

MEMORANDUM

TO: Water Right File 63-34025

FROM: Clay Webster – Water Resources Agent Sr.

DATE: September 20, 2017

SUBJECT: Licensing Review of Water Right 63-34025

This field exam was performed by Certified Field Examiner Terry Scanlan of SPF Engineering Inc. Mr. Scanlan reported that 0.23 cfs is used to fill a pond with 0.75 acre surface area with a maximum depth of 14 feet, average depth of 8 feet, and volume of 6 acre feet. This pond is also filled from surface water from Boise Valley Irrigation Ditch Company when it is available in the rotation schedule. The pond is filled for municipal purposes. 6.2 acres of landscape is irrigated from this pond. Mr. Scanlan also stated that the pond is kept full during the non-irrigation season for aesthetic and wildlife purposes. There is no direct diversion from the well to the pressurized irrigation system, which is fed from the pond. This use is mitigated by non-use of 7 acres of 63-280 owned by South Boise Mutual Irrigation Company LTD.

Acres and Place of Use:

Mr. Scanlan determined that the number of acres irrigated was 6.2 acres. I recreated the shape file and came up with the same. When creating the shape for the irrigation and pond I found that we did not have satellite imagery current enough for this area so the pond shape was recreated using references to landmarks outside of this parcel.

Diversion Rate:

Mr. Scanlan's field report shows that flow measurements were calculated by filling a 32 gallon container. He averaged the fill times between three fills at 18.3 seconds. $32 \text{ gallons} / 18.3 \text{ seconds} \times 60 \text{ seconds per minute} = 105 \text{ gpm.} / 448.3 = 0.23 \text{ cfs}$ and his calculations are sound, I am recommending a diversion rate for this permit at 0.23 cfs for diversion to storage.

Volume:

Mr. Scanlan provided an annual volume recommendation of 42 af for municipal storage. His calculation of 6 af storage capacity matches what I found with the pond calculator spreadsheet.

His seepage was calculated by using a design maximum rate of 1/2 inch per day for 11.4 af. The math is correct. However, design drawings show that the pond has an imported Clay/Bentonite liner (note: this is not a waterproof liner as described in Natural

Resources Conservation Service (NRCS) Agriculture Handbook Number 590, Pond-Planning, Design, Construction). The pond spreadsheet shows that a lined pond should be calculated with no seepage loss. However, application processing memo 76 seepage loss standards for Ponds and Reservoirs states that the maximum allowable seepage rate is 0.2 ft per day. Since the provided seepage estimates for the pond would calculate at 0.04165 ft per day, they are within the upper limitations. The Well Driller's Report provided shows the static water level was documented at 4.5 ft. Therefore, this pond was dug into the GW level, according to Application Processing Memo 76 the seepage loss should be calculated at zero. The aerial photo provided with the Field Exam during development showed that the pond partially filled with water once dug. This makes sense, since the Well Driller's Report documented ground water was first encountered at 4.5 feet and this level remained the static level after drilling. Measurements of the aerial photo provided showed an approximate 1/2 acre ring around the top had not filled with water. I contacted the Certified Field Examiner to get clarification on questions about the ground water infiltration and calculation for seepage loss. He provided information that showed that they did not bring import clay/bentonite per the pond grading plan provided during the development period. The Pond Soils Layer in the GIS show that the soil type is silty sand, sand silt mixtures. Calculating the seepage loss for that 1/2 acre portion that is not under the ground water level with SM with the pond spread sheet allows 36.5 AFA for seepage loss. Though, this portion of the water would not be consumptive due to recycling, the water would need to be pumped to refill the pond. His calculations are acceptable for seepage losses. He provided calculations for evaporation loss using ET Idaho calculations including the negative values in the winter months where we normally utilize zeros for these values. His calculations showed 1.7 af. loss vs. the pond loss spreadsheet's calculation of 1.3 af. His calculations for the evaporation are acceptable. He recommended 27.9 af of volume for Municipal from Storage.

$$42.0 \text{ af (permit)} - 13.1 \text{ af (evaporation and seepage)} - 6.0 \text{ af (capacity)} = 22.9 \text{ af (municipal from storage).}$$

22.9 af is what is available for supplemental irrigation (municipal from storage) after you remove the evaporation/seepage and the capacity of the pond from the permitted amount. I recommend 42.0 af for municipal storage and 22.9 af for municipal from storage.

Overlapping Water Rights:

This right is within the service area of Boise Valley Irrigation Ditch Co, United Water and the City of Boise. Three rights of the United Water Rights, 63-243H, 63-243E and 63-169F, are municipal for irrigation purposes. None of these nor the City of Boise Municipal rights are designated for the irrigation of this park. There is also a decreed City of Boise domestic right 63-16768 that covers the same POU as this permit, the owner of this domestic right had a new well drilled in 1993, with a static water level of 3 ft. That well was located slightly south of the well for this permit. Aerial photographs

show that this domestic right was originally appurtenant to a house located in the SW corner of this park, located at parcel R1318000600. The house was removed in 2016 for the development of this park. This right could be used for a future restroom facility at this park if needed.

Mitigation:

According to the mitigation plan, all of the water diverted under this right is going to be ground water tributary to the Boise River. Water right 63-280 owned by the Boise Valley Irrigation Ditch Company has had a portion of this right changed to mitigation by non-use to mitigate this permit. I performed an evaluation of the water rights authorized to divert down Bubb Canal/Ditch. With the mitigation by non-use and the wastewater right removed, the rights show that 5.20 cfs is authorized to be diverted at this point of diversion. A review of the water rights accounting records in 2016 and 2017 show that not more than 3.30 cfs was diverted into the Bubb Canal/Ditch during that time period. Therefore, it appears as though the mitigation is still in place and being maintained.

