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August 13, 2020

Rodney Stinson
Raney, Planning and Management, Inc (RPM)
1501 Sports Drive, Suite A
Sacramento, CA 95834

Subject: Applicant *Report Peer Review*
Idaho-Maryland Mine: Centennial and Brunswick Sites
Grass Valley, Nevada County, California

Dear Mr. Stinson:

ECM Consultants (ECM) is pleased to submit these peer review reports to Raney, Planning and Management, Inc. (RPM) for the Idaho-Maryland Mine: Centennial and Brunswick Sites in Grass Valley, Nevada County, California. The peer review was performed by both Art Braun (a Mining Geological Engineer) and Donald Stevens (a California Licensed Professional Engineer). The following reports were reviewed and are provided as separate attachments to this cover letter. Each peer review report includes project specific, discussion, conclusions and limitations.

1. Geomorphic Assessment, South Fork Wolf Creek, near Grass Valley, Ca. Balance Hydrologics, Inc., Report dated March 2020
2. Geotechnical Engineering Report, Idaho-Maryland Mine Project, Brunswick Site, NV5 Report dated November 18, 2019
3. Geotechnical Engineering Report, Idaho-Maryland Mine Project, Centennial Industrial Site, NV5 Report dated December 10, 2019
4. Management Plan for Potential Seismic Hazards- Portion of Brunswick Site, NV5, January 16, 2020
5. Steep Slope, Erosion and Sediment Control Management Plan – Centennial Site, NV5 Report dated January 16, 2020
6. Steep Slope, Erosion and Sediment Control Management Plan- New Brunswick Site, NV5 Report dated January 2, 2020
7. Desktop Study of Cemented Paste Backfill, Itasca Denver, Inc., Report dated February 24, 2020
8. Peer Review for Geotechnical Assessment of the Near Surface Mine Features. Balance NV5, Report dated June 2020

If you have any questions or comments, please do not hesitate to contact me at 559-824-8711.

Best regards,

ECM CONSULTANTS

Donald L. Stevens, PE C80476
Principal / Program Manager

Attachment 1:

Peer Review for Geomorphic Assessment, South Fork Wolf Creek, near Grass Valley, Ca. Balance Hydrologics, Inc., Report dated March 2020

Review of: Geomorphic Assessment, South Fork Wolf Creek, near Grass Valley, Ca. Balance Hydrologics, Inc., Report dated March 2020

Our review relied only on the document shown above, and USGS 7 ½ Minute Topographic Map 1:24,000

Review:

The Balance Hydrologics, Inc. (Balance), geomorphic assessment report included a review of relevant laws and regulations, and a summary of any available historical information that they had been able to collect for the drainage. They identified the data gaps in the historic hydrologic information, and then collected the data they deemed necessary for them to understand the surface water flows in the South Fork of Wolf Creek.

Their research found that mining had been a major industry in the area, beginning in the late 1840's, and continuing into the 1950's. In combination with mining, and the supporting industries, the South Fork of Wolf Creek had been historically modified by placer mining, hard rock mining, logging and agricultural activities. They noted that the historic Empire mine still discharges to the lower end of the drainage at rates ranging from 1.4 to 2.2 cubic feet per second (cfs). The report also noted that the South Fork of Wolf Creek, along most of its reach, has been heavily modified by those historical uses, and continues to be modified and affected by current urban development. Their research found that Nevada Irrigation District (NID) owns surface diversion ditches that bring water from other sources into the upper part of the drainage, and typically dump water out of those diversions into the upper reaches of the South Fork of Wolf Creek, both as part of their periodic maintenance, and during periods of high rainfall. Those discharges can occur at rates as high as 35 cfs, and the practice has likely occurred as part of their normal operations as long as the ditches have been in operation. They identified two locations from which the ditch operators typically discharge, one just upstream of the proposed Idaho-Maryland discharge point and the second located higher in the basin.

As part of Balance's field investigation, they collected flow measurements from near the proposed mine discharge point and downstream at the Ophir Street culvert. Their measurements found what they believed to be a low summer baseline flow of 0.17 cfs near the proposed discharge point and 0.4 cfs at the Ophir Street culvert. The low wintertime baseline flow was measured at 1.5 cfs near the discharge point and 2.5 cfs at the Ophir Street culvert. Comparing data sourced from other groups with theirs, they concluded that typical winter flows could be as high as 15 and 17 cfs respectively for the two points.

They were on the site shortly after a 3.43 inch precipitation event that occurred from December 7 to 9, 2019 and were present during a 1.25 inch precipitation event that occurred on January 26, 2020, when they measured a flow of 11 cfs near the proposed mine discharge point and 17.3 cfs at the Ophir Street culvert lower in the basin. Using those numbers along with information from others, they estimated that the December storm had resulted in a flow near the Ophir Street culvert of 23 cfs. Their December inspection found that this rate of flow had produced some sediment mobility and estimated that bedload transport would begin at approximately this rate. The discussion extended to the connection of bedload transport to turbidity, and that turbidity, would be expected to rise when bedload transport occurred.

As part of their field inspection, Balance inspected the stream banks to estimate recent high water flows. At a location near the Ophir Street culvert, they concluded that a flow of approximately 300 cfs had occurred. They then compared that flow rate with the measured flow from a gauging station located on the

Yuba River, and found that their flow coincided with the 10 to 15 year flood event and observed that this flow rate did not produce any significant or abnormal stream erosion with exception of minor localized bank erosion near culverts, and slight channel erosion and sedimentation as a result of log debris jams upstream.

In their conclusion, they restated that the watershed has been heavily disturbed by historic uses, and that NID has in the past, and still, periodically discharges water from their ditches in the upper reaches of the basin at flow rates as high as 35 cfs. They found that most reaches of the creek appear "quasi-stable" under the current flow conditions, and their calculations showed that sediment transport would begin to occur at flows of 20 cfs, but in practice found that significant work on the channel began to occur at flow rates of greater than 23 cfs. They concluded that a proposed mine maximum constant discharge rate of 5.6 cfs during low stream flow periods would not be enough to reach this flow rate, nor the sediment transport threshold. They also noted that the periodic discharges from the NID ditches have had no apparent negative effect on the stream.

Discussion and Conclusions

In this type of review, it is possible to verify some calculations and assess the reasonableness of the author's conclusions as supported by the data presented. Within the scope of a review such as this, it is not possible to duplicate or verify field generated data without repeating the studies conducted by previous field crews. The review must also include a determination of whether sufficient data has been collected to allow conclusions to be drawn. For these types of studies, no matter how much data exists, more is always better, but carefully treated, a large amount of information can be gleaned out of much less.

It is ECM's conclusion that Balance has properly summarized the regulatory requirements and, have carefully researched the available information related to the stream basin. Additionally, their field studies were designed to fill in missing information necessary to allow them to reach conclusions to fulfill their required assessment. It was fortuitous that they were able to collect information from both the December 2019 and January 2020 storm events to characterize the system under unusual flow stress. They showed diligence in getting personnel on site shortly after the December storm event, and again while the January storm event was in progress to collect this important data.

During its review, ECM performed random checks of the basic information contained in the report such as basin size, surface slope, etc., and found them consistent with our results. For the data that could not be confirmed directly, ECM carefully reviewed it and found it to be reasonable. Balance used the standard hydrologic Manning equation to calculate flows associated with the largest storm event for which they had information. ECM's experience has found that the Manning equation works well for accurately determining flows within constructed channels, but results in less precision for natural streams, since the variables cannot be as precisely determined. ECM agrees with the chosen range of Manning coefficients, as that range appears to be reasonable for a natural channel having grass and minor vines and brush. Based on their calculations, Balance concluded that a recent maximum flow of 300 cfs, had occurred, representing a 10 to 15-year precipitation event, roughly a 10-fold increase above typical peak seasonal flows. While this calculated value might not be precise, it does show that large flows have occurred in this stream and demonstrates that the channel remains essentially stable even in these extreme flows. Based on the uncertainty in the Manning equation, the actual flow could vary significantly from the calculated flow, and it is ECM's opinion that the addition or subtraction of a flow of 5.6 cfs would not be measurable in this natural channel, nor is the accuracy of the measurement critical. Variation in the actual flows, as related to the magnitude of storm events, will determine the outcome for the channel bed and banks, and this small

proposed rate of discharge from the mine will have no significant effect at either higher or lower flows that will occur during these events.

