

November 03, 2021

# SGS North America, Inc. Hurricane Ida Building Evaluation

151 James Drive West  
St. Rose, Louisiana

Mr. Thomas Phan  
SGS North America  
Deer Park, Texas

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Issued for Review  
Project #2021.151



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— TBPE FIRM REGISTRATION F-9027 —

**DRAFT**

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# EVALUATION

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## INTRODUCTION

Making landfall on August 29, 2021, the Category 4 Hurricane Ida became the second most damaging and intense hurricane to make landfall in Louisiana on record, behind Hurricane Katrina in 2005. The following report documents impact of this hurricane to the SGS North America facility located at 151 James Drive West, St. Rose, Louisiana. The building at this location consists of an office area with an adjacent laboratory used for testing products related to the oil and gas industry. This building was damaged, partially flooded, and without power during Hurricane Ida.

SGS North America has employed Mr. Douglas B. Lyle, a licensed professional engineer in the State of Texas, a principle at Lyle Engineering, and the Senior Engineer at A/W Mechanical Services to conduct this investigation. Mr. Lyle has spent the last nineteen years evaluating, designing, and installing air conditioning systems. He currently holds a Bachelor of Science in Mechanical Engineering from Louisiana Tech University, a Master of Science in Engineering Management from Southern Methodist University and has been a licensed Professional Engineer (PE) for sixteen years.

As directed by Mr. Thomas Phan (SGS North America), Mr. Lyle was to initially evaluate the current HVAC system installed at the St. Rose location to determine if the existing system could be properly cleaned. SGS had performed its own independent test and discovered the presence of harmful mold in the building and in the HVAC system which was driving the push to clean the system. Most of this mold is a result of a combination of the age of the existing HVAC system and the damage from and lack of power due to Hurricane Ida. Mr. Lyle was directed to produce a report documenting deficiencies, make recommendations to repair the discovered deficiencies, and develop costs to make the recommended repairs.

Upon arrival in New Orleans, a full set of plans for the SGS building (circa 1981) were given to Mr. Lyle showing all original design intent for the Architectural, Structural, Mechanical, Electrical, and Plumbing systems in the building. However, because of the extent of the damage and the age of the building, Mr. Lyle's investigation quickly expanded to observe both the condition and the impact of Hurricane Ida on these systems.

The results of Mr. Lyle's investigation show no part of the current HVAC system is salvageable and requires complete replacement to properly operate the office and laboratory. These upgrades are necessary to comply with current mechanical codes, ASHRAE recommendations, and OSHA regulations. In addition to the HVAC system, the building requires mold remediation, architectural work (sealing the building envelope), roof work, and some electrical and plumbing "upgrades" to continue to use the office and laboratory in a safe manner.

To operate the building as a laboratory (as intended), the Heating, Ventilation, and Air Conditioning system will need to be designed and installed such that the building maintains negative and positive pressures, air change rates, and ventilation, as prescribed for a commercial laboratory space. The existing HVAC equipment is mostly original and the 1981 design absolutely DOES NOT meet any of the above noted requirements. This will require installation of air conditioning units that are suited for the ever-changing space conditions in a laboratory *AND* suited for the St. Rose/ Gulf Coast environment.

To correct these issues noted above along with others noted throughout this report, Lyle Engineering recommends complete replacement of the HVAC system including the exhaust and controls system in the building, upgrades for the electrical switchgear serving the main building, replacement of the

roof insulation and membrane along with installation of proper roof curbs, flashing, gutters, and roof penetrations, sealing of the building envelope including “cracks” in the plenum space and areas of leakage, replacement of the damaged insulation (including upgrades to the exterior insulation in the office space), complete mold remediation, and replacement of the damaged sheetrock, carpet, and ceiling tiles throughout the facility.

The remainder of this report details the findings of Mr. Lyle and his staff including details of each system, photos, recommendations, and cost analysis of the repairs.



