



ENGINEERING DEPARTMENT

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MEMO

To: Edie Berghoff, Associate Planner
From: Michael Bateman, PE, Development Review Engineer
Subject: Crystal View Post Decision Review
Date: December 10, 2018

The Crystal View Post Decision Review/Plat Modification, Planning File P-06-18-18-01 was received and reviewed by the Engineering and Public Works departments. The following memo provides Engineering and Public Works comments and conditions on the proposed modifications.

A. Proposed Modifications

The applicant has proposed five modifications to the plat of Crystal View. These modifications have been reviewed by the Engineering and Public Works departments for consistency with the project's findings, conditions of approval and the decision criteria applicable to Engineering and Public Works issues. The proposed modifications and Engineering and Public Works review of the proposed modifications are as follows:

1. Grade development Division II

The applicant proposes to grade the whole development at one time. The applicant indicates that allowing for grading Divisions I and II at the same time "will minimize disturbance to new Division I lot owners from heavy construction activities such as excavating and hauling and recompacting significant amounts of earth. Utility installation and home construction will remain under multiple-phase approach."

A clearing and grading permit was issued 6/29/17 for Crystal View Division I only. The project was shut down for the wet season 11/14/17. Work resumed in the spring of 2018. Applicant was advised that Clearing and or Grading for Division II would not be considered until Division I work was completely stabilized. Substantial compliance with this condition was determined and a clearing only permit for Division II was issued 8/14/18.

During clearing limits staking for Division II it was discovered that private property issues related to septic system location existed between Crystal View property and neighboring property Tax ID 242601-3-050-2000 ("McKinnon Property"). As a result of this discovery, the Clearing Permit for Division II was suspended pending submission of information related to the McKinnon property issues.

A meeting was held 9/20/18 regarding clearing and grading Division II and conditions developed for the applicant to receive a clearing and grading for Division II under the original approved construction drawings in the area of the project outside Division II lots 1-10. This included requirements and limitations should work continue into the wet season. The applicant complied with the conditions and submission requirements and the clearing permit suspension was lifted for the area of lots 11-25 on

October 17, 2018. The area of lots 1-10 remained under suspension pending resolution of the McKinnon Property related issues.

A Grading permit for Crystal View Division II under the originally submitted construction drawings was approved 10/17/18, with the area of Division II lots 1-10 remaining under suspension. Issuance of approved construction drawings was delayed until 10/24/18 due to loss of original contractor copy of construction drawings with approval stamps. A replacement set of approved construction drawings contractor copy was issued 10/24/18 with the area of Division II lots 1-10 suspended.

The drawings submitted with the post decision review request include minor changes to grading as a result of revisions to the final stormwater system design, and revisions to grading in the area of Division II lots 11-25 to resolve needs associated with balancing project cut/fill. Further grading changes as well as changes to the sewer system in the Division II lots 11-25 area were proposed in a later submittal of a revised sheet #25 (Road A & C – Sewer Plan and Profile). The proposed changes to the sewer system were required to resolve construction standard non-compliance issues created by the grading changes in that area.

Grading and utility changes proposed in plat modification drawings and subsequent revised sheet #25 submittal have been reviewed by the Engineering and Public Works departments and have been found to be consistent with City construction standards and Engineering and Public Works departments conditions of approval. Technical comments on the application drawings and revised drawing #25 have been provided to the applicant as noted in this memo Item B. Final grades and utility details shall be resolved and shown on the revised construction drawing submittal.

No changes to the drawings associated with the private property issues between the Crystal View property and the McKinnon property are shown on the plat modification drawings submitted with the post decision review application. The applicant indicates that resolution of the issues associated with the McKinnon property will be pursued as a separate item. The applicant indicates that resolution of the private property issues will involve connection of the McKinnon property to the public sewer system being installed with the Crystal View development and decommissioning/abandonment of the existing septic tank and drainfield. The applicant has further indicated that resolution of the issues may also involve adjustment of property lines between the two properties. Any adjustment of property lines will require a Boundary Line Adjustment (BLA), which is a separate application with the Planning Department.

The private property issues associated with the McKinnon property must be resolved before authorization of grading in the area of Crystal View Division II lots 1-10. Clearing and grading will remain suspended in this area until sufficient agreements are executed between both parties and submitted to the City for review. Construction drawings revisions in the area of Crystal View Division II lots 1-10 will not be approved until resolution of the private property issues has progressed to a point satisfactory to the City Engineer. Clearing and grading in the area of Crystal View Division II Lots 1-10 will not be authorized until construction drawings showing all revisions necessary are submitted, reviewed and approved. Construction drawing revisions shall include TESC revisions necessary to accommodate resolution of private property issues, construction sequencing planning, temporary fencing of protected areas and any lot line revisions that result from any proposed BLA. Any BLA required to resolve the issues shall be reviewed, approved and recorded prior to authorization of clearing and grading for the area of Crystal View lots 1-10. All issues related to resolution of the private property issues shall be resolved prior to Final Plat approval of Crystal View Division I.

The following Engineering Condition of Approval shall be added:

“68. Revised construction drawings shall be submitted for review and approval. Revisions in the area of Division II lots 1-10 will not be approved until resolution of private property issues between the Crystal View property and the McKinnon Property tax ID 242601-3-050-2000 have been resolved to the satisfaction of the City Engineer. Clearing and Grading in the area of Crystal

View Division II lots 1-10 will not be authorized until sufficient agreements between both parties have been signed and submitted to the City and any Boundary Line Adjustment necessary as a part of resolution of private party issues shall be recorded prior to authorization of clearing and grading the area of Crystal View Division II lots 1-10. Construction drawings may be submitted for approval in stages and issued with areas under suspension in order to accommodate resolution of private property issues."