ECM is in agreement with Balance that the addition of 5.6 cfs to the South Fork of Wolf Creek drainage basin will have no significant effect on the stream channel or banks, or to the turbidity of the South Fork of Wolf Creek. During periods of low flows, since the threshold for bedload sediment transport has not been met, there would be no increased turbidity. Alternately during periods of high flow associated with storm events, increased bed movement and associated turbidity will be the result of the storm event, and the affect from the small amount of water proposed to be produced by the mine will be comparatively negligible.

ECM concurs with Balance that it would be useful to acquire some additional flow and channel information in the future, specifically collecting at least one observation at a time when both Nevada Irrigation District (NID) ditch discharges and mine discharges are occurring simultaneously.

Limitations

Our professional services were performed consistent with the generally accepted engineering principles and practices employed in northern California. Our analysis and conclusions are based on information supplied by others; thus, we do not warrant the accuracy of that information. Any reliance on this report by a third party is at that party's sole risk. The conclusions reached are based on available information at this time, and the findings are valid as of the present date. This report is solely for the use of our client unless noted otherwise. No other warranty, expressed or implied, is made or intended.

Attachment 2:

Peer Review for Geotechnical Engineering Report, Idaho-Maryland Mine Project, Brunswick Site, NV5
Report dated November 18, 2019

Review of: **Geotechnical Engineering Report, Idaho-Maryland Mine Project, Brunswick Site**, NV5 Report dated November 18, 2019

Our review relied on the document shown above and also the following:

Idaho-Maryland Mine, Project Description, Benchmark Resources, November 2019

Grading Plan Produced by Nevada City Engineering, Inc., Plate B-1

Geologic and Subsoil Investigation and Proposed Groundwater Monitoring System for the Grass Valley Lumber Mill Recycle Pond, Grass Valley, Ca., Vector Engineering Inc., 1988 (Appendix in NV5 report)

In-Situ Permeability Testing and Quality Control of the Clay Liner System Submittal of As-Built Drawings, Bohemia Grass Valley Lumber Mill Recycle Pond, Grass Valley, Ca., Vector Engineering Inc., 1989 (Appendix in NV5 report)

Geotechnical Report for Idaho-Maryland Mine Retention Basin, Nevada County, Ca, Holdrege and Kull, 1996 (Appendix in NV5 report)

Foundation Recommendations and Design Criteria for Proposed Hoist Building, Holdrege and Kull, 1997 (Appendix in NV5 report)

Preliminary Geotechnical Engineering Report -Idaho-Maryland Mining Corporation Property, Holdrege and Kull, 2004 (Appendix in NV5 report)

Background Reports

The NV5 report incorporated various other reports in Appendix E that contained important field information and data that was used in NV5's analysis. Therefore, it was necessary for ECM to review that information as it relates to the site, and following that review, to then evaluate NV5's incorporation and discussion of that information into their conclusions and recommendations. The appendix contained five reports.

The oldest report, written by Vector Engineering in 1988, documented 3 test holes that were completed as monitor wells relating to seepage that was believed to be occurring at what was referred to at the time as the lumber mill recycle pond.

Vector Engineering produced a second report in 1989 that documented the testing of the clay liner while it was being installed in the bottom of the lumber mill pond. The liner had been installed to seal the bottom against seepage.

In 1996, Holdrege and Kull, produced a report on work that included the drilling of six borings along the top of the lumber mill recycle pond. In this report they referred to this pond as a future retention pond for the mine. The goal was to assess the structural integrity of materials used to construct the dam. The work included sample collection and standard soil testing, and they found the dam to be suitable for short term use.

In 1997, Holdrege and Kull, performed site testing to assess the ground conditions for installation of a new hoist building at the New Brunswick Shaft. They found that existing soils would support necessary bearing loads for construction of that structure.

In 2004, Holdrege and Kull, produced a preliminary geotechnical report for the site. In that report, they discussed the Centennial and the New Brunswick sites, and also included one additional site. Holdrege and Kull performed no testing beyond a site inspection and relied on the technical work of other's work on which to base their report. Previous work used included US Department of Agriculture Soil Conservation Service information, various government geologic publications, and a report written by Anderson and Associates in 1991. The Holdrege and Kull report concluded that no asbestiform minerals were located on the site, but added that if some were to be found, a mitigation plan should be developed. They observed that the present rock and fill that were located on the site could cause technical issues relating to future building construction, with respect to the current lack of compaction and the fill materials having the potential for differential settling. Their additional concerns included historical underground mine workings open to the surface, the possible presence of expanding clays, and construction in areas that contained steep hillside slopes. They recommended clearing and grubbing the surface, provided guidelines for the installation of fill and cuts, erosion control, subsurface drainage, surface drainage, and foundations. They recommended that engineering oversight be available during construction.

NV5

The NV5 report consolidates and summarizes the information that had been collected by the previous groups. They concluded that the previous reports did not contain sufficient information for them to reach final determinations and so performed additional investigations themselves.

Their investigations, performed in the fall of 2019, included drilling 7 borings and digging 17 trenches. Testing included soil classification, soil moisture, in-place soil density, unconfined compression, direct shear, Atterberg index, expansion index, and measured resistance. Review of Appendix C finds their pit and drill logs to be detailed and the information contained in them to be consistent with what would be expected in the areas drilled or trenched.

Based, dominantly on their investigation, NV5, made several specific recommendations for development of the site. They concluded that some repair to the existing dam would be necessary. The report also recommended caution during construction of the shaft collar to mitigate potential for slope instability and possible failure within the cut. They expressed concern regarding the undocumented fill areas and recommended that stabilizing amendments be made to the material in the fill areas that are intended to support future commercial development. The report also identified a potential future problem if the fill might contain lenses of expansive clays. They inspected the metal culvert that channels the South Fork of Wolf Creek and recommended that it be replaced due to its age and condition. They identified the potential for naturally occurring asbestos fibers in materials that have been previously imported to the site, addressed the materials that are anticipated to be produced by the mine, made note of the underlying bedrock rock type, and addressed potential seismic related issues. Based on the collected information, they reach the conclusion that the site can support the improvements that have been proposed by Rise Grass Valley (applicant), and they provided recommendations for future design and testing to implement those planned improvements.

In their report, they covered the technical engineering issues that might be experienced during construction, which include: the potential presence of unsuitable on-site materials, evaluation of materials that are

anticipated to be imported, cuts and fills, fill transitions, erosion, grubbing, retaining walls, foundations, floors systems, pavements, trenches, utilities, surface and subsurface drainage, dewatering of excavations, and seismic considerations. Although it is quite likely that some of the tasks that have been covered in their report will not be necessary, their inclusion in the NV5 report shows that they considered them and their intent was to have instruction in the event that they did become necessary. After review of the comprehensive detail provided in the NV5 report for accomplishing each of the individual tasks ECM believes that the report is sufficient and provides good guidance to the contractor(s) performing the work in most instances.

Discussion and Conclusions

The goal for installation of the engineered fill is to produce an environmentally sound design where the fill is stable, and the finished top surface is solid and suitable for the construction of various industrial structures. The bedrock conditions for the site have been well defined, and the gross engineering properties of the materials that are to be removed from the mine are known. However, the exact composition and engineering characteristics of those materials to be placed will not be known until the mine starts operation. Additionally, the materials that are currently located on the site that have been characterized as "undocumented fill", include historic tailings and various other debris, the nature which has been generally but not completely characterized. As a result, these materials will require further characterization by the engineers as they are encountered, and determinations concerning their use need to be made at that time.

