

CITY COUNCIL AGENDA REPORT

Meeting Date:September 3, 2020From:Director of Public Works/City EngineerSubject:400 Kings Road Slope Stability Plans

Community Goal/Result: Safe Community

Purpose

To receive the Kings Road Roadway Protection Project plans prepared for the 400 block of Kings Road by Cotton, Shires and Associates.

Recommendation

Approve funding this project from the General Fund in the amount of \$250,000.

Background

The "background" section of the attached 3/5/20 staff report provides a summary of events up to that date.

At its 3/5/20 regularly scheduled meeting, Council directed staff to move forward with the design of an 8' high solider pile and wood lagging retaining wall. The exploratory drilling necessary to complete the project's final design was delayed until 6/24/20 due to restrictions imposed on construction activities by the San Mateo County Health Officer's Orders related to COVID-19.

Discussion: The completed design has been reviewed by staff, and is attached.

Fiscal Impact

The proposed budget of \$250,000 includes the engineer's estimate of \$229,550, plus a small contingency.

Measure of Success: Protection of the public and public infrastructure.

Attachments

- 1. 3/5/20 Staff Report
- 2. Kings Road Roadway Protection Project plans

R.L. Breault

Randy Breault, Public Works Director

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Clay Holstine, City Manager



CITY COUNCIL AGENDA REPORT

Meeting Date:March 5, 2020From:Director of Public Works/city EngineerSubject:400 Kings Road Slope Stability Evaluation

Community Goal/Result

Safe Community

Purpose

Tor receive the Geologic and Geotechnical Evaluation of Slope Stability prepared for the 400 block of Kings Road by Cotton, Shires and Associates.

Recommendation

Provide direction to staff on next steps to be taken.

Background

Notice of the unravelling of the slope on the uphill side vicinity of 400 Kings block was brought to the city's attention in late September 2019. A preliminary geotechnical evaluation was completed the next week, and per the geotech's recommendation, parking was prohibited at the toe of this slope. In mid-November, k-rail was installed as an additional protective measure to prevent loose rocks from migrating out into the travelway.

Concerned citizens from the neighborhood appeared at several council and committee meetings in the following months, expressing their desire for the restoration of the lost parking spaces. At its 11/21/19 meeting, City council approved \$30k for the initial investigation and preliminary design efforts.

Discussion

The attached report incorporates three pages of geologic engineering review that may be best left for study by experts in that field. The salient notes for general consumption are: the minor likely failures that are anticipated will likely be constrained by the currently installed k-rails, and a major seismic event and/or intense rainfall event could result in earth material overflowing the k-rail and blocking the roadway (but would not impact the downhill residences).

The following table discusses options currently reviewed and estimated for the council's consideration:

| Option | Cost | Notes |
|----------------------------------|-------------------------------|---------------------------------|
| No changes to current | No additional cost. De | Protects against likely events. |
| condition | minimis amounts spent to | Does not protect roadway |
| (leave k-rail in place) | date – city owned the k-rail, | against seismic events. Does |
| | only new purchases were | not protect uphill property. |
| | signs and posts | Does not restore pre-existing |
| | | substandard parking & |
| | | travelway. Protects downhill |
| | | residences. |
| Install rock bolt and drapery | \$80,000* | Protects against likely and |
| (leave k-rail in place) | | seismic events. Does not |
| | | restore pre-existing |
| | | substandard parking & |
| | | travelway. Protects downhill |
| | | residences. |
| Install 8-foot high soldier pile | \$160,000* | Protects against all |
| and wood lagging wall | | anticipated events. Without |
| (remove k-rail) | | some excavation of existing |
| | | slope, would only restore a |
| | | portion of pre-existing |
| | | substandard parking & |
| | | travelway. Protects downhill |
| | | residences. |
| Grade to a natural, stable | \$210,000* | Protects against all |
| slope. | (excludes cost of land | anticipated events. |
| (remove k-rail) | purchase) | Dependent upon quantity of |
| | | land purchased from uphill |
| | | properties, could create a |
| | | wider travelway and parking |
| | | area. Protects downhill |
| | | residences. |
| Shotcrete and soil nail wall | \$250,000* | Protects against all |
| (remove k-rail) | | anticipated events. Without |
| | | significant unaccounted for |
| | | off haul, would only restore |
| | | pre-existing substandard |
| | | parking & travelway. |
| | | Protects downhill residences. |

*Note that these costs are very preliminary, and final numbers could and likely will vary significantly. Also note that these numbers are pure construction only, and exclude items such as contractor's mobilization and demobilization, traffic control, costs to acquire uphill property for the fourth option, etc.

Fiscal Impact

Staff assumes any new work at this point in time would come from the General Fund.

Measure of Success

Protection of the public and public infrastructure.

Attachments

1. Cotton, Shires and Associates letter report dated January 10, 2020

RIB

Randy Breault, Public Works Director

Clay Holstine, City Manager



January 10, 2020 E5669 By Email (rbreault@ci.brisbane.ca.us) and by Mail

Randy Breault, P.E. Director of Public Works City of Brisbane 50 Park Place Brisbane, CA 94005

SUBJECT:Geologic and Geotechnical Evaluation of Slope StabilityRE:Kings Road StabilityCity of Brisbane, California

Dear Mr. Breault:

Cotton, Shires and Associates, Inc. (CSA) is pleased to provide the City of Brisbane with the results of our evaluation of the slope stability conditions along a segment of Kings Road, east of Beatrice Road. The subject segment of Kings road is approximately 120 feet in length. We understand that Kings Road is a publicly maintained roadway that is approximately 16 to 18 feet wide. We also understand that no development is currently proposed upslope of the subject roadway (i.e., 462 Kings Road). We visited the site on several occasions in December 2019, performed a topographic survey, observed surface conditions, and mapped pertinent geologic features. No subsurface exploration, laboratory testing of samples or installation of monitoring devices was conducted as part of this evaluation.

In the following letter-report, we discuss the purpose and scope of our work, the observed site conditions, our preliminary conclusions, and general recommendations regarding potential slope stability hazards impacting the public roadway and adjacent properties, along with the limitations of our services.

PURPOSE AND SCOPE OF WORK

The purpose of our slope stability evaluation was to: 1) identify pertinent geologic features at the site; 2) formulate conclusions regarding the potential slope stability hazards that could impact the public roadway and residents; and 3) provide recommendations for future action to address identified hazards.

Central California Office 6417 Dogtown Road San Andreas, CA 95249-9640 (209) 736-4252 • Fax (209) 736-1212 Southern California Office 699 Hampshire Road, Suite 101 Thousand Oaks, CA 91361-2352 (805) 370-8710

www.cottonshires.com

Randy Breault, P.E. Page 2

The specific scope of work performed for our investigation included the following tasks:

- 1) Review of technical documents and regional maps;
- 2) Conduct a ground-based topographic survey:
- 3) Geotechnical reconnaissance and geologic field mapping;
- 4) Geologic and geotechnical stability evaluations; and
- 5) Preparation of this letter-report.