Conditions:

Condition 1 (26A), will need to be removed at licensing. Conditions 2 (220) and 3 (259) will need capacity to be changed to 6.0 acre feet, the amount for seepage and evaporation changed to 13.1 af and the amount for additional fill to 22.9 af. Condition 4 will need the acres changed to 6.2. Conditions 5 (065) and 6, (105) will be replaced with condition 943. Conditions 7 (R61), 8 (01M), 9 (170), 10, 11 (930 note: a Well Driller's Report was submitted with the Beneficial Use Field Report showing that the well was backfilled to 29 feet 6 inches confirming that the water bearing zone condition was met), 12 (073), 16 (X59) and 17 (X60) should be carried forward to licensing. It should be noted that conditions 9 (170) and 10 should not be altered at licensing, since the mitigation requirement has not changed. Condition 13 (058) (because 073 is being used) and 14 (046) should be dropped upon licensing. Condition 15 (121) should be changed to condition 103. Condition WB7 should be added with the diversion rate of 0.03 cfs and the volume of 27.9 af.

Additional Data Entry:

The subdivision information will be populated on this right for the POD and POUs.



Total Storage Calculations

FILE NUMBER	63-34025
REVIEWER	Clay W
DATE	8/31/2017

This spreadsheet has been designed by Idaho Department of Water Resources to estimate the total seepage, evaporation and fill capacity required for a pond.

User Input
Calculated value
Formula Explanations

Surface Area (AC.)	0.75	"Surface Area" is automatically carried over from the "Seepage Loss" sheet.
Average Pond Depth (FT.)	8	"Average Pond Depth" depicts the actual depth of the pond either measured or estimated. Note: If you know the maximum depth and not the average depth, the Field Examiner's Handbook suggests multiplying the maximum depth by 0.4 to get the average depth, or you can use any method that seems reasonable to attain average depth.
Pond Capacity (AF)	6	Pond Capacity is calculated by multiplying the Pond Surface Area by the Average Pond Depth. If you know the capacity, divide the capacity by surface area and enter the average pond depth in the space above. Note: If pond capacity is determined using a method shown on the "Pond Capacity" sheet, the user may need to modify the value of "Pond Capacity" (cell B9) manually. Note that if the value is modified manually, the formula will be altered for future use.

Multiple Fill Volume Above Initial Fill to Fulfill From Storage Needs- "Multiple Fills" (AF)	21.9	The "Multiple Fill Volume Above Initial Fill" is the acre-feet of water required to meet a <i>from storage</i> component if the <i>from storage</i> component exceeds a one time fill. This section should not include the amount of water needed to fill the pond initially or the amount of water needed to maintain the pond level due to evaporation or seepage. For example: if a pond has a capacity of 5 acre feet and 2.5 acre feet of seepage and evaporation, but the pond is used for irrigation that requires 10 acre feet of from storage for the irrigation use, then you would insert 5 acre feet into this location (10 acre feet needed - 5 acre feet from the initial fill = 5 acre feet of additional storage needed). Note: You must have a "From Storage" component exceeding the initial fill on the permit to include a volume in this space.
Estimated Seepage Loss (AF)	11.4	The "Estimated Seepage Loss" is automatically carried over from the "Seepage Loss" sheet.
Estimated Evaporation Loss (AF)	1.3	The "Estimated Evaporation Loss" is automatically carried over from the "Evaporation Loss" sheet.
Total Volume Required (AF)	40.6	The "Total Volume Required" is calculated by adding the Pond Capacity, Multiple Fills, Seepage Loss, and Evaporation Loss amounts to determine the total amount of storage required.

Flow Rate into Pond (CFS)	0.23	The "Flow Rate into Pond" depicts the actual flow, either measured or estimated, into the pond. For offstream facilities, this will be equivalent to "diversion to storage" rate.
Highest Daily Evaporation Rate From Evaporation Tab. (mm/Day)	4.41	This number is carried over from the "Evaporation Loss" sheet. It is the highest recorded number in the "Precipitation Deficit Table".
Required Daily Maintenance Volume (AF/Day)	0.04	"Required Daily Maintenance Volume" is the maximum volume of water needed on any given day during the year to maintain pond volume. It is calculated by adding the highest daily evaporation loss to the average daily seepage loss in acre feet. The average daily seepage loss is calculated by dividing the "Estimated Seepage Loss" by 365 days. This is acceptable, since the seepage rate shouldn't vary throughout the season unless the pond completely freezes over during the winter months. The highest daily evaporation loss is calculated by dividing the Highest Daily Evaporation Rate by the 304.8 conversion factor and multiplying this number by the pond surface area to attain a combined daily acre feet requirement.
Minimum Maintenance Flow (CFS)	0.02	The "Minimum Maintenance Flow" is the minimum amount of flow required to maintain the level of the pond. This number is determined by dividing the "Maximum Required Daily Maintenance Volume" by 1.9835. This flow can be used to determine if the flow rate into the pond is adequate to maintain the pond level.
Days Required to Fill the Pond	14	The "Days Required to Fill the Pond" is calculated by dividing the "Pond Capacity" by the "Flow Rate" minus "Minimum Maintenance Flow" multiplied by 1.9835. This section will assist you in determining if the flow rate being diverted to the pond is adequate to fill the pond while maintaining the pond level. The length of time to fill the pond will help determine if the flow rate is adequate for the size of pond being proposed. If this number is approximately 6 months (180 days) or more, the reviewer should have a discussion with the applicant to make sure he/she understands that it will take a significant length of time to fill the pond.
Days Required to Fill the Pond at 13,000 Gallons per Day	-2741	Some water users may want to fill a pond under the 13,000 gallons per day domestic exemption. The "Days Required to Fill the Pond at 13,000 Gallons per Day" is calculated by converting the "Pond Capacity" and the "Required Daily Maintenance Volume" to gallons. The "Pond Capacity" is then divided by 13,000 gallons minus the "Required Daily Maintenance Volume" in gallons to determine the number of days to fill pond. If this number is approximately 6 months (180 days) or more, the reviewer should have a discussion with the applicant to make sure he/she understands that it will take a significant length of time to fill the pond. Negative values indicate that the supply of 13,000 gallons per day is not enough volume to overcome the required daily maintenance volume; the pond will never fill.