The Engineering and Public Works departments have determined that with the addition of the above condition of approval this proposed modification is consistent with City construction standards and Engineering and Public Works conditions of approval.

2. Construct storm vault approximately 10 feet further north and with development of Division I; and eliminate temporary pond with Division I development.

The applicant requests construction of storm vault with Division I, eliminating the temporary storm pond in Division II. As a normal part of construction drawing review, applicant has finalized the storm drainage report and stormwater system design. Storm vault dimensions have been revised to comply with revised final storm drainage report and final storm drainage design. Water quality treatment and offsite conveyance have been revised. Geotechnical report addendum #3 submitted by GeoResources supports the design of the vault, its location, and slope stability.

Engineering Department conditions of approval #21, #22 and #24 are not applicable to the development modification as proposed, as the storm vault construction will eliminate the need for the temporary detention pond in the Division II property.

The revised stormwater vault design and supporting documentation have been reviewed by the Engineering and Public Works departments and found to be consistent with the requirements of the project's vested DOE stormwater manual, City construction standards and Engineering and Public Works Departments conditions of approval.

3. Incorporate modular wetland structure in offsite road improvement to replace bioretention in stormwater tract.

The applicant proposes changing water quality treatment design from a bioretention facility in Tract A to a modular wetland structure located within the offsite emergency access easement/future right of way. The applicant indicates placement of water quality enhancement in Tract A requires "excessive storm pipe depths" and reduces "tall soil retaining walls in the vault area".

The change from bioretention to modular wetland structure has been reviewed by the Engineering and Public Works Departments and found to be consistent with the projects vested stormwater design manual. The location of the modular wetland structure is within an access and utilities easement that will be dedicated to the City prior to final plat approval for Division I per Engineering Department Condition of Approval #18. This easement is coincident with the anticipated future right of way to be dedicated to the City with the development of that property. This location provides for long term maintenance access by the Public Works Department consistent with Engineering condition of approval #16.

The change from bioretention to modular wetland structure and the proposed offsite location has been reviewed by the Engineering and Public Works Departments and found to be consistent with City construction standards and Engineering and Public Works departments conditions of approval.

An operation and maintenance manual for the modular wetland structure shall be submitted to the City prior to final plat for Division I per City standards.

4. **Modify Division Boundary.**

The applicant proposes to revise the boundary between Division I and Division II, moving Lot 26 from Division II to Division I. This modification has been reviewed by the Engineering and Public Works departments.

This modification does not affect any Engineering or Public Works conditions of approval and does not affect the divisions ability to stand alone per the requirements of Engineering Department condition of approval #10.

5. **Reconfigure Division I, Lots 6-11 and 21, and Division II, Lots 4-8.**

The applicant proposes revisions to Division I lots 6-11 and 21 as a result of final stormwater system design changes. This also results in dimensional and naming changes to the stormwater tract and the stormwater access tract. The changes proposed are a result of changes to the final stormwater system design necessary to comply with City construction standards and the vested DOE stormwater design manual.

Stormwater Tract B and the associated stormwater vault and piping shall be dedicated to the City on the face of the plat per City standards and Public Works condition of approval #29. An operation and maintenance manual for the stormwater vault shall be submitted to the City prior to final plat for Division 1 per City standards.

Easement for the stormwater piping across Open Space Tract D and lot 6 consistent with City easement requirements and construction standards shall be dedicated to the City on the face of the plat per Engineering Department condition of approval #33. The applicant shall be responsible for maintenance of the stormwater system and vault for a minimum of two years or until 80% of the residences in both divisions of the plat have been completed per Engineering Department condition of approval #17.

These modifications have been reviewed by the Engineering and Public Works Departments and found to be consistent with City construction standards and Engineering and Public Works departments conditions of approval with the following change to Engineering condition of approval #20:

Engineering department condition of approval #20 shall be revised as follows:

*"20. The storm vault on ~~Tract A~~ **Tract B** is the only method of stormwater detention ~~for Division II~~ approved within this decision. If in the future direct discharge is again proposed as a viable option, the applicant shall apply to the Planning Department for a post decision review. Direct discharge to Liberty Bay is not approved for the current the Crystal View preliminary plat application. Any revival of the direct discharge option will be deemed a new application for vesting and review purposes."*

The applicant proposes revisions to Division II, Lots 4-8 associated with revised sewer connection.

As a part of technical review of the construction drawings submitted with Division I, determination was made that the sewer system design proposed did not comply with City construction standards and conditions of approval due to utility depths exceeding City requirements. The proposed revision changes

the sewer main connection point for Lots 1-10 from the sewer main being constructed along the Sunrise Ridge roadway extension to connect to the existing City owned sewer system in the Deer Run subdivision. This revision allows all of the sewer system in the plat to be constructed as gravity sewer for all lots in the subdivision consistent with City construction standards and Public Works condition of approval #12 at depths that do not exceed City requirements for installation. The sewer system in the Deer Run subdivision is within the same basin as the sewer main being constructed along the Sunrise Ridge roadway extension that will serve the remaining lots in the subdivision. The sewer system in the Deer Run subdivision connects to the central interceptor in Johnson Road consistent with Public Works condition of approval #12. The sewer system in the Deer Run subdivision has been determined to have sufficient capacity to serve the connections proposed. The developer has obtained an offsite easement for this sewer utility extension consistent with City construction standard easement requirements and Engineering conditions of approval #34 and #66.

These modifications have been reviewed by the Engineering and Public Works Departments and found to be consistent with City construction standards and Engineering and Public Works departments conditions of approval.

B. Engineering and Public Works Review of plat modification drawings

The Engineering and Public Works departments have reviewed the drawing package submitted with the Post Decision Review/Plat Modification application as well as sheet #25 revisions submitted. Technical review comments were provided to the applicant in an email dated 11/29/18. These comments shall be resolved prior to submittal of revised construction drawings for review and approval.

