

**PMOC REPORT**

**OP 32D – Project Delivery Method Review**

**Honolulu Rail Transit Project  
Honolulu Authority for Rapid Transportation (HART)  
City and County of Honolulu  
Honolulu, HI**

**June 2012 (FINAL)**

PMOC Contract Number: DTFT60-09-D-00012  
Task Order Number 4: Programmatic  
Work Order Number 12: Honolulu Risk Refresh  
Project No. DC-27-5181  
OPs Referenced: OP 32D

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Length of Time Assigned: Five Years (November 18, 2009 through November 17, 2014)

## TABLE OF CONTENTS

<b>TABLE OF CONTENTS</b> .....	<b>ii</b>
<b>LIST OF TABLES</b> .....	<b>ii</b>
<b>LIST OF FIGURES</b> .....	<b>iii</b>
<b>LIST OF APPENDICES</b> .....	<b>iii</b>
<b>1.0 EXECUTIVE SUMMARY</b> .....	<b>4</b>
1.1 Introduction.....	4
1.2 Project Description.....	4
1.3 PMOC Scope of Work .....	5
1.4 Methodology .....	5
1.5 Summary of Findings.....	5
1.6 Conclusion .....	8
1.7 Recommendations.....	9
<b>2.0 INTRODUCTION</b> .....	<b>10</b>
2.1 Project Sponsor .....	10
2.2 Project Description.....	10
2.3 Project Status .....	12
2.4 Project Budget.....	12
2.5 Project Schedule.....	12
2.6 Project Management Oversight Contractor (PMOC) .....	13
2.7 Evaluation Team .....	13
2.8 Documents Reviewed .....	14
<b>3.0 OP 32D: PROJECT DELIVERY METHOD REVIEW</b> .....	<b>15</b>
3.1 Methodology .....	15
3.2 Review .....	15
3.2.1 Consultant Services.....	16
3.2.2 Construction and Major Material and Equipment Procurement .....	22
3.3 Findings.....	24
3.4 Review and Assessment.....	27
3.5 Conclusion .....	30
3.6 Recommendations.....	31
<b>APPENDICES</b> .....	<b>32</b>

## LIST OF TABLES

Table 1.	Target Milestone Dates .....	13
Table 2.	PMOC Evaluation Team.....	14
Table 3.	Contract Packages .....	19

## **LIST OF FIGURES**

Figure 1.	Project as Identified in FEIS .....	11
Figure 2.	Construction Segments .....	16

## **LIST OF APPENDICES**

Appendix A:	Acronym List
Appendix B:	Documents Reviewed

## 1.0 EXECUTIVE SUMMARY

### 1.1 Introduction

The Honolulu Authority for Rapid Transportation (HART) continues to advance development of its proposed Honolulu Rail Transit Project (“Project”), formerly known as the Honolulu High-Capacity Transit Corridor (HHCTC) Project, in accordance with the Federal Transit Administration (FTA) New Starts requirements. The Project is intended to provide improved mobility in the highly-congested east-west corridor along Oahu’s south shore between Kapolei and the Ala Moana Center. The Project would provide faster, more reliable public transportation services than those currently operating in mixed-flow traffic.

FTA assigned Jacobs as a Project Management Oversight Contractor (PMOC) on September 24, 2009, for the purpose of monitoring the Project and providing FTA with “information and well-grounded professional opinions regarding the reliability of the project scope, cost, and schedule” of the Project. That effort continues with this update report, which represents the PMOC’s assessment of the Project Delivery Method. The PMOC primarily reviewed the Contract Packaging Plan (CPP) Revision 3, dated March 30, 2012 to support the OP 32D PMOC report.

### 1.2 Project Description

The Project is an approximately-20-mile-long elevated fixed guideway rail system along Oahu’s south shore between East Kapolei and Ala Moana Center. The alignment is elevated, except for a 0.6-mile at-grade portion at the Leeward Community College station. The proposed investment includes 21 stations (20 aerial and 1 at-grade), 80 “light metro” rail transit vehicles, administrative/operations facilities, surface and structural parking, and maintenance facilities. The grantee plans to deliver the Project in four guideway segments:

- Segment I (West Oahu/Farrington Highway) – East Kapolei to Pearl Highlands (6 miles/7 stations)
- Segment II (Kamehameha Highway) – Pearl Highlands to Aloha Stadium (4 miles/2 stations)
- Segment III (Airport) – Aloha Stadium to Middle Street (5 miles/4 stations)
- Segment IV (City Center) – Middle Street to Ala Moana Center (4 miles/8 stations)

In a recently-announced change, HART has combined Segments III and IV into a single guideway construction contract. The Contract Packaging Plan has been updated to reflect this change.

Additional Project information:

- **Additional Facilities:** Maintenance and Storage Facility (MSF) and parking facilities
- **Vehicles:** 80 vehicles, supplied by the Core Systems Contractor (CSC), which is also responsible for systems design and construction and operations. The CSC is a Design-Build-Operate-Maintain (DBOM) contract.
- **Ridership Forecast:** Weekday boardings – 97,500 (2019); 116,300 (2030).
- **Target Revenue Service Date (RSD):** March 2019

### **1.3 PMOC Scope of Work**

Under this Work Order, Jacobs is to provide the following deliverables:

- OP 32A: Project Transit Capacity Review
- OP 32C: Project Scope Review
- OP 32D: Project Delivery Method Review
- OP 33: Capital Cost Estimate Review
- OP 34: Project Schedule Review
- OP 40: Risk and Contingency Review

This report is limited to OP 32D: Project Delivery Method Review.

### **1.4 Methodology**

The PMOC followed the requirements outlined in the *FTA OP 32D Project Delivery Method Review*, dated May 2011, to assess and evaluate the grantee's technical approach for delivering the proposed Project within the constraints of its existing or proposed statutory or organizational procurement authority and in the context of its project strategies, risk analysis, and procurement planning. The PMOC also assessed and evaluated whether the grantee's project delivery method and contracting packaging strategy as defined and implemented in the PMP minimize project risks and provide the greatest likelihood of implementation success. Specifically, the OP 32D review provides an overview of the contracting methodology to be employed during the design, construction, and procurement phases of the project.

### **1.5 Summary of Findings**

The contract delivery methodology proposed by the grantee can be successfully executed. The grantee does have the statutory authority to award the contract types currently under consideration.

The following sections include PMOC findings for each standard cost category.

#### General

The contract delivery methodology proposed by the grantee can be successfully executed. The grantee does have the statutory authority to award the contract types currently under consideration. However, the PMOC does have some general concerns as they relate to the overall project implementation as listed below:

- The PMOC is concerned about the amount of work that will be concurrently performed and require a significant amount of management and administrative resources. The PMOC recognizes that this risk can be mitigated with proper coordination of contracts. However, the grantee must continue to demonstrate that it has assembled a cohesive team during the early contracts and continues to expand the staff as required to meet the resource demands. During the project's PE and final design phases the grantee has struggled with technical capacity and capability. The PMOC will continue to monitor staffing as part of its monthly reviews.

- The PMOC and grantee are concerned with commodity resource availability and its potential to also impact spikes in cost during the remaining years of the project. The concern is two-fold. First, there is uncertainty in the global construction market that is affecting material costs. Since this is a multi-year award and build-out, conditions are subject to change and can vary greatly, as they have in the past year. Secondly, the limitation of available materials for an island market may influence cost and schedule. Furthermore, material and equipment transportation costs are significant since the project is located in Hawaii.
- The PMOC and grantee are concerned with potential construction equipment availability mainly during the peak of construction which may result in higher-than-anticipated unit costs and schedule impact.
- The PMOC and grantee are concerned about maintaining a competitive bidding environment during future bids since Kiewit has firmly established itself as the main contractor on the island. The perception by other contractors may prevent them from submitting construction bids since they will need to include expensive mobilization costs and speculative investment.

The PMOC concludes the contract packaging plan is achievable although the grantee will face considerable challenges meeting peak managerial and administrative resource demand. Additionally, the current contracts may spend a higher percentage of contingency than anticipated due to delays in acquiring project approvals. These issues were included in the development of a Risk Matrix and addressed at a Risk Workshops held in April 2011 and April 2012.

#### SCC 10 – Guideway and Track Elements

- The grantee has access to an extensive amount of geotechnical data from previous investigation programs. The GEC has effectively compiled and utilized this information to establish geotechnical criteria. From a review of the geotechnical data provided by the grantee, it is clear that the subsurface conditions are highly variable along the 20-mile corridor. Specific concerns include undulating stratigraphy, high water tables, and numerous environmental surface restrictions. Production rates for foundation installation should be set conservatively, given the variability of the subsurface conditions and the access restrictions, particularly within Airport and City Center segments.

The grantee is utilizing Geotechnical Baseline Reports for this project. Although Geotechnical Baseline Reports are typically utilized for underground construction (i.e., tunnels), the PMOC concurs with this approach given the extensive number of deep foundations required.

- Site access and logistics will be of particular concern for both guideway and station constructors. The amount of traffic and pedestrian congestion and close proximity of business and residential properties, particularly along the Airport and City Center corridors. This could result in schedule pressure and increased costs due to loss of

contractor productivity. The grantee has identified staging locations and focused on traffic control planning in effort of controlling such inefficiencies and impact to the public. The grantee's public outreach and communication department are also implementing public awareness efforts to keep the public apprised of congestion areas and alternate routes as the construction phase begins.

- Final Design of the WOFH and KH line segments will be performed by the same DB contractor, concurrent with the systems design, which will be performed by the CSC. The grantee has developed an acceptable Interface Management Plan to help ensure necessary coordination between the DB line segment contractor and the CSC can be achieved adequately to minimize schedule delays or cost impacts. However, the grantee must continue diligence to ensure all interfaces are managed adequately.
- The intent of the guideway aerial structure is generally uniform throughout the project alignment although by having the DB contractors develop the line segment design for the WOFH and KH segments and an EDC complete the Airport and City Center segment design, the grantee may not realize optimal cost and schedule savings from a more definitive 100% complete design.