OBSERVED SITE CONDITIONS

Regional geologic mapping of the site vicinity has identified sandstone and shale bedrock associated with the Franciscan Complex (Bonilla, M.G., 1998). This bedrock has been tectonically deformed, faulted and folded. An anticline fold is regionally aligned sub-parallel to the topographic ridge of San Bruno Mountain which trends approximately northwest-southeast. Reviewed regional maps do not identify landslide deposits in the site vicinity. Locally, the identified bedrock is mapped as dipping down to the northeast at approximately 35 to 50 degrees from horizontal. The subject site vicinity has not been included in state seismic hazard zone mapping efforts for earthquake induced landslides.

Based on the results of our topographic survey, the slope above Kings Road is up to 30 feet in height and is generally inclined at grades of 0.6H:1V to 1H:1V. We assume these precipitous slopes are cut slopes that were excavated during the original construction of Kings Road. Based on a review of historical aerial photographs construction of Kings Road occurred between 1930 and 1941. We observed sandstone and shale bedrock associated with the Franciscan Complex exposed in these cut slopes. The sandstone beds exposed are generally 1 to 2.5 feet thick and typically are bounded by laminated shale beds up to 1 inch thick. The in-place sandstone is moderately weathered and fractured and includes plagioclase feldspar. Roots were observed in open fractures and joints. The in-place shale was fissile, and hand samples easily crumbled. The results of our topographic surveying and geologic mapping are presented on Figure 1, Engineering Geologic Map and on Figure 2, Engineering Geologic Cross Section A-A'.

We measured the orientations of bedrock discontinuities including bedding planes, joints, and fractures. Planar bedding orientations at the site generally paralleled the roadway (strike orientations between 311 and 335 degrees), and were dipping between 43 and 52 degrees to the northeast (towards the roadway). We note that these bedding orientations are inclined shallower than the topography of slope. This geometric configuration is commonly referred to as a "dip-slope condition" where relatively weaker geologic features (e.g., bedding planes) daylight from a slope. This dip-slope condition is illustrated on Figure 2, Engineering Geologic Cross Section A-A'. Conjugate joints were

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noted with plane intersections that also trend and plunge out of the slope. It appears that recent minor wedge or slab failures along the slope resulted in blocks of friable/soft weathered bedrock accumulating at the toe of the slope. This slope debris was effectively restrained from entering the roadway by K-rails that we understand were recently installed.

In the vicinity of Beatrice Road, it appeared that a translational slab failure had previously evacuated from the slope along a shale bedding plane (Figure 3). Concrete and steel were observed on the exposed slope that we assume were intended to retain bedrock blocks upslope of the previous failure. This failure was located upslope of the intersection between Beatrice Road and Kings Road. Surficial colluvium and artificial fill earth materials were observed at the top of the cut slope (462 Kings Road) and on portions of the slope inclined approximately 1H:1V (100 percent). Existing foundations were observed at 462 Kings Road in proximity to the top of the cut slope, and we also observed a functioning water spigot located adjacent to an existing foundation footing (Figure 1). It is unclear if this spigot may be damaged and leaking water into the subsurface.

PRELIMINARY CONCLUSIONS AND GENERAL RECOMMENDATIONS

Based on our geotechnical and geologic evaluations it appears that the subject portion of Kings Road is primarily constrained by oversteepened slopes and dipslope geologic conditions, along with anticipated strong seismic ground shaking. These constraints contribute to a relatively increased potential for future rock-slope failures to impact the roadway. **If no action is taken, the City of Brisbane should anticipate small rock-slope type failures to continue to impact the slope and roadway**. We find that these minor wedge failures resulting from adverse dip-slope conditions or joint orientations will likely be contained by the currently installed K-rails at the toe of the slope, assuming periodic clearing of slope debris if/when a shallow failure or continued raveling occurs. We note that we have not observed surficial geomorphic features or distress suggesting imminent instability beneath the subject portion of Kings Road.

Based on our visual observations and completed topographic survey we estimate that a significant slope failure could deposit up to 500 to 750 cubic yards of earth material on the roadway. Our estimate is based on a conceptual bedding plane (assumed failure surface) oriented at 45 degrees from horizontal that parallels the roadway and intersects the slope at the roadway elevation. A failure of this nature could 1) occur during a significant seismic event or following prolonged and/or intense rainfall; 2) would significantly impact the upslope property (462 Kings Road); and 3) would likely temporarily block the roadway, because the K-rail will not have the necessary storage capacity or lateral resistance to contain the failure.

COTTON, SHIRES AND ASSOCIATES, INC.

It is our recommendation that no development (e.g., building permits or equivalent) should be permitted on the property directly upslope of the subject roadway without an adequate geotechnical investigation and implementation of mitigation measures reviewed and accepted by the City. We understand that the currently installed K-rails block portions of the roadway that were used for parking by neighboring residents. If the City determines that the current level of roadway protection (K-rails blocking portions of the roadway) is insufficient including likely temporary closure of the roadway following significant failures, then alternative mitigation measures should be considered.

In the following section we provide general recommendations and conceptual mitigation measures to improve the relative stability of the slope adjacent to the roadway and reduce the potential risk for adverse impacts from observed geotechnical and geologic conditions. The most significant geotechnical hazard to the roadway and adjacent properties is the dip-slope condition upslope of Kings Road. Our evaluation did not include quantitative slope stability analysis or geotechnical laboratory testing.

General Recommendations

The City of Brisbane should consider the following:

- 1) **Maintained and/or increased containment of anticipated minor slope failures**. This mitigation concept would include maintenance of the current K-rail installation to mitigate the potential for shallow failures or slope debris from entering the functioning roadway. This containment could be improved with further installation of mesh/drapery netting or equivalent on the slope. We find that this level of mitigation (K-rails and netting or equivalent) would appropriately mitigate the potential for minor wedge or block failures along the subject slope.
- 2) **Temporarily shutting off water service from 462 Kings Road** while it remains undeveloped (if possible). We note that water could remain servicing the unoccupied property if a qualified professional concludes that no water is leaking from existing site improvements into the subsurface.
- 3) Additional mitigation measures (e.g., retaining wall or internal slope reinforcing) if the potential for roadway closure, the potential for significant failures, or the current level of mitigation is found unacceptable by the City. Internal strengthening could be achieved with a combination of rock bolts and drapery, or rock bolts and shotcrete. Alternatively, the slope could be buttressed by an engineered retaining wall at the toe of the slope. Detailed mitigation concepts and designs would require additional geotechnical investigation and laboratory testing to derive appropriate

COTTON, SHIRES AND ASSOCIATES, INC.

geotechnical design recommendations and criteria. This level of mitigation could be designed to resist the potential of larger rock-slope failure and probable seismic conditions.

4) **Alternatively**, the City could acquire a portion of the upslope property (462 Kings Road) and grade the slope to a more stable gradient considering the site's dip-slope geologic condition. This alternative may require an extended closure of the roadway to complete grading improvements, would require use of the public roadway to haul excess cut materials off-site, and would restrict the buildable area of 462 Kings Road.

