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Feasibility Study and Detailed Designs for the Development of the Millet Intake within the John Compton Dam Raw Water Supply System

Environmental and Social Impact Assessment and Environmental and Social Management Plan – Report #2 (Final)

Prepared for
Water and Sewerage Company Ltd
WASCO

WASCO
WATER & SEWERAGE COMPANY, INC.

Submitted by
R.J. Burnside International Limited

Sub-Consulting services provided by
W.F. Baird & Associates
Coastal Engineers Ltd.
and
Amarna Consult Limited

March 2019

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Disclaimer

Acronyms

CARPHA/CEHI	Caribbean Public Health Authority/Caribbean Environmental Health Institute
DCA	Development Control Authority
DSD	Department of Sustainable Development
DVRP	Disaster Vulnerability Reduction Project
EA	Environmental Assessment
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
GOSL	Government of Saint Lucia
IDF	Intensity Duration Frequency
JCD	John Compton Dam
LD	Labour Department
LRTP	Long Range Transportation Plan
MAFPPNRC	Ministry of Agriculture, Fisheries, Physical Planning, Natural Resources and Cooperatives
MDC	Millet Development Committee
MEIGSD	Ministry of Education, Innovation, Gender Relations, and Sustainable Development
MESEYSCLG	Ministry of Equity, Social Justice, Empowerment, Youth Development, Sports, Culture, and Local Government
MHW	Ministry of Health and Wellness
MIPEL	Ministry of Infrastructure, Ports, Energy, and Labour
NCCC	National Climate Change Committee
ND	Nominal Diameter
NEMAC	National Emergency Management Advisory Committee
NEMO	National Emergency Management Organization
NEMS	National Environmental Management Strategy
NEP	National Environmental Policy
NGO	Non-Governmental Organization
NURC	National Utilities Regulatory Commission
NWSC	National Water and Sewerage Commission
OECS	Organization of Eastern Caribbean States

OP ..... Operational Policies

PAP ..... Project Affected Persons

PCU..... Project Coordinating Unit

PPS ..... Physical Planning Section

PS ..... Permanent Secretary

RAP ..... Resettlement Action Plan

SLSWMA ..... Saint Lucia Solid Waste Management Authority

TORs..... Terms of Reference

UNFCC..... United Nations Framework Convention on Climate Change

WASCO..... Water and Sewerage Company Inc.

WB ..... World Bank

WRMA..... Water Resource Management Unit/Water Management Authority

1.0 Introduction

The Government of Saint Lucia (GOSL) has obtained assistance from the World Bank towards the financing of the Disaster Vulnerability Reduction Project (DVRP). The DVRP is aimed at reducing the country's vulnerability to natural hazards and climate change impacts such as more intense hurricanes and storm events. This wider project is being implemented by the Department of Economic Development, Transport and Civil Aviation through the Project Coordination Unit (PCU).

The raw water intake and pipeline at Millet in Anse la Raye which in conjunction with the supply from the John Compton Dam supplies the north of the island, was severely damaged by Hurricane Tomas in 2010 and subsequent storm events. The Water and Sewerage Company Inc. (WASCO) has identified the reconstruction of the Millet Intake as a priority and is the technical implementation agency responsible for coordinating and managing the Project.

As a precursor to the reconstruction, WASCO has sought to undertake a feasibility study and detailed designs for the development of the Millet Intake, which includes amongst the required studies, the preparation of this Environmental and Social impact assessment (ESIA) and Environmental and Social Management Plan (ESMP).

This ESIA and the ESMP must be read in conjunction with the wider set of inter-related studies prepared by R.J. Burnside International Limited (Burnside) under this consultancy.

1.1 Background

The Millet intake and the John Compton Dam (the Dam) are located within the Roseau watershed. The pumped water from the Dam combined with the gravity flow from the Millet Intake, provides the raw water supply that is treated at Ciceron and then supplied to the growing north of the island as potable water supply.

The Millet Intake is a small in stream weir located approximately 190 meters above sea level constructed on the Millet River. The intake diverts water through a transmission line located within the Millet River combined with the supply from the John Compton Dam at a junction point, then by gravity on to the TR Theobalds Treatment plant at Ciceron. There is no raw water storage and the yield from the Millet Intake fluctuates greatly and in direct proportion to the stream flow depending on the wet or dry season of the year. Over the years, the yield from the intake has varied from approximately 27,277 m^3 (6,000,000 imperial gallons) to approximately 4,546 m^3 (1,000,000 imperial gallons) per day. While the catchment properties have remained the same, damage to

the intake works caused by Hurricane Tomas in 2010 and siltation at the point of intake are the main causes for this variation/shortfall.

