MUNICIPALITY OF ANCHORAGE
COMMUNITY DEVELOPMENT DEPARTMENT
PLANNING DIVISION

MEMORANDUM

DATE:	June 1, 2015
TO:	Planning and Zoning Commission
THRU:	JW Jerry T. Weaver, Jr., Director, Community Development Department
FROM:	MO'B Margaret O'Brien, Senior Planner
SUBJECT:	**2014-0219:** Request to rezone approximately 72.66 acres from R-8 (rural residential- large lot) district to R-6 (suburban residential- large lot) district
APPLICABLE ZONING CODE:	'Old' Title 21
APPLICANT: **REPRESENTATIVE:**	Big Country Enterprises, LLC S4 Group, Tom Dreyer
RECOMMENDATION SUMMARY:	DENIAL

On March 2, 2015, the Commission opened and closed the public hearing for a request to rezone 72.66 acres from R-8 (rural residential – large lot) district to R-6 (suburban residential – large lot) district). The property is located south of Upper De Armoun Road between Messinia Street to the west and Canyon Road to the west.

Property to the north is zoned R-6 (suburban residential-large lot) district requiring a minimum 1.25 acre lot size, R-8 (rural residential-large lot) district requiring a minimum 5.0 acre lot size, and R-9 (rural residential) district requiring a minimum 2.50 acre lot size.

Property adjoining the west petition site boundary is zoned R-6 and R-9; to the northwest property is zoned R-6. Property to the east is zoned R-8 and R-10 SL. Section 36 to the south is zoned PLI-p.

Twenty people testified in opposition to the rezone during the public hearing held on April 6, 2015. During the public hearing, a report on the delineation of wetlands was submitted; however, the maps of the wetland areas were not included with the report. A Soils Investigation Report prepared by Garness Engineering Group Ltd. was submitted as well. The reports had not been submitted in time for reviewing agencies to provide comments to the Commission. The case was postponed for one month.

The soils report found that "the average slopes across the majority of this parcel range from 5 to 20 percent running generally from northwest to southeast." Thirty-eight test holes were performed on the proposed subdivision. "The majority of the proposed subdivision has marginal to impermeable soils (soils that have a percolation rate of >120 minutes/inch) at a depth of four (4) feet."[1]

Test holes were performed "on the southeast quarter of the property for proposed Lots 1 through 4 (TH#1, TH#2, TH#3, and TH#4). Based upon our findings, these proposed lots appear to be unsuitable for onsite septic systems due to impermeable soil and/or high groundwater. Additionally, two (2) test holes (TH #11 and TH#11A (old TH#6)) were performed on proposed (on) Lot 11 and found that the lot will not meet the requirement for septic reserve area or platted drainfields. In short, this lot appears unsuitable for an onsite septic system."[2]

"Given the impermeable soils (at four feet and/or shallow groundwater) and based (on) our experience with the MOA Onsite Department on other subdivisions with similar conditions, these proposed lots will most likely require the use of platted drainfield sites served by advanced wastewater treatment systems."[3]

The petitioner is proposing a special limitation to allow 32 lots to be platted with a future plat. Based on the soils report, five (5) lots were found to be unsuitable for conventional on-site septic systems and may require advanced wastewater treatment systems.

AGENCY COMMENTS

The wetlands study was routed to the Wetlands Coordinator, On-Site Water and Wastewater Services and Watershed Management. To the Department's knowledge, the applicant has not submitted the wetlands report to the U.S. Army Corps of Engineers for a wetland determination. No additional comments were received from the Wetlands Coordinator or Watershed Management.

On-Site Water and Wastewater Services (OSWWS) comments are as follows:

<u>Onsite Septic Systems</u>

A quick review of the summary, soils logs and preliminary subdivision drawing originally dated January 2015 provided by Garness Engineering Group appears to be showing most but not all of the proposed 32 lots should be able to be served by

[1] Lewis and Clark Soils Investigation and Well/Septic Reserve Area Report, January 2014, revised April 29, 2015, page 2 of 4.
[2] Ibid.
[3] Ibid

individual onsite septic systems. Further research regarding the "dry drainageways" needs to be completed to determine if there is "surface water" as defined by AMC 15.65.010 Wastewater Code. Since AMC 15.65 requires septic tanks and drainfields to be at least 100 feet from surface water, the determination may render some of the proposed lots to be developable at great expense or possibly undevelopable at all.

<u>Source Aquifer(s) for Domestic Water Supply – Nitrates</u>

Based on nitrate levels in neighboring wells, the source aquifer for new wells serving the proposed subdivision will be required to have a nitrate study in addition to the standard subdivision aquifer study. The study results may indicate nitrate reducing septic systems should be required for the subdivision.

<u>Proposed Rezone</u>

The Wastewater Code, AMC 15.65, does not recognize or use zoning requirement for subdivision development review.

DISCUSSION

Both the density of the R-6 and R-8 zoning districts comply with the *Hillside District Plan* (HDP) Land Use Plan Map 2.1 recommended Limited Density 0-1 DUA. However, the proposed rezone of the petition site does not conform to Policy 1-C that states: "Maintain the same land use designations and zoning in this area as were established prior to the beginning of this plan." (HDP p. 2-11) This area was developed earlier than southeast Hillside; it has been developed with on-site utilities; public services are unlikely to be extended in the foreseeable future due to the distance from existing services.

Many of the subdivisions to the west and north of the petition site were platted prior to the implementation of the Areawide rezoning on June 6, 1974 (AO 74-84B). The lots do not meet the minimum lot size required by the R-6, R-8 and R-9 zoning districts that were implemented during the areawide rezoning. Many of the smaller lots to the west are served by holding tanks and there is evidence of elevated nitrates, albeit within the limits established by AMC 15.65.010 Wastewater Code. Development of Lots 1-4 and 11 that were found to be unsuitable for on-site septic systems may have to be developed with advanced wastewater treatment systems.[4]

The intent of the R-8 (rural residential – large lot) district "is designed primarily to satisfy the needs of low-density residential development in areas where topographic or other natural conditions are such that higher-density development and the provision of public sewers and water would be unfeasible at any time. In

[4] Advanced wastewater treatment systems (AWWTS) means all wastewater disposal systems, designs or types that use advanced technology to provide a higher quality effluent than a conventional septic system.

addition to topography, some of the natural conditions which could exist to render land desirable for the densities proposed in this zone are wind hazards, marginal soils, landslide susceptibility, groundwater pollution and groundwater availability. A secondary use of the R-8 district is to allow for low-density residential development in areas where public sewers and water are unlikely to be provided in the foreseeable future and where higher density development would exceed geological and hydrological capacities for safe and healthful human habitation unless these facilities were provided. An example of such a condition would be where higher density development in certain water recharge areas, utilizing on-site sewage disposal systems, could pollute the groundwater supply in the immediate areas as well as in areas of lower elevation."

With the proposed R-6 zoning district, 32 lots that are 1.25 acres in size would be allowed versus 14 lots containing 5.0 acres each that are permitted under the existing R-8 zoning district. There will be more grading and removal of natural vegetation under the R-6 zoning district increasing the potential for surface water run-off due to the impermeable soils and shallow groundwater. The greater the number of on-site septic systems, the greater the potential is for nitrate pollution of drinking water. On-Site Water and Wastewater Services (OSWWS) is requesting a nitrate study to determine if nitrate reducing systems will be required for development of the lots. OSWWS stated that "[F]urther research regarding the 'dry drainageways' needs to be completed to determine if there is 'surface water' as defined by AMC 15.65.010 Wastewater Code. Since AMC 15.65 requires septic tanks and drainfields to be at least 100 feet from surface water, the determination may render some of the proposed lots to be developable at great expense or possibly undevelopable at all."

The Department recognizes the intent stated by the owners of developing an environmentally sound subdivision during the public hearing. However, the development of the individual lots will be the responsibility of the future property owners who will be responsible for grading the lots, locating the home sites and constructing the homes and installing the on-site septic systems and wells.

DEPARTMENT RECOMMENDATION

The Department does not support the request and recommends DENIAL of the petition to rezone approximately 72.66 acres from R-8 (rural residential- large lot) district to R-6 (suburban residential- large lot) district.

Attachments: On-Site Services Comments
Public Comments
Preliminary Determination of Wetlands and Waters
Upper De Armoun and Canyon Road Preliminary Drainage Impact Analysis
Soils Investigation and Well/Septic Reserve Area Report
Revised preliminary plat (under separate cover)

Municipality of Anchorage
Development Services Department
Building Safety Division

MEMORANDUM

RECEIVED
MAY 08 2015
MUNICIPALITY OF ANCHORAGE
ZONING DIVISION

DATE: May 8, 2015

TO: Margaret O'Brien, Current Planning Section

FROM: Deb Wockenfuss, Civil Engineer, On-Site Water and Wastewater Program

SUBJECT: 2014-0219 Rezone for proposed Lewis and Clark Subdivision

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Onsite Septic Systems

A quick review of the summary, soils logs and preliminary subdivision drawing originally dated January 2015 provided by Garness Engineering Group appears to be showing most but not all of the proposed 32 lots should be able to be served by individual onsite septic systems. Further research regarding the "dry drainageways" needs to be completed to determine if there is "surface water" as defined by AMC 15.65.010 Wastewater Code. Since AMC 15.65 requires septic tanks and drainfields to be at least 100 feet from surface water, the determination may render some of the proposed lots to be developable at great expense or possibly undevelopable at all.

Source Aquifer(s) for Domestic Water Supply - Nitrates

Based on nitrate levels in neighboring wells, the source aquifer for new wells serving the proposed subdivision will be required to have a nitrate study in addition to the standard subdivision aquifer study. The study results may indicate nitrate reducing septic systems should be required for the subdivision.

Proposed Rezone

The Wastewater Code, AMC 15.65, does not recognize or use zoning requirements for subdivision development review.

Public Comments

Zoning and Platting Cases On-line

View Case Comments

Submit a Comment

** These comments were submitted by citizens and are part of the public record for the cases **

Questions? If you have questions regarding a case, please contact Zoning at **907-343-7943** or Platting & Variances at **907-343-7942**.

1. Select a Case: 2014-0219 View Comments

2. View Comments:

Case Num: 2014-0219
Rezone from R-8 (rural residential-large lot) district to R-6 (suburban residential-large lot) district

Site Address: 13301 MESSINIA ST, Anchorage, AK 99516
Location: Generally located south of Upper De Armoun Road, west of Canyon Road and east of Messinia Street

Details | Staff Report | submit a comment

Public Comments

5/18/15
Merideane Kennison
13341 Canyon Road
Anchorage AK 99516
My concerns about this proposed development are many. For ease of discussion I will list 3 categories: the environment/ecosystem, current residents, and the unsuspecting buyers. We live in the first house on Canyon Road, directly above the proposed development and one of the creeks flowing into the land below goes right through our lot. We have observed it for more than 24 years. This creek and the land below is a major corridor for wildlife, prime wetland habitat, and an important part of the Rabbit Creek watershed. 32 houses will certainly negatively impact trails used by bear, moose, lynx and countless other creatures. The runoff from those roofs, driveways and streets will go directly into Rabbit Creek affecting flow and water quality - not to mention the affect failed septic systems would have to the watershed. Although I'm not in favor of any development, I think that the current R-8 zoning would have less detrimental effects on the surrounding natural environment. The families that already live in this valley have chosen to reside in owner/builder type neighborhood and not a cul de sac style suburban subdivision. The increased traffic on our already substandard road would be hard to imagine. I think 32 houses would probably mean an additional 65-75 vehicles traveling up and down Upper DeArmoun several times a day. In winter this land is in the shadow of the ridge which lies to the south. It does not see much sun for several months and in years like this last one - containing many days of freezing rain - I have a difficult time imagining all those cars getting in and out of ice covered roads without piling up along the side of the road or in a ditch. The R-6 zoning will put too many people, vehicles and stress into our quiet neighborhood. The destruction of our immediate viewscape, light pollution from house & street lights and air quality issues (dust & sand

kicked up from the increased traffic)are other problems I see with the proposed development. I worry that potential buyers would purchase lots without knowing the extreme weather and conditions this valley experiences. Icy, sloping roads that receive little sun in the winter (coupled with high winds) could create a neighborhood people move into and then rapidly out of. Most of the folks that live in the area now bought their land, watched it for a year or more and considered where on the property to build and which way to orient the house. They like living on the edge of the wilderness and know what that means. A development like the one planned sends a message that this is the suburbs ... road maintenance, school bus transport, drainage, water and septic are all taken care of and reliable. In reality that will not be the case. All those houses going in at once will affect one another in ways that won't be known until it's too late. The R-8 zoning allows for more options regarding house, well, and septic placement, and will also have less impact on the existing neighbors and wildlife.

5/18/15

William Bryant
8820 Spendlove Drive
Anchorage AK 99516-358

First of all, I apologize ahead of time for the somewhat stream-of-consciousness nature of these remarks. I have two main concerns, the first of which is potential adverse effects on surface water and groundwater. Adding 30+ septic systems to known hydric soils seems to me like a recipe for disaster. Because soil types (and aquifers) may be discontinuous in this area (and therefore porosity and permeability will vary), there is potential for un- or partially-digested sewage to find its way to the ground surface, which would facilitate the movement of contaminated water into Rabbit Creek. Obviously, with higher density wells and septic systems, there is also the possibility of groundwater contamination. Because of the possible/probable discontinuous aquifers, some of which may be perched or confined, the actual domestic water supplies recharge rates might be variable and/or inconsistent. I lived in Bear Valley in the mid-80s, on a 0.5 acre lot with similar soils. I, and several neighbors, had frequent issues with water supply and/or septic systems. I know that the proposed lots are larger, but similar issues are likely. And there are also well and septic siting standoff issues that will have to be considered. My other concern is traffic. Upper Dearmoun is classified as substandard, and anyone who drives it even infrequently should have no trouble believing that. If an extra 100+ trips per day are added, it will have to be reclassified as a rutted urban trail! Anyway, for what it is worth and I am not an expert, but having lived on the Hillside for a total of about 24 years, all of which in houses with wells and septics, I have experienced problems personally, and heard about many others, believe that the current subdivision as planned is not a good idea, and therefore ask that the zoning change be denied.

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Details | Staff Report | submit a comment

Public Comments

5/18/15
Chris Alexander
9000 Spendlove Dr
Anchorage Ak 99516
I am against rezoning this property. My latest concern is that the opinions of those that spoke at the last meeting might not matter. Out of nearly 40 there only the developers and one neighbor were in favor of rezoning. Yet in order to make a decision more maps are needed. That lends me to think our opinion doesn't matter. As water is one of the largest concerns here, I don't believe using perk test results from the driest year ever is good idea. I live on a 5 acre lot, and can tell you it is wonderful. Leaving the current zoning the way it is will make whomever lives there very happy. My wife and I are not looking forward to more light, sound, and smoke pollution in our quite valley. Going from the currently allowed 14 houses to 32 would not be helpful from the eyes, ears, and noses point of view. We are not against the 5 acre lot zoning and would support that development. It would make for better homes with appropriate space for septic and leach fields to do their jobs correctly with less probability for "gross" errors. Good septic systems makes good neighbors. If this rezoning is allowed to go through, I'll be disappointed. Please recognize the overwhelming majority do not want this change.

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Public Comments

5/18/15
Timothy Thomas
Box 244151
Anchorage AK 99524
I oppose rezoning of this area. We don't need another Prominence Point like housing estate with 32 houses bunched on each other. The developer has not demonstrated any reason why it needs to be rezoned. Profit seems to be the only motive. Those who have chosen to live out there have done so because of its rural nature; putting 14 houses on that piece of land will change the neighbourhood somewhat but putting 32 houses is not acceptable, let alone feasible from a geophysical perspective. Please do not allow this rezoning to go forward. Thankyou

5/18/15
Raymond Kaufman
8521 Spendlove Drive
Anchorage AK 99516
Re-zoning this parcel of land would jeopardize the existing hillside neighborhoods by creating significant additional traffic on Upper DeArmoun Road. This road is already in very poor shape, and is the only route off the hillside for many residents in case of fire or other disaster. Additionally, most (if not all) homes up here obtain their water from wells. I fear permitting more homes to be built as a result of re-zoning will negatively impact the water table, causing loss of water pressure or possibly wells drying up altogether. Please deny this re-zoning request. Thank you

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Details | Staff Report | submit a comment

Public Comments

5/14/15
Mark Hodor
8918 Spendlove Drive
Anchorage AK 99516

I commented previously on this application and remain concerned about the scale and nature of the proposed development. One new piece of information that came to light today was a flier that the developers (Lewis & Clark Subdivision) produced. In that flier, they state the following: "We are committed to keeping the character of the area, maintaining the natural beauty found here, preserving existing ecologically sensitive areas . . . [and] leaving as small a footprint as possible." As I discuss this with more of my neighbors, it has become increasingly apparent that the proposed project will do just the opposite of what the developers seek. The project is too large for the neighborhood; it will result in significant degradation of the existing habitat; negatively impact the water quality; adversely affect our view; potentially diminish the water supply that supports the surrounding homes; and would increase the number of people and traffic in our peaceful neighborhood. Furthermore, all federal, state, and local processes must be adhered to before the project moves forward, including a rigorous analysis of the potential environmental and social impacts associated with this project. The public must also be given an opportunity to provide input during each process. The bottom line is that the project is ill-conceived and will negatively impact our quality of life and result in environmental harm that cannot be reversed. I would strongly encourage you to adopt the recommendation of your own expert planners and deny the request to rezone the site.

Zoning and Platting Cases On-line

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Public Comments

5/12/15
Bern Davis
3705 ARctic Bl, # 1332
Anchorage AK 99503
We live at 13101 Jeanne Road, directly across the street from this proposed development. The lot plan shows two new roads, both connecting with Upper DeArmoun. Headlights from this excess traffic will be shining right into the windows of several houses in line with these new roads- our house, especially. The excessive density of the proposed 32 houses is needless and disruptive. I notice that the developers have shielded their own new properties (proposed lots 1 and 2) from any such exposure to noise and traffic. If there is to be any new road for this subdivision, the logical path is to have just one road, that parallels DeArmoun, starting at Canyon Road, and connecting to Massena. Upper DeArmoun, itself, is a very old, bumpy and substandard road. The excessive traffic caused by yet another 32 houses will just result in a lot more overusage of this already under-maintained street. We walk all over our wonderful neighborhood, but we do not hike in the area south of DeArmoun (where this proposed development is located). It is usually far too steep, and marshy, and boggy. I do not understand how these developers can declare that an area with four streams and two ponds is "only 10% wetlands." The developers took soil measurements during one of the driest winters we have ever had. Although they were advised in January to contact the Army Corps of Engineers for a jurisdiction determination, I still do not think that they have bothered to make contact with this important government agency, at all. We are all greatly concerned about the impact that 32 more houses will have on our already tenuous water table. Once 32 houses are built, and our wells are sputtering, the city cannot order half of those properties to be demolished. At that point, we will have to endure this ill-conceived travesty forever. The city planners took great care to devise a long

12

range plan that would be economical and sustainable. The experts at the Community Development Department Planning Division have performed a thorough and thoughtful analysis of this rezoning proposal. They concluded that this overly dense plan does NOT conform to either the Anchorage Comprehensive Plan, NOR to the Hillside District plan. I implore the members of the Zoning Commission to travel out here, see what DeArmoun Road is really like, walk around the area, and think about the magnitude of the adverse impact that this zoning project will impose on this wonderful, peaceful and quiet neighborhood. Then vote "NO" on this proposed zoning change. Please consider this proposal very carefully, and vote to protect our neighborhood form such over zealous development. Thank you.

Municipality of Anchorage
P. O. Box 196650
Anchorage, Alaska 99519-6650
(907) 343-7943

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ANCHORAGE, AK, 99502

NOTICE OF PUBLIC HEARING: Monday, March 2, 2015

The Municipality of Anchorage Planning and Zoning Commission will consider the following:

CASE:	2014-0219 99502$1515 C021
PETITIONER:	Big Country Enterprises, LLC
REQUEST:	Rezone from R-8 (rural residential-large lot) district to R-6 (suburban residential-large lot) district
TOTAL AREA:	72.66 acres
SITE ADDRESS:	13301 MESSINIA STREET
LOCATION:	Generally located south of Upper De Armoun Road, west of Canyon Road and east of Messinia Street
CURRENT ZONE:	R-8 (rural residential-large lot) district
COM COUNCIL(S):	Hillside East,
LEGAL DESCR:	T12N R3W SEC 25, S2W2NW4SE4 & E2NW4SE4 & NE4SE4; and Vergason-Jones Subdivision, Lot 2

The Planning and Zoning Commission will hold a public hearing on the above matter at 6:30PM, Monday, March 2, 2015 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, Department of Community Development, Planning Division, P.O. Box 196650, Anchorage, Alaska 99519-6650. For more information call 343-7943; FAX 343-7927. Case information may be viewed at www.muni.org by selecting Department / Community Development / Planning / Current Planning and then click on the hyperlink 'View active cases and maps'.

Name: Benjamin + Heather Rolfs

Address: 3600 Mere Circle

Legal Description: Grecia-Hills Blk 3 lots 2 through 7 and lot 14.

Comments: I was unable to attend meeting due to Jury Duty. I believe the reduction in lot size is excessive. It will alter the nature of surrounding neighborhoods, it may place excessive septic systems in an area known for poor soil conditions and alter wildlife habitat / migration along the rabit creek corridor. A change in zoning to R7 or remaining R8 would best suit the larger community and planning of the Rabit Creek valley.

Thanks for your consideration,

Ben + Heather Rolfs

O'Brien, Margaret R.

From: Kimmel, Corliss A.
Sent: Tuesday, April 21, 2015 8:15 AM
To: O'Brien, Margaret R.
Subject: Online Comments: 2014-0219 Rezone, after public hearing was closed

Good Morning Margaret,

I am collecting these comments under a cover sheet as received after the public hearing was closed and putting them in the case folder:

4/20/15
Sue Goodglick
Anchorage AK 99516
From the Anchorage zoning definitions: R-8 Rural Residential District (Large lot) was designed to satisfy the needs of low-density residential development in areas where topographic or other natural conditions are such that higher-density development and the provision of public sewers and water would be unfeasible at any time. Since the topographic and other natural conditions in this area have not changed I do not see how this request can legally be accomplished - it remains unfeasible. Allowing more development in this area would be problematic to the area water supply, sewers, in addition to posing harm to valuable wildlife corridors in the immediate area and down stream of Rabbit Creek. Please ensure the proposed area is not rezoned from R-8 to R-6. Thank you.

4/13/15
Mark Hodor
8918 Spendlove Drive
Anchorage AK 99516
My family and I moved to Anchorage recently and purchased a home that overlooks the subject property, among other scenic views of the Upper Hillside neighborhood. We chose this neighborhood primarily for its beauty and the environmental features that Upper Hillside offers. The proposed development would alter, in an adverse way, the character and environmental features of my neighborhood and would result in significant congestion and traffic, thereby taxing further the structural integrity of Upper De Armoun Road. I have reviewed much of the information shared with me by my neighbors and have read Mr. Jon Cecil's Memorandum dated January 23, 2015, in which he recommended denial of the rezone from R-8 to R-6. Many legitimate reasons exist to deny the request. These include, but are not limited to the following: the parcel is comprised of important wetlands and habitat for wildlife; development will affect runoff by replacing permeable land with less permeable surface; potential problems with sewage, water quality, and water supply; the significant increase in vehicle traffic and residents; and the view from my home will be altered in a material way as I will now be looking directly at a parcel filled with homes instead of trees. I respectfully request that the Municipality of Anchorage deny the rezone request and, if possible, disallow any development on this parcel of land. Thank you

4/6/15
Amy Holman
8740 Spendlove Dr
Anchorage AK 99516
Thank you for the opportunity to comment. I recommend the planning department deny this rezoning request. My concerns include: - negative affect on my water supply as warm summers with long dry periods already are causing a change in water quality and availability in my well. - lack of emergency escape routes. There are limited emergency escape routes from this neighborhood already, adding a subdivision without creating addition egress routes (connection to Cox Dr or improving Jeanne Dr) is ill advised. - higher density housing would lead to increased run-off and pollution to Rabbit Creek - higher stress on Upper DeArmoun Road which is in need of maintenance - habitat loss for area wildlife; potential for wildlife causalities from increased traffic and 'self defense'

4/6/15
Loke Freedman
13921 ?Bonnielaine Rd.
Anchorage AK 99516
Having worked over 25 years ago, (and then purchasing my land soon after),in surveying the land in the area and in question, I recall Grandfathered water rights, watershed rights, and that this land was intended for Mental Health Trust Lands trade and use, not rezoning for prolifically built housing and overfilled subdivisions, ignoring critical watershed issues on this continuously wet land, home to moose, bear (frizzy & black), Lynx, wolverine, etc. We oppose such rezoning with severe concern for neighborhood well & septic use & needs.

4/6/15
Stephen Day
On behalf of the owner, my grandmother, of the plot of land directly to the south of the development in question I would like to oppose this zoning expansion. We have concerns as to what this amount of septic systems uphill from our land will have on our property and what effect it could have on rabbit creek which runs through our property. The water table being affected by so many wells is also a concern as well as the increased traffic on Upper Dearmoun which does not hold up well as is due to poor substrate.

4/6/15
Carol Ashlock
13921 Bonnielaine Rd.
Anchorage AK 99516
Located just below the area in question, and adjacent to Rabbit Creek, We are opposed to zoning change from R8 for the concerned property for Case No. 2014-0219 due to watershed, water table and septic issues, as well as proximity to Rabbit Creek itself, particularly in view of the recent changes brought about by the ice dam that occurred up at Rabbit Lake, thereby causing the lower flooding and change in the creek and effects itself. The impact on wildlife, coyote dens, short tailed weasel, porcupine and others are already being evidenced. Construction of the innumerable homes planned will further destroy this habitat, one that cannot sustain the septic, well, soil & watershed needs that would be required.

4/6/15 Bob Sutherland 8800 Spendlove Drive Anchorage AK 99516 I am dead set against this proposal because I think it will put too much traffic on Upper DeArmoun. If there is an accident closing the road above the Messina or Michael intersection with Upper Dearmoun, all the traffic will be re-routed onto Jeanne which a portion of is on private property. This section is poorly drained, seldom plowed in the winter and is narrow mud hole right now. Not safe. For safety purposes, What the developers should do is develop a road connecting to Laconia or Cox providing for a safe exit out of the bowl. Dumping any more traffic onto the private portion of Jeanne is unsafe and unacceptable. Upper DeArmoun barely has any shoulders so any walkers or runners are pushed into the road. Many of those folks have dogs, sometimes unleashed. Folks come bombing down and roar up the road making it unsafe for pedestrians if the vehicles don't move over. At a minimum there should be some decent (4 foot ?) shoulders which allow those users to get off the road. Thank you for allowing us to comment.
4/6/15 Mark & Gail Morrison 8600 Spendlove Drive Anchorage AK 99516 My wife & myself have the same concerns and trepidations as the other people commenting here. The proposed housing number is about three to four times greater than the acreage will support given the surface waters and natural drainages noted. Wetter years are worse for surface water. Dearmoun & Rabbit Creek roads were not designed nor capable to safely accommodate the anticipated increase in traffic. The proposed subdivision will all be depending on wells and septic systems. The drop in the existing water table would be unacceptable to existing residents, forcing everyone above the proposed subdivision to drill new wells in the near future. We have seen no information/comments from the Corps if Engineers to validate the existence of this new subdivision. The developers show a severe lack of planning and little or no concern for the affected residents.

Corliss Kimmel, Office Associate
Current Planning Section, Planning Division
Community Development Department
Municipality of Anchorage
(907) 343-7943
Fax: 343-7927

O'Brien, Margaret R.

From: Kimmel, Corliss A.
Sent: Monday, April 06, 2015 1:02 PM
To: O'Brien, Margaret R.
Subject: Two More Comments: 2014-0219

Robert Brown
13688 Canyon Rd.
Anchorage AK 99516
My wife and I are strongly concerned that the proposed housing concentration will do damage to the Rabbit Creek watershed and negatively affect the quality of the aquifer we pull water from, infringing upon our legal water rights. In addition to the inability of the roads to support so much extra traffic, the land is filled with high water and streams. R-6 zoning will negatively affect the character of the neighborhood, which we expected to stay at low density when we purchased our property.

4/6/15
Chris and Janet Alexander
9000 Spendlove Dr.
Anchorage Ak 99516
We are against a zoning change here. 1) Poor water drainage will be problematic for septic systems. 2) Increased wells with high density septic systems and poor drainage just sounds gross. 3) Upper DeArmoun isn't a great road. 4) I love walking this swampy, wildlife filled area, and was very sad with just the bulldozed dirt road to put in over 30 perk test holes. Since the perk test road was put in, there are not as many moose in the area, which is strange as I thought the dirt path would be liked by the moose. 5) Our house looks over the entire area to be developed, and I'm not thrilled with the idea of all the light pollution, and air pollution from smoky fire places. Star and northern light gazing will suffer. 6)The plan submitted doesn't have green space included except on the very edge where even the perk test guys didn't dig as it is always wet. We realize that our wants and desires aren't what will make this decision, but we live and play here and the developer doesn't. We don't want another high density development in the area. And any new development should have more green belts for wildlife, and recreation. Please, developer, think green.

Corliss Kimmel, Office Associate
Current Planning Section, Planning Division
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Municipality of Anchorage
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Fax: 343-7927

O'Brien, Margaret R.

From: Kimmel, Corliss A.
Sent: Monday, April 06, 2015 9:55 AM
To: O'Brien, Margaret R.
Subject: One More comment: 2014-0219

4/6/15
Michele Martin
12801 Michael Rd
Anchorage AK 99516
I do not believe a zone exemption should be given. The additional traffic first by the heavy construction trucks and then the additional subdivision traffic will wreak havoc on Upper DeArmoun which is already is very poor shape. The Glen Alps Road Service Area (GARSA) does not have the funds currently available to fix this road. Besides, isn't the south side of the road a swamp area from all the runoff? This could further affect the drainage of those individuals living off Messina & Cox Road, which is already bad. Please do not allow this exemption to go through.

Corliss Kimmel, Office Associate
Current Planning Section, Planning Division
Community Development Department
Municipality of Anchorage
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Fax: 343-7927

O'Brien, Margaret R.

From: Kimmel, Corliss A.
Sent: Monday, April 06, 2015 8:59 AM
To: O'Brien, Margaret R.
Subject: Cases Online Comments: Case 2014-0219

4/6/15
Bart Hawkins
12921 Monterey Circle
Anchorage AK 99516
I request that the parcel in question remain at its current zoning (R8) for the reasons giving in my prior comment.

4/5/15
Derek Reynolds
13456 Spendlove Dr.
Anchorage AK 99516
My Wife and I strongly object to the proposed rezoning described in 2014-0219. While we naturally disapprove of the proposed increase in density due to the impact on the overall subjective "feel" of the Upper Hillside – this is of course why we chose to move into the area in the first place – we believe the traffic and safety hazards created by this increased density would be objective, and measurable. As mentioned in the report, Upper DeArmoun is already substandard road. Even with the periodic maintenance currently performed, the road surface is constantly in a state of disrepair with large cracks and dips which are inconvenient at best in the Summer, but downright hazardous in the winter due to the steep grade and frequent sheet-ice conditions in Winter. An increase in vehicle traffic will only worsen these conditions. In addition, the access roads to this Proposed Subdivision are poorly thought-out. The proposed tie-ins to Upper DeArmoun would require vehicles to enter the road by making a blind, left-hand turn in front of oncoming downhill traffic in a section of Upper DeArmoun that is already particularly steep, and downright treacherous in the winter conditions described above. This will create an unnecessary additional safety hazard even at the current lower density of the present zoning, let alone the even higher traffic patterns created by any increased densities proposed. Even if the proposed rezoning is rejected, we would strongly urge that these access roads be re-routed to a safer merging point with Upper DeArmoun to mitigate this hazard. We respectfully request that the Planning Board reject this increased zoning density proposal. Thank You. Derek Reynolds

Corliss Kimmel, Office Associate
Current Planning Section, Planning Division
Community Development Department
Municipality of Anchorage
(907) 343-7943
Fax: 343-7927

Zoning and Platting Cases On-line

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1. Select a Case: 2014-0219 View Comments

2. View Comments:

Case Num: 2014-0219
Rezone from R-8 (rural residential-large lot) district to R-6 (suburban residential-large lot) district

Site Address: 13301 MESSINIA ST, Anchorage, AK 99516
Location: Generally located south of Upper De Armoun Road, west of Canyon Road and east of Messinia Street

Details | Staff Report | submit a comment

Public Comments

3/2/15
Adrienne Fleek
13591 Spendlove Drive
Anchorage AK 99516
I am a homeowner directly across from the proposed area. I do not believe the boggy land can support the proposed changes (from R8 to R6) and would strongly encourage the municipality to maintain the current designation of R8. Many lots on and around the proposed site have extreme glaciation activities each year and I believe the science shows that the greater number of well/septics installed has a negative impact on the water table and produces more glaciation. I am also very concerned about the run off into Rabbit Creek from massive land disturbances and it will impact the creeks ability to stay pristine and unpolluted. I am not against the area being developed but believe it should stay R8 to avoid impacting residents and wildlife above and below this plot of land. Another concern I have is the current status of the Upper Dearmoun Rd which has been severely neglected and cannot support increased traffic. Both an increase in the number of users on a daily basis as well as heavy equipment (contruction phase) will destroy the already poor road condition of both Canyon Road and Upper Dearmoun. This use will be very costly to the entire City of Anchorage.

O'Brien, Margaret R.

From: Kimmel, Corliss A.
Sent: Monday, March 02, 2015 10:45 AM
To: O'Brien, Margaret R.
Subject: Another Cases Online Comment: 2014-0219

3/2/15
James Brady
8731 Upper De Armoun Rd.
Anchorage AK 99516
I own and live on a lot immediately across Upper DeArmoun Rd from the 72.66 acre parcel requesting to rezone from R-8 to R-6. My family has lived here since 1990. We purchased our property because we like the space that larger lots provide in this scenic part of Anchorage, and it's proximity to Chugach State Park. The proposed rezoning and development of this parcel raises a number of concerns for us: 1.) The rezoning would potentially permit an increased density in housing in the area, thus diminishing the qualities that my family has enjoyed over the past 25 years; 2.) all houses in this area are dependent on wells, and most have a relatively slow recharge rate. How will the addition of a large number of new homes affect on water tables for the existing homes in the neighborhood? 3.) Are the soils adequate to support septic systems for the proposed housing density of R-6? 4.) The property contains important wetlands that support wildlife and hold water for the Rabbit Creek watershed, which feeds the Potter's Marsh wildlife park. How will these be affected? Won't much of this wetland habitat be lost to a high density development? 5.) Can Upper DeArmoun Rd support the increased traffic? This road has little shoulder, is constantly in need of surface repairs and suffers frost damage every year.

Corliss Kimmel, Office Associate
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Community Development Department
Municipality of Anchorage
(907) 343-7943
Fax: 343-7927

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Site Address: 13301 MESSINIA ST, Anchorage, AK 99516
Location: Generally located south of Upper De Armoun Road, west of Canyon Road and east of Messinia Street

Details | Staff Report | submit a comment

Public Comments

3/2/15
cliff hyatt
po box 112176
anchorage ak 99511
I have lived at 13035 Jeanne road since 1979. (Directly north, across Dearmoun Road from the property that the zoning change is being requested) The request for rezoning this parcel from R-8 Rural residential to R-6 Suburban residential will greatly increase the housing density. If I understand the Zoning correctly under the R-8 classification approximately 14 housing units are allowed. Rezoning to R-6 would allow 54 housing units to be built. My concerns are: 1. Water: All of these new units will require wells to be drilled into the aquifer that is probably the same one many of us are currently using. We do not have high output wells and we have to be careful not to run our wells dry. What assurances do we have that 58 new housing units will not effect our water supply? 2. Septic: All of these houses will require septic systems. Will the soils support this? This appears to be a fairly wet area. About 20 years ago a 20 acre plot directly north of this plot and across Dearmoun Road was denied the same rezoning request, R-8 to R-6, for this very reason of the land being too wet to support this housing density in regards to septic systems. They were ultimately allowed a change to a PUD (planned unit developement) which had more housing allowed than R8 but far less than R-6. 3. Roads: Dearmoun Road is the only access and it is not in very good shape. All the additional traffic for construction and then the added housing units owner traffic would surely tax and destroy the road. The soils underlying the road are poor and this is the reason the road is in such poor shape. A fairly costly rebuild of the road subbase would be required, as well as widening and paving. Who is going to pay for this? 4. Land aesthetics: Probably most of the current surrounding land owners purchased their property based on an expected housing density. I know I did. The land has long been classified R-8 which

denotes low housing density. We own property that is on R-6 zoning but it is on much better drained soils and is adjacent to this low density housing parcel, and our land was zoned as R-6 when we bought it, so we knew what we were getting. It's like buying a house next to a park and then having the park rezoned to allow dense housing. That's not why we chose to buy here. 5. Land value: Our property would more than likely lose some of its value. It would no longer be next to a low housing density area thus making it less attractive to potential buyers. 6. Disregard for Zoning Commission Work: Long ago the MOA Zoning and Planning Department put in a lot of time and money to determine the proper housing density of all the different property in Anchorage. This was based on drainage, available water, roads, vegetation, wildlife and soil type and condition. To request a change for such a large piece of property flies in the face of those who put these zoning and planning decisions in place. This change would allow 4 times the housing density from what was long ago decided as the proper density. Finally I request that this zoning change be denied for the above reasons. Thank you Cliff Hyatt

3/1/15
Marc June
8801 Upper Dearmoun Rd
Anchorage AK 99516
The Planning Department recommendation of denial appears to have a solid basis. In particular, I have concerns that Upper Dearmoun Road and existing Fire/Road infrastructure is inadequate to support access to this large number of homes.

