Energy Services Performance Contracting & Investment Grade Energy Audit

January 8, 2020

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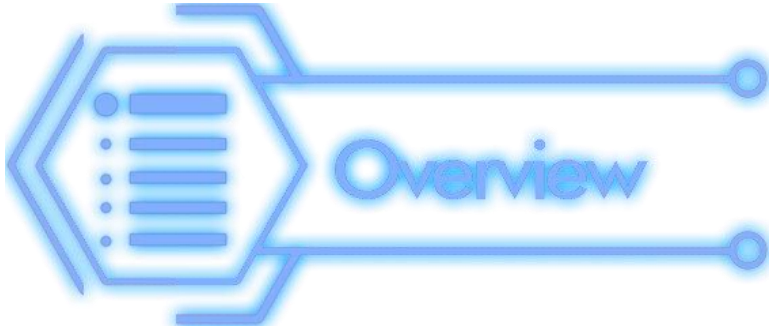
GLWA
Great Lakes Water Authority

Overview



Background

Phase I- Energy Audit

- Report
- Energy Conservation Measures

Phase II- Evaluation and Design

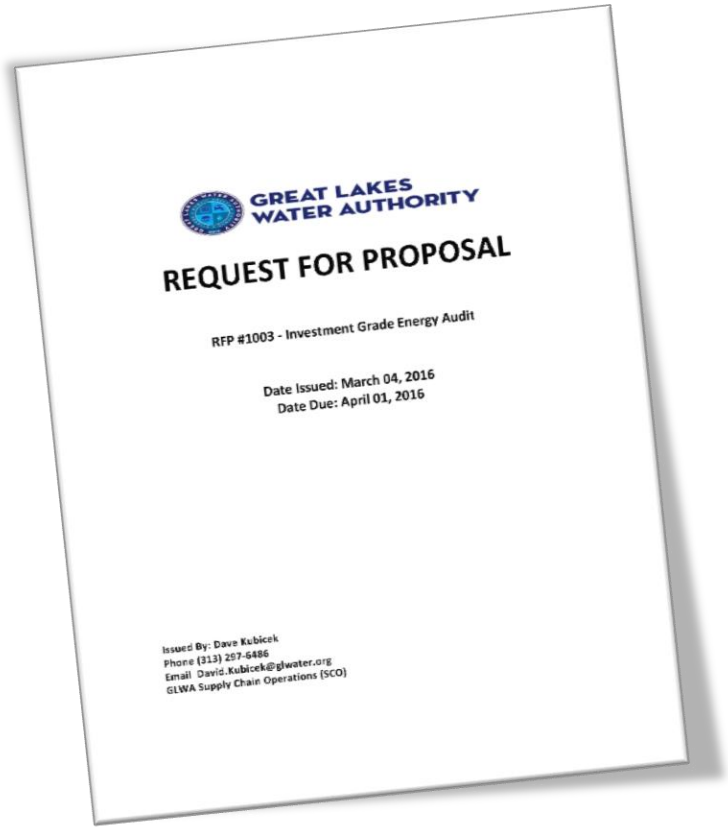
- Evaluation Services
- Design Services - 50%
  - ECM-1: Aeration System Improvements
  - ECM-2: Screened Final Effluent System Improvements

Next Steps

Background

Solicitation

- Posted to MITN on March 4th, 2016
- 30 different companies downloaded the RFP



WADE TRIM

Johnson Controls

NORESCO
United Technologies

SIEMENS

benesch

ARCADIS

fr&h

LGC GLOBAL

AECOM

OPTERRA
ENERGY SERVICES

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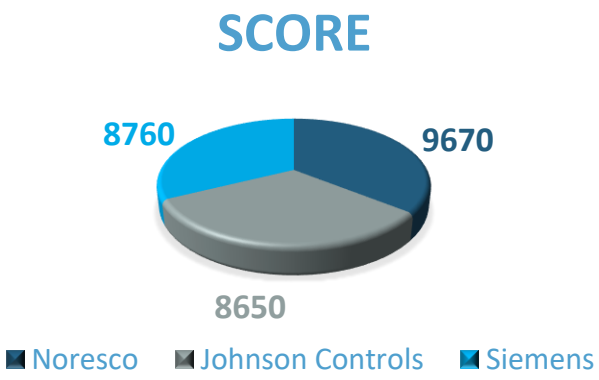
Background