#### SCC 20 – Stations, Stops, Terminals, Intermodal

- Site access and logistics will be of particular concern as discussed above.
- Material and equipment staging/storage areas have not been identified. The PMOC recognizes more definitive information will continue to evolve as Final Design progresses.
- Station security measures must be developed in more detail. The PMOC recognizes more definitive information will become available as the CSC design work progresses.

#### SCC 30 – Support Facilities: Yards, Shops, Administration Buildings

- The grantee has adequately defined the yard, site, and building requirements on the former Navy Drum Site.
- The major concern for the MSF design-build contract will be coordination with the CSC, as the design and maintenance of the vehicle and operating systems may require some changes. The PMP provides a framework for much of the coordination needed between contracts, including continuous contract oversight, weekly (or more frequent, as required) coordination/progress meetings, joint technical meetings, design reviews, contacts with permitting agencies, and procedures for Interface Management and Coordination, Configuration Management, Change Control, and Communications. In addition, the grantee has developed a separate Interface Management Plan that discusses management and coordination of all contractors.

#### SCC 40 – Sitework and Special Conditions

- The grantee has improved the detailed utility adjustment and relocation activities in their latest master project schedule. The PMOC recognizes that more definitive information may still evolve during the Final Design phases for the Airport and City Center segments.

#### SCC 50 – Systems and SCC 70 – Revenue Vehicles

- The scope and criteria for the systems components and revenue vehicles are well-defined, and the procurement method was appropriate for this Project. More detail on systems and vehicles will become available as the CSC design progresses. This detail will be reviewed by the PMOC as it is developed.
- It appears that there may be limited de-mobilization required by the CSC between beginning of operations within the first two segments (WOFH and KH) and within the final segments (Airport and City Center). However, it is unclear what amount of lag time will be required before the systems contractor can re-mobilize to complete the remaining work. It is expected the bids reflected this uncertainty and for that reason, the risk involved in re-mobilization of the CSC testing and startup tasks has been transferred to the CSC. The grantee must monitor the work to assure that re-mobilization does not have an adverse effect on the overall project critical path. The MPS does include float that should be sufficient to cover any expected lag time to prevent impact to the critical path.

#### SCC 60 – Right-of-Way

- The PMOC is concerned that the grantee's limited availability of ROW department staff may struggle meeting peak demand during the end of final design and early construction phases. Staffing with expertise in acquiring property and improvements under various strategies based on project requirements will require proficiency and capacity for easements, partial takes, full takes, eminent domain, relocation and relocation assistance, etc. To mitigate this concern, the grantee has hired a Real Estate Professional Services Consultant, which will improve technical capacity concern.
- The PMOC has concerns with several significant areas including temporary construction easements, any "economic remainders," and visual/aesthetic impacts of the guideway and stations to adjacent property owners. The grantee may discover the necessity to acquire more partial or full takes and/or temporary or permanent construction easements than initially planned, thus affecting the project budget and schedule. This was addressed in development of the project Risk Matrix and in the subsequent development of contingency amounts and risk mitigation requirements. It should be noted that the grantee has reviewed access to the properties adjacent to the corridor to mitigate any issues with access during construction and following the start of revenue operations.

### **1.6 Conclusion**

The PMOC concludes that the Project is ready to submit an FFGA application with regard to the Project Delivery Method (OP 32D) assessment.

## **1.7 Recommendations**

The PMOC recommends that the grantee utilize the project risk register as the basis for action items. These action items should be prioritized and addressed. The PMOC believes this approach will protect all stakeholder interests, should the project receive an FFGA.

## **2.0 INTRODUCTION**

The Honolulu Authority for Rapid Transportation (HART) continues to advance development of its proposed Honolulu Rail Transit Project (“Project”), formerly known as the Honolulu High-Capacity Transit Corridor (HHCTC) Project, in accordance with the Federal Transit Administration (FTA) New Starts requirements. The Project is intended to provide improved mobility in the highly-congested east-west corridor along Oahu’s south shore between Kapolei and the Ala Moana Center. The Project would provide faster, more reliable public transportation services than those currently operating in mixed-flow traffic.

FTA assigned Jacobs as a Project Management Oversight Contractor (PMOC) on September 24, 2009, for the purpose of monitoring the Project and providing FTA with “information and well-grounded professional opinions regarding the reliability of the project scope, cost, and schedule” of the Project. That effort continues with this update report, which represents the PMOC’s assessment of the Project Delivery Method.

### **2.1 Project Sponsor**

The City and County of Honolulu (“City”) is the overarching FTA grantee. The City’s Department of Transportation Services (DTS) and HART have executed a Memorandum of Understanding, which delineates each agency’s roles and responsibilities so as not to jeopardize the City’s standing as an FTA grantee. HART is responsible for the New Starts grants for the Project and may share responsibilities with DTS for grants using Section 5307 or other FTA funding sources.

### **2.2 Project Description**

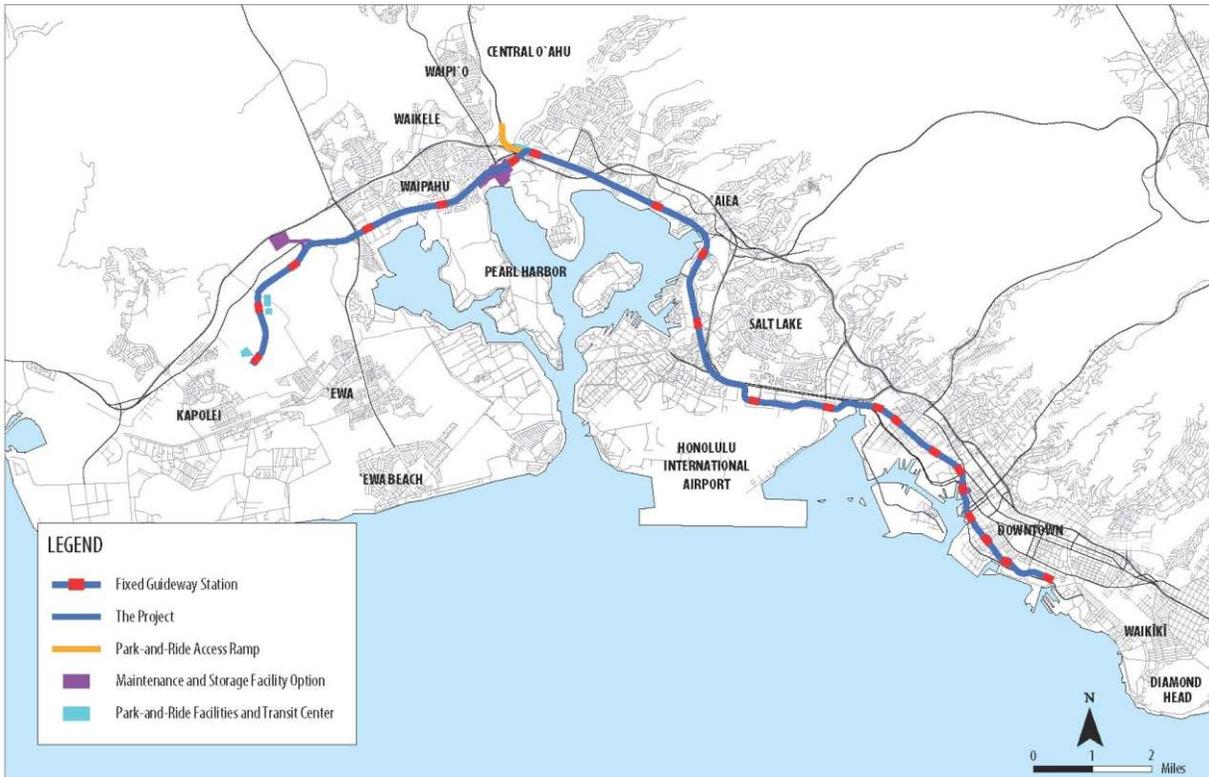
The proposed Project is a 20.5-mile light metro rail line in a grade-separated right-of-way that will provide high-capacity transit service on the island of Oahu from East Kapolei in the west to the Ala Moana Center in the east. The alignment is elevated except for a 0.6-mile at-grade portion adjacent to the Leeward Community College station. In addition to the guideway superstructure and trackwork, major physical elements of the Project include: 21 stations; one maintenance and storage facility; numerous right-of-way parcel acquisitions; and 80 light metro vehicles and associated core systems.

The Project is planned to be delivered in four design and construction segments:

- Segment I (West Oahu/Farrington Highway) – East Kapolei to Pearl Highlands (6 miles/7 stations)
- Segment II (Kamehameha Highway) – Pearl Highlands to Aloha Stadium (4 miles/2 stations)
- Segment III (Airport) – Aloha Stadium to Middle Street (5 miles/4 stations)
- Segment IV (City Center) – Middle Street to Ala Moana Center (4 miles/8 stations)

In a recently-announced change, HART has combined Segments III and IV into a single guideway construction contract. The Contract Packaging Plan has been updated to reflect this change.

**Figure 1. Project as Identified in FEIS**



East Kapolei is the western terminus of the Project. The alignment begins at North-South Road north of Kapolei Parkway. The alignment follows North-South Road in a northerly direction to Farrington Highway where it turns east following Farrington Highway and crosses Fort Weaver Road. The alignment is elevated along North-South Road and along Farrington Highway. The alignment continues in a north-easterly direction following Farrington Highway in an elevated structure. South of the H-1 Freeway, the alignment descends to grade as it runs alongside the Maintenance & Storage Facility at the former Navy Drum Site. The alignment continues at-grade to Leeward Community College and then returns to an elevated configuration to cross over the H-1 Freeway. North of the Freeway, the alignment turns eastward along Kamehameha Highway. Segment I includes seven stations: East Kapolei, University of Hawaii at West Oahu, Ho’opili, West Loch, Waipahu Transit Center, Leeward Community College and Pearl Highlands.

