### 1. Purpose:
To seek Board approval for Utility Construction Agreement Change Order (CCO) No. 01 for the reimbursement to Hawaiian Electric for the procurement of (4) Phoenix 180 and (2) Skybird 215 specialized maintenance vehicles.

CCO No. 01 is to increase the not-to-exceed contract amount by $13,192,600.00.

### 2. Background/Justification:
HART has a cost reimbursement agreement with Hawaiian Electric for costs associated with utility relocations for KHG. Hawaiian Electric requires horizontal working clearances of 50 ft., 40 ft., and 30 ft. between their existing overhead line conductors to the edge of the rail guideway for their 138kV, 46kV, and 12kV overhead lines respectively, in order to safely perform ongoing maintenance and repair of their existing facilities along the HART’s rail guideway and stations.

Hawaiian Electric and HART created a task force to address the clearance issues in the KHG area. A vehicle solution for the 138kV clearance issues in the KHG area was selected and agreed to by Hawaiian Electric and HART.

### 3. Board Authority
HART Board is required to approve all Change Order/Contract Amendment over $1M. The total amount of this CCO exceeds $1M.

### 4. Procurement Background
CCO No. 01 has been processed in accordance with Contract terms and Construction Change Order Procedures.

### 5. Financial/Budget Impact
CCO No. 01 will be allocated from the Utility contingency fund.

### 6. Policy Impact
Not Applicable

### 7. Public Involvement
Not Applicable

### 8. Alternatives
Not Applicable

### 9. Exhibits
PowerPoint Presentation, Staff Summary
January 19, 2018

To: HART Board of Directors

Through: Andrew S. Robbins
Executive Director and CEO

From: Charles S. Carnaggio
Project Director and Officer-in-Charge

Francis X. Kosior
Director of Design and Construction

Jason Chung
Project Manager

Subject: Request for Change Order Approval
Hawaiian Electric Company Inc. (HECO) – West Oahu/Farrington Highway (WOFH) Utility Construction Agreement
Change Order No. 2 for Construction Services for HART facilities
Contract No. CT-HRT-1400135

Overview
HART has a cost reimbursement agreement with Hawaiian Electric Company (HECO) for costs associated with utility relocations for WOFH. The previous not-to-exceed contract amount was $17,228,255.00, which includes labor, materials, and overhead for relocations and service work, however, excludes profit. This request is for Change Order No. 2, and it is to increase the not-to-exceed contract amount by $9,165,797.00, for a revised total not-to-exceed contract amount of $26,394,052.00, which now includes the 46kV vehicle solution and HECO’s additional relocation work, where HECO facilities are too close to the HART’s guideway.

Justification
HECO requires horizontal working clearances of 50’, 40’, and 30’ between their existing overhead line conductors to the edge of the rail guideway for their 138kV, 46kV, and 12kV overhead lines respectively, in order to safely perform ongoing maintenance and repair of their existing facilities along HART’s rail guideway and stations. HECO and HART created a task force to address the clearance issues in the WOFH Section of the Honolulu Rapid Transit Project (HRTP.) A vehicle solution for the 46kV clearance issues in the WOFH area was selected and agreed to by HART and HECO. As reported to the HART Board on February 16, 2017 (attached), this purchase will include (6) Altec AN67E-E100 and (3) Altec TA45-L55 vehicles. Also included is HECO’s additional relocation work for Kahi Mohala and LDS Church, where HECO facilities are too close to the HART’s guideway.

Recommendation
HART Staff recommends that the Board approve this Utility Construction Change Order in the amount of $9,165,797.00 to for the reimbursement to HECO for these vehicles and their relocation work.

Fiscal Impact
Allocation from Utility’s contingency for west side clearance is required to fund this $9,165,797.00 change.
### Honolulu Authority for Rapid Transportation

#### STAFF SUMMARY

**TITLE:** Hawaiian Electric Company Inc. (Hawaiian Electric)

**CT-HRT-1400135, West Oahu/Farrington Highway (WOFH) Utility Construction Agreement**

**Construction Change Order No. 2 - Procurement of Specialized Vehicles**

<table>
<thead>
<tr>
<th>Type</th>
<th>Goal</th>
<th>Focus Area</th>
<th>Reference Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>☒ Action/Approval</td>
<td>☒ Project Delivery</td>
<td>☐ Livability/Land Use</td>
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<tr>
<td>☐ Information</td>
<td>☐ Service Delivery</td>
<td>☐ Partnerships</td>
<td></td>
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<tr>
<td>☐ Follow-up</td>
<td>☐ Resource Stewardship</td>
<td>☐ Agency Admin.</td>
<td></td>
</tr>
</tbody>
</table>

#### 1. Purpose:

To seek Board approval for Utility Construction Agreement Change Order (CCO) No. 02 for the reimbursement to Hawaiian Electric for the procurement of (6) Altec AN67E-E100 and (3) Altec TA45-L55 specialized maintenance vehicles and relocation work in the Kahi Mohala /LDS Church area.