C. Public Comments received

I. Runoff/groundwater directed toward North (Deer Run) Easement to convey water to Miss Ellis Loop (Deer Run)

Applicant has supplied a geotechnical letter by GeoResources dated 10/29/18 addressing this issue at the request of the Engineering Department. The Engineering and Public Works departments have reviewed this letter and accept the conclusions contained within. The applicant shall follow the recommendations of this geotechnical letter when making application for building permit for the retaining wall on lot 7. Grading and utility installation shall continue to be monitored by GeoResources as per previous conditions of approval (Engineering conditions #6 and #11), to ensure that recommendations of Geotechnical engineer are followed for grading of lots 2-7.

II. Emergency services during sewer connection in Miss Ellis Loop (Deer Run)

Construction in public right-of-way and connection to public utilities requires a public property construction permit issued by the Engineering Department. The applicant will be required to obtain a public property construction permit prior to performing work in City right-of-way in the Deer Run neighborhood. Construction performed under a public property construction permit is subject to all City construction standards and public safety requirements. This permit requires that the applicant provide a traffic control plan compliant with American Association of State Highway and Transportation Officials (AASHTO) and Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) standards for review and approval. The traffic control plan requires providing and allowing for emergency services at all times. Permitting requirements will also

include coordination with neighboring property owners to minimize construction impacts during construction.

**III. Traffic Impacts:
To Deer Run subdivision
2 points of Access
Traffic increase in Meredith Heights subdivision
Traffic counts on Sunrise Ridge Avenue**

The proposed plat modification under review does not alter access, roadway network, number of lots, traffic generation or any other item or condition of approval related to traffic or traffic safety for this project from that which was approved under the previous Hearing Examiner decision issued 1/12/16 with limited reopening decision issued 3/8/16 regarding construction traffic on Sunrise Ridge and use of Johnson Rd for construction access. These impacts were studied, conditioned and mitigated previously under that decision.

IV. Sewer connection to sewer main in Miss Ellis Loop (Deer Run)

This issue is discussed under item (5) above.

V. Notification inadequate

This is not an Engineering or Public Works issue.

July 25, 2018

Crystal View LLC
105 South Main Street, Suite 230
Seattle, WA 98104
(206) 910-2728

Geotechnical Report Addendum No: 3:
Stormwater Detention Vault
Proposed Crystal View Residential Plat
Poulsbo, Washington
PN: 24260130512009, 2426013004007
Doc ID: CrystalViewLLC CrystalView.RG.A(3)

This addendum letter addresses City of Poulsbo comments in their July 2, 2018 letter regarding the proposed stormwater detention vault for the Crystal View plat. The letter indicated that documents dropped off on June 18, 2018 were incomplete. Comment #3 of the letter requested a geotechnical report reviewing the vault design, location, and critical areas. There was also a separate comment in the City of Poulsbo July 2, 2018 Memo that stated "As this is a vault of significant size, above a critical slope, a supporting geotechnical report or report supplement addressing feasibility and stability of vault construction will be required to complete the review. If supporting report(s) do exist already, please have the applicant forward them to support this review."

We previously prepared an *Updated Geotechnical Engineering Report* for the project dated September 28, 2015. Our report provided detailed recommendations for foundations, subgrade/basement walls (such as the vault walls), temporary excavations, site drainage, and structural fill. The City should have a copy of our original report, along with two previous addendums. Report addendum number 1 was requested by the City to address third party review comments about the stability of the constructed fill slope and report addendum number 2 address the Hearing Examiner Decision comment number E 11. Our report provides the geotechnical engineering parameters for the structural engineer to use to design the foundations and walls of the vault. However, this addendum report will also address concerns in the City's comments about the position of the vault relative to the top of a slope and grading/excavations required to install the vault.

Setbacks

We have been provided with structural details of the proposed vault by Voelker Engineering as well as updated plans and sections for the proposed vault location by Team 4 Engineering, a copy of which is attached. The vault will be situated near the lower, southeast corner of the site. As shown on the plan, the proposed vault location is outside of a critical stream buffer and 25-foot stream buffer building setback. The slope below the vault, according to the

Team 4 survey and plan, slopes down to off-site stream at about 13 to 27 percent with the slope having a vertical height of 15 to 30 feet. The edge of the vault is proposed to be setback about 3 to 15 feet with an excavation of 2 to 12 feet in order to achieve design grades. The slope below the vault and temporary slope required to install the vault is shown on the attached vault sections.

Section 1808.7 requires a building setback from slopes that are steeper than 3H:1V (Horizontal: Vertical) or 33 percent with greater than 10 feet in vertical height, unless evaluated and reduced and/or a structural setback is provided by a licensed geotechnical engineer. The setback distance is calculated based on the vertical height of the slope. The typical 2015 IBC setback from the top of the slope equals one third the height of the slope, while a setback from the toe of the slope equals one half the height of the slope.

As stated above, the slope below the vault is flatter than 33 percent and therefore doesn't require special setbacks in order to satisfy section 1808.7 of the 2015 International Building Code (IBC). Although not required by the IBC, given the height of the vault and amount of storage capacity, we recommend a minimum setback (actual or structural) of 5 feet. Given the current design, the foundations for the vault appear to meet or exceed this 5-foot setback.

Temporary Excavations

According to the three cross sections through the vault, the vault foundations will not encroach into the stream buffer or 25-foot stream buffer building setback. Additionally, most of the the vault excavation, including temporary cut slopes, will not encroach into 25-foot stream buffer building setback. However, the northern portion of the vault, as shown on Vault Section 1+50 will require a temporary excavation of 12 feet in depth, with about vertical distance of 8 feet from the outside edge of the vault foundation to the 25-foot stream buffer building setback. As stated in our original report, the upper 5 feet of the site soils are classified as Type C soils, while the deeper, glacially consolidated soils are classified as Type A soils. This will require the temporary excavation to encroach into the 25-foot stream buffer building setback. Our understanding of the code is that no structure can encroach into the building setback, but some grading and excavation is allowed. By the middle of the vault (section 0+75), the temporary excavation will not encroach into the building setback.