Segment II carries the alignment from Pearl Highlands to Aloha Stadium, running mostly above the median of Kamehameha Highway. At the highway interchange ‘Ewa of the stadium, the alignment crosses over to the mauka side of Kamehameha Highway, in land adjacent to the roadway that is currently used for stadium parking. Segment II includes two stations: Pearl Ridge and Aloha Stadium. East of Aloha Stadium Station, the segment features a third track for temporary train layovers or storage.

The Airport Segment, or Segment III, takes the alignment from Aloha Stadium to Middle Street. This entirely elevated section of the route starts on the mauka side of Kamehameha Highway, then transitions to the median of that street. As the route proceeds in the Koko Head direction, it leaves Kamehameha Highway to run on the makai side of the elevated H-1 Freeway. At Honolulu International Airport, the alignment swings out over the median of the H-1, then down Aolele Street to a station site adjacent to the main airport terminal. The route then continues Koko Head on Aolele and, eventually, the parallel Ualena Street to Lagoon Drive. At that point, the alignment crosses a corner of Ke'ehi Lagoon Park and threads through another highway interchange to Kamehameha Highway again at Middle Street. Segment III includes four stations: Pearl Harbor, Airport, Lagoon Drive, and Middle Street.

The City Center Segment, Segment IV, is also entirely-elevated as it carries the alignment from Middle Street to the Ala Moana Center. Segment IV features guideway structures above Dillingham Boulevard, Nimitz Highway, Halekauwila Street, Queen Street, and Kona Street. Above Kona Street at the Ala Moana Center Station, the segment includes tail tracks beyond the station to provide operational flexibility and storage. The segment includes eight stations: Kalihi, Kapalama, Iwilei, Chinatown, Downtown, Civic Center, Kaka'ako, and Ala Moana.

The Project also includes one Maintenance & Storage Facility (MSF), two park and ride lots, one park and ride structure and two bus transit centers. The rail vehicles will be fully-automatic and driverless.

The anticipated weekday boardings for the line are as follows:

- 97,500 (in 2019)
- 116,300 (in 2030)

### **2.3 Project Status**

A Locally Preferred Alternative (LPA) was adopted in July 2008. The grantee was provided approval to begin Preliminary Engineering (PE) on October 16, 2009. The Final Environmental Impact Statement (FEIS) was published on June 25, 2010, and a Record of Decision (ROD) was issued on January 18, 2011. FTA granted approval to enter Final Design on December 29, 2011. The grantee is preparing an application for a Full Funding Grant Agreement in accordance with the FTA New Starts requirements.

### **2.4 Project Budget**

The grantee's Base Cost Estimate (BCE), dated June 2012, is \$5.122 billion in Year-of-Expenditure (YOE) dollars, including \$644 million in allocated and unallocated contingency and \$173 million financing costs.

### **2.5 Project Schedule**

Table 1 presents the grantee's target dates for key milestones of this New Starts Project as identified in its Master Project Schedule.

**Table 1. Target Milestone Dates**

<b>Milestone Description</b>	<b>Grantee Target Date</b>
FTA Award Full Funding Grant Agreement	06-Oct-12
WOFH/KH Revenue Service	29-Jun-16
Airport/City Center Revenue Service (RSD)	12-Mar-19

Note: MPS Data Date of March 30, 2012

## **2.6 Project Management Oversight Contractor (PMOC)**

Under this Work Order, Jacobs is to provide the following deliverables:

- OP 32A: Project Transit Capacity Review
- OP 32C: Project Scope Review
- OP 32D: Project Delivery Method Review
- OP 33: Capital Cost Estimate Review
- OP 34: Project Schedule Review
- OP 40: Risk and Contingency Review

This report is limited to OP 32D: Project Delivery Method Review.

## **2.7 Evaluation Team**

The following table presents the PMOC Evaluation Team and the respective roles associated with the assessment of the Project.

**Table 2. PMOC Evaluation Team**

<b>Name</b>	<b>Location</b>	<b>Role</b>
<b>Jacobs</b>		
Tim Mantych	St. Louis, MO	Program Manager
Bill Tsiforas	Las Vegas, NV	Task Order Manager
Keith Konradi	St. Louis, MO	Rail Engineering
Bob Niemietz	St. Louis, MO	Structural Engineering
Ahmad Hasan	St. Louis, MO	Geotechnical Engineering
Allan Zreet	Dallas, TX	Architect
Charles Neathery	Dallas, TX	Construction Management, Project Controls, Schedule Risk Assessment
Tim Morris	Dallas, TX	Cost Estimating
Brian Carpenter	Dallas, TX	Cost Estimating, Scheduling
Steve Rogers	Dallas, TX	Cost Estimating
Albert Amos	Austin, TX	Economics
David Nelson	Boston, MA	Operations, Transit Capacity
Tracey Lober	St. Louis, MO	QA/QC
Joe Leindecker	St. Louis, MO	Planning
<b>Virginkar and Associates, Inc.</b>		
Arun Virginkar	Brea, CA	Vehicle Engineer, Buy America
Hal Edris	Spring Grove, PA	Systems Integration Manager
<b>Triunity Engineering Management Inc.</b>		
Jonnie Thomas	Denver, CO	Systems (Communications)
<b>Interactive Elements Inc.</b>		
Dennis Newman	New York, NY	Safety
Dorothy Schulz	New York, NY	Security
<b>LS Gallegos Inc.</b>		
JR Casner	Centennial, CO	Construction Management, QA/QC
<b>OR Colan &amp; Associates</b>		
Bob Merryman	St. Louis, MO	Real Estate
<b>Kowalenko Consulting Group Inc.</b>		
Emma Kowalenko	Chicago, IL	Planning/Environmental
<b>Independent Contractor</b>		
David Sillars	Corvallis, OR	Risk Manager

## 2.8 Documents Reviewed

Appendix B provides a listing of the project-related documents that were utilized during development of this PMOC Report.

### **3.0 OP 32D: PROJECT DELIVERY METHOD REVIEW**

#### **3.1 Methodology**

The PMOC followed the requirements outlined in the “*FTA OP 32D: Project Delivery Method Review*”, dated June 2009 to assess and evaluate the grantee’s technical approach for delivering the proposed project within the constraints of its existing or proposed statutory or organizational procurement authority and in the context of its project strategies, risk analysis, and procurement planning. The PMOC also assessed and evaluated whether the grantee’s project delivery method and contracting packaging strategy as defined and implemented in the Project Management Plan (PMP) minimizes project risks and provides the greatest likelihood of implementation success. Specifically, this section of the PMOC Report provides an overview of the contracting methodology being employed during the design, construction, and procurement phases of the project.

The PMOC primarily reviewed the Contract Packaging Plan (CPP) Revision 3, dated March 30, 2012 to support the OP 32D PMOC report. Additional files, reports and documents used for this review are identified in Appendix B.

#### **3.2 Review**

The Project, which runs from East Kapolei to Ala Moana Center, has been divided into four (4) line segments as shown in Figure 2. The grantee intends to build and open the rail system in an easterly direction. The first section service opening is planned for June 2016 and will combine the first two segments: West Oahu/Farrington and Kamehameha Highway segments, the second project service opening is the Airport segment, scheduled for October 2017, and the third and final service opening, the official Service Revenue Date is the City Center segment scheduled for March 2019. The grantee is using a combination of design-build, design-bid-build, and design-build-operate-maintain contract delivery methods. The grantee has decided to combine the Airport segment and the City Center segment openings, which results in a total of two service openings in lieu of three as previously planned.

**Figure 2. Construction Segments**



FTA approved HART's request for Letter of No Prejudice (LONP) 2 on February 6, 2012 to incur costs of \$184.7 million for limited construction activities associated with West Oahu /Farrington Highway (WOFH) Design-Build Contract, Kamehameha Highway (KH) Guideway DB Contract, Maintenance and Storage (MSF) DB Contract and Farrington Station Group Construction Contract. The LONP allows early construction work to proceed so as not to further delay the design-build contractors as the FFGA process continues.

FTA approved HART's request for LONP 2A on May 17, 2012. LONP 2A authorizes \$21.8 million in expenditures to begin activities associated with the precast yard.

The grantee's funds are limited so construction cannot proceed too far into calendar year 2013 without an FFGA.

### **3.2.1 Consultant Services**

#### SCC 80.01 – Preliminary Engineering

The grantee contracted with Parsons Brinkerhoff (PB) to serve as the General Engineering Consultant (GEC) in completing PE/EIS efforts for the Project. The scope of work for this contract includes PE for all project components. The GEC prepared design documents to a level sufficient enough to support a two-step best value procurement package for design-build procurement.

The grantee executed the GEC contract on August 24, 2007 for \$85 million. Eight contract amendments were issued extending the period of performance through July 2011 and increasing the contract value to \$168 million. The pre-PE costs for the GEC I contract per the grantee's Contract Packaging Plan (CPP) was approximately \$88 million.

#### SCC 80.02 – Final Design

The second GEC contract (GEC II) provides services related to elevated guideway engineering, systems engineering, rail station design, construction management oversight, procurement,

contract administration, configuration control, claims support, scheduling, project financing and environmental planning.

The grantee executed the GEC II contract with Parsons Brinkerhoff on June 30, 2011. The contract amount is \$300 million (\$150 million base amount plus \$150 million allowance amount). It is anticipated that the \$150 million allowance for additional work will be used after the initial three-year term of the contract. However, it is possible with a contract amendment to expend a portion of the allowance amount any time during the term of the contract. Notice to Proceed (NTP) #1 was issued on August 2, 2011. The GEC II contract transition continues smoothly as most of the key management personnel are already on board from the GEC I contract.

