FINAL PRELIMINARY DESIGN REPORT

GCT Administration & Operations Facility
Gold Coast Transit
Oxnard, California

March 31, 2014
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Chapter One  
Project Overview

Introduction  
Gold Coast Transit (GCT) wishes to vacate their existing facilities and relocate their Bus Operations to a new site on the northwest corner of Auto Center Drive and Paseo Mercado in Oxnard, California. Their current fleet is sized at 54 buses and the original August 2013 Master Plan was developed as a 150-bus facility program. The new Administration and Operations Facility is now being developed as a 125-bus facility.

Conceptual designs have been prepared for the site and buildings which are included in this submittal.

Functional and Operational Design Data

Administration Function  
The Administration staff is responsible for budgeting, accounting, payroll and benefits, purchasing, human resources, risk management, safety programs, etc. The Administration staff also includes Planning & Marketing staff responsible for oversight of the paratransit contract, marketing, scheduling, long and short range route planning, sales of fare media, promotions, customer communications and outreach, and agency interface.

The projected hours of operation for Administrative staff are 8:00 a.m. to 5:00 p.m. Monday through Friday. A separate Customer Service Center is located off-site and is open from 7:00 a.m. to 7:00 p.m., five days a week. See Table 1.A for staffing data summary and the Program for breakdown of employees by department.

Operations Function  
Operations staff provide bus and paratransit service throughout the County and Cities which are within GCT’s service area. The Service Area includes the Cities of Ojai, Oxnard, Port Hueneme, and Ventura and unincorporated areas of western Ventura County.

The projected hours of Operations are 4:00 a.m. to 12:00 a.m., but have the potential to go to a 24 hour facility. See Table 1.A for staffing data summary and the Program for breakdown of employees by department.
Maintenance and Service Function

Fleet Maintenance staff is responsible for maintaining the fleet of buses and the non-revenue fleet of vehicles. Work includes, but is not limited to, preventive maintenance, inspections, tires, brake work, fare box repair, electronics repair, etc.

Service workers are responsible for fueling, interior cleaning, washing buses, and parking the buses in the bus parking area. Building Maintenance staff is responsible for maintaining the buildings and grounds of the bus property. Work includes minor plumbing, HVAC and electrical, and performing the preventive maintenance tasks required for the equipment building systems. Janitorial work is contracted out.

The projected hours of Operation are 4:30 a.m. to 12:30 a.m. Monday through Friday, 6:00 a.m. to 11:00 p.m. Saturday, and Sunday, 8:00 a.m. to 11:00 p.m. See Table 1.A for staffing data summary and the Space Needs Program (Appendix C) for a detailed breakdown of employees by department.

Table 1.A - Staff Summary

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Pull-out/Pull-in Schedule

GCT has developed projections of their anticipated pull-out/pull-in schedule for a 125-bus facility. The Exhibit 1.A captures these projections which were used to develop the “Operators” staffing calculations in the On-site Employee Breakdown spreadsheet shown previously.
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**Total Buses:** 55
### On-site Employee Staff Breakdown

Due to the varying staffing hours and shift overlaps for a transit agency, GCT and MDG prepared a detailed On-Site Employee Staff Breakdown spreadsheet (Exhibit 1.B) using the Space Needs Program (Appendix C). The spreadsheet is intended to show the projected number of employees onsite during a designated period throughout the day.

It is important to note the On-site Employee Staff Breakdown assumes all employees will be onsite 30 minutes before and after their respective shift.

The On-site Employee Staff Breakdown is divided into each the following:

- Administration
- Operations
- Operators
  - Coincides with GCT’s 125-bus pull-in/pull-out schedule (Exhibit 1.A)
- Maintenance
- Service
- Facilities Maintenance

### Noise Sources

As a study for the environmental documentation, GCT has requested the Design Team provide graphics to support potential noise sources located on the new Master Plan which is shown on Exhibit 1.C.
### Exhibit 1.B - GCT On-Site Staff Breakdown

#### GCT Staff Onsite (125 Bus Program)

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<th>Day</th>
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<td>100% Staff</td>
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<td>100% Team</td>
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#### GCT Staff Onsite Chart

The chart illustrates the staff onsite by day of the week for different roles and departments. The x-axis represents the day of the week (Mon to Fri), and the y-axis represents the number of staff onsite. Different roles and departments are color-coded for easy differentiation. The chart shows the peak and trough times for each role across the week.

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**Gold Coast Transit**
**Oxnard, California**

1.5

**Maintenance Design Group, LLC**
Chapter Two
Design Charrette

Introduction
As part of this effort, GCT asked the MDG Design Team to review and confirm the Program and Space Needs data from the August 2013 Auto Center Facility Program Verification and Master Plan Report. The following is a list of notable changes from the 2013 report as directed by GCT:

- Project is to be designed as a 125-bus facility
- No public CNG fueling will be incorporated
- CNG fueling will occur at the site for standard buses (40-foot), Paratransit buses, and non-revenue vehicles
- Gas vehicles will be fueled offsite
- Provisions for servicing, maintaining, and storing articulated buses and Paratransit buses are not required with the exception of fueling for Paratransit buses

Prior to conducting the Design Charrette with GCT, MDG (Project Management and Industrial Equipment Design), RNL (Architect), and Huitt-Zollars (Civil Engineer) gathered at MDG’s Pasadena office to review the abovementioned program and conduct a “hot-start” charrette to develop various site concepts and building layouts using the revised program.

The Design Charrette was held at the Oxnard Transportation Center (201 East 4th Street, Oxnard, CA) January 22-24, 2014. This On-site Design Charrette approach allowed key staff from GCT to gather, participate, and provide valuable input and insight into the overall design and layout of the Site Master Plan and Building Concepts for the new facility.

This chapter provides an analysis and GCT comments of various concepts presented throughout the week. The final agreed upon Site Master Plan is presented at the end of this chapter.

Participants
The following groups participated in the on-site Design Charrette:

- Gold Coast Transit
- Maintenance Design Group
- RNL
- Huitt-Zollars

A detailed attendance sheet for each review session can be found in Appendix J - Meeting Notes and Attendance.
Master Plan Goals

The MDG Design Team approached the on-site design effort with a list of predetermined goals. These goals provided direction as the MDG Design Team looked to meet the facility needs and objectives. The following goals also helped focus the effort of the design session during the development and presentation of the different concepts and planning options.

- Meet the Master Planning Needs of Gold Coast Transit of a 125-bus facility.
- Provide adequate vehicle parking
- Provide good site circulation
- Provide Dispatch view of bus yard
- Building should be welcoming and open to public

On-site Design Charrette

Day 1
January 22, 2014

GCT and the Design Team independently reviewed the 2013 Program and proposed changes based on a 125-bus facility. Many of the originally programmed spaces and sizes were unchanged in Administration because they are not dependent on the number of buses. Some totals (number of drivers, dispatchers, mechanics, and repair bays) were affected based on the programming ratios per bus and revised prior to the charrette.

Don Leidy (MDG) gave an introduction to the project and an overview for each of the following concepts developed during the “hot-start” charrette:

Exhibit 2.A - Site Concept A

Concept A was developed during the 2013 Master Plan effort as a 150-bus facility with a public CNG fueling station along Paseo Mercado. As noted previously, these programmatic elements were revised (125-bus facility) and removed (public CNG fueling).

GCT’s General Manager, Steve Brown, noted that the driving factor behind Site Concept A during the 2013 study was the requirement for CNG Public Fueling. GCT eliminated public CNG fueling from the program because they did not receive support from the City of Oxnard.
Concept B was takes into account GCT’s request to have a private access road at the controlled intersection of Paseo Mercado and Auto Center Drive but cuts through the southern portion of the site back towards the existing Paseo Mercado road. This would eliminate total on-site paving required and free up more space for employee vehicle parking. The Fuel and Wash Building is relocated to the west portion of the site and the Maintenance Building is positioned along the east side of the site along Paseo Mercado.

Key features:
- Single-loaded Maintenance Building
- U-turn-concept fuel and wash cycle
- All buses enter site at cul-de-sac
  - Alternate bus entry is at cul-de-sac
  - No private drive road west of employee parking
- Reduced employee parking counts

Comments from GCT:
- Want true drive-through Maintenance Building
- Concerns about donut-concept at Fuel and Wash Building
- Limited parking growth if needed in future

Concept C is similar to Concept B but provides a double-loaded drive-through Maintenance Building. Maintenance and Non-Revenue parking is a long row of parking between Admin/Ops and Maintenance Buildings.

Key features:
- Double-loaded drive-through Maintenance Building
- U-turn-concept fuel and wash cycle
- All buses enter site at Paseo Mercado intersection
  - No private drive road west of employee parking
- Reduced employee parking counts
- Maintenance employee parking east of Maintenance Building
- Admin/Ops employee parking south of Admin/Ops Building

Comments from GCT:
- Concerns about donut-concept at Fuel and Wash Building
- Concerns about employee vehicle circulation and parking mixed with bus circulation and parking.
- Concerns about unsecure employee parking
- Limited parking growth if needed in future
Exhibit 2.D - Site Concept D

Concept D is similar to Concept C with a reconfigured private drive off Auto Center Drive west of the employee parking and located employee and visitor parking lot entries along Paseo Mercado.

Key features:
- Double-loaded drive-through Maintenance Building
- U-turn-concept fuel and wash cycle
- Space for 25 future bus parking
- All buses enter site at cul-de-sac
  - Alternate bus entry is at cul-de-sac
- Reduced employee parking counts
- All employee parking to south of Admin/Ops Building
- Secure employee parking
- Separate visitor and accessible parking near Admin/Ops Building
- Shared courtyard between Admin/Ops and Maintenance Buildings

Comments from GCT:
- Concerns about donut-concept at Fuel and Wash Building
- Like that there is no mixing of buses and employee vehicles
- Need additional access point from employee parking area and private drive aisle
Admin/Ops Concept A uses a two-story office-type building concept with Operations on the ground floor and Administration on the second floor.

Key features:
- Two-story office-type building
- Some Admin functions on ground level include Board Room, Lobby, Reception, Interview, and Lost and Found.

Comments from GCT:
- Prefer separate Driver and public entry doors
- GCT wants buildings and public entry to be “welcoming” to public
- Want Design Team to show patio on roof west of Admin spaces on second floor.
Admin/Ops Concept B is designed using a single-story structure for both departments. The total footprint is larger than Concept A but it requires less building height. GCT has a specific synergy between Administration and Operations and the single-story concept can enhance that.

Key features:
• Single-story office structure
• Consolidates all Admin/Ops square footage to ground floor level.

Comments from GCT:
• GCT would prefer two-story structure similar to Concept A. The proximity within one building will still enhance synergy between each department.
• Prefer to maximize natural light and reduce quantity of interior spaces
• Long distance to walk from Administration end of building to Operations end of building
Exhibit 2.G - Maintenance Building Concept A

Maintenance Building Concept A is a single-loaded back-in/pull-out concept with Admin, Storage, and Support spaces on the other side of the forklift aisle running down the center of the building.

Key features:
- PM Inspection Bays allow drive-through

Comments from GCT:
- GCT wants a true drive-through facility for all repair bays

Exhibit 2.H - Maintenance Building Concept B

Maintenance Building Concept B implements a 100% drive-through facility. The shops and parts storeroom are centrally located between the maintenance bays. All Admin and Support spaces are located on the (right) end of the building.