Prior to the damage imparted by Hurricane Tomas to the Millet Intake in 2010 and to the raw water transmission main, the Millet River provided a significant component of the raw water that was abstracted from the John Compton Dam/Millet Intake supply system. The damage to the intake and transmission pipeline, and the resultant reduction in the available supply from the John Compton Dam/Millet Intake system highlighted the increased vulnerability of key water supply infrastructure to natural hazards.

The objective of this Project is therefore to re-establish the Millet Intake as the primary source of raw water supply within the John Compton Dam/Millet Intake supply system and to reduce the dependency on the pumped supply that is currently drawn from the Dam. The fundamental objective therefore is to re-establish and maximize the yield from the Millet River Intake while taking into full consideration (and appropriately mitigating) environmental and social impacts and stakeholder concerns that may be identified. The anticipated works to be implemented will consist of a reconstructed intake works, and a rehabilitated 2.3 km raw water transmission main to connect to the main existing raw water pipeline that is also supplied from the John Compton Dam in the area referred to as the Junction.

The ESIA is required, along with an ESMP to identify potential environmental and social impacts and to provide guidance on the mitigative measures that are to be implemented as a component of the Project. The activities that are carried out through the ESIA process provide key information that feeds into the design process and will assist with the selection of the most appropriate solution that will minimize potential negative environmental and social impacts, and will provide inputs to the ESMP. The ESMP will become a component of the contract specifications and will guide the compliance during the construction activities. In the longer term, a key criterion to this Project and its associated activities is that there must be no interference with water yield at the end of the implementation period and to the extent that is to be determined by the Regulator, the National Utilities Regulatory Commission (NURC); deemed to be the Water Resource Management Agency in accordance with the Water and Sewerage Act, 2005 and the National Utilities Regulatory Commission Act of 2016.

The location of the Project area is shown below in Figure 1 – Project Location Map.

Dame De Traversay

The Junction Storage Tank

The Junction

Millet

John Compton Dam

Existing Millet Intake

Millet River

Millet Road

Roseau River

Roseau Reservoir

600mm CIP Raw Water

600mm CAS Raw Water

Datum: St Lucia 1955	
Coord. System: St Lucia 1955 British West Indies Grid	
Projection: Transverse Mercator	
Central Meridian: 62°0'0.00"W	
False Easting: 400,000m	False Northing: 0m
Page Orientation: 0°	Scale Factor: 0.99950

N

True North

0 500 1,000

Metres

- Existing Water Intake
- Contour (50m Interval)
- Existing Water Transmission Mains
- 500 x 500m Reference Grid
- Roseau River Watershed Boundary

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WASCO
WATER & SEWERAGE COMPANY, INC.

Figure Title

DEVELOPMENT OF THE MILLET INTAKE WITHIN THE JOHN COMPTON DAM / ROSEAU WATER SUPPLY SYSTEM

PROJECT LOCATION MAP

Drawn	Checked	Date	Figure No.
PS	RDC	2018/01/04	1
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File Path: D:\GIS\Project\039491\Map\039491 Millet 20k.mxd Print Date: 2018/01/04 Time: 04:20 PM

1.2 Objective of the ESIA

This Environmental and Social impact assessment (ESIA) and the Environmental and Social Management Plan (ESMP) is a requirement of the Terms of Reference for the Millet Intake and Pipeline Rehabilitation Project and is undertaken in accordance with the DVRP Environmental Assessment/Environmental Management Framework (March 2016).

The objective of the ESIA and the ESMP is to identify the potential environmental and social impacts of the proposed works on the Project's area of influence, determine standard mitigative measures to address the impacts, and produce a plan for implementation of these measures during the works in order to minimize and manage the impacts on the natural and social environment. The ESIA and ESMP incorporate and address the relevant World Bank Operational Guidelines and Policies that apply, such as World Bank Operational Policy 4.12 Involuntary Resettlement, those for working within forested areas or Forest Reserve, and the DVRP's Resettlement Policy Framework.