3/1/15
Bart Hawkins
12921 Monterey Circle
Anchorage AK 99516
I own an adjacent property (Block 2 Lot 1, Grecian Hills subdivision). I acquired this property for several reasons: 1. Scenic views of Flattop Mt. and adjacent woodlands. 2. Rural character, with extensive wooded areas, low traffic and low noise, particularly to the east toward the Chugach Mountains. 2. R8 zoning on east side limiting future development. This situation would be expected to preserve views, woodlands and low traffic volume. 3. Good well production and clean well water as there are no homes uphill of my site. Rezoning the site at 13301 Messinia Street that is the subject of this case from R8 to R6 will likely diminish the above values of my property, since the expected purpose of requesting a rezoning would be to enable the property to be developed as a subdivision. This will increase local traffic and noise from additional residents. The increased traffic may damage the access roads that were not designed to carrying the increased volume of traffic, and would decrease air quality due to increased creation of dust. It will very likely result in removal of much of the wooded areas adjacent to my property and partially or fully reduce the scenic views of the Chugach from my property. The rural character will be significantly diminished. In addition, building a subdivision on the subject property that rely on wells and septic systems may significantly change the water table or subsurface water flow, resulting in reduced flow at my well or others in the area to the west of the subject property, and may reduce water quality at my well or others. In addition, as parts of the subject property lie uphill of creek drainage areas, denser development may put the general watershed at greater risk due to increased runoff, less water infiltration and other causes. Development of the

property will also reduce the extent of wetlands important to maintaining water quality downstream. Reduction of woodlands and increased development density will also reduce existing wildlife habitat and transit corridors, making it more difficult for wildlife to reside in areas around Anchorage. The presence of wild lands and wildlife is a major city-wide benefit attracting tourists and increasing the desirability of living in Anchorage. Increased encroachment of development into low-density or rural lands will likely increase human encounters with bears or moose and, as has happened at other locations on the hillside, increased risk for both.

2/28/15
Joan Priestley
3705 Arctic Blvd, # 1332
Anchorage AK 99503
My friend talked to someone onsite, who said his group has bought the property, and intended to construct 32 houses(!) here. They will ALL be lower in the drainage area. A project of this size could easily diminish or deplete the water table of every house that is above them. The only address given on our Notice (13301 Messina) refers to just Lot 2, which is the very small lot on the Western-most end of the entire parcel. Typing every conceivable combination of numbers comprising the legal description produces no meaningful or accurate results,either. The letter we received states that "case information" can be found here, but there is NO information about this case, at all. Therefore, I cannot do any research on this property. I urgently request a delay in this hearing, until we have been provided sufficient information to make informed and reasoned, fact-based judgments about this proposed huge project.

1/8/15
Adrienne Fleek
13591 Spendlove Drive
Anchorage ak 99516
I would like to know the proposed lot sizes for the rezoning of this property (how large are the individual R-6 lots going to be)? Thank you,

Zoning & Platting Cases On-line website

S4 Group
Land Surveying
Land Development Consultants
Subdivision Specialists
Construction Surveying
124 E 7th Avenue, Anchorage, Alaska 99501 www.S4AK.com 907-306-8104

Erika McConnell
Senior Planner
MOA Planning Department
4700 Elmore Road
Anchorage, Ak 99507

March 20, 2015

Dear Ms McConnell,

This letter is in response to the 3/2/2015 department recommendations for case 2014-0126. The comments are:

Denial of the request to rezone the petition area from R-8 to R-6 due to:

1) Does not conform to the comprehensive plan.
2) Environmental impacts that include steep slopes; wetlands, and hydric soils;
3 Significant increase in density and average daily trips travelling on a substandard road system.

Overall response:

Our response is to the specific items listed and to the overall issue. To help alleviate the overall issue and all of the conditions above, we would like to propose a special limitation to the rezoning to restrict the total number of dwelling units to 32 on the 70 acre parcel. This would create an overall density ratio of less than 1/2 DU per acre, and this would correspond to an average lot and tract size of approx. 2 1/4 acres.

Responses in specificity:

1) Does not conform to the comprehensive plan.

This rezone is compatible with the comprehensive plan. Policy 5 states that rezones shall be compatible in scale with adjacent uses, and we are. Adjacent to the north of this property lies R-6 zoning with developed 1 & 1/4 acre lot sizes. Adjacent to the west of this property lies R-9 zoned property and has been developed with half-acre and acre sized lots. Adjacent to the east lies R-8 zoning developed with 1 & 1/4 acre lots. Adjacent to the south lies undeveloped R-8 property that encompasses Rabbit Creek. With the addition of the special limitation of 32 homes on this property, this rezoning clearly complies with all intents and purposes of the comp plan.
Policy 5 states that new rural subdivisions shall be designed to maintain the rural character of the area, our proposal is for R-6 lots, which are considered rural lots. Policy 5 states that we should link to adjacent roadway systems, which we do. Policy 5 states that we link to existing trail systems, which we do. Policy 5 states that we should protect wetlands and other environmental areas, which we do. Policy 5 states that we should incorporate wildland fire safety design standards, which new homes are built to.

2) Environmental impacts that include steep slopes; wetlands, and hydric soils;

All of the environmental impacts are being dealt with through the subdivision design process. All lots will have to conform to Title 21 standards and current engineering design standards.

Steep slopes: Lots with steep slopes will comply with the slope chart standards in Title 21. table.

Wetlands: Pat Athey, with Hemlock Scientific, LLC has performed extensive wetland studies that have defined the wetland boundaries and water features of the property. Lots will be designed to these standards with the wetland areas being protected by being tracted out, and by Title 21 regulations, as can be seen on the rough sketch site plan that has been submitted. Again, the platting process will further define and refine the future lot lines according to the professional reports, Title 21 subdivision standards, and other reporting agencies comments.

Soils: Extensive soil studies have been conducted by the local engineering firm of Garness Engineering Group. We have drilled test holes over the entire parcel to help us define the future lot layout to insure that each lot will have adequate areas and reserve sites for septic systems. Through the platting process, all lots will meet Title 21 regulations concerning septic site standards and availability of water. Final lot line locations will take into consideration the boundaries of the areas suitable for septic sites and wellsite locations.

3) Significant increase in density and average daily trips travelling on a substandard road system.

With the special limitation of 32 homes on this property, any concern with item number 3 should be eliminated. The road in question is DeArmoun Road, classified as a type 1C collector according to the Anchorage Official Streets & Highways Plan. A class 1C road is required to have two lanes, a sixty foot ROW width, and a rating of 2,000 to 10,000 ADT's. DeArmoun Road is built to 1C standards, and is designed to accomodate 10,000 ADT's. This rezoning would allow 18 more lots than the existing zoning currently allows. As per Title 21, a single family house is rated at 8.2 ADT's, which equates to an additional 150 ADT's, which equals 1.5% of the allowed ADT's onto DeArmoun Road as per the design standards. Staff stated that DeArmoun Road is a gravel road, which is incorrect, DeAmoun Road is a two lane paved roadway.

All standards have been met by this rezoning application, and we request your recommendation for approval. If you or your staff need any additional information, please let me know.

Thank you,

Tom Dreyer, PLS
S4 Group
Petitioner's representative

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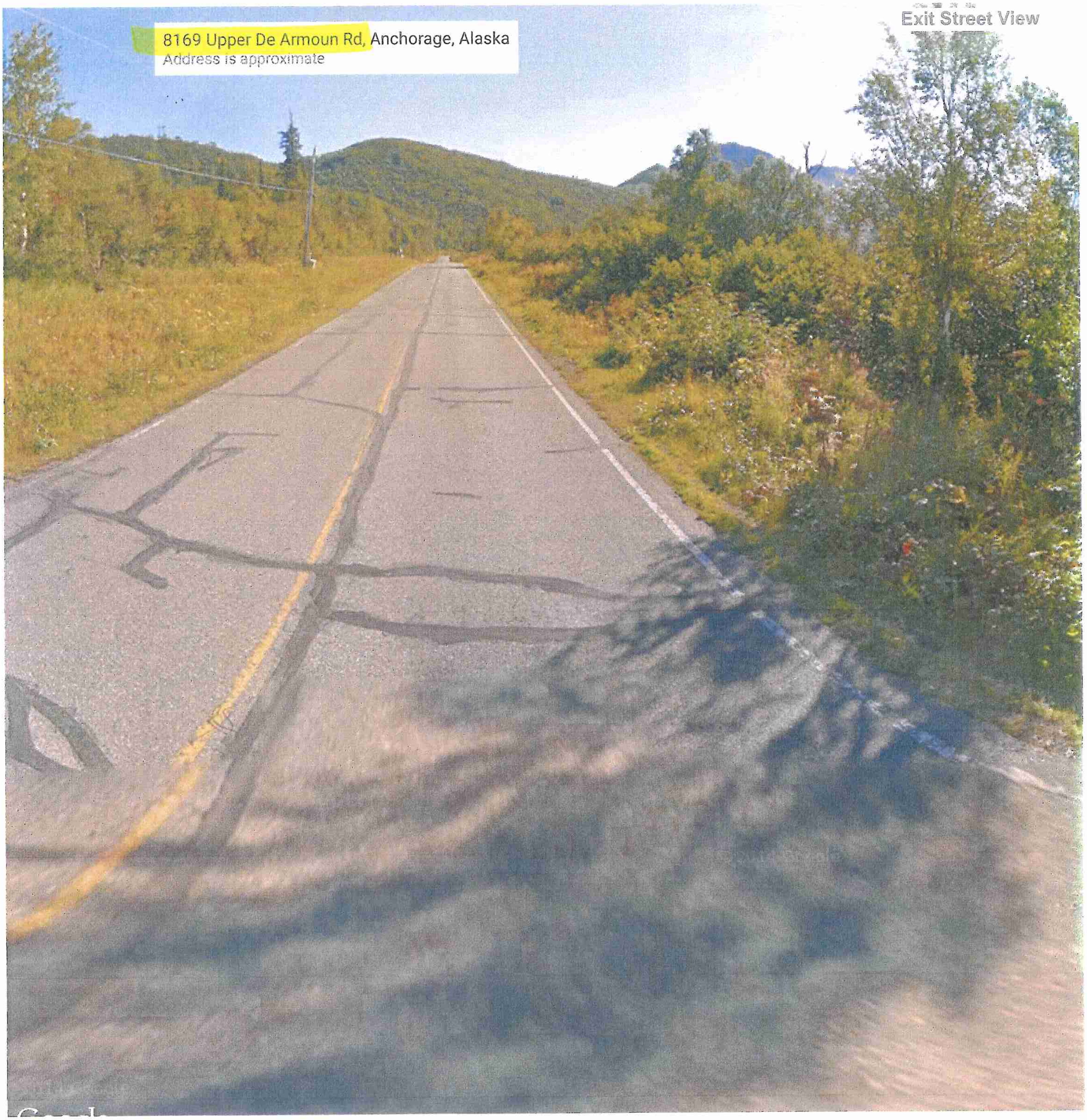

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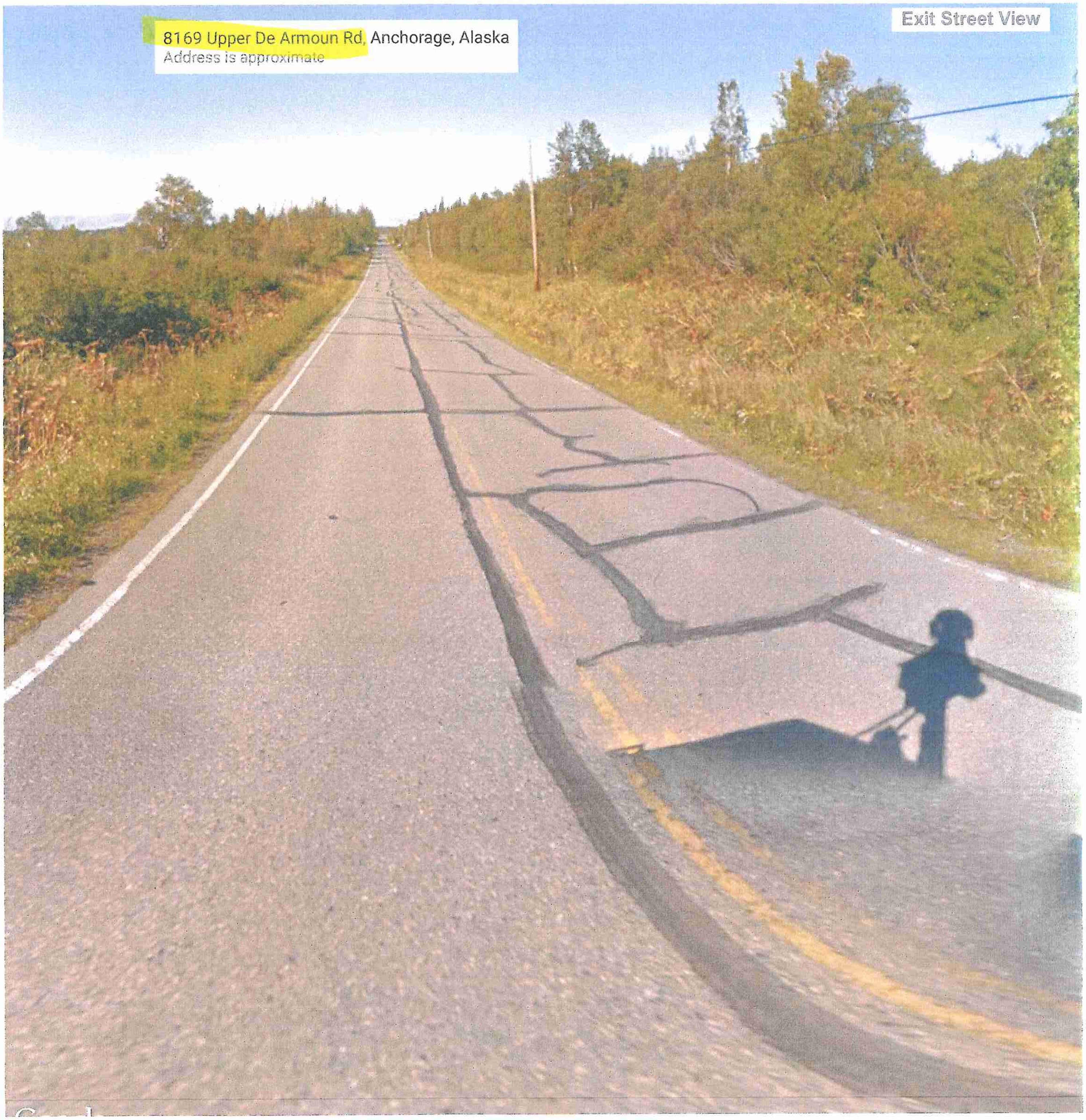

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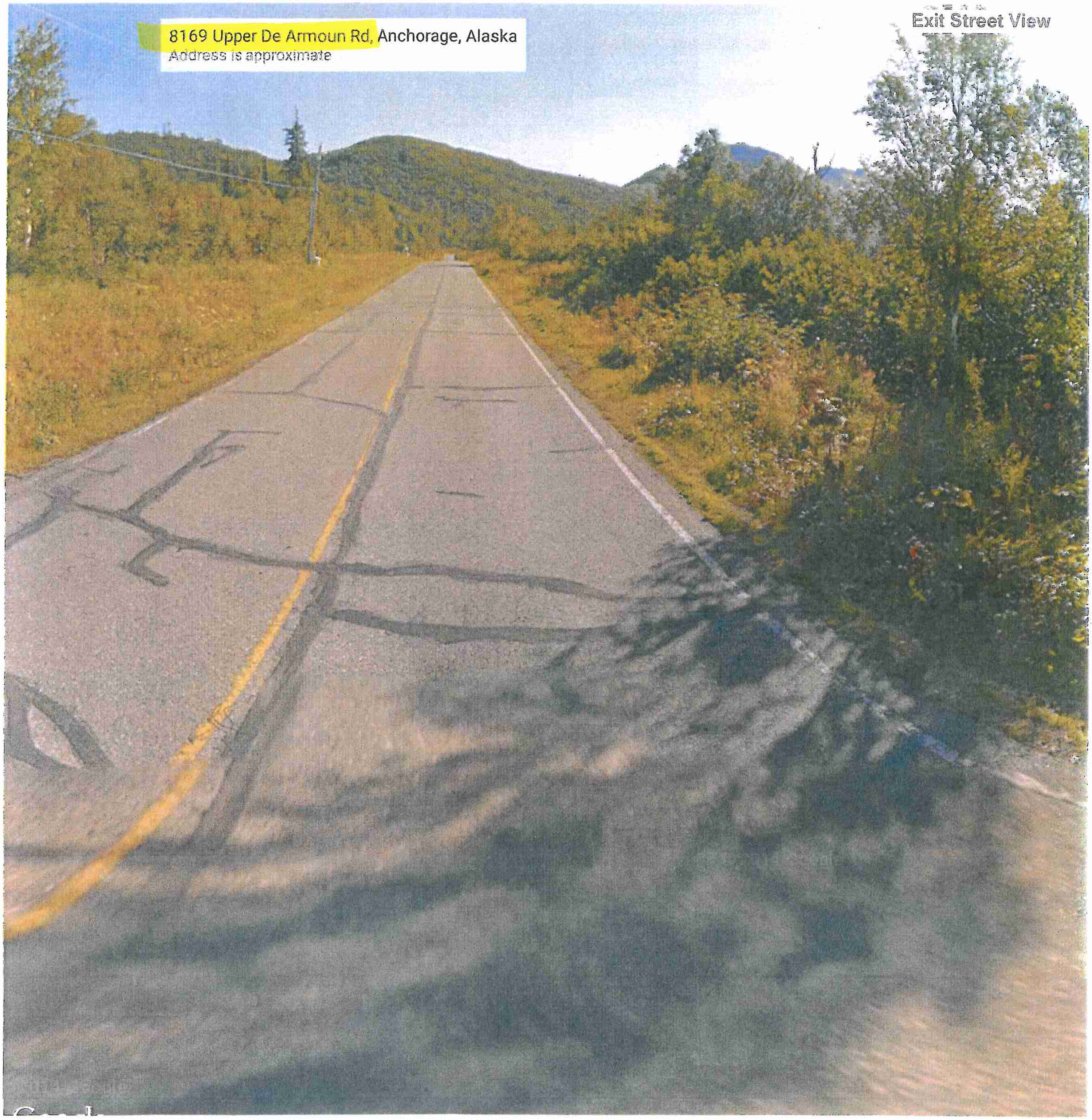

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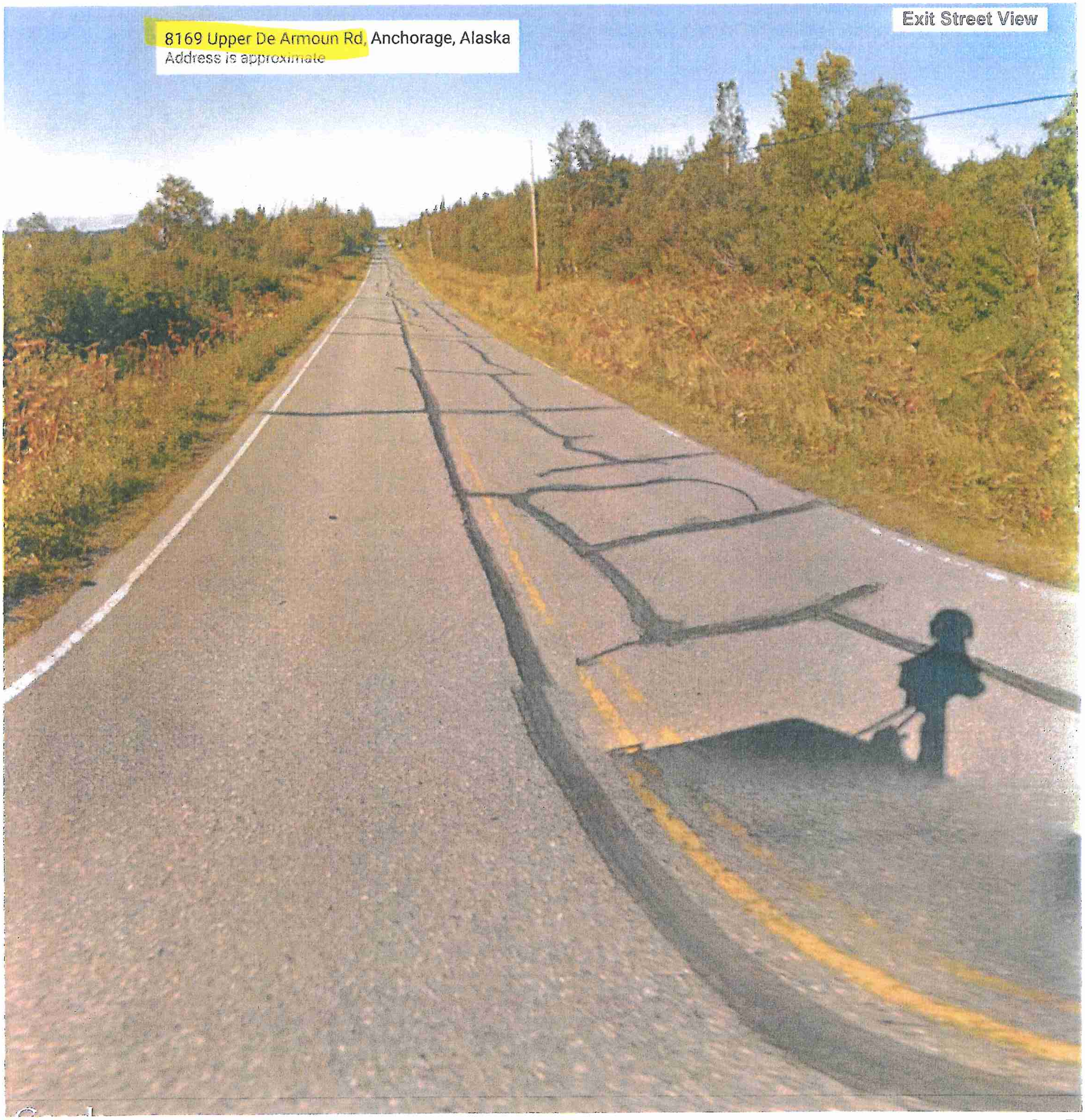

Preliminary Determination of Wetlands and Waters

Prepared by

Hemlock Scientific, LLC
December 22, 2014

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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

Hemlock Scientific, LLC
199 Comfort Lane
Indian, AK 99540
(907) 350-3880
pat@hemsci.com
www.hemsci.com

Table of Contents

Tables

Attachments

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 Dearmoun 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[1]
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)

[1]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
Total		**8.458**	**1,064**

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.

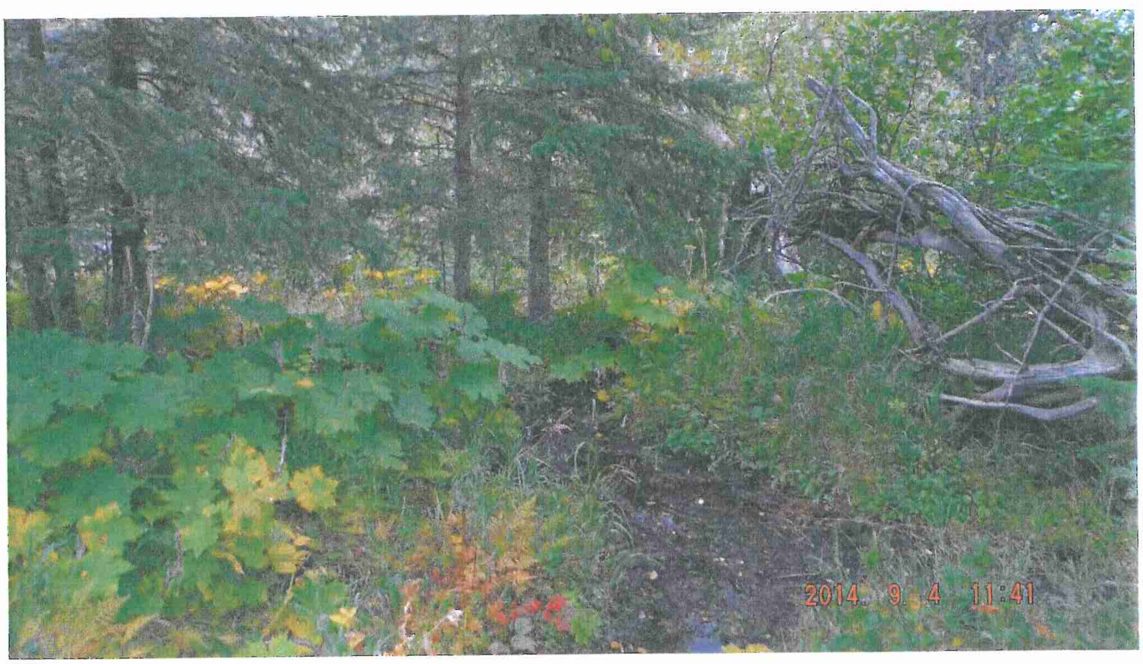
This wetland can be characterized as *Palustrine, Needle-Leaved Forested / Emergent Persistent, Seasonally Flooded (*PFO4/EM1C) by the Cowardin system.

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.

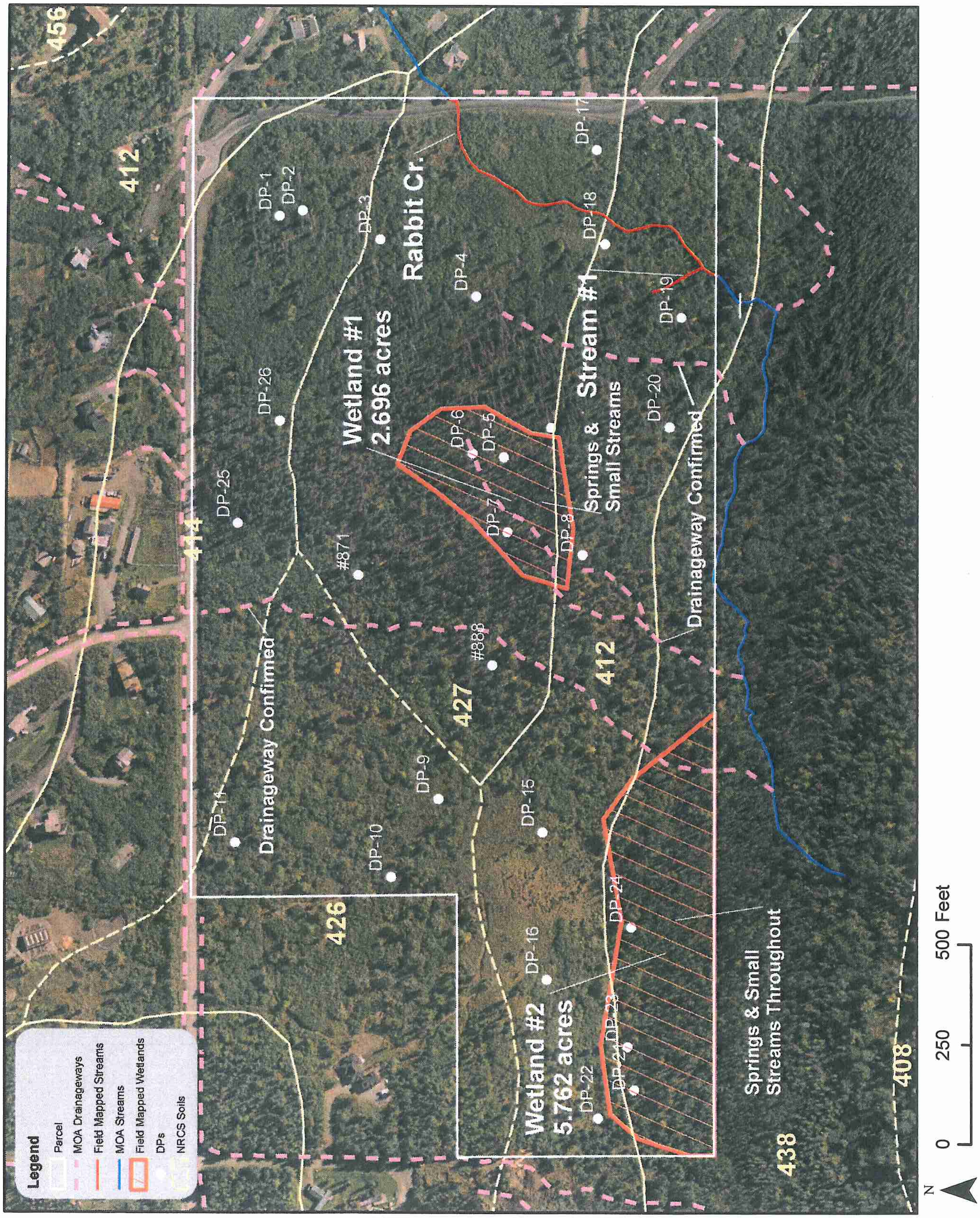
Upland Open Forest Vegetation at DP-20.



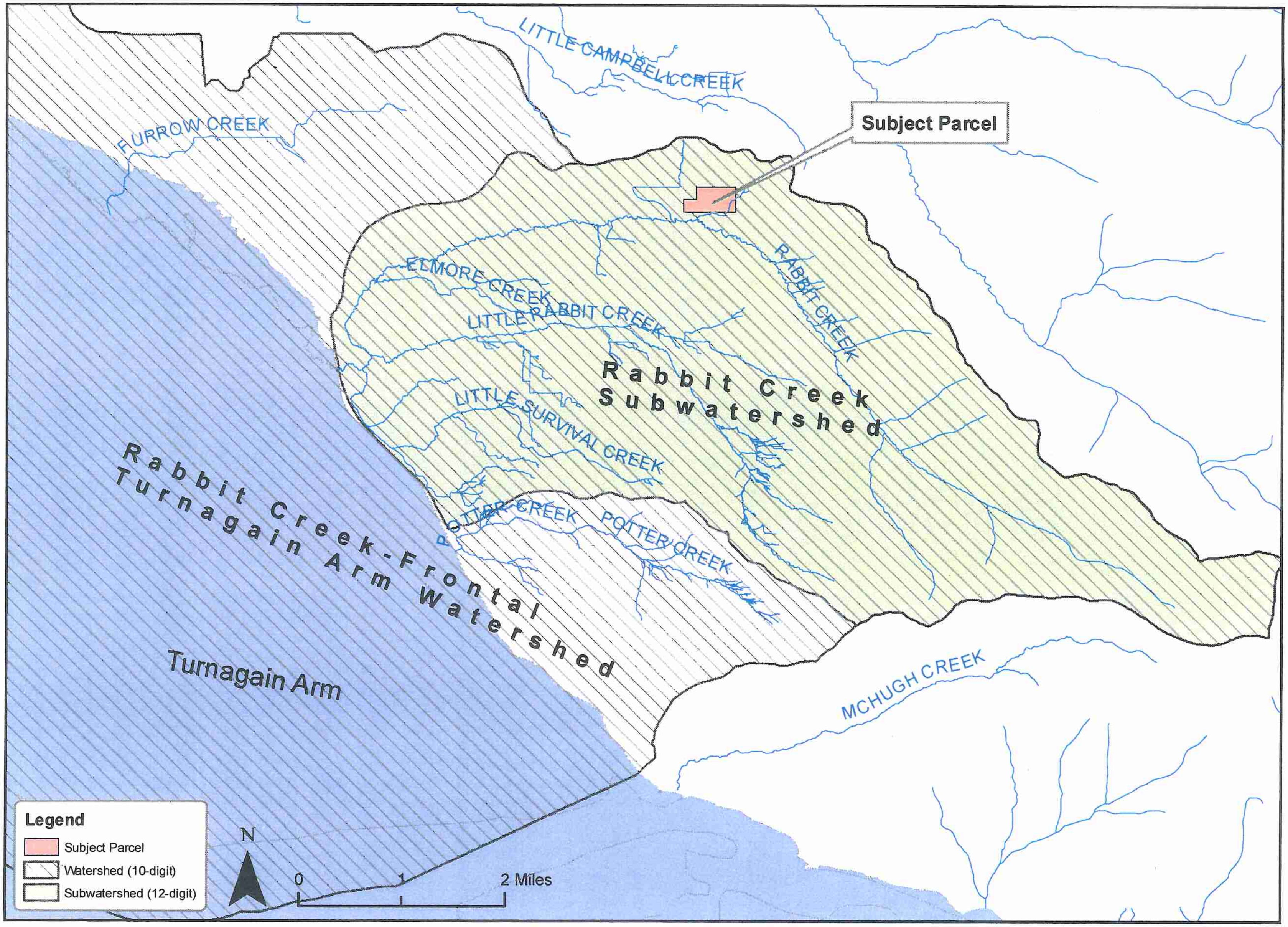
Stream #1

Attachment 1
Maps

MOA Parcel 1707306000



Legend
Parcel
MOA Drainageways
Field Mapped Streams
MOA Streams
Field Mapped Wetlands
DPs
NRCS Soils
Wetland #1
2.696 acres
Wetland #2
5.762 acres
Rabbit Cr.
Stream #1
Springs &
Small Streams
Drainageway Confirmed
Drainageway Confirmed
Springs & Small
Streams Throughout
DP-1
DP-2
DP-3
DP-4
DP-5
DP-6
DP-7
DP-8
DP-9
DP-10
DP-14
DP-15
DP-16
DP-17
DP-18
DP-19
DP-20
DP-22
DP-23
DP-24
DP-25
DP-26
#871
#888
456
412
414
427
412
426
438
408
0
250
500 Feet
N


Subject Parcel
LITTLE CAMPBELL CREEK
FURROW CREEK
RABBIT CREEK
ELMORE CREEK
LITTLE RABBIT CREEK
LITTLE SURVIVAL CREEK
POTTER CREEK
MCHUGH CREEK
Rabbit Creek
Subwatershed
Rabbit Creek-Frontal
Turnagain Arm Watershed
Turnagain Arm
Legend
Subject Parcel
Watershed (10-digit)
Subwatershed (12-digit)
N
0
1
2 Miles

WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW 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 X
Hydric Soil Present?	Yes	No X
Wetland Hydrology Present?	Yes	No X

Is the Sampled Area within a Wetland? Yes ______ No X

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
1. *Betula papyrifera (Southcentral)*	25	Yes	FAC
2.			
3.			
4.			
Total Cover:	25		
50% of total cover: 12.5	20% of total cover: 5		
Sapling/Shrub Stratum			
1. *Alnus viridis*	75	Yes	FAC
2. *Oplopanax horridus*	25	Yes	FACU
3. *Rubus idaeus*	10		FACU
4. *Viburnum edule*	10		FACU
5. *Actaea rubra*	5		FAC
6.			
Total Cover:	125		
50% of total cover: 62.5	20% of total cover: 25		
Herb Stratum			
1. *Calamagrostis canadensis*	50	Yes	FAC
2. *Gymnocarpium dryopteris*	25	Yes	FACU
3. *Urtica dioica*	25	Yes	FACU
4. *Athyrium filix-femina*	10		FAC
5. *Galium boreale*	10		FACU
6. *Poa pratensis*	5		FACU
7.			
8.			
9.			
10.			
Total Cover:	125		
50% of total cover: 62.	20% of total cover: 25		

Plot size (radius, or length x width) 30-ft diameter % Bare Ground ______

% Cover of Wetland Bryophytes 0 Total Cover of Bryophytes 25
(Where applicable)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 0
FACW species		x 2 = 0
FAC species	165	x 3 = 495
FACU species	110	x 4 = 440
UPL species		x 5 = 0
Column Totals:	275 (A)	935 (B)

Prevalence Index = B/A = 3.39

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%

No Prevalence Index is ≤3.0

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ______ No X

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
+2-0	v dk gray brn 10YR3/2	50					slightly decomposed plant material	
	black 10YR2/1	50						
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	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]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[3]:

- ___ Alaska Color Change (TA4)[4]
- ___ Alaska Alpine Swales (TA5)
- ___ Alaska Redox With 2.5Y Hue
- ___ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ___ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.
[4]Give details of color change in Remarks.

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:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

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

Project/Site: MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW corner of Upper DeArmoun 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 X	No	Is the Sampled Area within a Wetland? Yes ______ No X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

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
1. *Picea mariana*	5	Yes	FACW
2.			
3.			
4.			
Total Cover:	5		
50% of total cover: 2.5	20% of total cover: 1		
Sapling/Shrub Stratum			
1. *Alnus viridis*	50	Yes	FAC
2. *Oplopanax horridus*	25	Yes	FACU
3. *Ribes triste*	10		FAC
4. *Cornus canadensis*	10		FACU
5. *Rubus idaeus*	5		FACU
6.			
Total Cover:	100		
50% of total cover: 50	20% of total cover: 20		
Herb Stratum			
1. *Calamagrostis canadensis*	75	Yes	FAC
2. *Heracleum maximum*	10		FACU
3. *Plantago lanceolata*	5		FACU
4. *Athyrium filix-femina*	5		FAC
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	95		
50% of total cover: 47.	20% of total cover: 19		

Plot size (radius, or length x width) 30-ft diameter % Bare Ground ______

% Cover of Wetland Bryophytes 0 Total Cover of Bryophytes 10
(Where applicable)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 0
FACW species	5	x 2 = 10
FAC species	140	x 3 = 420
FACU species	55	x 4 = 220
UPL species		x 5 = 0
Column Totals:	200 (A)	650 (B)

Prevalence Index = B/A = 3.25

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes X No ______

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 Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
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 brn 10YR5/2	100					silt loam, few med roots, dry, nonfriable	
23-30	brn 10YR5/3	100					silt loam w/ gravel & cobbles, dry; massive; firm, slightly sticky and slightly plastic	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]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[3]:

- ___ Alaska Color Change (TA4)[4]
- ___ Alaska Alpine Swales (TA5)
- ___ Alaska Redox With 2.5Y Hue
- ___ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ___ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.
[4]Give details of color change in Remarks.

