

**From:** [Troy Monroe](#)  
**To:** ["Jason Rice"](#); [Andrew Mill](#); [Kevin Slovarp](#); [Bob Hayes](#)  
**Cc:** [Cory Davis](#); [Anita McNamara](#); [Mary McCrea](#); [Mike Haynes](#)  
**Subject:** RE: City Engineering comments on Hillside Crossing sufficiency  
**Date:** Tuesday, October 09, 2018 11:30:13 AM

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Cory –

The City has reviewed the submitted storm water report and [find the report sufficient](#). However, there are items that need to be addressed in the final submittal after infrastructure has been designed. Additionally, this review and the finding of sufficiency does not, in any way, relieve the consultant of responsibility of storm water design. Since first submittal the errors that the City has found has almost doubled the amount of storm water being produced by the development. Having these errors being found by City review verses the consultant's quality assurance does not give us faith that engineering concepts are being followed. If additional errors or omissions are discovered in this preliminary design or in future submittals it will be the developer's responsibility to correct them. The City's deeming the preliminary design sufficient does not indicate full acceptance of design.

With that said, here are two items that need to be addressed in the final report:

1. Section 5.2B – The pro-rated outlet flow calculation must only include the area that can drain to the collection ditch. Adding acreage that is below the ditch to the calculation of what flows to the ditch is incorrect.
2. Section 5.2C – Calculations for pipe capacity must look at the system as a whole and not just individual pipe sections. The capacity of pipes in a system are dependent on both upstream and downstream conditions and therefore should be modeled as a system.

Again, the City has deemed the preliminary design report sufficient and no submittals are required at this time.

Please contact me with any questions or concerns.

Thanks,

**Troy Monroe PE**

Assistant City Engineer  
552-6091

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**From:** Jason Rice <jasonr@territoriallandworks.com>  
**Sent:** Tuesday, October 9, 2018 9:06 AM  
**To:** Troy Monroe <MonroeT@ci.missoula.mt.us>; Andrew Mill <AndrewM@territoriallandworks.com>; Kevin Slovarp <KSlovarp@ci.missoula.mt.us>; Bob Hayes <BHayes@ci.missoula.mt.us>  
**Cc:** Cory Davis <CoryD@territoriallandworks.com>; Anita McNamara <McNamaraA@ci.missoula.mt.us>; Mary McCrea <McCreaM@ci.missoula.mt.us>; Mike Haynes <HaynesM@ci.missoula.mt.us>  
**Subject:** Re: City Engineering comments on Hillside Crossing sufficiency

Troy. Have you completed the review?

**Jason Rice, P.E., CEO**

**Territorial-Landworks, Inc**  
1817 South Ave West Suite A | P.O. Box 3851 | Missoula, MT 59806  
406/721-0142 phone | 406/215-1016 direct | 406/240-4265 cell | 406/721-5224 fax  
[JasonR@TerritorialLandworks.com](mailto:JasonR@TerritorialLandworks.com)

Sent from my Verizon, Samsung Galaxy smartphone

----- Original message -----

**From:** Troy Monroe <[MonroeT@ci.missoula.mt.us](mailto:MonroeT@ci.missoula.mt.us)>  
**Date:** 10/3/18 11:00 AM (GMT-07:00)  
**To:** Andrew Mill <[AndrewM@territoriallandworks.com](mailto:AndrewM@territoriallandworks.com)>, Jason Rice <[jasonr@territoriallandworks.com](mailto:jasonr@territoriallandworks.com)>, Kevin Slovarp <[KSlovarp@ci.missoula.mt.us](mailto:KSlovarp@ci.missoula.mt.us)>, Bob Hayes <[BHayes@ci.missoula.mt.us](mailto:BHayes@ci.missoula.mt.us)>  
**Cc:** Cory Davis <[CoryD@territoriallandworks.com](mailto:CoryD@territoriallandworks.com)>, Anita McNamara <[McNamaraA@ci.missoula.mt.us](mailto:McNamaraA@ci.missoula.mt.us)>, Mary McCrea <[McCreaM@ci.missoula.mt.us](mailto:McCreaM@ci.missoula.mt.us)>, Mike Haynes <[HaynesM@ci.missoula.mt.us](mailto:HaynesM@ci.missoula.mt.us)>  
**Subject:** RE: City Engineering comments on Hillside Crossing sufficiency

Thanks Andrew. I am assuming that this has been QA reviewed by the signing PE and all basic engineering concepts have been followed.