## INVESTIGATION

Prompted by the detection and identification of mold in the building, Mr. Phan asked Lyle Engineering to investigate the building systems to determine deficiencies in the building and make recommendations to correct these issues. The steps in carrying out such an investigation is to determine exactly what type of system serves the facility/building, determine if it is sized adequately, determine if it is installed and working correctly, and make recommendations on how to correct the problem, if one exists. The investigation was originally intended to concentrate on these areas, however, given the extent of damage to the building, this investigation has expanded to cover, in addition to the mechanical systems, the electrical, plumbing, roofing, maintenance, and general damage to the building.

### GENERAL ARCHITECTURAL

SGS St. Rose is a one-story office/laboratory designed and built in 1981 consisting of approximately 11,600 sq. ft. of office space ("Office") adjacent to nearly 7,000 sq. ft. of testing laboratory ("Central Lab"). There is an additional 4,600 sq. ft. of storage/laboratory space across an open walkway from the lab area ("West Lab"). See Appendix "G" for a General Floor Plan of the building.

The office area is metal framed with a 5/8 gypsum, water barrier, and brick exterior. Windows are single pane 1/4" and the building also has spandrel glass in the plenum space. The central lab area is constructed of 8" cinderblock walls which serve as a firewall between the lab and office space. The office/central lab roof has a LWIC roof deck; however, the west lab area has a metal, standing seam roof.

### ROOFING SYSTEM

The Office and Central Lab share a Lightweight insulating Concrete (LWIC) Roof cast over a galvanized metal deck. This roofing system has insulation sandwiched between layers of lightweight concrete with a roofing membrane on top. At some point in the past, the membrane was coated with a sprayed fiberglass product. The current fiberglass membrane is not sloped properly, is peeling, is blistered in multiple places, and not properly flashed to the mechanical curbs/penetrations through the roof. Hurricane IDA caused extensive damage to the mechanical systems on the roof and to the roof flashing at the West lab.

### MECHANICAL SYSTEM - OFFICE

The office area is served by two (2) Carrier DX split systems originally installed in 1981. Over the past 40 years, some components have been replaced; however the original indoor air handling units and distribution system remain in service. The units were originally designed to serve an office variable air volume system which allows for multiple control zones throughout the office. Air is treated (cooled) at the units and distributed through a galvanized sheetmetal duct system that is internally lined with a fiberglass duct liner. The zoning system was either removed at some point or was never installed correctly and the zoning controls have been removed from the system. All air in the office building returns to the mechanical rooms through the plenum space (above ceiling). Fresh air (outdoor air or OA) is transferred to the Carrier air handling units through an intake hood on the roof.

### MECHANICAL SYSTEM – CENTRAL LABORATORY

The lab area is served by two (2) Carrier DX split systems originally installed in 1981. Over the past 40 years, some components have been replaced; however, the original indoor air handling units and distribution system remain in service. The units were designed to recirculate air from the lab. The

AC system is supplemented by a 3-ton rooftop package unit which has been replaced within the past 3 years and a 17-ton package unit which was added to the building within the last few years. The “recirculation” has been eliminated at one of the Carrier air handling units forcing it to “make-up” its air through the office space. As a result of this makeup, the office is negatively pressurized in relation to the lab area.

Makeup air to the lab is supplied through supply fans on the roof ducted to the lab. These fans were designed to bring in approximately 23,000 cfm (cubic feet per minute) of air to “makeup” for the air exhausted through the lab hood exhaust system. These fans supply ambient air from the roof. None of these fans are currently in operation.

The exhaust fans in the lab are mostly functional; however, most are at the end of their useful life. A majority of the fans do not have proper “stacks” to exhaust the air above the roof line or OA intakes. All hood exhaust fans are mounted on 4x4 treated wood which is simply set on the roof. The lab currently exhaust about 26,000 cfm of air, all of which must be made-up either through the office or from outside air intakes. There is no pretreatment of the outside air before it enters the building.

#### MECHANICAL SYSTEM – WEST LABORATORY

The West Laboratory is served by three (3) rooftop package units (sitting on the Central Lab roof) and associated ductwork. While part of the original design, two (2) of these unit have been replaced within the last 10 years. Most ventilation fans for this area are not working (some were damaged during Hurricane Ida) and some supplemental HVAC has been added to the octane room to help control temperature.