Restrictive Layer (if present):
Type: None
Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks: The lower portion of the profile correlates wtih 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:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

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

Project/Site: MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW 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 X	No	Is the Sampled Area within a Wetland? Yes ____ No X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

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
1. *Picea mariana*	5	Yes	FACW
2.			
3.			
4.			
Total Cover:	5		
50% of total cover: 2.5	20% of total cover: 1		
Sapling/Shrub Stratum			
1. *Alnus viridis*	50	Yes	FAC
2. *Rubus idaeus*	25	Yes	FACU
3. *Rosa acicularis*	10		FACU
4. *Cornus canadensis*	10		FACU
5.			
6.			
Total Cover:	95		
50% of total cover: 47.5	20% of total cover: 19		
Herb Stratum			
1. *Calamagrostis canadensis*	50	Yes	FAC
2. *Equisetum arvense*	25	Yes	FAC
3. *Poa pratensis*	10		FACU
4. *Carex laeviculmis*	10		FACW
5. *Carex echinata*	10		OBL
6. *Geocaulon lividum*	5		FACU
7. *Geranium erianthum*	5		FACU
8. *Sanguisorba canadensis*	1		FACW
9.			
10.			
Total Cover:	116		
50% of total cover: 58	20% of total cover: 23.2		

Plot size (radius, or length x width) 30-ft diameter % Bare Ground ______

% Cover of Wetland Bryophytes 0 Total Cover of Bryophytes 0
(Where applicable)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	10	x 1 = 10
FACW species	11	x 2 = 22
FAC species	135	x 3 = 405
FACU species	60	x 4 = 240
UPL species		x 5 = 0
Column Totals:	216 (A)	677 (B)

Prevalence Index = B/A = 3.13

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes X No ______

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 Color (moist)	Matrix %	Redox Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
+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						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]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[3]:

___ Alaska Color Change (TA4)[4]
___ Alaska Alpine Swales (TA5)
___ Alaska Redox With 2.5Y Hue
___ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
___ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.
[4]Give details of color change in Remarks.

Restrictive Layer (if present):
Type: None
Depth (inches): ______

Hydric Soil Present? Yes ____ No X

Remarks: The lower portion of the profile correlates wtih 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:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

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

Project/Site: MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW corner of Upper DeArmoun 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 X	No	Is the Sampled Area within a Wetland? Yes ______ No X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

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
1. *Betula papyrifera (Southcentral)*	5	Yes	FAC
2.			
3.			
4.			
Total Cover:	5		
50% of total cover: 2.5	20% of total cover: 1		
Sapling/Shrub Stratum			
1. *Alnus viridis*	50	Yes	FAC
2. *Rubus idaeus*	25	Yes	FACU
3. *Rosa acicularis*	10		FACU
4. *Cornus canadensis*	10		FACU
5.			
6.			
Total Cover:	95		
50% of total cover: 47.5	20% of total cover: 19		
Herb Stratum			
1. *Calamagrostis canadensis*	75	Yes	FAC
2. *Heracleum maximum*	25	Yes	FACU
3. *Equisetum arvense*	25		FAC
4. *Taraxacum officinale*	10		FACU
5. *Carex laeviculmis*	10		FACW
6. *Carex echinata*	10		OBL
7. *Geocaulon lividum*	5		FACU
8. *Geranium erianthum*	5		FACU
9. *Sanguisorba canadensis*	1		FACW
10.			
Total Cover:	166		
50% of total cover: 83	20% of total cover: 33.2		

Plot size (radius, or length x width) 30-ft diameter % Bare Ground ______

% Cover of Wetland Bryophytes 0 Total Cover of Bryophytes 0
(Where applicable)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	10	x 1 = 10
FACW species	11	x 2 = 22
FAC species	155	x 3 = 465
FACU species	90	x 4 = 360
UPL species		x 5 = 0
Column Totals:	266 (A)	857 (B)

Prevalence Index = B/A = 3.22

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes X No ______

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 Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
+3-0	black 10YR2/1	100					decomposed plant material, roots, silt	
0-10	black 10YR2/1	50					silt loam, many fine roots, dry	
	v dk gray 10YR3/1	50						
12 -15	v dk gray 10YR3/1	100					silt loam, few med roots, dry, nonfriable	
15-27	brn 10YR5/3	100					silt loam w/ gravel & cobbles, dry; massive	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]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[3]:

- ___ Alaska Color Change (TA4)[4]
- ___ Alaska Alpine Swales (TA5)
- ___ Alaska Redox With 2.5Y Hue
- ___ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ___ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.
[4]Give details of color change in Remarks.

Restrictive Layer (if present):
Type: None
Depth (inches): ______

Hydric Soil Present? Yes _____ No X

Remarks: The lower portion of the profile correlates wtih 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:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

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

Project/Site: MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW corner of Upper DeArmoun Rd and Canyon Rd. Borough/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 X	No
Hydric Soil Present?	Yes X	No
Wetland Hydrology Present?	Yes X	No

Is the Sampled Area within a Wetland? Yes X No ______

Remarks: Site is located on a south-facing mountain slope in open black spruce forest interspersed with sedge-grass meadows and small sreams 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
1. *Picea mariana*	25	Yes	FACW
2.			
3.			
4.			
Total Cover:	25		
50% of total cover: 12.5	20% of total cover: 5		
Sapling/Shrub Stratum			
1. *Alnus viridis*	10	Yes	FAC
2. *Picea mariana*	10	Yes	FACW
3. *Dasiphora fruticosa*	10	Yes	FAC
4. *Vaccinium uliginosum*	5		FAC
5.			
6.			
Total Cover:	35		
50% of total cover: 17.5	20% of total cover: 7		
Herb Stratum			
1. *Calamagrostis canadensis*	25	Yes	FAC
2. *Sanguisorba canadensis*	10	Yes	FACW
3. *Deschampsia caespitosa*	10		FAC
4. *Equisetum fluviatile*	10		OBL
5. *Carex laeviculmis*	5		FACW
6. *Carex echinata*	1		OBL
7. *Parnassia palustris*	1		FACW
8.			
9.			
10.			
Total Cover:	62		
50% of total cover: 31	20% of total cover: 12.4		

Plot size (radius, or length x width) 30-ft diameter % Bare Ground ______

% Cover of Wetland Bryophytes 10 Total Cover of Bryophytes 10

(Where applicable)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	11	x 1 = 11
FACW species	51	x 2 = 102
FAC species	60	x 3 = 180
FACU species		x 4 = 0
UPL species		x 5 = 0
Column Totals:	122 (A)	293 (B)

Prevalence Index = B/A = 2.40

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes X No ______

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-30	v dk gray brn 10YR3/2	50					muck and plant debris, roots; saturated; greasy;	
	black 10YR2/1	50						

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

Hydric Soil Indicators:

- X 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[3]:

- ___ Alaska Color Change (TA4)[4]
- ___ Alaska Alpine Swales (TA5)
- ___ Alaska Redox With 2.5Y Hue
- ___ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ___ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.
[4]Give details of color change in Remarks.

Restrictive Layer (if present):
Type: Saturation
Depth (inches): 0

Hydric Soil Present? Yes X No ___

Remarks: An area of groundwater discharge, small springs emerge from the slope and formstreams that flow a short distance then seep back into the ground.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 4
Water Table Present? Yes ___ No X Depth (inches): 0
Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0

Wetland Hydrology Present? Yes X No ___

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

Project/Site: MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW corner of Upper DeArmoun 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 X	No	Is the Sampled Area within a Wetland?	Yes X No ____
Hydric Soil Present?	Yes X	No		
Wetland Hydrology Present?	Yes X	No		

Remarks: Site is located on a south-facing mountain slope in open black spruce forest interspersed with sedge-grass meadows and small sreams 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
1. *Picea mariana*	10	Yes	FACW
2.			
3.			
4.			
Total Cover:	10		
50% of total cover: 5		20% of total cover: 2	
Sapling/Shrub Stratum			
1. *Dasiphora fruticosa*	25	Yes	FAC
2. *Alnus viridis*	10	Yes	FAC
3. *Betula nana*	10		FAC
4. *Vaccinium uliginosum*	5		FAC
5. *Ledum groenlandicum*	5		FAC
6. *Empetrum nigrum*	5		FAC
Total Cover:	60		
50% of total cover: 30		20% of total cover: 12	
Herb Stratum			
1. *Calamagrostis canadensis*	25	Yes	FAC
2. *Arctagrostis latifolia*	25	Yes	FACW
3. *Sanguisorba canadensis*	10		FACW
4. *Equisetum fluviatile*	10		OBL
5. *Carex laeviculmis*	5		FACW
6. *Carex echinata*	5		OBL
7. *Geocaulon lividum*	1		FACU
8. *Mertensia paniculata*	1		FACU
9.			
10.			
Total Cover:	82		
50% of total cover: 41		20% of total cover: 16.4	

Plot size (radius, or length x width) 30-ft diameter % Bare Ground ______

% Cover of Wetland Bryophytes 10 Total Cover of Bryophytes 10
(Where applicable)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	15	x 1 = 15
FACW species	35	x 2 = 70
FAC species	102	x 3 = 306
FACU species		x 4 = 0
UPL species		x 5 = 0
Column Totals:	152 (A)	391 (B)

Prevalence Index = B/A = 2.57

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes X No ______

Remarks:

SOIL

Sampling Point: DP-6

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-30	v dk gray brn 10YR3/2	50					muck and plant debris, roots; saturated; greasy;	
	black 10YR2/1	50						

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

Hydric Soil Indicators:

- X 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[3]:

- ___ Alaska Color Change (TA4)[4]
- ___ Alaska Alpine Swales (TA5)
- ___ Alaska Redox With 2.5Y Hue
- ___ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ___ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.
[4]Give details of color change in Remarks.

Restrictive Layer (if present):
Type: Saturation
Depth (inches): 0

Hydric Soil Present? Yes X No ___

Remarks: An area of groundwater discharge, small springs emerge from the slope and formstreams that flow a short distance then seep back into the ground.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 4
Water Table Present? Yes ___ No X Depth (inches): 0
Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0

Wetland Hydrology Present? Yes X No ___

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

Project/Site: MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW corner of Upper DeArmoun 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 X	No	Is the Sampled Area within a Wetland? Yes X No ____
Hydric Soil Present?	Yes X	No	
Wetland Hydrology Present?	Yes X	No	

Remarks: Site is located on a south-facing mountain slope in open black spruce forest interspersed with sedge-grass meadows and small sreams 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
1. *Picea mariana*	10	Yes	FACW
2.			
3.			
4.			
Total Cover:	10		
50% of total cover: 5	20% of total cover: 2		
Sapling/Shrub Stratum			
1. *Alnus viridis*	25	Yes	FAC
2. *Picea mariana*	10	Yes	FACW
3. *Dasiphora fruticosa*	10		FAC
4. *Betula nana*	10		FAC
5. *Vaccinium uliginosum*	5		FAC
6. *Ledum groenlandicum*	5		FAC
Total Cover:	65		
50% of total cover: 32.5	20% of total cover: 13		
Herb Stratum			
1. *Calamagrostis canadensis*	25	Yes	FAC
2. *Deschampsia caespitosa*	25	Yes	FAC
3. *Sanguisorba canadensis*	10		FACW
4. *Equisetum fluviatile*	10		OBL
5. *Carex laeviculmis*	5		FACW
6. *Carex echinata*	5		OBL
7. *Geocaulon lividum*	1		FACU
8. *Mertensia paniculata*	1		FACU
9.			
10.			
Total Cover:	82		
50% of total cover: 41	20% of total cover: 16.4		

Plot size (radius, or length x width) 30-ft diameter % Bare Ground ______

% Cover of Wetland Bryophytes 10 Total Cover of Bryophytes 10
(Where applicable)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	15	x 1 = 15
FACW species	35	x 2 = 70
FAC species	105	x 3 = 315
FACU species	2	x 4 = 8
UPL species		x 5 = 0
Column Totals:	157 (A)	408 (B)

Prevalence Index = B/A = 2.59

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

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 Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-30	v dk gray brn 10YR3/2	50						muck and plant debris, roots; saturated; greasy;
	black 10YR2/1	50						

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

Hydric Soil Indicators:

- X 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[3]:

- ___ Alaska Color Change (TA4)[4]
- ___ Alaska Alpine Swales (TA5)
- ___ Alaska Redox With 2.5Y Hue
- ___ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ___ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.
[4]Give details of color change in Remarks.

Restrictive Layer (if present):
Type: Saturation
Depth (inches): 0

Hydric Soil Present? Yes X No ___

Remarks: An area of groundwater discharge, small springs emerge from the slope and formstreams that flow a short distance then seep back into the ground.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 4
Water Table Present? Yes ___ No X Depth (inches): 0
Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0

Wetland Hydrology Present? Yes X No ___

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

Project/Site: MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW 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 X	No	Is the Sampled Area within a Wetland? Yes ____ No X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

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
1. *Betula papyrifera (Southcentral)*	25	Yes	FAC
2. *Picea glauca*	1		FACU
3.			
4.			
Total Cover:	26		
50% of total cover: 13	20% of total cover: 5.2		
Sapling/Shrub Stratum			
1. *Cornus canadensis*	75	Yes	FACU
2. *Alnus viridis*	10		FAC
3. *Vaccinium vitis-idaea*	10		FAC
4. *Oplopanax horridus*	5		FACU
5.			
6.			
Total Cover:	100		
50% of total cover: 50	20% of total cover: 20		
Herb Stratum			
1. *Sanguisorba canadensis*	25	Yes	FACW
2. *Geocaulon lividum*	10	Yes	FACU
3. *Calamagrostis canadensis*	10	Yes	FAC
4. *Rhinanthus minor*	5		FACU
5. *Eauisetum arvense*	5		FAC
6. *Phleum pratense*	5		FACU
7. *Heracleum maximum*	1		FACU
8. *Mertensia paniculata*	1		FACU
9. *Carex mertensii*	1		FACW
10.			
Total Cover:	63		
50% of total cover: 31.	20% of total cover: 12.6		

Plot size (radius, or length x width) 30-ft diameter % Bare Ground ______

% Cover of Wetland Bryophytes 0 Total Cover of Bryophytes 5
(Where applicable)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 0
FACW species	26	x 2 = 52
FAC species	60	x 3 = 180
FACU species	103	x 4 = 412
UPL species		x 5 = 0
Column Totals:	189 (A)	644 (B)

Prevalence Index = B/A = 3.40

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes X No ____

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 Color (moist)	Matrix %	Redox Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
+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						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]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[3]:

- ___ Alaska Color Change (TA4)[4]
- ___ Alaska Alpine Swales (TA5)
- ___ Alaska Redox With 2.5Y Hue
- ___ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ___ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.
[4]Give details of color change in Remarks.

Restrictive Layer (if present):
Type: None
Depth (inches): ______

Hydric Soil Present? Yes ___ No X

Remarks: The lower portion of the profile correlates wtih the mapped unit for this location, Deception-Estelle-Kichatna complex.The washed-out coloration of the lower profile is likley from remnant ash layers that leached down thorugh 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:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

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

Project/Site: MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW 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 X
Hydric Soil Present?	Yes	No X
Wetland Hydrology Present?	Yes	No X

Is the Sampled Area within a Wetland? Yes ____ No X

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
1.			
2.			
3.			
4.			
Total Cover:	0		
50% of total cover: 0		20% of total cover: 0	
Sapling/Shrub Stratum			
1. *Rubus idaeus*	25	Yes	FACU
2.			
3.			
4.			
5.			
6.			
Total Cover:	25		
50% of total cover: 12.5		20% of total cover: 5	
Herb Stratum			
1. *Calamagrostis canadensis*	100	Yes	FAC
2. *Equisetum sylvaticum*	5		FAC
3. *Heracleum maximum*	5		FACU
4. *Gymnocarpium dryopteris*	1		FACU
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	111		
50% of total cover: 55.		20% of total cover: 22.2	

Plot size (radius, or length x width) 30-ft diameter % Bare Ground ______

% Cover of Wetland Bryophytes 0 Total Cover of Bryophytes 0
(Where applicable)

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 0
FACW species		x 2 = 0
FAC species	105	x 3 = 315
FACU species	31	x 4 = 124
UPL species		x 5 = 0
Column Totals:	136 (A)	439 (B)

Prevalence Index = B/A = 3.22

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%

No Prevalence Index is ≤3.0

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ____ No X

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
+1-0	dk gray brn 10YR4/2	100					silt, roots, wood debris and decomposed plant matter	
0-7	black 10YR2/1	50					silt loam w/ cobbles; few med roots;; dry	
	v dk gray 10YR3/1	50						
7-31	pale brn 10YR6/3	10					silt loam w/ gravel & cobbles, dry; massive; firm	
	yel brown 10YR6/3	90						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]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[3]:
- ___ Alaska Color Change (TA4)[4]
- ___ Alaska Alpine Swales (TA5)
- ___ Alaska Redox With 2.5Y Hue
- ___ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ___ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.
[4]Give details of color change in Remarks.

Restrictive Layer (if present):
Type: None
Depth (inches): ________

Hydric Soil Present? Yes ____ No X

Remarks: The lower portion of the profile correlates wtih the mapped unit for this location, Deception-Estelle-Kichatna complex.The washed-out coloration of the lower profile is likley from remnant ash layers that leached down thorugh 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:

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

Secondary Indicators (2 or more required)
- ___ Water-stained Leaves (B9)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Salt Deposits (C5)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

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

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

Project/Site: MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW corner of Upper DeArmoun 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 X	No	Is the Sampled Area within a Wetland? Yes ____ No X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

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
1.			
2.			
3.			
4.			
Total Cover:	0		
50% of total cover: 0	20% of total cover: 0		
Sapling/Shrub Stratum			
1. *Rubus idaeus*	25	Yes	FACU
2. *Alnus viridis*	10	Yes	FAC
3.			
4.			
5.			
6.			
Total Cover:	35		
50% of total cover: 17.5	20% of total cover: 7		
Herb Stratum			
1. *Calamagrostis canadensis*	100	Yes	FAC
2. *Equisetum sylvaticum*	5		FAC
3. *Heracleum maximum*	5		FACU
4. *Gymnocarpium dryopteris*	1		FACU
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	111		
50% of total cover: 55.	20% of total cover: 22.2		

Plot size (radius, or length x width) 30-ft diameter % Bare Ground ____

% Cover of Wetland Bryophytes 0 Total Cover of Bryophytes 0
(Where applicable)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.6 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 0
FACW species		x 2 = 0
FAC species	115	x 3 = 345
FACU species	31	x 4 = 124
UPL species		x 5 = 0
Column Totals:	146 (A)	469 (B)

Prevalence Index = B/A = 3.21

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes X No ____

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 Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
+2-0	dk gray brn 10YR4/2	100					silt, roots, wood debris and decomposed plant matter	
0-10	v pale brn 10YR7/2	20					ash and silt loam; many fine, med roots; dry	
	yel brown 10YR6/3	80						
7-31	pale brn 10YR6/3	10					silt loam w/ gravel & cobbles, dry; massive; firm	
	yel brown 10YR6/3	90						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]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[3]:

- ___ Alaska Color Change (TA4)[4]
- ___ Alaska Alpine Swales (TA5)
- ___ Alaska Redox With 2.5Y Hue
- ___ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ___ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.
[4]Give details of color change in Remarks.

Restrictive Layer (if present):
Type: None
Depth (inches): ________

Hydric Soil Present? Yes _____ No X

Remarks: The profile correlates wtih 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:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

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

Project/Site: MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW 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 X
Hydric Soil Present?	Yes	No X
Wetland Hydrology Present?	Yes	No X

Is the Sampled Area within a Wetland? Yes ____ No X

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
1.			
2.			
3.			
4.			
Total Cover:	0		
50% of total cover: 0	20% of total cover: 0		
Sapling/Shrub Stratum			
1. *Rubus idaeus*	25	Yes	FACU
2. *Alnus viridis*	10	Yes	FAC
3. *Sorbus scopulina*	10	Yes	FACU
4.			
5.			
6.			
Total Cover:	45		
50% of total cover: 23	20% of total cover: 9		
Herb Stratum			
1. *Calamagrostis canadensis*	100	Yes	FAC
2. *Equisetum sylvaticum*	5		FAC
3. *Heracleum maximum*	5		FACU
4. *Gymnocarpium dryopteris*	1		FACU
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	111		
50% of total cover: 56	20% of total cover: 22		

Plot size (radius, or length x width) 30-ft diameter % Bare Ground ______

% Cover of Wetland Bryophytes 0 Total Cover of Bryophytes 0
(Where applicable)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 0
FACW species		x 2 = 0
FAC species	115	x 3 = 345
FACU species	41	x 4 = 164
UPL species		x 5 = 0
Column Totals:	156 (A)	509 (B)

Prevalence Index = B/A = 3.26

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%

No Prevalence Index is ≤3.0

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ____ No X

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
+2-0	black 10YR2/1	50					wood debris and decomposed plant material	
	dk red brn 5YR3/4	50						
0-8	black 10YR2/1	50					charcol, ash, and silt loam; many fine, med roots; dry	
	white 10YR 81	20						
	v pale brn 10YR7/2	20						
8-25	pale brn 10YR6/3	10					silt loam w/ gravel & cobbles, dry; massive; firm	
	yel brown 10YR6/3	90						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]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[3]:

- ___ Alaska Color Change (TA4)[4]
- ___ Alaska Alpine Swales (TA5)
- ___ Alaska Redox With 2.5Y Hue
- ___ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ___ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.
[4]Give details of color change in Remarks.

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:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ________

Water Table Present? Yes ____ No X Depth (inches): ________

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): ________

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

Project/Site: MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW corner of Upper DeArmoun 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 X
Hydric Soil Present?	Yes	No X
Wetland Hydrology Present?	Yes	No X

Is the Sampled Area within a Wetland? Yes ____ No X

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
1. *Alnus viridis*	10	Yes	FAC
2.			
3.			
4.			
Total Cover:	10		
50% of total cover: 5	20% of total cover: 2		
Sapling/Shrub Stratum			
1. *Alnus viridis*	75	Yes	FAC
2. *Sorbus scopulina*	25	Yes	FACU
3. *Ribes triste*	5		FAC
4.			
5.			
6.			
Total Cover:	105		
50% of total cover: 53	20% of total cover: 21		
Herb Stratum			
1. *Calamagrostis canadensis*	50	Yes	FAC
2. *Mertensia paniculata*	25	Yes	FACU
3. *Mertensia paniculata*	10	Yes	FACU
4. *Chamerion angustifolium*	10		FACU
5. *Urtica dioica*	10		FACU
6. *Gymnocarpium dryopteris*	1		FACU
7.			
8.			
9.			
10.			
Total Cover:	106		
50% of total cover: 53	20% of total cover: 21		

Plot size (radius, or length x width) 30-ft diameter % Bare Ground ______

% Cover of Wetland Bryophytes 0 Total Cover of Bryophytes 0
(Where applicable)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 0
FACW species		x 2 = 0
FAC species	140	x 3 = 420
FACU species	81	x 4 = 324
UPL species		x 5 = 0
Column Totals:	221 (A)	744 (B)

Prevalence Index = B/A = 3.36

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%

No Prevalence Index is ≤3.0

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ____ No X

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
+10- +4	dk gray brn 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 brn 10YR4/2	100					gravelly silt loam; few med roots; dry	
11-17	v pale brn 10YR7/3	50					silt loam w/ gravel & cobbles, dry; loose	
	brown 10YR5/3	50						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]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[3]:

- ___ Alaska Color Change (TA4)[4]
- ___ Alaska Alpine Swales (TA5)
- ___ Alaska Redox With 2.5Y Hue
- ___ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ___ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.
[4]Give details of color change in Remarks.

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:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

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 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

Project/Site: MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW corner of Upper DeArmoun 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.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? Yes ____ No X

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
1. *Picea mariana*	25	Yes	FACW
2. *Alnus viridis*	10	Yes	FAC
3.			
4.			
Total Cover:	35		
50% of total cover: 18 20% of total cover: 7			
Sapling/Shrub Stratum			
1. *Alnus viridis*	25	Yes	FAC
2. *Rosa acicularis*	25	Yes	FACU
3. *Rubus idaeus*	10	Yes	FACU
4. *Oplopanax horridus*	5		FACU
5. *Cornus canadensis*	5		FACU
6.			
Total Cover:	70		
50% of total cover: 35 20% of total cover: 14			
Herb Stratum			
1. *Calamagrostis canadensis*	50	Yes	FAC
2. *Mertensia paniculata*	25	Yes	FACU
3. *Heracleum maximum*	10	Yes	FACU
4. *Chamerion angustifolium*	10		FACU
5. *Urtica dioica*	10		FACU
6. *Gymnocarpium dryopteris*	1		FACU
7. *Mertensia paniculata*	1		FACU
8. *Geranium erianthum*	1		FACU
9. *Chamerion angustifolium*	1		FACU
10.			
Total Cover:	109		
50% of total cover: 55 20% of total cover: 22			

Plot size (radius, or length x width) 30-ft diameter % Bare Ground ________

% Cover of Wetland Bryophytes 0 Total Cover of Bryophytes 0
(Where applicable)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 0
FACW species	75	x 2 = 150
FAC species	35	x 3 = 105
FACU species	104	x 4 = 416
UPL species		x 5 = 0
Column Totals:	214 (A)	671 (B)

Prevalence Index = B/A = 3.13

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%

No Prevalence Index is ≤3.0

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ____ No X

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
+8 -0	black 10YR2/1	50					silt, roots, wood debris and decomposed plant matter	
	dk red brn 5YR3/4	50						
+4-0	black 10YR2/1	50					silt loam, many fine roots, dry	
	v dk gray 10YR3/1	50						
0-11	black 10YR2/1	100					silt loam; few med roots; dry; greasy when wetted	
11-14	black 10YR2/1	80					silt loam and ash; dry	
	white 10YR 8/1	20						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]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[3]:
- ___ Alaska Color Change (TA4)[4]
- ___ Alaska Alpine Swales (TA5)
- ___ Alaska Redox With 2.5Y Hue
- ___ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ___ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.
[4]Give details of color change in Remarks.

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:

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

Secondary Indicators (2 or more required)
- ___ Water-stained Leaves (B9)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Salt Deposits (C5)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? Yes ___ No X Depth (inches): ______
Water Table Present? Yes ___ No X Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ______

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 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

Project/Site: MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW 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 X	Is the Sampled Area within a Wetland? Yes ______ No X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

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
1.			
2.			
3.			
4.			
Total Cover:	0		
50% of total cover: 0	20% of total cover: 0		
Sapling/Shrub Stratum			
1. *Rubus idaeus*	25	Yes	FACU
2. *Sorbus scopulina*	10	Yes	FACU
3. *Rubus idaeus*	10	Yes	FACU
4.			
5.			
6.			
Total Cover:	45		
50% of total cover: 23	20% of total cover: 9		
Herb Stratum			
1. *Calamagrostis canadensis*	100	Yes	FAC
2. *Equisetum sylvaticum*	5		FAC
3. *Heracleum maximum*	5		FACU
4. *Gymnocarpium dryopteris*	1		FACU
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	111		
50% of total cover: 56	20% of total cover: 22		

Plot size (radius, or length x width) 30-ft diameter % Bare Ground ______

% Cover of Wetland Bryophytes 0 Total Cover of Bryophytes 0
(Where applicable)

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 0
FACW species		x 2 = 0
FAC species	105	x 3 = 315
FACU species	51	x 4 = 204
UPL species		x 5 = 0
Column Totals:	156 (A)	519 (B)

Prevalence Index = B/A = 3.32

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%

No Prevalence Index is ≤3.0

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ______ No X

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 Color (moist)	Matrix %	Redox Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
+2-0	dk gray brn 10YR4/2	100					silt, roots, and decomposed plant matter	
0-8	black 10YR2/1	50					silt loam, many fine roots, dry	
	v dk gray 10YR3/1	50						
8-29	brown 10YR5/3	50					silt loam w/ gravel & cobbles, dry; massive; loose	
	yel brown 10YR5/6	50						
>29							cobbles and gravel, compacted, dry	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]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[3]:

- ___ Alaska Color Change (TA4)[4]
- ___ Alaska Alpine Swales (TA5)
- ___ Alaska Redox With 2.5Y Hue
- ___ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ___ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.
[4]Give details of color change in Remarks.

Restrictive Layer (if present):
Type: None
Depth (inches): ________

Hydric Soil Present? Yes ____ No X

Remarks: The profile correlates wtih 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:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

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 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

Project/Site: MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW corner of Upper DeArmoun 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 X	**Is the Sampled Area within a Wetland?** **Yes** ______ **No** X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

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
1.			
2.			
3.			
4.			
Total Cover:	0		
50% of total cover: 0 20% of total cover: 0			
Sapling/Shrub Stratum			
1. *Rubus idaeus*	25	Yes	FACU
2. *Sorbus scopulina*	10	Yes	FACU
3. *Rubus idaeus*	10	Yes	FACU
4.			
5.			
6.			
Total Cover:	45		
50% of total cover: 23 20% of total cover: 9			
Herb Stratum			
1. *Calamagrostis canadensis*	100	Yes	FAC
2. *Athyrium filix-femina*	25		FAC
3. *Heracleum maximum*	10		FACU
4. *Gymnocarpium dryopteris*	1		FACU
5. *Mertensia paniculata*	1		FACU
6. *Chamerion angustifolium*	1		FACU
7. *Equisetum sylvaticum*	1		FAC
8.			
9.			
10.			
Total Cover:	139		
50% of total cover: 70 20% of total cover: 28			

Plot size (radius, or length x width) 30-ft diameter % Bare Ground ______

% Cover of Wetland Bryophytes 0 Total Cover of Bryophytes 0
(Where applicable)

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 0
FACW species		x 2 = 0
FAC species	125	x 3 = 375
FACU species	59	x 4 = 236
UPL species		x 5 = 0
Column Totals:	184 (A)	611 (B)

Prevalence Index = B/A = 3.32

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%

No Prevalence Index is ≤3.0

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? **Yes** ______ **No** X

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
+1-0	dk gray brn 10YR4/2	100					silt, roots, and decomposed plant matter	
0-12	gray brn 10YR5/2 v dk gray 10YR3/1	50 50					silty gravel, many fine/med roots, dry	
12-19	gray brn 10YR5/2 gray 10YR6/1	80 20					gravel and small cobble, few med roots, moist (not saturated)	
19-29	gray 10YR6/1 lt gray 10YR7/1	20 80					cobbles and gravel, compacted, saturated	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]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[3]:

- ___ Alaska Color Change (TA4)[4]
- ___ Alaska Alpine Swales (TA5)
- ___ Alaska Redox With 2.5Y Hue
- ___ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ___ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.
[4]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 moisturein the upper 12-in. during this wet season supports the finding of nonhydric soil.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ______
Water Table Present? Yes ____ No X Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes X No ____ Depth (inches): 19

Wetland Hydrology Present? Yes ____ No X

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

Remarks: Saturation at 19-in. depth is below the threshold for wetland hydrology, especially supporte 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).

WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW 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 X	No	Is the Sampled Area within a Wetland? Yes ______ No X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

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
1. *Alnus viridis*	10	Yes	FAC
2.			
3.			
4.			
Total Cover:	10		
50% of total cover: 5		20% of total cover: 2	
Sapling/Shrub Stratum			
1. *Sorbus scopulina*	75	Yes	FACU
2. *Alnus viridis*	25	Yes	FAC
3.			
4.			
5.			
6.			
Total Cover:	100		
50% of total cover: 50		20% of total cover: 20	
Herb Stratum			
1. *Urtica dioica*	50	Yes	FACU
2. *Calamagrostis canadensis*	25	Yes	FAC
3. *Chamerion angustifolium*	10		FACU
4. *Mertensia paniculata*	1		FACU
5. *Streptopus amplexifolius*	1		FACU
6.			
7.			
8.			
9.			
10.			
Total Cover:	87		
50% of total cover: 44		20% of total cover: 17	

Plot size (radius, or length x width) 30-ft diameter % Bare Ground ______

% Cover of Wetland Bryophytes 0 Total Cover of Bryophytes 0
(Where applicable)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 0
FACW species		x 2 = 0
FAC species	60	x 3 = 180
FACU species	137	x 4 = 548
UPL species		x 5 = 0
Column Totals:	197 (A)	728 (B)

Prevalence Index = B/A = 3.69

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes X No ______

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
+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						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]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[3]:

- ___ Alaska Color Change (TA4)[4]
- ___ Alaska Alpine Swales (TA5)
- ___ Alaska Redox With 2.5Y Hue
- ___ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ___ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.
[4]Give details of color change in Remarks.

Restrictive Layer (if present):
Type: None
Depth (inches): ________

Hydric Soil Present? Yes ___ No X

Remarks: The lower portion of the profile correlates wtih 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:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

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 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

Project/Site: MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW 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 X	No	Is the Sampled Area within a Wetland? Yes ______ No X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

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
1.			
2.			
3.			
4.			
Total Cover:	0		
50% of total cover: 0	20% of total cover: 0		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
6.			
Total Cover:	0		
50% of total cover: 0	20% of total cover: 0		
Herb Stratum			
1. *Calamagrostis canadensis*	100	Yes	FAC
2. *Athyrium filix-femina*	25		FAC
3. *Heracleum maximum*	10		FACU
4. *Gymnocarpium dryopteris*	1		FACU
5. *Mertensia paniculata*	1		FACU
6. *Chamerion angustifolium*	1		FACU
7. *Equisetum sylvaticum*	1		FAC
8.			
9.			
10.			
Total Cover:	139		
50% of total cover: 70	20% of total cover: 28		

Plot size (radius, or length x width) 30-ft diameter % Bare Ground ______

% Cover of Wetland Bryophytes 0 Total Cover of Bryophytes 0
(Where applicable)

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 0
FACW species		x 2 = 0
FAC species	126	x 3 = 378
FACU species	13	x 4 = 52
UPL species		x 5 = 0
Column Totals:	139 (A)	430 (B)

Prevalence Index = B/A = 3.09

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes X No ______

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
+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						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]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[3]:

___ Alaska Color Change (TA4)[4]
___ Alaska Alpine Swales (TA5)
___ Alaska Redox With 2.5Y Hue
___ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
___ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.
[4]Give details of color change in Remarks.

Restrictive Layer (if present):
Type: None
Depth (inches): ______

Hydric Soil Present? Yes ___ No X

Remarks: The profile correlates wtih 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:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

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 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

Project/Site: MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW 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 X	Is the Sampled Area within a Wetland? Yes ______ No X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

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
1. *Betula papyrifera (Southcentral)*	25	Yes	FAC
2. *Picea glauca*	10	Yes	FACU
3.			
4.			
Total Cover:	35		
50% of total cover: 18	20% of total cover: 7		
Sapling/Shrub Stratum			
1. *Alnus viridis*	25	Yes	FAC
2. *Rosa acicularis*	25	Yes	FACU
3. *Cornus canadensis*	25	Yes	FACU
4. *Oplopanax horridus*	5		FACU
5.			
6.			
Total Cover:	80		
50% of total cover: 40	20% of total cover: 16		
Herb Stratum			
1. *Calamagrostis canadensis*	25	Yes	FAC
2. *Dryopteris expansa*	10		FACU
3. *Heracleum maximum*	10		FACU
4. *Sanguisorba canadensis*	10		FACW
5. *Mertensia paniculata*	1		FACU
6. *Chamerion angustifolium*	1		FACU
7.			
8.			
9.			
10.			
Total Cover:	57		
50% of total cover: 29	20% of total cover: 11		

Plot size (radius, or length x width) 30-ft diameter % Bare Ground ______

% Cover of Wetland Bryophytes 0 Total Cover of Bryophytes 0
(Where applicable)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 0
FACW species	10	x 2 = 20
FAC species	75	x 3 = 225
FACU species	87	x 4 = 348
UPL species		x 5 = 0
Column Totals:	172 (A)	593 (B)

Prevalence Index = B/A = 3.44

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%

No Prevalence Index is ≤3.0

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ______ No X

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 Color (moist)	Matrix %	Redox Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
+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 brn 10YR4/2	50						
14-23	lt brn gray 10YR6/2	80					silt loam w/fine sand; dry	
	gray brn 10YR5/2	20						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]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[3]:

- ___ Alaska Color Change (TA4)[4]
- ___ Alaska Alpine Swales (TA5)
- ___ Alaska Redox With 2.5Y Hue
- ___ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ___ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None

Depth (inches): ______

Hydric Soil Present? Yes ____ No X

Remarks: The surfical 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:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ______

Water Table Present? Yes ____ No X Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): ______

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 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

Project/Site: MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW 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 X	No	Is the Sampled Area within a Wetland? Yes ____ No X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

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
1. *Betula papyrifera (Southcentral)*	25	Yes	FAC
2. *Picea mariana*	10	Yes	FACW
3.			
4.			
Total Cover:	35		
50% of total cover: 18	20% of total cover: 7		
Sapling/Shrub Stratum			
1. *Alnus viridis*	25	Yes	FAC
2. *Rosa acicularis*	25	Yes	FACU
3. *Cornus canadensis*	25	Yes	FACU
4. *Oplopanax horridus*	5		FACU
5.			
6.			
Total Cover:	80		
50% of total cover: 40	20% of total cover: 16		
Herb Stratum			
1. *Calamagrostis canadensis*	25	Yes	FAC
2. *Dryopteris expansa*	10		FACU
3. *Heracleum maximum*	10		FACU
4. *Sanguisorba canadensis*	10		FACW
5. *Mertensia paniculata*	1		FACU
6. *Chamerion angustifolium*	1		FACU
7.			
8.			
9.			
10.			
Total Cover:	57		
50% of total cover: 29	20% of total cover: 11		

Plot size (radius, or length x width) 30-ft diameter % Bare Ground ______

% Cover of Wetland Bryophytes 0 Total Cover of Bryophytes 0
(Where applicable)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 0
FACW species	20	x 2 = 40
FAC species	75	x 3 = 225
FACU species	77	x 4 = 308
UPL species		x 5 = 0
Column Totals:	172 (A)	573 (B)

Prevalence Index = B/A = 3.33

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes X No ____

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 Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
+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						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]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[3]:

- ___ Alaska Color Change (TA4)[4]
- ___ Alaska Alpine Swales (TA5)
- ___ Alaska Redox With 2.5Y Hue
- ___ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ___ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.
[4]Give details of color change in Remarks.