Seepage Loss Calculations

This spreadsheet has been designed by Idaho Department of Water Resources to estimate the total annual seepage losses from a pond.

FILE NUMBER	63-34025
REVIEWER	Clay W
DATE	9/6/2017

User Input
Calculated value
Formula Explanations

INPUTS

Pond Surface Area (AC.)	0.5	AC.
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Pond Surface Area (SQ. FT.)	21780	SQ. FT.
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I used the following method to obtain my Soil Classification information:	PondSoils Layer in GIS	
My Soil Classification is	SM	
Suggested Seepage Rate (FT./DAY)	0.2000	FT./DAY

Formula: (Surface Area X Seepage Rate) X 7.48 = Gallons Per Day Loss		
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Convert to GPD	32583	GPD
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Total Seepage Loss (AFA)	36.5	AFA
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Though sand and gravel seepage rates may actually be higher, the maximum allowable rate is 0.2 ft/day, pursuant to Administrative Memo "Seepage Loss Standards for Ponds and Reservoirs."

Suggested Seepage Rates for Different Soil Types:
GW, GP, GM, GC, SW, SP and SM (silty sand, sand silt mixtures and gravel mixtures) = 0.2 ft per day
OL and ML (inorganic silts - very fine sands, silty, or clayey fine sands) = 0.02 ft per day
SC (clayey sands, sand clay mixtures) = 0.007 ft per day
CL (Low to medium plasticity clays) = 0.003 ft per day
MH, OH, PT and CH (high plasticity clays) = 0.0003 ft per day
LINED PONDS (liners can be chemical, fabric, or bentonite) = 0 ft per day
Ponds Intercepting Groundwater (excavated ponds filled by ground water) = 0 ft per day

PLEASE NOTE: The initial basis for the Suggested Seepage Rates in the table above is found on Page 16 of Seepage from Fish Ponds, Bulletin 599, August 1989 Alabama Agricultural experiment Station, Auburn University, Auburn University Alabama. If you don't know the soil type, please refer to the map provided at the NRCS Web Soil Survey (Tab #1), an ArcMap Soil Classification Map (Tab #1.1), or published NRCS Soil Survey (Tab #1.2). Use "0" if the pond fill relies on the water table.

Webster, Clay

From: Terry Scanlan <TScanlan@spfwater.com>
Sent: Thursday, September 07, 2017 3:34 PM
To: Webster, Clay
Cc: Justin Leraris
Subject: FW: [External] Magnolia Park
Attachments: 9.28.16.pdf; 9.26.16.pdf; 9.19.16.pdf; 9.16.16.pdf; Magnolia Park Sub. 1% Bentonite Flexwall Perm t2 ISSUED 4-21-2016.pdf; Magnolia Park Sub. 0% Bentonite Flexwall Perm t2 ISSUED 4-21-2016.pdf

Clay –

See test information below and attached. It looks like the pond was leaking at more than 1" per day when full last year. When the water level falls far enough, it probably equalizes with groundwater level as you suggested which eliminates seepage.