CCO No. 02 is to increase the not-to-exceed contract amount by $9,165,797.00.

#### 2. Background/Justification:

HART has a cost reimbursement agreement with Hawaiian Electric for costs associated with utility relocations for WOFH. Hawaiian Electric requires horizontal working clearances of 50 ft., 40 ft. and 30 ft. between their existing overhead line conductors to the edge of the rail guideway for their 138kV, 46kV, and 12kV overhead lines respectively, in order to safely perform ongoing maintenance and repair of their existing facilities along the HART’s rail guideway and stations.

Hawaiian Electric and HART created a task force to address the clearance issues in the WOFH section of the Honolulu Rapid Transit Project (HRT). A vehicle solution for the 46kV clearance issues in the WOFH area was selected and agreed to by Hawaiian Electric and HART.

#### 3. Board Authority

HART Board is required to approve all Change Order/Contract Amendment over $1M. The total amount of this CCO exceeds $1M.

#### 4. Procurement Background

CCO No. 02 has been processed in accordance with Contract terms and Construction Change Order Procedures.

#### 5. Financial/Budget Impact

CCO No. 02 will be allocated from the Utility contingency fund.

#### 6. Policy Impact

Not Applicable

#### 7. Public Involvement

Not Applicable

#### 8. Alternatives

Not Applicable

#### 9. Exhibits

PowerPoint Presentation, Staff Summary
To: HART Board of Directors
Through: Andrew S. Robbins
Executive Director and CEO

From: Charles S. Carnaggio
Project Director and Officer-in-Charge
Francis X. Kosich
Director of Design and Construction
Jason Chung
Project Manager

Subject: Request for Change Order Approval
Hawaiian Electric Company Inc. (HECO) – Kamehameha Highway (KHG)
Utility Construction Agreement
Change Order No. 1 for Construction Services for HART facilities
Contract No. CT-HRT-1400136

Overview
HART has a cost reimbursement agreement with Hawaiian Electric Company (HECO) for costs associated with utility relocations for KHG. The original not-to-exceed contract amount was $13,000,000.00, which includes labor, materials, and overhead for relocation work, however, excludes profit. This request is for Change Order No. 1 and it is to increase the not-to-exceed contract amount by $13,192,600.00, for a revised total not-to-exceed contract amount of $26,192,600.00, which now includes the 138kV vehicle solution.

Justification
HECO requires horizontal working clearances of 50', 40', and 30' between their existing overhead line conductors to the edge of the rail guideway for their 138kV, 46kV, and 12kV overhead lines respectively, in order to safely perform ongoing maintenance and repair of their existing facilities along HART's rail guideway and stations. HECO and HART created a task force to address the clearance issues in the KHG Section of the Honolulu Rapid Transit Project (HRTP.) A vehicle solution for the 138kV clearance issues in the KHG area was selected and agreed to by HART and HECO. As reported to the HART Board of Directors on February 16, 2017 (attached), this purchase will include (4) Phoenix 180 and (2) Skybird 215 vehicles.

Recommendation
HART Staff recommends that the Board approve this Utility Construction Change Order in the amount of $13,192,600.00 to allow for the reimbursement to HECO for the purchase of these vehicles.

Fiscal Impact
Allocation from Utility’s contingency for west side clearance is required to fund this $13,192,600.00 change.
HECO Utility Construction Agreement Amendments
WOFH - Change Order #2
KHG – Change Order #1

February 22, 2018
HART seeks approval for two (2) change orders in order to implement its cost avoidance strategy regarding encroachment of the new rail guideway within Hawaiian Electric’s specified clearance requirements.