Restrictive Layer (if present):
Type: None
Depth (inches): ________

Hydric Soil Present? Yes ____ No X

Remarks: The lower portion of the profile correlates wtih 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:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

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 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

Project/Site: MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW 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 X	No	Is the Sampled Area within a Wetland? Yes X No ____
Hydric Soil Present?	Yes X	No	
Wetland Hydrology Present?	Yes X	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
1. *Picea mariana*	25	Yes	FACW
2. *Alnus viridis*	25	Yes	FAC
3.			
4.			
Total Cover:	50		
50% of total cover: 25 20% of total cover: 10			
Sapling/Shrub Stratum			
1. *Alnus viridis*	50	Yes	FAC
2.			
3.			
4.			
5.			
6.			
Total Cover:	50		
50% of total cover: 25 20% of total cover: 10			
Herb Stratum			
1. *Calamagrostis canadensis*	75	Yes	FAC
2. *Equisetum fluviatile*	25	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
50% of total cover: 50 20% of total cover: 20			

Plot size (radius, or length x width) 30-ft diameter % Bare Ground ______

% Cover of Wetland Bryophytes 0 Total Cover of Bryophytes 0
(Where applicable)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	25	x 1 = 25
FACW species	25	x 2 = 50
FAC species	150	x 3 = 450
FACU species		x 4 = 0
UPL species		x 5 = 0
Column Totals:	200 (A)	525 (B)

Prevalence Index = B/A = 2.62

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes X No ____

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
+16-0	black 10YR2/1	50					muck and plant debris, roots; saturated; greasy;	
	dk yel brn 10YR4/4	50						

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

Hydric Soil Indicators:

- X 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[3]:

- ___ Alaska Color Change (TA4)[4]
- ___ Alaska Alpine Swales (TA5)
- ___ Alaska Redox With 2.5Y Hue
- ___ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ___ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.
[4]Give details of color change in Remarks.

Restrictive Layer (if present):
Type: Saturation
Depth (inches): 0

Hydric Soil Present? Yes X No ____

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:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes X No ____ Depth (inches): 0
Water Table Present? Yes ____ No X Depth (inches): 0
Saturation Present? (includes capillary fringe) Yes X No ____ Depth (inches): 0

Wetland Hydrology Present? Yes X No ____

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

Project/Site: MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW corner of Upper DeArmoun 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 X	No	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

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 prseent.

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

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover: 0			
50% of total cover: 0 20% of total cover: 0			
Sapling/Shrub Stratum			
1. *Sorbus scopulina*	10	Yes	FACU
2. *Alnus viridis*	10	Yes	FAC
3.			
4.			
5.			
6.			
Total Cover: 20			
50% of total cover: 10 20% of total cover: 4			
Herb Stratum			
1. *Calamagrostis canadensis*	100	Yes	FAC
2. *Athyrium filix-femina*	25		FAC
3. *Heracleum maximum*	10		FACU
4. *Gymnocarpium dryopteris*	1		FACU
5. *Mertensia paniculata*	1		FACU
6. *Chamerion angustifolium*	1		FACU
7. *Equisetum sylvaticum*	1		FAC
8.			
9.			
10.			
Total Cover: 139			
50% of total cover: 70 20% of total cover: 28			

Plot size (radius, or length x width) 30-ft diameter % Bare Ground ______

% Cover of Wetland Bryophytes 0 Total Cover of Bryophytes 0
(Where applicable)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 0
FACW species		x 2 = 0
FAC species	136	x 3 = 408
FACU species	23	x 4 = 92
UPL species		x 5 = 0
Column Totals:	159 (A)	500 (B)

Prevalence Index = B/A = 3.14

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes X No ____

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
+7- +5	dk yel brn 10YR4/6	50					silt, roots, and decomposed plant matter	
	dk red brn 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 brn gray 10YR6/2	80					silt loam w/fine sand; dry	
	gray brn 10YR5/2	20						
19-23	dk gray brn 10YR4/2	80					gravelly silt loam; moist; massive; loose	
	gray brn 10YR5/2	20						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]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[3]:

- ___ Alaska Color Change (TA4)[4]
- ___ Alaska Alpine Swales (TA5)
- ___ Alaska Redox With 2.5Y Hue
- ___ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ___ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None

Depth (inches): ______

Hydric Soil Present? Yes ___ No X

Remarks: The surfical 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:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

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

Project/Site: MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW 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 X	No
Hydric Soil Present?	Yes X	No
Wetland Hydrology Present?	Yes X	No

Is the Sampled Area within a Wetland? Yes X 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
1. *Alnus viridis*	10	Yes	FAC
2.			
3.			
4.			
Total Cover:	10		
50% of total cover: 5	20% of total cover: 2		
Sapling/Shrub Stratum			
1. *Alnus viridis*	50	Yes	FAC
2.			
3.			
4.			
5.			
6.			
Total Cover:	50		
50% of total cover: 25	20% of total cover: 10		
Herb Stratum			
1. *Calamagrostis canadensis*	75	Yes	FAC
2. *Equisetum fluviatile*	25	Yes	OBL
3. *Heracleum maximum*	1		FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	101		
50% of total cover: 51	20% of total cover: 20		

Plot size (radius, or length x width) 30-ft diameter % Bare Ground ______

% Cover of Wetland Bryophytes 10 Total Cover of Bryophytes 10
(Where applicable)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	25	x 1 = 25
FACW species		x 2 = 0
FAC species	135	x 3 = 405
FACU species	1	x 4 = 4
UPL species		x 5 = 0
Column Totals:	161 (A)	434 (B)

Prevalence Index = B/A = 2.69

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: DP-23

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
+16-0	black 10YR2/1	50					muck and plant debris, roots; saturated; greasy;	
	dk yel brn 10YR4/4	50						

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

Hydric Soil Indicators:

- X 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[3]:

- ___ Alaska Color Change (TA4)[4]
- ___ Alaska Alpine Swales (TA5)
- ___ Alaska Redox With 2.5Y Hue
- ___ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ___ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: Saturation

Depth (inches): 0

Hydric Soil Present? Yes X No ____

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:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes X No ____ Depth (inches): 0

Water Table Present? Yes ____ No X Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes X No ____ Depth (inches): 0

Wetland Hydrology Present? Yes X No ____

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

Project/Site: MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW corner of Upper DeArmoun Rd and Canyon Rd. Borough/City: Anchorage Sampling Date: 9/8/2014

Applicant/Owner: ______ Sampling Point: DP-24

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 149.7263 Datum: NAD83

Soil Map Unit Name: 438—Moose River-Niklason complex, occasionally flooded, 0 to 3 percent NWI classification: PSS1/4B

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 X	No	**Is the Sampled Area within a Wetland?** Yes X No ______
Hydric Soil Present?	Yes X	No	
Wetland Hydrology Present?	Yes X	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
1. *Alnus viridis*	25	Yes	FAC
2. *Betula papyrifera (Southcentral)*	10	Yes	FAC
3. *Picea mariana*	10	Yes	FACW
4.			
Total Cover:	45		
50% of total cover: 23		20% of total cover: 9	
Sapling/Shrub Stratum			
1. *Alnus viridis*	25	Yes	FAC
2.			
3.			
4.			
5.			
6.			
Total Cover:	25		
50% of total cover: 13		20% of total cover: 5	
Herb Stratum			
1. *Calamagrostis canadensis*	75	Yes	FAC
2. *Athyrium filix-femina*	10		FAC
3. *Heracleum maximum*	10		FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	95		
50% of total cover: 48		20% of total cover: 19	

Plot size (radius, or length x width) 30-ft diameter % Bare Ground ______

% Cover of Wetland Bryophytes 5 Total Cover of Bryophytes 5
(Where applicable)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 0
FACW species	10	x 2 = 20
FAC species	145	x 3 = 435
FACU species	10	x 4 = 40
UPL species		x 5 = 0
Column Totals:	165 (A)	495 (B)

Prevalence Index = B/A = 3

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes X No ______

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
+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						

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

- ___ Alaska Color Change (TA4)[4]
- ___ Alaska Alpine Swales (TA5)
- ___ Alaska Redox With 2.5Y Hue
- ___ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ___ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.
[4]Give details of color change in Remarks.

Restrictive Layer (if present):
Type: Compacted soil
Depth (inches): 12

Hydric Soil Present? Yes X No ___

Remarks: The soil profile generally correlates with the mapped soil unit for the location, Moose River-Niklason complex. The presenece of gleyed soil with oxidized root channels qaulifies 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:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 22

Wetland Hydrology Present? Yes X No ___

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

Project/Site: MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW 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 X	Is the Sampled Area within a Wetland? Yes ____ No X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

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
1. *Picea mariana*	25	Yes	FACW
2. *Betula papyrifera (Southcentral)*	5		FAC
3.			
4.			
Total Cover:	30		
50% of total cover: 15	20% of total cover: 6		
Sapling/Shrub Stratum			
1. *Sorbus scopulina*	25	Yes	FACU
2. *Rosa acicularis*	25	Yes	FACU
3. *Cornus canadensis*	25	Yes	FACU
4. *Viburnum edule*	10		FACU
5. *Alnus viridis*	10		FAC
6.			
Total Cover:	95		
50% of total cover: 48	20% of total cover: 19		
Herb Stratum			
1. *Calamagrostis canadensis*	25	Yes	FAC
2. *Gymnocarpium dryopteris*	25	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	50		
50% of total cover: 25	20% of total cover: 10		

Plot size (radius, or length x width) 30-ft diameter % Bare Ground ______

% Cover of Wetland Bryophytes 0 Total Cover of Bryophytes 0
(Where applicable)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 0
FACW species	25	x 2 = 50
FAC species	40	x 3 = 120
FACU species	110	x 4 = 440
UPL species		x 5 = 0
Column Totals:	175 (A)	610 (B)

Prevalence Index = B/A = 3.48

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%

No Prevalence Index is ≤3.0

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ____ No X

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
+9- +5	v dk gray brn 10YR3/2	50					silt, roots, wood debris and decomposed plant matter	
	black 10YR2/1	50						
+5-0	black 10YR2/1	50					organic soil; many fine roots; greasy when wetted; dry	
	v dk gray 10YR3/1	50						
0-10	dk gray brn 10YR4/2	100					silt loam and charcol; dry	
10-17	v pale brn 10YR7/3	50						
	brown 10YR5/3	50						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]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[3]:

- ___ Alaska Color Change (TA4)[4]
- ___ Alaska Alpine Swales (TA5)
- ___ Alaska Redox With 2.5Y Hue
- ___ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ___ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.
[4]Give details of color change in Remarks.

Restrictive Layer (if present):
Type: None
Depth (inches): ______

Hydric Soil Present? Yes ____ No X

Remarks: The surfical 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:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

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 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

Project/Site: MOA Parcel 1707306000; SEC 25, T12N, R3W, SM; SW 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.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X
Is the Sampled Area within a Wetland?		X

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
1. *Picea mariana*	25	Yes	FACW
2. *Picea glauca*	25	Yes	FACU
3. *Betula papyrifera (Southcentral)*	10	Yes	FAC
4.			
Total Cover:	60		
50% of total cover: 30		20% of total cover: 12	
Sapling/Shrub Stratum			
1. *Cornus canadensis*	50	Yes	FACU
2. *Rosa acicularis*	10	Yes	FACU
3. *Rubus idaeus*	10	Yes	FACU
4. *Viburnum edule*	10		FACU
5. *Alnus viridis*	10		FAC
6.			
Total Cover:	90		
50% of total cover: 45		20% of total cover: 18	
Herb Stratum			
1. *Calamagrostis canadensis*	25	Yes	FAC
2. *Gymnocarpium dryopteris*	10	Yes	FACU
3. *Equisetum arvense*	10	Yes	FAC
4. *Sanguisorba canadensis*	5		FACW
5. *Mertensia paniculata*	1		FACU
6. *Chamerion angustifolium*	1		FACU
7.			
8.			
9.			
10.			
Total Cover:	52		
50% of total cover: 26		20% of total cover: 10	

Plot size (radius, or length x width) 30-ft diameter % Bare Ground ______

% Cover of Wetland Bryophytes 0 Total Cover of Bryophytes 0
(Where applicable)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 44 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 0
FACW species	30	x 2 = 60
FAC species	55	x 3 = 165
FACU species	117	x 4 = 468
UPL species		x 5 = 0
Column Totals:	202 (A)	693 (B)

Prevalence Index = B/A = 3.43

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%

No Prevalence Index is ≤3.0

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ______ No X

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
+10- +4	dk gray brn 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 charcol; dry	
11-19	v pale brn 10YR7/3 brown 10YR5/3	50 50					silt loam w/ gravel & cobbles, dry; loose	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]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[3]:

- ___ Alaska Color Change (TA4)[4]
- ___ Alaska Alpine Swales (TA5)
- ___ Alaska Redox With 2.5Y Hue
- ___ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ___ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.
[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks: The surfical 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:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

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

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

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 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

DP-5

DP-6

DP-7

DP-8

DP-9

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DP-21

DP-22

DP-22

DP-23

DP-24

DP-24

DP-25

DP-25

DP-26

DP-26

Upper De Armoun & Canyon Road Preliminary Drainage Impact Analysis

Prepared by

Triad Engineering
May 4, 2015

TRIAD ENGINEERING

PHYSICAL
1300 E. 68th Ave., Suite 210
Anchorage, AK 99518

MAILING
P.O. Box 110890
Anchorage, AK 99511

OFFICE
907-561-6537

UPPER DEARMOUN & CANYON ROAD PARCEL
PRELIMINARY DRAINAGE IMPACT ANALYSIS

5-04-15

The following preliminary drainage impact analysis is associated with the proposed project located south of Upper DeArmoun and west of Canyon Road consisting of approximately 74 acres. The project will include the installation of infrastructure to develop 34 residential lots, plus or minus, ranging in size from 1 ¼ to 3 acres in size. Improvements will include publicly maintained strip paved roads with drainage swales along with individual on-site wells and septic on each lot furnished by the future home owners.

Current Development

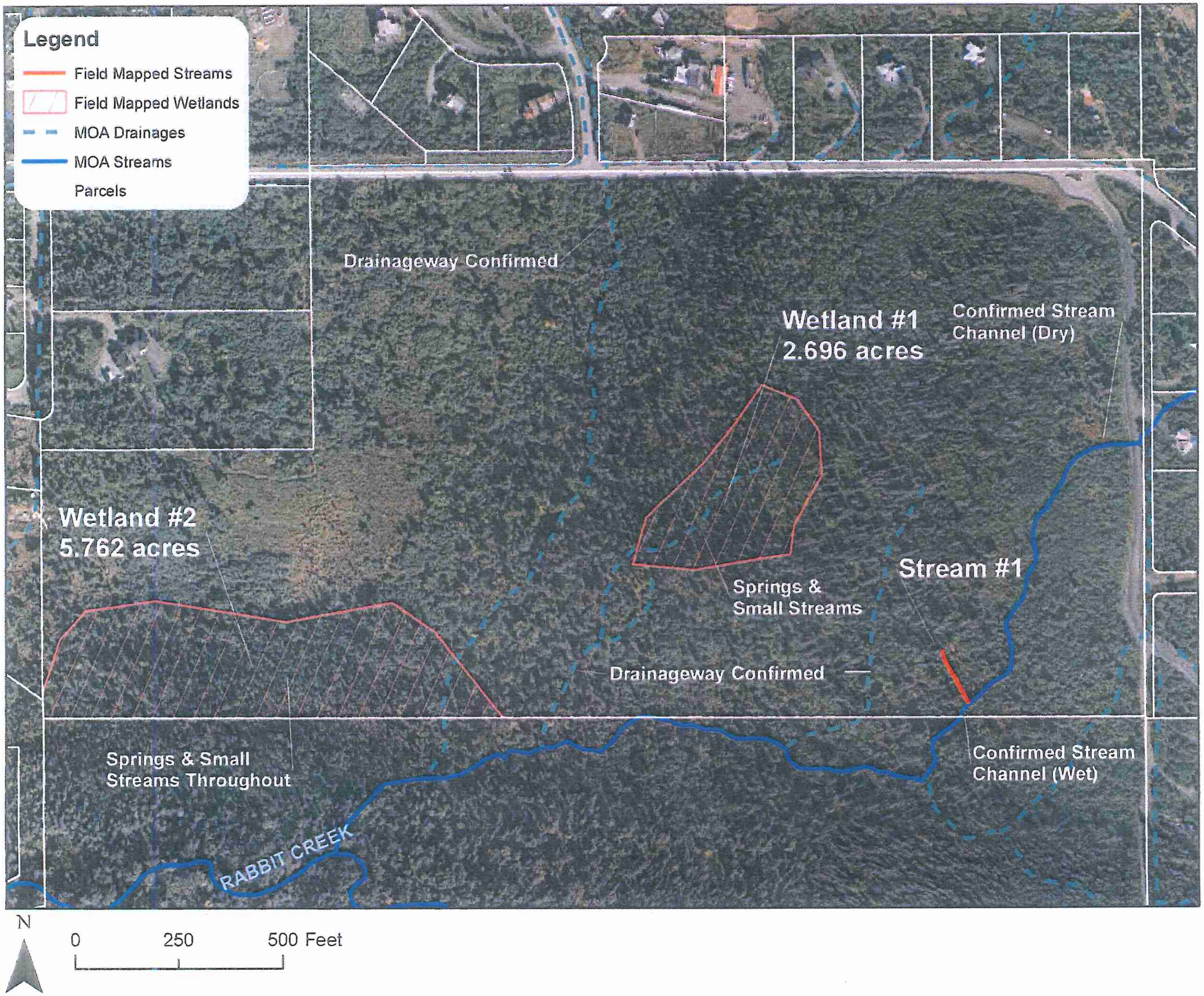
The undeveloped site is currently well vegetated and drains generally from the northeast to the southwest. There are two identified wetland areas on the parcel which account for approximately 8 ½ acres of the total site. There are also four drainage ways and one stream that have been identified as shown on the attached exhibit. No municipal owned storm drain systems exist either on or within the vicinity of this proposed project.

Future Development

The storm runoff generated by this project will sheet flow off of the future lots toward the dedicated rights of way and roadside drainage swales. A series of rock trenches will be installed within the swales to capture and infiltrate a portion of the runoff. The swales will outfall into either an identified drainage way, wetland or stream which all outfall to Rabbit Creek located directly south of the property. Drainage easements will be created for all of these features and will be shown on the recorded plat. Increase in the quantity of runoff due to the development of the parcel will be minimal due to the low density and relatively small amount of impervious area anticipated. The current pattern of off-site drainage that enters the site from the north through existing culverts will remain unchanged. The Autodesk storm and sanitary analysis 2015 computer program, which utilizes the SCS TR-55 methodology, will be used to analyze and model the project drainage in both the present and future conditions as required by Chapter 2 of the Municipality of Anchorage 2008 Design Criteria Manual (DCM).

Summary

Based on the initial review of the site and the existing conditions in the project area, the municipal drainage requirements appear to be attainable with no adverse impact to adjacent properties.


Legend
Field Mapped Streams
Field Mapped Wetlands
MOA Drainages
MOA Streams
Parcels
Drainageway Confirmed
Wetland #1
2.696 acres
Confirmed Stream
Channel (Dry)
Wetland #2
5.762 acres
Stream #1
Springs &
Small Streams
Drainageway Confirmed
Springs & Small
Streams Throughout
Confirmed Stream
Channel (Wet)
RABBIT CREEK
N
0
250
500 Feet

Soils Investigation and Well/Septic Reserve Area Report

Prepared by

Garness Engineering Group, Ltd.

Dated January 2014
Revised April 29, 2015

S4 Group
Land Surveying
Land Development Consultants
Subdivision Specialists
Construction Surveying
124 E 7th Avenue, Anchorage, Alaska 99501 www.S4AK.com 907-306-8104

April 30, 2015

Erika McConnell, Planning Section Manager
MOA Community Development Department
4700 Elmore Road
Anchorage, AK

Re: Rezoning Case 2014-0219: Soil Test submittal

Dear Ms. McConnell,

Please find enclosed a copy of the updated soils report for the Lewis & Clark rezoning Case # 2014-0219, as requested by the Planning & Zoning Commission. The soils engineers, Garness Engineering Group, were able to update their report with soil monitoring this spring. In brief, the tests confirm that based upon soil tests, water monitoring, and surrounding well site analysis, this site will meet MOA subdivision standards for most of the parcel. Of course, portions that do not meet specifications will not be developed. The platting process will further define the number of lots allowed as per strict Title 21 standards that must be met. The owners intent is to create a high quality subdivision with large, over two acre lots on average. At this point, our proposed special limitation is for a maximum of 32 lots on the 73 acre parcel, in reality, that number will go down to about 29 lots, as dictated by the soil tests.

On April 22, 2015, we presented this case to the Mid-Hillside and Hillside East Community Council joint meeting. The feedback was generally positive, with one person not in favor. Very few people attended the meeting.

On April 27, 2015, the owners hosted a meet & greet with the neighbors to discuss the project. The meeting went well, and some even changed their minds about the project and now want to buy lots when they come available. I have included in this packet some displays that the owners shared at the meeting showing that Lewis & Clark is actually less dense by quite a bit then any neighboring portion in the Glenn Alps Service Area.

If you require any further information or clarification, please let me know,

Thank you,

Tom Dreyer, PLS, petitioners representative
S4 Group

Mid-Hillside and Hillside East Community Councils Joint Meeting Announcement

April 22, 2015

The next meeting is scheduled for Wednesday,April 22 at 7 pm at O'Malley Elementary School(Rockridge Rd/O'Malley Rd), Multi-Purpose Room ;meetings are usually held the fourth Wednesday of each month.

The Mid-Hillside and Hillside East Community Councils strive to keep the Council members informed of current happenings in the Councils' area. E-mail is the best way to communicate and receive information from the Councils. To be added to the e-mail distribution list please contact the Community Councils Center at info@communitycouncils.org.

Agenda, April 22, 2015

7:00 Start of Meeting and Intros-Mayor's Office Rep.,Tammy Townsend

7:05 Presidents' Reports ,MHCC Treasurer's Report, HECC Treasurer's Report, Report of April 15,2015 Federation of Community Councils Meet, Approval of January 28,2015 HECC/MHCC Meeting Minutes.(These meeting minutes can be examined and reviewed at info@communitycoucils.org)

7:15 State Legislators' Report
Representatives Bob Lynn and
Mike Hawker and Sens. Kevin Meyer and Cathy Giessel…..all have been invited to participate.

7:30 Assembly Report-Assemblyperson Jennifer Johnston and Assemblyperson Bill Evans have been invited.

7:40 MOA Fire station 8 Personnel-Welcome !

Items to Discuss and Review

7:50 A representative of the S4 Design will give a presentation on a rezoning petition going before the P&Z Commission

Lewis & Clark Subdivision

Hillside East, Anchorage, Alaska

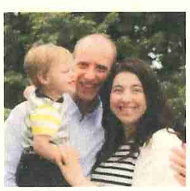
- Subdivision with proposed 32 developed lots averaging 2.3 acres per lot

- This proposed plan was born out of the sincere intention to provide an opportunity to build our homes and raise our families surrounded by the unique beauty and peace found in this particular part of Anchorage.
- It is also the intention of this project to fill an obvious need to provide an opportunity for others seeking the same Alaskan dream and experience that many of you were also once looking for when you made this your community.
- We are committed to keeping the character of the area, maintaining the natural beauty found here, preserving existing ecologically sensitive areas, and living here amongst you as neighbors. We hold a keen awareness of leaving as small a footprint as possible, retaining and replanting trees as necessary.
- Care has been taken to locate, map, and preserve existing sensitive wetland areas, stream channels and drainageways. We intend to protect all mapped wetlands from development.
- The development will incorporate a comprehensive drainage plan to manage water and mitigate existing sheetflow issues. Any discharge will be vigilantly monitored for maximum protection of the environment. We intend to live on the southern/downhill side of the property, so we have an additional vested interest in guaranteeing such.
- Extensive investigation and testing has been, and is continuing to be done to ensure that this land can support the septic systems and wells that the proposed design will require. If any lots do not meet minimum standards for water/waste they will not be developed even if approved by the municipality.
- We understand that traffic patterns and adequate roadway design are critical. Safety, low noise, and minimum impact to existing local roads will be incorporated.

Neighbors and Community

- We would appreciate any and all feedback at lewisandclarkalaska@gmail.com
- If you have any data or history regarding water/drainage/sheetflow please let us know.
- We would like your input on our idea of setting aside setbacks for minimal impact use such as dog walking, walking, cross-country running or skiing.
- We want to preserve the character of the area and we highly value your input.

Owners, developers and residents (Big Country Enterprises)



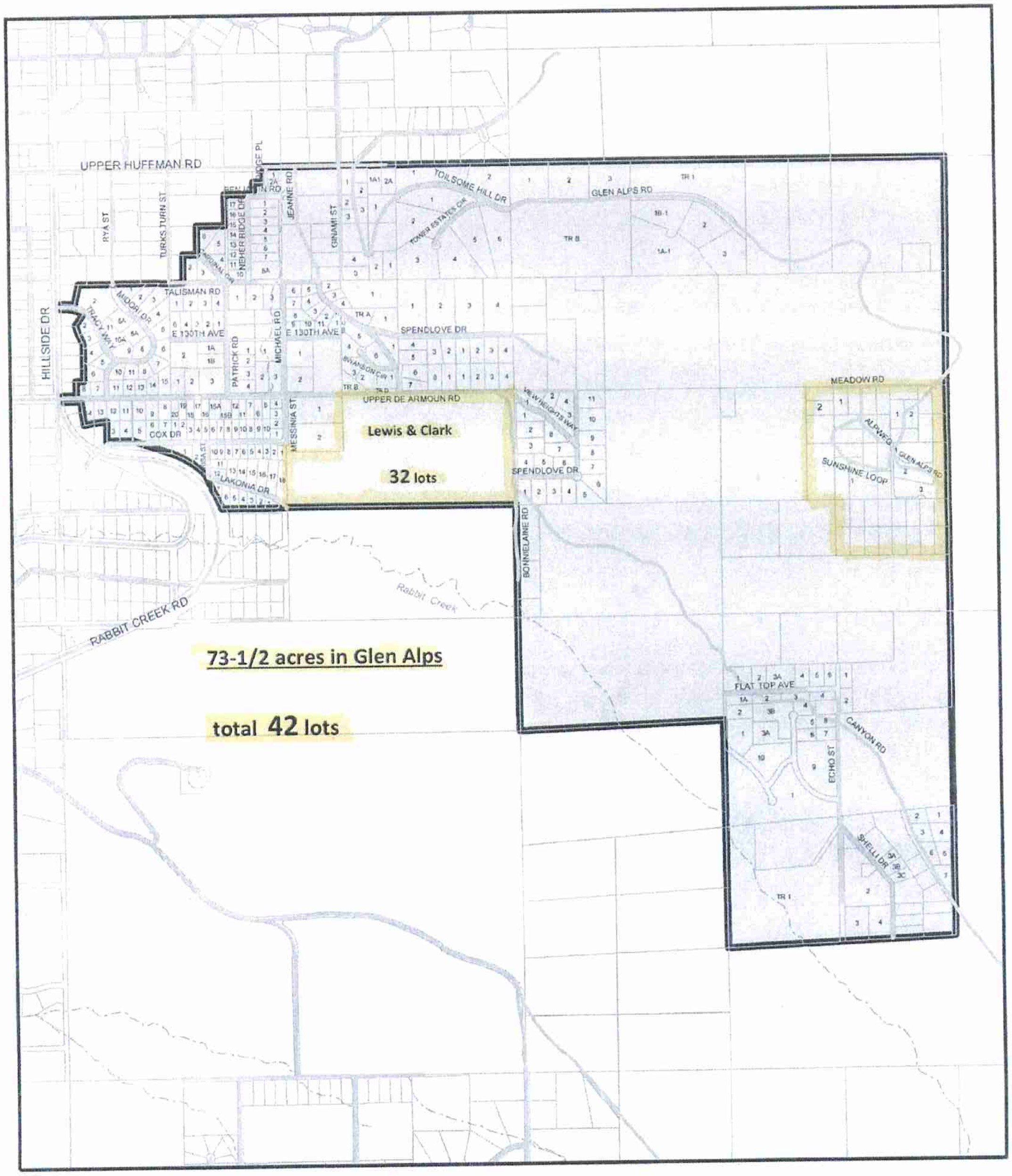
Todd, Elisha and Clark Brownson

Elisha is a lifelong Alaskan, WWAMI alum, and Critical Care and Trauma surgeon.
Todd was born in Montana, but fell in love with Alaska while commercial fishing in Southeast.
Todd is a civil engineer with a specialty in soils.
Todd has the integrity and knowledge of soil stabilization to keep this a beautiful area.
The Brownsons intend on spending their life in this subdivision.

Paul and Susanne Gionet

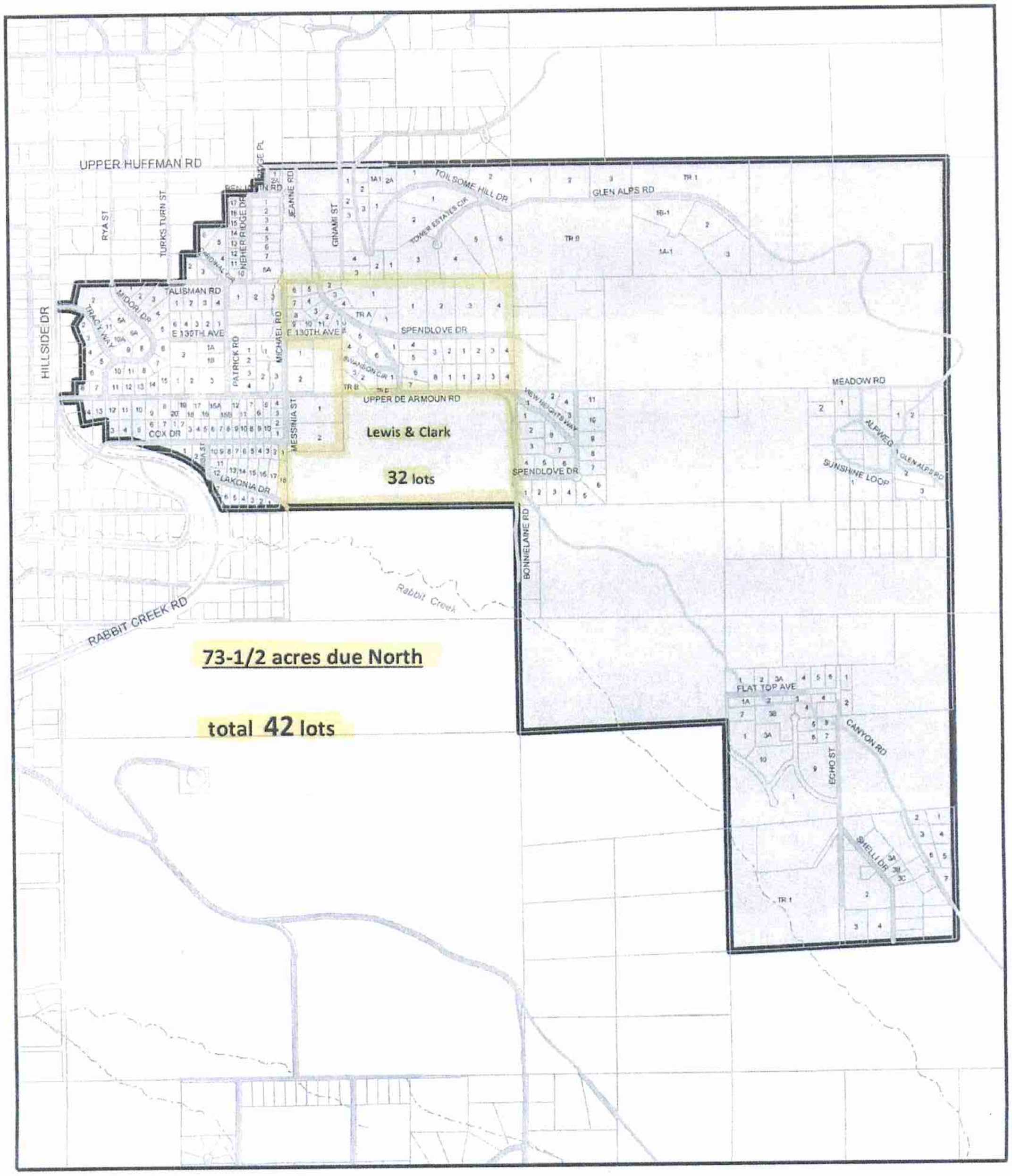
Long time Alaskans (30 yrs +) and raised 8 children on hillside.
Developed and maintained an Alaskan specialized medical practice.
Avid runners and hikers of most local peaks (20yrs of Mt Marathon races).
Involved in the community with volunteerism and want to be your neighbor.

Glen Alps Service Area



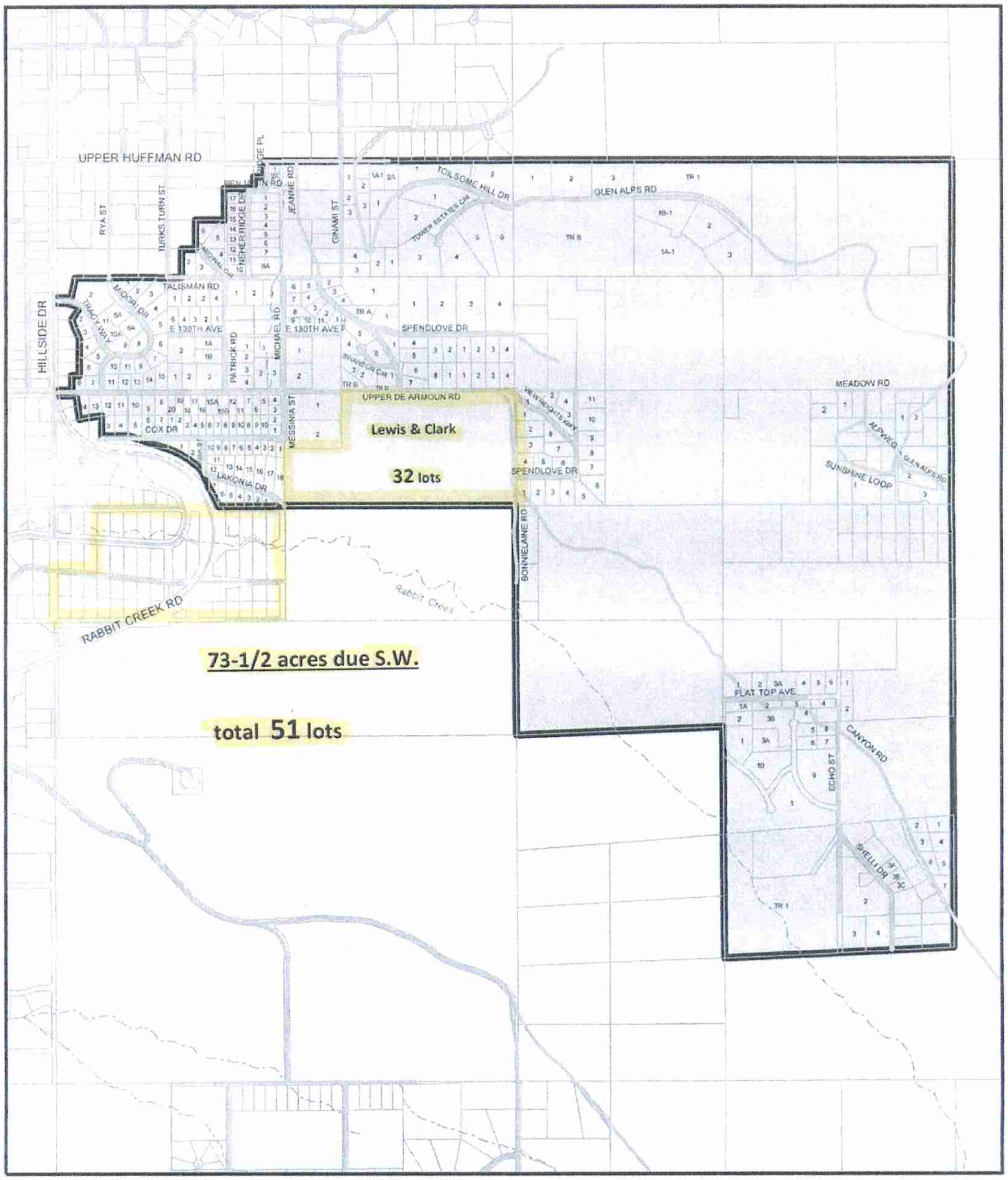
Map produced by MOA Planning Dept. Technical Services Division May 2005

Glen Alps Service Area



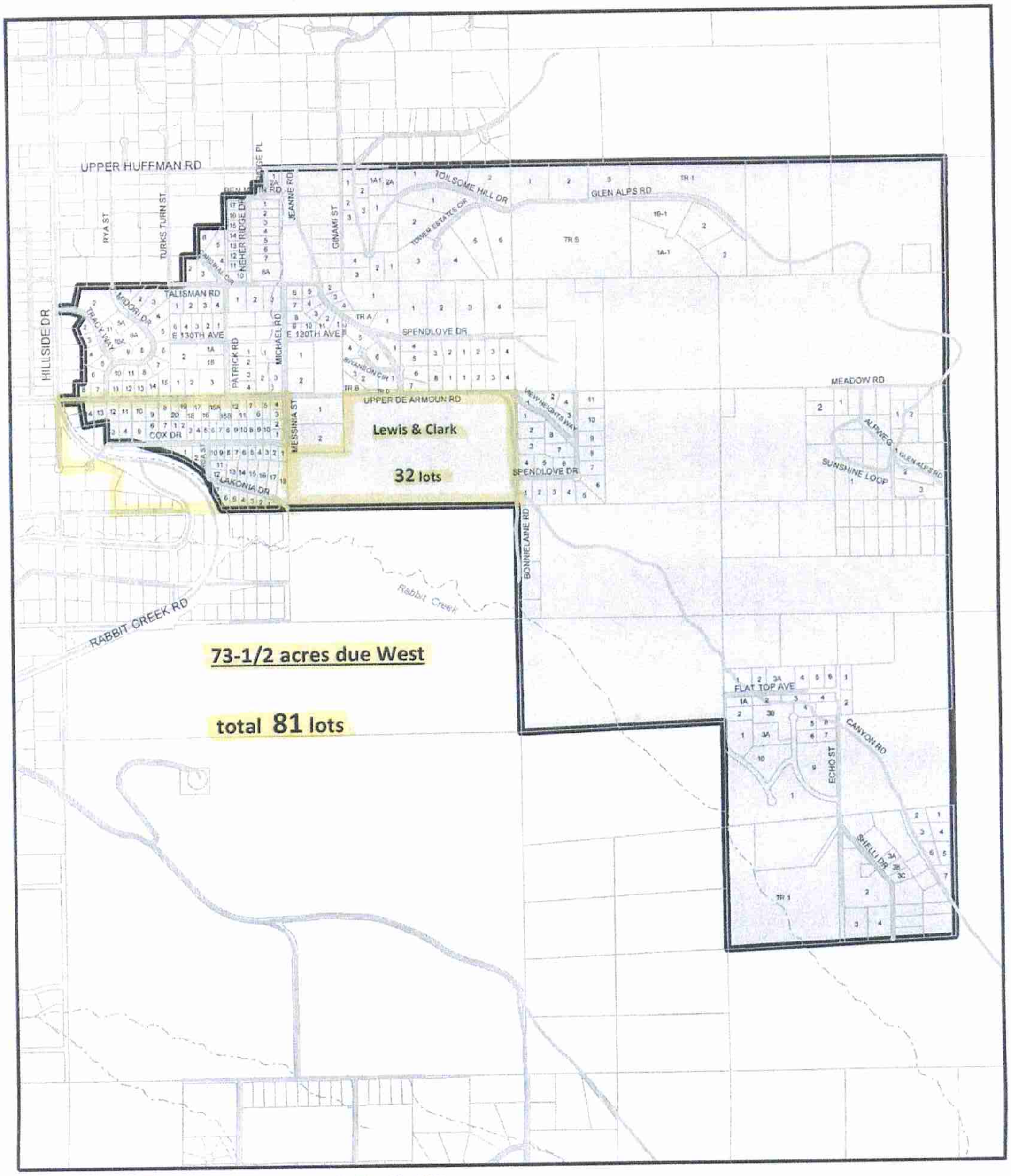
Map produced by MOA Planning Dept, Technical Services Division May 2005