We have prepared this report for Crystalview LLC, Team 4 Engineering, and Voelker Engineering for use in evaluating the proposed detention pond for the Crystal View Plat, as well as addressing the City of Poulsbo comments. The recommendations contained herein should be used in conjunction with the recommendations in our September 12, 2017 updated *Geotechnical Engineering Report*. Our report, conclusions and interpretations are based on data original report and our previous subsurface explorations. No new subsurface explorations were performed. Our analyses and recommendations assume that the conditions observed in our explorations are representative of the subsurface conditions in general.

Variations in subsurface conditions are possible between the explorations and may also occur with time. A contingency for unanticipated conditions should be included in the budget and schedule. Sufficient monitoring, testing and consultation should be provided by our firm during construction to confirm that the conditions encountered are consistent with those indicated by the explorations, to provide recommendations for design changes should the conditions revealed during the work differ from those anticipated, and to evaluate whether earthwork and foundation installation activities comply with contract plans and specifications.

If there are any changes in the loads, grades, locations, configurations or type of the vault be constructed, the conclusions and recommendations presented in this report may not be fully applicable. If such changes are made, we should be given the opportunity to review our recommendations and provide written modifications or verifications, as appropriate.



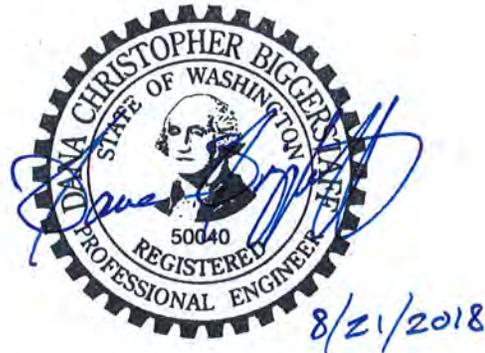
Please do not hesitate to call with any other questions or comments.

Respectfully submitted,
GeoResources, LLC



KEITH SCOTT SCHEMBS

Keith S. Schembs, LEG
Principal

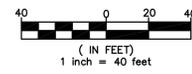


Dana C. Biggerstaff, PE
Senior Geotechnical Engineer

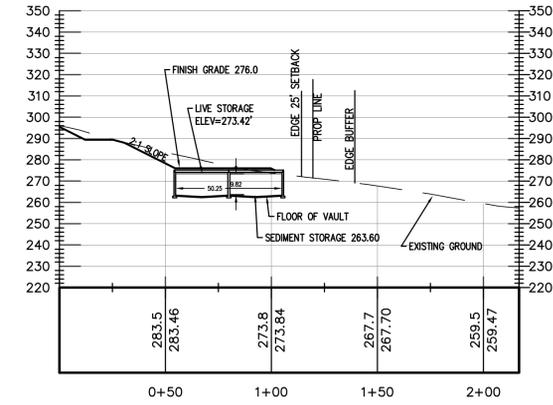
CRYSTAL VIEW PLAT MOD

VAULT SECTIONS

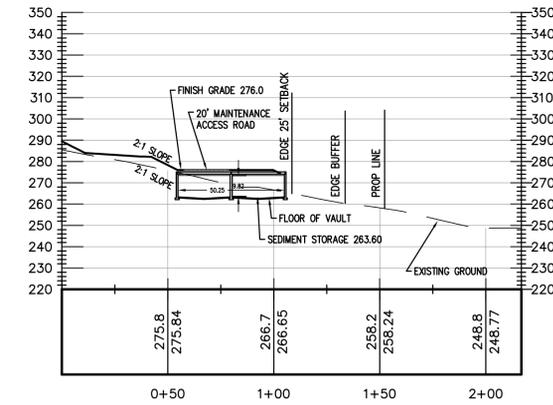
GRAPHIC SCALE



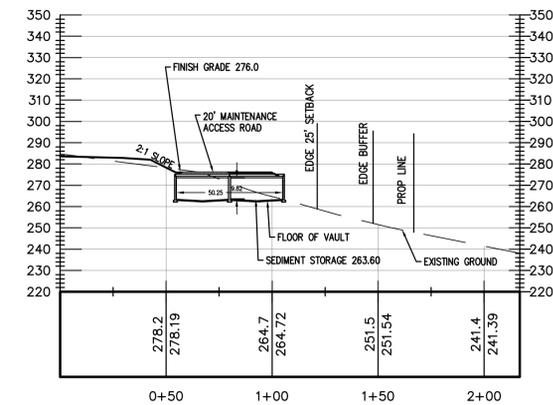
Profile View of VAULT 01+50
HORIZONTAL SCALE 1" = 40'
VERTICAL SCALE 1" = 40'



Profile View of VAULT 00+75
HORIZONTAL SCALE 1" = 40'
VERTICAL SCALE 1" = 40'



Profile View of VAULT 00+00
HORIZONTAL SCALE 1" = 40'
VERTICAL SCALE 1" = 40'



DESIGN	MAK
DRAWN	JAB
CHECKED	MAK
SEC	24 T 26N R 1E
DISC NO	DATE 2/01/16
SCALE	1" = 40'

REV NO	REVISION DESCRIPTION	DATE	BY
1	FEB 24, 2016 CITY COMMENT MODS	16.03.31	JAB
2	MAY 10, 2016 CITY COMMENT #2	16.05.25	JAB
3	JUNE 22, 2016 CITY COMMENTS	16.07.20	JAB
4	MINOR PLAT MODS	18.06.09	JAB