These change orders will result in cost avoidance/savings of $131,937,145
Background

- March ‘13 - HECO informed HART of their working clearance requirements in a letter, indicating that the guideway would be too close to their existing electrical lines and would require extensive undergrounding of said lines.
- May ’15 - HART & HECO formed a Task Force (TF) to resolve these clearance issues. Options considered included:
  - Overhead electrical circuit relocation
  - Underground electrical circuit conversion
  - Guideway attachment of the electrical circuit
  - Procurement of alternative vehicles to perform electrical work on existing overhead electrical circuits.
- TF traveled to the mainland to view specialized vehicles firsthand.
- TF also demonstrated use of select vehicles in operation on Oahu.
Background
(continued)

• HART performed their analysis and determined that the most cost-effective option by far was the vehicle option.
• TF results:
  • Identified new equipment (vehicles) capable of accessing lines within prescribed clearances.
  • Agreed to variances from prescribed clearances in select locations.
  • Confirmed locations where relocation/undergrounding was still required.
• HART proposed the vehicle option as a cost avoidance measure.
  • One-time procurement of the following:
    • 9 Altec Vehicles to perform 12kV and 46kV utility work
    • 6 Versalift Vehicles to perform 138kV utility work.
• HART presented a status update to BoD in Feb ‘17.
## WOFH CO#2 – Vehicle Cost Breakdown

<table>
<thead>
<tr>
<th>Description</th>
<th>Qty</th>
<th>Total $</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vehicle Purchase</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Altec AN67E-E100</td>
<td>6</td>
<td>3,279,136</td>
</tr>
<tr>
<td>Altec TA45-L55</td>
<td>3</td>
<td>1,147,698</td>
</tr>
<tr>
<td><strong>Shipping/Delivery</strong></td>
<td>9</td>
<td>147,561</td>
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<tr>
<td><strong>Employee Training</strong></td>
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<td></td>
</tr>
<tr>
<td>Classroom and Field Training</td>
<td>4000</td>
<td>420,000</td>
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<tr>
<td>Fleet Training</td>
<td>768</td>
<td>64,000</td>
</tr>
<tr>
<td>Trainer Fee ($11,000 per Vehicle)</td>
<td>2</td>
<td>22,000</td>
</tr>
<tr>
<td>Operator/Mechanic Training and Vehicle Inspections</td>
<td>1</td>
<td>50,000</td>
</tr>
<tr>
<td><strong>Outfitting</strong></td>
<td>9</td>
<td>664,025</td>
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<tr>
<td><strong>Overhead</strong></td>
<td>9</td>
<td>1,375,805</td>
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<tr>
<td><strong>TOTAL COST (without Land/Storage)</strong></td>
<td></td>
<td>$7,170,225</td>
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</tbody>
</table>

HONOLULU RAIL TRANSIT PROJECT

www.HONOLULUTRANSPORT.ORG
**KHG CO#1 – Vehicle Cost Breakdown**

<table>
<thead>
<tr>
<th>Description</th>
<th>Qty</th>
<th>Total $</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vehicle Purchase</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Versalift Phoenix – 180</td>
<td>4</td>
<td>6,657,615</td>
</tr>
<tr>
<td>Versalift Skybird - 215</td>
<td>2</td>
<td>2,584,352</td>
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<tr>
<td>Shipping/Delivery</td>
<td>6</td>
<td>131,841</td>
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<tr>
<td><strong>Employee Training</strong></td>
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<tr>
<td>Classroom and Field Training</td>
<td>4000</td>
<td>420,000</td>
</tr>
<tr>
<td>Fleet Training</td>
<td>768</td>
<td>64,000</td>
</tr>
<tr>
<td>Trainer Fee($11,000 per Vehicle)</td>
<td>2</td>
<td>22,000</td>
</tr>
<tr>
<td>Operator/Mechanic Training and Vehicle Inspections</td>
<td>1</td>
<td>50,000</td>
</tr>
<tr>
<td><strong>Outfitting</strong></td>
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<td>1,386,295</td>
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<td><strong>Overhead</strong></td>
<td>6</td>
<td>1,876,497</td>
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<tr>
<td><strong>TOTAL COST (without Land/Storage)</strong></td>
<td></td>
<td>$13,192,600</td>
</tr>
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</table>
## Cost Avoidance Summary

### Undergrounding Option

<table>
<thead>
<tr>
<th>Description</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>46kV Undergrounding Cost Estimate (WOFH/KHG)</td>
<td>49,295,572</td>
</tr>
<tr>
<td>138 kV Underground Cost Estimate (WOFH/KHG)</td>
<td>105,000,000</td>
</tr>
<tr>
<td><strong>TOTAL UG RELOCATION COST (Projected)</strong></td>
<td><strong>$154,295,572</strong></td>
</tr>
</tbody>
</table>