The grantee intends to award ten separate Engineering Design Consultant (EDC) contracts to complete final design for those components that are to be constructed utilizing Design-Bid-Build (DBB) methodology as identified in Table 3. Management of these contracts would be performed by the grantee with support from the Program Management Consultant (PMC) and the GEC II. It should be noted that the contract dates identified in Table 3 were based on the Contract Packaging Plan and MPS with a data date of January 27, 2012.

The selected DB or DBOM contractors will complete final design of the line segments (WOFH and Kamehameha), Maintenance and Storage Facility (MSF), and Core Systems DBOM Contracts.

#### SCC 80.03 – Project Management for Design and Construction

The grantee awarded a contract to InfraConsult LLC in November 2009 to provide Project Management Support Services (PMC). The consultant will serve as a program manager in providing oversight of preliminary engineering, final design, and construction support services for all contracts. In general, the PMC contract serves as a staff augmentation contract for the grantee. The scope of the PMC contract includes the following:

- Assisting the grantee with specialized support throughout the design, procurement and construction phases of the project
- Assisting the grantee with oversight of design, procurement, construction, manufacturing, installation, testing and commissioning
- Assisting the grantee with executive management support for political and financial issues
- Assisting the grantee with oversight of the professional services contracts
- Supporting the grantee in the development, updating and presentation of reports
- Providing claims support through a subconsultant

During the fall of 2011 the FTA determined the (PMC) contract was not solicited with the required Federal clauses based on the Fiscal Year 2010 Procurement System Review Final Report. The FTA notified the grantee that they must re-procure the contract to include all federal clauses. The grantee issued an RFP on August 2, 2011 and subsequently selected InfraConsult LLC. An NTP was issued on February 23, 2012. The contract, which has a duration of three years, is valued at \$33 million.

#### SCC 80.04 – Construction Administration & Management

The overall responsibility for construction management for final design and construction has been assigned to Parsons Brinckerhof under the GEC II contract. Their scope of services includes the following:

- Provide project management and project controls services and support
- Perform interface management and coordination
- Support the grantee's Risk and Contingency Management Plan (RCMP)
- Support the grantee's Quality Program
- Support the grantee's Safety and Security Plans
- Advise the grantee with regard to FTA processes and requirements.
- Assist the grantee with the procurement of professional services, construction contracts and other agreements as required
- Provide planning and environmental coordination and oversight
- Perform design management and engineering support services
- Provide construction management for DB and DBOM contracts
- Assist the grantee with public involvement
- Assist the grantee with the Arts in Transit Program

The GEC II will also coordinate interfaces between designers, contractors and the CSC and will perform oversight of the Construction Engineering and Inspection (CE&I) contractors, who will provide field services for the DBB construction activities.

Table 3 summarizes the Contract Packages the grantee is utilizing for this project, including the applicable Standard Cost Categories.

**Table 3. Contract Packages**

<b>Contract No.</b>	<b>Description</b>	<b>Contractor/ Consultant</b>	<b>Start Date</b>	<b>End Date</b>	<b>Applicable SCCs</b>
<b>Design-Build (DB) / Design-Build-Operate-Maintain (DBOM) / Manufacture-Install-Maintain</b>					
DB-120	West Oahu/Farrington Highway Guideway DB	Kiewit Infrastructure West Company	01-Dec-09	1-Apr-15	10.04, 10.08, 10.09, 10.11, 40.01, 40.02, 40.04, 40.05, 40.06, 40.07, 40.08, 80.01, 80.02
DB-200	Maintenance & Storage Facility (MSF)	Kiewit/Kobayashi JV	25-Jul-11	1-Dec-14	10.09, 30.02, 30.03, 30.04, 30.05, 40.06, 40.07, 40.08, 50.03, 50.04, 50.05, 80.01, 80.02
DB-320	Kamehameha Guideway DB	Kiewit Infrastructure West Company	12-Jul-11	1-Sep-15	10.04, 10.09, 40.01, 40.02, 40.03, 40.04, 40.05, 40.06, 40.07, 40.08, 50.02, 80.01, 80.02
DBOM-920	Core Systems DBOM	Ansaldo Honolulu JV	13-Jan-12	1-Apr-19	40.08, 50.01, 50.03, 50.04, 50.05, 50.06, 50.07, 70.01, 70.06, 70.07, 80.02, 80.08
MI-930	Project Wide Elevators & Escalators	TBD	25-Jul-13	9-Nov-17	20.07
<b>Design-Bid-Build (DBB) / On-Call Construction Contracts</b>					
DBB-170	West Oahu Stations (3)	TBD	22-Dec-13	30-Oct-15	20.02, 40.02, 40.06, 40.07
DBB-270	Farrington Highway Stations (3)	TBD	29-Jun-13	30-Jun-15	20.01, 20.02, 40.02, 40.06, 40.07
DBB-275	Pearl Highlands Parking Structure/Bus Transit Center	TBD	11-Feb-16	29-Jun-18	20.06, 40.02, 40.06, 40.07
DBB-370	Kamehameha Stations Group (3)	TBD	31-Mar-14	30-Oct-15	20.02, 40.01, 40.02, 40.05, 40.06, 40.07
DBB-470	Airport Stations Group (3)	TBD	19-Apr-15	29-Jun-17	20.02, 40.01, 40.02, 40.06, 40.07
DBB-505	Airport Segment Utilities	TBD	11-Aug-13	15-Dec-14	40.01, 40.02, 40.03, 40.04, 40.05, 40.06, 40.07
DBB-510	City Center Segment Utilities	TBD	18-Jan-14	15-Sep-15	40.01, 40.02, 40.03, 40.04, 40.05, 40.06, 40.07
DBB-520	Airport and City Center Segments Guideway	TBD	14-Aug-14	1-Jul-18	10.04, 10.09, 10.12, 20.02, 40.01, 40.02, 40.03, 40.04, 40.06, 40.07, 50.02, 50.04
DBB-570	Dillingham Stations (4)	TBD	25-Nov-15	30-Dec-17	20.02, 40.01, 40.02, 40.06, 40.07
DBB-575	Kaka'ako Stations Group (4)	TBD	19-Apr-16	30-Jul-18	20.02, 40.02, 40.06
DBB-600	UH West Oahu Park n Ride & Hoopili Delayed Construction	TBD	5-Mar-17	15-Aug-18	20.02, 40.02, 40.06, 40.07

<b>Contract No.</b>	<b>Description</b>	<b>Contractor/ Consultant</b>	<b>Start Date</b>	<b>End Date</b>	<b>Applicable SCCs</b>
MM-945	On-Call Construction Contractor(s)	TBD	27-Aug-13	3-Mar-19	
MM-946	On-Call Hazardous Materials (HazMat) Removal Contractor	TBD	30-Jun-12	15-Feb-17	
<b>Final Design Consultants</b>					
FD-140	West Oahu Stations (3)	TBD	8-Jun-12	20-Oct-15	80.02, 80.07
FD-240	Farrington Highway Stations (3)	HDR Engineering Inc.	14-Jan-11	30-May-15	80.02, 80.07
FD-245	Pearl Highlands Parking Structure/Bus Transit Center	TBD	16-Feb-14	29-Apr-18	80.02, 80.07
FD-340	Kamehameha Highway Stations (3)	TBD	22-Jun-12	30-Oct-15	80.02, 80.07
FD-430	Airport Segment Guideway and Utilities	AECOM Technical Services Inc.	5-Jan-12	15-Aug-18	80.02, 80.07
FD-440	Airport Stations Group (4)	TBD	26-Oct-12	29-Jul-17	80.02, 80.07
FD-530	City Center Guideway and Utilities	TBD	1-Aug-12	15-Aug-18	80.02, 80.07
FD-540	Dillingham Stations Group (4)	TBD	1-Jun-13	31-Jul-18	80.02, 80.07
FD-545	Kaka'ako Stations Group (4)	TBD	12-Sep-13	14-Sep-18	80.02, 80.07
FD-600	UH West Oahu Park n Ride & Hoopili Finishes	TBD	12-May-15	14-Sep-18	80.02, 80.07
<b>Construction Engineering and Inspection Services (CE&amp;I)</b>					
MM-180	West Oahu/Farrington Highway Stations (6) CE&I	TBD	17-Dec-12	30-Oct-15	80.04, 80.07
MM-380	Kamehameha Highway Stations Group (3) CE&I	TBD	16-Sep-13	30-Oct-15	80.04, 80.07
MM-385	Pearl Highlands Parking Structure/Bus Transit Center CE&I	TBD	3-Aug-15	30-Oct-17	80.04, 80.07
MM-485	Airport Stations Group (4) CE&I	TBD	16-Jun-14	19-Jul-16	80.04, 80.07
MM-500	Airport and City Center Utility Relocations CE&I	TBD	28-Dec-12	10-Feb-15	80.04, 80.07
MM-525	Airport and City Center Guideway CE&I	TBD	31-Jan-14	1-Jul-18	80.04, 80.07
MM-585	Dillingham & Kaka'ako Stations Group (8) CE&I	TBD	17-Dec-14	30-Jul-18	80.04, 80.07
MM-600	UH West P&R & Hoopili Finishes - Delayed Work CE&I	TBD	5-May-16	18-Jun-18	80.04, 80.07
<b>HDOT Consultants</b>					
MM-915	HDOT Traffic Management Coordination Consultant	TBD	1-Feb-12	15-Feb-19	80.06