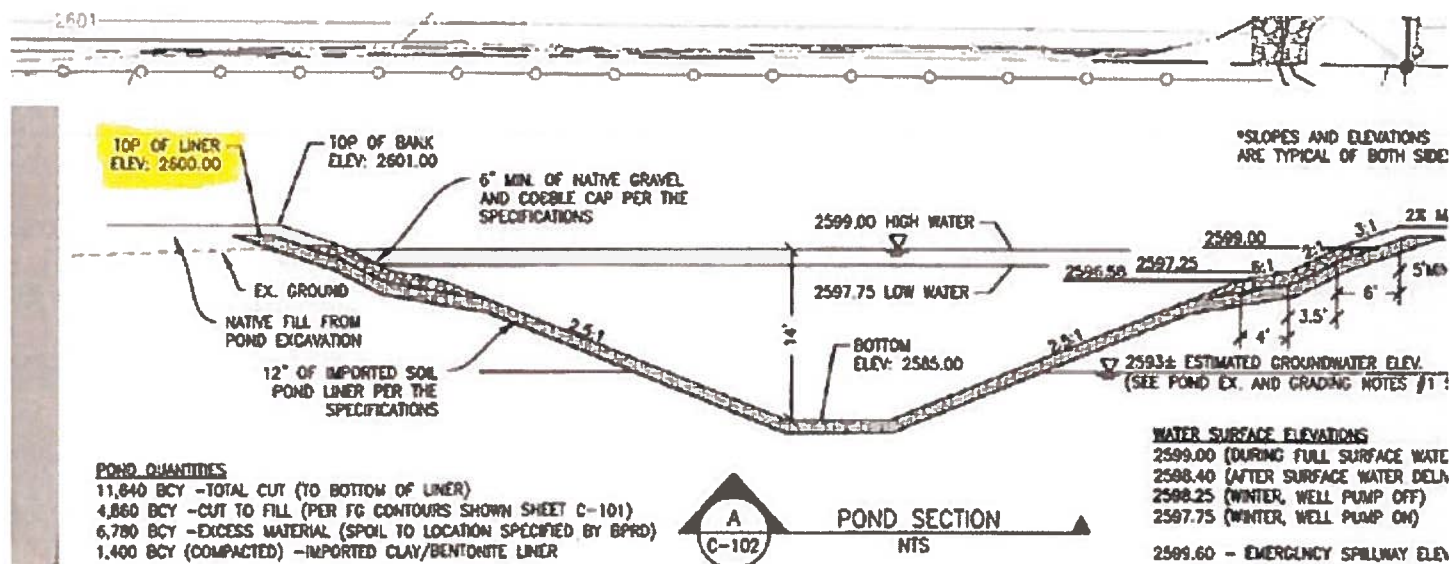
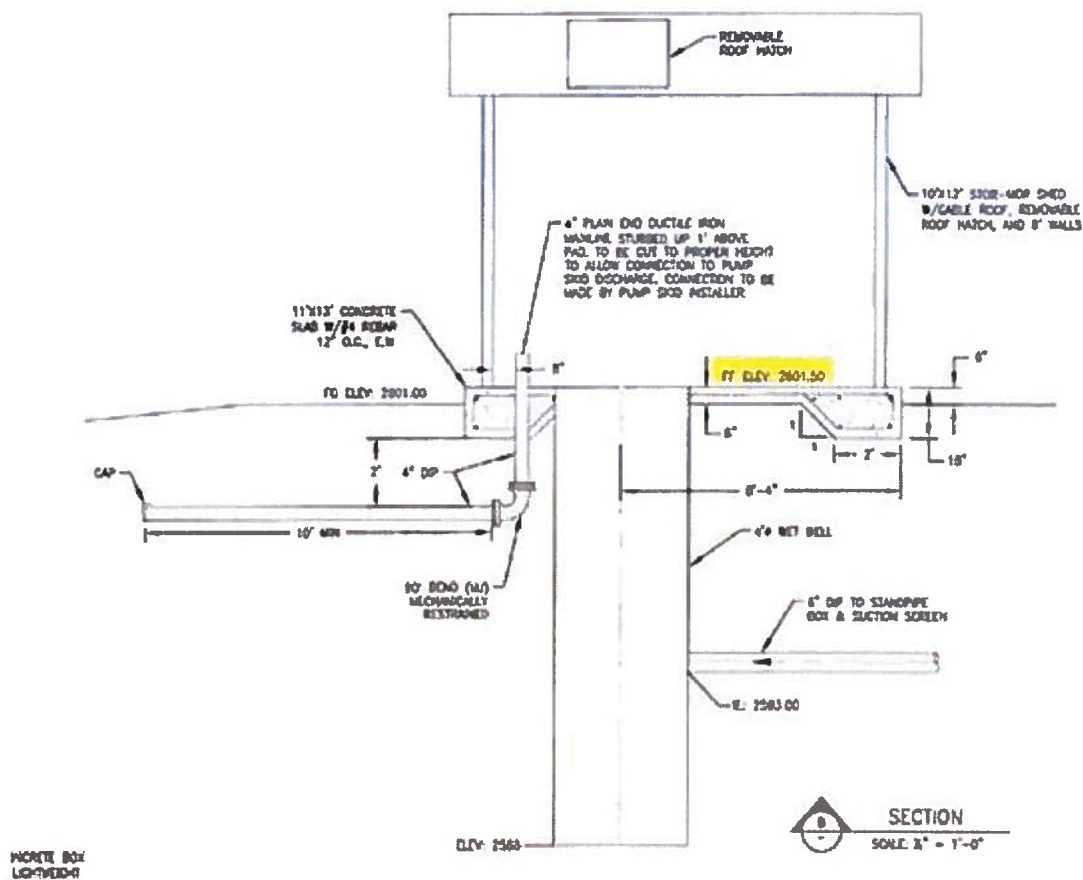
I understand that bentonite is being added around the banks and will be retested this fall to confirm that it meets the 1/2 " specification. However, at the time of the exam, the pond was full and I assume it was leaking more than 1/2" per day.