We are available to discuss these general recommendations, and discuss potential further action as needed. Please let us know how we can best be of service moving forward.

Randy Breault, P.E. Page 6 January 10, 2020 E5669

ROFESS

NO. 2334

EXP. 12/31/19

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LIMITATIONS

Our services consist of professional opinions and recommendations made in accordance with generally accepted engineering geology and geotechnical engineering principles and practices. No warranty, expressed or implied, or merchantability of fitness, is made or intended in connection with our work, by the proposal for consulting or other services, or by the furnishing of oral or written reports or findings.

This report is based solely on a reconnaissance-level evaluation without benefit of subsurface exploration and/or laboratory testing. Such additional work would be necessary to provide final design recommendations.

We trust that this provides you with the information that you need at this time. If you have any questions, or need additional information, please call.

Respectfully submitted,

COTTON, SHIRES AND ASSOCIATES, INC.

mid L. Schrie

David T. Schrier Principal Geotechnical Engineer GE 2334

Craig Stewart Senior Geologist

AM:DTS:CS:st

Attachments:

- 1) Figure 1, Engineering Geologic Map
- 2) Figure 2, Engineering Geologic Cross Section A-A'
- 3) Figure 3, Annotated Photograph



| | 410 | A | Explanation: | | |
|-------|-------|-------|--|--|-------|
| | | | Scale: 1 inch = 5 feet Horizontal = Vertical | | 462 |
| | | | A-A' azimuth orientation: 213 degrees | 9 | |
| | 400 — | | Orientation of joints or fractures measured on the slope (red) | Bedding plane daylighting from slope (i.e., "dip-slope condition") | Qc/Af |
| | | - ? - | Geologic contact, dashed where queried (black, ?) | | -?? |
| et) | | | Attitude/orientation of bedding structure in bedrock (blue/purple) | | |
| ı (fe | | Qsd | Slope debris, including soft blocks of KJsk (up to 1' diameter) and s | soil | 1 |
| tior | 390 — | Qc/Af | Colluvium and undocumented fill, soil materials | | KJsk |
| Eleva | | KJsk | SANDSTONE AND SHALE: 1' to 2.5' thick beds of moderately weathered sandstone with feldspar, interbedded with 0.5" to 1" thick fissile and laminated shale. Joint/fractures are smooth and spacing is moderate. Fractures are open up to 1" and locally include roots. (Franciscan Complex) | \bigwedge | |
| | 380 — | | | / // | |
| | | | Kings Road God | | |
| | 370 | | | | |





Figure 3: Photograph taken from Beatrice Road facing southeast towards Kings Road. In the fore-ground, fractured sandstone and shale bedrock of the Franciscan Complex is exposed on the slope. It appears that a previous rock-slope failure along a bedding plane (orientation annotated in purple) may have exposed this bedrock outcrop. Colluvial slopes are inclined at grades of approximately 100 percent (1H:1V Slope Gradient).



SITE LOCATION MAP

PROJECT DESCRIPTION NOTE

The Kings Road Roadway Protection Project consists of constructing a new soldier pile and wood lagging retaining wall located along the inboard side of the roadway. The intent of the wall is to protect the roadway from rocks and other slope debris falling off the adjacent slope.

LIMITATIONS NOTES

1. The Kings Road Roadway Protection Project has been designed to protect the roadway for only that portion of the roadway improved with a wall, as shown on these drawings.

2. Our services consist of professional designs, opinions and recommendations made in accordance with generally accepted engineering geology, geotechnical engineering and civil engineering principles and practices. No warranty, expressed or implied, or merchantability of fitness, is made or intended in connection with our work, by the proposal for consulting or other services, or by the furnishing of oral or written reports or findings.

3. Any engineered design notes, drawings and specifications presented in this plan set are contingent upon Cotton, Shires and Associates, Inc. being consulted when any questions arise with regard to the notes and specifications contained herein, and to provide observation and testing services for construction operations. Unanticipated soil and geologic conditions are commonly encountered during construction which cannot be fully determined from existing exposures or by limited subsurface investigation. Such conditions may require additional expenditures during construction to obtain a properly constructed project. Some contingency fund is recommended to accommodate these possible extra costs.

GENERAL NOTES

- For reference in these documents, the "Owner" is the City of Brisbane, the "Engineer" is Cotton, Shires and Associates, Inc. (CSA), and the "Contractor" is a separate entity retained by the Owner to accomplish the work described herein. The construction work of the Contractor shall be observed by the Engineer, who is a separate entity retained by the Owner to design and observe the project.
- 2. The Contractor shall verify all site conditions and grades prior to commencing work. Any conflicts or discrepancies shall be brought to the attention of the Engineer and be resolved prior to the commencement of work.
- 3. The Contractor shall coordinate the work of all trades.
- 4. The Contractor shall exercise particular care to preserve existing trees not identified for removal, their root structures, and other natural landscaping. The Contractor shall require the approval from the Owner to remove any tree or branch prior to the removal.
- 5. The Contractor shall exercise particular care to protect the roadways, driveways, curbs, gutters, and adjacent structures from damage.
- 6. In the event that any unusual conditions not covered by the drawings or specifications are encountered during construction operations, the Engineer shall be immediately contacted for recommendations.
- 7. All work to be in accordance with the Standard Provisions of the City of Brisbane and the latest edition of the State of California Standard Specifications.
- 8. Any distress or damage, caused by the Contractor's actions, to existing structures not identified for construction, including, without limitation, existing structures, fences, AC pavement, utilities, landscaping, etc. shall be repaired or replaced at the Contractor's expense. The Contractor shall document existing conditions of the site and adjacent structures prior to commencement of construction.
- 9. The Contractor shall notify the City and the Engineer at least two (2) working days prior to commencing work or if work has been suspended for a period of more than twenty-four (24) hours.

| | | COTTON, SHIRES & ASSO CONSULTING ENGINEERS AND GEOL | OCIATES, INC. OGISTS | 330 Village Lane Los Gatos, California 95030 (408) 254 5542 Form (408) 254 1852 | F0R: Mr. Randy Breault | | Approvals (If Applicable) |
|------------------|------------|--|-------------------------|---|---|------------------|---------------------------|
| | | David T. Schrier P.E. 8/13/20 | SUBMITTED: | PROFESS/01/1 | Director of Public Works City Engineer CITY OF BRISBANE | Reviewed By: | Reviewed By: |
| | | DESIGNED DATE | | LU THO TO SCHOP FOR | 50 Park Place Brisbane, California 94005-1310 | Reviewed By: | Reviewed By: |
| | | David T. Schrier P.E. 8/13/20 DRAWN DATE | | | | Reviewed By: | Date |
| NO. REVISIONS BY | DATE APP'D | Sam W. Nolan, P.E. 8/13/20 CHECKED DATE | David I. Schrier | OF CALIFORNIE | | Reviewed By: | Date |

KINGS ROAD ROADWAY PROTECTION PROJECT 400 Block of Kings Road Brisbane, California

10. The Contractor shall provide the Owner and Engineer with the names and telephone numbers of the responsible persons to contact, with regard to this project, 24 hours a day.

