



**LSD&FC**

LAGOS STATE DNA AND FORENSIC CENTER

# ***Strategic, Business & Operational Plan***

**Lagos State DNA & Forensic Center  
48 Broad Street, Lagos Island,  
Lagos, Nigeria.**

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# 1. Historical Overview and Background

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Lagos State is the most populated state in Nigeria and it is located in the south-western part of Nigeria. It is bordered on the North and East by Ogun State, in the West by the Republic of Benin and in the South by the Atlantic Ocean. About 22% of its 3,577 km<sup>2</sup> area are lagoons and creeks.

The city of Lagos is Nigeria's largest city and largest economy. According to Heinrich-Boll-Stiftung (HBS) Foundation report, if Lagos State were a country, it will rank number 7 in Africa, which will make it bigger than the following countries; Kenya, Cote D Ivoire, and Ghana. With a population of over 21 million (Nigerian Population Report, 2014), Lagos is the 7th fastest growing city in the world. The Borgen Project reports an annual growth rate of 2 to 3 percent. The Lagos economy is diversified. It includes manufacturing, transportation, construction, services, wholesale, and retail sectors. The State accounts for over 60 percent of the industrial and commercial output of Nigeria and a 2015 report by the *Economist* states that Lagos State generates \$90 billion dollars in goods and services annually.

As would be expected in many mega cities different kinds of crime, including murder, kidnappings, extortion, carjacks, assaults, rapes, armed muggings and burglaries occur in Lagos, which is why the United States Overseas Security Advisory Council (OSAC) gives Lagos a crime rating of "critical".

The Lagos State DNA & Forensic Center (LSD&FC) was established as a dedicated crime laboratory to help fight crime and make Lagos a safe place to live, work, visit and play. LSD&FC is owned by the Lagos State government. It was conceptualized, developed and currently operated and managed under a multi-year contract by ITSI-Biosciences, LLC, a Johnstown, PA, USA based company. LSD&FC is organized under the Lagos State Ministry of Justice (MoJ), and a committee chaired by the Solicitor General & Permanent Secretary, Ministry of Justice provides oversight. The design, construction, staffing and equipping of the Forensic DNA and Forensic Serology section occurred between June 2016 and August 2017.

The initial plan was to establish only a DNA forensic section. However, in recognition of the fact that no single forensic discipline will be sufficient to solve every type of crime, a decision was made in July 2017 to phase in other forensic disciplines, such as toxicology, chemistry, trace evidence, firearms, ballistics, toolmarks, digital forensics and questioned documents.

The official commissioning of the Forensic Science program and start of Forensic DNA and Forensic Serology Services was conducted by His Excellency Mr Akinwunmi Ambode, the Governor of Lagos State on 27<sup>th</sup> of September 2017.

Phase 2 of the LSD&FC project concerned with the development of the forensic toxicology and chemistry disciplines, central administration, training laboratory and security

enhancement started in 2018. It is expected that the remaining forensic disciplines will be established as needed between 2021 and 2025.

## *2. Purpose, Vision and Mission*

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The main purpose of establishing LSD&FC is to make available modern scientific methods and expertise to investigators, law enforcement and the judiciary, to help solve crime and resolve disputes faster and unequivocally in Lagos State. It is expected that LSD&FC will help improve public safety by facilitating faster dispensation of justice in Lagos State. LSD&FC is a not-for-profit organization that is open to the public. However, LSD&FC will apply good business principles to ensure that the highest level of forensic services are provided and some if not all the cost associated with rendering forensic services is recovered.

The LSD&FC business and operational plan encompass three fundamental management priorities that aim to maximize the value derived from all LSD&FC assets. LSD&FC operates a socially responsible business model that focuses on empathy, sustainability and maximization of the government's investment to support public safety.

LSD&FC management will strive to maximize the value that will be reaped from the LSD&FC assets via the following management priorities, namely:

- a) Enhance public safety and discourage criminal behavior by faster resolution of cases.
- b) Generate income from personal services rendered to clients.
- c) Increase the asset value of LSD&FC and
- d) Protect the income and value of all assets.

The LSD&FC strategic business and operational plan describes how these management priorities will be achieved, and the execution of these priorities will represent the business and operational plan for LSD&FC.