Therefore, ECM considers Section 5.1.15 of the NV5 report to be very important, and concurs with NV5 that it is absolutely necessary that a qualified engineer be available to inspect and perform testing on materials that might be different from those that have been previously characterized. This requirement extends to new materials generated from the mine, and to even greater extent, for the "undocumented fill" materials present at the site. As the project proceeds, the necessity of an available engineer becomes less critical, but during the installation of the first few lifts of mine-generated material, and the movement and incorporation of the existing tailings, the presence of an engineer will promote good construction practice, and ensure that the fill will meet the design specifications.

ECM's review finds that the NV5 report is sufficiently thorough and provides the information and guidance needed to meet the development objectives at the site. ECM considers the information adequate to guide construction and we recommend no changes or modifications.

Limitations

Our professional services were performed consistent with the generally accepted engineering principles and practices employed in northern California. Our analysis and conclusions are based on information supplied by others; thus, we do not warrant the accuracy of that information. Any reliance on this report by a third party is at that party's sole risk. The conclusions reached are based on available information at this time, and the findings are valid as of the present date. This report is solely for the use of our client unless noted otherwise. No other warranty, expressed or implied, is made or intended.

Attachment 3:

Peer Review for Geotechnical Engineering Report, Idaho-Maryland Mine Project, Centennial Industrial Site, NV5 Report dated December 10, 2019

Review of: Geotechnical Engineering Report, Idaho-Maryland Mine Project, Centennial Industrial Site, NV5 Report dated December 10, 2019

Our review relied on the document shown above and also the following:

Idaho-Maryland Mine, Project Description, Benchmark Resources, November 2019

Grading Plan Produced by Nevada City Engineering, Inc., Plate C-1

Contaminant Assessment Report for Bouma-Erickson-Toms Property, Grass Valley, Ca., Vector Engineering Inc., 1993 (Appendix in NV5 report)

Preliminary Geotechnical Engineering Report for Idaho-Maryland Mining Corp, Nevada County, Ca., Holdrege and Kull, 2004 (Appendix in NV5 report)

Geotechnical Report, Idaho-Maryland Mine Surface Facilities and Improvements, Grass Valley, Ca., Engeo, Inc., 2007 (Appendix in NV5 report)

Background Reports

The NV5 report incorporated various other reports in Appendix C that contained important field information and data that was used in NV5's analysis. Therefore, it was necessary for ECM to review that information as it related to the site, and following that review, to evaluate NV5's incorporation and discussion of that information and allow comparison of it to their conclusions and recommendations. The appendix contained three reports with the oldest report having been written by Vector Engineering in 1993.

Vector Engineering dug 19 test pits into the tailings and tested the materials they intercepted for pH, cyanide, and for metals of concern that might be found on the site, including the 7 RCRA metals. The metals concentrations that were reported appear reasonable, based on the milling methods that were used in the 1930's. Vector assembled a history for the site that matches well with our understanding of what has occurred there, and their history matches well with the features that still remain today. Their results and interpretations, coupled with the results from the laboratory testing of the samples appear reasonable, and generally match values that would be expected. The report provided an estimate of the volume of tailings that had originally been deposited but did not include an estimate on how many tons of tailings might still exist on the site. Their detailed report contains sufficient information to allow a rough calculation of the remaining tailings volume.

In 2004, Holdrege and Kull, produced a preliminary geotechnical report for the site. In that report, they discussed the Centennial and the New Brunswick sites, and also included one additional site. Holdrege and Kull performed no testing beyond a site inspection and relied on the technical work of other's work on which to base their report. Previous work used included US Department of Agriculture Soil Conservation Service information, various government geologic publications, and a report written by Anderson and Associates in 1991. The Holdrege and Kull report concluded that no asbestiform minerals were found on the site, but added that if some were to be found, a mitigation plan should be developed. They observed that the present rock and fill that were located on the site could cause technical issues relating to future building construction, with respect to the current lack of compaction and the fill materials having the potential for differential settling. Their additional concerns included historical underground mine workings

open to the surface, the possible presence of expanding clays, and construction in areas that contained steep hillside slopes. They recommended clearing and grubbing the surface, provided guidelines for the installation of fill and cuts, erosion control, subsurface drainage, surface drainage, and foundations. They recommended that engineering oversight be available during construction.

A third report was produced by Engeo, Inc., in 2007, and their investigation included the drilling of 19 soil borings and 11 test pits. The deepest boring was reported to have reached a depth of 50.5 feet below ground surface. The work was intended to address questions concerning seismic stability, geology, surface, underground, and ground water conditions. The report contained detailed logs for the borings and pits that they installed, slope analysis data for one of the berms, laboratory testing results for the samples collected, including dry density, unconfined compression, plasticity, corrosion, shear, and grain size analysis. The report included analysis of the laboratory and field-collected results, along with recommendations for construction of fill, cuts, erosion control, subsurface drainage, surface drainage, and foundations. They recommended that engineering monitoring occur during construction.

NV5 Report

The NV5 report consolidates and summarizes the information that had been collected by the previous groups. Based on the information that has been assembled, NV5 made several observations, and recommendations. Importantly, they concluded that the site can support the improvements that have been proposed, and they provided recommendations for future design and testing to implement the planned improvements. In their report, they covered the technical engineering concerns that the site might have the presence of unsuitable on-site materials, materials that are anticipated to be imported, cuts and fills, fill transitions, erosion, grubbing, retaining walls, foundations, floor systems, pavements, trenches, utilities, surface and subsurface drainage, dewatering of excavations, and seismic considerations. It is quite likely that at this site, some of the tasks that have been covered in their report will not be necessary. Their inclusion in the NV5 report shows that they considered them and their intent was to have instruction in the event that they did become necessary. After review of the detail provided in the NV5 report for accomplishing each of the individual tasks ECM believes that the report is sufficient and provides good guidance to the contractor(s) performing the work in most instances.

Discussion and Conclusions

The goal for installation of the engineered fill is to produce an environmentally sound design where the fill is stable, and the finished top surface is solid and suitable for the construction of various industrial structures. The bedrock conditions for the site are well known, and the gross engineering properties of the materials that are to be imported from the New Brunswick site are known. However, the precise composition and engineering characteristics of those materials to be placed will not be known until the mine starts operation. Additionally, the materials that are currently located on the site that have been characterized as “undocumented fill”, include historic tailings and various other debris, the nature which has been generally but not completely characterized. As a result, these materials will require further consideration by the engineers as they are encountered with determinations as to their suitability made at that time.

Therefore, ECM considers Section 5.1.15 of the NV5 report to be very important, and concurs with NV5 that it is absolutely necessary that a qualified engineer be available to inspect and perform testing on materials that might be different from those that have been previously characterized. This requirement extends to new materials generated from the mine and to even greater extent to the “undocumented fill”

material present at the site. As the project proceeds, the necessity of an available engineer becomes less critical, but during the installation of the first few lifts of mine-generated material, and the movement and incorporation of the existing tailings, the presence of an engineer will promote good construction practice, and ensure that the fill will meet the design specifications.

ECM's review finds that the NV5 report is sufficiently thorough and provides the information and guidance needed to meet the development objectives at the site. ECM considers the information adequate to guide the next phase of construction and we recommend no changes or modifications.

Limitations

Our professional services were performed consistent with the generally accepted engineering principles and practices employed in northern California. Our analysis and conclusions are based on information supplied by others; thus, we do not warrant the accuracy of that information. Any reliance on this report by a third party is at that party's sole risk. The conclusions reached are based on available information at this time, and the findings are valid as of the present date. This report is solely for the use of our client unless noted otherwise. No other warranty, expressed or implied, is made or intended.

