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February 1, 2021

Attn: Chad Meyerhoffer

RE: Crimson Ridge Phase 2 & Harbor View Estates Subdivision

We have addressed the plan review comments dated January 7, 2021 as follows:

1. Please see redlines on Reserve at Crimson Ridge PH2&3_Engineering_Review_Jan2021pdf.

   See response to plan set comments as follows:

   Sheet S1/3 (Harbor View Estates)

   Yes, the easement covers the drip fields. The Open space is dedicated as an easement for Pineview West Sewer Improvement District and we updated the reference to indicate this.

   Sheet S1/3 (Phase 2C)

"Yes, an average high water mark width of 10' was used for the stream." The setback width of the ephemeral stream is 110' with most lots having some additional buffer from this designated setback.

Regarding the comment with the geology report, there were some recommended references in an earlier report that is not being submitted for this development. Per the latest AGEC geotechnical report all of the lot is identified ad buildable and there are no requirements from this report stating buildable areas for the mentioned lots should be restricted.

Refer also to sheet C2 which shows the geological landforms.

Sheet C1

Thanks for looking at this

(4) Source Protection.

Public drinking water systems are responsible for protecting their sources from contamination. The selection of a well location shall only be made after consideration of the requirements of R309-600.

Considered. The hydrogeologist completed and the State approved a preliminary engineering report for this well site before drilling started, which meets the requirements of R309-600.

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Sources shall be located in an area that will minimize threats from existing or potential sources of pollution.

The well is in a deep, protected aquifer. The hydrogeologist has indicated that this is safe location for a well.

Generally, sewer lines may not be located within zone one and zone two of a public drinking water system's source protection zones.

Zone 1 is a 100' radius around the well and the hydrogeologist has set the extents of zone two as a 150' radius around the well. Thus, no sewer facilities are within source protection Zone 2. We understand that the County source protection ordinance prohibits the location of septic tanks within the established Zone 2. The ordinance would ensure that the solids-holding tanks for the two residential lots adjacent to the well would not be allowed within Zone 2. Please verify that is correct. If that is not a correct assumption, we may need to pursue a land use agreement for the Lot in Phase 1, and include a restriction on the lot in Phase 2.

Sheet C8

Does the drip field meet the setback requirements under R317-4 Table 2?

Yes. Per R317-4, Table 2 setback requirements for building foundation without foundation drain is 5' from absorption area. A minimum of 12 feet of separation is being provided from the drain field to the lot corner. The plat is also being updated to show a restriction for no basements and foundation drains for lots 205 and 206.

Sheet PP1

Check with Water Co. regarding 5' bury depth.

We have checked with water company and updated to show 5' waterline burry depth.

Sheet PP3

Will need a stream alteration permit for work within stream.

Noted. Stream alteration permit is anticipated to be obtained after February 22nd. The state has new extension deadlines that allow for permit to have a one year extension. The application for the permit has been submitted to Darren Rasmussen.

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Calculations for culvert size?

Calculations for culvers size are shown on sheet C5. Also see provided specific flow calculations as follows:

Existing Upstream 60” Culvert, (Maximum allowed flow based on existing 60-inch pipe size and existing pipe slope of S=6.65%) Manning’s calculated flow capacity is Q = 582 cfs (see provided pipe calculations below):

Manning Formula Uniform Pipe Flow at Given Slope and Depth

Check out our spreadsheet version of this calculator Download Spreadsheet Open Google Sheets version View All Spreadsheets

Existing Upstream 60" Pipe Flow Calculations

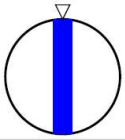
Crimson Ridge Project

Inputs

Pipe diameter, d_0	5	ft
Manning roughness, n	.015	
Pressure slope (possibly ? equal to pipe slope), S_0	.0665	rise/run
Percent of (or ratio to) full depth (100% or 1 if flowing full)	1	fraction

Results

Flow, Q	582.0291	cfs
Velocity, v	29.6428	ft/sec
Velocity head, h_v	13.6564	ft H2O
Flow area	19.6356	ft^2
Wetted perimeter	15.7080	ft
Hydraulic radius	1.2500	ft
Top width, T	0.0000	ft
Froude number, F	0.00	
Shear stress (tractive force), tau	0.0000	



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The added pipe extension connecting to the existing 60” RCP can accommodate the following calculated flow:

Manning Formula Uniform Pipe Flow at Given Slope and Depth

Check out our spreadsheet version of this calculator Download Spreadsheet Open Google Sheets version View All Spreadsheets

New 60" Pipe Extension Flow Calculations

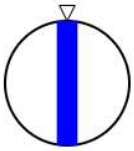
Crimson Ridge Project

Inputs

Pipe diameter, d_0	5	ft
Manning roughness, n	.015	
Pressure slope (possibly ? equal to pipe slope), S_0	.1897	rise/run
Percent of (or ratio to) full depth (100% or 1 if flowing full)	1	fraction