<b>Contract No.</b>	<b>Description</b>	<b>Contractor/ Consultant</b>	<b>Start Date</b>	<b>End Date</b>	<b>Applicable SCCs</b>
MM-920	HDOT Coordination Consultant – WOFH	AECOM Technical Services Inc.	8-Jun-11	15-Jun-18	80.06
MM-921	HDOT Coordination Consultant – KHG	TBD	1-Jul-12	15-Jul-15	80.06
MM-922	HDOT Coordination Consultant – Airport	TBD	30-Jan-14	15-Jun-18	80.06
MM-923	HDOT Coordination Consultant – City Center	TBD	30-Sep-15	15-Jun-18	80.06
<b>Project Management and Specialty Consultant Agreements</b>					
MM-900	Program Management Support Consultant (PMSC-1)	InfraConsult LLC	19-Nov-09	1-Apr-12	80.03
MM-901	Program Management Support Consultant (PMSC-2)	InfraConsult LLC	8-Mar-12	8-Mar-15	80.03
MM-905	General Engineering Consultant I (EIS/PE)	PB Americas Inc.	25-Oct-09	1-Jun-12	80.01, 80.03
MM-910	General Engineering Consultant II (Final Design & Construction)	PB Americas Inc.	2-Aug-11	1-Aug-14	80.01, 80.03, 80.04, 80.06
MM-935	Real Estate Consultant	Paragon Partners, Ltd.	14-Mar-12	15-Mar-17	60.02
MM-940	Kako'o Consultant	Pacific Legacy Inc.	30-Mar-12	14-Feb-17	80.06
MM-950	Owner Controlled Insurance Program (OCIP) Consultant	Marsch	1-Jun-12	1-Dec-19	80.06
MM-975	LEED Commissioning Services for Maintenance and Storage Facility (MSF)	Enovity, Inc.	7-Oct-10	14-Jan-16	80.02

### **3.2.2 Construction and Major Material and Equipment Procurement**

#### SCC 10 – Guideway and Track Elements

The Project is divided into four (4) line segments: West Oahu/Farrington, Kamehameha, Airport, and City Center. The West Oahu/ Farrington and Kamehameha segments will be completed under DB contracts. The grantee utilized a two-step Request for Proposals (RFP), or Best Value, contract procurement process. Under these DB contracts, the grantee intends to complete all utility relocations, guideway construction, and trackwork for these two line segments. Station and systems work will be completed under separate contracts as discussed below. The grantee awarded the WOFH DB Contract on October 21, 2009 and the Kamehameha Highway DB Contract on March 21, 2011, both to Kiewit Infrastructure West Company.

*The grantee has recently decided to combine the Airport and City Center segments into one DBB construction contract. The line segment contracts will include guideway construction and trackwork. Separate utility relocation contracts will be awarded to complete that work in advance of the guideway construction. The grantee anticipates awarding the guideway contract in early 2014.*

The foundations generally will consist of drilled piers and pier caps. The elevated guideway will consist of a viaduct supported by columns and bent caps. The current configuration of the viaduct superstructure is a precast segmental trapezoidal box girder proportioned to support two trackways and two parapets acting as sound barriers. The girder section will be designed to span 150 feet and would be simply supported. For spans longer than 150 feet, particularly where the aerial structure crosses freeway and highway interchanges, other construction methods are being considered including balanced cantilever or possibly cast-in-place concrete spans.

#### SCC 20 – Stations, Stops, Terminals, Intermodal

The grantee intends to utilize the DBB delivery method for all stations, resulting in a total of seven (7) construction contract packages. A separate construction package has been identified for construction of the garage and ramps (but not the station) at the Pearl Highlands Station. The earliest of the station construction packages is anticipated to start construction in June 2013, with later packages beginning construction as late as 2016.

The grantee intends to issue a separate Manufacture & Install (M&I) contract to furnish / install / test / commission all elevator and escalator equipment located at the elevated stations.

#### SCC 30 – Support Facilities: Yards, Shops, Administration Buildings

The Maintenance and Storage Facility (MSF) contract delivery method is DB. The MSF is located at the former Navy Drum Site between Waipahu High School and the Leeward Community College. Due to known environmental issues with the site, the grantee obtained an Environmental Condition of Property (ECP) Report regarding the history and current condition of all known hazardous materials on the site. That report concluded that, “based on the current environmental condition of the site, there are no land use controls or restrictions necessary for the proposed real estate transaction.”

The Navy Drum Site topography is very steep and will require an extensive amount of cut and fill. Earthwork, retaining walls, and other structures are shown on the yard plans.

The MSF contract includes design and construction of the maintenance shop, the storage yard, all trackwork, the operations control center, the vehicle wash building, the maintenance-of-way facility, and the administration facilities. The contract was awarded July 2011 to Kobayashi Kiewit, A Joint Venture.

The grantee has included procurement of all the project's running and third rail materials within the MSF contract. The MSF contractor is thereby responsible for procurement, shipping, and storage of the rail until the respective line segment contractors can begin installation. It is anticipated that the line segment contractors would be responsible for transportation of the rail to the specific line segments from the storage point at the MSF.

#### SCC 40 – Sitework & Special Conditions

The WOFH and KH segment contractors will be responsible for relocation of all utilities within their respective contract limits. For the other line segments, the grantee anticipates awarding two separate advanced utility relocation contracts using the DBB project delivery method starting in late 2013. Execution of utility relocation agreements between the grantee and the respective utility owners has commenced.

#### SCC 50 – Systems and SCC 70 – Vehicles

The grantee utilized a best value approach for selection of a core systems DBOM contractor. The scope included: design / manufacture / testing of light metro rail vehicles; design / supply / installation / testing of the traction power, signal system, train control, and communications systems; operation of the system; and maintenance of the entire system. The grantee believes that this would reduce its risk in integrating new revenue vehicle technology with third-party systems components. The grantee held a workshop on August 22, 2008 to solicit input and feedback from the contracting and manufacturing community on this approach before it was implemented.

The Operations and Maintenance contract will extend 5 years beyond the full build revenue service date (3.2019), with an additional 5 year option. The Operations and Maintenance contractor will be responsible for intermediate operating section openings.

The grantee issued RFP Part 1 on April 9, 2009. RFP Part 2 was issued on August 17, 2009. Ansaldo Honolulu Joint Venture was awarded a contract on November 28, 2011, and NTP was issued on January 13, 2012.

Delivery of revenue vehicles would be scheduled to support the start of revenue service along the western portion of the guideway in 2016. The grantee anticipates opening the entire length of the line for revenue service in March 2019.

The CSC also includes furnishing and installing the fare collection equipment.

### SCC 60 – Right-of-Way

The grantee has hired a Professional Real Estate Services Consultant, Paragon Partners, Limited to assist with real estate acquisition and relocation activities. NTP was issued on March 15, 2012. This additional consultant support will be beneficial to the project.

### **3.3 Findings**

The following sections include PMOC findings for each standard cost category.

#### General

The contract delivery methodology proposed by the grantee can be successfully executed. The grantee does have the statutory authority to award the contract types currently under consideration. However, the PMOC does have some general concerns as they relate to the overall project implementation as listed below:

- The PMOC is concerned about the amount of work that will be concurrently performed and require a significant amount of management and administrative resources. The PMOC recognizes that this risk can be mitigated with proper coordination of contracts. However, the grantee must continue to demonstrate that it has assembled a cohesive team during the early contracts and continues to expand the staff as required to meet the resource demands. During the project's PE and final design phases the grantee has struggled with technical capacity and capability. The PMOC will continue to monitor staffing as part of its monthly reviews.
- The PMOC and grantee are concerned with commodity resource availability and its potential to also impact spikes in cost during the remaining years of the project. The concern is two-fold. First, there is uncertainty in the global construction market that is affecting material costs. Since this is a multi-year award and build-out, conditions are subject to change and can vary greatly, as they have in the past year. Secondly, the limitation of available materials for an island market may influence cost and schedule. Furthermore, material and equipment transportation costs are significant since the project is located in Hawaii.
- The PMOC and grantee are concerned with potential construction equipment availability mainly during the peak of construction which may result in higher-than-anticipated unit costs and schedule impact.
- The PMOC and grantee are concerned about maintaining a competitive bidding environment during future bids since Kiewit has firmly established itself as the main contractor on the island. The perception by other contractors may prevent them from submitting construction bids since they will need to include expensive mobilization costs and speculative investment.

The PMOC concludes the contract packaging plan is achievable although the grantee will face considerable challenges meeting peak managerial and administrative resource demand. Additionally, the current contracts may spend a higher percentage of contingency than

anticipated due to delays in acquiring project approvals. These issues were included in the development of a Risk Matrix and addressed at a Risk Workshops held in April 2011 and April 2012.

#### SCC 10 – Guideway and Track Elements

- The grantee has access to an extensive amount of geotechnical data from previous investigation programs. The GEC has effectively compiled and utilized this information to establish geotechnical criteria. From a review of the geotechnical data provided by the grantee, it is clear that the subsurface conditions are highly variable along the 20-mile corridor. Specific concerns include undulating stratigraphy, high water tables, and numerous environmental surface restrictions. Production rates for foundation installation should be set conservatively, given the variability of the subsurface conditions and the access restrictions, particularly within Airport and City Center segments.

The grantee is utilizing Geotechnical Baseline Reports for this project. Although Geotechnical Baseline Reports are typically utilized for underground construction (i.e., tunnels), the PMOC concurs with this approach given the extensive number of deep foundations required.

- Site access and logistics will be of particular concern for both guideway and station constructors. The amount of traffic and pedestrian congestion and close proximity of business and residential properties, particularly along the Airport and City Center corridors. This could result in schedule pressure and increased costs due to loss of contractor productivity. The grantee has identified staging locations and focused on traffic control planning in effort of controlling such inefficiencies and impact to the public. The grantee's public outreach and communication department are also implementing public awareness efforts to keep the public apprised of congestion areas and alternate routes as the construction phase begins.
- Final Design of the WOFH and KH line segments will be performed by the same DB contractor, concurrent with the systems design, which will be performed by the CSC. The grantee has developed an acceptable Interface Management Plan to help ensure necessary coordination between the DB line segment contractor and the CSC can be achieved adequately to minimize schedule delays or cost impacts. However, the grantee must continue diligence to ensure all interfaces are managed adequately.
- The intent of the guideway aerial structure is generally uniform throughout the project alignment although by having the DB contractors develop the line segment design for the WOFH and KH segments and an EDC complete the Airport and City Center segment design, the grantee may not realize optimal cost and schedule savings from a more definitive 100% complete design.