### *Vision Statement*

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The Lagos State DNA & Forensic Center shall be a leading and trusted forensic science center that supports criminal investigators, judiciary, law enforcement officers and the public, to enable better, faster, reliable investigations and objective resolution of criminal and civil cases in Nigeria.

## *Mission Statement*

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The Lagos State DNA and Forensic Center shall utilize advanced scientific techniques and international best practices to provide high quality, unbiased, accurate, and reliable forensic services to help resolve cases and enhance public safety in Nigeria.

## *Core Values*

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LSD&FC adheres to the following core values that influences the way it practices forensic science and serves the public:

- Maintain quality at all times.
- Professional development.
- Work as a team.
- Be accountable
- Work in a safe environment
- Communicate clearly.
- Constant improvement.

## *3. Business Operations*

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### *3.1 Enhance public safety and discourage criminal behavior by faster resolution of cases*

The primary goal of LSD&FC is to deliver industry leading forensic services to aid investigations and unequivocal resolution of cases. LSD&FC shall achieve this goal by working closely with law enforcement, judiciary and other emergency responders to lend scientific methods to investigations. The services will be delivered using international best practices that can be defended in court. Several strategies will be used to provided services. This will include:

- a) Recruitment of qualified and experienced forensic scientists with cognate experience.
- b) Continued education and training.
- c) Acquisition and use of state-of-the-art equipment.
- d) Strict adherence to calibration and maintenance schedules.
- e) Maintaining ISO accreditation status.
- f) Implementing best facility management standards to keep .

### *3.2 Generation of recurring income*

The primary goal of LSD&FC is not income generation. However, LSD&FC will deliver certain services at a cost that will be competitive, yet enough to cover the delivery cost and allow for a modest/reasonable profit. The DFB SECTION will utilize state-of-art equipment, industry best practices and efficient processes that reduce costs to derive higher profitability. Several types of strategies will be used to generate recurring income in an organic and socially responsible manner. This will include:

- a) Establish of forensic casework support contracts and MoU's with organizations especially the Police, security agencies and NGO's.
- b) Promote paternity, maternity and other relationship testing for which clients will pay out of pocket.
- c) Establish offsite DNA collection stations around the state and country to increase the volume of the relationship tests performed.
- d) Implement multiple revenue streams for each forensic section and develop various sources of business income that can support each other.

### *3.3 Increasing the value of assets*

The LSD&FC is a *not-for-profit* entity established by the Lagos State Government to apply scientific methods in support of all public safety initiatives of the Government. However, the value and success of LSD&FC section will partly be measured by the amount of income it generates from outsourced services, to augment government investment, allow for operational efficiency and eliminate bureaucratic bottlenecks that may negatively impact its operations.

LSD&FC will increase the value of its assets by implementing;

- a) Growth strategies focused on expanding market share. It will enter new forensic markets and dominate in existing markets. It will build a recognizable brand through design and implementation of innovative marketing strategies and plans.
- b) Systems of management that are nimble, allow expansion, maintenance of intangible assets like patenting and trademarking, protection of physical assets and regular maintenance of all equipment and building to ensure smooth operations are strategies that will keep LSD&FC relevant.

### *3.4 Protect income and value*

LSD&FC protects its income and the value of its assets in a sustainable manner. It will be proactively, adopt industry best practices and implement competitive pricing strategies.

For example, it will offer unique DNA testing services desired by its customers at a competitive price. It will develop and utilize SOP's for operations, obtain and maintain international accreditation and control the quality of its services by implementing multiple QA and QC protocols.

LSD&FC ensures that it is trusted by the community it serves and that it has the highest public regards in terms of quality of service, honesty, confidentiality, accuracy of results and security of evidence.

## 4. Personnel Requirements

LSD&FC is organized under specific disciplines. Presently, the DNA and Forensic Biology and Serology Disciplines are operational and accredited. The Forensic Toxicology and Forensic Chemistry disciplines are under development. The dedicated DFB personnel focus mainly on DNA and serology testing. The core full time employees (FTE's) include a Director, Technical Leader, Quality Manager, Office Manager, Forensic DNA Analyst, DNA Technician, Administrative Assistant, Receptionist, Driver and Housekeeper. The number of FTS's will be increased as the need arises.

