>Alnus viridis</i></u>	<u>25</u>	Yes	<u>FAC</u>	Prevalence Index = B/A = <u>3.13</u>  <b>Hydrophytic Vegetation Indicators:</b> No Dominance Test is >50% No Prevalence Index is ≤3.0 ___ Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.
2. <u><i>Rosa acicularis</i></u>	<u>25</u>	Yes	<u>FACU</u>	
3. <u><i>Rubus idaeus</i></u>	<u>10</u>	Yes	<u>FACU</u>	
4. <u><i>Oplopanax horridus</i></u>	<u>5</u>	_____	<u>FACU</u>	
5. <u><i>Cornus canadensis</i></u>	<u>5</u>	_____	<u>FACU</u>	
6. _____	_____	_____	_____	
Total Cover: <u>70</u>				
50% of total cover: <u>35</u> 20% of total cover: <u>14</u>				
Herb Stratum				
1. <u><i>Calamagrostis canadensis</i></u>	<u>50</u>	Yes	<u>FAC</u>	<b>Hydrophytic Vegetation Present?</b> Yes _____ No <u>X</u>
2. <u><i>Mertensia paniculata</i></u>	<u>25</u>	Yes	<u>FACU</u>	
3. <u><i>Heracleum maximum</i></u>	<u>10</u>	Yes	<u>FACU</u>	
4. <u><i>Chamerion angustifolium</i></u>	<u>10</u>	_____	<u>FACU</u>	
5. <u><i>Urtica dioica</i></u>	<u>10</u>	_____	<u>FACU</u>	
6. <u><i>Gymnocarpium dryopteris</i></u>	<u>1</u>	_____	<u>FACU</u>	
7. <u><i>Mertensia paniculata</i></u>	<u>1</u>	_____	<u>FACU</u>	
8. <u><i>Geranium erianthum</i></u>	<u>1</u>	_____	<u>FACU</u>	
9. <u><i>Chamerion angustifolium</i></u>	<u>1</u>	_____	<u>FACU</u>	
10. _____	_____	_____	_____	
Total Cover: <u>109</u>				
50% of total cover: <u>55</u> 20% of total cover: <u>22</u>				
Plot size (radius, or length x width) <u>30-ft diameter</u> % Bare Ground _____				
% Cover of Wetland Bryophytes <u>0</u> Total Cover of Bryophytes <u>0</u> (Where applicable)				
Remarks:				

**SOIL**

Sampling Point: DP-13

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 <sup>1</sup>		
+8-0	black 10YR2/1 dk red brn 5YR3/4	50 50					silt, roots, wood debris and decomposed plant matter
+4-0	black 10YR2/1 v dk gray 10YR3/1	50 50					silt loam, many fine roots, dry
0-11	black 10YR2/1	100					silt loam; few med roots; dry; greasy when wetted
11-14	black 10YR2/1 white 10YR 8/1	80 20					silt loam and ash; dry

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

**Hydric Soil Indicators:**

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

**Restrictive Layer (if present):**

Type: None \_\_\_\_\_

Depth (inches): \_\_\_\_\_

**Hydric Soil Present?** Yes \_\_\_\_\_ No

Remarks: The absence of redox indicators and lack of soil moisture during this wet season supports the finding of nonhydric soil.

**HYDROLOGY**

Wetland Hydrology Indicators:		Secondary Indicators (2 or more required)	
Primary Indicators (any one indicator is sufficient)			
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Water-stained Leaves (B9)	
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Drainage Patterns (B10)	
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Marl Deposits (B15)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Presence of Reduced Iron (C4)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Salt Deposits (C5)	
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	
<input type="checkbox"/> Algal Mat or Crust (B4)		<input type="checkbox"/> Geomorphic Position (D2)	
<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Shallow Aquitard (D3)	
<input type="checkbox"/> Surface Soil Cracks (B6)		<input type="checkbox"/> Microtopographic Relief (D4)	
		<input type="checkbox"/> FAC-Neutral Test (D5)	
<b>Field Observations:</b>		<b>Wetland Hydrology Present?</b> Yes _____ No <input checked="" type="checkbox"/>	
Surface Water Present?	Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____		
Water Table Present?	Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____		
Saturation Present? (includes capillary fringe)	Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____		
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks: The site lacks characteristics of wetland hydrology despite the seasonally high cumulative precipitation in the region. Cumulative total precipitation on September 3, 2014 was above normal with 9.08 inches since June 1st, compared to the normal of 6.37 inches, resulting in an excess of 2.71 inches. Since January 1st, the total was 12.31 inches, compared to the normal of 9.61 inches, resulting in an excess of 2.7 inches. The site is within the Rabbit Creek-Frontal Turnagain Arm Watershed (HUC 1902040107); Rabbit Creek Subwatershed (HUC 190204010701).			

## WETLAND DETERMINATION DATA FORM – Alaska Region

MOA Parcel 1707306000: SEC 25, T12N, R3W, SM; SW

Project/Site: corner of Upper DeArmoun Rd and Canyon Rd. Borough/City: Anchorage Sampling Date: 9/3/2014

Applicant/Owner: \_\_\_\_\_ Sampling Point: DP-15

Investigator(s): Pat Athey Landform (hillside, terrace, hummocks, etc.): Mountain slope

Local relief (concave, convex, none): Convex Slope (%): \_\_\_\_\_

Subregion: Southcentral Lat: N 61.0989 Long: W 149.7249 Datum: NAD83

Soil Map Unit Name: 412—Deception-Estelle-Kichatna complex. 20 to 45 percent slopes NWI classification: None Indicated

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ 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	No <u>X</u>	<b>Is the Sampled Area within a Wetland?</b>	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes	No <u>X</u>			
Wetland Hydrology Present?	Yes	No <u>X</u>			
Remarks: Site is located on a south-facing mountain slope in open bluejoint reed grass-herb meadow. The site is exposed with trees and high shrubs absent.					

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

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)	
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>4</u> (B)	
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>25</u> (A/B)	
4. _____	_____	_____	_____	<b>Prevalence Index worksheet:</b>	
Total Cover: <u>0</u>				Total % Cover of:	
50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				OBL species	x 1 = <u>0</u>
Sapling/Shrub Stratum				FACW species	x 2 = <u>0</u>
1. <u>Rubus idaeus</u>	<u>25</u>	<u>Yes</u>	<u>FACU</u>	FAC species	<u>105</u> x 3 = <u>315</u>
2. <u>Sorbus scopulina</u>	<u>10</u>	<u>Yes</u>	<u>FACU</u>	FACU species	<u>51</u> x 4 = <u>204</u>
3. <u>Rubus idaeus</u>	<u>10</u>	<u>Yes</u>	<u>FACU</u>	UPL species	x 5 = <u>0</u>
4. _____	_____	_____	_____	Column Totals:	<u>156</u> (A) <u>519</u> (B)
5. _____	_____	_____	_____	Prevalence Index = B/A = <u>3.32</u>	
6. _____	_____	_____	_____	<b>Hydrophytic Vegetation Indicators:</b>	
Total Cover: <u>45</u>				No Dominance Test is >50%	
50% of total cover: <u>23</u> 20% of total cover: <u>9</u>				No Prevalence Index is ≤3.0	
Herb Stratum				Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)	
1. <u>Calamagrostis canadensis</u>	<u>100</u>	<u>Yes</u>	<u>FAC</u>	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
2. <u>Equisetum sylvaticum</u>	<u>5</u>	_____	<u>FAC</u>	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.	
3. <u>Heracleum maximum</u>	<u>5</u>	_____	<u>FACU</u>		
4. <u>Gymnocarpium dryopteris</u>	<u>1</u>	_____	<u>FACU</u>		
5. _____	_____	_____	_____		
6. _____	_____	_____	_____		
7. _____	_____	_____	_____		
8. _____	_____	_____	_____		
9. _____	_____	_____	_____		
10. _____	_____	_____	_____		
Total Cover: <u>111</u>					
50% of total cover: <u>56</u> 20% of total cover: <u>22</u>					
Plot size (radius, or length x width) <u>30-ft diameter</u> % Bare Ground _____					
% Cover of Wetland Bryophytes <u>0</u> Total Cover of Bryophytes <u>0</u> (Where applicable)					
Remarks:					

**SOIL**

Sampling Point: DP-15

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 <sup>1</sup>	Loc <sup>2</sup>		
+2-0	dk gray brn 10YR4/2	100					silt, roots, and decomposed plant matter	
0-8	black 10YR2/1 v dk gray 10YR3/1	50 50					silt loam, many fine roots, dry	
8-29	brown 10YR5/3 yel brown 10YR5/6	50 50					silt loam w/ gravel & cobbles, dry, massive; loose	
>29							cobbles and gravel, compacted, dry	

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

**Hydric Soil Indicators:**

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

**Restrictive Layer (if present):**

Type: None

Depth (inches): \_\_\_\_\_

**Hydric Soil Present?** Yes \_\_\_\_\_ No X

**Remarks:** The profile correlates with the mapped unit for this location, Deception-Estelle-Kichatna complex. The absence of redox indicators and lack of soil moisture during this wet season supports the finding of nonhydric soil.

**HYDROLOGY**

Wetland Hydrology Indicators:		Secondary Indicators (2 or more required)
<b>Primary Indicators (any one indicator is sufficient)</b>		<input type="checkbox"/> Water-stained Leaves (B9)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Marl Deposits (B15)	<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Salt Deposits (C5)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Algal Mat or Crust (B4)		<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Microtopographic Relief (D4)
<input type="checkbox"/> Surface Soil Cracks (B6)		<input type="checkbox"/> FAC-Neutral Test (D5)
<b>Field Observations:</b>		<b>Wetland Hydrology Present?</b> Yes _____ No <u>X</u>
Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____	Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____	
Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)		
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
<p><b>Remarks:</b> The site lacks characteristics of wetland hydrology despite the seasonally high cumulative precipitation in the region. Cumulative total precipitation on September 3, 2014 was above normal with 9.08 inches since June 1st, compared to the normal of 6.37 inches, resulting in an excess of 2.71 inches. Since January 1st, the total was 12.31 inches, compared to the normal of 9.61 inches, resulting in an excess of 2.7 inches. The site is within the Rabbit Creek-Frontal Turnagain Arm Watershed (HUC 1902040107); Rabbit Creek Subwatershed (HUC 190204010701).</p>		

## WETLAND DETERMINATION DATA FORM – Alaska Region

MOA Parcel 1707306000; SEC 25, T12N, R3W, SM: SW  
 Project/Site: corner of Upper DeArmour Rd and Canyon Rd. Borough/City: Anchorage Sampling Date: 9/3/2014  
 Applicant/Owner: \_\_\_\_\_ Sampling Point: DP-16  
 Investigator(s): Pat Athey Landform (hillside, terrace, hummocks, etc.): Mountain slope  
 Local relief (concave, convex, none): Concave Slope (%): \_\_\_\_\_  
 Subregion: Southcentral Lat: N 61.0989 Long: W 149.7270 Datum: NAD83  
 Soil Map Unit Name: 412—Deception-Estelle-Kichatna complex, 20 to 45 percent slopes NWI classification: None Indicated  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ 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	No <u>X</u>	Is the Sampled Area within a Wetland?	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes	No <u>X</u>			
Wetland Hydrology Present?	Yes	No <u>X</u>			
Remarks: Site is located on a south-facing mountain slope in open bluejoint reed grass-herb meadow. The site is exposed with trees and high shrubs absent.					

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

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:			
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)			
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>4</u> (B)			
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>25</u> (A/B)			
4. _____	_____	_____	_____	Prevalence Index worksheet:			
Total Cover: <u>0</u>				Total % Cover of:			
50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				OBL species	x 1 = <u>0</u>		
Sapling/Shrub Stratum				FACW species	x 2 = <u>0</u>		
1. <u>Rubus idaeus</u>	<u>25</u>	Yes	FACU	FAC species	<u>125</u> x 3 = <u>375</u>		
2. <u>Sorbus scopulina</u>	<u>10</u>	Yes	FACU	FACU species	<u>59</u> x 4 = <u>236</u>		
3. <u>Rubus idaeus</u>	<u>10</u>	Yes	FACU	UPL species	x 5 = <u>0</u>		
4. _____	_____	_____	_____	Column Totals:	<u>184</u> (A) <u>611</u> (B)		
5. _____	_____	_____	_____	Prevalence Index = B/A = <u>3.32</u>			
6. _____	_____	_____	_____	Hydrophytic Vegetation Indicators:			
Total Cover: <u>45</u>				No Dominance Test is >50%			
50% of total cover: <u>23</u> 20% of total cover: <u>9</u>				No Prevalence Index is ≤3.0			
Herb Stratum				___ Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)			
1. <u>Calamagrostis canadensis</u>	<u>100</u>	Yes	FAC	___ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)			
2. <u>Athyrium filix-femina</u>	<u>25</u>	_____	FAC	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.			
3. <u>Heracleum maximum</u>	<u>10</u>	_____	FACU	Hydrophytic Vegetation Present?    Yes _____    No <u>X</u>			
4. <u>Gymnocarpium dryopteris</u>	<u>1</u>	_____	FACU				
5. <u>Mertensia paniculata</u>	<u>1</u>	_____	FACU				
6. <u>Chamerion angustifolium</u>	<u>1</u>	_____	FACU				
7. <u>Equisetum sylvaticum</u>	<u>1</u>	_____	FAC				
8. _____	_____	_____	_____				
9. _____	_____	_____	_____				
10. _____	_____	_____	_____				
Total Cover: <u>139</u>							
50% of total cover: <u>70</u> 20% of total cover: <u>28</u>							
Plot size (radius, or length x width) <u>30-ft diameter</u> % Bare Ground _____							
% Cover of Wetland Bryophytes <u>0</u> Total Cover of Bryophytes <u>0</u>							
(Where applicable)							
Remarks:							

**SOIL**

Sampling Point: DP-16

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 <sup>1</sup>		
+1-0	dk gray brn 10YR4/2	100					silt, roots, and decomposed plant matter
0-12	gray brn 10YR5/2	50					silty gravel, many fine/med roots, dry
	v dk gray 10YR3/1	50					
12-19	gray brn 10YR5/2	80					gravel and small cobble, few med roots, moist (not saturated)
	gray 10YR6/1	20					
19-29	gray 10YR6/1	20					cobbles and gravel, compacted, saturated
	lt gray 10YR7/1	80					

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: 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 Soils<sup>3</sup>:**

Alaska Color Change (TA4)<sup>4</sup>

Alaska Alpine Swales (TA5)

Alaska Redox With 2.5Y Hue

Alaska Gleyed Without Hue 5Y or Redder Underlying Layer

Other (Explain in Remarks)

<sup>3</sup>One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.

<sup>4</sup>Give details of color change in Remarks.

**Restrictive Layer (if present):**

Type: None

Depth (inches): \_\_\_\_\_

**Hydric Soil Present?** Yes \_\_\_\_\_ No X

**Remarks:** The presence of depleted (lt gray) soil is indicative of hydric conditions below 12-in. depth, which is too deep to qualify the soil profile as hydric. The absence of redox indicators and lack of soil moisture in the upper 12-in. during this wet season supports the finding of nonhydric soil.

**HYDROLOGY**

Wetland Hydrology Indicators:		Secondary Indicators (2 or more required)
<b>Primary Indicators (any one indicator is sufficient)</b>		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Water-stained Leaves (B9)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Marl Deposits (B15)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Salt Deposits (C5)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Algal Mat or Crust (B4)		<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Surface Soil Cracks (B6)		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)
<b>Field Observations:</b>		
Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____		
Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____		
Saturation Present? (includes capillary fringe) Yes <u>X</u> No _____ Depth (inches): <u>19</u>	<b>Wetland Hydrology Present?</b> Yes _____ No <u>X</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
<p><b>Remarks:</b> Saturation at 19-in. depth is below the threshold for wetland hydrology, especially supported by the abundance of accumulated precipitation at the time of the investigation. Cumulative total precipitation on September 3, 2014 was above normal with 9.08 inches since June 1st, compared to the normal of 6.37 inches, resulting in an excess of 2.71 inches. Since January 1st, the total was 12.31 inches, compared to the normal of 9.61 inches, resulting in an excess of 2.7 inches. The site is within the Rabbit Creek-Frontal Turnagain Arm Watershed (HUC 1902040107); Rabbit Creek Subwatershed (HUC 190204010701).</p>		

## WETLAND DETERMINATION DATA FORM – Alaska Region

MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW

Project/Site: corner of Upper DeArmoun Rd and Canyon Rd. Borough/City: Anchorage Sampling Date: 9/4/2014

Applicant/Owner: \_\_\_\_\_ Sampling Point: DP-17

Investigator(s): Pat Athey Landform (hillside, terrace, hummocks, etc.): Mountain slope

Local relief (concave, convex, none): Concave Slope (%): \_\_\_\_\_

Subregion: Southcentral Lat: N 61.0986 Long: W 149.7153 Datum: NAD83

Soil Map Unit Name: 427—Jacobsen-Disappear-Doroshin complex, 7 to 12 percent slopes NWI classification: None Indicated

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ 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>X</u>	No	<b>Is the Sampled Area within a Wetland?</b>	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes	No <u>X</u>			
Wetland Hydrology Present?	Yes	No <u>X</u>			
Remarks: Site is located on a south-facing mountain slope in closed shrub-scrub of red elder and alder.					

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

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. <u><i>Alnus viridis</i></u>	10	Yes	FAC	Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A)	
2. _____				Total Number of Dominant Species Across All Strata: <u>5</u> (B)	
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>60</u> (A/B)	
4. _____				<b>Prevalence Index worksheet:</b>	
Total Cover: <u>10</u>				Total % Cover of: _____ Multiply by:	
50% of total cover: <u>5</u> 20% of total cover: <u>2</u>				OBL species _____ x 1 = <u>0</u>	
Sapling/Shrub Stratum				FACW species _____ x 2 = <u>0</u>	
1. <u><i>Sorbus scopulina</i></u>	75	Yes	FACU	FAC species <u>60</u> x 3 = <u>180</u>	
2. <u><i>Alnus viridis</i></u>	25	Yes	FAC	FACU species <u>137</u> x 4 = <u>548</u>	
3. _____				UPL species _____ x 5 = <u>0</u>	
4. _____				Column Totals: <u>197</u> (A) <u>728</u> (B)	
5. _____				Prevalence Index = B/A = <u>3.69</u>	
6. _____				<b>Hydrophytic Vegetation Indicators:</b>	
Total Cover: <u>100</u>				Yes Dominance Test is >50%	
50% of total cover: <u>50</u> 20% of total cover: <u>20</u>				No Prevalence Index is ≤3.0	
Herb Stratum				____ Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)	
1. <u><i>Urtica dioica</i></u>	50	Yes	FACU	____ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
2. <u><i>Calamagrostis canadensis</i></u>	25	Yes	FAC	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.	
3. <u><i>Chamerion angustifolium</i></u>	10		FACU		
4. <u><i>Mertensia paniculata</i></u>	1		FACU		
5. <u><i>Streptopus amplexifolius</i></u>	1		FACU		
6. _____					
7. _____					
8. _____					
9. _____					
10. _____					
Total Cover: <u>87</u>					
50% of total cover: <u>44</u> 20% of total cover: <u>17</u>					
Plot size (radius, or length x width) <u>30-ft diameter</u> % Bare Ground _____					
% Cover of Wetland Bryophytes <u>0</u> Total Cover of Bryophytes <u>0</u> (Where applicable)					
Remarks:					

**SOIL**

Sampling Point: DP-17

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 <sup>1</sup>	Loc <sup>2</sup>		
+10 -0	black 10YR2/1	50					silt, roots, wood debris and decomposed plant matter	
	dk gray brn 10YR4/2	50						
0-23	gray brn 10YR5/2	50					silt loam and decomposed plant material; few med roots; dry	
	yel brown 10YR6/3	50						
23-34	yel brown 10YR6/3	80					silt loam; few med roots; dry	
	dk gray brn 10YR4/2	20						

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

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

<b>Restrictive Layer (if present):</b> Type: <u>None</u> Depth (inches): _____	<b>Hydric Soil Present?</b> Yes _____ No <u>X</u>
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Remarks: The lower portion of the profile correlates with the mapped unit for adjacent areas, Deception-Estelle-Kichatna complex. The absence of redox indicators and lack of soil moisture during this wet season supports the finding of nonhydric soil.

**HYDROLOGY**

Wetland Hydrology Indicators:	Secondary Indicators (2 or more required)
<b>Primary Indicators (any one indicator is sufficient)</b> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Water-stained Leaves (B9) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Salt Deposits (C5) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
<b>Field Observations:</b> Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	<b>Wetland Hydrology Present?</b> Yes _____ No <u>X</u>

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

Remarks: The site lacks characteristics of wetland hydrology despite the seasonally high cumulative precipitation in the region. Cumulative total precipitation on September 4, 2014 was above normal with 9.63 inches since June 1st, compared to the normal of 6.47 inches, resulting in an excess of 3.16 inches. Since January 1st, the total was 12.86 inches, compared to the normal of 9.71 inches, resulting in an excess of 3.15 inches. The site is within the Rabbit Creek-Frontal Turnagain Arm Watershed (HUC 1902040107); Rabbit Creek Subwatershed (HUC 190204010701).

## WETLAND DETERMINATION DATA FORM – Alaska Region

MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW

Project/Site: corner of Upper DeArmoun Rd and Canyon Rd. Borough/City: Anchorage Sampling Date: 9/4/2014

Applicant/Owner: \_\_\_\_\_ Sampling Point: DP-18

Investigator(s): Pat Athey Landform (hillside, terrace, hummocks, etc.): Mountain slope

Local relief (concave, convex, none): Convex Slope (%): \_\_\_\_\_

Subregion: Southcentral Lat: N 61.0985 Long: W 149.7166 Datum: NAD83

Soil Map Unit Name: 412—Deception-Estelle-Kichatna complex, 20 to 45 percent slopes NWI classification: None Indicated

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ 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>X</u>	No	<b>Is the Sampled Area within a Wetland?</b>		
Hydric Soil Present?	Yes	No <u>X</u>		Yes _____	No <u>X</u>
Wetland Hydrology Present?	Yes	No <u>X</u>			
Remarks: Site is located on a south-facing mountain slope in open bluejoint reed grass-herb meadow. The site is exposed with trees and high shrubs absent.					

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

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)	
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>1</u> (B)	
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)	
4. _____	_____	_____	_____	<b>Prevalence Index worksheet:</b>	
Total Cover: <u>0</u>				Total % Cover of: _____ Multiply by: _____	
50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				OBL species _____ x 1 = <u>0</u>	
Sapling/Shrub Stratum				FACW species _____ x 2 = <u>0</u>	
1. _____	_____	_____	_____	FAC species <u>126</u> x 3 = <u>378</u>	
2. _____	_____	_____	_____	FACU species <u>13</u> x 4 = <u>52</u>	
3. _____	_____	_____	_____	UPL species _____ x 5 = <u>0</u>	
4. _____	_____	_____	_____	Column Totals: <u>139</u> (A) <u>430</u> (B)	
5. _____	_____	_____	_____	Prevalence Index = B/A = <u>3.09</u>	
6. _____	_____	_____	_____	<b>Hydrophytic Vegetation Indicators:</b>	
Total Cover: <u>0</u>				Yes Dominance Test is >50%	
50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				No Prevalence Index is ≤3.0	
Herb Stratum				____ Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)	
1. <u>Calamagrostis canadensis</u>	<u>100</u>	<u>Yes</u>	<u>FAC</u>	____ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
2. <u>Athyrium filix-femina</u>	<u>25</u>	_____	<u>FAC</u>	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.	
3. <u>Heracleum maximum</u>	<u>10</u>	_____	<u>FACU</u>		
4. <u>Gymnocarpium dryopteris</u>	<u>1</u>	_____	<u>FACU</u>		
5. <u>Mertensia paniculata</u>	<u>1</u>	_____	<u>FACU</u>		
6. <u>Chamerion angustifolium</u>	<u>1</u>	_____	<u>FACU</u>		
7. <u>Equisetum sylvaticum</u>	<u>1</u>	_____	<u>FAC</u>		
8. _____	_____	_____	_____		
9. _____	_____	_____	_____		
10. _____	_____	_____	_____		
Total Cover: <u>139</u>				<b>Hydrophytic Vegetation Present?</b> Yes <u>X</u> No _____	
50% of total cover: <u>70</u> 20% of total cover: <u>28</u>					
Plot size (radius, or length x width) <u>30-ft diameter</u> % Bare Ground _____					
% Cover of Wetland Bryophytes <u>0</u> Total Cover of Bryophytes <u>0</u>					
(Where applicable)					
Remarks:					

**SOIL**

Sampling Point: DP-18

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 <sup>1</sup>	Loc <sup>2</sup>		
+2 -0	dk gray brn 10YR4/2	100					silt loam; many fine/med roots; wood debris and decomposed plant matter	
0-10	dk yel brn 10YR4/4	50					silt loam; many fine/med roots; dry	
	dk gray brn 10YR4/2	50						
10-23	yel brown 10YR6/3	60					sandy silt loam; dry	
	gray brn 10YR5/2	20						
	dk gray brn 10YR4/2	20						
23-35	brown 10YR5/3	50					sandy silt loam; dry; massive; loose	
	yel brown 10YR5/6	50						

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

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

<b>Restrictive Layer (if present):</b> Type: <u>None</u> Depth (inches): _____	<b>Hydric Soil Present?</b> Yes _____ No <u>X</u>
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Remarks: The profile correlates with the mapped unit for this location, Deception-Estelle-Kichatna complex. The absence of redox indicators and lack of soil moisture during this wet season supports the finding of nonhydric soil.

**HYDROLOGY**

Wetland Hydrology Indicators:		Secondary Indicators (2 or more required)
<u>Primary Indicators (any one indicator is sufficient)</u>		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Water-stained Leaves (B9)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Marl Deposits (B15)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Salt Deposits (C5)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Algal Mat or Crust (B4)		<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Surface Soil Cracks (B6)		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)
<b>Field Observations:</b> Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)		<b>Wetland Hydrology Present?</b> Yes _____ No <u>X</u>

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

Remarks: The site lacks characteristics of wetland hydrology despite the seasonally high cumulative precipitation in the region. Cumulative total precipitation on September 4, 2014 was above normal with 9.63 inches since June 1st, compared to the normal of 6.47 inches, resulting in an excess of 3.16 inches. Since January 1st, the total was 12.86 inches, compared to the normal of 9.71 inches, resulting in an excess of 3.15 inches. The site is within the Rabbit Creek-Frontal Turnagain Arm Watershed (HUC 1902040107); Rabbit Creek Subwatershed (HUC 190204010701).

## WETLAND DETERMINATION DATA FORM – Alaska Region

MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW  
 Project/Site: corner of Upper DeArmoun Rd and Canyon Rd. Borough/City: Anchorage Sampling Date: 9/4/2014  
 Applicant/Owner: \_\_\_\_\_ Sampling Point: DP-19  
 Investigator(s): Pat Athey Landform (hillside, terrace, hummocks, etc.): Mountain slope  
 Local relief (concave, convex, none): Concave Slope (%): \_\_\_\_\_  
 Subregion: Southcentral Lat: N 61.0980 Long: W 149.7177 Datum: NAD83  
 Soil Map Unit Name: 412—Deception-Estelle-Kichatna complex. 20 to 45 percent slopes NWI classification: None Indicated  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ 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	No <u>X</u>	<b>Is the Sampled Area within a Wetland?</b>		
Hydric Soil Present?	Yes	No <u>X</u>		Yes _____	No <u>X</u>
Wetland Hydrology Present?	Yes	No <u>X</u>			
Remarks: Site is located on a south-facing mountain slope in open bluejoint reed grass-herb meadow. The site is partially exposed with trees and high shrubs occurring at the edge of the plot.					

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

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. <u><i>Betula papyrifera (Southcentral)</i></u>	25	Yes	FAC	Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A)	
2. <u><i>Picea glauca</i></u>	10	Yes	FACU	Total Number of Dominant Species Across All Strata: <u>6</u> (B)	
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50</u> (A/B)	
4. _____				<b>Prevalence Index worksheet:</b>	
Total Cover: <u>35</u>				Total % Cover of:	
50% of total cover: <u>18</u> 20% of total cover: <u>7</u>				Multiply by:	
Sapling/Shrub Stratum				OBL species _____ x 1 = <u>0</u>	
1. <u><i>Alnus viridis</i></u>	25	Yes	FAC	FACW species <u>10</u> x 2 = <u>20</u>	
2. <u><i>Rosa acicularis</i></u>	25	Yes	FACU	FAC species <u>75</u> x 3 = <u>225</u>	
3. <u><i>Cornus canadensis</i></u>	25	Yes	FACU	FACU species <u>87</u> x 4 = <u>348</u>	
4. <u><i>Oplopanax horridus</i></u>	5		FACU	UPL species _____ x 5 = <u>0</u>	
5. _____				Column Totals: <u>172</u> (A) <u>593</u> (B)	
6. _____				Prevalence Index = B/A = <u>3.44</u>	
Total Cover: <u>80</u>				<b>Hydrophytic Vegetation Indicators:</b>	
50% of total cover: <u>40</u> 20% of total cover: <u>16</u>				No Dominance Test is >50%	
Herb Stratum				No Prevalence Index is ≤3.0	
1. <u><i>Calamagrostis canadensis</i></u>	25	Yes	FAC	Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)	
2. <u><i>Dryopteris expansa</i></u>	10		FACU	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
3. <u><i>Heracleum maximum</i></u>	10		FACU		
4. <u><i>Sanguisorba canadensis</i></u>	10		FACW		
5. <u><i>Mertensia paniculata</i></u>	1		FACU		
6. <u><i>Chamerion angustifolium</i></u>	1		FACU		
7. _____					
8. _____					
9. _____					
10. _____					
Total Cover: <u>57</u>				<b>Hydrophytic Vegetation Present?</b> Yes _____ No <u>X</u>	
50% of total cover: <u>29</u> 20% of total cover: <u>11</u>					
Plot size (radius, or length x width) <u>30-ft diameter</u> % Bare Ground _____					
% Cover of Wetland Bryophytes <u>0</u> Total Cover of Bryophytes <u>0</u> (Where applicable)					
Remarks:					

**SOIL**

Sampling Point: DP-19

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 <sup>1</sup>		
+7 -0	black 10YR2/1	100					organic soil (silt, roots, wood debris and decomposed plant matter); not saturated; many fine/med roots; greasy when wetted
0-14	black 10YR2/1	50					silt loam w/fine sand; dry
	dk gray bm 10YR4/2	50					
14-23	lt brn gray 10YR6/2	80					silt loam w/fine sand; dry
	gray bm 10YR5/2	20					

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

**Hydric Soil Indicators:**

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

**Restrictive Layer (if present):**

Type: None

Depth (inches): \_\_\_\_\_

**Hydric Soil Present?** Yes \_\_\_\_\_ No X

**Remarks:** The surficial organic, black soil indicates potential hydric conditions but does not extend to depth and is not saturated. The absence of redox indicators and lack of soil moisture during this wet season supports the finding of nonhydric soil.

**HYDROLOGY**

Wetland Hydrology Indicators:		Secondary Indicators (2 or more required)
Primary Indicators (any one indicator is sufficient)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Water-stained Leaves (B9)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Marl Deposits (B15)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Salt Deposits (C5)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Algal Mat or Crust (B4)		<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Surface Soil Cracks (B6)		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)
<b>Field Observations:</b>		<b>Wetland Hydrology Present?</b> Yes _____ No <u>X</u>
Surface Water Present?	Yes _____ No <u>X</u> Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u> Depth (inches): _____	
Saturation Present? (includes capillary fringe)	Yes _____ No <u>X</u> Depth (inches): _____	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
<p><b>Remarks:</b> The site lacks characteristics of wetland hydrology despite the seasonally high cumulative precipitation in the region. Cumulative total precipitation on September 4, 2014 was above normal with 9.63 inches since June 1st, compared to the normal of 6.47 inches, resulting in an excess of 3.16 inches. Since January 1st, the total was 12.86 inches, compared to the normal of 9.71 inches, resulting in an excess of 3.15 inches. The site is within the Rabbit Creek-Frontal Turnagain Arm Watershed (HUC 1902040107); Rabbit Creek Subwatershed (HUC 190204010701).</p>		

**WETLAND DETERMINATION DATA FORM – Alaska Region**

MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW

Project/Site: corner of Upper DeArmoun Rd and Canyon Rd. Borough/City: Anchorage Sampling Date: 9/4/2014

Applicant/Owner: \_\_\_\_\_ Sampling Point: DP-20

Investigator(s): Pat Athey Landform (hillside, terrace, hummocks, etc.): Mountain slope

Local relief (concave, convex, none): Concave Slope (%): \_\_\_\_\_

Subregion: Southcentral Lat: N 61.0981 Long: W 149.7192 Datum: NAD83

Soil Map Unit Name: 412—Deception-Estelle-Kichatna complex. 20 to 45 percent slopes NWI classification: None Indicated

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ 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>X</u>	No _____	<b>Is the Sampled Area within a Wetland?</b>	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>			
Wetland Hydrology Present?	Yes _____	No <u>X</u>			

Remarks: Site is located on a south-facing mountain slope in open bluejoint reed grass-herb meadow. The site is partially exposed with trees and high shrubs occurring at the edge of the plot.