If so, I should have a review completed in the next couple of days.

Thanks,

**Troy Monroe PE**

Assistant City Engineer  
552-6091

---

**From:** Andrew Mill <[AndrewM@territoriallandworks.com](mailto:AndrewM@territoriallandworks.com)>  
**Sent:** Wednesday, October 3, 2018 10:14 AM  
**To:** Jason Rice <[jasonr@territoriallandworks.com](mailto:jasonr@territoriallandworks.com)>; Troy Monroe <[MonroeT@ci.missoula.mt.us](mailto:MonroeT@ci.missoula.mt.us)>; Kevin Slovarp <[KSlovarp@ci.missoula.mt.us](mailto:KSlovarp@ci.missoula.mt.us)>; Bob Hayes <[BHayes@ci.missoula.mt.us](mailto:BHayes@ci.missoula.mt.us)>  
**Cc:** Cory Davis <[CoryD@territoriallandworks.com](mailto:CoryD@territoriallandworks.com)>; Anita McNamara <[McNamaraA@ci.missoula.mt.us](mailto:McNamaraA@ci.missoula.mt.us)>; Mary McCrean <[McCreaM@ci.missoula.mt.us](mailto:McCreaM@ci.missoula.mt.us)>; Mike Haynes <[HaynesM@ci.missoula.mt.us](mailto:HaynesM@ci.missoula.mt.us)>  
**Subject:** RE: City Engineering comments on Hillside Crossing sufficiency

Troy,

See attached for the again revised preliminary drainage report. The areas (pre vs. post development) now match, as the western proposed trail area was added to Basin 5 (not a separate Basin 6 as Jason described below) for purposes of the drainage analysis.

**Andrew Mill, E.I., Staff Engineer**



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**From:** Jason Rice  
**Sent:** Tuesday, October 02, 2018 2:07 PM  
**To:** Troy Monroe <[MonroeT@ci.missoula.mt.us](mailto:MonroeT@ci.missoula.mt.us)>; Andrew Mill <[AndrewM@territoriallandworks.com](mailto:AndrewM@territoriallandworks.com)>; Kevin Slovarp <[KSlovarp@ci.missoula.mt.us](mailto:KSlovarp@ci.missoula.mt.us)>; Bob Hayes <[BHayes@ci.missoula.mt.us](mailto:BHayes@ci.missoula.mt.us)>  
**Cc:** Cory Davis <[CoryD@territoriallandworks.com](mailto:CoryD@territoriallandworks.com)>; Anita McNamara <[McNamaraA@ci.missoula.mt.us](mailto:McNamaraA@ci.missoula.mt.us)>; Mary McCrean <[McCreaM@ci.missoula.mt.us](mailto:McCreaM@ci.missoula.mt.us)>; Mike Haynes <[HaynesM@ci.missoula.mt.us](mailto:HaynesM@ci.missoula.mt.us)>  
**Subject:** RE: City Engineering comments on Hillside Crossing sufficiency

Troy – I did not review the original, but did notice that they were different as I was filling in for Cory. However, as you can see, we used the exact same basin sizes that you discussed in the original report. This seems like a moving target to me, but perhaps the original report did not get reviewed as rigorously?