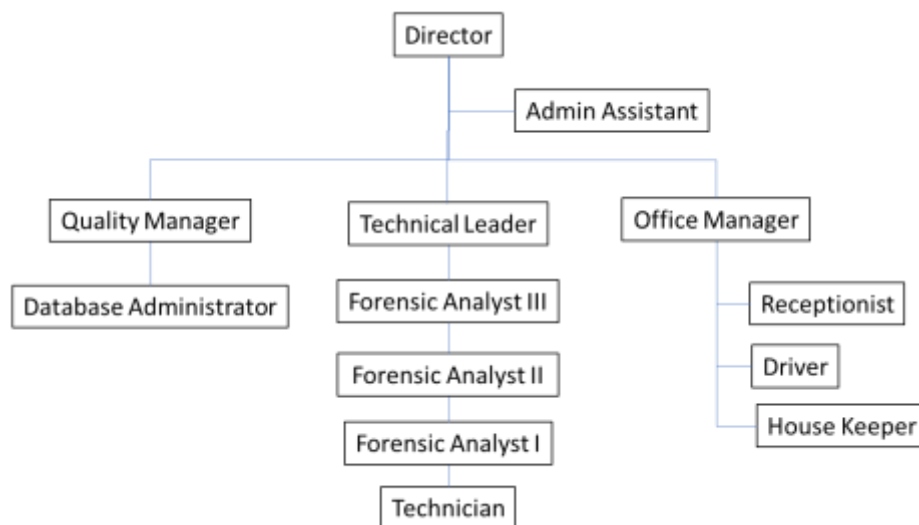


Figure 1: Draft DFB Organizational Chart

### 4.1 Director, DNA & Forensic Biology

He/she is the overall head of the DNA and Forensic Biology Section. This position reports to the Center Director. A higher degree in a relevant field and cognate experience is required for this position.

## *4.2 DNA Technical Leader*

He/She is the Technical Leader responsible for the day-to-day operations and management of the laboratory. This position requires a Master's degree in a relevant field and at least 5 years' experience in forensic biology practice in an ISO accredited laboratory.

## *4.3 Quality Manager*

He/She coordinates, manages and directs all quality programs to ensure a high level of quality control and quality assurance. He/she manages the Quality team and ensures that all processes and policies relating to quality are followed by all. This position requires a bachelor's or higher degree.

## *4.4 Database Administrator*

He/She provides database administration and ICT support services.

## *4.5 Forensic Analyst I, II, III.*

He/She is responsible for DNA isolation, analysis, interpretation of results and preparation of the report. This position requires a bachelor's or graduate degree in molecular biology, biochemistry or genetics and at least 2 years of experience working in a relevant forensic laboratory.

## *4.6 Technician*

He/She serves as the technician in the laboratory to support all laboratory processes, evidence examination, interpretation of results and preparation of the report. This position requires a bachelor's or higher degree.

## *4.7 Office manager*

He/She manages the office and provides different levels of administrative assistance.



## *4.8 Administrative Assistant*

He/She provides general administrative assistance to the section.

## *4.9 Receptionist*

He/she will serve as the receptionist to receive guest, packages as well as perform some secretarial duties.

## *4.10 Driver*

The driver provides safe and efficient transportation services and is responsible for the effective functioning of the vehicle.

## *4.11 Housekeeper*

He/she serves as the housekeeper and is responsible for cleaning the office spaces and the laboratory.

# *5. Operational Objectives*

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Only the DNA and Forensic Biology (DFB) section is fully equipped and operational. It presently provides full forensic Biology, human Identification and serology services to all stakeholders in Lagos State. DFB can currently support the police, prosecutors, defense attorneys and private citizens in many areas including paternity, maternity, biological relationship testing, consultation, crime scene processing, evidence collection, serological screening for blood and semen, DNA analysis, mass disaster identification, unidentified and missing person's identification and expert witness testimony. The DFB's operational objectives are the short-term goals that have been established to move the section forward towards realization of the ultimate goals of serving as the premier DNA forensic center in Lagos State. Below are the operational objectives of the DFB section.

## *5.1 Stabilize the Work Environment*

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1. Functional electrical supply without power surges or lapses.
2. Functional HVAC with no lapse.
3. Maintenance of optimal humidity levels to avoid sample/equipment damage.