Attachment 4:

Peer Review for Management Plan for Potential Seismic Hazards- Portion of Brunswick Site, NV5, January 16, 2020

Review of: Management Plan for Potential Seismic Hazards- Portion of Brunswick Site, NV5, January 16, 2020

Our review relied on the following documents:

Chico, California 1 by 2 degree map, Scale 1: 250,000, by Saucedo and Wagner, 1992

Special Report 164, State map DRG SM-164, Mineral Land Classification of Mineral County, California, California Department of Conservation Division of Mines and Geology, Scale of 1:48,000, by Loyd and Clinkenbeard, 1990 (incorporates results of Tuminas, 1983)

East Bennett Street Property and East Bennett Street and Brunswick Road [Investigation], by Anderson Geotechnical Consultants, May 1986 (original report not located by NV5 or ECM)

Geotechnical Report, Anderson Geotechnical Consultants, February 1986 (original report not located by NV5 or ECM)

Survey Map for BET Acres, Nevada County, California, by A.W Beeson and Associates, Inc., 1987

California Earthquake Zone Database https://maps.conservation.ca.gov/cgs/EQZApp/

Review:

ECM's search for published maps of the area found the 1:250,000 scale geologic map of the Chico 1 by 2 degree quadrangle and a 1:48,000 scale geologic map by Loyd and Clinkenbeard. The NV5 report includes a 1986 report by Anderson Geotechnical Consultants, Inc., which contains a map that showed the location of various mining improvements located at the New Brunswick site. The Anderson report also includes a one inch equals 100 feet scale map dated January 1987 by A. W Beeson and Associates. The Beeson map shows a dashed line labeled "fault line per Anderson Geotechnical Report", likely referring to a report produced by Anderson in February 1986 although the original has not been located. The land parcels were also researched in the California Earthquake Zones of Required Investigation database, and it was found that the State of California believes neither to be located "within an Earthquake Fault Zone".

Both of the two small-scale maps depict an unnamed north-northwest trending fault in the vicinity of the site. Both maps depict the feature as a dashed line meaning that the fault is believed to exist, but its location is approximate. This fault, as shown on the Saucedo and Wagner map, locates it only approximately somewhere within the valley formed by the South Fork of Wolf Creek. The scale of the Loyd and Clinkenbeard map is larger, and the topographic detail is sufficient to show the inferred fault to be located on the east side of Brunswick Road. Note that at the scale of a 1:250,000 map, the width of the line on the Chico map is about 600 feet, and at a scale of 1:48,000, the line width on the Loyd and Clinkenbeard map is about 150 feet. The Loyd and Clinkenbeard map shows the unnamed fault to be located east of Brunswick Road, placing it about 600 feet east of the New Brunswick Shaft and off of the property. Thus, even if the location of the fault were precisely known, its plotted location on the Loyd and Clinkenbead map would only be within 150 feet of its actual location on the ground, and since it is shown on the maps as being inferred, the actual location might be even farther away. No other information for this feature such as measured strike, dip or relative movement has been found.

Anderson Geotechnical Consultants (May 1986 report) investigated two sites, one in the vicinity of the New Brunswick shaft (Lots 6, 7 and 8), and a second site located near the old Brunswick shaft (Lots 1 through 5). It appears that they used old historic maps to locate mining related structures including surface buildings and underground openings. They drilled six test borings on Lots 1 through 5 at the Old Brunswick shaft and referenced a February 1986 report that included details for the area around the New Brunswick Shaft. While that February 1986 report was not available for review, the NV5 report did discuss the findings in that report, and included a map dated January 1987 that was drawn up by A. W. Beeson. That Beeson map showed the location of where Anderson had believed a fault to be, and depicted it as a straight dashed line with two parallel lines located 200 feet either side, showing, presumably Anderson's suggested setback distances for building construction. The map shows the feature to strike north north-west, and to be dominantly located in Lot 8, cutting across a portion of Lot 7. Anderson stated in his May 1986 report that he had previously described it in his February report stating the fault "appears to be present on the northern part of the lot", which we interpret to mean that the presence of the fault is "inferred" and its presence and location has not necessarily been proven. The Beeson map depicts the feature as straight-line crossing through the entire length of the lot, which is slightly different than Anderson's description. ECM believes that if the feature had been mapped in any detail, and confirmed by Anderson, that it would have been depicted on the map as a solid line instead of a dashed line.

Discussion and Conclusions

At this point, based on the available evidence, we cannot be certain that a fault actually exists, at the location shown at the Loyd and Clinkenbeard location, or at Anderson's described location or Beeson's plotted location. NV5 has assumed the Beeson location to be correct and shows it superimposed on an aerial photo in Figure 1 of their report. Some further review of historic documents by ECM suggest that a feature, presumed to be a fault intercepted within the underground workings of the mine, might project to a location just a few feet to the west of the New Brunswick Shaft.

The basic definition of a fault is important for discussion. A fault is defined as a fracture on which movement has occurred. This movement might be as little as a few microns, or as large as thousands of feet as might be associated with earth scale tectonic features. Smaller displacement faults are common across the entire Earth, and can be the result of localized stress relief that occurred during the original placement of the rocks, or from other local inhomogeneities that occur during erosion, or old tectonic activity. In all of these cases, even though they might exist, they do not necessarily have to have any recent movement. A fault likely does exist somewhere in the vicinity of the three different inferred locations discussed above. The question then arises as to whether it might have been active in recent times. NV5 believes the feature formed during the Mesozoic era, at least 65 million years ago. They consider it inactive and designate it as a Type C fault zone "with a low seismicity and a low rate or occurrence". Based on ECM's knowledge of the geology of the area, we are in agreement with their conclusion, and no evidence has been found that suggests there might have been any recent fault movement in the general site area. In support of NV5's and ECM's conclusion, further review of the Chico quadrangle map shows that Saucedo and Wagner's interpretation of the fault shows it to terminate at the north edge of mapped Tertiary volcanics (MPv), at a location a little over a half mile south of the New Brunswick Shaft. Since the map does not show the fault crossing the volcanic unit, we conclude that there has been no fault movement to break the overlaying Miocene volcanic rock since its deposition in the Miocene Epoch 5 to 23 million years ago. If otherwise, the overlying Miocene volcanic unit would also be displaced, or at least fractured.

As the most recent evidence, both surface and underground miners have been working in the Grass Valley

area at the various mines since the mid 1860's provides over 150 years of observation. We have found no records that indicate that any movement has occurred on any faults at or near the site. This conclusion is also consistent with the conclusions reached by the State of California as related to Earthquake Zones, as shown on the California Earthquake Zone Database.

Based on the information that has been presented, there is likely a fault located on or near the site within 600 feet of the New Brunswick shaft. The nearby 5 to 23 million-year-old volcanics located over the inferred location of the fault show no fracturing, thus this is indicative that no movement had occurred more recently. From a modern perspective, the existing New Brunswick shaft and its various ancillary facilities have been in place for over 150 years, and have never reported any seismic damage, nor have any historic reports been found that might indicate modern seismic activity. Whether or not a fault might exist, there is no evidence that this area is now seismically active, thus we reach the same conclusion as NV5, that danger to surface structures from seismic activity is unlikely. As also discussed in the NV5 report, this is a proposed mining operation and it will be necessary to locate some mine-related facilities, including a mine shaft, at specific locations based on proximity to the underground target areas. Based on the information collected, ECM agrees with NV5's conclusion that the shaft can be located in this location and the chances of any movement along any nearby fault is low.

Limitations

Our professional services were performed consistent with the generally accepted engineering principles and practices employed in northern California. Our analysis and conclusions are based on information supplied by others; thus we do not warrant the accuracy of that information. Any reliance on this report by a third party is at that party's sole risk. The conclusions reached are based on available information at this time, and the findings are valid as of the present date. This report is solely for the use of our client unless noted otherwise. No other warranty, expressed or implied, is made or intended.

Attachment 5:

Peer Review for Steep Slope, Erosion and Sediment Control Management Plan – Centennial Site, NV5
Report dated January 16, 2020

Review of: Steep Slope, Erosion and Sediment Control Management Plan – Centennial Site, NV5 Report dated January 16, 2020

Our review relied on the following documents:

Grading Plan Produced by Nevada City Engineering, Inc., Plate C-1
Idaho-Maryland Mine, Project Description, Benchmark Resources, November 2019

Review

ECM has reviewed the grading plan for the site, the major task of which will be the construction of an engineered fill to be located on an area that slopes gently to the north, located south of Idaho-Maryland Road. The final surface of the engineered fill is to have a gradient of 2.4 percent to the northwest and the northern edge of the fill will have a 1 to 3 slope (rise to run). A small retention/sediment pond will be constructed at the northwest corner of the fill. The plan includes the removal of some old mined material from the bottom of Wolf Creek that remediates some historic damage to Wolf Creek. The engineered fill will be composed of rock and finer-grained, dominantly sand-sized particles that will result in a final surface suitable for future industrial use.