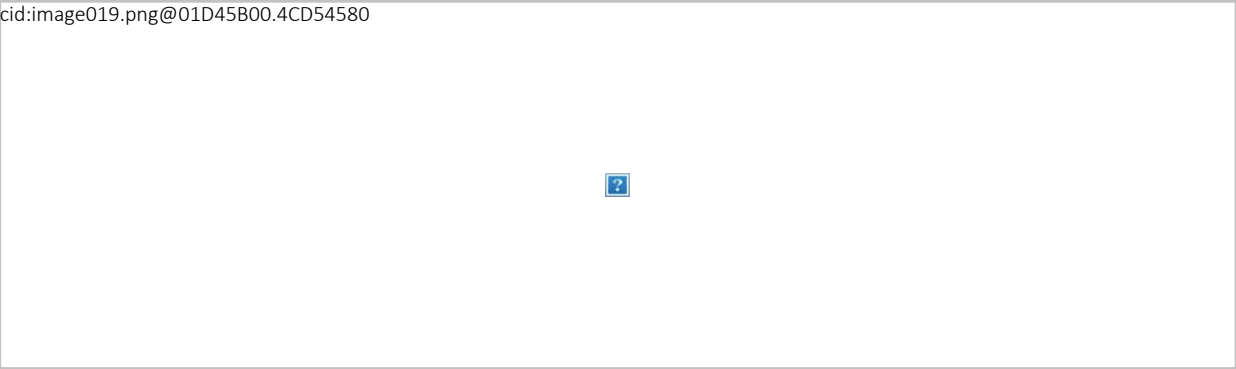
The maps have been the same in both reports and show that the area west of Basin 3 and 5 was not included (we will call it post development basin 6) and also includes the area along the entry road. I suggest that it will also be improved as the upper area will be planted and landscaped so we can certainly add that basin in, but doubt that it will change much since it has no impervious other than the gravel trail, but does see the benefit in the upper area from the landscaping that will occur roadside and next to the home. I am not sure why it was done that way or why it was agreed upon. Also note that neither sets include the area below the cut-off ditch. Picture of basin 6 below...

I do not think a face to face meeting is needed, but do you only want us to include the Basin 6 as described above or do you want us to update all the calcs to include the area below the cut-off ditch too?

I phone call could also accommodate the conversation.

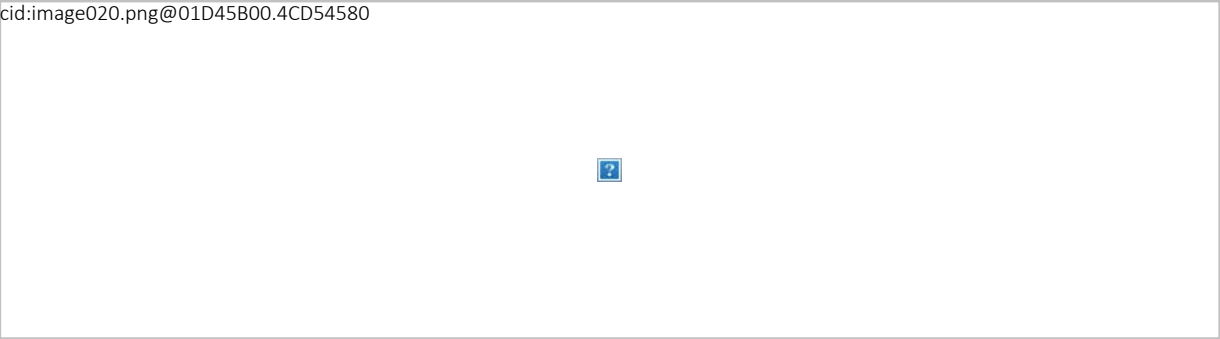
From the original report..

cid:image019.png@01D45B00.4CD54580



From the updated report... (the acreage of the basins did not change)

cid:image020.png@01D45B00.4CD54580



cid:image021.png@01D45B00.4CD54580



**Jason Rice, P.E., CEO**





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**From:** Troy Monroe <[MonroeT@ci.missoula.mt.us](mailto:MonroeT@ci.missoula.mt.us)>  
**Sent:** Tuesday, October 2, 2018 1:01 PM  
**To:** Jason Rice <[jasonr@territoriallandworks.com](mailto:jasonr@territoriallandworks.com)>; Andrew Mill <[AndrewM@territoriallandworks.com](mailto:AndrewM@territoriallandworks.com)>; Kevin Slovarp <[KSlovarp@ci.missoula.mt.us](mailto:KSlovarp@ci.missoula.mt.us)>; Bob Hayes <[BHayes@ci.missoula.mt.us](mailto:BHayes@ci.missoula.mt.us)>  
**Cc:** Cory Davis <[CoryD@territoriallandworks.com](mailto:CoryD@territoriallandworks.com)>; Anita McNamara <[McNamaraA@ci.missoula.mt.us](mailto:McNamaraA@ci.missoula.mt.us)>; Mary McCrea <[McCreaM@ci.missoula.mt.us](mailto:McCreaM@ci.missoula.mt.us)>; Mike Haynes <[HaynesM@ci.missoula.mt.us](mailto:HaynesM@ci.missoula.mt.us)>  
**Subject:** RE: City Engineering comments on Hillside Crossing sufficiency