Glen Alps Service Area



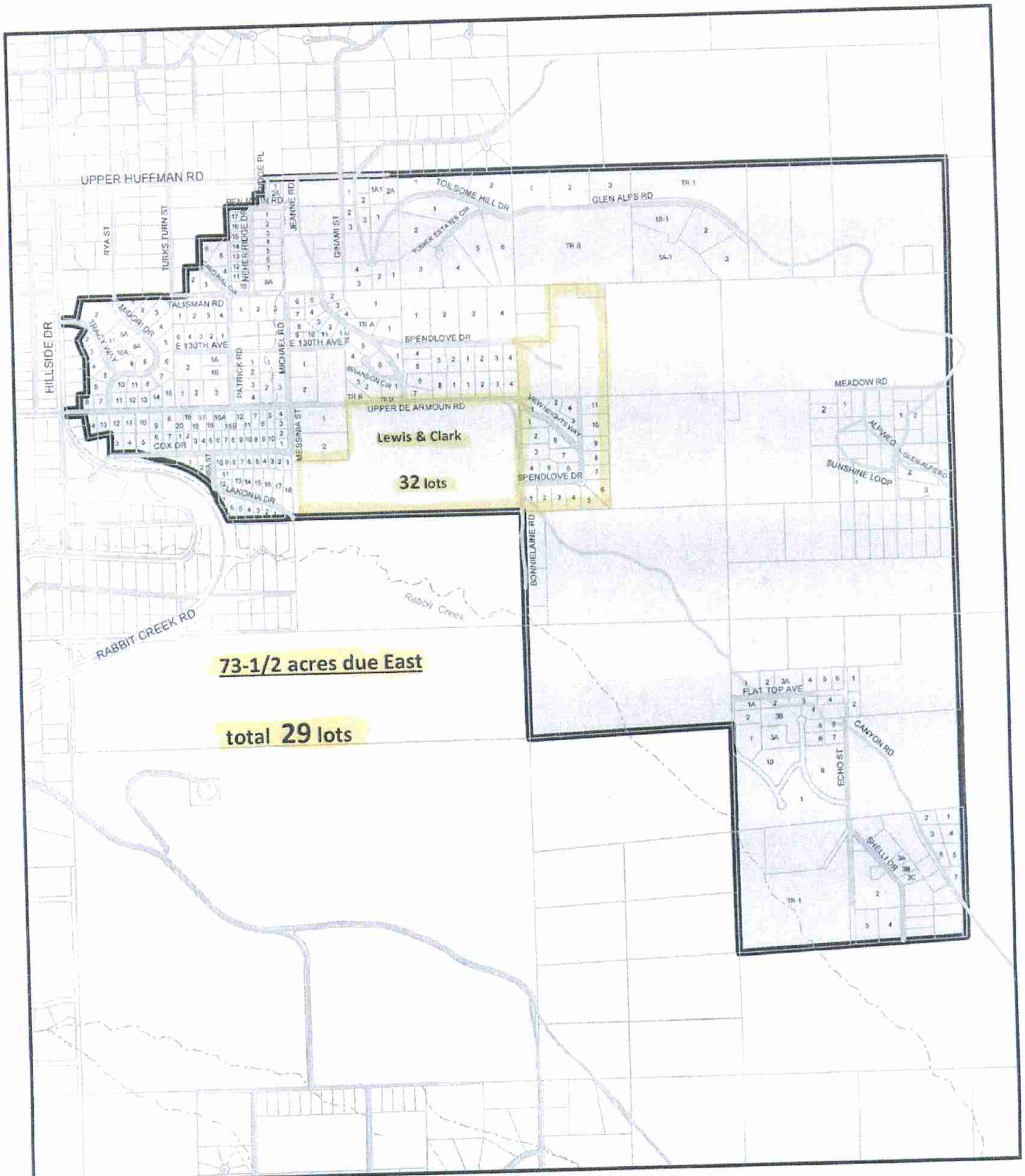
Map produced by MOA Planning Dept, Technical Services Division May 2005

Glen Alps Service Area



Map produced by MOA Planning Dept, Technical Services Division May 2005

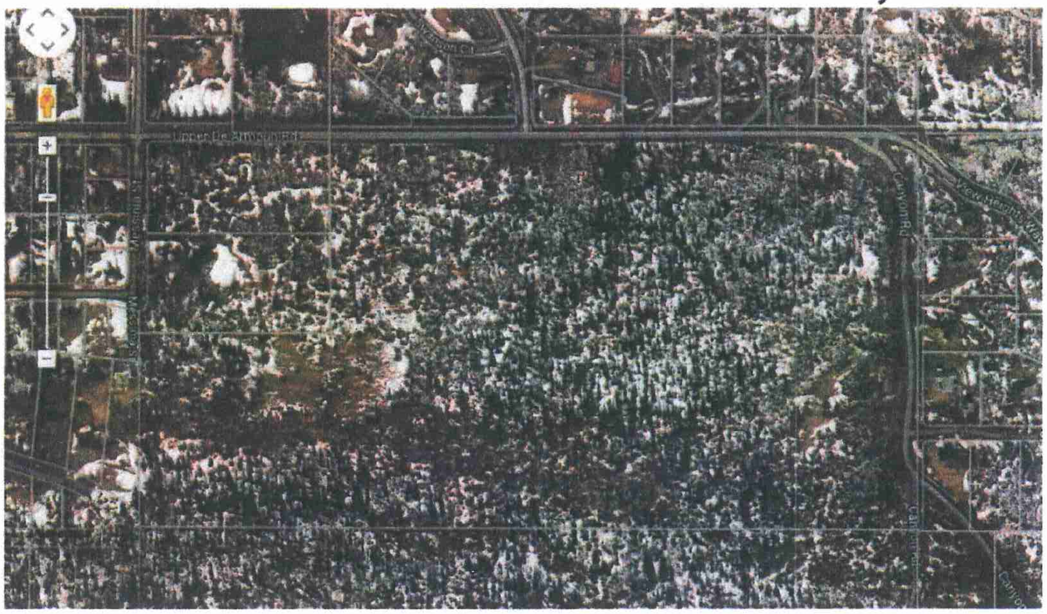
Glen Alps Service Area



Map produced by MOA Planning Dept, Technical Services Division May 2005

GARNESS ENGINEERING GROUP, Ltd
CIVIL & ENVIRONMENTAL ENGINEERS

S4 GROUP AND BIG COUNTRY ENTERPRISES, LLC.



LEWIS AND CLARK
SOILS INVESTIGATION AND WELL/ SEPTIC RESERVE AREA REPORT

January 2014

Prepared for:
S4 Group & Big Country Enterprises, LLC
Attention: Tom Dreyer, P.L.S.
124 E 7th Avenue
Anchorage, Alaska 99501
Phone: (907) 306-8104

Prepared by:
Garness Engineering Group, Ltd.
Jeffrey A. Garness P.E., M.S.
3701 East Tudor Road, Suite 101
Anchorage, Alaska 99507-1259
Phone: (907) 337-6179
Facsimile: (907) 338-3246
Email: jeff@garnessengineering.com

STATE OF ALASKA
49TH
Jeffrey Archer Garness
No. CE-7953
REGISTERED PROFESSIONAL ENGINEER
1.29.15

GARNESS ENGINEERING GROUP, Ltd
CIVIL & ENVIRONMENTAL ENGINEERS

GARNESS ENGINEERING GROUP, Ltd
CIVIL & ENVIRONMENTAL ENGINEERS

S4 GROUP AND BIG COUNTRY ENTERPRISES, LLC.

LEWIS AND CLARK
Soils Investigation and Well/ Septic Reserve Area Report

TAB Index

3701 East Tudor Road, Suite 101 * Anchorage, AK 99507-1259
Ph: (907) 337-6179 * Fax: (907) 338-3246 * Website: www.garnessengineering.com

GARNESS ENGINEERING GROUP, Ltd
CIVIL & ENVIRONMENTAL ENGINEERS

S4 GROUP AND BIG COUNTRY ENTERPRISES, LLC.

LEWIS AND CLARK
SOILS INVESTIGATION AND WELL/SEPTIC RESERVE AREA REPORT

Tab 1

- Soils Investigation and Surrounding Well Information Report

3701 East Tudor Road, Suite 101 * Anchorage, AK 99507
Ph: (907) 337-6179 * Fax: (907) 338-3246 * Website: garnessengineering.com

GARNESS ENGINEERING GROUP, Ltd
CIVIL & ENVIRONMENTAL ENGINEERS

Quanics
Advanced Treatment System Certified Dealer

STATE OF ALASKA
49TH
Jeffrey Archer Garness
No. CE-7953
4/29/15
REGISTERED PROFESSIONAL ENGINEER

April 29, 2015 (Revised)

S4 Group
124 E. 7th Ave.
Anchorage, AK. 99501
Phone: 907-306-8104
Attention: Tom Dreyer

Subject: **Soils Investigation Report and Well/Septic Reserve Area for Lewis and Clark Subdivision (proposed) Located off Upper Dearmoun Road in Anchorage, Alaska**

Mr. Dreyer,

Lewis and Clark Subdivision (proposed) is located on the south side of Upper Dearmoun Road in Anchorage, Alaska. Based on the preliminary plat drawing provided to us, this development is proposed to consist of thirty-two (32) lots and two (2) large tracts. The two (2) large tracts are classified as wetlands. Improvements will include street improvements and storm drainage, all within publicly dedicated right of way. Per your request we excavated and logged test holes and performed percolation test/s for each lot. This information will be used to establish septic reserve areas or platted drainfield sites for each lot in the subdivision.

PROPOSED WELL AND SEPTIC RESERVE AREAS

Soil logs have been prepared for all test holes excavated on the property (see **Tab 4**). We have also prepared a site map showing the proposed well locations with 100 foot protective radii and proposed septic reserve areas or platted drainfield sites (see **Tab 2**). In regards to the septic reserve areas, MOA wastewater ordinance AMC 15.65.180 requires that a site map be provided showing the septic reserve area for each lot or identify three (3) platted drainfield sites. In regards to the septic reserve area, the total reserve area must meet the requirements set forth in Table 2 of AMC 15.65.180 (see below).

TABLE 2

TABLE INSET:

Percolation Rate (minutes/inch)	Total Reserved Area (square feet)
1--5	10,000
5--12	12,000
12--24	14,000
24--60	16,000

In regards to platted drainfields, the platted drainfield sites must meet the requirements set forth in AMC 15.65.180 (see below).

2 *The lot must contain sufficient area to provide for structures, and a well or other water source, and sufficient area for an original on-site wastewater disposal system and two replacement subsurface disposal fields designed in accordance with the standards and procedures of Sections 15.65.040, 15.65.050 and 15.65.060. The plat must designate the maximum number of bedrooms allowed on each lot. The area to be used for wastewater disposal system and replacement subsurface disposal fields must be designated on the plat for each lot as being unavailable for use for driveways, parking areas or structures.*

Based upon the soils conditions on the property we have provided a combination of septic reserve areas and platted drainfield sites. The platted Drainfields have been sized for four (4) bedrooms and will require a plat note limiting the number of bedrooms to this size for each lot. The following is a summary of our findings of the topography, soil conditions, groundwater conditions, etc., across the property.

SOILS REPORT SUMMARY

Based upon the topography information provided to us by your firm, the average slopes across the majority of this parcel range from 5 to 20 percent running generally from northwest to southeast (see attached site plan). Prior to excavation of the test holes, your firm provide us with a proposed subdivision drawing with the layout of the planned subdivision of the which includes the location of delineated wetlands, drainageway/s, and a stream channel. Based on the topography information, the proposed lot configurations, the location of delineated wetlands, drainageway/s, stream channel, etc., test hole locations were chosen and these locations were staked by your firm. All test hole locations were excavated at the staked/flagged location. A total of thirty-eight (38) test holes have been excavated on the property and percolation test/s have been performed in separate benches in undisturbed, native material. Attached are all the soil logs (see **Tab 4**) which indicates the soils classification, groundwater monitoring data, and percolation test information. In addition to the soil logs, we prepared a spreadsheet summarizing all the test hole percolation data, the highest groundwater readings, and the depth of impermeable soils (see **Tab 3**). This spreadsheet notes if a septic reserve area or a platted drainfield is proposed for each particular lot. The following is a brief overall description of the soil conditions across the parcel:

We performed test holes on the southeast quarter of the property for proposed Lots 1 through 4 (TH#1, TH#2, TH#3, and TH#4). Based upon our findings, these proposed lots appear to be unsuitable for onsite septic systems due to impermeable soil and/or high groundwater. Additionally, two (2) test holes (TH#11 and TH#11A (old Th#6)) were performed on proposed Lot 11 and found that the lot will not meet the requirement for septic reserve area or platted drainfields. In short, this lot appears unsuitable for an onsite septic system.

The majority of the of the proposed subdivision has marginal to impermeable soils (soils that have a percolation rate of >120 minutes/inch) at a depth of four (4) feet. Each test hole in this portion of property generally has one (1) to two (2) feet of organic/peat material. Between the organic layer and the impermeable layer, generally there is a two (2) to three (3) foot layer of gravel, silt mixture (GM) that had percolation rates that ranged from 3.3 to 48 minutes/inch. Given the impermeable soils (at four feet and/or shallow groundwater) and based our experience with the MOA Onsite Department on other subdivisions with similar conditions, these proposed lots will most likely require the use of platted drainfield sites served by advanced wastewater treatment systems. We have prepared a conceptual cross-section detail drawing which shows a profile view of a proposed platted drainfield (see **Tab 5**). In the cross-section drawing, we are showing the limits of excavation to be the same (2 feet) and the installation of 4+ feet of MOA approved sand filter. This will put the bottom of the proposed drainfields at 2 feet above original grade and provide the required 6 foot separation distances to impermeable soils. All the platted drainfield sites are "mounded" and require 3 to 1 slopes that are vegetated. Since these are all mounded drainfields, we have shown on the site plan that all platted drainfields are at least 35 feet away from any lot line that is below/downhill from the lowest platted site. This will insure no cutbanks or slopes that exceed 25 percent will exist 50 feet downhill from the proposed drainfields. It is extremely important that the proposed roadways, driveways and house locations are planned for these properties to insure that no cutbanks are created 50 feet below the platted drainfields. We are also recommending that the most upper platted drainfield site be used as the first installation preference. There were several test holes that did not have impermeable soils and had percolation tests that would appear to support conventional onsite septic systems and qualify for septic reserve areas. These lots include proposed Lots 6, 8, 9, 10, and 19 (TH#6 (old TH#2), TH#8 (old Th#1), TH#9, TH#10, and TH#19).

All of these test holes were performed between October of 2014 and January of 2015. During this time frame during (multiple site visits), we did not see any running water in any of the drainageways or the stream channel that were shown on your drawing. The only standing water visibly seen on the lot was in the designated wetlands on proposed Tract A. On April 17, 2015, we performed spring groundwater monitoring on all the test holes. This is approximately a month earlier than the normal spring groundwater timeframe (May), but due to the early spring conditions and the lack of snow conditions in the area, it is our opinion that the April groundwater reading would be adequate for high groundwater conditions. Prior to performing spring groundwater readings, we contacted Deb Wockenfuss with the MOA Onsite Department and confirmed that she would accept these readings as the high groundwater levels. During our site visit on April 17, 2015, we inspected all the drainageways and stream channels and found them to be dry except for the drainageway at the South end of Canyon Road, where there was a small flow of water running through the channel. This water appeared to be from runoff travelling down the Eastside ditch line of Canyon Road, flowing through a culvert under Canyon Road, and daylighting in the drainageway located in the Southeast corner of this parcel. This will most likely dry-up after spring "break-up". In short, based upon our observations, there was no issues with surface waters on the property except those noted as designated wetlands or the small amount of water in the aforementioned drainageway.

WELL AND AQUIFER SUMMARY FOR NEIGHBORING PROPERTIES

Per your request, we performed records research on the neighboring properties to find well information including well depths, casing depths, static water level, well production, and water quality. On the site plan we have included the approximate well location of all the neighboring wells and also have included a text box to include any well information that could be found on each well. The well information shown on the site plan were taken from well logs, Certificate of System Approvals (COSA's), Health Authority Approvals (HAA's), well adequacy reports, etc., found on the MOA Onsite Department public records and State of Alaska WELTS website. The information may not be comprehensive. The following is a summary of the neighboring well information:

For the properties to the west and northwest of this parcel, the well depths ranged from 54 feet to 315 feet deep, the casing depths ranged from >40 feet to 230 feet, the static water levels (SWL) ranged from 23 feet to 160 feet, well production ranged from 5 to 12.5 gallons per minute (gpm), and nitrate levels ranged from 2.22 to 7.31 mg/L. Based upon this information, the wells to the west/northwest of this parcel appear to meet MOA AMC 15.55 Water Well Ordinance.

For the properties to the north of this parcel, the well depths ranged from 115 feet to 247 feet deep, the casing depths ranged from >40 feet to 76 feet, the static water levels (SWL) ranged from 17 feet to 87 feet, well production ranged from 0.81 to 4 gallons per minute (gpm), and nitrate levels ranged from 2.5 to 4.73 mg/L. Based upon this information, the wells to the north of this parcel appear to meet MOA AMC 15.55 Water Well Ordinance.

For the properties to the east of this parcel, the well depths ranged from 106 feet to 325 feet deep, the casing depths ranged from 27 feet (bedrock) to 61 feet, the static water levels (SWL) ranged from 0 feet to 40 feet, well production ranged from 1.31 to 5 gallons per minute (gpm), and nitrate levels ranged from 0.5 to 4.35 mg/L. Based upon this information, the wells to the east of this parcel appear to meet MOA AMC 15.55 Water Well Ordinance

The property to the south (downhill) of the parcel is undeveloped. Based upon the neighboring well information, it initially appears that there should be no issues with drilling wells for this subdivision; however, moderately elevated nitrate levels could be an issue.

CONCLUSION

Based upon the well/septic reserve site map, the soils reports and the surrounding well information; the proposed subdivision appears to meet the MOA subdivision standards for most of the parcel. If you have any questions, please contact us at 907-337-6179.

Sincerely,

Jeffrey A. Garness, P.E., M.S.
President

GARNESS ENGINEERING GROUP, Ltd
CIVIL & ENVIRONMENTAL ENGINEERS

S4 GROUP AND BIG COUNTRY ENTERPRISES, LLC.

LEWIS AND CLARK
SOILS INVESTIGATION AND WELL/SEPTIC RESERVE AREA REPORT

Tab 2

- Site Plan for Septic Reserve Areas/Platted Drainfield Sites and Surrounding Well Information

3701 East Tudor Road, Suite 101 * Anchorage, AK 99507
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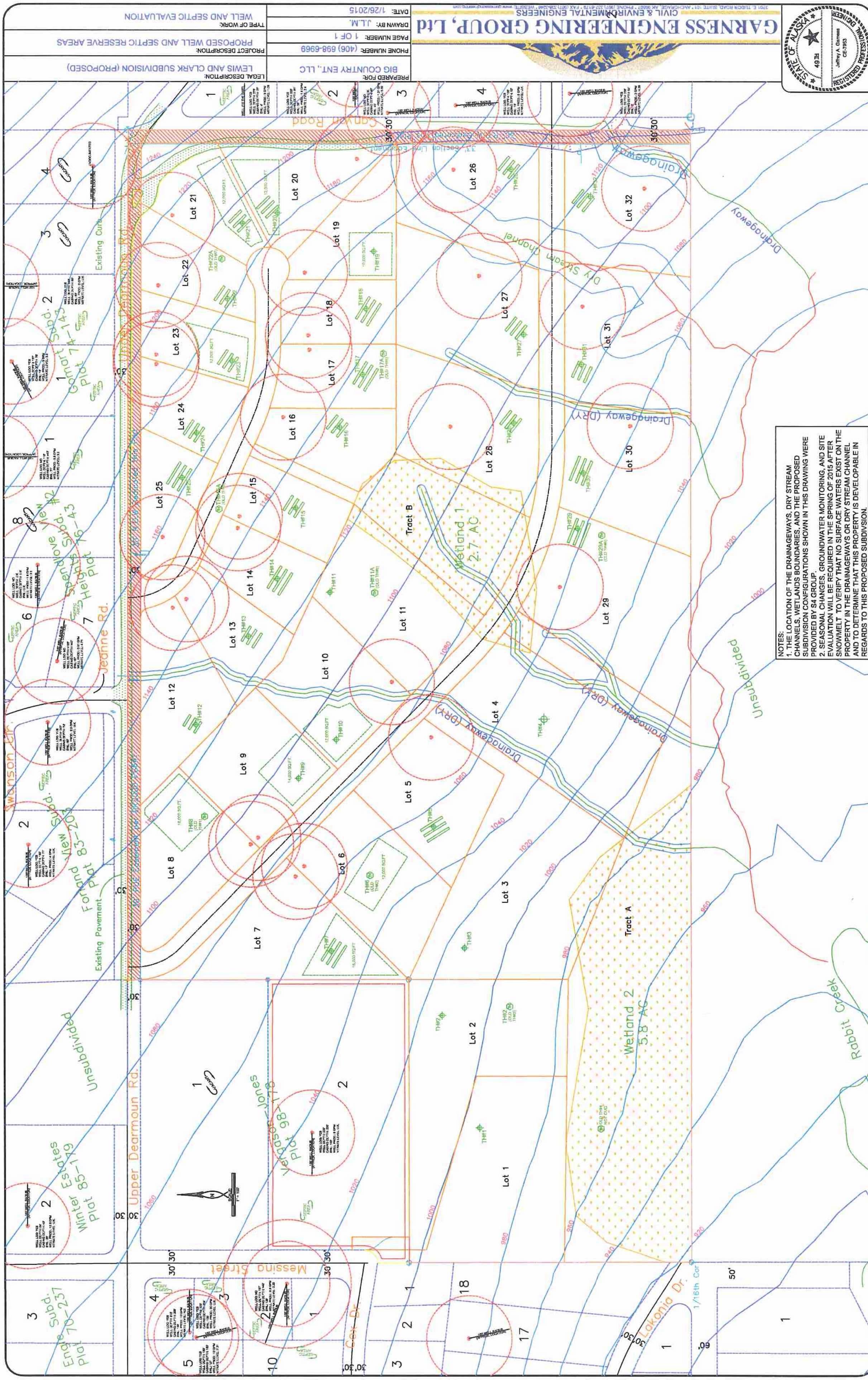

GARNESS ENGINEERING GROUP, Ltd
CIVIL & ENVIRONMENTAL ENGINEERS
PREPARED FOR: BIG COUNTRY ENT., LLC
PHONE NUMBER: (406) 698-6969
PAGE NUMBER: 1 OF 1
DRAWN BY: J.L.M.
DATE: 1/26/2015
LEGAL DESCRIPTION: LEWIS AND CLARK SUBDIVISION (PROPOSED)
PROJECT DESCRIPTION: PROPOSED WELL AND SEPTIC RESERVE AREAS
TYPE OF WORK: WELL AND SEPTIC EVALUATION
Canyon Road
Upper Dearmoun Rd.
Upper Dearmoun Rd
Messing Street
Lakonia Dr.
Jeanne Rd.
Swanson Dr.
Existing Curb
Existing Pavement
Gonhart Subd. 2 Plat 74-143
Forland View Subd. Plat 83-20
Sandy Cove View Subd. #2 Heights Plat 76-43
Winter Estates Plat 85-179
Vegas - Jones Plat 98-118
Engle Subd. Plat 70-237
Unsubdivided
Lot 1
Lot 2
Lot 3
Lot 4
Lot 5
Lot 6
Lot 7
Lot 8
Lot 9
Lot 10
Lot 11
Lot 12
Lot 13
Lot 14
Lot 15
Lot 16
Lot 17
Lot 18
Lot 19
Lot 20
Lot 21
Lot 22
Lot 23
Lot 24
Lot 25
Lot 26
Lot 27
Lot 28
Lot 29
Lot 30
Lot 31
Lot 32
Tract A
Tract B
Wetland 1 2.7 AC
Wetland 2 5.8 AC
Drainageway
Drainageway (DRY)
Dry Stream Channel
Rabbit Creek
1/16th Cor
NOTES:
1. THE LOCATION OF THE DRAINAGEWAYS, DRY STREAM CHANNELS, WETLANDS BOUNDARIES, AND THE PROPOSED SUBDIVISION CONFIGURATIONS SHOWN IN THIS DRAWING WERE PROVIDED BY S4 GROUP.
2. SEASONAL CHANGES, GROUNDWATER MONITORING, AND SITE EVALUATION WILL BE REQUIRED IN THE SPRING OF 2015 AFTER SNOWMELT TO VERIFY THAT NO SURFACE WATERS EXIST ON THE PROPERTY IN THE DRAINAGEWAYS OR DRY STREAM CHANNEL AND TO DETERMINE THAT THIS PROPERTY IS DEVELOPABLE IN REGARDS TO THIS PROPOSED SUBDIVSION.

GARNESS ENGINEERING GROUP, Ltd
CIVIL & ENVIRONMENTAL ENGINEERS

S4 GROUP AND BIG COUNTRY ENTERPRISES, LLC.

LEWIS AND CLARK
SOILS INVESTIGATION AND WELL/SEPTIC RESERVE AREA REPORT

Tab 3

- Spreadsheet of Test Hole/ Percolation Information Including Septic Reserve Areas or Platted Drainfield Requirements

3701 East Tudor Road, Suite 101 * Anchorage, AK 99507
Ph: (907) 337-6179 * Fax: (907) 338-3246 * Website: garnessengineering.com

LEWIS AND CLARK - SPREADSHEET OF TEST HOLE/PERCOLATION TEST INFORMATION

Prop. Lot #	Test Hole Number	Perk Depth (Upper)	Perk Rate (Min. /Inch)	Perk Depth (Lower)	Perk Rate (Min. /Inch)	Ground-water (Yes or No)	Highest Ground-water Depth	Imper. Soils (Yes or No)	Imper. Soils Depth	Septic Reserve Area (Yes or No)	Minimum Septic Reserve Area Size	Recomm. Aplication Rate (Gpd/Sq.Ft.)	Requires Platted Drainfields (Yes or No)	Minimum Platted Drainfield Size	Notes
1	1	2'-3'	240	N/A	N/A	Yes	2'	Yes	~2'	N/A	N/A	N/A	N/A	N/A	Site NOT suitable for development
2	2	4'-5'	240	N/A	N/A	Yes	6'	Yes	~2'	N/A	N/A	N/A	N/A	N/A	Site NOT suitable for development
2	2A (old #3)	4.5'-5.5'	240	N/A	N/A	Yes	6.7'	Yes	~2'	N/A	N/A	N/A	N/A	N/A	Site NOT suitable for development
3	3	5'-6'	240+	N/A	N/A	No	N/A	Yes	~2'	N/A	N/A	N/A	N/A	N/A	Site NOT suitable for development
4	4	4.5'-5.5'	>120	N/A	N/A	No	N/A	Yes	~2'	N/A	N/A	N/A	N/A	N/A	Site NOT suitable for development
5	5	2'-3'	24	4.5'-5.5'	>120	No	Dry to 16'	Yes	4'	No	N/A	*2.0	Yes	*3 - 5' X 60'	*Requires Cat II Treatment System or better
6	6 (old #2)	4.5'-5.5'	12	N/A	N/A	No	Dry to 16'	No	N/A	Yes	12,000	0.8	No	N/A	
7	7	2'-3'	7.1	4.5'-5.5'	60	Yes	12'	**No	**N/A	*Yes	*16,000	0.8-0.45 *(3.0)	No	*3 - 5' X 40'	*Recommend Cat II Treatment System
8	8 (old #1)	4.5'-5.5'	48	N/A	N/A	No	Dry to 16'	No	N/A	Yes	16,000	0.45	No	N/A	
9	9	4.5'-5.5'	20	N/A	N/A	No	Dry to 16'	No	N/A	Yes	14,000	0.6	No	N/A	
10	10	4.5'-5.5'	5	N/A	N/A	No	Dry to 16'	No	N/A	Yes	12,000	0.8	No	N/A	
11	11	4'-5'	80	N/A	N/A	No	Dry to 16'	No	N/A	No	N/A	*0.5	Yes	*3 - 5' X 240'	Site most liklly NOT suitable for development
11	11A (old #6)	2'-3'	16	N/A	N/A	Yes	4' (1.7')	No	N/A	No	N/A	*2.0	Yes	*3 - 5' X 60'	Site most liklly NOT suitable for development
12	12	2'-3'	3.3	4.5'-5.5'/ 6.5'-7.5'	>120	No	Dry to 16'	Yes	4'	No	N/A	*4.0	Yes	*3 - 5' X 30'	*Requires Cat II Treatment System or better
13	13	2'-3'	7.3	4.5'-5.5'/ 6.5'-7.5'	>120	No	Dry to 16'	Yes	4'	No	N/A	*3.0	Yes	*3 - 5' X 40'	*Requires Cat II Treatment System or better
14	14	2'-3'	40	4.5'-5.5'/ 6.5'-7.5'	>120	No	Dry to 16'	Yes	4'	No	N/A	*2.0	Yes	*3 - 5' X 60'	*Requires Cat III (3) Treatment System
15	15	2'-3'	10	5'-6'	120	No	Dry to 16'	**No	**N/A	No	N/A	*3.0	Yes	*3 - 5' X 40'	*Requires Cat II Treatment System or better
15	15A (old #5)	4.5'-5.5'	24	N/A	N/A	No	Dry to 16'	No	N/A	No	N/A	N/A	N/A	N/A	Test hole in proposed right-of-way.
16	16	2'-3'	5	5'-6'	>120	No	Dry to 16'	Yes	4'	No	N/A	*3.0	Yes	*3 - 5' X 40'	*Requires Cat II Treatment System or better
17	17	2'-3'	7.5	5'-6'	>120	Yes	14'	Yes	4'	No	N/A	*3.0	Yes	*3 - 5' X 40'	*Requires Cat II Treatment System or better
17	17A (old #8)	4'-5'	17.1	N/A	N/A	Yes	5.95'	**No	**N/A	No	N/A	*2.0	Yes	*3 - 5' X 60'	*Requires Cat II Treatment System or better
18	18	2'-3'	48	5'-6'	>120	No	Dry to 16'	Yes	4'	No	N/A	*2.0	Yes	*3 - 5' X 60'	*Requires Cat III Treatment System
19	19	6'-7'	2	N/A	N/A	No	Dry to 15'	No	N/A	Yes	10,000	1.2	No	N/A	
20	20	3.5'-4.5'	7.5	N/A	N/A	Yes	6'	No	N/A	*Yes	*12,000	0.8 *(3.0)	No	*3 - 5' X 40'	*Recommend Cat II Treatment System
21	21	4'-5'	7.5	N/A	N/A	Yes	8'	No	N/A	*Yes	*12,000	0.8 *(3.0)	No	*3 - 5' X 40'	*Recommend Cat II Treatment System
22	22	2'-3'	5	4.5'-5.5'	>120	No	Dry to 16'	Yes	4'	No	N/A	*3.0	Yes	*3 - 5' X 40'	*Requires Cat II Treatment System or better
22	22A (old #7)	4'-5'	15	N/A	N/A	Yes	5.9'	N/A	N/A	No	N/A	N/A	N/A	N/A	Use Test Hole #22 for this lot.
23	23	5'-6'	10	N/A	N/A	No	Dry to 14.5'	**No	**N/A	*Yes	*12,000	0.8 *(3.0)	No	*3 - 5' X 40'	*Recommend Cat II Treatment System
24	24	2'-3'	5	4.5'-5.5'	60	Yes	10'	**No	**N/A	No	N/A	*3.0	Yes	*3 - 5' X 40'	*Requires Cat II Treatment System or better
25	25	2'-3'	34.3	4.5'-5.5'	120	Yes	6.5'	**No	**N/A	No	N/A	*2.0	Yes	*3 - 5' X 60'	*Requires Cat III (3) Treatment System
26	26	2'-3'	5	5'-6'	120	No	Dry to 16'	**No	**N/A	No	N/A	*3.0	Yes	*3 - 5' X 40'	*Requires Cat II Treatment System or better
27	27	2'-3'	9.2	5'-6'	>120	No	Dry to 16'	Yes	4'	No	N/A	*3.0	Yes	*3 - 5' X 40'	*Requires Cat II Treatment System or better
28	28	2'-3'	12	5'-6'	>120	No	Dry to 16'	Yes	4'	No	N/A	*3.0	Yes	*3 - 5' X 40'	*Requires Cat II Treatment System or better
29	29	2'-3'	20	5'-6'	80	No	Dry to 16'	**No	**N/A	No	N/A	*2.0	Yes	*3 - 5' X 60'	*Requires Cat II Treatment System or better
29	29A (old #9)	4-'5'	>120	N/A	N/A	No	Dry to 16'	Yes	4'	No	N/A	N/A	N/A	N/A	Use Test Hole #29 for this lot.
30	30	2'-3'	20	5'-6'	240	No	Dry to 16'	Yes	4'	No	N/A	*2.0	Yes	*3 - 5' X 60'	*Requires Cat II Treatment System or better
31	31	2'-3'	9.2	5'-6'	>120	No	Dry to 16'	Yes	4'	No	N/A	*3.0	Yes	*3 - 5' X 40'	*Requires Cat II Treatment System or better
32	32	2'-3'	5	5'-6'	>120	No	Dry to 16'	Yes	4'	No	N/A	*3.0	Yes	*3 - 5' X 40'	*Requires Cat II Treatment System or better

**Soils below four (4) to five (5) feet may be impermeable. Recommend all lots marked with ** use advanced wastewater treatment systems.

GARNESS ENGINEERING GROUP, Ltd
CIVIL & ENVIRONMENTAL ENGINEERS

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LEWIS AND CLARK
SOILS INVESTIGATION AND WELL/SEPTIC RESERVE AREA REPORT

Tab 4

- Soil Logs

3701 East Tudor Road, Suite 101 * Anchorage, AK 99507
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CIVIL & ENVIRONMENTAL ENGINEERS

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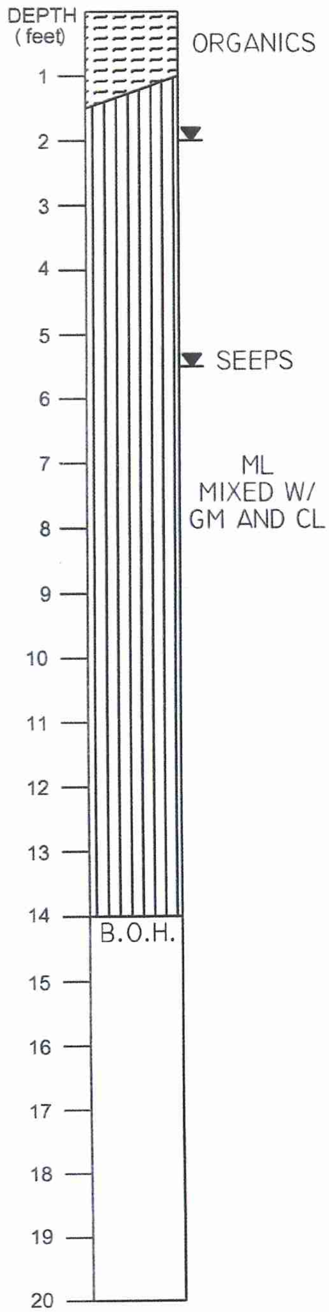
STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
4/22/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

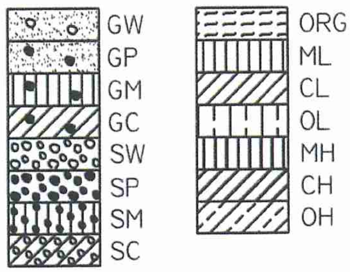
LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 1)

PERFORMED FOR: BIG COUNTRY ENTERPRISES LLC / S4 GROUP DATE: 1/7/2015

TEST HOLE #1

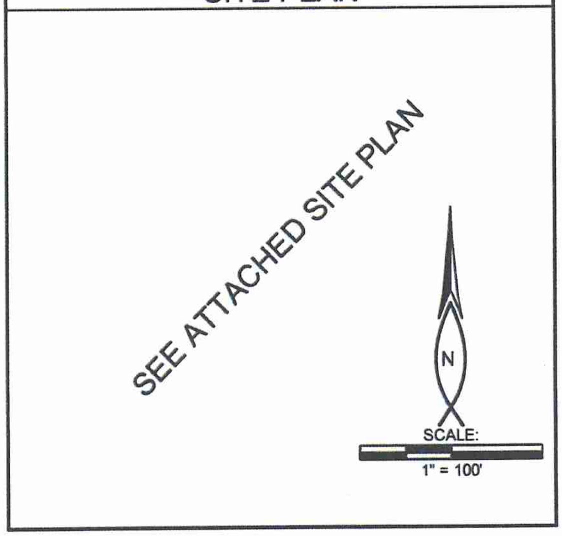


SOIL CLASSIFICATIONS



DEPTH TO GROUNDWATER	DATE
5.5' (SEEPS)	1/7/2015
2'	1/16/2015
3.5'	4/17/2015

SITE PLAN



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

PERCOLATION RATE 240 (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: JODY MAUS PERCOLATION TEST PERFORMED BY: ROB CAMPBELL

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

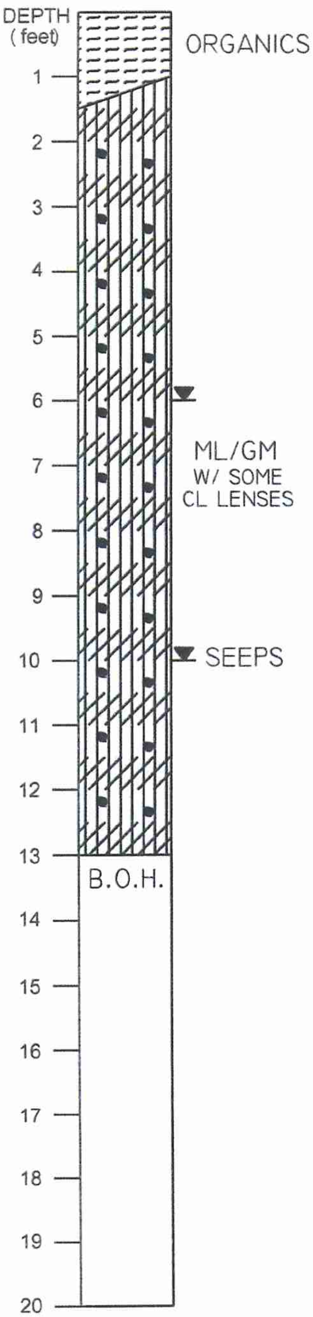
CIVIL & ENVIRONMENTAL ENGINEERS
3701 E. TUDOR ROAD, SUITE 101 * ANCHORAGE, AK 99507 * PHONE (907) 337-6179 * FAX (907) 338-3246 * WEBSITE: www.garnessengineering.com

STATE OF ALASKA
49 TH
Jeffrey A. Garness
CE-7953
4/22/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 2)

PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 1/7/2015



TEST HOLE #2

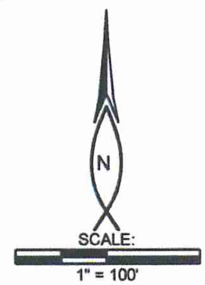
SOIL CLASSIFICATIONS

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

DEPTH TO GROUNDWATER	DATE
10' (HEAVY SEEPS)	1/7/2015
6'	1/16/2015
DRY TO 12'	4/17/2015

SITE PLAN

SEE ATTACHED SITE PLAN



DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
1/9/2015	1	2:01	-	6"	-
↓	2	2:31	30	5-7/8"	1/8"
STOPPED READINGS					

PERCOLATION RATE 240 (MIN./INCH) PERC. HOLE DIA. 6 (INCHES)

TEST RUN BETWEEN 4 FT. AND 5 FT.