Key features:
- Allows for full drive-through capability in all repair and PM inspection bays

Comments from GCT:
• GCT has an issue with the overall length of the building and travel distance from one end to another.
Day 2
January 23, 2014

Concept E kept the Admin/Ops Building in the center of the site but relocated a single-loaded drive-through Maintenance Building closer to Auto Center Drive. The design intent was to give GCT a presence closer to Auto Center Drive and the Maintenance Building is able to provide that without compromising necessary clearances.

Key features:
- Single-loaded drive-through Maintenance Building
- In-line fuel and wash cycle
- Space for 25 future bus parking
- All buses enter site at Auto Center Drive and Paseo Mercado controlled intersection
- Alternate bus entry is at cul-de-sac
- Reduced employee parking counts
- All employee parking to north of Admin/Ops Building
- Secure employee parking
- Separate visitor and accessible parking near Admin/Ops Building

Comments from GCT:
- Prefer the in-line service cycle at Fuel and Wash Building
- Some mixing of employee vehicles and buses but is managed well by the layout
- Appreciate the effort to provide presence along Auto Center Drive, GCT was not convinced that is the appropriate place for the Maintenance Building

Concept F kept the Admin/Ops Building in the center of the site but relocated a single-loaded drive-through Maintenance Building closer to Auto Center Drive. The design intent was to give GCT a presence closer to Auto Center Drive and the Maintenance Building is able to provide that without compromising necessary clearances.

Key features:
- Single-loaded drive-through Maintenance Building
- L-shape Maintenance Building
- In-line fuel and wash cycle
- All buses enter site at Auto Center Drive and Paseo Mercado controlled intersection
  - Alternate bus entry is at cul-de-sac
- Admin/Ops employee parking to south of Admin/Ops Building
- Maintenance and Non-Revenue Parking east of Maintenance Building
Secure employee parking
Separate visitor and accessible parking near Admin/Ops Building

Comments from GCT:
- Prefer the in-line service cycle at Fuel and Wash Building
- Some mixing of Maintenance employee vehicles and buses, but it is not a significant issue to GCT
- Dispatch does not have a view of the entire yard
- GCT asked if Paratransit could fuel offsite to not increase circulation throughout bus yard
- GCT does not prefer disconnected bus parking

Exhibit 2.K - Site Concept G

Concept G locates all employee parking south of the Admin/Ops Building. The Maintenance Building is positioned in the west corner of the site and the Admin/Ops Building is positioned slightly farther to the northeast compared to previous layouts.

Key features:
- Single-loaded drive-through Maintenance Building
- L-shape Maintenance Building
- Fuel and Wash Buildings are separated but still provides an in-line service cycle
- All buses enter site at Auto Center Drive and Paseo Mercado controlled intersection
  - Alternate bus entry is at cul-de-sac
- All employee parking to south of Admin/Ops Building
- Secure employee parking
- Separate visitor and accessible parking near Admin/Ops Building
- Paratransit fuel lane located on Paseo Mercado but not within bus yard

Comments from GCT:
- Concerns about the amount of circulation throughout the site during the service cycle
- Dispatch does not have a view of the entire yard
- Concerns about CNG odors close to Admin/Ops Building and neighboring buildings across Paseo Mercado
- GCT feels obligated to make Fuel and Wash Building look good aesthetically due to proximity to Paseo Mercado
- Concerns about offsite Paratransit CNG fueling station. Requires additional security to ensure safety of employees and equipment
Exhibit 2.L - Site Concept H

Concept H locates Admin/Ops employee parking south of the Admin/Ops Building. Maintenance and Non-Revenue parking is east of Maintenance Building. The Maintenance Building is positioned in the north corner of the site and the Admin/Ops Building is positioned slightly farther to the northeast compared to previous layouts.

Key features:
- Single-loaded drive-through Maintenance Building
- In-line fuel and wash cycle
- All buses enter site at Auto Center Drive and Paseo Mercado controlled intersection
- Admin/Ops employee parking to south of Admin/Ops Building
- Maintenance and Non-Revenue Parking east of Maintenance Building
- Secure employee parking
- Separate visitor and accessible parking near Admin/Ops Building

Comments from GCT:
- Do not want to back buses into parking spaces like that show on the eastern-most section of bus parking
- GCT prefers Admin/Ops and Maintenance Buildings are near one another for connection
- Maintenance Building location causes security concerns for deliveries
- Maintenance Building location will create additional costs for utilities and other services to this location on site

Exhibit 2.M - Site Concept I

Concept I locates the Maintenance Building on the west portion of the site, similar to the 2013 Master Plan. Maintenance employee and Non-Revenue parking is located south of the Maintenance Building. Fuel and Wash is located near Paseo Mercado.

Key features:
- Single-loaded drive-through Maintenance Building
- In-line fuel and wash cycle
- All buses enter site at Auto Center Drive and Paseo Mercado controlled intersection
- Admin/Ops employee parking to south of Admin/Ops Building
- Maintenance and Non-Revenue Parking south of Maintenance Building
- Secure employee parking
- Separate visitor and accessible parking near Admin/Ops Building
Comments from GCT:
- GCT prefers Admin/Ops and Maintenance Buildings are near one another for connection
- Maintenance Building location causes security concerns for deliveries
- Maintenance Building location will create additional costs for utilities and other services to this location on site
- Concerns about CNG odors close to Admin/Ops Building and neighboring buildings across Paseo Mercado
- GCT feels obligated to make Fuel and Wash Building look good aesthetically due to proximity to Paseo Mercado
- Shorter walk for operators with Maintenance Building on west portion of site

Exhibit 2.N - Admin/Ops Concept D

Admin/Ops Concept D was developed as a two-story concept similar to Concept B which had common spaces between offices located along exterior walls. The overall footprint of this design is wider because of the multiple corridors required for circulation.
Key features:
- Two-story design
- Administration mostly on second floor

Comments from GCT:
- Operations spaces (Dispatch, Drivers’ area, restrooms, etc.) look too small
- Board Room should be adjacent to Lobby so that public know where to go when visiting for Board meeting
- Need security point to secure Lobby and spaces beyond
- Training Room is too close to Lobby
- Training Office should have exterior window

Exhibit 2.O - Admin/Ops Concept E

Admin/Ops Concept D

Key features:
- Shared spaced between offices
- Training spaces and restrooms central to first floor
- “Bump-outs” in floor plan help plan meet program and allow for natural daylighting opportunities.
Comments from GCT:
- Dispatch needs view of Drivers’ area
- Provide expansion space on second floor of Admin/Ops building and extend Patio to align with west corner of south façade.
- GCT likes that the north façade begins to develop interior courtyard.

**Exhibit 2.P - Maintenance Building Concept B.1**

Maintenance Building Concept B.1 is a long, single-loaded drive-through building design developed for Site Concept E. The Tire Storage and Lube/Compressor Room are “bump outs” in the floor plan to meet program and break up the building skin.

Key features:
- Parts storeroom centrally located
- Drive-through repair bays
- Office and Support spaces located on (right) end of building plan

Comments from GCT:
- Tire storage areas need to be near, and open to, repair bay.
- Supervisor has view of only half of the repair bays. GCT Supervisor suggests providing a view to all repair bays
Concept J locates the Maintenance Building on the west portion of the site, similar to the 2013 Master Plan. Maintenance employee and Non-Revenue parking is located south of the Maintenance Building. Fuel and Wash is located near Paseo Mercado.

Key features:
- Single-loaded drive-through Maintenance Building
- U-shape Maintenance Building
- In-line fuel and wash cycle
- All buses enter site at Auto Center Drive and Paseo Mercado controlled intersection
  - Alternate bus entry is at cul-de-sac
- All employee parking to south of Admin/Ops Building
- Secure employee parking
- Non-Revenue parking west of Admin/Ops Building
- Delivery trucks enter at cul-de-sac and exit near Maintenance and Admin/Ops Buildings
- Courtyard space between Admin/Ops and Maintenance Buildings
- Allows for 25 additional future bus parking stalls west of Non-Revenue parking
- Paratransit and Non-Revenue parking occurs onsite
- Offsite detection of CNG odors are mitigated by location of CNG fuel yard in north corner of site
• Provides sufficient water retention areas
• Dispatch has view of entire bus yard

Comments from GCT:
• Shorter walk for operators with Fuel and Wash Building on west portion of site
• Employee parking needs to be secured from visitor parking

Exhibit 2.R - Final Admin/Ops Concept E.1

The Final Admin/Ops Concept E.1 accommodates future expansion area and roof-top patio for employees to view courtyard and bus storage yard.

Key features:
• Per GCT’s request, the Design Team included future expansion space on the second floor to accommodate potential expansion by GCT. This space was drawn in west of the Break Room, Planning & Marketing areas on the west end of the second floor.
• The Dispatch area has a view of the bus yard west of the building.
• Consolidated floor plan on second floor

Comments from GCT:
• Relocate Drivers’ Area to north face of building to allow view of courtyard.
• Move Operations offices and Conference Room to southwest corner.

Exhibit 2.5 - Maintenance Building Concept C

The Maintenance Building Concept C implements a single-loaded drive-through design. The design is U-shaped building to fit within the constraints of the site while maintaining clearances to the north of the repair bays.

Key features:
• Single-loaded, drive-through concept
• Parts storeroom on northeast corner for deliveries
• Maintenance office areas are located on south end of building for proximity to Admin/Ops Building

Comments from GCT:
• GCT likes the proximity of office spaces between Maintenance and Admin/Ops Buildings
• Like the Admin Supervisors having a view of all repair bays from the shared office near Parts Storeroom
• May need to expand Parts Storeroom space to meet Program
• Reduce square footage of Training Room
• Training Room does not need to be adjacent to Repair Bays
• Reduce square footage of Money/Vault Room and add Admin/Ops Storage on west end of "south bar" for additional Admin/Ops storage space

Summary
The on-site Design Charrette was well-received by GCT staff because it served as an opportunity for key stakeholders to come together and participate in the design process, which resulted in consensus on the Site Master Plan.

Below is a list of consistent comments received from GCT staff during the Design Charrette:

• No employee vehicles within bus yard
• Develop true drive-through Maintenance Building
• Admin/Ops and Maintenance Buildings should be located near each other on the final site plan
• Points of access beyond Lobby must be secured.

Post On-Site
After the on-site Design Charrette, the Design Team made necessary adjustments to Concept J to produce the Final Site Master Plan and update the Maintenance Building plan following discussions with GCT Maintenance Staff on Day 3 of the Design Charrette. The Design Team will use this plan moving forward throughout the design stages.
Chapter Three
Design Narratives

Architectural

Governing Codes

- Authority Jurisdiction: City of Oxnard
- Planning Reference: Rose-Santa Clara Corridor Specific Plan (Jan 1985)
- 2013 California Building Standards Code
- 2013 California Electrical Code
- 2013 California Mechanical Code
- 2013 California Plumbing Code
- 2013 California Energy Code
- 2013 California Fire Code
- 2013 California Green Building Standards Code
- NFPA 72, National Fire Alarm & Signaling Code, 2013 edition
- 2010 ADA Standards for Accessible Design

Design Process/Concept

The Gold Coast Transit (GCT) project is a campus of buildings intended to service and maintain a bus fleet of 125 buses. The project is designed to accommodate the existing and future growth needs. The campus consists of a Maintenance Building, Bus Fueling, Bus Washing, and a two-level Administration and Operations Building.

The overall design concept which informs the massing and character of the architecture stems from idealistic agricultural imagery of the region. This imagery informs the massing and strategic use of color throughout the campus, with creatively arranged architectural composition using appropriately sited materials and color. The site and building layouts address the functional nature of the project while giving GCT a new public image. GCT provides a necessary service to the community it serves, and strives to promote ‘sustainability’ not only as a
Administration and Operations Facility
Final Preliminary Design Report

byproduct of their service, but as a fundamental basis for this project, using the buildings as a Civic representation of their commitment to sustainability.