Results

Flow, Q	983.0318	cfs
Velocity, v	50.0659	ft/sec
Velocity head, h_v	38.9568	ft H2O
Flow area	19.6356	ft^2
Wetted perimeter	15.7080	ft
Hydraulic radius	1.2500	ft
Top width, T	0.0000	ft
Froude number, F	0.00	
Shear stress (tractive force), tau	14.8037	psf



The additional flows capable of flowing into the downstream drainage culvert are quantified using the Rational Method as follows (which adds an additional conservative 14 CFS for the 23 acre additional contributing area of flow):

SUBAREA	4			
AREAS		Sq. Ft.	Acre	C
Hard Surface		0		0.90
Landscape		1,003,873		0.15
Average C Value		1,003,873	23.05	0.15
Tc =	20	MIN		
i =	4	IN/HR	(100 year)	
Q = CiA	Q =	13.83	CFS	

Existing upstream pipe capacity + down stream overland flow = 582 CFS +14 CFS = 596 CFS Max Flow required for down stream pipe culvert.

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Proposed 60” RCP Culvert, Q = 651 cfs: (651 CFS > 596 CFS, so pipe has sufficient capacity).

Manning Formula Uniform Pipe Flow at Given Slope and Depth

Check out our spreadsheet version of this calculator Download Spreadsheet Open Google Sheets version View All Spreadsheets

New 60" Pipe Flow Calculations

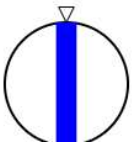
Crimson Ridge Project

Inputs

Pipe diameter, d_0	5	ft
Manning roughness, n	.015	
Pressure slope (possibly ? equal to pipe slope), S_0	.0832	rise/run
Percent of (or ratio to) full depth (100% or 1 if flowing full)	1	fraction

Results

Flow, Q	651.0219	cfs
Velocity, v	33.1566	ft/sec
Velocity head, h_v	17.0859	ft H2O
Flow area	19.6356	ft^2
Wetted perimeter	15.7080	ft
Hydraulic radius	1.2500	ft
Top width, T	0.0000	ft
Froude number, F	0.00	
Shear stress (tractive force), tau	6.4927	psf



Alternative Proposed 4’ x 5’ box Culvert, Q = 736.89 cfs:

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Manning Formula Uniform Trapezoidal Channel Flow at Given Slope and Depth

4' Wide x 5' High Box Culvert

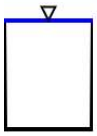
Printable Subtitle

Inputs

Bottom width	4	ft
Side slope 1 (horiz./vert.)	.01	
Side slope 2 (horiz./vert.)	.01	
Manning roughness, n ?	0.015	
Channel slope	.0832	rise/run
Flow depth	5	ft
Bend Angle? (for riprap sizing)	0	
Stone specific gravity (2.65)	2.65	

Results

Flow area	20.2507	ft^2
Wetted perimeter	14.0005	ft
Hydraulic radius	1.4464	ft
Velocity, v	36.5442	ft/sec
Flow, Q	740.0113	cfs
Velocity head, h_v	20.7556	ft
Top width, T	4.1000	ft
Froude number, F	2.90	
Shear stress (tractive force), tau	7.5127	psf
Implied design ? riprap size based on n	0.0033	ft
Required bottom angular riprap size, D50, Maricopa County ?	2.8792	ft
Required side slope 1 angular riprap size, D50, Maricopa County ?	2.8792	ft
Required side slope 2 angular riprap size, D50, Maricopa County ?	2.8792	ft
Required angular riprap size, D50, per Maynord, Ruff, and Abt (1989)	33.4440	ft
Required angular riprap size, D50, per Searcy (1967)	8.9553	ft



It should also be noted that the existing down stream pipe north of this development (shown on sheet C8) was put in as a 36" RCP and no evidence of pipe capacity issues is apparent. Our proposed larger cross sectional area pipes have more available capacity than the existing upstream and .

PP7

Comment regarding no need for public road and rest of the roads are private, then this one should be as well.

We were of the understanding that to the extent practical, roads were to be designed to be public per the county standards. Seeing as how this is not a gated private road and these lots are being plated as a separate subdivision name, developers would like to request this stay a public road. Originally we had dimensioned as 50' wide street widths and updated widths at the request of Weber County comments (per public street standards). The landscape island is designed to be an enhancement beautified entry for an aesthetic entryway which the developers will have the HOA maintain.

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Sheet D2

Comment: Does the State Rules allow for anything smaller than 2-inch? Need something from the State approving it.

Per email received and forwarded to Chad on 1/13/2021 R317-5 is the referenced code section which according to Robert Beers provides allowance for the smaller recommended pipe lateral size. The 1.25 inch lateral is the size that was provided in the detail by Richard Jex who is a sales rep for Orenco products.

2. Some of the comments may not pertain to phase 2, but where the improvement plans were submitted and other information comments were given.