The NV5 report discusses the details of the installation of the fill, including ground preparation of the base, grubbing, and keying the new material into the original surface. The keying in of the base of the fill using 10-foot wide benches is reasonable and can be efficiently accomplished using typical construction equipment. The report discusses inspection of materials to be used in the fill, segregation of those materials, and compaction in the finished fill. These guidelines set out by NV5 are all standard in the industry and if implemented as discussed should produce a good engineered fill and stable surface.

There are no significant road modifications proposed in the Grading Plan Map, as the access will be from the road located on the east edge of the fill that access Whispering Pine Lane and there are no cuts shown on the map. The plan includes discussion of both subsurface and surface drainage and includes the possible need for dewatering of excavations. Our review of the grading plan does not suggest that any significant dewatering will become necessary.

Discussion and Conclusions

ECM concludes that construction of the facilities proposed is feasible and believes that it can be performed in an environmentally safe manner. The area where the construction is to be done, is classified by the US Natural Resource Conservation Service as “Placer Diggings”, meaning that the area generally contains sands and gravels, which is consistent with the existence of tailings found over much of the site. The grading plan shows that nearly all of the work to be performed will consist of the placement of fill, and the drawing shows no cut slopes having surface grades of greater than 30 percent, with exception of the engineered slopes on the faces of the fill which are shown in the design to be 1 (vertical) to 3 (horizontal). In their report, for the purpose of completeness, NV5 makes mention of slopes of 1 (vertical) to 2 horizontal) or provides recommendations in the event that any should ever be encountered. NV5’s recommendations dealing with surface water drainage and erosion control during construction are appropriate and address all of the potential issues that would be anticipated to arise.

We do observe that there could be some variability in materials that are to be placed in the fill and assume

that the dominant component will consist of angular rock. The angular rock is anticipated to have good binding properties and compaction will occur by grain to grain contact, while finer grained materials will require more effort to obtain a desired level of compaction. Blending of the two materials can produce a higher density final fill since the finer material fills in spaces between the larger fragments. Depending on the characteristics of the actual fill material, it might be that particles sized greater than 8 inches can be used beneficially should the fill be dominantly composed of a higher percentage of angular rock. However, that decision must be made by the engineers following inspection of the actual material. The face of the fill should be easily maintainable at a slope of 1 to 3 (rise over run) and a vegetation cover would be expected to grow well on the north and northwest facing surfaces.

While not specifically discussed in the NV5 plan, the fill is going to be constructed over a period of years, and while most of the surface can be maintained in a finished, or semi-finished and stable vegetated condition, during the life of the project, there will always be areas that will be open and subject to potential erosion should a larger than expected storm occur. An important design feature shown on the Grading Plan map is the small pond that is to be constructed immediately down-gradient of the fill area. This pond, while collecting sediments, also provides a second level of containment in the event that unanticipated erosion of an open surface occurs. Further, the design of the pond will allow any eroded material that has entered it to be recovered and reused beneficially. The design has been well thought out and is appropriate for the site and project.

Since all eventualities associated with construction on this type of site cannot be anticipated, ECM thoroughly agrees with NV5 concerning the availability and presence of an engineer during construction. While the plan is to be implemented as shown in the drawing, the engineer will be able to make immediate minor adjustments in response to actual site conditions encountered and those modifications can be immediately implemented to the benefit of the project and protection of the environment. We believe that the Steep Slope, Erosion and Sediment Control Management Plan contains all the necessary design and mitigation features to meet County requirements, and ECM recommends no changes beyond those recommended above.

Limitations

Our professional services were performed consistent with the generally accepted engineering principles and practices employed in northern California. Our analysis and conclusions are based on information supplied by others; thus we do not warrant the accuracy of that information. Any reliance on this report by a third party is at that party's sole risk. The conclusions reached are based on available information at this time, and the findings are valid as of the present date. This report is solely for the use of our client unless noted otherwise. No other warranty, expressed or implied, is made or intended.

Attachment 6:

Peer Review for Steep Slope, Erosion and Sediment Control Management Plan- New Brunswick Site, NV5
Report dated January 2, 2020

Review of: **Steep Slope, Erosion and Sediment Control Management Plan- New Brunswick Site**, NV5 Report dated January 2, 2020

Our review relied on the following documents:

Grading Plan Produced by Nevada City Engineering, Inc., Plate B-1
Idaho-Maryland Mine, Project Description, Benchmark Resources, November 2019

Review

ECM has reviewed the grading plan for the site and based on our review, the most significant changes include construction of a fill on the southern side of the site, and the addition of a second pond to be installed between that fill and the existing pond labeled "Water Treatment Pond" on the Grading Plan map. Additionally, the Grading Plan map shows some minor regrading to be performed to the access roads from the north, and minor regrading along the eastern edge of the site. The NV5 plan incorporates industry standard stabilization and erosion controls to protect soils against soil erosion and movement. As with any project, the areas that are relatively level require little erosion protection, while areas with steeper slopes require greater protections. The goal is to promote proper surface drainage, provide hillside support if necessary, and to establish surface vegetation to stabilize soils as quickly as possible.

As the fill makes up the majority of the grading, the NV5 report discusses details of the installation of the fill, including ground preparation of the base, grubbing, and keying the new material into the original surface. The keying in the base of the fill using 10-foot wide benches is reasonable and can be efficiently accomplished using typical construction equipment. The report discusses inspection of materials to be used in the fill, segregation of those materials, and compaction in the finished fill. These guidelines set out by NV5 are all standard in the industry and if implemented as discussed should produce a good engineered fill and a stable surface.

Discussion and Conclusions

ECM concludes that construction of the facilities proposed is feasible and believes that it can be performed in an environmentally safe manner. The area where the construction is to be done, is classified by the US Natural Resource Conservation Service as "Placer Diggings", meaning that the area generally contains sands and gravels, which is consistent with the existence of tailings found over much of the site. The grading plan shows that nearly all of the work to be performed will consist of the placement of fill, and the drawing shows the only final slopes having surface grades of greater than 30 percent, will be the engineered slopes on the faces of the fill which are shown in the design to be 1 (vertical) to 3 (horizontal), and a small area bordering the east side of the parking area near the New Brunswick Shaft. In section 7.4 of the report includes discussion for the stabilization of the small areas that will have slopes greater than 1 (vertical) to 2 horizontal). We agree with the design and the procedures as recommended by NV5. NV5's recommendations dealing with surface water drainage and erosion control during construction are appropriate and address all of the potential issues that would be anticipated to arise. NV5 has fully addressed the road modifications that are proposed near the north and east edges of the site, and the plan discusses the installation of walls, fabrics, straw, check walls, sediments traps, etc. The plan also addresses both subsurface drainage and surface drainage and includes the possible need for dewatering of excavations. Our review of the grading plan does not suggest that any significant dewatering will become necessary. If dewatering becomes, necessary, NV5 provides discussion in Section 7.5 of the report, and specifies that an

engineer be consulted if this becomes necessary.

We do observe that there could be some variability in materials that are to be placed in the fill and assume that the dominant component will consist of angular rock. The angular rock is anticipated to have good binding properties and compaction will occur by grain to grain contact, while finer grained materials will require more effort to obtain a desired level of compaction. Blending of the two materials can produce a higher density final fill since the finer material fills in spaces between the larger fragments. Depending on the characteristics of the actual fill material, it might be that particles sized greater than 8 inches can be used beneficially should the fill be dominantly composed of a higher percentage of angular rock. However, that decision must be made by the engineers following inspection of the actual material. The face of the fill should be easily maintainable at a slope of 1 to 3 (rise over run) and a vegetation cover would be expected to grow well on the north and northwest facing surfaces.