11. The Contractor shall call U.S.A. (Underground Service Alert) at (800) 642-2444, forty-eight (48) hours prior to beginning any underground work to verify the location of existing underground utilities. Possible conflicts with underground utilities should be brought to the Engineer's attention.

12. The Contractor shall notify all public and private utility owners two (2) working days prior to commencement of work adjacent to the utilities unless the permit specifies otherwise.

13. The Contractor shall conform to the rules and regulations of the State Construction Safety Orders pertaining to excavations and trenches.

14. The Construction work shall occur only between the hours of 9:00 A.M. and 5:00 P.M., Monday through Friday, unless an exception is granted by the City of Brisbane.

15. The Contractor shall provide adequate dust control at all times. Any operation that creates excessive dust shall cease immediately until sufficient measures satisfactory to the Owner have been taken to insure compliance with dust control requirements.

The Contractor shall furnish and install all signs, lights, barricades, and other traffic control or warning devices, including flagpersons, as required by the City of Brisbane. The work area can be closed to traffic during construction hours.
 All materials and methods of construction shall comply with the provisions of the California Building Code (most recent release).
 All work shall be subject to inspection and approval by the Owner and Engineer.

19. Contractor shall comply with all Federal, California, City of Brisbane and/or other applicable laws and regulations and shall bear the cost of any violations by Contractor thereof.

20. Any uncertainties, and need for clarifications, shall be addressed to the Engineer in writing in the form of Requests For Information (RFI's). The RFI forms shall include the date submitted, a reference to the sheet number, and a sketch if appropriate. The Contractor shall submit an RFI as soon as a question arises and understand that, depending on the complexity of the question, the answer may take time to be resolved.

21. The Contractor shall provide submittals as may be required for the prosecution of the work and approval of materials and/or equipment. Submittals may include calculations, specifications, product data, samples, manuals, spare parts, photographs, schedules, or similar items required to be submitted to the Engineer. These submittals shall be approved by the Engineer before any work involving these submittals is performed. No change shall be made by the Contractor to any submittal after it has been approved by the Engineer. Submittals shall contain all required detailed information at a reasonable scale with enough views to clearly show the work to be done or the item to be furnished, and shall be properly checked. It is expressly understood, however, that approval of the Contractor's submittals shall not relieve the Contractor of any responsibility for accuracy of dimensions and details, or for mutual agreement of dimensions and details. The Contractor shall be solely responsible for agreement and conformity of submittals with the Contract Drawings and Specifications. The submittals shall be returned to the Contractor marked, "No Exceptions Noted," "Make Corrections Noted and Resubmit Final File Copy," "Rejected," "Revise and Resubmit," or "Submit Specified Items," within 10 days after receipt. The Contractor shall make any necessary corrections and revisions to returned submittals in sufficient time for approval action, including resubmittal, without delaying construction.

22. Submittals shall be required for the following items: 1) Construction Schedule; 2) Permits and Licenses; 3) Construction Area Traffic Plan; 4) Public Notification; 5) Steel Mill Certifications 6) Concrete Mix Designs; 7) Pressure Treated Wood Lagging; 8) Visqueen; 9) Asphalt Concrete Pavement; and 10) Corrosion Protection (galvanized, Ameron Dimetcote 21-5, epoxy paint, ZRC Galvanizing Touchup Paint, etc.). Submittals may also be required for other items as they come up during the course of construction.

23. All Substitutions shall be approved by the Engineer prior to incorporation in the project.

24. The Engineer's field personnel shall verify geotechnical conditions during construction. If field conditions are different, the Engineer shall revise the design layout to suit.

25. The Contractor shall be responsible for site cleanup to the satisfaction of the Owner.

26. The Contractor is responsible for legally disposing of slope debris, drill spoils, construction debris, and excavated AC Pavement. The Contractor is responsible for coordinating and costs associated with testing the off-haul material for contamination.
27. The Contractor should visit the site to evaluate access and site conditions, and is responsible for determining how to access the site for equipment and supplies.

28. The Contractor can temporarily stockpile material (beams and lagging only) at 1050 Tunnel Avenue in Brisbane.

REQUIRED SPECIAL INSPECTION NOTES

In addition to regular inspections, the following numbered items shall also require Special Inspection in accordance with Sec. 1701 of the California Building Code: SITE PREPARATION INSPECTION, PIER DRILLING, AND EXCAVATIONS: Cotton, Shires and Assoc. Inc. STRUCTURAL CONCRETE where F'c > 2,500 psi: Not Anticipated, but City to coordinate, if required.

| (E) (N) CMP # or No. AC PVC Type V ' or ft. in. or " @ typ. or TYP. Ø % H = V TD DI Inv. T.G. UP Lt. Rt. C < × x N E W S mil. or mm RCJ cu. yds. STD EA SQ. fc FS QC TOW BOW CONC. PT | |
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| | (E) (N) CMP # or No. AC PVC Type V ' or ft. in. or " @ typ. or TYP. Ø % H = V TD DI Inv. T.G. UP Lt. Rt. C \leq x N E W S mil. or mm RCJ cu. yds. STD EA SQ. fc FS QC TOW BOW CONC. PT |

| LIST OF | SHEETS |
|-----------|--------|
| Sheet No. | Drawin |
| 1 of 10 | Site I |
| 2 of 10 | Note |
| 3 of 10 | Tech |
| 4 of 10 | Retai |
| 5 of 10 | Cros |
| 6 of 10 | Eleva |
| 7 of 10 | Detai |
| 8 of 10 | Detai |
| 9 of 10 | Erosi |
| 10 of 10 | Borin |
| | |

ABBREVIATIONS

| Existing | Elev, El, | |
|---------------------------------|------------|---------------------------|
| New | or EL | Elevations |
| Corrugated Metal Pipe | Max. | Maximum |
| Number | Min. | Minimum |
| Asphaltic Concrete | O.C. | On Center |
| Polyvinylchloride | Af | Artificial Fill |
| Portland Cement | Col | Colluvium |
| Feet | psi | Pounds per square inch |
| Inches | AB | Aggregate Base |
| At | St. or STA | Survey Station |
| Typical | C.I.D.H. | Cast In Drilled Hole |
| Diameter | W/ | With |
| Percent | C.C. | Center to Center |
| Horizontal equals Vertical | Als | Active Landslide |
| Termination Depth | DIs | Dormant Landslide |
| Drop Inlet | CSA | Cotton Shires and |
| Invert | | Associates. Inc. |
| Top of Grate | Sch. | Schedule |
| Utility Pole | lb. | Pounds |
| Left | kg | Kilograms |
| Right | IĎ | Inner Diameter |
| Centerline | OD | Outer Diameter |
| Angle | N/A | Not Applicable |
| Ву | C/O | Clean-Out |
| North | R.C. | Relative Compaction |
| East | HDPE | High Density Polyethylene |
| West | HP | High Point |
| South | G.S. | Ground Surface |
| Millimeters | EQ. | Equal |
| Rough Construction Joint | VERT. | Vertical |
| Cubic Yards | CNTR. | Center |
| Standard | REINF. | Reinforcement |
| Each | STL. | Steel |
| Square | T&B | Top and Bottom |
| Unconfined Compressive Strength | f | Fahrenheit |
| Factor of Safety | STD. | Standard |
| Quality Control | DIA. | Diameter |
| Top of Wall | GR | Grade |
| Bottom of Wall | U.O.N. | Unless Otherwise Noted |
| Concrete | ga | Gauge |
| Pressure Treated | мв | Machine Bolt |
| | MI | Malleable Iron |
| | | |