PROJECT MANAGER JEFF A. BROWN

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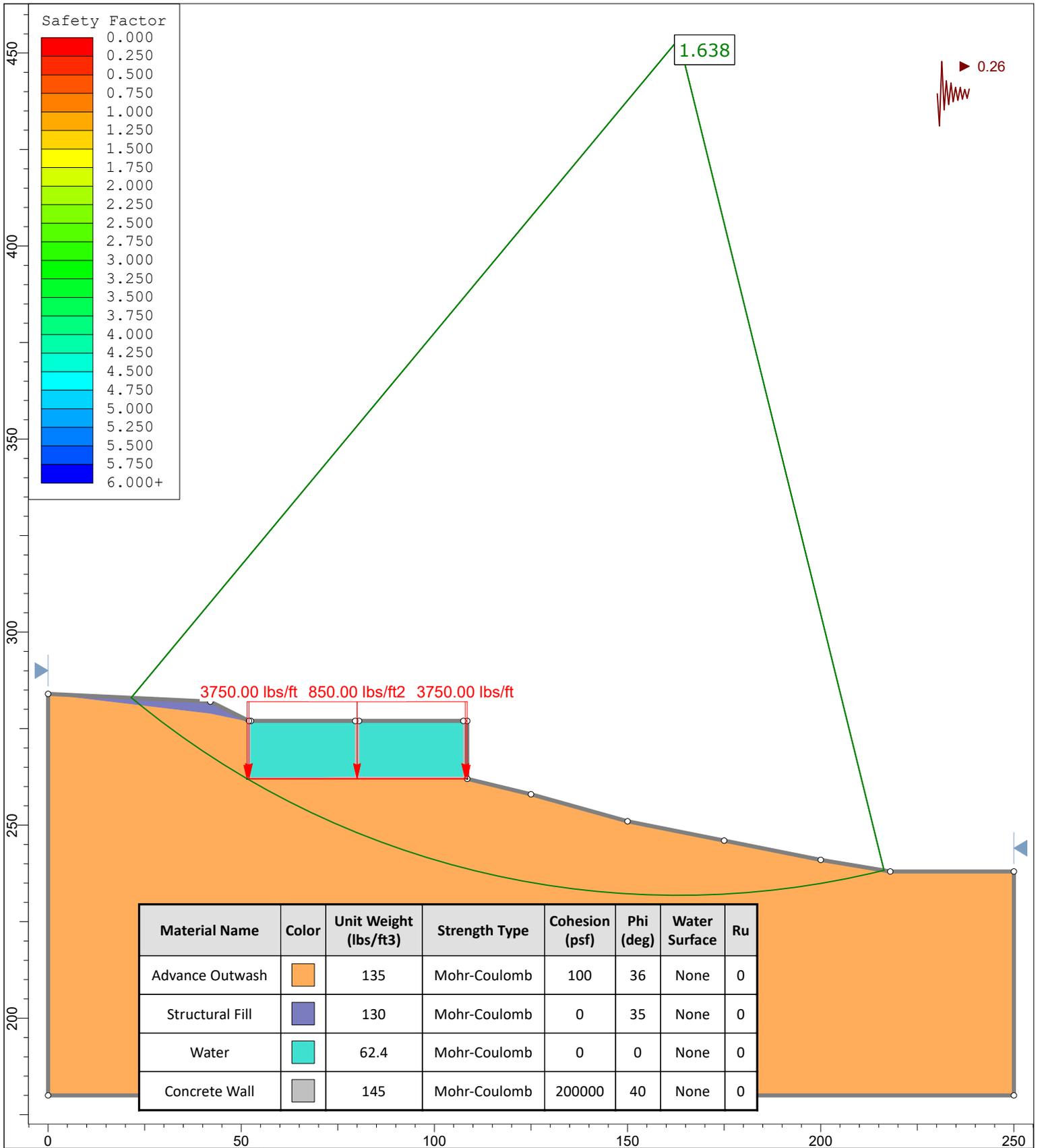
CLIENT
CRYSTAL VIEW POULSBORO LLC
% BARRY MARCOLESE
105 S MAIN STREET, STE 230
SEATTLE, WA 98104
206-910-2728