Proposal evaluation

- Proposals received
  - Noresco
  - OpTerra
  - Siemens
  - Johnson Controls
- Oral Interviews held between April 21st – 28th , 2016
  - Noresco
  - Siemens
  - Johnson Controls
- Internal Evaluation



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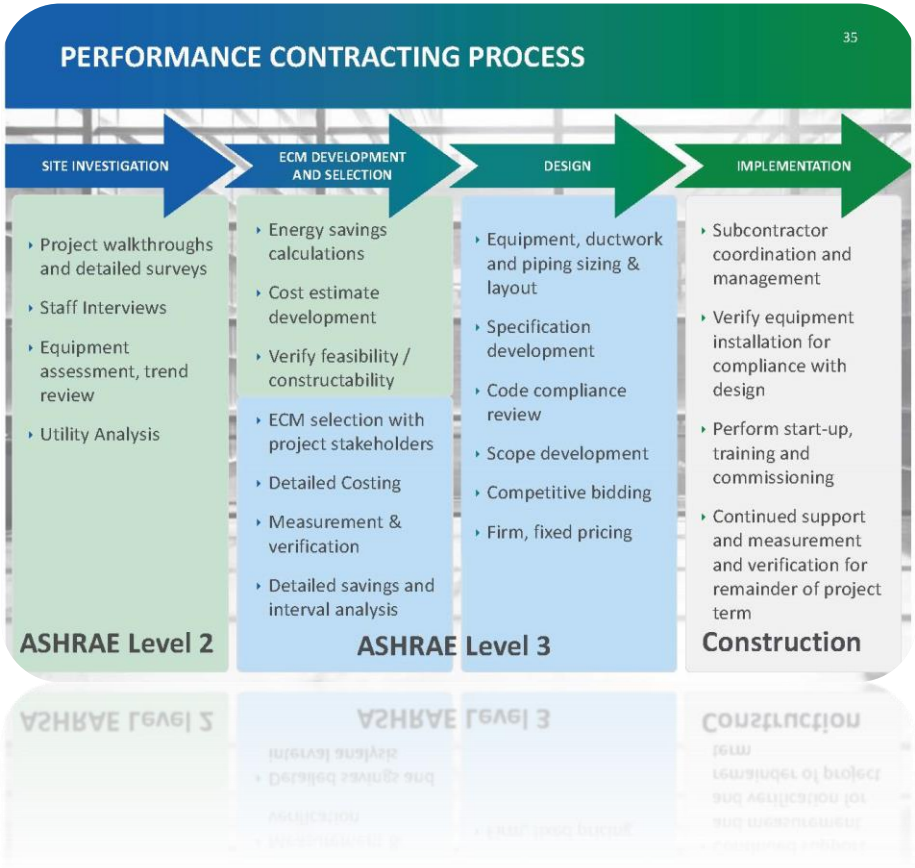
Background

Contract Awarded on March 19, 2018

- Noresco
  - Vendor-neutral approach
  - GLWA-preferred products and equipment
  - Quality products ensure persistence of savings and long-term performance
  - Design review by GLWA
  - Performance-based specifications
  - Pre-qualify subcontractors
  - Single point of contact for planning, design, and construction
  - Turnkey approach