The general area of influence for the Project includes the intake site, pipeline route and affected properties, any access routes, the immediate and wider Tet Chemin community, downstream water users or ecosystems, or any off-site areas required for any resettlement or compensatory tracts (in the case of any impacts related to private land acquisition, resettlement or economic displacement). Any relevant permit requirements are also identified and included in this ESIA.

1.3 Methodology

The methodology for this ESIA study was guided by the specifics within the Terms of Reference (TORs) for Consultancy Services for the Feasibility Study and Detailed Designs for the Development of the Millet Intake within the John Compton Dam Raw Water Supply provided by the Department of Economic Development, Transport and Civil Aviation under the Disaster Vulnerability Reduction Project. The TORs are provided in Appendix 1 for reference.

In preparing this ESIA, the Environmental and Social Specialist undertook the following activities:

- site visits to the Project area as part of a scoping exercise to determine the existing baseline environmental and social conditions;
- a detailed scoping assessment of the intake site and surrounding area to undertake an inventory and assessment of the existing conditions. This also included a preliminary social survey of the residents or communities that may be impacted by the proposed works;

- desktop research, literature review and study leading to the identification of data and information gaps;
- meetings with key informants and stakeholders;
- a second and more specific scoping activity following the identification of the preferred design option for the intake works and with the location of the new routing of the transmission main and access road to the proposed intake works;
- meeting with affected landowners to present the scope of the Project and to solicit responses that will be incorporated into the final ESIA and ESMP;
- meeting with communities in a public meeting to present the Project and to solicit responses that will be incorporated into the final ESIA and ESMP;
- follow-up meeting with key informants and stakeholders; and
- follow-up meeting with affected landowners.

Site visits were conducted over the period from October 2017 to February 2019. The Water and Sewerage Company Inc. (WASCO) facilitated access to the Millet Intake site which is located within the Forest Reserve on Crown Lands, and along the existing and proposed pipeline route which traverses through private property, for the required field studies.

The existing conditions were assessed in relations to the proposed design and project works, potential environmental and social issues and impacts and mitigative and management measures were identified to address these issues and potential impacts. The management measures to address the environmental and social issues and to guide the works construction contractor during implementation are identified in the ESMP.

Apart from the community and affected landowners who were deemed as the primary stakeholders, the following agencies and groups were also deemed stakeholders and were consulted:

- Ministry of Education, Innovation, Gender Relations and Sustainable Development (Sustainable Development Section);
- Ministry of Agriculture, Fisheries, Physical Planning, Natural Resources and Co-operatives-Forestry section;
- Water Resources Management Unit;
- The Physical Planning Department;
- The Development Control Authority;
- Ministry of Infrastructure, Ports, Energy and Labour – Chief Engineer's office;
- Ministry of Equity, Social Justice and Empowerment- Director of Research and Development;
- Ministry of Health and Wellness – Environmental Health Unit;
- Water Resources Management Agency;

- Caribbean Public Health Agency/Caribbean Environmental Health Agency;
- The DVRP Project Coordination Unit (PCU);
- WASCO; and
- Millet Development Committee.

The engagements with the agencies were directly with individuals or in a group with relevant staff. Inputs from the consultation with the stakeholder agencies and the community contributed to the identification of potential environmental and social impacts, and perceived potential short and long-term measures to address these occurrences. The list of fact gathering interviews and meetings is reflected in Appendix 2 of this report.

The study was also guided by the relevant World Bank safeguard policies, particularly operational policy requirements under OP 4.01 Environmental Assessment and by the DVRP Safeguards instruments - Environmental Assessment, Environmental Management Framework and the Social Assessment and Resettlement Policy Framework, all of which set out the wider context within which the Project was to be assessed and this ESIA undertaken.

2.0 Regulatory Framework

The following provides a general overview of the agencies with some form of environmental management responsibility that may directly or indirectly affect the Project along with their general responsibilities, and guiding legislation. They cover such areas as environmental, land use, water management, domestic, commercial, and hazardous waste management, historical and cultural patrimony, public health, and disaster response. The varied environmental management efforts have generally been fragmented and stymied in many cases by a lack of coordinated efforts, clear or absent empowering legislation or regulations and financial and technical resources.

Table 1 below summarizes a number of pertinent agencies, their responsibilities, and enabling legislation.