The site is within an existing industrial business park. The front door of the facility is the Administration & Operations (Admin/Ops) Building which is set back from the main street frontage in order to use the buildings as part of the secured perimeter of the site. The bus parking is within the back (non-public) portion of the site, screened by the Maintenance and Admin/Ops Buildings. The buses circulate in a counterclockwise maneuver motion around the site which facilitates reduced movement for hostlers as they service the vehicles through the fuel and wash functions at the end of each day.

The Admin/Ops Building is a steel structure enclosed with metal panels on steel studs, glass and shading devices. Alternate exterior cladding materials, shown later in this chapter, for the first floor include concrete panels, tilt up or precast, masonry blocks or stucco. Alternate materials for the second floor include stucco. Sun-screens will be used on the south facade to reduce heat gain and glare.

The main front door of the building is the public entry and shares this function with the Board Room adjacent to the building’s main lobby space. A rooftop patio serves the employees above the west facing portion of the building. All regularly occupied spaces receive natural light reducing the need for artificial light requirements. Each space will also have task lighting and operable windows. The office areas of each building will use natural ventilation techniques wherever possible to reduce electrical motor loads. The Admin/Ops and Maintenance Buildings together create an exterior, landscaped courtyard between them which is shared by all the users of the facility.

The Maintenance Building is also steel structure enclosed with masonry block to 8'-6" height with metal panels on steel studs above. Alternate exterior cladding materials include full height
masonry blocks or full height concrete panels, tilt up or precast. It is one service bay deep, giving the users complete drive through capability, avoiding any backing maneuvers. Operationally this building requires hard surfaces, easy to maintain and maneuver throughout; therefore floors will be sealed concrete with a light colored ad-mixture which will be light-reflective. Walls will be primarily masonry and ceilings primarily exposed. Duct and conduit will be exposed and often surface mounted to walls or columns. Natural light is being brought into the maintenance bays through clerestory lights or skylights. This light will provide even light throughout the bays, and not just at the back of the bays where work is being done, which should provide for an exceptional working environment and the reduction of operating costs. Natural light is being brought into the unoccupied mezzanine spaces by use of solatubes.

The Bus Wash Building and Fuel Facility follow the same design aesthetic as the Maintenance and Admin/Ops Buildings, each one different in form and massing based on its specific function, but similar in the architectural character of the materials. The Bus Wash Building and Fueling Facility are load bearing concrete or masonry walls enclosing the building functions. The wash bays are separated by walls made of polycarbonate material used for the high humidity areas while allowing the light to filter through the bays. The wash canopy and fueling lanes are covered, providing shade and protection from the environment. The wash canopy roof structure will utilize concrete planks to avoid rusting due to the wet environment of this space. Flat roofs on this building will be light colored.

The cohesiveness of all the buildings within the project lie in its use of durable materials, similar detailing, and a combination of massing which is appropriate to the environment while celebrating the richness of regional landscape forms and colors.

Some special consideration items are the use of passive ventilation techniques and the use of photovoltaic (PV) panels. The Design Team is exploring incorporating PV panels to the employee parking area to be installed to collect solar energy and offset GCT’s operational energy needs for the facility. Panels may also be considered on the surface of the Maintenance Building, Fuel and Wash canopies. This would serve as an expression of GCT’s commitment to sustainability and to the surrounding community. Metering this energy collection separately will be an important component to GCT’s long-term operational desires.
Building Materials and Technology

**Fire and Life Safety**
The buildings will have appropriate systems such as automatic fire sprinklers and fire alarms throughout the facilities. They should be suited to the specific functional areas. All systems will comply with all Codes, Standards and Regulations within the design guidelines.

Backup generators will be considered in the next design task. The final design and locations will be determined with GCT.

**Building Skin**
The exterior cladding (building skin) includes the inside face of the wall to the outside face of the wall. Base building cladding in the Conceptual Cost Estimate is metal panels for the Admin/Ops Building and masonry block with metal panels above for the Maintenance Building. Additionally, the Design Team presented three conceptual building design options for the Admin/Ops Building and the Maintenance Building. The building concepts presentation can be found in Appendix D - Conceptual Plans and Building Concepts. These concepts include interchangeable alternate cladding materials such as concrete panels, tilt up or precast, and stucco. The Fuel and Wash Buildings will be concrete or masonry block to match major material selected for the Maintenance Building. Materials will be evaluated for cost and functionality prior to final recommendations and selection.

**Administration/Operations Building**

- **Option 1**
  - 1st floor - Colored CMU aka masonry block and Sealer or concrete panel, with Furring, Batt Insulation (Value R-13), Painted gypsum wall board
  - 2nd floor - Stucco on Lath and Metal Panel or all Metal Panel and Batt Insulation with Sheathing, Vapor Barrier, Continuous Rigid Exterior Insulation (Value R-19) on Z-clips, Painted gypsum wall board
• **Option 2**
  ✓ 1st floor - Tilt-up or precast Concrete panel with Furring, Batt Insulation (Value R-13), Painted gypsum wall board
  ✓ 1st floor - Stucco on Lath and Batt Insulation with Sheathing, Vapor Barrier, Continuous Rigid Exterior Insulation (Value R-19) on Z-clips, Painted gypsum wall board or concrete panel assembly above.
  ✓ 2nd floor - Metal Panel on Metal Studs, Batt Insulation with Sheathing, Vapor Barrier, Continuous Rigid Exterior Insulation (Value R-19) on Z-clips, Painted gypsum wall board

• **Option 3**
  ✓ 1st floor - Colored CMU and Sealer or concrete panel, with Furring, Batt Insulation (Value R-13), Painted gypsum wall board
  ✓ 2nd floor - Metal Panel on Metal Studs, Batt Insulation with Sheathing, Vapor Barrier, Continuous Rigid Exterior Insulation (Value R-19) on Z-clips, Painted gypsum wall board
Maintenance Building

- **Option 1**
  - Metal Panel on Metal Studs - decorative applied over CMU
  - Colored CMU with Furring, Batt Insulation (Value R-13), Painted gypsum wall board
  - Low-E glazing or Translucent Polycarbonate windows above all bay doors

- **Option 2**
  - Metal Panel on Metal Studs - decorative applied over concrete panels
  - Tilt-up or precast Concrete panels with Furring, Batt Insulation (Value R-13), Painted gypsum wall board
  - Low-E glazing or Translucent Polycarbonate windows above all bay doors

- **Option 3**
  - Metal Panel on Metal Studs - decorative applied over CMU
  - Colored CMU with Furring, Batt Insulation (Value R-13), Painted gypsum wall board
  - Glazing or Translucent Polycarbonate clerestory under high side of sloped roofs.
Fuel/Wash Building
• Regular CMU or Cast in Place concrete, Polycarbonate Panels

Roof
Base building roof included in Conceptual Cost Estimate is membrane roofing over rigid insulation (Value R-30).

Administration/Operations Building
• All Options
  ✓ Membrane roofing over rigid insulation (Value R-30)
  ✓ Tubular Skylights

Exterior Patio on Second Level
Base Building Conceptual Cost Estimate does not include a patio on Second Level.

This would occur as part of the Admin/Ops Building as an amenity.

• Option 1
  ✓ Covered exterior balcony in courtyard on architectural steel structure
• Option 2
  ✓ Covered exterior balcony within second floor
• Option 3
  ✓ Roof deck with concrete pavers

Maintenance Building
• Option 1
  ✓ Membrane roofing over rigid insulation (Value R-30)
  ✓ Tubular Skylights
• Option 2
  ✓ Membrane roofing over rigid insulation (Value R-30)
  ✓ Skylight Monitors
• Option 3
  ✓ Standing seam metal roofing over rigid insulation (Value R-30)
  ✓ Sloped Structure
  ✓ Tubular Skylights

Fuel/Wash Building
• Membrane roofing, over rigid insulation (Value R-30) in conditioned spaces

Fenestration
For all buildings and options, tint and low e coating will reduce heat gain and glare for east, west and south exposures with a value of 0.25 shading coefficient.

HVAC Integration
Southern California is a relatively arid environment when considering rainfall. There is an approximate annual average rainfall of 15.64 inches. The sun impact is strong with the temperature being moderate and ranging between 59°F to 74°F in summer and between 45°F to 66°F in winter. Any major heat gain should occur from the south, east and west directions.

HVAC equipment will be rooftop mounted in all buildings, concealed from public view by parapets or rooftop screens. HVAC delivery will be above the ceiling in the Admin/Ops Building. HVAC delivery will be exposed below the structure in the Maintenance Building.

Admin/Ops Building Interiors
The interior design will revolve the overall architectural design in materials, color and approach. The design will interpret operational needs of GCT as established in programming, charrettes and conceptual presentations. The materials will be sustainable where possible including but not limited to the following:

• recycled content carpet and backing
• low VOC paints, primers and adhesives
• locally manufactured materials within 500 miles, when the industry allows
• post-consumer recycled tile and counter tops
• FSC certified wood products

The surfaces will optimize durability when possible. The office environments will be designed to enhance employee productivity with use of natural light, softer materials and multiple colors. All materials will be commercial or industrial grade and will be selected to reduce maintenance.
requirements where possible. The public spaces will have harder more durable surfaces.

**Maintenance Interiors**

Finishes in the Maintenance Bays and adjacent functions are more functional due to nature of activities within these spaces. The floors in bays will be concrete with a white colored hardener for long-term durability and ability to reflect natural light. The walls and ceilings in bays will be exposed and natural light will be brought in through clerestories or skylights. The walls and ceilings will be light-colored for reflectivity and all floor coverings used must be durable and easily maintained.

**Sustainability**

**Overview**

The major goals defined by the Design Team for the new GCT Administration and Operations Facility include a LEED Silver certification. At the Concept Design stage, the specific objectives of this narrative are to define the sustainability goals and processes for the project, identify sustainable features of the project, describe the LEED Green Building Rating System® (LEED) and focus on potential LEED credits being pursued.

To meet the minimum sustainability goal of a LEED Silver certification, a detailed LEED Checklist is provided in *Appendix E - LEED Checklist*. The LEED Documentation Plan specifies the Design Team champions and credit requirements for each LEED credit and prerequisite, the strategies being considered by the Design Team to meet their requirements and their relation to CALGreen. For the GCT Administration and Operations Facility, 50 points have been identified for pursuit by the project team, with an additional 43 points identified for further investigation. Based on the current LEED Documentation Plan point allocation, the design team needs to identify additional credits and pursue at least 55 points to position the project comfortably within the Silver Certification threshold.
LEED

LEED is administered by the U.S. Green Building Council (USGBC) to assess building performance and sustainability goals. LEED addresses facility design considerations for sustainable site development, water savings, energy efficiency, materials selection, indoor environmental quality, as well as innovation in design. The LEED-NC (New Construction), version 4, has been developed for new construction and major renovation projects that wish to pursue LEED certification. The Design Team is committed to maximizing the sustainability of the Gold Coast Transit’s Administration and Operations Facility within the budget and has identified strategies that complement CAL Green to pursue LEED credits in order to achieve a LEED Silver certification.

LEED v4 and CAL Green are mutually supporting systems. While CAL Green 2014 is a code requirement by the State of California, LEED v4 provides opportunities for expanding the benefits of sustainability initiatives required by CAL Green.