Scope of Services

Phase I

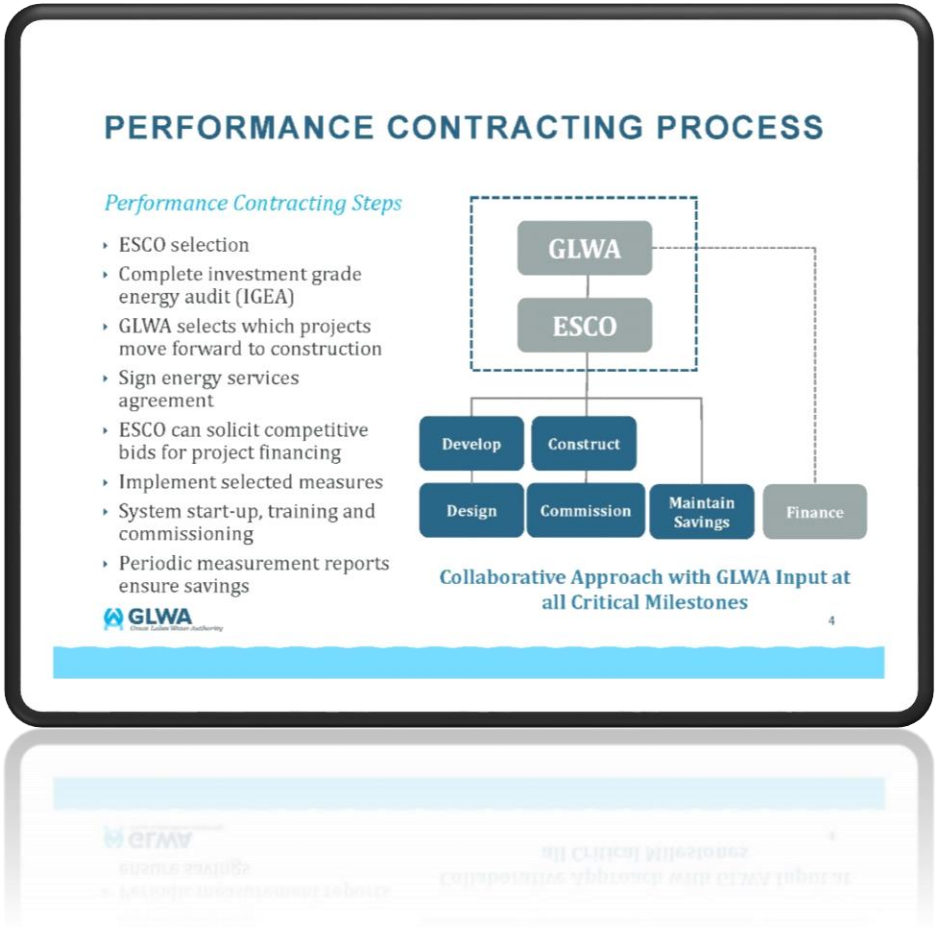
- Complete Investment Grade Energy Audit (IGEA)
- GLWA selects which projects move forward

Phase II – Evaluation

- Define Projects
- Calculate Present Worth

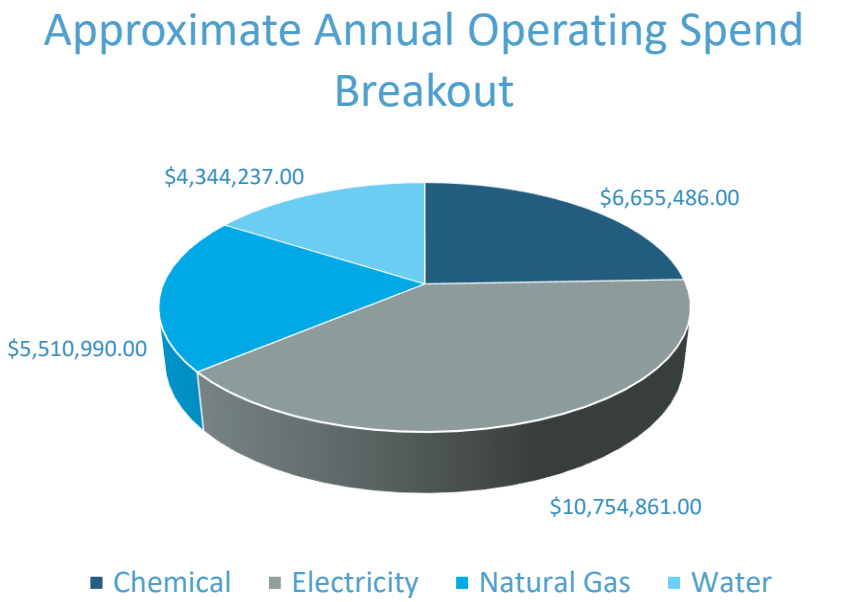
Phase II – Design

- *Develop Design Documents*
- *Solicit and Obtain Construction Bids*
- *Guarantee Performance and Savings*



