**Georgia Tech OPR Boilerplate CxA User Guide**

* 1. OPR Boilerplate Purpose
     1. The intent of this document is to serve as the starting point for the Owner’s Project Requirements (OPR) document for all Georgia Tech capital projects in which the development of the OPR is required, which is typically the case for projects over 10,000 square feet or complex construction projects, such as laboratory projects, in which the campus engineering team deems the OPR necessary. This boilerplate has been assembled specifically to align with ASHRAE Standard 202, which is a document that outlines the overall commissioning process and includes details on the specific information to be included in an OPR document.
     2. The OPR is NOT a replacement for the programming efforts to be completed by the Design Professional, though both the programming and OPR development exercises are important for project success.
     3. This document shall be used by the CxA and GT Facilities Management and CPSM to aid the Design Professional in their programming effort.
  2. Boilerplate Revision History

|  |  |
| --- | --- |
| **Revision** | **Date** |
| Outline | October 20, 2017 |
| First Draft | November 3, 2017 |
| Revision 0 | December 8, 2017 (updated January 12, 2018) |
| Revision 1 | February 9, 2018 |
| Revision 2 | March 23, 2018 |
| Revision 3 | June 8, 2018 |
| Revision 4 | September 7, 2018 |

* 1. Project-Specific OPR Development Requirements
     1. Use of Comments
        1. Comments are included within the document to convey pertinent information to the CxA regarding the use of each section for each project. Example used here.
     2. Tracking Changes
        1. For the purposes of tracking the OPR document on each project, the CxA shall “track changes” after the development of the OPR outline or first draft. This function shall be used to capture the modifications to the document based on decisions made by GT, the design team and the construction team where project requirements or performance metrics are modified. For example, if displacement ventilation is originally pursued but the VE process results in the allowance of overhead distribution then using tracked changes will reflect the evolution of the OPR. The intent is to have this living document by presented to GT at the end of the project showing the full history of the owner’s requirements.
     3. OPR Issuance and Review
        1. The CxA shall produce a PDF of the OPR for record to be delivered to GT after each major design milestone (SDs, DDs, CDs). The CxA shall reconcile the OPR with the design documents at each phase and then submit:
           1. Clean PDF version
           2. Tracked Changes PDF version
           3. Microsoft Word version
        2. The PDF versions of the OPR shall be placed into Bluebeam session review by GT and other relevant project team members at each iteration of delivery.
     4. OPR Exhibits for Reference
        1. This boilerplate OPR shall be updated to include example documents for reference for the CxA.
        2. Example documents to be included are (once relevant examples are ready):
           1. Completed OPR
           2. Energy Report
           3. M&V Plan
           4. GT Commissioning Process Checklist

**END OF USER GUIDE**

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# OPR Legend

OPR LEGEND

Black text: Generally known information with blanks to be completed

*Black italic text: Example text for reference only*

*Blue italic text: Info from GT Yellow Book*

Red text: Requires input from the Design Professional.

Green text: Project specific input needed from GT

# List of Abbreviations

* 1. ADA: Americans with Disabilities Act
  2. A/E: Design Professional
  3. A/V: Audio-Visual
  4. BECx: Building Envelope Commissioning
  5. BOD: Basis of Design
  6. CCTV: Closed Circuit Television
  7. CD: Construction Documents
  8. CM: Construction Manager
  9. Cx: Commissioning
  10. CxA: Commissioning Authority
  11. dB: Decibel Level
  12. DD: Design Development
  13. EUI: Energy Use Intensity
  14. FC: Foot-Candle
  15. FPT: Functional Performance Test
  16. GC: General Contractor
  17. GMP: Guaranteed Maximum Price
  18. HVAC: Heating Ventilation and Air Conditioning
  19. IT: Information Technology
  20. M&V: Measurement and Verification
  21. MEP: Mechanical/Electrical/Plumbing
  22. NC: Noise Criteria
  23. NDL: No Dollar Limit
  24. OPR: Owner’s Project Requirements
  25. PFC: Prefunctional Checklist
  26. PM: Owner’s Project Manager
  27. PV: Photovoltaics
  28. SCL: Stated Cost Limitation
  29. SD: Schematic Design
  30. STC: Sound Transmission Class

# General Project Description

Example project description:

*Georgia Tech will construct a 143,300 square foot building that will house several major campus programs. The facility will house more than two dozen classrooms, four seminar rooms, a multi-purpose lecture hall, auditorium, student commons and specialized labs. The project will incorporate the requirements of the Energy Efficiency & Sustainable Construction Act (SB 130) (O.C.G.A 50-8-18)*.