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

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. <u><i>Betula papyrifera (Southcentral)</i></u>	<u>25</u>	<u>Yes</u>	<u>FAC</u>	Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u>	(A)
2. <u><i>Picea mariana</i></u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>	Total Number of Dominant Species Across All Strata: <u>6</u>	(B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>67</u>	(A/B)
4. _____	_____	_____	_____	<b>Prevalence Index worksheet:</b>	
Total Cover: <u>35</u>				Total % Cover of: _____	
50% of total cover: <u>18</u> 20% of total cover: <u>7</u>				OBL species _____ x 1 = <u>0</u>	
Sapling/Shrub Stratum				FACW species <u>20</u> x 2 = <u>40</u>	
1. <u><i>Alnus viridis</i></u>	<u>25</u>	<u>Yes</u>	<u>FAC</u>	FAC species <u>75</u> x 3 = <u>225</u>	
2. <u><i>Rosa acicularis</i></u>	<u>25</u>	<u>Yes</u>	<u>FACU</u>	FACU species <u>77</u> x 4 = <u>308</u>	
3. <u><i>Cornus canadensis</i></u>	<u>25</u>	<u>Yes</u>	<u>FACU</u>	UPL species _____ x 5 = <u>0</u>	
4. <u><i>Oplopanax horridus</i></u>	<u>5</u>	_____	<u>FACU</u>	Column Totals: <u>172</u> (A) <u>573</u> (B)	
5. _____	_____	_____	_____	Prevalence Index = B/A = <u>3.33</u>	
6. _____	_____	_____	_____	<b>Hydrophytic Vegetation Indicators:</b>	
Total Cover: <u>80</u>				Yes Dominance Test is >50%	
50% of total cover: <u>40</u> 20% of total cover: <u>16</u>				No Prevalence Index is ≤3.0	
Herb Stratum				Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)	
1. <u><i>Calamagrostis canadensis</i></u>	<u>25</u>	<u>Yes</u>	<u>FAC</u>	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
2. <u><i>Dryopteris expansa</i></u>	<u>10</u>	_____	<u>FACU</u>	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.	
3. <u><i>Heracleum maximum</i></u>	<u>10</u>	_____	<u>FACU</u>		
4. <u><i>Sanguisorba canadensis</i></u>	<u>10</u>	_____	<u>FACW</u>		
5. <u><i>Mertensia paniculata</i></u>	<u>1</u>	_____	<u>FACU</u>		
6. <u><i>Chamerion angustifolium</i></u>	<u>1</u>	_____	<u>FACU</u>		
7. _____	_____	_____	_____		
8. _____	_____	_____	_____		
9. _____	_____	_____	_____		
10. _____	_____	_____	_____		
Total Cover: <u>57</u>				<b>Hydrophytic Vegetation Present?</b>	
50% of total cover: <u>29</u> 20% of total cover: <u>11</u>				Yes <u>X</u> No _____	
Plot size (radius, or length x width) <u>30-ft diameter</u> % Bare Ground _____					
% Cover of Wetland Bryophytes <u>0</u> Total Cover of Bryophytes <u>0</u>					
(Where applicable)					
Remarks:					

**SOIL**

Sampling Point: DP-20

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 <sup>1</sup>	Loc <sup>2</sup>		
+2-0	dk yel brn 10YR4/6	50					silt, roots, and decomposed plant matter	
	dk red brn 5YR3/4	50						
0-6	dk yel brn 10YR4/4	50					silt loam; many fine/med roots; dry	
	dk gray brn 10YR4/2	50						
6-18	gray brn 10YR5/2	50					gravel and small cobble; few med roots; dry	
	gray 10YR6/1	50						
18-30	brown 10YR5/3	50					gravelly silt loam; dry; massive; loose	
	yel brown 10YR5/6	50						

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

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

<b>Restrictive Layer (if present):</b> Type: <u>None</u> Depth (inches): _____	<b>Hydric Soil Present?</b> Yes _____ No <u>X</u>
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Remarks: The lower portion of the profile correlates with the mapped unit for this location, Deception-Estelle-Kichatna complex. The absence of redox indicators and lack of soil moisture during this wet season supports the finding of nonhydric soil.

**HYDROLOGY**

Wetland Hydrology Indicators:	Secondary Indicators (2 or more required)
<b>Primary Indicators (any one indicator is sufficient)</b>	<input type="checkbox"/> Water-stained Leaves (B9)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Salt Deposits (C5)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Microtopographic Relief (D4)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> FAC-Neutral Test (D5)

<b>Field Observations:</b> Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	<b>Wetland Hydrology Present?</b> Yes _____ No <u>X</u>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: The site lacks characteristics of wetland hydrology despite the seasonally high cumulative precipitation in the region. Cumulative total precipitation on September 4, 2014 was above normal with 9.63 inches since June 1st, compared to the normal of 6.47 inches, resulting in an excess of 3.16 inches. Since January 1st, the total was 12.86 inches, compared to the normal of 9.71 inches, resulting in an excess of 3.15 inches. The site is within the Rabbit Creek-Frontal Turnagain Arm Watershed (HUC 1902040107); Rabbit Creek Subwatershed (HUC 190204010701).

## WETLAND DETERMINATION DATA FORM – Alaska Region

MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW  
 Project/Site: corner of Upper DeArmoun Rd and Canyon Rd. Borough/City: Anchorage Sampling Date: 9/8/2014  
 Applicant/Owner: \_\_\_\_\_ Sampling Point: DP-21  
 Investigator(s): Pat Athey Landform (hillside, terrace, hummocks, etc.): Mountain slope  
 Local relief (concave, convex, none): Concave Slope (%): \_\_\_\_\_  
 Subregion: Southcentral Lat: N 61.0983 Long: W 149.7286 Datum: NAD83  
 Soil Map Unit Name: 438—Moose River-Niklason complex, occasionally flooded, 0 to 3 percent NWI classification: None Indicated  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ 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>X</u>	No	<b>Is the Sampled Area within a Wetland?</b>	Yes <u>X</u>	No _____
Hydric Soil Present?	Yes <u>X</u>	No			
Wetland Hydrology Present?	Yes <u>X</u>	No			
Remarks: Site is located at the base of a south-facing mountain slope in closed black spruce trees and alder scrub. Springs emerge from the slope to the north and form small streams that flow only a short distance before re-entering the ground.					

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

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. <u>Picea mariana</u>	<u>25</u>	<u>Yes</u>	<u>FACW</u>	Number of Dominant Species That Are OBL, FACW, or FAC: <u>5</u> (A)	
2. <u>Alnus viridis</u>	<u>25</u>	<u>Yes</u>	<u>FAC</u>	Total Number of Dominant Species Across All Strata: <u>5</u> (B)	
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)	
4. _____				<b>Prevalence Index worksheet:</b>	
Total Cover: <u>50</u>				Total % Cover of:	
50% of total cover: <u>25</u> 20% of total cover: <u>10</u>				OBL species	<u>25</u> x 1 = <u>25</u>
<b>Sapling/Shrub Stratum</b>				FACW species	<u>25</u> x 2 = <u>50</u>
1. <u>Alnus viridis</u>	<u>50</u>	<u>Yes</u>	<u>FAC</u>	FAC species	<u>150</u> x 3 = <u>450</u>
2. _____				FACU species	_____ x 4 = <u>0</u>
3. _____				UPL species	_____ x 5 = <u>0</u>
4. _____				Column Totals:	<u>200</u> (A) <u>525</u> (B)
5. _____				Prevalence Index = B/A = <u>2.62</u>	
6. _____				<b>Hydrophytic Vegetation Indicators:</b>	
Total Cover: <u>50</u>				Yes Dominance Test is >50%	
50% of total cover: <u>25</u> 20% of total cover: <u>10</u>				Yes Prevalence Index is ≤3.0	
<b>Herb Stratum</b>				____ Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)	
1. <u>Calamagrostis canadensis</u>	<u>75</u>	<u>Yes</u>	<u>FAC</u>	____ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
2. <u>Equisetum fluviatile</u>	<u>25</u>	<u>Yes</u>	<u>OBL</u>	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.	
3. _____				<b>Hydrophytic Vegetation Present?</b> Yes <u>X</u> No _____	
4. _____					
5. _____					
6. _____					
7. _____					
8. _____					
9. _____					
10. _____					
Total Cover: <u>100</u>					
50% of total cover: <u>50</u> 20% of total cover: <u>20</u>					
Plot size (radius, or length x width) <u>30-ft diameter</u> % Bare Ground _____					
% Cover of Wetland Bryophytes <u>0</u> Total Cover of Bryophytes <u>0</u> (Where applicable)					
Remarks:					

**SOIL**

Sampling Point: DP-21

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 <sup>1</sup>	Loc <sup>2</sup>		
+16-0	black 10YR2/1	50					muck and plant debris, roots; saturated; greasy;	
	dk yel bm 10YR4/4	50						

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

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

<b>Restrictive Layer (if present):</b> Type: Saturation Depth (inches): 0	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
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Remarks: The soil profile generally correlates with the mapped soil unit for the location, Moose River-Niklason complex. This is an area of groundwater discharge, small springs emerge from the slope and form streams that flow a short distance then seep back into the ground, providing a permanent source of soil moisture resulting in the observed hydric soil.

**HYDROLOGY**

Wetland Hydrology Indicators:	Secondary Indicators (2 or more required)
<b>Primary Indicators (any one indicator is sufficient)</b> <input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Water-stained Leaves (B9) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Salt Deposits (C5) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
<b>Field Observations:</b> Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): 0 Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): 0 Saturation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): 0 (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

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

Remarks: There has been an seasonally high cumulative precipitation in the region over the past growing season that likley contributes to the observed wetland hydrology. Cumulative total precipitation on August 26, 2014 was above normal with 8.29 inches since June 1st, compared to the normal of 5.71 inches, resulting in an excess of 3.21 inches. Since January 1st, the total was 12.15 inches, compared to the normal of 8.95 inches, resulting in an excess of 3.2 inches. The site is within the Rabbit Creek-Frontal Turnagain Arm Watershed (HUC 1902040107); Rabbit Creek Subwatershed (HUC 190204010701).

## WETLAND DETERMINATION DATA FORM – Alaska Region

MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW

Project/Site: corner of Upper DeArmour Rd and Canyon Rd. Borough/City: Anchorage Sampling Date: 9/8/2014

Applicant/Owner: \_\_\_\_\_ Sampling Point: DP-22

Investigator(s): Pat Athey Landform (hillside, terrace, hummocks, etc.): Mountain slope

Local relief (concave, convex, none): Concave Slope (%): \_\_\_\_\_

Subregion: Southcentral Lat: N 61.0986 Long: W 149.7290 Datum: NAD83

Soil Map Unit Name: 412—Deception-Estelle-Kichatna complex, 20 to 45 percent slopes NWI classification: None Indicated

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ 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>X</u>	No	<b>Is the Sampled Area within a Wetland?</b>	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes	No <u>X</u>			
Wetland Hydrology Present?	Yes	No <u>X</u>			
Remarks: Site is located at the base of a south-facing mountain slope in open bluejoint reed grass-herb meadow. The site is exposed with a few high shrubs present.					

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

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)	
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>3</u> (B)	
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>67</u> (A/B)	
4. _____	_____	_____	_____	Prevalence Index worksheet:	
Total Cover: <u>0</u>				Total % Cover of: _____ Multiply by: _____	
50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				OBL species _____ x 1 = <u>0</u>	
Sapling/Shrub Stratum				FACW species _____ x 2 = <u>0</u>	
1. <u>Sorbus scopulina</u>	<u>10</u>	<u>Yes</u>	<u>FACU</u>	FAC species <u>136</u> x 3 = <u>408</u>	
2. <u>Alnus viridis</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>	FACU species <u>23</u> x 4 = <u>92</u>	
3. _____	_____	_____	_____	UPL species _____ x 5 = <u>0</u>	
4. _____	_____	_____	_____	Column Totals: <u>159</u> (A) <u>500</u> (B)	
5. _____	_____	_____	_____	Prevalence Index = B/A = <u>3.14</u>	
6. _____	_____	_____	_____	Hydrophytic Vegetation Indicators:	
Total Cover: <u>20</u>				Yes Dominance Test is >50%	
50% of total cover: <u>10</u> 20% of total cover: <u>4</u>				No Prevalence Index is ≤3.0	
Herb Stratum				Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)	
1. <u>Calamagrostis canadensis</u>	<u>100</u>	<u>Yes</u>	<u>FAC</u>	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
2. <u>Athyrium filix-femina</u>	<u>25</u>	_____	<u>FAC</u>	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.	
3. <u>Heracleum maximum</u>	<u>10</u>	_____	<u>FACU</u>		
4. <u>Gymnocarpium dryopteris</u>	<u>1</u>	_____	<u>FACU</u>		
5. <u>Mertensia paniculata</u>	<u>1</u>	_____	<u>FACU</u>		
6. <u>Chamerion angustifolium</u>	<u>1</u>	_____	<u>FACU</u>		
7. <u>Equisetum sylvaticum</u>	<u>1</u>	_____	<u>FAC</u>		
8. _____	_____	_____	_____		
9. _____	_____	_____	_____		
10. _____	_____	_____	_____		
Total Cover: <u>139</u>					
50% of total cover: <u>70</u> 20% of total cover: <u>28</u>					
Plot size (radius, or length x width) <u>30-ft diameter</u> % Bare Ground _____					
% Cover of Wetland Bryophytes <u>0</u> Total Cover of Bryophytes <u>0</u> (Where applicable)					
Remarks:					

**SOIL**

Sampling Point: DP-22

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 <sup>1</sup>	Loc <sup>2</sup>		
+7- +5	dk yel bm 10YR4/6	50					silt, roots, and decomposed plant matter	
	dk red bm 5YR3/4	50						
+5 -0	black 10YR2/1	100					organic soil (silt, roots, wood debris and decomposed plant matter); not saturated; many fine/med roots; greasy when wetted	
0-19	lt bm gray 10YR6/2	80					silt loam w/fine sand; dry	
	gray bm 10YR5/2	20						
19-23	dk gray bm 10YR4/2	80					gravelly silt loam; moist; massive; loose	
	gray bm 10YR5/2	20						

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

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

**Restrictive Layer (if present):**  
 Type: None  
 Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes \_\_\_\_\_ No X

Remarks: The surficial organic, black soil indicates potential hydric conditions but does not extend to depth and is not saturated. The absence of redox indicators and lack of soil moisture during this wet season supports the finding of nonhydric soil.

**HYDROLOGY**

Wetland Hydrology Indicators:		Secondary Indicators (2 or more required)
<b>Primary Indicators (any one indicator is sufficient)</b>		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Water-stained Leaves (B9)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Marl Deposits (B15)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Salt Deposits (C5)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Algal Mat or Crust (B4)		<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Surface Soil Cracks (B6)		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes \_\_\_\_\_ No X Depth (inches): \_\_\_\_\_

Water Table Present? Yes \_\_\_\_\_ No X Depth (inches): \_\_\_\_\_

Saturation Present? Yes \_\_\_\_\_ No X Depth (inches): \_\_\_\_\_  
 (includes capillary fringe)

Wetland Hydrology Present? Yes \_\_\_\_\_ No X

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

Remarks: The site lacks characteristics of wetland hydrology despite the seasonally high cumulative precipitation in the region. Cumulative total precipitation on September 8, 2014 was above normal with 10.06 inches since June 1st, compared to the normal of 6.88 inches, resulting in an excess of 3.18 inches. Since January 1st, the total was 13.29 inches, compared to the normal of 10.12 inches, resulting in an excess of 3.17 inches. The site is within the Rabbit Creek-Frontal Turnagain Arm Watershed (HUC 1902040107); Rabbit Creek Subwatershed (HUC 190204010701).

**WETLAND DETERMINATION DATA FORM – Alaska Region**

MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW

Project/Site: corner of Upper DeArmoun Rd and Canyon Rd. Borough/City: Anchorage Sampling Date: 9/8/2014

Applicant/Owner: \_\_\_\_\_ Sampling Point: DP-23

Investigator(s): Pat Athey Landform (hillside, terrace, hummocks, etc.): Mountain slope

Local relief (concave, convex, none): Concave Slope (%): \_\_\_\_\_

Subregion: Southcentral Lat: N 61.0983 Long: W 149.7280 Datum: NAD83

Soil Map Unit Name: 438—Moose River-Niklason complex, occasionally flooded, 0 to 3 percent NWI classification: None Indicated

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ 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>X</u>	No _____	<b>Is the Sampled Area within a Wetland?</b>	Yes <u>X</u>	No _____
Hydric Soil Present?	Yes <u>X</u>	No _____			
Wetland Hydrology Present?	Yes <u>X</u>	No _____			
Remarks: Site is located at the base of a south-facing mountain slope in closed black spruce trees and alder scrub. Springs emerge from the slope to the north and form small streams that flow only a short distance before re-entering the ground.					

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

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. <u>Alnus viridis</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>	Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u>	(A)
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>4</u>	(B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u>	(A/B)
4. _____	_____	_____	_____	<b>Prevalence Index worksheet:</b>	
Total Cover: <u>10</u>				Total % Cover of:	Multiply by:
50% of total cover: <u>5</u> 20% of total cover: <u>2</u>				OBL species <u>25</u>	x 1 = <u>25</u>
<b>Sapling/Shrub Stratum</b>				FACW species _____	x 2 = <u>0</u>
1. <u>Alnus viridis</u>	<u>50</u>	<u>Yes</u>	<u>FAC</u>	FAC species <u>135</u>	x 3 = <u>405</u>
2. _____	_____	_____	_____	FACU species <u>1</u>	x 4 = <u>4</u>
3. _____	_____	_____	_____	UPL species _____	x 5 = <u>0</u>
4. _____	_____	_____	_____	Column Totals: <u>161</u>	(A) <u>434</u> (B)
5. _____	_____	_____	_____	Prevalence Index = B/A = <u>.269</u>	
6. _____	_____	_____	_____	<b>Hydrophytic Vegetation Indicators:</b>	
Total Cover: <u>50</u>				Yes Dominance Test is >50%	
50% of total cover: <u>25</u> 20% of total cover: <u>10</u>				Yes Prevalence Index is ≤3.0	
<b>Herb Stratum</b>				___ Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)	
1. <u>Calamagrostis canadensis</u>	<u>75</u>	<u>Yes</u>	<u>FAC</u>	___ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
2. <u>Equisetum fluviatile</u>	<u>25</u>	<u>Yes</u>	<u>OBL</u>	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.	
3. <u>Heracleum maximum</u>	<u>1</u>	_____	<u>FACU</u>		
4. _____	_____	_____	_____		
5. _____	_____	_____	_____		
6. _____	_____	_____	_____		
7. _____	_____	_____	_____		
8. _____	_____	_____	_____		
9. _____	_____	_____	_____		
10. _____	_____	_____	_____		
Total Cover: <u>101</u>				<b>Hydrophytic Vegetation Present?</b>	
50% of total cover: <u>51</u> 20% of total cover: <u>20</u>				Yes <u>X</u>	No _____
Plot size (radius, or length x width) <u>30-ft diameter</u> % Bare Ground _____					
% Cover of Wetland Bryophytes <u>10</u> Total Cover of Bryophytes <u>10</u>					
(Where applicable)					
Remarks:					





**SOIL**

Sampling Point: DP-24

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 <sup>1</sup>	Loc <sup>2</sup>		
+8-0	black 10YR2/1	50					muck and plant debris, roots; saturated; greasy;	
	dk yel brn 10YR4/4	50						
0-3	dk yel brn 10YR4/4	50					silt loam; several med roots; saturated	
	dk gray brn 10YR4/2	50						
3-25	lt gray N7/1	50					silty clay loam w/fine sand; plastic; massive; oxidized root channels; moist (saturated at 22-in. depth)	
	lt brn gray 10YR6/2	50						

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: 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 Soils<sup>3</sup>:**

- Alaska Color Change (TA4)<sup>4</sup>
- Alaska Alpine Swales (TA5)
- Alaska Redox With 2.5Y Hue
- Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- Other (Explain in Remarks)

<sup>3</sup>One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.

<sup>4</sup>Give details of color change in Remarks.

**Restrictive Layer (if present):**

Type: Compacted soil  
 Depth (inches): 12

Hydric Soil Present? Yes  No

Remarks: The soil profile generally correlates with the mapped soil unit for the location, Moose River-Niklason complex. The presence of gleyed soil with oxidized root channels qualifies as Alaska Gleyed hydric soil. This is an area of groundwater discharge, small springs emerge from the slope and form streams that flow a short distance then seep back into the ground, providing a permanent source of soil moisture resulting in the observed hydric soil.

**HYDROLOGY**

Wetland Hydrology Indicators:		Secondary Indicators (2 or more required)
Primary Indicators (any one indicator is sufficient)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Water-stained Leaves (B9)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input checked="" type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Marl Deposits (B15)	<input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Salt Deposits (C5)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Algal Mat or Crust (B4)		<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Surface Soil Cracks (B6)		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)
<b>Field Observations:</b>		
Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____	
Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____	
Saturation Present? (includes capillary fringe) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (inches): <u>22</u>	
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		

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

Remarks: No saturation w/in 12-inches but the presence of depleted soil along with the secondary indicators of oxidized root channels, and the obvious drainage patterns in the area support a wetland hydrology finding. Cumulative total precipitation on August 26, 2014 was above normal with 8.29 inches since June 1st, compared to the normal of 5.71 inches, resulting in an excess of 3.21 inches. Since January 1st, the total was 12.15 inches, compared to the normal of 8.95 inches, resulting in an excess of 3.2 inches. The site is within the Rabbit Creek-Frontal Turnagain Arm Watershed (HUC 1902040107); Rabbit Creek Subwatershed (HUC 190204010701).

**WETLAND DETERMINATION DATA FORM – Alaska Region**

MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW

Project/Site: corner of Upper DeArmoun Rd and Canyon Rd. Borough/City: Anchorage Sampling Date: 9/9/2014

Applicant/Owner: \_\_\_\_\_ Sampling Point: DP-25

Investigator(s): Pat Athey Landform (hillside, terrace, hummocks, etc.): Mountain slope

Local relief (concave, convex, none): Flat Slope (%): \_\_\_\_\_

Subregion: Southcentral Lat: N 61.1011 Long: W 149.7206 Datum: NAD83

Soil Map Unit Name: 414—Deception-Estelle-Kichatna complex, undulating and hilly NWI classification: None Indicated

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ 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	No <u>X</u>	<b>Is the Sampled Area within a Wetland?</b>		
Hydric Soil Present?	Yes	No <u>X</u>		Yes _____	No <u>X</u>
Wetland Hydrology Present?	Yes	No <u>X</u>			
Remarks: Site is located on a south-facing mountain slope in open spruce-birch forest and dense alder shrub growth. Much of the spruce has been beetle-killed and blown down, resulting in an open canopy.					

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

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. <u><i>Picea mariana</i></u>	<u>25</u>	Yes	FACW	Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)	
2. <u><i>Betula papyrifera</i> (Southcentral)</u>	<u>5</u>		FAC	Total Number of Dominant Species Across All Strata: <u>6</u> (B)	
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>33</u> (A/B)	
4. _____				<b>Prevalence Index worksheet:</b>	
Total Cover: <u>30</u>				Total % Cover of:	
50% of total cover: <u>15</u>		20% of total cover: <u>6</u>		OBL species _____ x 1 = <u>0</u>	
<b>Sapling/Shrub Stratum</b>				FACW species <u>25</u> x 2 = <u>50</u>	
1. <u><i>Sorbus scopulina</i></u>	<u>25</u>	Yes	FACU	FAC species <u>40</u> x 3 = <u>120</u>	
2. <u><i>Rosa acicularis</i></u>	<u>25</u>	Yes	FACU	FACU species <u>110</u> x 4 = <u>440</u>	
3. <u><i>Cornus canadensis</i></u>	<u>25</u>	Yes	FACU	UPL species _____ x 5 = <u>0</u>	
4. <u><i>Viburnum edule</i></u>	<u>10</u>		FACU	Column Totals: <u>175</u> (A) <u>610</u> (B)	
5. <u><i>Alnus viridis</i></u>	<u>10</u>		FAC	Prevalence Index = B/A = <u>3.48</u>	
6. _____				<b>Hydrophytic Vegetation Indicators:</b>	
Total Cover: <u>95</u>				No Dominance Test is >50%	
50% of total cover: <u>48</u>		20% of total cover: <u>19</u>		No Prevalence Index is ≤3.0	
<b>Herb Stratum</b>				___ Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)	
1. <u><i>Calamagrostis canadensis</i></u>	<u>25</u>	Yes	FAC	___ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
2. <u><i>Gymnocarpium dryopteris</i></u>	<u>25</u>	Yes	FACU	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.	
3. _____					
4. _____					
5. _____					
6. _____					
7. _____					
8. _____					
9. _____					
10. _____					
Total Cover: <u>50</u>				<b>Hydrophytic Vegetation Present?</b>	
50% of total cover: <u>25</u>		20% of total cover: <u>10</u>		Yes _____ No <u>X</u>	
Plot size (radius, or length x width) <u>30-ft diameter</u> % Bare Ground _____					
% Cover of Wetland Bryophytes <u>0</u> Total Cover of Bryophytes <u>0</u>					
(Where applicable)					
Remarks:					

**SOIL**

Sampling Point: DP-25

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 <sup>1</sup>	Loc <sup>2</sup>		
+9- +5	v dk gray bm 10YR3/2 black 10YR2/1	50 50					silt, roots, wood debris and decomposed plant matter	
+5-0	black 10YR2/1 v dk gray 10YR3/1	50 50					organic soil; many fine roots; greasy when wetted; dry	
0-10	dk gray bm 10YR4/2	100					silt loam and charcoal; dry	
10-17	v pale bm 10YR7/3 brown 10YR5/3	50 50						

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

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

<b>Restrictive Layer (if present):</b> Type: None _____ Depth (inches): _____	<b>Hydric Soil Present?</b> Yes _____ No <u>X</u>
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Remarks: The surficial organic, black soil indicates potential hydric conditions but does not extend to depth and is not saturated. The absence of redox indicators and lack of soil moisture during this wet season supports the finding of nonhydric soil.

**HYDROLOGY**

Wetland Hydrology Indicators:	Secondary Indicators (2 or more required)
<b>Primary Indicators (any one indicator is sufficient)</b> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Water-stained Leaves (B9) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Salt Deposits (C5) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)

<b>Field Observations:</b> Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	<b>Wetland Hydrology Present?</b> Yes _____ No <u>X</u>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: The site lacks characteristics of wetland hydrology despite the seasonally high cumulative precipitation in the region. Cumulative total precipitation on September 9, 2014 was above normal with 10.30 inches since June 1st, compared to the normal of 6.90 inches, resulting in an excess of 3.40 inches. Since January 1st, the total was 13.53 inches, compared to the normal of 10.22 inches, resulting in an excess of 3.31 inches. The site is within the Rabbit Creek-Frontal Turnagain Arm Watershed (HUC 1902040107); Rabbit Creek Subwatershed (HUC 190204010701).

**WETLAND DETERMINATION DATA FORM – Alaska Region**

MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW

Project/Site: corner of Upper DeArmoun Rd and Canyon Rd. Borough/City: Anchorage Sampling Date: 9/9/2014

Applicant/Owner: \_\_\_\_\_ Sampling Point: DP-26

Investigator(s): Pat Athey Landform (hillside, terrace, hummocks, etc.): Mountain slope

Local relief (concave, convex, none): Flat Slope (%): \_\_\_\_\_

Subregion: Southcentral Lat: N 61.1008 Long: W 149.7192 Datum: NAD83

Soil Map Unit Name: 414—Deception-Estelle-Kichatna complex, undulating and hilly NWI classification: None Indicated

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ 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	No <u>X</u>	<b>Is the Sampled Area within a Wetland?</b>	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes	No <u>X</u>			
Wetland Hydrology Present?	Yes	No <u>X</u>			
Remarks: Site is located on a south-facing mountain slope in open spruce-birch forest and dense alder shrub growth. Much of the spruce has been beetle-killed and blown down, resulting in an open canopy.					

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

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. <u>Picea mariana</u>	<u>25</u>	<u>Yes</u>	<u>FACW</u>	Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A)	
2. <u>Picea glauca</u>	<u>25</u>	<u>Yes</u>	<u>FACU</u>	Total Number of Dominant Species Across All Strata: <u>9</u> (B)	
3. <u>Betula papyrifera (Southcentral)</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>44</u> (A/B)	
4. _____	_____	_____	_____	<b>Prevalence Index worksheet:</b>	
Total Cover: <u>60</u>				Total % Cover of: _____ Multiply by: _____	
50% of total cover: <u>30</u> 20% of total cover: <u>12</u>				OBL species _____ x 1 = <u>0</u>	
<b>Sapling/Shrub Stratum</b>				FACW species <u>30</u> x 2 = <u>60</u>	
1. <u>Cornus canadensis</u>	<u>50</u>	<u>Yes</u>	<u>FACU</u>	FAC species <u>55</u> x 3 = <u>165</u>	
2. <u>Rosa acicularis</u>	<u>10</u>	<u>Yes</u>	<u>FACU</u>	FACU species <u>117</u> x 4 = <u>468</u>	
3. <u>Rubus idaeus</u>	<u>10</u>	<u>Yes</u>	<u>FACU</u>	UPL species _____ x 5 = <u>0</u>	
4. <u>Viburnum edule</u>	<u>10</u>	_____	<u>FACU</u>	Column Totals: <u>202</u> (A) <u>693</u> (B)	
5. <u>Alnus viridis</u>	<u>10</u>	_____	<u>FAC</u>	Prevalence Index = B/A = <u>3.43</u>	
6. _____	_____	_____	_____	<b>Hydrophytic Vegetation Indicators:</b>	
Total Cover: <u>90</u>				No Dominance Test is >50%	
50% of total cover: <u>45</u> 20% of total cover: <u>18</u>				No Prevalence Index is ≤3.0	
<b>Herb Stratum</b>				Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)	
1. <u>Calamagrostis canadensis</u>	<u>25</u>	<u>Yes</u>	<u>FAC</u>	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
2. <u>Gymnocarpium dryopteris</u>	<u>10</u>	<u>Yes</u>	<u>FACU</u>	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.	
3. <u>Equisetum arvense</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>		
4. <u>Sanguisorba canadensis</u>	<u>5</u>	_____	<u>FACW</u>		
5. <u>Mertensia paniculata</u>	<u>1</u>	_____	<u>FACU</u>		
6. <u>Chamerion angustifolium</u>	<u>1</u>	_____	<u>FACU</u>		
7. _____	_____	_____	_____		
8. _____	_____	_____	_____		
9. _____	_____	_____	_____		
10. _____	_____	_____	_____		
Total Cover: <u>52</u>				<b>Hydrophytic Vegetation Present?</b>	
50% of total cover: <u>26</u> 20% of total cover: <u>10</u>				Yes _____ No <u>X</u>	
Plot size (radius, or length x width) <u>30-ft diameter</u> % Bare Ground _____					
% Cover of Wetland Bryophytes <u>0</u> Total Cover of Bryophytes <u>0</u> (Where applicable)					
Remarks:					

**SOIL**

Sampling Point: DP-26

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 <sup>1</sup>	Loc <sup>2</sup>		
+10- +4	dk gray bm 10YR4/2	100					organic matter, fine roots, wood debris and decomposed plants	
+4-0	black 10YR2/1 v dk gray 10YR3/1	50 50					organic soil; many fine roots; greasy when wetted; dry	
0-11	black 10YR2/1	100					silt loam and charcoal; dry	
11-19	v pale bm 10YR7/3 brown 10YR5/3	50 50					silt loam w/ gravel & cobbles, dry; loose	

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

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

<b>Restrictive Layer (if present):</b> Type: <u>None</u> Depth (inches): _____	<b>Hydric Soil Present?</b> Yes _____ No <u>X</u>
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Remarks: The surficial organic, black soil indicates potential hydric conditions but does not extend to depth and is not saturated. The absence of redox indicators and lack of soil moisture during this wet season supports the finding of nonhydric soil.