Minimum Program Requirements and LEED Project Boundary

LEED v4 Minimum Program Requirements (MPRs) describe the minimum characteristics that a project must possess in order to be eligible for LEED certification. LEED MPRs define the types of buildings that each LEED rating system was designed to evaluate and are provided by the USGBC to provide clear guidance for LEED project teams on the LEED
certification process. The four buildings within the LEED Project Boundary meet the MPRs individually and can pursue separate certifications individually; however, a single rating will be pursued using the Group Certification process since the design and construction scope includes these buildings. Under Group Certification process, multiple buildings or spaces may be certified as a group within one LEED project registration and the entire group with a single LEED project boundary receives a single rating and certification.

The LEED Project Boundary is the portion of the project site submitted for LEED certification. LEED Project Boundary is typically the entire project scope as defined by the property line or limits of construction however, in some cases a different LEED Project Boundary can be defined by the project team. Due to heavy process load in the Fuel and Wash Buildings, the Design Team will be able to fully determine the LEED Project Boundary after initial round of energy analysis. The level of energy analysis required to determine the most useful LEED boundary will support the Design Team to determine the most energy efficient approaches to the project systems design.

**LEED for New Construction Categories**

**Integrative Process**
LEED Integrative Process credit supports high-performance, cost-effective project outcomes through an early analysis of the interrelationships among systems. An initial energy analysis and water analyses performed by the Design Team will be carried out to inform the Owner’s Project Requirements (OPR), Basis of Design (BOD), design documents, and construction documents.

**Location and Transportation**
LEED Location and Transportation prerequisites and credits address issues related to environmental concerns related to building location, compact development, alternative transportation and connection with amenities. The project site avoids environmentally sensitive land and may also pursue high priority site credit if found to contain contaminated materials in the geotechnical investigation. The project will provide bike racks for short-term as well as long-term bicycle storage. GCT has a compressed natural gas fleet and the project will include refueling stations. The project might consider providing fewer parking spaces than local code making it eligible to pursue reduced parking footprint credit. However, project program requirements for future expansion may be more critical to the project’s success.
Sustainable Sites
LEED Sustainable Sites prerequisites and credits address issues related to environmental concerns related to building landscape, hardscape, managing stormwater runoff, protecting and promoting biodiversity, and other exterior building issues. Site assessment will be carried out and used for project design. Native and adaptive species will be used for landscaping to promote biodiversity. In addition the project will consider providing vegetated open space.

The Design Team will work to determine the most effective and lowest maintenance stormwater management system compliant with local jurisdictional, CAL Green and LEED v4 requirements. Stormwater quality and quantity will be managed by diverting stormwater runoff to retention ponds on the property, thus limiting disruption and pollution of natural water flows. The most passive and low maintenance means of retention and filtration will be taken into consideration.

The project will also reduce microclimate temperatures and contribute to the reduction of the urban heat island by using light colored hardscape, possible shading from canopies with PVs, and white roof for the buildings. The project will reduce night time light pollution by using appropriate fixtures to eliminate light trespass and meet uplight requirements.

Water Efficiency
LEED Water Efficiency prerequisites and credits address the critical issue of site and building-related water use, disposal, and treatment, and the related environmental impact of each. One of the key design concepts for the landscape is to primarily use native and/or adapted plant species and plant material with low to very low water requirements. Potable water use for indoor fixtures will be addressed by specifying low-flow fixtures and dual-flush toilets. Water meters will be provided for two or more water use types including irrigation which is mandated per City’s requirements.

Energy and Atmosphere
LEED Energy & Atmosphere prerequisites and credits promote the use of high-performance building and systems design, commissioning, and monitoring to achieve a level of energy performance that exceeds the current industry standard; and managing refrigerants to eliminate chlorofluorocarbons (CFCs), mitigate harmful effects to the ozone layer and global warming.

Project elements associated with energy consumption and production will be carefully studied as these have a significant impact on GCT’s long-term operational costs. The Design Team is committed to maximizing the energy and cost
efficiency of the building systems and processes. The project will pursue the goal of better than 12% energy cost savings against the ASHRAE 90.1-2010 Baseline and/or Title 24 2014, equivalent to four points under EAc1 Optimize Energy Efficiency. This goal will be evaluated after initial energy analysis to determine if additional savings is possible without increasing the cost to the project. The Design Team will collaborate to identify Energy Efficiency Measures (EEMs) that have the potential for further savings in energy use, peak demand, and energy costs beyond the proposed basis of design. Consideration to passive thermal conditioning strategies will be made during early design development. The Design Team will work to access and develop passive conditioning and ventilation design solutions. Analysis of local climate conditions indicates that incorporating passive strategies may be the most cost effective solutions for GCT.

The project will use refrigerants that have no ozone depletion potential and low global warming potential. PVs are being considered to be used on-site to offset building energy cost. Green power and carbon offset will be considered to offset the projects energy use.

**Materials and Resources**

Building material choices are very important in a sustainable design. Materials and Resources section address environmental impacts associated with each of the various lifecycle stages including extraction, harvest, processing, manufacturing, transportation, use, maintenance, and disposal of materials. Strategies proposed to reduce material waste and redirect recyclable recovered resources back to manufacturing process and reusable materials to appropriate sites include providing numerous recycling bins to encourage recycling of waste generated by the building’s employees and visitors that would otherwise be hauled to and disposed of in a landfill during the operations of the building.

The project will reduce landfill waste by diverting at least 75% of the construction waste. The project will use products and materials for which life-cycle information is available and that have environmentally, economically, and socially preferable life-cycle impacts. In order to reduce impacts resulting from extraction and processing of virgin materials and to support local industries and reduce emission and carbon footprint from material transportation, the project will use regional and materials with recycled content. Some of the materials with recycled content under consideration are steel, concrete, metal ceiling, ceramic tiles, carpet, and insulation. By using certified wood, the project will support proper stewardship of forests and related ecosystems. The project will also use materials and products for which the chemical ingredients in
the product are inventoried using an accepted methodology and verified to minimize the use and generation of harmful substances.

**Indoor Environmental Quality**

The Indoor Environmental Quality category aims to address multiple aspects of the indoor environment, emphasizing that health, safety, and comfort are a multi-faceted issue beyond simple air quality. Per CAL Green requirements, the buildings will be no smoking. HVAC strategies that are under consideration to control air quality include demand control ventilation in high-occupancy spaces at the zone-level, and outdoor airflow monitoring stations at the system-level.

Construction Indoor Air Quality Management Plans will be developed to address air quality during construction and before occupancy. The project plans on using the low-emitting materials credit by using low-VOC (volatile organic compound) paints, coatings, adhesives, sealants, and flooring systems, as well as urea-formaldehyde free composite wood and agrifiber products in order to reduce off-gassing and overall VOC levels in the air which is also required by CAL Green.

Occupant-control of lighting will be explored within the logistics of the differing occupancy of each space (e.g. administration office versus repair bay areas). Daylight optimization to enhance the quality of significant spaces is a key design consideration. Strategies for maximizing daylight access in regularly occupied spaces within the parameters of the desired building design and constructability, impact on energy performance, and overall indoor environmental comfort will be analyzed. The Design Team will assist the awarded contractor in developing a Construction IAQ plan that will meet the credit requirements. The Design Team will review the specifications to include appropriate language for the VOC levels of different products.

**Innovation and Design**

The Innovation in Design category is a means to recognize projects for innovative performance for green building strategies not specifically addressed by LEED. Because some green building strategies provide results that greatly exceed the LEED requirements, this category is also used to recognize projects for exemplary performance on certain LEED credits. The Design Team hopes to pursue all six credits in this category and identify specific credits during the schematic design phase. A clear focus will be on project design areas where the team can project operations and maintenance cost reductions.
Regional Priority
The Regional Priority category aims to provide an incentive for achievement of credits that addresses geographically specific environmental priorities. Based on the sustainable strategies being pursued for four Regional Priority credits can be pursued by the project which will be determined after the project is registered on LEED-Online.

Mechanical and Plumbing

Overview

Governing Mechanical Codes:
- California Title 24 – 2013 Edition
- California Mechanical Code (CMC) – 2013 Edition
- California Fire Code (CFC) – 2013 Edition

Governing Mechanical Standards:
- NFPA 30A – Standard for Motor Fuel Dispensing Facilities and Repair Garages
- NFPA 52 – Standard for Vehicular Gaseous Fuel Systems
- ASHRAE
- ANSI
- OSHA
- EPA Regulations

Administration and Operations Building
HVAC Systems for the Admin/Ops Building will include constant volume packaged air handling units with electric cooling and natural gas heat for each major zone. Heat pump fan coil units with hot water heat from a high-efficiency boiler will also be included for smaller, remote spaces. Equipment will be rooftop mounted and concealed from public view by parapets or rooftop screens.

Maintenance Building
HVAC systems for the office areas of the Maintenance Building will include packaged air handling units with electric cooling and natural gas heat. Split system heat pumps with fan coil units with hot water heat from a high-efficiency boiler will also be included. Equipment will be located indoors on the mezzanine if possible. This is an effort to reduce wear and tear on the equipment from the elements, to promote easier
maintenance, and to reduce heat gain and loss from direct exposure to outdoors.

The repair bays and shops in the Maintenance Building will be passively ventilated and mechanically heated. The ventilation and make-up air units will operate at a low volume unless CNG is monitored above Code levels. CNG exhaust from buses within the Maintenance Building will be exhausted through vehicle exhaust reels to the exterior of the building. The makeup air units will be direct gas-fired with evaporative cooling.

Open Storage and Parts Areas of the Maintenance Building will include gas-fired infrared tube heaters for heating and Code minimum exhaust.

Fuel and Wash Buildings
HVAC Systems for the occupied spaces in the Fuel Facility will include constant volume packaged air handling units with electric cooling and natural gas heat. Heat pump fan coil units with supplemental electric heat will also be included as needed. The wash bay will be provided with gas-fired infrared tube heaters for heating while vehicles are being hand-cleaned during evening hours. The compressor room, wash equipment room, and vacuum room will be served by sealed combustion gas-fired unit heaters to keep the space above freezing.

Plumbing Systems
The plumbing systems will be high-efficiency, low-flow plumbing fixtures throughout the facility. Waterless urinals are not recommended for long-term operations and maintenance required.

Mechanical Sustainable Design Systems
In addition to following the California Energy Code and CAL Green throughout the Mechanical Systems Design we have chosen two more highly Sustainable Design Options for the Mechanical Systems that will be evaluated for the facility including:

The Heat Recovery Variable Refrigerant Flow (VRF) Heat Pump System to serve zone-level fan-coil units in the Admin/Ops Building and office areas in the Maintenance Building. Ventilation air will be provided by a VAV demand-controlled heat recovery ventilation unit. Our opinion is that the cost of this system would be about a 20% premium over the Basic System described above. Similar systems typically result in approximately 25% in energy savings. The simple payback at the above cost premium and cost savings would be approximately 16 years.
The second system being considered is a Geothermal Heat Pump System for the Admin/Ops, Maintenance, and Fuel Buildings. This system uses vertical borehole, closed loop heat pumps to serve the packaged heat pump units. Ventilation air will be provided by a VAV demand-controlled heat recovery ventilation unit. Our opinion is that the cost of this system would be about a 35% premium over the Basic System above. Similar systems typically result in approximately 35% in energy savings. The simple payback at the above cost premium and cost savings would be approximately 20 years.

Electrical

Systems Overview

Administration and Operations Building
Basic electrical systems for the Admin/Ops Building will include power to mechanical systems and equipment, convenience receptacle power, and interior and exterior lighting systems with controls. The electrical service entrance will be served by a Southern California Edison pad mounted transformer located near building off of Paseo Mercado. Power for the facility will be taken at 480Y/277V, 3 phase, 4 wire, with solid neutral.