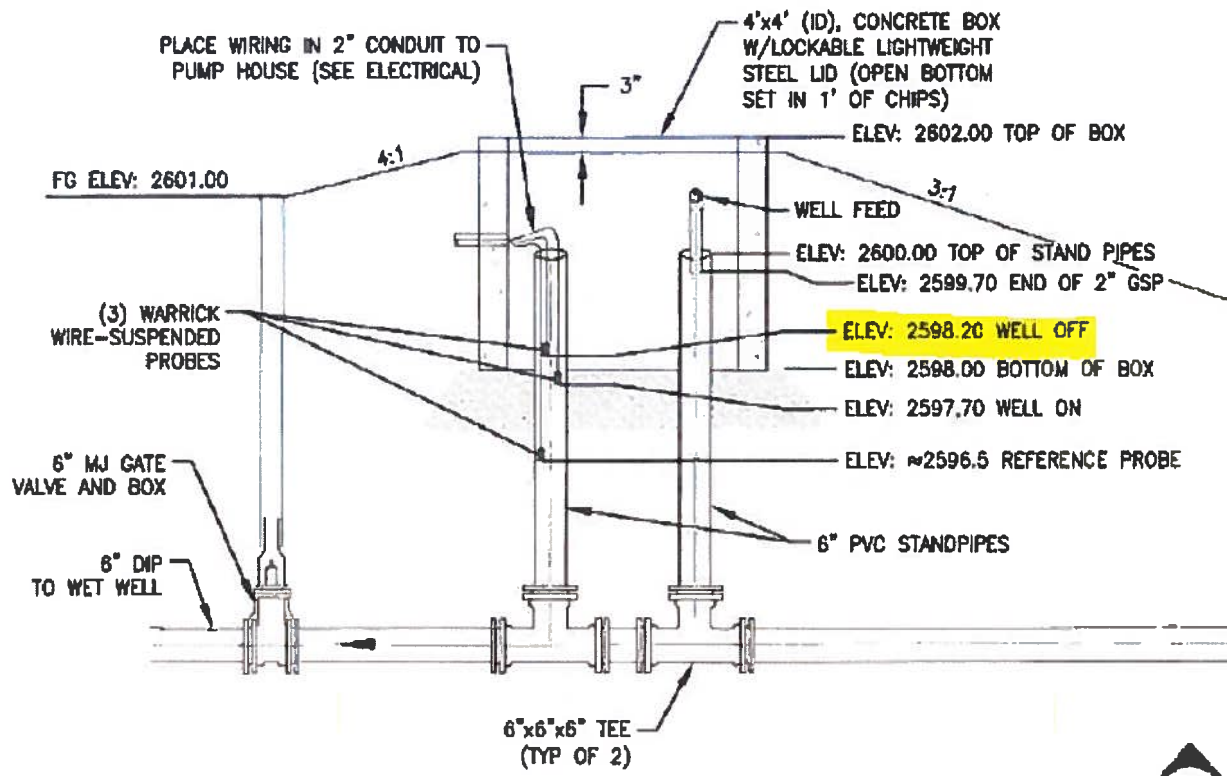
Terry

From: Justin Leraris
Sent: Monday, August 21, 2017 7:32 PM
To: 'Wendy Larimore' <WLarimore@cityofboise.org>
Subject: RE: [External] Magnolia Park

Wendy,

It looks like the pond is sealed very well from 45-inches below the wet well slab and down, but the upper banks may not be meeting spec (1/2" per day max). See the first test from 9-13 to 9-16. The first two days the level drops from 42.5" to 45 5/8", which is roughly 1.5" per day. Below that it leaks very little (but could be under the influence of groundwater...) Our plans show that the liner should have been constructed to 2600'. We show the wet well slab at 2601.50 and the pond overflow at 2598.40. So at the very least, the pond should be holding from about 3.1' or 37" from top of slab and lower (assuming slab was constructed to the design elevation). We can discuss more over the phone. But it would probably be a good idea for us to go out and check as-built elevations before you sign off on this. Otherwise, the well pump will be working harder than it should to try to pump up to the winter high (pump off) elevation of 2598.20 (which is 3.3' or 39.6" below the slab).





From: Wendy Larimore [<mailto:WLarimore@cityofboise.org>]
Sent: Monday, August 21, 2017 4:01 PM
To: Justin Leraris <Jleraris@spfwater.com>
Subject: FW: [External] Magnolia Park

Attached is the leak testing data for Magnolia. I haven't had a chance to look over it yet and thought I would forward it to you for a quick perusal.

Thank you,

Wendy Larimore
 Park Development Coordinator
 Boise Parks and Recreation
 208 608-7636

From: Jeff Arant [<mailto:jeff@diamondidaho.com>]
Sent: Monday, August 21, 2017 3:17 PM
To: Wendy Larimore <WLarimore@cityofboise.org>
Cc: Sam <sam@diamondidaho.com>
Subject: [External] Magnolia Park

It is my belief that all work is done with the exception of some seed repair in the fall. Sunshine Landscape indicated they completed their scope of work on Friday. Sam sent a guy down this morning to touch up the walking path. Attached are soil and perk tests for the pond. Sunshine is working on as-builts.



DIAMOND

CONTRACTORS, L.L.C.

Jeff Arant

PO Box 2658

Eagle, ID 83616

Office 208-898-4330

Fax 208-898-4331

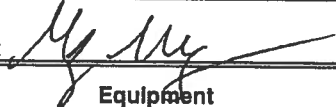
Mobile 208-841-9670

jeff@diamonddidaho.com



ALLWEST Testing & Engineering

DAILY PROJECT FIELD REPORT

Project: Magnolia Park Subdivision				Project #: 516-219			
Project Address: N. Bogart Lane. Boise, ID				Weather: Sunny/Cool			
Permit #		Date: 9/13/2016		Page 1		of 1	
Report #		Technician: Isaac Rede					
Type of Testing / Inspection: Water Monitoring- Pond Leak Test							
Deficiencies Noted:		☒ X		☐ NO		☐ YES If yes, explain below	
Reported To: Jeff Arant of Diamond Contractors							
Narrative: ALLWEST arrived on-site at 8:00 am to perform water level measurements. Using a tape measure, the water level reading was 42 ½ inches. The water level reading was obtained from the existing water level to the top of the slab in the pump house well. I then returned to ALLWEST's Meridian office.							
Representative: Isaac Rede				Received By:			
This report shall be considered preliminary until reviewed and countersigned by the ALLWEST Project Manager				Reviewed By: 			
Codes	Activity	Hours	Miles	Equipment			
VO	Visual Observation				Nuke	Coring Machine	Generator
				Other Type:			Quantity
Field Samples Obtained: None							

