



Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Concept Design

Public Works and Government Services Canada
February 2014



MCA
CONSULTANTS INC.

ENGINEERS - PROJECT MANAGEMENT

RICHARDSON ASSOCIATES
(1993) Ltd.
Engineering Consultants





1.0 Executive Summary 1

2.0 Project Description 3

3.0 Building Systems Description 3

 3.1 General Facility Overview 3

 3.2 Mechanical Systems 3

 3.2.1 Heating 3

 3.2.2 Cooling 4

 3.2.3 Air Distribution 4

 3.2.4 Humidification 4

 3.2.5 Automatic Controls 5

 3.2.6 Exhaust System 5

 3.2.7 Fire Protection 5

 3.2.8 Plumbing Systems 6

 3.3 Electrical Systems 6

 3.3.1 Main Electrical Service 6

 3.3.2 Building Power Distribution 7

 3.3.3 Building Emergency Power Distribution 7

 3.3.4 Building Lighting System 8

 3.3.5 Building Lighting Control System 8

 3.3.6 Building Life Safety Lighting System 9

 3.3.7 Building Communications System 9



3.3.8 Building Fire Alarm System	9
3.3.9 Building Fire Pump System	10
4.0 Recommendations	10
4.1 General	10
4.2 Mechanical	10
4.2.1 Main Air Handling System(s)	12
4.2.2 High Performance Fan Coil System	12
4.2.3 Main Distribution Ductwork	13
4.2.4 Heating Plant	13
4.2.5 Chiller Plant	13
4.2.6 Fire Protection	13
4.2.7 Plumbing System	14
4.2.8 Automatic Controls	14
4.3 Electrical Systems	15
4.3.1 Main Electrical Service	15
4.3.2 Building Power Distribution	15
4.3.3 Building Emergency Power Distribution	16
4.3.4 Building Lighting System	16
4.3.5 Building Lighting Control System	17
4.3.6 Building Life Safety Lighting System	17
4.3.7 Building Communications System	17
4.3.8 Building Fire Alarm System	18
4.3.9 Building Fire Pump System	18
4.3.10 Workplace 2.0 – Electrical Considerations	19



5.0 Project Breakdown20

Appendices

Preliminary Class 'C' Budgets

Project Schedule

HAP Analysis

HVAC Concept Schematics

Electrical Conceptual Riser Diagram

Reference Documents

Floor Plans





1.0 Executive Summary

The Daniel J. MacDonald (DJM) Building in Charlottetown, PEI was built in the early 1980's and many of the mechanical and electrical systems are of original installation.

This report provides a mid-life study/concept design to replace/upgrade the mechanical and electrical systems to support the occupancy and use of the building with consideration for the Workplace 2.0 standards taken into consideration.

A number of factors which have been taken into consideration include:

- Energy efficiency
- Facility is to remain occupied during the incorporation of the multi-projects
- Minimize disruption to building occupants during construction
- Minimize swing space requirements for upgrades/replacements
- Capital cost
- Sequencing to reduce risk to occupant comfort

The recommended concept design includes the following:

- Provision of new high performance fan coil system with integral regulated outdoor air dampers.
- Provision of new dedicated outdoor air heat recovery system to support fan coil system.
- Upgrade/replace energy management control system.
- Chiller plant and heating plant to remain as they have been recently upgraded.
- Provision of new fire pump and controller.
- Replacement of existing bus ducts with dedicated riser feeders.
- Provision of new emergency generator.
- Provision of new extremely efficient and user friendly lighting system incorporating LED technologies and individual occupant control through a lighting control system.
- Provision of new life safety lighting system.
- Upgrade to building communications systems to Workplace 2.0 standards and provision of emergency power to systems.
- Provision of new voice notification and communication fire alarm system.

The scope of work was divided into sixteen (16) distinct projects to allow the upgrades/replacements to occur over multiple years and maintain an operational facility.



The total cost of these projects is \$25,485,207.00 excluding project management and “soft costs” and broken down by project as follows:

Description		Total
Project I	<u>Scope of Work:</u> Outdoor Air Handling Unit, Electrical Power Risers, Emergency Generator, Fire Pump, Lighting in Penthouse	\$ 1,520,705
Project II	<u>Scope of Work:</u> Main Floor North (Project Area II) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 598,852
Project III	<u>Scope of Work:</u> Main Floor North (Project Area III) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 870,334
Project IV	<u>Scope of Work:</u> Main Floor South (Project Area IV) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 542,212
Project V	<u>Scope of Work:</u> Main Floor South (Project Area V) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 462,461
Project VI	<u>Scope of Work:</u> Second Floor North (Project Area VI) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 1,782,246
Project VII	<u>Scope of Work:</u> Second Floor Southeast (Project Area VII) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 563,256
Project VIII	<u>Scope of Work:</u> Second Floor Southwest (Project Area VIII) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 546,517
Project IX	<u>Scope of Work:</u> Third Floor North (Project Area IX) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 1,569,793
Project X	<u>Scope of Work:</u> Third Floor (Project Area X) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 499,144
Project XI	<u>Scope of Work:</u> Third Floor South (Project Area XI) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 1,376,520
Project XII	<u>Scope of Work:</u> Fourth Floor (Project Area XII) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 1,501,256
Project XIII	<u>Scope of Work:</u> Fifth Floor (Project Area XIII) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 1,154,007
Project XIV	<u>Scope of Work:</u> Atrium (Project Area XIV) HVAC Unit Replacement, Lighting System	\$ 753,579
Project XV	<u>Scope of Work:</u> Decommissioning/Removal of All Redundant Mechanical and Electrical Systems, Fire Alarm System, Exit Signage, Stairwell Lighting	\$ 658,583
Project XVI	<u>Scope of Work:</u> Parking Garage Ventilation Replacement, Sanitary Piping Replacement, Basement Power Distribution, Lighting Systems	\$ 349,059
Note: Refer to report for items excluded from the preliminary budget estimates.		Total \$ 14,748,524



2.0 Project Description

The Daniel J. MacDonald (DJM) Building in Charlottetown, PEI was built in 1984. There have been a number of mechanical and electrical system upgrades over the years but generally the majority of the systems are of original installation.

The purpose of this report is to prepare a midlife fit-up study/concept design with an associated methodology on multi-project sequencing. Preliminary budget estimates to complete the upgrades over a number of years are included to facilitate the planning and funding process. There have been reports completed previously and these have been used as reference documentation in the recommendations and defining multi-project sequencing. The reports used for reference are identified in the Appendix. The projects have been recommended and sequenced based on a number of factors outlined in this report with the ultimate goal of having the facility systems upgraded/replaced over a number of years.

3.0 Building Systems Description

3.1 General Facility Overview

The Daniel J. MacDonald Building is located at 161 Grafton Street, Charlottetown, PEI. The building is owned by the Government of Canada and was constructed in 1984.

The building is five (5) storeys plus an underground parking garage and has an area of approximately 13,500 m². The building was designed for an occupant load of 450 but presently has approximately 700-750 occupants. The Workplace 2.0 capacity study suggests the occupant load of 900 could be accommodated in this building and has been taken into consideration in the recommendations.

3.2 Mechanical Systems

3.2.1 Heating

Heating for the building is provided by two (2) oil fired cast iron boilers. The boilers are located in a boiler room located at the Penthouse Level. Fuel oil storage is in a dedicated room in the parking garage and is pumped up to the boilers and complete with day tanks in the boiler room. Heating water is delivered to the space by three (3) main circulators. These are controlled lead-lag with a dedicated stand-by pump. Generally the space heat is a perimeter hot water baseboard radiation system with pneumatic temperature control valves. There are radiant ceiling panels also installed in sections of the building. Unit heaters and cabinet unit heaters are installed in building entrances and service areas. The parking garage is unheated with the exception of the entrance ramps which are heated. The ramps are heated by a glycol plate and frame heat exchanger.



3.2.2 Cooling

The chiller plant consists of four (4) air cooled chillers providing 320 nominal tons of cooling for the building through cooling coils installed in the main air handling units. The chillers and primary pumps have been replaced in 2010 and are of adequate capacity to meet the facility cooling requirements with redundancy. At the time of this report, three (3) out of four (4) of the chillers have been damaged but are in the process of being repaired. The secondary pumps and cooling coils, piping, etc. are of original installation. These components are at the end of their useful life expectancy and should be replaced.

IT spaces are air conditioned by mobile air conditioning units with heat rejected into washroom exhaust system. The main server room located on the Third Level is conditioned by computer room air conditioning units with remote condensers on the roof. Two (2) Canatal units have been recently installed and original Liebert unit has been retained to serve as additional backup.

3.2.3 Air Distribution

Ventilation and air conditioning for the building is provided through five (5) central air handling units located in the Penthouse and one packaged (1) rooftop HVAC unit.

Units 1, 2, 3 and 4 in the Penthouse are variable air volume (VAV) units with mixing box section, filter section, chilled water coils, heating water coils, and supply/return fans with variable frequency drives or inlet vanes. Unit No. 3 has been abandoned in place and has been replaced with new system as outlined below.

Unit No. 5 in the Penthouse is a constant volume system which serves the Atrium with mixing box section, filter section, heating water coil and supply fan. This unit has no air conditioning.

A new packaged rooftop VAV unit has recently been installed to serve the north side of Level 3 as part of renovations in 2008 to replace AHU-3. This unit consists of packaged DX cooling section, electric heat and variable speed supply fan with power exhaust. A heat recovery ventilator provides outdoor air based on operator schedule and CO₂ levels.

Ductwork distribution system is a single duct c/w VAV boxes with pneumatic operators. The Third Floor which has been renovated has electronic actuators on the VAV boxes. All VAV boxes are interfaced to EMCS system either directly or through E/P transducers.

3.2.4 Humidification

The existing electric resistance humidification system is presently in the process of being replaced with a central oil fired low pressure steam boiler system to provide humidification to AHU's 1, 2, 3 and 4.

The new rooftop AHU-3 is complete with an electric resistant humidifier to provide humidification to the area served by this unit, Level 3 North.



3.2.5 Automatic Controls

The automatic controls are a combination of pneumatic and electronic controls. The baseboard radiation heating valves, ventilation control valves, VAV box dampers and damper operators are all operated with pneumatic operators. The pneumatic system is of original installation.

An energy management control system (EMCS) was installed in early 1990's and is a Delta Controls system – Version 2. This system controls air handling units 1, 2 4 and 5, chiller plant, heating plant all VAV boxes and radiation zone heating. E/P transducers have been provided to interface the pneumatic components.

A Delta Controls BACnet system – Version 3 has recently been installed which controls the rooftop AHU No. 3 and all VAV boxes associated with this system.

The two systems presently do not communicate with each other but we are of the understanding that an Ethernet cord is being installed in the existing Version 2 system to allow communication to the Version 3 system as part of the steam humidification project.

3.2.6 Exhaust Systems

There are a number of exhaust systems which are of original installation and beyond their expected life.

These include the following:

- Washroom Exhaust Fans
- Elevator Room Exhaust Fans
- Oil Tank Room Exhaust Fan
- Parking Garage Exhaust Fans

The washroom exhaust fans located in the parking garage discharge into the garage which is not in accordance with NBC.

In addition, the operation of the parking garage system is to be modified to provide continuous ventilation as per NBC.

3.2.7 Fire Protection

The building is provided with a wet sprinkler system throughout and a standpipe system serving fire hose cabinets. There is a fire pump in a room adjacent to the Parkade with a 60 HP motor on it which appears to be original with the building.

The fire protection system in the building is operational and tested on a regular basis but is nearing the end of it's service life and some components should be scheduled to be replaced such as fire pump system and standpipe hoses.



3.2.8 Plumbing Systems

The domestic water in the building is supplied by Charlottetown's municipal water system through an 8" main water entry located at the Parkade level which feeds the building via a 3" water pipe, a water meter and a check valve. The domestic hot water is supplied by two (2) electric water heaters, one (1) 270 litre (70 US gallon) and one (1) 378 litre (100 US gallon) located in the mechanical room. The heated water is distributed from these central domestic hot water heaters to washrooms, janitor closets and kitchen sinks located throughout the facility. A single circulating pump is used for domestic hot water recirculation to provide hot water at the fixture. The storm and sanitary drain piping is cast iron and the vent and domestic water piping is copper. All date back to 1981.

The plumbing piping and fixtures are original, all dating back to 1981. Some portions of cast iron drainpipe in the garage area shows signs of deterioration and rust and requires replacement. Also all the plumbing fixtures are original and are reaching the end of their service life.

3.3 Electrical Systems

3.3.1 Main Electrical Service

The main electrical service for the facility is a 2000 ampere, 600 volt, 3 phase, 4 wire electrical system. The main electrical switch board manufactured by Square D was installed recently in a service entrance upgrade project in 2009. The switchboard is in very good condition and is adequately sized and has a number of spare feeders for future expansion. The main electrical switchgear is fed via a utility owned pad mounted transformer located on the east side of the building. Currently the main switchboard feeds two 800 ampere bus ducts that rise through the building as well as a 400 ampere feeder to power panel P3G located on the third floor. The first bus duct is dedicated to service the mechanical penthouse while the second 800 ampere bus duct is dedicated to delivering power to the basement as well as to each of the five floors in the building. The main service as well as each bus duct and the feeder to power panel P3G are all equipped with a Schneider electric ION 7650 digital power recording meters. At the time of the site visit the three meters were interrogated and the total load on the system was 460 amperes. The load on Bus Duct #1 was 224 amperes while the load on Bus Duct #2 was 245 amperes and the load on power panel P3G was 4.8 amperes. This represented a total electrical demand on the electrical service at that time of approximately 480 KVA. In review of historical utility billing information presented in the Decommissioning Report dated March 2012 records indicate that over the past seven years the peak demand typically has occurred during the summertime with a peak demand over this period of 732.2 Kw which occurred in August 2009. Based on the above the existing electrical service is at approximately 37% of its capacity which leaves a significant spare capacity for future upgrades and or renovations to the facility.

3.3.2 Building Power Distribution

As mentioned the main power distribution throughout the building is accomplished through two 800 ampere, 600 volt bus ducts that rise up through the building delivering power to each floor. Also as mentioned one of the bus ducts is dedicated to servicing the electrical needs of the penthouse while the second bus duct is used to provide the general power and lighting needs of the building. The bus duct itself is original equipment and is now 32 years old and approaching the end of its expected service life. Availability of components will become increasingly difficult and expensive as the systems ages.

Many of the electrical rooms are small and in some cases there are coded violations with respect to safe distance limitations to equipment in addition most branch circuit panel boards are at full capacity and offer very little opportunity for expansion and/or renovation. As a result, over the past number of years, PWGSC has actively been modifying and



renovating the electrical rooms on each floor by expanding the existing rooms. As such new electrical branch circuit panel boards have been added to many of the rooms to provide increased ability to accommodate the electrical needs of the floors.

There is a motor control centre located in the main mechanical penthouse which services the main mechanical loads for the building. The motor control centre is a Square D CL8998, 600 volt, 600 ampere, 3 phase, 3 wire system. There are approximately 10 empty spaces that could accommodate future loads however the MCC is original to the building and approaching the end of its expected service life. As with the buildings bus duct system availability of components will become increasingly difficult and expensive as the systems ages.

With respect to the buildings secondary transformers the majority of the transformers are original equipment and now, like much of the buildings electrical infrastructure, are approaching the end of their useful life. In the recent electrical upgrade of the third floor south side new transformers were installed. These transformers meet the current PWGSC requirements for harmonic mitigating transformers and are generally considered to be not only more energy efficient than their predecessors but also better suited to today's office environments with increased solid state loads such as computers copiers and printers.

3.3.3 Building Emergency Power Distribution

Emergency power for the facility is provided from a 175 kilowatt, 347/600 volt ONAN generator with a full load output rating of 211 amperes. The generator is powered by a Cummings diesel engine and it appears there is a service arrangement with Sansom Equipment sales. Fuel is provided to the engine from an 800 litre day tank located within the generator room. This day tank, in turn is supplied fuel from the building's main 4600 litre diesel fuel storage facility located outside on the ground level. The generator is located in a separate room in the mechanical penthouse and is connected to the main emergency distribution panel "PBX" also located in the mechanical penthouse through an ASCO 962 automatic transfer switch. The transfer switch was last inspected on the 27th of October 2013 so it is current. There is also a 400 ampere junction box located at the first floor level to allow annual load bank testing of the generator. Emergency power is distributed to the buildings critical loads through panel PBX. The emergency loads in the building include but are not limited to the following;

- Building air compressor
- Heating circulating pumps
- Elevator car lights
- Elevators #1 and #2
- Water heater
- Flow detection system
- Fourth floor power panel
- Lighting panels on all floors
- Garage exhaust Fans
- Garage bilge pumps
- Security office
- 60 HP fire pump



3.3.4 Building Lighting System

The building lighting system varies throughout the five floors of the facility and while numerous renovations and upgrades have taken place there is still a large portion of the building that has the original lighting system in place although the lamps and ballasts have been upgraded over the years to the more energy efficient T-8 lamps and electronic ballasts as well as T-5 lamps and electronic ballasts in the most recent renovation of the third floor south.

As mentioned various renovations have taken place over the past number of years. Though this time there has been a dramatic change in lighting technologies and techniques and as a result the building is really quite disjointed from a lighting perspective. There are recessed fluorescent luminaires in coffered ceilings, recessed direct/indirect luminaires in the corridors as well as recessed down lighting.

The third floor "South" is one of the most recent of the areas where the lighting system has been upgraded. The fixtures utilized in this renovation are the suspended indirect type and incorporate occupancy sensors to enhance control and hence energy savings. In conversation with maintenance staff however it is understood that the buildings occupants are not entirely pleased with the lighting system as the occupancy sensors often turn the lights off even though the spaces are occupied.

Generally speaking lighting levels in many areas of the building appear to be below the 500 lux minimum level currently required by PWGSC standards for office lighting. As well in many areas lamps appear to be either burnt out or missing and in some cases entire fixtures were not working. When questioned however, maintenance staff indicated that in many cases fixtures have been disconnected and lamps removed at the request of the buildings occupants as not all employees desire the same light levels.

During the site visit it was noticed that most of the lighting control switches are located at 1500mm above finished floor. Although this mounting height was code compliant at the time the building was originally constructed it is no longer compliant when referencing the current CSA standard for Barrier Free design (CAN/CSA-B651) which identifies the height of light switches shall not be higher than 1200mm above finished floor.

The underground parking is illuminated using a combination of both fluorescent as well as high pressure sodium luminaires. Lighting levels appear to be low particularly at the underground parking entrance / exit area.

The exterior lighting has been upgraded over the past number of years with the most recent upgrade being the replacement of the existing under canopy lighting with new recessed LED down lights.

A more comprehensive survey of the lighting levels should be undertaken to verify if the current PWGSC standards are being adhered to.

3.3.5 Building Lighting Control System

The existing building lighting control system is a General Electric low voltage relay system. Low voltage relay panels are located in the various electrical rooms throughout the facility system and all tied back to the central lighting control computer located in the building facility managers office area. Interior and exterior lights are controlled by a combination of time controls as well as occupancy sensors and manual occupant low voltage switches. The system, originally installed in 1992 is now 20 years old and although the system is in good working condition there have been vast improvements in lighting control technologies over the past 20 years and replacement of the system should be seriously considered when an upgrade and or replacement of the buildings lighting system is undertaken



3.3.6 Building Life Safety Lighting System

The building emergency lighting system is delivered from emergency lighting panels located on each floor and connected to the building's generator.

Exit lighting is located through the space and generally on all means of egress from the building as required by code. The emergency lights are the bilingual combination EXIT/SORTIE units as required by the current PWGSC standards. Records indicate all the existing exit lights were just recently replaced in 2009 / 2010. Although the operation of these units was not tested we have a high degree of confidence that they are all working properly as the buildings operators as well as PWGSC have always been very diligent in ensuring their buildings are compliant with respect to life safety matters.

The most recent revision of the National Building Code now however has adopted the use of the more internationally accepted "pictogram" (Running man) exit lights which are universally recognized as a means of egress from a building. The city of Charlottetown has recently adopted the latest version of the NBC and now requires the use of the new exit signs for all building construction and/or renovations within the City of Charlottetown.

3.3.7 Building Communications System

The building's communications systems went under a major upgrade and renovation in 2005. During these renovations and modification to the buildings communication rooms were undertaken. Currently the communications system consists of a main telephone room located on the first floor as well as two communications rooms on each of first, second and third floors ("north" and "south"). The third floor "south" communications room was added in 2007 when a major renovation was undertaken on the south side of the third floor. All communications rooms are interconnected with communications conduits delivering copper and fibre backbone communications to all rooms. In addition all communications rooms are equipped with a #2/0 copper main communications grounding conductor in conduit with telecommunications grounding bars TGB's located in each of the communications rooms. The telecommunications grounding system is bonded to all data cabinets, wall mounted cabinets and cable trays for a complete integrated grounding system. All TGB's are in turn connected to the main telecommunications grounding bar TMGB which is connected to the main building ground.

A network of cable trays radiate from each of the communication rooms to deliver network data drops to the buildings occupants. The entire system appears to be properly designed and installed as required by the appropriate CSA standards.

The main server room is located on the third floor and is serviced through a dedicated electrical panel board which in turn feeds a 40 kVA uninterruptible power supply (UPS) for the buildings critical server loads as well as the buildings eight communication rooms.

3.3.8 Building Fire Alarm System

The building's fire alarm system was upgraded in 2008 to a Siemens FS-250C fully addressable, single stage fire alarm system. The upgrade consisted of a new control panel, smoke detectors and pull stations. All new devices were wired to the existing wiring infrastructure which is quite common to fire alarm upgrades in existing facilities. This new system replaced the original Simplex system. Although the indicating devices were all upgraded and replaced the original 250mm diameter fire alarm bells are still in place as per the original construction.

During our site review it was noticed that all fire alarm pull stations appear to be mounted at 1500mm above finished floor. This is a violation of the barrier free code which indicates all devices shall be no higher than 1200 mm above finished floor. In addition, as mentioned above, it was noticed that the building's audible signaling devices are generally the



original Simplex 250mm diameter bells. One exception however is the first floor southwest where some horn/strobe devices exist as well. We suspect the horn strobes were added to accommodate some building occupants with hearing impairments however it is our understanding that it is against code to have audible signaling devices that produce different audible signals.

3.3.9 Building Fire Pump System

The building's fire pump is a 60 hp Brooks Crompton Parkinson system and is located in the northwest corner of the basement. The fire pump is fed from the emergency generator through the main emergency distribution Panel DPX which in turn feeds the basement emergency Panel DPXA which in turn feeds the fire pump from a 175A-3P circuit breaker. Although we expect the installation met code at the time the building was originally constructed the arrangement currently does not meet code and subsequently needs to be upgraded and or replaced. In addition it is questionable as to whether the existing emergency generator is adequately sized to carry the emergency load of the building and be able to start the fire pump in the event the fire pump is required to operate under emergency power. The starting means for this pump also needs to be reviewed as utility regulations require any electric motor of 25 horsepower or larger to have a means of reduced voltage starting. If it is determined that the fire pumps starter is not of the reduced voltage type then not only would it not meet the utility's requirements but it may also cause problems with the existing emergency generator if called upon to start when the building is running on emergency power.

In the previous building condition report (P200152A) commissioned in 2000 the fire pump was identified for replacement. This replacement however has not been undertaken as of this date.

4.0 Recommendations

4.1 General

The mechanical and electrical systems have been reviewed and the following recommendations are based on a number of factors which have been taken into consideration. They include the following:

- Energy efficiency
- Facility is to remain occupied during the incorporation of the multi-projects
- Minimize disruption to building occupants during construction
- Minimize swing space requirements for upgrades/replacements
- Capital Cost
- Sequencing to reduce risk to occupant comfort.

4.2 Mechanical

There are a significant amount of the mechanical systems which are of original installation. They have been well maintained but are approaching the end of anticipated life expectancy or of insufficient capacity as a result of increased building loads and poor equipment performance.

The ventilation system specifically is operating at maximum capacity with no redundancy or diversification available. In addition, the maximum operating capacity is operating below the design parameters which is compounding the comfort issues of the facility.



The options to upgrade the mechanical systems were reviewed and evaluated based on the above parameters and the application.

The preferred options, in our opinion, for this facility were to upgrade the existing VAV system or provide high performance fan coils with dedicated outdoor air system.

The upgrade of the VAV system which requires significant increase in ductwork sizes has many challenges, if not impossible, in an occupied building. The magnitude of the systems in the penthouse would require the systems to be out of commission for a length of time which would be detrimental to the occupant comfort.

A comparative energy analysis of the VAV system and fan coil systems confirmed that the fan coil system was more energy efficient and a summary of these results are included in Appendix.

The energy costs were calculated utilizing Carrier's HAP software which is a design and simulation program for building HVAC systems. Each system alternative was modeled with the same energy rates, operating schedules, setpoints, airflows, etc., as closely as possible to the actual building operation. The results of this analysis provides an annual energy cost estimate for the various alternatives considered.

A summary of the findings indicate the following:

- The fan coil system is approximately 5% more efficient operationally than VAV. This is not significant, but confirms there is no operational cost penalty to proceeding in this direction.
- Boiler plant required for fan coil system is 2037 MBH as compared to 2162 MBH required for VAV.
- Chilled water plant capacity required for fan coil system is 283 tons compared to 331 tons for VAV system.
- The steam plant for humidification system required for fan coil system is 232 MBH compared to 405 MBH for VAV system.

This confirms there are real operational costs benefits to the recommended high performance fan coil system.

Additional benefits would include:

- The fan coil system would be more flexible in maintaining occupant comfort in the building as each of the spaces are upgraded. A dedicated outdoor air system could be installed in the existing available space in the penthouse to allow the existing systems to remain operational throughout the implementation of multiple projects.
- The fan coil system with integral regulated outdoor air damper would also be compatible with existing VAV system. This would allow upgraded areas to be temporarily provided with outdoor air from existing air handling unit which would provide more flexibility as projects proceed in coordinating department operations and available swing space.
- The fan coil system with integral outdoor air damper provides positive feedback on outdoor air quantities being supplied to each zone and flexibility to adjust as occupant loads change, using demand CO₂ control if desired.



The following is a list of recommendations to upgrade/replace on the mechanical systems:

- Replace all main air handling units in their entirety including AHU-1, 2, 4 and 5 with dedicated outdoor air supply systems to support high performance fan coil system.
- Replace all existing VAV boxes and controllers with high efficiency fan coils with constant speed fans with ECM motors and integral regulated outdoor air damper.
- Upgrade/modify main ventilation distribution ductwork as required to deliver outdoor air to fan coil distribution system. This is described in more detail in project descriptions in report.
- Upgrade/replace existing EMCS system to control all new equipment with electronic type devices.

4.2.1 Main Air Handling System(s)

It would be recommended to provide to the occupied areas in accordance with ASHRAE 62 Guideline a new 100% dedicated outdoor air handling unit(s) to replace existing VAV systems to provide outdoor air.

The unit(s) would include supply fan, steam humidification section served by a new steam humidification boiler system, hydronic heating coils with energy from existing boiler plant, chilled water cooling coils based on glycol with cooling from primary side of new air cooled chiller plant, filter sections as per latest ASHRAE guidelines. Heat recovery technology would also be incorporated into the unit to maximize energy efficiency. All fans would incorporate variable speed technology to maximize efficiency.

The outdoor air system would also incorporate sequence for dehumidification of outdoor air which will improve occupant comfort in the facility

Heating coils would incorporate glycol for freeze protection and modulating valves to control supply air temperature.

Cooling coils would incorporate two way control valves and variable speed secondary chilled glycol pumps. Cooling coils would be selected based on glycol solution to allow the system to be charged with glycol for freeze protection.

The following is a summary of the proposed air handling system and air flows:

Air Handling Units			
AHU #	Airflow (cfm)	Area Served	Comments
AHU-1	20000	Levels 1 through 5	

4.2.2 High Performance Fan Coil System

It is recommended to remove all VAV boxes and replace with new high performance fan coil units constant speed fans with ECM motors for energy efficiency and cooling coils. EMCS to provide space temperature control. Outdoor air quantities from dedicated outdoor air system to be maintained by outdoor air intake damper controller and required outdoor air volume required to meet ASHRAE guidelines for outdoor air requirements based on Workplace 2.0 occupancy load. These valves can be operator adjustable to allow adjustment as occupancy changes to maximize energy efficiency and occupant comfort. CO₂ could be incorporated in the design where practical, these would include meeting spaces, common areas, etc. where occupancy would vary considerably.



4.2.3 Main Distribution Ductwork

It is proposed to provide new dedicated outdoor air system duct risers through the atrium to deliver the outdoor airflows required to the fan coil system. The existing main and branch ductwork will be reused where possible but is described in more detail in each of the projects below for each area affected. This recommended direction will allow future project areas to continue to operate without disruption throughout the various projects.

4.2.4 Heating Plant

The existing boiler plant is in good condition. The boilers have been recently replaced and are of adequate capacity.

It is recommended to replace the existing distribution pumps as these are of original installation. Pumps to be provided with variable frequency drives to optimize energy savings and operational load matching.

A new dedicated pumps, glycol heat exchanger and piping system will be provided to serve the heating coils in the new air handling units. The recommended arrangement is shown schematically in Appendix.

4.2.5 Chiller Plant

The chiller plant consists of four (4) new chillers and associated primary pumps which have been installed in 2010.

The secondary pumps will be replaced with variable frequency driven pumps to maximize efficiency and provide cooling to the new fan coil unit chilled water piping distribution system(s). Two way control valves will be provided on the chilled water coils. The mains would be arranged and installed to allow the branch piping and/or loops to be installed on a project by project basis as the fan coils are installed. System to be charged with glycol at the primary chilled water loop to provide freeze protection to the system and shown schematically in Appendix.

Dedicated chilled water pump(s) shall be provided to serve the chilled water coil in the outdoor air handling unit. Chilled water coils to be sized based on glycol for freeze protection.

An air cooled fluid cooler is recommended to be incorporated into the chiller plant to improve overall system efficiency. This is shown schematically in Appendix.

This would provide efficient cooling for the facility during colder weather.

This system has been included in the HAP analysis and confirms energy savings will be achieved.

4.2.6 Fire Protection

The fire protection system is of original installation but has been well maintained.

The cost of replacing the branch piping for each individual head has been included in each project area to minimize disruption to tenants and cost effectiveness of other systems in area.

The main fire pump is identified for replacement which would include the replacement/upgrade of associated fire pump control panel to current industry standards and code compliance. Refer to electrical section for more details on the electrical component.



4.2.7 Plumbing System

The plumbing systems are generally of original installation with the exception of lavatory faucets.

It is recommended that the corroded sanitary piping be replaced in the parking garage and cost has been included in the preliminary budget estimates for this work.

A plumbing allowance to replace all fixtures has been included in each project area although the fixtures are in relatively good condition. It is recommended that the piping be investigated in more detail to confirm its condition.

4.2.8 Automatic Controls

It is recommended that a new building energy management control system (ECMS) be provided to replace the existing system.

The system is to be a fully operational Direct Digital Control (DDC) microprocessor based building energy management and control system (EMCS) with full range of programmable HVAC and Energy Management capabilities resident on the controller. Scope of work shall include but not limited to the following:

- .1 Local area network Ethernet based.
- .2 Building controllers.
- .3 Operator work station and/or touch screen HMI(s).
- .4 Data communication equipment necessary to effect EMCS data transmission systems.
- .5 Field control devices.
- .6 Software/hardware complete with full documentation.
- .7 Complete operating and maintenance manuals.
- .8 Training of personnel.
- .9 Acceptance tests, technical support during commissioning, full documentation.
- .10 Wiring interface co-ordination of equipment as required.
- .11 Miscellaneous work as indicated or specified herein.

It is suggested that in the process of selection of various building systems that provide communication, control, or lighting function that the selected systems be of compatible technology to allow for a full system wide integration to transfer information seamlessly from one system to another via standard Ethernet category 6 wiring system.

It is suggested that the DDC building control system and lighting control systems be integrated where acceptable to the Owner.



4.3 Electrical

4.3.1 Main Electrical Service

The main electrical service is in very good condition and has adequate capacity for future branch circuit feeders there is no reason to believe that any upgrades and or replacement of the main service will be required. As will be identified below, if and when, the main vertical bus ducts are upgraded and /or replaced there is adequate space and capacity within the existing main switchboard to accommodate these upgrades.

4.3.2 Building Power Distribution

As previously mentioned the main power distribution throughout the building is accomplished through two 800 ampere, 600 volt bus ducts that rise up through the building delivering power to each floor. Also as mentioned the bus ducts themselves are now over 32 years old and approaching the end of its expected service life.

It is suggested that existing bus ducts be replaced with three dedicated riser feeders consisting of conductors in conduits. The new feeders would be dedicated to the following services:

- | | | | |
|-------------|------------|---|-----------------------------------|
| 1. Feeder A | 400 Ampere | - | Building Lighting Systems |
| 2. Feeder B | 400 Ampere | - | Building Plug Power Systems |
| 3. Feeder C | 800 Ampere | - | Building Mechanical Power Systems |

With this type of a riser system opportunities will be created for greater ease in adding and modifying the systems in the future. In addition it will enable a more accurate and meaningful way to monitor the buildings energy consumption based on systems lighting, general receptacle power as well as mechanical systems power. By separating the buildings energy usage into the above mentioned categories PWGSC can accurately monitor the electrical energy consumption and provide energy trending on the building lighting and power densities and hence enable the building energy performance to be compared to the Canadian Model Energy Code.

It is suggested that all existing standard step down transformers be replaced with new harmonic mitigating transformers which are generally considered to be not only more energy efficient than their predecessors but also better suited to today's office environments with increased solid state loads such as computers, copiers and printers. These new transformers would also meet the current PWGSC requirements.

It is suggested that the existing branch circuit panel boards be replaced with new panel boards with a greater number of branch circuit breakers to not only satisfy the increasing demand for branch circuit loads but also to prepare the electrical distribution system for the implementation of the Workplace 2.0 Fit-Up standards.

Undertaking the above mentioned work within the newly expanded electrical rooms will also offer the opportunity to correct existing code deficiencies that may exist in the existing electrical rooms.

As mentioned in Part 3 of the report the existing motor control centre located in the main mechanical penthouse is approaching the end of its expected service life. As a result it is recommended that at the time the main penthouse mechanical systems are replaced that the replacement of the motor control centre be undertaken at the same time.



4.3.3 Building Emergency Power Distribution

As indicated the original 175 kW emergency generator has been in service and is in need of replacement. It is suggested that a new generator of an increased size would better service the needs of the building and offer greater opportunity to provide emergency power to other critical loads within the facility such as the main server room as well as provide an enhanced and more secure source of emergency power to the existing emergency loads.

In addition a careful analysis also needs to be undertaken to modify the emergency distribution system to insure emergency power is being delivered to the fire pump in a code compliant manner. At the same time it would be prudent to evaluate the sizing and capacity of the existing fire pump to ensure it meets the requirements of the building's fire protection system. Further comments regarding the fire pump are identified below.

4.3.4 Building Lighting System

As mentioned the buildings lighting system has gone through a number of upgrades in a number of various areas throughout the building. As a result there is a diverse mixture of lighting systems, products and technologies throughout the building. The system is not consistent nor does it seem to service the space effectively. Even the third floor "South" space which was most recently upgraded in 2008 to a suspended indirect lighting system incorporating occupancy sensors in an effort to enhance control and reduce energy consumption appears to be problematic to the buildings occupants.

There have been tremendous advances in lighting technology in recent years and as a result tremendous opportunities are available to create an extremely efficient and user friendly lighting system incorporating the latest LED technologies coupled with individual occupant control allowing the lighting over each individuals work space to be adjusted to suit their particular requirements.