While not specifically discussed in the NV5 plan, the fill is going to be constructed over a period of years, and while most of the surface can be maintained in a finished, or semi-finished and stable vegetated condition, during the life of the project, there will always be areas that will be open and subject to potential erosion should a larger than expected storm occur. An important design feature shown on the Grading Plan map is the small pond that is to be constructed immediately down-gradient of the fill area. This pond, while collecting sediments, also provides a second level of containment in the event that unanticipated erosion of an open surface occurs. Further, the design of the pond will allow any eroded material that has entered it to be recovered and reused beneficially. The design has been well thought out and is appropriate for the site and project.

Since all eventualities associated with construction on this type of site cannot be anticipated, ECM thoroughly agrees with NV5 concerning the availability and presence of an engineer during construction. While the plan is to be implemented as shown in the drawing, the engineer will be able to make immediate minor adjustments in response to actual site conditions encountered and those modifications can be immediately implemented to the benefit of the project and protection of the environment. We believe that the Steep Slope, Erosion and Sediment Control Management Plan contains all the necessary design and mitigation features to meet County requirements, and ECM recommends no changes beyond those recommended above.

Limitations

Our professional services were performed consistent with the generally accepted engineering principles and practices employed in northern California. Our analysis and conclusions are based on information supplied by others; thus we do not warrant the accuracy of that information. Any reliance on this report by a third party is at that party's sole risk. The conclusions reached are based on available information at this time, and the findings are valid as of the present date. This report is solely for the use of our client unless noted otherwise. No other warranty, expressed or implied, is made or intended.

Attachment 7:

Peer Review for Desktop Study of Cemented Paste Backfill, Itasca Denver, Inc., Report dated February 24, 2020

Review of: **Desktop Study of Cemented Paste Backfill,** Itasca Denver, Inc., Report dated February 24, 2020

Our review relied only on the document shown above

Background

Underground mining involves the removal of mineralized (ore) and un-mineralized (waste) material from the subsurface and transport of that material to the surface where it is stored and or processed. Waste products from processing the ore (tailings) can in some cases be returned to the mine to fill void space resulting in permanent benign disposal of the tailings. If backfilling of the mine is desired, there are various ways to accomplish the task, and backfilling is generally done for two reasons. The first is to reduce the volume of removed material that might remain on the surface, and the second to use that material beneficially to provide stability and ground support within the mine itself. The use of ground support can help stabilize the mine openings against spalling, cracking and block movement, to modify mine ventilation, and to enhance safe working conditions for the miners. It can also be used to allow the removal of additional economic rock by adding replacement support, or by partially filling an opening which can provide a new a surface on which the miners can continue to work.

The simplest method of backfilling is to simply return the rock that has been removed back into the mine openings. In a shaft, the material can simply be dumped down into the shaft collar and the opening can be completely filled via gravity. For features where the floor of the mine opening dips at an angle of less than 55 degrees from horizontal, it becomes difficult to completely fill that void. As an example, backfilling of the floor of horizontal openings can easily be accomplished but filling the upper portions of the same opening can take significantly more effort.

A second method of backfilling uses a hydraulically placed (pumped) sand slurry. This method has been used since the latter 1800's. It was used extensively at the Homestake Mine in Lead, South Dakota, where sand tailings from the mill provided the material to backfill mine openings. The pumped in sand completely fills the void and the water drains out of the pore spaces. The support to the mine is accomplished via grain to grain contact in the sand. The excess water drained from the slurry must be pumped back out of the mine. Although, as noted above, there are several advantages of backfilling, one disadvantage is that the method requires high water to solids ratios. Retaining the fluid backfill in specific locations can require robust bulkheads similar in construction as those used for forms for high slump concrete.

Specialized pumps were developed in the 1970's which could move materials having higher solid to water ratios allowing more viscous "paste" backfill to become a practical disposal method. It became possible to pump materials with solids to water ratio as high as 75 to 80 percent. Where the slurry method uses sand size particles, paste backfill uses the finer silt and clay sized materials. When Portland cement is added, most of this added water is consumed in formation of the concrete. Some bulkheading is still required but not to the extent required for a sand slurry. Rise Grass Valley, Inc, has determined that paste backfilling will be an optimum method for disposal of tailings at the Idaho-Maryland mine site.

Project Specific

Rise Grass Valley, Inc. has collected drill core samples of material that they believe is representative of the ore that will be processed at the Idaho-Maryland mill. They retained two companies, considered to be

experts in their fields to perform tests to determine if underground paste backfill will be feasible at the Idaho-Maryland site. ECM is familiar with both companies and have worked with both McClelland Laboratories, Inc. in Reno, Nevada and ACZ Laboratories, Inc. in Steamboat Springs, Colorado. They both have excellent reputations for their quality work. Itasca Denver Inc. is well qualified to review the McCelland and ACZ technical information and to produce their summary report.

There are two important considerations concerning the use of paste backfill. The first is that the mill can produce a product that has the proper physical characteristics. The second is that the material to be used to make the paste backfill is environmentally benign. McClelland and ACZ laboratory testing shows that the material is chemically benign and physically suitable to produce paste backfill. Based on ECM's review of Itasca's summary of both the flotation results and the analytical results we believe that the results look reasonable and are consistent with what would be expected at this mine.

More specifically, the acid-based testing performed by ACZ shows that there is actually a large excess of natural carbonate in the tailings, which result in acid neutralization potential ratios for this material that exceed 100 to one. This means that the rock that will be used as backfill will have a large excess calcium carbonate content as compared to the amount needed to neutralize sulfur that might remain in the tailings paste. This high neutralization ratio suggests that the insertion of the material back into the mine openings can be environmentally beneficial, since the excess calcium carbonate content can serve to provide some localized neutralization of even the naturally occurring free sulfur that might remain within adjacent unmined portions of the vein.

The paste backfill method has been in use for about 40 years, and as a result, the technology has been well developed over that time with respect to the proper equipment used to make and deliver it. Itasca has answered as many of the project-specific questions as is currently possible, and the remaining details cannot be completely determined until the first tailings have been produced by the mill. Itasca has identified these variables, as "site specific factors", and they include selection of the proper binder (dominantly Portland cement with a low hexavalent chromium [Cr^{+6}] content), and the need for testing of the material, both as it is produced, and again after it has cured. They have specific concerns on exposure to excess water (both neutral and low pH) prior to cure, and have noted that they would prefer to minimize exposure to oxygen after cure. Subject to several noted concerns, Itasca believes that the use of paste backfill can be successfully accomplished at the Idaho-Maryland site.

Discussion and Conclusions

It is ECM's opinion that, based on the testing that has been performed, the material is suitable for paste backfill, and that the material can be successfully manufactured and transported to the intended location. ECM is in agreement with Itasca reasoning and discussions, based on the laboratory information that has been provided. We are also in agreement with their conclusions that paste backfill can be used at this site and are in agreement with all of their conclusions except one. They state that the backfill should be isolated from exposure to oxygen. It is ECM's understanding of the mining method that will be used that the filling openings will be at similar elevations in the mine as those that are being simultaneously mined. Based on the Itasca comment, it appears that they would prefer that the backfill be submerged soon after curing. As mining will be expected to continue near the backfilled areas, submergence below water will not be possible. It is expected that the miners will backfill certain specific areas, such as the ends of dead-end tunnels, or areas where the vein has been removed, thus leaving only small surfaces of the cured paste backfill to be exposed to air. If Itasca believes that significant degradation to the paste backfill might occur, then ECM recommends that the mixture be modified so as to minimize any degradation that might occur

while in the presence of air.

Limitations

Our professional services were performed consistent with the generally accepted engineering principles and practices employed in northern California. Our analysis and conclusions are based on information supplied by others; thus we do not warrant the accuracy of that information. Any reliance on this report by a third party is at that party's sole risk. The conclusions reached are based on available information at this time, and the findings are valid as of the present date. This report is solely for the use of our client unless noted otherwise. No other warranty, expressed or implied, is made or intended.