A FOUR HOUR PRESOAK WAS PERFORMED: ■ YES ☐ NO

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

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

3701 E. TUDOR ROAD, SUITE 101 * ANCHORAGE, AK 99507 * PHONE (907) 337-6179 * FAX (907) 338-3246 * WEBSITE: www.garnessengineering.com

STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
4/24/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

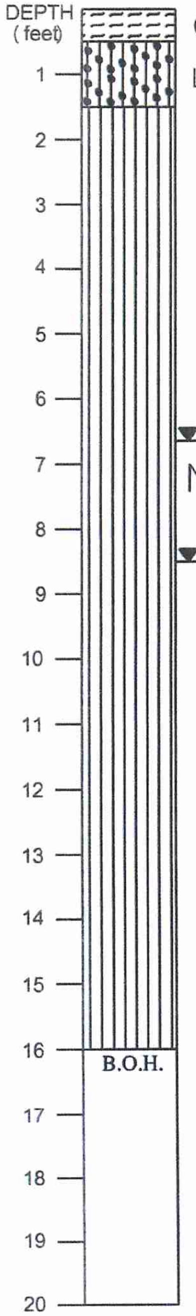
LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 2)

PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 10/16/2014

TEST HOLE #2A
OLD TH#3

DEPTH (feet)

ORGANICS
LOAM (SM)
ML
B.O.H.



SOIL CLASSIFICATIONS

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

DEPTH TO GROUNDWATER	DATE
DRY	10/16/2014
6.7'	10/27/2014
8.5'	1/16/2015
*10.5'	4/17/2015

*WATER IN BENCH AT 3' (PROBABLY FROM SNOWMELT)

SITE PLAN

SEE ATTACHED SITE PLAN

N
SCALE:
1" = 100'

DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
10/17/2014	1	2:55	-	6"	-
	2	3:25	30	5-7/8"	1/8"
	3	00:00	-	6"	-
	4	00:00	30	5-7/8"	1/8"
TEST STOPPED >120 MIN/INCH					

PERCOLATION RATE >120 (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

SOILS LOGGED BY: JODY MAUS PERCOLATION TEST PERFORMED BY: ANDREW GRAY

COMMENTS: PERCOLATION READINGS ARE WITHIN 1/16 OF INCH RECOMMEND FURTHER INVESTIGATION OF THIS AREA..

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: 4/24/15

GARNESS ENGINEERING GROUP, Ltd

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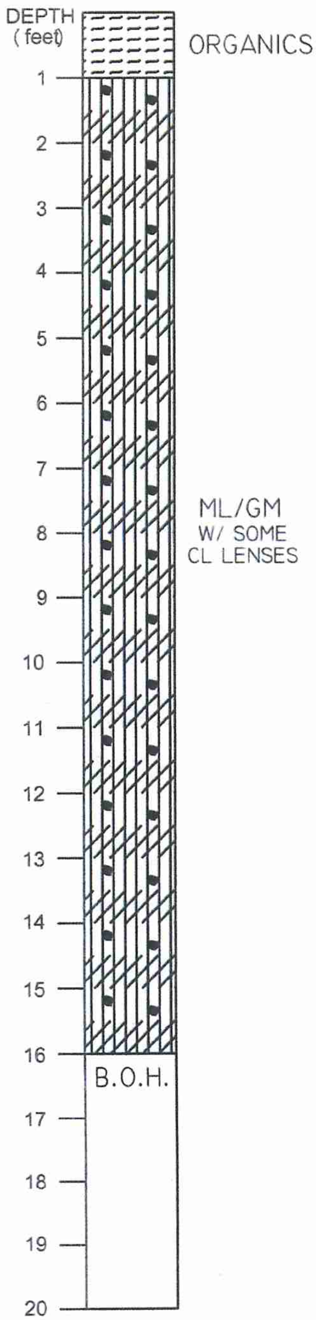
STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
4/22/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 3)

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



TEST HOLE #3

SOIL CLASSIFICATIONS

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

DEPTH TO GROUNDWATER	DATE
DRY	1/8/2015
DRY	1/16/2015
DRY	4/17/2015

SITE PLAN

SEE ATTACHED SITE PLAN

N

SCALE:
1" = 100'

DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
1/9/2015	1	2:06	-	6"	-
↓	2	2:36	30	5-15/16"	1/16"
STOPPED READINGS					

PERCOLATION RATE 240+ (MIN./INCH) PERC. HOLE DIA. 6 (INCHES)

TEST RUN BETWEEN 5 FT. AND 6 FT.

A FOUR HOUR PRESOAK WAS PERFORMED: ■ YES ☐ NO

SOILS LOGGED BY: ROB CAMPBELL PERCOLATION TEST PERFORMED BY: ROB CAMPBELL

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

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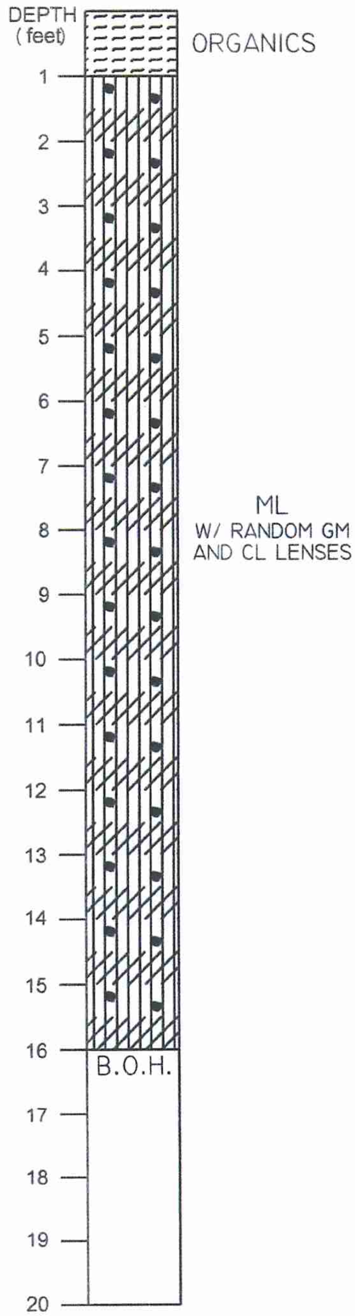
STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
4/22/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 4)

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



TEST HOLE #4

SOIL CLASSIFICATIONS

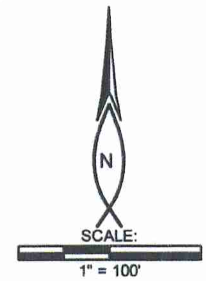
GW, GP, GM, GC, SW, SP, SM, SC

ORG, ML, CL, OL, MH, CH, OH

DEPTH TO GROUNDWATER	DATE
DRY	1/8/2015
DRY	1/16/2015
11'	4/17/2015

SITE PLAN

SEE ATTACHED SITE PLAN



DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
1/9/2015	LIQUID LEVEL DID NOT DROP DURING PRE-SOAK				

PERCOLATION RATE >120 (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

SOILS LOGGED BY: ROB CAMPBELL PERCOLATION TEST PERFORMED BY: ROB CAMPBELL

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

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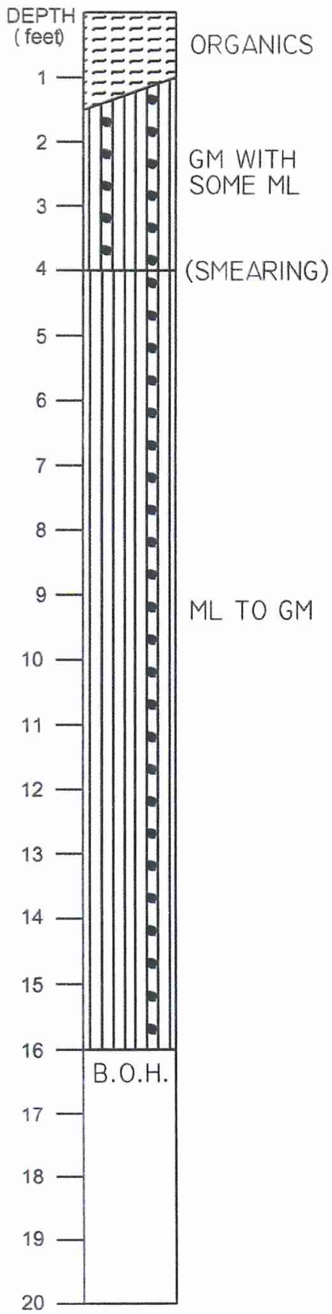
STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
4/22/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 5)

PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 1/7/2015



TEST HOLE #5

PAGE 1 OF 2

SOIL CLASSIFICATIONS

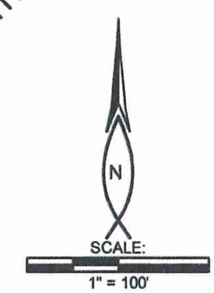
GW, GP, GM, GC, SW, SP, SM, SC

ORG, ML, CL, OL, MH, CH, OH

DEPTH TO GROUNDWATER	DATE
DRY	1/7/2015
DRY	1/15/2015
DRY	4/17/2015

SITE PLAN

SEE ATTACHED SITE PLAN



	DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
LOWER BENCH	1/8/2015	LIQUID LEVEL DID NOT DROP DURING PRE-SOAK				

PERCOLATION RATE >120 (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

SOILS 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

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STATE OF ALASKA
49 TH
Jeffrey A. Garness
CE-7953
1/28/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 5)

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

TEST HOLE #5

PAGE 2 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

SOIL CLASSIFICATIONS

GW, GP, GM, GC, SW, SP, SM, SC

ORG, ML, CL, OL, MH, CH, OH

DEPTH TO GROUNDWATER	DATE
SEE PAGE 1 OF 2	

SITE PLAN

SEE ATTACHED SITE PLAN

N

SCALE: 1" = 100'

UPPER BENCH

DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
1/16/2015	1	2:12	-	6"	-
	2	2:42	30	4-3/4"	1-1/4"
	3	2:42	-	6"	-
	4	3:12	30	4-3/4"	1-1/4"
	5	3:12	-	6"	-
	6	3:42	30	4-3/4"	1-1/4"

PERCOLATION RATE 24 (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: ROB CAMPBELL

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: 1/28/15

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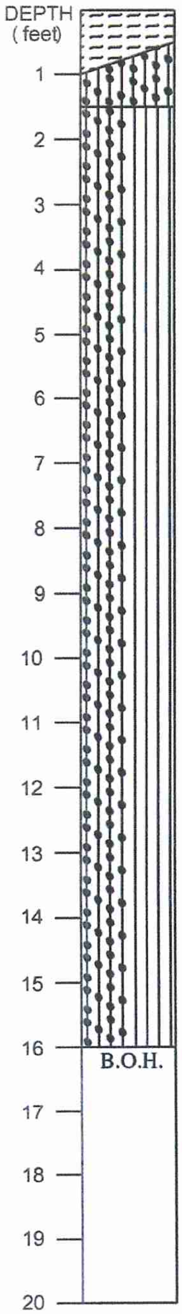
STATE OF ALASKA 49TH Jeffrey A. Garness CE-7953 4/22/15 REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: PROPOSED LEWIS AND CLARK S/D - 70 ACRE PARCEL OFF UPPER DEARMOUN RD.

PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 10/16/2014



ORGANICS

LOAM (SM)

SM/ML W/ SOME GRAVEL AND POCKETS OF GM THROUGHOUT (HARDPAN)

TEST HOLE #6

OLD TH#2

SOIL CLASSIFICATIONS

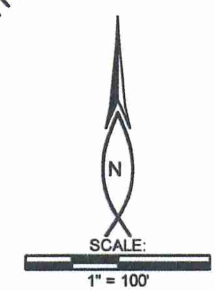
GW, GP, GM, GC, SW, SP, SM, SC

ORG, ML, CL, OL, MH, CH, OH

DEPTH TO GROUNDWATER	DATE
DRY	10/16/2014
DRY	10/27/2014
DRY	1/15/2015
DRY	4/17/2015

SITE PLAN

SEE ATTACHED SITE PLAN



DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
10/17/2014	1	2:50	-	6"	-
	2	3:20	30	3-1/4"	2-3/4"
	3	3:20	-	6"	-
	4	3:50	30	3-1/2"	2-1/2"
	5	3:50	-	6"	-
	6	4:20	30	3-1/2"	2-1/2"

PERCOLATION RATE 12 (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

SOILS LOGGED BY: JODY MAUS 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: 4/22/15

GARNESS ENGINEERING GROUP, Ltd

CIVIL & ENVIRONMENTAL ENGINEERS

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STATE OF ALASKA 49TH Jeffrey A. Garness CE-7953 4/22/15 REGISTERED PROFESSIONAL ENGINEER

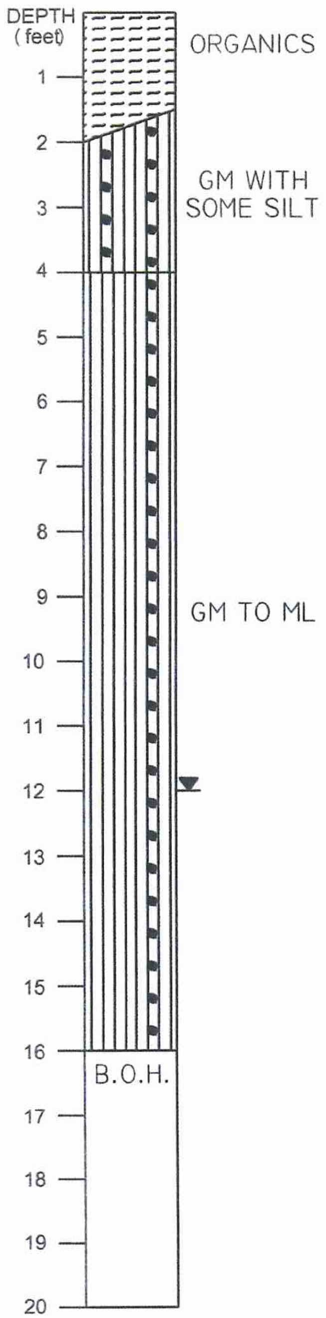
SOIL LOG - PERCOLATION TEST

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

PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 1/7/2015

TEST HOLE #7

PAGE 1 OF 2



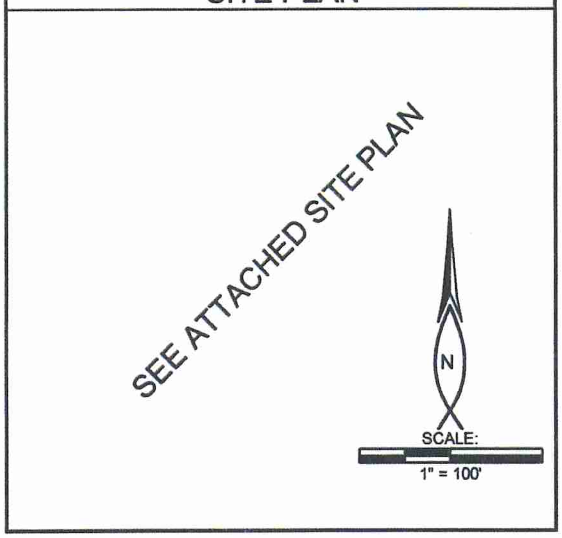
SOIL CLASSIFICATIONS

GW, GP, GM, GC, SW, SP, SM, SC

ORG, ML, CL, OL, MH, CH, OH

DEPTH TO GROUNDWATER	DATE
DRY	1/7/2015
12'	1/16/2015
DRY	4/17/2015

SITE PLAN



LOWER BENCH

DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
1/8/2015	1	1:53	-	6"	-
	2	2:23	30	5-1/2"	1/2"
	3	2:23	-	6"	-
	4	2:53	30	5-1/2"	1/2"
	5	2:53	-	6"	-
	6	3:23	30	5-1/2"	1/2"

PERCOLATION RATE 60 (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

SOILS 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

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STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
1/28/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

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

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

TEST HOLE #7

PAGE 2 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

SOIL CLASSIFICATIONS

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

DEPTH TO GROUNDWATER	DATE
SEE PAGE 1 OF 2	

SITE PLAN

SEE ATTACHED SITE PLAN

N

SCALE: 1" = 100'

UPPER BENCH

DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
1/16/2015	1	2:16	-	6"	-
	2	2:46	30	1-3/4"	4-1/4"
	3	2:46	-	6"	-
	4	3:16	30	1-3/4"	4-1/4"
	5	3:16	-	6"	-
	6	3:46	30	1-3/4"	4-1/4"

PERCOLATION RATE 7.1 (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: ROB CAMPBELL

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: 1/28/15

GARNESS ENGINEERING GROUP, Ltd
CIVIL & ENVIRONMENTAL ENGINEERS
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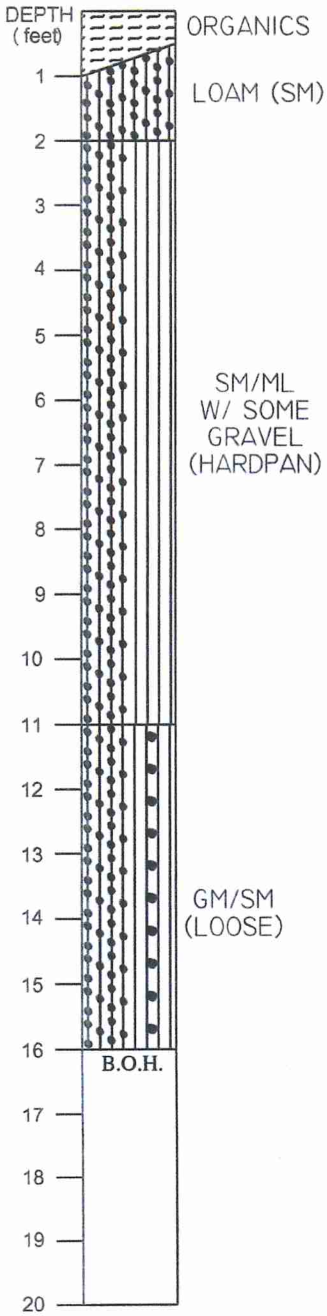
STATE OF ALASKA 49TH Jeffrey A. Garness CE-7953 4/22/15 REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 8)

PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 10/16/2014



TEST HOLE #8

OLD TH#1

SOIL CLASSIFICATIONS

GW, GP, GM, GC, SW, SP, SM, SC

ORG, ML, CL, OL, MH, CH, OH

DEPTH TO GROUNDWATER	DATE
DRY	10/16/2014
DRY	10/27/2014
DRY	1/15/2015
DRY	4/17/2015

SITE PLAN

SEE ATTACHED SITE PLAN

N

SCALE: 1" = 100'

DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
10/17/2014	1	2:45	-	6"	-
	2	3:15	30	5-1/8"	1/8"
	3	3:15	-	6"	-
	4	3:45	30	5-3/8"	5/8"
	5	3:45	-	6"	-
	6	4:15	30	5-3/8"	5/8"

PERCOLATION RATE 48 (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

SOILS LOGGED BY: JODY MAUS 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: 4/22/15

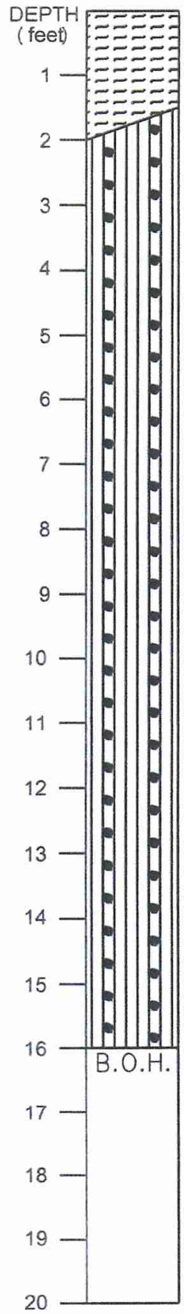
GARNESS ENGINEERING GROUP, Ltd
CIVIL & ENVIRONMENTAL ENGINEERS
3701 E. TUDOR ROAD, SUITE 101 * ANCHORAGE, AK 99507 * PHONE (907) 337-6179 * FAX (907) 338-3246 * WEBSITE: www.garnessengineering.com

STATE OF ALASKA
49 TH
Jeffrey A. Garness
CE-7953
4/22/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 9)

PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 1/7/2015



ORGANICS

GM WITH OCCASIONAL LENSES OF ML

TEST HOLE #9

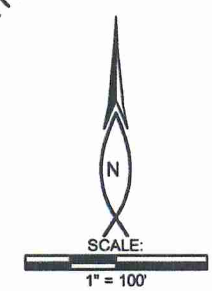
SOIL CLASSIFICATIONS

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

SITE PLAN

SEE ATTACHED SITE PLAN



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

SOILS 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

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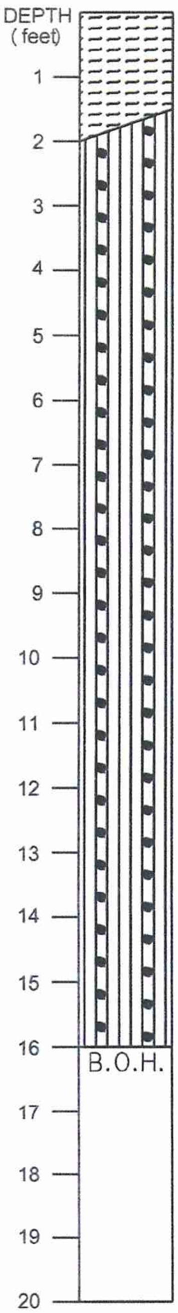
STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
4/22/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 10)

PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 1/7/2015

DEPTH (feet)



ORGANICS

GM WITH OCCASIONAL LENSES OF ML

TEST HOLE #10

SOIL CLASSIFICATIONS

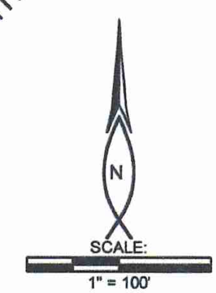
GW, GP, GM, GC, SW, SP, SM, SC

ORG, ML, CL, OL, MH, CH, OH

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

SITE PLAN

SEE ATTACHED SITE PLAN



DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
1/8/2015	1	1:45	-	6"	-
	2	2:15	30	0"	6"
	3	2:15	-	6"	-
	4	2:45	30	0"	6"
	5	2:45	-	6"	-
	6	3:15	30	0"	6"

PERCOLATION RATE 5 (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

SOILS 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

3701 E. TUDOR ROAD, SUITE 101 * ANCHORAGE, AK 99507 * PHONE (907) 337-6179 * FAX (907) 338-3246 * WEBSITE: www.garnessengineering.com

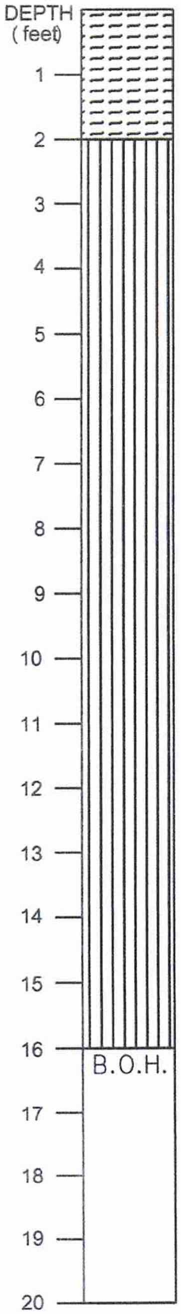
STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
4/22/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 11)

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

DEPTH (feet)



PEAT/ORGANICS

ML
W/ SOME
GM AND CL
THROUGHOUT

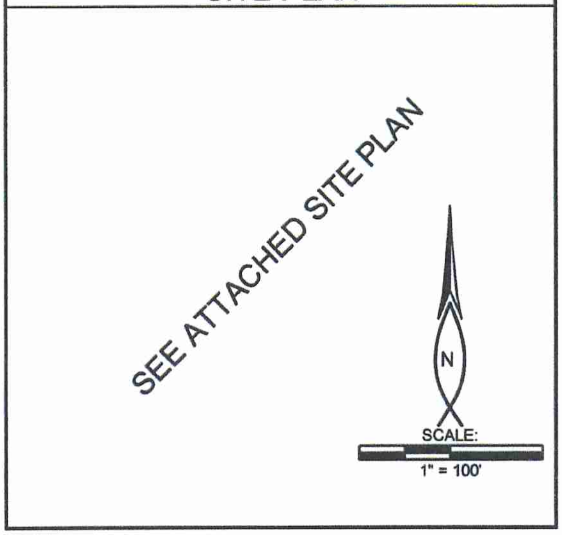
TEST HOLE #11

SOIL CLASSIFICATIONS

GW, GP, GM, GC, SW, SP, SM, SC

ORG, ML, CL, OL, MH, CH, OH

SITE PLAN



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)
1/2/2015	1	4:20	-	6"	-
↓	2	4:50	30	5-5/8"	3/8"
	3	4:50	-	6"	-
	4	5:20	30	5-5/8"	3/8"
	5	5:20	-	6"	-
	6	5:50	30	5-5/8"	3/8"

PERCOLATION RATE 80 (MIN./INCH) PERC. HOLE DIA. 6 (INCHES)

TEST RUN BETWEEN 4 FT. AND 5 FT.

A FOUR HOUR PRESOAK WAS PERFORMED: ■ YES ☐ NO

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

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

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STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
4/22/15
REGISTERED PROFESSIONAL ENGINEER

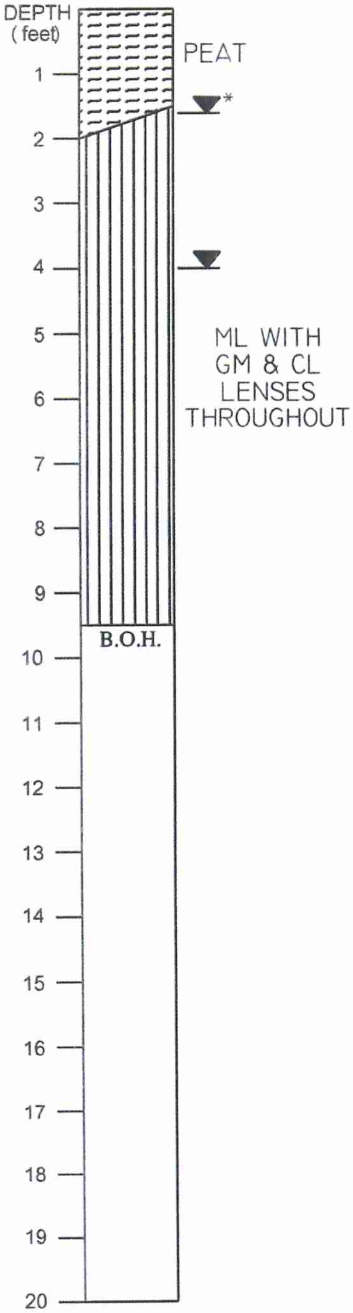
SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 11)

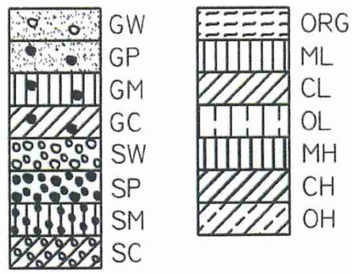
PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 10/16/2014

TEST HOLE #11A

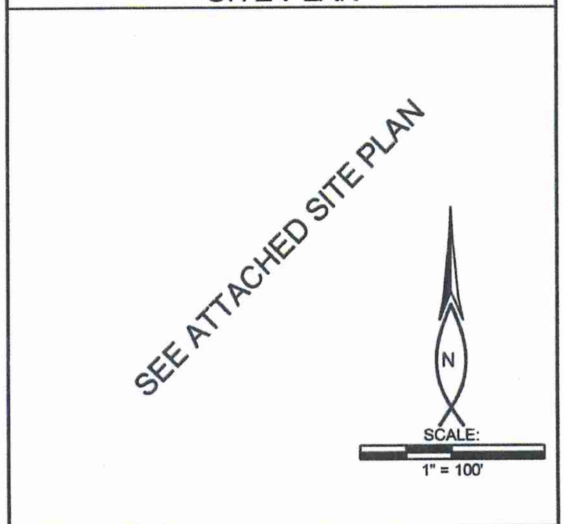
OLD TH#6



SOIL CLASSIFICATIONS



SITE PLAN



*MAY BE INFLUENCED SNOWMELT/RUNOFF

DEPTH TO GROUNDWATER	DATE
SEEPS @ 4'	10/16/2014
*1.7'	10/27/2014
DRY	1/16/2015
**3.5'	4/17/2015

**WATER IN BENCH AT 1.5' (PROBABLY FROM SNOWMELT)

DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
10/17/2014	1	2:00	-	6"	-
	2	2:30	30	3-7/8"	2-1/8"
	3	2:30	-	6"	-
	4	3:00	30	4-1/8"	1-7/8"
	5	3:00	-	6"	-
	6	3:30	30	4-1/8"	1-7/8"

PERCOLATION RATE 16 (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: 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

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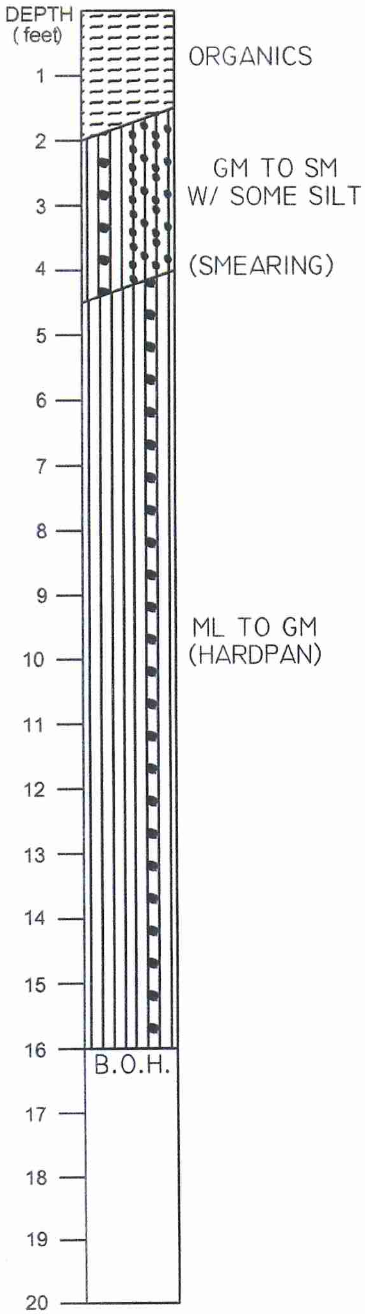
STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
4/22/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

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

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

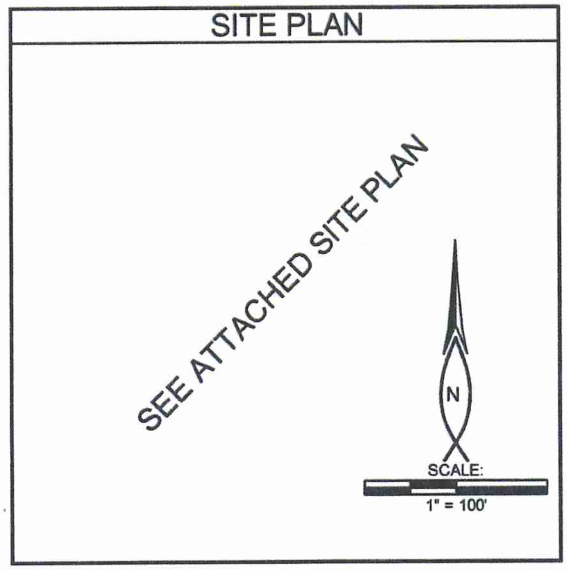


TEST HOLE #12
PAGE 1 OF 2

SOIL CLASSIFICATIONS

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

SITE PLAN



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

LOWER BENCH

DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
1/2/2015	1/4" DROP IN 3 HOURS - DID NOT PERK (RC)				
1/5/2015	DEEPENED 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

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

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STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
1/28/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

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

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

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

N

SCALE: 1" = 100'

UPPER BENCH

DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
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	3:56	20	0"	6"
	9	3:56	-	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: 1/28/15

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STATE OF ALASKA
49 TH
Jeffrey A. Garness
CE-7953
4/22/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

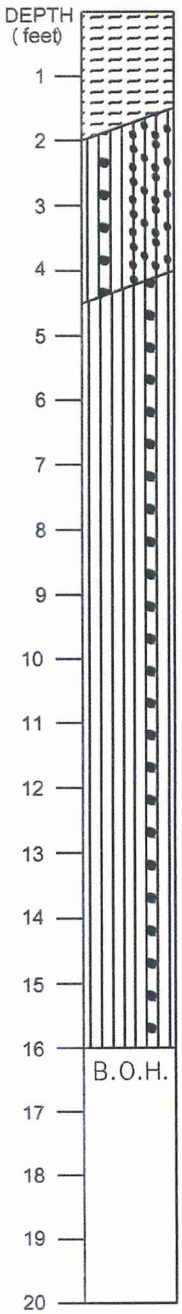
LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 13)

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

TEST HOLE #13

PAGE 1 OF 2

DEPTH (feet)



ORGANICS/PEAT (0 – 2 ft)

GM TO SM W/ SOME SILT (SMEARING) (2 – 4.5 ft)

ML TO GM (HARDPAN) (4.5 – 16 ft)

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

N

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 PRESOAK WAS PERFORMED: ■ YES ☐ NO

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

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STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
1/28/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 13)

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

TEST HOLE #13

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

SOIL CLASSIFICATIONS

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

DEPTH TO GROUNDWATER	DATE
SEE PAGE 1 OF 2	

SITE PLAN

SEE ATTACHED SITE PLAN

N

SCALE: 1" = 100'

UPPER BENCH

DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
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: 1/28/15

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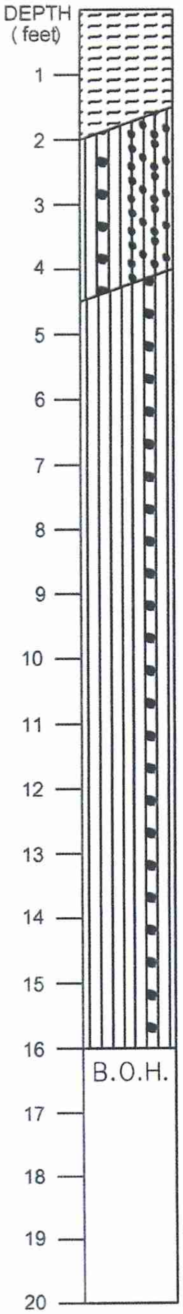
STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
4/22/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

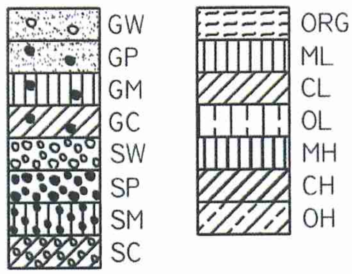
LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 14)

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

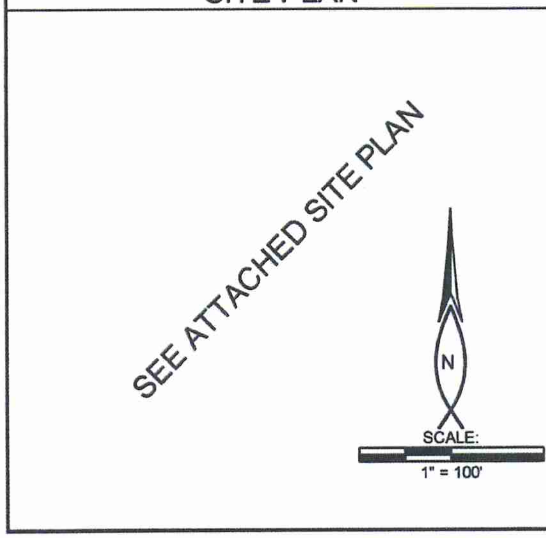
TEST HOLE #14
PAGE 1 OF 2



SOIL CLASSIFICATIONS



SITE PLAN



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

LOWER BENCH

DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
1/2/2015	NO DROP DURING PRE-SOAK (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 PRESOAK WAS PERFORMED: ■ YES ☐ NO

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

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STATE OF ALASKA 49TH Jeffrey A. Garness CE-7953 1/28/15 REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 14)

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

TEST HOLE #14

PAGE 2 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

SOIL CLASSIFICATIONS

GW, GP, GM, GC, SW, SP, SM, SC

ORG, ML, CL, OL, MH, CH, OH

DEPTH TO GROUNDWATER	DATE
SEE PAGE 1 OF 2	

SITE PLAN

SEE ATTACHED SITE PLAN

N

SCALE: 1" = 100'

UPPER BENCH

DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
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. GARNESS, CERTIFY THAT THIS WAS PERFORMED IN ACCORDANCE WITH ALL STATE AND MUNICIPAL GUIDELINES IN EFFECT ON THIS DATE: 1/28/15

STATE OF ALASKA 49TH Jeffrey A. Garness CE-7953 4/22/15 REGISTERED PROFESSIONAL ENGINEER

GARNESS ENGINEERING GROUP, Ltd

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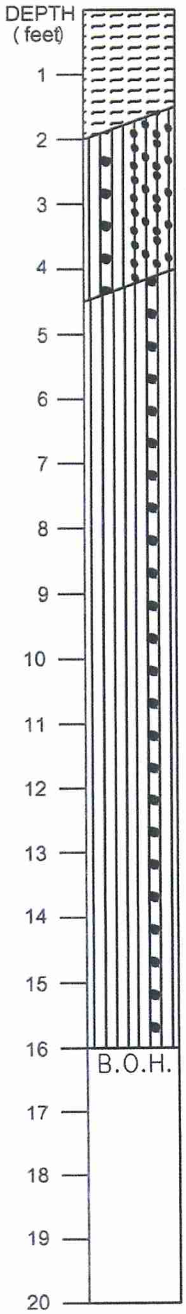
SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 15)

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

TEST HOLE #15



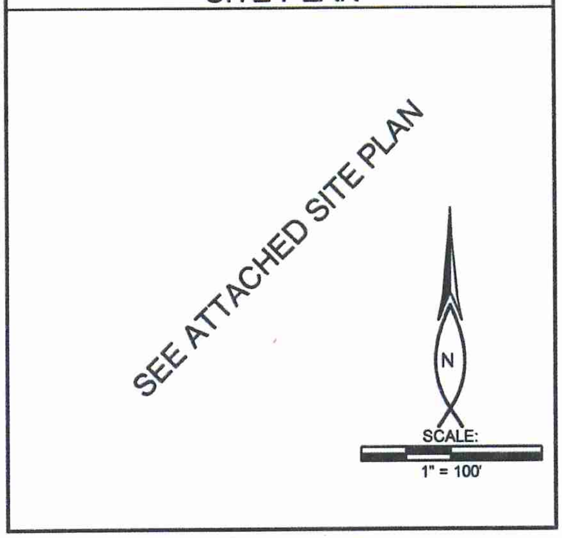
SOIL CLASSIFICATIONS

GW, GP, GM, GC, SW, SP, SM, SC

ORG, ML, CL, OL, MH, CH, OH

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

SITE PLAN



	DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
LOWER BENCH	1/6/2015	1	2:25	-	6"	-
		2	2:55	30	5-3/4"	1/4"
		3	2:55	-	6"	-
		4	3:25	30	5-3/4"	1/4"
		5	3:25	-	6"	-
		6	3:55	30	5-3/4"	1/4"

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

TEST RUN BETWEEN 5 FT. AND 6 FT.