The above mentioned lighting system would enable the current PWGSC lighting requirements of 500 lux minimum to be satisfied while still allowing individual occupant to lower the levels in their areas to suit their personal preference. In the opinion of this consultant an even better solution that would offer increased energy savings and an increased level of control would be to design and install a lighting system that would maintain an average lighting level of 300 lux and then supplement the light levels at the occupants workstations through the use of task lighting with integral occupancy sensor control.

All lighting control stations, by code, need to be lowered to insure they are no higher than 1200 mm above the finished floor. By doing so the building will be compliant with the current CSA standard for Barrier free design (CAN/CSA-B651).

The underground parking lighting should be completely replaced with a new lighting system utilizing the current LED technology. It is suggested that this lighting system incorporate the use of occupancy sensors to ensure the lights are dimmed to a lower light level at times when the parking garage is unoccupied.

One major item to consider however, is that the existing buildings lighting system operates at 347 volts. While efficient from a distribution perspective it does present problems due to the current limitations on products available at 347 volts. Industry is responding to these needs by developing LED products that are rated for 347 volts however it is safe to say that the industries focus remains on products rated for 120 volts. Serious consideration will have to be given to the products that are available at the time the renovations are undertaken and also to the possibility of converting the buildings lighting system to 120 volts to fully take advantage of increased array of lighting products and control schemes that are available using a system voltage of 120 volts.



With the continuing advancements in the LED lighting technology there is no question that LED lighting is the way of the future. Tremendous opportunities exist and meaningful energy saving are available through the use of LED's. LED's also offer reduced maintenance due to their increased lamp life therefore reducing the burden on the buildings maintenance staff.

4.3.5 Building Lighting Control System

As mentioned the buildings lighting control system is a General Electric low voltage relay system and has been in place since the early 1990's. Although this system is in good working condition there have been vast improvements in lighting control technologies over the past 20 years and with the implementation of a new lighting system an opportunity will be created to upgrade and replace the buildings lighting control system at the same time.

4.3.6 Building Life Safety Lighting System

The building emergency lighting system is delivered from emergency lighting panels located on each floor and connected to the building's generator.

As mentioned previously the exit lighting in the building was just recently replaced in 2009 / 2010. Also however, as mentioned earlier the City of Charlottetown has recently adopted the most recent revision of the National Building Code which now requires the use of the more internationally accepted "pictogram" (Running man) exit lights. Although there is no set time line on a mandatory conversion to the use of the new "Running man" signs it would be recommended that at the time the buildings general lighting systems are upgraded that the existing exit lights be replaced to be compliant with the 2010 National Building Code.

4.3.7 Building Communications System

The building's communications systems went under a major upgrade and renovation in 2005. Currently there are two communications rooms on first, second and third floors with one communication room being on the south side and the other on the north side. Current industry standards indicate a communications room is required for every 1000 m² of useable office space. Based on the current occupied space and in consideration of the possible implementation of the Workplace 2.0 Fit-up standards a detailed evaluation of the useable floor place will be required. Based on preliminary calculations it appears a second communications room will be required on the north side of the second, third and fourth floors and possibly on the first floor depending on the intended use of the space. This preliminary calculation is based on CAN/CSA Standard T-530.

If the second communications closets are deemed necessary they should be provided for at a time when other renovations within the ceiling space are taking place as additions and modifications of the buildings cable tray system, main interconnecting backbone communications services and communications grounding systems will all be required.

At present there is a 40 kVa providing uninterruptible power supply (UPS) to the buildings critical server loads. This UPS however is not connected to the emergency generator and as a result when power is lost the servers will eventually have to be shut down if power is not restored as the current battery runtime is approximately 58 minutes. In addition the existing batteries have a typical life span of 36 to 60 months and are approaching the end of their life. We understand this battery replacement is currently scheduled and will be undertaken in the near future.



As a result consideration should be given to connecting the server room UPS system and its cooling system to the emergency generator when the emergency generator is upgraded and replaced as we expect the existing generator is not adequately sized to handle the server room loads in addition to the existing emergency loads. By having the building's main server room on emergency power the critical communications equipment will remain uninterrupted throughout an extended interruption to utility power.

4.3.8 Building Fire Alarm System

The building's fire alarm system was upgraded in 2008 to a Siemens FS-250C fully addressable, single stage fire alarm system. The upgrade consisted of new control panel smoke detectors and pull stations. All new devices were wired to the existing wiring infrastructure which is quite common to fire alarm upgrades in existing facilities. This new system replaced the original Simplex system.

As mentioned during our site review it was noticed that all fire alarm pull stations appear to be mounted at 1500mm above finished floor. This is a violation of the barrier free code which indicates all devices shall be no higher than 1200 mm above finished floor. All existing fire alarm pull stations should be lowered to 1200mm AFF to satisfy the accessibility code. This problem is not uncommon in many buildings across the country and as a result many manufacturers now offer dedicated ADA retrofit pull station extenders that can be installed with no wiring modifications and very little disruption to the existing systems operation.

The owner may also wish to give consideration to the installation of a fire alarm system with voice notification and communication features. Although voice notification and communications are not required by code for this building many building owners are now installing voice communications systems as a part of their fire alarm system. As a result these systems are serving the purpose of mass notification in addition to fire alarm purposes. In recent history the issue of mass notification has become more of a concern as there are many instances in which buildings occupants require notifications of threatening circumstances pertaining to the occupant's safety.

There has been some recent discussions within the NFPA organizing body that will incorporate the requirement for mass notification systems in the future revisions of its codes. It is prudent to consider this mass notification system if and when the replacement of the signaling devices takes place. It should be pointed out however that the upgrade of the system to include mass notification would require the replacement of the existing fire alarm panel as a system with integrated ULC approved redundant amplifiers would be required with an integrated voice system.

4.3.9 Building Fire Pump System

The building's fire pump is a 60 hp Brooks Crompton Parkinson system and is located in the northwest corner of the basement. The fire pump is fed from the emergency generator through the main emergency distribution Panel DPX which in turn feeds the basement emergency Panel DPXA which in turn feeds the fire pump from a 175A-3P circuit breaker.

In the previous building condition report (P200152A) commissioned in 2000 the fire pump was identified for replacement. This replacement however has not been undertaken as of this date.

According to the Canadian Electrical Code, Section 32-200 a fire pump is required to be service from a separate and independent service directly from the utility power supply. In addition when connected to the emergency power supply the fire pump is required to have its own dedicated feeder connected directly to the emergency generator and also to have its own dedicated automatic transfer switch. Furthermore there shall be no device capable of interrupting the fire pump circuit other than the circuit breaker labeled in a conspicuous, legible, and permanent manner identifying it as a fire pump disconnecting means. According to the code this circuit breaker shall also be capable of being locked in the "closed" position.



The new fire pump is to be installed to the requirements of the Canadian electrical Code, the National Building Code, Section 3.2.5.18 and the requirements of NFPA 20.

In addition and as previously stated the starting means for this pump also needs to be reviewed as utility regulations require any electric motor of 25 horsepower or larger to have a means of reduced voltage starting. If it is determined that the fire pumps starter is not of the reduced voltage type then not only would it not meet the utility's requirements but it may also cause problems with the existing emergency generator if called upon to start when the building is running on emergency power.

4.3.10 Workplace 2.0 – Electrical Considerations

Currently there is consideration being given to applying the Workplace 2.0 Fit-up standards to the Daniel J. Macdonald building. The result of applying the above standard would see the buildings occupant load increasing from the present level of approximately 743 to 900 fulltime employees. Therefore an additional 157 full time employees would have to be accommodated within the existing 12,236.9 m² of useable space.

Previous reports and Initial investigations reveled that the additional occupant load would put the buildings M&E systems beyond its capacity and would necessitate the need for expansion and or replacements of the existing systems.

From an electrical perspective we feel the building's main service equipment is adequately sized to accommodate the implementation of the Workplace 2.0 Fit-up Requirements.

As discussed earlier the existing electrical demand on the building's main electrical switchgear peaks during the summer months to approximately 732 kW, which is approximately 36% of the electrical service capacity. In additional there is a reasonable provision for future branch circuit feeders without requiring any major upgrades apart from adding the circuit breakers themselves.

When referencing the most current version of the Canadian Model Energy Code for Buildings 2011 and assuming this code will be followed for any future upgrades and renovations to the building it can be assumed the following power requirements will be necessary using the building area method of calculation:

- Lighting Load 9.7 W/m²
- Peak Receptacle Load 7.5 W/m²
- Service water heating load 90 W/person

Based on the above one could expect the buildings lighting load to be 159.5 kW, the general plug power load to be 123.5 kW and the service water load requirements to be in the order of 81 kW for a total load of 364 kilowatts, based on a total occupant load of 900 employees and a total building size of 16,435m² and not the 12,236.9 m² of useable space mentioned above. To this, of course, one must add the electrical requirements of the buildings HVAC which must be calculated by the mechanical consultant. As mentioned the electrical demand calculation above is based on the "Building Type" "Office" classification. Once the design work for the building is undertaken it is suggested that the more efficient "Space-by-Space" method of calculation be used as it generally is considered to be a more flexible means of calculation for the designer.



5.0 Project Breakdown

We would suggest the scope of work necessary to complete the mechanical and electrical system upgrades be completed in independent projects. The priorities of these projects has been taken into account many factors including the following:

- Health and Safety
- Code Compliance
- Service Life
- Operational Requirements
- Cost Benefit
- Energy Efficiency
- Occupant Comfort

The following is a description of each project and preliminary estimated capital costs. A breakdown of the capital cost for each project is included in the Appendices.

Project I

- Provide dedicated outdoor air handling unit c/w heat recovery system in penthouse.
- Provide new secondary chilled water pumps. One (1) set of secondary pumps to serve new air handling unit and one (1) set of variable speed secondary pumps to serve fan coil system.
- Provision of chilled water piping to new AHU coil.
- Provision of heating piping and components to new AHU coil.
- Provision of chilled water main risers through atrium space or dedicated shaft(s). Arrangement to provide branches for each level valved and capped at each floor with arrangement to allow operation as projects proceed.
- Provision of new dedicated outdoor air riser(s) through atrium space and branches at each level capped for future.
- Provision of new BacNet EMCS control system with capability of expansion as projects proceed.
- Replacement of existing heating water primary pumps.
- Provision of new heating water piping to new dedicated outdoor air AHU coil.
- Provision of low pressure steam piping for humidifier in dedicated outdoor air unit.
- Install new 600 volt, 800 ampere, 3 phase, 4 wire main "Mechanical Power" riser from the main electrical switchboard through the existing electrical rooms. Establish new branch mechanical panel boards on each floor for future electrical servicing of new fan coil units in future project phases.
- Install new 600 volt, 400 ampere, 3 phase, 4 wire main "Lighting Power" riser from the main electrical switchboard through the existing electrical rooms. Relocate / refeed existing lighting panels to the new main building lighting riser.
- Install new 600 volt, 400 ampere, 3 phase, 4 wire main "Plug Power" riser from the main electrical switchboard through the existing electrical rooms. Relocate / re-feed existing lighting panels to the new main building lighting riser.
- Provide a new motor control centre and provide new branch circuit wiring to all new, relocated and existing mechanical loads that are affected in the above mentioned description of work.
- Remove and dispose of the existing motor control centre upon completion.
- Provide dedicated owners digital meter to monitor and trend all penthouse mechanical loads.
- Replace existing 600/120/208 volt step down transformer with new harmonic mitigating transformers.
- Replace all existing 120/208 volt panel boards with new panel boards with increased branch circuit capacity and spare circuit breakers future consideration.



- Replace the existing emergency generator with a new larger generator that can provide upgraded emergency services to:
 - o Additional essential building loads
 - o New Fire Pump
 - o Main Server room
- Replace the existing automatic transfer switch with a new transfer switch sized for the capacity of the new generator.
- Upgrade mechanical penthouse lighting to LED luminaires.
- Lower all lighting control stations (switches) to 1200mm above finished floor to satisfy the requirements of the Barrier Free code (CAN/CSA B651-04).
- Replace the existing fire pump located in the basement. New fire pump shall be installed to the requirements of the NBCC, Section 3.2.5.18 and the requirements of NFPA 20.
- Provide new dedicated normal power utility metered service to the new fire pump as required by Code.
- Provide a new dedicated electrical feeder from the new emergency generator to the new fire pump as required by Code.

Preliminary Cost Estimate: \$1,520,705.00

Project II

- Provision of new high performance fan coil system in project area II of main floor north as identified on HVAC-1 in Appendix.
- Provision of branch secondary chilled water piping mains to serve new fan coils.
- Provide water and air balancing
- Provision of new ductwork and grilles downstream of fan coils.
- Modify existing VAV ductwork and convert to dedicated outdoor air and connect to new riser.
- Provision of BacNet EMCS system expansion from existing system installed under Project I.
- Provide a new dedicated mechanical systems branch circuit panel board in the electrical room and feed it from the new main mechanical system power riser provided in Project I. Wire all new fan coil units and other mechanical equipment to this new panel board.
- Rewire all remaining mechanical loads to the new mechanical systems branch circuit panel board.
- Replace all existing 600/120/208 volt step down transformers with new harmonic mitigating transformers.
- Replace all existing 120/208 volt panel boards with new panel boards with increased branch circuit capacity and spare circuit breakers future consideration.
- Provide new lighting branch circuit panel boards and feed them from the main lighting riser provided in Project I.
- Provide a new lighting system for project area and upgrade the existing low voltage lighting control system. All new lighting systems shall be wired from the new lighting branch circuit panelboard.
- Lower all lighting control stations (switches) to 1200mm above finished floor to satisfy the requirements of the Barrier Free code (CAN/CSA B651-04).
- Upgrade ceiling power distribution grid to meet current PWGSC standards and to accommodate the Workplace 2.0 Fit-up standards. Re-wire all ceiling grid power distribution circuits to new "Plug Power" panel boards and feed new "plug Power" panel boards from the new "Plug Power" riser.
- Upgrade ceiling cable tray distribution system to meet current PWGSC standards and to accommodate the Workplace 2.0 Fit-up standards.

Preliminary Cost Estimate: \$598,852.00



Project III

- Provision of new high performance fan coil system in project area III of main floor north as identified in Appendix.
- Provision of branch secondary chilled water piping mains to serve new fan coils.
- Provide water and air balancing
- Provision of new ductwork and grilles downstream of fan coils.
- Modify existing VAV ductwork and convert to dedicated outdoor air and connect to new riser.
- Provision of BacNet EMCS system expansion from existing system installed under Project I.
- Provide a new dedicated mechanical systems branch circuit panel board in the electrical room and feed it from the new main mechanical system power riser provided in project I. Wire all new fan coil units and other mechanical equipment to this new panel board.
- Rewire all remaining mechanical loads to the new mechanical systems branch circuit panel board.
- Replace all existing 600/120/208 volt step down transformers with new harmonic mitigating transformers.
- Replace all existing 120/208 volt panel boards with new panel boards with increased branch circuit capacity and spare circuit breakers future consideration.
- Provide new lighting branch circuit panel boards and feed them from the main lighting riser provided in Project I.
- Provide a new lighting system for project area and upgrade the existing low voltage lighting control system. All new lighting systems shall be wired from the new lighting branch circuit panelboard.
- Lower all lighting control stations (switches) to 1200mm above finished floor to satisfy the requirements of the Barrier Free code (CAN/CSA B651-04).
- Upgrade ceiling power distribution grid to meet current PWGSC standards and to accommodate the Workplace 2.0 Fit-up standards. Re-wire all ceiling grid power distribution circuits to new "Plug Power" panel boards and feed new "plug Power" panel boards from the new "Plug Power" riser.
- Upgrade ceiling cable tray distribution system to meet current PWGSC standards and to accommodate the Workplace 2.0 Fit-up standards.

Preliminary Cost Estimate: \$870,334.00

Project IV

- Provision of new high performance fan coil system in project area IV of main floor south as identified in Appendix.
- Provision of branch secondary chilled water piping mains to serve new fan coils.
- Provide water and air balancing
- Provision of new ductwork and grilles downstream of fan coils.
- Modify existing VAV ductwork and convert to dedicated outdoor air and connect to new riser.
- Provision of BacNet EMCS system expansion from existing system installed under Project I.
- Provide a new dedicated mechanical systems branch circuit panel board in the electrical room and feed it from the new main mechanical system power riser provided in project I. Wire all new fan coil units and other mechanical equipment to this new panel board.
- Rewire all remaining mechanical loads to the new mechanical systems branch circuit panel board.
- Replace all existing 600/120/208 volt step down transformers with new harmonic mitigating transformers.
- Replace all existing 120/208 volt panel boards with new panel boards with increased branch circuit capacity and spare circuit breakers future consideration.
- Provide new lighting branch circuit panel boards and feed them from the main lighting riser provided in Project I.



- Provide a new lighting system for project area and upgrade the existing low voltage lighting control system. All new lighting systems shall be wired from the new lighting branch circuit panelboard.
- Lower all lighting control stations (switches) to 1200mm above finished floor to satisfy the requirements of the Barrier Free code (CAN/CSA B651-04).
- Upgrade ceiling power distribution grid to meet current PWGSC standards and to accommodate the Workplace 2.0 Fit-up standards. Re-wire all ceiling grid power distribution circuits to new "Plug Power" panel boards and feed new "plug Power" panel boards from the new "Plug Power" riser.
- Upgrade ceiling cable tray distribution system to meet current PWGSC standards and to accommodate the Workplace 2.0 Fit-up standards.

Preliminary Cost Estimate: \$542,212.00

Project V

- Provision of new high performance fan coil system in project area V of main floor south as identified in Appendix.
- Provision of branch secondary chilled water piping mains to serve new fan coils.
- Provide water and air balancing
- Provision of new ductwork and grilles downstream of fan coils.
- Modify existing VAV ductwork and convert to dedicated outdoor air and connect to new riser.
- Provision of BacNet EMCS system expansion from existing system installed under Project I.
- Provide a new dedicated mechanical systems branch circuit panel board in the electrical room and feed it from the new main mechanical system power riser provided in project I. Wire all new fan coil units and other mechanical equipment to this new panel board.
- Rewire all remaining mechanical loads to the new mechanical systems branch circuit panel board.
- Replace all existing 600/120/208 volt step down transformers with new harmonic mitigating transformers.
- Replace all existing 120/208 volt panel boards with new panel boards with increased branch circuit capacity and spare circuit breakers future consideration.
- Provide new lighting branch circuit panel boards and feed them from the main lighting riser provided in Project I.
- Provide a new lighting system for project area and upgrade the existing low voltage lighting control system. All new lighting systems shall be wired from the new lighting branch circuit panelboard.
- Lower all lighting control stations (switches) to 1200mm above finished floor to satisfy the requirements of the Barrier Free code (CAN/CSA B651-04).
- Upgrade ceiling power distribution grid to meet current PWGSC standards and to accommodate the Workplace 2.0 Fit-up standards. Re-wire all ceiling grid power distribution circuits to new "Plug Power" panel boards and feed new "plug Power" panel boards from the new "Plug Power" riser.
- Upgrade ceiling cable tray distribution system to meet current PWGSC standards and to accommodate the Workplace 2.0 Fit-up standards.

Preliminary Cost Estimate: \$462,461.00



Project VI

- Provision of new high performance fan coil system in project area VI of second floor north as identified in Appendix.
- Provision of branch secondary chilled water piping mains to serve new fan coils.
- Provide water and air balancing
- Provision of new ductwork and grilles downstream of fan coils.
- Modify existing VAV ductwork and convert to dedicated outdoor air and connect to new riser.
- Provision of BacNet EMCS system expansion from existing system installed under Project I.
- Provide a new dedicated mechanical systems branch circuit panel board in the electrical room and feed it from the new main mechanical system power riser provided in project I. Wire all new fan coil units and other mechanical equipment to this new panel board.
- Rewire all remaining mechanical loads to the new mechanical systems branch circuit panel board.
- Replace all existing 600/120/208 volt step down transformers with new harmonic mitigating transformers.
- Replace all existing 120/208 volt panel boards with new panel boards with increased branch circuit capacity and spare circuit breakers future consideration.
- Provide new lighting branch circuit panel boards and feed them from the main lighting riser provided in Project I.
- Provide a new lighting system for project area and upgrade the existing low voltage lighting control system. All new lighting systems shall be wired from the new lighting branch circuit panelboard.
- Lower all lighting control stations (switches) to 1200mm above finished floor to satisfy the requirements of the Barrier Free code (CAN/CSA B651-04).
- Upgrade ceiling power distribution grid to meet current PWGSC standards and to accommodate the Workplace 2.0 Fit-up standards. Re-wire all ceiling grid power distribution circuits to new "Plug Power" panel boards and feed new "plug Power" panel boards from the new "Plug Power" riser.
- Upgrade ceiling cable tray distribution system to meet current PWGSC standards and to accommodate the Workplace 2.0 Fit-up standards.

Preliminary Cost Estimate: \$1,782,246.00

Project VII

- Provision of new high performance fan coil system in project area VII of second floor southeast as identified in Appendix.
- Provision of branch secondary chilled water piping mains to serve new fan coils.
- Provide water and air balancing
- Provision of new ductwork and grilles downstream of fan coils.
- Modify existing VAV ductwork and convert to dedicated outdoor air and connect to new riser.
- Provision of BacNet EMCS system expansion from existing system installed under Project I.
- Provide a new dedicated mechanical systems branch circuit panel board in the electrical room and feed it from the new main mechanical system power riser provided in project I. Wire all new fan coil units and other mechanical equipment to this new panel board.
- Rewire all remaining mechanical loads to the new mechanical systems branch circuit panel board.
- Replace all existing 600/120/208 volt step down transformers with new harmonic mitigating transformers.
- Replace all existing 120/208 volt panel boards with new panel boards with increased branch circuit capacity and spare circuit breakers future consideration.
- Provide new lighting branch circuit panel boards and feed them from the main lighting riser provided in Project I.



- Provide a new lighting system for project area and upgrade the existing low voltage lighting control system. All new lighting systems shall be wired from the new lighting branch circuit panelboard.
- Lower all lighting control stations (switches) to 1200mm above finished floor to satisfy the requirements of the Barrier Free code (CAN/CSA B651-04).
- Upgrade ceiling power distribution grid to meet current PWGSC standards and to accommodate the Workplace 2.0 Fit-up standards. Re-wire all ceiling grid power distribution circuits to new "Plug Power" panel boards and feed new "plug Power" panel boards from the new "Plug Power" riser.
- Upgrade ceiling cable tray distribution system to meet current PWGSC standards and to accommodate the Workplace 2.0 Fit-up standards.

Preliminary Cost Estimate:\$563,256.00

Project VIII

- Provision of new high performance fan coil system in project area VIII of second floor southwest as identified in Appendix.
- Provision of branch secondary chilled water piping mains to serve new fan coils.
- Provide water and air balancing
- Provision of new ductwork and grilles downstream of fan coils.
- Modify existing VAV ductwork and convert to dedicated outdoor air and connect to new riser.
- Provision of BacNet EMCS system expansion from existing system installed under Project I.
- Provide a new dedicated mechanical systems branch circuit panel board in the electrical room and feed it from the new main mechanical system power riser provided in project I. Wire all new fan coil units and other mechanical equipment to this new panel board.
- Rewire all remaining mechanical loads to the new mechanical systems branch circuit panel board.
- Replace all existing 600/120/208 volt step down transformers with new harmonic mitigating transformers.
- Replace all existing 120/208 volt panel boards with new panel boards with increased branch circuit capacity and spare circuit breakers future consideration.
- Provide new lighting branch circuit panel boards and feed them from the main lighting riser provided in Project I.
- Provide a new lighting system for project area and upgrade the existing low voltage lighting control system. All new lighting systems shall be wired from the new lighting branch circuit panelboard.
- Lower all lighting control stations (switches) to 1200mm above finished floor to satisfy the requirements of the Barrier Free code (CAN/CSA B651-04).
- Upgrade ceiling power distribution grid to meet current PWGSC standards and to accommodate the Workplace 2.0 Fit-up standards. Re-wire all ceiling grid power distribution circuits to new "Plug Power" panel boards and feed new "plug Power" panel boards from the new "Plug Power" riser.
- Upgrade ceiling cable tray distribution system to meet current PWGSC standards and to accommodate the Workplace 2.0 Fit-up standards.

Preliminary Cost Estimate: \$546,517.00



Project IX

- Provision of new high performance fan coil system in project area IX of third floor north as identified in Appendix.
- Provision of branch secondary chilled water piping mains to serve new fan coils.
- Provide water and air balancing
- Provision of new ductwork and grilles downstream of fan coils.
- Modify existing VAV ductwork and convert to dedicated outdoor air and connect to new riser.
- Provision of BacNet EMCS system expansion from existing system installed under Project I.
- Provide a new dedicated mechanical systems branch circuit panel board in the electrical room and feed it from the new main mechanical system power riser provided in project I. Wire all new fan coil units and other mechanical equipment to this new panel board.
- Rewire all remaining mechanical loads to the new mechanical systems branch circuit panel board.
- Replace all existing 600/120/208 volt step down transformers with new harmonic mitigating transformers.
- Replace all existing 120/208 volt panel boards with new panel boards with increased branch circuit capacity and spare circuit breakers future consideration.
- Provide new lighting branch circuit panel boards and feed them from the main lighting riser provided in Project I.
- Provide a new lighting system for project area and upgrade the existing low voltage lighting control system. All new lighting systems shall be wired from the new lighting branch circuit panelboard.
- Lower all lighting control stations (switches) to 1200mm above finished floor to satisfy the requirements of the Barrier Free code (CAN/CSA B651-04).
- Upgrade ceiling power distribution grid to meet current PWGSC standards and to accommodate the Workplace 2.0 Fit-up standards. Re-wire all ceiling grid power distribution circuits to new "Plug Power" panel boards.
- Upgrade ceiling cable tray distribution system to meet current PWGSC standards and to accommodate the Workplace 2.0 Fit-up standards.
- Provide a new dedicated emergency feeder to the main server room establish a main server room emergency power panel. Re-wire all ceiling grid power distribution circuits to new "Plug Power" panel boards and feed new "plug Power" panel boards from the new "Plug Power" riser.
- Rewire existing main server room HVAC systems to new server room emergency power panel.

Preliminary Cost Estimate: \$1,569,793.00

Project X

- Provision of new high performance fan coil system in project area X of third floor as identified in Appendix.
- Provision of branch secondary chilled water piping mains to serve new fan coils.
- Provide water and air balancing
- Provision of new ductwork and grilles downstream of fan coils.
- Modify existing VAV ductwork and convert to dedicated outdoor air and connect to new riser.
- Provision of BacNet EMCS system expansion from existing system installed under Project I.
- Provide a new dedicated mechanical systems branch circuit panel board in the electrical room and feed it from the new main mechanical system power riser provided in project I. Wire all new fan coil units and other mechanical equipment to this new panel board.
- Rewire all remaining mechanical loads to the new mechanical systems branch circuit panel board.
- Replace all existing 600/120/208 volt step down transformers with new harmonic mitigating transformers.
- Replace all existing 120/208 volt panel boards with new panel boards with increased branch circuit capacity and spare circuit breakers future consideration.



- Provide new lighting branch circuit panel boards and feed them from the main lighting riser provided in Project I.
- Provide a new lighting system for project area and upgrade the existing low voltage lighting control system. All new lighting systems shall be wired from the new lighting branch circuit panelboard.
- Lower all lighting control stations (switches) to 1200mm above finished floor to satisfy the requirements of the Barrier Free code (CAN/CSA B651-04).
- Upgrade ceiling power distribution grid to meet current PWGSC standards and to accommodate the Workplace 2.0 Fit-up standards. Re-wire all ceiling grid power distribution circuits to new "Plug Power" panel boards and feed new "plug Power" panel boards from the new "Plug Power" riser.
- Upgrade ceiling cable tray distribution system to meet current PWGSC standards and to accommodate the Workplace 2.0 Fit-up standards.

Preliminary Cost Estimate: \$499,144.00

Project XI

- Provision of new high performance fan coil system in project area XI of third floor south as identified in Appendix.
- Provision of branch secondary chilled water piping mains to serve new fan coils.
- Provide water and air balancing
- Provision of new ductwork and grilles downstream of fan coils.
- Modify existing VAV ductwork and convert to dedicated outdoor air and connect to new riser.
- Provision of BacNet EMCS system expansion from existing system installed under Project I.
- Provide a new dedicated mechanical systems branch circuit panel board in the electrical room and feed it from the new main mechanical system power riser provided in project I. Wire all new fan coil units and other mechanical equipment to this new panel board.
- Rewire all remaining mechanical loads to the new mechanical systems branch circuit panel board.
- Replace all existing 600/120/208 volt step down transformers with new harmonic mitigating transformers.
- Replace all existing 120/208 volt panel boards with new panel boards with increased branch circuit capacity and spare circuit breakers future consideration.
- Provide new lighting branch circuit panel boards and feed them from the main lighting riser provided in Project I.
- Provide a new lighting system for project area and upgrade the existing low voltage lighting control system. All new lighting systems shall be wired from the new lighting branch circuit panelboard.
- Lower all lighting control stations (switches) to 1200mm above finished floor to satisfy the requirements of the Barrier Free code (CAN/CSA B651-04).
- Upgrade ceiling power distribution grid to meet current PWGSC standards and to accommodate the Workplace 2.0 Fit-up standards. Re-wire all ceiling grid power distribution circuits to new "Plug Power" panel boards and feed new "plug Power" panel boards from the new "Plug Power" riser.
- Upgrade ceiling cable tray distribution system to meet current PWGSC standards and to accommodate the Workplace 2.0 Fit-up standards.

Preliminary Cost Estimate: \$1,376,520.00



Project XII

- Provision of new high performance fan coil system in project area XII of fourth floor as identified in Appendix.
- Provision of branch secondary chilled water piping mains to serve new fan coils.
- Provide water and air balancing
- Provision of new ductwork and grilles downstream of fan coils.
- Modify existing VAV ductwork and convert to dedicated outdoor air and connect to new riser.
- Provision of BacNet EMCS system expansion from existing system installed under Project I.
- Provide a new dedicated mechanical systems branch circuit panel board in the electrical room and feed it from the new main mechanical system power riser provided in project I. Wire all new fan coil units and other mechanical equipment to this new panel board.
- Rewire all remaining mechanical loads to the new mechanical systems branch circuit panel board.
- Replace all existing 600/120/208 volt step down transformers with new harmonic mitigating transformers.
- Replace all existing 120/208 volt panel boards with new panel boards with increased branch circuit capacity and spare circuit breakers future consideration.
- Provide new lighting branch circuit panel boards and feed them from the main lighting riser provided in Project I.
- Provide a new lighting system for project area and upgrade the existing low voltage lighting control system. All new lighting systems shall be wired from the new lighting branch circuit panelboard.
- Lower all lighting control stations (switches) to 1200mm above finished floor to satisfy the requirements of the Barrier Free code (CAN/CSA B651-04).
- Upgrade ceiling power distribution grid to meet current PWGSC standards and to accommodate the Workplace 2.0 Fit-up standards. Re-wire all ceiling grid power distribution circuits to new "Plug Power" panel boards and feed new "plug Power" panel boards from the new "Plug Power" riser.
- Upgrade ceiling cable tray distribution system to meet current PWGSC standards and to accommodate the Workplace 2.0 Fit-up standards.

Preliminary Cost Estimate: \$1,501,256.00

Project XIII

- Provision of new high performance fan coil system in project area XIII of fifth floor as identified in Appendix.
- Provision of branch secondary chilled water piping mains to serve new fan coils.
- Provide water and air balancing
- Provision of new ductwork and grilles downstream of fan coils.
- Modify existing VAV ductwork and convert to dedicated outdoor air and connect to new riser.
- Provision of BacNet EMCS system expansion from existing system installed under Project I.
- Provide a new dedicated mechanical systems branch circuit panel board in the electrical room and feed it from the new main mechanical system power riser provided in project I. Wire all new fan coil units and other mechanical equipment to this new panel board.
- Rewire all remaining mechanical loads to the new mechanical systems branch circuit panel board.
- Replace all existing 600/120/208 volt step down transformers with new harmonic mitigating transformers.
- Replace all existing 120/208 volt panel boards with new panel boards with increased branch circuit capacity and spare circuit breakers future consideration.
- Provide new lighting branch circuit panel boards and feed them from the main lighting riser provided in Project I.
- Provide a new lighting system for project area and upgrade the existing low voltage lighting control system. All new lighting systems shall be wired from the new lighting branch circuit panelboard.



- Lower all lighting control stations (switches) to 1200mm above finished floor to satisfy the requirements of the Barrier Free code (CAN/CSA B651-04).
- Upgrade ceiling power distribution grid to meet current PWGSC standards and to accommodate the Workplace 2.0 Fit-up standards. Re-wire all ceiling grid power distribution circuits to new "Plug Power" panel boards and feed new "plug Power" panel boards from the new "Plug Power" riser.
- Upgrade ceiling cable tray distribution system to meet current PWGSC standards and to accommodate the Workplace 2.0 Fit-up standards.

Preliminary Cost Estimate: \$1,154,007.00

Project XIV

This project upgrades the mechanical and electrical systems in the main atrium. This would include the following:

- Provision of new air handling system c/w mixed air damper, heating coil, cooling coil, filter sections to ASHRAE guideline, humidifier section and variable speed supply and return fans.
- Provision of heating water, chilled water and steam piping to support new unit thermal capacities.
- Existing ductwork to be modified and connected to new unit. Existing main risers outside penthouse intended to remain.
- Provision of EMCS automatic controls which would incorporate CO2 monitoring and control strategy to maximize energy efficiency.
- Replace existing atrium lighting system with new pedant mounted LED lighting system.
- Replace existing atrium common area lighting with new LED luminaires.
- Replace existing lighting at Grafton and Kent Street entrances with new LED luminaires.

Preliminary Cost Estimate: \$753,579.00

Project XV

This project required would be the decommissioning, removal and disposal of all existing mechanical and electrical systems not intended to be utilized in the final system arrangement.

This would include but not limited to the following:

- Removal of existing air handling units 1, 2, 3, 4 and 5.
- Removal of all associated piping, pumps, controls, etc.
- Removal of all associated ductwork including main risers through atrium space.
- All patching of existing finishes and openings left from removal with similar products to match existing.
- Replace existing fire alarm system main control panel with a new voice based utilizing amplifiers and speakers to enable enhanced fire alarm notification and well as mass notification system.
- Install new audible and visual fire alarm signal notification devices throughout the facility.
- Lower all fire alarm pull stations to 1200mm above finished floor to satisfy the requirements of the Barrier Free code (CAN/CSA B651-04).
- Install new "Running man" exit signage throughout the facility.
- Review and enhance emergency lighting battery units.
- Replace all exit stairwell lighting with new LED luminaires incorporating built-in motion sensors to allow the lighting levels to be reduced by 50% during unoccupied times.

Preliminary Cost Estimate: \$658,583.00



Project XVI

- Replace existing washroom exhaust fans and provide ductwork to discharge to exterior to meet NBC.
- Replace existing parking garage exhaust fans.
- Upgrade gas detection and control system to provide continuous ventilation.
- Provision of BacNet EMCS automatic controls system expansion from existing system installed under Project I.
- Replace all existing sanitary piping in parking garage.
- Replace all existing sprinkler heads.
- Replace existing underground parking lot lighting with a new LED lighting system.
- Lower all lighting control stations (switches) to 1200mm above finished floor to satisfy the requirements of the Barrier Free code (CAN/CSA B651-04).
- Replace all basement electrical panel boards.
- Review and replace all existing branch circuit wiring found to be deficient or no code compliant.