**HYDROLOGY**

Wetland Hydrology Indicators:	Secondary Indicators (2 or more required)
<b>Primary Indicators (any one indicator is sufficient)</b> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Water-stained Leaves (B9) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Salt Deposits (C5) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
<b>Field Observations:</b> Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	<b>Wetland Hydrology Present?</b> Yes _____ No <u>X</u>

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

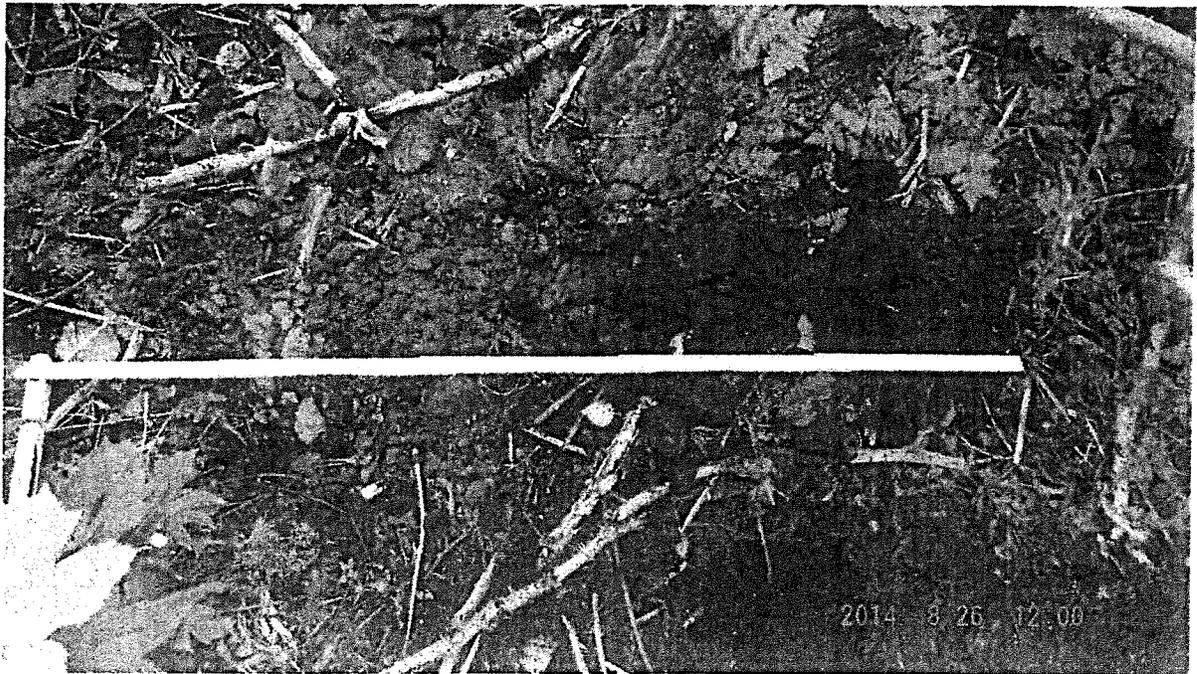
Remarks: The site lacks characteristics of wetland hydrology despite the seasonally high cumulative precipitation in the region. Cumulative total precipitation on September 9, 2014 was above normal with 10.30 inches since June 1st, compared to the normal of 6.90 inches, resulting in an excess of 3.40 inches. Since January 1st, the total was 13.53 inches, compared to the normal of 10.22 inches, resulting in an excess of 3.31 inches. The site is within the Rabbit Creek-Frontal Turnagain Arm Watershed (HUC 1902040107); Rabbit Creek Subwatershed (HUC 190204010701).

**Attachment 3**  
**Photos**

MOA Parcel 1707306000



DP-1



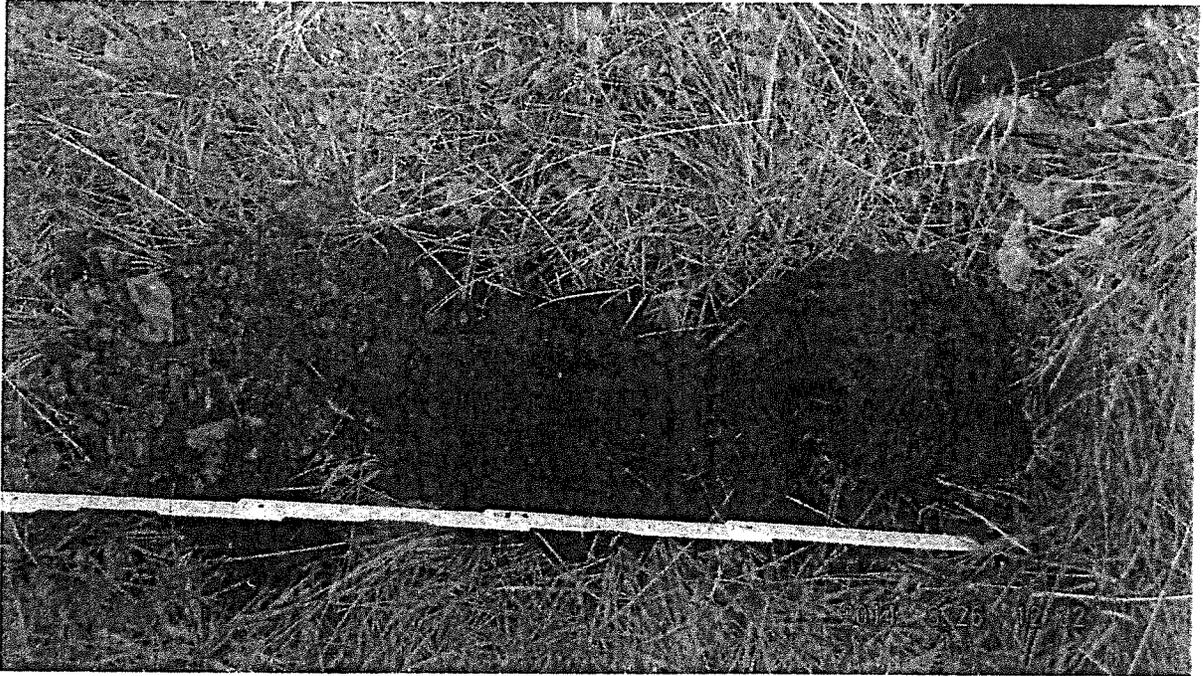
DP-1



DP-1



DP-2



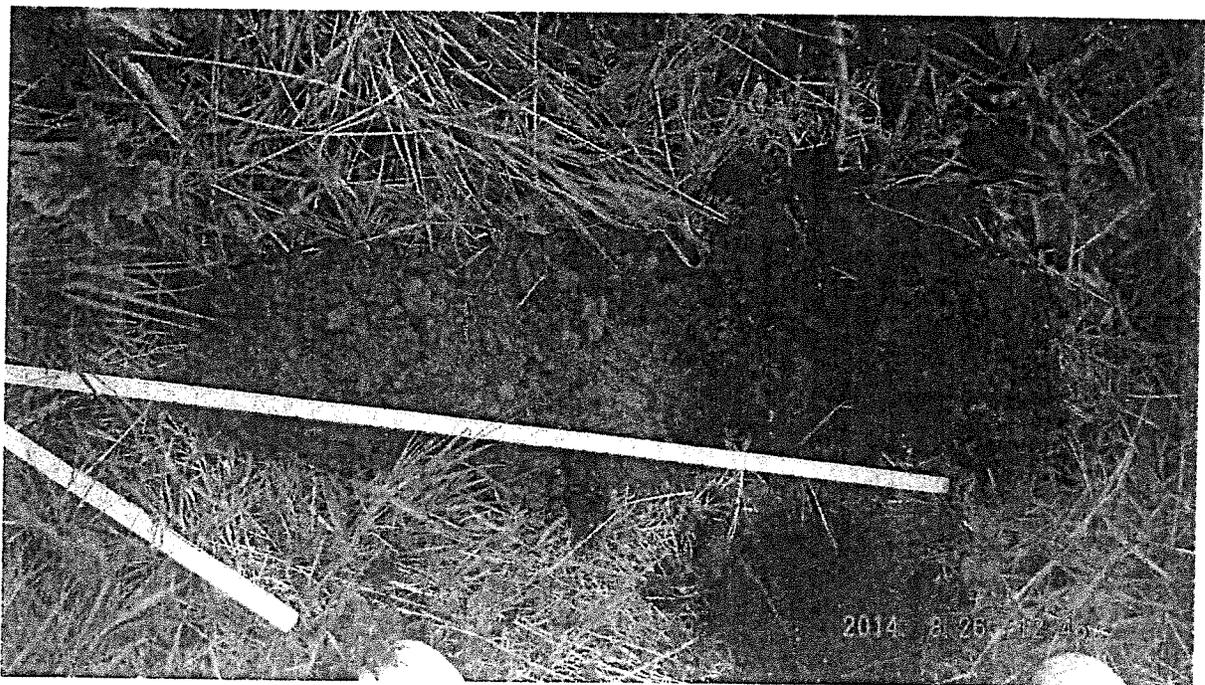
DP-3



DP-3



DP-4



DP-4



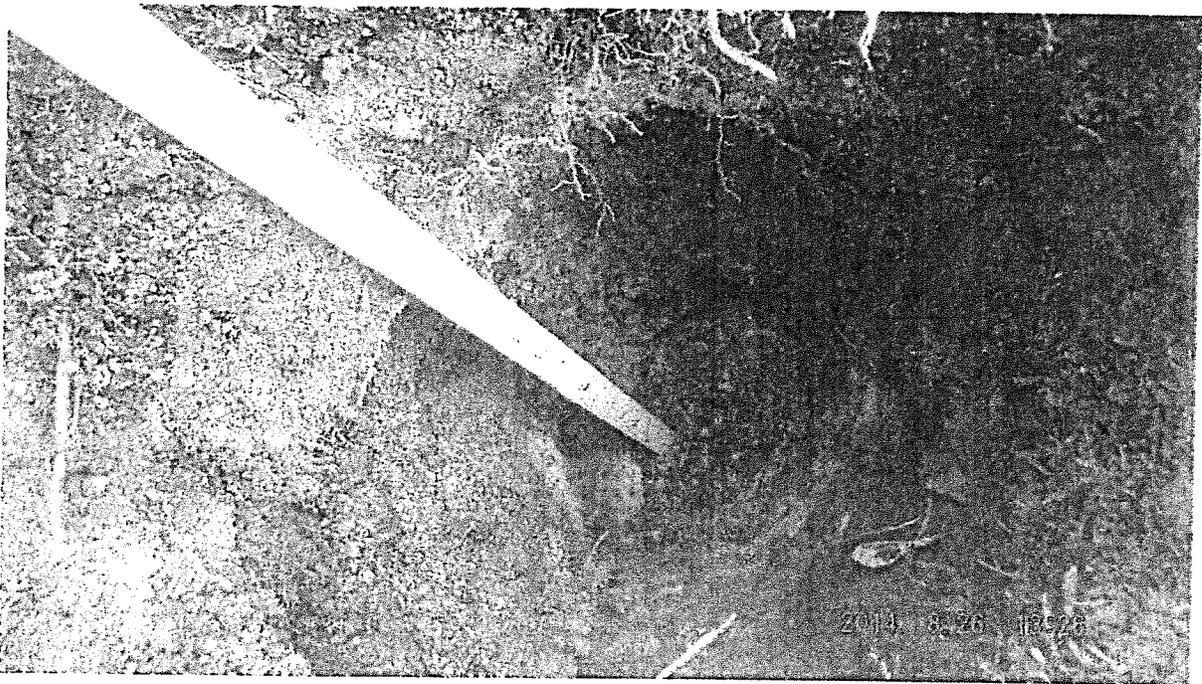
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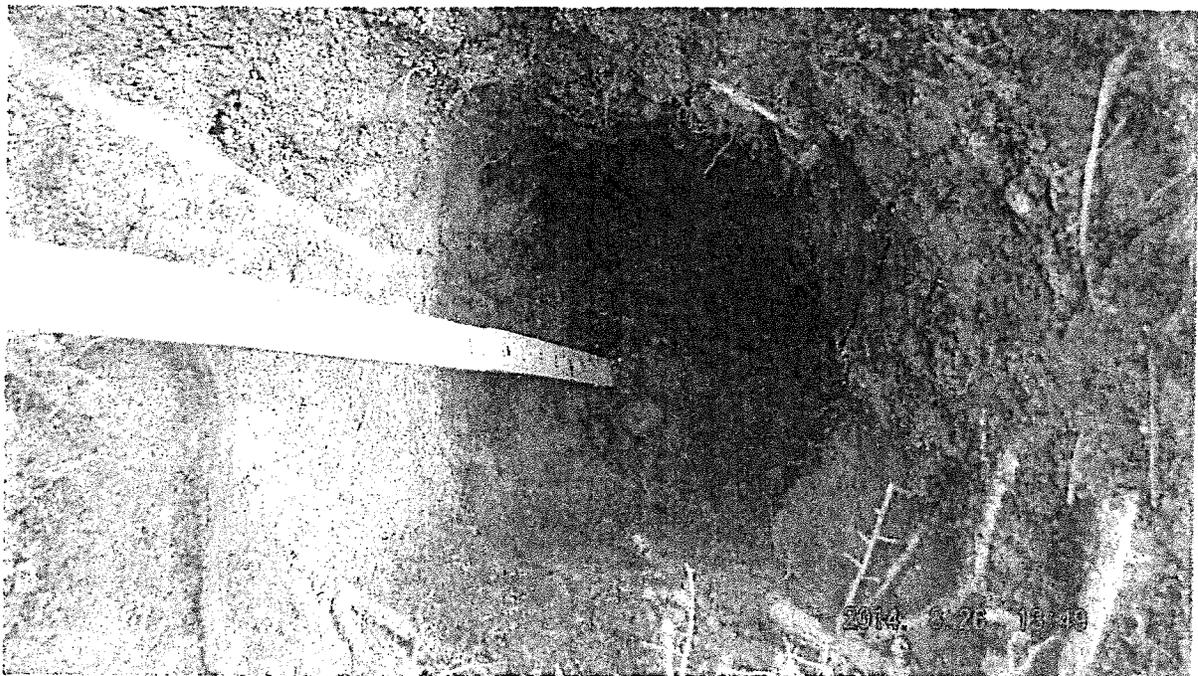
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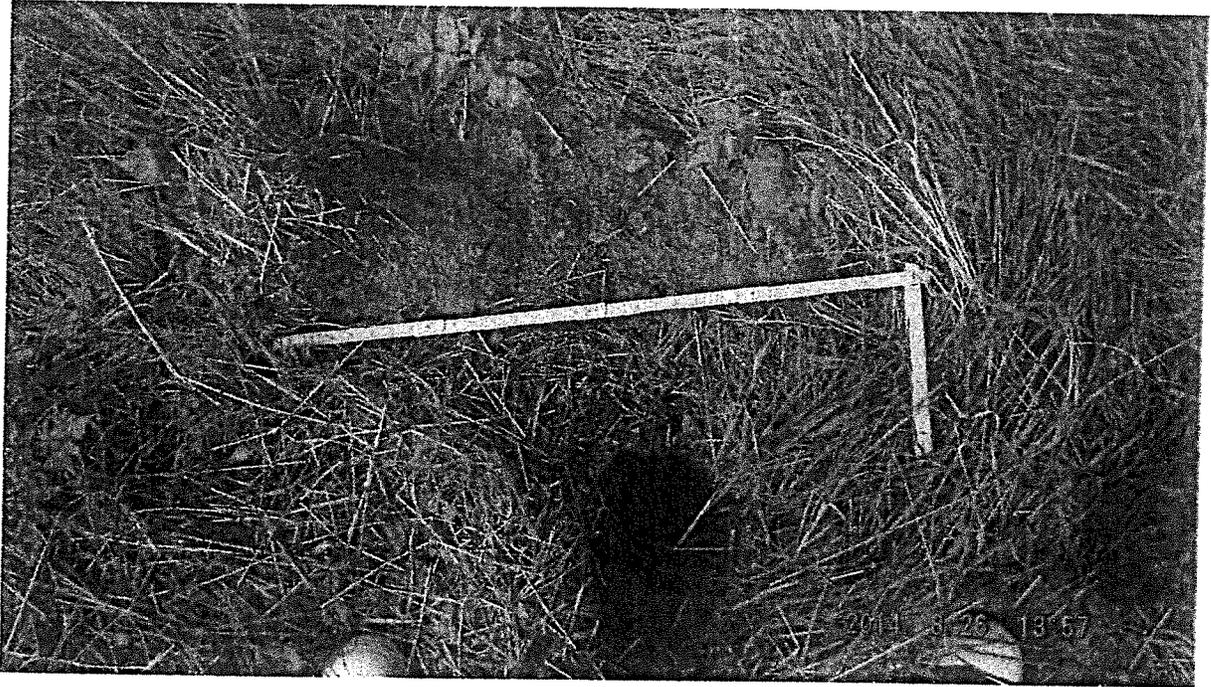
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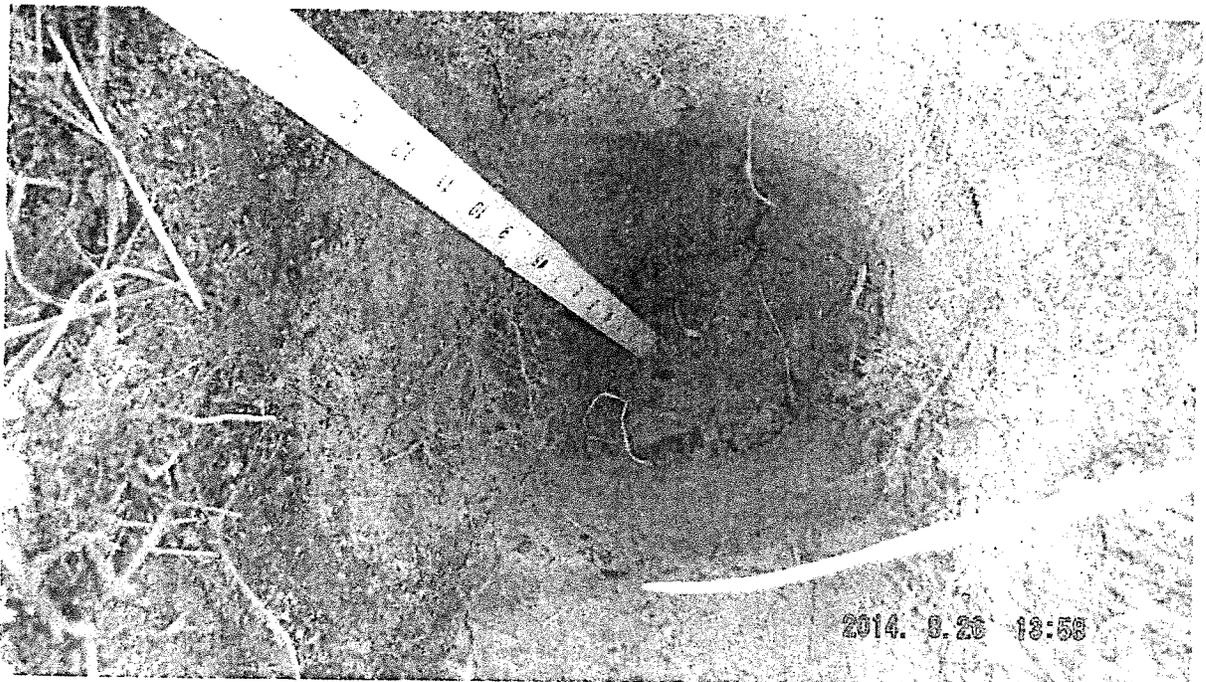
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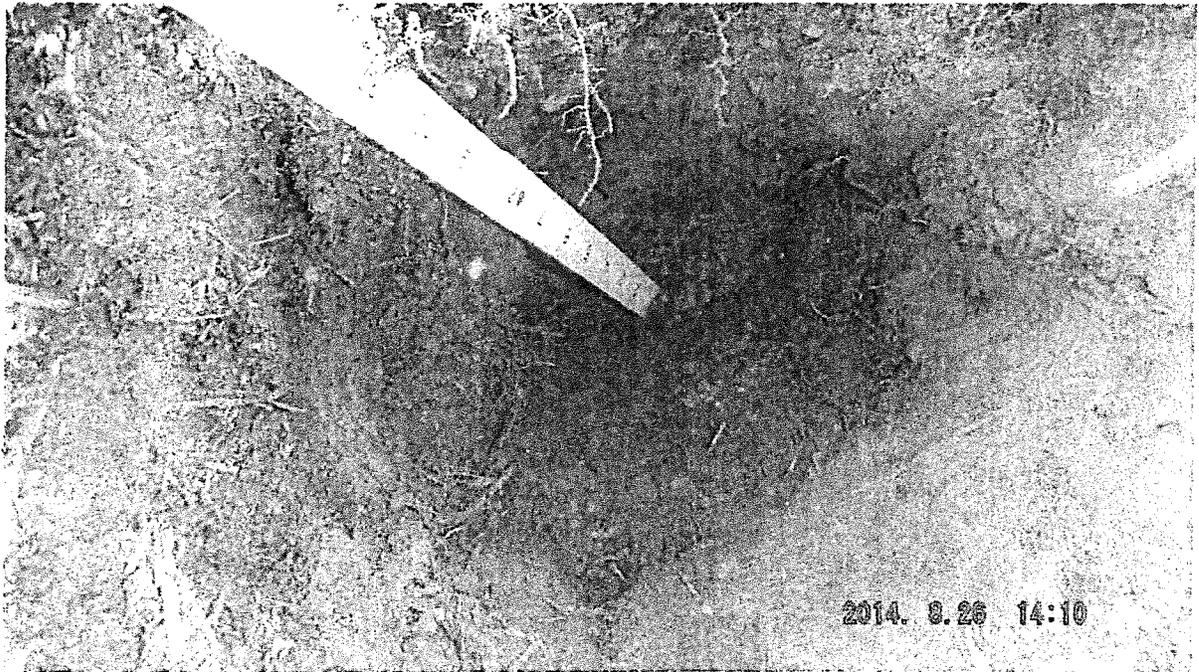
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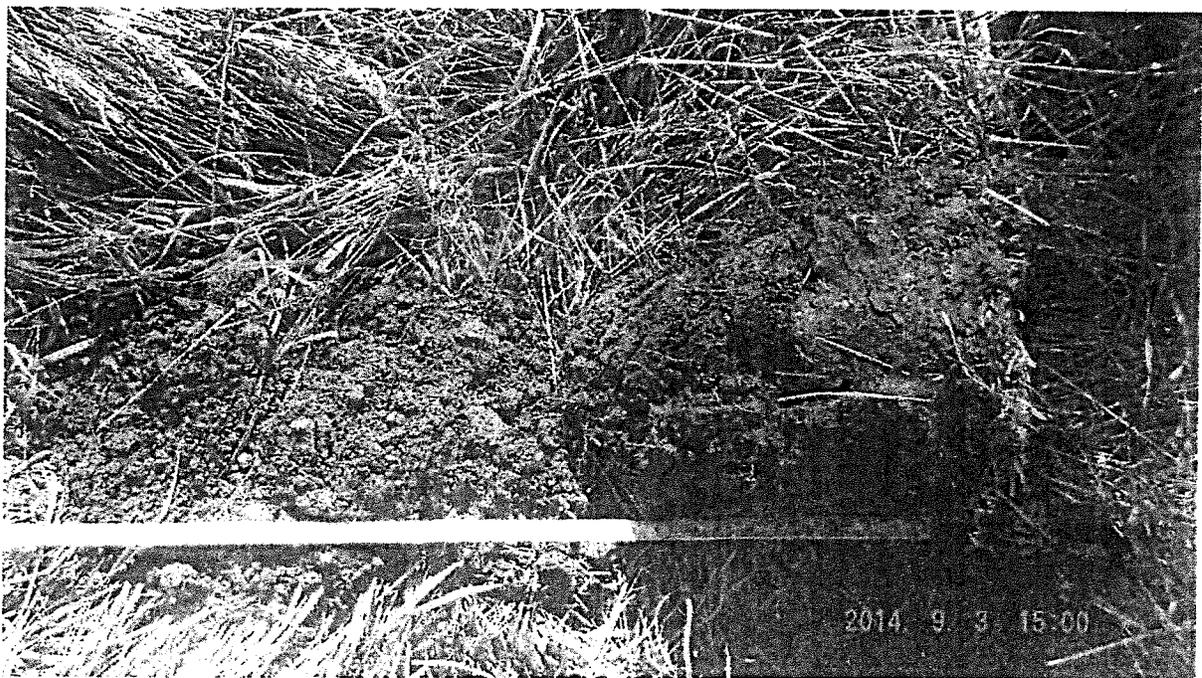
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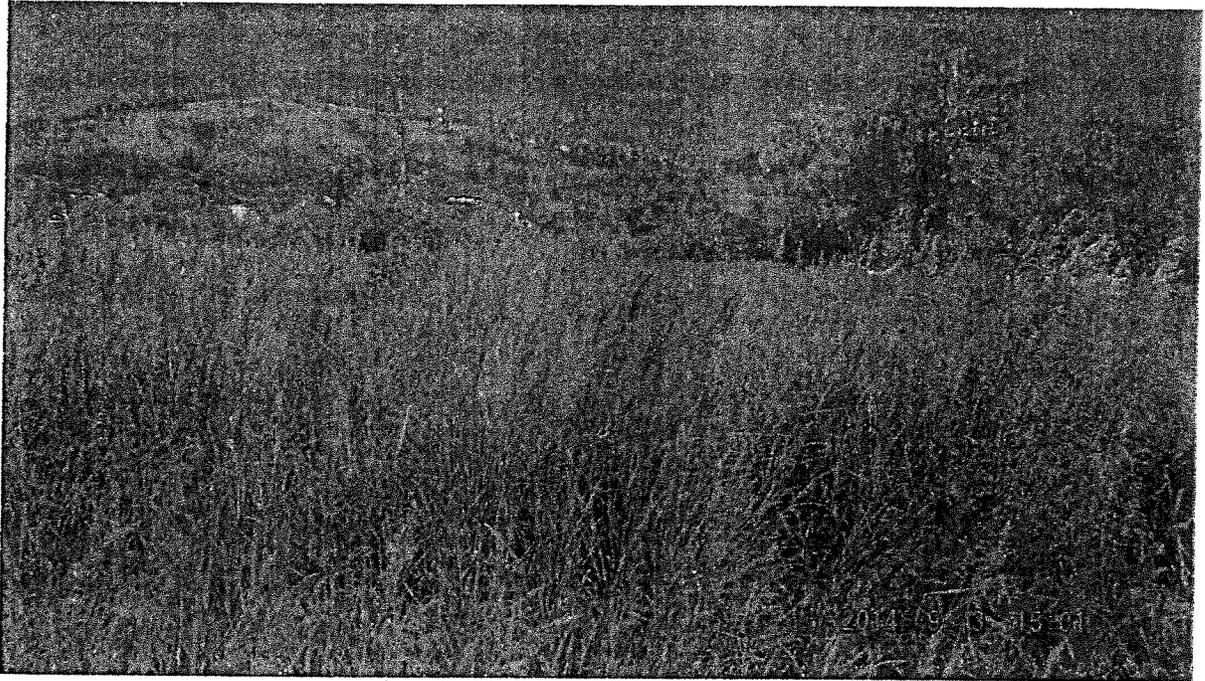
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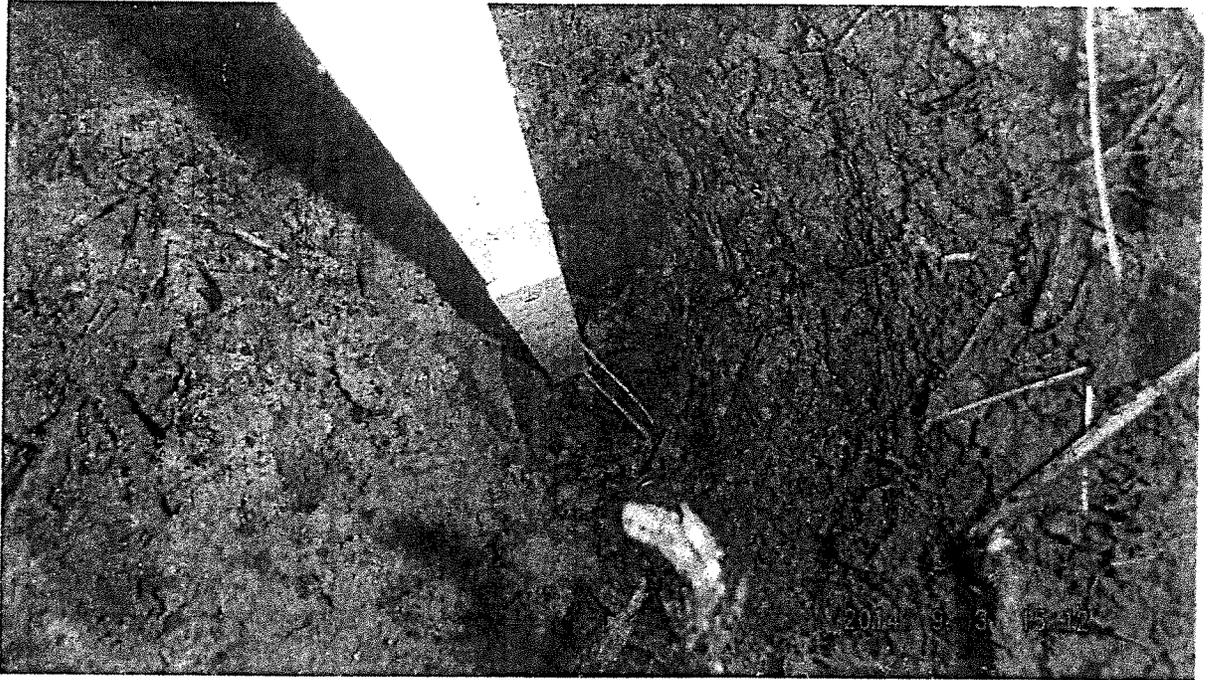
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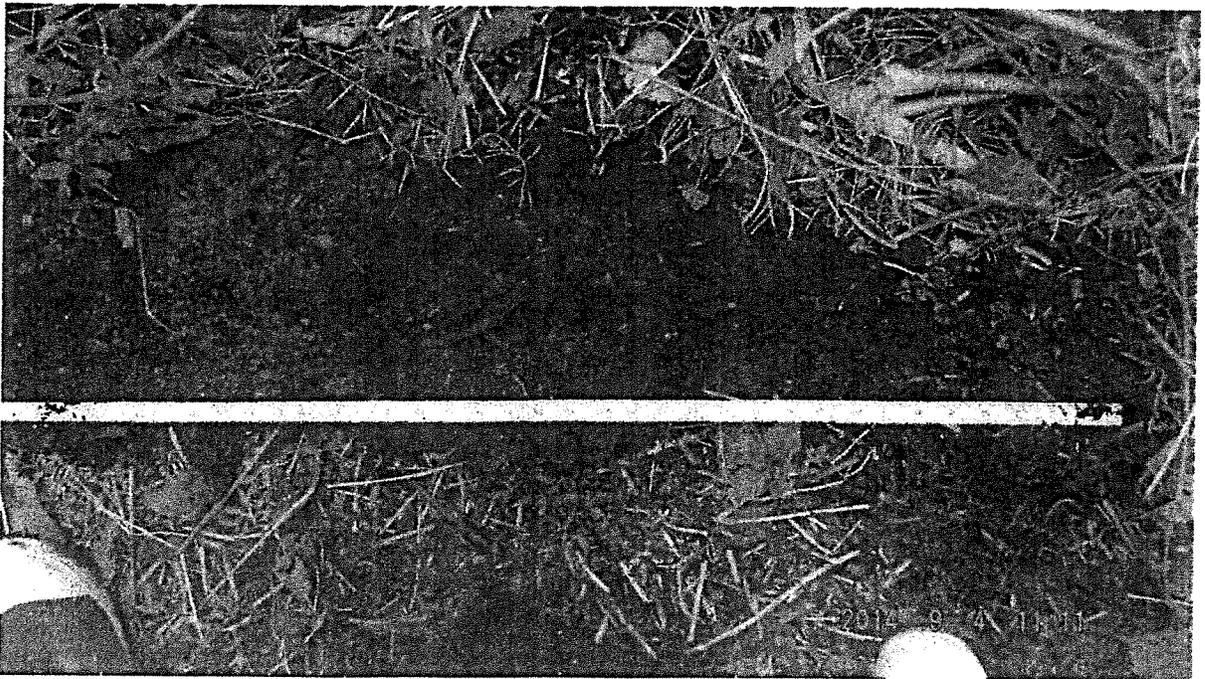
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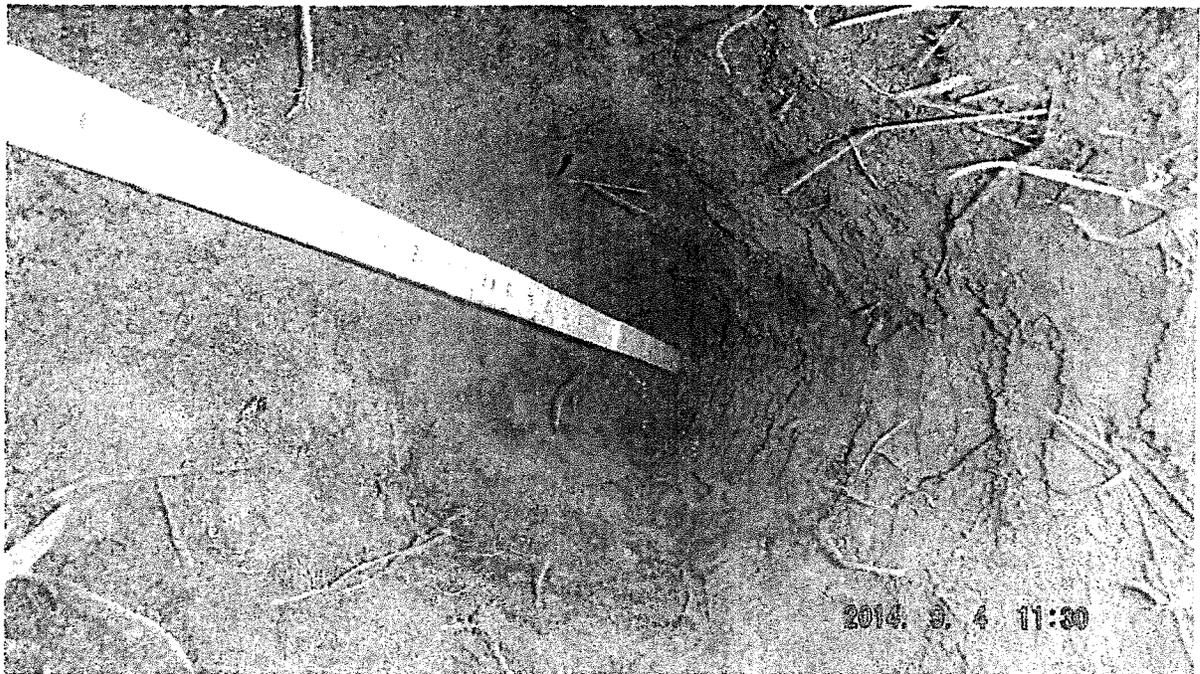
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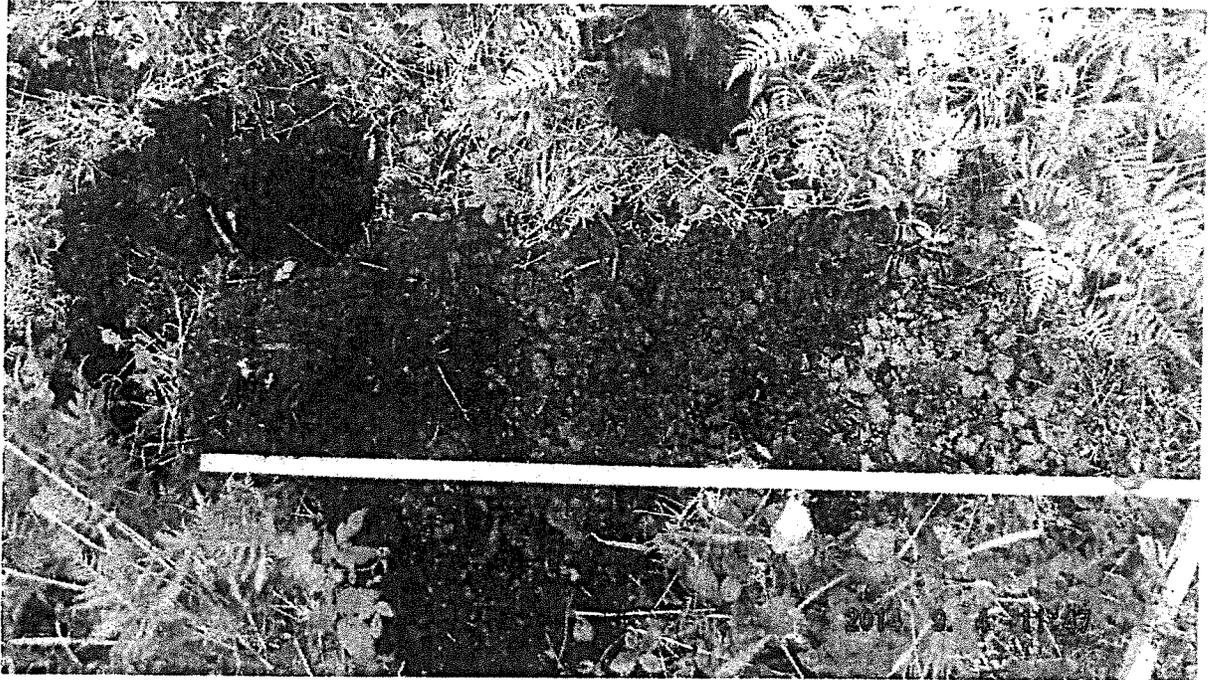
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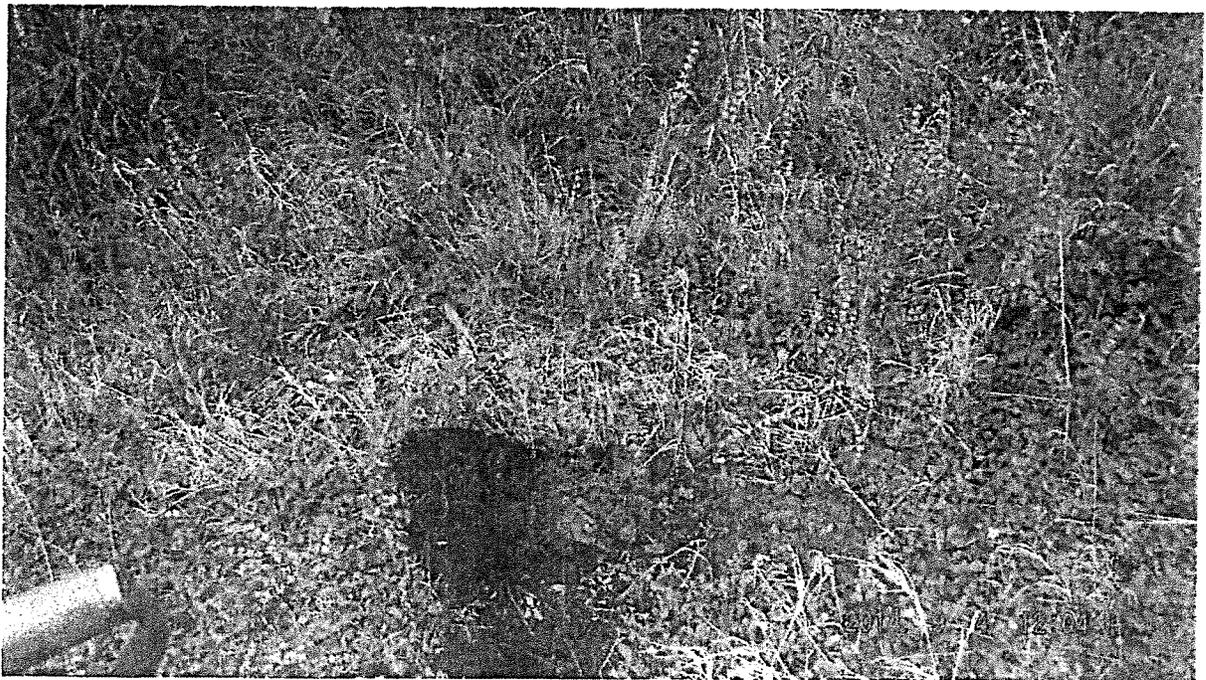
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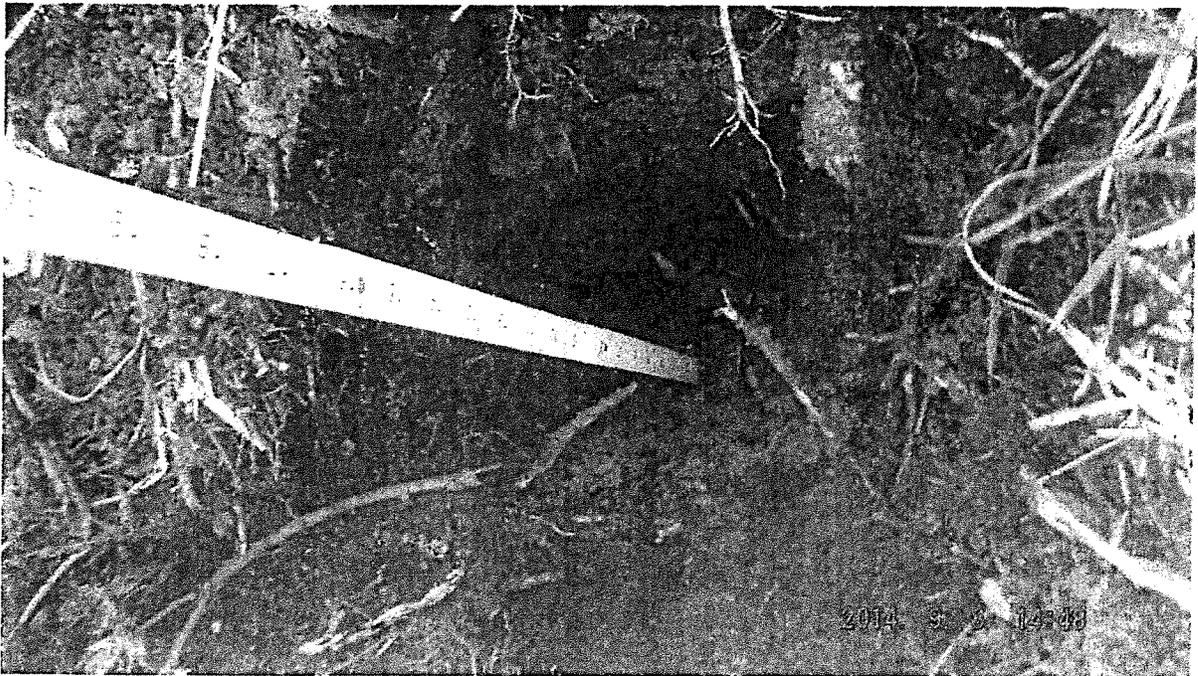
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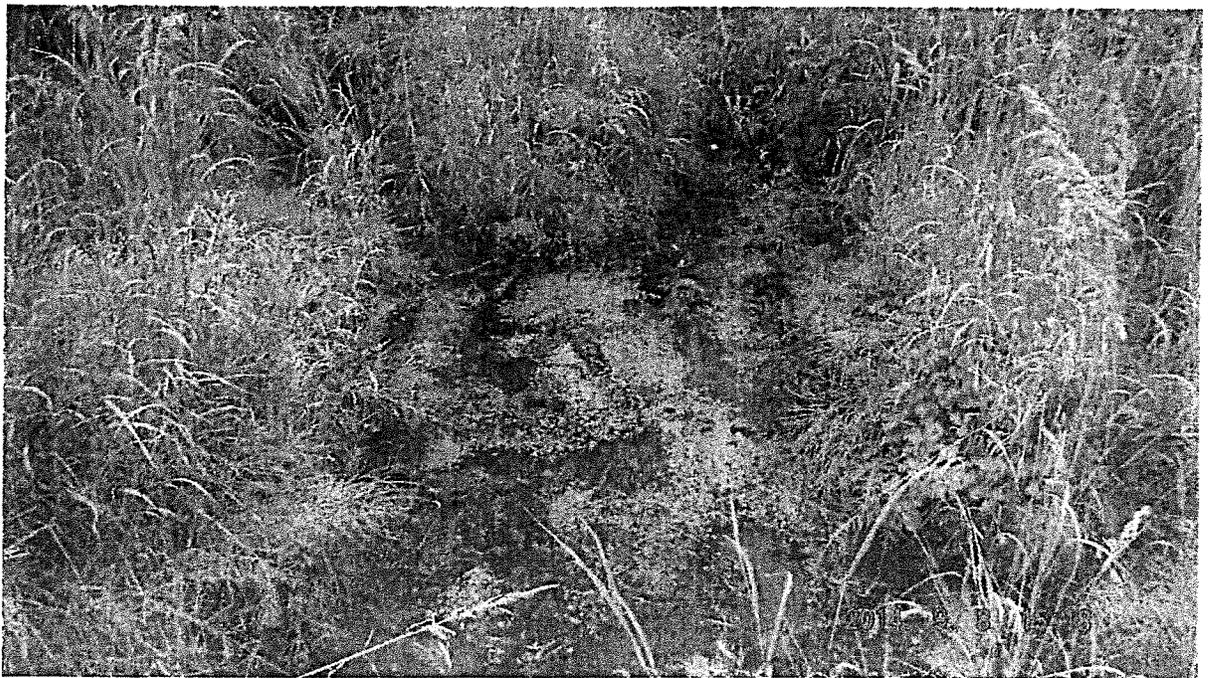
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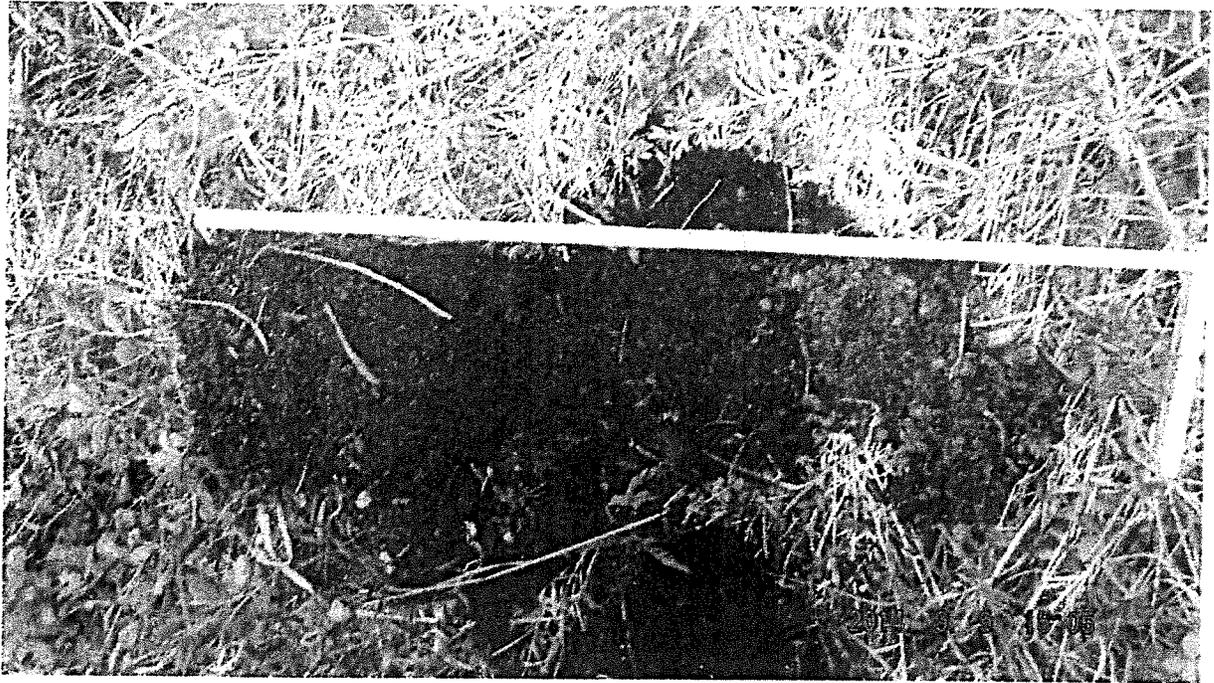
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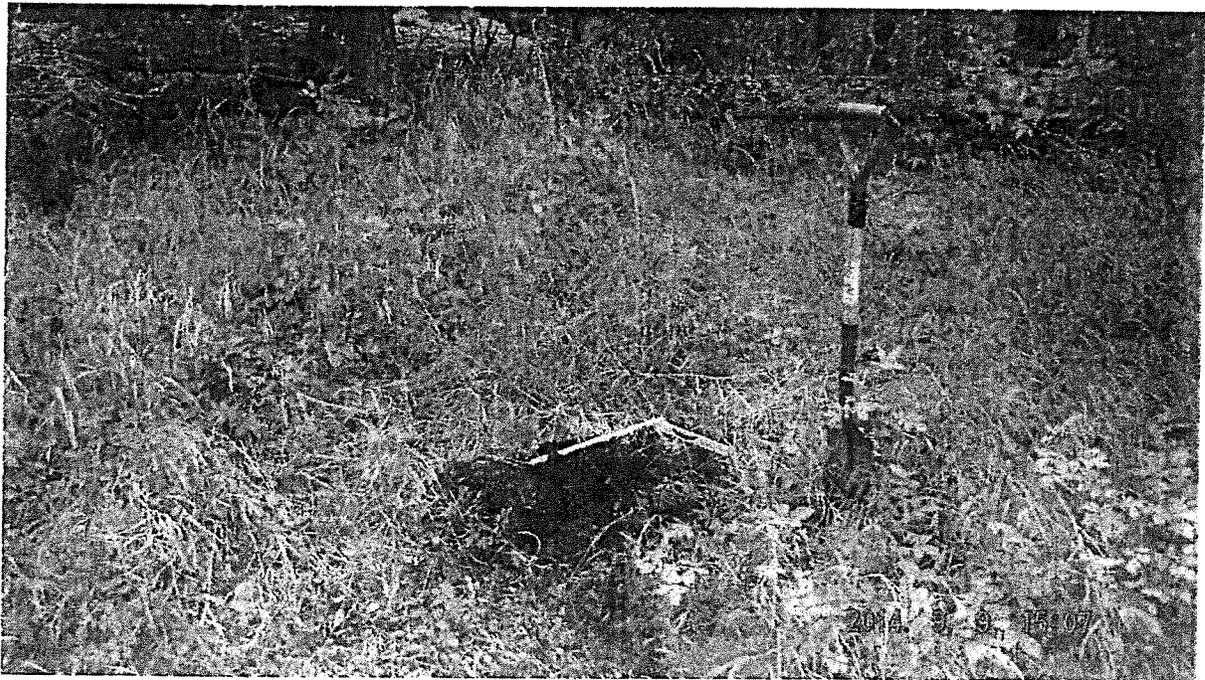
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**Geological Consulting      Environmental Restoration      Regulatory Compliance**