4. Access control and security of the facility.
5. Vetting and approval of maintenance companies.

## **5.2 Vendor Selection & Vetting**

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For security reasons and to conform with standards, all vendors must be vetted and approved before they can work with LSD&FC. Vendors are required for:

- a) Administrative support.
- b) General equipment and building maintenance
- c) Supply of the following:
  - I. Office supplies
  - II. Cleaning supplies
  - III. Reagents
  - IV. Small and large Equipment
  - V. Lab Supplies
  - VI. Shipping
  - VII. Printing

## **5.3 Facility Management & Security**

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Management will ensure that a reputable and experienced company is hired for facility management and security.

5.3.1 A reputable security company will be retained. The retained company will:

- a) Provide adequate number of educated and trained security personnel that can perform perimeter and internal security patrols and surveillance to maintain situation and security awareness 24/7.
- b) Prevent 100% unauthorized entrance into the compound and building.
- c) Actively perform digital security monitoring and surveillance of the entire premises.
- d) Perform frequent standardized and randomized vulnerability assessment using industry best practices.
- e) Develop and implement SOP's consistent with forensic lab requirements that predicts and prevents covert and active intrusion aimed at destruction or contamination of evidence.
- f) Profile and search guests and visitors to keep arms and weapons off the premises.
- g) Preempt, Stop, Detain and Arrest all Intruders.
- h) Prepare monthly Security and Incident Reports that meets crime laboratory best standards and practices.

- i) Be trained and capable of handling and protecting classified, security and intelligence reports.
- j) Develop a plan of action for contact and liaison with police and other Nigerian security and emergency agencies in an emergency.

5.3.2 A facility management company will be retained. The company will be expected to support, maintain and repair utilities, electrical and plumbing fittings at the center. The facility management services will cover (but not limited to) the following:

- a) Electrical
- b) HVAC
- c) Generator
- d) Elevator
- e) Trash removal
- f) Grounds/Landscaping
- g) General maintenance.

## 5.4 Training of Staff

LSD&FC requires trained and certified personnel. Staff have been trained and mentored to ensure that they can operate independently. The following were the operational objectives for the DFB section at the onset:

1. Completion of training of 2 DNA Analysts and DNA Technician within 2 years.
2. The training included both theory and hands-on practice under supervision.
3. Upon completion, the trainees where qualified as DNA Analysts and DNA Technician after passing multiple proficiency and competency tests.



Figure 2: Training plan for DFB Analyst and Technician.

## 5.5 Validation of Assays

All assays conducted at LSD&FC have been validated. Initial validation studies involved running the same samples at DFB and at an ISO accredited laboratory in the USA. The validation studies that were performed were for critical assays including:

- Serology (Semen, Blood and Saliva)
- STR Analysis
- Y-STR Analysis



Figure 3: Validation Process for Serology Tests.

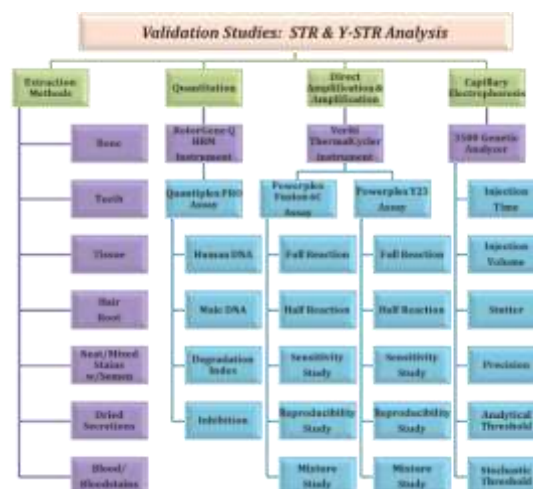


Figure 4: Validation Process for STR and Y-STR Tests

## 5.6 Implementation of Forensic Caseworks

Following the completion of validation studies, DFB section commenced provision of forensic casework services. The forensic case work focuses on human identification to support criminal investigations. Test that can be performed include STR, Y-STR and Serology tests. The following were the operational objectives:

1. Installation of *JusticeTrax* Laboratory Information Management System (LIMS) for tracking and management of evidence pathway, analysis and reports.
2. Installation of *SmallPond* software for DNA profile databasing and searching.
3. Complete validation studies for casework processing.
4. Installation and Validation of GeneMarker HID Human Identity Software from SoftGenetics as the Statistical Analysis Software.