At this time, some emergency power is anticipated for the facility including back-up for exit signs and emergency exit lighting. The Design Team will work with GCT in the subsequent tasks to identify specific emergency power demands.

Lighting Systems for the building will be specified as follows:
- Lighting fixtures will utilize an LED light source.
- Daylight harvesting will be utilized wherever practical.
- Occupancy and vacancy sensors will be incorporated into a low voltage lighting control system for all interior and exterior lighting systems.

Maintenance Building
Basic Electrical Systems for the Maintenance Building will include power to maintenance equipment; mechanical systems and equipment; convenience receptacle power; and interior and exterior lighting systems with controls. The electrical service entrance will be served by a SCE pad mounted transformer located near the building off of Paseo Mercado. Power for the facility will be taken at 480Y/277V, 3 phase, 4 wire, with solid neutral.

At this time, some emergency power is anticipated for the facility including back-up for exit signs and emergency exit
lighting. The Design Team will work with GCT in the subsequent tasks to identify specific emergency power demands.

Lighting Systems for the building will be specified as follows:
- Lighting fixtures will utilize an LED light source.
- Daylight harvesting will be utilized wherever practical.
- Occupancy and vacancy sensors will be incorporated into a low voltage lighting control system for all interior and exterior lighting systems.

Fuel and Wash Buildings
Basic Electrical Systems for the Fuel and Wash Buildings will include power to CNG production equipment, wash equipment, mechanical systems and equipment, convenience receptacle power, and interior and exterior lighting systems with controls. The electrical service entrance will be served by a SCE pad mounted transformer located near the Wash Building just west of the Service vehicle parking lot. Power for the facility will be taken at 480Y/277V, 3 phase, 4 wire, with solid neutral.

Lighting Systems for the buildings will be specified as follows:
- Lighting fixtures will utilize an LED light source.
- Daylight harvesting will be utilized wherever practical.
- Occupancy and vacancy sensors will be incorporated into a low voltage lighting control system for all interior and exterior lighting systems.

Site Lighting
Site lighting fixtures will include an LED light source. The fixtures will be controlled by a programmable low voltage lighting control panel. Lighting levels and program times are yet to be determined. We are considering fixtures capable of step dimming to 50% of output to be dimmed during non-use hours. The 50% light level will provide security light while no traffic is anticipated.

Electrical Sustainable Design Systems
Along with following the California Energy Code and incorporating daylight harvesting throughout the electrical systems design we have identified demand response as a more highly sustainable design option for the facility. This option may be utilized for the Admin/Ops Building and the Fueling Systems.

Administration and Operations Building
A demand response system for lighting and HVAC systems will be coordinated with SCE. The cost may be offset by SCE immediately or over the first few years the building is
Fuel Systems
A demand response system for fueling operations will be coordinated and designed with SCE. The cost may be offset by SCE immediately or over the first few years the building is operational. This system would reduce the output of compressed natural gas when called upon by reducing the number compressors that can be used simultaneously.

Civil

Grading
The existing site has mild gradients running generally from northwest to southeast at an average of approximately 0.4%. As a result, the initial expectation was that this was going to be a site that required moderate amounts of fill to improve drainage patterns onsite and prevent cross-lot drainage. Compounding these factors, the City of Oxnard requires grading design to remain functional assuming storm drain system blockage, resulting in any sump conditions being able to “cascade” downstream prior to impacting structures or blocking circulation. The result of these requirements is that sumps are designed in a localized manner that does not allow for significant impacts to earthwork quantities.

After further review, however, the design of the site with substantial pavement and building sections as well as open infiltration / detention areas will reduce the potential import considerably. The natural drainage patterns of the site can also be largely maintained, which will reduce the movement of dirt onsite as the overall low and high points will not shift substantially. Grading efforts are ongoing; however, it is anticipated that the site will range from an overall balance to a slight import situation.

Hydrology
Hydrology for this site, as referenced above, is tied to maintaining general existing patterns across the site while maintaining a “cascading” design from northwest to southeast. This cascading involves generating a series of localized sump areas that overflow into sump areas that are slightly lower and eventually discharge offsite. Assuming things function normally, the sump areas will collect in catch basins and drain to storm drain systems that will convey flow to detention areas and then offsite. Should these systems plug or otherwise fail, however, there is still ability to drain water offsite prior to impacting buildings or vital system components.

The original design concept identified two areas for surface infiltration and detention, per the requirements of the Ventura County Watershed Protection District. Preliminary infiltration
testing, however, has indicated that the soils are not suitable for infiltration. It is anticipated that these basins will instead function as bioretention basins, which will still biotreat stormwater but without the infiltration aspect. Other macro design elements at this time remain unchanged.

**Structural**

**Overview**

**Administration and Operations Building**

The Admin/Ops Building is a two-story office building roughly rectangular in shape, with the upper story having minor setbacks for exterior patio areas and a minor overhang at the main entrance and a flat roof. Gravity framing consist of steel wide flange beams and square tube (HSS) columns. The upper roof consists of unfilled light gauge metal deck. The lower roof / second floor is a composite metal deck with lightweight structural concrete fill and topping. The ground floor is a concrete slab on grade.

Foundations consist of continuous footings under structural walls and shallow spread footings under columns. The lateral force resisting system consist of special reinforced nonbearing masonry shearwalls, and/or special concentrically braced steel braced frames with round HSS braces. Interior braced frames will require foundation grade beams. Upper floor setbacks and overhangs will be arranged such that shear walls and braced frames are continuous vertically from the roof to the foundation without a horizontal offset.

**Maintenance Building**

The Maintenance Building is a U-shaped structure with mezzanines at the intersecting corners and a low slope or flat roof. The south wing and storage mezzanine is similar in construction to the Admin/Ops Building. The remainder of the building consists of high-bay, single-story spaces with unfilled light gauge metal deck roof over open web steel joists, supported by steel wide flange beams or deep steel trusses and HSS columns, with perimeter nonbearing 10-inch CMU shear walls. The lateral force resisting system consists of special reinforced nonbearing masonry shearwalls, and/or special concentrically braced steel braced frames with round HSS braces. Interior braced frames will require foundation grade beams. Roof elevation changes will be arranged to occur at shear wall or braced frame lines that are continuous vertically from the roof to the foundation without a horizontal offset.

**Wash Building**

The Wash Building is a single-story rectangular shaped building with a low sloped roof, used as a pull-through bus
wash facility. Structural walls will be 10-inch thick CMU or concrete bearing walls, and the roof system is precast concrete plank with lightweight structural concrete topping, supported by the masonry walls or by concrete beams and columns where walls do not occur. The lateral force resisting system consists of special reinforced bearing masonry or concrete shear walls.

**Fuel Building**
This is a single-story rectangular shaped building with a low slope roof, used for equipment, storage, and restroom facilities. This building will use the same construction as either the Wash Building or the Admin/Ops Building, depending on selected architectural scheme.

**Fuel Canopy**
A lightweight steel structure supported by steel columns on large spread footings. Lateral system is steel special cantilever column.

**Fuel/CNG Yard**
The Fuel Yard primarily consists of a reinforced slab on grade with concrete equipment pads and steel equipment racks. Freestanding CMU site walls 8-inch or 10-inch thick shall be used as required for security or fire separation height.

**Photovoltaic Canopies**
Photovoltaic canopies over parking stalls, if included in the project, are to be structural steel of a modular or prefabricated arrangement supported with drilled concrete pier footings.

**Governing Codes**
2013 California Building Code, no local amendments currently enforced by the City of Oxnard.

**Performance Assumptions**
- Building use and operations are for ordinary code occupancy in Risk Category II, with the exception of the CNG fuel yard which is Risk Category III.
- Buildings are to be of normal construction with standard code prescribed live loads and structural deflection limitations.
- The facilities are not designated for use as an emergency operations/communications center and does not store significant quantities of toxic or hazardous materials.
- Maintenance and washing facility structures are subject to normal maintenance activities such as; minor equipment loads, tool cart impact and wash downs.
• Floor slabs in the bus maintenance and wash areas are to be designed for HS-20 traffic loads, and light or heavy storage loads where located in the use layout.

• Slab-on-grade and raised floor flatness and levelness is a normal classification with a specified overall FF=35 and FL=25 which is suitable for office use, low speed vehicular traffic and conventional forklifts. This is assumed to be adequate for the automated parts retrieval storage area and high density storage system, and will need to be confirmed against performance specifications from the manufacturers.

• Exposed concrete floors are to have control joints at regular intervals, approximately 20 to 30 feet on center with blockouts for steel columns. Concrete and masonry walls are to have control joints at regular intervals, approximately 40 to 60 feet on center.

• Traffic bollards, curbs or guards are to be implemented where vehicle impact is of concern, such as adjacent to vehicle doors, corners of buildings, and columns immediately adjacent to major driveways.

• Foundations are to be designed to maintain global structural stability with differential seismic settlements per the geotechnical engineer.

• Reinforcement is to be standard deformed type, uncoated. Structural steel deck and light gauge materials are to have standard minimum galvanized finish from the manufacturer, or a finish coating as required where exposed to view or the elements. Structural steel is to be uncoated unless exposed to view or the elements, in which case a galvanized or protective finish will be applied. Concrete shall use Type II Cement; local aggregates are assumed to be acceptable for use.

**System Modeling and Calculations**

Structural analyses for gravity, wind and seismic forces will be performed primarily by manual calculation, RAM Structural System, RISA-3D and/or ETABS. For seismic design a static equivalent lateral force analysis will be used, or as required by code a dynamic model of the lateral system with modal response spectrum analysis using the design code spectra will be used.

**Limitations**

Evaluation of building vibrations for occupant comfort is not explicitly performed or considered for structural design.

Structures are not to be designed for vehicle impact loads.

Interior slabs are not to be designed for hard-wheeled equipment loading.
Differential seismic settlement may impair functionality and operations after a significant earthquake.

Overhead crane or hoist rails are not required, and allowances for such are not included in design loads.

Foundations are to be shallow spread footings, deep foundations are not considered.

Canopies where they occur shall be simple in design with no excessive cantilevers or special detailing requirements.

Metal stairs, metal stud curtain wall and window wall systems, pre-manufactured steel joists, elevator railing, HVAC equipment anchorage and fire sprinkler piping supports are deferred approval items that are not part of the structural drawings.

**Maintenance Equipment**

**Overview**

The Gold Coast Transit Administration and Operations Facility will consist of four buildings: Administration and Operations Building, a bus Maintenance Building, as well as a separate Fueling Building and Wash Building.

The equipment information provided below is provided to comprehensively inform Gold Coast Transit (GCT) of the extensive maintenance and service equipment and systems requirements for use in the Administration and Operations Facility. The draft Preliminary Equipment List does not include furniture or fixtures required for the Administration and Operations areas of the building.

**Equipment Selections**

The facility will require specialized maintenance equipment within the bays, shop areas, parts storage, interior clean lanes, fueling lanes, and bus wash lanes. This equipment shall be utilized during required maintenance and service activities. A general description and list of the proposed groups of equipment is provided below. A detailed list (with equipment allocated by functional area) of the projected equipment with quantities, costs, and manufacturer data is located in the Maintenance Equipment Manual.

**Storage Equipment**

A mix of conventional and high-density storage equipment has been selected for use in the Parts Room. Throughout the Facility the storage equipment shall include, but not be limited to, a mix of drawer cabinets, storage cabinets, bulk storage racks, tire racks and automated storage systems.
### Vehicle Lifts

GCT would like to incorporate several different lifting technologies into their new facility. The facility will have one new parallelogram lift in the Chassis Wash Bay, four new two post in-ground piston lifts in the Repair Bays and one new in-ground twin post lift in the Non-Revenue Bay.