No, this is not correct. You have 24.58 acres in the pre-development calculation and 22.76 acres in the post-development calculation. You are adding 1.82 acres to the pre-development calculation and taking that volume off of the increase in post-development.

Please schedule a meeting to come in and I can walk you through the math.

**Troy Monroe PE**  
Assistant City Engineer  
552-6091

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**From:** Jason Rice <[jasonr@territoriallandworks.com](mailto:jasonr@territoriallandworks.com)>  
**Sent:** Tuesday, October 2, 2018 12:43 PM  
**To:** Troy Monroe <[MonroeT@ci.missoula.mt.us](mailto:MonroeT@ci.missoula.mt.us)>; Andrew Mill <[AndrewM@territoriallandworks.com](mailto:AndrewM@territoriallandworks.com)>; Kevin Slovarp <[KSlovarp@ci.missoula.mt.us](mailto:KSlovarp@ci.missoula.mt.us)>; Bob Hayes <[BHayes@ci.missoula.mt.us](mailto:BHayes@ci.missoula.mt.us)>  
**Cc:** Cory Davis <[CoryD@territoriallandworks.com](mailto:CoryD@territoriallandworks.com)>; Anita McNamara <[McNamaraA@ci.missoula.mt.us](mailto:McNamaraA@ci.missoula.mt.us)>; Mary McCrea <[McCreaM@ci.missoula.mt.us](mailto:McCreaM@ci.missoula.mt.us)>; Mike Haynes <[HaynesM@ci.missoula.mt.us](mailto:HaynesM@ci.missoula.mt.us)>  
**Subject:** Re: City Engineering comments on Hillside Crossing sufficiency

Troy. This is the same method that you agreed to when Cory and you met with our client. If methodology was approved then why change? We are comparing entire developed site to entire developed site.

**Jason Rice, P.E., CEO**

**Territorial-Landworks, Inc**  
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[JasonR@Territorial-Landworks.com](mailto:JasonR@Territorial-Landworks.com)

Sent from my Verizon, Samsung Galaxy smartphone

----- Original message -----

**From:** Troy Monroe <[MonroeT@ci.missoula.mt.us](mailto:MonroeT@ci.missoula.mt.us)>  
**Date:** 10/2/18 12:01 PM (GMT-07:00)  
**To:** Andrew Mill <[AndrewM@territoriallandworks.com](mailto:AndrewM@territoriallandworks.com)>, Kevin Slovarp <[KSlovarp@ci.missoula.mt.us](mailto:KSlovarp@ci.missoula.mt.us)>, Bob Hayes <[BHayes@ci.missoula.mt.us](mailto:BHayes@ci.missoula.mt.us)>  
**Cc:** Jason Rice <[jasonr@territoriallandworks.com](mailto:jasonr@territoriallandworks.com)>, Cory Davis <[CoryD@territoriallandworks.com](mailto:CoryD@territoriallandworks.com)>, Anita McNamara <[McNamaraA@ci.missoula.mt.us](mailto:McNamaraA@ci.missoula.mt.us)>, Mary McCrea <[McCreaM@ci.missoula.mt.us](mailto:McCreaM@ci.missoula.mt.us)>, Mike Haynes <[HaynesM@ci.missoula.mt.us](mailto:HaynesM@ci.missoula.mt.us)>  
**Subject:** RE: City Engineering comments on Hillside Crossing sufficiency

Guys, you have to compare the same area pre-development to post-development. There is obviously a difference between your whole lot (used for pre-development rate) and the summation of the post-development basins (used for post-development rates).

So, this is how I would approach the calculation. Either use the whole lot and account for the overall acreage change to impervious and landscaping per soil group. Or, use the basins acreage and do a pre-development calculation (in addition to the post-development calculation) and show the difference for each basin.