Figure 5: Forensic Casework Workflow A

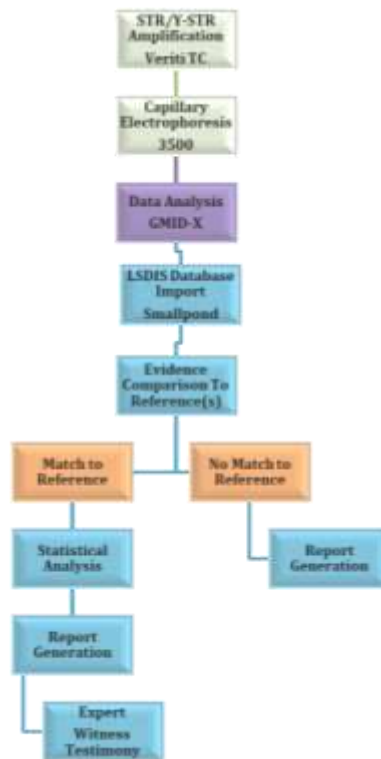


Figure 6: Forensic Casework Workflow B

## 5.7 Relationship Casework

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The DFB SECTION is expected to derive significant revenue from paternity and relationship testing. Critical to the success of the relationship testing will be:

1. Development of a kit for offsite collection, preservation and shipping of DNA to LSD&FC.
2. Use of *SoftGenetics'* GeneMaker HID for relationship testing and statistical calculations.

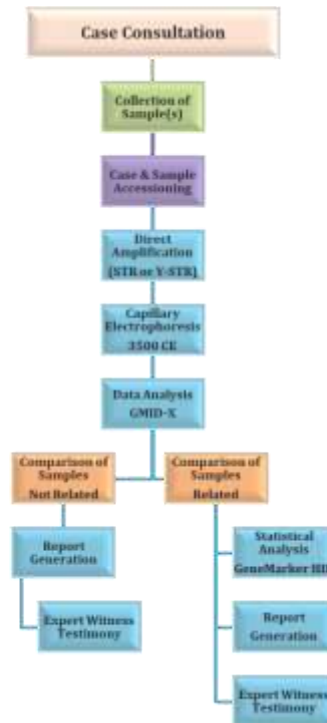


Figure 7: Relationship Casework Workflow

## 5.8 Accreditation

The DFB section of LSD&FC is ISO 17025:2017 accredited by A2LA. Prior to accreditation all relationship and casework DNA tests were performed at DFB SECTION and at an ISO accredited laboratory in USA. Below is the certificate and scope of Accreditation.



<b>Test:</b>	<b>Test Method(s):</b>
<b>Biology/DNA</b>	
Blood Screening	LSDFC – Serology - Reduced Phenolphthalein for the presence of Hemoglobin
Human Blood Identification	LSDFC – Serology - ABACard® Hematrace for the Presence of Human Blood
Seminal Fluid Screening	LSDFC – Serology – Acid Phosphatase Test
Seminal Fluid Identification	LSDFC – Serology - ABACard® p30 for the Presence of Semen
Spermatozoa Identification	LSDFC – Serology – Microscopic Examination of Seminal Fluid Stains with Christmas Tree Stain  LSDFC – DNA - Extraction - Chelex-100 Extraction Manual
DNA Casework Analyses – Nuclear STR	LSDFC – DNA - Extraction – Organic Extraction Manual  LSDFC – DNA – Extraction - Preparation of Buccal swabs with SwabSolution  LSDFC – DNA - Extraction – Preparation of NonFTA punches with PunchSolution  LSDFC – DNA - Extraction – Purification and Concentration of DNA Extracts.  LSDFC – DNA - Extraction – Normalization of DNA Extracts.  LSDFC – DNA- Quantitation- Quantitation of Human and Male DNA with the Investigator® Quantiplex PRO Kit on the RotorGene Q.  LSDFC – DNA – Amplification - Amplification with PowerPlex® Fusion 6C.  LSDFC – DNA – CE of PowerPlex® Fusion 6C Product on the 3500.  LSDFC – DNA – GeneMapper® ID-X Analysis of STR Data.
DNA Relationship Analyses – Nuclear STR	LSDFC – DNA - GeneMarker® - HID Statistical Analysis of STR Data
DNA Database Analyses – Nuclear STR	LSDFC – DNA - Extraction – Organic Extraction Manual.  SmallPond Database DNA Profiling Matching System.