### Shop Equipment

Shop equipment selected for the GCT Facility shall be good quality, heavy duty units. The shop equipment and associated support equipment being provided refers to such equipment as: grinders, drill presses, saws, welding equipment, tire equipment, cranes, hoists, vehicle exhaust reels and parts cleaning tanks.

### Central Lubrication Distribution Equipment and compressed air (System)

The central lubrication distribution equipment and the compressed air distribution Equipment selected for the GCT Facility are heavy duty units that are proven in the transit industry to have a long service life. The compressed air system will provide compressed air throughout the maintenance building for equipment, convenience and at the workbenches. The central lubrication system provides all necessary fluids to the Service Bays through hose reels with metered dispensers.

### Clean Equipment

The deep cleaning of the buses will be done at the Day Clean/Hand Wash lanes adjacent to the Vehicle Wash Bay during the service Cycle.

Daily cleaning will occur at the fueling lanes. GCT and the Design Team are exploring the use of a central vacuum system and stationary canister type systems similar to those found at the service stations and car washes.

### Fueling Equipment

The fueling will be done on-site and will be incorporated into the Fuel Building. This function will be a part of the service cycle.

### Bus Wash Equipment

GCT would like to add a new drive-through vehicle wash that should utilize a reclamation system.

Infrastructure Requirements: In-bay used water collection pits needed for the water reclamation system are the major infrastructure component of this area.

Water Reclamation System: The bus wash system shall be provided with a centralized used water reclamation system designed to accommodate the water quality and operating conditions present in the facility.
Wash Components: The bus washer consists of two distinct components:

- Touch-less front and brush side drive-through wash: This wash system uses a combination of high pressure and conventional rotating brushes. This combination effectively washes the front, top, and rear of the bus with direct high pressure. Fixed side brushes that activate to avoid damage to the buses mirrors are utilized to wash the side of the buses.

- Wash Equipment: The wash equipment (wash pumps and reverse osmosis water treatment systems) are to be located in a wash equipment room. The wash equipment room will be completely operational including all piping and electrical wiring, disconnects and panels.

Workbench, Tables, and Stools

The workbench, tables, and stools selected for the GCT Administration and Operations Facility are necessary for the projected maintenance functions. These items are to be shared between mechanics working in the facility and should be good quality, heavy duty units that will have a long services life.

Other Miscellaneous Equipment

Other miscellaneous equipment selected for the GCT Administration and Operations Facility is necessary for the projected maintenance functions. These items are to be shared between Mechanics and should be good quality, heavy duty units that will have a long services life. The miscellaneous equipment shall include such items as: workbenches, tables, stools, battery benches, forklifts, floor scrubbers, work platforms, safety harness and parts lift.

CNG Fuel Systems

Overview

The Design Team has analyzed GCT’s current fueling system and future fueling needs to develop a plan for fueling systems at GCT’s Administration and Operations Facility. At this stage of the project, the focus is on the CNG fueling system since this portion of the system is the overwhelming cost driver and determines the space and utility needs on the site. There will be no liquid fuel system incorporated in the design of this project.

The Design Team first performed a CNG station sizing based on the ultimate (mature) fleet needs (standard buses, Paratransit buses, and non-revenue vehicles). This mature fleet sizing is used to determine utility and space requirements on site and then used to develop a phasing plan to allow GCT to grow into the mature facility as the fleet grows.
An analysis of the current (legacy) fuel station equipment has also been conducted to first investigate what equipment is technically feasible to reuse based on age, condition and the ability to transition it to a new facility (while keeping the current facility operable during a transition). Equipment that is deemed re-usable was then analyzed to determine the financial implications of its redeployment at the new facility.

Recommendations for station size and potential equipment reuse are provided within this report.

Performance Criteria and Assumptions

The MDG Design Team queried GCT on their current fueling and bus operations and on plans for future fleet growth. Criteria were developed for use in the sizing of the facilities. Based on the responses from GCT and on interview questions, the following information has been assumed:

- 125 forty foot transit buses with an average daily consumption of 60 GGE per bus.
- 30 Paratransit (cutaway van) vehicles with an average daily fuel consumption of 20 GGE per vehicle.
- Approximately 20 non-revenue vehicles (cars, trucks, vans) with an average daily fuel consumption of 10 GGE.
- 20 percent spare ratio on all vehicles.
- All forty foot buses (net of spares) to be fueled in the 6 hours of productive fueling time. The total fill shift is expected to run from 10:00 PM to 04:00 AM, however, breaks, lunch and setup/cleanup reduces this to six hours of productive time. The MDG Design Team feels that this is a conservative assumption since there is generally some off-shift fueling at transit properties.
- No Paratransit or non-revenue vehicles to be fueled in the 6 hours of productive fueling time.
  - These vehicles will be fueled during normal business hours throughout the day.

The MDG Design Team has also re-confirmed the available gas pressure from Southern California Gas Company (SCG) for the new site to be 229 psig based on the required flow rate as calculated herein. It should be noted that although SCG does not believe that final pressure will vary significantly from the projected pressure; this should still be considered a preliminary estimate only.

The Design Team also applied its own experience in developing the required sizing with the following factors:

- Station inlet piping and dryer pressure drop of 5 psig.
• A station load factor of 80 percent was used—this is the amount of time in a fuel shift that the compressors run loaded versus total compressor operating time. The current station has a load factor of approximately 73 percent; however, it is felt that with a larger bus population and a more optimized fuel island and parking arrangement, there will be less time lost in cycling buses through the service operation.

• An iterative sizing approach was used to optimize the use of compressors (e.g. maximize the use of the frame horsepower rating). Based on this approach, using a 280 Horsepower rated frame (Ariel-same frame model as current compressors) running a 250 horsepower motor, it was found that three (3) compressors would provide the required flow with one (1) additional compressor for redundancy for a total of four (4) compressors.

• Standby generator capacity to power at least half (50 percent) of the firm capacity is assumed. Since this station requires 3 compressors to meet the mature fleet firm capacity, a generator will be sized to power two compressors operating simultaneously. It is assumed that dryer regeneration will be blocked during standby power operations.

GCT has also provided additional information that is not required during this initial phase of work but will be considered during the design phases:

• GCT would like to use Variable Frequency Drives (VFDs) on compressor main and fan motors as per the current station design.

• GCT would prefer a covered area (canopy or three sided building) over the dryer, electrical panels and compressors.

• GCT has been very satisfied with the support, serviceability and performance of the Ariel compressor packages.

• GCT is satisfied that the current design approach with lubricated compressors and conservative filtration is preventing excessive (problematic) oil carryover to the buses.

• GCT would like to have a current technology Systems Control and Data Acquisition (SCADA) system similar to their current system but with tablet computers for remote access.

Utilities Required

Based on the above performance criteria and assumptions, the station will require:

• A “firm” CNG Compressor flow rate of 2567 scfm, however, assuming one additional compressor for redundancy, and
assuming optimized compression utilization, the station would have a total flow rate of 3500 scfm. This is the flow rate that is used to size all utilities and the dryer and piping systems.

- Based on the total flow rate and including all ancillary station equipment, this station will require a minimum electrical service of 2,000 Amps at 480/277 Volts. It should be noted that this service size may be increased to power the bus wash and other service lane loads.

- Based on the assumption that two compressors will be operated on standby power, a generator rated at a minimum of 750 kW is recommended. The Automatic Transfer Switch (ATS) should be sized for a minimum of 2,000 Amps or larger if the service is upsized to handle other service lane loads.

| Table 3.A - Mature CNG Fueling Station Required Equipment |
|-----------------------------------|------------------|------------------|
| **Equipment** | **Capacity/Type** | **Quantity** |
| CNG Dryer | 4000 scfm at 229 psig (300 psig rated) Twin Tower Fully Automatic | 1 |
| CNG Compressors | 850+ scfm at 224 psig/250 Hp Lubricated Potentially unenclosed-if installed under canopy | 4 compressor packages with all controls and VFD motor control |
| | | This can be phased with 3 now and one later |
| CNG Buffer | 70,000 scf at 4,500 psig 5,500 psig rated | 1 assembly |
| CNG Transit Dispensers | 1" high flow single hose dispenser | 3 units |
| | | This can be phased with 2 now and one later. |
| CNG Light Vehicle Dispensers | 1/2" dual hose dispenser | 1 unit |
| CNG Defuel Panel | | 1 unit |
| Control and SCADA System | PLC based controls with new SCADA system matched to station equipment | 1 system |
| Diesel Generator/ATS | 750 kW with belly mounted diesel tank with 2000 Amp ATS | 1 unit |
Description of Existing System

GCT has operated a CNG bus fleet since approximately 1996. The original fueling facility underwent a significant renewal and upgrade in 2008, and remains essentially unchanged since that upgrade. The current station equipment is well maintained and is in generally good condition, although equipment that was not replaced in 2008 is now at, or past, its serviceable life.

A summary table is provided in Appendix G - Inventories and Questionnaires of this report that outlines in more detail the performance and condition of the CNG station equipment as documented in the Design Team inspection on February 28, 2014. A general description is provided below, along with an initial assessment of the potential to redeploy this equipment at the new facility.

Most of the existing equipment should remain reliably operable for the next three years until transition to the new facility. There are two issues that do concern the Design Team:

- The Reltek gas detection system dates back approximately 20 years. The GCT maintenance staff has been resourceful in their ability to keep the system operable by sourcing replacement components to repair failed equipment that is no longer supported by the manufacturer. This system is very proprietary in nature and a failure of certain components could potentially render the system inoperable. Reltek has proposed to sell expensive replacement panels for those items they no longer support, however, GCT may want to consider purchasing a new system that would be redeployed to the new facility. This will be discussed in more detail in the following Design Tasks.
- The current CNG dispensers are equipped with an obsolete meter and display head. The West dispenser is

<table>
<thead>
<tr>
<th>System</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressed Air System</td>
<td>Duplex 10 Horsepower with twin tower dryer—larger if required for lube/fluid pumps</td>
<td>1 system</td>
</tr>
<tr>
<td>Fluid Management System</td>
<td>New system is required to control and report for all fuels and fluids in service lanes and maintenance shop</td>
<td>1 system</td>
</tr>
<tr>
<td>Gas Detection System</td>
<td>New system is required within Maintenance Shop, CNG Station and Service Lanes</td>
<td>1 system</td>
</tr>
</tbody>
</table>
reportedly fully operable while the South dispenser will dispense gas but is not displaying the correct dispensed volumes. The MDG Design Team recommends that these dispensers not be upgraded, unless a failure of one of the units occurs, at which time newer replacement parts can be sourced to allow continued operation at minimal upgrade cost, these newer replacement parts can be used as spare parts for the new station.