Phase I - Energy Audit

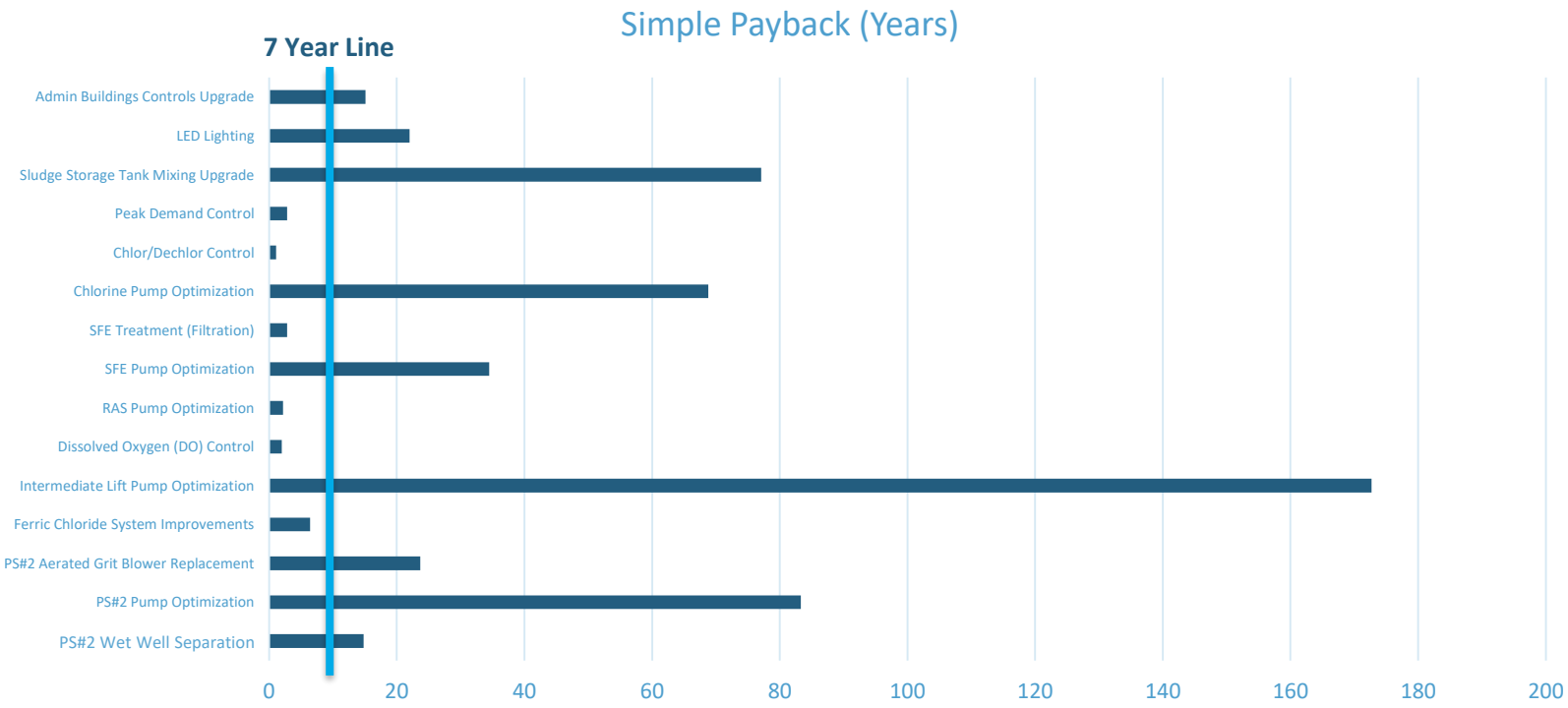
- Report
  - Electrical
    - 25 Building/Process Areas Were Identified
    - Rates Broken Down by Components
    - Loading During Normal and Peak Conditions
  - Natural Gas
    - 19 Building/Process Areas Were Identified
  - Water
    - 13 Meters
  - Process Chemicals
    - 6 Suppliers



*The cost are for the WRRF facility only. The cost presented in the graph above are based on usage data from May 2017 thru April 2018.