# Project Objectives



# Funding Plan

# Project Budget

* 1. Total Project Budget: $\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  2. Stated Cost Limitation: $\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Project Schedule

|  |  |  |
| --- | --- | --- |
| **Milestone** | **Begin Date** | **End Date** |
| **Design** |  |  |
| Programming |  |  |
| Schematic Design |  |  |
| Design Development |  |  |
| Construction Documents |  |  |
| **Construction** |  |  |
| *CCO#1* |  |  |
| *Renovation/Addition* |  |  |
| *New Building* |  |  |
| Material (or Substantial) Completion |  |  |
| **Warranty** |  |  |
| Seasonal Testing |  |  |
| 1-Year Warranty Expiration |  |  |

# Building Operations Information

|  |  |  |
| --- | --- | --- |
| **POC** | **POC Name** | **Email** |
| GT FM |  |  |
| GT O&M (Area Mgr) |  |  |
| GT End-User POCs |  |  |
| Design Team POC |  |  |
| Construction Team POC |  |  |
| CxA/M&V POC |  |  |
|  |  |  |
|  |  |  |

* 1. Building Management
  2. Building Maintenance
     1. Scheduled Maintenance (SMART)
     2. Preventive Maintenance
  3. Billable Entities

# Owner’s Directives and Special Project Requirements

* 1. Project Delivery Method
  2. Requirements for the Design Professional
     1. The Design Professional shall participate in the OPR development process through attendance at OPR Workshops facilitated by the CxA as well as by contributing feedback through reviews of the OPR document. The CxA will coordinate meetings in advance with GT and the Design Professional.
     2. The Design Professional, , with collaboration with GT CPSM, shall produce comprehensive Room Data Sheets for the project and they shall be delivered to GT and the CxA ideally at the end of programming and no later than the end of Schematic Design. This requirement shall only be removed if GT agrees based on the nature of the project.
     3. All design deliverables shall be per the GT Yellowbook, but also shall be setup in a Bluebeam session for review by GT and relevant team members including the CxA. This shall include the Energy Report, as required by the Yellowbook, at each major design milestone.
     4. The Design Professional shall perform a partial-day page-turn for the O&M Staff at the end of:
        1. Schematic Design
        2. 100% Design Development
        3. 75% (or 90%) Construction Document

This page-turn shall occur in parallel with the Bluebeam design review sessions for GT stakeholders with interest but not able to perform a drawing/specification review.

* + 1. Refer to Section 15, Utilities and Metering for additional requirements of the DP during the design process.
  1. CPSM Project Initiation Sheet Expectations

|  |  |
| --- | --- |
| Building Square Footage |  |
| Occupants (End-Users) |  |
| Program Description |  |
| Sustainability Goals (refer to checklist below in Section 13) |  |
| Budget |  |
| Schedule of Milestones/Deliverables |  |

* 1. End-User
  2. Georgia Tech Standards Deviations
     1. *Example: Design Professional shall not be required to provide an energy model for the project given that this project is a renovation.*

# Building Occupancy / Space Utilization Information

* 1. Occupancy Table

|  |  |  |
| --- | --- | --- |
| **Floor** | **Life Safety Counts** | **Load Calculation Counts** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

* 1. Space Utilization Table

|  |  |  |  |
| --- | --- | --- | --- |
| **Space Type** | **Size (sf)** | **Occupant Count** | **Occupied Hours** |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