#### PLUMBING SYSTEM

The office plumbing system performs as designed serving four restrooms and a breakroom. The SGS personal have not complained of system backups; however, the system could benefit from the replacement of the fixtures in the building.

The roof drainage system discharges its water through two roof drains and a series of gutters that move water to the sanitary system. The roof drains and gutters will require replacement when the roof is addressed.

The lab drainage system consists of a series of floor drains, sinks, and an acid waste neutralization tank installed in ground upstream of the primary sanitary connection. Most floor drains seemed to be painted over in the lab area. The Acid neutralization tank is original – installed in 1981.

#### ELECTRICAL SYSTEM

The electrical system is a 1600-amp service originally installed in 1981. The main service is 460V/3Ø and is stepped down to 208-230V/1Ø in the primary electrical room. There is no primary disconnect for the building.

## HURRICANE IDA

The effects of Hurricane Ida were devastating to SGS in St. Rose. Although roof leaks were present, additional water was “pushed” into the building from the effects of strong winds and ground water. Combined with a lengthy loss of power, mold began to quickly set in the gypsum and fiberglass insulation. In addition to the loss of carpet, sheetrock, and insulation, decay set in on the metal track used to construct the walls. Loss of power also accelerated the growth of mold in the insulated duct system rendering the system useless after power was returned to the building.

Hurricane Ida also had devastating effects on the roof by peeling up much of the fiberglass coating and blowing over or damaging many of the exhaust fans. The metal flashing was also peeled from the West lab, exposing much of the area to the outside air.

## BUILDING RECOMMENDATIONS

### GENERAL ARCHITECTURE<sup>1</sup>

Because of the damage from Hurricane IDA, the following work will be required at the interior of the building:

- Remediation of all mold in the building.
- Replacement of all metal track that is damaged / decayed due to water damage.
- Replacement of all insulation in the walls removed from Hurricane Ida damage. We recommend using an open cell spray foam insulation in the exterior walls including applying insulation on the spandrel glass in the plenum area.
- Replacement of carpet where damaged.
- Sealing of the building envelope including all cracks or building penetrations to prevent air and water intrusion.
- Replacement of all ceiling tile in the Office and Central lab.

Optional General Architectural includes the following:

- Removal of the old laboratory equipment in the front office.
- Replacement of the office carpet.
- Replacement of the laboratory flooring.
- Re-arrangement of the Central Lab / Office to facilitate more lab space and less office space.

### ROOFING<sup>2</sup>

Due to the deficiencies in the existing roof, we recommend a new roof be applied. This will require removal of the fiberglass coating and original roof membrane to expose the existing lightweight concrete. To achieve current IECC R-values on the roof, we recommend installation of polyisocyanurate board insulation to the existing roof which will be sloped to achieve the proper drainage as originally designed and a TPO membrane applied. During the process of replacing the roof system, all mechanical equipment will need to be raised to a minimum of 14” above the roof and

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<sup>1</sup> See Appendix C, D, & E for General Architectural Pictures

<sup>2</sup> See Appendix A for Roofing Pictures

proper curbs for all equipment will be installed and tied to the structure for wind-storm ratings (if not being replaced under the mechanical contract). All plumbing drains (total of 2) and the gutter system will be replaced as well. If desired by SGS to “fill in” the atrium area, this will receive a new roof as well.

### MECHANICAL<sup>3</sup>

As noted earlier, the mechanical system for the entire building is just over 40 years old. The building was originally designed to makeup air through a series of supply air fans. Per current mechanical codes and recommendations by ASHRAE, the laboratory should remain in a negative pressurization in relation to the adjacent office space; the office should always be “positive” in relation to the laboratory. A majority of the exhaust fans do not have proper exhaust stacks on the positive side of the fan and all are set on the roof on 4x4 pressure treated wood. None of the emergency purge works in the lab; however, SGS no longer needs the emergency purge system. All of the air in the office and lab is distributed through internally lined ductwork that is molded and cannot be cleaned of the mold. Neither the office zoning system nor the electric heating system currently function and the office is in a constant negative state as the air from the office is used to “makeup” the exhaust air from the lab.