Phase I - Energy Audit

- Energy Conservation Measures (ECMs)
  - 20 Measures were identified, 15 with Simple Payback



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Phase I - Energy Audit

		Turnkey Cost	Utility Savings	Chemical or O&M Savings	Simple Payback (Years)
CON-222 & CIP-211008 →	Ferric Chloride System Improvements	$417,000.00		$65,000.00	6.4
	Dissolved Oxygen (DO) Control	$1,160,000.00	-	$570,000.00	2
	RAS Pump Optimization	$665,000.00	$307,200.00		2.2
	SFE Treatment (Filtration)	$8,936,000.00	$3,170,500.00		2.8
CON-238 →	Chlor/Dechlor Control	$100,000.00	-	$90,000.00	1.1
	Peak Demand Control	$963,000.00	$343,900.00		2.8

- Costs provided are at preliminary level estimates
- The audit identified six improvement opportunities with less than 7-year payback
- Several of those opportunities are captured in existing projects in progress
- GLWA elected to focus on two of the ECMs to advance into Phase II
  - Aeration Optimization
  - Secondary Final Effluent System (SFE)

Energy Conservation Measures

- ECM-1: Aeration System Improvements (CIP 212008)
  - Innovative Oxygen Control
  - Electric Peak Demand Control

	Turnkey Cost	Savings Source	Savings per Year	Simple Payback (Years)
Dissolved Oxygen Control	$1,160,000.00	Oxygen	$570,000.00	2.04
Peak Demand Control	$963,000.00	Electricity	$343,900.00	2.8

  - Additional Operational Needs (Greater than 7year payback)
    - Anaerobic Zones
    - Level Control
    - Mixer-Aerator Replacement

	Turnkey Cost	Savings Source	Savings per Year	Simple Payback (Years)
Level Control*	$3,000,000.00	Electricity & Operations	$106,000.00	28.3
Anaerobic Zones*	$5,000,000.00	Chemical	TBD	TBD
Mixer-Aerator Replacement*	$35,000,000.00	Electricity & Oxygen	$312,450.00	112

*The additional improvements identified for the operational needs increase the total payback for the project to greater than 20 Years

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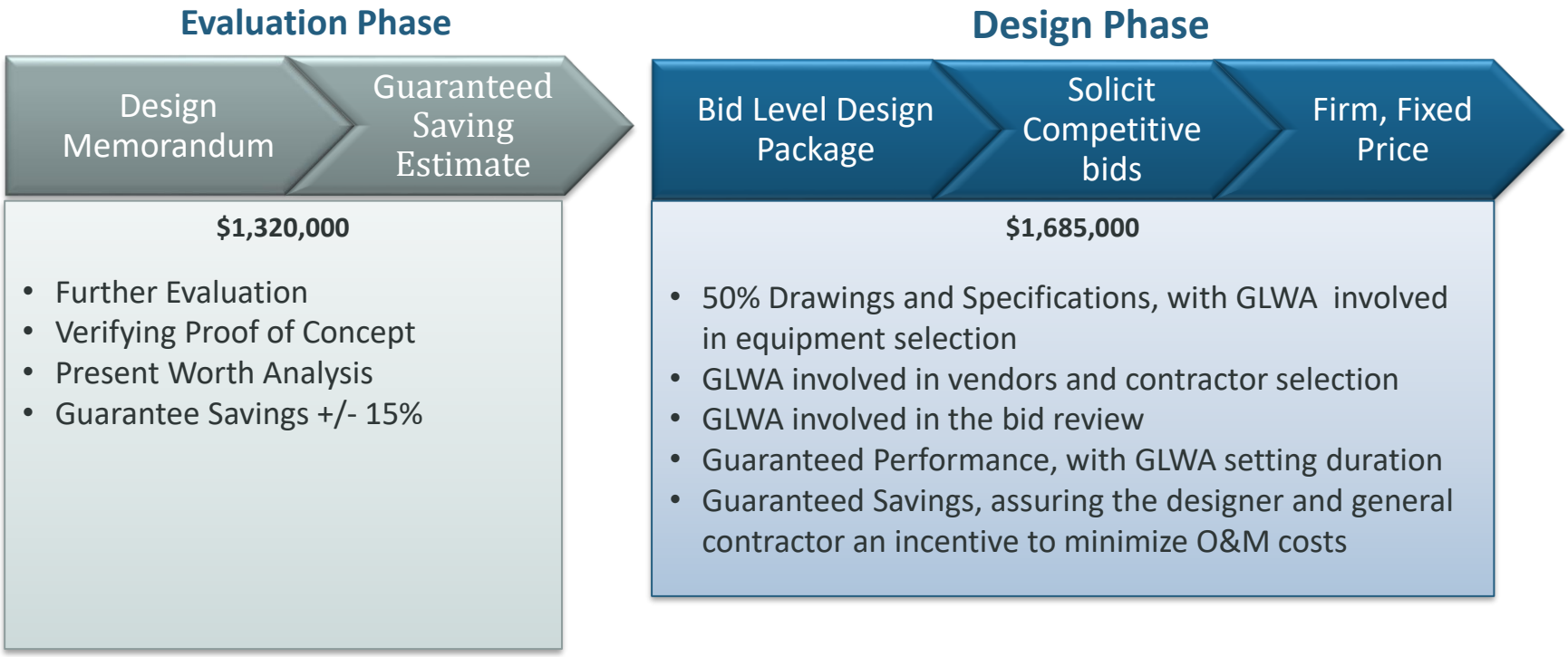
Energy Conservation Measures