ng Title

Location Map, Notes, List of Sheets and Abbreviations es and Technical Specifications (Parts 1, 2, 3 and 4) hnical Specifications (Parts 5, 6, and 7) ining Wall Plan ss Section A-A' ation B-B' ail 1 ail 2 sion Control Plan ng Logs Grading Quantity Estimates (all volumes are in-place volumes, Contractor shall estimate bulking {swelling} and shrinking) cubic yards (Drill Spoils and Debris) 155 Export: 0 cubic yards Import: Cut: 100 cubic yards (Debris Removal Base of Slope) 55 cubic yards (Drill Spoils) Fill: 0 cubic yards DRAWING TITLE: DRAWING NO. SITE LOCATION MAP, NOTES, LIST OF Date SHEETS AND ABBREVIATIONS Date SHEET NO. of 10 **ROADWAY PROTECTION** Kings Road CSA PROJECT NO. E5669A Brisbane, California

CONSTRUCTION, DESIGN, INSPECTION AND TESTING NOTES

- 1. All work shall be subject to inspection, testing and approval by the Engineer (Cotton, Shires and Associates, Inc.).
- 2. The Contractor agrees that they shall assume sole and complete responsibility for jobsite safety conditions during the course of construction of this project, including the safety of all persons and property: that this requirement shall apply continuously and not be limited to normal working hours and that the Contractor shall defend, indemnify and hold the Owner and the Engineer (Cotton, Shires and Associates, Inc.) harmless from any liability, real or alleged in connection with the safe performance of the work on this project excepting for liability arising from the sole negligence of the Owner or Engineer.
- 3. It is the Contractor's responsibility to assure the stability of adjacent structures and slopes, including temporary cutslopes, during excavations.
- 4. Locations are approximate and shall be verified by the Contractor in the field. Control shall be determined by relative location to temporary survey monuments.
- 5. The Contractor shall be responsible for site clean-up to the satisfaction of the Owner. All construction-related disturbed slope areas shall be treated with erosion control measures consisting of native vegetation planting and associated activities, exclusive of any drip or other irrigation techniques, as specified herein at the completion of the project.
- 6. The Engineer shall be responsible for initial layout of piers, as well as providing elevation control points. The Contractor shall notify the Engineer at least 48 hours prior to when layout is needed and shall allow at least two working days for the Engineer to provide layout. Any layout destroyed or rendered inaccurate shall be replaced by the Engineer and paid for by the Contractor.
- 7. The Contractor shall be responsible for all measurements that may be necessary or required for the execution of any work to the locations, lines and grades specified or shown. Control Points placed by Licensed Surveyors or other reference marks moved, destroyed or rendered inaccurate by any cause whatsoever shall be replaced by a Licensed Land Surveyor and paid for by the Contractor at no additional cost to the Owner.
- 8. Where a construction detail is not shown or noted, the details shall be the same as for other similar work. The more restrictive detail shall be used with approval of the Engineer.
- 9. Stockpiling or storage of materials on or near the top of slope is not permitted unless noted on the drawings and/or with prior approval of the Engineer.
- 10. Details and notes shown in this set of drawings and titled "typical" are typical and shall apply unless otherwise noted. Details of construction not fully shown shall be of the same nature as shown in typical details or as shown for similar conditions.
- 11. No pipes or sleeves shall pass through structural members without the approval of the Engineer unless shown on drawings. 12. The contract drawings and specifications represent the finished structure. They do not indicate the means and methods of construction. The Contractor shall provide all measures necessary to protect the existing improvements during construction. Such measures shall include, but not be limited to, bracing, shoring for loads due to construction equipment, materials, etc. Contractor shall provide for design, permits and installation of such bracing, if required.
- 13. The Contractor shall carefully check stability of all elements of existing improvements before doing any work on existing structures and brace or strengthen all portions of existing structures which may be weakened by removal of existing construction until new construction is in place.
- 14. Contractor shall take precautionary measures to ensure that all property is protected during construction. Any damaged or changed conditions shall be repaired and restored to the pre-construction conditions and to the satisfaction of the Engineer and Owner. Contractor shall repair any damage at Contractor's expense.
- 15. All excavations shall be properly backfilled. Backfill shall not be placed against new concrete structures until 75% of the design compressive strength has been developed.
- 16. The Owner shall retain a testing agency to perform inspection and special inspection in accordance with Section 1704 of the CBC, including taking and breaking test cylinders for confirmatory concrete compressive strength.
- 17. The testing agency shall compile testing and inspection reports detailing the items of work which have been inspected. A copy of the reports shall be sent to the Owner and Engineer and Contractor for review.
- 18. Concrete placement and testing:

18.1 Job site inspector shall review concrete batch dispatch ticket from driver for conformance with required mix.

- 18.2 Concrete shall be sampled and tested for quality control during the placement of concrete, as follows:
- 18.2.1 Sampling fresh concrete: comply with CBC, Sec. 1905A.6. 18.2.2 Slump: ASTM C143: one test for each load at point of discharge of chute; and one for each set of compressive strength test specimens.
- 18.2.3 Compression test specimen: ASTM C31: one cylinder or test panel for each compressive strength test, unless otherwise directed. Store cylinder or test panel for laboratory cured test specimens except when fieldcure test specimens are required.
- 18.2.4 Compressive strength tests: ASTM C39; one set each day and one set for each 50 Cu. Yds or fraction thereof, of each concrete class placed in any one day. Test 1 specimen at 7 days, 2 specimens at 28 days, and retain 1 specimen in reserve for later testing as required.

18.3 Test results shall be reported in writing to the Engineer and the Contractor on the same day that tests are made. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of contractor, name of concrete testing service, concrete type and class, location of concrete batch in the structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests.

18.4 Additional tests: the testing service shall make additional tests of in-place concrete when test results indicate the specified concrete strengths and other characteristics have not been attained in the structure. The testing service shall conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42, or by other methods as recommended by the Engineer. Owner shall pay for such tests conducted, and any other additional testing as may be required. When unacceptable concrete is verified, test costs will be back-charged to the Contractor.

19. Reinforcement placement: special inspector shall observe placement of reinforcement, including rebar size or beam size, steel grades, spacing, clearances, and security during the concrete placement operation. Special inspector shall observe that reinforcing is free of dirt, mud or other materials prior to concrete placements.