Preliminary Cost Estimate: \$349,059.00

5.1 Preliminary Class 'C' Budgets

The preliminary cost estimates are expressed in present day dollars. There has been no allowance for escalation in the estimates. These costs do not include the following additional costs which will also be required to complete the projects:

- Harmonized Sales Tax (HST).
- Project management fees.
- Costs associated with required "swing space" for execution of the work.
- Additional fit-up costs that tenants may request as part of the retrofit projects.
- Cost associated with security systems or access control which is part of tenant scope.
- Interim project financing costs.
- Legal fees that may be required.


A construction contingency of fifteen (15%) percent has been included in each project. There has been no allowance for design contingency in the estimated professional design fees.





APPENDICES

Preliminary Class 'C' Budgets – Project Schedule –
HAP Analysis – HVAC Concept Schematics –
Electrical Conceptual Riser Diagram –
Reference Documents – Floor Plans





PRELIMINARY CLASS 'C' BUDGETS



PRELIMINARY CLASS C BUDGET ESTIMATE SUMMARY

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate Summary	DATE February 28, 2014

SUMMARY		
Description		Total
Project I	<u>Scope of Work:</u> Outdoor Air Handling Unit, Electrical Power Risers, Emergency Generator, Fire Pump, Lighting in Penthouse	\$ 1,520,705
Project II	<u>Scope of Work:</u> Main Floor North (Project Area II) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 598,852
Project III	<u>Scope of Work:</u> Main Floor North (Project Area III) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 870,334
Project IV	<u>Scope of Work:</u> Main Floor South (Project Area IV) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 542,212
Project V	<u>Scope of Work:</u> Main Floor South (Project Area V) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 462,461
Project VI	<u>Scope of Work:</u> Second Floor North (Project Area VI) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 1,782,246
Project VII	<u>Scope of Work:</u> Second Floor Southeast (Project Area VII) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 563,256
Project VIII	<u>Scope of Work:</u> Second Floor Southwest (Project Area VIII) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 546,517
Project IX	<u>Scope of Work:</u> Third Floor North (Project Area IX) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 1,569,793
Project X	<u>Scope of Work:</u> Third Floor (Project Area X) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 499,144
Project XI	<u>Scope of Work:</u> Third Floor South (Project Area XI) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 1,376,520
Project XII	<u>Scope of Work:</u> Fourth Floor (Project Area XII) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 1,501,256
Project XIII	<u>Scope of Work:</u> Fifth Floor (Project Area XIII) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 1,154,007
Project XIV	<u>Scope of Work:</u> Atrium (Project Area XIV) HVAC Unit Replacement, Lighting System	\$ 753,579
Project XV	<u>Scope of Work:</u> Decommissioning/Removal of All Redundant Mechanical and Electrical Systems, Fire Alarm System, Exit Signage, Stairwell Lighting	\$ 658,583
Project XVI	<u>Scope of Work:</u> Parking Garage Ventilation Replacement, Sanitary Piping Replacement, Basement Power Distribution, Lighting Systems	\$ 349,059
Note: Refer to report for items excluded from the preliminary budget estimates.		Total \$ 14,748,524

PRELIMINARY CLASS C BUDGET ESTIMATE SUMMARY

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept						PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate Summary						DATE February 28, 2014

SUMMARY								
Project	Description	General	Mechanical	Electrical	Contingency	Engineering	Total	
Project I	Scope of Work: Outdoor Air Handling Unit, Electrical Power Risers, Emergency Generator, Fire Pump, Lighting in Penthouse	\$ 153,743	\$ 500,900	\$ 581,200	\$ 185,376	\$ 99,485	\$ 1,520,705	
Project II	Scope of Work: Main Floor North (Project Area II) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 131,684	\$ 221,000	\$ 133,990	\$ 73,001	\$ 39,177	\$ 598,852	
Project III	Scope of Work: Main Floor North (Project Area III) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 205,401	\$ 331,500	\$ 170,400	\$ 106,095	\$ 56,938	\$ 870,334	
Project IV	Scope of Work: Main Floor South (Project Area IV) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 127,526	\$ 195,000	\$ 131,950	\$ 52,265	\$ 35,472	\$ 542,212	
Project V	Scope of Work: Main Floor South (Project Area V) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 107,632	\$ 164,000	\$ 104,200	\$ 56,375	\$ 30,254	\$ 462,461	
Project VI	Scope of Work: Second Floor North (Project Area VI) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 399,292	\$ 681,500	\$ 367,600	\$ 217,259	\$ 116,596	\$ 1,782,246	
Project VII	Scope of Work: Second Floor Southeast (Project Area VII) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 129,296	\$ 195,000	\$ 133,450	\$ 68,662	\$ 36,849	\$ 563,256	
Project VIII	Scope of Work: Second Floor Southwest (Project Area VIII) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 92,672	\$ 222,000	\$ 129,470	\$ 66,621	\$ 35,753	\$ 546,517	
Project IX	Scope of Work: Third Floor North (Project Area IX) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 355,336	\$ 595,000	\$ 325,400	\$ 191,360	\$ 102,697	\$ 1,569,793	
Project X	Scope of Work: Third Floor (Project Area X) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 113,994	\$ 162,000	\$ 129,650	\$ 60,847	\$ 32,654	\$ 499,144	
Project XI	Scope of Work: Third Floor South (Project Area XI) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 264,767	\$ 551,000	\$ 302,900	\$ 167,800	\$ 90,053	\$ 1,376,520	
Project XII	Scope of Work: Fourth Floor (Project Area XII) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 334,787	\$ 566,000	\$ 319,250	\$ 183,006	\$ 98,213	\$ 1,501,256	
Project XIII	Scope of Work: Fifth Floor (Project Area XIII) HVAC Upgrade, Lighting, Power Distribution, Fire Protection	\$ 261,436	\$ 410,000	\$ 266,400	\$ 140,675	\$ 75,496	\$ 1,154,007	
Project XIV	Scope of Work: Atrium (Project Area XIV) HVAC Unit Replacement, Lighting System	\$ 178,567	\$ 301,500	\$ 132,350	\$ 91,862	\$ 49,300	\$ 753,579	
Project XV	Scope of Work: Decommissioning/Removal of All Redundant Mechanical and Electrical Systems, Fire Alarm System, Exit Signage, Stairwell Lighting	\$ 184,573	\$ 65,000	\$ 290,250	\$ 80,973	\$ 37,788	\$ 658,583	
Project XVI	Scope of Work: Parking Garage Ventilation Replacement, Sanitary Piping Replacement, Basement Power Distribution, Lighting Systems	\$ 63,423	\$ 97,000	\$ 123,250	\$ 42,551	\$ 22,836	\$ 349,059	
Note: Refer to report for items excluded from the preliminary budget estimates.		Totals	\$ 3,104,126	\$ 5,258,400	\$ 3,641,710	\$ 1,784,729	\$ 959,559	\$ 14,748,524

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT I

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project I	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES					
Description	Qty	Units	Unit Price	Amount	Total
Part 1 General				\$	103,743
1.01 General Conditions, OH&P, Mobilization	8%	sum		\$ 90,568	
1.02 Permits	1%	sum		\$ 13,175	
Part 2 Architectural				\$	50,000
2.01 Cutting and Patching	1	lot	\$ 30,000	\$ 30,000	
2.02 Demolition	1	lot	\$ 20,000	\$ 20,000	
Part 3 Mechanical				\$	361,000
3.01 Outdoor Air Handling Unit	20,000	cfm	\$ 4	\$ 80,000	
3.02 Ductwork	20,000	cfm	\$ 8	\$ 160,000	
3.03 Heating Piping	1	lot	\$ 20,000	\$ 20,000	
3.04 Chilled Water Piping	1	lot	\$ 50,000	\$ 50,000	
3.05 Chilled Water Pumps	2	ea	\$ 4,000	\$ 8,000	
3.06 Heating Water Pumps	2	ea	\$ 4,000	\$ 8,000	
3.07 Low Pressure Steam Piping	1	lot	\$ 10,000	\$ 10,000	
3.08 Plumbing	1	lot	\$ 5,000	\$ 5,000	
3.09 Air and Water Balancing	20,000	cfm	\$ 1	\$ 20,000	
Part 4 Fire Protection				\$	104,900
4.01 Sprinkler Heads	830	m ²	\$ 10	\$ 8,300	
4.02 Sprinkler Branch Piping	830	m ²	\$ 20	\$ 16,600	
4.03 Fire Pump	1	ea	\$ 80,000	\$ 80,000	
Part 5 Automatic Controls				\$	35,000
5.01 EMCS	1	lot	\$ 25,000	\$ 25,000	
5.02 EMCS Commissioning	1	lot	\$ 10,000	\$ 10,000	
Part 6 Electrical					
6.1 Lighting				\$	13,300
6.1.1 Lighting Fixtures	40	ea	\$ 75	\$ 3,000	
6.1.2 Branch Circuit Wiring	830	m ²	\$ 10	\$ 8,300	
6.1.3 Lighting Control	10	ea	\$ 200	\$ 2,000	
6.2 Branch Circuit Power & Wiring				\$	20,300
6.2.1 Receptacles	20	ea	\$ 100	\$ 2,000	
6.2.2 Connections to Mechanical Systems	20	ea	\$ 500	\$ 10,000	
6.2.3 Branch Circuit Wiring	830	m ²	\$ 10	\$ 8,300	
6.3 Electrical Distribution				\$	392,600

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT I

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project I	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES					
Description	Qty	Units	Unit Price	Amount	Total

Part 1 General	\$	103,743
-----------------------	-----------	----------------

6.3.1 Main Normal Power Distribution Riser Feeder	60	m	\$ 700	\$ 42,000	
6.3.2 Normal Power Distribution Panelboards (600V)	5	ea	\$ 5,000	\$ 25,000	
6.3.3 Normal Power Stepdown Transformers	0	ea	\$ 3,500	\$ -	
6.3.4 Normal Power Branch Panel Feeders	0	ea	\$ 1,000	\$ -	
6.3.5 Normal Power Branch Circuit Panels (120/208V)	0	ea	\$ 2,500	\$ -	
6.3.6 Main Lighting Distribution Riser Feeder	60	m	\$ 350	\$ 21,000	
6.3.7 Normal Lighting Branch Panel Feeders	0	ea	\$ 1,000	\$ -	
6.3.8 Normal Lighting Panelboards (600V)	5	ea	\$ 5,000	\$ 25,000	
6.3.9 Main Mechanical Power Distribution Riser Feeder	60	m	\$ 700	\$ 42,000	
6.3.10 Mechanical Power Distribution Panelboard	1	ea	\$ 10,000	\$ 10,000	
6.3.11 Mechanical Power Stepdown Transformers	6	ea	\$ 3,500	\$ 21,000	
6.3.12 Mechanical Power Branch Panel Feeders	6	ea	\$ 1,000	\$ 6,000	
6.3.13 Mechanical Power Branch Circuit Panels (120/208V)	1	ea	\$ 2,500	\$ 2,500	
6.3.14 Normal Power Motor Control Centre (600V)	1	ea	\$ 50,000	\$ 50,000	
6.3.15 Main Emergency Power Distribution Riser Feeder	60	m	\$ 335	\$ 20,100	
6.3.16 Emergency Power Penthouse Dist Panelboard (600V)	1	ea	\$ 10,000	\$ 10,000	
6.3.17 Emergency Power Motor Control Centre (600V)	1	ea	\$ 50,000	\$ 50,000	
6.3.18 Emergency Power Stepdown Transformers	1	ea	\$ 3,500	\$ 3,500	
6.3.19 Emergency Power Branch Panel Feeders	1	m	\$ 1,000	\$ 1,000	
6.3.20 Emergency Power Branch Circuit Panel (120/208V)	1	ea	\$ 2,500	\$ 2,500	
6.3.21 Emergency Power Basement Dist. Panel Feeders	60	m	\$ 250	\$ 15,000	
6.3.22 Emergency Power Basement Dist Panelboard (600V)	1	ea	\$ 10,000	\$ 10,000	
6.3.23 Emergency Basement Power Stepdown Transformer	1	ea	\$ 3,500	\$ 3,500	
6.3.24 Emergency Basement Power Panel (120/208V)	1	ea	\$ 2,500	\$ 2,500	
6.3.25 Main Grounding System	1	ea	\$ 10,000	\$ 10,000	
6.3.26 New Digital Meter (ION 7650)	1	ea	\$ 10,000	\$ 10,000	
6.3.27 New 400A-3P Circuit Bbreaker for Main Switchboard	1	ea	\$ 10,000	\$ 10,000	

6.4 Life Safety	\$	-
------------------------	-----------	----------

6.4.1 Running man signs	0	ea	\$ 200	\$ -	
6.4.2 Branch Circuit Wiring	0	m ²	\$ 2	\$ -	
6.4.3 Emergency Lighting Units	0	ea	\$ 200	\$ -	

6.5 Communications Systems	\$	-
-----------------------------------	-----------	----------

6.5.1 Cable Tray	1	m	\$ -	\$ -	
6.5.2 Data Cabling	1	m	\$ -	\$ -	
6.5.3 Data/voice Outlets	1	ea	\$ -	\$ -	
6.5.4 Terminations	1	ea	\$ -	\$ -	
6.5.5 Testing	1	lot	\$ -	\$ -	

6.6 Fire Alarm System	\$	-
------------------------------	-----------	----------

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT I

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project I	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES					
Description	Qty	Units	Unit Price	Amount	Total
Part 1 General				\$	103,743
6.6.1 Fire Alarm Control Panel	1	ea	\$ -	\$ -	
6.6.2 Manual Pull Stations	1	ea	\$ -	\$ -	
6.6.3 Smoke Detectors	1	ea	\$ -	\$ -	
6.6.4 Heat Detectors	1	ea	\$ -	\$ -	
6.6.5 Duct Detectors	1	ea	\$ -	\$ -	
6.6.6 Interface Modules	1	ea	\$ -	\$ -	
6.6.7 Speakers	1	ea	\$ -	\$ -	
6.6.8 Strobes	1	ea	\$ -	\$ -	
6.6.9 Annunciators	1	ea	\$ -	\$ -	
6.6.10 Wiring	1	ea	\$ -	\$ -	
6.7 Fire Pump				\$	32,500
6.7.1 Fire Pump Service (Utility Power)	1	ea	\$ 10,000	\$ 10,000	
6.7.2 200A, 600V Socket for Utility Meter	1	ea	\$ 1,500	\$ 1,500	
6.7.3 200A, 3P, 600V Isolating Disconnet	1	ea	\$ 1,000	\$ 1,000	
6.7.4 Normal Power Wiring	1	m	\$ 2,500	\$ 2,500	
6.7.5 Fire Pump Service (Emergency Power)	60	m	\$ 250	\$ 15,000	
6.7.5 Emergency Power Wiring	1	m	\$ 2,500	\$ 2,500	
6.8 Emergency Generator				\$	122,500
6.8.1 Generator	1	ea	\$ 80,000	\$ 80,000	
6.8.2 Automatic Transfer Switch	1	ea	\$ 30,000	\$ 30,000	
6.8.3 Normal Power Wiring	1	ea	\$ 5,000	\$ 5,000	
6.8.4 Emergency Power Wiring	1	ea	\$ 7,500	\$ 7,500	
Part 7 Suggested Contingency				\$	185,376
7.01 Based on Suggested Budget Amounts	15%	sum		\$ 185,376	
Part 8 Engineering and Project Administration				\$	99,485
8.01 Engineering and Administration					
8.02 Project Administration					
8.03 Professional Design Fees (Excluding Taxes)	7%	sum		\$ 99,485	
Suggested Total Budget				\$	1,520,705

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT II

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project II	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES					
Description	Qty	Units	Unit Price	Amount	Total
Part 1 General				\$	40,184
1.01 General Conditions, OH&P, Mobilization	8%	sum		\$ 35,719	
1.02 Permits	1%	sum		\$ 4,465	
Part 2 Architectural				\$	91,500
2.01 Cutting and Patching	715	m ²	\$ 50	\$ 35,750	
2.02 Demolition	1	lot	\$ 20,000	\$ 20,000	
2.03 Ceiling Replacement	715	m ²	\$ 50	\$ 35,750	
Part 3 Mechanical				\$	162,400
3.01 High Performance Fan Coils	12	ea	\$ 4,000	\$ 48,000	
3.02 Ductwork	715	m ²	\$ 80	\$ 57,200	
3.03 Chilled Water Piping	715	m ²	\$ 50	\$ 35,750	
3.04 Plumbing	715	m ²	\$ 30	\$ 21,450	
Part 4 Fire Protection				\$	28,600
4.01 Sprinkler Heads	715	m ²	\$ 10	\$ 7,150	
4.02 Sprinkler Branch Piping	715	m ²	\$ 30	\$ 21,450	
Part 5 Automatic Controls				\$	30,000
5.01 EMCS	12	zones	\$ 2,000	\$ 24,000	
5.02 EMCS Commissioning	12	zones	\$ 500	\$ 6,000	
Part 6 Electrical				\$	44,300
6.1 Lighting				\$	44,300
6.1.1 Lighting Fixtures	150	ea	\$ 200	\$ 30,000	
6.1.2 Branch Circuit Wiring	715	m ²	\$ 15	\$ 10,725	
6.1.3 Lighting Control	715	m ²	\$ 5	\$ 3,575	
6.2 Branch Circuit Power & Wiring				\$	21,650
6.2.1 Circuits	60	ea	\$ 200	\$ 12,000	
6.2.2 Connections to Mechanical Systems	5	ea	\$ 500	\$ 2,500	
6.2.3 Branch Circuit Wiring	715	m ²	\$ 10	\$ 7,150	
6.3 Electrical Distribution				\$	25,500

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT II

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project II	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES					
Description	Qty	Units	Unit Price	Amount	Total
Part 1 General				\$	40,184
6.3.1 Normal Power Distribution Panelboards (600V)	0	ea	\$ 5,000	\$ -	
6.3.2 Main Normal Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.3 Normal Lighting Panelboard (347/600V)	1	ea	\$ 2,500	\$ 2,500	
6.3.4 Normal Power Stepdown Transformers	1	ea	\$ 5,000	\$ 5,000	
6.3.5 Normal Power Branch Panel Feeders	2	m	\$ 1,000	\$ 2,000	
6.3.6 Normal Power Branch Circuit Panels (120/208V)	2	ea	\$ 2,500	\$ 5,000	
6.3.7 Emergency Power Distribution Panelboards (600V)	0	ea	\$ 5,000	\$ -	
6.3.8 Main Emergency Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.9 Emergency Power Stepdown Transformers	0	ea	\$ 3,500	\$ -	
6.3.10 Emergency Power Branch Panel Feeders	0	m	\$ 1,000	\$ -	
6.3.11 Emergency Power Branch Circuit Panels (347/600V)	1	ea	\$ 2,500	\$ 2,500	
6.3.12 Main Mechanical Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.13 Mechanical Power Stepdown Transformers	1	ea	\$ 5,000	\$ 5,000	
6.3.14 Mechanical Power Branch Panel Feeders	1	m	\$ 1,000	\$ 1,000	
6.3.15 Mechanical Power Branch Circuit Panels (120/208V)	1	m	\$ 2,500	\$ 2,500	
6.3.16 Digital Meters (ION 7650)	0	ea	\$ -	\$ -	
6.4 Life Safety				\$	-
6.4.1 Running man signs	0	ea	\$ 200	\$ -	
6.4.2 Branch Circuit Wiring	0	m ²	\$ 2	\$ -	
6.4.3 Emergency Lighting Units	0	ea	\$ 200	\$ -	
6.5 Communications Systems				\$	42,540
6.5.1 Cable Tray	96	m	\$ 90	\$ 8,640	
6.5.2 Data Cabling	7500	m	\$ 3	\$ 22,500	
6.5.3 Data/voice Outlets	120	ea	\$ 40	\$ 4,800	
6.5.4 Terminations	120	ea	\$ 30	\$ 3,600	
6.5.5 Testing	1	lot	\$ 3,000	\$ 3,000	
6.6 Fire Alarm System				\$	-
6.6.1 Fire Alarm Control Panel	1	ea	\$ -	\$ -	
6.6.2 Manual Pull Stations	1	ea	\$ -	\$ -	
6.6.3 Smoke Detectors	1	ea	\$ -	\$ -	
6.6.4 Heat Detectors	1	ea	\$ -	\$ -	
6.6.5 Duct Detectors	1	ea	\$ -	\$ -	
6.6.6 Interface Modules	1	ea	\$ -	\$ -	
6.6.7 Speakers	1	ea	\$ -	\$ -	
6.6.8 Strobes	1	ea	\$ -	\$ -	
6.6.9 Annunciators	1	ea	\$ -	\$ -	
6.6.10 Wiring	1	ea	\$ -	\$ -	
6.7 Fire Pump				\$	-

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT II

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project II	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES					
Description	Qty	Units	Unit Price	Amount	Total
Part 1 General				\$	40,184
6.7.1 Fire Pump Service	0	ea	\$ -	\$ -	
6.7.2 Utility Meter	0	ea	\$ -	\$ -	
6.7.3 Isolating Disconnet	0	ea	\$ -	\$ -	
6.7.4 Normal Power Wiring	0	m	\$ -	\$ -	
6.7.5 Emergency Power Wiring	0	m	\$ -	\$ -	
6.8 Emergency Generator				\$	-
6.8.1 Generator	0	ea	\$ -	\$ -	
6.8.2 Automatic Transfer Switch	0	ea	\$ -	\$ -	
6.8.3 Normal Power Wiring	0	m	\$ -	\$ -	
6.8.4 Emergency Power Wiring	0	m	\$ -	\$ -	
Part 7 Suggested Contingency				\$	73,001
7.01 Based on Suggested Budget Amounts	15%	sum		\$ 73,001	
Part 8 Engineering and Project Administration				\$	39,177
8.01 Engineering and Administration					
8.02 Project Administration					
8.03 Professional Design Fees (Excluding Taxes)	7%	sum		\$ 39,177	
Suggested Total Budget				\$	598,852

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT III

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project III	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES					
Description	Qty	Units	Unit Price	Amount	Total
Part 1 General				\$	58,401
1.01 General Conditions, OH&P, Mobilization	8%	sum		\$ 51,912	
1.02 Permits	1%	sum		\$ 6,489	
Part 2 Architectural				\$	147,000
2.01 Cutting and Patching	1,170	m ²	\$ 60	\$ 70,200	
2.02 Demolition	1	lot	\$ 30,000	\$ 30,000	
2.03 Ceiling Replacement	1,170	m ²	\$ 40	\$ 46,800	
Part 3 Mechanical				\$	247,200
3.01 High Performance Fan Coils	15	ea	\$ 4,000	\$ 60,000	
3.02 Ductwork	1,170	m ²	\$ 80	\$ 93,600	
3.03 Chilled Water Piping	1,170	m ²	\$ 50	\$ 58,500	
3.04 Plumbing	1,170	m ²	\$ 30	\$ 35,100	
Part 4 Fire Protection				\$	46,800
4.01 Sprinkler Heads	1,170	m ²	\$ 10	\$ 11,700	
4.02 Sprinkler Branch Piping	1,170	m ²	\$ 30	\$ 35,100	
Part 5 Automatic Controls				\$	37,500
5.01 EMCS	15	zones	\$ 2,000	\$ 30,000	
5.02 EMCS Commissioning	15	zones	\$ 500	\$ 7,500	
Part 6 Electrical					
6.1 Lighting				\$	69,400
6.1.1 Lighting Fixtures	230	ea	\$ 200	\$ 46,000	
6.1.2 Branch Circuit Wiring	1170	m ²	\$ 15	\$ 17,550	
6.1.3 Lighting Control	1170	m ²	\$ 5	\$ 5,850	
6.2 Branch Circuit Power & Wiring				\$	36,700
6.2.1 Circuits	100	ea	\$ 200	\$ 20,000	
6.2.2 Connections to Mechanical Systems	10	ea	\$ 500	\$ 5,000	
6.2.3 Branch Circuit Wiring	1170	m ²	\$ 10	\$ 11,700	

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT III

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project III	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES					
Description	Qty	Units	Unit Price	Amount	Total
6.3 Electrical Distribution				\$	7,000
6.3.1 Normal Power Distribution Panelboards (600V)	0	ea	\$ 5,000	\$ -	
6.3.2 Main Normal Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.3 Normal Lighting Panelboard (347/600V)	0	ea	\$ 2,500	\$ -	
6.3.4 Normal Power Stepdown Transformers	0	ea	\$ 5,000	\$ -	
6.3.5 Normal Power Branch Panel Feeders	2	m	\$ 1,000	\$ 2,000	
6.3.6 Normal Power Branch Circuit Panels (120/208V)	2	ea	\$ 2,500	\$ 5,000	
6.3.7 Emergency Power Distribution Panelboards (600V)	0	ea	\$ 5,000	\$ -	
6.3.8 Main Emergency Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.9 Emergency Power Stepdown Transformers	0	ea	\$ 3,500	\$ -	
6.3.10 Emergency Power Branch Panel Feeders	0	m	\$ 1,000	\$ -	
6.3.11 Emergency Power Branch Circuit Panels (347/600V)	0	ea	\$ 2,500	\$ -	
6.3.12 Main Mechanical Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.13 Mechanical Power Stepdown Transformers	0	ea	\$ 5,000	\$ -	
6.3.14 Mechanical Power Branch Panel Feeders	0	m	\$ 1,000	\$ -	
6.3.15 Mechanical Power Branch Circuit Panels (120/208V)	0	m	\$ 2,500	\$ -	
6.3.16 Digital Meters (ION 7650)	0	ea	\$ -	\$ -	
6.4 Life Safety				\$	-
6.4.1 Running man signs	0	ea	\$ 200	\$ -	
6.4.2 Branch Circuit Wiring	0	m ²	\$ 2	\$ -	
6.4.3 Emergency Lighting Units	0	ea	\$ 200	\$ -	
6.5 Communications Systems				\$	57,300
6.5.1 Cable Tray	110	m	\$ 90	\$ 9,900	
6.5.2 Data Cabling	12000	m	\$ 3	\$ 36,000	
6.5.3 Data/voice Outlets	120	ea	\$ 40	\$ 4,800	
6.5.4 Terminations	120	ea	\$ 30	\$ 3,600	
6.5.5 Testing	1	lot	\$ 3,000	\$ 3,000	
6.6 Fire Alarm System				\$	-
6.6.1 Fire Alarm Control Panel	1	ea	\$ -	\$ -	
6.6.2 Manual Pull Stations	1	ea	\$ -	\$ -	
6.6.3 Smoke Detectors	1	ea	\$ -	\$ -	
6.6.4 Heat Detectors	1	ea	\$ -	\$ -	
6.6.5 Duct Detectors	1	ea	\$ -	\$ -	
6.6.6 Interface Modules	1	ea	\$ -	\$ -	
6.6.7 Speakers	1	ea	\$ -	\$ -	
6.6.8 Strobes	1	ea	\$ -	\$ -	
6.6.9 Annunciators	1	ea	\$ -	\$ -	
6.6.10 Wiring	1	ea	\$ -	\$ -	

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT III

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project III	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES					
Description	Qty	Units	Unit Price	Amount	Total
6.7 Fire Pump				\$	-
6.7.1 Fire Pump Service	0	ea	\$ -	\$ -	
6.7.2 Utility Meter	0	ea	\$ -	\$ -	
6.7.3 Isolating Disconnet	0	ea	\$ -	\$ -	
6.7.4 Normal Power Wiring	0	m	\$ -	\$ -	
6.7.5 Emergency Power Wiring	0	m	\$ -	\$ -	
6.8 Emergency Generator				\$	-
6.8.1 Generator	0	ea	\$ -	\$ -	
6.8.2 Automatic Transfer Switch	0	ea	\$ -	\$ -	
6.8.3 Normal Power Wiring	0	m	\$ -	\$ -	
6.8.4 Emergency Power Wiring	0	m	\$ -	\$ -	
Part 7 Suggested Contingency				\$	106,095
7.01 Based on Suggested Budget Amounts	15%	sum		\$ 106,095	
Part 8 Engineering and Project Administration				\$	56,938
8.01 Engineering and Administration					
8.02 Project Administration					
8.03 Professional Design Fees (Excluding Taxes)	7%	sum		\$ 56,938	
Suggested Total Budget				\$	870,334

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT IV

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project IV	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES						
Description	Qty	Units	Unit Price	Amount	Total	
Part 1 General				\$	37,526	
1.01 General Conditions, OH&P, Mobilization	8%	sum		\$ 33,356		
1.02 Permits	1%	sum		\$ 4,170		
Part 2 Architectural				\$	90,000	
2.01 Cutting and Patching	650	m ²	\$ 60	\$ 39,000		
2.02 Demolition	1	lot	\$ 25,000	\$ 25,000		
2.03 Ceiling Replacement	650	m ²	\$ 40	\$ 26,000		
Part 3 Mechanical				\$	144,000	
3.01 High Performance Fan Coils	10	ea	\$ 4,000	\$ 40,000		
3.02 Ductwork	650	m ²	\$ 80	\$ 52,000		
3.03 Chilled Water Piping	650	m ²	\$ 50	\$ 32,500		
3.04 Plumbing	650	m ²	\$ 30	\$ 19,500		
Part 4 Fire Protection				\$	26,000	
4.01 Sprinkler Heads	650	m ²	\$ 10	\$ 6,500		
4.02 Sprinkler Branch Piping	650	m ²	\$ 30	\$ 19,500		
Part 5 Automatic Controls				\$	25,000	
5.01 EMCS	10	zones	\$ 2,000	\$ 20,000		
5.02 EMCS Commissioning	10	zones	\$ 500	\$ 5,000		
Part 6 Electrical						
6.1 Lighting				\$	39,600	
6.1.1 Lighting Fixtures	133	ea	\$ 200	\$ 26,600		
6.1.2 Branch Circuit Wiring	650	m ²	\$ 15	\$ 9,750		
6.1.3 Lighting Control	650	m ²	\$ 5	\$ 3,250		
6.2 Branch Circuit Power & Wiring				\$	20,400	
6.2.1 Circuits	57	ea	\$ 200	\$ 11,400		
6.2.2 Connections to Mechanical Systems	5	ea	\$ 500	\$ 2,500		
6.2.3 Branch Circuit Wiring	650	m ²	\$ 10	\$ 6,500		

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT IV

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project IV	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES					
Description	Qty	Units	Unit Price	Amount	Total
6.3 Electrical Distribution				\$	22,000
6.3.1 Normal Power Distribution Panelboards (600V)	0	ea	\$ 5,000	\$ -	
6.3.2 Main Normal Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.3 Normal Lighting Panelboard (347/600V)	1	ea	\$ 2,500	\$ 2,500	
6.3.4 Normal Power Stepdown Transformers	1	ea	\$ 5,000	\$ 5,000	
6.3.5 Normal Power Branch Panel Feeders	1	m	\$ 1,000	\$ 1,000	
6.3.6 Normal Power Branch Circuit Panels (120/208V)	1	ea	\$ 2,500	\$ 2,500	
6.3.7 Emergency Power Distribution Panelboards (600V)	0	ea	\$ 5,000	\$ -	
6.3.8 Main Emergency Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.9 Emergency Power Stepdown Transformers	0	ea	\$ 3,500	\$ -	
6.3.10 Emergency Power Branch Panel Feeders	0	m	\$ 1,000	\$ -	
6.3.11 Emergency Power Branch Circuit Panels (347/600V)	1	ea	\$ 2,500	\$ 2,500	
6.3.12 Main Mechanical Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.13 Mechanical Power Stepdown Transformers	1	ea	\$ 5,000	\$ 5,000	
6.3.14 Mechanical Power Branch Panel Feeders	1	m	\$ 1,000	\$ 1,000	
6.3.15 Mechanical Power Branch Circuit Panels (120/208V)	1	m	\$ 2,500	\$ 2,500	
6.3.16 Digital Meters (ION 7650)	0	ea	\$ -	\$ -	
6.4 Life Safety				\$	-
6.4.1 Running man signs	0	ea	\$ 200	\$ -	
6.4.2 Branch Circuit Wiring	0	m ²	\$ 2	\$ -	
6.4.3 Emergency Lighting Units	0	ea	\$ 200	\$ -	
6.5 Communications Systems				\$	49,950
6.5.1 Cable Tray	95	m	\$ 90	\$ 8,550	
6.5.2 Data Cabling	10000	m	\$ 3	\$ 30,000	
6.5.3 Data/voice Outlets	120	ea	\$ 40	\$ 4,800	
6.5.4 Terminations	120	ea	\$ 30	\$ 3,600	
6.5.5 Testing	1	lot	\$ 3,000	\$ 3,000	
6.6 Fire Alarm System				\$	-
6.6.1 Fire Alarm Control Panel	1	ea	\$ -	\$ -	
6.6.2 Manual Pull Stations	1	ea	\$ -	\$ -	
6.6.3 Smoke Detectors	1	ea	\$ -	\$ -	
6.6.4 Heat Detectors	1	ea	\$ -	\$ -	
6.6.5 Duct Detectors	1	ea	\$ -	\$ -	
6.6.6 Interface Modules	1	ea	\$ -	\$ -	
6.6.7 Speakers	1	ea	\$ -	\$ -	
6.6.8 Strobes	1	ea	\$ -	\$ -	
6.6.9 Annunciators	1	ea	\$ -	\$ -	
6.6.10 Wiring	1	ea	\$ -	\$ -	

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT IV

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project IV	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES						
Description	Qty	Units	Unit Price	Amount	Total	
6.7 Fire Pump					\$	-
6.7.1 Fire Pump Service	0	ea	\$ -	\$ -		
6.7.2 Utility Meter	0	ea	\$ -	\$ -		
6.7.3 Isolating Disconnet	0	ea	\$ -	\$ -		
6.7.4 Normal Power Wiring	0	m	\$ -	\$ -		
6.7.5 Emergency Power Wiring	0	m	\$ -	\$ -		
6.8 Emergency Generator					\$	-
6.8.1 Generator	0	ea	\$ -	\$ -		
6.8.2 Automatic Transfer Switch	0	ea	\$ -	\$ -		
6.8.3 Normal Power Wiring	0	m	\$ -	\$ -		
6.8.4 Emergency Power Wiring	0	m	\$ -	\$ -		
Part 7 Suggested Contingency					\$	52,265
7.01 Based on Suggested Budget Amounts	12%	sum		\$ 52,265		
Part 8 Engineering and Project Administration					\$	35,472
8.01 Engineering and Administration						
8.02 Project Administration						
8.03 Professional Design Fees (Excluding Taxes)	7%	sum		\$ 35,472		
Suggested Total Budget					\$	542,212

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT V

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project V	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES						
Description	Qty	Units	Unit Price	Amount	Total	
Part 1 General				\$	31,032	
1.01 General Conditions, OH&P, Mobilization	8%	sum		\$ 27,584		
1.02 Permits	1%	sum		\$ 3,448		
Part 2 Architectural				\$	76,600	
2.01 Cutting and Patching	560	m ²	\$ 60	\$ 33,600		
2.02 Demolition	1	lot	\$ 15,000	\$ 15,000		
2.03 Ceiling Replacement	560	m ²	\$ 50	\$ 28,000		
Part 3 Mechanical				\$	121,600	
3.01 High Performance Fan Coils	8	ea	\$ 4,000	\$ 32,000		
3.02 Ductwork	560	m ²	\$ 80	\$ 44,800		
3.03 Chilled Water Piping	560	m ²	\$ 50	\$ 28,000		
3.04 Plumbing	560	m ²	\$ 30	\$ 16,800		
Part 4 Fire Protection				\$	22,400	
4.01 Sprinkler Heads	560	m ²	\$ 10	\$ 5,600		
4.02 Sprinkler Branch Piping	560	m ²	\$ 30	\$ 16,800		
Part 5 Automatic Controls				\$	20,000	
5.01 EMCS	8	zones	\$ 2,000	\$ 16,000		
5.02 EMCS Commissioning	8	zones	\$ 500	\$ 4,000		
Part 6 Electrical						
6.1 Lighting				\$	33,200	
6.1.1 Lighting Fixtures	110	ea	\$ 200	\$ 22,000		
6.1.2 Branch Circuit Wiring	560	m ²	\$ 15	\$ 8,400		
6.1.3 Lighting Control	560	m ²	\$ 5	\$ 2,800		
6.2 Branch Circuit Power & Wiring				\$	17,700	
6.2.1 Circuits	48	ea	\$ 200	\$ 9,600		
6.2.2 Connections to Mechanical Systems	5	ea	\$ 500	\$ 2,500		
6.2.3 Branch Circuit Wiring	560	m ²	\$ 10	\$ 5,600		