## **Ground Water Resource Evaluation for the Proposed Lewis and Clark Subdivision**

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## 1.0 SUMMARY

(Big Country Enterprises, LLC. (Big Country) contracted TERRASAT, Inc. (TERRASAT) to conduct an investigation of hydrogeological conditions at the proposed Lewis and Clark Subdivision (see Figures 1 & 2). In addition, TERRASAT supervised the installation of three new wells and conducted aquifer testing and evaluation as part of the overall study objectives.

The proposed Lewis and Clark subdivision is comprised of approximately 80 acres of undeveloped land on the Hillside area of Anchorage, Alaska. Ten acres of the land in the northwest corner of the parcel may be not included in the final plat for the development. The parcel is bordered on the north by Upper DeArmoun Road, on the east by Canyon Road, on the west by Messinia Street on the south by undeveloped land that lies 500 to 1000 feet up gradient of a segment of Rabbit Creek. Figure 1 shows the site general location and Figure 2 shows the specific site location.

Our investigation of the area water budget concluded that sufficient sustainable ground water is available to supply the proposed Lewis and Clark subdivision land development. An evaluation of area well data suggests at least five separate aquifers exist in the local area. TERRASAT proposes that at least two aquifers will likely be used to extract groundwater for the various lots in the Lewis and Clark development.

Average yield per well for 124 residential wells in an approximate 1/2 mile area around Lewis and Clark subdivision that were evaluated in this study is 5.09 gallons/minute. Aquifer test results suggest that the average well in the Lewis and Clark subdivision may produce between 7 to as much as 135 gallons/minute. Hydrogeological modeling of the new wells show that the largest impact to a property 200 feet away ranges between 0.0 and 3.08 feet when a well is pumped for up to three hours at 2 gallons per minute, a typical rate. Most of the neighboring wells have more than 200 feet of available static water level in their wells. Therefore, the neighboring wells will continue to function without a significant impact.

## 2.0 METHODS

TERRASAT conducted a comprehensive groundwater investigation of the area in and around the proposed Lewis & Clark Subdivision using available well logs from the MOA and from the ADNRS WELTS databases that were within 1/2 to 3/4 miles from the property of interest. Figure 3 shows the locations of 124 private residential wells whose records were analyzed during the site evaluation conducted by TERRASAT for the proposed Lewis and Clark subdivision.

## 3.0 GEOLOGY

### 3.1 Background Information

Several State and Federal reports have documented the generalized geology of the area around and including the proposed Lewis and Clark subdivision. Much of the Upper Hillside area of Anchorage is part of the Chugach State Park and the boundary lies one mile east of the eastern boundary of the Lewis and Clark subdivision. A USGS map report "Generalized Geologic Map of Anchorage and Vicinity, Alaska" by Henry R. Schmoll and Ernest Dobrovolsky 1972, shows the surficial geology types, not including a thin layer of organics that is found in many areas, include the following:

- Colluvium (c): Slope deposits on mountain sides and valley walls in lowlands. Consisting of diamicton and poorly sorted to well sorted gravel with some sand, silt or clay. Usually, and in this location, it is found downslope of bedrock.
- Lake and Pond Sediment (l): Near mountains it is chiefly silt and clay with some fine sand, and sand and gravel: it is accumulated in former ice-dammed lakes. In this case, from ice-dammed water flowing down the modern Rabbit Creek channel as seen in Figure 4 south of the property of interest.
- Alluvial Fan Deposits (af): Deposits in alluvial fans or alluvial cones. In this case they are likely from alluvial fan or cone deposits that came down from mountain sides in the area. Consisting dominantly of gravel and may contain some silt and clay. Often, as here, they are found next to and grade into colluvium (c).
- Morainal Deposits (m): Deposits found generally in long ridges marking the merging of former glaciers. Chiefly till.

While beneath the surface, any of the above type deposits may also be found, ultimately at some depth bedrock will be located:

- Bedrock (b): Metamorphic rock, principally McHugh Complex metamorphosed siltstone, greywacke, arkose, conglomerate sandstone, and greenstone. Chert and argillite are often associated with these deposits. This type rock is surely to be found at the Lewis and Clark site, likely at depths no greater than 250 feet bgs.

Figure 4 is a map display of the information contained in the USGS geology map of the area. Figure 5 shows the topographic location of the site and includes the location of a drainage basin divide in the area. Figure 6 below, from Hydrology For Land-Use Planning: The Hillside Area, Anchorage, Alaska, Larry L. Dearborn and William W. Barnwell, USGS Open File Report 75-105 in cooperation with the Greater Anchorage Area Borough shows likely bedrock depths of the Hillside area including the Lewis and Clark site.

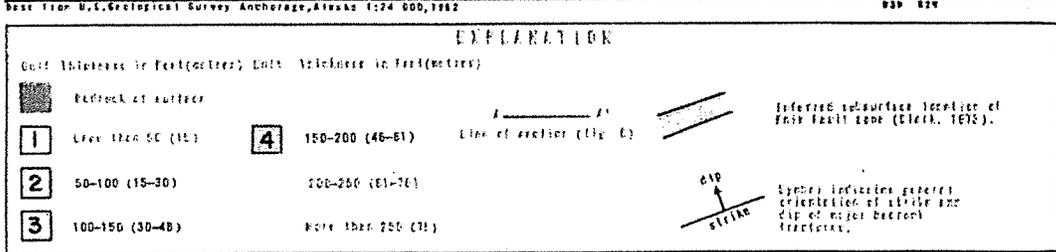
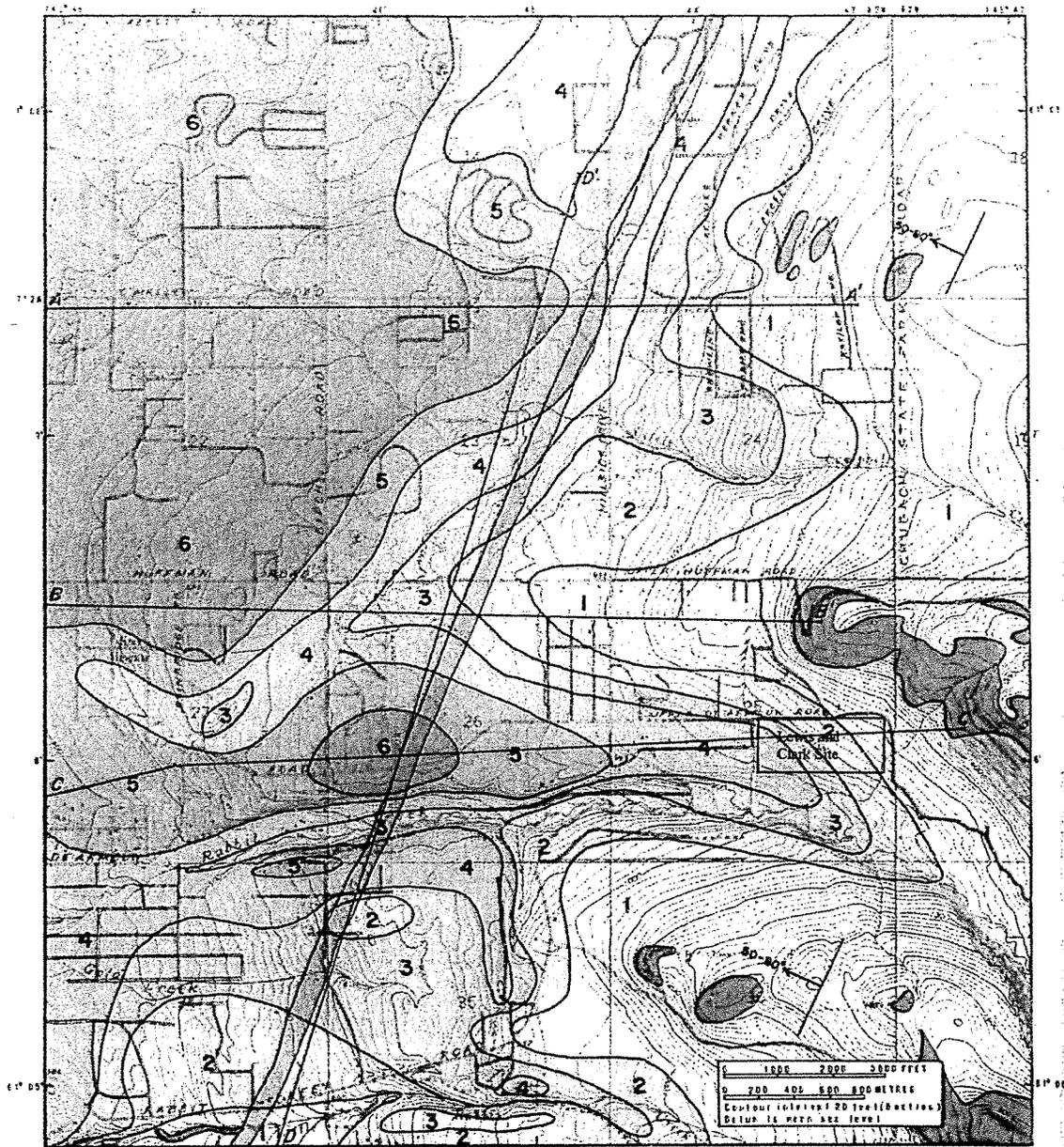


Figure 6. Hillside bedrock depths. (from Hydrology For Land-Use Planning: The Hillside Area, Anchorage, Alaska, Larry L. Dearborn and William W. Barnwell, USGS Open File Report 75-105 in Cooperation with the Greater Anchorage Area Borough)

Note in Figure 6 that bedrock depths across the Lewis and Clark site range from 50 to 200 feet (below ground surface) bgs. This compares favorably to a statistical modeling evaluation by TERRASAT, based on well log data from area wells, that showed depths to bedrock likely will range from between 0 to 158 feet bgs for the up-gradient 2/3 of the property, with greater depths downgradient in a southwestern direction. Insufficient data was available to model the lower 1/3 of the Lewis and Clark site.

Subsequent data collected from the installation of the three new wells (see following sections) in December 2016 has compared favorable to the TERRASAT and USGS bedrock modeling of that specific area of the Lewis and Clark subdivision and confirms the actual bedrock depth at those locations ranges from 43 to 92 feet below ground surface.

### **3.2 Subsurface Investigations**

#### **3.2.1 Pre-Drilling Evaluations**

Figure 4 shows the geology of in the area of interest consists of colluvium in the south and in the north, lake and pond sediments that run in the center of the property, and alluvial fan deposits on the east of the property. Percolation test hole logs show peat in the upper 1 to 2 feet, with silty or gravelly fine sands (colluvium or lake and pond sediments) predominant for several feet beneath the upper layers.

Wells in the area are known to be in bedrock in most locations, however to the west of Lewis and Clark several private wells in the Grecian Hills Subdivision are installed in unconsolidated material as is a private well (within the project area) located on the east side of Messina Street. These wells are likely located in the alluvial fan or morainal deposits that are shown in Figure 4, indicating that either or both of those type of deposits may extend further south than the generalized USGS map indicates. This is inferred from the fact that the residential wells directly north of the Lewis and Clark subdivision, which are located in colluvium, are bedrock wells according to well logs, while wells directly west of the Lewis and Clark subdivision are located in unconsolidated material. As one moves from higher to lower elevations in the Hillside area, bedrock is generally found deeper and the percentage of wells in unconsolidated material becomes greater. This effect may become evident within the Lewis and Clark parcel because the land there grades gently downward toward the Rabbit Creek valley which lies south of it.

TERRASAT reviewed the water well data from 124 local wells and reviewed static water levels and elevations, lithology, depths to bedrock, well aquifer type, and other available information including water quality. Appendix A contains much of that information.

### 3.2.2 Post Well-Drilling Geological Results

Three drinking water well boreholes were drilled in December 2016 through January 2017 . Well logs (Appendix D) show that fractures in bedrock aquifers exist at several depths in the Lewis and Clark Subdivision at those specific locations. These water bearing fractures-zone aquifers are protected from surface activities by at least 100 feet of bedrock aquitard. Bedrock was initially encountered at depths of 43, 51 and 92 feet below ground surface in the three exploratory wells. Those wells were drilled to depths of 398, 256, and 236 feet below ground surface respectively. All three wells were completed in bedrock with water producing fracture zones encountered at several depth intervals. The bedrock was predominately greywacke with numerous hydrothermal veins of quartz and other minerals at various depths. Section 4.2 describes the results of aquifer testing at the three wells.

## 4.0 HYDROGEOLOGY

### 4.1 Subsurface and Previous Investigations

Several prior studies describe various aspects of the geology and hydrogeology of the area. TERRASAT used “Hydrology For Land-Use Planning: The Hillside Area, Anchorage, Alaska, Larry L. Dearborn and William W. Barnwell, USGS Open File Report 75-105” in cooperation with the Greater Anchorage Area Borough, to help define the water budget for the area. Another study that was referenced was “Emanuel and Cowing, USGS Open File Report 82-86, Hydrogeology for land-use planning; the Potter Creek Area, 1982, Anchorage, Alaska” in cooperation with the Greater Anchorage Area Borough.

Static water levels at the time of drilling from available well logs were converted to static water elevations above sea level for the area well logs used in TERRASAT’s investigation. The static water elevations were then statistically evaluated to differentiate aquifers in the communities surrounding the Lewis and Clark subdivision. Five separate aquifers were delineated for the area.

The western area of the Lewis and Clark subdivision likely contains a thicker section of unconsolidated material above bedrock. At least one confined aquifer likely exists in this unconsolidated material that either does not exist further to the east, or if it exists, is too thin to produce sustainable water supplies. The one water well that currently exists in that area confirms this likelihood.

TERRASAT’s investigation found that ancient channels of Rabbit Creek once crossed two locations within or very near the property of interest. Figure 7 shows the locations of these former stream channels. These ancient channels will have altered the subsurface and surface geology in those specific areas, likely creating deposits of alluvium that still exist. These will likely be encountered during development of the area and have a potential to serve as a high yield aquifer.

#### 4.1.1 Local Aquifers and Availability of Water

According to the report; Hydrology For Land-Use Planning: The Hillside Area, Anchorage, Alaska, Larry L. Dearborn and William W. Barnwell, USGS Open File Report 75-105, the groundwater budget for the Anchorage Upper Hillside area containing the Lewis and Clark project area is approximately 10-16 Mgal/day. Figure 8, below depicts the general study area of that Hillside report which closely correlates with the 99516 area code area. Figure 9 shows the water budget in that area.

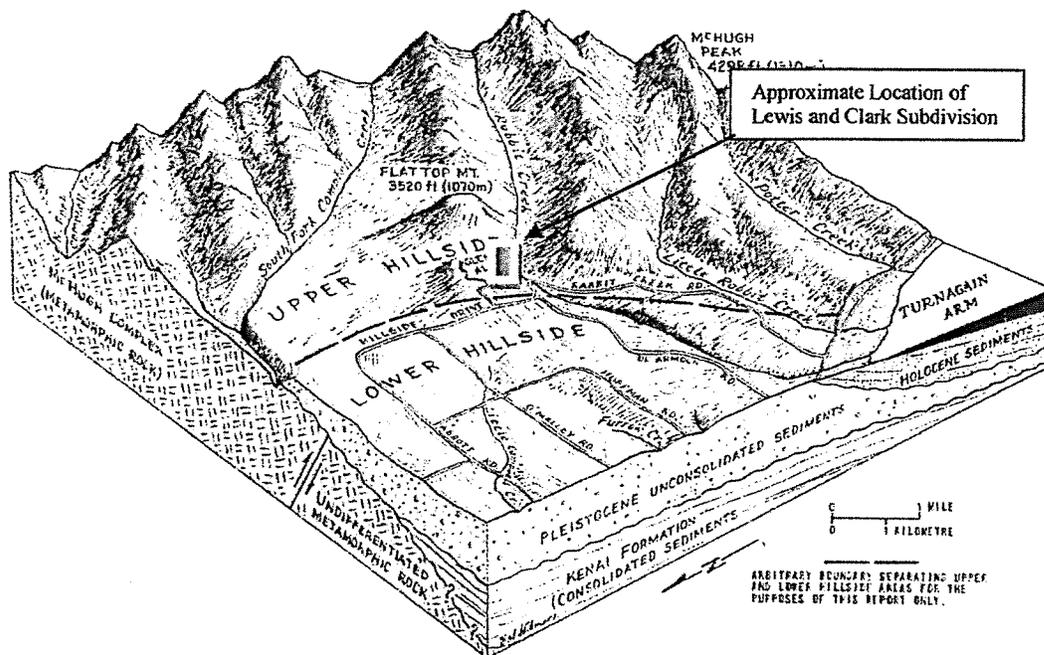


Figure 8. Upper Hillside Area (from Hydrology For Land-Use Planning: The Hillside Area, Anchorage, Alaska, Larry L. Dearborn and William W. Barnwell, USGS Open File Report 75-105 in Cooperation with the Greater Anchorage Area Borough.)