   (Noted. We have renamed Phase 3 to be Phase 2 with subphases 2A, 2B, and 2C). The other area is now know as Harbor View Estates Subdivision, so it has a separate unique identity.

3. We will need a letter from UDOT on the access with their requirements and approval.

   See provided emailed UDOT approval letter (emailed on 1-8-2021). Letter was also emailed to Felix upon his request on 1/13/2021.

4. All the recommendations in the geology and geotechnical report will need to be followed/addressed.

   To the best of our knowledge we have followed all the design recommendations in the geology and geotechnical report. The geotechnical engineer will prepare and submit construction observation reports from their construction observation.

5. Those lots that fall in the geological hazard areas will require geological reconnaissance reports when submitting for building permit.

   Noted.

6. In the Geologic Hazards Evaluation it talks about Debris Flow, Flooding, and shallow ground water as moderate risks. These items should be addressed by the geotechnical engineer/civil engineer.

   The risks for debris flows has been reduced in that storm drain detention pond will intercept much of the surface water and release it from a detention pond. Also the height of the roadway crossing the stream would provide for debris flow storage area should this occur. We also added the required note 1 to sheet PP3 specifying that the HOA will be responsible for removing any debris near the headwall structures and storm drain pipe culverts that may create a potential for a log jam or other debris (as applicable).

7. Plate 40 shows some recommended non-buildable areas, these lots and any others with geologic issues should be labeled with an “R” Restricted Lot, or show a buildable area that meets the ordinance.

   This is a reference to the Christensen report which is not a part of the submittals for this development. The report was replaced with the AGEC report which was included in email attachment sent Jan 8, 2021.

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8. In the geotech report it states a Christensen Geotechnical representative should observe the site grading operations. We will want to see a letter from him that he has done so before approval.

   There should not be any referenced to Christensen Geotechnical for this project. AGEC report is what is being used. The earlier Christensen geotechnical report should not be used as a part of this review and the updated AGEC report should be used instead.

   On sheet PP1 we list that AGEC Representative should observe the site grading operations. A letter from the geotechnical engineer will be provided regarding their observations of the site grading prior to Weber County approval.

9. Did the geologist/geotech engineer see a copy of the improvement plans, for the cut and fills that will be on site as part of this project.

   Yes we have sent our improvement plans for the Geologist/Geotech engineer to review cuts and fills of this project.

10. Subdivision will need to be annexed into Pineview West Sewer Improvement District if it presently is not in it.

    Noted. Subdivision to be annexed into Pineview West Sewer Improvement District. See submitted annexation plat that should have been uploaded to Frontier.

11. We will need a letter from the water and secondary water district approving of the design of the new infrastructure.

    A new water company is being created and backflow preventors will be used for secondary water connections. Therefore no additional approval letter is required for these services. We have though also provided our plans to Peter Turner (of Pineview West) to coordinate as may be required and have requested approval letters.

12. Please provide the storm water study for the project, or at least the calculations for the 60" Pipe.

    See provided Calculations in comment 1 (sheet PP3). Also refer to sheet C5 for calculations for the 60-inch pipe. The new improvements being added to the existing system will have very little increase in flow due the additional contributing area of flow being added is 23 Acres for which the new pipes can handle the increase in flow as was demonstrated in comment 1 (shown on earlier pages).

13. Make sure that the drain fields and drip irrigation meet the setbacks from drainages and ponds.

    100' minimum is required and we have at least 100' minimum from detention ponds. See dimensions shown on sheet C8.

14. There will need to be an escrow established for the improvements prior to recording or the improvements will need to be installed prior to final approval.

    Noted. Developers to set up escrow prior to recording or improvements will be installed prior to final approval.

15. A set of as-built drawings will need to be submitted to our office when the project is completed.

    Noted. As-Built drawings to be submitted when project is completed.

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16. Because soil conditions vary throughout the county, it is now necessary to provide an engineered pavement design showing required sub-base, road-base, fabric, and asphalt thickness as needed for soil type. Asphalt thickness shall not be less than 3 inches. The county engineer is now requiring a minimum of 8" of 3" minus sub-base and 6" road-base. Compaction test on both will be required.

    (Geotech Report from AGEC, Section H.2 lists recommended minimum thickness of 3" on 8"). County increased minimums are called out on our plans as requested. Compaction testing is also called out. See sheet PP1 and PP7 required cross sections.

17. SWPPP Comments: Once known who the operator/contact will be those will need to be filled in. I believe Pineview is an impaired water body with a TMDL double check. The NOI will need to be added and submitted once it is taken out. All the necessary signatures need to be filled in. A copy of the state general permit needs to be under appendix I.

    We have updated section 3.2 to list Pineview with an approved TMDL. Operator/contact information will be updated prior to preconstruction meeting along with the NOI and signatures provided.

18. A Storm Water Activity Permit will need to be obtained through our office before construction begins. http://www1.co.weber.ut.us/mediawiki/images/5/56/Stormwater_Construction_Activity_Permit.pdf

    Noted.