# Applicable Codes, Standards and GT Reference Documents

* 1. [GT Yellow Book](file:///C:\Users\ddraper\Dropbox\NEW%20COMPUTER%20MIGRATION\Projects\gtopr\reference%20documents\Yellowbook%20Combined%20-%20Oct2017.pdf)
  2. [GT Applicable Standards, Guidelines and Specifications](http://www.facilities.gatech.edu/standards-forms) (BIM, Low Voltage, Housing Standard, etc.)
  3. [GT Campus Master Plan](http://www.space.gatech.edu/campus-master-plan)
  4. The Year International Mechanical Code, with Georgia Amendments *(2014)(2015)*
  5. The Year National Electrical Code, with no amendments
  6. The Year Edition International Fire Code, with Georgia amendments *(2014)*
  7. The Year Edition International Energy Conservation Code, with Georgia Supplements and Amendments *(2011)(2012)*
  8. NFPA 101 – Year Edition, Life Safety Code
  9. [Energy Efficiency and Sustainable Construction Act of 2008](file:///C:\Users\ddraper\Dropbox\NEW%20COMPUTER%20MIGRATION\Projects\gtopr\reference%20documents\energy-efficiency-and-sustainable-construction-standards-final.pdf) (SB 130).
  10. ASHRAE 52.2-Year – Ventilation for Acceptable Indoor Air Quality
  11. ASHRAE 55-Year – Thermal Environmental Conditions for Human Occupancy
  12. ASHRAE 62.1-Year Ventilation for Acceptable Indoor Air Quality
  13. SMACNA "HVAC Duct Construction Standards, Metal and Flexible ", Third Edition, 2005, latest printing as published by SMACNA.
  14. [USG Design Criteria for Laboratories](file:///C:\Users\ddraper\Dropbox\NEW%20COMPUTER%20MIGRATION\Projects\gtopr\reference%20documents\USG_Design_Criteria_for_Lab_4th_Edition.pdf) (November 2013)
  15. ASHRAE 110 (testing will be applied to every fume hood for this project)

# Functional Requirements

* 1. Space Type 1

# Sustainability Requirements and Certification Goals

* 1. Energy and Water Performance Criteria
     1. Energy Use Intensity (EUI) target: \_\_\_ kBtu/ft2‑yr which shall be tracked utilizing the energy modeling process during the design phase and validated post-occupancy through the M&V process which is led by the CxA.
     2. The energy model shall be the responsibility of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the energy modeling software that shall be used is EnergyPlus. The consultant shall be responsible for delivering the model file to GT with each design deliverable to include the input data, output data and all assumptions.
     3. Water use requirements:
        1. *Example: Low flow fixtures per the Yellow Book*
        2. *Example: HVAC condensate shall be diverted to cistern*
  2. Building Life Cycle Requirements
     1. Building Life Expectancy: The building shall be designed and constructed as a \_\_\_\_-year building. Materials and systems shall be selected accordingly.
  3. Other Sustainability Requirements
     1. ASHRAE 189.1-Year shall be applied to the fullest extent possible while factoring in project budget (understanding this might be a stretch goal). Specific targets include:
     2. WELL v\_\_ shall be shall be applied to the fullest extent possible while factoring in project budget (understanding this might be a stretch goal). Specific targets include:
     3. GT Sustainability Checklist Requirements

|  |  |  |
| --- | --- | --- |
| **1. General Project Criteria** | | |
|  | 1.1 Does the project have an EUI target comparable to the regional benchmark for this building type? |  |
|  | 1.2 Does the project align to the Landscape Master Plan? |  |
|  | 1.3 Does the project align to the Bicycle Master Plan? (i.e. bike parking, path connectivity) |  |
|  | 1.4 Does the project align to the Stormwater Master Plan? |  |
|  | 1.5 Does the project have plans to include a cistern for rainwater capture? |  |
|  | 1.6 Does the project include funding for PV installations as necessitated by Georgia Tech's renewable energy goals? |  |
|  | 1.7 If the project does not meet Category 1.6, is the roof space "PV-ready"? |  |
|  | 1.8 Does the project have funding for solar thermal heating for domestic hot water? |  |
|  | 1.9 Does the project include funding for the submetering of all utilities at the building level? |  |
|  | 1.10 If the project includes multiple departments/business units, will their corresponding sections be sub-metered? |  |
|  | 1.11 Is the project pursuing ASHRAE 189.1 building code? |  |
|  | 1.12 Is the project pursuing the WELL building standard? |  |
|  | 1.13 Has the project contact the Center for Serve-Learn-Sustain for academic involvement? |  |
|  | 1.14 Does the project have funding for enhanced commissioning? |  |
|  | 1.15 Does the project have funding for solar thermal heating for domestic hot water? |  |
|  | 1.16 Does the project have funding for an informational display to educate occupants on building utility usage? |  |
|  | 1.17 Does the project have recycling and composting plans? |  |
|  | 1.18 Is lighting for common spaces controlled for occupancy and daylighting? |  |
|  | 1.19 Will early energy modeling be included in the project's design process? |  |
|  | 1.20 Does the project have additional and unique sustainability goals that require a charrette? |  |
| **2. Housing Project Criteria (delete if not applicable)** | | |
|  | 2.1 Does the project have funding for additional sub-metering on each floor/wing to use for utility reduction competitions? |  |
|  | 2.2 Will room HVAC, plug-loads, and lighting be tied to occupancy? |  |
|  | 2.3 Does the project have plans to include post-occupancy training for residents on efficient utility utilization? |  |
| **3. Dining Project Criteria (delete if not applicable)** | | |
|  | 3.1 Does the project have room for collection and transfer of pre-consumer compost waste? |  |
|  | 3.2 Does the project have room for collection and transfer of post-consumer compost waste? |  |
|  | 3.3 Does the project's landscaping plan include edible plants/trees? |  |
|  | 3.4 Does the project have plans to include local gardens/farms in supply chain? |  |
|  | 3.5 Is the project including low-flow kitchen hoods? |  |
|  | 3.6 Is the project including demand control for kitchen hoods? |  |
| **4. Parking Project Criteria (delete if not applicable)** | | |
|  | 4.1 Does this project utilize LED lighting throughout parking and pedestrian spaces? |  |
|  | 4.2 Is the lighting level reduced for daylight harvesting? |  |
|  | 4.3 Are lights controlled for motion? |  |
|  | 4.4 Are Level 2 charging stations included with restricted parking spaces? |  |