#### SCC 20 – Stations, Stops, Terminals, Intermodal

- Site access and logistics will be of particular concern as discussed above.

- Material and equipment staging/storage areas have not been identified. The PMOC recognizes more definitive information will continue to evolve as Final Design progresses.
- Station security measures must be developed in more detail. The PMOC recognizes more definitive information will become available as the CSC design work progresses.

#### SCC 30 – Support Facilities: Yards, Shops, Administration Buildings

- The grantee has adequately defined the yard, site, and building requirements on the former Navy Drum Site.
- The major concern for the MSF design-build contract will be coordination with the CSC, as the design and maintenance of the vehicle and operating systems may require some changes. The PMP provides a framework for much of the coordination needed between contracts, including continuous contract oversight, weekly (or more frequent, as required) coordination/progress meetings, joint technical meetings, design reviews, contacts with permitting agencies, and procedures for Interface Management and Coordination, Configuration Management, Change Control, and Communications. In addition, the grantee has developed a separate Interface Management Plan that discusses management and coordination of all contractors.

#### SCC 40 – Sitework and Special Conditions

- The grantee has improved the detailed utility adjustment and relocation activities in their latest master project schedule. The PMOC recognizes that more definitive information may still evolve during the Final Design phases for the Airport and City Center segments.

#### SCC 50 – Systems and SCC 70 – Revenue Vehicles

- The scope and criteria for the systems components and revenue vehicles are well-defined, and the procurement method was appropriate for this Project. More detail on systems and vehicles will become available as the CSC design progresses. This detail will be reviewed by the PMOC as it is developed.
- It appears that there may be limited de-mobilization required by the CSC between beginning of operations within the first two segments (WOFH and KH) and within the final segments (Airport and City Center). However, it is unclear what amount of lag time will be required before the systems contractor can re-mobilize to complete the remaining work. It is expected the bids reflected this uncertainty and for that reason, the risk involved in re-mobilization of the CSC testing and startup tasks has been transferred to the CSC. The grantee must monitor the work to assure that re-mobilization does not have an adverse effect on the overall project critical path. The MPS does include float that should be sufficient to cover any expected lag time to prevent impact to the critical path.

#### SCC 60 – Right-of-Way

- The PMOC is concerned that the grantee's limited availability of ROW department staff may struggle meeting peak demand during the end of final design and early construction phases. Staffing with expertise in acquiring property and improvements under various

strategies based on project requirements will require proficiency and capacity for easements, partial takes, full takes, eminent domain, relocation and relocation assistance, etc. To mitigate this concern, the grantee has hired a Real Estate Professional Services Consultant, which will improve technical capacity concern.

- The PMOC has concerns with several significant areas including temporary construction easements, any "economic remainders," and visual/aesthetic impacts of the guideway and stations to adjacent property owners. The grantee may discover the necessity to acquire more partial or full takes and/or temporary or permanent construction easements than initially planned, thus affecting the project budget and schedule. This was addressed in development of the project Risk Matrix and in the subsequent development of contingency amounts and risk mitigation requirements. It should be noted that the grantee has reviewed access to the properties adjacent to the corridor to mitigate any issues with access during construction and following the start of revenue operations.

### 3.4 Review and Assessment

FTA's OP 32D, Project Delivery Method Review, Section 6.4, Review and Assessment, requires the PMOC to provide specific answers to questions regarding the grantee's project delivery method. This section presents those answers.

- ***The PMOC should review for the adequacy and timing of the checks planned and implemented by the Grantee. Checks may be in the form of peer reviews and/or independent or internal process reviews that ensure the strategies employed and processes used to select and ultimately deliver the project are both sound and comprehensive.***

The grantee has implemented a technology selection panel, a structures forum, a contractor's forum and workshop, a systems forum, and two construction round tables to help resolve and verify project implementation strategies. The process goes beyond "adequacy" and can certainly be described as both sound and comprehensive.

- ***The PMOC shall fully identify, describe, and analyze the grantee's individual contract packages and anticipated or actual pricing/compensation components inclusive of overheads, contingency and "contingency like" components, and any negotiated profit/fee values.***

PMOC has identified and described the various contract packages in the text preceding this section. While PMOC has also seen and reviewed anticipated pricing or compensation components, it cannot publish the confidential information for pending or future contracts. The following is an analysis of the varying contract package types:

- Program Management Support Consultant (PMC): The description of this contract's function, essentially, is to assist the grantee in a number of management support and oversight functions. The PMC (InfraConsult) has become, in effect, an extension of grantee staff. The relative lack of grantee staff and experience makes this contract essential for this project.

- GEC II: Following its first contract's functions as developer of PE documents and the FEIS, the GEC will continue in its second contract as engineering manager, with oversight of all design, construction, inspection, and coordination contractors. The GEC is a common feature in projects of this magnitude. The use of a large, well established international firm (Parsons Brinckerhoff) for this role should mitigate concerns with sufficient technical resources.
  - Design-Build Contracts (MSF and WOFH and Kamehameha Highway Guideway Segments): These contracts have all been openly procured and awarded. Although the grantee introduced certain risks to the project by awarding these contracts without benefit of either an FFGA or LONP from the FTA, it did so to expedite the project and lock in recession-influenced lower prices. The grantee has thus transferred much of the project risk to the DB contractors for these three significant contracts, although the grantee is at risk for the possibility of delay claims if it is unable to allow the contractors to proceed with their work in a timely manner.
  - CSC (Core Systems Contract): This DBOM contract arranges for one entity to take responsibility for design, construction, and operations of the vehicles, systems, and ticket vending for a period of 5-10 years. This contract transferred most of the systems/vehicles risk onto the contractor (AHJV). The most difficult aspect of this contracting method may have been in the resolution of the final RFP, a process that produced over 40 addenda.
  - Design-Bid-Build Contracts: These would include separate design and construction contracts in this traditional project delivery method, covering the final two (easternmost) line segments and all stations. DBB will allow the grantee more control over the designs, albeit at a cost in time and, perhaps, money, since this method will likely delay bids by several years over the DB contracting method. DBB contracting will likely allow smaller design firms to participate in the project and will, perhaps, encourage more competition for the remaining construction contracts.
  - Other Contracts: These would include CE&I contracts, coordination contracts, and other miscellaneous specialty contracts. These are acceptable and expected smaller contracts that farm out responsibilities for specialists who act as the owner's representative.
- ***The PMOC shall assess and evaluate the degree to which such pricing/compensation components are themselves aligned with the grantee's project strategy/risk management plan and their effectiveness in terms of minimizing costs (and cost overruns) and schedule (and schedule slippages).***

The grantee has presented its own risk assessment document, identifying key risks and using current risk assessment processes to determine ranges of project cost and schedule expectations. The PMOC, however, completed an independent FTA-sponsored risk workshop. The grantee has developed a Risk and Contingency Management Plan (RCMP) that includes a mitigation strategy that can make use of these analyses to better define project cost and schedule contingencies. However, this RCMP must be updated based on the most recent cost and schedule risk assessment completed for the Project.

The RCMP should be revisited at least annually to ensure that it remains current and effective.

- ***Does the grantee have a comprehensive project delivery strategy?***

The project delivery strategy is well document in the contract packaging plan and the master project schedule. Both comprehensively expressed a well thought plan that now requires successful implementation.

- ***Was a sound process used to develop the strategy?***

The grantee used a sound process to determine and implement its strategy. The grantee first determined the scope magnitude, financial constraints, and local market conditions. They also researched the surety market and assemble work packages no more than \$500 million in value to keep the bidding conditions competitive. The grantee chose early-delivery DB approach for several packages in an effort to advance construction and codify the public perception of visible progress.

The recession that began in December 2007 was a further impetus for the grantee to both take advantage of a favorable bidding climate and provide stimulus to construction employers by expediting the letting of DB contracts. The grantee made further reasoned decisions in breaking up the guideway into geographically-similar areas and to proceed with traditional DBB methods for the stations. The stations were separated from the guideway contracts due to their different natures of construction. The grantee will rely heavily on its GEC to control interface between the various construction contracts.

Lastly, the grantee used a sound process to determine the advantages of combining vehicles, systems, operations, and maintenance into a single DBOM contract for the CSC, thereby allowing prepackaged integration from suppliers.

- ***Is the grantee's strategy likely to satisfy the overall project objectives as well as the unique objectives of individual elements?***

The grantee's strategy is likely to satisfy the overall project objectives, although the objectives of all the individual elements are less of a certainty. As is typical, the project may involve circumstances that cost excessive amounts of contingency or float in one or several areas, but the overall project, if budgeted and planned for such contingencies, may still come in within those allotments.

- ***Did the selected delivery method(s) consider relevant risks associated with the project element(s)?***

PMOC believes that the grantee, in choosing its delivery methods, did consider most relevant risks, although some risks remain or were possibly exacerbated by the choices. For example, the grantee chose to reduce the risks of higher bid prices at a later date by locking in prices early with Design-Build contracting. As a result, some of the early

contracts could risk additional costs if the grantee is delayed in issuing requisite NTPs in a timely manner or if further study or design induces changes in scope.

- ***Is (Are) the selected delivery method(s) appropriate for use with the particular project element?***

PMOC finds that the combination of different methods for the various contracts is appropriate, although not without its own set of risks. Although, the PMOC has found the grantee has executed some contracts to premature and has caused delay on some design build contracts which undermines time saving benefits related to that particular contract delivery method.