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT V

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project V	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES					
Description	Qty	Units	Unit Price	Amount	Total
6.3 Electrical Distribution				\$	11,000
6.3.1 Normal Power Distribution Panelboards (600V)	0	ea	\$ 5,000	\$ -	
6.3.2 Main Normal Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.3 Normal Lighting Panelboard (347/600V)	0	ea	\$ 2,500	\$ -	
6.3.4 Normal Power Stepdown Transformers	1	ea	\$ 5,000	\$ 5,000	
6.3.5 Normal Power Branch Panel Feeders	1	m	\$ 1,000	\$ 1,000	
6.3.6 Normal Power Branch Circuit Panels (120/208V)	1	ea	\$ 2,500	\$ 2,500	
6.3.7 Emergency Power Distribution Panelboards (600V)	0	ea	\$ 5,000	\$ -	
6.3.8 Main Emergency Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.9 Emergency Power Stepdown Transformers	0	ea	\$ 3,500	\$ -	
6.3.10 Emergency Power Branch Panel Feeders	0	m	\$ 1,000	\$ -	
6.3.11 Emergency Power Branch Circuit Panels (347/600V)	1	ea	\$ 2,500	\$ 2,500	
6.3.12 Main Mechanical Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.13 Mechanical Power Stepdown Transformers	0	ea	\$ 5,000	\$ -	
6.3.14 Mechanical Power Branch Panel Feeders	0	m	\$ 1,000	\$ -	
6.3.15 Mechanical Power Branch Circuit Panels (120/208V)	0	m	\$ 2,500	\$ -	
6.3.15 Digital Meters (ION 7650)	0	ea	\$ -	\$ -	
6.4 Life Safety				\$	-
6.4.1 Running man signs	0	ea	\$ 200	\$ -	
6.4.2 Branch Circuit Wiring	0	m ²	\$ 2	\$ -	
6.4.3 Emergency Lighting Units	0	ea	\$ 200	\$ -	
6.5 Communications Systems				\$	42,300
6.5.1 Cable Tray	80	m	\$ 90	\$ 7,200	
6.5.2 Data Cabling	7200	m	\$ 3	\$ 21,600	
6.5.3 Data/voice Outlets	150	ea	\$ 40	\$ 6,000	
6.5.4 Terminations	150	ea	\$ 30	\$ 4,500	
6.5.5 Testing	1	lot	\$ 3,000	\$ 3,000	
6.6 Fire Alarm System				\$	-
6.6.1 Fire Alarm Control Panel	1	ea	\$ -	\$ -	
6.6.2 Manual Pull Stations	1	ea	\$ -	\$ -	
6.6.3 Smoke Detectors	1	ea	\$ -	\$ -	
6.6.4 Heat Detectors	1	ea	\$ -	\$ -	
6.6.5 Duct Detectors	1	ea	\$ -	\$ -	
6.6.6 Interface Modules	1	ea	\$ -	\$ -	
6.6.7 Speakers	1	ea	\$ -	\$ -	
6.6.8 Strobes	1	ea	\$ -	\$ -	
6.6.9 Annunciators	1	ea	\$ -	\$ -	
6.6.10 Wiring	1	ea	\$ -	\$ -	

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT V

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project V	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES						
Description	Qty	Units	Unit Price	Amount	Total	
6.7 Fire Pump					\$	-
6.7.1 Fire Pump Service	0	ea	\$ -	\$ -		
6.7.2 Utility Meter	0	ea	\$ -	\$ -		
6.7.3 Isolating Disconnet	0	ea	\$ -	\$ -		
6.7.4 Normal Power Wiring	0	m	\$ -	\$ -		
6.7.5 Emergency Power Wiring	0	m	\$ -	\$ -		
6.8 Emergency Generator					\$	-
6.8.1 Generator	0	ea	\$ -	\$ -		
6.8.2 Automatic Transfer Switch	0	ea	\$ -	\$ -		
6.8.3 Normal Power Wiring	0	m	\$ -	\$ -		
6.8.4 Emergency Power Wiring	0	m	\$ -	\$ -		
Part 7 Suggested Contingency					\$	56,375
7.01 Based on Suggested Budget Amounts	15%	sum		\$ 56,375		
Part 8 Engineering and Project Administration					\$	30,254
8.01 Engineering and Administration						
8.02 Project Administration						
8.03 Professional Design Fees (Excluding Taxes)	7%	sum		\$ 30,254		
Suggested Total Budget					\$	462,461

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT VI

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project VI	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES						
Description	Qty	Units	Unit Price	Amount	Total	
Part 1 General						\$ 119,592
1.01 General Conditions, OH&P, Mobilization	8%	sum		\$ 106,304		
1.02 Permits	1%	sum		\$ 13,288		
Part 2 Architectural						\$ 279,700
2.01 Cutting and Patching	2,270	m ²	\$ 60	\$ 136,200		
2.02 Demolition	1	lot	\$ 30,000	\$ 30,000		
2.03 Ceiling Replacement	2,270	m ²	\$ 50	\$ 113,500		
Part 3 Mechanical						\$ 503,200
3.01 High Performance Fan Coils	35	ea	\$ 4,000	\$ 140,000		
3.02 Ductwork	2,270	m ²	\$ 80	\$ 181,600		
3.03 Chilled Water Piping	2,270	m ²	\$ 50	\$ 113,500		
3.04 Plumbing	2,270	m ²	\$ 30	\$ 68,100		
Part 4 Fire Protection						\$ 90,800
4.01 Sprinkler Heads	2,270	m ²	\$ 10	\$ 22,700		
4.02 Sprinkler Branch Piping	2,270	m ²	\$ 30	\$ 68,100		
Part 5 Automatic Controls						\$ 87,500
5.01 EMCS	35	zones	\$ 2,000	\$ 70,000		
5.02 EMCS Commissioning	35	zones	\$ 500	\$ 17,500		
Part 6 Electrical						
6.1 Lighting						\$ 135,400
6.1.1 Lighting Fixtures	450	ea	\$ 200	\$ 90,000		
6.1.2 Branch Circuit Wiring	2270	m ²	\$ 15	\$ 34,050		
6.1.3 Lighting Control	2270	m ²	\$ 5	\$ 11,350		
6.2 Branch Circuit Power & Wiring						\$ 66,700
6.2.1 Circuits	195	ea	\$ 200	\$ 39,000		
6.2.2 Connections to Mechanical Systems	10	ea	\$ 500	\$ 5,000		
6.2.3 Branch Circuit Wiring	2270	m ²	\$ 10	\$ 22,700		

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT VI

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project VI	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES					
Description	Qty	Units	Unit Price	Amount	Total
6.3 Electrical Distribution				\$	29,000
6.3.1 Normal Power Distribution Panelboards (600V)	0	ea	\$ 5,000	\$ -	
6.3.2 Main Normal Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.3 Normal Lighting Panelboard (347/600V)	1	ea	\$ 2,500	\$ 2,500	
6.3.4 Normal Power Stepdown Transformers	1	ea	\$ 5,000	\$ 5,000	
6.3.5 Normal Power Branch Panel Feeders	3	m	\$ 1,000	\$ 3,000	
6.3.6 Normal Power Branch Circuit Panels (120/208V)	3	ea	\$ 2,500	\$ 7,500	
6.3.7 Emergency Power Distribution Panelboards (600V)	0	ea	\$ 5,000	\$ -	
6.3.8 Main Emergency Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.9 Emergency Power Stepdown Transformers	0	ea	\$ 3,500	\$ -	
6.3.10 Emergency Power Branch Panel Feeders	0	m	\$ 1,000	\$ -	
6.3.11 Emergency Power Branch Circuit Panels (347/600V)	1	ea	\$ 2,500	\$ 2,500	
6.3.12 Main Mechanical Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.13 Mechanical Power Stepdown Transformers	1	ea	\$ 5,000	\$ 5,000	
6.3.14 Mechanical Power Branch Panel Feeders	1	m	\$ 1,000	\$ 1,000	
6.3.15 Mechanical Power Branch Circuit Panels (120/208V)	1	m	\$ 2,500	\$ 2,500	
6.3.16 Digital Meters (ION 7650)	0	ea	\$ -	\$ -	
6.4 Life Safety				\$	-
6.4.1 Running man signs	0	ea	\$ 200	\$ -	
6.4.2 Branch Circuit Wiring	0	m ²	\$ 2	\$ -	
6.4.3 Emergency Lighting Units	0	ea	\$ 200	\$ -	
6.5 Communications Systems				\$	136,500
6.5.1 Cable Tray	420	m	\$ 90	\$ 37,800	
6.5.2 Data Cabling	22500	m	\$ 3	\$ 67,500	
6.5.3 Data/voice Outlets	360	ea	\$ 40	\$ 14,400	
6.5.4 Terminations	360	ea	\$ 30	\$ 10,800	
6.5.5 Testing	1	lot	\$ 6,000	\$ 6,000	
6.6 Fire Alarm System				\$	-
6.6.1 Fire Alarm Control Panel	1	ea	\$ -	\$ -	
6.6.2 Manual Pull Stations	1	ea	\$ -	\$ -	
6.6.3 Smoke Detectors	1	ea	\$ -	\$ -	
6.6.4 Heat Detectors	1	ea	\$ -	\$ -	
6.6.5 Duct Detectors	1	ea	\$ -	\$ -	
6.6.6 Interface Modules	1	ea	\$ -	\$ -	
6.6.7 Speakers	1	ea	\$ -	\$ -	
6.6.8 Strobes	1	ea	\$ -	\$ -	
6.6.9 Annunciators	1	ea	\$ -	\$ -	
6.6.10 Wiring	1	ea	\$ -	\$ -	

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT VI

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project VI	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES					
Description	Qty	Units	Unit Price	Amount	Total
6.7 Fire Pump				\$	-
6.7.1 Fire Pump Service	0	ea	\$ -	\$ -	
6.7.2 Utility Meter	0	ea	\$ -	\$ -	
6.7.3 Isolating Disconnet	0	ea	\$ -	\$ -	
6.7.4 Normal Power Wiring	0	m	\$ -	\$ -	
6.7.5 Emergency Power Wiring	0	m	\$ -	\$ -	
6.8 Emergency Generator				\$	-
6.8.1 Generator	0	ea	\$ -	\$ -	
6.8.2 Automatic Transfer Switch	0	ea	\$ -	\$ -	
6.8.3 Normal Power Wiring	0	m	\$ -	\$ -	
6.8.4 Emergency Power Wiring	0	m	\$ -	\$ -	
Part 7 Suggested Contingency				\$	217,259
7.01 Based on Suggested Budget Amounts	15%	sum		\$ 217,259	
Part 8 Engineering and Project Administration				\$	116,596
8.01 Engineering and Administration					
8.02 Project Administration					
8.03 Professional Design Fees (Excluding Taxes)	7%	sum		\$ 116,596	
Suggested Total Budget				\$	1,782,246

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT VII

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project VII	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES						
Description	Qty	Units	Unit Price	Amount	Total	
Part 1 General				\$	37,796	
1.01 General Conditions, OH&P, Mobilization	8%	sum		\$ 33,596		
1.02 Permits	1%	sum		\$ 4,200		
Part 2 Architectural				\$	91,500	
2.01 Cutting and Patching	650	m ²	\$ 60	\$ 39,000		
2.02 Demolition	1	lot	\$ 20,000	\$ 20,000		
2.03 Ceiling Replacement	650	m ²	\$ 50	\$ 32,500		
Part 3 Mechanical				\$	144,000	
3.01 High Performance Fan Coils	10	ea	\$ 4,000	\$ 40,000		
3.02 Ductwork	650	m ²	\$ 80	\$ 52,000		
3.03 Chilled Water Piping	650	m ²	\$ 50	\$ 32,500		
3.04 Plumbing	650	m ²	\$ 30	\$ 19,500		
Part 4 Fire Protection				\$	26,000	
4.01 Sprinkler Heads	650	m ²	\$ 10	\$ 6,500		
4.02 Sprinkler Branch Piping	650	m ²	\$ 30	\$ 19,500		
Part 5 Automatic Controls				\$	25,000	
5.01 EMCS	10	zones	\$ 2,000	\$ 20,000		
5.02 EMCS Commissioning	10	zones	\$ 500	\$ 5,000		
Part 6 Electrical						
6.1 Lighting				\$	39,000	
6.1.1 Lighting Fixtures	130	ea	\$ 200	\$ 26,000		
6.1.2 Branch Circuit Wiring	650	m ²	\$ 15	\$ 9,750		
6.1.3 Lighting Control	650	m ²	\$ 5	\$ 3,250		
6.2 Branch Circuit Power & Wiring				\$	19,800	
6.2.1 Circuits	54	ea	\$ 200	\$ 10,800		
6.2.2 Connections to Mechanical Systems	5	ea	\$ 500	\$ 2,500		
6.2.3 Branch Circuit Wiring	650	m ²	\$ 10	\$ 6,500		

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT VII

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project VII	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES					
Description	Qty	Units	Unit Price	Amount	Total
6.3 Electrical Distribution				\$	22,000
6.3.1 Normal Power Distribution Panelboards (600V)	0	ea	\$ 5,000	\$ -	
6.3.2 Main Normal Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.3 Normal Lighting Panelboard (347/600V)	1	ea	\$ 2,500	\$ 2,500	
6.3.4 Normal Power Stepdown Transformers	1	ea	\$ 5,000	\$ 5,000	
6.3.5 Normal Power Branch Panel Feeders	1	m	\$ 1,000	\$ 1,000	
6.3.6 Normal Power Branch Circuit Panels (120/208V)	1	ea	\$ 2,500	\$ 2,500	
6.3.7 Emergency Power Distribution Panelboards (600V)	0	ea	\$ 5,000	\$ -	
6.3.8 Main Emergency Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.9 Emergency Power Stepdown Transformers	0	ea	\$ 3,500	\$ -	
6.3.10 Emergency Power Branch Panel Feeders	0	m	\$ 1,000	\$ -	
6.3.11 Emergency Power Branch Circuit Panels (347/600V)	1	ea	\$ 2,500	\$ 2,500	
6.3.12 Main Mechanical Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.13 Mechanical Power Stepdown Transformers	1	ea	\$ 5,000	\$ 5,000	
6.3.14 Mechanical Power Branch Panel Feeders	1	m	\$ 1,000	\$ 1,000	
6.3.15 Mechanical Power Branch Circuit Panels (120/208V)	1	m	\$ 2,500	\$ 2,500	
6.3.16 Digital Meters (ION 7650)	0	ea	\$ -	\$ -	
6.4 Life Safety				\$	-
6.4.1 Running man signs	0	ea	\$ 200	\$ -	
6.4.2 Branch Circuit Wiring	0	m ²	\$ 2	\$ -	
6.4.3 Emergency Lighting Units	0	ea	\$ 200	\$ -	
6.5 Communications Systems				\$	52,650
6.5.1 Cable Tray	100	m	\$ 90	\$ 9,000	
6.5.2 Data Cabling	9000	m	\$ 3	\$ 27,000	
6.5.3 Data/voice Outlets	195	ea	\$ 40	\$ 7,800	
6.5.4 Terminations	195	ea	\$ 30	\$ 5,850	
6.5.5 Testing	1	lot	\$ 3,000	\$ 3,000	
6.6 Fire Alarm System				\$	-
6.6.1 Fire Alarm Control Panel	1	ea	\$ -	\$ -	
6.6.2 Manual Pull Stations	1	ea	\$ -	\$ -	
6.6.3 Smoke Detectors	1	ea	\$ -	\$ -	
6.6.4 Heat Detectors	1	ea	\$ -	\$ -	
6.6.5 Duct Detectors	1	ea	\$ -	\$ -	
6.6.6 Interface Modules	1	ea	\$ -	\$ -	
6.6.7 Speakers	1	ea	\$ -	\$ -	
6.6.8 Strobes	1	ea	\$ -	\$ -	
6.6.9 Annunciators	1	ea	\$ -	\$ -	
6.6.10 Wiring	1	ea	\$ -	\$ -	

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT VII

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project VII	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES						
Description	Qty	Units	Unit Price	Amount	Total	
6.7 Fire Pump					\$	-
6.7.1 Fire Pump Service	0	ea	\$ -	\$ -		
6.7.2 Utility Meter	0	ea	\$ -	\$ -		
6.7.3 Isolating Disconnet	0	ea	\$ -	\$ -		
6.7.4 Normal Power Wiring	0	m	\$ -	\$ -		
6.7.5 Emergency Power Wiring	0	m	\$ -	\$ -		
6.8 Emergency Generator					\$	-
6.8.1 Generator	0	ea	\$ -	\$ -		
6.8.2 Automatic Transfer Switch	0	ea	\$ -	\$ -		
6.8.3 Normal Power Wiring	0	m	\$ -	\$ -		
6.8.4 Emergency Power Wiring	0	m	\$ -	\$ -		
Part 7 Suggested Contingency					\$	68,662
7.01 Based on Suggested Budget Amounts	15%	sum		\$ 68,662		
Part 8 Engineering and Project Administration					\$	36,849
8.01 Engineering and Administration						
8.02 Project Administration						
8.03 Professional Design Fees (Excluding Taxes)	7%	sum		\$ 36,849		
Suggested Total Budget					\$	563,256

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT VIII

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project VIII	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES						
Description	Qty	Units	Unit Price	Amount	Total	
Part 1 General						\$ 36,672
1.01 General Conditions, OH&P, Mobilization	8%	sum		\$ 32,598		
1.02 Permits	1%	sum		\$ 4,075		
Part 2 Architectural						\$ 56,000
2.01 Cutting and Patching	720	m ²		\$ -		
2.02 Demolition	1	lot	\$ 20,000	\$ 20,000		
2.03 Ceiling Replacement	720	m ²	\$ 50	\$ 36,000		
Part 3 Mechanical						\$ 163,200
3.01 High Performance Fan Coils	12	ea	\$ 4,000	\$ 48,000		
3.02 Ductwork	720	m ²	\$ 80	\$ 57,600		
3.03 Chilled Water Piping	720	m ²	\$ 50	\$ 36,000		
3.04 Plumbing	720	m ²	\$ 30	\$ 21,600		
Part 4 Fire Protection						\$ 28,800
4.01 Sprinkler Heads	720	m ²	\$ 10	\$ 7,200		
4.02 Sprinkler Branch Piping	720	m ²	\$ 30	\$ 21,600		
Part 5 Automatic Controls						\$ 30,000
5.01 EMCS	12	zones	\$ 2,000	\$ 24,000		
5.02 EMCS Commissioning	12	zones	\$ 500	\$ 6,000		
Part 6 Electrical						
6.1 Lighting						\$ 43,400
6.1.1 Lighting Fixtures	145	ea	\$ 200	\$ 29,000		
6.1.2 Branch Circuit Wiring	720	m ²	\$ 15	\$ 10,800		
6.1.3 Lighting Control	720	m ²	\$ 5	\$ 3,600		
6.2 Branch Circuit Power & Wiring						\$ 21,700
6.2.1 Circuits	60	ea	\$ 200	\$ 12,000		
6.2.2 Connections to Mechanical Systems	5	ea	\$ 500	\$ 2,500		
6.2.3 Branch Circuit Wiring	720	m ²	\$ 10	\$ 7,200		

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT VIII

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project VIII	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES					
Description	Qty	Units	Unit Price	Amount	Total
6.3 Electrical Distribution				\$	11,000
6.3.1 Normal Power Distribution Panelboards (600V)	0	ea	\$ 5,000	\$ -	
6.3.2 Main Normal Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.3 Normal Lighting Panelboard (347/600V)	0	ea	\$ 2,500	\$ -	
6.3.4 Normal Power Stepdown Transformers	1	ea	\$ 5,000	\$ 5,000	
6.3.5 Normal Power Branch Panel Feeders	1	m	\$ 1,000	\$ 1,000	
6.3.6 Normal Power Branch Circuit Panels (120/208V)	1	ea	\$ 2,500	\$ 2,500	
6.3.7 Emergency Power Distribution Panelboards (600V)	0	ea	\$ 5,000	\$ -	
6.3.8 Main Emergency Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.9 Emergency Power Stepdown Transformers	0	ea	\$ 3,500	\$ -	
6.3.10 Emergency Power Branch Panel Feeders	0	m	\$ 1,000	\$ -	
6.3.11 Emergency Power Branch Circuit Panels (347/600V)	1	ea	\$ 2,500	\$ 2,500	
6.3.12 Main Mechanical Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.13 Mechanical Power Stepdown Transformers	0	ea	\$ 5,000	\$ -	
6.3.14 Mechanical Power Branch Panel Feeders	0	m	\$ 1,000	\$ -	
6.3.15 Mechanical Power Branch Circuit Panels (120/208V)	0	m	\$ 2,500	\$ -	
6.3.16 Digital Meters (ION 7650)	0	ea	\$ -	\$ -	
6.4 Life Safety				\$	-
6.4.1 Running man signs	0	ea	\$ 200	\$ -	
6.4.2 Branch Circuit Wiring	0	m ²	\$ 2	\$ -	
6.4.3 Emergency Lighting Units	0	ea	\$ 200	\$ -	
6.5 Communications Systems				\$	53,370
6.5.1 Cable Tray	108	m	\$ 90	\$ 9,720	
6.5.2 Data Cabling	9000	m	\$ 3	\$ 27,000	
6.5.3 Data/voice Outlets	195	ea	\$ 40	\$ 7,800	
6.5.4 Terminations	195	ea	\$ 30	\$ 5,850	
6.5.5 Testing	1	lot	\$ 3,000	\$ 3,000	
6.6 Fire Alarm System				\$	-
6.6.1 Fire Alarm Control Panel	1	ea	\$ -	\$ -	
6.6.2 Manual Pull Stations	1	ea	\$ -	\$ -	
6.6.3 Smoke Detectors	1	ea	\$ -	\$ -	
6.6.4 Heat Detectors	1	ea	\$ -	\$ -	
6.6.5 Duct Detectors	1	ea	\$ -	\$ -	
6.6.6 Interface Modules	1	ea	\$ -	\$ -	
6.6.7 Speakers	1	ea	\$ -	\$ -	
6.6.8 Strobes	1	ea	\$ -	\$ -	
6.6.9 Annunciators	1	ea	\$ -	\$ -	
6.6.10 Wiring	1	ea	\$ -	\$ -	

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT VIII

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project VIII	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES						
Description	Qty	Units	Unit Price	Amount	Total	
6.7 Fire Pump					\$	-
6.7.1 Fire Pump Service	0	ea	\$ -	\$ -		
6.7.2 Utility Meter	0	ea	\$ -	\$ -		
6.7.3 Isolating Disconnet	0	ea	\$ -	\$ -		
6.7.4 Normal Power Wiring	0	m	\$ -	\$ -		
6.7.5 Emergency Power Wiring	0	m	\$ -	\$ -		
6.8 Emergency Generator					\$	-
6.8.1 Generator	0	ea	\$ -	\$ -		
6.8.2 Automatic Transfer Switch	0	ea	\$ -	\$ -		
6.8.3 Normal Power Wiring	0	m	\$ -	\$ -		
6.8.4 Emergency Power Wiring	0	m	\$ -	\$ -		
Part 7 Suggested Contingency					\$	66,621
7.01 Based on Suggested Budget Amounts	15%	sum		\$ 66,621		
Part 8 Engineering and Project Administration					\$	35,753
8.01 Engineering and Administration						
8.02 Project Administration						
8.03 Professional Design Fees (Excluding Taxes)	7%	sum		\$ 35,753		
Suggested Total Budget					\$	546,517

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT IX

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project IX	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES						
Description	Qty	Units	Unit Price	Amount	Total	
Part 1 General				\$	105,336	
1.01 General Conditions, OH&P, Mobilization	8%	sum		\$ 93,632		
1.02 Permits	1%	sum		\$ 11,704		
Part 2 Architectural				\$	250,000	
2.01 Cutting and Patching	2,000	m ²	\$ 60	\$ 120,000		
2.02 Demolition	1	lot	\$ 30,000	\$ 30,000		
2.03 Ceiling Replacement	2,000	m ²	\$ 50	\$ 100,000		
Part 3 Mechanical				\$	440,000	
3.01 High Performance Fan Coils	30	ea	\$ 4,000	\$ 120,000		
3.02 Ductwork	2,000	m ²	\$ 80	\$ 160,000		
3.03 Chilled Water Piping	2,000	m ²	\$ 50	\$ 100,000		
3.04 Plumbing	2,000	m ²	\$ 30	\$ 60,000		
Part 4 Fire Protection				\$	80,000	
4.01 Sprinkler Heads	2,000	m ²	\$ 10	\$ 20,000		
4.02 Sprinkler Branch Piping	2,000	m ²	\$ 30	\$ 60,000		
Part 5 Automatic Controls				\$	75,000	
5.01 EMCS	30	zones	\$ 2,000	\$ 60,000		
5.02 EMCS Commissioning	30	zones	\$ 500	\$ 15,000		
Part 6 Electrical						
6.1 Lighting				\$	116,000	
6.1.1 Lighting Fixtures	380	ea	\$ 200	\$ 76,000		
6.1.2 Branch Circuit Wiring	2000	m ²	\$ 15	\$ 30,000		
6.1.3 Lighting Control	2000	m ²	\$ 5	\$ 10,000		
6.2 Branch Circuit Power & Wiring				\$	58,000	
6.2.1 Circuits	165	ea	\$ 200	\$ 33,000		
6.2.2 Connections to Mechanical Systems	10	ea	\$ 500	\$ 5,000		
6.2.3 Branch Circuit Wiring	2000	m ²	\$ 10	\$ 20,000		

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT IX

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project IX	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES					
Description	Qty	Units	Unit Price	Amount	Total
6.3 Electrical Distribution				\$	29,000
6.3.1 Normal Power Distribution Panelboards (600V)	0	ea	\$ 5,000	\$ -	
6.3.2 Main Normal Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.3 Normal Lighting Panelboard (347/600V)	1	ea	\$ 2,500	\$ 2,500	
6.3.4 Normal Power Stepdown Transformers	1	ea	\$ 5,000	\$ 5,000	
6.3.5 Normal Power Branch Panel Feeders	3	m	\$ 1,000	\$ 3,000	
6.3.6 Normal Power Branch Circuit Panels (120/208V)	3	ea	\$ 2,500	\$ 7,500	
6.3.7 Emergency Power Distribution Panelboards (600V)	0	ea	\$ 5,000	\$ -	
6.3.8 Main Emergency Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.9 Emergency Power Stepdown Transformers	0	ea	\$ 3,500	\$ -	
6.3.10 Emergency Power Branch Panel Feeders	0	m	\$ 1,000	\$ -	
6.3.11 Emergency Power Branch Circuit Panels (347/600V)	1	ea	\$ 2,500	\$ 2,500	
6.3.12 Main Mechanical Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.13 Mechanical Power Stepdown Transformers	1	ea	\$ 5,000	\$ 5,000	
6.3.14 Mechanical Power Branch Panel Feeders	1	m	\$ 1,000	\$ 1,000	
6.3.15 Mechanical Power Branch Circuit Panels (120/208V)	1	m	\$ 2,500	\$ 2,500	
6.3.16 Digital Meters (ION 7650)	0	ea	\$ -	\$ -	
6.4 Life Safety				\$	-
6.4.1 Running man signs	0	ea	\$ 200	\$ -	
6.4.2 Branch Circuit Wiring	0	m ²	\$ 2	\$ -	
6.4.3 Emergency Lighting Units	0	ea	\$ 200	\$ -	
6.5 Communications Systems				\$	122,400
6.5.1 Cable Tray	310	m	\$ 90	\$ 27,900	
6.5.2 Data Cabling	22500	m	\$ 3	\$ 67,500	
6.5.3 Data/voice Outlets	300	ea	\$ 40	\$ 12,000	
6.5.4 Terminations	300	ea	\$ 30	\$ 9,000	
6.5.5 Testing	1	lot	\$ 6,000	\$ 6,000	
6.6 Fire Alarm System				\$	-
6.6.1 Fire Alarm Control Panel	1	ea	\$ -	\$ -	
6.6.2 Manual Pull Stations	1	ea	\$ -	\$ -	
6.6.3 Smoke Detectors	1	ea	\$ -	\$ -	
6.6.4 Heat Detectors	1	ea	\$ -	\$ -	
6.6.5 Duct Detectors	1	ea	\$ -	\$ -	
6.6.6 Interface Modules	1	ea	\$ -	\$ -	
6.6.7 Speakers	1	ea	\$ -	\$ -	
6.6.8 Strobes	1	ea	\$ -	\$ -	
6.6.9 Annunciators	1	ea	\$ -	\$ -	
6.6.10 Wiring	1	ea	\$ -	\$ -	

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT IX

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project IX	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES						
Description	Qty	Units	Unit Price	Amount	Total	
6.7 Fire Pump					\$	-
6.7.1 Fire Pump Service	0	ea	\$ -	\$ -		
6.7.2 Utility Meter	0	ea	\$ -	\$ -		
6.7.3 Isolating Disconnet	0	ea	\$ -	\$ -		
6.7.4 Normal Power Wiring	0	m	\$ -	\$ -		
6.7.5 Emergency Power Wiring	0	m	\$ -	\$ -		
6.8 Emergency Generator					\$	-
6.8.1 Generator	0	ea	\$ -	\$ -		
6.8.2 Automatic Transfer Switch	0	ea	\$ -	\$ -		
6.8.3 Normal Power Wiring	0	m	\$ -	\$ -		
6.8.4 Emergency Power Wiring	0	m	\$ -	\$ -		
Part 7 Suggested Contingency					\$	191,360
7.01 Based on Suggested Budget Amounts	15%	sum		\$ 191,360		
Part 8 Engineering and Project Administration					\$	102,697
8.01 Engineering and Administration						
8.02 Project Administration						
8.03 Professional Design Fees (Excluding Taxes)	7%	sum		\$ 102,697		
Suggested Total Budget					\$	1,569,793

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT X

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project X	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES						
Description	Qty	Units	Unit Price	Amount	Total	
Part 1 General						\$ 33,494
1.01 General Conditions, OH&P, Mobilization	8%	sum		\$ 29,772		
1.02 Permits	1%	sum		\$ 3,722		
Part 2 Architectural						\$ 80,500
2.01 Cutting and Patching	550	m ²	\$ 60	\$ 33,000		
2.02 Demolition	1	lot	\$ 20,000	\$ 20,000		
2.03 Ceiling Replacement	550	m ²	\$ 50	\$ 27,500		
Part 3 Mechanical						\$ 120,000
3.01 High Performance Fan Coils	8	ea	\$ 4,000	\$ 32,000		
3.02 Ductwork	550	m ²	\$ 80	\$ 44,000		
3.03 Chilled Water Piping	550	m ²	\$ 50	\$ 27,500		
3.04 Plumbing	550	m ²	\$ 30	\$ 16,500		
Part 4 Fire Protection						\$ 22,000
4.01 Sprinkler Heads	550	m ²	\$ 10	\$ 5,500		
4.02 Sprinkler Branch Piping	550	m ²	\$ 30	\$ 16,500		
Part 5 Automatic Controls						\$ 20,000
5.01 EMCS	8	zones	\$ 2,000	\$ 16,000		
5.02 EMCS Commissioning	8	zones	\$ 500	\$ 4,000		
Part 6 Electrical						
6.1 Lighting						\$ 33,000
6.1.1 Lighting Fixtures	110	ea	\$ 200	\$ 22,000		
6.1.2 Branch Circuit Wiring	550	m ²	\$ 15	\$ 8,250		
6.1.3 Lighting Control	550	m ²	\$ 5	\$ 2,750		
6.2 Branch Circuit Power & Wiring						\$ 17,600
6.2.1 Circuits	48	ea	\$ 200	\$ 9,600		
6.2.2 Connections to Mechanical Systems	5	ea	\$ 500	\$ 2,500		
6.2.3 Branch Circuit Wiring	550	m ²	\$ 10	\$ 5,500		

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT X

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project X	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES					
Description	Qty	Units	Unit Price	Amount	Total
6.3 Electrical Distribution				\$	19,500
6.3.1 Normal Power Distribution Panelboards (600V)	0	ea	\$ 5,000	\$ -	
6.3.2 Main Normal Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.3 Normal Lighting Panelboard (347/600V)	0	ea	\$ 2,500	\$ -	
6.3.4 Normal Power Stepdown Transformers	1	ea	\$ 5,000	\$ 5,000	
6.3.5 Normal Power Branch Panel Feeders	1	m	\$ 1,000	\$ 1,000	
6.3.6 Normal Power Branch Circuit Panels (120/208V)	1	ea	\$ 2,500	\$ 2,500	
6.3.7 Emergency Power Distribution Panelboards (600V)	0	ea	\$ 5,000	\$ -	
6.3.8 Main Emergency Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.9 Emergency Power Stepdown Transformers	0	ea	\$ 3,500	\$ -	
6.3.10 Emergency Power Branch Panel Feeders	0	m	\$ 1,000	\$ -	
6.3.11 Emergency Power Branch Circuit Panels (347/600V)	1	ea	\$ 2,500	\$ 2,500	
6.3.12 Main Mechanical Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.13 Mechanical Power Stepdown Transformers	1	ea	\$ 5,000	\$ 5,000	
6.3.14 Mechanical Power Branch Panel Feeders	1	m	\$ 1,000	\$ 1,000	
6.3.15 Mechanical Power Branch Circuit Panels (120/208V)	1	m	\$ 2,500	\$ 2,500	
6.3.16 Digital Meters (ION 7650)	0	ea	\$ -	\$ -	
6.4 Life Safety				\$	-
6.4.1 Running man signs	0	ea	\$ 200	\$ -	
6.4.2 Branch Circuit Wiring	0	m ²	\$ 2	\$ -	
6.4.3 Emergency Lighting Units	0	ea	\$ 200	\$ -	
6.5 Communications Systems				\$	59,550
6.5.1 Cable Tray	90	m	\$ 90	\$ 8,100	
6.5.2 Data Cabling	11250	m	\$ 3	\$ 33,750	
6.5.3 Data/voice Outlets	210	ea	\$ 40	\$ 8,400	
6.5.4 Terminations	210	ea	\$ 30	\$ 6,300	
6.5.5 Testing	1	lot	\$ 3,000	\$ 3,000	
6.6 Fire Alarm System				\$	-
6.6.1 Fire Alarm Control Panel	1	ea	\$ -	\$ -	
6.6.2 Manual Pull Stations	1	ea	\$ -	\$ -	
6.6.3 Smoke Detectors	1	ea	\$ -	\$ -	
6.6.4 Heat Detectors	1	ea	\$ -	\$ -	
6.6.5 Duct Detectors	1	ea	\$ -	\$ -	
6.6.6 Interface Modules	1	ea	\$ -	\$ -	
6.6.7 Speakers	1	ea	\$ -	\$ -	
6.6.8 Strobes	1	ea	\$ -	\$ -	
6.6.9 Annunciators	1	ea	\$ -	\$ -	
6.6.10 Wiring	1	ea	\$ -	\$ -	