- ECM-2: Screened Final Effluent (SFE) System Improvements (CIP 216008)
  - Right-Size the system to improve efficiency
  - Adding treatment to allow for additional water reuse to improve the facility sustainability and resiliency
  - New structure to improve the operation and maintenance of the assets including needed space for treatment.

	Turnkey Cost	Savings Source	Savings per Year	Simple Payback (Years)
SFE Treatment	$8,936,000.00	Water	$3,170,500.00	2.83
SFE Pump Replacement	$8,861,000.00	Electricity	$256,700.00	34.5
Connect to Secondary Water	$750,000.00	Water	$96,172.00	7.8
SFE Building and Infrastructure	$7,151,000.00	N/A	N/A	N/A
Total	$25,698,000.00		$3,523,372.00	7.3

Phase II - Noresco Proposal (ECM 1 & 2)



- Noresco's proposal include scope of services for proceeding with both ECM 1 and ECM 2

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Next Steps

- Revise the scope of services to eliminate ECM1 (Aeration System Improvement)
- Obtain O&R Committee approval to proceed with Energy Audit Project Delivery Method for ECM 2 only (Screened Final Effluent (SFE) System Improvements)
- Begin negotiation with Noresco to establish a contract for Phase II & III
- Obtain Consensus from Stakeholders
- Request GLWA Board Authorization to enter into contract for Phase II & III
- GLWA to continue forward with Aeration System Improvement Design and Construction through alternative delivery method.