One way or another you must compare the same acreage pre-development to post-development.

Before I can mark storm water as sufficient I have to be certain that your methodology is correct.

As a note, there are a lot of holidays in the next three (3) months. This issue has already pushed the Council meeting from November to December. Anita has warned me that if this isn't sufficient by next week then it will probably get pushed to January.

**Troy Monroe PE**

Assistant City Engineer  
552-6091

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**From:** Andrew Mill <[AndrewM@territoriallandworks.com](mailto:AndrewM@territoriallandworks.com)>

**Sent:** Tuesday, October 2, 2018 10:20 AM

**To:** Troy Monroe <[MonroeT@ci.missoula.mt.us](mailto:MonroeT@ci.missoula.mt.us)>; Kevin Slovarp <[KSlovarp@ci.missoula.mt.us](mailto:KSlovarp@ci.missoula.mt.us)>; Bob Hayes <[BHayes@ci.missoula.mt.us](mailto:BHayes@ci.missoula.mt.us)>

**Cc:** Jason Rice <[jasonr@territoriallandworks.com](mailto:jasonr@territoriallandworks.com)>; Cory Davis <[CoryD@territoriallandworks.com](mailto:CoryD@territoriallandworks.com)>

**Subject:** RE: City Engineering comments on Hillside Crossing sufficiency

Troy,

See attached for the revised report and calculations. After the previous back and forth, we completed a more thorough review of the calculations to determine if there were any other errors that those previously pointed out.

After review, a few calculation changes were made, mainly what you described previously. Basin 5 is in fact to be included in both pre and post development calculations. Additionally, the combination of HSG 'B' and 'C' were taken into account throughout the site due to both occurring. This was an oversight and scaling of the HSG Soils Map compared to our site and should be corrected now (i.e. Basin 1 is both 'B' and 'C'; Basin 2 is primarily 'C' with some 'B'; Basin 3 is both 'B' and 'C'; Basin 4 and 5 are all 'B', etc.). Originally, it appeared that there were more 'C' areas than 'B' areas, but that is not the case. Another error encountered was that Basin 5 is actually all HSG 'B' and not 'C' as previously specified within the calculations. This altered the post-development conditions and total runoff volume that will need to be detained, which is actually closer to 14,100 cubic feet. The calculations showing how this was obtained is in the attached report.

Please review and let me know if you have any further questions or comments.

Andrew

**Andrew Mill, E.I., Staff Engineer**



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[AndrewM@TerritorialLandworks.com](mailto:AndrewM@TerritorialLandworks.com)



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---

**From:** Troy Monroe <[MonroeT@ci.missoula.mt.us](mailto:MonroeT@ci.missoula.mt.us)>

**Sent:** Friday, September 28, 2018 10:40 PM

**To:** Andrew Mill <[AndrewM@territoriallandworks.com](mailto:AndrewM@territoriallandworks.com)>; Kevin Slovarp <[KSlovarp@ci.missoula.mt.us](mailto:KSlovarp@ci.missoula.mt.us)>; Bob Hayes <[BHayes@ci.missoula.mt.us](mailto:BHayes@ci.missoula.mt.us)>

**Cc:** Jason Rice <[jasonr@territoriallandworks.com](mailto:jasonr@territoriallandworks.com)>; Cory Davis <[CoryD@territoriallandworks.com](mailto:CoryD@territoriallandworks.com)>

**Subject:** RE: City Engineering comments on Hillside Crossing sufficiency

Andrew –

I think you have a serious calculation problem. You need to go back and separate the basins and recalculate based on basin pre to post. If you have 25 acres in the pre-development calculation then you need to include all 25 acres in the post development calculation. If one

basin is the same pre-development and post-development either not include it in both calculations or include it in both calculations. When you do you should come up with 19k CF difference.

Please check your calculations and re-submit.