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TECHNICAL SPECIFICATIONS

PART 1 GENERAL

1.1 Work includes furnishing and installing soldier pile piers and wood lagging, as designated on the construction drawings and as specified herein.

- A. Typical details and notes on these sheets shall apply unless specifically shown or noted otherwise. Construction details not shown or noted shall be similar to details shown for similar conditions. All work and/or construction shall comply with the latest edition of the California Building Code .
- B. Discrepancies The Contractor shall verify all dimensions, elevations, and existing conditions (where applicable) at the job site as well as the provisions of the entire construction documents and bring to the Engineer's attention any discrepancy. In the event of a discrepancy in the construction documents, the note or detail utilizing the stricter requirement shall apply.
- C. Excavation, Shoring, and Bracing It shall be the Contractor's sole responsibility to design and provide adequate shoring, bracing, formwork, etc., as required for protection of life and property, to support any construction loads, and to maintain all building components safely in place prior to their final assembly and anchorage into the completed structure.
- D. The design for this slope improvement was based on the geotechnical site investigation performed by Cotton, Shires and Associates, Inc, summarized in the Geotechnical Investigation Report dated May 2019.

1.2 Reference Standards

- A. California Building Code Latest edition.
- B. American Concrete Institute (ACI) 301 Latest edition ACI specifications for structural concrete for buildings.
- C. American Concrete Institute (ACI) 318 Latest edition ACI specifications for reinforced concrete.
- D. A.I.S.C. Latest edition specifications for the design, fabrication and erection of structural steel for buildings.
- E. A.W.S. Latest edition structural welding code D1.1 and D1.4.
- F. A.I.S.I. Latest edition specifications for the design of cold-formed steel structural members.
- G. California Department of Transportation (Caltrans) Standard Specifications.
- H. Standard Specifications for Public Works Construction (SSPWC).
- I. American Society for Testing Materials (ASTM).
- J. American Association of State Highway and Transportation Officials (AASHTO).
- K. Occupational Safety Health Administration (OSHA)
- L. Asphalt Institute (AI).
- 1.3 Delivery, Storage and Handling
 - A. Contractor shall check the materials upon delivery to assure that proper material has been received. B. Contractor shall prevent excessive mud, wet cement, epoxy, and like materials which may affix themselves, from
 - coming in contact with the materials. C. Contractor shall protect the materials from damage.
 - D. Contractor shall not stockpile or store material at the tops of slopes or on slopes steeper than 4:1 (H:V).
- PART 2 REINFORCED CONCRETE

Piers:

2.1 Products

- 2.1.1 Cement shall conform to ASTM C 150, Type V.
- 2.1.2 Aggregates for normal weight concrete shall conform to ASTM C 33.
- 2.1.3 Concrete work shall conform to all requirements of ACI 301, "Specifications for Structural Concrete for Buildings", except as modified by these notes.
- 2.1.4 Concrete shall be mixed and delivered in accordance with ASTM C 94.
- 2.1.5 Admixtures shall be used only with prior written approval of the Engineer. Admixtures shall comply with ASTM C 494 and be of a type that increases the workability of the concrete, but which shall not reduce the specified minimum cement content. Calcium chloride shall not be used.
- 2.1.6 Aggregate: Minimum coarse aggregate shall be1/2 inch for the piers.
- 2.1.7 Contractor shall submit mix designs for review before fabrication and installation.
- 2.1.8 Concrete shall develop the following minimum compressive strength at 28 days:
 - 2,500 psi (Min. 6 Sacks Cement Mix)
- 2.1.9 The concrete shall have a maximum water-to-cement ratio (W:C) 0.45.

2.2 Installation

- 2.2.1 Concrete shall be placed in a continuous operation until the section is completed between predetermined construction joints. Concrete shall be placed in piers in one continuous pour. Concrete shall be of a consistency to permit placing intimately around reinforcing bars and against forms.
- 2.2.2 Slumps shall be in a range of 4 to 6 inches for dry excavations and in a range of 6 to 8 inches for approved wet tremie placement
- 2.2.3 Exposed surfaces of concrete shall be kept moist or cured by protective coverings applied in accordance with manufacturer's specifications.
- 2.2.4 Forms, if necessary, shall be tight, clean and wetted before placing concrete.
- 2.2.5 Chamfer all exposed edges of concrete 3/4" unless noted otherwise.
- 2.2.6 All defective work shall be repaired by the Contractor as specified.

2.2.7 Curing: during the curing periods specified herein, concrete shall be maintained above 40 degrees (f) and in moist condition. In initial curing, concrete shall be kept moist for 24 hours after placement is complete. Final curing shall continue for seven days after pouring, for three days if high-early strength cement is used, or until the specified strength is obtained. Final curing shall consist of a fog spray or an approved moisture retaining cover or curing compound forming a membrane.

| TES, INC. | 330 Village Lane Los Gatos, California 95030 | F0R: Mr. Randy Breault | Approvals | (If Applicable) | DRAWING TITLE: | | DRAWING NO. |
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| JBMITTED: | (408) 354-5542 Fax: (408) 354-1852 | Director of Public Works City Engineer CITY OF BRISBANE 50 Park Place Brisbane, California 94005-1310 | Reviewed By: Da Reviewed By: Da Reviewed By: | Reviewed By: Reviewed By: Reviewed By: | Date | SPECIFICATIONS (PARTS 1, 2, 3 AND 4) | 2 SHEET NO. |
| David T. Schier | CIVIL FR FR FR FR FR FR FR FR FR FR | | Reviewed By: Da Da | ie ie | | ROADWAY PROTECTION Kings Road Brisbane, California | CSA PROJECT NO. E5669A |

- 2.3 Inspections and Testing

PART 3 REINFORCING STEEL

- 3.1 Products water tanks. 3.2 Installation 3.3 Inspections and Testing

PART 4 SOLDIER PILE PIERS

4.1 Pier Drilling

| 4.1.1 4.1.2 | Rock/soil mater recommended dump site or, if coordinate and Pier excavation shall provide ac |
|------------------|---|
| 4.1.3 | The Contractor of extending the stabilization unl |
| 4.1.4 | The Contractor pier holes to the |
| 4.1.5 | Loose material steel or pouring |
| 4.2 Installation | on |
| 4.2.1 | A minimum 3 in excavation. A r of the excavatio |
| 4.2.2 | If more than 6 in |

2.3.1 Inspections shall conform to CBC Section 1924.11

2.3.2 Strength test: strength tests for concrete shall be made in accordance with ASTM standards by an approved agency on specimens which are representative of the work and which have been water soaked for at least 24 hours prior to testing. When the maximum size aggregate is 3/8 inch or smaller, specimens shall consist of not less than three, 2 inch diameter cores. Specimens shall be taken in accordance with section 18.2.4 of the Construction, Design, Inspection and Testing Notes.