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DAILY PROJECT FIELD REPORT

Project: Magnolia Park Subdivision				Project #: 516-219			
Project Address: N. Bogart Lane. Boise, ID				Weather: Sunny/Cool			
Permit #		Date: 9/15/2016		Page 1		of 1	
Report #		Technician: Greg Mugavero					
Type of Testing / Inspection: Water Monitoring- Pond Leak Test							
Deficiencies Noted:		X		NO		YES If yes, explain below	
Reported To: Jeff Arant of Diamond Contractors							
Narrative: ALLWEST arrived on-site at 8:00 am to perform water level measurements. Using a tape measure, the water level reading was 45 5/8 inches. The water level reading was obtained from the existing water level to the top of the slab in the pump house well. I then returned to ALLWEST's Meridian office.							
Representative: Greg Mugavero				Received By:			
This report shall be considered preliminary until reviewed and countersigned by the ALLWEST Project Manager				Reviewed By: 			
Codes	Activity	Hours	Miles	Equipment			
VO	Visual Observation			Nuke	Coring Machine	Generator	
				Other Type:		Quantity	
Field Samples Obtained None							

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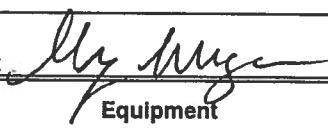
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DAILY PROJECT FIELD REPORT

Project: Magnolia Park Subdivision		Project #: 516-219	
Project Address: N. Bogart Lane. Boise, ID		Weather: Sunny/Cool	
Permit #	Date: 9/16/2016	Page 1	of 1
Report #	Technician: Isaac Rede		
Type of Testing / Inspection: Water Monitoring- Pond Leak Test			
Deficiencies Noted:	☒ X	☐ NO	☐ YES If yes, explain below
Reported To: Jeff Arant of Diamond Contractors			
Narrative: ALLWEST arrived on-site at 8:00 am to perform water level measurements. Using a tape measure, the water level reading was 46 1/4 inches. The water level reading was obtained from the existing water level to the top of the slab in the pump house well. I then returned to ALLWEST's Meridian office.			
Representative: Isaac Rede		Received By:	
This report shall be considered preliminary until reviewed and countersigned by the ALLWEST Project Manager		Reviewed By: 	
Codes	Activity	Hours	Miles
VO	Visual Observation		
Equipment			
		Nuke	Coring Machine
			Generator
		Other Type:	Quantity
Field Samples Obtained None			

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DAILY PROJECT FIELD REPORT

Project: Magnolia Park Subdivision		Project #: 516-219	
Project Address: N. Bogart Lane. Boise, ID		Weather: Sunny/Cool	
Permit #	Date: 9/17/2016	Page 1	of 1
Report #	Technician: Isaac Rede		
Type of Testing / Inspection: Water Monitoring- Pond Leak Test			
Deficiencies Noted:	☒ X	☐ NO	☐ YES If yes, explain below
Reported To: Jeff Arant of Diamond Contractors			
Narrative: ALLWEST arrived on-site at 8:00 am to perform water level measurements. Using a tape measure, the water level reading was 46 1/2 inches. The water level reading was obtained from the existing water level to the top of the slab in the pump house well. I then returned to ALLWEST's Meridian office.			
Representative: Isaac Rede		Received By:	
This report shall be considered preliminary until reviewed and countersigned by the ALLWEST Project Manager		Reviewed By: <i>[Signature]</i>	
Codes	Activity	Hours	Miles
VO	Visual Observation		
Field Samples Obtained		None	

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DAILY PROJECT FIELD REPORT

Project: Magnolia Park Subdivision				Project #: 516-219			
Project Address: N. Bogart Lane. Boise, ID				Weather: Sunny/Cool			
Permit #		Date: 9/19/2016		Page 1		of 1	
Report #		Technician: Greg Mugavero					
Type of Testing / Inspection: Percolation Testing							
Deficiencies Noted:		X		NO		YES If yes, explain below	
Reported To: Jeff Arant of Diamond Contractors							
Narrative: ALLWEST arrived on-site at 11:30 am to perform water level measurements. Using a tape measure, the water level reading was 46 3/8 inches. The water level reading was obtained from the existing water level to the top of the slab in the pump house well. I then returned to ALLWEST's Meridian office.							
Representative: Greg Mugavero				Received By:			
This report shall be considered preliminary until reviewed and countersigned by the ALLWEST Project Manager				Reviewed By:			
Codes	Activity	Hours	Miles	Equipment			
PERC	Percolation Test	2.0	20		Nuke	Coring Machine	Generator
				Other Type:			Quantity
Field Samples Obtained None							

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DAILY PROJECT FIELD REPORT

Project: Magnolia Park Subdivision				Project #: 516-219			
Project Address: N. Bogart Lane. Boise, ID				Weather: Clear & Cool 68°F			
Permit #		Date: 9/20/2016		Page 1		of 1	
Report #		Technician: Greg Mugavero					
Type of Testing / Inspection: Percolation Testing							
Deficiencies Noted:		X		NO		YES If yes, explain below	
Reported To: Jeff Arant				of Diamond Contractors			
Narrative: ALLWEST arrived on-site at 11:05 am to perform water level measurements. Using a tape measure, the water level reading was 46 1/2 inches. The water level reading was obtained from the existing water level to the top of the slab in the pump house well. I then returned to ALLWEST's Meridian office.							
Representative: Greg Mugavero				Received By:			
This report shall be considered preliminary until reviewed and countersigned by the ALLWEST Project Manager				Reviewed By:			
Codes	Activity	Hours	Miles	Equipment			
PERC	Percolation Test	2.0	20		Nuke	Coring Machine	Generator
				Other Type:			Quantity
Field Samples Obtained None							