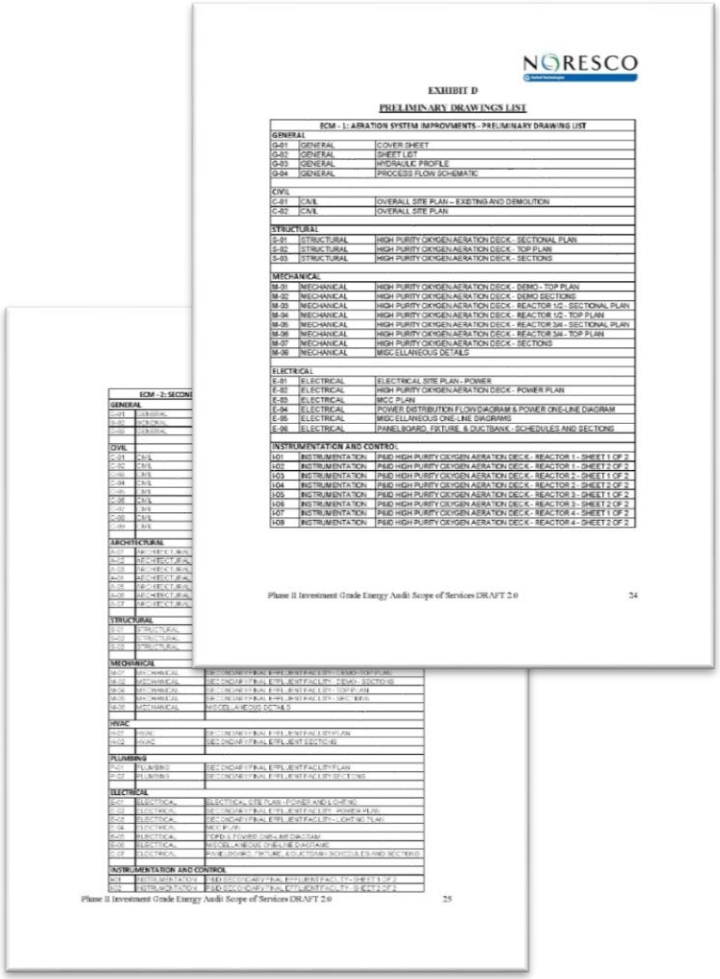
NORESCO

EXHIBIT D

PRELIMINARY DRAWINGS LIST

ECM - 1: AERATION SYSTEM IMPROVEMENTS - PRELIMINARY DRAWING LIST

GENERAL		
G-01	GENERAL	COVER SHEET
G-02	GENERAL	SHEET LIST
G-03	GENERAL	HYDRAULIC PROFILE
G-04	GENERAL	PROCESS FLOW SCHEMATIC
CIVIL		
C-01	CIVIL	OVERALL SITE PLAN – EXISTING AND DEMOLITION
C-02	CIVIL	OVERALL SITE PLAN
STRUCTURAL		
S-01	STRUCTURAL	HIGH PURITY OXYGEN AERATION DECK - SECTIONAL PLAN
S-02	STRUCTURAL	HIGH PURITY OXYGEN AERATION DECK - TOP PLAN
S-03	STRUCTURAL	HIGH PURITY OXYGEN AERATION DECK - SECTIONS
MECHANICAL		
M-01	MECHANICAL	HIGH PURITY OXYGEN AERATION DECK - DEMO - TOP PLAN
M-02	MECHANICAL	HIGH PURITY OXYGEN AERATION DECK - DEMO SECTIONS
M-03	MECHANICAL	HIGH PURITY OXYGEN AERATION DECK - REACTOR 1/2 - SECTIONAL PLAN
M-04	MECHANICAL	HIGH PURITY OXYGEN AERATION DECK - REACTOR 1/2 - TOP PLAN
M-05	MECHANICAL	HIGH PURITY OXYGEN AERATION DECK - REACTOR 3/4 - SECTIONAL PLAN
M-06	MECHANICAL	HIGH PURITY OXYGEN AERATION DECK - REACTOR 3/4 - TOP PLAN
M-07	MECHANICAL	HIGH PURITY OXYGEN AERATION DECK - SECTIONS
M-08	MECHANICAL	MISC ELLANEOUS DETAILS
ELECTRICAL		
E-01	ELECTRICAL	ELECTRICAL SITE PLAN - POWER
E-02	ELECTRICAL	HIGH PURITY OXYGEN AERATION DECK - POWER PLAN
E-03	ELECTRICAL	MCC PLAN
E-04	ELECTRICAL	POWER DISTRIBUTION FLOW DIAGRAM & POWER ONE-LINE DIAGRAM
E-05	ELECTRICAL	MISC ELLANEOUS ONE-LINE DIAGRAMS
E-06	ELECTRICAL	PANEL BOARD, FIXTURE, & DUCTBANK - SCHEDULES AND SECTIONS
INSTRUMENTATION AND CONTROL		
I-01	INSTRUMENTATION	P&ID HIGH PURITY OXYGEN AERATION DECK - REACTOR 1 - SHEET 1 OF 2
I-02	INSTRUMENTATION	P&ID HIGH PURITY OXYGEN AERATION DECK - REACTOR 1 - SHEET 2 OF 2
I-03	INSTRUMENTATION	P&ID HIGH PURITY OXYGEN AERATION DECK - REACTOR 2 - SHEET 1 OF 2
I-04	INSTRUMENTATION	P&ID HIGH PURITY OXYGEN AERATION DECK - REACTOR 2 - SHEET 2 OF 2
I-05	INSTRUMENTATION	P&ID HIGH PURITY OXYGEN AERATION DECK - REACTOR 3 - SHEET 1 OF 2
I-06	INSTRUMENTATION	P&ID HIGH PURITY OXYGEN AERATION DECK - REACTOR 3 - SHEET 2 OF 2
I-07	INSTRUMENTATION	P&ID HIGH PURITY OXYGEN AERATION DECK - REACTOR 4 - SHEET 1 OF 2
I-08	INSTRUMENTATION	P&ID HIGH PURITY OXYGEN AERATION DECK - REACTOR 4 - SHEET 2 OF 2

Phase II Investment Grade Energy Audit Scope of Services DRAFT 2.0 24

Phase II Investment Grade Energy Audit Scope of Services DRAFT 2.0 25

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Questions

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