- ***Is the strategy, including the contract packaging plan, appropriately documented in the Project Management Plan?***

The PMP contains a satisfactory contract packaging plan that has thus far been successfully included in the master project schedule and other PMP companion documents.

- ***Does the project schedule reflect the project delivery strategy, including sufficient preparation time?***

The master project schedule includes a robust and flexible work breakdown structure that includes the contract packaging plan. The schedule can be organized and sorted by a multitude of project components and topics and contains all work packages. When contracts are awarded, the individual construction project schedules are then summarized and incorporated into the master project schedule during routine progress updates.

- ***Does the grantee currently possess, or have a plan to acquire, the staff resources to successfully execute the project delivery strategy?***

The PMOC has identified some technical capacity and capability issues that should be addressed, as identified in the OP 21 review. However, in general, the grantee has a plan to acquire all staff resources necessary to execute the project delivery strategy. The grantee has gradually added staff over the past several years, but supplements its personnel with employees of its GEC and PMC. The PMOC finds that the grantee's plan to add staff, as described in the PMP and supporting sub-plans is sufficient.

### **3.5 Conclusion**

The PMOC concludes that the Project is ready to submit an FFGA application with regard to the Project Delivery Method (OP 32D) assessment.

### **3.6 Recommendations**

The PMOC recommends that the grantee utilize the project risk register as the basis for action items. These action items should be prioritized and addressed. The PMOC believes this approach will protect all stakeholder interests, should the project receive an FFGA.

## APPENDICES

### Appendix A: List of Acronyms

A	▪ Ampere
AA	▪ Alternatives Analysis
AACE	▪ Association for the Advancement of Cost Engineering
AC	▪ Alternating Current
ACT ID	▪ Activity Identification
ADA	▪ Americans with Disabilities Act
AHJV	▪ Ansaldo Honolulu Joint Venture
ANSI	▪ American National Standards Institute
APB	▪ Absolute Permissive Block
APS	▪ Adjusted Project Schedule
APTA	▪ American Public Transportation Association
ASCE	▪ American Society of Civil Engineers
ASHRAE	▪ American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASME	▪ American Society of Mechanical Engineers
ASTM	▪ ASTM International, nee, American Society for Testing and Materials
ATC	▪ Alternative Technical Concept
ATC	▪ Automatic Train Control
ATO	▪ Automatic Train Operation
BAFO	▪ Best and Final Offers
BCE	▪ Base Cost Estimate
BEA	▪ Bureau of Economic Analysis
BFMP	▪ Bus Fleet Management Plan
BLS	▪ Bureau of Labor Statistics
BOS	▪ Basis of Schedule
BRF	▪ Beta Risk Factor
BRIC	▪ Brazil, Russia, India and China
CBTC	▪ Communications-Based Train Control
CC	▪ Community College
CE&I	▪ Construction Engineering and Inspection
CER	▪ Cost Estimating Relationship
CIH	▪ Central Instrument Hut
CIL	▪ Central Instrument Location
CIR	▪ Central Instrument Room
CMP	▪ Configuration Management Plan
CMS	▪ Document Management System
COTS	▪ Commercial off-the-Shelf
CPI	▪ Consumer Price Index
CPM	▪ Critical Path Method
CPP	▪ Contract Packaging Plan
CPS	▪ Construction Project Schedule
CPS	▪ Current Probable Schedule
CSC	▪ Core Systems Contract
DB	▪ Design-Build
DBB	▪ Design-Bid-Build
DBEDT	▪ Hawaii Department of Business Economic Development and Tourism
DBOM	▪ Design-Build-Operate-Maintain
DC	▪ Direct Current
DEIS	▪ Draft Environmental Impact Statement
DHHL	▪ Department of Hawaiian Homelands
DOT	▪ United States Department of Transportation
DTS	▪ Department of Transportation Services

ECP	▪ Environmental Condition of Property
EDC	▪ Engineering Design Consultant
EIS	▪ Environmental Impact Statement
ENR	▪ Engineering News Record
ERTMS	▪ European Rail Traffic Management System
EUM	▪ Estimate Uncertainty Model
FAA	▪ Federal Aviation Administration
FAQ	▪ Frequently Asked Questions
FD	▪ Final Design
FEIS	▪ Final Environmental Impact Statement
FF	▪ Finish-Finish
FFGA	▪ Full Funding Grant Agreement
FMOC	▪ Financial Management Oversight Consultant
FS	▪ Finish-Start
ft	▪ Foot
FTA	▪ Federal Transit Administration
FY	▪ Fiscal Year
GBS	▪ Gap Breaker Station
GDP	▪ Gross Domestic Product
GEC	▪ General Engineering Consultant
GET	▪ General Excise Tax
GPRM	▪ Great Pacific Rocky Mountain
HART	▪ Honolulu Authority for Rapid Transportation
HDOT	▪ Hawaii Department of Transportation
HECO	▪ Hawaiian Electric Company
HHCTC	▪ Honolulu High Capacity Transit Corridor
HHCTCP	▪ Honolulu High Capacity Transit Corridor Project
HNL	▪ Honolulu International Airport
HVAC	▪ Heating, Ventilating, and Air Conditioning
ICD	▪ Interface Control Document
IEEE	▪ Institute of Electrical and Electronics Engineers
IPS	▪ Integrated Project Schedule
IRM	▪ Impacted Risk Model
KH (or KHG)	▪ Kamehameha Highway (or Kamehameha Highway Guideway)
kW	▪ Kilowatt
LCD	▪ Liquid Crystal Diode
LONP	▪ Letter of No Prejudice
LPA	▪ Locally Preferred Alternative
LV	▪ Low Voltage
M&I	▪ Manufacture and Install
MDBCF	▪ Mean Distance between Component Failure
MFP	▪ Multifunction Protective Relay
MIL	▪ Military Specification
MOS	▪ Minimum Operating Segment
MOT	▪ Maintenance of Traffic
mph	▪ Miles Per Hour
mphps	▪ Miles Per Hour Per Second
MPS	▪ Master Project Schedule
MS	▪ Microsoft
MSF	▪ Maintenance and Storage Facility
MSS	▪ Master Summary Schedule
MTTR	▪ Mean Time to Repair
MVA	▪ Mega Volt Ampere
MW	▪ Megawatt
NBER	▪ National Bureau of Economic Research
NEMA	▪ National Electrical Manufacturers Association

NEPA	▪ National Environmental Policy Act
NFPA	▪ National Fire Protection Association
NGD	▪ Negative Grounding Device
NTP	▪ Notice to Proceed
O&M	▪ Operations and Maintenance
OBS	▪ Organizational Breakdown Structure
OCC	▪ Operations Control Center
OCIP	▪ Owner Controlled Insurance Program
OCS	▪ Overhead Contact System
OD	▪ Original Duration
OD	▪ Original Duration
OP	▪ Oversight Procedure
PA	▪ Programmatic Agreement
PB	▪ Parsons Brinckerhoff
PE	▪ Preliminary Engineering
PHF	▪ Peak Hour Factor
PLA	▪ Project Labor Agreement
PLC	▪ Programmable Logic Controller
PMBOK	▪ Project Management Institute's Body of Knowledge
PMC	▪ Project Management Support Consultant
PMO	▪ Project Management Oversight
PMOC	▪ Project Management Oversight Contractor
PMP	▪ Project Management Plan
PPI	▪ Producer Price Index
QA/QC	▪ Quality Assurance/Quality Control
QMP	▪ Quality Management Plan
RA	▪ Risk Assessment
RAM	▪ Responsibility Assignment Matrix
RAMP	▪ Real Estate Acquisition and Management Plan
RBC CBTC	▪ Radio Block-Centered Communications-Based Train Control
RCMP	▪ Risk and Contingency Management Plan
RFMP	▪ Rail Fleet Management Plan
RFP	▪ Request for Proposals
rms	▪ Root Mean Squared
ROD	▪ Record of Decision
ROW	▪ Right-of-Way
RSD	▪ Revenue Service Date
RTD	▪ Rapid Transit Division
SBS	▪ Schedule Breakdown Structure
SCC	▪ Standard Cost Category
SF	▪ Start-Finish
SOA	▪ State Oversight Agency
SS	▪ Start-Start
SSCP	▪ Safety and Security Certification Plan
SSMP	▪ Safety and Security Management Plan
TC	▪ Train Control
TC&C	▪ Technical Capacity and Capability
TCCR	▪ Train Control and Communications Room
TCRP	▪ Transit Cooperative Research Program
TES	▪ Train Electrification System
TPM	▪ Office of Program Management
TPSS	▪ Traction Power Substation
TRB	▪ Transportation Research Board
TRU	▪ Transformer-Rectifier Unit
TVM	▪ Ticket Vending Machine
UH	▪ University of Hawaii

UHERO	▪ University of Hawaii Economic Research Organization
UL	▪ Underwriters Laboratories
UPS	▪ Uninterruptible Power Supply
US	▪ United States of America
USB	▪ Universal Service Bus
USDOT	▪ United States Department of Transportation
USN	▪ United States Navy
V	▪ Volt
UITP	▪ International Association of Public Transport and
UTO	▪ Unattended Train Operation
VDC	▪ Volts, Direct Current
VE	▪ Value Engineering
VTA	▪ Verification, Test, and Acceptance
WBS	▪ Work Breakdown Structure
WOFH	▪ West Oahu/Farrington Highway
YOE	▪ Year of Expenditure

Note: The above list includes all acronyms identified in the various OP deliverables.