Table 3.B - Existing Equipment and Initial Recommendation

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Capacity/Type</th>
<th>Initial Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNG Dryer</td>
<td>One unit: 5200 scfm at 400 psig Twin Tower Fully Automatic</td>
<td>Dryer will flow approximately 3300 scfm at 229 psig—dryer is in good repair and will be evaluated further below.</td>
</tr>
<tr>
<td>CNG Compressors</td>
<td>Three units: 900 scfm at 400 psig/200 Hp Lubricated compressors VFD Drives PLC controls</td>
<td>Compressors will flow approximately 600+ scfm at 224 psig—compressors are in good repair and will be evaluated further below.</td>
</tr>
<tr>
<td>CNG Buffer</td>
<td>One assembly: 90,000 scf at 4,500 psig 5,500 psig rated</td>
<td>Unit can be reconditioned and redeployed</td>
</tr>
<tr>
<td>CNG Transit Dispensers</td>
<td>Two Units: 1&quot; high flow single hose dispenser</td>
<td>Units are past their service life and should be retired.</td>
</tr>
<tr>
<td>CNG Defuel Panel</td>
<td>One Unit</td>
<td>Recondition and redeploy.</td>
</tr>
<tr>
<td>Control and SCADA System</td>
<td>One system: PLC based controls with new SCADA system matched to station equipment</td>
<td>This system is matched to the compressors and should only be reused if the existing compressors are redeployed.</td>
</tr>
<tr>
<td>Diesel Generator/ATS</td>
<td>One unit: 380 kW with belly mounted diesel tank with 1000 Amp ATS</td>
<td>This equipment is in very good condition but is small for the new CNG station—recommend redeploying this</td>
</tr>
</tbody>
</table>
## Redeployment Analysis of Existing System

This section focuses only on those items that have orange cell recommendations in the above table. These items could be redeployed but this involves cost, risk and reliability factors that require further analysis. Thus, this analysis will focus only on the redeployment of the CNG dryer and the CNG compressors—note that the Compressor Motor Control Panels and the Station Master PLC control Panel and SCADA system are only practical to redeploy if the existing compressors are redeployed.

A financial analysis is provided to quantify to the extent practical the cost implications of redeploying this legacy equipment, however, there are difficult to quantify or unquantifiable aspects to this decision as well. These are summarized and discussed below:

- Installing all new equipment will initially reduce short term maintenance costs since there will be warranty coverage in year one. However, there is an offsetting cost since in the scenario where used equipment is installed initially, there is a reduced operating cost in the later years when new

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Capacity/Type</th>
<th>Initial Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressed Air System</td>
<td>Simplex 10 Horsepower with twin tower dryer</td>
<td>Can be reused however a second unit is required for redundancy—the suitability of this unit will be reviewed during design.</td>
</tr>
<tr>
<td>Fluid Management System</td>
<td>New system is required to control and report for all fuels and fluids in service lanes and maintenance shop</td>
<td>Retire the current system.</td>
</tr>
<tr>
<td>Gas Detection System</td>
<td>Reltek System</td>
<td>System is old and partially unsupported—recommend retiring the system. MDG Team is concerned that this system may not survive until the move to the new facility in early 2017.</td>
</tr>
</tbody>
</table>
equipment is eventually installed—this is also a period of heavier use since the bus population is rising over time. No cost factor is included in the analysis due to this offset of costs.

- Based on information provided by Gold Coast Transit, it has been assumed that the existing equipment will be fully depreciated by early 2017 in the eyes of FTA and thus there will be no penalties or return of capital to FTA should this equipment be retired.

- If the legacy equipment is to be transitioned to the new site, there will be a time during which both sites will need to be operable. There are costs associated with this transition which includes reprogramming of the equipment and other workarounds to allow equipment operate during transition. It is also assumed that a technician will be required to oversee this transition for a period estimated to be up to 90 days.

- It has been difficult to get reliable salvage value for the existing equipment. Although this equipment is high quality and well maintained, it is designed to operate at relatively high inlet pressures, making it less universally applicable to other applications. For purposes of analysis, it has been assumed that this equipment will have a residual wholesale value of 25 percent of current retail in 2014.

- A three (3) percent inflation rate over time and a six (6) percent discount rate has been assumed.

- Two station construction cost scenarios is provided in Table 3.C below. These scenarios reflect the initial cost of constructing a CNG station (in 2014 dollars) based on initial construction with all new equipment or with reuse of the potentially redeployed equipment.
<table>
<thead>
<tr>
<th>Item#</th>
<th>Description</th>
<th>All New Equipment</th>
<th>New and Legacy Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Qty</td>
<td>Unit Cost</td>
</tr>
<tr>
<td>1</td>
<td>CNG Dryer</td>
<td>1</td>
<td>$ 250,000</td>
</tr>
<tr>
<td>2</td>
<td>CNG Compressor(s)</td>
<td>3</td>
<td>$ 250,000</td>
</tr>
<tr>
<td>3</td>
<td>CNG Storage</td>
<td>0</td>
<td>$ 200,000</td>
</tr>
<tr>
<td>4</td>
<td>Compressor Valve Control Panel</td>
<td>3</td>
<td>$ 25,000</td>
</tr>
<tr>
<td>5</td>
<td>Storage Priority/ESD Panel</td>
<td>1</td>
<td>$ 30,000</td>
</tr>
<tr>
<td>6</td>
<td>CNG High Flow Dispensers</td>
<td>2</td>
<td>$ 60,000</td>
</tr>
<tr>
<td>7</td>
<td>CNG Light Vehicle Dispenser-Dual Hose</td>
<td>1</td>
<td>$ 50,000</td>
</tr>
<tr>
<td>8</td>
<td>Defueling System</td>
<td>0</td>
<td>$ 20,000</td>
</tr>
<tr>
<td>9</td>
<td>Air Compressor and Dryer</td>
<td>0.5</td>
<td>$ 25,000</td>
</tr>
<tr>
<td>10</td>
<td>Miscellaneous Valves and Equipment</td>
<td>1</td>
<td>$ 30,000</td>
</tr>
<tr>
<td>11</td>
<td>MCC</td>
<td>1</td>
<td>$ 160,000</td>
</tr>
<tr>
<td>12</td>
<td>Master PLC Panel</td>
<td>1</td>
<td>$ 50,000</td>
</tr>
<tr>
<td>13</td>
<td>SCADA System</td>
<td>1</td>
<td>$ 50,000</td>
</tr>
<tr>
<td>14</td>
<td>Fuel Management System</td>
<td>0</td>
<td>$ 100,000</td>
</tr>
<tr>
<td>15</td>
<td>Generator and ATS</td>
<td>1</td>
<td>$ 150,000</td>
</tr>
<tr>
<td>16</td>
<td>Equipment Freight</td>
<td>1</td>
<td>$ 40,000</td>
</tr>
<tr>
<td>17</td>
<td>Equipment Subtotal</td>
<td></td>
<td>$ 1,767,500</td>
</tr>
<tr>
<td>18</td>
<td>Installation Cost Factor</td>
<td>125%</td>
<td>$ 2,209,375</td>
</tr>
<tr>
<td>19</td>
<td>Total Station Cost Estimate</td>
<td></td>
<td>$ 3,976,875</td>
</tr>
</tbody>
</table>
Another two station construction cost scenarios is provided in Table 3.D below. These scenarios reflect the initial cost of a mid-life upgrade to meet the mature fleet fueling needs and in the case of the scenario where legacy equipment was used initially, to replace that equipment.

Table 3.D –Phase 2 Costs All New Equipment vs. New and Legacy Equipment

<table>
<thead>
<tr>
<th>Item#</th>
<th>Description</th>
<th>Build Out with New Equipment</th>
<th>Build Out and Replacement of Legacy Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Qty</td>
<td>Unit Cost</td>
</tr>
<tr>
<td>1</td>
<td>CNG Dryer</td>
<td>0</td>
<td>$250,000</td>
</tr>
<tr>
<td>2</td>
<td>CNG Compressor(s)</td>
<td>1</td>
<td>$250,000</td>
</tr>
<tr>
<td>3</td>
<td>CNG Storage</td>
<td>0</td>
<td>$200,000</td>
</tr>
<tr>
<td>4</td>
<td>Compressor Valve Control Panel</td>
<td>1</td>
<td>$25,000</td>
</tr>
<tr>
<td>5</td>
<td>Storage Priority/ESD Panel</td>
<td>0</td>
<td>$30,000</td>
</tr>
<tr>
<td>6</td>
<td>CNG High Flow Dispensers</td>
<td>1</td>
<td>$60,000</td>
</tr>
<tr>
<td>7</td>
<td>CNG Light Vehicle Dispenser-Dual Hose</td>
<td>0</td>
<td>$50,000</td>
</tr>
<tr>
<td>8</td>
<td>Defueling System</td>
<td>0</td>
<td>$20,000</td>
</tr>
<tr>
<td>9</td>
<td>Air Compressor and Dryer</td>
<td>0</td>
<td>$25,000</td>
</tr>
<tr>
<td>10</td>
<td>Miscellaneous Valves and Equipment</td>
<td>0.25</td>
<td>$30,000</td>
</tr>
<tr>
<td>11</td>
<td>MCC</td>
<td>0</td>
<td>$160,000</td>
</tr>
<tr>
<td>12</td>
<td>Master PLC Panel</td>
<td>0</td>
<td>$50,000</td>
</tr>
<tr>
<td>13</td>
<td>SCADA System</td>
<td>0.1</td>
<td>$50,000</td>
</tr>
<tr>
<td>14</td>
<td>Fuel Management System</td>
<td>0</td>
<td>$100,000</td>
</tr>
<tr>
<td>15</td>
<td>Generator and ATS</td>
<td>0</td>
<td>$150,000</td>
</tr>
<tr>
<td>16</td>
<td>Equipment Freight</td>
<td>0.25</td>
<td>$40,000</td>
</tr>
<tr>
<td>17</td>
<td>Equipment Subtotal</td>
<td></td>
<td>$357,500</td>
</tr>
<tr>
<td>18</td>
<td>Installation Cost Factor</td>
<td>100%</td>
<td>$357,500</td>
</tr>
<tr>
<td>19</td>
<td>Additional Design Cost</td>
<td></td>
<td>$50,000</td>
</tr>
<tr>
<td>20</td>
<td>Total Station Cost Estimate</td>
<td></td>
<td>$765,000</td>
</tr>
</tbody>
</table>
A life cycle capital cost analysis with 2017 as year zero (0) is provided in Table 3.E. This life cycle cost analysis provides a Net Present Value (NPV) of the scenario with all new equipment initially compared to redeployment of some used equipment which is later retired and replaced with new equipment. It is apparent that while there is an initial NPV cost savings of approximately $1 million dollars (Item 8 below), the life cycle cost of using all new equipment in 2017 has an NPV approximately $1.2 million lower than redeploying used equipment then changing it out at a later time.