An average home in Anchorage uses approximately 450 gallons per day of water. The MOA census data from 2013 for the Upper Hillside, the area code 99516 area, lists a population of 20,781. If we are to assume that an average house contains four people, then we can assume that the area contains approximately 5195 houses. If 5195 homes use 450 gallons per day then the Upper Hillside area would use 2,337,750 gallons per days of the available 10-16 million gallons. This shows that availability of groundwater is not, at this time, an issue for the Upper Hillside area. The Lewis and Clark subdivision will have approximately 30 houses

or less. The daily water consumption for 30 houses at 450 gallons per house equals 13,500 gallons per day. This is a fraction of the 10-16 million gallons per day of available groundwater shown in Figure 9. We conclude that groundwater recharge is abundant for the Lewis and Clark subdivision and surrounding subdivisions.

One-hundred seventeen wells had available data regarding aquifer type for each well. Figure 10 shows the most current static water elevations measured for each well. Some are the measurement taken at the time of drilling and some are taken at a later date, often when the property ownership was being transferred. The results show that five separate aquifers likely exist in the area.

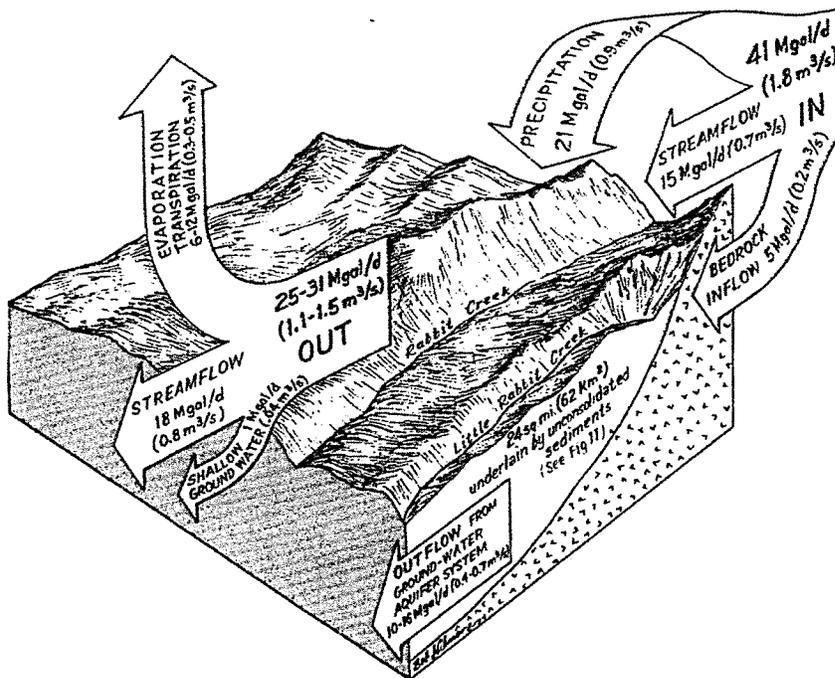


Figure 9. Water Budget of the Upper Hillside area containing the Lewis and Clark project site. (from Hydrology For Land-Use Planning: The Hillside Area, Anchorage, Alaska, Larry L. Dearborn and William W. Barnwell, USGS Open File Report 75-105)

Available well logs show 92 water wells are completed in consolidated rock (bedrock) and twenty-five are completed in unconsolidated (sand and gravel) aquifers. Figure 11 shows static water elevations at the time of drilling. These water levels differentiate aquifers.

Well yields for the 124 area wells show that 92 wells completed in bedrock have a mean yield of 2.7 gpm (see Figure 12). More than 97.5% of the consolidated rock wells produced more than 0.33 gallons per minute at the time of drilling. Figure 12 shows the well yield of all 124 wells, including the wells completed in unconsolidated material. Average yield per well for 124 residential wells in an approximate 1/2 mile area around Lewis and Clark subdivision that were evaluated in this study is 5.1 gallons/minute.

A four bedroom house requires about a third of a gallon per minute without the need for a holding tank. We conclude that adequate groundwater resources are available for the Lewis and Clark Subdivision with a planned density of R-6 lots.

Most homes use less than 450 gallons per day, or 0.3 gallons per minute, while most area wells produce more than 3 gallons per minute and, as Figure 12 shows, the area bedrock aquifer is capable of producing as much as 20 gallons per minute.

#### **4.2 Well Installation and Aquifer Test Results at Lewis & Clark**

Three wells were drilled on three contiguous lots in December of 2016 and January of 2017. The contiguous lots were selected so that aquifer tests could determine likely impacts to nearby wells. Wells were spaced approximately 180 feet apart. These lots are typical of lots within the subdivision. Wells were drilled to depths of 393, 256, and 236 feet below ground surface. These wells were completed in bedrock. Figure 13 shows the locations of three wells installed at Lewis and Clark. Initially, step tests were performed at each well to determine the maximum rate at which each could be pumped for the 24 or 6 hour tests, without causing rapid or significant drawdown to the observation wells. These observation wells acted as proxy wells for neighboring wells.

The wells were also monitored for diurnal-antecedent water level fluctuations. Well LCW-1 is an artesian flowing well and was constantly flowing during manual observations taken several times during the January to February well drilling and aquifer testing program. Only during pump testing of LCW-2 did the water level fall temporarily below the top of the casing. Wells LCW-2 and LCW-3 were instrumented with pressure transducers for one 24 hour period. Well LCW-2 showed 0.137 ft. (1.64 inches) of water level fluctuation while well LCW-3 showed 0.8 ft. (9.6 inches) of fluctuation. From past experience, these results were not deemed great enough to affect the AqteSolv data evaluation of the aquifer pump testing, and the dataset was therefore not modified before evaluating the results.

Aquifers were tested following ASTM standards. Two wells were tested with a 24-hour continuous discharge test and one well was tested with a 6-hour continuous discharge test. Each well was allowed to recover for the same duration as the drawdown testing. Aquifer test results show that each well is capable of providing adequate water supplies and that the impact to wells on adjacent lots will be

insignificant. The basic well and aquifer test results and information for each well are listed below.

LCW-1

- Total Depth (ft. top of casing) : 393
- Depth of Casing (ft. bgs) : 65
- Depth to Bedrock (ft. bgs) :43 fractured/weathered – 62 fully consolidated
- Static Water Level (ft. top of casing) : Flowing
- Static Water Level Elevation (ft AMSL) :
- Diurnal Antecedent Water Fluctuation (ft.): 0
- Casing Height Above Ground Surface (ft.) : 2.0
- Maximum Potential Yield (gpm) : 135
- Drawdown at 200 Radial Feet (@3gpm/2Hrs.) (ft.) : 0
- Recovery After 6 Hours (ft.): 100%

LCW-2

- Total Depth (ft. top of casing) : 256
- Depth of Casing (ft. bgs) : 53
- Depth to Bedrock (ft. bgs): 52
- Static Water Level (ft. top of casing): 18.5
- Static Water Level Elevation (ft. AMSL) :
- Diurnal Antecedent Water Fluctuation (ft.) : 0.137
- Casing Height Above Ground Surface (ft.) : 2.6
- Maximum Potential Yield (gpm) : 135
- Drawdown at 200 Radial Feet (@3gpm/2Hrs.) (ft.) : 5.1
- Recovery After 24 Hours (ft.): 100%

LCW-3

- Total Depth (ft. top of casing) : 236
- Depth of Casing (ft. bgs) :100
- Depth to Bedrock (ft. bgs) : 92
- Static Water Level (ft. top of casing) : 55
- Static Water Level Elevation (ft. AMSL)
- Diurnal Antecedent Water Fluctuation (ft.) : 0.8
- Casing Height Above Ground Surface (ft.) : 2.0
- Maximum Potential Yield (gpm) : 135
- Drawdown at 200 Radial Feet (@3gpm/2Hrs.) (ft.) : 0
- Recovery After 24 Hours (ft.) : 96%

The maximum potential yields listed above refers to the rate at which the well could be continuously pumped before 100% of the available drawdown would be reached. These test data show that abundant water is available for planned wells in the Lewis and Clark subdivision. The average Anchorage household well would need to be pumped at a rate of 0.31 gpm continuously, when equilibrating this rate to the average daily household usage of 450 gallons/day. The maximum rates listed for the wells above are therefore far above the range of expected normal rates. They indicate that much more water is available than will ever normally be used.

For the Lewis and Clark subdivision, 200 lateral feet is the approximate distance between planned wells on separate lots. That hydrogeological modeling of the new wells show that the largest drawdown impact to a property 200 feet away ranges between 0 and 3.08 feet when a well is pumped for up to three hours at 2 gallons per minute, a typical rate. The individual well data are listed below:

- Based on the aquifer test data for well LCW-1, pumping at 3 gpm for 2 hours will result in drawdown of 0.0 feet at a distance of 200 ft.
- Based on the aquifer test data for well LCW-2 pumping at 3 gpm for 2 hours will results in drawdown 3.08 ft. at a distance of 200 feet.
- Based on the aquifer test data for well LCW-3 pumping at 3 gpm for 2 hours will results in drawdown of 0.0 ft. at a distance of 200 feet.

Most wells in the Lewis and Clark Hillside area contain at least 200 feet of available drawdown. A well 200 feet away from well LCW-2 would draw down 3.08 feet, which leaves 98.46% of the available water. The drawdown is temporary and recharge begins as soon as pumping is discontinued. Pumping of the other two wells would have no drawdown effect for wells 200 feet away.

Recharge rates as listed above show that all three wells attain 96% to 100% recharge in the same amount of time or less time than they were pumped during aquifer testing. Well LCW-3 (96%) is the only well that did not achieve 100% recharge in the same time period as the pump test, and it is also the well with the highest (0.8 feet) amount of normal daily water level fluctuation.

Based on static water level elevations of the three new wells and laboratory water chemistry results (see Table 1), we conclude that at least two bedrock aquifers exist beneath the Lewis and Clark subdivision. Further, based on observations made during the aquifer testing procedures we conclude that partial connectivity exists between all three wells. Wells LCW-2 and LCW-3 exhibit a higher degree of connectivity than does LCW-1 to either of the other two wells.

## **5.0 ENVIRONMENTAL CONSIDERATIONS**

### **5.1 Existing Contaminants**

The proposed Lewis and Clark subdivision is an undeveloped forested parcel. Site inspections by TERRASAT have found no potential contaminants or environmental concerns that currently exist on the property. Potential contaminants and environmental considerations that are commonly associated with development are discussed below. A discussion of the potential for the Lewis and Clark development to affect adjoining or nearby properties is included for each topic of concern. The potential effect of potential contaminants on aquifers that supply drinking water is discussed in section 5.2.5.

## 5.1.1 Water Quality at Lewis and Clark

Water samples were collected from the three new wells drilled in January of 2017. The samples were analyzed for Calcium, Iron, Manganese, Total Dissolved Solids (TDS), and total Nitrogen by Nitrate-Nitrite. Table 1 lists the results of the water sampling. Water quality from the three wells complies with primary drinking water standards for the parameters tested. Iron and manganese exceeds the secondary drinking water standards in some wells, based on desirability of drinking water. Iron or manganese treatment could be employed to reduce these metals from the water supply.

Table 1. Results of Water Sampling in January 2017

	Sample Collection Date	Calcium (ug/L)	Iron (ug/L)	Manganese (ug/L)	TDS (mg/L)	Nitrate-Nitrite-N (mg/L)
Drinking Water Standard		NA	NA	NA	NA	10
Secondary Drinking Water Standard		NA	300	50	500	NA
Well ID						
LCW-1	1/31/17	27000	1330	57.3	246	1.12
LCW-2	1/25/17	54900	ND (DL=78.0)	4.67	286	1.83
LCW-3	1/30/17	43300	ND (DL=78.0)	59.0	291	0.0378

NA refers to non-applicable items. ND refers to an analyte that was analyzed for but was not detected at a level above the detection limit. Calcium is not a regulated or secondary parameter of water quality in Alaska. Secondary Standards are not regulated by law but are used to suggest good or desirable water quality. DL=Detection Limit

## 5.2 Potential Contaminants

TERRASAT, Inc. considered potential contaminants that could be introduced to the property as a result of development. Contaminants typically associated with residential development include pesticides and herbicides, automotive wastes, de-icing chemicals, nutrients, and bacteria and viruses.

### 5.2.1 Pesticides and Herbicides

Pesticides and herbicides are likely to be used in small quantities in residential developments. Pesticide use in Anchorage is even less than other parts of the country because we have fewer pests and a short growing season. Both pesticides and herbicides have an affinity for carbon and, therefore, are not mobile in carbon-rich environments. This reduces their capability for overland flow and soil infiltration. This means that pesticides and herbicides will likely remain in root mass, leaf mass, or within the root zone, where they will be trapped and naturally degraded. In the Lewis and Clark development, large lawns or garden areas are not likely to be created by the new owners as the large lot concept that is planned retains most of the currently existing vegetation and trees. This will

result in even lower amounts of pesticides and herbicides than an average Anchorage home that is located in the bowl area.

#### 5.2.2 Automotive Wastes

Several types of contaminants are commonly associated with automotive waste. These include hydrocarbons (gasoline or diesel fuels, oils, grease etc.), metals (lead, copper zinc, and cadmium), and antifreeze. These contaminants are typically released to driveways and roadways and are transported in storm water. Storm water in this development will be treated using grassy swales and bio-filtering, will follow Best Management Practices, and will follow the Municipality of Anchorage Storm Water Treatment Plan Review Guidance Manual. This type of treatment is common in other Upper Hillside subdivisions, where the Municipality of Anchorage's Municipal Separate Storm Sewer System (MS4) does not reach at this time.

The treated storm water will then be discharged into Rabbit Creek and eventually to Cook Inlet as does all of Anchorage's storm water. Stormwater monitoring in other, higher-density subdivisions within the Municipality of Anchorage show that contaminants from automotive waste seldom if ever reach major conveyances. The amount of automotive waste transported in storm water is expected to be minimal and insignificant.

#### 5.2.3 De-Icing Chemicals

The Municipality of Anchorage uses Magnesium Chloride as an anti-icing and de-icing agent on some roadways in Anchorage. Common de-icing chemicals used by residents on walkways and driveways are sodium chloride and calcium chloride. These chemicals may be applied in small quantities and would be significantly diluted by melting snow and rainwater prior to entering the storm water outflow. Low concentrations of de-icing chemicals will be removed with bio filtration.

#### 5.2.4 Nutrients

Based on the ADEC Guidance Manual for Class A Public Water Systems and the development plan for Lewis and Clark, we determined that the most likely sources for nutrients would be leaking septic systems, lawn fertilizer, and animal waste. The nutrients that could have the greatest impact on water quality are nitrogen and phosphorus. The fate and transport of nitrogen is described in section 5.3.2 below. Phosphorus, and phosphates, complex with calcium in soil and become insoluble, thus they are less mobile than nitrates. Likewise, nutrients will be filtered by soil or used by the lawns and will be taken up by plants or immobilized within the root zone.

##### 5.2.4.1 *Septic Systems*

Although there is little evidence of the water table aquifer being used to supply drinking water in the general area, one does exist throughout the area. Septic

systems and leach fields within the Lewis and Clark subdivision will be installed above the shallow unconsolidated water table aquifer that exists there. The shallow water table aquifer is distinctly different from the confined unconsolidated or confined bedrock aquifers. The shallow water table aquifer is likely recharged in part from bedrock fractures. The shallow water table is not a known source of potable water for the surrounding community. Septic systems within the Lewis and Clark subdivision will use advanced treatment systems. The results are discussed in section 5.3. In summary, the shallow water table will be protected from microorganisms and nitrates.

#### 5.2.4.2 *Lawn Fertilizer*

The Lewis and Clark development includes large lots that are likely to remain mostly forested with the original vegetation and small lawn space. Because of this, we expect that the nitrate loading to the water table aquifer due to leachate from lawn fertilizer and animal waste will be below laboratory detection limits. The process of fertilizer fate and transport in soil explains why ground water in the Upper Hillside area is not susceptible to nitrate contamination from lawn fertilizer.

The lawn fertilizer often contains a soluble form of nitrogen known urea. Urea is composed of carbon, oxygen, nitrogen and hydrogen. The urea is converted to ammonia and carbon dioxide. Some of the ammonia is lost as gas to the atmosphere. The remaining ammonia is converted to positively charged ions that attach to negatively charged soil grains. Soil bacteria then convert the ions into nitrate through a process called nitrification. The nitrogen, as nitrate, is now in a form that is useable by plants and soil microbes. Four main processes remove nitrogen from the soil. Most nitrogen is bound in organic matter, is used by plants, or is used by bacteria and released to the atmosphere as nitrogen gas. The remaining nitrogen, as nitrate, that escapes the root and humic zones is available to leach through the soil. The amount of nitrate available to leach through the soil is reduced further as some of it is immobilized by organic sources below the root zone. Tight soils that slow or prevent the infiltrations of water also prevent the vertical migration of nitrate to the aquifer.

The minimum uptake of nitrogen by nine common grass species is 125 pounds/acre/year (Croste, 1997). The minimum uptake of nitrogen by the most popular grass seed mix sold by Alaska Mill and Feed (Fescue and bluegrass) has a minimum uptake of 158 pounds/acre/year and an average uptake rate of 211 pounds/acre/year. According to several university extension services, typical nitrate application rates for urban lawn range from 43 to 174 pounds/acre/year. Hillside Lawn and Snow, an Anchorage lawn maintenance company, reported their normal nitrate application rate to be less than 70 pounds/acre/year. Alaska Mill and Feed recommends applying nitrogen at a rate of 194 pounds/acre/year. The average uptake rate is greater than the expected application rate of nitrate in lawn fertilizer for a typical Anchorage lawn. Furthermore, some nitrate will be immobilized by organic matter and some will be denitrified. This suggests that no

nitrate added during lawn fertilization will be able to reach the water table aquifer by leaching through soil in the root zone.

Several researchers have looked at nitrate leaching beneath urban lawns under various conditions. Gold *et al* (1990) looked at nitrate leaching from residential and agricultural land uses. He found that with an application rate of 218 pounds/acre/year only 4% of the applied nitrate leached in the first year of the study. The second year of the study less than 1% leached through the top 8 inches of the soil profile. Geron *et al.* (1993) looked at nitrogen leaching from seeded and sodded turf-grass under different a fertilizer programs. Using an application rate of 194.5 pounds/acre/year, he found that in the first year after establishment 26% and 28% leaches from seeded and sodded plots respectively. By the second year of the study, leaching decreased to 3.5% and 11% respectively. He concluded that “the results for the second year are more representative of a stable turf-grass environment”. These studies demonstrate that even exceeding the recommended/average application rate, nitrate leaching from lawn fertilizer decreases rapidly as the sod/roots develop. A judiciously managed phased approach to fertilization during lawn establishment will greatly reduce first year nitrogen leaching.

#### 5.2.5 Effect of Surface Contaminants on Water Supply Aquifers

The above descriptions of surface contaminant fate and transport show that most contaminants will not reach the water table. Lawns and the use of fertilizers are minimal on Anchorage R-6 zoned lots on most of the Upper Hillside. Pesticide and herbicide use on R-6 zoned lots will likely be minimal and completely insignificant. Thus, the limited use of these types of contaminants reduces the risks of water table contamination to nearly zero. Natural vegetation and soil microbes will further protect the upper water table aquifer.

Available well logs and data show that 92 water wells are completed in consolidated rock (bedrock) and twenty-five are completed in unconsolidated (sand and gravel) aquifers. Based on well static water elevations, at least five separate aquifers are being used to supply water to area wells. These do not include the water table aquifer. High static water levels in the surrounding subdivisions suggest the dominant recharge of the water table aquifer is from water migrating upward from rock fractures.

### 5.3 Nitrate Fate and Transport Modeling

#### 5.3.1 ATS Systems

The Lewis and Clark development plans to use Advanced Treatment Systems (ATS) for the septic systems on all lots. These systems significantly reduce nitrate effluent using a filter media and biodegradation processes. The filter media reduces virus and bacteria outflow by 99% more than conventional systems. The likelihood of leachate migrating offsite is extremely low to non-existent. The

more relevant concern is migration within the Lewis and Clark development, specifically to water well aquifers on downgradient lots.

Nitrates from septic systems, as with other compounds, have distinct migration characteristics depending on the media and physical conditions through which it passes. TERRASAT used analytical mathematical modeling techniques to determine the distances and rates at which nitrates are likely to move through the soils at the proposed sites. Of particular concern are water well distances from nitrate sources. Surface water, such as Rabbit Creek, were also considered in the modeling process.

### 5.3.2 Nitrate Fate and Transport

TERRASAT evaluated existing percolation test results, surface topography, water well logs, distances to property boundaries, and distances to active drainages. Sixteen water well logs from surrounding subdivisions provided the basis to determine the thickness of the shallow water table aquifer. We created two appropriate mathematical models to evaluate the fate and transport of nitrogen from the proposed advanced nitrate reducing septic systems. We modeled total nitrogen, which includes nitrates. We found that nitrogen, at the local creek, 430 feet away from the nearest lot, would be less than 0.07 mg / liter. This model assumes that no biological processes denitrify the nitrate between the source and the receptor, in this case Rabbit Creek. Denitrification does occur in aquifers, breaking down the nitrate molecule into nitrogen gas and oxygen. Denitrification by heterotrophic bacteria will occur, with published removal rates in excess of 0.01 mg per liter per day and as much as 0.44 m/l per day. Travel time from the nearest leach field to Rabbit Creek is over 112 days. That means at least 1 milligram/liter of nitrogen will be denitrified, converted to nitrogen gas, before it reached the creek. Therefore, we conclude that measurable nitrates will not reach Rabbit Creek from septic systems within the Lewis and Clark subdivision. Appendix B contains the worksheets and results of the nitrate fate and transport model.

TERRASAT concludes that septic nitrate migration to other properties or to Rabbit Creek is highly unlikely, based on modeling results, the use of ATS systems, and taking into consideration the topographic slopes of the Lewis and Clark property.

## 5.4 Bacteria and Pathogen Removal Modeling

TERRASAT considered the potential migration of five different pathogenic bacteria from a proposed leach field. The bacteria are:

- *E. Coli* bacteria
- *Enterococci* bacteria
- *Fecal streptococci* bacteria
- *Salmonella* bacteria

- *Shingella* bacteria

Bacteria and viruses are primarily removed from ground water by the process of attachment and deactivation, where attachment (think straining) is the dominant process. The Manual of Design for Slow Sand Filtration (1999) states that 97% of coliform bacteria are removed within the first meter (approximately 3 feet) of sand filtration beneath a leach field. More recent studies (Morales, et al, 2014) found removal rates of 99.99% removal of bacteria and 99.99% removal of viruses for drinking water (Predicting Attenuation of Viruses During Percolation in Soils, August, 2002)

These studies suggest that more than 99.99% pathogenic organism are removed from septic leachate before the effluent reaches groundwater. Ignoring the primary attachment process, we calculate that 99% *E. Coli* bacteria that could reach groundwater will be deactivated within 51 feet of the leach field. We conclude that the MOA separation distance of 100 feet from a leach field to a domestic water well is much more than adequate. We also conclude that pathogenic organisms will be deactivated before they can reach a lot boundary.

In conclusion, the MOA separation distance of 100 feet from a leach field to domestic water well is adequate in this subdivision and the local stream is also protected. Most lots are at least 1,000 feet from the stream and the closest lot is more than 430 feet (leach field) to the stream. Appendix B contains the deactivation models for bacteria and pathogens.

## **6.0 AERIAL PHOTOGRAPHIC EVALUATION OF TERRAIN**

TERRASAT evaluated aerial photographs of the area to interpret site drainage and topography.

### **6.1 Surface Drainage**

Surface drainage of the Lewis and Clark parcel is currently overland in an approximate southwestern direction as it moves downgradient toward one of the branches of Rabbit Creek. This was also verified by onsite inspections. A historic segment of Rabbit Creek was discovered that existed along the eastern border area of the parcel. Figure 7 shows this segment. This was verified by investigating older maps and documents and TERRASAT found that this segment was likely changed when Canyon Road was constructed.

### **6.2 Site Topography**

Lewis and Clark subdivision is situated in a low point topographically compared to properties northeast and east of it. Some properties to the northwest lie cross gradient (on the approximate same elevations) as portions of Lewis and Clark. A very small portion of land to the southwest lies downgradient of the property of interest. Finally, while no land is developed in that area, the land directly south of

Lewis and Clark is downgradient of the development. Rabbit Creek prevents surface flow from moving south beyond Rabbit Creek as it accepts any runoff from up-gradient areas.

Figure 5 shows this relationship.

## 7.0 CONCLUSIONS

TERRASAT was concerned about the sufficiency of groundwater to support the Lewis and Clark subdivision. We were also concerned about what impact water wells would have on the new subdivision and on the surrounding neighboring water wells. We found that more than 10 million gallons per day of groundwater flows through this area of the south Anchorage hillside, far in excess of what the existing community uses. We found that groundwater recharge is from several watersheds south and east of this proposed development. TERRASAT concludes that *recharge* is expected to remain abundant and far in excess of the demands of residential use.

Available water well logs and a statistical analysis show that the community within a half mile of the Lewis and Clark subdivision exploits groundwater from at least five different aquifers. Recharge for these aquifers are up-gradient from the Lewis and Clark subdivision. Therefore, TERRASAT also concludes that, drinking water *quality* is expected to remain unaffected by the new land development.

Based on static water level elevations of the three new wells and water chemistry laboratory results we conclude that at least two bedrock aquifers exist beneath the Lewis and Clark subdivision. Further, based on observations made during the aquifer testing procedures we conclude that partial connectivity exists between the three wells. Wells LCW-2 and LCW-3 exhibit a higher degree of connectivity than does LCW-1 to either of the other two wells.

Test data shows that maximum well yield is in the range of 7.4 gpm to 135 gpm for the three water wells recently completed. Wells in this subdivision are expected to use an average of 0.31 gallons per minute. We predict that the drawdown 200 feet away will be up to 3.08 feet, an insufficient amount to impact the neighboring lots. Recharge is expected to be complete within minutes to several hours after the pumps are off, meaning the small, insignificant impact will only last for several minutes. Therefore, we conclude that impact to wells on adjacent lots will be insignificant.

TERRASAT evaluated the concern that other nearby subdivisions have a significant nitrate problem in their aquifers. Two reports about nitrates exist for this area. Both reports state that nitrate levels are low and are not concerning. TERRASAT evaluated newer data from the Municipality of Anchorage. We found low levels of nitrate exist and conclude that the newer data is consistent with the previous reports. We found that nitrate concentrations increased in some

subdivisions and decreased in others. We further conclude that rates of increase are low and consistent with past information.

TERRASAT also evaluated the vulnerability of Rabbit Creek from development of the subdivision. Several community members expressed concern that nitrates from septic systems could have a negative impact to the water quality of the creek. We conducted mathematical modeling to evaluate the fate and transport of nitrates from proposed septic systems. Specifically, we modeled the septic system that would be closest to the creek. The results show that in a worst-case scenario, nitrate would reach the creek at a concentration of 0.07 milligrams per liter. However, this assumes that no denitrification occurs. Denitrification by heterotrophic bacteria will occur, with published removal rates<sup>1</sup> in excess of 0.01 mg per liter per day and as much as 0.44 mg/l. Travel time from the nearest leach field to Rabbit Creek is over 112 days. That means at least 1 milligram/liter of nitrogen will be denitrified, converted to nitrogen gas, before it reaches the creek. Therefore, we conclude that measurable nitrates will not reach Rabbit Creek from septic systems within the Lewis and Clark subdivision.

TERRASAT investigated the concern of several community members that nitrates from the Lewis and Clark subdivision could impact their water supply. Soils within the Lewis and Clark subdivision will, for the most part, support conventional septic systems. However, as good citizens and protectors of the environment, the developers are proposing to use advanced nitrate reducing septic treatment systems, reducing nitrate output by a factor of three from conventional systems. The ultimate fate of the nitrates after leaving the leach field is that they will ultimately reach the upper water table. In the upper water table, heterotrophic bacteria will denitrify the nitrates into nitrogen gas and nitrous oxide gas. We modeled nitrate migration to the nearest lot line in the water table. Nitrate concentrations will be less than 0.1 mg per liter at the lot boundary, minus the amount removed by denitrification, which could easily be 0.5 mg per liter. TERRASAT concludes therefore that nitrates will not likely reach an adjacent lot.

TERRASAT examined other potential impacts to the environment, such as stormwater runoff towards Rabbit Creek, pesticide use and the existence of wetlands. This low-density land development is expected to protect the natural resources and surrounding communities. We conclude that the preservation of the existing wetlands will allow the distinct existing biological communities to continue their function of treating stormwater and protecting Rabbit Creek water quality.

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<sup>1</sup> Morales Parra, Ivan, "Modeling Onsite Wastewater Treatment System Contaminants in Current and Climate Changing Conditions" (2015). *Open Access Dissertations*. Paper 376. pg118.

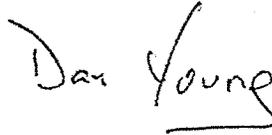
Please contact us at (907) 344-9370 if you have any questions or would like further information.

Prepared By:



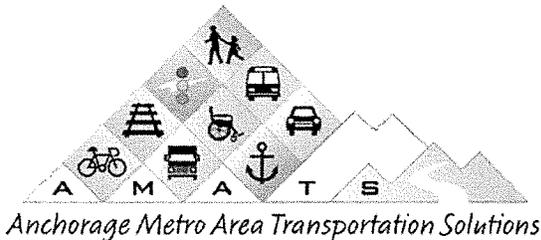
Cali Swatowski (for Steven Smith)  
Project Environmental Scientist

Approved By:



Dan Young  
Principal,  
CPG, #7811

# Departmental and Public Comments



MUNICIPALITY OF ANCHORAGE  
Community Development Department,  
Transportation Planning Section  
Non-Motorized Transportation Coordinator  
Planning & Development Center, 4700 Elmore Road  
P. O. Box 196650, Anchorage, AK 99519-6650  
voice (907) 343-8387  
e-mail: [blessingbr@muni.org](mailto:blessingbr@muni.org)

DATE: October 13, 2017  
TO: David Whitfield, Platting Officer  
FROM:  Brooke Blessing, Non-Motorized Transportation Coordinator  
SUBJECT: **S12388** Lewis & Clark Subdivision, Lots 1-16, Block 1 Tract A

The 2010 Hillside District Plan identifies primary & secondary trail connections along Upper Dearmoun and Canyon Road, bordering this parcel. The proposed plat appears to have provided adequate Right of Way for future development of pathways within these roadways.

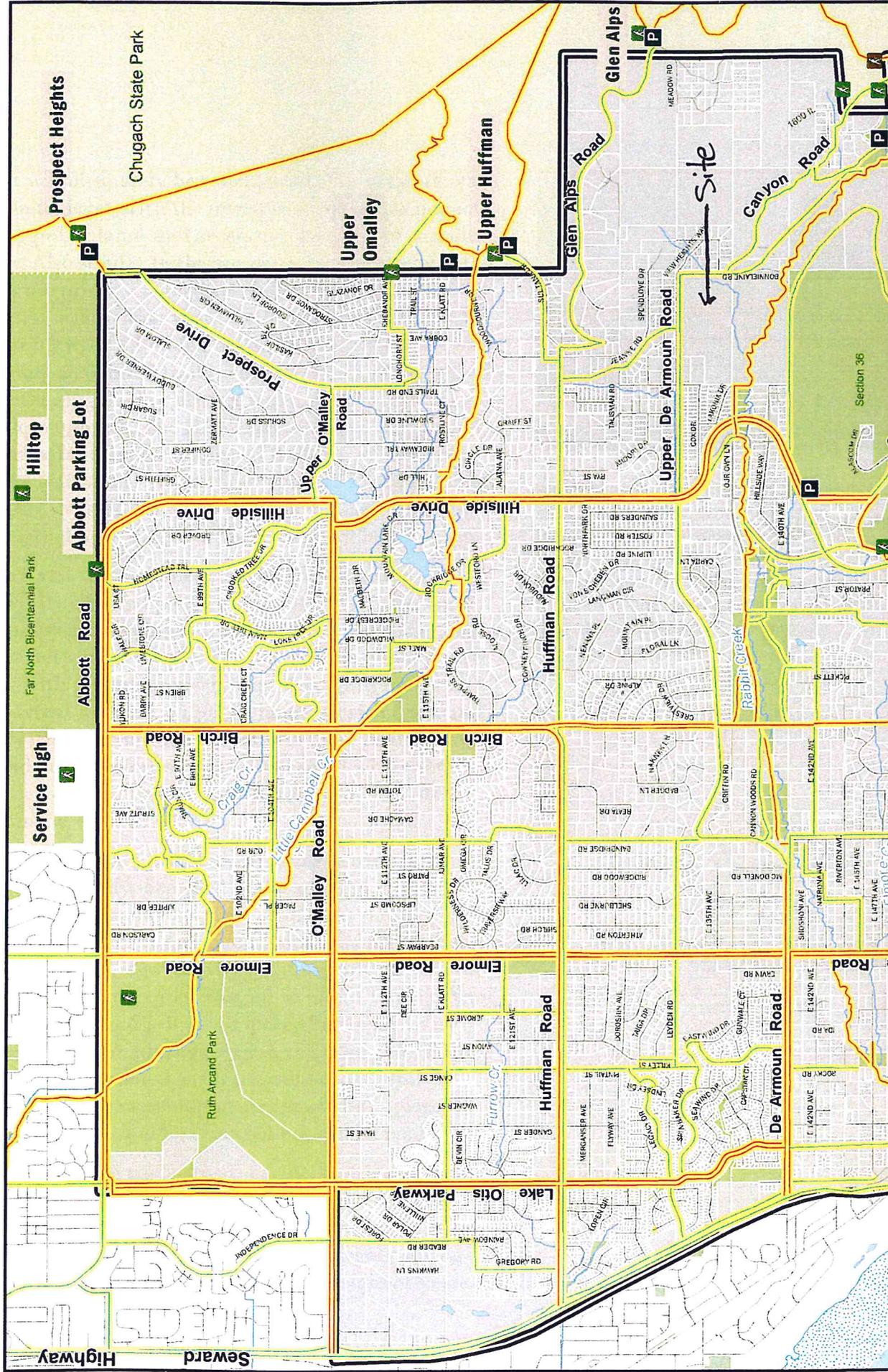
Title 21.07.060.D.3.b.ii requires pedestrian easements from cul-de-sacs to the nearest adjacent street. The proposed Brownson Circle's nearest roadway of Dearmoun is an insignificant pedestrian connection only gaining minimal internal street connectivity, however a 10' Walkway Easement is requested within the proposed Lewis & Clark Circle, connecting the cul-de-sac to Canyon Road.