TITLE CRYSTAL VIEW PLAT MOD
VAULT SECTIONS

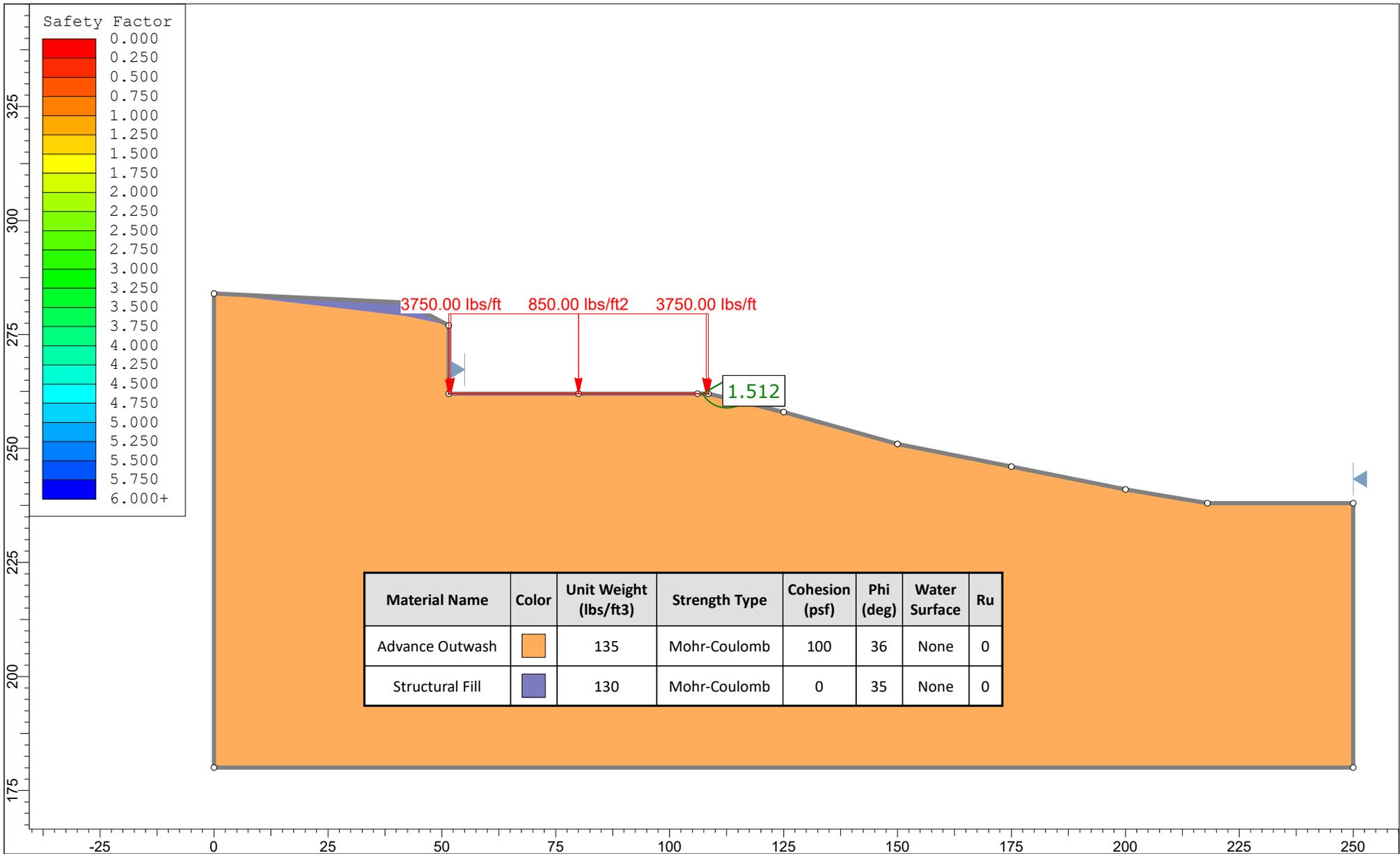
SHEET X OF 38
FILE NO 173B

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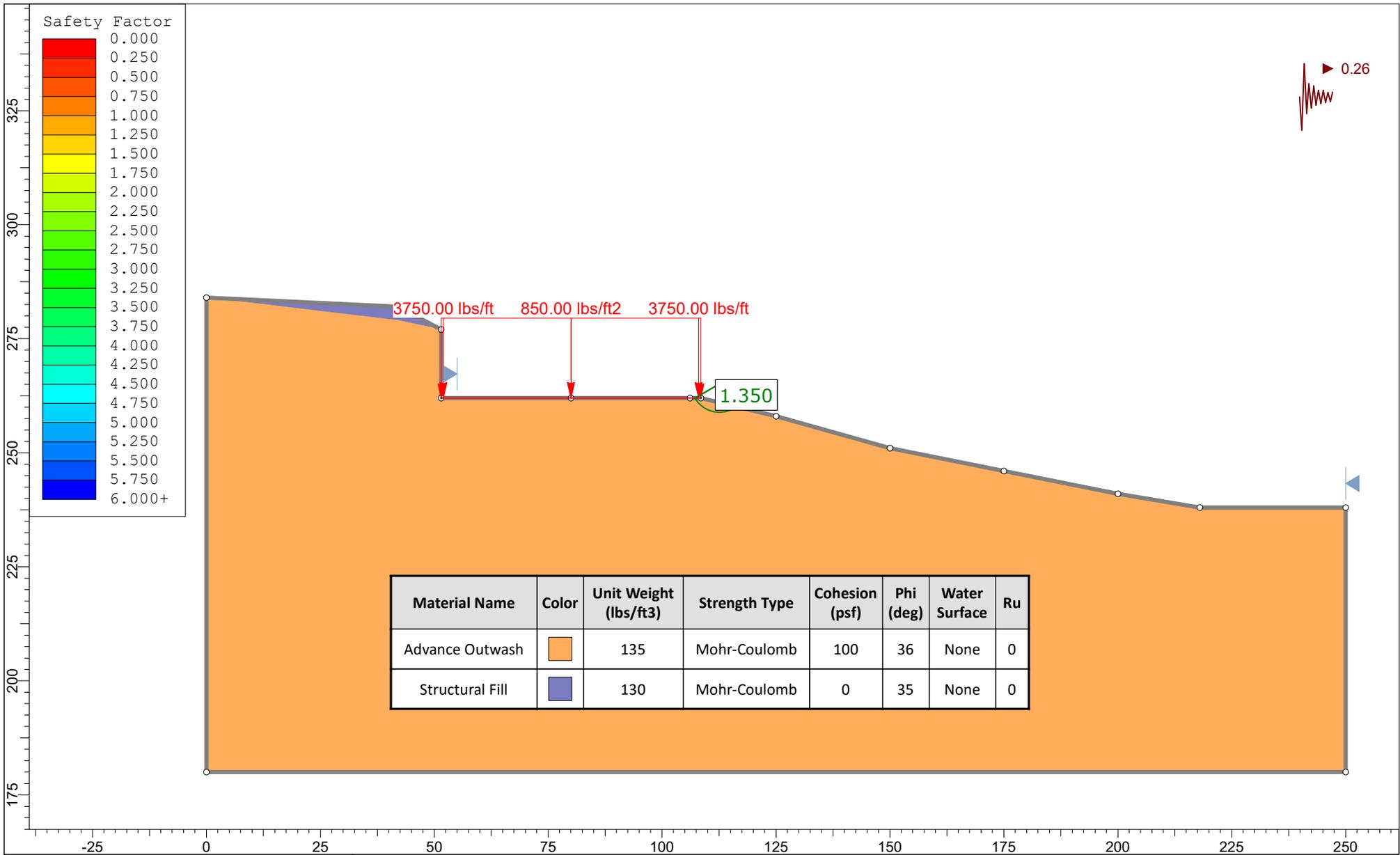
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Advance Outwash		135	Mohr-Coulomb	100	36	None	0
Structural Fill		130	Mohr-Coulomb	0	35	None	0
Water		62.4	Mohr-Coulomb	0	0	None	0
Concrete Wall		145	Mohr-Coulomb	200000	40	None	0