## Appendix B: Documents Reviewed

Document	Rev. No.	Date
<b>Management Plans/Administrative</b>		
Final Environmental Impact Statement (FEIS)	-	25-Jun-10
Programmatic Agreement (PA)	-	18-Jan-11
Record of Decision (ROD)	-	18-Jan-11
Project Management Plan (PMP)	4.1	Feb-12
Quality Management Plan (QMP)	1	05-Feb-12
Real Estate Acquisition and Management Plan (RAMP)	5	31-Jan-12
Bus Fleet Management Plan (BFMP)	3	Mar-12
Rail Fleet Management Plan (RFMP)	0.1	Mar-12
Safety and Security Management Plan (SSMP)	3A	28-Feb-12
Safety and Security Certification Plan (SSCP)	2A	01-Mar-12
Configuration Management Plan	0.2	07-Feb-12
Staffing and Succession Plan	4	09-Feb-12
Operating Plan	0.1	Mar-12
Force Account Plan	0.3	05-Jan-12
Mitigation Monitoring Program	0	15-Mar-12
Interface Management Plan	0.1	17-Jan-12
Risk Contingency Management Plan	Pending	Pending
Contract Packaging Plan	3	30-Mar-12
Claims Avoidance Plan	0.1	24-Jan-12
Construction Management Plan (CMP)	0.1	03-Feb-12
Contract Resident Engineer Manuals (DB & DBOM)	0.1	Feb-12
Contract Resident Engineer Manual (DBB)	A	15-Feb-12
1.PP-01 – Procedures Index	0	15-Mar-12
1.PP-02 – Procedure Development Process	0.1	12-Mar-12
1.PP-03 – Standard Terms, definitions, and Acronyms	0.1	12-Mar-12
1.PP-04 – Baseline Documents Revision and Control	0.1	12-Mar-12
1.PP-05 – Identification of Badge Policy	0.1	15-Mar-12
2.PA-01 – Security Sensitive Information (SSI)	0.1	12-Mar-12
2.PA-02 – Procurement Control	0.1	12-Mar-12
2.PA-03 – Email Management	0.1	12-Mar-12
2.PA-04 – Project Wide Document Control	0.1	12-Mar-12
2.PA-05 – Project Library	0.1	12-Mar-12
2.PA-06 – Community Relations and Media Contacts	0.1	12-Mar-12
2.PA-07 – RTD Training Procedure	0.1	12-Mar-12
2.PA-08 – Policy for Safeguarding Protected Information	0.1	12-Mar-12
3.PM-01 – Contract Management System	1.1	14-Mar-12
3.PM-04 – Public Information Communication	0.1	15-Mar-12
3.PM-05 Meeting/Minutes	2.1	12-Mar-12
4.PC-02 – Project Management Control	0.1	15-Mar-12
4.PC-03 – Project Progress Reports	0.1	15-Mar-12
4.PC-04 – Program Scheduling	0.1	15-Mar-12
4.PC-05 – Project Accounting	0.1	12-Mar-12
4.PC-06 – Cost Estimating	0.1	12-Mar-12
4.PC-07 – Cost Control	0.1	12-Mar-12
4.PC-08 – Risk Management	0.1	12-Mar-12
4.PC-09 – Contingency Management	1	15-Mar-12
5.CA-01 – Contract Administration	0.1	15-Mar-12
5.CA-02 – Contract Change Management	0.1	14-Mar-12

Document	Rev. No.	Date
5.CA-03 – Contractor Progress Payments	0.1	13-Mar-12
5.CA-04 – Contractor Progress Reports	0.1	13-Mar-12
5.CA-05 – Contract Change Orders	0.1	13-Mar-12
5.CA-06 – Contract Closeout	0.1	13-Mar-12
5.CA-07 – Claims and Disputes Resolution	0.2	14-Mar-12
5.CA-08 – CACO and Contract Amendment Procedure	0	14-Mar-12
6.CM-01 – Submittal Procedure	1.1	14-Mar-12
6.CM-02 – RFI Procedure	2.1	14-Mar-12
6.CM-03 – RFC Procedure	0.2	14-Mar-12
6.CM-05 – Interface Management and Coordination Procedure	0.1	12-Mar-12
7.GA-01 – Board – Staff Interaction	0	17-July-11
7.GA-04 – Petty Cash Fund	0	17-July-11
7.GA-06 - Travel	0	17-July-11
7.GA-07 – Preparation of Board Materials	0	20-July-11
<b>Technical</b>		
Design Criteria		
Chapter 1 – General		15-Mar-12
Chapter 2 – Operations		15-Mar-12
Chapter 3 – Environmental Considerations		15-Mar-12
Chapter 4 – Track Alignment and Vehicle Clearances		14-Feb-12
Chapter 5 – Trackwork		15-Mar-12
Chapter 6 – Civil		15-Mar-12
Chapter 7 – Traffic		15-Mar-12
Chapter 8 – Utilities		15-Mar-12
Chapter 9 – Structural		15-Mar-12
Chapter 10 – Architecture		10-Feb-12
Chapter 11 – Landscape Architecture		15-Mar-12
Chapter 12 – Passenger Vehicles		10-Feb-12
Chapter 13 – Traction Electrification		15-Mar-12
Chapter 14 – Train Control		15-Mar-12
Chapter 15 – Communications and Control		15-Mar-12
Chapter 16 – Fare Vending		15-Mar-12
Chapter 17 – Corrosion Control		15-Mar-12
Chapter 18 – Maintenance & Storage Facilities (MSF)		14-Feb-12
Chapter 19 – Facilities Mechanical		15-Mar-12
Chapter 20 – Facilities Electrical		15-Mar-12
Chapter 21 – Fire and Intrusion Alarm Systems		15-Mar-12
Chapter 22 – Elevators and Escalators		15-Mar-12
Chapter 23 – Fire/Life Safety		15-Mar-12
Chapter 24 – Systems Assurance		10-Feb-12
Chapter 25 – System Safety and Security		15-Mar-12
Chapter 26 – Sustainability		14-Feb-12
HART Directive Drawings		3-Nov-10
H RTP Standard Specifications		15-Feb-12
West Oahu/Farrington Station Highway Final Design Drawings		Various
Geotechnical Data Report (WOFH)		27-Mar-09
Supplement to Geotechnical Data Report (WOFH)		15-May-09
Geotechnical Baseline Report (WOFH)	2.0	Aug-09
Kamehameha Highway Interim Design, Advanced Interim Design, and Final Design Drawings		Various
Kamehameha Highway Segment Geotechnical Baseline Report	1.1	07-May-10
Kamehameha Highway Geotechnical Data Report		16-Feb-10

Document	Rev. No.	Date
Kamehameha Highway Geotechnical Data Report Addendum		7-May-10
Airport Preliminary Engineering Drawings, Volumes 1-3		1-Oct-10
Airport Geotechnical Data Report		8-Feb-10
Airport Fixed-Guideway Foundation Technical Memorandum		6-Feb-10
City Center Preliminary Engineering Drawings, Volumes 1-4		6-Oct-10
City Center Geotechnical Data Report		26-Feb-10
City Center Fixed-Guideway Foundation Technical Memorandum		26-Feb-10
East Kapolei Station Updated Design Plans		9-Mar-12
UH West Oahu Station Updated Design Plans		9-Mar-12
Hoopili Station Updated Design Plans		9-Mar-12
West Loch Station In-Progress Submission		29-Feb-12
Waipahu Transit Center Station In-Progress Submission		29-Feb-12
Leeward Community College Station In-Progress Submission		29-Feb-12
Pearl Highlands Station Updated Design Plans		9-Mar-12
Pearlridge Station Updated Design Plans		9-Mar-12
Aloha Stadium Station Updated Design Plans		9-Mar-12
Airport Station Group Updated Design Plans		9-Mar-12
Dillingham Station Group Undated Design Plans		9-Mar-12
Kaka'ako Station Group Updated Design Plans		9-Mar-12
Ala Moana Station Updated Design Plans		9-Mar-12
Guideway Superstructure Study – Summary Report		22-May-08
Structures Workshop Summary Report		7-10-Jan-08
Systems Workshop Presentation		22-Aug-08
Transportation Technical Report		1-Aug-08
Construction Workshop Frequently Asked Questions (FAQ)		12-Jun-08
Construction Workshop Presentation		12-Jun-08
Environment Condition of Property, NAVFAC (Navy Drum Site)		Mar-09
Final Evaluation of Project Delivery Options		2-Nov-06
Fixed Guideway Fleet Sizing Report		Jun-09
Value Engineering – Stations Report		Sep-10
Value Enhancement Summary Report		Sep-10
<b>Contracts</b>		
West Oahu/Farrington Highway Design-Build – RFP, Addenda, Proposal and Contract Documents		Various
Kamehameha Highway Design-Build – RFP, Addenda, Proposal and Contract Documents		Various
Maintenance and Storage Facility Design-Build – RFP, Addenda, Proposal and Contract Documents		Various
Core Systems DBOM – RFP, Addenda, Proposal and Contract Documents		Various
General Conditions of Design-Build Contracts, Honolulu		Feb-09
<b>Financial/Cost</b>		
FFGA Capital Cost Estimate Basis and Assumptions		9-May-12
FFGA Main Worksheet – Build Alternative		14-May-12
FFGA Cash Flows Worksheet		14-May-12
FFGA H RTP SCC Cost Workbook		14-May-12
HART Capital Cost by Contract by SCC Workbook		20-Mar-12
Price Proposals (post bid) Kiewit WOFH		11-Nov-09
Price Proposals (post bid) Kiewit MSF		16-Mar-11
Price Proposals (post bid) Kiewit Kamehameha		16-Mar-11
Price Proposals (post bid) Ansaldo Core Systems		16-Mar-11
General Excise and Use Tax in Hawaii		16-Feb-06
<b>Schedule</b>		

<b>Document</b>	<b>Rev. No.</b>	<b>Date</b>
HRTTP Baseline Progress Schedule REV.04.xer		13-Jun-12
HART FFGA BASELINE PMOC Review.plf		13-Jun-12
Basis of Schedule 062012.pdf (Rev 3.0)	3.0	20-Jun-12

Note: The above list includes all key documents reviewed by the PMOC for preparation of the various OP deliverables.