A FOUR HOUR PRESOAK WAS PERFORMED: ■ YES ☐ NO

SOILS 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

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STATE OF ALASKA 49TH Jeffrey A. Garness CE-7953 1/28/15 REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 15)

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

TEST HOLE #15

PAGE 2 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

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

N

SCALE: 1" = 100'

	DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
UPPER BENCH	1/14/2015	1	3:27	-	6"	-
		2	3:57	30	2-15/16"	3-1/16"
		3	3:57	-	6"	-
		4	4:27	30	3"	3"
		5	4:27	-	6"	-
		6	4:57	30	3"	3"

PERCOLATION RATE 10 (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: ROD CAMPBELL

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: 1/28/15

GARNESS ENGINEERING GROUP, Ltd

CIVIL & ENVIRONMENTAL ENGINEERS

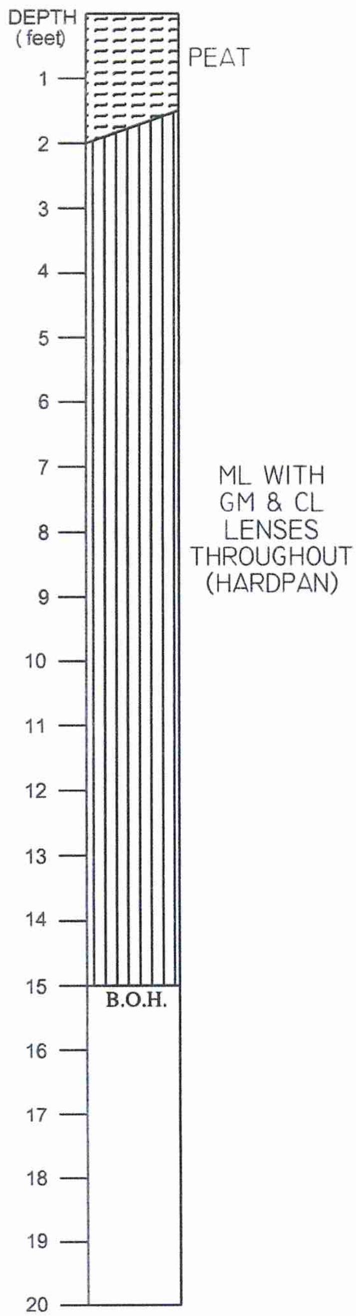
3701 E. TUDOR ROAD, SUITE 101 * ANCHORAGE, AK 99507 * PHONE (907) 337-6179 * FAX (907) 338-3246 * WEBSITE: www.garnessengineering.com

STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
4/22/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 15)

PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 10/17/2014



TEST HOLE #15A

OLD TH#5

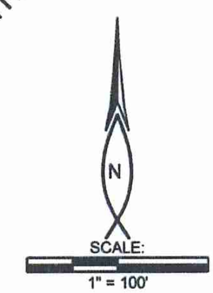
SOIL CLASSIFICATIONS

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

DEPTH TO GROUNDWATER	DATE
DRY	10/17/2014
DRY	10/27/2014
DRY	1/15/2015
DRY	4/17/2015

SITE PLAN

SEE ATTACHED SITE PLAN



DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
10/27/2014	1	2:49	-	6"	-
	2	3:19	30	4-3/4"	1-1/4"
	3	3:19	-	6"	-
	4	3:49	30	4-3/4"	1-1/4"
	5	3:49	-	6"	-
	6	4:19	30	4-3/4"	1-1/4"

PERCOLATION RATE 24 (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

SOILS LOGGED BY: JODY MAUS PERCOLATION TEST PERFORMED BY: PIERCE BLEWETT & 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: ____________

GARNESS ENGINEERING GROUP, Ltd

CIVIL & ENVIRONMENTAL ENGINEERS

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STATE OF ALASKA
49 TH
Jeffrey A. Garness
CE-7953
1/28/15
REGISTERED PROFESSIONAL ENGINEER

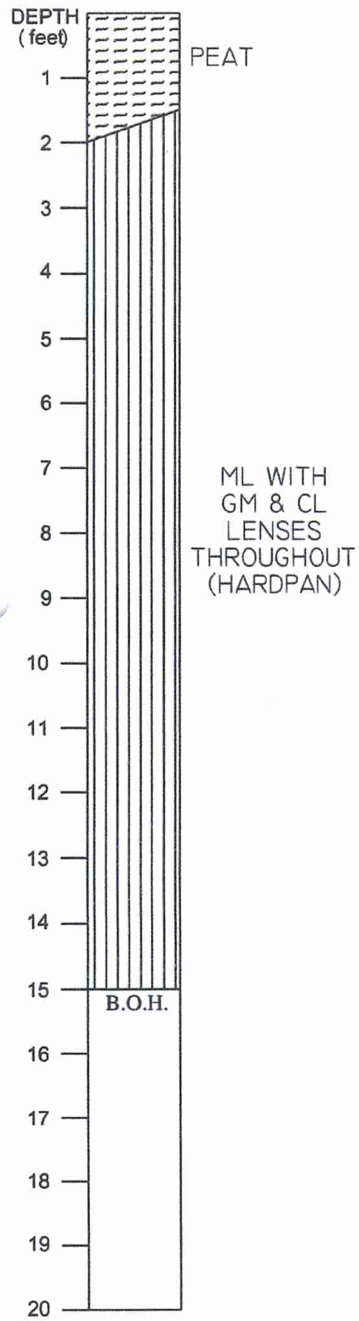
SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 15)

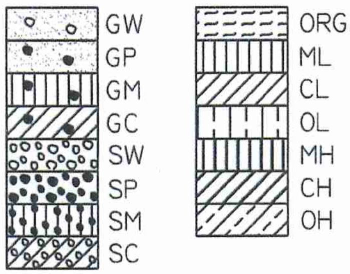
PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 10/17/2014

TEST HOLE #15A

OLD TH#5



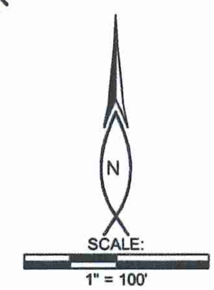
SOIL CLASSIFICATIONS



DEPTH TO GROUNDWATER	DATE
DRY	10/17/2014
DRY	10/27/2014
DRY	1/15/2015

SITE PLAN

SEE ATTACHED SITE PLAN



DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
10/27/2014	1	2:49	-	6"	-
	2	3:19	30	4-3/4"	1-1/4"
	3	3:19	-	6"	-
	4	3:49	30	4-3/4"	1-1/4"
	5	3:49	-	6"	-
	6	4:19	30	4-3/4"	1-1/4"

PERCOLATION RATE 24 (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

SOILS LOGGED BY: JODY MAUS PERCOLATION TEST PERFORMED BY: PIERCE BLEWETT & 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: 1/28/15

GARNESS ENGINEERING GROUP, Ltd

CIVIL & ENVIRONMENTAL ENGINEERS

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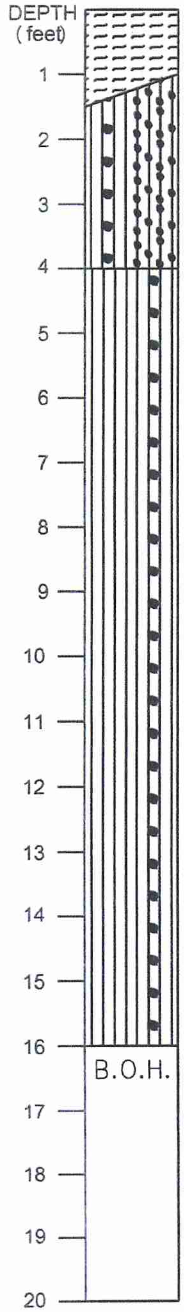
STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
4/22/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

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

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



TEST HOLE #16

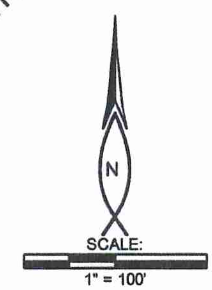
PAGE 1 OF 2

SOIL CLASSIFICATIONS

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

SITE PLAN

SEE ATTACHED SITE PLAN



DEPTH TO GROUNDWATER	DATE
DRY	1/2/2015
DRY	1/16/2015
DRY	4/17/2015

LOWER BENCH

DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
1/5/2015	1	2:45	-	6"	-
↓	2	3:15	30	5-7/8"	1/8"
	3	3:15	-	6"	-
	4	3:45	30	>5-7/8"	<1/8"
STOPPED READINGS					

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

TEST RUN BETWEEN 5 FT. AND 6 FT.

A FOUR HOUR PRESOAK WAS PERFORMED: ■ YES ☐ NO

SOILS LOGGED BY: ROB CAMPBELL/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

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STATE OF ALASKA 49TH Jeffrey A. Garness CE-7953 1/28/15 REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

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

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

TEST HOLE #16

PAGE 2 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

SOIL CLASSIFICATIONS

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

DEPTH TO GROUNDWATER	DATE
SEE PAGE 1 OF 2	

SITE PLAN

SEE ATTACHED SITE PLAN

N

SCALE: 1" = 100'

	DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
UPPER BENCH	1/14/2015	1	3:34	-	6"	-
		2	4:04	30	0"	6"
		3	4:04	-	6"	-
		4	4:34	30	0"	6"
		5	4:34	-	6"	-
		6	5:04	30	0"	6"

PERCOLATION RATE 5 (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: ROD CAMPBELL

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: 1/28/15

GARNESS ENGINEERING GROUP, Ltd

CIVIL & ENVIRONMENTAL ENGINEERS

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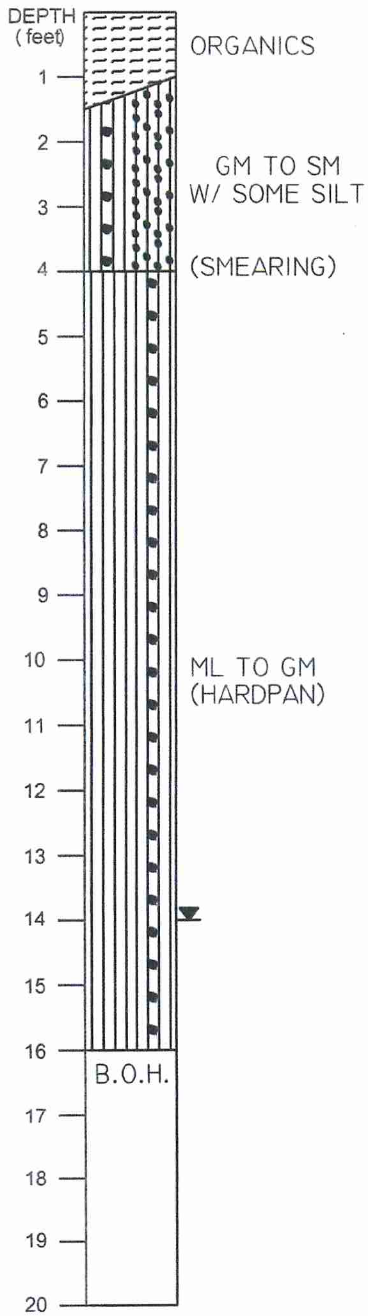
STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
4/22/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 17)

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

TEST HOLE #17

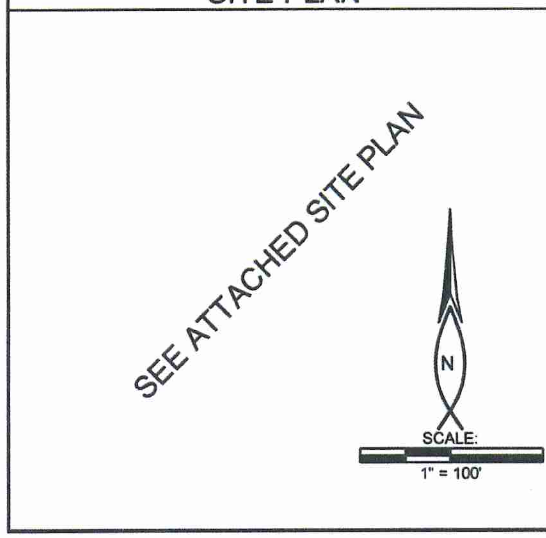


SOIL CLASSIFICATIONS

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

DEPTH TO GROUNDWATER	DATE
DRY	1/2/2015
14'	1/16/2015
DRY	4/17/2015

SITE PLAN



LOWER BENCH

DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
1/5/2015	1	2:50	-	6"	-
↓	2	3:20	30	6"	0"
STOPPED READINGS					

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

TEST RUN BETWEEN 5 FT. AND 6 FT.

A FOUR HOUR PRESOAK WAS PERFORMED: ■ YES ☐ NO

SOILS LOGGED BY: ROB CAMPBELL/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

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STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
1/28/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 17)

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

TEST HOLE #17

PAGE 2 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

SOIL CLASSIFICATIONS

GW, GP, GM, GC, SW, SP, SM, SC

ORG, ML, CL, OL, MH, CH, OH

DEPTH TO GROUNDWATER	DATE
SEE PAGE 1 OF 2	

SITE PLAN

SEE ATTACHED SITE PLAN

N

SCALE: 1" = 100'

	DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
UPPER BENCH	1/14/2015	1	3:39	-	6"	-
	↓	2	4:09	30	2"	4"
		3	4:09	-	6"	-
		4	4:39	30	2"	4"
		5	4:39	-	6"	-
		6	5:09	30	2"	4"

PERCOLATION RATE 7.5 (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: ROD CAMPBELL

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: 1/28/15

GARNESS ENGINEERING GROUP, Ltd

CIVIL & ENVIRONMENTAL ENGINEERS

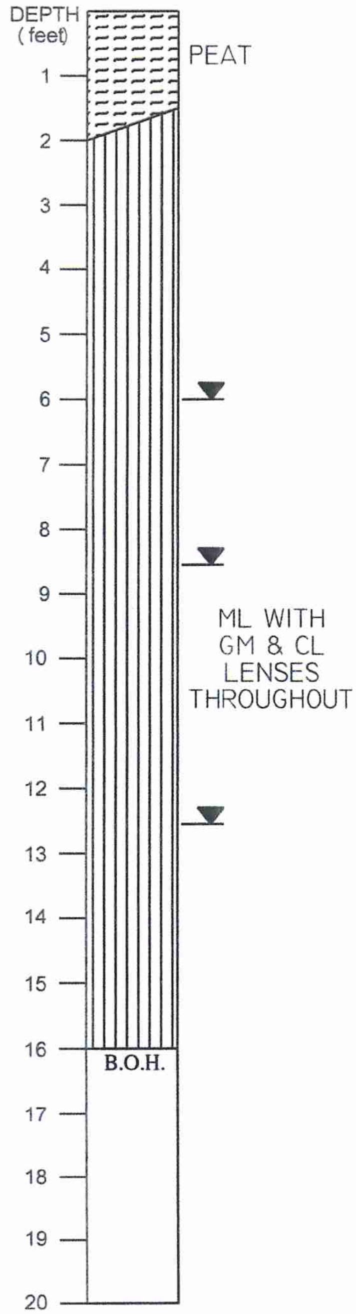
3701 E. TUDOR ROAD, SUITE 101 * ANCHORAGE, AK 99507 * PHONE (907) 337-6179 * FAX (907) 338-3246 * WEBSITE: www.garnessengineering.com

STATE OF ALASKA
49 TH
Jeffrey A. Garness
CE-7953
4/22/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 17)

PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 10/16/2014



TEST HOLE #17A

OLD TH#8

SOIL CLASSIFICATIONS

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

DEPTH TO GROUNDWATER	DATE
SEEP @ 8.5'	10/16/2014
5.95'	10/27/2014
12.6'	1/16/2015
DRY	4/17/2015

SITE PLAN

SEE ATTACHED SITE PLAN

N

SCALE: 1" = 100'

DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
10/17/2014	1	2:05	-	6"	-
	2	2:35	30	4"	2"
	3	2:35	-	6"	-
	4	3:35	60	2-3/4"	3-1/4"
	5	3:35	-	6"	-
	6	4:05	30	4-1/4"	1-3/4"
	7	4:05	-	6"	-
	8	4:35	30	4-1/4"	1-3/4"

PERCOLATION RATE 17.1 (MIN./INCH) PERC. HOLE DIA. 6 (INCHES)

TEST RUN BETWEEN 4 FT. AND 5 FT.

A FOUR HOUR PRESOAK WAS PERFORMED: ■ YES ☐ NO

SOILS 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

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STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
4/22/15
REGISTERED PROFESSIONAL ENGINEER

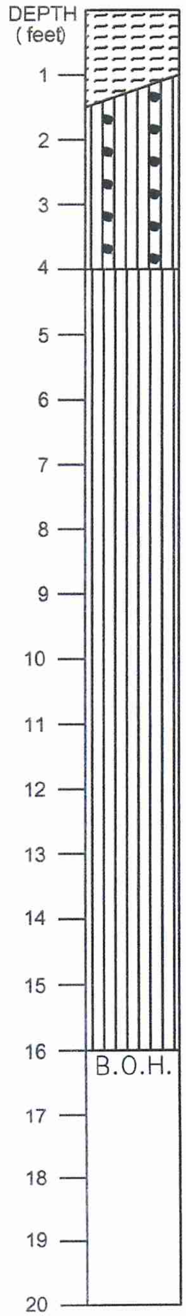
SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 18)

PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 1/5/2015

TEST HOLE #18

PAGE 1 OF 2



ORGANICS

GM WITH SOME SILT

(SMEARING)

ML WITH SOME GRAVEL

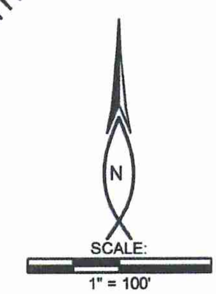
SOIL CLASSIFICATIONS

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

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

SITE PLAN

SEE ATTACHED SITE PLAN



LOWER BENCH

DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
1/5/2015	1	2:55	-	6"	-
↓	2	3:25	30	6"	0"
STOPPED READINGS					

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

TEST RUN BETWEEN 5 FT. AND 6 FT.

A FOUR HOUR PRESOAK WAS PERFORMED: ■ YES ☐ NO

SOILS 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
3701 E. TUDOR ROAD, SUITE 101 * ANCHORAGE, AK 99507 * PHONE (907) 337-6179 * FAX (907) 338-3246 * WEBSITE: www.garnessengineering.com

STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
1/28/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 18)

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

TEST HOLE #18

PAGE 2 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

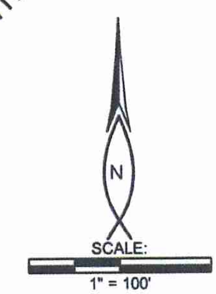
SOIL CLASSIFICATIONS

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

DEPTH TO GROUNDWATER	DATE
SEE PAGE 1 OF 2	

SITE PLAN

SEE ATTACHED SITE PLAN



	DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
UPPER BENCH	1/14/2015	1	3:42	-	6"	-
		2	4:12	30	5-3/8"	5/8"
		3	4:12	-	6"	-
		4	4:42	30	5-3/8"	5/8"
		5	4:42	-	6"	-
		6	5:12	30	5-3/8"	5/8"

PERCOLATION RATE 48 (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: ROD CAMPBELL

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: 1/28/15

GARNESS ENGINEERING GROUP, Ltd

CIVIL & ENVIRONMENTAL ENGINEERS

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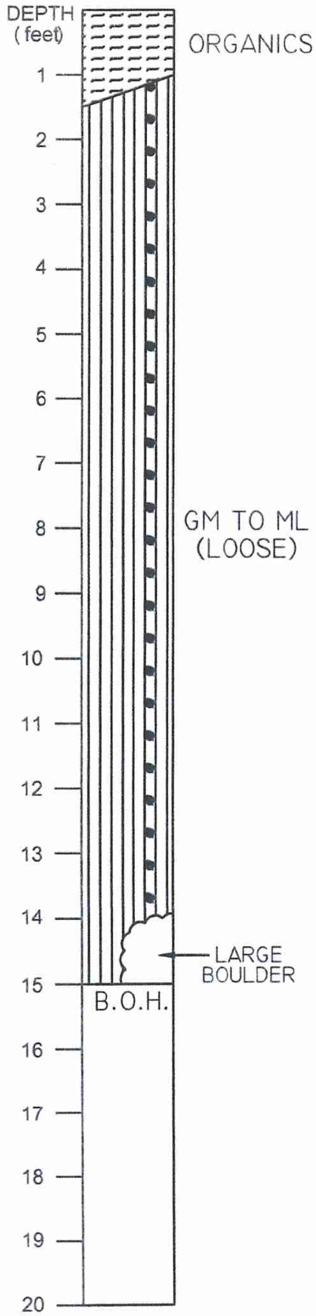
STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
4/22/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

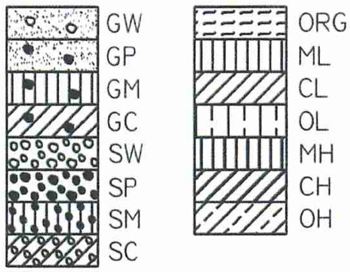
LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 19)

PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 1/5/2015



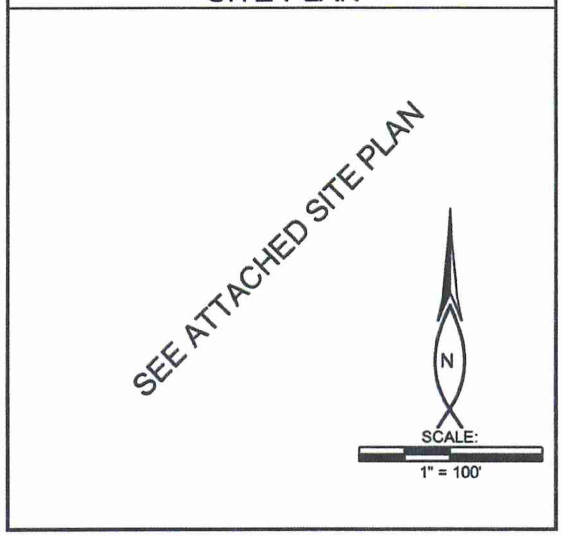
TEST HOLE #19

SOIL CLASSIFICATIONS



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

SITE PLAN



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 DIA. 6 (INCHES)

TEST RUN BETWEEN 6 FT. AND 7 FT.

A FOUR HOUR PRESOAK WAS PERFORMED: ■ YES ☐ NO

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

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

3701 E. TUDOR ROAD, SUITE 101 * ANCHORAGE, AK 99507 * PHONE (907) 337-6179 * FAX (907) 338-3246 * WEBSITE: www.garnessengineering.com

STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
4/22/15
REGISTERED PROFESSIONAL ENGINEER

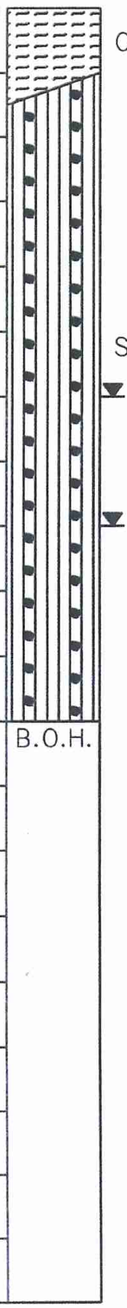
SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 20)

PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 1/5/2015

DEPTH (feet)

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



ORGANICS

GM W/ SOME SILT

B.O.H.

TEST HOLE #20

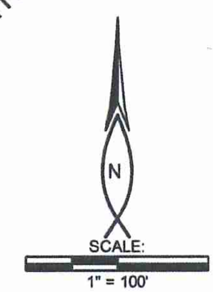
SOIL CLASSIFICATIONS

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

DEPTH TO GROUNDWATER	DATE
8'	1/5/2015
6'	1/16/2015
6.5'	4/17/2015

SITE PLAN

SEE ATTACHED SITE PLAN



DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
1/6/2015	1	2:41	-	6"	-
	2	3:11	30	1"	5"
	3	3:11	-	6"	-
	4	3:41	30	2"	4"
	5	3:41	-	6"	-
	6	4:11	30	2"	4"

PERCOLATION RATE 7.5 (MIN./INCH) PERC. HOLE DIA. 6 (INCHES)

TEST RUN BETWEEN 3.5 FT. AND 4.5 FT.

A FOUR HOUR PRESOAK WAS PERFORMED: ■ YES ☐ NO

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

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

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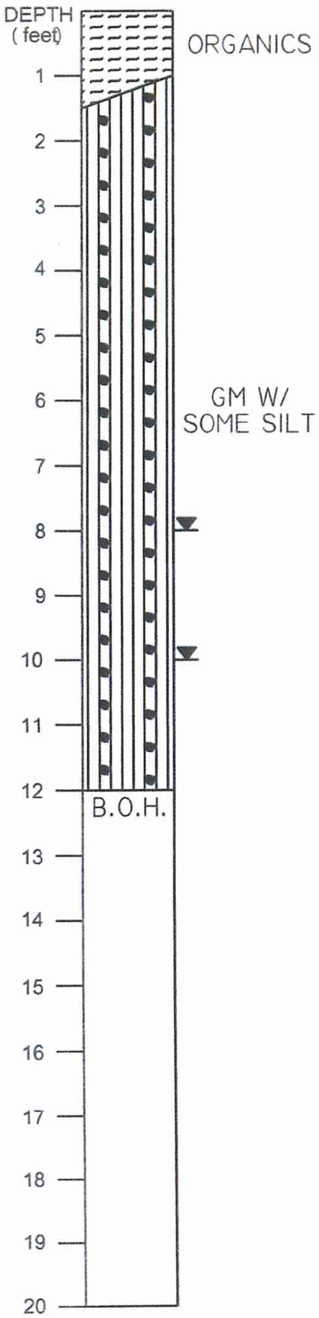
STATE OF ALASKA 49TH Jeffrey A. Garness CE-7953 4/22/15 REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 21)

PERFORMED FOR: BIG COUNTRY ENTERPRISES LLC / S4 GROUP DATE: 1/5/2015



TEST HOLE #21

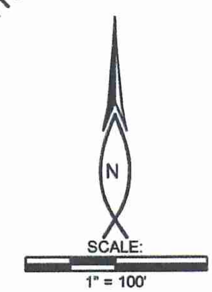
SOIL CLASSIFICATIONS

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

DEPTH TO GROUNDWATER	DATE
10'	1/5/2015
8'	1/16/2015
8.5'	4/17/2015

SITE PLAN

SEE ATTACHED SITE PLAN



DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
1/6/2015	1	2:38	-	6"	-
	2	3:08	30	2"	4"
	3	3:08	-	6"	-
	4	3:38	30	2"	4"
	5	3:38	-	6"	-
	6	4:08	30	2"	4"

PERCOLATION RATE 7.5 (MIN./INCH) PERC. HOLE DIA. 6 (INCHES)

TEST RUN BETWEEN 4 FT. AND 5 FT.

A FOUR HOUR PRESOAK WAS PERFORMED: ■ YES ☐ NO

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

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

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CIVIL & ENVIRONMENTAL ENGINEERS
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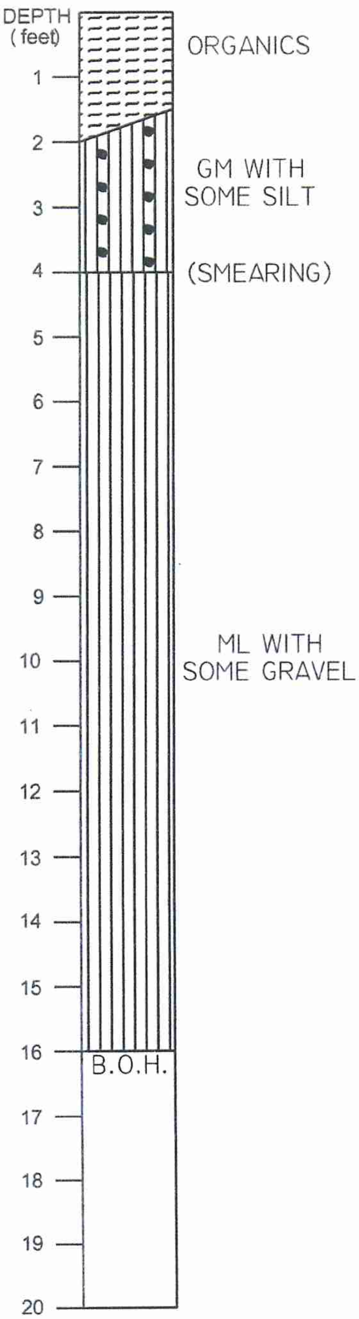
STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
4/22/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 22)

PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 1/5/2015

TEST HOLE #22



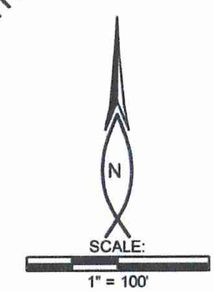
SOIL CLASSIFICATIONS

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

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

SITE PLAN

SEE ATTACHED SITE PLAN



LOWER BENCH

DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
1/6/2015	LIQUID LEVEL DID NOT DROP DURING PRE-SOAK				

PERCOLATION RATE >120 (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

SOILS 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

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STATE OF ALASKA 49TH Jeffrey A. Garness CE-7953 1/28/15 REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 22)

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

TEST HOLE #22

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

SOIL CLASSIFICATIONS

GW, GP, GM, GC, SW, SP, SM, SC

ORG, ML, CL, OL, MH, CH, OH

DEPTH TO GROUNDWATER	DATE
SEE PAGE 1 OF 2	

SITE PLAN

SEE ATTACHED SITE PLAN

N

SCALE: 1" = 100'

	DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
UPPER BENCH	1/15/2015	1	3:30	-	6"	-
	↓	2	4:00	30	0"	6"
		3	4:00	-	6"	-
		4	4:30	30	0"	6"
		5	4:30	-	6"	-
		6	5:00	30	0"	6"

PERCOLATION RATE 5 (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: 1/28/15

GARNESS ENGINEERING GROUP, Ltd

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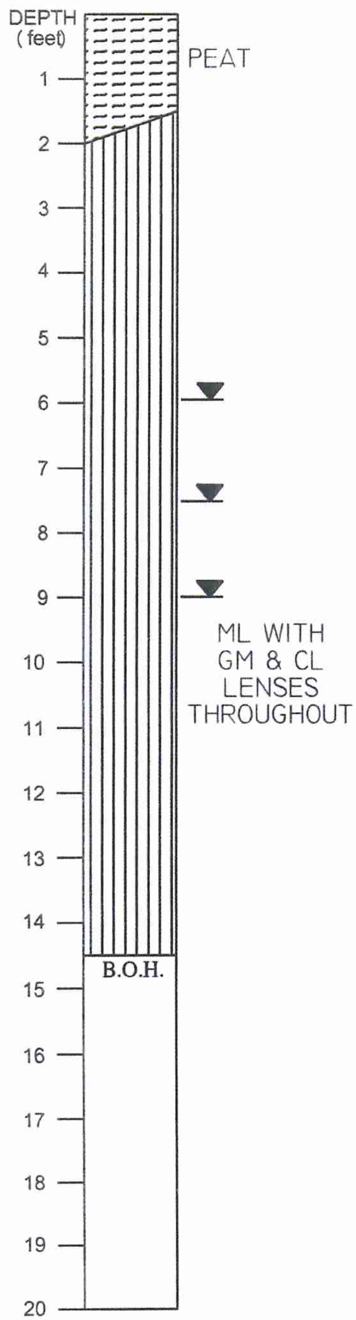
STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7958
4/22/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 22)

PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 10/16/2014



TEST HOLE #22A

OLD TH#7

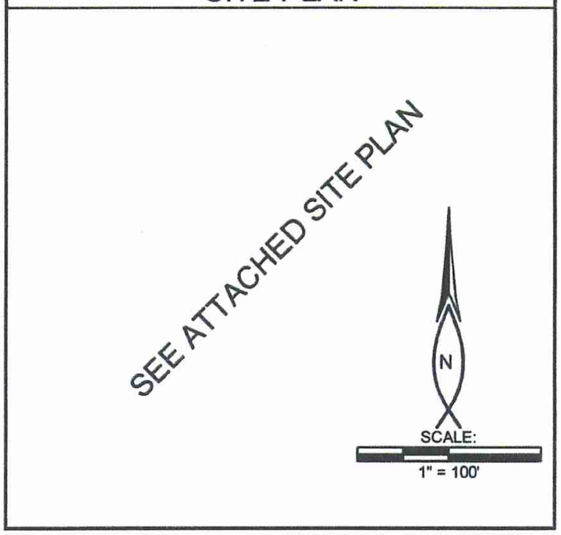
SOIL CLASSIFICATIONS

GW, GP, GM, GC, SW, SP, SM, SC

ORG, ML, CL, OL, MH, CH, OH

DEPTH TO GROUNDWATER	DATE
SEEPS @ 7.5'-9.5'	10/16/2014
5.9'	10/27/2014
9'	1/16/2015
DRY	4/17/2015

SITE PLAN



DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
10/17/2014	1	2:10	-	6"	-
	2	2:40	30	2-1/2"	3-1/2"
	3	2:40	-	6"	-
	4	3:40	60	2-1/4"	3-3/4"
	5	3:40	-	6"	-
	6	4:10	30	4"	2"
	7	4:10	-	6"	-
	8	4:40	30	4"	2"

PERCOLATION RATE 15 (MIN./INCH) PERC. HOLE DIA. 6 (INCHES)

TEST RUN BETWEEN 4 FT. AND 5 FT.