2.3.3 Inspections: during placement, special inspection is required. The special inspector shall provide inspection of the placement of the reinforcement and continuous inspection of the concrete and shall submit a statement indicating compliance with the drawings and specifications.

3.1.1 Reinforcing bars shall be in accordance with ASTM A615, Grade 60. Tie wires to be 18 ga, or heavier, black annealed

3.1.2 The steel beams shall be in accordance with ASTM A572, Grade 50, or ASTM A588 Grade 50. The entire ASTM, A572 Grade 50 steel beam shall be corrosion protected either by: 1) hot-dipped galvanized; 2) covered with two (2) coats at least 4 to 6 mil of Ameron Dimetcote 21-5 water based inorganic-zinc silicate; or 3) AMERLOCK 400 epoxy paint; or approved equal. Use ZRC Galvanizing compound for field touch up. ASTM A588 Grade 50 steel does not require a protective coating. The exposed portions of the beams shall be painted to match the color of the existing

3.2.1 Minimum lap splices of steel reinforcing bars shall be as follows: Class B as defined in ACI 318-05

3.2.2 Reinforcement detailing, bending, and placement shall be in accordance with the Concrete Reinforcing Steel Institute "Manual of Standard Practice", latest edition.

3.2.3 Reinforcing steel shall be provided with at lest 3 in. of cover for concrete at all structures.

3.2.4 All reinforcing, shall be rigidly secured in place prior to pouring concrete.

3.2.5 The clear distance between parallel bars in a layer shall not be less than 1-1/2 times the nominal diameter of the bars, or 1-1/3 times the maximum size aggregate, nor less than 1-1/2".

3.2.6 Unless otherwise noted, lap splices of bottom footing bars shall be staggered at least 5'-0" minimum from laps in other bottom footing bars. Stagger lap splices of top footing bars similarly.

3.2.7 Reinforcement splices: lap splices in reinforcing bars shall be by the non-contact lap splice method with at least 2 inches clearance between bars. All splices in reinforcing bars can be made with pre-approved threaded or welded reinforcing bar couplers as an alternate.

3.2.7 When lap splicing reinforcement bars of different sizes, Contractor shall use the largest bar lap splice length. 3.2.8 Contractor shall submit reinforcing steel shop drawings for review prior to fabrication and placing reinforcing steel.

3.3.1 City and Cotton, Shires and Associates, Inc. shall observe placement of steel beams including size, grades, spacing, clearances, and security during the concrete placement operation. City and Cotton, Shires and Assoc. inc. shall also observe that the beams are free of dirt, mud or other materials prior to concrete placements.

rial shall be excavated as required for piers as shown on the construction drawings, or as by the Engineer. All excavated soil, including drill spoils, shall be off-hauled to a legal approved approved by the Engineer, used as engineered fill in designated areas on site. The Contractor shall I pay for all required testing to off-haul and dispose of the material.

ns shall be logged by the Engineer during excavation by Contractor. During drilling, the Contractor ccurate drill depths to the Engineer when requested by the Engineer.

shall anticipate both caving and hard-rock drilling, and therefore provide suitable equipment capable e pier holes to their design depth. Water shall not be added to the pier holes as a method of hole less approved by the Engineer.

shall anticipate groundwater and/or seeps and provide suitable equipment capable of extending the eir design depth.

at the bottom of the pier excavations shall be removed or compacted by tamping prior to placing g of concrete. The tamped material shall not exceed 6 inches in tamped thickness.

nches of clearance all around shall be maintained between the structural steel and the sides of the minimum of 12 inches of clearance shall be maintained between the structural steel and the bottom on.

inches of water has accumulated in the hole, the water shall be removed by pumping prior to the pouring of concrete or the concrete shall be placed by the tremie method.

4.2.3 The concrete shall stop at the elevations shown in these drawings. Sonotubes, if necessary, shall be removed prior to engineered backfill placement.

4.2.4 The beams shall be installed vertical with and braced/secured to prevent movement during concrete pouring.

PART 5 WOOD LAGGING

5.1 Materials

5.1.1 The new lagging shall be 6" x 12" Pressure Treated Douglas Fir #2 with all saw cuts treated with preservatives. Pressure treatment method shall be Alkaline Copper Quat (ACQ) with a retention level of 0.40 pcf or approved equivalent.

5.2 Installation

- 5.2.1 Treat all saw cuts with preservatives.
- 5.2.2 The lagging shall be horizontal and installed "tight" to the web of the soldier pile beam, with at least 3 inches of flange overlap on each side.
- 5.2.3 The bottom lagging shall be horizontal, embedded slightly below the ground surface or seated flush on a concrete pad.
- 5.2.4 Install 10-mil polyethylene sheeting against back of wood lagging.

PART 6 PAVEMENT

6.1 Reference Standards, American Society for Testing and Materials (ASTM)

- 6.1.1 ASTM D-422 Particle Size Analysis
- 6.1.2 ASTM D-698 Laboratory Compaction Characteristics of Soil -Standard Effort
- 6.1.3 ASTM D-1557 Laboratory Compaction
- 6.1.4 ASTM D-5195 In-Place unit weight by Nuclear Methods

6.2 Products

- 6.2.1 Aggregate Base Rock The Aggregate Base rock shall conform to the provisions of Section 26 of Caltrans Standard Specifications for 3/4-inch maximum, Class 2 Aggregate Base.
- 6.2.2 Asphaltic Concrete Asphaltic Concrete shall conform to the provisions of Section 39, 92 and 94 of Caltrans Standard Specifications for Type A, 3/8-inch maximum aggregate.
 - a. Asphaltic binder shall be steam refined paving asphalt, viscosity grade AR4000.
 - b. Prime coat shall be liquid asphalt, SC-250.
 - c. Tack coat (paint binder) shall be penetration type, slow setting asphaltic emulsion, Type SS-1, conforming to
 - requirements of Section 94, Caltrans State Specifications.

6.3 Installation

- 6.3.1 Contractor shall saw cut at the limit of the new pavement.
- 6.3.2 Aggregate Base shall be at least 9 inches thick and be compacted to at least 95 percent Relative Compaction (RC) as determined by ASTM D1557-12 with scarification 8 inches deep and compacted to 95% RC below base.
- 6.3.3 Asphaltic Concrete shall be at least 3 inches thick and conform to the applicable provisions of Section 39 of the Caltrans Standard Specifications.
- 6.3.4 Type A Asphaltic Concrete dike shall be installed to the limits shown and conform to the applicable provisions of Section 39 of the Caltrans Standard Specifications.