### Equipment Option

<table>
<thead>
<tr>
<th>Description</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altec Vehicle Cost for 46 kV</td>
<td>7,170,225</td>
</tr>
<tr>
<td>Skybird &amp; Phoenix Cost for 138 kV</td>
<td>13,192,600</td>
</tr>
<tr>
<td>46kV &amp; 12kV Relocation (WOFH) HECO scope</td>
<td>1,995,572</td>
</tr>
<tr>
<td><strong>TOTAL COST WITH VEHICLE PURCHASE</strong></td>
<td><strong>$22,358,397</strong></td>
</tr>
</tbody>
</table>

*Not including land/storage costs*

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Estimated Cost Avoidance of $131,937,145
WOFH Change Order #2

• HART has a cost reimbursement agreement with Hawaiian Electric (HECO) for costs associated with utility relocations including 12kV and 46kV lines for WOFH.
  • The previous Not to Exceed (NTE) contract amount is $17,228,255

• Proposed WOFH CO#2 is $9,165,797 and includes:
  • procurement of specialized maintenance vehicles ($7,170,225);
  • reimbursement of HECO construction costs to underground portions of 46kV lines ($1,995,572)

• The revised NTE amount to the cost reimbursement agreement for WOFH will be $26,394,052
WOFH Change Order #2 - Vehicles

**Altec TA45-L55 (HELCO Truck)**

**Altec AN67-E100 tested on 46 kV along Farrington Highway (April 2016)**
KHG Change Order #1

- HART has a cost reimbursement agreement with Hawaiian Electric (HECO) for costs associated with utility relocations including 12kV and 46kV lines for KHG.
  - The original NTE contract amount is $13,000,000

- Proposed KHG Change Order No. 1 is $13,192,600 which allows for procurement of specialized 138kV maintenance vehicles;

- The revised NTE amount to the cost reimbursement agreement for KHG will be $26,192,600
The Phoenix has an upward reach of 180 ft and a sideward reach of 79 ft with a platform carrying capacity of 2000 lbs.

The Skybird has an upward reach of 210 ft and a sideward reach of 102 ft with a platform carrying capacity of 1300 lbs.
Conclusions

• Procurement of vehicles reduces underground relocation requirements:
  • Approximately 60,500 LF of 46 kV can be maintained in place.
  • Approximately 16,500 LF (of the total 29,100 LF) of 138 kV can be maintained in place.
• Vehicle costs are NTE amounts as confirmed with HECO

• Cost sharing considerations:
  • Vehicle procurement and integration a one-time cost to HART
  • Maintenance and replacement costs to be borne by the Utility
• Cost avoidance figures from the AGS contract are estimated to be approximately $15M.

• Clearance relocations for KHG will be covered by future contract and potentially a separate change order to the KHG Utility Construction Agreement.
Recommendation

HART Staff recommends approval of these two (2) HECO Utility Construction Agreement Change Orders in order to implement its cost avoidance strategy and enable reimbursement of costs associated with the procurement of specialized vehicles and additional clearance relocations along the WOFH & KHG guideways as detailed.
Mahalo!
WOFH
Kualakai: 138 kV, 46 kV
Farrington: 46 kV

KHG
Kamehameha (makai): 138 kV, 46 kV
Kamehameha (mauka): 46 kV

AGS
Kamehameha: 138 kV, 46 kV

CCGS
Dillingham (makai): 138 kV, 46 kV
Dillingham (mauka): 138 kV, 46 kV

HECO Transmission Lines
## West Side Summary (from 1/24/17)

<table>
<thead>
<tr>
<th>Undergrounding Option</th>
<th>Total</th>
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<tbody>
<tr>
<td>46kV Undergrounding Cost Estimate (WOFH/KHG)</td>
<td>63,000,000</td>
</tr>
<tr>
<td>138 kV Underground Cost Estimate (WOFH/KHG)</td>
<td>137,000,000</td>
</tr>
<tr>
<td>TOTAL UG RELOCATION COST (Projected)</td>
<td>$200,000,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Equipment Option</th>
<th>Total</th>
</tr>
</thead>
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<td>Skybird &amp; Phoenix Cost for 138 kV</td>
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</tr>
<tr>
<td>46kV &amp; 12kV Relocation (WOFH) HECO scope</td>
<td>1,995,572</td>
</tr>
<tr>
<td>46kV &amp; 12kV Relocation Estimate (WOFH) HART scope</td>
<td>3,704,428</td>
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<tr>
<td>138 kV Underground Relocation Estimate (KHG)</td>
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<tr>
<td>46 kV OH On Shorter Poles Estimate (KHG)</td>
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<tr>
<td>TOTAL COST WITH VEHICLE PURCHASE*</td>
<td>$68,062,855</td>
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</tbody>
</table>

* Not including land/storage costs

Estimated Cost Avoidance of $131,937,145