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT X

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project X	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES						
Description	Qty	Units	Unit Price	Amount	Total	
6.7 Fire Pump					\$	-
6.7.1 Fire Pump Service	0	ea	\$ -	\$ -		
6.7.2 Utility Meter	0	ea	\$ -	\$ -		
6.7.3 Isolating Disconnet	0	ea	\$ -	\$ -		
6.7.4 Normal Power Wiring	0	m	\$ -	\$ -		
6.7.5 Emergency Power Wiring	0	m	\$ -	\$ -		
6.8 Emergency Generator					\$	-
6.8.1 Generator	0	ea	\$ -	\$ -		
6.8.2 Automatic Transfer Switch	0	ea	\$ -	\$ -		
6.8.3 Normal Power Wiring	0	m	\$ -	\$ -		
6.8.4 Emergency Power Wiring	0	m	\$ -	\$ -		
Part 7 Suggested Contingency					\$	60,847
7.01 Based on Suggested Budget Amounts	15%	sum		\$ 60,847		
Part 8 Engineering and Project Administration					\$	32,654
8.01 Engineering and Administration						
8.02 Project Administration						
8.03 Professional Design Fees (Excluding Taxes)	7%	sum		\$ 32,654		
Suggested Total Budget					\$	499,144

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT XI

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project XI	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES						
Description	Qty	Units	Unit Price	Amount	Total	
Part 1 General				\$	92,367	
1.01 General Conditions, OH&P, Mobilization	8%	sum		\$ 82,104		
1.02 Permits	1%	sum		\$ 10,263		
Part 2 Architectural				\$	172,400	
2.01 Cutting and Patching	1,780	m ²	\$ 60	\$ 106,800		
2.02 Demolition	1	lot	\$ 30,000	\$ 30,000		
2.03 Ceiling Replacement	1,780	m ²	\$ 20	\$ 35,600		
Part 3 Mechanical				\$	404,800	
3.01 High Performance Fan Coils	30	ea	\$ 4,000	\$ 120,000		
3.02 Ductwork	1,780	m ²	\$ 80	\$ 142,400		
3.03 Chilled Water Piping	1,780	m ²	\$ 50	\$ 89,000		
3.04 Plumbing	1,780	m ²	\$ 30	\$ 53,400		
Part 4 Fire Protection				\$	71,200	
4.01 Sprinkler Heads	1,780	m ²	\$ 10	\$ 17,800		
4.02 Sprinkler Branch Piping	1,780	m ²	\$ 30	\$ 53,400		
Part 5 Automatic Controls				\$	75,000	
5.01 EMCS	30	zones	\$ 2,000	\$ 60,000		
5.02 EMCS Commissioning	30	zones	\$ 500	\$ 15,000		
Part 6 Electrical						
6.1 Lighting				\$	105,600	
6.1.1 Lighting Fixtures	350	ea	\$ 200	\$ 70,000		
6.1.2 Branch Circuit Wiring	1780	m ²	\$ 15	\$ 26,700		
6.1.3 Lighting Control	1780	m ²	\$ 5	\$ 8,900		
6.2 Branch Circuit Power & Wiring				\$	50,300	
6.2.1 Circuits	150	ea	\$ 200	\$ 30,000		
6.2.2 Connections to Mechanical Systems	5	ea	\$ 500	\$ 2,500		
6.2.3 Branch Circuit Wiring	1780	m ²	\$ 10	\$ 17,800		

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT XI

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project XI	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES					
Description	Qty	Units	Unit Price	Amount	Total

6.3 Electrical Distribution						\$ 25,500
6.3.1 Normal Power Distribution Panelboards (600V)	0	ea	\$ 5,000	\$ -		
6.3.2 Main Normal Power Distribution Feeders	0	m	\$ -	\$ -		
6.3.3 Normal Lighting Panelboard (347/600V)	1	ea	\$ 2,500	\$ 2,500		
6.3.4 Normal Power Stepdown Transformers	1	ea	\$ 5,000	\$ 5,000		
6.3.5 Normal Power Branch Panel Feeders	2	m	\$ 1,000	\$ 2,000		
6.3.6 Normal Power Branch Circuit Panels (120/208V)	2	ea	\$ 2,500	\$ 5,000		
6.3.7 Emergency Power Distribution Panelboards (600V)	0	ea	\$ 5,000	\$ -		
6.3.8 Main Emergency Power Distribution Feeders	0	m	\$ -	\$ -		
6.3.9 Emergency Power Stepdown Transformers	0	ea	\$ 3,500	\$ -		
6.3.10 Emergency Power Branch Panel Feeders	0	m	\$ 1,000	\$ -		
6.3.11 Emergency Power Branch Circuit Panels (347/600V)	1	ea	\$ 2,500	\$ 2,500		
6.3.12 Main Mechanical Power Distribution Feeders	0	m	\$ -	\$ -		
6.3.13 Mechanical Power Stepdown Transformers	1	ea	\$ 5,000	\$ 5,000		
6.3.14 Mechanical Power Branch Panel Feeders	1	m	\$ 1,000	\$ 1,000		
6.3.15 Mechanical Power Branch Circuit Panels (120/208V)	1	m	\$ 2,500	\$ 2,500		
6.3.16 Digital Meters (ION 7650)	0	ea	\$ -	\$ -		
6.4 Life Safety						\$ -
6.4.1 Running man signs	0	ea	\$ 200	\$ -		
6.4.2 Branch Circuit Wiring	0	m ²	\$ 2	\$ -		
6.4.3 Emergency Lighting Units	0	ea	\$ 200	\$ -		
6.5 Communications Systems						\$ 121,500
6.5.1 Cable Tray	300	m	\$ 90	\$ 27,000		
6.5.2 Data Cabling	22500	m	\$ 3	\$ 67,500		
6.5.3 Data/voice Outlets	300	ea	\$ 40	\$ 12,000		
6.5.4 Terminations	300	ea	\$ 30	\$ 9,000		
6.5.5 Testing	1	lot	\$ 6,000	\$ 6,000		
6.6 Fire Alarm System						\$ -
6.6.1 Fire Alarm Control Panel	1	ea	\$ -	\$ -		
6.6.2 Manual Pull Stations	1	ea	\$ -	\$ -		
6.6.3 Smoke Detectors	1	ea	\$ -	\$ -		
6.6.4 Heat Detectors	1	ea	\$ -	\$ -		
6.6.5 Duct Detectors	1	ea	\$ -	\$ -		
6.6.6 Interface Modules	1	ea	\$ -	\$ -		
6.6.7 Speakers	1	ea	\$ -	\$ -		
6.6.8 Strobes	1	ea	\$ -	\$ -		
6.6.9 Annunciators	1	ea	\$ -	\$ -		
6.6.10 Wiring	1	ea	\$ -	\$ -		

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT XI

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project XI	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES						
Description	Qty	Units	Unit Price	Amount	Total	
6.7 Fire Pump					\$	-
6.7.1 Fire Pump Service	0	ea	\$ -	\$ -		
6.7.2 Utility Meter	0	ea	\$ -	\$ -		
6.7.3 Isolating Disconnet	0	ea	\$ -	\$ -		
6.7.4 Normal Power Wiring	0	m	\$ -	\$ -		
6.7.5 Emergency Power Wiring	0	m	\$ -	\$ -		
6.8 Emergency Generator					\$	-
6.8.1 Generator	0	ea	\$ -	\$ -		
6.8.2 Automatic Transfer Switch	0	ea	\$ -	\$ -		
6.8.3 Normal Power Wiring	0	m	\$ -	\$ -		
6.8.4 Emergency Power Wiring	0	m	\$ -	\$ -		
Part 7 Suggested Contingency					\$	167,800
7.01 Based on Suggested Budget Amounts	15%	sum		\$ 167,800		
Part 8 Engineering and Project Administration					\$	90,053
8.01 Engineering and Administration						
8.02 Project Administration						
8.03 Professional Design Fees (Excluding Taxes)	7%	sum		\$ 90,053		
Suggested Total Budget					\$	1,376,520

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT XII

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project XII	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES						
Description	Qty	Units	Unit Price	Amount	Total	
Part 1 General						\$ 100,737
1.01 General Conditions, OH&P, Mobilization	8%	sum		\$ 89,544		
1.02 Permits	1%	sum		\$ 11,193		
Part 2 Architectural						\$ 234,050
2.01 Cutting and Patching	1,855	m ²	\$ 60	\$ 111,300		
2.02 Demolition	1	lot	\$ 30,000	\$ 30,000		
2.03 Ceiling Replacement	1,855	m ²	\$ 50	\$ 92,750		
Part 3 Mechanical						\$ 416,800
3.01 High Performance Fan Coils	30	ea	\$ 4,000	\$ 120,000		
3.02 Ductwork	1,855	m ²	\$ 80	\$ 148,400		
3.03 Chilled Water Piping	1,855	m ²	\$ 50	\$ 92,750		
3.04 Plumbing	1,855	m ²	\$ 30	\$ 55,650		
Part 4 Fire Protection						\$ 74,200
4.01 Sprinkler Heads	1,855	m ²	\$ 10	\$ 18,550		
4.02 Sprinkler Branch Piping	1,855	m ²	\$ 30	\$ 55,650		
Part 5 Automatic Controls						\$ 75,000
5.01 EMCS	30	zones	\$ 2,000	\$ 60,000		
5.02 EMCS Commissioning	30	zones	\$ 500	\$ 15,000		
Part 6 Electrical						
6.1 Lighting						\$ 111,100
6.1.1 Lighting Fixtures	370	ea	\$ 200	\$ 74,000		
6.1.2 Branch Circuit Wiring	1855	m ²	\$ 15	\$ 27,825		
6.1.3 Lighting Control	1855	m ²	\$ 5	\$ 9,275		
6.2 Branch Circuit Power & Wiring						\$ 51,050
6.2.1 Circuits	150	ea	\$ 200	\$ 30,000		
6.2.2 Connections to Mechanical Systems	5	ea	\$ 500	\$ 2,500		
6.2.3 Branch Circuit Wiring	1855	m ²	\$ 10	\$ 18,550		

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT XII

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project XII	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES					
Description	Qty	Units	Unit Price	Amount	Total
6.3 Electrical Distribution				\$	29,000
6.3.1 Normal Power Distribution Panelboards (600V)	0	ea	\$ 5,000	\$ -	
6.3.2 Main Normal Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.3 Normal Lighting Panelboard (347/600V)	1	ea	\$ 2,500	\$ 2,500	
6.3.4 Normal Power Stepdown Transformers	1	ea	\$ 5,000	\$ 5,000	
6.3.5 Normal Power Branch Panel Feeders	3	ea	\$ 1,000	\$ 3,000	
6.3.6 Normal Power Branch Circuit Panels (120/208V)	3	ea	\$ 2,500	\$ 7,500	
6.3.7 Emergency Power Distribution Panelboards (600V)	0	ea	\$ 5,000	\$ -	
6.3.8 Main Emergency Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.9 Emergency Power Stepdown Transformers	0	ea	\$ 3,500	\$ -	
6.3.10 Emergency Power Branch Panel Feeders	0	m	\$ 1,000	\$ -	
6.3.11 Emergency Power Branch Circuit Panels (347/600V)	1	ea	\$ 2,500	\$ 2,500	
6.3.12 Main Mechanical Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.13 Mechanical Power Stepdown Transformers	1	ea	\$ 5,000	\$ 5,000	
6.3.14 Mechanical Power Branch Panel Feeders	1	m	\$ 1,000	\$ 1,000	
6.3.15 Mechanical Power Branch Circuit Panels (120/208V)	1	m	\$ 2,500	\$ 2,500	
6.3.16 Digital Meters (ION 7650)	0	ea	\$ -	\$ -	
6.4 Life Safety				\$	-
6.4.1 Running man signs	0	ea	\$ 200	\$ -	
6.4.2 Branch Circuit Wiring	0	m ²	\$ 2	\$ -	
6.4.3 Emergency Lighting Units	0	ea	\$ 200	\$ -	
6.5 Communications Systems				\$	128,100
6.5.1 Cable Tray	350	m	\$ 90	\$ 31,500	
6.5.2 Data Cabling	22500	m	\$ 3	\$ 67,500	
6.5.3 Data/voice Outlets	330	ea	\$ 40	\$ 13,200	
6.5.4 Terminations	330	ea	\$ 30	\$ 9,900	
6.5.5 Testing	1	lot	\$ 6,000	\$ 6,000	
6.6 Fire Alarm System				\$	-
6.6.1 Fire Alarm Control Panel	1	ea	\$ -	\$ -	
6.6.2 Manual Pull Stations	1	ea	\$ -	\$ -	
6.6.3 Smoke Detectors	1	ea	\$ -	\$ -	
6.6.4 Heat Detectors	1	ea	\$ -	\$ -	
6.6.5 Duct Detectors	1	ea	\$ -	\$ -	
6.6.6 Interface Modules	1	ea	\$ -	\$ -	
6.6.7 Speakers	1	ea	\$ -	\$ -	
6.6.8 Strobes	1	ea	\$ -	\$ -	
6.6.9 Annunciators	1	ea	\$ -	\$ -	
6.6.10 Wiring	1	ea	\$ -	\$ -	

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT XII

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project XII	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES						
Description	Qty	Units	Unit Price	Amount	Total	
6.7 Fire Pump					\$	-
6.7.1 Fire Pump Service	0	ea	\$ -	\$ -		
6.7.2 Utility Meter	0	ea	\$ -	\$ -		
6.7.3 Isolating Disconnet	0	ea	\$ -	\$ -		
6.7.4 Normal Power Wiring	0	m	\$ -	\$ -		
6.7.5 Emergency Power Wiring	0	m	\$ -	\$ -		
6.8 Emergency Generator					\$	-
6.8.1 Generator	0	ea	\$ -	\$ -		
6.8.2 Automatic Transfer Switch	0	ea	\$ -	\$ -		
6.8.3 Normal Power Wiring	0	m	\$ -	\$ -		
6.8.4 Emergency Power Wiring	0	m	\$ -	\$ -		
Part 7 Suggested Contingency					\$	183,006
7.01 Based on Suggested Budget Amounts	15%	sum		\$ 183,006		
Part 8 Engineering and Project Administration					\$	98,213
8.01 Engineering and Administration						
8.02 Project Administration						
8.03 Professional Design Fees (Excluding Taxes)	7%	sum		\$ 98,213		
Suggested Total Budget					\$	1,501,256

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT XIII

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project XIII	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES						
Description	Qty	Units	Unit Price	Amount	Total	
Part 1 General				\$	77,436	
1.01 General Conditions, OH&P, Mobilization	8%	sum		\$ 68,832		
1.02 Permits	1%	sum		\$ 8,604		
Part 2 Architectural				\$	184,000	
2.01 Cutting and Patching	1,400	m ²	\$ 60	\$ 84,000		
2.02 Demolition	1	lot	\$ 30,000	\$ 30,000		
2.03 Ceiling Replacement	1,400	m ²	\$ 50	\$ 70,000		
Part 3 Mechanical				\$	304,000	
3.01 High Performance Fan Coils	20	ea	\$ 4,000	\$ 80,000		
3.02 Ductwork	1,400	m ²	\$ 80	\$ 112,000		
3.03 Chilled Water Piping	1,400	m ²	\$ 50	\$ 70,000		
3.04 Plumbing	1,400	m ²	\$ 30	\$ 42,000		
Part 4 Fire Protection				\$	56,000	
4.01 Sprinkler Heads	1,400	m ²	\$ 10	\$ 14,000		
4.02 Sprinkler Branch Piping	1,400	m ²	\$ 30	\$ 42,000		
Part 5 Automatic Controls				\$	50,000	
5.01 EMCS	20	zones	\$ 2,000	\$ 40,000		
5.02 EMCS Commissioning	20	zones	\$ 500	\$ 10,000		
Part 6 Electrical						
6.1 Lighting				\$	84,000	
6.1.1 Lighting Fixtures	280	ea	\$ 200	\$ 56,000		
6.1.2 Branch Circuit Wiring	1400	m ²	\$ 15	\$ 21,000		
6.1.3 Lighting Control	1400	m ²	\$ 5	\$ 7,000		
6.2 Branch Circuit Power & Wiring				\$	40,500	
6.2.1 Circuits	120	ea	\$ 200	\$ 24,000		
6.2.2 Connections to Mechanical Systems	5	ea	\$ 500	\$ 2,500		
6.2.3 Branch Circuit Wiring	1400	m ²	\$ 10	\$ 14,000		

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT XIII

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project XIII	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES					
Description	Qty	Units	Unit Price	Amount	Total
6.3 Electrical Distribution				\$	25,500
6.3.1 Normal Power Distribution Panelboards (600V)	0	ea	\$ 5,000	\$ -	
6.3.2 Main Normal Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.3 Normal Lighting Panelboard (347/600V)	1	ea	\$ 2,500	\$ 2,500	
6.3.4 Normal Power Stepdown Transformers	1	ea	\$ 5,000	\$ 5,000	
6.3.5 Normal Power Branch Panel Feeders	2	ea	\$ 1,000	\$ 2,000	
6.3.6 Normal Power Branch Circuit Panels (120/208V)	2	ea	\$ 2,500	\$ 5,000	
6.3.7 Emergency Power Distribution Panelboards (600V)	0	ea	\$ 5,000	\$ -	
6.3.8 Main Emergency Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.9 Emergency Power Stepdown Transformers	0	ea	\$ 3,500	\$ -	
6.3.10 Emergency Power Branch Panel Feeders	0	m	\$ 1,000	\$ -	
6.3.11 Emergency Power Branch Circuit Panels (347/600V)	1	ea	\$ 2,500	\$ 2,500	
6.3.12 Main Mechanical Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.13 Mechanical Power Stepdown Transformers	1	ea	\$ 5,000	\$ 5,000	
6.3.14 Mechanical Power Branch Panel Feeders	1	m	\$ 1,000	\$ 1,000	
6.3.15 Mechanical Power Branch Circuit Panels (120/208V)	1	m	\$ 2,500	\$ 2,500	
6.3.16 Digital Meters (ION 7650)	0	ea	\$ -	\$ -	
6.4 Life Safety				\$	-
6.4.1 Running man signs	0	ea	\$ 200	\$ -	
6.4.2 Branch Circuit Wiring	0	m ²	\$ 2	\$ -	
6.4.3 Emergency Lighting Units	0	ea	\$ 200	\$ -	
6.5 Communications Systems				\$	116,400
6.5.1 Cable Tray	220	m	\$ 90	\$ 19,800	
6.5.2 Data Cabling	22500	m	\$ 3	\$ 67,500	
6.5.3 Data/voice Outlets	330	ea	\$ 40	\$ 13,200	
6.5.4 Terminations	330	ea	\$ 30	\$ 9,900	
6.5.5 Testing	1	lot	\$ 6,000	\$ 6,000	
6.6 Fire Alarm System				\$	-
6.6.1 Fire Alarm Control Panel	1	ea	\$ -	\$ -	
6.6.2 Manual Pull Stations	1	ea	\$ -	\$ -	
6.6.3 Smoke Detectors	1	ea	\$ -	\$ -	
6.6.4 Heat Detectors	1	ea	\$ -	\$ -	
6.6.5 Duct Detectors	1	ea	\$ -	\$ -	
6.6.6 Interface Modules	1	ea	\$ -	\$ -	
6.6.7 Speakers	1	ea	\$ -	\$ -	
6.6.8 Strobes	1	ea	\$ -	\$ -	
6.6.9 Annunciators	1	ea	\$ -	\$ -	
6.6.10 Wiring	1	ea	\$ -	\$ -	

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT XIII

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project XIII	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES					
Description	Qty	Units	Unit Price	Amount	Total
6.7 Fire Pump				\$	-
6.7.1 Fire Pump Service	0	ea	\$ -	\$ -	
6.7.2 Utility Meter	0	ea	\$ -	\$ -	
6.7.3 Isolating Disconnet	0	ea	\$ -	\$ -	
6.7.4 Normal Power Wiring	0	m	\$ -	\$ -	
6.7.5 Emergency Power Wiring	0	m	\$ -	\$ -	
6.8 Emergency Generator				\$	-
6.8.1 Generator	0	ea	\$ -	\$ -	
6.8.2 Automatic Transfer Switch	0	ea	\$ -	\$ -	
6.8.3 Normal Power Wiring	0	m	\$ -	\$ -	
6.8.4 Emergency Power Wiring	0	m	\$ -	\$ -	
Part 7 Suggested Contingency				\$	140,675
7.01 Based on Suggested Budget Amounts	15%	sum		\$ 140,675	
Part 8 Engineering and Project Administration				\$	75,496
8.01 Engineering and Administration					
8.02 Project Administration					
8.03 Professional Design Fees (Excluding Taxes)	7%	sum		\$ 75,496	
Suggested Total Budget				\$	1,154,007

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT XIV

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project XIV	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES					
Description	Qty	Units	Unit Price	Amount	Total
Part 1 General				\$	50,567
1.01 General Conditions, OH&P, Mobilization	8%	sum		\$ 44,948	
1.02 Permits	1%	sum		\$ 5,619	
Part 2 Architectural				\$	128,000
2.01 Cutting and Patching	1	lot	\$ 40,000	\$ 40,000	
2.02 Demolition	1	lot	\$ 20,000	\$ 20,000	
2.03 Ceiling Replacement	850	m ²	\$ 80	\$ 68,000	
Part 3 Mechanical				\$	251,000
3.01 Atrium Air Handling Unit	15,000	cfm	\$ 4	\$ 60,000	
3.02 Ductwork	15,000	cfm	\$ 6	\$ 90,000	
3.03 Heating Piping	1	lot	\$ 20,000	\$ 20,000	
3.04 Chilled Water Piping	1	lot	\$ 30,000	\$ 30,000	
3.05 Chilled Water Pump	2	ea	\$ 4,000	\$ 8,000	
3.06 Heating Water Pump	2	ea	\$ 4,000	\$ 8,000	
3.07 Low Pressure Steam Piping	1	lot	\$ 10,000	\$ 10,000	
3.08 Plumbing	1	lot	\$ 5,000	\$ 5,000	
3.09 Air and Water Balancing	20,000	cfm	\$ 1	\$ 20,000	
Part 4 Fire Protection				\$	25,500
4.01 Sprinkler	850	m ²	\$ 30	\$ 25,500	
Part 5 Automatic Controls				\$	25,000
5.01 EMCS to Control AHU	1	lot	\$ 20,000	\$ 20,000	
5.02 EMCS Commissioning	1	lot	\$ 5,000	\$ 5,000	
Part 6 Electrical					
6.1 Lighting				\$	105,750
6.1.1 Atrium Lighting Fixtures	12	ea	\$ 4,000	\$ 48,000	
6.1.2 Common Area Lighting	850	m ²	\$ 50	\$ 42,500	
6.1.3 Branch Circuit Wiring	850	m ²	\$ 15	\$ 12,750	
6.1.4 Lighting Control	1	lot	\$ 2,500	\$ 2,500	
6.2 Branch Circuit Power & Wiring				\$	14,500
6.2.1 Circuits	40	ea	\$ 200	\$ 8,000	
6.2.2 Connections to Mechanical Systems	5	ea	\$ 500	\$ 2,500	
6.2.3 Branch Circuit Wiring	400	m ²	\$ 10	\$ 4,000	

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT XIV

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project XIV	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES					
Description	Qty	Units	Unit Price	Amount	Total

6.3 Electrical Distribution						\$ -
6.3.1 Normal Power Distribution Panelboards (600V)	0	ea	\$ 5,000	\$ -		
6.3.2 Main Normal Power Distribution Feeders	0	m	\$ -	\$ -		
6.3.3 Normal Lighting Panelboard (347/600V)	0	ea	\$ 2,500	\$ -		
6.3.4 Normal Power Stepdown Transformers	0	ea	\$ 5,000	\$ -		
6.3.5 Normal Power Branch Panel Feeders	0	ea	\$ 1,000	\$ -		
6.3.6 Normal Power Branch Circuit Panels (120/208V)	0	ea	\$ 2,500	\$ -		
6.3.7 Emergency Power Distribution Panelboards (600V)	0	ea	\$ 5,000	\$ -		
6.3.8 Main Emergency Power Distribution Feeders	0	m	\$ -	\$ -		
6.3.9 Emergency Power Stepdown Transformers	0	ea	\$ 3,500	\$ -		
6.3.10 Emergency Power Branch Panel Feeders	0	m	\$ 1,000	\$ -		
6.3.11 Emergency Power Branch Circuit Panels (347/600V)	0	ea	\$ 2,500	\$ -		
6.3.12 Main Mechanical Power Distribution Feeders	0	m	\$ -	\$ -		
6.3.13 Mechanical Power Stepdown Transformers	0	ea	\$ 5,000	\$ -		
6.3.14 Mechanical Power Branch Panel Feeders	0	m	\$ 1,000	\$ -		
6.3.15 Mechanical Power Branch Circuit Panels (120/208V)	0	m	\$ 2,500	\$ -		
6.3.16 Digital Meters (ION 7650)	0	ea	\$ -	\$ -		
6.4 Life Safety						\$ -
6.4.1 Running man signs	0	ea	\$ 200	\$ -		
6.4.2 Branch Circuit Wiring	0	m ²	\$ 2	\$ -		
6.4.3 Emergency Lighting Units	0	ea	\$ 200	\$ -		
6.5 Communications Systems						\$ 12,100
6.5.1 Cable Tray	0	m	\$ 90	\$ -		
6.5.2 Data Cabling	3000	m	\$ 3	\$ 9,000		
6.5.3 Data/voice Outlets	30	ea	\$ 40	\$ 1,200		
6.5.4 Terminations	30	ea	\$ 30	\$ 900		
6.5.5 Testing	1	lot	\$ 1,000	\$ 1,000		
6.6 Fire Alarm System						\$ -
6.6.1 Fire Alarm Control Panel	1	ea	\$ -	\$ -		
6.6.2 Manual Pull Stations	1	ea	\$ -	\$ -		
6.6.3 Smoke Detectors	1	ea	\$ -	\$ -		
6.6.4 Heat Detectors	1	ea	\$ -	\$ -		
6.6.5 Duct Detectors	1	ea	\$ -	\$ -		
6.6.6 Interface Modules	1	ea	\$ -	\$ -		
6.6.7 Speakers	1	ea	\$ -	\$ -		
6.6.8 Strobes	1	ea	\$ -	\$ -		
6.6.9 Annunciators	1	ea	\$ -	\$ -		
6.6.10 Wiring	1	ea	\$ -	\$ -		

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT XIV

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project XIV	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES						
Description	Qty	Units	Unit Price	Amount	Total	
6.7 Fire Pump					\$	-
6.7.1 Fire Pump Service	0	ea	\$ -	\$ -		
6.7.2 Utility Meter	0	ea	\$ -	\$ -		
6.7.3 Isolating Disconnet	0	ea	\$ -	\$ -		
6.7.4 Normal Power Wiring	0	m	\$ -	\$ -		
6.7.5 Emergency Power Wiring	0	m	\$ -	\$ -		
6.8 Emergency Generator					\$	-
6.8.1 Generator	0	ea	\$ -	\$ -		
6.8.2 Automatic Transfer Switch	0	ea	\$ -	\$ -		
6.8.3 Normal Power Wiring	0	m	\$ -	\$ -		
6.8.4 Emergency Power Wiring	0	m	\$ -	\$ -		
Part 7 Suggested Contingency					\$	91,862
7.01 Based on Suggested Budget Amounts	15%	sum		\$ 91,862		
Part 8 Engineering and Project Administration					\$	49,300
8.01 Engineering and Administration						
8.02 Project Administration						
8.03 Professional Design Fees (Excluding Taxes)	7%	sum		\$ 49,300		
Suggested Total Budget					\$	753,579

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT XV

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project XV	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES					
Description	Qty	Units	Unit Price	Amount	Total
Part 1 General				\$	44,573
1.01 General Conditions, OH&P, Mobilization	8%	sum		\$ 39,620	
1.02 Permits	1%	sum		\$ 4,953	
Part 2 Architectural				\$	140,000
2.01 Cutting and Patching	1	lot	\$ 40,000	\$ 40,000	
2.02 Demolition of Equipment	1	lot	\$ 100,000	\$ 100,000	
2.03 Ceiling Replacement	0	m ²	\$ -	\$ -	
Part 3 Mechanical				\$	50,000
3.01 Disconnect and Cap Piping	1	lot	\$ 20,000	\$ 20,000	
3.02 Disconnect and Cap Ductwork	1	lot	\$ 30,000	\$ 30,000	
Part 4 Fire Protection				\$	-
4.01 Sprinkler	0	m ²	\$ -	\$ -	
Part 5 Automatic Controls				\$	15,000
5.01 Demolition of All Existing Automatic Controls	1	lot	\$ 15,000	\$ 15,000	
Part 6 Electrical					
6.1 Lighting				\$	37,000
6.1.1 Stairwell Lighting Fixtures	1	lot	\$ 24,000	\$ 24,000	
6.1.2 Branch Circuit Wiring	1	lot	\$ 8,000	\$ 8,000	
6.1.3 Lighting Control	1	lot	\$ 5,000	\$ 5,000	
6.2 Branch Circuit Power & Wiring				\$	-
6.2.1 Circuits	0	ea	\$ 200	\$ -	
6.2.2 Connections to Mechanical Systems	0	ea	\$ 500	\$ -	
6.2.3 Branch Circuit Wiring	0	m ²	\$ 10	\$ -	

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT XV

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project XV	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES					
Description	Qty	Units	Unit Price	Amount	Total

6.3 Electrical Distribution				\$	-
6.3.1 Normal Power Distribution Panelboards (600V)	0	ea	\$ 5,000	\$ -	
6.3.2 Main Normal Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.3 Normal Lighting Panelboard (347/600V)	0	ea	\$ 2,500	\$ -	
6.3.4 Normal Power Stepdown Transformers	0	ea	\$ 5,000	\$ -	
6.3.5 Normal Power Branch Panel Feeders	0	ea	\$ 1,000	\$ -	
6.3.6 Normal Power Branch Circuit Panels (120/208V)	0	ea	\$ 2,500	\$ -	
6.3.7 Emergency Power Distribution Panelboards (600V)	0	ea	\$ 5,000	\$ -	
6.3.8 Main Emergency Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.9 Emergency Power Stepdown Transformers	0	ea	\$ 3,500	\$ -	
6.3.10 Emergency Power Branch Panel Feeders	0	m	\$ 1,000	\$ -	
6.3.11 Emergency Power Branch Circuit Panels (347/600V)	0	ea	\$ 2,500	\$ -	
6.3.12 Main Mechanical Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.13 Mechanical Power Stepdown Transformers	0	ea	\$ 5,000	\$ -	
6.3.14 Mechanical Power Branch Panel Feeders	0	m	\$ 1,000	\$ -	
6.3.15 Mechanical Power Branch Circuit Panels (120/208V)	0	m	\$ 2,500	\$ -	
6.3.16 Digital Meters (ION 7650)	0	ea	\$ -	\$ -	
6.4 Life Safety				\$	103,000
6.4.1 Running man signs	135	ea	\$ 200	\$ 27,000	
6.4.2 Branch Circuit Wiring	16000	m ²	\$ 1	\$ 16,000	
6.4.3 Emergency Lighting Units	300	ea	\$ 200	\$ 60,000	
6.5 Communications Systems				\$	-
6.5.1 Cable Tray	0	m	\$ 90	\$ -	
6.5.2 Data Cabling	0	m	\$ 3	\$ -	
6.5.3 Data/voice Outlets	0	ea	\$ 40	\$ -	
6.5.4 Terminations	0	ea	\$ 30	\$ -	
6.5.5 Testing	0	lot	\$ 6,000	\$ -	
6.6 Fire Alarm System				\$	150,250
6.6.1 Fire Alarm Control Panel	1	ea	\$ 5,000	\$ 5,000	
6.6.2 Manual Pull Stations c/w ADA compliant adaptors	35	ea	\$ 200	\$ 7,000	
6.6.3 Smoke Detectors	75	ea	\$ 150	\$ 11,250	
6.6.4 Heat Detectors	20	ea	\$ 150	\$ 3,000	
6.6.5 Duct Detectors	10	ea	\$ 300	\$ 3,000	
6.6.6 Interface Modules	20	ea	\$ 300	\$ 6,000	
6.6.7 Speakers	155	ea	\$ 200	\$ 31,000	
6.6.8 Strobes	155	ea	\$ 200	\$ 31,000	
6.6.9 Annunciators	3	ea	\$ 1,000	\$ 3,000	
6.6.10 Wiring	1	lot	\$ 50,000	\$ 50,000	

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT XV

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project XV	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES						
Description	Qty	Units	Unit Price	Amount	Total	
6.7 Fire Pump					\$	-
6.7.1 Fire Pump Service	0	ea	\$ -	\$ -		
6.7.2 Utility Meter	0	ea	\$ -	\$ -		
6.7.3 Isolating Disconnet	0	ea	\$ -	\$ -		
6.7.4 Normal Power Wiring	0	m	\$ -	\$ -		
6.7.5 Emergency Power Wiring	0	m	\$ -	\$ -		
6.8 Emergency Generator					\$	-
6.8.1 Generator	0	ea	\$ -	\$ -		
6.8.2 Automatic Transfer Switch	0	ea	\$ -	\$ -		
6.8.3 Normal Power Wiring	0	m	\$ -	\$ -		
6.8.4 Emergency Power Wiring	0	m	\$ -	\$ -		
Part 7 Suggested Contingency					\$	80,973
7.01 Based on Suggested Budget Amounts	15%	sum		\$ 80,973		
Part 8 Engineering and Project Administration					\$	37,788
8.01 Engineering and Administration						
8.02 Project Administration						
8.03 Professional Design Fees (Excluding Taxes)	7%	sum		\$ 37,788		
Suggested Total Budget					\$	658,583

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT XVI

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project XVI	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES					
Description	Qty	Units	Unit Price	Amount	Total
Part 1 General				\$	23,423
1.01 General Conditions, OH&P, Mobilization	8%	sum		\$ 20,820	
1.02 Permits	1%	sum		\$ 2,603	
Part 2 Architectural				\$	40,000
2.01 Cutting and Patching	1	lot	\$ 30,000	\$ 30,000	
2.02 Demolition	1	lot	\$ 10,000	\$ 10,000	
Part 3 Mechanical				\$	87,000
3.01 Exhaust Fans	4	ea	\$ 3,000	\$ 12,000	
3.02 Ductwork	4	ea	\$ 5,000	\$ 20,000	
3.03 Plumbing - Sanitary Piping	1	lot	\$ 50,000	\$ 50,000	
3.04 Air Balancing	1	lot	\$ 5,000	\$ 5,000	
Part 4 Fire Protection				\$	-
4.01 Sprinkler	0	m ²	\$ -	\$ -	
Part 5 Automatic Controls				\$	10,000
5.01 EMCS to Control AHU	4	ea	\$ 2,000	\$ 8,000	
5.02 EMCS Commissioning	4	ea	\$ 500	\$ 2,000	
Part 6 Electrical					
6.1 Lighting				\$	60,700
6.1.1 Garage Lighting Fixtures	50	ea	\$ 400	\$ 20,000	
6.1.2 Misc Lighting Fixtures	1100	m ²	\$ 30	\$ 33,000	
6.1.2 Branch Circuit Wiring	1100	m ²	\$ 2	\$ 2,200	
6.1.3 Lighting Control	1100	m ²	\$ 5	\$ 5,500	
6.2 Branch Circuit Power & Wiring				\$	20,000
6.2.1 Circuits	50	ea	\$ 200	\$ 10,000	
6.2.2 Connections to Mechanical Systems	20	ea	\$ 500	\$ 10,000	
6.2.3 Branch Circuit Wiring	0	m ²	\$ 10	\$ -	

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT XVI

PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project XVI	DATE February 28, 2014