**Troy Monroe PE**

Assistant City Engineer  
552-6091

---

**From:** Andrew Mill <[AndrewM@territorialandworks.com](mailto:AndrewM@territorialandworks.com)>

**Sent:** Friday, September 28, 2018 4:37 PM

**To:** Troy Monroe <[MonroeT@ci.missoula.mt.us](mailto:MonroeT@ci.missoula.mt.us)>; Kevin Slovarp <[KSlovarp@ci.missoula.mt.us](mailto:KSlovarp@ci.missoula.mt.us)>; Bob Hayes <[BHayes@ci.missoula.mt.us](mailto:BHayes@ci.missoula.mt.us)>

**Cc:** Jason Rice <[jasonr@territorialandworks.com](mailto:jasonr@territorialandworks.com)>; Cory Davis <[CoryD@territorialandworks.com](mailto:CoryD@territorialandworks.com)>

**Subject:** RE: City Engineering comments on Hillside Crossing sufficiency

Troy,

My apologies. In the urgency of revising all the calculations and report, I erased the calculation. See attached for the report showing how this value was obtained.

Thanks,  
Andrew

**Andrew Mill**, E.I., Staff Engineer



1817 South Ave West Suite A | Missoula, MT 59801  
406/721-0142 phone | 406/381-2320 cell | 406/721-5224 fax  
[AndrewM@Territorialandworks.com](mailto:AndrewM@Territorialandworks.com)



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---

**From:** Troy Monroe <[MonroeT@ci.missoula.mt.us](mailto:MonroeT@ci.missoula.mt.us)>

**Sent:** Friday, September 28, 2018 4:01 PM

**To:** Andrew Mill <[AndrewM@territorialandworks.com](mailto:AndrewM@territorialandworks.com)>; Kevin Slovarp <[KSlovarp@ci.missoula.mt.us](mailto:KSlovarp@ci.missoula.mt.us)>; Bob Hayes <[BHayes@ci.missoula.mt.us](mailto:BHayes@ci.missoula.mt.us)>

**Cc:** Jason Rice <[jasonr@territorialandworks.com](mailto:jasonr@territorialandworks.com)>; Cory Davis <[CoryD@territorialandworks.com](mailto:CoryD@territorialandworks.com)>

**Subject:** RE: City Engineering comments on Hillside Crossing sufficiency

Andrew –

Can you send me the calculation for the Runoff Volumes. You show 6,158 CF but not the calculation used to obtain this value. Why is the calculation not included in the revised report?

cid:image024.jpg@01D45A37.7EFDA440



Thanks,

**Troy Monroe PE**

Assistant City Engineer  
552-6091

From first report:

cid:image025.jpg@01D45A37.7EFDA440



---

**From:** Andrew Mill <[AndrewM@territoriallandworks.com](mailto:AndrewM@territoriallandworks.com)>

**Sent:** Friday, September 28, 2018 3:15 PM

**To:** Troy Monroe <[MonroeT@ci.missoula.mt.us](mailto:MonroeT@ci.missoula.mt.us)>; Kevin Slovarp <[KSlovarp@ci.missoula.mt.us](mailto:KSlovarp@ci.missoula.mt.us)>; Bob Hayes <[BOHayes@ci.missoula.mt.us](mailto:BOHayes@ci.missoula.mt.us)>

**Cc:** Jason Rice <[jasonr@territoriallandworks.com](mailto:jasonr@territoriallandworks.com)>; Cory Davis <[CoryD@territoriallandworks.com](mailto:CoryD@territoriallandworks.com)>

**Subject:** City Engineering comments on Hillside Crossing sufficiency

Hi Troy,

See our revised preliminary drainage report for the City's sufficiency review. We should have addressed all of the comments or questions you had regarding our previously submitted one. A few things to point out that have changed:

- A "pro-rated" allowable discharge rate from the design 7 cfs. There is also an exhibit included showing how that calculations was completed.
- A combination curve number was used for the mixed hydrologic soil groups B and C. This subsequently updated a majority of the runoff calculations.
- Language throughout was updated based on the comments in the previous report. Generally, the sections updated due to City comments were 3.1A, 5.1A, 5.1B, 5.2A, 5.2B, 5.2C, and the conclusion. These can be pointed out if needed.

If you have any further questions, comments, or concerns, please let me know.

Thanks,

Andrew

**Andrew Mill**, E.I., Staff Engineer



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[AndrewM@TerritorialLandworks.com](mailto:AndrewM@TerritorialLandworks.com)



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