	Project			CrystalView.Poulsbo		
	Analysis Description			Proposed Seismic		
	Drawn By	CC	Scale	1:400	Company	GeoResources, LLC
	Date	8/22/2018, 9:00:32 AM		File Name	CrystalView.PoulsboVault.slmd	

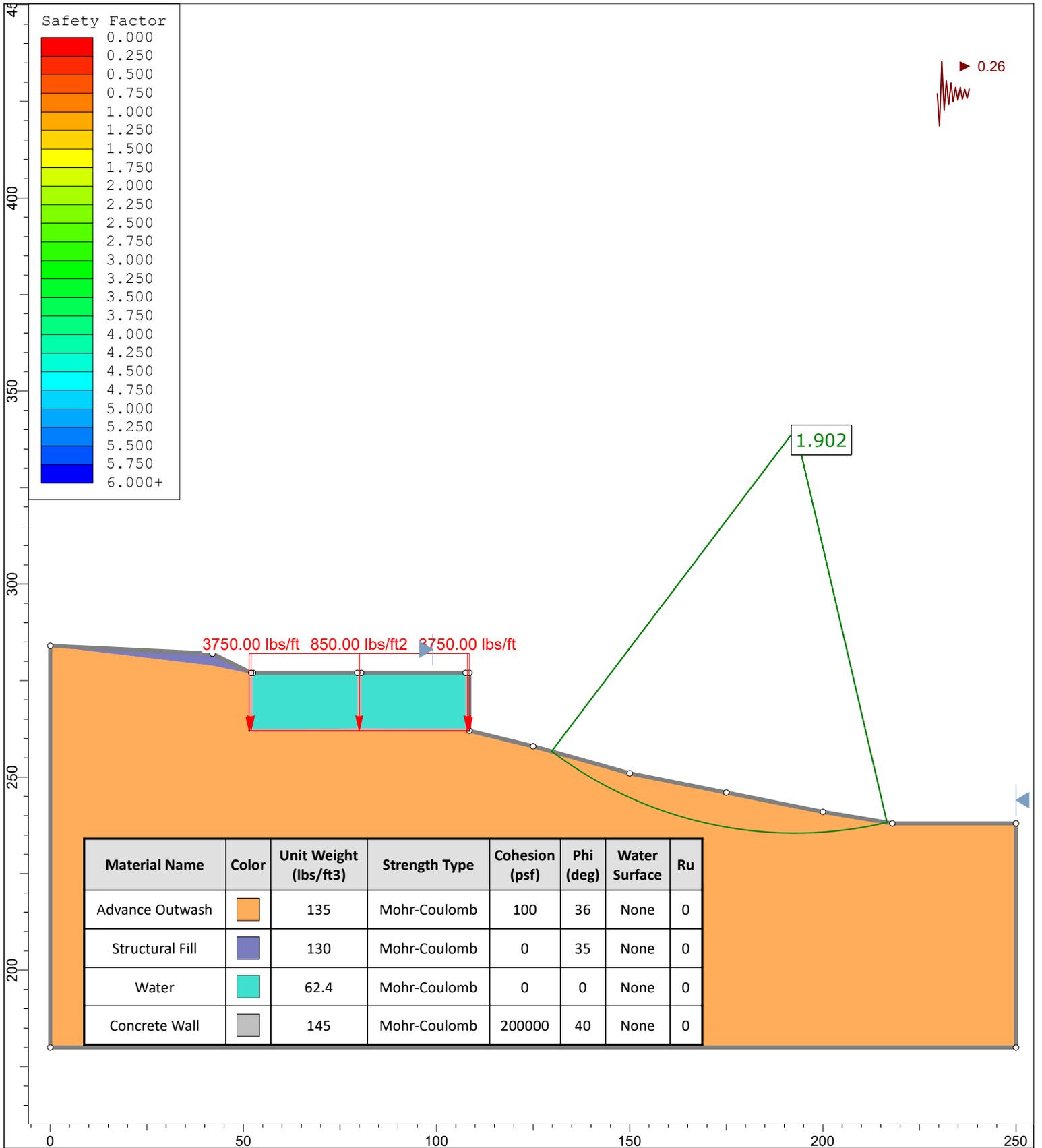


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Ru
Advance Outwash		135	Mohr-Coulomb	100	36	None	0
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	Project			CrystalView.Poulsbo		
	Analysis Description			Proposed Static		
	Drawn By	CC	Scale	1:350	Company	GeoResources, LLC
	Date	8/22/2018, 9:00:32 AM		File Name	CrystalView.PoulsboVault.slmd	



	Project			CrystalView.Poulsbo		
	Analysis Description			Proposed Seismic		
	Drawn By	CC	Scale	1:350	Company	GeoResources, LLC
	Date	8/22/2018, 9:00:32 AM		File Name	CrystalView.PoulsboVault.slmd	



	Project			CrystalView.Poulsbo		
	Analysis Description			Proposed Seismic		
	Drawn By	CC	Scale	1:400	Company	GeoResources, LLC
	Date	8/22/2018, 9:00:32 AM		File Name	CrystalView.PoulsboVault.slmd	