Table 1: Agencies with Environmental Management Responsibilities

Agency	Responsibility	Legislation
Water and Sewerage Company Inc. (WASCO)	WASCO is responsible for the provision of potable water to the country, provision and management of potable water infrastructure, along with sewerage management / waste water services. The company is responsible for the management of the John Compton Dam and a number of intakes throughout the country. The tariffs set by WASCO are regulated by the National Utilities Regulatory Commission (NURC). Institutionally, WASCO falls under the Ministry of Agriculture, Fisheries, Physical Planning, Natural Resources and Co-operatives	Water and Sewage Act 2005 with amendment in 2008
National Utilities Regulatory Commission (NURC)	The NURC is a multi-sector independent regulator which succeeded the National Water and Sewerage Commission (NWSC), and is established to regulate utility supply services in Saint Lucia including, water, sewerage and electricity. The primary functions of the NURC are to regulate the provision of utility services, protect the rights of utility customers and establish, approve, monitor and review rates. WASCO and LUCELEC tariffs are therefore regulated by the NURC.	National Utilities Regulatory Commission Act No. 3 of 2016

Agency	Responsibility	Legislation
Physical Planning Department and the Surveys and Mapping Department, Ministry for Agriculture, Fisheries, Physical Planning, Natural Resources and Co-operatives	This Ministry has responsibility through the functions of its various departments/ sections which impact directly on the management of the country's natural resources. The Physical Planning section is the technical arm of the Development Control Authority (DCA). The Physical Planning Ministry is also responsible for the implementation of the Saint Lucia Building Codes and guidelines which are supposed to provide guides for best construction practices. The Ministry also prepares the memorandum to Cabinet for acquisition and various matters. The Surveys and Mapping Department carries out the functions related to surveys, mapping, and lodging of these surveys. The Chief Surveyor is the authorized Officer with responsibility for surveying, valuation and acquisition.	The Physical Planning and Development Act No. 21 of 2001 Land Acquisition Act No. 12 of 1945 Amended by Act No. 11 of 2000
Development Control Authority	The Board of the Development Control Authority the power to review and decide on development proposals that are brought to it by its technical secretariat, the Physical Section of the Ministry of Physical Development. The relevant Act provides the legislated authority to make provision for the development of land, the assessment of the environmental impacts of development, the grant of permission to develop land and for other powers to regulate the use of land and for related matters.	The Physical Planning and Development Act No. 21 of 2001 (amended 2005) which superseded the 1971 Land Interim Development Control Act Amendments to the 1971 Land Interim Development Control Act
Ministry of Health, Wellness, Human Services, and Gender Relations	Through its Environmental Health Department, it has the responsibility for reviewing plans, monitoring and enforcing public health and sanitation regulations and practices, and promoting public awareness on matters relating to public health and the environment. These include practices that affect health such as food preparation, sanitation, solid waste management, liquid and solid waste disposal, dust and air pollution, water quality, some occupational health and safety matters.	Public Health Act of 1975 and attendant Regulations to present No. 10, 11, 12, 13, 14, 15, 16, 18, 20, 21, and 22 of 1978]: Public Health [Nuisances] Regulations Public Health [Offensive Trades]

Agency	Responsibility	Legislation
		Regulations: Public Health [Communicable and Notifiable Disease] Regulations: Public Health [Water Quality Control] Regulations: Public Health [Apartment Houses, Guest Houses and Hotels] Regulations: Public Health [Swimming Pools] Regulations: Public Health [Disposal of Offensive Matter] Regulations: Public Health [Sewage and Disposal of Sewage and Liquid Industrial Waste Works] Regulations
Pesticides Control Board (in the Ministry of Agriculture)	Pesticides Control Board in the Ministry of Agriculture and is responsible for monitoring the importation and use of various chemical substances.	The Pesticides and Toxic Chemicals Control Act 1975
Saint Lucia Solid Waste Management Authority	A statutory authority with the responsibility for providing a coordinated and integrated systematic approach to collection, treatment, disposal, and recycling of wastes including hazardous wastes. The Authority is also responsible for the management of two sanitary disposal sites, one in the north at Deglos, and the other in the south in Vieux Fort.	The St. Lucia Solid Waste Management Authority Act No. 8 of 2004 Amendment of No. 10 of 2007
Forestry and Fisheries Departments - Ministry of Agriculture, Fisheries, Physical Planning, Natural	This Ministry has wide ranging management responsibilities relating to the conservation and management. The Forestry Department is responsible for terrestrial ecosystems and resources, flora and fauna in particular	Forest Soil and Water Conservation Ordinance 1946 (amended in 1957 and 1983)