Attachment 8:

Peer Review for Geotechnical Assessment of the Near Surface Mine Features. Balance NV5, Report dated June 2020

Review of: Geotechnical Assessment of the Near Surface Mine Features. Balance NV5, Report dated June 2020

Our review relied on the document shown above and also the following:

- Plate A202 Existing Historic Underground Mine Workings, Rise Grass Valley, Inc., 2019
- Plate A207 Mine Workings Near Surface Showing Location and Geometry, Rise Grass Valley, Inc., 2019 (attachment to NV5 report)
- East Bennett Street Property and East Bennett Street and Brunswick Road [Investigation], by Anderson Geotechnical Consultants, May 1986 (attachment to NV5 report)
- Geotechnical Plans for Lawler House Underpinnings, 12305 Bett Road, by Carlton Engineers, Inc., 2000 (attachment to NV5 report)
- Selected pages from the Draft Environmental Impact Report (pages 4.5-9 and pages 4.5.19 through 4.5-22, 2008 (attachment to NV5 report)
- Preliminary Geotechnical Engineering Report for Idaho-Maryland Mining Corp, Nevada County, Ca., Holdrege and Kull, 2004 (attachment to NV5 report)
- Engineering Geologic Report for Whispering Pines Park, Lowry and Associates, 1983 (attachment to NV5 report)
- Spring Hill Mines Property at Idaho-Maryland Road and Dorsey Drive, Grass Valley Ca, by Lowry and Associates, 1978 (attachment to NV5 report)
- Foundation Engineering Report for Wolf Creek Industrial Park by Lowry and Associates, 1985 (attachment to NV5 report)
- Geotechnical Report Whispering Pines Assessment District Improvements by Lowry and Associates, 1986 (attachment to NV5 report)
- Article titled Shaft Boring Found to be Inexpensive and Safe, by J. B. Newsom, Engineering and Mining Journal, 1936 (attachment to NV5 report)
- Shaft Sinking with a Shot Drill, Idaho Maryland Mine, by J. B. Newsom and G. F. Jackson, Us Bureau of Mines, Information Circular 6923, 1936 (attachment to NV5 report)
- Idaho-Maryland Mine Round Hole Photo Set (attachment to NV5 report)
- Series of letters and reports by Glenn Waterman on Geology of the Idaho Maryland Mine, 1997 (attachment to NV5 report)
- Two Agreements with surface owners where Rise Grass Valley agrees to plug three old shafts (attachment to NV5 report)

Background Reports

The NV5 report incorporated various other reports that contained important field information and data that was used in NV5's analysis. Therefore, it was necessary for ECM to review that information as it related to the site, and following that review, to evaluate NV5's incorporation and discussion of that information and allow comparison to their conclusions and recommendations. For completeness, all the reports that were attached to the NV5 base report were reviewed and summarized. Included in the section, are the portions of the mine that are above and below the static ground water surface.

Anderson Geotechnical Consultants (May 1986 report) investigated two sites, one in the vicinity of the New Brunswick shaft (Lots 6, 7 and 8), and a second site located near the old Brunswick shaft (Lots 1 through 5). It appears that they used historic maps to locate mining related structures including surface

buildings and underground openings. They drilled six test borings on Lots 1 through 5 at the Old Brunswick shaft and referenced a February 1986 report that included details for the area around the New Brunswick Shaft. While that February 1986 report was not available for review, the NV5 report did discuss its findings, and included a map dated January 1987 that was drawn by A. W. Beeson. The Beeson map showed the location of where Anderson had believed a fault to be, and depicted it as a straight dashed line with two parallel lines located 200 feet either side, indicating what appears to be their suggested setback distance related to building construction. The map shows the feature to strike north north-west, and to be dominantly located in Lot 8, cutting across a portion of Lot 7. The map shows the projected fault to skirt to the east of Lot 2. Anderson stated in the May 1986 report, that they had previously described it in the February report stating the fault "appears to be present on the northern part of the lot", which we interpret to mean that the presence of the fault is "inferred" and its presence and location have not necessarily been proven. The Beeson map depicts the feature as a straight-line crossing through the entire length of the lot, which is slightly different than Anderson's description. ECM believes that if the feature had been actually mapped in any detail, and confirmed by Anderson, that it would have been depicted on the map as a solid line instead of a dashed line, thus the actual location was not accurately known.

The Carlton Engineers, Inc. report for 12305 Bett Road provides details of a site investigation for a house on Lot 1 of the Bett Acres Subdivision. The report documents the results of a soil investigation that included 8 borings, of which one was believed to have to have been drilled into the Old Brunswick Shaft. The report contains the locations of the drill holes and logs

The attachment includes selected pages from the 2008 Draft Environmental Impact Report for the Idaho-Maryland Project. The environmental report includes reference to a collapse at the Old Brunswick shaft that resulted in damage to a private home built near its collar. It also mentions the nearby "70-foot Level Tunnel" and discusses the risk of collapse of shallow underground openings. The report includes discussion on the New Brunswick Shaft, considering the potential that it could collapse, and speculates that the concrete collar might be too old and weak to support mining related surface equipment. It also notes that the area around the shaft would not be open to the public since it will be located within a restricted area on private property.

In 2004, Holdrege and Kull, produced a preliminary geotechnical report for the site. In that report, they discussed the Centennial and the New Brunswick sites, and also included one additional site that is not related to this project. Holdrege and Kull performed no testing beyond a site inspection and relied on the technical work of others for their report. Previous work used by them included US Department of Agriculture Soil Conservation Service information, various government geologic publications, and a report written by Anderson Geotechnical Consultants. The Holdrege and Kull report concluded that no asbestiform minerals were found on the site, but added that if some were to be found, a mitigation plan should be developed. They observed that the presence of potentially uncompacted fill observed at the site could cause differential settling issues for future building construction. Their additional concerns included historical underground mine workings open to the surface, the possible presence of expanding clays, and construction in areas with steep hillside slopes. They recommended clearing and grubbing the surface, provided guidelines for the installation of fill and cuts, erosion control, subsurface drainage, surface drainage, and foundations. They recommended that engineering oversight be available during construction.

A total of four reports by Lowry and Associates are included in the NV5 attachments and are listed in the same order as they appear in that report. The 1983 Lowry and Associates engineering report is a comprehensive report discussing the old mines, the associated above and below ground structures, and the

soils and surface characteristics within the Whispering Pines Park area. The report concludes that underground workings within the subdivision present no danger with regards to surface collapse, and have suggestions concerning proper closure of shafts. They recommend that erosion controls conform to the California Erosion and Sediment Control Handbook, and the report contains the results of soil borings and laboratory testing. The report references the Maslin Shaft, located adjacent to Whispering Pines Road, about 2,000 feet east of the Idaho Shaft.

The 1987 Lowry and Associates report discusses property located north of Idaho-Maryland Road and south of Dorsey Road. The report concluded that there was no evidence of active faults, and they considered the property suitable for its intended use. They added that construction should conform to Uniform Building Code for Zone 3 earthquake shaking intensities.

The 1985 Lowry and Associates report discusses a property located north of Idaho-Maryland Road, south of Highway 49, and bounded by other private properties to the east and west. The report stated that underground mining had occurred in this area and one or more shafts were present. It makes recommendations on stabilizing the shaft(s), included soils data and provided recommendations on construction of various structures. The Eureka shaft is located on the southeast corner of this parcel and the report discusses in detail how to plug the shaft along with a discussion on placement of fill, and activities associated other construction.

A 1986 Lowry and Associates report addresses roadway improvements within Whispering Pines Subdivision. The report addresses slope and soil stability, sources of construction materials, erosion control, pavements, and retaining structures.

An article titled “Shaft Boring Found to be Inexpensive and Safe”, by J. B. Newsom was published in the Engineering and Mining Journal and documented a new method of construction of a shaft using a large diameter core drill. The report details the equipment used and some information on the rock formations encountered in the Idaho No. 2 shaft, which is also referred to in reports as the Round Hole Shaft.

U. S. Bureau of Mines, Information Circular 6923, “Shaft Sinking with a Shot Drill, Idaho Maryland Mine”, describes the boring of the shaft, the equipment used, along with some basic geology encountered in the Idaho No. 2 Shaft, which is also referred to in reports as the Round Hole Shaft.