We recommend the entire mechanical system be replaced with a system that is suitable for a commercial laboratory. This includes replacement of all mechanical components including units, fans, ductwork, controls, refrigerant pipe, and dampers. To properly treat the outside air in the laboratory, an air cooled, chill water system with hot water heating should be utilized to properly handle the sensible and latent loads common to the New Orleans area. The air will be distributed with newly installed, externally wrapped, galvanized ductwork. New air handling units sized for the proper amount of ventilation air will be installed to serve the office, central lab, and west lab. The existing mechanical rooms in the building can be utilized for the new AHUs along with some space on the roof for the west lab.

A 1.5MM Btu/hr heating loop consisting of two boilers and associated pumps, piping, etc. will be added to provide re-heat for the lab areas and handle winter temperatures.

With the proper controls installed, the new HVAC system can be limited to approximately 140-tons for the lab area with an additional 35-40 tons for the office area. This provides 12 air changes per hour (ACH) for the lab areas and controls humidity and temperature. This system will also require retrofit of the existing hoods to monitor sash position and balance the air in the lab accordingly.

A new building automation system (BAS) able to control and monitor the chillers, boilers, air handling units, exhaust system, system pressurization, and lab hoods will be installed with the new mechanical equipment. SGS North America currently holds a Computrols Building Automation System (CBAS) license at the Deer Park, Texas location which is applicable to any location in North America.

Ideally, new exhaust fans and outside air intakes will be installed in conjunction with the new roof work.

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<sup>3</sup> See Appendix B for Mechanical Pictures

## PLUMBING

Recommended plumbing improvement include the following:

- Replacement of the existing roof drains with proper drains and covers (performed during the roof work).
- Rodding out/cleaning all sewer lines to ensure proper flow.
- Evaluation of the acid neutralization tank
- Cleaning / replacement of the Central Laboratory floor drains

## ELECTRICAL

Most electrical upgrades in buildings such as this tend to become a necessity as mechanical equipment is upgraded. However, we do recommend, in conjunction with the mechanical upgrades, replacement of the main switch gear to add a new service disconnect for the electrical system.

## COSTS

Remodel of the interior of the building will incur Architectural cost for permitting drawings if changes are to be made to the interior of the building (i.e. re-arranging the laboratory and office area). If SGS wishes to pursue interior remodeling, Lyle Engineering will consult with a Louisiana based architect for design fees related to this work.

Replacement/renovation of the MEP systems and roof work will require engineering design and drawings suitable for permit by the local authorities and construction. The proposal for this work from Lyle Engineering is found in Appendix F.

Cost estimates for the mold remediation, architectural work, mechanical/electrical/plumbing (MEP) work, and roof work are forthcoming and will be published once all estimates have been compiled from the appropriate sub-contractors.