PRELIMINARY BUDGET ESTIMATES					
Description	Qty	Units	Unit Price	Amount	Total
6.3 Electrical Distribution				\$	32,700
6.3.1 Normal Power Distribution Panelboards (600V)	1	ea	\$ 5,000	\$ 5,000	
6.3.2 Main Normal Power Distribution Feeders	30	m	\$ 120	\$ 3,600	
6.3.3 Normal Power Stepdown Transformers	1	ea	\$ 5,000	\$ 5,000	
6.3.4 Normal Power Branch Panel Feeders	1	ea	\$ 1,000	\$ 1,000	
6.3.5 Normal Power Branch Circuit Panels (120/208V)	1	ea	\$ 2,500	\$ 2,500	
6.3.6 Emergency Power Distribution Panelboards (600V)	1	ea	\$ 5,000	\$ 5,000	
6.3.7 Main Emergency Power Distribution Feeders	30	m	\$ 120	\$ 3,600	
6.3.8 Emergency Power Stepdown Transformers	1	ea	\$ 3,500	\$ 3,500	
6.3.9 Emergency Power Branch Panel Feeders	1	m	\$ 1,000	\$ 1,000	
6.3.10 Emergency Power Branch Circuit Panels (347/600V)	1	ea	\$ 2,500	\$ 2,500	
6.3.11 Main Mechanical Power Distribution Feeders	0	m	\$ -	\$ -	
6.3.12 Mechanical Power Stepdown Transformers	0	ea	\$ 5,000	\$ -	
6.3.13 Mechanical Power Branch Panel Feeders	0	m	\$ 1,000	\$ -	
6.3.14 Mechanical Power Branch Circuit Panels (120/208V)	0	m	\$ 2,500	\$ -	
6.3.15 Digital Meters (ION 7650)	0	ea	\$ -	\$ -	
6.4 Life Safety				\$	-
6.4.1 Running man signs	0	ea	\$ 200	\$ -	
6.4.2 Branch Circuit Wiring	0	m ²	\$ 1	\$ -	
6.4.3 Emergency Lighting Units	0	ea	\$ 200	\$ -	
6.5 Communications Systems				\$	9,850
6.5.1 Cable Tray	0	m	\$ 90	\$ -	
6.5.2 Data Cabling	2250	m	\$ 3	\$ 6,750	
6.5.3 Data/voice Outlets	30	ea	\$ 40	\$ 1,200	
6.5.4 Terminations	30	ea	\$ 30	\$ 900	
6.5.5 Testing	1	lot	\$ 1,000	\$ 1,000	
6.6 Fire Alarm System				\$	-
6.6.1 Fire Alarm Control Panel	0	ea	\$ 5,000	\$ -	
6.6.2 Manual Pull Stations	0	ea	\$ 150	\$ -	
6.6.3 Smoke Detectors	0	ea	\$ 150	\$ -	
6.6.4 Heat Detectors	0	ea	\$ 150	\$ -	
6.6.5 Duct Detectors	0	ea	\$ 300	\$ -	
6.6.6 Interface Modules	0	ea	\$ 300	\$ -	
6.6.7 Speakers	0	ea	\$ 200	\$ -	
6.6.8 Strobes	0	ea	\$ 200	\$ -	
6.6.9 Annunciators	0	ea	\$ 1,000	\$ -	
6.6.10 Wiring	0	lot	\$ 50,000	\$ -	

PRELIMINARY CLASS C BUDGET ESTIMATE PROJECT XVI

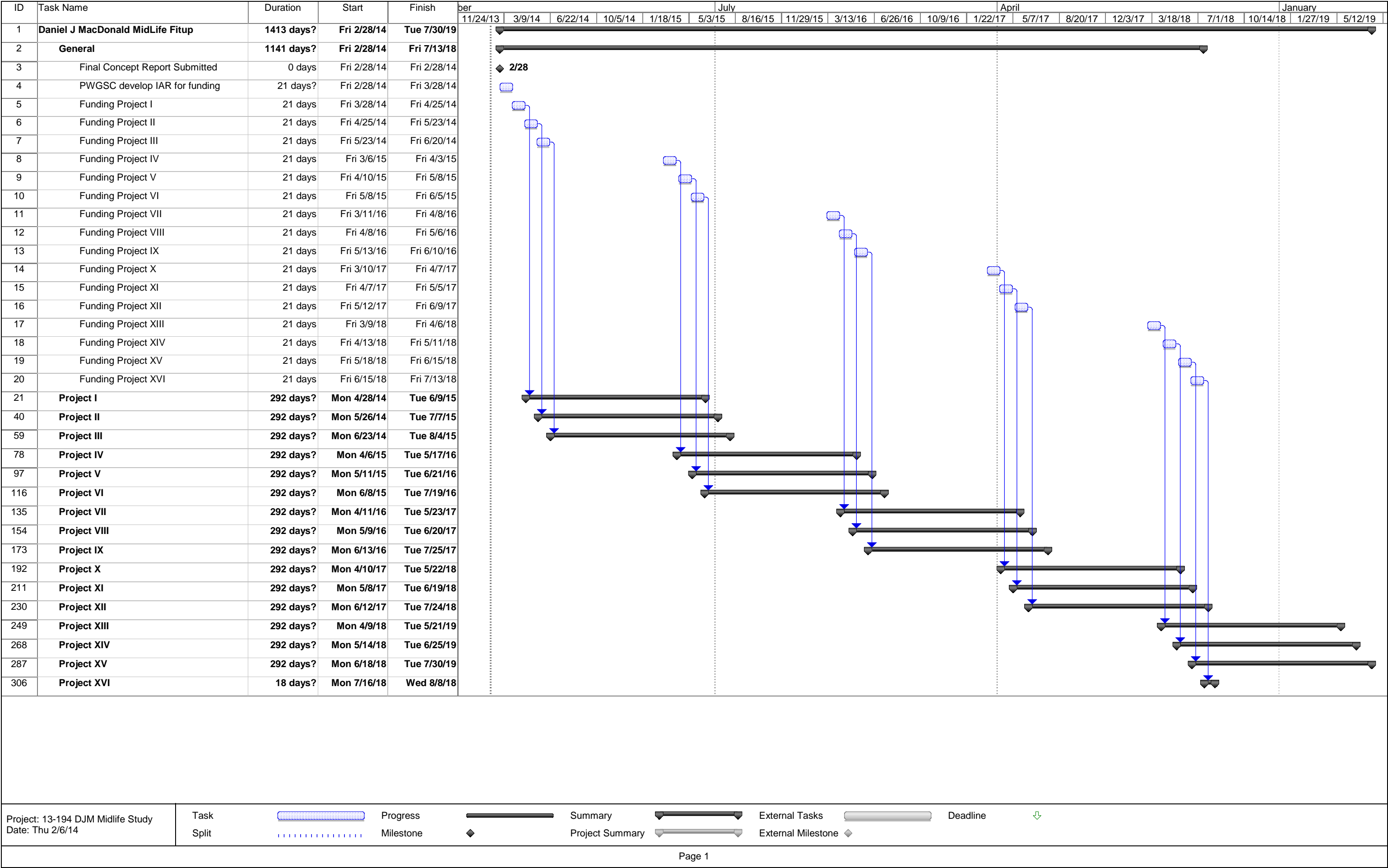
PROJECT Public Works and Government Services Canada Daniel J. MacDonald Building Mechanical & Electrical Midlife Fit-Up Study/Design Concept	PROJECT NO. 13-194
DESCRIPTION Preliminary Class C Budget Estimate - Project XVI	DATE February 28, 2014

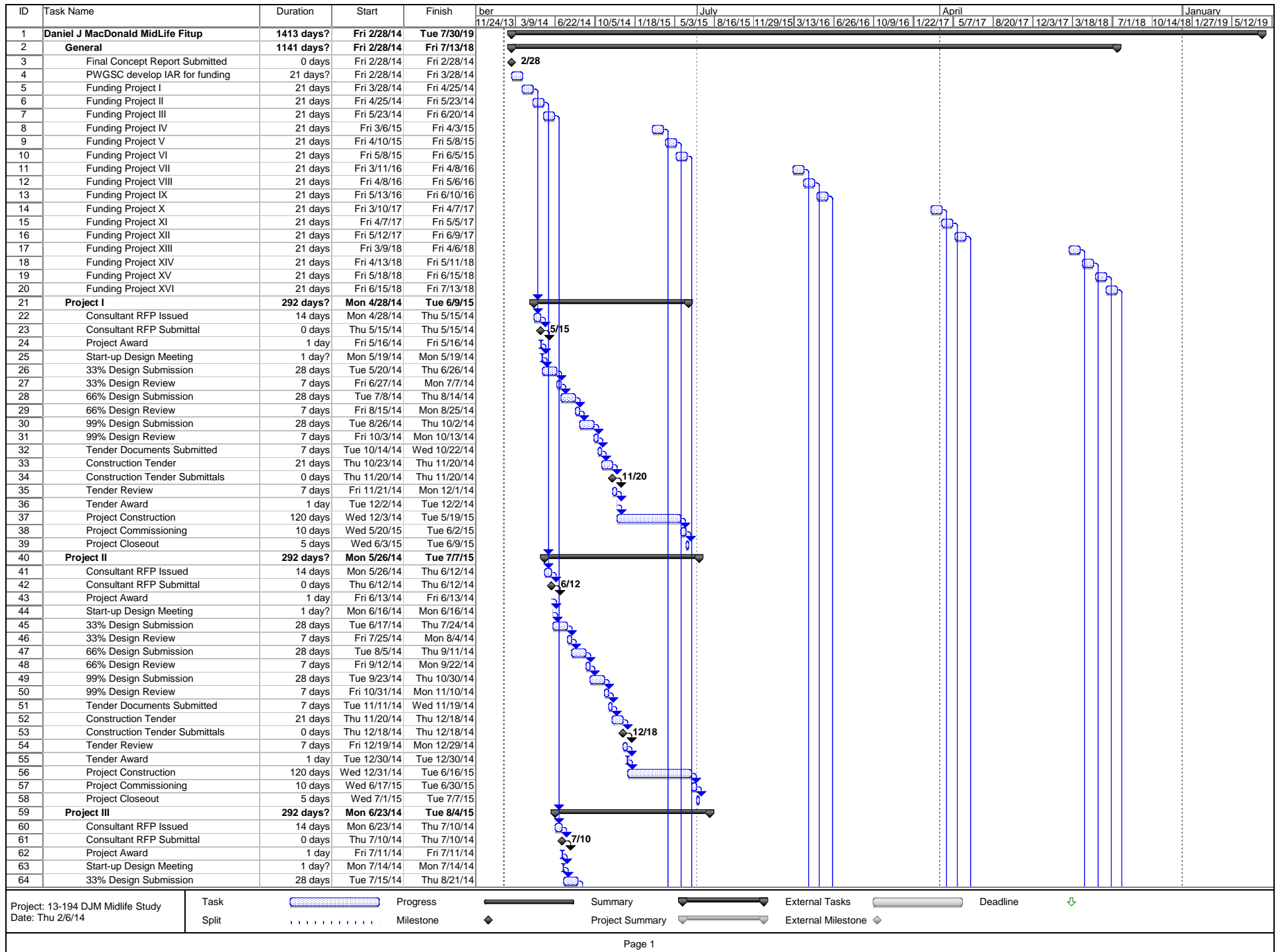
PRELIMINARY BUDGET ESTIMATES						
Description	Qty	Units	Unit Price	Amount	Total	
6.7 Fire Pump					\$	-
6.7.1 Fire Pump Service	0	ea	\$ -	\$ -		
6.7.2 Utility Meter	0	ea	\$ -	\$ -		
6.7.3 Isolating Disconnet	0	ea	\$ -	\$ -		
6.7.4 Normal Power Wiring	0	m	\$ -	\$ -		
6.7.5 Emergency Power Wiring	0	m	\$ -	\$ -		
6.8 Emergency Generator					\$	-
6.8.1 Generator	0	ea	\$ -	\$ -		
6.8.2 Automatic Transfer Switch	0	ea	\$ -	\$ -		
6.8.3 Normal Power Wiring	0	m	\$ -	\$ -		
6.8.4 Emergency Power Wiring	0	m	\$ -	\$ -		
Part 7 Suggested Contingency					\$	42,551
7.01 Based on Suggested Budget Amounts	15%	sum		\$ 42,551		
Part 8 Engineering and Project Administration					\$	22,836
8.01 Engineering and Administration						
8.02 Project Administration						
8.03 Professional Design Fees (Excluding Taxes)	7%	sum		\$ 22,836		
Suggested Total Budget					\$	349,059

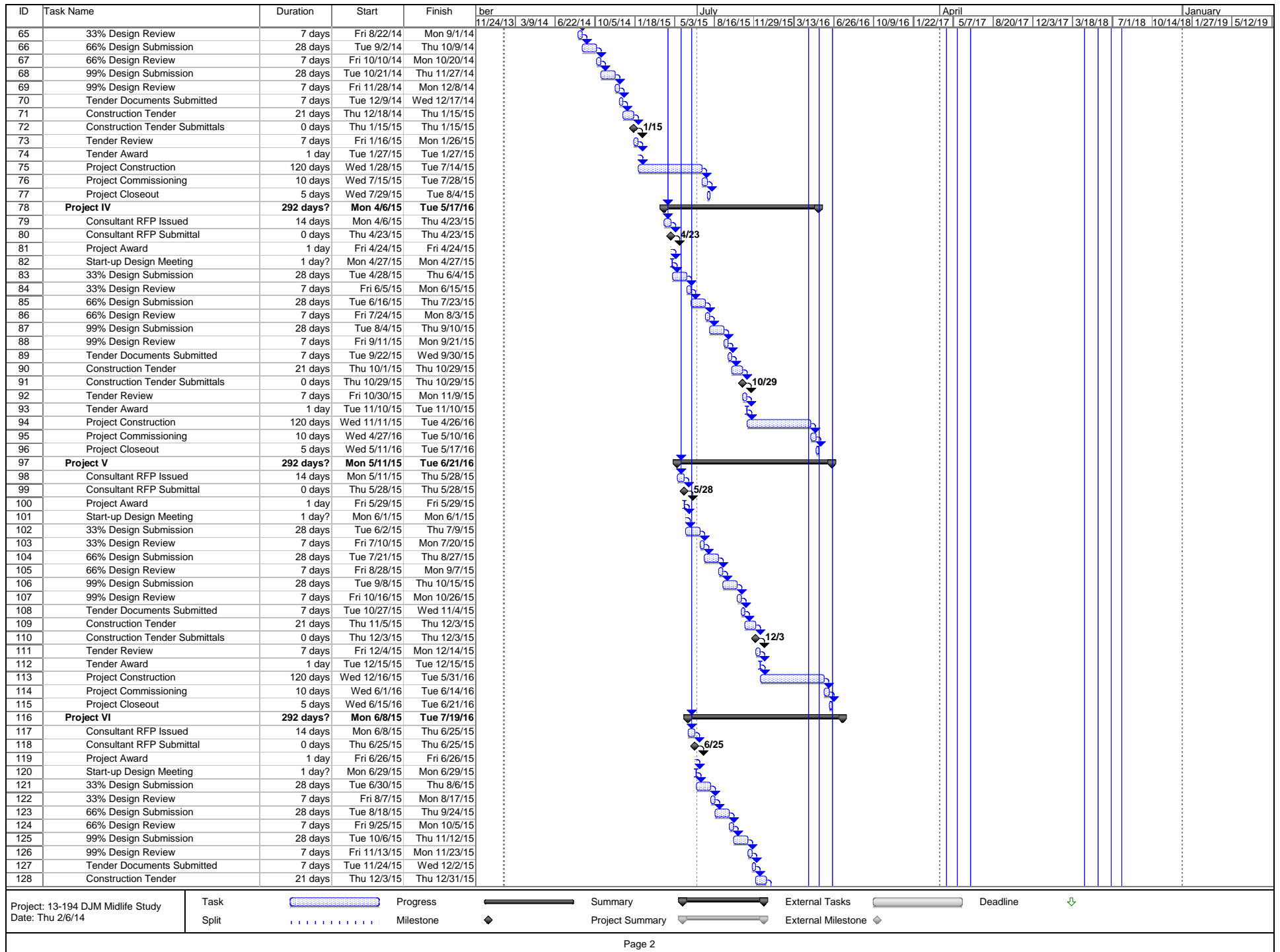


PROJECT SCHEDULE

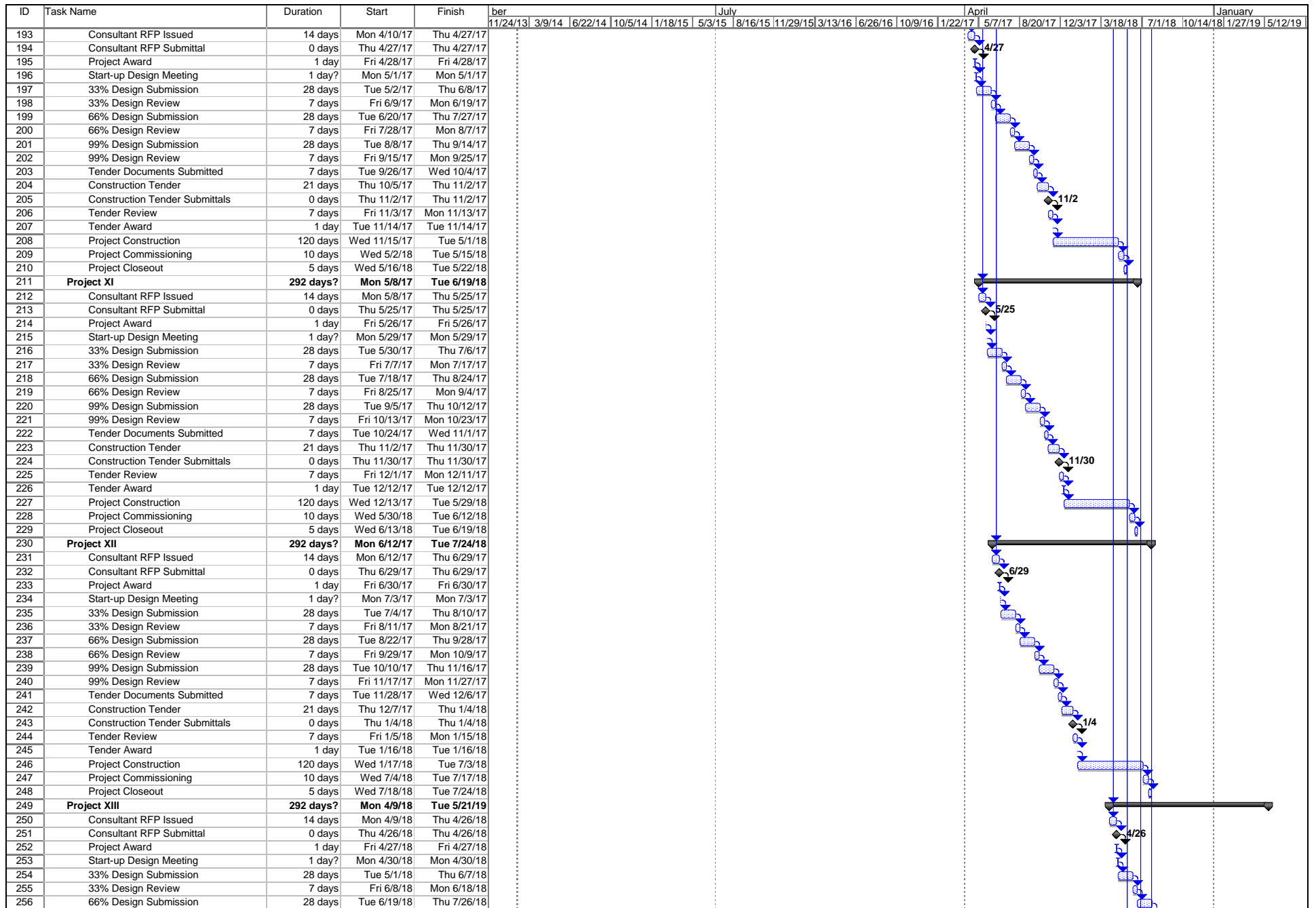


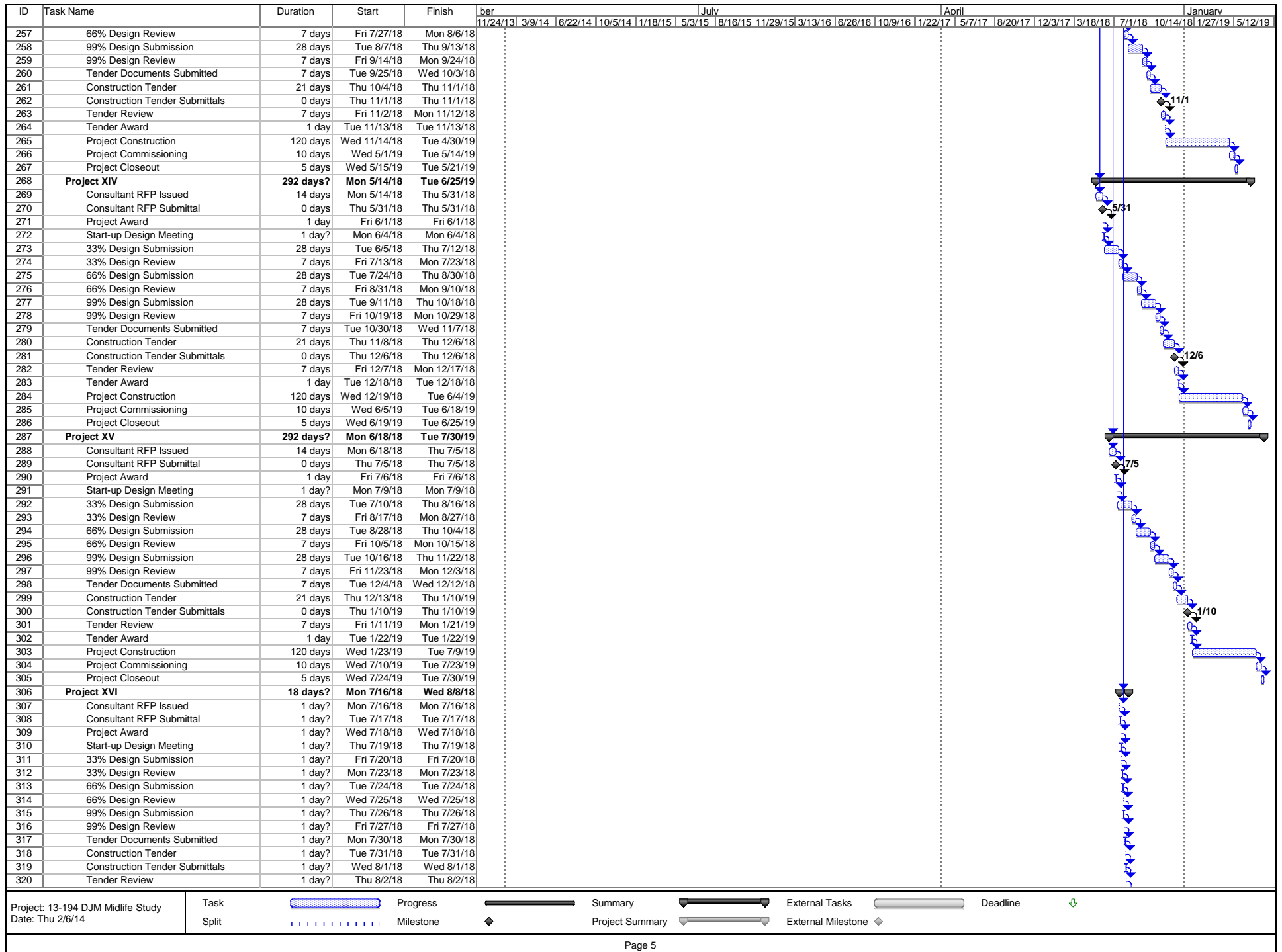






ID	Task Name	Duration	Start	Finish	ber	11/24/13	3/9/14	6/22/14	10/5/14	1/18/15	5/3/15	July	8/16/15	11/29/15	3/13/16	6/26/16	10/9/16	1/22/17	April	5/7/17	8/20/17	12/3/17	3/18/18	7/1/18	10/14/18	January	1/27/19	5/12/19
129	Construction Tender Submittals	0 days	Thu 12/31/15	Thu 12/31/15																								
130	Tender Review	7 days	Fri 1/1/16	Mon 1/11/16																								
131	Tender Award	1 day	Tue 1/12/16	Tue 1/12/16																								
132	Project Construction	120 days	Wed 1/13/16	Tue 6/28/16																								
133	Project Commissioning	10 days	Wed 6/29/16	Tue 7/12/16																								
134	Project Closeout	5 days	Wed 7/13/16	Tue 7/19/16																								
135	Project VII	292 days?	Mon 4/11/16	Tue 5/23/17																								
136	Consultant RFP Issued	14 days	Mon 4/11/16	Thu 4/28/16																								
137	Consultant RFP Submittal	0 days	Thu 4/28/16	Thu 4/28/16																								
138	Project Award	1 day	Fri 4/29/16	Fri 4/29/16																								
139	Start-up Design Meeting	1 day?	Mon 5/2/16	Mon 5/2/16																								
140	33% Design Submission	28 days	Tue 5/3/16	Thu 6/9/16																								
141	33% Design Review	7 days	Fri 6/10/16	Mon 6/20/16																								
142	66% Design Submission	28 days	Tue 6/21/16	Thu 7/28/16																								
143	66% Design Review	7 days	Fri 7/29/16	Mon 8/8/16																								
144	99% Design Submission	28 days	Tue 8/9/16	Thu 9/15/16																								
145	99% Design Review	7 days	Fri 9/16/16	Mon 9/26/16																								
146	Tender Documents Submitted	7 days	Tue 9/27/16	Wed 10/5/16																								
147	Construction Tender	21 days	Thu 10/6/16	Thu 11/3/16																								
148	Construction Tender Submittals	0 days	Thu 11/3/16	Thu 11/3/16																								
149	Tender Review	7 days	Fri 11/4/16	Mon 11/14/16																								
150	Tender Award	1 day	Tue 11/15/16	Tue 11/15/16																								
151	Project Construction	120 days	Wed 11/16/16	Tue 5/2/17																								
152	Project Commissioning	10 days	Wed 5/3/17	Tue 5/16/17																								
153	Project Closeout	5 days	Wed 5/17/17	Tue 5/23/17																								
154	Project VIII	292 days?	Mon 5/9/16	Tue 6/20/17																								
155	Consultant RFP Issued	14 days	Mon 5/9/16	Thu 5/26/16																								
156	Consultant RFP Submittal	0 days	Thu 5/26/16	Thu 5/26/16																								
157	Project Award	1 day	Fri 5/27/16	Fri 5/27/16																								
158	Start-up Design Meeting	1 day?	Mon 5/30/16	Mon 5/30/16																								
159	33% Design Submission	28 days	Tue 5/31/16	Thu 7/7/16																								
160	33% Design Review	7 days	Fri 7/8/16	Mon 7/18/16																								
161	66% Design Submission	28 days	Tue 7/19/16	Thu 8/25/16																								
162	66% Design Review	7 days	Fri 8/26/16	Mon 9/5/16																								
163	99% Design Submission	28 days	Tue 9/6/16	Thu 10/13/16																								
164	99% Design Review	7 days	Fri 10/14/16	Mon 10/24/16																								
165	Tender Documents Submitted	7 days	Tue 10/25/16	Wed 11/2/16																								
166	Construction Tender	21 days	Thu 11/3/16	Thu 12/1/16																								
167	Construction Tender Submittals	0 days	Thu 12/1/16	Thu 12/1/16																								
168	Tender Review	7 days	Fri 12/2/16	Mon 12/12/16																								
169	Tender Award	1 day	Tue 12/13/16	Tue 12/13/16																								
170	Project Construction	120 days	Wed 12/14/16	Tue 5/30/17																								
171	Project Commissioning	10 days	Wed 5/31/17	Tue 6/13/17																								
172	Project Closeout	5 days	Wed 6/14/17	Tue 6/20/17																								
173	Project IX	292 days?	Mon 6/13/16	Tue 7/25/17																								
174	Consultant RFP Issued	14 days	Mon 6/13/16	Thu 6/30/16																								
175	Consultant RFP Submittal	0 days	Thu 6/30/16	Thu 6/30/16																								
176	Project Award	1 day	Fri 7/1/16	Fri 7/1/16																								
177	Start-up Design Meeting	1 day?	Mon 7/4/16	Mon 7/4/16																								
178	33% Design Submission	28 days	Tue 7/5/16	Thu 8/11/16																								
179	33% Design Review	7 days	Fri 8/12/16	Mon 8/22/16																								
180	66% Design Submission	28 days	Tue 8/23/16	Thu 9/29/16																								
181	66% Design Review	7 days	Fri 9/30/16	Mon 10/10/16																								
182	99% Design Submission	28 days	Tue 10/11/16	Thu 11/17/16																								
183	99% Design Review	7 days	Fri 11/18/16	Mon 11/28/16																								
184	Tender Documents Submitted	7 days	Tue 11/29/16	Wed 12/7/16																								
185	Construction Tender	21 days	Thu 12/8/16	Thu 1/5/17																								
186	Construction Tender Submittals	0 days	Thu 1/5/17	Thu 1/5/17																								
187	Tender Review	7 days	Fri 1/6/17	Mon 1/16/17																								
188	Tender Award	1 day	Tue 1/17/17	Tue 1/17/17																								
189	Project Construction	120 days	Wed 1/18/17	Tue 7/4/17																								
190	Project Commissioning	10 days	Wed 7/5/17	Tue 7/18/17																								
191	Project Closeout	5 days	Wed 7/19/17	Tue 7/25/17																								
192	Project X	292 days?	Mon 4/10/17	Tue 5/22/18																								







HAP ANALYSIS



Annual Cost Summary

13-194 DJM Building Midlife Fit-up Study
MCA

02/06/2014
12:26PM

Table 1. Annual Costs

Component	DJM Offices Fan Coils with Dry Cooler (\$)	DJM Offices VAV (\$)
Air System Fans	40,940	67,141
Cooling	55,763	33,730
Heating	72,723	98,434
Pumps	34,823	22,595
Heat Rejection Fans	0	0
HVAC Sub-Total	204,249	221,900
Lights	91,510	92,165
Electric Equipment	134,514	135,476
Misc. Electric	0	0
Misc. Fuel Use	0	0
Non-HVAC Sub-Total	226,024	227,641
Grand Total	430,274	449,541

Table 2. Annual Cost per Unit Floor Area

Component	DJM Offices Fan Coils with Dry Cooler (\$/ft²)	DJM Offices VAV (\$/ft²)
Air System Fans	0.274	0.449
Cooling	0.373	0.226
Heating	0.486	0.658
Pumps	0.233	0.151
Heat Rejection Fans	0.000	0.000
HVAC Sub-Total	1.366	1.484
Lights	0.612	0.617
Electric Equipment	0.900	0.906
Misc. Electric	0.000	0.000
Misc. Fuel Use	0.000	0.000
Non-HVAC Sub-Total	1.512	1.523
Grand Total	2.878	3.007
Gross Floor Area (ft²)	149500.0	149500.0
Conditioned Floor Area (ft²)	149500.0	149500.0

Note: Values in this table are calculated using the Gross Floor Area.

Annual Cost Summary

13-194 DJM Building Midlife Fit-up Study
MCA

02/06/2014
12:26PM

Table 3. Component Cost as a Percentage of Total Cost

Component	DJM Offices Fan Coils with Dry Cooler (%)	DJM Offices VAV (%)
Air System Fans	9.5	14.9
Cooling	13.0	7.5
Heating	16.9	21.9
Pumps	8.1	5.0
Heat Rejection Fans	0.0	0.0
HVAC Sub-Total	47.5	49.4
Lights	21.3	20.5
Electric Equipment	31.3	30.1
Misc. Electric	0.0	0.0
Misc. Fuel Use	0.0	0.0
Non-HVAC Sub-Total	52.5	50.6
Grand Total	100.0	100.0

Plant Sizing Summary for Boiler Plant Fan Coils

13-194 DJM Building Midlife Fit-up Study
MCA

02/06/2014
10:00AM

1. Plant Information:

Plant Name **Boiler Plant Fan Coils**
Plant Type **Hot Water Plant**
Design Weather **Charlottetown, Prince Edward Island**

2. Heating Plant Sizing Data:

Maximum Plant Load **2037.3** MBH
BTU/(hr-ft²) **13.6** BTU/(hr-ft²)
Floor area served by plant **149500.0** ft²

3. Coincident Heating Loads for Winter Design

		System Heating Coil Load (MBH)
Air System Name	Mult.	
Fan Coils	1	2037.3

Air system loads are for coils whose heating source is ' Hot Water ' .

Plant Sizing Summary for Boiler Plant VAV

13-194 DJM Building Midlife Fit-up Study
MCA

02/06/2014
10:00AM

1. Plant Information:

Plant Name **Boiler Plant VAV**
Plant Type **Hot Water Plant**
Design Weather **Charlottetown, Prince Edward Island**

2. Heating Plant Sizing Data:

Maximum Plant Load **2162.0** MBH
BTU/(hr-ft²) **14.5** BTU/(hr-ft²)
Floor area served by plant **149500.0** ft²

3. Coincident Heating Loads for Winter Design

Air System Name	Mult.	System Heating Coil Load (MBH)
VAV	1	2162.0

Air system loads are for coils whose heating source is ' Hot Water ' .

Plant Sizing Summary for Chiller Plant Fan Coils

13-194 DJM Building Midlife Fit-up Study
MCA

02/06/2014
10:00AM

1. Plant Information:

Plant Name Chiller Plant Fan Coils
Plant Type Chiller Plant
Design Weather Charlottetown, Prince Edward Island

2. Cooling Plant Sizing Data:

Maximum Plant Load 282.7 Tons
Load occurs at Jul 1700
ft²/Ton 528.9 ft²/Ton
Floor area served by plant 149500.0 ft²

3. Coincident Cooling Loads for Jul 1700

Air System Name	Mult.	System Cooling Coil Load (Tons)
Fan Coils	1	282.7

Air system loads are for coils whose cooling source is ' Chilled Water ' .

Plant Sizing Summary for Chiller Plant VAV

13-194 DJM Building Midlife Fit-up Study
MCA

02/06/2014
10:00AM

1. Plant Information:

Plant Name Chiller Plant VAV
Plant Type Chiller Plant
Design Weather Charlottetown, Prince Edward Island

2. Cooling Plant Sizing Data:

Maximum Plant Load 330.9 Tons
Load occurs at Aug 1600
ft²/Ton 451.8 ft²/Ton
Floor area served by plant 149500.0 ft²

3. Coincident Cooling Loads for Aug 1600

Air System Name	Mult.	System Cooling Coil Load (Tons)
VAV	1	330.9

Air system loads are for coils whose cooling source is ' Chilled Water ' .