# Indoor Environmental Quality Requirements

* 1. Are there special requirements for Indoor Environmental Quality [YES or NO]
  2. Temperature and Humidity
     1. Refer to the GT Yellow Book Section 230003 (reference version stated under Section XI of this OPR document)
     2. Record project-specific requirements deviations to the 230003 requirements:
     3. Minimum humidity: \_\_\_\_ % RH
  3. Ventilation Requirements
     1. Meet the requirements of ASHRAE 62.1-\_\_\_\_\_\_ as required by the Yellowbook.
     2. Demand Control Ventilation (if applicable)
     3. Deviations from Yellowbook
  4. Acoustics

|  |  |  |
| --- | --- | --- |
| **Space Type** | **NC (Max)** | **Wall STC** |
|  |  |  |
|  |  |  |
|  |  |  |
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|  |  |  |
|  |  |  |

* + 1. Acoustical Field Testing Requirements

# Utilities and Metering Requirements

* 1. Utilities
     1. Tie-in to existing utilities for use on the project shall be assessed during Programming. Utilities to be considered and the tie-in requirements shall be documented here.

|  |  |  |
| --- | --- | --- |
| **Utility Type** | **Applicable?** | **Important Notes** |
| Power | *Yes* |  |
| Campus Chilled Water |  |  |
| Campus Steam |  |  |
| Natural Gas |  |  |
| Domestic Water |  |  |
| Data |  |  |
| Phone |  |  |

* 1. Metering
     1. The Design Professional shall include in the design documents a one-line metering diagram for all project meters with a meter schedule on a single sheet. This shall include not only power meters but also gas, water, submeters and other components that are to be used as a metering tool for M&V purposes (i.e. variable frequency drives).
     2. M&V Plan Required: [YES OR NO]
        1. If yes, the [CxA][Design Professional] shall be responsible for development of the M&V Plan which shall be submitted as first draft for initial review at the same time as the 100% DDs. Final M&V Plan to be issued at the same time as 100% CDs.
     3. DP shall plan to segregate power feeds to enable submetering strategy, whether submetering is pursued or not.
     4. Submetering requirements shall be determined during the design process and initial submetering strategy shall be captured no later than the DD phase.