## APPENDIX A: ROOF PHOTOS

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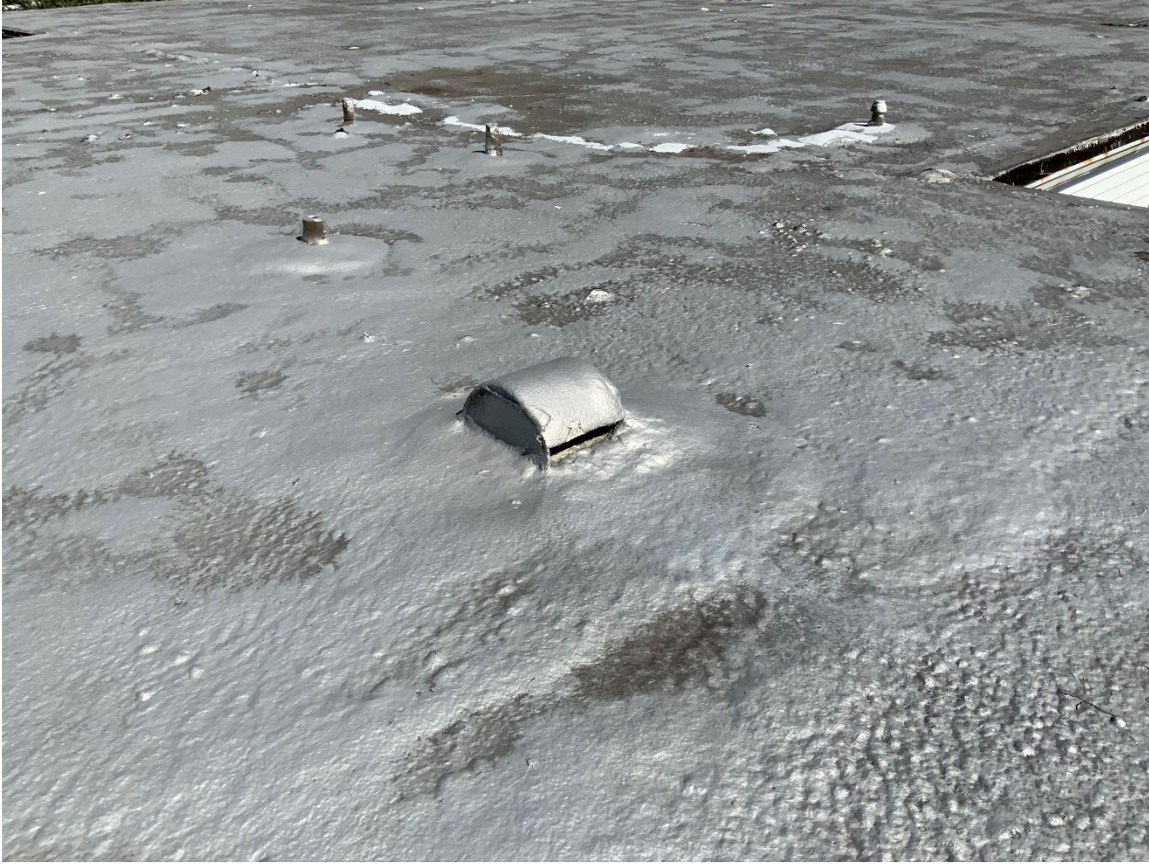


































## APPENDIX B: MECHANICAL PICTURES

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## APPENDIX C: GENERAL ARCHITECTURAL PICTURES (OFFICE AREA)

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Figure C.2: East Front Wall in Office Area

























## APPENDIX D: GENERAL ARCHITECTURAL PICTURES (CENTRAL LABORATORY)

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## APPENDIX E: GENERAL ARCHITECTURAL PICTURES (WEST LAB)

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Figure E.1: West Lab Ceiling (where flashing removed due to Hurricane IDA).





Figure E.2: West Lab



Figure E.3: West Lab





Figure E.4: West Lab Octane Room





Figure E.5 – West Lab Maintenance (fan damaged during Hurricane IDA).

# APPENDIX F: ENGINEERING SERVICES PROPOSAL

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November 3, 2021

Mr. Thomas Phan  
SGS North America  
Deer Park, Texas  
[thomas.phan@sgs.com](mailto:thomas.phan@sgs.com)

*SGS St. Rose Engineering Services Proposal*  
*LEI Project No. **2021.151-SGS\_StRose***

Mr. Phan,

Lyle Engineering Inc., is pleased to submit the following proposal to provide consulting engineering services for the SGS North America Facility located at 151 James Drive West, St. Rose, Louisiana.

This proposal includes a proposed scope of consulting engineering services and fee based upon review of the existing building, several project walks at the facility, and a review of existing plans.

## Scope of Basic Services

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Lyle Engineering Inc., will participate as a member of the development team, working in conjunction with the owner, and insurance agents (if applicable) to identify and respond to key issues related to design and renovation of the SGS St. Rose office and laboratory space including the roofing, electrical, plumbing, and air conditioning and ventilation systems (HVAC). All work will be performed according to the schedule agreed upon by SGS and Lyle Engineering.