The NV5 report includes several photographs, some personal correspondence, and a report by Glen Waterman. The photos show the Idaho No. 2 Shaft, and Waterman discussed the geology of the mine.

Two legal agreements between surface owners are included which allow Rise Grass Valley to plug three old shafts. The documents are not technical and so not germane to this review.

NV5 Report

NV5 reviewed the attached reports and in their report provides a brief overview of the mining properties and surface openings. The summaries include discussion of the condition of the features, the estimated elevation of the water in the mines, and a tabulation of the distance between the water level and the ground surface. The report states that the static water elevation in the mine is at about 2,497 feet (above mean sea level). The report specifically lists and describes what is known about the Eureka Shaft, the Eureka Vertical Shaft and the Eureka Drain located on the north side of Idaho-Maryland Road. The openings on the south side of Idaho-Maryland Road include the East Eureka Shaft, the East Eureka Drain,

the Idaho Drain Tunnel, the Idaho Pump Shaft, the Idaho Shaft, and the Old Air Raise located near the southeast corner of the intersection of Idaho-Maryland Road and Whispering Pines Lane. The report includes a description for the Roundhole Shaft, also known as Idaho No.2 Shaft to the east. To the south they discussed the Old Brunswick Incline Shaft, the Old Brunswick Raise (Shaft 2), the Old Brunswick 70-level Stope, the Old Brunswick Drain Tunnel (70-foot level Tunnel), and the New Brunswick Shaft.

Section 3 of the report contains NV5's conclusions, and they provide four recommendations.

1. Investigate the condition of the East Eureka Shaft, East Eureka Drain, Idaho Drain Tunnel, Idaho Pump Shaft and Idaho Shaft since the static groundwater surface is located within 100 feet of the ground surface. Develop physical closure designs for these features based on the results of the investigations.
2. Monitor paved locations where groundwater is within 100 feet of the surface including performing surveys on the surface.
3. Photographically document surface features in areas where groundwater is within 100 feet of the surface in developed areas and within 10 feet of the surface in undeveloped areas.
4. They recommend taking no action for mine features that are separated from the current groundwater surface by greater than 100 feet, as they conclude that a change in water level this distance below the feature would have no physical connection to the surface.

Discussion and Conclusions

The Idaho-Maryland mine complex includes the Eureka, the Idaho and the Brunswick mines, and based on ECM's review, all are interconnected by underground tunnels, with a total distance between the northernmost opening and the southernmost openings being about 10,000 feet. Assuming that no bulkheads or significant collapses have occurred within the mine, the workings are all hydrologically interconnected, and the groundwater surface elevation throughout the mine should be approximately the same. NV5 made this assumption and ECM concurs. Table 1 in the NV5 report shows the Eureka Drain and the East Eureka Drain openings to be the lowest elevation openings to the ground surface. Both openings are at approximately the same elevation, and as a result, these two openings would be expected to control the water elevation in the entire mine. NV5 reports that both openings currently discharge water to the surface. Since the ground surface rises to the south, the distance between the land and water surface increases to the south, and this increase in separation is reflected in that table.

ECM believes that there may be widespread misconception about the terms caving and subsidence and offers this brief discussion. Upon seeing these terms, the general public likely envisions "sink holes" that occur within limestone environments where a gaping hole forms that may be tens or even hundreds of feet across. These images are sometimes prominent in news reporting due to their dramatic nature. These sinkholes are caused by the dissolution of the underlying limestone creating a cave, or cavern, just below the ground surface. As dissolution proceeds, the cavern becomes larger and larger, and as some point the rock can no longer support the ground surface above it, and failure occurs. This catastrophic failure often occurs as a result of pumping related drawdown of the water table since the water had been providing some, albeit minimal buoyant support, for the overlying rock in spite of the rock's higher density.

This type of failure would not be expected near the mines in Grass Valley. Instead, the mine-related voids in Grass Valley are steeply dipping to vertical, features and their widths generally range from as narrow as a few inches and rarely exceed 4 feet. As a result, any caving of a vein would be limited to the width of the vein, and it would occur at the exact point at which the vein outcrops on the surface. As the

area where potential failure along the vein's outcrop might occur are so small, buoyancy would not be a factor and the failure would wholly occur as a result of the breakdown of the rock itself. Typically, the length of one of these failures might be as short as a couple of feet, with the maximum length rarely exceeding 20 feet. The location of a potential collapse can usually be accurately predicted based on the location of vein's surface outcrop. An example of this type of feature has been specifically identified in the NV5 report as the 70-Level Stope near the Old Brunswick Inclined Shaft.

A second type of failure can occur around mine shafts, which are vertical or near-vertical openings. Some shafts are set directly into bedrock, and the collars of these features are quite stable due to the competency of the rock. At other locations, the shafts might have been sunk through surface soils and weathered rock for the first few feet, and as a result, ground support must be constructed to keep the soils and weathered rock from sluffing into the shaft. In these cases, the shafts are generally supported using wooden timbers, and when the timbers finally rot, they allow the rock and debris along the sides to cave into the shaft. This type of collapse generally produces a cone-shaped opening where the slope of the bottom of the cone is dependent on the internal angle of friction of the surrounding material. Less competent soils produce a shallower cone, while more competent materials produce one that is steeper. If the distance from the ground surface to competent bedrock is great enough, these surface failures can have diameters as great as 30 to 40 feet, with the bottom of the core being the point in which the shaft enters solid bedrock.

As a margin of safety, NV5 has chosen a separation between the groundwater surface and the ground surface of 100 feet. They believe that in all areas where the separation equals or exceeds 100 feet there is no chance that ground water drawdown could affect surface structures. This water table/ground surface separation distance clearly divides the northern mines from the southern mines. The northern mine openings all have a separation of less than 100 feet, and NV5 recommends further studies and potential remediation for all of them. For the southern mines, where the separation is greater than 100 feet, they recommend no further actions. ECM is in agreement with NV5 and based on their conclusions and based on the known physical characteristics of the rock units, considers this distance to be conservative.

ECM's review of the NV5 report does produce two questions. The first question concerns the Maslin Shaft which is located approximately 2,000 feet east of the Idaho Shaft, on the north side of Whispering Pines Lane. The Maslin shaft collar is at an approximate elevation of 2,660 feet, placing it about 160 feet above the current static water level in the mine. Changing water levels in the mine would probably have no effect, but since this shaft appears to be connected to a crosscut on the Idaho 2000 level, it is recommended that the opening be considered for review, as it might have some effect on the future mining operation.

The second question involves the surface outcrop of the Eureka-Idaho vein. Rise Grass Valley's map A202 includes a long section of the mine, and the section shows no stopes nearer than 250 feet from the surface, other than the 70-Level Stope located near the Old Brunswick Shaft. The explanation for the section indicates that those stoped areas shown on the section have been backfilled. Although the section does not show stopes above that level, based on mining that has occurred on other veins in the general area, it seems likely that some stoping might have occurred nearer to the surface than is shown on the section. ECM recommends that NV5 review more detailed larger scaled maps, if available, to allow them to determine if there are any nearer surface stopes. If it is found that more shallow stopes do exist and they reach within 100 feet from the ground surface, it is recommended that these areas be identified, and their present condition be surveyed and documented as discussed in NV5 recommendations 2 and 3.

EMC has one editorial comment and recommends that in Section 2.11 Line 5 the words "foundation

residence" be changed to read "residence foundation".

Other than the items addressed above, ECM finds that the NV5 report is sufficiently thorough and provides the information and guidance necessary.

Limitations

Our professional services were performed consistent with the generally accepted engineering principles and practices employed in northern California. Our analysis and conclusions are based on information supplied by others; thus we do not warrant the accuracy of that information. Any reliance on this report by a third party is at that party's sole risk. The conclusions reached are based on available information at this time, and the findings are valid as of the present date. This report is solely for the use of our client unless noted otherwise. No other warranty, expressed or implied, is made or intended.