A FOUR HOUR PRESOAK WAS PERFORMED: ■ YES ☐ NO

SOILS 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

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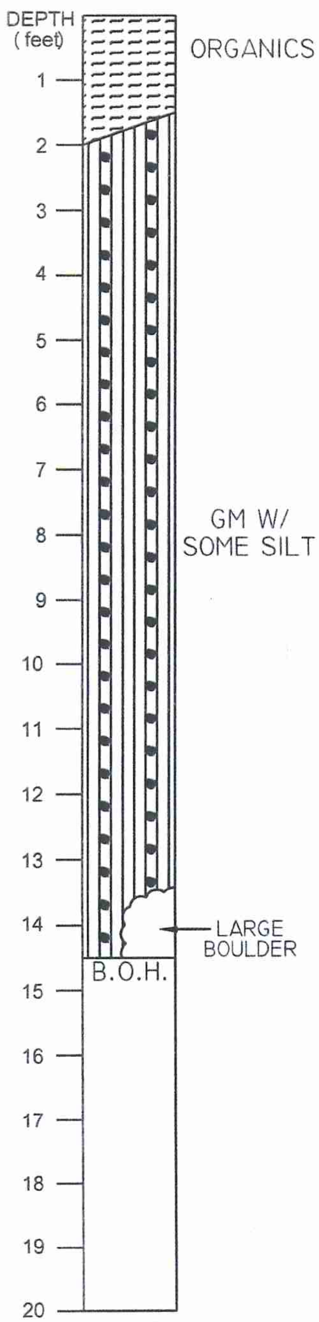
STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
4/22/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 23)

PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 1/5/2015



TEST HOLE #23

SOIL CLASSIFICATIONS

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

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

SITE PLAN

SEE ATTACHED SITE PLAN

N

SCALE: 1" = 100'

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

PERCOLATION RATE 10 (MIN./INCH) PERC. HOLE DIA. 6 (INCHES)

TEST RUN BETWEEN 5 FT. AND 6 FT.

A FOUR HOUR PRESOAK WAS PERFORMED: ■ YES ☐ NO

SOILS 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

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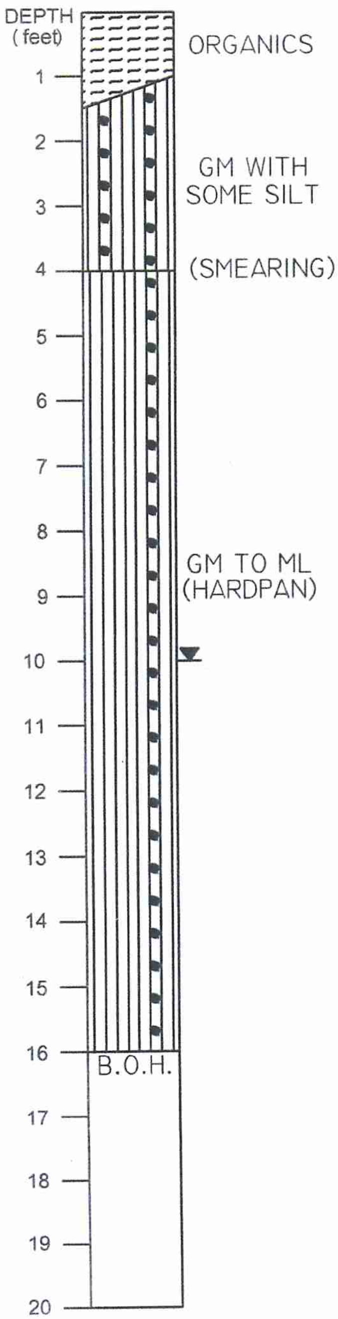
STATE OF ALASKA 49TH Jeffrey A. Garness CE-7953 4/22/15 REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 24)

PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 1/5/2015

TEST HOLE #24



SOIL CLASSIFICATIONS

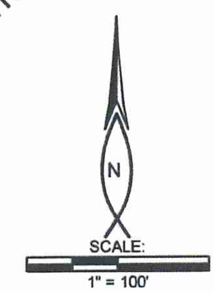
GW, GP, GM, GC, SW, SP, SM, SC

ORG, ML, CL, OL, MH, CH, OH

DEPTH TO GROUNDWATER	DATE
DRY	1/5/2015
10'	1/16/2015
11'	1/16/2015

SITE PLAN

SEE ATTACHED SITE PLAN



	DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
LOWER BENCH	1/6/2015	1	2:33	-	6"	-
		2	3:03	30	5-1/2"	1/2"
		3	3:03	-	6"	-
		4	3:33	30	5-1/2"	1/2"
		5	3:33	-	6"	-
		6	4:03	30	5-1/2"	1/2"

PERCOLATION RATE 60 (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

SOILS LOGGED BY: ROB CAMPBELL/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
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STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
1/28/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 24)

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

TEST HOLE #24

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

SOIL CLASSIFICATIONS

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

DEPTH TO GROUNDWATER	DATE
SEE PAGE 1 OF 2	

SITE PLAN

SEE ATTACHED SITE PLAN

N

SCALE: 1" = 100'

UPPER BENCH

DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
1/15/2015	1	3:25	-	6"	-
	2	3:55	30	0"	6"
	3	3:55	-	6"	-
	4	4:25	30	0"	6"
	5	4:25	-	6"	-
	6	4:55	30	0"	6"

PERCOLATION RATE 5 (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: 1/28/15

GARNESS ENGINEERING GROUP, Ltd

CIVIL & ENVIRONMENTAL ENGINEERS

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STATE OF ALASKA * 49TH * Jeffrey A. Garness CE-7953 4/22/15 REGISTERED PROFESSIONAL ENGINEER

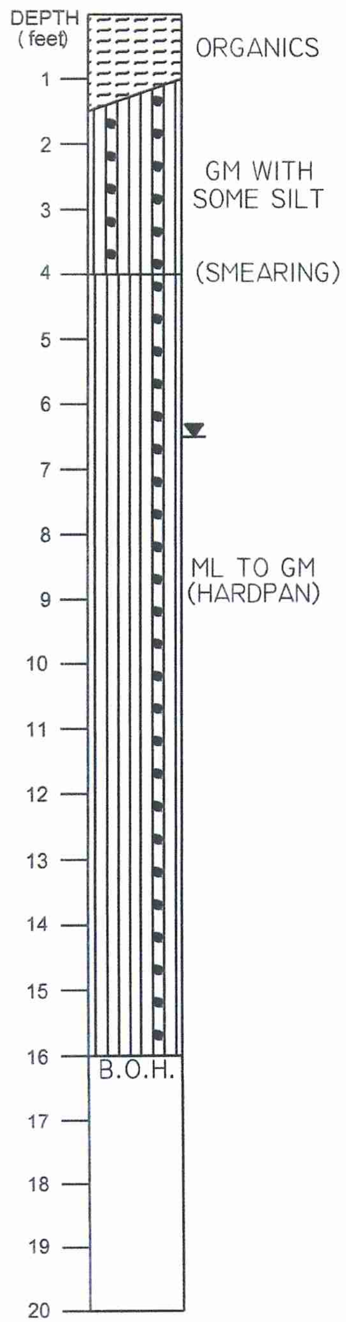
SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 25)

PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 1/5/2015

TEST HOLE #25

PAGE 1 OF 2



SOIL CLASSIFICATIONS

GW, GP, GM, GC, SW, SP, SM, SC

ORG, ML, CL, OL, MH, CH, OH

DEPTH TO GROUNDWATER	DATE
DRY	1/5/2015
6.5'	1/16/2015
11'	4/17/2015

SITE PLAN

SEE ATTACHED SITE PLAN

N

SCALE: 1" = 100'

	DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
LOWER BENCH	1/6/2015	1	2:30	-	6"	-
		2	3:00	30	5-3/4"	1/4"
		3	3:00	-	6"	-
		4	3:30	30	5-3/4"	1/4"
		5	3:30	-	6"	-
		6	4:00	30	5-3/4"	1/4"

PERCOLATION RATE 120 (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

SOILS LOGGED BY: ROB CAMPBELL/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
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STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
1/28/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 25)

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

TEST HOLE #25

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

SOIL CLASSIFICATIONS

GW, GP, GM, GC, SW, SP, SM, SC

ORG, ML, CL, OL, MH, CH, OH

DEPTH TO GROUNDWATER	DATE
SEE PAGE 1 OF 2	

SITE PLAN

SEE ATTACHED SITE PLAN

N

SCALE: 1" = 100'

	DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
UPPER BENCH	1/15/2015	1	3:20	-	6"	-
	↓	2	3:50	30	5-1/8"	7/8"
		3	3:50	-	6"	-
		4	4:20	30	5-1/8"	7/8"
		5	4:20	-	6"	-
		6	4:50	30	5-1/8"	7/8"

PERCOLATION RATE 34.3 (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: 1/28/15

GARNESS ENGINEERING GROUP, Ltd

CIVIL & ENVIRONMENTAL ENGINEERS

3701 E. TUDOR ROAD, SUITE 101 * ANCHORAGE, AK 99507 * PHONE (907) 337-6179 * FAX (907) 338-3246 * WEBSITE: www.garnessengineering.com

STATE OF ALASKA · 49TH · Jeffrey A. Garness · CE-7953 · 4/22/15 · REGISTERED PROFESSIONAL ENGINEER

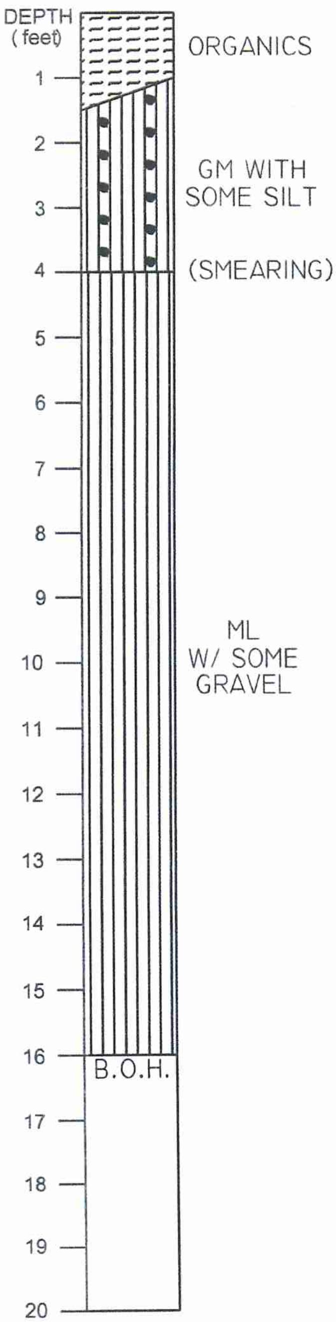
SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 26)

PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 1/6/2015

TEST HOLE #26

PAGE 1 OF 2

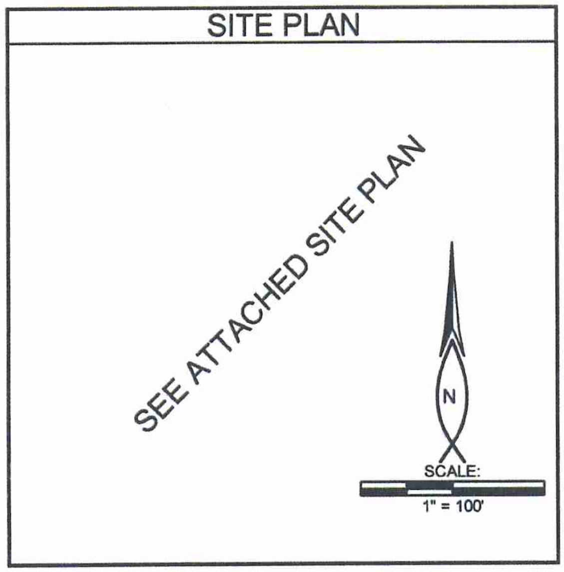


SOIL CLASSIFICATIONS

GW, GP, GM, GC, SW, SP, SM, SC

ORG, ML, CL, OL, MH, CH, OH

DEPTH TO GROUNDWATER	DATE
DRY	1/6/2015
DRY	1/15/2015
DRY	4/17/2015



	DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
LOWER BENCH	1/7/2015	1	2:28	-	6"	-
		2	2:58	30	5-3/4"	1/4"
		3	2:58	-	6"	-
		4	3:28	30	5-3/4"	1/4"
		5	3:28	-	6"	-
		6	3:58	30	5-3/4"	1/4"

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

TEST RUN BETWEEN 5 FT. AND 6 FT.

A FOUR HOUR PRESOAK WAS PERFORMED: ■ YES ☐ NO

SOILS LOGGED BY: ROB CAMPBELL/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

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STATE OF ALASKA ★ 49 TH ★ Jeffrey A. Garness CE-7953 1/28/15 REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 26)

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

TEST HOLE #26

PAGE 2 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

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

N

SCALE: 1" = 100'

	DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
UPPER BENCH	1/15/2015	1	3:40	-	6"	-
		2	4:10	30	0"	6"
		3	4:10	-	6"	-
		4	4:40	30	0"	6"
		5	4:40	-	6"	-
		6	5:10	30	0"	6"

PERCOLATION RATE 5 (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: ROB CAMPBELL

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: 1/28/15

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CIVIL & ENVIRONMENTAL ENGINEERS

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STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
4/22/15
REGISTERED PROFESSIONAL ENGINEER

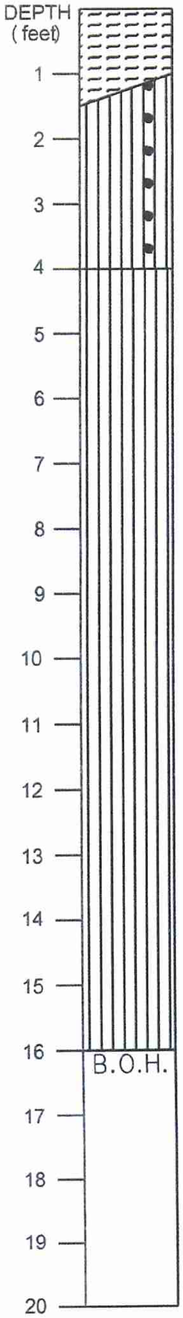
SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 27)

PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 1/6/2015

TEST HOLE #27

PAGE 1 OF 2



SOIL CLASSIFICATIONS

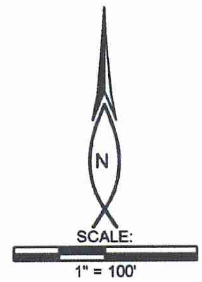
GW, GP, GM, GC, SW, SP, SM, SC

ORG, ML, CL, OL, MH, CH, OH

DEPTH TO GROUNDWATER	DATE
DRY	1/6/2015
DRY	1/15/2015
DRY	4/17/2015

SITE PLAN

SEE ATTACHED SITE PLAN



LOWER BENCH

DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
1/7/2015	1	2:25	-	6"	-
	2	2:55	30	5-3/4"	1/4"
	3	2:55	-	6"	-
	4	3:25	30	>5-3/4"	<1/4"
STOPPED READINGS					

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

TEST RUN BETWEEN 5 FT. AND 6 FT.

A FOUR HOUR PRESOAK WAS PERFORMED: ■ YES ☐ NO

SOILS LOGGED BY: ROB CAMPBELL/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: ____________

GARNESS ENGINEERING GROUP, Ltd

CIVIL & ENVIRONMENTAL ENGINEERS

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STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
1/28/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 27)

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

TEST HOLE #27

PAGE 2 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

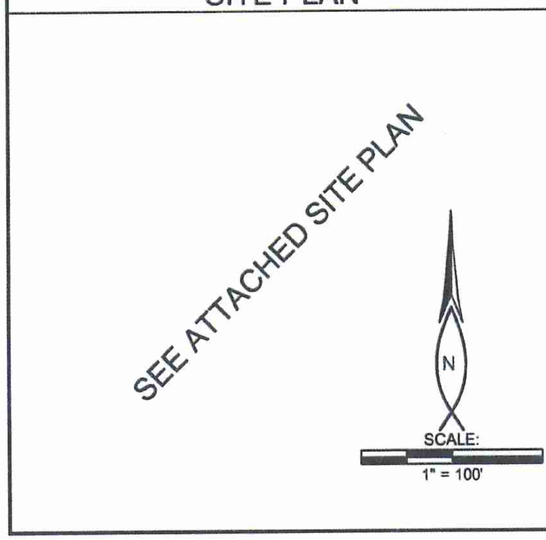
SOIL CLASSIFICATIONS

GW, GP, GM, GC, SW, SP, SM, SC

ORG, ML, CL, OL, MH, CH, OH

DEPTH TO GROUNDWATER	DATE
SEE PAGE 1 OF 2	

SITE PLAN



	DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
UPPER BENCH	1/15/2015	1	3:44	-	6"	-
		2	4:14	30	2-3/4"	3-1/4"
		3	4:14	-	6"	-
		4	4:44	30	2-3/4"	3-1/4"
		5	4:44	-	6"	-
		6	5:14	30	2-3/4"	3-1/4"

PERCOLATION RATE 9.2 (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: ROB CAMPBELL

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: 1/28/15

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STATE OF ALASKA 49TH Jeffrey A. Garness CE-7953 4/22/15 REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 28)

PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 1/6/2015

TEST HOLE #28

DEPTH (feet)

Depth (feet)	Soil
0–1	ORGANICS
1–4	GM TO ML (SMEARING)
4–16	ML W/ SOME GRAVEL
16	B.O.H.

SOIL CLASSIFICATIONS

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

DEPTH TO GROUNDWATER	DATE
DRY	1/6/2015
DRY	1/15/2015
DRY	4/17/2015

SITE PLAN

SEE ATTACHED SITE PLAN

N

SCALE: 1" = 100'

LOWER BENCH

DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
1/7/2015	1	2:20	-	6"	-
↓	2	2:50	30	>5-3/4"	<1/4"
STOPPED READINGS					

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

TEST RUN BETWEEN 5 FT. AND 6 FT.

A FOUR HOUR PRESOAK WAS PERFORMED: ■ YES ☐ NO

SOILS LOGGED BY: ROB CAMPBELL/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

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STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
1/28/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 28)

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

TEST HOLE #28

PAGE 2 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

SOIL CLASSIFICATIONS

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

DEPTH TO GROUNDWATER	DATE
SEE PAGE 1 OF 2	

SITE PLAN

SEE ATTACHED SITE PLAN

N

SCALE: 1" = 100'

	DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
UPPER BENCH	1/15/2015	1	3:47	-	6"	-
	↓	2	4:17	30	3-1/2"	2-1/2"
		3	4:17	-	6"	-
		4	4:47	30	3-1/2"	2-1/2"
		5	4:47	-	6"	-
		6	5:17	30	3-1/2"	2-1/2"

PERCOLATION RATE 12 (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: ROB CAMPBELL

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: 1/28/15

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STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
4/22/15
REGISTERED PROFESSIONAL ENGINEER

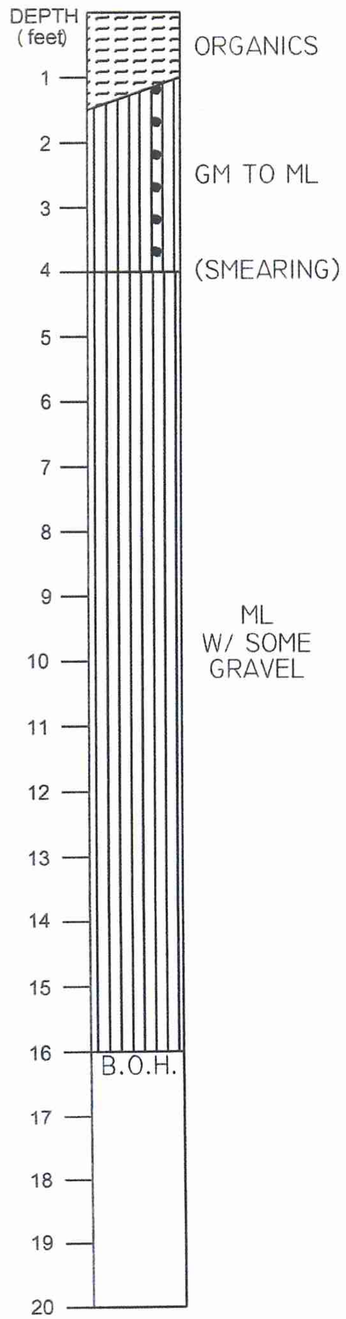
SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 29)

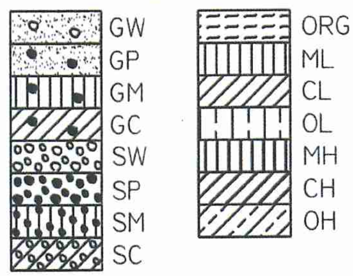
PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 1/6/2015

TEST HOLE #29

PAGE 1 OF 2



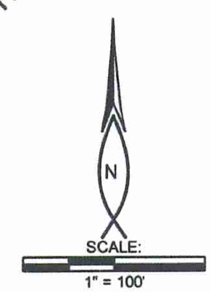
SOIL CLASSIFICATIONS



DEPTH TO GROUNDWATER	DATE
DRY	1/6/2015
DRY	1/15/2015
DRY	4/17/2015

SITE PLAN

SEE ATTACHED SITE PLAN



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

PERCOLATION RATE 80 (MIN./INCH) PERC. HOLE DIA. 6 (INCHES)

TEST RUN BETWEEN 5 FT. AND 6 FT.

A FOUR HOUR PRESOAK WAS PERFORMED: ■ YES ☐ NO

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

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

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STATE OF ALASKA 49TH Jeffrey A. Garness CE-7953 1/28/15 REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 29)

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

TEST HOLE #29

DEPTH (feet) 1–20

SEE PAGE 1 OF 2 FOR SOILS CLASSIFICATION

SOIL CLASSIFICATIONS

GW, GP, GM, GC, SW, SP, SM, SC

ORG, ML, CL, OL, MH, CH, OH

DEPTH TO GROUNDWATER	DATE
SEE PAGE 1 OF 2	

SITE PLAN

SEE ATTACHED SITE PLAN

N

SCALE: 1" = 100'

	DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
UPPER BENCH	1/15/2015	1	3:25	-	6"	-
		2	3:55	30	4-1/2"	1-1/2"
		3	3:55	-	6"	-
		4	4:25	30	4-1/2"	1-1/2"
		5	4:25	-	6"	-
		6	4:55	30	4-1/2"	1-1/2"

PERCOLATION RATE 20 (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: ROB CAMPBELL

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: 1/28/15

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STATE OF ALASKA 49TH Jeffrey A. Garness CE-7953 4/22/15 REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 29)

PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 10/17/2014

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

PEAT (0 – approx. 2 ft)

ML (approx. 2 – 16 ft)

B.O.H. (16 ft)

TEST HOLE #29A

OLD TH#9

SOIL CLASSIFICATIONS

GW, GP, GM, GC, SW, SP, SM, SC

ORG, ML, CL, OL, MH, CH, OH

DEPTH TO GROUNDWATER	DATE
DRY	10/17/2014
DRY	10/27/2014
DRY	1/15/2015
*DRY	4/17/2015

*WATER IN BENCH AT 2.5' (PROBABLY FROM SNOWMELT)

SITE PLAN

SEE ATTACHED SITE PLAN

N

SCALE: 1" = 100'

DATE	READING	CLOCK TIME	(MINUTES)	READING	NET DROP (INCHES)
10/27/2014	PRE-SOAK STARTED AT 10:30 A.M. WITH 7" OF WATER. AT 2:30 P.M.,				
	THE LIQUID LEVEL WAS 6-3/4". PERK MAY BE INFLUENCED BY				
	SNOWMELT AND/OR FROZEN SOILS. RECOMMEND				
	ADDITONAL INVESTIGATION OF THIS AREA.				

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

TEST RUN BETWEEN 4 FT. AND 5 FT.

A FOUR HOUR PRESOAK WAS PERFORMED: ☐ YES ☐ NO

SOILS 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

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STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
4/22/15
REGISTERED PROFESSIONAL ENGINEER

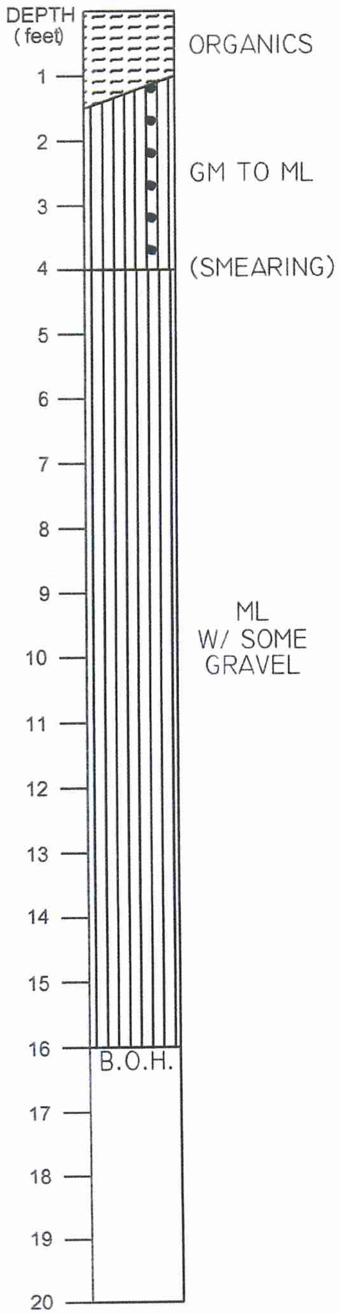
SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 30)

PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 1/6/2015

TEST HOLE #30

PAGE 1 OF 2

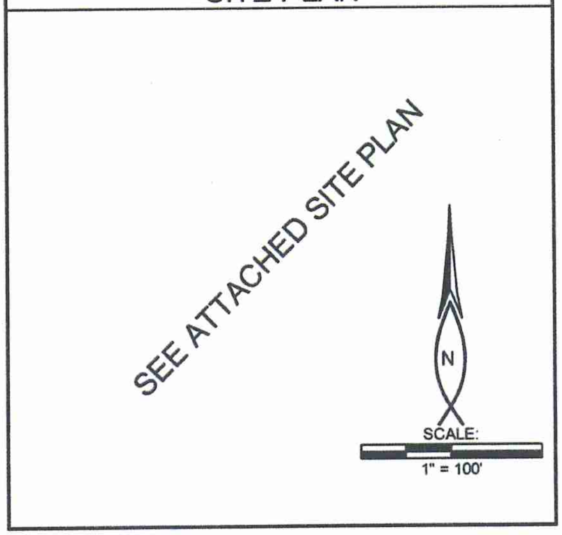


SOIL CLASSIFICATIONS

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

DEPTH TO GROUNDWATER	DATE
DRY	1/6/2015
DRY	1/15/2015
DRY	4/17/2015

SITE PLAN



LOWER BENCH

DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
1/7/2015	1	3:08	-	6"	-
↓	2	3:38	30	5-7/8"	1/8"
STOPPED READINGS					

PERCOLATION RATE 240 (MIN./INCH) PERC. HOLE DIA. 6 (INCHES)

TEST RUN BETWEEN 5 FT. AND 6 FT.

A FOUR HOUR PRESOAK WAS PERFORMED: ■ YES ☐ NO

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

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: ____________

GARNESS ENGINEERING GROUP, Ltd

CIVIL & ENVIRONMENTAL ENGINEERS

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STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
1/28/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 30)

PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP

DATE: SEE PAGE 1 OF 2

TEST HOLE #30

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

SOIL CLASSIFICATIONS

GW, GP, GM, GC, SW, SP, SM, SC

ORG, ML, CL, OL, MH, CH, OH

DEPTH TO GROUNDWATER	DATE
SEE PAGE 1 OF 2	

SITE PLAN

SEE ATTACHED SITE PLAN

N

SCALE: 1" = 100'

UPPER BENCH

DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
1/15/2015	1	3:29	-	6"	-
↓	2	3:59	30	4-1/2"	1-1/2"
	3	3:59	-	6"	-
	4	4:29	30	4-1/2"	1-1/2"
	5	4:29	-	6"	-
	6	4:59	30	4-1/2"	1-1/2"

PERCOLATION RATE 20 (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: ROB CAMPBELL

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: 1/28/15

GARNESS ENGINEERING GROUP, Ltd
CIVIL & ENVIRONMENTAL ENGINEERS

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STATE OF ALASKA 49TH Jeffrey A. Garness CE-7953 4/22/15 REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 31)

PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 1/7/2015

TEST HOLE #31

PAGE 1 OF 2

DEPTH (feet)	SOIL
0–1	ORGANICS
1–4	GM TO ML
4	(SMEARING)
4–15.5	ML W/ SOME GRAVEL
15.5	B.O.H.

Depth scale: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

SOIL CLASSIFICATIONS

GW, GP, GM, GC, SW, SP, SM, SC

ORG, ML, CL, OL, MH, CH, OH

DEPTH TO GROUNDWATER	DATE
DRY	1/7/2015
DRY	1/15/2015
DRY	4/17/2015

SITE PLAN

SEE ATTACHED SITE PLAN

N

SCALE: 1" = 100'

LOWER BENCH

DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
1/7/2015	LIQUID LEVEL DID NOT DROP DURING PRE-SOAK				

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

TEST RUN BETWEEN 5 FT. AND 6 FT.

A FOUR HOUR PRESOAK WAS PERFORMED: ■ YES ☐ NO

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

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

3701 E. TUDOR ROAD, SUITE 101 * ANCHORAGE, AK 99507 * PHONE (907) 337-6179 * FAX (907) 338-3246 * WEBSITE: www.garnessengineering.com

STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
1/28/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 31)

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 #31

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

N

SCALE: 1" = 100'

	DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
UPPER BENCH	1/15/2015	1	3:33	-	6"	-
		2	4:03	30	2-3/4"	3-1/4"
		3	4:03	-	6"	-
		4	4:33	30	2-3/4"	3-1/4"
		5	4:33	-	6"	-
		6	5:03	30	2-3/4"	3-1/4"

PERCOLATION RATE 9.2 (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: ROB CAMPBELL

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: 1/28/15

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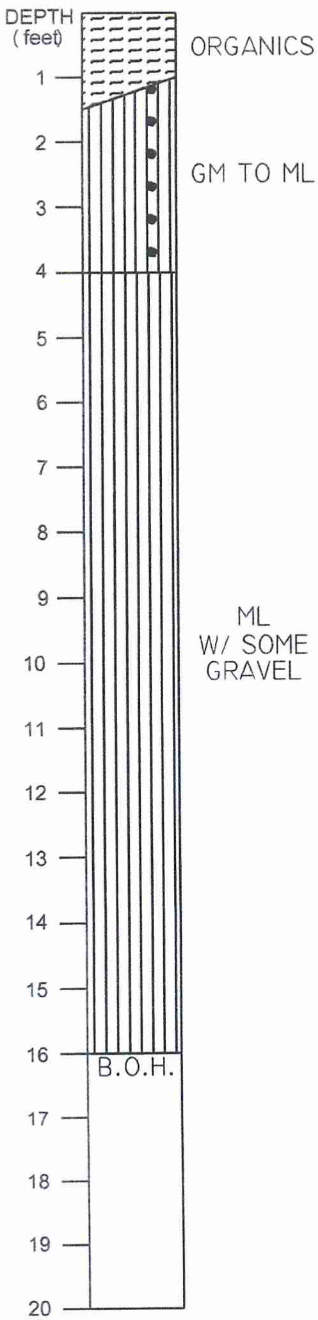
STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
4/22/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 32)

PERFORMED FOR: BIG COUNTRY ENTERPRISES, LLC / S4 GROUP DATE: 1/7/2015

TEST HOLE #32



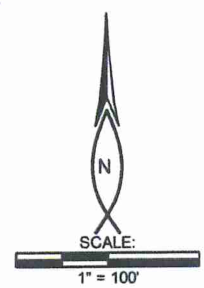
SOIL CLASSIFICATIONS

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

DEPTH TO GROUNDWATER	DATE
DRY	1/7/2015
DRY	1/15/2015
DRY	4/17/2015

SITE PLAN

SEE ATTACHED SITE PLAN



LOWER BENCH

DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
1/7/2015	1	3:15	-	6"	-
↓	2	3:45	30	5-15/16"	1/16"
STOPPED READINGS					

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

TEST RUN BETWEEN 5 FT. AND 6 FT.

A FOUR HOUR PRESOAK WAS PERFORMED: ■ YES ☐ NO

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

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

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STATE OF ALASKA
49TH
Jeffrey A. Garness
CE-7953
1/28/15
REGISTERED PROFESSIONAL ENGINEER

SOIL LOG - PERCOLATION TEST

LEGAL DESCRIPTION: LEWIS AND CLARK S/D (PROPOSED - LOT 32)

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

TEST HOLE #32

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

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

N

SCALE:
1" = 100'

UPPER BENCH

DATE	READING	CLOCK TIME	NET TIME (MINUTES)	WATER LEVEL READING	NET DROP (INCHES)
1/15/2015	1	3:36	-	6"	-
	2	4:06	30	0"	6"
	3	4:06	-	6"	-
	4	4:36	30	0"	6"
	5	4:36	-	6"	-
	6	5:06	30	0"	6"

PERCOLATION RATE 5 (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: ROB CAMPBELL

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: 1/28/15

GARNESS ENGINEERING GROUP, Ltd
CIVIL & ENVIRONMENTAL ENGINEERS

S4 GROUP AND BIG COUNTRY ENTERPRISES, LLC.

LEWIS AND CLARK
SOILS INVESTIGATION AND WELL/SEPTIC RESERVE AREA REPORT

Tab 5

- Cross-Section Detail Drawing for Example Platted Drainfield Sites

3701 East Tudor Road, Suite 101 * Anchorage, AK 99507
Ph: (907) 337-6179 * Fax: (907) 338-3246 * Website: garnessengineering.com

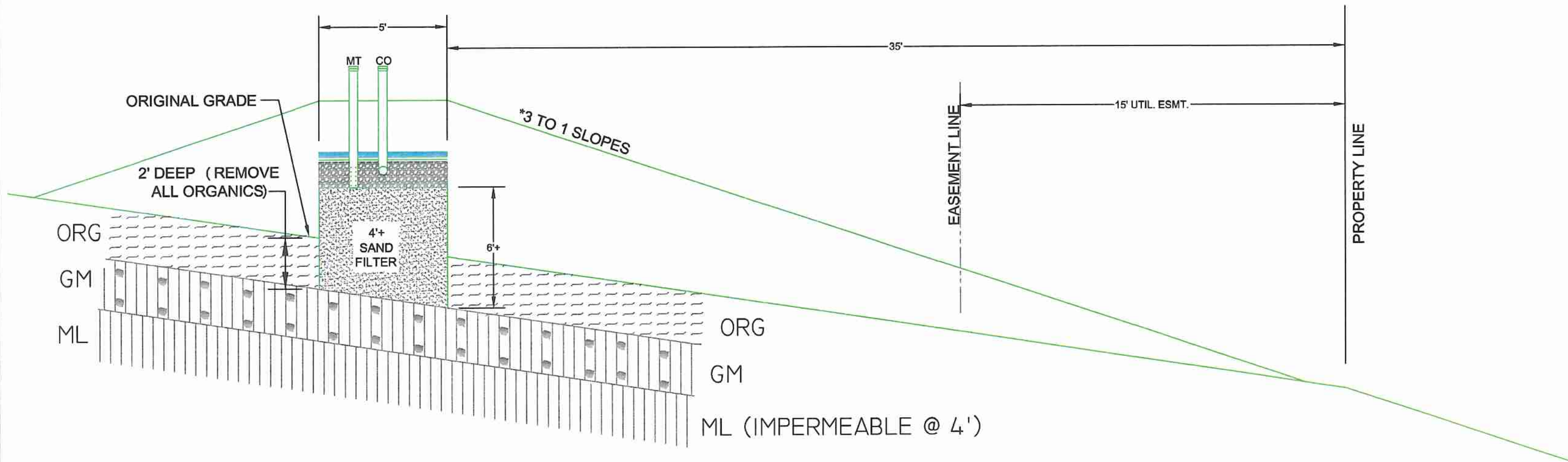
NOTES:
1. ORGINAL GRADE SLOPES ARE SHOWN AT 15%.
2. RECOMMEND THE MOST UPPER PLATTED DRAINFIELD SITE BE INSTALLED FIRST.
3. NO CUTS FOR DRIVEWAYS OR EXCESSIVE SLOPE GREATER THAN 25% CAN EXIST WITHIN 35 FEET DOWNHILL FROM THE LOWEST PLATTED DRAINFIELD SITE.
4. ALL SLOPES FOR THE MOUNDED DRAINFIELDS MUSt NOT EXCEED *3 TO 1 SLOPES AND THE MOUNDS ARE REQUIRED TO BE TOPSOILED AND HYDROSEEDED.
5. THE LOWEST PLATTED DRAINFIELD SITE MUST BE 35 FEET AT ANY POINT TO THE DOWNHILL PROPERTY LINE.

DESIGN CRITERIA:

NUMBER OF BEDROOMS: 4
GALLONS PER DAY (GPD) : 600
PERCOLATION RATE/S: *1-60 MIN./INCH
APPLICATION RATE: *1.0-4.0 GPD/FT2
MINIMUM DRAINFIELD SQ.FT.: *150-600
*USING CAT II OR CAT III ADVANCED TREATMENT

DRAINFIELD DESIGN:

MAXIMUM DEPTH: 2 FEET (REMOVE ALL ORGANICS)
WIDTH: 5 FEET
LENGTH: 30-60 FEET
M.O.A. APPROVED SAND FILTER: 2+ FEET
EFFECTIVE: 0.5 FEET
ACTUAL SQ.FT.: 150-300



CROSS SECTION DETAIL OF PLATTED DRAINFIELDS WITH 6 FOOT SEPARATION TO IMPERMEABLE SOILS

PREPARED FOR: BIG COUNTRY ENTERPRISES, LLC
PHONE NUMBER: (406) 698-6969
PAGE NUMBER: 1 OF 1
DRAWN BY: J.L.M.
DATE: REVISED 4/24/2015

GARNESS ENGINEERING GROUP, Ltd
CIVIL & ENVIRONMENTAL ENGINEERS

LEGAL DESCRIPTION: LEWIS AND CLARK SUBDIVISION (PROPOSED)
TYPE OF WORK: CROSS SECTION DETAIL DRAWING FOR POSSIBLE PLATTED DRAINFIELD SITES

STATE OF ALASKA
49 TH
Jeffrey A. Garness
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REGISTERED PROFESSIONAL ENGINEER