Our proposal, scope of services, and deliverables for each Phase are described below:

- I. Design Documentation Phase
  - a. Design Discussions and Meetings – Participate in design discussions and site visits, providing mechanical, roofing, electrical, and plumbing system requirements for incorporation into architectural/structural drawings as required.
  - b. Engineering Calculations – Prepare calculations establishing capacity requirements for mechanical and plumbing equipment and systems. Select equipment from manufacturer's product catalogs.
  - c. Drawings and Specifications – Prepare schematic mechanical drawings and specifications (if required) for the project. Drawings will be prepared using CAD drawings files. Specifications (if needed for the project) will be in Adobe PDF and printed in 8 ½ x 11" formats. Drawings and specifications will be suitable for bidding, permit, and construction.
- II. Construction Phase
  - a. Submittals – Review shop drawings and major equipment product data submittals only for general conformance with the design concept and information given in the design documents.
  - b. Construction Meetings – participate in project construction meetings on an as-needed basis to address specific issues related to the designed systems.



- c. Request for Information (RFI) – Review and respond to legitimate request by the subcontractor for supplemental information to clarify design intent. This proposal assumes qualified Contractors will be hired and the legitimate need for supplemental information to define design intent will be minimal.

### Scope of Additional Services:

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Any services provided beyond the above-described Basic services shall be defined as Additional Services. Each Additional Service shall be individually approved in writing prior to providing the service.

### Scope of Excluded Services:

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Architectural and Structural design services are not part of this proposal.

### Fee for Services:

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#### **BASIC SERVICES**

Basic Services compensation shall be a fixed fee of **\$60,000.00**. Services will be invoiced monthly based upon our estimate of the percentage of services completed.

#### **ADDITIONAL SERVICES**

Additional Services charges are not subject to the maximum fixed fee and will be approved in writing prior to proceeding with the work. Additional Services will be invoiced monthly on an hourly basis at the standard hourly rates plus expenses incurred. A listing of typical additional services is attached as Appendix A.

#### **HOURLY RATE SCHEDULE**

Lyle Engineering Inc.'s hourly rate schedule is as follows:

<u>Category</u>	<u>Hourly Rate</u>
Principal	\$160.00
Senior Project Manager	140.00
Project Manager	120.00
Senior Project Engineer	100.00
Project Engineer	90.00
Senior Designer	80.00
Designer	70.00
CAD Technician	65.00
Technical Support	60.00

**REIMBURSABLE EXPENSES:**

Normal, reimbursable expenses include courier service, shipping, and delivery charges, in-house plotting, and/or photocopy reproductions, and reproduction of drawings and specifications for issue to the City, Owner, or Contractors. A carrying fee of 10 percent (10%) will be added to all reimbursable costs.

**Payment:**

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Payment of invoices shall be due upon receipt. Invoices shall be considered Past Due if payment is not received within thirty (30) days of the invoice date and subject to a finance charge.

**Ownership of Instruments of Service:**

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All reports, plans, specifications, drawings, and electronic media prepared by **Lyle Engineering, Inc.** as instruments of service shall remain the property of **Lyle Engineering, Inc.**

**Proposal Acceptance:**

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If this proposal is acceptable, please indicate acceptance by adding the appropriate signature in the space provided below and returning the signed original to our office. We will proceed with the work upon receipt of the executed proposal.