| | COTTON, SHIRES & ASSOC | CIATES, INC. gists | 330 Village Lane Los Gatos, California 95030 (408) 354-5542 Fax: (408) 354-1852 | F0R: Mr. Randy Breault Director of Public Works | Reviewed By: | Approvals (If Applicable) | DRAWING TITLE: | DRAWING NO. |
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| | David T. Schrier P.E. 8/13/20 DESIGNED DATE | SUBMITTED: | PROFESSIONAL FRANKLAND | City Engineer CITY OF BRISBANE 50 Park Place Brisbane, California 94005-1310 | Reviewed By: | Date Reviewed By: | Date TECHNICAL SPECIFICATIONS (PART 5) | 3 |
| | David T. Schrier P.E. 8/13/20 DRAWN DATE Sam W/ Nolan P.E. 8/13/20 | \bigcirc $\cdot 1 = 1 1$ | | | Reviewed By: | Date | ROADWAY PROTECTION Kings Road | SHEET NO. 3 OF 10 |
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| SUBMITTED: | PROFESSIONAL ALD T. SCHAPIC C | City Engineer CITY OF BRISBANE 50 Park Place | Reviewed By: | Date | Reviewed By: | |
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(N) EIGHT, 6" X 12" PRESSURE TREATED— DOUGLAS FIR #2 LAGGING (COAT ALL SAW CUTS WITH PRESERVATIVES)

(N) WET-SET LAGGING-AS NECESSARY INTO PIER CONCRETE TO CREATE UNIFORM HORIZONTAL SURFACE OR PLACE LEAN CONCRETE

SAWCUT (E) PAVEMENT 2.5' FROM-FACE OF BEAM AND PLACE (N) 3" AC UP TO FACE OF FLANGE AND

(N) A572 GRADE 50 KSI W16X36 STEEL-BEAM TREATED WITH GALVANIZATION, AMERON DIMETCOTE 21-5 WATER BASED INORGANIC-ZINC, OR AMERLOCK 400 EPOXY COATING, AND EXPOSED PORTIONS PAINTED TO

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(N) LAGGING TO FIT TIGHT TO-BEAM WEB, MIN 3" OVERLAP W/ FLANGE

PIER AND LAGGING DETAIL

SCALE: NTS

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INSERTING BOLTS. USE NYLON SPACER,









| ATES, INC. | 330 Village Lane Los Gatos, California 95030 | F0R: Mr. Randy Breault | A | Approvals (I | f Applicable) |
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| SUBMITTED: | (408) 354-5542 Fax: (408) 354-1852 | Director of Public Works City Engineer | Reviewed By: | | Reviewed By: |
| | LU NO T. SCHAPTOR | CITY OF BRISBANE 50 Park Place | Reviewed By: | Date | Reviewed By: |
| | NO. 47816 | Brisbane, California 94005-1310 | Reviewed By: | Date | |
| Provid T Il in | × CIVIL ONT | | Reviewed By: | Date | |
| - Ward L. Schuer | OF CALIFOR | | | Date | |



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COTTON, SHIRES AND ASSOCIATES, INC. LOG OF EXPLORATORY DRILLING Boring CSA/SD-2

| Project Kings Rd. Boring CSA/SD-2 | | | | | | | | -2 | | | | | |
|---|--|----------------|--|-----------------------------|-----------------------|-------------------------|------------------------|----------------|------------------------------------|--|--|--|--|
| LocationBrisbane, CA - near Beatrice Road | | | | | | | _ Project NoE5669A | | | | | | |
| Drilliı | ng Co | ntrac | tor/Rig Britton Exploration/ CME 55 | _ Date of Drilling6/24/2020 | | | | | | | | | |
| Groun | Ground Surface Elev. <u>372'</u> Logged By <u>CS</u> | | | | | | | | _ Hole Diameter6" Sold Stem Augers | | | | |
| Surface Pavement | | | | | | | . Weather <u>Sunny</u> | | | | | | |
| Depth (feet) | Graphic Log | USCS Class. | Geotechnical Description | Sample Desig. | Dry Unit Wt. (pcf) | Moisture Content (%) | SPT Blows/ft | Sample Type | Recov. (%) | Remarks | | | |
| _ | <u>///</u> | | <u>0'- 0.5': AC PAVEMENT</u> | - | | | | | | _ Start Drilling: 12:21 AM | | | |
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| 4 | , , , , , , , , , , , , , , , , , , , | | <u>0.5'-15.1' Sandstone with shale</u> - orange brown to tan, moderately weathered and fractured sandstone, dry, oxidized | S-1 | | | 26 27 40 67 | SPT | | —12:35 PM, driller added water | | | |
| 6- | $\overline{\mathbf{A}}$ | | less oxidized | | | | 50/1" | МС | 0 | shoe sample bagged | | | |
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| ATES, INC. | 330 Village Lane Los Gatos, California 95030 | F0R: Mr. Randy Breault | ŀ | Approvals (I | f Applicable) |
|-------------------------------|---|---|--|-------------------------------|------------------------------|
| SUBMITTED: David T. Schier | (408) 354-5542 Fax: (408) 354-1852 | Director of Public Works City Engineer CITY OF BRISBANE 50 Park Place Brisbane, California 94005-1310 | Reviewed By: Reviewed By: Reviewed By: Reviewed By: Reviewed By: Reviewed By: | Date Date Date Date Date Date | Reviewed By: Reviewed By: |
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COTTON SHIRES AND ASSOCIATES INC

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| Locati | on B | risban | e, CA - East | Project No. E5669A | | | | | | |
| Drillin | Date of Drilling 6/24/20 | | | | | | | | | |
| Groun | | _ н | ole D | iame | eter_ | 6" S | old Stem Augers | | | |
| Surface Pavement | | | | | _ w | eath | er <u>S</u> | unny | / | |
| Depth (feet) | Graphic Log | USCS Class. | Geotechnical Description | Sample Desig. | Dry Unit Wt. (pcf) | Moisture Content (%) | SPT Blows/ft | Sample Type | Recov. (%) | Remarks |
| _ | 777 | | <u>0'- 0.5': AC PAVEMENT</u> | - | | Ŭ | | | | _ Start Drilling: 1:20 PM |
| 2 — | | | 0.5' - BOH: FRANCISCAN FORMATION | MC - 1 | | | 38 | MC | | - |
| - | | | 0.5'-15' - Sandstone with shale - orange | MC - 2 MC - 3 | 126 102 | 8.0 9.0 | 50 5 0/4 " | мс | | - |
| 4- | × | | brown, moderately weathered and fractured, dry, oxidized | | | 0.0 | 68/10 | | | - |
| 6- | ~~ ~~ [] | | | | | | 50/2" | SPT | | 1:38 PM MD |
| 8- | | ne | | | | | | | | - |
| 10- | | Siltsto | | | | | | | | driller added water |
| - | · · · · · · · · · · · · · · · · · · · | | slightly less oxidized | <u>S-1</u> | | | 50/5" | SPT | | – 1:50 PM – – |
| | × , ~ | | | | | | | | | |
| 14- | | | | | | | | | | - |
| 16- | | | Total Depth: 15 Feet | | | | 50/0" | SPT | | _ 2:07 PM |
| 18- | | | | | | | | | | - |
| | | | | | | | | | | - |
| | | | | | | | | | | |
| 22- | | | | | | | | | | - |
| 24- | | | | | | | | | | - |
| 26- | | | | | | | | | | - |
| | | | | | | | | | | - |
| | | | | | | | | | | |
| - | | | | | | | | | | - |

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