Air System Sizing Summary for Fan Coils

Project Name: 13-194 DJM Building Midlife Fit-up Study
Prepared by: MCA

02/06/2014
10:02AM

Air System Information

Air System Name **Fan Coils**
Equipment Class **TERM**
Air System Type **4P-FC**

Number of zones **27**
Floor Area **149500.0** ft²
Location **Charlottetown, Prince Edward Island**

Sizing Calculation Information

Calculation Months **Jan to Dec**
Sizing Data **Calculated**

Zone CFM Sizing **Sum of space airflow rates**
Space CFM Sizing **Individual peak space loads**

Cooling Coil Sizing Data

Total coil load **46.7** Tons
Total coil load **560.6** MBH
Sensible coil load **334.2** MBH
Coil CFM at Jul 1500 **13473** CFM
Max coil CFM **13473** CFM
Sensible heat ratio **0.596**
Water flow @ 10.0 °F rise **112.18** gpm

Load occurs at **Jul 1500**
OA DB / WB **79.0 / 69.0** °F
Entering DB / WB **78.7 / 68.9** °F
Leaving DB / WB **55.6 / 55.5** °F
Bypass Factor **0.100**

Heating Coil Sizing Data

Max coil load **415.2** MBH
Coil CFM at Des Htg **13473** CFM
Max coil CFM **13473** CFM
Water flow @ 20.0 °F drop **41.54** gpm

Load occurs at **Des Htg**
Ent. DB / Lvg DB **32.8 / 61.5** °F

Humidifier Sizing Data

Max steam flow at Des Htg **219.91** lb/hr
Airflow Rate **13473** CFM

Air mass flow **60241.77** lb/hr
Moisture gain **.00365** lb/lb

Ventilation Fan Sizing Data

Actual max CFM **13473** CFM
Standard CFM **13387** CFM
Actual max CFM/ft² **0.09** CFM/ft²

Fan motor BHP **18.45** BHP
Fan motor kW **14.64** kW
Fan static **5.00** in wg

Exhaust Fan Sizing Data

Actual max CFM **13473** CFM
Standard CFM **13387** CFM
Actual max CFM/ft² **0.09** CFM/ft²

Fan motor BHP **11.07** BHP
Fan motor kW **8.78** kW
Fan static **3.00** in wg

Outdoor Ventilation Air Data

Design airflow CFM **13473** CFM
CFM/ft² **0.09** CFM/ft²

CFM/person **14.96** CFM/person

Zone Sizing Summary for Fan Coils

Project Name: 13-194 DJM Building Midlife Fit-up Study
Prepared by: MCA

02/06/2014
10:02AM

Air System Information

Air System Name **Fan Coils**
Equipment Class **TERM**
Air System Type **4P-FC**

Number of zones **27**
Floor Area **149500.0** ft²
Location **Charlottetown, Prince Edward Island**

Sizing Calculation Information

Calculation Months **Jan to Dec**
Sizing Data **Calculated**

Zone CFM Sizing **Sum of space airflow rates**
Space CFM Sizing **Individual peak space loads**

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (MBH)	Design Airflow (CFM)	Minimum Airflow (CFM)	Time of Peak Load	Maximum Heating Load (MBH)	Zone Floor Area (ft ²)	Zone CFM/ft ²
Zone 1	8.9	490	490	Jul 1700	13.1	225.0	2.18
Zone 2	57.5	3319	3319	Jul 1800	89.0	3000.0	1.11
Zone 3	7.5	490	490	Jul 1400	13.1	225.0	2.18
Zone 4	43.3	2373	2373	Jul 1000	44.5	1500.0	1.58
Zone 5	9.9	543	543	Aug 1400	13.1	225.0	2.42
Zone 6	99.7	5463	5463	Sep 1400	89.0	3000.0	1.82
Zone 7	10.7	584	584	Aug 1600	13.1	225.0	2.60
Zone 8	49.8	2732	2732	Jul 1700	44.5	1500.0	1.82
Zone 9	273.0	15000	15000	Feb 2100	0.0	20000.0	0.75
Zone 10	9.4	527	527	Jul 1700	14.1	225.0	2.34
Zone 11	65.3	3937	3937	Jul 1800	105.6	3000.0	1.31
Zone 12	7.9	527	527	Jul 1500	14.1	225.0	2.34
Zone 13	44.6	2447	2447	Jul 1000	52.8	1500.0	1.63
Zone 14	10.3	562	562	Aug 1400	14.1	225.0	2.50
Zone 15	100.8	5525	5525	Sep 1400	105.6	3000.0	1.84
Zone 16	11.1	609	609	Aug 1600	14.1	225.0	2.70
Zone 17	53.6	2940	2940	Jul 1700	52.8	1500.0	1.96
Zone 18	323.3	17720	17720	Jul 1900	166.0	20000.0	0.89
Zone 19	26.6	1456	1456	Jul 1700	36.8	675.0	2.16
Zone 20	172.4	9453	9453	Jul 1800	242.2	9000.0	1.05
Zone 21	22.4	1373	1373	Jul 1400	36.8	675.0	2.03
Zone 22	129.9	7120	7120	Jul 1000	121.1	4500.0	1.58
Zone 23	29.7	1630	1630	Aug 1400	36.8	675.0	2.42
Zone 24	299.0	16388	16388	Sep 1400	242.2	9000.0	1.82
Zone 25	32.0	1753	1753	Aug 1600	36.8	675.0	2.60
Zone 26	149.5	8196	8196	Jul 1700	121.1	4500.0	1.82
Zone 27	818.9	45000	45000	Feb 2100	0.0	60000.0	0.75

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Load
Zone 1	8.9	8.7	76.9 / 65.1	60.3 / 59.2	1.78	Jun 1800
Zone 2	58.4	55.9	76.2 / 65.2	60.6 / 59.5	11.68	Jul 1700
Zone 3	7.8	7.6	76.5 / 66.0	62.0 / 61.0	1.55	Jul 1500
Zone 4	45.1	43.4	76.6 / 64.7	59.6 / 58.4	9.02	Jul 1000
Zone 5	10.1	9.8	77.3 / 65.2	60.4 / 59.2	2.01	Aug 1400
Zone 6	100.8	97.8	77.1 / 65.2	60.4 / 59.3	20.16	Sep 1400
Zone 7	10.7	10.5	77.3 / 65.3	60.5 / 59.4	2.15	Aug 1600
Zone 8	50.1	48.8	77.1 / 65.3	60.5 / 59.4	10.03	Jul 1700
Zone 9	295.5	274.0	75.9 / 64.3	58.9 / 57.8	59.14	Sep 2000
Zone 10	9.7	9.5	76.9 / 65.0	60.1 / 59.0	1.94	Jul 1700
Zone 11	66.1	64.0	76.4 / 65.5	61.2 / 60.2	13.22	Jun 1800

Zone Sizing Summary for Fan Coils

Project Name: 13-194 DJM Building Midlife Fit-up Study
Prepared by: MCA

02/06/2014
10:02AM

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Load
Zone 12	8.3	8.2	76.5 / 66.0	62.0 / 61.0	1.66	Jul 1400
Zone 13	46.5	44.9	76.7 / 64.7	59.6 / 58.5	9.31	Jul 1400
Zone 14	10.4	10.1	77.3 / 65.3	60.5 / 59.3	2.07	Aug 1400
Zone 15	104.0	100.8	76.8 / 64.8	59.8 / 58.7	20.82	Sep 1400
Zone 16	11.3	11.1	77.3 / 65.2	60.3 / 59.2	2.26	Aug 1600
Zone 17	54.6	53.0	77.1 / 65.2	60.3 / 59.2	10.92	Jul 1700
Zone 18	342.9	321.8	76.2 / 64.5	59.2 / 58.1	68.62	Jul 1900
Zone 19	26.7	26.1	77.1 / 65.2	60.4 / 59.3	5.35	Jul 1700
Zone 20	176.6	167.7	76.2 / 64.7	59.7 / 58.6	35.34	Jul 1700
Zone 21	23.3	22.8	76.5 / 65.4	61.1 / 60.0	4.67	Jul 1500
Zone 22	136.6	131.3	76.5 / 64.5	59.3 / 58.2	27.33	Jul 1000
Zone 23	30.1	29.4	77.2 / 65.3	60.4 / 59.3	6.01	Aug 1400
Zone 24	304.9	295.8	77.0 / 65.1	60.2 / 59.0	61.01	Sep 1400
Zone 25	32.2	31.5	76.8 / 64.9	60.0 / 58.9	6.45	Jul 1700
Zone 26	152.0	147.4	77.0 / 65.1	60.3 / 59.1	30.41	Jul 1700
Zone 27	873.2	810.8	75.9 / 64.4	59.1 / 58.0	174.74	Oct 1700

Terminal Unit Sizing Data - Heating, Fan, Ventilation

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @20.0 °F (gpm)	Fan Design Airflow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design Airflow (CFM)
Zone 1	12.6	69.9 / 93.9	1.26	490	0.217	0.172	20
Zone 2	84.3	69.3 / 92.9	8.43	3319	1.472	1.168	270
Zone 3	12.6	69.9 / 93.9	1.26	490	0.217	0.172	20
Zone 4	41.5	69.9 / 86.2	4.15	2373	1.053	0.835	135
Zone 5	12.2	69.5 / 90.4	1.22	543	0.241	0.191	20
Zone 6	81.5	69.9 / 83.8	8.16	5463	2.424	1.923	270
Zone 7	12.2	69.7 / 89.1	1.22	584	0.259	0.206	20
Zone 8	42.1	70.3 / 84.6	4.21	2732	1.212	0.962	135
Zone 9	0.0	0.0 / 0.0	0.00	15000	6.655	5.279	1802
Zone 10	13.1	69.3 / 92.5	1.31	527	0.234	0.186	20
Zone 11	99.4	69.2 / 92.7	9.95	3937	1.747	1.386	270
Zone 12	13.1	69.3 / 92.5	1.31	527	0.234	0.186	20
Zone 13	49.6	69.7 / 88.6	4.96	2447	1.086	0.861	135
Zone 14	13.5	69.9 / 92.3	1.35	562	0.249	0.198	20
Zone 15	98.7	69.9 / 86.6	9.88	5525	2.451	1.944	270
Zone 16	13.2	69.8 / 90.1	1.33	609	0.270	0.214	20
Zone 17	49.7	70.1 / 85.9	4.97	2940	1.305	1.035	135
Zone 18	153.5	70.3 / 78.4	15.36	17720	7.862	6.237	1802
Zone 19	34.7	69.7 / 91.9	3.47	1456	0.646	0.512	61
Zone 20	224.8	69.3 / 91.4	22.49	9453	4.194	3.327	811
Zone 21	34.9	69.8 / 93.5	3.49	1373	0.609	0.483	61
Zone 22	113.4	70.0 / 84.8	11.35	7120	3.159	2.506	406
Zone 23	34.1	69.6 / 89.0	3.41	1630	0.723	0.574	61
Zone 24	230.7	70.4 / 83.6	23.08	16388	7.271	5.768	811
Zone 25	34.6	70.0 / 88.4	3.47	1753	0.778	0.617	61
Zone 26	112.0	70.1 / 82.9	11.20	8196	3.636	2.885	406
Zone 27	0.0	0.0 / 0.0	0.00	45000	19.965	15.838	5407

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/ft²
------------------------	-------	------------------------	--------------	----------------	--------------------	------------------	---------------

Zone Sizing Summary for Fan Coils

Project Name: 13-194 DJM Building Midlife Fit-up Study
Prepared by: MCA

02/06/2014
10:02AM

Zone 1							
BLD1-F001-Z01	1	8.9	Jul 1700	490	13.1	225.0	2.18
Zone 2							
BLD1-F001-Z02	1	57.5	Jul 1800	3319	89.0	3000.0	1.11
Zone 3							
BLD1-F001-Z03	1	7.5	Jul 1400	490	13.1	225.0	2.18
Zone 4							
BLD1-F001-Z04	1	43.3	Jul 1000	2373	44.5	1500.0	1.58
Zone 5							
BLD1-F001-Z05	1	9.9	Aug 1400	543	13.1	225.0	2.42
Zone 6							
BLD1-F001-Z06	1	99.7	Sep 1400	5463	89.0	3000.0	1.82
Zone 7							
BLD1-F001-Z07	1	10.7	Aug 1600	584	13.1	225.0	2.60
Zone 8							
BLD1-F001-Z08	1	49.8	Jul 1700	2732	44.5	1500.0	1.82
Zone 9							
BLD1-F001-Z09	1	273.0	Feb 2100	15000	0.0	20000.0	0.75
Zone 10							
BLD1-F005-Z01	1	9.4	Jul 1700	527	14.1	225.0	2.34
Zone 11							
BLD1-F005-Z02	1	65.3	Jul 1800	3937	105.6	3000.0	1.31
Zone 12							
BLD1-F005-Z03	1	7.9	Jul 1500	527	14.1	225.0	2.34
Zone 13							
BLD1-F005-Z04	1	44.6	Jul 1000	2447	52.8	1500.0	1.63
Zone 14							
BLD1-F005-Z05	1	10.3	Aug 1400	562	14.1	225.0	2.50
Zone 15							
BLD1-F005-Z06	1	100.8	Sep 1400	5525	105.6	3000.0	1.84
Zone 16							
BLD1-F005-Z07	1	11.1	Aug 1600	609	14.1	225.0	2.70
Zone 17							
BLD1-F005-Z08	1	53.6	Jul 1700	2940	52.8	1500.0	1.96
Zone 18							
BLD1-F005-Z09	1	323.3	Jul 1900	17720	166.0	20000.0	0.89
Zone 19							
BLD1-FTYP-Z01	3	8.9	Jul 1700	485	12.3	225.0	2.16
Zone 20							
BLD1-FTYP-Z02	3	57.5	Jul 1800	3151	80.7	3000.0	1.05
Zone 21							
BLD1-FTYP-Z03	3	7.5	Jul 1400	458	12.3	225.0	2.03
Zone 22							
BLD1-FTYP-Z04	3	43.3	Jul 1000	2373	40.4	1500.0	1.58
Zone 23							
BLD1-FTYP-Z05	3	9.9	Aug 1400	543	12.3	225.0	2.42
Zone 24							
BLD1-FTYP-Z06	3	99.7	Sep 1400	5463	80.7	3000.0	1.82
Zone 25							
BLD1-FTYP-Z07	3	10.7	Aug 1600	584	12.3	225.0	2.60
Zone 26							
BLD1-FTYP-Z08	3	49.8	Jul 1700	2732	40.4	1500.0	1.82
Zone 27							
BLD1-FTYP-Z09	3	273.0	Feb 2100	15000	0.0	20000.0	0.75

Ventilation Sizing Summary for Fan Coils

Project Name: 13-194 DJM Building Midlife Fit-up Study
Prepared by: MCA

02/06/2014
10:02AM

1. Summary

Ventilation Sizing Method **Sum of Space OA Airflows**
Design Ventilation Airflow Rate **13473** CFM

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 1									
BLD1-F001-Z01	1	225.0	1.4	490.0	5.00	0.06	0.0	0.0	20.3
Zone 2									
BLD1-F001-Z02	1	3000.0	18.1	3318.8	5.00	0.06	0.0	0.0	270.4
Zone 3									
BLD1-F001-Z03	1	225.0	1.4	490.0	5.00	0.06	0.0	0.0	20.3
Zone 4									
BLD1-F001-Z04	1	1500.0	9.0	2373.2	5.00	0.06	0.0	0.0	135.2
Zone 5									
BLD1-F001-Z05	1	225.0	1.4	543.4	5.00	0.06	0.0	0.0	20.3
Zone 6									
BLD1-F001-Z06	1	3000.0	18.1	5462.8	5.00	0.06	0.0	0.0	270.4
Zone 7									
BLD1-F001-Z07	1	225.0	1.4	584.4	5.00	0.06	0.0	0.0	20.3
Zone 8									
BLD1-F001-Z08	1	1500.0	9.0	2732.0	5.00	0.06	0.0	0.0	135.2
Zone 9									
BLD1-F001-Z09	1	20000.0	120.5	15000.0	5.00	0.06	0.0	0.0	1802.4
Zone 10									
BLD1-F005-Z01	1	225.0	1.4	527.1	5.00	0.06	0.0	0.0	20.3
Zone 11									
BLD1-F005-Z02	1	3000.0	18.1	3937.0	5.00	0.06	0.0	0.0	270.4
Zone 12									
BLD1-F005-Z03	1	225.0	1.4	527.1	5.00	0.06	0.0	0.0	20.3
Zone 13									
BLD1-F005-Z04	1	1500.0	9.0	2447.3	5.00	0.06	0.0	0.0	135.2
Zone 14									
BLD1-F005-Z05	1	225.0	1.4	562.2	5.00	0.06	0.0	0.0	20.3
Zone 15									
BLD1-F005-Z06	1	3000.0	18.1	5524.5	5.00	0.06	0.0	0.0	270.4
Zone 16									
BLD1-F005-Z07	1	225.0	1.4	608.6	5.00	0.06	0.0	0.0	20.3
Zone 17									
BLD1-F005-Z08	1	1500.0	9.0	2940.4	5.00	0.06	0.0	0.0	135.2
Zone 18									
BLD1-F005-Z09	1	20000.0	120.5	17719.7	5.00	0.06	0.0	0.0	1802.4
Zone 19									

Ventilation Sizing Summary for Fan Coils

Project Name: 13-194 DJM Building Midlife Fit-up Study
Prepared by: MCA

02/06/2014
10:02AM

BLD1-FTYP-Z01	3	225.0	1.4	485.2	5.00	0.06	0.0	0.0	20.3
Zone 20									
BLD1-FTYP-Z02	3	3000.0	18.1	3150.9	5.00	0.06	0.0	0.0	270.4
Zone 21									
BLD1-FTYP-Z03	3	225.0	1.4	457.5	5.00	0.06	0.0	0.0	20.3
Zone 22									
BLD1-FTYP-Z04	3	1500.0	9.0	2373.2	5.00	0.06	0.0	0.0	135.2
Zone 23									
BLD1-FTYP-Z05	3	225.0	1.4	543.4	5.00	0.06	0.0	0.0	20.3
Zone 24									
BLD1-FTYP-Z06	3	3000.0	18.1	5462.8	5.00	0.06	0.0	0.0	270.4
Zone 25									
BLD1-FTYP-Z07	3	225.0	1.4	584.4	5.00	0.06	0.0	0.0	20.3
Zone 26									
BLD1-FTYP-Z08	3	1500.0	9.0	2732.0	5.00	0.06	0.0	0.0	135.2
Zone 27									
BLD1-FTYP-Z09	3	20000.0	120.5	15000.0	5.00	0.06	0.0	0.0	1802.4
Totals (incl. Space Multipliers)				158157.5					13473.0

Air System Sizing Summary for VAV

Project Name: 13-194 DJM Building Midlife Fit-up Study
Prepared by: MCA

02/06/2014
10:02AM

Air System Information

Air System Name VAV
Equipment Class CW AHU
Air System Type VAV

Number of zones 27
Floor Area 149500.0 ft²
Location Charlottetown, Prince Edward Island

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone CFM Sizing Peak zone sensible load
Space CFM Sizing Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load 330.9 Tons
Total coil load 3971.1 MBH
Sensible coil load 3331.6 MBH
Coil CFM at Aug 1600 117805 CFM
Max block CFM at Aug 1600 130104 CFM
Sum of peak zone CFM 138568 CFM
Sensible heat ratio 0.839
ft²/Ton 451.8
BTU/(hr-ft²) 26.6
Water flow @ 10.0 °F rise 794.64 gpm

Load occurs at Aug 1600
OA DB / WB 78.5 / 68.8 °F
Entering DB / WB 77.9 / 62.4 °F
Leaving DB / WB 51.5 / 50.1 °F
Coil ADP 48.6 °F
Bypass Factor 0.100
Resulting RH 43 %
Design supply temp. 55.0 °F
Zone T-stat Check 27 of 27 OK
Max zone temperature deviation 0.0 °F

Central Heating Coil Sizing Data

No central heating coil loads occurred during this calculation.

Preheat Coil Sizing Data

Max coil load 65.8 MBH
Coil CFM at Des Htg 27714 CFM
Max coil CFM 130104 CFM
Water flow @ 20.0 °F drop 6.58 gpm

Load occurs at Des Htg
Ent. DB / Lvg DB 47.8 / 50.0 °F

Humidifier Sizing Data

Max steam flow at Jan 0500 384.56 lb/hr
Airflow Rate 61822 CFM

Air mass flow 276423.20 lb/hr
Moisture gain00139 lb/lb

Supply Fan Sizing Data

Actual max CFM at Aug 1600 130104 CFM
Standard CFM 129274 CFM
Actual max CFM/ft² 0.87 CFM/ft²

Fan motor BHP 178.16 BHP
Fan motor kW 141.33 kW
Fan static 5.00 in wg

Return Fan Sizing Data

Actual max CFM at Aug 1600 130104 CFM
Standard CFM 129274 CFM
Actual max CFM/ft² 0.87 CFM/ft²

Fan motor BHP 106.89 BHP
Fan motor kW 84.80 kW
Fan static 3.00 in wg

Outdoor Ventilation Air Data

Design airflow CFM 17156 CFM
CFM/ft² 0.11 CFM/ft²

CFM/person 19.05 CFM/person

Zone Sizing Summary for VAV

Project Name: 13-194 DJM Building Midlife Fit-up Study
Prepared by: MCA

02/06/2014
10:02AM

Air System Information

Air System Name VAV
Equipment Class CW AHU
Air System Type VAV

Number of zones 27
Floor Area 149500.0 ft²
Location Charlottetown, Prince Edward Island

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data Calculated

Zone CFM Sizing Peak zone sensible load
Space CFM Sizing Individual peak space loads

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (MBH)	Design Airflow (CFM)	Minimum Airflow (CFM)	Time of Peak Load	Maximum Heating Load (MBH)	Zone Floor Area (ft ²)	Zone CFM/ft ²
Zone 1	8.9	461	92	Jul 1700	13.1	225.0	2.05
Zone 2	55.9	2896	579	Jul 1800	89.0	3000.0	0.97
Zone 3	7.5	389	78	Jul 1400	13.1	225.0	1.73
Zone 4	42.5	2201	440	Jul 1000	44.5	1500.0	1.47
Zone 5	10.0	516	103	Aug 1400	13.1	225.0	2.29
Zone 6	98.1	5080	1016	Sep 1400	89.0	3000.0	1.69
Zone 7	10.7	555	111	Aug 1600	13.1	225.0	2.46
Zone 8	49.1	2540	508	Jul 1700	44.5	1500.0	1.69
Zone 9	248.4	12859	2572	Feb 2100	0.0	20000.0	0.64
Zone 10	9.1	470	94	Jul 1700	14.1	225.0	2.09
Zone 11	58.5	3027	605	Jul 1800	105.6	3000.0	1.01
Zone 12	7.6	396	79	Jul 1400	14.1	225.0	1.76
Zone 13	43.0	2228	446	Jul 1000	52.8	1500.0	1.49
Zone 14	10.1	522	104	Aug 1400	14.1	225.0	2.32
Zone 15	98.6	5107	1021	Sep 1400	105.6	3000.0	1.70
Zone 16	10.9	562	112	Aug 1600	14.1	225.0	2.50
Zone 17	50.3	2604	521	Jul 1700	52.8	1500.0	1.74
Zone 18	264.0	13665	2733	Jul 1900	166.0	20000.0	0.68
Zone 19	26.7	1383	277	Jul 1700	36.8	675.0	2.05
Zone 20	167.8	8688	1738	Jul 1800	242.2	9000.0	0.97
Zone 21	22.5	1166	233	Jul 1400	36.8	675.0	1.73
Zone 22	127.6	6604	1321	Jul 1000	121.1	4500.0	1.47
Zone 23	29.9	1547	309	Aug 1400	36.8	675.0	2.29
Zone 24	294.3	15239	3048	Sep 1400	242.2	9000.0	1.69
Zone 25	32.1	1664	333	Aug 1600	36.8	675.0	2.46
Zone 26	147.2	7621	1524	Jul 1700	121.1	4500.0	1.69
Zone 27	745.2	38578	7716	Feb 2100	0.0	60000.0	0.64

Zone Terminal Sizing Data

Zone Name	Reheat Coil Load (MBH)	Reheat Coil Water gpm @ 20.0 °F	Zone Htg Coil Load (MBH)	Zone Htg Water gpm @ 20.0 °F	Mixing Box Fan Airflow (CFM)
Zone 1	0.0	0.00	14.6	1.46	0
Zone 2	0.0	0.00	98.4	9.84	0
Zone 3	0.0	0.00	14.4	1.44	0
Zone 4	0.0	0.00	51.6	5.16	0
Zone 5	0.0	0.00	14.8	1.48	0
Zone 6	0.0	0.00	105.4	10.54	0
Zone 7	0.0	0.00	14.9	1.49	0
Zone 8	0.0	0.00	52.7	5.27	0
Zone 9	0.0	0.00	41.4	4.14	0
Zone 10	0.0	0.00	15.7	1.57	0

Zone Sizing Summary for VAV

Project Name: 13-194 DJM Building Midlife Fit-up Study
Prepared by: MCA

02/06/2014
10:02AM

Zone Name	Reheat Coil Load (MBH)	Reheat Coil Water gpm @ 20.0 °F	Zone Htg Coil Load (MBH)	Zone Htg Water gpm @ 20.0 °F	Mixing Box Fan Airflow (CFM)
Zone 11	0.0	0.00	115.4	11.54	0
Zone 12	0.0	0.00	15.4	1.54	0
Zone 13	0.0	0.00	60.0	6.00	0
Zone 14	0.0	0.00	15.8	1.58	0
Zone 15	0.0	0.00	122.1	12.21	0
Zone 16	0.0	0.00	16.0	1.60	0
Zone 17	0.0	0.00	61.2	6.12	0
Zone 18	0.0	0.00	210.0	21.01	0
Zone 19	0.0	0.00	41.3	4.13	0
Zone 20	0.0	0.00	270.1	27.03	0
Zone 21	0.0	0.00	40.6	4.06	0
Zone 22	0.0	0.00	142.3	14.24	0
Zone 23	0.0	0.00	41.8	4.18	0
Zone 24	0.0	0.00	291.2	29.14	0
Zone 25	0.0	0.00	42.2	4.22	0
Zone 26	0.0	0.00	145.6	14.57	0
Zone 27	0.0	0.00	124.2	12.43	0

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/ft²
Zone 1							
BLD1-F001-Z01	1	8.9	Jul 1700	461	13.1	225.0	2.05
Zone 2							
BLD1-F001-Z02	1	55.9	Jul 1800	2896	89.0	3000.0	0.97
Zone 3							
BLD1-F001-Z03	1	7.5	Jul 1400	389	13.1	225.0	1.73
Zone 4							
BLD1-F001-Z04	1	42.5	Jul 1000	2201	44.5	1500.0	1.47
Zone 5							
BLD1-F001-Z05	1	10.0	Aug 1400	516	13.1	225.0	2.29
Zone 6							
BLD1-F001-Z06	1	98.1	Sep 1400	5080	89.0	3000.0	1.69
Zone 7							
BLD1-F001-Z07	1	10.7	Aug 1600	555	13.1	225.0	2.46
Zone 8							
BLD1-F001-Z08	1	49.1	Jul 1700	2540	44.5	1500.0	1.69
Zone 9							
BLD1-F001-Z09	1	248.4	Feb 2100	12859	0.0	20000.0	0.64
Zone 10							
BLD1-F005-Z01	1	9.1	Jul 1700	470	14.1	225.0	2.09
Zone 11							
BLD1-F005-Z02	1	58.5	Jul 1800	3027	105.6	3000.0	1.01
Zone 12							
BLD1-F005-Z03	1	7.6	Jul 1400	396	14.1	225.0	1.76
Zone 13							
BLD1-F005-Z04	1	43.0	Jul 1000	2228	52.8	1500.0	1.49
Zone 14							
BLD1-F005-Z05	1	10.1	Aug 1400	522	14.1	225.0	2.32
Zone 15							
BLD1-F005-Z06	1	98.6	Sep 1400	5107	105.6	3000.0	1.70
Zone 16							
BLD1-F005-Z07	1	10.9	Aug 1600	562	14.1	225.0	2.50
Zone 17							

Zone Sizing Summary for VAV

Project Name: 13-194 DJM Building Midlife Fit-up Study
Prepared by: MCA

02/06/2014
10:02AM

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/ft²
BLD1-F005-Z08	1	50.3	Jul 1700	2604	52.8	1500.0	1.74
Zone 18							
BLD1-F005-Z09	1	264.0	Jul 1900	13665	166.0	20000.0	0.68
Zone 19							
BLD1-FTYP-Z01	3	8.9	Jul 1700	461	12.3	225.0	2.05
Zone 20							
BLD1-FTYP-Z02	3	55.9	Jul 1800	2896	80.7	3000.0	0.97
Zone 21							
BLD1-FTYP-Z03	3	7.5	Jul 1400	389	12.3	225.0	1.73
Zone 22							
BLD1-FTYP-Z04	3	42.5	Jul 1000	2201	40.4	1500.0	1.47
Zone 23							
BLD1-FTYP-Z05	3	10.0	Aug 1400	516	12.3	225.0	2.29
Zone 24							
BLD1-FTYP-Z06	3	98.1	Sep 1400	5080	80.7	3000.0	1.69
Zone 25							
BLD1-FTYP-Z07	3	10.7	Aug 1600	555	12.3	225.0	2.46
Zone 26							
BLD1-FTYP-Z08	3	49.1	Jul 1700	2540	40.4	1500.0	1.69
Zone 27							
BLD1-FTYP-Z09	3	248.4	Feb 2100	12859	0.0	20000.0	0.64

Ventilation Sizing Summary for VAV

Project Name: 13-194 DJM Building Midlife Fit-up Study
Prepared by: MCA

02/06/2014
10:02AM

1. Summary

Ventilation Sizing Method **ASHRAE Std 62.1-2010**
Design Condition **Minimum flow (cooling)**
Occupant Diversity **1.000**
Uncorrected Ventilation Airflow Rate **13473** CFM
System Ventilation Efficiency **0.785**
Design Ventilation Airflow Rate **17156** CFM

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Minimum Supply Air (CFM)	Floor Area (ft²)	Required Outdoor Air (CFM/ft²)	Time Averaged Occupancy	Required Outdoor Air (CFM/person)	Air Distribution Effectiveness	Required Outdoor Air (CFM)	Uncorrected Outdoor Air (CFM)	Space Ventilation Efficiency
Zone 1										
BLD1-F001-Z01	1	92	225.0	0.06	1.4	5.00	1.00	20	<i>20</i>	1.266
Zone 2										
BLD1-F001-Z02	1	579	3000.0	0.06	18.1	5.00	1.00	270	<i>270</i>	1.019
Zone 3										
BLD1-F001-Z03	1	78	225.0	0.06	1.4	5.00	1.00	20	<i>20</i>	1.225
Zone 4										
BLD1-F001-Z04	1	440	1500.0	0.06	9.0	5.00	1.00	135	<i>135</i>	1.179
Zone 5										
BLD1-F001-Z05	1	103	225.0	0.06	1.4	5.00	1.00	20	<i>20</i>	1.290
Zone 6										
BLD1-F001-Z06	1	1016	3000.0	0.06	18.1	5.00	1.00	270	<i>270</i>	1.220
Zone 7										
BLD1-F001-Z07	1	111	225.0	0.06	1.4	5.00	1.00	20	<i>20</i>	1.303
Zone 8										
BLD1-F001-Z08	1	508	1500.0	0.06	9.0	5.00	1.00	135	<i>135</i>	1.220
Zone 9										
BLD1-F001-Z09	1	2572	20000.0	0.06	120.5	5.00	1.00	1802	<i>1802</i>	0.785
Zone 10										
BLD1-F005-Z01	1	94	225.0	0.06	1.4	5.00	1.00	20	<i>20</i>	1.271
Zone 11										
BLD1-F005-Z02	1	605	3000.0	0.06	18.1	5.00	1.00	270	<i>270</i>	1.040
Zone 12										
BLD1-F005-Z03	1	79	225.0	0.06	1.4	5.00	1.00	20	<i>20</i>	1.230
Zone 13										
BLD1-F005-Z04	1	446	1500.0	0.06	9.0	5.00	1.00	135	<i>135</i>	1.183
Zone 14										
BLD1-F005-Z05	1	104	225.0	0.06	1.4	5.00	1.00	20	<i>20</i>	1.292
Zone 15										
BLD1-F005-Z06	1	1021	3000.0	0.06	18.1	5.00	1.00	270	<i>270</i>	1.221
Zone 16										
BLD1-F005-Z07	1	112	225.0	0.06	1.4	5.00	1.00	20	<i>20</i>	1.306
Zone 17										
BLD1-F005-Z08	1	521	1500.0	0.06	9.0	5.00	1.00	135	<i>135</i>	1.227

Ventilation Sizing Summary for VAV

Project Name: 13-194 DJM Building Midlife Fit-up Study
Prepared by: MCA

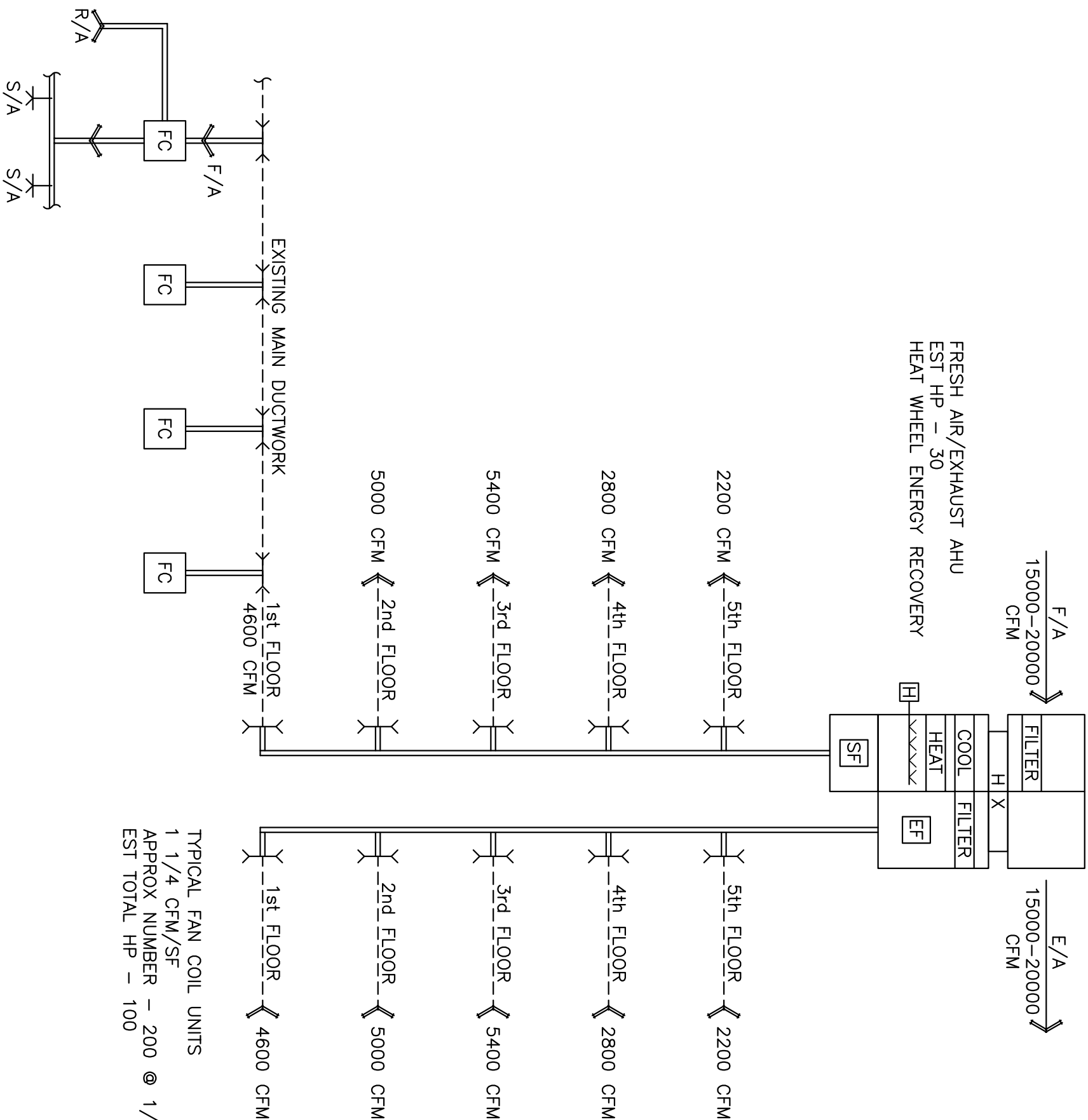
02/06/2014
10:02AM

Zone 18										
BLD1-F005-Z09	1	2733	20000.0	0.06	120.5	5.00	1.00	1802	<i>1802</i>	0.827
Zone 19										
BLD1-FTYP-Z01	3	92	225.0	0.06	1.4	5.00	1.00	20	<i>20</i>	1.266
Zone 20										
BLD1-FTYP-Z02	3	579	3000.0	0.06	18.1	5.00	1.00	270	<i>270</i>	1.019
Zone 21										
BLD1-FTYP-Z03	3	78	225.0	0.06	1.4	5.00	1.00	20	<i>20</i>	1.225
Zone 22										
BLD1-FTYP-Z04	3	440	1500.0	0.06	9.0	5.00	1.00	135	<i>135</i>	1.179
Zone 23										
BLD1-FTYP-Z05	3	103	225.0	0.06	1.4	5.00	1.00	20	<i>20</i>	1.290
Zone 24										
BLD1-FTYP-Z06	3	1016	3000.0	0.06	18.1	5.00	1.00	270	<i>270</i>	1.220
Zone 25										
BLD1-FTYP-Z07	3	111	225.0	0.06	1.4	5.00	1.00	20	<i>20</i>	1.303
Zone 26										
BLD1-FTYP-Z08	3	508	1500.0	0.06	9.0	5.00	1.00	135	<i>135</i>	1.220
Zone 27										
BLD1-FTYP-Z09	3	2572	20000.0	0.06	120.5	5.00	1.00	1802	<i>1802</i>	0.785
Totals (incl. Space Multipliers)		27714							13473	0.785