October 5, 2018

Crystal View LLC
105 South Main Street, Suite 230
Seattle, WA 98104
(206) 910-2728

Geotechnical Report Addendum No: 4:
Wet Weather Grading
Proposed Crystal View Residential Plat
Poulsbo, Washington
PN: 24260130512009, 2426013004007
Doc ID: CrystalViewLLC.CrystalView.RG.A(4)

This addendum letter addresses wet weather grading and moving of soil from the upper portion of Division 2 to the reinforced fill slope on the eastern side of Division 1. We understand that the City of Poulsbo has interpreted the Wet Weather and Wet Condition Consideration section within our September 25, 2015 *Updated Geotechnical Engineering Report* to apply to utility trench work and backfilling. During our September 20, 2018, the City requested additional guidance be provided to the project contractor for general "mass grading" during the wet weather season. We understand that the approved plans include the appropriate Temporary Erosion and Sediment Control (TESC) plan, Stormwater Pollution Prevention Plan (SWPPP), and National Pollutant Discharge Elimination Systems (NPDES) plans. We also understand that the contractor, Seton Construction, has a Certified Erosion and Sediment Control Lead (CESCL) inspector designated for the site.

In the Puget Sound area, wet weather generally begins about mid-October and continues through about May, although rainy periods could occur at any time of year. Given the high fine content of the site soils, mass grading is strongly encouraged to occur during the dry weather months. Soils with high fines content are highly sensitive to changes in water content and tends to become unstable and are difficult to impossible to compact if the moisture content exceeds the optimum by more than 2 to 3 percent.

In addition, during wet weather months, the site is prone to a shallow perched groundwater table that could result in seepage into site excavations and saturation of loose or disturbed surficial soils. Performing earthwork during dry weather would reduce these problems and costs associated with rainwater, construction traffic, and handling of wet soil. However, should wet weather/wet condition earthwork be necessary, the following recommendations are provided:

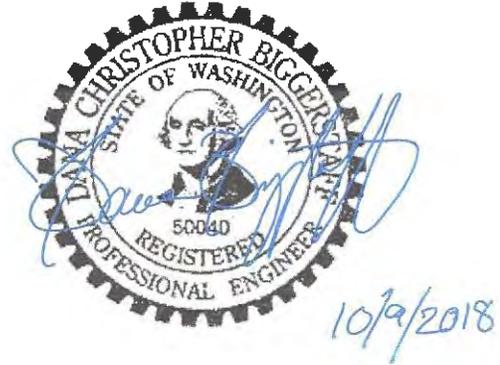
- Appropriate Best Management Practices (BMPs) should be installed per the approved TESC plan, SWPPP, and NPDES plan. Adhering to recommendations and guidelines within these documents will help reduce the influx of uncontrolled stormwater runoff into the

We trust that this is sufficient for your current needs. Please do not hesitate to call with any other questions or comments.

Respectfully submitted,
GeoResources, LLC



Keith S. Schembs, LEG, CESCL
Principal



Dana C. Biggerstaff, PE
Senior Geotechnical Engineer

October 29, 2018

Crystal View LLC
105 South Main Street, Suite 230
Seattle, WA 98104
(206) 910-2728

Geotechnical Letter: Division 2 Grading
Proposed Crystal View Residential Plat
Poulsbo, Washington
PN: 24260130512009, 2426013004007
Doc ID: CrystalViewLLC.CrystalView.L(2)

This letter address changes to the proposed grading of the northeast corner of Division 2 of the Crystal View Residential Plat. The original proposed grades in this area sloped gently down to then north across the building site. The rear portion of the lot continued to slope down to the north at steep grades. There was also a slight slope down to the east. We understand that the neighbor to the east has complained about runoff from the undeveloped site. In order to prevent additional runoff from adversely impacting the neighbor to the east, the grading plan was altered by adding a wall along the east property line on Division 2, Lot 7 that will allow for the lot to be regraded so that it sheet flows back to cul-de-sac.

The proposed grading changes are shown on the attached plan prepared by Team 4 Engineering. The wall will have a maximum height of 12 feet and will taper down to north and south. The City will require the wall to be engineered and to have a separate permit, but the concept to raise grades on Lot 7 in order to prevent runoff from flowing on the adjacent parcel to the east appears feasible. The engineering should include calculations for internal and external stability. In conjunction, the construction of the paved roadway, driveways, and roof areas will reduce the amount of groundwater recharge atop the slope down to the east, also reducing the ongoing seepage.

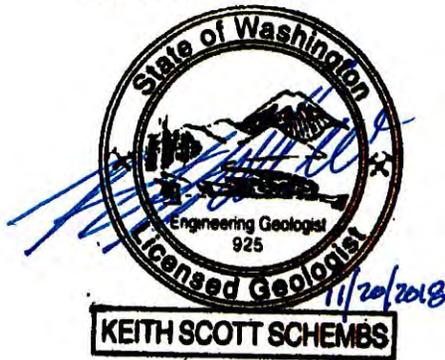
However, as shown, water will be still potentially be allowed to sheet flow over the steeper slope to the north of the Lots 3 through Lot 7. The revised plans show a shallow inceptor (French) drain across the top of the slope on the back of these lots that will collect sheet flow runoff from the rear yards and reduce the amount of runoff flowing offsite and onto the adjacent parcel to the north. The drains are shown extending the full width across the top fo the slope and are conveyed to the storm system in the street in front of the lots.

In our opinion, both proposed changes should reduce sheet flow runoff from the completed plat from flowing offsite, reducing or minimizing the potential impacts to the adjacent slopes and residences.



We trust that this is sufficient for your current needs. Please do not hesitate to call with any other questions or comments.

Respectfully submitted,
GeoResources, LLC



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