## 6. Operational Plan for the Future

The operational plan for the future is under development. This plan will document the current conditions as well as future staff and funding requirements to guide the full implementation of the entire LSD&FC program.

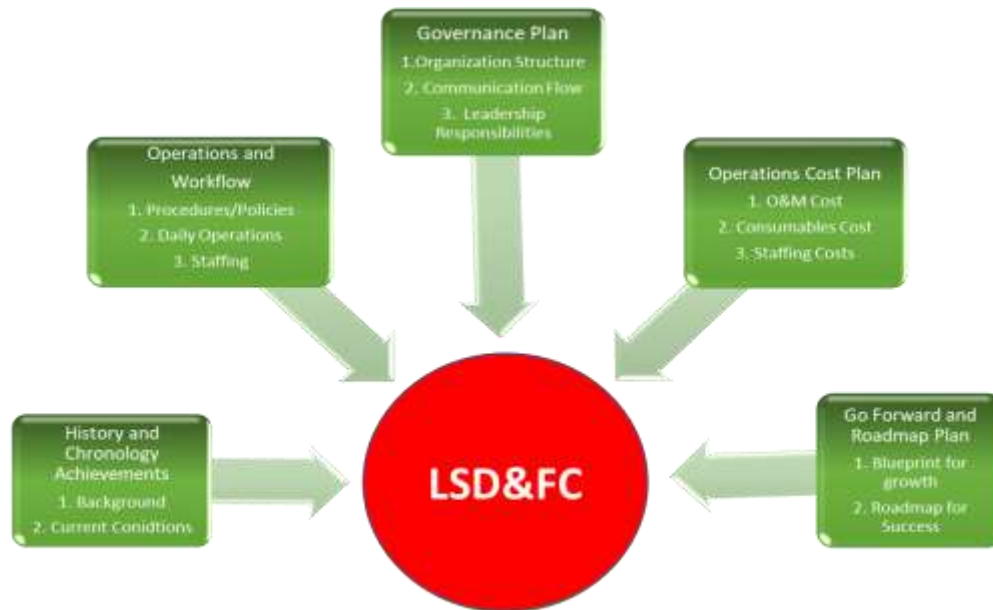


Figure 8: Items to be put in place as part of the future plan for LSD&FC

### 6.1. Current Conditions

Presently the DNA and Forensic Biology section is the only unit that is functional and ISO 17025:2017 accredited. The plan for the future will document the history and background of the laboratory since commissioning. It will describe past achievements and milestones. This task will also include a narrative of the current operational conditions of the DNA laboratory. For example, the type of DNA work the lab is doing and its' main source of workload and revenue.

### 6.2. Operations and Workflow Plan

The Daily Operations Workflow Plan will enable, assist, guide, and form an operational baseline for the crime lab. Daily procedures and policies will be documented. These will include day-to-day facility management, scheduling, security, and procedures for laboratory operations that address recognized standards and any unique local requirements. The Daily Operational Plan will also include several logistic and managerial scenarios.

The final Operations Plan will contain the following components:

- Staffing plan for all LSD&FC sections.
- Administrative Staff with job descriptions, duties and responsibilities
- Usage policies and procedures
- Daily Facility maintenance check lists and safety check procedures
- Long range maintenance plan

### 6.3: Governance Administration Plan

A Governance Administration Plan is the set of policies, roles, responsibilities and processes that are established to guide, direct, and control how the laboratory will operate in order to successfully meet its stated goals. The Governance Administration Plan determines the managerial, communication and leadership command of the facility.

### 6.4: Operational Cost Plan

An Operational Cost Plan will be developed for annual operations. This task will provide the financial cost to operate LSD&FC based on actual and projected throughput of each unit. The financial assessment will provide estimated values for all aspects of equipment purchases and annual operation and maintenance costs. Financial pro forma statements will include:

- Annual Equipment Maintenance Cost Estimate.
- Annual Operations and Maintenance Cost Estimate (O&M)
- Annual costs of consumables.
- Staffing costs
- Insurance costs.

### 6.5: Go Forward Roadmap

Go Forward Roadmap will be developed. This will include professional suggestions and recommendations for the project such as:

- Future staff needs, including potential transfer of the operations and management from ITSI-Biosciences to LSG and the trained staff.
- Future operational costs.
- Future facilities need and build out phasing.
- Future governance and management structure.