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DAILY PROJECT FIELD REPORT

Project: Magnolia Park Subdivision				Project #: 516-219			
Project Address: N. Bogart Lane. Boise, ID				Weather: Cloudy & Cool 62°F			
Permit #		Date: 9/21/2016		Page 1		of 1	
Report #		Technician: Greg Mugavero					
Type of Testing / Inspection: Percolation Testing							
Deficiencies Noted:		X NO		YES		If yes, explain below	
Reported To: Jeff Arant of Diamond Contractors							
Narrative: ALLWEST arrived on-site at 10:55 am to perform water level measurements. Using a tape measure, the water level reading was 46 5/8 inches. The water level reading was obtained from the existing water level to the top of the slab in the pump house well. I then returned to ALLWEST's Meridian office.							
Representative: Greg Mugavero				Received By:			
This report shall be considered preliminary until reviewed and countersigned by the ALLWEST Project Manager				Reviewed By:			
Codes	Activity	Hours	Miles	Equipment			
PERC	Percolation Test	2.0	20	Nuke	Coring Machine	Generator	
				Other Type:			Quantity
Field Samples Obtained None							

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DAILY PROJECT FIELD REPORT

Project: Magnolia Park Subdivision		Project #: 516-219				
Project Address: N. Bogart Lane. Boise, ID		Weather: Cloudy & Cool 58°F				
Permit #	Date: 9/22/2016	Page 1 of 1				
Report #	Technician: Greg Mugavero					
Type of Testing / Inspection: Percolation Testing						
Deficiencies Noted:	☒ X	☐ NO	☐ YES If yes, explain below			
Reported To: Jeff Arant of Diamond Contractors						
Narrative: ALLWEST arrived on-site at 11:50 am to perform water level measurements. Using a tape measure, the water level reading was 46 7/8 inches. The water level reading was obtained from the existing water level to the top of the slab in the pump house well. I then returned to ALLWEST's Meridian office.						
Representative: Greg Mugavero		Received By:				
This report shall be considered preliminary until reviewed and countersigned by the ALLWEST Project Manager		Reviewed By:				
Codes	Activity	Hours	Miles	Equipment		
PERC	Percolation Test	2.0	20	☐ Nuke	☐ Coring Machine	☐ Generator
				Other Type:		Quantity
Field Samples Obtained None						

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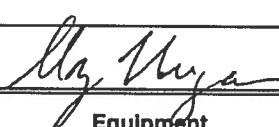
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ALLWEST Testing & Engineering

DAILY PROJECT FIELD REPORT

Project: Magnolia Park Subdivision		Project #: 516-219	
Project Address: N. Bogart Lane. Boise, ID		Weather: Clear & Cool 65°F	
Permit #	Date: 9/23/2016	Page 1	of 1
Report #	Technician: Isaac Rede		
Type of Testing / Inspection: Percolation Testing			
Deficiencies Noted:	☒ YES	☐ NO	If yes, explain below
Reported To: Jeff Arant of Diamond Contractors			
Narrative: ALLWEST arrived on-site at 11:00 am to perform water level measurements. Using a tape measure, the water level reading was 46 3/4 inches. The water level reading was obtained from the existing water level to the top of the slab in the pump house well. I then returned to ALLWEST's Meridian office. Turnament			
Representative: Isaac Rede		Received By:	
This report shall be considered preliminary until reviewed and countersigned by the ALLWEST Project Manager		Reviewed By: 	
Codes	Activity	Hours	Miles
PERC	Percolation Test	2.0	20
Field Samples Obtained None			

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ALLWEST Testing & Engineering

DAILY PROJECT FIELD REPORT

Project: Magnolia Park Subdivision		Project #: 516-219				
Project Address: N. Bogart Lane. Boise, ID		Weather: Cloudy & Cool 64°F				
Permit #	Date: 9/24/2016	Page 1 of 1				
Report #	Technician: Greg Mugavero					
Type of Testing / Inspection: Percolation Testing						
Deficiencies Noted:	☒ X	☐ NO	☐ YES If yes, explain below			
Reported To: Jeff Arant of Diamond Contractors						
Narrative: ALLWEST arrived on-site at 11:50 am to perform water level measurements. Using a tape measure, the water level reading was 47.0 inches. The water level reading was obtained from the existing water level to the top of the slab in the pump house well. I then returned to ALLWEST's Meridian office.						
Representative: Greg Mugavero <i>Greg Mugavero</i>		Received By:				
This report shall be considered preliminary until reviewed and countersigned by the ALLWEST Project Manager		Reviewed By:				
Codes	Activity	Hours	Miles	Equipment		
PERC	Percolation Test	2.0	20	☐ Nuke	☐ Coring Machine	☐ Generator
				Other Type:		Quantity
Field Samples Obtained None						

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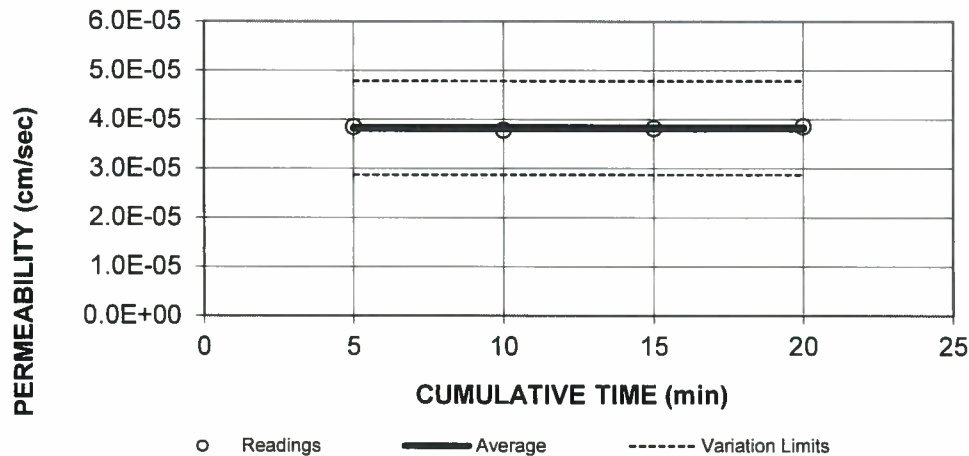
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FLEXIBLE WALL PERMEAMETER - CONSTANT VOLUME