HVAC CONCEPT SCHEMATICS





**MIDLIFE FIT-UP
STUDY/CONCEPT DESIGN
D.J. MACDONALD BLDG
CHARLOTTETOWN
QUEENS CO., PEI**

CONCEPTUAL HVAC SCHEMATIC

designed	FJC	conçu
----------	-----	-------

date FEBRUARY 04, 2014

drawn	NFS	dessiné
-------	-----	---------

date	FEBRUARY 04, 2014
------	-------------------

approved	approve
----------	---------

date

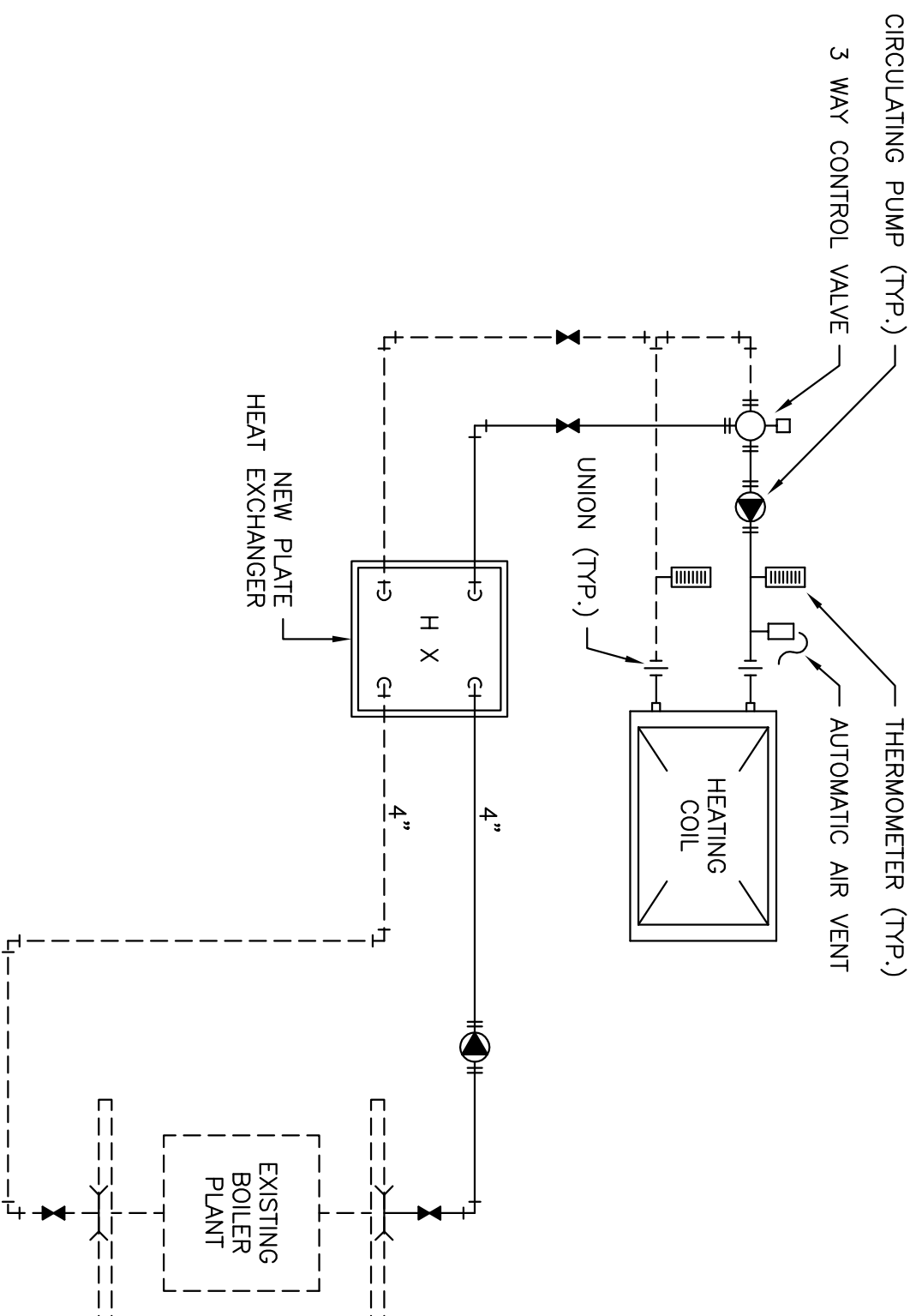
Tender	Soumission
--------	------------

PWGSC Project Manager **Administrateur de projets TPSSC**

project number	no. du projet
----------------	---------------

drawing no.	no. du dessin
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15
16	16
17	17
18	18
19	19
20	20
21	21
22	22
23	23
24	24
25	25
26	26
27	27
28	28
29	29
30	30
31	31
32	32
33	33
34	34
35	35
36	36
37	37
38	38
39	39
40	40
41	41
42	42
43	43
44	44
45	45
46	46
47	47
48	48
49	49
50	50
51	51
52	52
53	53
54	54
55	55
56	56
57	57
58	58
59	59
60	60
61	61
62	62
63	63
64	64
65	65
66	66
67	67
68	68
69	69
70	70
71	71
72	72
73	73
74	74
75	75
76	76
77	77
78	78
79	79
80	80
81	81
82	82
83	83
84	84
85	85
86	86
87	87
88	88
89	89
90	90
91	91
92	92
93	93
94	94
95	95
96	96
97	97
98	98
99	99
100	100

HVAC-1



0		
revisions		date

**MIDLIFE FIT-UP
STUDY/CONCEPT DESIGN
D.J. MACDONALD BLDG
CHARLOTTETOWN
QUEENS CO., PEI**

drawing	dessein
---------	---------

CONCEPTUAL HEATING COIL SCHEMATIC FRESH AIR/EXHAUST AIR AHU

designed	FJC	conçu

date FEBRUARY 04, 2014

drawn NFS

date FEBRUARY 04, 2014

approved	approuvé
----------	----------

date

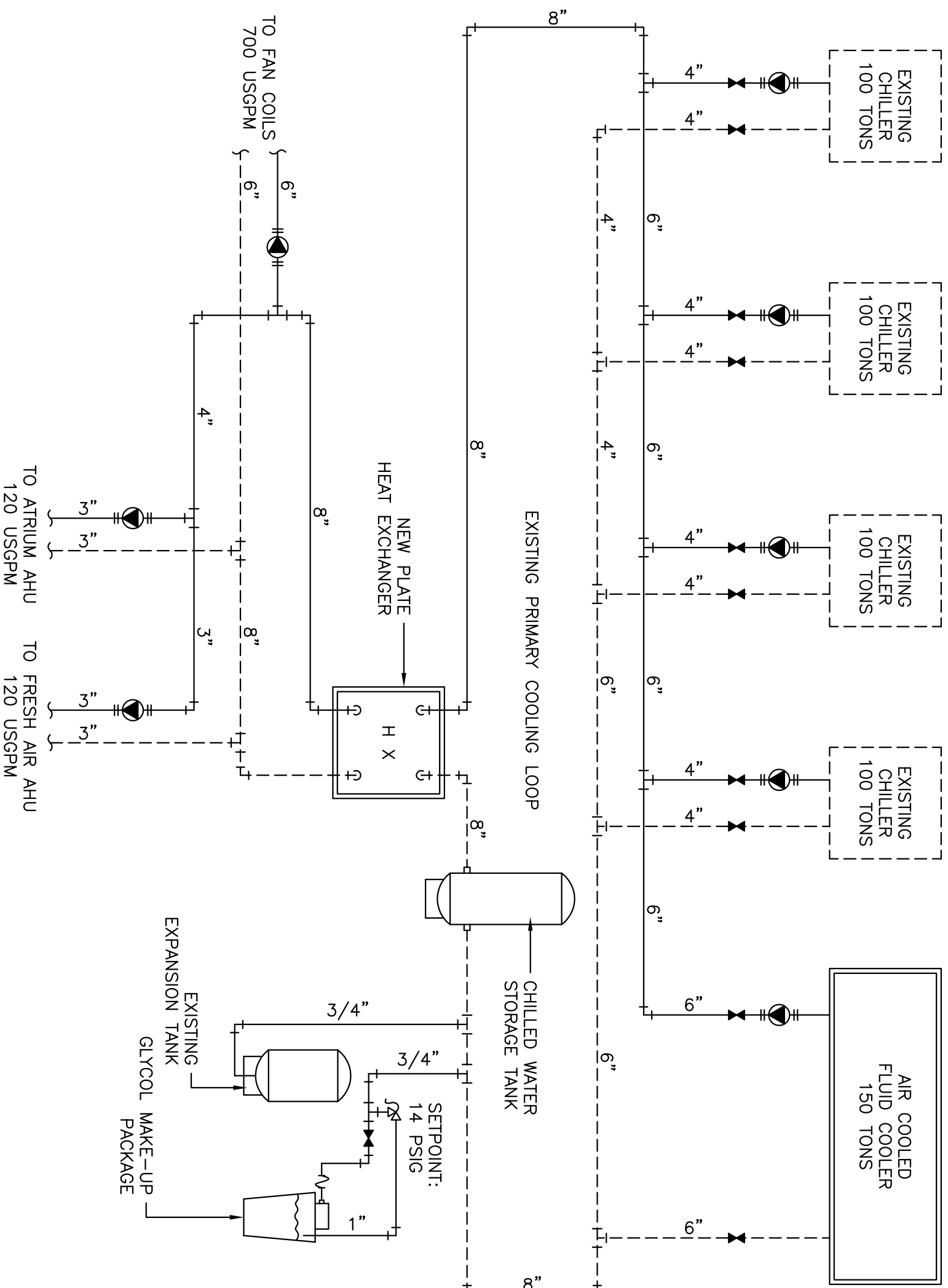
Tender	Soumission
--------	------------

PWGSC Project Manager **Administrateur de projets TPSSC**

project number	no. du projet
----------------	---------------

[illegible]

HVAC-2



0		
revisions		
project		project

**MIDLIFE FIT-UP
STUDY/CONCEPT DESIGN
D.J. MACDONALD BLDG
CHARLOTTETOWN
QUEENS CO., PEI**

CONCEPTUAL CHILLED WATER PIPING SCHEMATIC

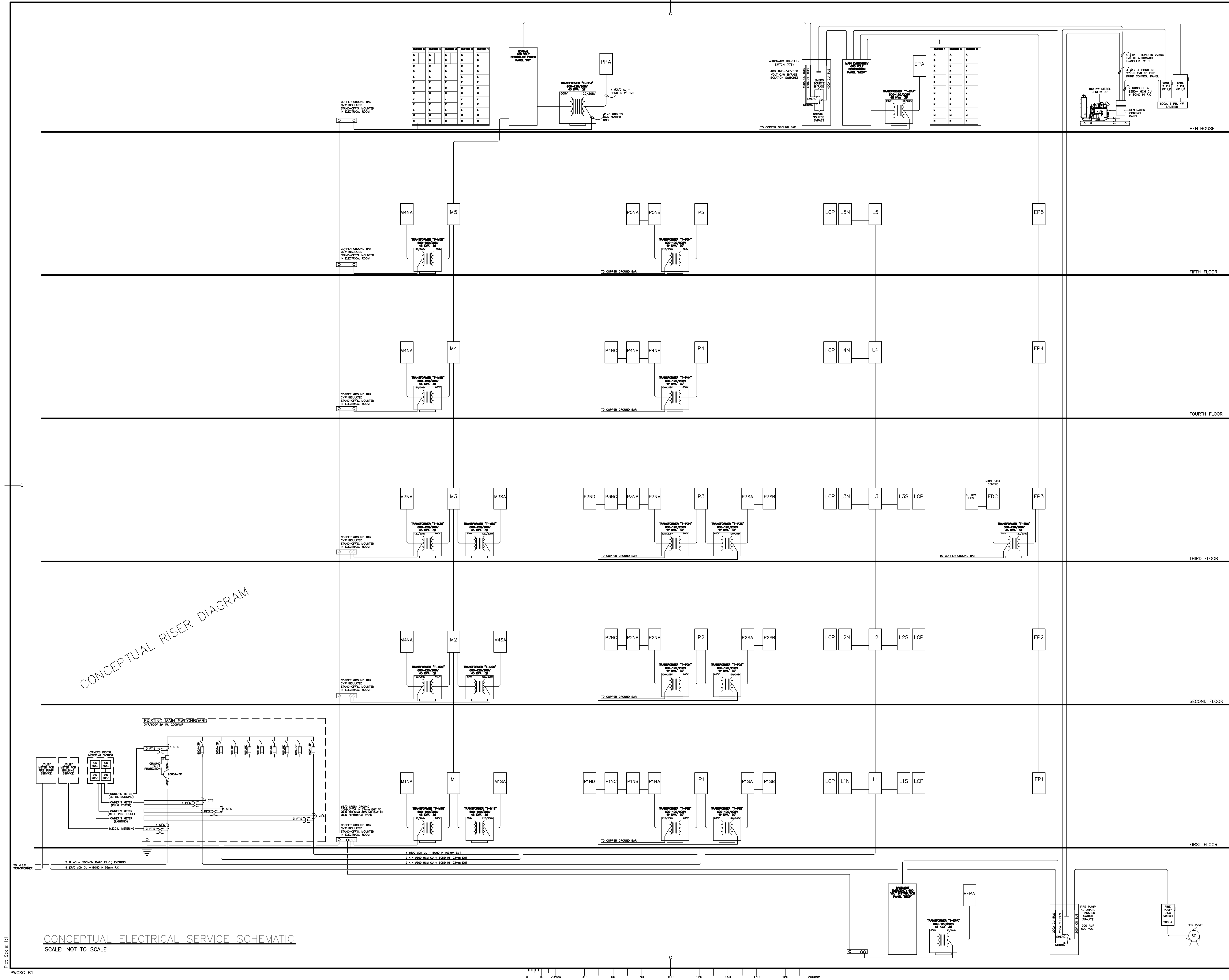
designed	FJC	conçu
date	FEBRUARY 04, 2014	
drawn	NFS	dessiné
date	FEBRUARY 04, 2014	
approved		approuvé
date		
Tender		Soumission
—		—
PWSC Project Manager	Administrateur de projets PWSGC	
project number		no. du projet
	—	

HVAC-3



ELECTRICAL CONCEPTUAL RISER DIAGRAM





Public Works and Government Services Canada

Travaux Publics et Services gouvernementaux Canada

RICHARDSON ASSOCIATES (1993) Limited
Engineering Consultants
Telephone 502 566 4044
Facsimile 502 566 4999
E-mail bozon@rsd.com
PO Box 1057
565 North River Road, Suite 1
Charlottetown, Prince Edward Island
Canada C1A 1B4

Copyright of these documents resides with the Consultant. These documents may only be used for the purpose intended unless written consent is received from the Consultant.

revisions	date										
<table><tr><td>A</td><td>A detail no.</td></tr><tr><td>C</td><td>C location drawing no.</td></tr><tr><td></td><td>sur dessin no.</td></tr><tr><td></td><td>C drawing no.</td></tr><tr><td></td><td>dessin no.</td></tr></table>	A	A detail no.	C	C location drawing no.		sur dessin no.		C drawing no.		dessin no.	
A	A detail no.										
C	C location drawing no.										
	sur dessin no.										
	C drawing no.										
	dessin no.										

project

MIDLIFE FIT-UP STUDY/CONCEPTUAL DESIGN
DJM BUILDING
CHARLOTTETOWN
QUEEN'S CO. PEI

project

drawing

CONCEPTUAL ELECTRICAL RISER DIAGRAM

dessin

designed RLS	concu
date FEB 12, 2014	
drawn RLS	dessine
date FEB 12, 2014	
approved	approuve
date	
Tender	Soumission
PWSC Project Manager	Administrateur de projets TPSGC
project number	no. du projet
drawing no.	no. du dessin

E1 OF 1

EDRM Document No. 109981 Version 1



REFERENCE DOCUMENTS



Reference Documents

Public Works and Government Services Canada
Mechanical System Modernization Study
Daniel J. MacDonald Building
September 2003

Public Works and Government Services Canada
Mechanical Systems Modernization Study
Daniel J. MacDonald Building
March 2008

Public Works and Government Services Canada
Building Condition Report
Daniel J. MacDonald Building
March 2012

SNC Lavalin O & M
Public Works and Government Services Canada
Daniel J. MacDonald Building
Recommissioning Report
March 2012

Public Works and Government Services Canada
Statement of Requirements (SOR)
Air Handling Unit Mechanical Project
Daniel J. MacDonald Building
November 2012

Public Works and Government Services Canada
AFD Project Listing
Daniel J. MacDonald Building

SNC Lavalin O & M
Proposed DJM Mechanical Upgrades

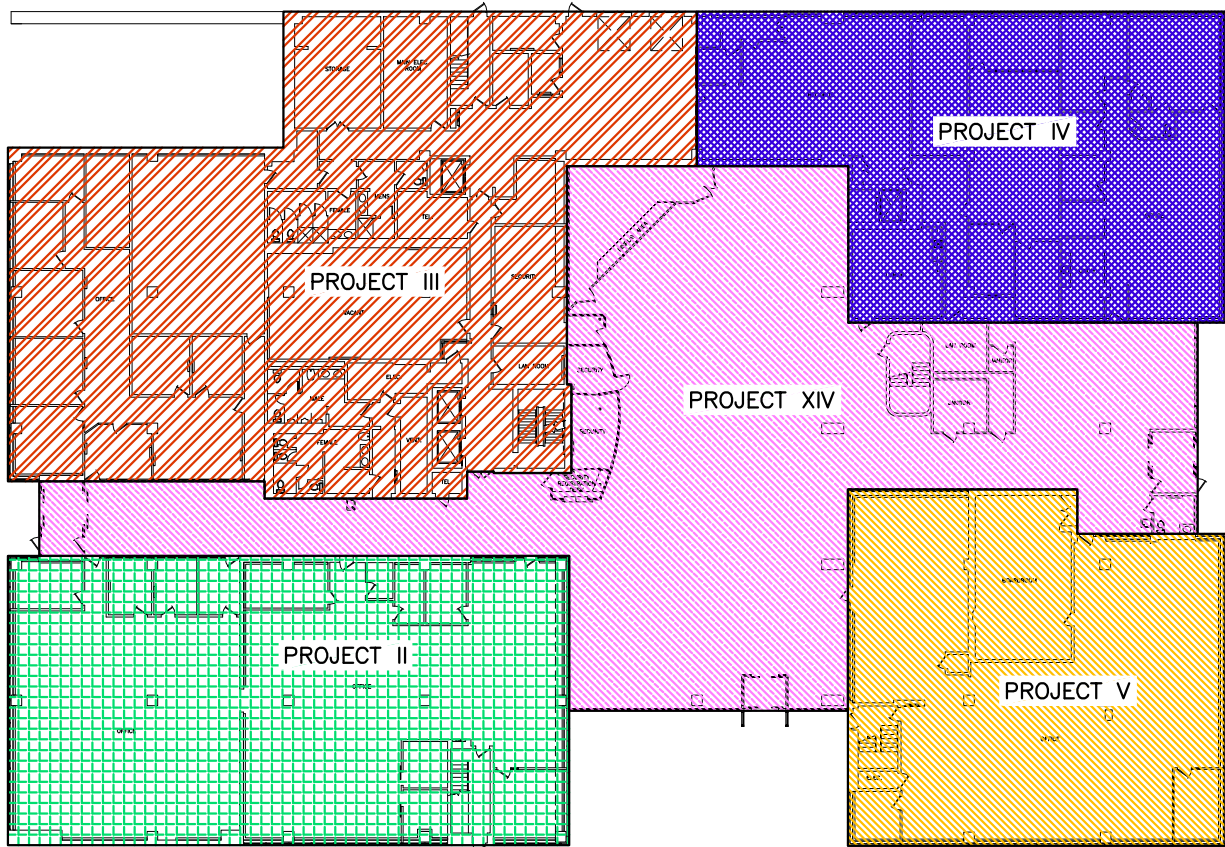
Public Works and Government Services Canada
PEI GOCB Workplace 2.0 Capacity Study
Daniel J. MacDonald Building
March 2013


Building Record Drawings

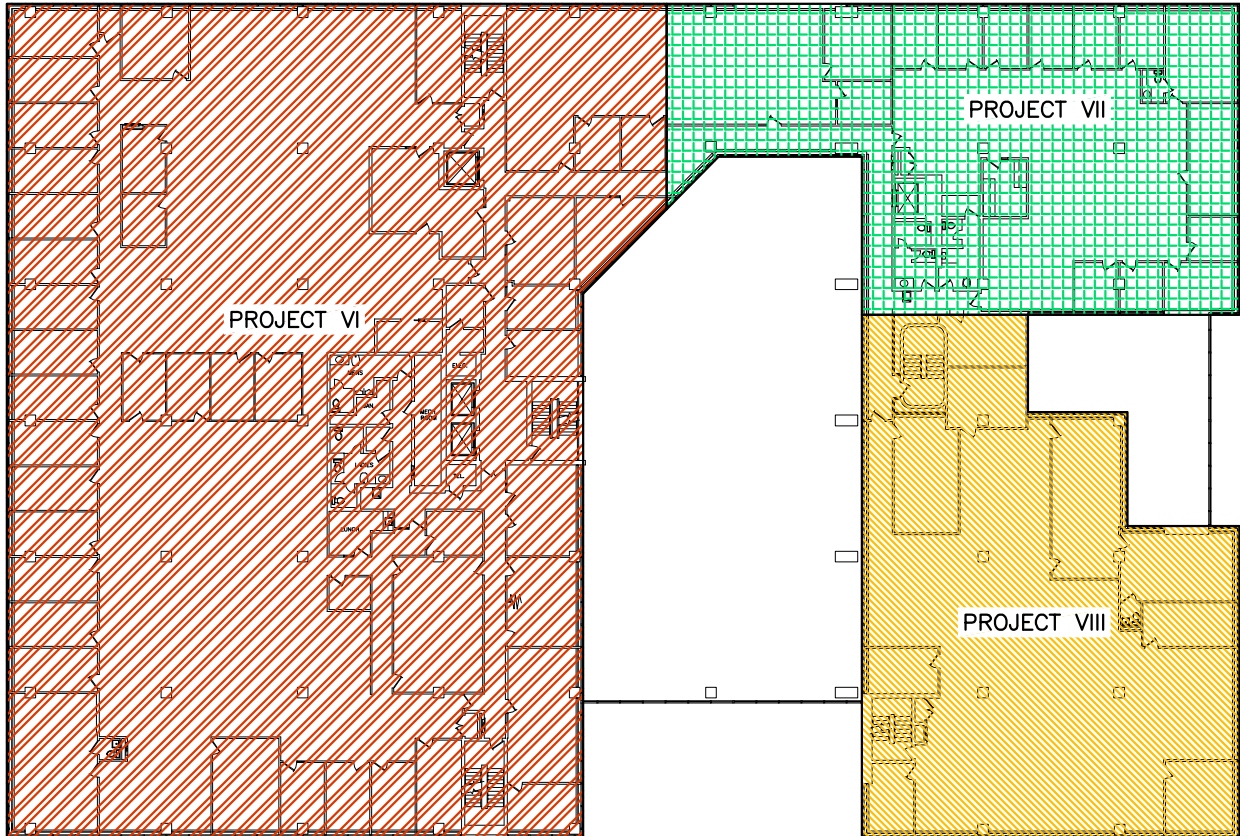



FLOOR PLANS

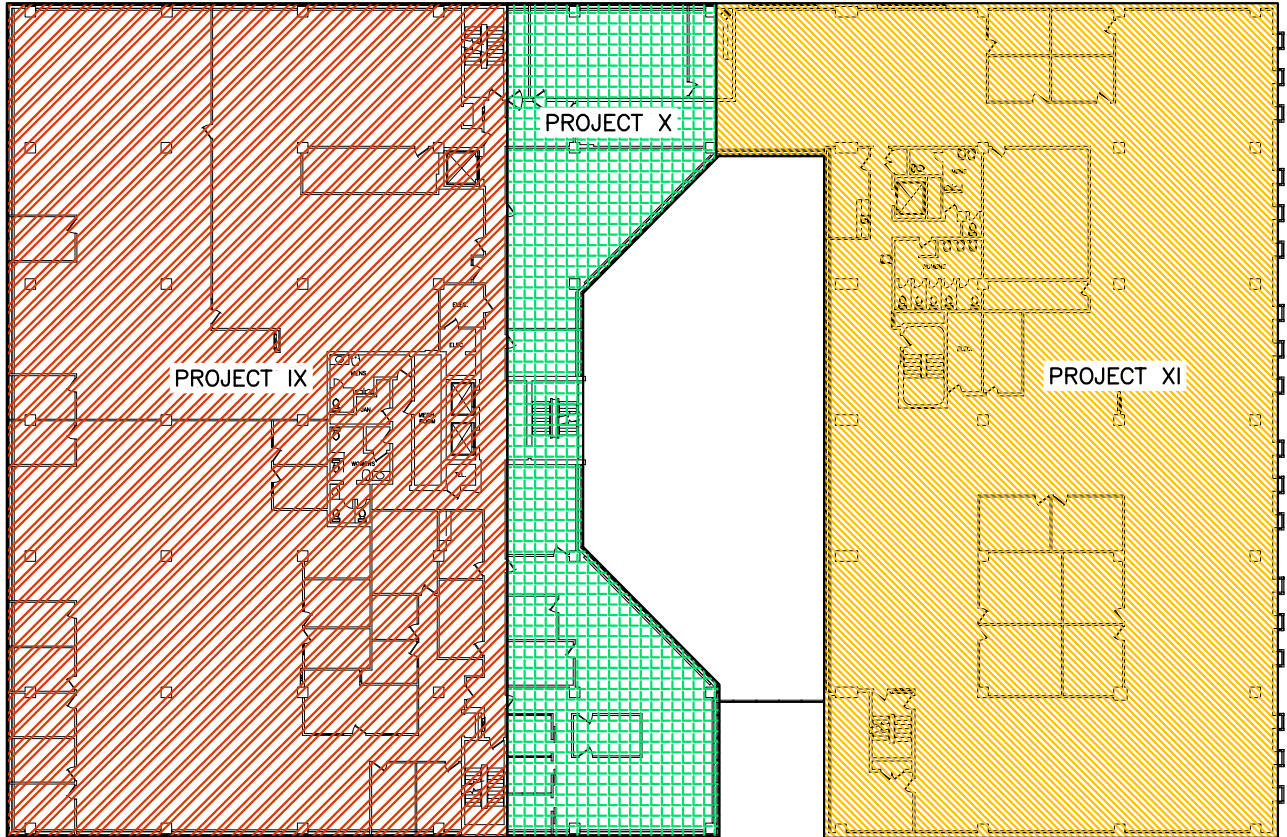





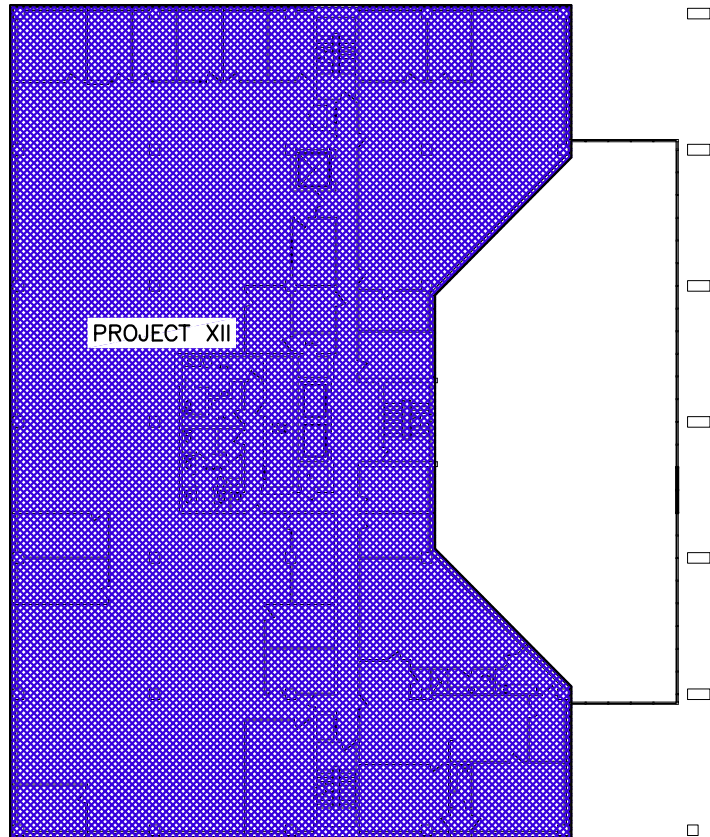
 Public Works and Government Services Canada		Travaux publics et Services gouvernementaux Canada		Drawing title Titre du dessin FIRST FLOOR PROJECT PHASING		designed JDM date 01/31/14
project MIDLIFE FIT-UP STUDY/CONCEPT DESIGN DANIEL J. MACDONALD BLDG CHARLOTTETOWN QUEENS CO., PEI		projet 		drawn JAS date 01/31/14		approved date
Tender — PWGSC Project Manager				Soumission — Administrateur de projets TPSGC		
project number —		no. du projet —		drawing no. SK-1		no. du dessin




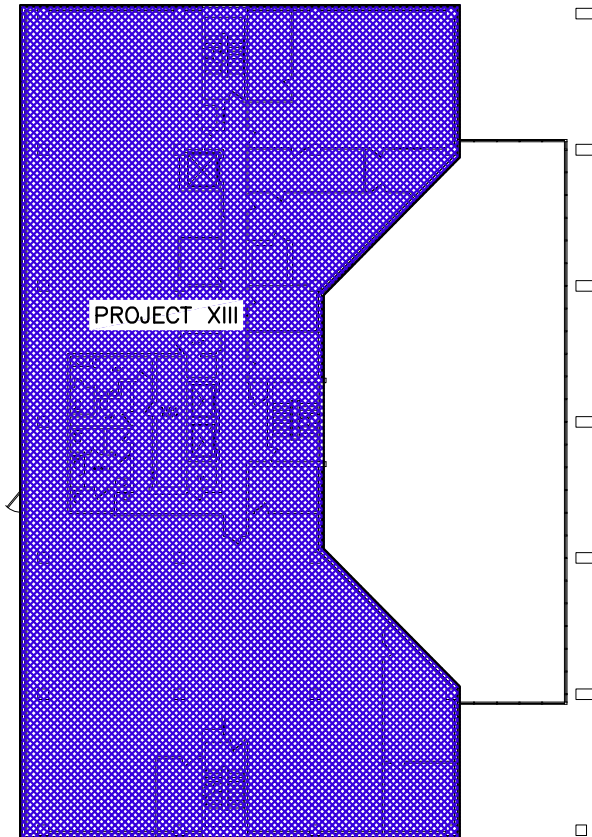
 Public Works and Government Services Canada	Travaux publics et Services gouvernementaux Canada	Drawing title Titre du dessin SECOND FLOOR PROJECT PHASING	designed JDM	conçu 	date 01/31/14
project MIDLIFE FIT-UP STUDY/CONCEPT DESIGN DANIEL J. MACDONALD BLDG CHARLOTTETOWN QUEENS CO., PEI	projet 	Tender — PWGSC Project Manager	— Administrateur de projets TPSGC	Soumission	
project number —	no. du projet 	drawing no. SK-2	no. du dessin 	date 01/31/14	
approved 	approuvé 	date 			




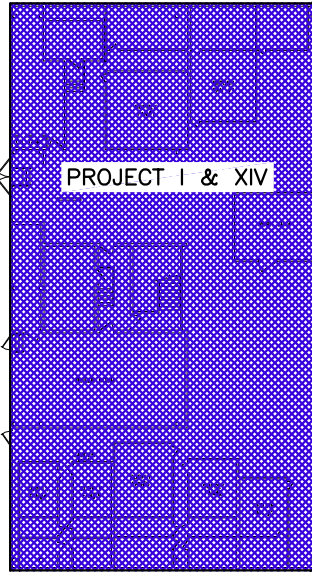
 Public Works and Government Services Canada		Travaux publics et Services gouvernementaux Canada		Drawing title Titre du dessin THIRD FLOOR PROJECT PHASING		designed JDM date 01/31/14
project MIDLIFE FIT-UP STUDY/CONCEPT DESIGN DANIEL J. MACDONALD BLDG CHARLOTTETOWN QUEENS CO., PEI		project 		drawn JAS date 01/31/14		approved date
Tender — PWGSC Project Manager				Soumission — Administrateur de projets TPSGC		
project number —		no. du projet —		drawing no. SK-3		no. du dessin




 Public Works and Government Services Canada Travaux publics et Services gouvernementaux Canada	Drawing title Titre du dessin FOURTH FLOOR PROJECT PHASING	designed JDM	conçu date 01/31/14
project MIDLIFE FIT-UP STUDY/CONCEPT DESIGN DANIEL J. MACDONALD BLDG CHARLOTTETOWN QUEENS CO., PEI	drawn JAS	dessiné date 01/31/14	
	approved	approuvé date	
	Tender — PWGSC Project Manager		
Soumission — Administrateur de projets TPSGC			drawing no. SK-4
project number	no. du projet	no. du dessin	



 Public Works and Government Services Canada Travaux publics et Services gouvernementaux Canada	Drawing title Titre du dessin		designed conçu		date
project	FIFTH FLOOR PROJECT PHASING		JDM		01/31/14
project	MIDLIFE FIT-UP STUDY/CONCEPT DESIGN		drawn dessiné		date
DANIEL J. MACDONALD BLDG CHARLOTTETOWN QUEENS CO., PEI	Tender — PWGSC Project Manager		JAS		01/31/14
	project number —		approved approuvé		date
			no. du projet		Soumission
			drawing no.		Administrateur de projets TPSGC
			no. du dessin		
			SK-5		



 Public Works and Government Services Canada	Travaux publics et Services gouvernementaux Canada	Drawing title		Titre du dessin		designed	conçu	date		
		PENTHOUSE PROJECT PHASING		JDM		01/31/14				
				drawn	dessiné	date				
project		project		JAS		01/31/14				
				approved	approuvé	date				
MIDLIFE FIT-UP STUDY/CONCEPT DESIGN DANIEL J. MACDONALD BLDG CHARLOTTETOWN QUEENS CO., PEI		Tender							Soumission	
		—							—	
		PWGSC Project Manager							Administrateur de projets TPSGC	
project number		no. du projet		drawing no.		no. du dessin				
		—		SK-6						