I am available to meet and discuss further details. Thank you for the opportunity to review.

Cc: Craig Lyon, AMATS

Map 4.6

# Existing / Proposed Trail Routes





**MUNICIPALITY OF ANCHORAGE**  
**Development Services Department**  
**Right of Way Section**

**MEMORANDUM**

**RECEIVED**

**DEC 07 2017**

**PLANNING DEPARTMENT**

**DATE:** December 7, 2017  
**TO:** Community Planning and Development  
**THRU:** Jack L. Frost, Jr., Right of Way Supervisor  
**FROM:** Lynn McGee, Senior Plan Reviewer  
**SUBJ:** Request for Comments on Platting Board Case(s) for January 3, 2018.

Right of Way Section has reviewed the following cases due December 6, 2017.

**S12383 Alderwood #1, Block 3, Tract B1, Common Area, grid SW2025**  
Right of Way has no objections to the proposed action.  
Review time 15 minutes.

**S12386 The Terraces, Phase 8, Tract E1-A1D, grid SW2634**  
Right of Way has no objections to the proposed time extension.  
Review time 15 min.

**S12388**

**Lewis and Clark, Block 1, Lots 1-16 and Tract A, grid SW2941.**  
Suggest placing the title block in the conventional lower right corner of the plat, utilizing a break line for the existing reference monument location.  
Provide a legend item and identify the cross hatching and/or wetlands types and boundaries.  
Provide utility easements as required.  
Resolve with the MOA Traffic Departments the need for notes addressing the location, number, and size of the driveway entries to the street rights of way.  
Enter into a subdivision agreement to construct the required improvements to the interior and peripheral rights of way.  
Review time 30 min.



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

December 7, 2017

Municipality of Anchorage  
Planning Department  
P.O. Box 196650  
Anchorage Alaska 99519-6650

RECEIVED

DEC 07 2017

PLANNING DEPARTMENT

Re: Plat Reviews

Dear Sir/Madam:

ENSTAR Natural Gas Company has reviewed the following Preliminary Plats and has no comments, recommendations or objections:

- S12383** Alderwood Subdivision Add. #1, Block 3, Tract B1 note removal
- S12386** The Terraces Subdivision, Phase 8, Tract E1-A1D extension
- S12388** Lewis and Clark Subdivision

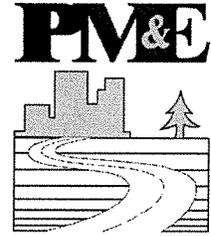
If you have any questions, please do not hesitate to contact me at 334-7944 or by email at [cassie.wohlgemuth@enstarnaturalgas.com](mailto:cassie.wohlgemuth@enstarnaturalgas.com).

Sincerely,

Cassie Wohlgemuth  
Right of Way and Compliance Technician  
ENSTAR Natural Gas Company



**Municipality of Anchorage**  
**Project Management and Engineering**  
**MEMORANDUM**



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**DATE:** December 5, 2017

**To:** Dave Whitfield

**FROM:** Kyle Cunningham

**SUBJECT:** S12386 & S12388: Comments from Watershed Management Services.

Watershed Management Services (WMS) has the following comments for the January 3, 2018 Platting Board hearing.

- S12386 – The Terraces Subdivision, Phase 8, Tract E1-A1D;
  - WMS has no comments regarding this case.
- S12388 – Lewis & Clark Subdivision, Lots 1-16, Block 1, & Tract A (Orig. Legal: T12N, R3W, SEC 25, S2W2NW4SE4 & E2NW4SE4 & NE4SE4)
  - There is a stream located on this plat and the stream protection setback will be as specified in AMC 21.07.020 or as specified in future adopted provisions of AMC 21. Portions of streams contained within mapped wetlands are subject to setbacks as described in the Anchorage Wetlands Management Plan.
  - Maintain continuity of drainage from existing drainageways that currently drain across the subdivision. Drainageways may not be relocated without prior approval from MOA Private Development.
  - Tract A will be preserved as open space by this subdivision. Tract A will be owned and maintained by the homeowners association and cannot be further subdivided, developed, or sold.

# MUNICIPALITY OF ANCHORAGE



Development Services Department  
Private Development

Phone: 907-343-8301  
Fax: 907-343-8200

*Mayor Ethan Berkowitz*

## MEMORANDUM

Comments to Preliminary Plat Applications/Petitions

RECEIVED

**DATE:** December 6, 2017

DEC 06 2017

**TO:** David Whitfield, Current Planning; Platting Officer

PLANNING DEPARTMENT

**FROM:** Brandon Telford, Private Development; Plan Review Engineer

**SUBJECT:** Comments for Platting Authority Public Hearing date January 03, 2018  
S12383; S12386; S12388

**Case No. S12383 – Alderwod Subdivision Addition #1:** Plat note removal request Plat No. 85-156 Note No. 2 which states “Property owners of Lots 2 thru 11 shall have an undivided interest in Tract B-1”

### Department Recommendations:

The Private Development Section has no comment on the plat note removal.

**Case No. S12386 – The Terraces Subdivision, Phase 8:** Request for a 1<sup>st</sup> 60 month time extension for a preliminary plat approved on 11/07/2012

### Department Recommendations:

The Private Development Section has no objection to the time extension.

**Case No. S12388 – Lewis and Clark Subdivision:** A conservation subdivision of one (1) tract of land into sixteen (16) lots and one (1) tract of land; Variance from AMC 21.08.030.F.6.a; Cul-de-Sacs to allow a cul-de-sac to extend beyond 900 feet; Variance from AMC 21.07.060.D.3.b.ii; Internal Street Connectivity, to not require a walkway to cross a stream.

**Roads:** The proposed subdivision abuts the following right-of-way:

- To the north, Upper De Armoun Road, a Glen Alps Service Area maintained right-of-way that is classified as a Class IC Neighborhood Collector in the current OSHP. Upper De Armoun Road appears to be strip paved with a width of approximately 24-feet where it abuts the proposed subdivision.

- To the east, Canyon Road, a Glen Alps Service Area maintained right-of-way that is classified as a Class IC Neighborhood Collector in the current OSHP. The Municipality of Anchorage has an upcoming project that will upgrade Canyon Road.
- Internal to the subdivision, Lewis & Clark Circle, a proposed right-of-way located in the Glen Alps Service Area. Lewis & Clark Circle is not constructed.
- Internal to the subdivision, Brownson Circle, a proposed right-of-way located in the Glen Alps Service Area. Brownson Circle is not constructed.

#### **Improvement Recommendations:**

Upper De Armoun Road appears to be strip paved with a width of approximately 24-feet where it abuts the proposed subdivision. This does not meet municipal requirements for shoulder width or pedestrian facilities. The existing level of improvement of Upper De Armoun Road is consistent with the level of improvement proposed for Canyon Road (also a Class IC Neighborhood Collector). As a result no road improvements are recommended at this time.

**Lewis & Clark Circle is not constructed where it is internal to the proposed subdivision. The petitioner shall construct to municipal standards a 20-foot wide strip paved street as shown on Typical Section No. 20-1 of the Municipality of Anchorage Standard Specifications.**

**Brownson Circle is not constructed where it is internal to the proposed subdivision. The petitioner shall construct to municipal standards a 20-foot wide strip paved street as shown on Typical Section No. 20-1 of the Municipality of Anchorage Standard Specifications.**

#### **Subdivision Agreement Requirements:**

**Prior to final plat approval the petitioner shall enter into a subdivision agreement with Private Development for the required public Class B area improvements, to include paved streets, traffic control devices, street signs, monuments, drainage facilities, utilities, and any Traffic Section improvement requirements.**

#### **Drainage:**

**Prior to final plat approval, submit to Private Development for review and approval a project specific full drainage analysis and calculations. An analysis will be required to address storm runoff as a result of the proposed changes to infrastructure and to permeable / impermeable surface treatments. The analysis and plans shall present and illustrate respectively how drainage from this facility is being managed in relation to peripheral properties and right of way; demonstrate that post development drainage will not adversely impact adjacent properties or rights of way; and, measures to be taken in the event that excavation associated with the build-out of the property exposes subsurface flows. Drainage analysis and design shall conform to the Municipality of Anchorage Design Criteria Manual (DCM) and the Drainage Design Guidelines (DDG).**

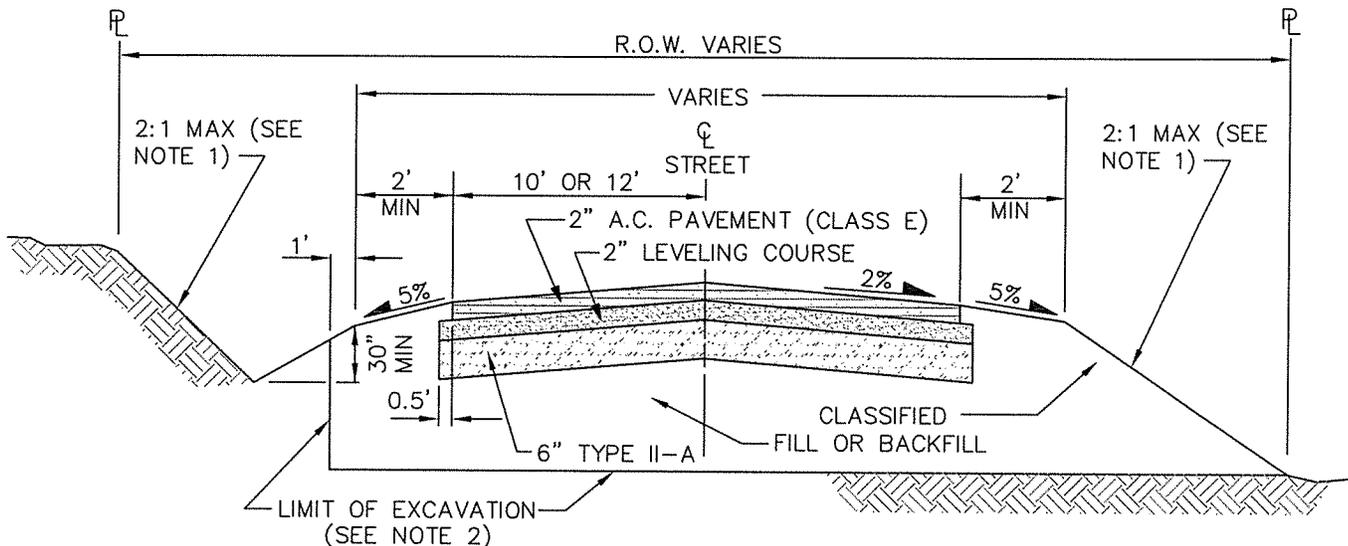
#### **Plat Notes:**

Private Development recommends the following notes be added to the final plat:

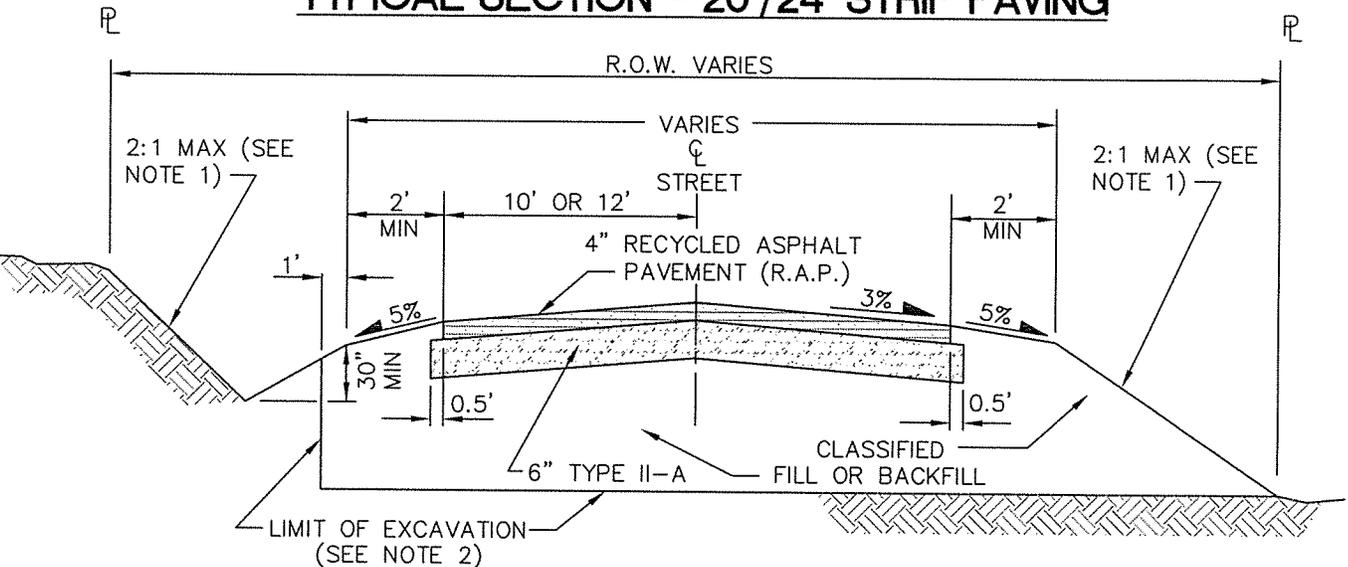
1. The property owner and utilities shall not raise, lower, or re-grade the property in a manner that will alter the drainage patterns from those shown on the approved grading and drainage plan without prior approval from Municipality of Anchorage Building Safety Office.
2. Property owners and utilities shall not obstruct, impede, or alter drainage facilities (e.g. swales, ditches) in any what that will adversely impact adjacent properties or rights-of-way.

**Department Recommendations:**

The Private Development Section has no objection to the proposed subdivision, subject to the above recommendations and conditions.



**TYPICAL SECTION - 20'/24' STRIP PAVING**



**TYPICAL SECTION - 20'/24' RECYCLED ASPHALT STREET**

**NOTES:**

1. PLACE OR REMOVE AND GRADE MATERIAL IN A NEAT MANNER FROM EXCAVATION LIMITS TO EXISTING ELEVATION AT PROPERTY LINE OR AS DIRECTED BY THE ENGINEER. (MAXIMUM 2:1 CUT AND FILL SLOPES)
2. ENGINEER WILL DETERMINE THE DEPTH OF EXCAVATION.
3. UNLESS OTHERWISE APPROVED, THE CENTERLINE OF STREET SHALL BE THE CENTERLINE OF R.O.W.
4. RECYCLED ASPHALT PAVING (R.A.P.) SHALL BE SEAL-COATED AS SPECIFIED IN DIVISION 40, SECTION 40.08 - RECYCLED ASPHALT PAVEMENT.

MUNICIPALITY  OF ANCHORAGE	SCALE: <b>NTS</b> APPROVED:  REVISED: <b>10/07</b>	<h2 style="margin: 0;">TYPICAL SECTIONS</h2> <h1 style="margin: 0;">20'/24' STRIP PAVED AND R.A.P. STREETS</h1>	SECTION # <b>DIV 20</b>  DETAIL # <b>218</b>
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# MUNICIPALITY OF ANCHORAGE



Development Services Department  
Addressing Section  
Addressing email: [addressing@muni.org](mailto:addressing@muni.org)

Phone: 907 343-8466  
Fax: 907 249-7868

*Mayor Ethan Berkowitz*

**RECEIVED**

December 4th, 2017

DEC 04 2017

**S12388, Lots 1-16 & Tract A, Lewis & Clark Subdivision, SW2941**

PLANNING DEPARTMENT

- a. Platted Area/Proposed Street Names
  - i. LEWIS & CLARK CIRCLE is not an acceptable street name. Street names must be 10 characters or fewer, including spaces and excluding the prefix/suffix. Ampersands are not allowed on street signs.
- b. Title Block
  - i. ".Block 1" of differs from the rest of the application

**Nick Maciaszek**

MSAG Coordinator - Addressing  
Municipality of Anchorage  
907.343.8244 (direct line)  
907.343.8466



# Municipality of Anchorage

Planning Department  
Long-Range Planning Division

## Memorandum



**Date:** December 1, 2017

**To:** Francis McLaughlin, Senior Planner, Current Planning  
Corliss Kimmel, Office Associate, Current Planning

**From:** Jon Cecil, Senior Planner, Long-Range Planning

**Subject:** S12388, Lewis and Clark Conservation Subdivision of one (1) tract into sixteen (16) lots and one (1) tract of land; Variance from AMC 21.08.030F.6.a; Cul-de-Sacs to allow a cul-de-sac to extend beyond 900 feet; Variance from AMC 21.07.060D.3.b.ii., Internal Street Connectivity, to not require a walkway to cross a stream

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**DEC 01 2017**

**PLANNING DEPARTMENT**

Long-Range Planning section has reviewed the packet for the establishment of a Conservation Subdivision that requires subdivision of one (1) tract into sixteen (16) individual lots, and one (1) tract of land. In addition, the applicant seeks a variance from AMC 21.08.030F.6.a to allow a cul-de-sac, which seeks to allow a cul-de-sac to extend beyond 900 feet; and, a variance from AMC 21.07.060D.3.b.ii., Internal Street Connectivity, to not require a walkway to cross a stream.

The proposed conservation subdivision will contain 70.05-acres, is zoned R-8 and will result in a buildout density of 0-1 dua per acre.

The applicable policies from *Anchorage 2020 - Anchorage Bowl Comprehensive Plan* include:

Anchorage 2020 Policy #2 states:

Land use and Generalized Residential Intensity Maps shall be developed with each Neighborhood or District Plan incorporating elements of the Land Use Policy Map and shall guide land use decisions.

Anchorage 2020 Policy #8 states:

Urban residential density, defined as greater than 1 dwelling unit per acre, is the optimum standards in the urban services area; and rural density residential, defined as equal to or less than 1 primary dwelling unit per acre, is the optimum standard in the rural services area.

Anchorage 2020 Policy #13 states:

New rural residential subdivisions shall be designed to

- a) Maintain the rural character of the area;
- b) Link to existing adjacent road and trail systems;
- c) Protect, maintain or avoid sensitive environmental areas (wetlands, steep slopes, drainageways, unsuitable soils, geohazard areas); and,
- d) Incorporate wildland fire safety design standards.

Anchorage 2020 Policy #48 states:

Subdivision plats and site development plans shall be designed to enhance or preserve scenic views and other significant natural features in accordance with applicable goals, policies and strategies.

Anchorage 2020 Policy #49 states:

Site plan layout and building design for new development shall consider the character of adjacent development. The Municipality may require layouts and design to incorporate the functional and aesthetic character of adjacent development.

Anchorage 2020 Policy #50 states:

Healthy mature tree and forested areas shall be retained as much as possible.

Anchorage 2020 Policy #55 states:

Provide pedestrian and trail connections within and between residential subdivisions in new plats, including replats.

Anchorage 2020 Policy #69 states:

The Municipality shall preserve the functions and values of important wetlands, and manage the proper use of low-value wetlands with General Permits, as delineated in the *Anchorage Wetlands Management Plan*.

Anchorage 2020 Policy #71 states:

Utilize wetlands to manage drainage and improve water quality, where appropriate.

### **Hillside District Plan (HDP)**

The proposed conservation subdivision site is located within the *Hillside District Plan (HDP)*, which is an adopted element of the comprehensive plan, and sets the goals, objectives and policies governing future land use and development. The HDP implements the comprehensive plan by examining in detail the Hillside land use and development issues identified in *Anchorage 2020* for future planning.

The proposed application seeks approval for a conservation subdivision on the Hillside that is consistent with the Limited-Intensity Residential, 0-1 DUA for large lot, single family residences in a rural environment, much of which is served by private wells and septic systems.

Applicable goals and policies of the HDP to this application include:

#### **Goal 1. Location and Intensity of Development:**

##### **Policy 1-B: Southeast Hillside Residential**

Maintain policies for the amount of development as adopted under current land use designations.

#### **Goal 9. Roads**

Improve the system of Hillside roads to respond to current use and expected growth:

- Improve road safety through, for example, physical changes in roads and intersections, speed limits, improving sight distance, minimizing cresting over roads, and improving strategies for providing road access in steep areas;
- Improve road connectivity while maintaining neighborhood character, particularly in areas where new development is likely to occur;
- Provide improved emergency access and egress; and

- Align and design roads with regard for natural setting and neighborhood character by minimizing cut-and-fill, preserving views and landmark natural features, controlling traffic speeds, and modifying lighting.

#### **Policy 14-L. Conservation Subdivisions**

Establish development standards for a Hillside Conservation Subdivision.

The HDP references conservation subdivisions specifically designed for the Hillside. The Hillside Conservation Subdivision has not been adopted at the time of writing. The HDP reference to conservation subdivisions is not applicable to this application. Title 21 21.08.070 includes provisions for three alternatives from conventional subdivisions for new residential neighborhoods: conservation subdivisions, cluster housing, and narrow lot housing. The Applicant seeks approval for the Lewis & Clark Conservation Subdivision per the requirements of Title 21.

#### **VariANCES**

The Applicant seeks relief through two variances for 1) AMC 21.08.030F.6.a; Cul-de-Sacs to allow a cul-de-sac, which seeks to allow a cul-de-sac to extend beyond 900 feet; and, 2) variance from AMC 21.07.060D.3.b.ii., Internal Street Connectivity, to not require a walkway to cross a stream.

The Applicant has requested a variance from the Design Standards for cul-de-sacs that prohibits cul-de-sac ROW greater than 900 feet. The applicant has requested cul-de-sac ROWs of 985 feet and 996 (for two cul-de-sacs), which are greater than 85 feet and 96 feet, respectively. We defer to the Municipal Traffic Engineer as well as the Fire Department to determine whether changes to this standard are acceptable based on the "extreme environmental or topographical conditions or unusually or irregularly shaped boundaries" found on the subject property.

The Applicant has also requested a variance from Development and Design Standards for internal street connectivity that requires cul-de-sac streets to include a 10-foot wide pedestrian access right-of-way easement unless "it would result in damage to or intrusion into significant natural areas such as stream corridors, wetlands, and steep slope areas, or if the configuration of existing adjacent development prevents such a connection." The applicant has not provided a clear and compelling case that the requested variance meets the four standards that are required to be substantially satisfied. Again, staff defers to the Non-Motorized Transportation Coordinator (PM&E) as to the suitability to require a 10-foot pedestrian access from the two cul-de-sacs to the nearest adjacent street.

#### **Wetlands**

The resubdivision of Tract A will permanently protect Class "C" wetlands by creating an open space greenbelt tract that will be protected through a deed restriction or easement that has been recorded at the district recorder's office.

#### Observation/Comment/Recommendation:

- 1) The plat does not reference that Tract A contains 1,000,365 SF or 22.965-acres that will be protected as private open space greenbelt that includes Class C wetlands, a stream, and other greenspace. Such reference should be included on the plat.
- 2) Long-Range recommends denial of the vacation of the trail segment from the eastern cul-de-sac to Canyon Road unless otherwise not recommended by the Non-Motorized Transportation Coordinator (PM&E).

Long-Range Planning Section has no objection to this request.

Thank you for the opportunity to comment and review.

RECEIVED

NOV 30 2017

PLANNING DEPARTMENT

November 27, 2017

Municipality of Anchorage  
Planning and Development  
P.O. Box 196650  
Anchorage, Alaska 99519-6650

Attention: Dave Whitfield, Acting Planning Section Supervisor

Dear Mr. Whitfield:

Chugach has provided comments to the enclosed proposed plat referenced per the following case number:

**S-12388 – Lewis & Clark Subdivision**

In the event that there are changes to the lot configurations or additional dedications requested in those same areas identified as electric easements, Chugach requests the opportunity to review the revised preliminary plat.

Sincerely,



Karen Keesecker,  
Manager, Land Services

Enclosures

# MEMORANDUM

**DATE:** November 29, 2017  
**TO:** Dave Whitfield, Platting Officer, Planning Section, Planning Division  
**FROM:** Paul Hatcher, Engineering Technician III, Planning Section, AWWU  
**RE:** Plat Case Comments  
Plats to be heard January 3, 2018  
Comments due December 6, 2017

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NOV 30 2017

PLANNING DEPARTMENT

The Anchorage Water & Wastewater Utility has reviewed the reference plat(s) and has the following comments:

**S12386 THE TERRACES (FORMERLY S11954-1), Request for a 1<sup>st</sup> 60 month time extension for a preliminary plat approved on 11/7/2012, Grid SW2634**

1. AWWU water and sanitary sewer are available to this parcel.
2. AWWU has no objection to this platting action.

**S12388 LEWIS AND CLARK, A conservation subdivision of one (1) tract of land into sixteen (16) lots and one (1) tract of land; Variance from AMC 21.08.030f.6.a; Cul-de-Sacs to allow a cul-de-sac to extend beyond 900 feet; Variance from AMC 21.07.060D.3.b.ii, Internal Street Connectivity, to no require a walkway to cross a stream, Grid SW2941**

1. AWWU water and sanitary sewer are not available to this parcel.
2. These parcels are located outside of AWWU's Water Service District.
3. Wastewater facilities are to be in accordance with the Hillside District Plan (HDP) adopted per AO2010-22. This property is located outside the max perimeter of Public Sewerage per HDP.
4. AWWU has no objection to this platting action.

If you have any questions pertaining to public water or sewer, please call 564-2721 or send an e-mail to [paul.hatcher@awwu.biz](mailto:paul.hatcher@awwu.biz)





MEMORANDUM

DATE: November 28, 2017  
TO: Current Planning Division Supervisor,  
Planning Department  
THRU: Kristen A. Langley, Traffic Safety Section Supervisor,  
Traffic Department  
FROM: Randy Ribble, Assistant Traffic Engineer  
SUBJECT: Traffic Department Comments

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NOV 28 2017

PLANNING DEPARTMENT

**S12388 Lewis and Clark Subdivision, Lots 1-16 Block 1, & Tracts A**

The traffic department recommends approval of this preliminary plat with the following comments;

This new subdivision is dedicating two new 60 foot rights of way for construction of two cul-de-sacs to support the proposed subdivision. The subdivision is zoned R-8 and all lots appear to meet the requirements for lot size and access to rights of way. It anticipated that the roads will be constructed under a subdivision agreement with municipality and will meet the standards of development for a Class B. Upper Dearmoun and Canyon Roads are classified as neighborhood collectors in Official Streets and Highway Plan.

1. Add a Plat note, Identifying that all development within this subdivision meet all requirements for an Alternative Residential Subdivision (Conservation Subdivision) outline in AMC 21.08.070 B.4
2. Add a Plat note; No direct access to Upper De Armoun and Canyon Roads for Lots 1-6, and 14, 15.
3. Revise radius of curve at intersection of Lewis and Clark Circle with Upper Dearmoun Road to 30 feet for curve number C4 and C21. Design Criteria manual, Chapter 1, Section 1.9 requires 30 foot radius when at intersection between local and collector roadways.
4. Dedication of 30 feet of Right of Way along both Dearmoun and Canyon road as currently shown on Preliminary Plat.
5. A majority of these lots appear that they will have a difficult time of constructing driveways to future homes that will meet municipal driveway standards for maximum grade based on existing contours shown on the plat.
6. Provide right of way or access easement for access to public right of ways from cul-de-sac as required by 21.07.060 D.3.B.ii. Please review additional comments in regards to variance request below.

**Variance for Length of Cul-de Sac per 21.08.030 F.6.a**

7. Traffic has no objections to this requested variance for the two cul-de-sacs shown on the preliminary plat.

**Variance for 10 foot pedestrian access from cul-de-sac bulbs.**

8. Traffic is not supportive of this variance to Title 21 based on the information provided in the application. Traffic agrees that existing contours and existing wetlands and streams limits the location of these easements. However, there are a couple of lots in the northwest and northeast sections of the subdivision that would support either an easement or right of way. The information provide in application was insufficient in addressing variance standards 3 and 4.

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NOV 22 2017



1000 North 1st Avenue, Suite 300 Anchorage, Alaska 99503  
alaskacommunications.com

November 20, 2017

Municipality of Anchorage  
Planning Division  
P.O. Box 196650  
Anchorage, Alaska 99519-6650

**SUBJECT:** Request for Comments

Alaska Communications has reviewed the plats listed below and recommends the following:

**S-#12383**                      **Alderwood Subd.**  
Alaska Communications has no objections.

**S-#12386**                      **The Terraces Subd.**  
Alaska Communications has no objections.

**S-#12388**                      **Lewis & Clark Subd.**  
Alaska Communications requires a twenty foot "telecommunication and electrical easement" as shown on attached plat.

Sincerely,

Larry Smith  
Network Engineering Foreman  
Alaska Communications  
600 Telephone Avenue, MS#14  
Anchorage, Alaska 99503  
[lsmith@acsalaska.com](mailto:lsmith@acsalaska.com)  
Phone: (907) 564-1812  
Cell: (907) 244-3779  
enc



THE STATE  
of **ALASKA**  
GOVERNOR BILL WALKER

Department of Transportation and  
Public Facilities

DIVISION of PROGRAM DEVELOPMENT  
Anchorage Field Office

4111 Aviation Avenue  
P.O. Box 196900  
Anchorage, Alaska 99519-6900  
Main Phone: (907)269-0520  
Fax: (907)269-0521  
Web site: dot.state.ak.us

November 22, 2017

David Whitfield, Senior Planner  
MOA, Community Development Department  
Planning Division  
P.O. Box 196650  
Anchorage, Alaska 99519-6650

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**NOV 22 2017**

**PLANNING DEPARTMENT**

RE: MOA Plat Review

Dear Mr. Whitfield:

The Alaska Department of Transportation and Public Facilities (DOT&PF), Central Region  
Region Planning Division has no comments on the following plats:

- S12383: Alderwood Subdivision Addition #1, Block 3, Tract B1
- S12386: Terraces Subdivision, Phase 8, Tract E1-A1D
- S12388: T12N, R3W, SEC25, S2W2NW4SE4 & E2NW4SE4 & NE4SE4 (Lewis & Clark Subdivision)

Sincerely,

James Starzec  
Anchorage Area Planner

Cc: Tucker Hurn, Right of Way Agent, Right of Way, DOT&PF  
Scott Thomas, P.E., Regional Traffic Engineer, Traffic Safety and Utilities, DOT&PF  
Jim Amundsen, P.E., Highway Design Group Chief, DOT&PF  
Morris Beckwith, Right of Way Agent II, Right of Way DOT&PF



**Municipality of Anchorage  
Development Services Department  
Building Safety Division**



**MEMORANDUM**

**RECEIVED**

**DATE:** November 17, 2017  
**TO:** Dave Whitfield, Platting Officer  
**FROM:** Deb Wockenfuss, Civil Engineer, On-Site Water and Wastewater Program  
**SUBJECT:** Comments on Cases due December 6, 2017

NOV 17 2017

PLANNING DEPARTMENT

The On-Site Water & Wastewater Program has reviewed the following cases and has these comments:

S12383      Alderwood Subdivision Add #1

No objection

S12386      The Terraces Subdivision Phase 8

No objection

S12388      Lewis and Clark

Information to satisfy the requirements specified by AMC 21.15, AMC 15.55 and AMC 15.65 must be submitted for each lot within this proposed subdivision. Submittal documents are to have the engineer's stamp and original signatures. This information must include, but may not necessarily be limited to:

- A. Soils testing, percolation testing, and ground water monitoring must be conducted to confirm the suitability for development using on-site wastewater disposal systems. Ground water monitoring must be conducted during a high ground water season in either the fall (October) or spring (May).
- B. Areas designated for the original and replacement wastewater disposal system sites must be identified and must meet all criteria specified in AMC 15.65 including slope and slope setback requirements for each lot.
- C. Topographical information must be submitted.