(Mercury Permometer Test - Method F)

ASTM D-5084



Fluid Temp. (C°)	Elapsed Time (sec.)	Cumulative Time (sec.)	Hydraulic Gradient (cm-Hg)	Calculated Permeability (cm/sec)	Average Permeability
21.7	5	5	3.28	3.85E-05	cm/sec 3.8E-05
21.7	5	10	2.19	3.78E-05	
21.7	5	15	1.43	3.81E-05	in/hr 0.0541
21.7	5	20	0.93	3.86E-05	

Compaction Data		Sample Data		Initial	Final
Proctor, pcf	110.5	Specimen Height, inches		3.07	3.06
Opt. M.C., %	15.9	Specimen Diameter, inches		2.78	2.78
Comp. Method	AASHTO T-99A	Moisture Content, %		15.9	20.2
% Recompaction	95.9	Saturation, %		75.0	95.4
Test Pressures, psi		Wet Density, pcf		122.8	127.4
Back Pressure	90.0	Dry Density, pcf		106.0	105.9
Cell Pressure	91.5	Void Ratio		0.56	0.56
Effective Stress	1.5	Calculated Porosity, %		0.36	0.36

Liquid Limit	N/A	Plastic Index	N/A	Specific Gravity	2.65
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A M E R I C A N
G E O
T E C H N I C S

Client	Allwest/Diamond Construction
Project	Magnolia Park Subdivision
Project Number	516-219
Sample Number	16-0217
Sample Location	Onsite Stockpile
Description	Dark Brown Sandy Silt (ML)
Date	4/19/2016
Tested By	TT

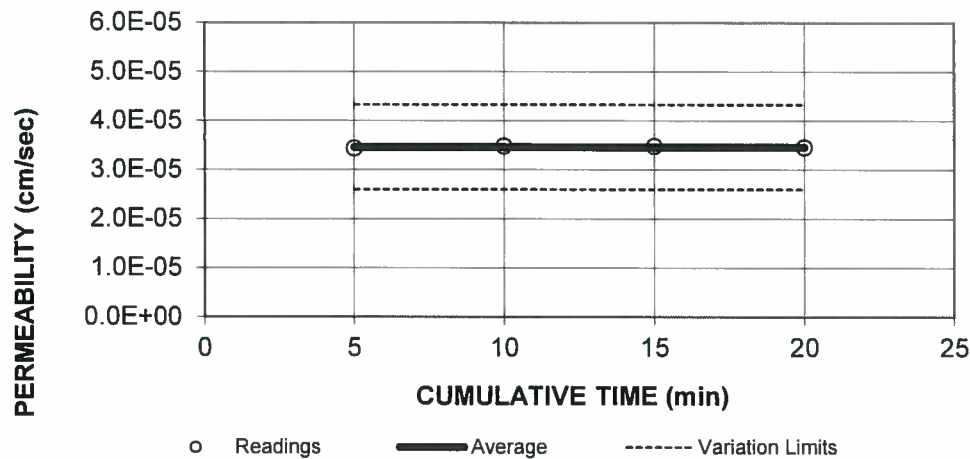
Remarks: No Bentonite added.

Reviewed by: *Paul Clawges*

FLEXIBLE WALL PERMEAMETER - CONSTANT VOLUME

(Mercury Permometer Test - Method F)

ASTM D-5084



Fluid Temp. (C°)	Elapsed Time (sec.)	Cumulative Time (sec.)	Hydraulic Gradient (cm-Hg)	Calculated Permeability (cm/sec)	Average Permeability (cm/sec)
21.3	5	5	2.36	3.43E-05	cm/sec 3.5E-05
21.3	5	10	1.60	3.47E-05	
21.3	5	15	1.10	3.48E-05	in/hr 0.0490
21.3	5	20	0.76	3.45E-05	

Compaction Data		Sample Data		Initial	Final
Proctor, pcf	110.5	Specimen Height, inches		3.06	3.05
Opt. M.C., %	15.9	Specimen Diameter, inches		2.79	2.78
Comp. Method	AASHTO T-99 A	Moisture Content, %		15.8	20.0
% Recomposition	95.9	Saturation, %		74.6	96.0
Test Pressures, psi		Wet Density, pcf		122.7	127.9
Back Pressure	90.0	Dry Density, pcf		105.9	106.5
Cell Pressure	91.5	Void Ratio		0.56	0.55
Effective Stress	1.5	Calculated Porosity, %		0.36	0.36

Liquid Limit	N/A	Plastic Index	N/A	Specific Gravity	2.65
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A M E R I C A N
G E O
T E C H N I C S

Client	Allwest/Diamond Construction
Project	Magnolia Park Subdivision
Project Number	516-219
Sample Number	16-0216
Sample Location	Onsite Stockpile
Description	Dark Brown Sandy Silt (ML)
Date	4/19/2016
Tested By	TT

Remarks: 1% Teague Mineral Products Custom Sealant Bentonite added by dry weight to sample

Reviewed by: *Paul Clawges*