Table 3.E –Phase 2 Costs All New Equipment vs. New and Legacy Equipment

<table>
<thead>
<tr>
<th>Item#</th>
<th>Description</th>
<th>Qty</th>
<th>Unit Cost</th>
<th>Extended Cost</th>
<th>Qty</th>
<th>Unit Cost</th>
<th>Extended Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CNG Dryer</td>
<td>0</td>
<td>$250,000</td>
<td></td>
<td>1</td>
<td>$250,000</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>CNG Compressor(s)</td>
<td>1</td>
<td>$250,000</td>
<td>$250,000</td>
<td>4</td>
<td>$250,000</td>
<td>$1,000,000</td>
</tr>
<tr>
<td>3</td>
<td>CNG Storage</td>
<td>0</td>
<td>$200,000</td>
<td></td>
<td>0</td>
<td>$200,000</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Compressor Valve Control Panel</td>
<td>1</td>
<td>$25,000</td>
<td>$25,000</td>
<td>4</td>
<td>$25,000</td>
<td>$100,000</td>
</tr>
<tr>
<td>5</td>
<td>Storage Priority/ESD Panel</td>
<td>0</td>
<td>$30,000</td>
<td></td>
<td>0</td>
<td>$30,000</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>CNG High Flow Dispensers</td>
<td>1</td>
<td>$60,000</td>
<td>$60,000</td>
<td>1</td>
<td>$60,000</td>
<td>$60,000</td>
</tr>
<tr>
<td>7</td>
<td>CNG Light Vehicle Dispenser-Dual Hose</td>
<td>0</td>
<td>$50,000</td>
<td></td>
<td>0</td>
<td>$50,000</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Defueling System</td>
<td>0</td>
<td>$20,000</td>
<td></td>
<td>0</td>
<td>$20,000</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Air Compressor and Dryer</td>
<td>0</td>
<td>$25,000</td>
<td></td>
<td>0</td>
<td>$25,000</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Miscellaneous Valves and Equipment</td>
<td>0.25</td>
<td>$30,000</td>
<td>$7,500</td>
<td>1</td>
<td>$30,000</td>
<td>$30,000</td>
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<tr>
<td>11</td>
<td>MCC</td>
<td>0</td>
<td>$160,000</td>
<td></td>
<td>0</td>
<td>$160,000</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Master PLC Panel</td>
<td>0</td>
<td>$50,000</td>
<td></td>
<td>1</td>
<td>$50,000</td>
<td>$50,000</td>
</tr>
<tr>
<td>13</td>
<td>SCADA System</td>
<td>0.1</td>
<td>$50,000</td>
<td>$5,000</td>
<td>1</td>
<td>$50,000</td>
<td>$50,000</td>
</tr>
<tr>
<td>14</td>
<td>Fuel Management System</td>
<td>0</td>
<td>$100,000</td>
<td></td>
<td>0</td>
<td>$100,000</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Generator and ATS</td>
<td>0</td>
<td>$150,000</td>
<td></td>
<td>0</td>
<td>$150,000</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Equipment Freight</td>
<td>0.25</td>
<td>$40,000</td>
<td>$10,000</td>
<td>1</td>
<td>$40,000</td>
<td>$40,000</td>
</tr>
<tr>
<td>17</td>
<td></td>
<td></td>
<td></td>
<td>$357,500</td>
<td></td>
<td></td>
<td>$1,580,000</td>
</tr>
<tr>
<td>18</td>
<td>Installation Cost Factor</td>
<td></td>
<td>100%</td>
<td>$357,500</td>
<td></td>
<td>Plus $100K Transition</td>
<td>$1,680,000</td>
</tr>
<tr>
<td>19</td>
<td>Additional Design Cost</td>
<td></td>
<td>$50,000</td>
<td></td>
<td></td>
<td></td>
<td>$150,000</td>
</tr>
<tr>
<td>20</td>
<td>Total Station Cost Estimate</td>
<td></td>
<td></td>
<td>$765,000</td>
<td></td>
<td></td>
<td>$3,410,000</td>
</tr>
</tbody>
</table>
A life cycle capital cost analysis with 2017 as year zero (0) is provided in Table 3.F. This life cycle cost analysis provides a Net Present Value (NPV) of the scenario with all new equipment initially compared to redeployment of some used equipment which is later retired and replaced with new equipment. It is apparent that while there is an initial NPV cost savings of approximately $1 million dollars (Item 8 below), the life cycle cost of using all new equipment in 2017 has an NPV approximately $1.2 million lower than redeploying used equipment then changing it out at a later time.

Table 3.F –Life Cycle Capital Cost Summary for All New Equipment vs. New and Legacy Equipment

<table>
<thead>
<tr>
<th>Item#</th>
<th>Description</th>
<th>Qty</th>
<th>Raw Cost in 2014 Dollars</th>
<th>NPV Cost</th>
<th>Raw Cost in 2014 Dollars</th>
<th>NPV Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Inflation Rate</td>
<td>3.00%</td>
<td>$3,976,875</td>
<td>$3,648,682</td>
<td>$2,884,375</td>
<td>$2,646,341</td>
</tr>
<tr>
<td>2</td>
<td>Discount Rate</td>
<td>6.00%</td>
<td>$765,000</td>
<td>$590,804</td>
<td>$3,410,000</td>
<td>$2,633,520</td>
</tr>
<tr>
<td>3</td>
<td>Current Year</td>
<td>2014</td>
<td>$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Commissioning Year</td>
<td>2017</td>
<td>$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Mid Life Upgrade Year</td>
<td>2023</td>
<td>$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Legacy Equipment-Salvage Cost Factor-Commissioning Year</td>
<td>25%</td>
<td>$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Legacy Equipment-Salvage Cost Factor-Mid Life Upgrade Year</td>
<td>10%</td>
<td>$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Year Zero Cost after Inflation and Discounted to 2014</td>
<td></td>
<td>$3,976,875</td>
<td>$3,648,682</td>
<td>$2,884,375</td>
<td>$2,646,341</td>
</tr>
<tr>
<td>9</td>
<td>Year Zero Salvage Cost after Inflation and Discounted to 2014 (Compressors, Controls, Gas Dryer)</td>
<td>294,739</td>
<td>$1,285,000</td>
<td>$2,633,520</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Mid Life Cost after Inflation and Discounted to 2014</td>
<td></td>
<td>$765,000</td>
<td>$590,804</td>
<td>$3,410,000</td>
<td>$2,633,520</td>
</tr>
<tr>
<td>11</td>
<td>Mid Life Salvage Cost after Inflation and Discounted to 2014 (Compressors, Controls, Gas Dryer)</td>
<td></td>
<td>$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Raw Cost</td>
<td></td>
<td>$3,456,875</td>
<td>$5,009,375</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total NPV Cost</td>
<td></td>
<td>$3,944,748</td>
<td>$5,180,621</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Unquantified Factor-Initial Construction/Transition Risk:
- As noted in the financial analysis above, if the legacy equipment is to be transitioned to the new site, there will be a time period when both sites will need to be operable. Apart from the cost of this transition, there is also a risk
during this period. This risk stems from the fact that equipment will be reprogrammed several times during this transition and will be operated in a fashion other than its intended design. During the transition one of the stations will have only one compressor.

- Both stations will be inherently less reliable than one fully operable station.
- Conversely, if a completely new station is constructed, the risk is reduced below current levels of risk as there will be two fully operable stations during transition.

Unquantified Factor-Deferred Construction/Transition Risk:
- Given that existing equipment will be approximately 9 years old in 2017, it is expected that this equipment will need to be replaced in year 2023 when the equipment reaches 15 year life.
- This transition will include new motor and station controls—this is a significant change as the station will effectively be rewired to accommodate the new equipment. This upgrade will essentially require two stations operable on the same footprint not unlike the transition that was implemented in 2008.
- There is a significant risk posed where legacy equipment and new equipment must communicate with each other. This risk should be minimal initially at the new site even with legacy equipment, however, during a transition this risk is elevated (there was a situation not unlike this at another transit agency that ended in a serious incident).

Unquantified Factor-Warranty Risk and Integration Risk:
- As noted in the financial analysis, installing new equipment initially will reduce short term maintenance risk since there will be warranty in year one. However, there is an offsetting risk reduction since in the scenario where used equipment is installed initially, there is a reduced operating cost in the later years when new equipment is eventually installed—this is also a period of heavier use since the bus population is rising over time.
- Notwithstanding the above, in the case where all new equipment is installed initially, there is new equipment installed for a greater period of life cycle than with the reuse of legacy equipment. This will lead to less chance of obsolescence and generally better manufacturer support.

Unquantified Factor-Training and Support for New vs Used Equipment:
- GCT staff currently provides the majority of the maintenance at the existing site. If this equipment is relocated, there should be minimal impact on this situation
and limited retraining required. If new equipment is used, there will be some retraining required, however, the MDG Team believes that this will be minimized as equipment will be specified such that it is configured and operated similarly to the current equipment.

- Although GCT's current equipment is currently operating well and GCT is receiving support from the original manufacturers, it should be noted that Exterran has withdrawn from the CNG market—this could affect their ability to support the compressors and station controls packages. Xebec has become a small player in the US CNG market, having endured financial challenges—this could affect their ability to support their equipment in the long term.

**Recommendations Regarding Redeployment of Existing System**

While there is a significant short term cost savings (approximately $1 million) to redeploying legacy equipment to the new facility, over the life of the station this savings is reversed and results in an NPV that is estimated to be $1.2 million higher than the scenario using all new equipment at the outset—it should be noted that the Design Team has estimated a $100,000 transition cost above the actual construction costs but this number could be much higher if bidders see more risk or if unforeseen transition issues materialize—this will reduce the initial cost savings for used equipment. In addition to the reduced life cost of using new equipment, this approach will result in a much easier, smoother, and lower risk transition to the new facility.

The MDG Design Team is recommending the use of all new equipment at the new CNG station with the exception of the Generator and ATS which are recommended for use with the other buildings, and the CNG storage and defueling systems. The initial construction estimate is based on the above recommendation.
Chapter Four
Opinion of Cost

Introduction

The following is the budgetary opinion of probable cost for Gold Coast Transit Administration and Operations Facility. The estimate presented was prepared by MDG’s subconsultant Jacobus & Yuang, Inc., an independent construction cost consultant based in Ventura, California. The values were derived from the information in the conceptual floor drawings in Appendix D - Conceptual Plans and Building Concepts and other supplemental information. This information was augmented by the narratives presented in this report.

Opinion of Probable Cost

Methods and values used in determining the construction cost of the site and buildings were based on historical data. Information regarding projects that have been recently constructed in the surrounding area and methods as assumed were analyzed in this process.

The current Opinion of Probable Construction Cost is $42,563,962. This cost represents the probable price to be paid to a General Contractor to construct the facility. It should be noted that the cost information has been based on the following assumptions:

- An Escalation Factor of 7.75% has been included in the prorates and is based on a mid-point of construction.
- Prices are based on a minimum of four to five competitive responsive bids received from general contractors.
- Labor costs are based on prevailing wage rates, material, and equipment costs.
- All work would be performed during regular work hours.

Estimate Schedule Basis

The following schedule was utilized as a basis for the Opinion of Cost with an 18 month construction duration:

- Start Design: January 2014
- End Design: April 2014
- Construction: July 2015 - January 2017
- Midpoint of Construction: March, 2016
- Allowance for Escalation: 7.75%

Items Excluded

Items excluded in this Opinion cost are as follows:
• Project soft costs beyond estimated construction cost, land costs, construction contingency, occupant relocation costs and temporary swing space preparation.
• Canopy over CNG equipment yard.
• Site PV canopy and panels.
  o Estimated value $350,000
• Liquid gas fueling systems (tank, piping, and dispensers).
• Future bus stop.

Items Impacting the Estimate

As with any estimate, the possibility that market conditions will change exists. In recent years, since GCT’s 2009 New Sites Analysis Master Plan, the cost of construction has increased significantly due to environmental events, economic cycles, and material supply and demand trends. This estimate uses an escalation factor that has been taken to the mid-point for construction reflecting average increase for material and labor during the course of the project. Scopes of work that are performed early in the construction process will see little or no cost increase due to escalation, whereas the trades and materials involved at the end of construction will recognize the full effect of increasing economic conditions in the building industry.

Items affecting the estimated construction cost include, but are not limited to:

• Additional square footage in Administration
• Additional mezzanine storage space for Administration in Maintenance Building
• Additional Day Clean/Hand Wash Bay at Wash Building
• Cal Green and Title 24 requirements for increased building efficiency
• Courtyard between Admin/Ops and Maintenance Buildings

Soft Costs

The Opinion of Probable Construction Cost does not include project soft costs. Soft costs include Architecture and Engineer Design, Construction Management, GCT contingency during construction, and furniture allowance (desk chairs, file cabinets, moving costs, and data/phone equipment). Total soft costs are estimated at 30% of the construction cost.

Estimated Project Costs

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
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<tbody>
<tr>
<td>Construction Costs</td>
<td>$42,563,962</td>
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<tr>
<td>Soft Costs</td>
<td>$12,769,189</td>
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</tbody>
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**Total**: $55,333,151