# MUNICIPAL LIGHT & POWER

## ENGINEERING MEMORANDUM

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NOV 16 2017

PLANNING DEPARTMENT

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DATE: November 16, 2017  
TO: Dave Whitfield  
FROM: Jake Maxwell PLS, Chief Surveyor  
SUBJECT: PRELIMINARY PLAT

Case #	Description
S12388	Lewis & Clark Subdivision, Lots 1-16, Block 1, Tract A
Comments:	No comment.

## McLaughlin, Francis D.

---

**From:** bruce Vergason <bvergason@hotmail.com>  
**Sent:** Tuesday, December 19, 2017 8:53 AM  
**To:** McLaughlin, Francis D.; Lori Jones  
**Subject:** Lewis and Clark Plat Application  
**Attachments:** HCC Letter Ref Lewis and Clark 12-18-17.pdf

Good Morning Francis,

My name is Bruce Vergason, I am the current Chairman for the Hillside Community counsel. The folks from Lewis and Clark (the developer) presented their preliminary plans to HCC at our October meeting. HCC members present at that meeting had a lengthy Q&A session with the developers engineering representative. The HCC members present seemed to be satisfied that their questions and concerns were addressed. HCC has been following their plat application and to date has received only one comment (see attached ) that refers to two variances requested in the original application. Please incorporate into the registry of comments for this plat application.

Although I am certainly not an expert in the area of land development, after reviewing the Developers current platting application and the recent changes, the Developers appear to have met the requirements for this type of development the two variances they have requested are in the best interest of our neighborhood. (only my opinion...).

Bruce Vergason

Reply | Delete Junk |

Re: Lewis & Clark

BV bruce Vergason <bvergason@hotmail.com>  
Today, 8:08 AM  
You

Reply |

---

**From:** lori <gumgardener.ak@hotmail.com>  
**Sent:** Monday, December 18, 2017 10:46 PM  
**To:** Bruce Vergason  
**Subject:** Fwd: Lewis & Clark

Dear Mr. Vergason,

I was sent information regarding the January 3rd, 2018 hearing of the Lewis & Clark Plat. I attended our last general meeting where the applicants and their representative Tom Dreyer from S4 presented. Myself and my husband liked the thoroughness of the proposal and thought the plan was well laid out as presented. I know that the Lewis & Clark development is looking for two variances. Both my husband and I are in support of these two important issues.

First, Lewis & Clark has asked that their main cul-de-sac be a little longer than code enabling them to accommodate all the lots with driveway access. This just makes sense, since also in the plat documents it states that the lots adjoining Upper DeArmoun and Canyon Road are prohibited from driveway access directly onto those roads which would be a potential area of danger.

Second, and similar is the variance that no further trails be required other than the almost 3000 linear feet they will create just developing the two cul-de-sacs with adequate shoulders for walkers, bicyclists, and baby strollers.

Mr. Vergason, we have had our property for over 20 years and it is one of the few that actually touches and abuts with the Lewis & Clark property. The other neighbors are all across the roads that align the property. their arguments are based on NO development at all because of view. My issue is more close to the heart. It is for safety sake that no additional trails be required from these two cul-de-sacs unto either Upper DeArmoun Road or Canyon Road. I was lucky my two children did not have direct access on to a trail that connected to these two dangerous roads. I applaud the developers for applying for this variance based on safety issues. Now I have grandchildren and I have the same concerns for their safety. If trails are built in the "wrong" places, they will naturally wander down those trails to Canyon Road which 4 community councils already commented in the Municipality Pedestrian Plan, that both Upper Dearmoun and Canyon roads remain unsafe for pedestrian traffic. After the latest Canyon Road upgrade this summer, it is easy to see that the safety of pedestrians has not rectified and the project manager indicated next years upgrade will be no different.

Please pass on my comments to the muni regarding my safety concerns. I understand that the Hillside District Plan and other plans want as much connectivity between new developments as possible, but it doesn't take much to realize that there are no further developments across Canyon Road at this time. If this was Huffman Timbers cul-de-sac that needed a connection to the paved sidewalks on Huffman Road, then yes, I totally agree with this regulation.

Please make a common sense ruling and allow Lewis and Clark to be granted these variances

Sincerely,

Lori and Jeff Jones  
Messinia Street

<http://www.muni.org/CityViewPortal/Planning/Status?planningId=16601>



## Rabbit Creek Community Council

1057 West Fireweed Lane, Suite 100



December 15, 2017

MOA Platting Board

Francis McLaughlin, MOA Senior Planner (HartHH@ci.anchorage.ak.us)

Carol Wong, MOA Long Range Planning Supervisor

(WongCC@ci.anchorage.ak.us)

Hal Hart, MOA Director of Planning (McLaughlinFD@ci.anchorage.ak.us)

Re: Case S12388 – Lewis and Clark Subdivision plat and variance requests

Dear Platting Board and Planning Staff:

At our December 14 general membership meeting, Rabbit Creek Community Council (RCCC) voted to send the following comments.

RCCC regards Case S12388, the proposed Lewis and Clark Subdivision, as an important precedent for implementing the policies of the Hillside District Plan.

RCCC applauds the use of the conservation subdivision template under AO 21.08.070B. The proposed creation of Tract A answers the Council's concerns stated in our May 24 letter on PZC Case 2017-0072. The retention of Tract A as undisturbed open space will help to retain and filter run-off, protecting residential wells and reducing the likelihood of contamination, erosion and flooding in Rabbit Creek. In addition, the total density of the tract is in compliance with policies 2B and 2C of the Hillside District Plan (HDP).

RCCC is here re-stating several concerns from our previous letter that still need to be addressed in Case S12388:

1. Show dedicated drainage way and riparian protection easements on the plat, in accordance with Title 21, clauses 21.08.030C and 21.08.040F. Setbacks and maintenance easements are required for drainage ways that cross Lots 1, 8-11, and 16, as well as the stream that crosses Lot 7 and Tract A. This appears to be a stand-alone requirement. Staff should make a finding if this dedication is not needed within a Conservation Subdivision Dedication and Recording under 21.08.070.B.7.
2. Dedicate pedestrian easements and construct walkways in compliance with Title 21, the 2020 Comprehensive Plan, the Anchorage Pedestrian Plan, and

the Hillside District Plan. The Council requests a pedestrian easement to connect the Brownson cul-de-sac to the eastern extension of Our Own Lane, which is a designated Primary Trail on HDP Map 4.6 and leads to Rabbit Creek Greenbelt. This follows HDP policies, Title 21.07.060.D.3.g. *Pedestrian Connectivity*, and the *Anchorage Pedestrian Plan*:

Action Item 4.1.3. Consider designing pedestrian ways to avoid the main traffic routes and allow convenient shortcuts

Action Item 6.1.5. Require convenient, direct, walkway and trail connections even where roads are cul-de-sacs or circuitous, where appropriate in relation to surrounding terrain.

3. We request that road shoulders be required for pedestrian safety on Lewis and Clark and Brownson roads, per HDP Policy 9-B, Figure 4.4 (page 4-15 and page 4-17).

HDP Policy 9-B, application of municipal road standards, is consistent with challenging site conditions and rural character: Fig 4.4 (page 4-15) "Local roads would include 2-to 4-foot shoulders, wide enough to accommodate pedestrians" and text on page 4-17..."Rural streets are strip-paved (paved streets without curb and gutter or sidewalks), with shoulders wide enough to accommodate pedestrians....."

4. Address the requirement for a screening buffer on Lots 13 and 14, as required by 21.08.070.B.4.h. "Common open space with level 4 Screening landscaping shall be provided along any lot line abutting a residential neighborhood where any adjoining lot is greater than 150% of the average lot size along that lot line of the conservation subdivision. In class B areas this abutting landscaped open space area shall be one hundred feet wide."
5. We request that the approval conditions maintain this density and do not allow future subdivision of these lots.

### Summary

Rabbit Creek Community Council supports this plat for a Conservation Subdivision, with minor revisions to meet ordinance requirements. The compact layout of roads and lots is good, because it will minimize disturbance to the site. The dedication of undisturbed common open space protects the natural hydrology of this site, which in turn will protect residential wells, and reduce the potential for erosion, contamination, and flooding all along Rabbit Creek. We request that the Platting Board ensure the dedication of stream setbacks, a partial perimeter buffer, and pedestrian facilities, as required by ordinance. We request that the approval conditions maintain this density.

Sincerely,

Adam Lees, Chair

Cc:

HALO (presidenthalo@gmail.com)

Hillside Council (bvergason@hotmail.com)

19300 Villages Scenic Parkway  
Anchorage, Alaska 99516

December 1, 2017

Francis McLaughlin, MOA Senior Planner  
[McLaughlinFD@ci.anchorage.ak.us](mailto:McLaughlinFD@ci.anchorage.ak.us)  
Carol Wong, MOA Long Range Planning Supervisor  
[WongCC@ci.anchorage.ak.us](mailto:WongCC@ci.anchorage.ak.us)  
Hal Hart, MOA Director of Planning  
[HartHH@ci.anchorage.ak.us](mailto:HartHH@ci.anchorage.ak.us)

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DEC 05 2017

PLANNING DEPARTMENT

Case S12388 – Lewis and Clark Subdivision plat and variances

The development of Lewis & Clark Subdivision under the Conservation Subdivision ordinance is commendable. The creation of Tract A will permanently protect wetlands and stream corridors, thus protecting natural recharge patterns and water quality for well users, for Rabbit Creek, and for Potter Marsh. The subdivision layout allows efficient residential development along a compact road system, as well as protection of natural terrain and vegetation.

#### PLAT REVISIONS

Several features of the proposed plat need to be clarified and specified to ensure compliance with municipal plans and ordinances:

1. Specify the provision of road shoulders for pedestrian use on Lewis & Clark Circle. The subdivision roads, which meet the definition of low-density rural roads, do not need a separated pathway, but the Hillside District Plan Policy 9 requires accommodation of pedestrian traffic.

HDP Policy 9-B addresses application of municipal road standards, consistent with challenging site conditions and rural character....

Fig 4.4 (page 4-15) "Local roads would include 2-to 4-foot shoulders, wide enough to accommodate pedestrians". and text on page 4-17..."Rural streets are strip-paved (paved streets without curb and/or sidewalks), with shoulders wide enough to accommodate pedestrians.....

Per HDP Policy 9-B, the plat approval should specify 2-to 4-foot paved shoulders. Given the length of the Lewis & Clark Circle and the need for pedestrian through-connection (explained below), a 3-foot or 4-foot shoulder is appropriate.

2. Dedicate a riparian protection easement. 21.08.040.F Subdivision Standards calls for dedication of a riparian maintenance and protection easement. This

should be depicted and labeled on the plat, even though there will be a Conservation Subdivision Dedication and Recording under 21.08.070.B.7,

3. The plat should label Tract A as undisturbed open space, and should possibly also label a common pedestrian corridor from the road into the tract for use of subdivision residents, in accordance with 21.08.070.B.6. Tract A's frontage on the public road is shown as wetlands, and therefore a designated private pedestrian corridor that does not disturb the wetlands should be provided, in accordance with 21.08.070.B.6 Conservation Subdivision (below). Access for residents to the open space is intended. However, without a path, it's uncertain how the open space will "remain undisturbed" by regular use.

21.08.070.B.6. ...In order that all residents of a development have access, there should be, provided by the developer, a common pedestrian corridor leading into all common open space. Common open space areas in class B improvement areas shall remain undisturbed.

4. The plat should include a plat note prohibiting further subdivision of the lots. The intent of a Conservation Subdivision is to achieve a compact and balanced land use pattern without increasing total density or total number of lots. When small lots adjoin much larger lots, the small lots can be used as supporting evidence for subdividing or rezoning.

#### **DENIAL OF VARIANCE FROM 21.07.060D.3.B.ii, regarding pedestrian walkway**

The Municipality should deny a variance regarding walkways, and require their provision, for the following reasons:

1. The importance of achieving pedestrian connectivity between subdivisions, and from neighborhoods to trails and parks, is clearly stated in multiple municipal land use and transportation planning documents.

Appended to this letter is a summary of policies from:

Anchorage Municipal Code Title 21

Anchorage 2020 Comprehensive Plan

Hillside District Plan

Anchorage Pedestrian Plan

2035 Metropolitan Transportation Plan

Anchorage Bowl Parks, Natural Resource, and Recreation Facility Plan.

Anchorage's plans and policies emphasize direct, safe, convenient pedestrian connections. The Anchorage Pedestrian Plan (page 47) states: "Low-Density Residential Streets can sometimes serve as the best through routes" [for pedestrians]. Direct pedestrian "short-cut" connections are especially needed for the 'superblocks' created by long cul-de-sacs, such as Lewis & Clark Circle.

- A pedestrian pathway linking Lewis & Clark cul-de-sac to Upper Canyon Road would be about 500 feet long, compared to the alternative distance of over 2,700 feet via the roadways: over a half-mile.
- A pedestrian easement or pathway should link Brownson Circle to the east end of Our Own Lane, which is a proposed Primary Trail in the Hillside District Plan. This would connect the subdivision directly to the future Rabbit Creek Greenbelt trail, which will enhance property values.
- In addition, the circuitous routes would put pedestrians on steep collector roads that lack shoulders for safe walking. Neighbors have testified at previous public hearings about the hazard of pedestrian use on the substandard collector roads.

2. Anchorage's policies promote connections from neighborhoods to the surrounding trail system and to parks. Pedestrian pathways at the end of Lewis & Clark Circle would connect several parts of the proposed Hillside District Plan trail system.

- Lewis and Clark Circle should connect to adjoining neighborhoods and to municipal parks. A walkway at the end of Lewis and Clark Circle provides important connectivity in three directions. From the end of Lewis & Clark Circle, the pedestrian pathway would connect to Upper Canyon Road, which is part of a proposed pedestrian corridor to the municipality's Echo Road parkland and to Chugach State Park. The pathway would also link to the Section Line easement that leads to an intended trail along Rabbit Creek, and provides a legal connection to Section 36 Park, which is a regional-sized park. Finally, Lewis and Clark Circle aligns with Jeanne Road, which is a designated pedestrian route in the HDP.
- Brownson (or a public easement via Tract A) should connect to the proposed Rabbit Creek Primary Trail and adjoining neighborhoods. First, this easement provides a shortcut to Hillside Drive, via Lakonia Circle, which is less than half the distance via roadways. More importantly, this subdivision can provide direct access to the proposed Primary Trail along Rabbit Creek (Hillside District Plan Map 4.6). The subdivision is tangent to that trail. Pedestrian access to that proposed greenbelt trail will enhance property values and public health. The pedestrian easement could be platted with a note to resolve future construction, since the last 100 feet of trail would cross wetlands or be rerouted. (Trails CAN be constructed across

wetlands without disturbance, as shown at Potter Marsh and Baxter Bog.)

- The HDP charges MOA planners to identify local pedestrian connections at the time of development. HDP Page 4-23 states: ...while Map 4.6 identifies all the priority regional and district trails in the Hillside District, it is clear that there are local trails that may be needed within or between adjoining neighborhoods; these are not shown on the trails map. Such trails, which serve a more localized functions than either regional or district trails, may be identified at the time of development.

2. There is no convincing evidence to meet any of the four standards for the variance request regarding pedestrian connections.

2A. Not shown: There are special circumstances or conditions affecting the property such that the strict application of the provisions of the subdivision regulations would clearly be impractical, unreasonable, or undesirable to the general public

From Lewis and Clark Circle, there are no impractical or unreasonable physical constraints to constructing a pedestrian pathway along the north or south lot line of the flagpole driveway of lot 7. For examples of the practicality of pathway construction, nearby Rabbit Creek Greenbelt has trails on sloping terrain and across small drainage ways. There is no reason to deny a pathway crossing of the stream on Lot 7, since a driveway crossing is possible ; and since the stream is quite small. The south line of the flagpole, parallel to the slope, offers the best gradient.

2B. Not shown: the granting of the specific variance will not be detrimental to the public welfare or injurious to other property in the area.

The variance would be detrimental to the public welfare because it:

- fails to achieve convenient connections to adjoining neighborhoods, parks and trails;
- fails to provide the safety of a non-motorized pathway, forcing pedestrians to use a collector road that lacks shoulders; and
- discourages walking, by requiring residents of the cul-de-sac to walk two to five times the distance to adjoining subdivisions and the trail networks..

2C. Not shown: such variance will not have the effect of nullifying the intent and purpose of the subdivision regulations or the comprehensive plan of the municipality.

The variance would nullify the intent of pedestrian connectivity that is repeated many times in plans and regulations (see appended list).. The

application incorrectly suggests that nearby future trails on Upper Canyon Road and along Rabbit Creek are “substitutes” for the required pathways when all of them are part of a proposed network. The cul-de-sacs and pathways are part of a transportation network., as specifically stated in the Anchorage Pedestrian Plan:

- Action item 5. Require convenient, direct, walkway and trail connections even where roads are cul-de-sacs or circuitous, where appropriate in relation to surrounding terrain.

2D. Not shown: Undue hardship would result from strict compliance with specific provisions or requirements of the subdivision regulations.

The applicant implies that there is an undue hardship from a pedestrian easement near future homeowners’ houses and yards.

- The lots adjoining the pedestrians easement encompass 1.6 to 3.99 acres, and the future owners can locate and landscape their houses for complete privacy from the easements if they choose. Conservation subdivision have reduced front and back setback requirement,, allowing still more flexibility for owners to situate their houses.
- This is a neighborhood connection and not likely to attract users other than those from surrounding neighborhoods.
- Realtors use trail connections as a selling point. Potter Highlands subdivision just installed a public trail on their private open space tracts to enhance the value of the subdivision.

In summary, the Conservation Subdivision is a commendable approach that protects wetlands and watershed, while enhancing the neighborhood and property value to homeowners through the common open space. The plat needs a few alterations to comply with the Hillside District Plan and Title 21. The variance request regarding the pedestrian connections does not make the case for impracticality or hardship. The variance would diminish public safety and decrease the intended connectivity between neighborhoods and the surrounding trails system: therefore, the variance should be denied and pedestrian easements should be shown on the plat and constructed during development of the subdivision.

Please contact me if you have questions about these points.

Sincerely,  
Nancy Pease

**APPENDIX OF RELATED POLICIES AND ORDINANCES**  
**regarding Lewis and Clark Subdivision Plat, Case S12388**

Title 21 regulations and Comprehensive Plan policies that support pedestrian connectivity through subdivision plats

Anchorage 2020 Anchorage Bowl Comprehensive Plan

Policy 54, page 83 Design and construct neighborhood roads and walkways to ensure safe pedestrian movement and neighborhood connectivity and to discourage high-speed cut-through traffic.

Policy 55, page 83 Provide pedestrian and trail connections within and between residential subdivisions in new plats, including replats

Page 65 – Planning Principles for Design and Environment

Promote community connectivity with safe, convenient, year-round auto and not-auto travel routes within and between neighborhoods,...

Page 66 Planning Principles for Public facilities and Services

Encourage the following the location and design of land use...enhance bicycle and pedestrian movement.

Hillside District Plan

Policy 9-B, regarding application of municipal road standards, consistent with challenging site conditions and rural character....

Fig 4.4 (page 4-15) “Local roads would include 2-to 4-foot shoulders, wide enough to accommodate pedestrians”. and text on page 4-17...”Rural streets are strip-paved (paved streets without curb an utter or sidewalks), with shoulders wide enough to accommodate pedestrians.....

HDP Map 4.6 Existing/Proposed Trail Routes Map notes:

Not all neighborhood access points to trail systems, greenbelts, or Chugach State Park are shown on the map. Refer to HDP text.

HDP Page 4-23 ...while Map 4.6 identifies all the priority regional and district trails in the Hillside District, it is clear that there are local trails that may be needed within or between adjoining neighborhoods; these are not shown on the trails map. Such trails, which serve a more localized functions than either regional or district trails, may be identified at the time of development.

Anchorage Pedestrian Plan

Anchorage Pedestrian Plan, Chapter 4. Designing an Environment that Promotes Walking.

page 47 Low-Density Residential Streets. Long distances between destinations also reduce the amount of walking trips compared to those in higher density residential areas, although walking is a significant recreational activity. Low-density residential streets....can sometimes serve as the best through routes [for pedestrians].

Page 53, Chapter 5, Recommendations, Policies, and Actions Items:

Policy 4.1 Provide for pedestrian walkway and trail connections in all subdivision plats for access to schools, regional parks, recreation facilities, employment centers, and institutional and governmental facilities, and between neighborhoods.

Action Item 2.3. consider designing pedestrian ways to avoid the main traffic routes and allow convenient shortcuts.

Policy 4.4 Identify and preserve connectivity provided by existing platted easements for walkways and trails. Action Item 1. Install nonmotorized pathway signs on existing and new walkways that are separated from roadways.

2. Require all new development to install these signs.

4. Advocate dedication of easements in site plan and plat reviews.

Policy 6.1 Promote land use and site design that make walking convenient and enjoyable.

Action item 5 Require convenient, direct, walkway and trail connections even where roads are cul-de-sacs or circuitous, where appropriate in relation to surrounding terrain.

### Anchorage Bowl Park, Natural Resource, and Recreation Facility Plan

Map 7, The Anchorage Parks Plan identifies Upper DeArmoun Road as a recreation trail, and also identifies a proposed recreation trail along Rabbit Creek, both leading to Chugach State Park. (These are also shown on Hillside District Plan Map 4-6). The Parks Plan calls for pedestrian connections from neighborhoods to parks and trails, including these policies:.

#### Page 48. Park Strategy 6: Access and Connections

Neighborhood-level connections where children are safe to travel from home to school to park, and that encourage residents to walk, run, and enjoy their neighborhood, are of notable value.

#### Page 71 Trails and connections

Continue to upgrade trails and path system to safely connect parks,, schools, homes, and commercial areas.

Page 71 Utilize Title 21 for dedication of trail rights-of-way through subdivisions.

### 2035 Metropolitan Transportation Plan MTP (November 2015)

#### Goal 3 Objectives

Improve opportunities for active transportation (non-motorized) as part of daily system use.

#### Goal 5

Establish community connectivity with safe, convenient, year-round automobile and non-automobile travel routes within and between neighborhoods...

#### Goal 5 Objectives

Enhance the physical connectivity between neighborhoods by increasing the number of roadway, pedestrian, bicycle and transit connections.

Goal 7 objectives. Promote the development of a safe network of trails and sidewalks that provide reasonable access to work, schools, parks, services, shopping and the natural environment...

## Anchorage Municipal Code - Title 21

### 21.07.060 Transportation and Connectivity

**A. Purpose** The purpose of this section 21.07.060 is to support the creation of a safe and highly connected transportation system within the municipality in order to provide choices for drivers, bicyclists, and pedestrians; increase effectiveness of municipal service delivery; promote walking and bicycling; connect neighborhoods to each other and to local destinations such as employment, schools, parks, and shopping centers; reduce vehicle miles of travel and travel times; improve air quality; reduce emergency response times; support the pattern of designated land uses; mitigate the traffic impacts of new development; create road and trail connectivity to free up arterial capacity while protecting neighborhood identity and safety; and, in high-volume traffic corridors, maintain an adequate degree of crossings for local circulation and minimize road and traffic impacts on adjacent uses.

*Note: this pathway enhances connectivity to Upper Canyon Road heading south, near the section line that leads to Section 36 Park, a regional park and the only municipal park in the vicinity with a Master Plan and potential for near term developed trails.*

*This trail section will allow future nonmotorized connectivity to Section 36 Park via Rabbit Creek Greenbelt. Section 36 Master Plan (June 2011) will have a developed trail system and is the only regional-sized municipal park in the area.*

#### **C. Street Connectivity**

##### **D.3.a. Purpose**

Street and block patterns should include a clear hierarchy of well-connected streets that distribute local traffic over multiple streets, providing multiple direct connections for neighborhood residents to and between local destinations, and avoid traffic congestion on principal routes. Within each residential development, the access and circulation system should accommodate the safe, efficient, and convenient movement of vehicles, bicycles, and pedestrians through the development; provide ample opportunities for linking adjacent neighborhoods, properties, and land uses; and be designed in such a way as to limit and discourage cut-through traffic and protect the new development and adjacent development from adverse impacts.

##### **D.3.b. Internal Street Connectivity**

- i. **Developments, whether subdivisions or not, shall meet the block length requirements of subsection 21.08.030G.**
- ii. **Whenever cul-de-sac streets are created, at least one 10 foot wide pedestrian access right-of-way or easement shall be provided, to the extent reasonably feasible, between each cul-de-sac head or street turnaround and the closest adjacent street or pedestrian walkway. This requirement**

shall not apply where it would result in damage to or intrusion into significant natural areas such as stream corridors, wetlands, and steep slope areas, or if the configuration of existing adjacent development prevents such a connection.

**D.3.g. Pedestrian Connectivity**

Where the director and the traffic engineer have determined a vehicular connection required above is not feasible or appropriate, a pedestrian access way shall be provided as long as:

- i. The topography and existing development patterns allow for pedestrian access; and
- ii. The land uses allowed on either end of the potential pedestrian connection are such that may generate pedestrian traffic.

**E. Standards for Pedestrian Facilities**

**E.1 Purpose**

The purpose of this section is to provide convenient, safe, and regular pedestrian facilities along streets and within and between developments. Such facilities create a healthful built environment in which individuals have opportunities to incorporate physical activity, such as walking or bicycling, into their daily routine. Injuries and fatalities are reduced when interactions between pedestrians and vehicles are minimized. Adequate pedestrian facilities meet community goals for mobility and access, as well as for providing transportation choices. Safe pedestrian access for students to their schools is also an essential purpose of these standards.

E.1.d In class B zoning districts, sidewalks, walkways, pathways, and trails shall be provided in accordance with the comprehensive plan. In all cases, pedestrian facilities shall be provided on at least one side of collector and arterial streets.

Where sidewalks are not specifically called for on both sides of the street by the comprehensive plan, the decision-making body may reduce a requirement to provide sidewalks (or other pedestrian facilities) on both sides of a street after considering the following:

1. Site conditions and the potential for significant negative impacts on the natural environment;
2. The need to maintain and improve sidewalk continuity;
3. Evidence that a sidewalk would decrease pedestrian safety;
4. Extensive public testimony offering rational arguments against sidewalks;
5. Availability of an alternate trail system; and
6. Vehicular speeds and pedestrian safety.

**E.3. Through-Block Connections**

Within new developments, pedestrian walkways, crosswalks, or multi-purpose trails no less than five feet in width shall be constructed near the center and entirely through any block that is 900 feet or more in length. This standard may be waived during a site plan review, if justified by the decision-making body.

Ordinances related to Conservation Subdivisions

21.08.070.B.6 Conservation Subdivision, **Minimum Open Space**

1. ...In order that all residents of a development have access, there should be, provided by the developer, a common pedestrian corridor leading into all common open space. Common open space areas in class B improvement areas shall remain undisturbed.

21.08.070.B.7 Conservation Subdivision, **Dedication and Recording**

The required common open space shall be preserved from development in perpetuity through the use of a deed restriction or easement, and shall be conveyed to a property owners' association or other organization with responsibility for maintenance of the open space and the ability to collect assessments or dues for such purpose. The applicant shall submit proof that:

1. Such deed restriction or easement has been recorded at the district recorder's office; and
2. The property owners' association or other organization has been established before any building or land use permits for construction in a conservation subdivision shall be issued.

21.08.040.F Subdivision Standards, Dedications

**F. Riparian Protection and Maintenance Easements**

1. The platting authority shall require the dedication of riparian maintenance and protection easements where a stream, water body, or wetland traverses or is adjacent to the subdivision, in accordance with subsection 21.07.020B., *Stream, Water Body, and Wetland Protection*.
2. The easement shall conform substantially to the line of the watercourse. The width of the easement shall be that which the platting authority finds necessary to provide access to widen, deepen, slope, improve, and maintain the stream, and to protect the stream and adjacent property from soil erosion, flooding, water pollution, and destruction of fish and wildlife habitat. At a minimum, the easement shall be the same as the applicable setback

T

Chapter 21.08: Subdivision Standards

<b>TABLE 21.08-2: REQUIRED IMPROVEMENTS BY IMPROVEMENT AREA R = Improvement Required</b>		
<b>Improvement</b>	<b>Class A</b>	<b>Class B</b>
Paved Interior Streets	R	
Strip-Paved Access and Peripheral Streets	R	R
Strip-Paved Interior Streets		R
Curbs and Gutters	R	
Sidewalks	R	
Walkways	R	R
Street Lighting	R	
Traffic Control Devices	R	R
Monuments	R	R
Drainage	R	R

Telephone & Electrical Facilities	R	R
Water Supply Facilities	R	
Sanitary Sewer Facilities	R	
Landscaping	R	R

December 1, 2017

Planning Dept, MOA  
Frances McLaughlin  
PO Box 196650  
Anchorage, AK 99519

RECEIVED

DEC 05 2017

PLANNING DEPARTMENT

S-112388, Lewis and Clark (L&C) Conservation Subdivision Plat,  
Response to Variance for Pedestrian Walkway

It is encouraging to see this plat for a Conservation Subdivision (CS). This parcel is well-suited for this type of development with protection for wetlands and the adjacent water bodies. Quality of life and property values--for the MOA overall--increase with each new subdivision that is platted with good development standards.

The current plat is different from that shown at the Hillside Council meeting in October (see plat segment below). These comments focus on the walkway variance as it relates to the Comp Plan, its elements and Title 21 code.

Various MOA adopted plans and maps show pedestrian routes over the wider Municipality, but not on undeveloped residentially-zoned land. It would be unreasonable and inappropriate to expect these walkways to be shown before platting. Consequently, the adopted plans won't show pathways for this subdivision, but code clearly expects connections to be made. With each subdivision contributing, the goal for better pedestrian facilities will be met, eventually.

Please recognize, in the staff recommendations, the wealth of code and polices/goals in adopted plans that support transportation options for safe, non-motorized connectivity:

2020 Comp Plan, polices 54, 55; Planning Principles p. 65, 66  
Title 21.07.060, Transportation & Connectivity  
Anchorage Bowl Park . . . Plan, Strategy 6: Access & Connections  
Anchorage Bowl Park . . . Plan, P. 71, Trail connections & dedicated ROW  
Anchorage Pedestrian Plan, Chapter 4 & 5, Designing (to) promote walking  
2035 MTP (Nov., '15), Goals 3, 5

**Four standards** must be met before the walkway variance is granted. However, nothing in the application compels approval of this variance:

#1 Strict application to regs would be impractical, unreasonable, undesirable.

Response: The location of the proposed walkway (per the plat shown at the Hillside Council meeting) is not topographically challenged. The walkway to Canyon Rd (which is a section line) is a logical location to connect neighborhoods and future trails. See photo below of successfully built trails in more difficult terrain in the Rabbit Creek Greenbelt.

Some may argue that a path should not cross a drainage way/stream; this is not a valid excuse because this path can be designed to avoid the stream. Note the driveway for Lot 7 DOES cross the stream.

A second walkway should extend westward from the other cul-de-sac to connect that neighborhood and Section 36 Park (to the south); this would avoid a longer, less safe route along DeArmoun Rd.

The application narrative states in Item 'h'—"opportunities for recreation/light, air and avoids congestion"—that the plat provides opportunities for recreation for the lot owners by creating access to the large private open space greenbelt tract. It is illogical that a variance would be requested that would inhibit the availability of even more recreational opportunities for L&C homeowners.

#2 Variance would not be detrimental to public welfare or injurious to other property in the area.

Response: Eliminating the walkway *would* be detrimental to public welfare because residents would be discouraged from walking when the only option would be a long way around on DeArmoun Rd to reach other neighborhoods, the future extension of trails in the upper RC greenbelt, and Section 36 Park. DeArmoun Rd, a collector, has neither sidewalks nor shoulders.

Walkways at the end of each cul-de-sac would be good locations for L&C residents, who would be the primary users of the paths. (See photos below of paths integrated in other Anchorage neighborhoods).

A variance would not serve the MOA's goal for providing eventual walkway connections across the city to promote healthy walking options.

#3 The variance would not nullify the intent of the subdivision regs, nor the MOA's comp plan.

Response: The variance *would* nullify some 2020 Comp Plan's policies, various Title 21 sections, and elements of the comp plan (Pedestrian, Park & MTP). Walkways that will eventually connect to other walkways will allow for the successful implementation of the goal for safe pedestrian options.

Walkways in rural areas are needed just as much as they are in higher density settings. Larger lot subdivisions and rural roads often have fewer pedestrian facilities, thus walkers have to go farther to reach their desired destination.

There is misleading information given on the variance application #3 standard—currently no trails exist along Rabbit Cr directly south of L&C. Farther up the creek, however, is a trail that has yet to be extended downstream. While the Park Plan and the HDP may shows trails along Canyon and DeArmoun roads, they do not exist yet. DeArmoun is a State road and the State is not likely to construct a sidewalk anytime soon. Thus, the L&C walkway would keep walkers safely off the main road while at the same time getting them closer to the eventual trails along the greenbelt.

#4 Strict compliance would result in undue hardship by having pedestrian easement along residential lots.

See photos below of walkways in the Independence Park subdivision. These paths do not impose a hardship on the neighborhood, rather they are an enhancement. Trails are in fact desirable features that are highlighted in any real estate ad. Note how the trail in the new Potter Highlands subdivision is touted in their ads.