Respectfully Submitted,



Douglas B. Lyle, P.E.  
Engineering Services

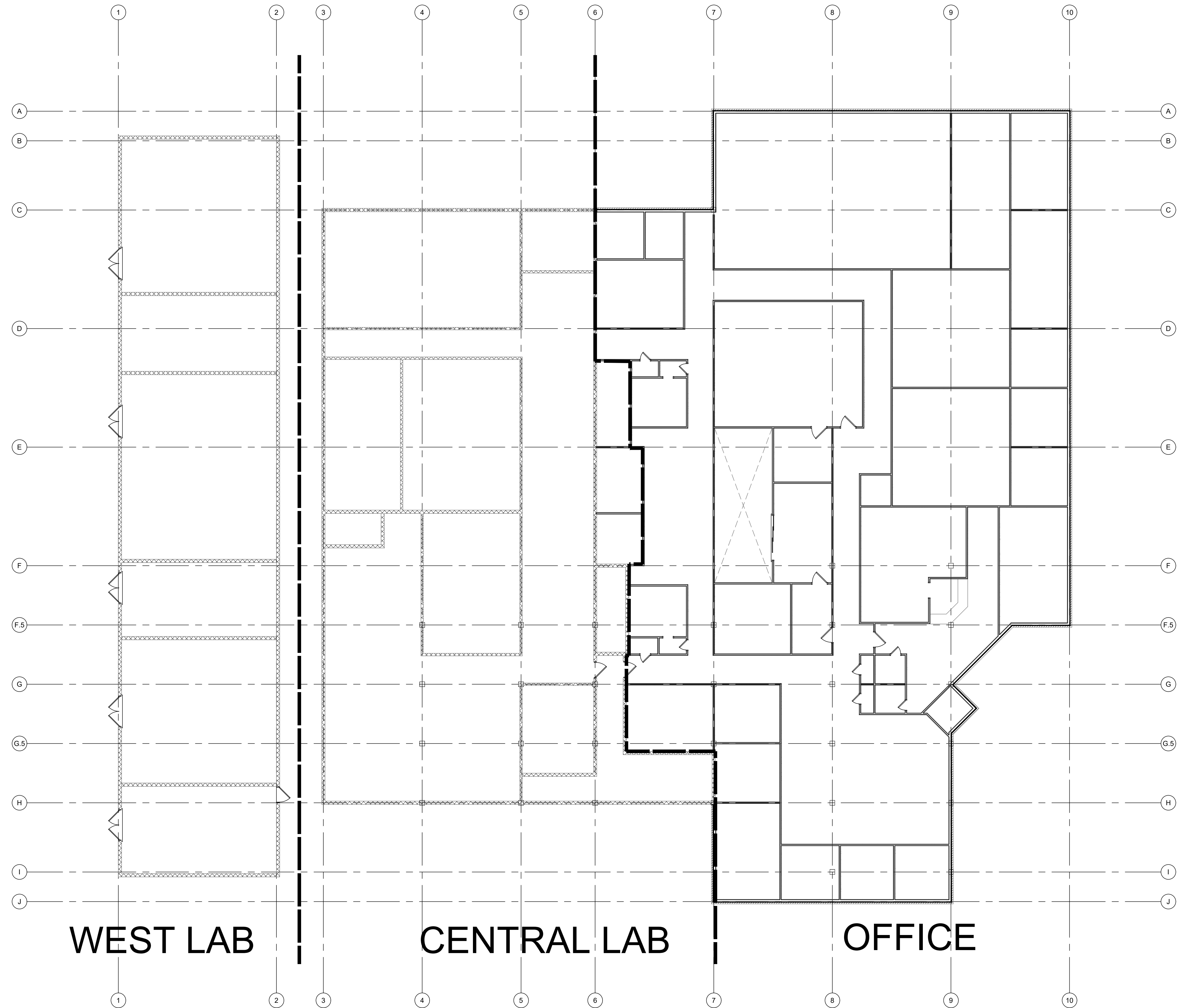
The above prices, specifications, and conditions are satisfactory as stated and are hereby accepted. You are authorized to do the work as specified. Payment will be made as outlined above.

**SIGNATURE:** \_\_\_\_\_ **DATE:** \_\_\_\_\_

## APPENDIX G: GENERAL FLOOR PLAN

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Consultants:

Lyle Engineering, Inc.  
26807 Vista Meadow Court  
Huffman, Texas 77336  
713.306.7487

SGS North America, Inc.  
NOLA UPGRADES

Highway 362  
Waller, Texas 77484

REV #	DATE	DESCRIPTION



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PROJ. #: 2021.04	SCALE: AS SHOWN
DRAWN BY: DH	CHECKED BY: DBL

DRAWING NAME

COMPOSITE  
PLAN

G0.00

1 SGS COMPOSITE PLAN  
G0.00 NOT TO SCALE

# APPENDIX H: COST ESTIMATES

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