# Envelope and Systems Performance Requirements

* 1. Envelope
     1. Division 7
        1. Vapor barrier/retarder
        2. Waterproofing
        3. Air barrier
        4. Vertical thermal insulation
        5. Roofing
        6. Joints and sealants
        7. Alternates
     2. Division 8
        1. Storefront
        2. Curtainwall
        3. Entrances
        4. Alternates
     3. Mock-up requirements
        1. Stand-alone
        2. In-place
     4. Testing requirements
        1. Waterproofing
        2. Air barrier
        3. Sealants
        4. Storefront and Curtainwalls
        5. Roofing
     5. Roof and Wall Bond Required
  2. Equipment
     1. Equipment Responsibility
        1. The Design Professional shall produce a matrix to be included in the design documents that indicates the requirements for furnishing and installing of equipment. This shall include equipment, locations, power requirements, loads (w/sf), etc. Coordinate with GT applicable end-users on all existing equipment that is being re-used for the project and include in the matrix as well.
     2. Lab Equipment (delete if not applicable)
        1. Fume Hoods
        2. Autoclave
     3. Other Equipment (add all as applicable)
  3. Fire Protection
     1. Wet-Pipe
     2. Dry-Pipe (delete if not applicable)
     3. FM-200 (delete if not applicable)
     4. Other mandates
     5. Alternates
  4. Plumbing
     1. Sanitary and storm
     2. Domestic water
     3. Natural gas
     4. Water heating
     5. Fixtures
     6. Trap primers
     7. Sump pumps
     8. Roof drains
     9. Piping and insulation
     10. Laboratory systems (if applicable)
         1. Compressed air
         2. Vacuum
     11. Other mandates
     12. Alternates
  5. Intelligent Building System/Fault Detection and Diagnostics
  6. HVAC
     1. Outdoor design conditions shall match those stipulated in the GT Yellowbook
     2. Refer to GT Yellowbook for detailed requirements of HVAC design deliverables at each stage of design including building load estimates for each system type.
     3. The mechanical engineer shall document the lighting power density assumptions in the Basis of Design document.
     4. Chilled water (if applicable)
        1. Building Load (tons):
     5. Steam (if applicable)
        1. Building Load (lb/hr):
     6. Heating hot water (if applicable)
        1. Building Load (btuh):
     7. Clean Steam (if applicable)
     8. Air handling systems
     9. Terminal units (if applicable, refer to the GT Controls Spec )
     10. Chilled beams (if applicable)
     11. Exhaust fans
     12. Air filtration
     13. Ductwork, piping and insulation
     14. Building automation
     15. Other mandates
     16. Alternates to be considered
  7. Electrical
     1. Main service
     2. Distribution
     3. Grounding
     4. Raceway
     5. Emergency and stand-by power
     6. Lighting and lighting controls
     7. Daylight harvesting
     8. HVAC and plumbing equipment coordination
     9. Other mandates
     10. Alternates to be considered
  8. Fire Alarm
     1. Fire panel/Sub panel
     2. Smoke detectors (beams, ductwork, ceiling-mount)
     3. Retracting fire doors
     4. Fire and fire/smoke dampers
  9. Security/Access Control
  10. Audio-Visual
      1. Refer to [GT Low Voltage Standards](http://gtlowvoltagestandards.gatech.edu/)
      2. Deviations from the GT Low Voltage Standard
  11. IT Requirements
      1. Refer to [GT Low Voltage Standards](http://gtlowvoltagestandards.gatech.edu/)
      2. Deviations from the GT Low Voltage Standard
  12. Renewable Systems
  13. Site
      1. Cistern (if applicable)
      2. Irrigation/Controls (if applicable)
      3. Greywater (if applicable)
      4. Blackwater (if applicable)
      5. Constructed Wetlands (if applicable)
      6. Water Features (if applicable)

# Operations and Maintenance Expectations

* 1. Owner Training Requirements
     1. Qualified training personnel for each training session is required. Specifications for training shall require submission of training personnel resumes.
     2. Training shall specifically cover equipment operation, associated controls and integration with other systems and controls, metering or fault detection.
     3. Training shall cover manufacturer’s maintenance requirements.
     4. Training durations shall be defined during the design process to fit the project specific systems.
     5. All training shall be video-recorded by a qualified videographer.
  2. Equipment Access Requirements
  3. Special Warranty and Bond Requirements
     1. Roof and Wall Bond: 5 years
     2. Roofing: 30 years NDL (20 years as deductive alternate)
     3. Chillers: 5 years (all components and labor)
  4. Service Agreements
  5. Post-Construction Contact Information

|  |  |  |
| --- | --- | --- |
| Point of Contact (POC) | Name | Email or Phone Number |
| GSFIC POC (if applicable) |  |  |
| GT FM POC |  |  |
| GT Area Manager |  |  |
| DP POC |  |  |
| CM/GC POC |  |  |
| CxA POC |  |  |
|  |  |  |

* 1. Warranty Phase Communication Protocol

# Commissioning Process

* 1. Scope Summary
     1. Design Phase
     2. Construction Phase
     3. Acceptance Phase
     4. Occupancy Phase
     5. Measurement & Verification
  2. Systems to be Commissioned
  3. Sampling Procedures

# Document Revision History

|  |  |
| --- | --- |
| **Revision** | **Date** |
| Draft |  |
| Revision 0 |  |
| Revision 1 |  |
| Revision 2 |  |
|  |  |