Property that is near trails, parks, greenbelts or water command up to 20% more in value according to the MOA's Watershed Management paper from 2004: "Economic Benefits of Urban Natural

Resources in Anchorage, AK.” It would be a poor business decision for a developer to deliberately pass up the opportunity to get more value from his/her subdivision—especially when the cost to put in a short, unpaved path is minimal.

The L&C path will be used primarily by L&C homeowners; it is doubtful that they would object to their neighbors using a walkway. In addition, the proposed walkway could be nearly invisible if the current vegetation is kept in place.

Conclusion: This CS plat seems appropriate for the terrain. Conditions should be placed to ensure there will be no further subdividing. To fulfill the intent of Title 21 and adopted plans, walkways between subdivisions--at the end of cul-de-sacs--is in effective way to accomplish the MOA’s goals, above—even though all adjacent connections may not be in place yet

**Other Plat Concerns:**

Since a conservation subdivision may be further divided, a condition of the plat should include that no further subdivision can occur. Further subdivision would negate the point of a CS.

**Some Applicable Codes/ Adopted Plans:**

21.07.060.E3 The provision that eliminates super-blocks by requiring road connections is evidence of the need for pedestrian connections, also.

21.07.060.E2 Class B Zoning District, sidewalks, walkways, pathways and trails shall be provided.

Pedestrian Plan, Chapter 4 & 5. Designing an environment that promotes walking.

P. 47 Low-Density Residential Streets. Long distances between destinations also reduce the amount of walking trips compared to those in higher density. . . .

P. 53- \_\_\_, Policies 4.1, 4.4, 6.1 These all address the need for walkways.

2020 Comp Plan, Polices 54, 55 & Planning Principles (PP)

Policy 54 Design and construct neighborhood roads and walkways to ensure safe pedestrian movement and neighborhood connectivity and to discourage high-speed cut-through traffic.

Policy 55 Provide pedestrian and trail connections within and between residential subdivisions in new plats, including replats.

PP, p.83 Promote community connectivity with safe, convenient, year-round auto and non-auto travel routes within and between neighborhoods . . . .

PP, p.66 Encourage the location and design of land use...enhance bicycle and pedestrian movement.

Anchorage Bowl Park . . . Plan.

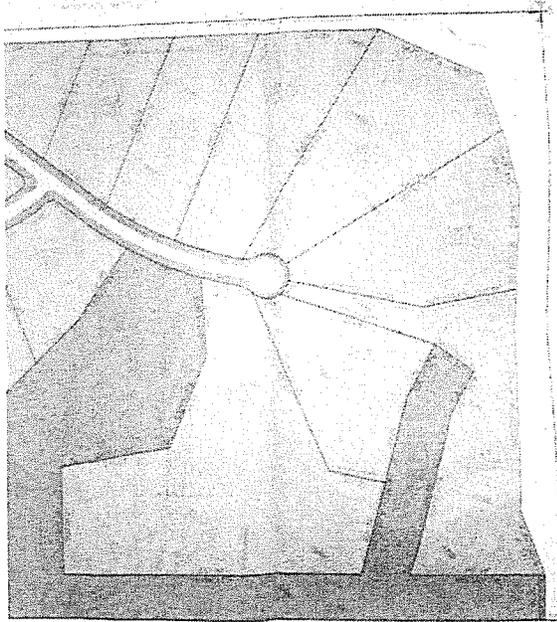
Page 48 Strategy 6: Neighborhood-level connections where children are safe to travel from home to school to park, and that encourage residents to walk . . . .

Page 71 Continue to upgrade trails and path system to safely connect parks, schools, homes, and commercial areas.

Page 71 Utilize Title 21 for dedication of trail rights-of-way through subdivisions.

Sincerely,

Dianne Holmes



L&C plat with trail, Oct '17



RC greenbelt trail on slope



Independence Park ped path



Independence Park path between districts

12921 Monterey Circle  
Anchorage, AK 99516

512388

**RECEIVED**  
DEC 28 2017  
PLANNING DEPARTMENT

The platting request does not appear to meet the following requirements of AMC 21.08.070B for Conservation Subdivisions. The application should be denied until revisions are made to meet the requirements. (Numbers below refer to the AMC 21.08.070b section numbers.)

4. The Conservation Subdivision permits one or more lots to be smaller than required by the underlying zoning (R8). This application proposes all but one lot to be smaller than required. While this may technically conform to the wording of the requirement, it is clear that the intent is that a minority or small fraction of lots may be permitted to be smaller than the underlying zoning requires -- not virtually all of them.

4.c. Lots are apparently being proposed with as little as 12.5 feet of front/back setback. Given that the proposed lots are a minimum of 1.16 acres, such small setbacks would be unreasonable and unnecessary and create an eyesore for the public.

4.h. This section mandates 100' of landscaped open space abutting lot lines for Class B areas. This requirement would not be met on the north half of the western boundary. The developers have not applied for a variance of this requirement, so the application should be denied as it doesn't meet this requirement.

5. Lot coverage allowed. The developer suggests that lot coverage may be increased by 10% and simply adds this to the normal 5% coverage to come up with 15% as acceptable under the Conservation Subdivision. This is incorrect math -- 10% additional of a 5% base is  $5\% + (5\% * .10) = 5.5\%$ , not 15%. Lot coverage should be evaluated to a 5.5% coverage, not the developer's proposed 15%.

Canyon Road might require the elimination of one lot on the north side of the parcel, but such enhancement would bring the subdivision up to a much higher standard of public safety.

Variance # 2- Ignore Title 21 mandates for  
pedestrian access routes

I have read, and agree with, the excellent analyses that were sent to Mr. McLaughlin and Mr. Whitfield, by the two people who are most knowledgeable about land use issues. I would like to add for the public record comments that this variance definitely DOES "nullify the intent and purpose of the subdivision regulations and the Comprehensive Plan."

Facilitating pedestrian access ("connectivity") to neighborhoods, trails and recreational areas is a clear and long-standing policy directive of Anchorage. This position is stated in MANY land use ordinances and other planning reports, notably including the Hillside District Plan, the Comprehensive Plan, the Transportation Plan and the Anchorage Pedestrian Plan.

Pedestrian access paths in the subdivision would meet this goal by allowing direct and much shorter routes connecting with Canyon Road on the east, which is a gateway to several nice Rabbit Creek trails. The second walkway from the cul-de-Sac to the west would lead to and (hopefully) Messina on the west.

The non-answers submitted by the S4 Group on November 8, 2017 make no convincing statements, and effectively avoid the real issue. They have failed to demonstrate that there is any reason to consider such pedestrian access as "impractical, unreasonable or undesirable to the public." Therefore, I believe that the reasons behind this variance request have nothing to do with public welfare or safety.

However, Mr. Paul Gionett wants the lot directly south of the obvious trail location. He has said at Community Council meetings that he does not want his grandchildren able to ride their bikes along some nearby pedestrian path to Canyon Road. So everyone else has to be denied access, as well. A variance should never be granted to satisfy the hopeful whim of a single person.

I request that the platting board deny this variance, for the reason stated above.

S12388

Michelle & Dave Pope

12/27/2017 11:11:05 AM

**RECEIVED**

**DEC 27 2017**

**PLANNING DEPARTMENT**

We are not opposed to new construction in our area. However, there are many concerns we still have for this project. These concerns are all the same concerns from the beginning of this project for this developer; drainage, water/well, septic, road and environmental issues.

Septic/well/drainage/environment-This area has poor soil and drainage. The developer needs to guarantee none of the surrounding, existing homes, will be affected by building the number and size of homes they want. The developer needs to guarantee the existing home wells will not run dry due to any new wells in this development. The developer needs to guarantee the new septic systems adhere to the strict codes for poor soil in this area and guarantee there will be no run off that will affect existing homes and contaminate those home's well systems. The developer needs to guarantee they will not cause a detriment to the surrounding environment.

Roads-The developer and or the Municipality needs guarantee to make considerable improvements to the roads accessing this new development: Cox Dr., Messina, Upper De'Armoun. These roads are already in severely poor condition and cannot support the amount of traffic that will increase from new residents, not to mention the traffic of heavy machinery, dump trucks etc. that will be used to build this project. Without these road improvements, those roads will become unsafe and deadly.

The most important issue of all is the issue where the developer appears to want special treatment and wants to bypass protocol and will do whatever manipulation of numbers and rules needed to make this development happen. Everyone else who has built a home in this area has had to abide by all Municipal codes/easements/rules. This developer should be held to those same rules and standards as everyone else. There should be no special treatment for a wealthy developer from Outside just so they can push their development through at the cost and detriment to the neighbors, roads and environment.

No approval should be given until the develop plays by the same rules as everyone else, makes sure to address all issues and make the fixes necessary to guarantee everyone and their homes are safe.

# Public Comments: s12388

Commenter	Email	Phone Number	Submitted
George Horton, DML&W 550 W 7th St. Suite 650 Anchorage, AK 99501	george.horton@alaska.gov	907-269-8610	12/15/2017 1:56:23 PM
<p>If a 33' or 50' wide section-line easement exists along the west boundary of this subdivision (i.e. underlying the 30' ROW dedication) we request that it be depicted and labeled on the final plat.</p> <p>Thank you for the opportunity to comment.</p>			
Rob Brown 13688 Canyon Rd.			12/20/2017 7:17:44 PM
<p>This application does not meet Conservation Subdivision Standards. Below I will describe why:</p> <ol style="list-style-type: none"> <li>1. Municipal Code 21.08.070 B.4.h. says "Common open space with level 4 Screening landscaping shall be provided along any lot line abutting a residential neighborhood where any adjoining lot is greater than 150 percent of the average lot size along that lot line of the conservation subdivision. In class B areas this abutting landscaped open space area shall be 100 feet wide" - They are required to put a 100 foot wide open space along the west side of the norther half of their western lots. Lots 13 &amp; 14 (or Lots 14 &amp; 15 in the map presented to the community council) would be reduced in size greatly, and perhaps have to even be eliminated due to decreased lot line size. Why is this not reflected in the plat application map? And if they don't want to do it, then they must apply for a Variance. The developer says in their application, "The northern half of our western boundary MAY be applicable to the screening requirement." Why is not reflected in the application's map and why was this not presented at the community council? Where is the Variance Request?</li> <li>2. The waterway coming across Canyon on the East side of the property that runs through lot 7 (see page 25 of application) should not count towards the total open space. This is a recognized waterway by the muni. See Municode &amp;quot;21.07.030 - Private open space. D. Standards. 1.Areas not credited. Lands within the following areas shall not be counted towards required private open space areas:             <ol style="list-style-type: none"> <li>a. Setbacks with slopes over ten percent;</li> <li>b. Swales with side slopes over ten percent, and drainage ditches</li> </ol> </li> <li>3. The very fuzzy map on their application shows that they have only platted a 30' wide section line easement. The section line easement is 33 feet wide in actuality -- they have denied the existence of one from the beginning but were wrong -- so their measurements are off. This land was patented from the Federal government March 10, 1954 (Patent Anchorage 019854). Per Alaska Administrative Code 11 AAC 51.025, "for surveyed federal land that was unappropriated and unreserved at any time on or after March 21, 1953 through December 14, 1968, the width identified in ch. 35, SLA 1953 for any section-line easement is 33 feet" Why does this matter? Because at the Southeast corner, they have Open Space abutting the Right of Way and they have calculated the Open Space incorrectly if they don't have the section line easement correct.</li> <li>4. Per ANC municode 21.08.070 B.5 "Lot coverage allowed. The maximum lot coverage requirements for lots in a conservation subdivision, as set forth in Chapter 21.06, may be increased by no more than 10 percent." The developer is claiming they can have 15% lot coverage (normal R-8 is 5%) -see page 5 &amp; 7 of application. Doesn't the code mean lots can be increased by no more than 10 percent of the allowed coverage, meaning they can have 5.5% coverage? Why would the code allow for a tripling of lot coverage? This would mean all of their larger lots can have more coverage than any other R-8 property in the city, causing massive amounts of runoff to flow downhill towards other properties. That is NOT Conservation.</li> <li>5. I have pictures from the community council meetings of the map they presented and</li> </ol>			

it is different from the one in their application. Which map is the real map and how can the public accurately comment on something which has not been accurately presented?

6. They are now asking to not have a walkway for pedestrians through the top of Lot 7 -- Paul Gionet, the co-developer's personal lot. Though the Hillside District Plan and the Comprehensive Plan require it, Paul says the reason is he doesn't want the walkway is for his kids/grandkids riding bikes onto Canyon. But, he HAS been trying to get a driveway for himself coming off Canyon and has already put one in where the equipment is currently. They had previously retracted the request for a variance claiming hardship but now are using the kids as a reason. Where is the second variance request with a new reason in the application so that we may accurately comment on it? Also, Lot 7 has the creek going through it. So, are they going to build a bridge to go over the creek for themselves so that they can drive from the cul-de-sac to Lot 7? No, they will try to get the driveway off Canyon. Where is the plan for accessing Lot 7 in the application?

Clearly, this is a bad application. They have changed it significantly since we were presented with it at the community council. It does not follow the law and does not show enough information to be accurately considered by the public. The Assembly made the code for Conservation Subdivision standards very specific because they did not want to bog down the system and they wanted to prevent environmental degradation. This application has so many problems with it and it clearly does not meet the Conservation Subdivision standards.

Joan Priestley  
3705 Arctic Blvd, # 1332  
Anchorage, AK 99503

onecreativedoc@yahoo.com

12/26/2017 7:51:39 AM

Comments about the Lewis & Clark subdivision (S12388)

Joan Priestley, owner 13101 Jeanne Road

Here is the standard that must be upheld by the Platting Board:

21.08.030.A No subdivision shall be approved unless it complies with:

2. the Comprehensive Plan

The design shall further the goals of the Comprehensive Plans

3. other provisions of this title

All other applicable zoning, design and development requirements.

In addition, the Platting board must consider 9 items listed at 21.03.200.C.9.

I am glad to see that the developers of the Lewis & Clark subdivision have chosen to work with the R-8 zoning. It fulfills most, but not all, of the concepts listed at 21.03.200.C.9. I support their new effort to be good stewards of the land in our neighborhood. The Conservation Easement will protect the wetlands and other natural portions of the parcel forever, moving forward.

However, I have some concerns about several aspects of the present plan.

1. The size of a lot of the lots

21.08.070.B.4 clearly states that alterations in lot size and configuration are allowed, with a Conservation Easement. It states:

"Conservation subdivisions may include one or more lots that do not conform to the minimum lot size or lot width requirements of chapter 21.06, or the dimensional requirements of 21.08.030.K.1 and 2. . ."

It is reasonable to permit some flexibility from the R-8 mandate of 4 acres per lot, that are also at least 300 feet wide.

But with the developer's plan, 15 of its 16 lots do not meet the size requirements. 5 of them are barely more than 1 acre. Another 5 are less than 3 acres, and another 5 still are less than 4 acres. 93.75% of the total lots fail to meet the standard of 4 acre lots in an R-8 zone.

In addition, the width standard is not met, for at least 9 of the lots. Only one of the entire 16 lots meets the R-8 standard for both size and width.

Title 21 section allows a variance of "one or more lots." Surely the legislators never intended "one or more" to mean 15 out of 16 lots! The developers have tried three times to achieve an R-6 designation, which would allow lots as small as one acre.

With this new plan, they have defacto met that goal, and subverted the clear directives contained in the Hillside District Plan and Title 21 R-8 restrictions. Moreover, the smallest lots are jammed up against DeArmoun Road. All we will see is the back of several houses, whose lots are far smaller than the allowable lot size for our R-8 zoning.

If passed without change, this plan sets a dangerous precedent for the future integrity of both title 21 and the Hillside District Plan. It will invite developers to install one "show lot" that meets the acreage requirements, and flaunt Title 21 restrictions, with every other lot in their plan. Title 21 will basically become irrelevant.

This way of "gaming the system" abuses the privilege of allowing some smaller lots. The developers' new plan goes FAR beyond any reasonable legislative intent of the Anchorage Assembly, and should not be allowed, as it presently stands.

## 2. The real "allowable increase" in lot coverage

Title 21.08.070.B.5 states that "maximum lot coverage for lots in a Conservation subdivision, as set forth in chapter 06, may be increase by no more than 10%."

A rational reading of this sentence means "by no more than 10% of the allowable lot coverage." For R-8, that coverage is 5%, so an increase of 10% would expand the allowable lot coverage (i.e., a house) up to 5.5%. But the developers, in their application (page 5 of the November 9th letter from the S4 Group), simply added 5% plus 10%, to arrive at a new allowable lot coverage of 15%.

For the smallest lot (1.16 acres, or 50,529 square feet), 5% coverage would be 2,526 for a one story house, or 1,263 for a 2 story house. 5.5% would increase that up to 2,779 feet, or 1,385 for a two story dwelling.

Going from 5% to 15% coverage is actually a 300% increase in an allowable house size. For the smallest lot, the house would go from 2,526 feet to 7,578 square feet. I can't believe that such huge gain in the house size was the intention of the legislators who wrote this new Title 21. This is an important issue, that needs to be resolved before the Plat plan can be approved.

## 3. Where's the buffer zone?

21.08.070.B.4.h states that a:

"common open space with level 4 Screening landscaping shall be provided along any lot

line where any adjoining lot is greater than 150% of the average lot size along that lot line of the conservation easement. In class B areas, this abutting landscaped open space area shall be 100 feet wide."

On page 4-5 of the developers' November 9th S4 Group letter, they somewhat glibly state that "the northern half of our western boundary may be applicable to the required screening easement." Of course it is applicable. Lot 13 is only 1.66 acres, and lot 14 is 2.16 acres. The adjacent lots to the west are each 4 acres, which is way more than 150% larger.

The Plat map needs to be amended, to show the mandatory 100 foot setback on lots 13 and 14. In addition, the developers should be prepared to supply the mandatory designs by a licensed architect, and the 3 trees and 10 shrubs required for every 20 linear feet of the 630 feet buffer zone.

Lot 13 is one of the tiniest lots in the parcel- only 1.66 acres (72,093 square feet), with 329 feet abutting the much larger lot. With a 100 foot buffer zone, removing 32,900 feet (.755 acre), takes the developable area down to 39,193 feet (.90 acre). Using the 5.5% lot coverage, the house could have a footprint of 2,155- but with the irregular shape of the lot, coupled with the well and drainfield setbacks, it may not be developable at all.

Also, this 100 foot wide setback, times the two lots at a total of 629 linear feet, means that 62,900 feet should be subtracted from the lot size that could be counted towards the 30% open spaces demanded in title 21.

#### 4. Where is the "riparian easement," and other easements?

An easement for riparian maintenance and protection is mandated in 21.08.040.F (Subdivision Standards). This is necessary "whenever a stream, water body or wetland traverses or is adjacent to the subdivision." However, the present Plat does not show these easements. The plan should be amended to include all these important easements.

#### 21.08.030.F Streets

##### 3. ROW Open Area

"All street rights of way shall include an open area, which may contain sidewalks, for snow storage. The open area shall extend 7 feet outwards from the back of the curb or pavement edge."

These easements should be added to the Plat plan, as well. In fact, all the necessary setbacks for the drainageways and streams should be included on the Plat map. Otherwise, they may be overlooked or deliberately ignored, when the clients' builders get started.

#### 5. Stream and drainageway setbacks

#### 21.08.030.C Maintenance of existing natural drainage

"The general lot configuration and layout shall be consistent with naturally occurring drainage features and historical drainage patterns within the subdivision and surrounding areas. . . Reasonable efforts have been made to avoid or mitigate the diversion and/or contamination of natural and historical drainageways."

Here are my thoughts-

A. Lot 7 calls for a driveway to be installed directly over an active stream. The setback, which cannot be disturbed, is 50 feet on each side of the waterway. Paul Gionett would have to build a suspension bridge over 100 feet long, to install such a road. Has the Army Corps been notified? What is their opinion about this proposed encroachment on a stream that feeds directly into Rabbit Creek?

B. A drainageway runs right through the middle of lot 16 and lot 9. These mandatory setbacks should be included on the Plat map. With the well and septic setbacks added on, they may render lot 16 undevelopable, too.

6. No more future lots

Such a Plat could, in theory, be further subdivided in the future. The approval should include a statement declaring that NO further subdivision shall ever be allowed for this project.

Thank you for your consideration of these important issues.

Joan Priestley

Bern Davis

3040 Lake Otis Parkway, # B  
Anchorage, AK 99508

12/26/2017 8:03:46 AM

Comments about the Lewis & Clark subdivision (S 12388)

Bern Davis, owner 13101 Jeanne Road

We support responsible and rational development in the Hillside area. For the most part, the present plan for the Lewis & Clark subdivision has become a better design. It is now more in conformance with the Hillside District Plan goals. However, there are some problems that still need to be addressed.

21.08.010.B

"The subdivision should provide safe efficient and convenient movement to points of destination or collection. . . . should protect residents from adverse noise and vehicular traffic. [New developments should include] considerations of connectivity and pedestrian access to neighborhood destinations. . . ."

The two variance requests violate the clear provisions of this section, and many other sections, of title 21.

Variance # 1- longer cul-de-Sacs

21.08.030.F.6. cul-de-Sacs

a. The platting authority shall permit longer cul de sacs when necessary to accommodate natural features.

b. The length shall be measured from the centerline of the intersecting through street to the radius point of the cul-de-Sac bulb.

The developers are asking for a minor increase of 85 feet and 96 feet to their two cul-de-Sacs, for total lengths of 985 and 996 feet. However, their plat map has a 1" = 100 feet ratio. Using their own map, (starting from the center of DeArmoun Road), the cul-de-Sac that connects to Upper DeArmoun, and turns right (east) on the map, is clearly NOT 985 or 996 feet, but appears to be about 1150 to 1200 feet in length.

Calculation of the longitudinal length of the parcel is another example of numbers that do not match. Adding all the east-west linear feet on each lot, as listed by the

developer in the plat map, plus 60 feet for the cul-de-Sac road, plus 30 feet for the Canyon Road right-of-way, the total linear footage comes to 1,923.70:

202.99	Lot 14
400.00	Lot 16
60.00	cul-de-Sac
296.03	Lot 1
185.24	Lot 2
185.24	Lot 3
264.39	Lot 4
300.31	Lot 5
_ 30.00	Canyon Rd ROW
1,923.70	

However, the Plat diagram also shows a distance of 1,983.63, from the western monument above Lot 14, to the eastern monument above Lot 5- a difference of 60 feet. I do not understand how their own numbers could be so different. They should exactly match.

This potential difference in the calculated length of the cul-de-Sac is also a disconcerting discrepancy. If my measurements are correct, this plat design should NOT BE APPROVED until an independent surveyor can determine the real length of the proposed cul-de-Sac, and take other measurements, too.

I personally think that an entirely new and more accurate plat design will have to be developed and submitted to the Board.

Moreover, extensions in length of a cul-de-Sac are supposed to be approved only "to accommodate natural features." In this parcel, there are no natural features that need accommodation. It seems that the developers just do not want to have to create a better design. Mandates in Title 21 should not be tossed aside, merely to perpetuate an inferior design and layout, that contains questionable numbers.

The non-answers provided by the S4 Group on October 25, 2017 do not show any substantive facts about the way in which the developers have met the mandatory four standards, that the platting board must consider. In fact, as discussed below, longer cul-de-Sacs are in direct violation of standard # 2- they ARE detrimental to the public welfare, because all traffic and pedestrians will be forced to use just one extremely long road, to traverse the entire subdivision.

There is another important aspect of these cul-de-Sacs that needs to be discussed. On May 17, 2017, the state Department of Transportation stated opinions about this plat. It said that a single, solitary exit point was not acceptable. The DOT brought up a very important issue about safety standards and concerns. The DOT stated that a second access to existing roads would be necessary.

Having only one exit road to accommodate 16 houses, each with multiple cars, poses a serious threat to important issues of congestion, noise and public (and pedestrian) safety. The developers have not included plans for any sidewalks by the road. With the present plan, I certainly would not want to live on Lot number 1, 2, or 16. All that traffic is just too noisy.

Due to the boundaries of the subdivision on the west side, the obvious solution (to meet the DOT standard) is to extend the eastward cul-de-Sac road to Canyon Road, on the east. This change would eliminate the need for a variance to merely extend the cul-de-Sac, and would also negate any need for special pedestrian access paths.

In fact, the very first Plat created by the developers, and also one of the incarnations of their 2014 Plat, included that very connection to Canyon Road. Now this extension to

Canyon Road might require the elimination of one lot on the north side of the parcel, but such enhancement would bring the subdivision up to a much higher standard of public safety.

Variance # 2- Ignore Title 21 mandates for  
pedestrian access routes

I have read, and agree with, the excellent analyses that were sent to Mr. McLaughlin and Mr. Whitfield, by the two people who are most knowledgeable about land use issues. I would like to add for the public record comments that this variance definitely DOES "nullify the intent and purpose of the subdivision regulations and the Comprehensive Plan."

Facilitating pedestrian access ("connectivity") to neighborhoods, trails and recreational areas is a clear and long-standing policy directive of Anchorage. This position is stated in MANY land use ordinances and other planning reports, notably including the Hillside District Plan, the Comprehensive Plan, the Transportation Plan and the Anchorage Pedestrian Plan.

Pedestrian access paths in the subdivision would meet this goal by allowing direct and much shorter routes connecting with Canyon Road on the east, which is a gateway to several nice Rabbit Creek trails. The second walkway from the cul-de-Sac to the west would lead to and (hopefully) Messina on the west.

The non-answers submitted by the S4 Group on November 8, 2017 make no convincing statements, and effectively avoid the real issue. They have failed to demonstrate that there is any reason to consider such pedestrian access as "impractical, unreasonable or undesirable to the public." Therefore, I believe that the reasons behind this variance request have nothing to do with public welfare or safety.

However, Mr. Paul Gionett wants the lot directly south of the obvious trail location. He has said at Community Council meetings that he does not want his grandchildren able to ride their bikes along some nearby pedestrian path to Canyon Road. So everyone else has to be denied access, as well. A variance should never be granted to satisfy the hopeful whim of a single person.

I request that the platting board deny this variance, for the reason stated above.

Municipality of Anchorage  
P. O. Box 196650  
Anchorage, Alaska 99519-6650  
(907) 343-7943



01707379000  
MOBLEY THOMAS E & PAMELA  
8011 LAKONIA DR  
ANCHORAGE, AK, 99516-3838

RECEIVED

DEC 18 2017

PLANNING DEPARTMENT

**NOTICE OF PUBLIC HEARING: Wednesday, January 3, 2018**

The Municipality of Anchorage Platting Board will consider the following:

CASE: S12388

PETITIONER: Big Country Enterprises, LLC

REQUEST: A conservation subdivision of one (1) tract of land into sixteen (16) lots and one (1) tract of land; Variance from AMC 21.08.030F.6.a; Cul-de-Sacs to allow a cul-de-sac to extend beyond 900 feet; Variance from AMC 21.07.060D.3.b.ii., Internal Street Connectivity, to not require a walkway to cross a stream.

TOTAL AREA: 67.83 acres

SITE ADDRESS: N/A

LOCATION: Generally located east of Messinia Street, south of Upper DeArmoun Road and west of Canyon Road.

CURRENT ZONE: R-8 Low-Density Residential (4 acres)

COM COUNCIL(S): Hillside East, Glen Alps, Bear Valley, Rabbit Creek

LEGAL DESCR: T12N, R3W, SEC 25, S2W2NW4SE4 & E2NW4SE4 & NE4SE4

The Platting Board will hold a public hearing on the above matter at 6:30PM, Wednesday, January 3, 2018 in the Loussac Library Assembly Chambers, 3600 Denali Street, Anchorage, Alaska.

The zoning ordinance requires that you be sent notice because your property, residence, or business is within the vicinity of the petition area. This will be the only public hearing before the commission regarding this case and you are invited to attend and present testimony, if you so desire.

If you would like to comment on the petition, this form may be used for your convenience. Mailing Address: Municipality of Anchorage, Planning Department, P.O. Box 196650, Anchorage, Alaska 99519-6650. For more information call 343-7943; FAX 343-7927. Case information may be viewed online at <http://www.muni.org/CityViewPortal>.

Name: Tom Mobley

Address: 8011 LAKONIA DR.  
ANCHORAGE, AK 99516.

Comments: BORDERING RABBIT CREEK IS A CLASS C WET LAND.  
PLUS THE SEWAGE PRODUCED BY THAT MARY HOMES IS  
ENOUGH TO AFFECT THE AREA. THE WATER TABLE MAY NOT  
SUPPORT THAT AREA. PLUS UPPER DEARMOUN ROAD ISNT IN  
THE BEST SHAPE AND WILL ONLY WORSEN WITH THAT MARY VIEW  
HOMES. NOT IN FAVOR OF THIS PROJECT.

December 7, 2017

Municipality of Anchorage, Planning Department  
Attention Francis McLaughlin,  
4700 Elmore Road  
Anchorage, AK 99507

Re Project: S12388  
Big Country Enterprises, LLC/Lewis and Clark Subdivision  
Application for Plat Approval with Variance re Cul De Sac Length

Dear Mr. McLaughlin:

I am a homeowner at 8801 Upper Dearmoun adjacent to the proposed Lewis and Clark Subdivision.

This Project has a long history dating back to 2014. During that time, the Owners have made more than 10 different proposals, each seeking reduced 1-2 acre lot sizes below the minimum 5 acres required by R8 Zoning, a minimum lot size which has now been reduced to 4 acres by “new” Title 21. The smallest lots in each proposal are consistently stacked along Upper Dearmoun Road to the Canyon Road intersection. Despite Planning Department advocacy, these proposals were rejected by the Planning and Zoning Commission.

I am encouraged by the Owners’ abandonment of the quest for rezoning. Paraphrasing the poet, Robert Frost, zoning compliance makes good neighbors. At the same time, I remain concerned about the ongoing desire for lots below R8’s minimum size requirements. Five (5) of the proposed 16 lots, all along Upper Dearmoun Road, are under 2 acres. Five (5) other proposed lots are under 3 acres. Only 1 of the 16 proposed lots meets the 4 acre minimum lot size restrictions of R-8 zoning. Beyond the Application for Preliminary Plat stating that it is proposing a Conservation Subdivision, there is no attempt to justify the reduced lot size or consider the possibility of larger lots.

Understanding that the Application is for an AMC 21.08.070 Conservation Subdivision, I believe the Platting Board should proceed cautiously with a close scrutiny of any deviations from minimum lot size. To the greatest extent practicable, the proposed plat should comply with the underlying R8 zoning. Otherwise, R8 zoning protections provided to the neighborhood and Anchorage community in general are rendered meaningless.

Beyond stating that the Board has the discretion to permit “one or more” lots below the minimum lot size, AMC 21.08.070 provides no Board guidance as to how

much lot sizes should be reduced or how many lots below minimum size requirements should be permitted. When presented with a large 70 acre project and asked to approve sub-minimum lots for 15 of 16 lots, this lack of guidance is problematic. The problems become even greater when there is an absence of further guidance normally provided by other cases, regulations, or policies. With the Platting Board pioneering new ground, prudence dictates caution so as to withstand legal challenges on the basis that lot size reduction lacks a rational basis or that Platting Board's actions are arbitrary and capricious.

The prudent way to address this issue is to require the Owner to justify each deviation with the Board, to the extent practicable, minimizing lots below the minimum size requirements, something that is not done by the Application's conclusory assertion that a Conservation Subdivision is being presented. For those reasons, the Application for Preliminary Plat should be denied without prejudice, at least at this time, for the purpose of allowing the Owner to present this justification and allowing the Board, after further public comment, to address minimizing deviations from minimum lot size requirements.

There are 2 additional concerns. First, if the Board permits lots below the required minimum size, the Board must also condition approval on the approved plat not being subject to further subdivision. Otherwise, subsequent landowners have the ability to further circumvent R-8 zoning requirements by successive Conservation Subdivisions.

Secondly, the variance request for the extended cul de sac should be denied. To the extent that the features of the land make development impracticable, this is addressed by AMC 21.08.070 permitting smaller lots smaller than required. Having received this benefit, further variance from zoning requirements and subdivision standards is not justified.

Again, compliance with high standards makes good neighbors. Thank you for your consideration.

Very truly yours,

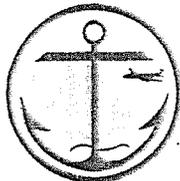


Marc June

MWJ/wws

cc: Hal H. Hart, Planning Director, David Whitfield, Carol Wong, Brooke Blessing

# Affidavit of Posting



# AFFIDAVIT OF POSTING

CASE NUMBER: S12388

I, ANDRE KAEFFELE hereby certify that I have posted a Notice as prescribed by Anchorage Municipal Code 21.03.020H.5. on the property that I have petitioned for Subdivision and Variance. The notice was posted on Dec 4<sup>th</sup>, 2017 which is at least 21 days prior to the public hearing on this petition. I acknowledge this Notice(s) must be posted in plain sight and displayed until all public hearings have been completed.

Affirmed and signed this 4<sup>th</sup> day of DECEMBER, 2017.

[Handwritten Signature]  
Signature

## LEGAL DESCRIPTION

Tract or Lot: \_\_\_\_\_

Block: \_\_\_\_\_

Subdivision: To be Lots 1-16 and Tract A, Lewis & Clark