Agency	Responsibility	Legislation
Resources and Co-operatives	legislated reserves on public or private lands such as forest reserve and water catchment areas, water abstraction, and public awareness. Extension and advisory sections are responsibility for the dissemination of information and methodologies to farmers as well as undertaking crop damage evaluations. The Fisheries Department has similar responsible for the coastal marine environment and is heavily involved in education of fishers. They also have some responsibilities for some riverine environments.	Sale of Produce Act No. 4 of 1945 and amendment of 2001 Banana Plants Protocol of 1958 Fisheries Act 1984 Wildlife Protection Act 1964
Ministry of Infrastructure, Port Services, and Transport	This Ministry is primarily responsible for the provision and maintenance of major infrastructure (roads and drains) within the state. It also issues licences for the extraction of sand from beach areas. The Ministry is responsible for the provision and management of technical services in the areas of communications, meteorology, transport, electrical safety, roads, hydraulic and building infrastructure, and utilities. The Chief Engineer represents the Ministry on the Development Control Authority and the National Emergency Management Advisory Committee (NEMAC).	Motor Vehicle and road Traffic Act 2003 Beach Protection Ordinance 1963
Sustainable Development, Energy, Science and Technology Section - Ministry for Education, Innovation, Gender Relations and Sustainable Development	The Sustainable Development, Energy, Science and Technology is the government body responsible for the following-up of the international commitments signed by Saint Lucia related with environmental issues, including the United Nations Framework Convention on Climate Change (UNFCC). The Sustainable Development, Energy, Science and Technology Section oversees all matters relating to sustainable development within the country and ensure that the various protocols are adhered to. It spearheads the National Environmental Policy (NEP), National Environmental Management Strategy (NEMS), the National Climate Change Committee (NCCC), and other initiatives related to biodiversity, marine and terrestrial pollution,	

Agency	Responsibility	Legislation
	energy efficiency, sustainable development and environment.	
The Caribbean Environmental Health Institute (CEHI), now called Caribbean Public Health Authority- now CARPHA	The Caribbean Environmental Health Institute, now called Caribbean Public Health Authority (CARPHA), is a regional CARICOM institution and a lead agency in matters related to water quality and water pollution control. It has been involved in testing for and quantifying various inputs into the coastal waters of the island and establishing monitoring and controls especially as part of water quality monitoring programmes. It collaborates with the Ministry of Health performing testing and analysis for that ministry as well as other ministries, agencies, and the private sector who may wish to employ its technical services. This organization has a well equipped laboratory to assist its functions. The Ministry of Health relies on the Caribbean Environmental Health Institute (CEHI) to perform many of its analytical functions. CEHI also provides technical assistance and support to water resource management initiatives.	
The National Emergency Management Office (NEMO)	The role of the National Emergency Management Organisation (NEMO) is to develop, test and implement adequate measures to protect the population of Saint Lucia from the physical, social, environmental and economic effects of both natural and man-made disasters from Hurricanes, to landslides, to oil spills and fires. Its responsibility is to ensure the efficient functioning of preparedness, prevention, mitigation and response actions. NEMO is responsible for preparing and managing the National Emergency Management Plan. NEMO is the chair of the National emergency Management Advisory Committee which convenes whenever there is a national emergency.	Disaster Management Act No. 30 of 2006 Emergency Powers (Disasters) Act No. 5 of 1995
Saint Lucia National Trust	The Trust is a statutory body established in 1975 and is charged with protecting and promoting natural and cultural heritage and manages sites such as the historical Pigeon Island National Landmark and the Maria Islands	The St. Lucia National Trust Act of 1975

Agency	Responsibility	Legislation
	Nature Reserve. The Trust has developed the System Plan for Saint Lucia, and is also trying to document and preserve the Architectural Heritage of Saint Lucia. While the Trust is a referral agency for the DCA, and also in the vocal manner in which it voices its opinion on matters where it believes the matter of national heritage or preservation has threatened.	
The Archaeological and Historical Society	The Archaeological and Historical Society is an NGO founded in 1954. It is custodian of many of Saint Lucia's archaeological and historical collections and is supposed to serve as a "Preserver of Records". The area of preservation of historical buildings and sites has remained a grey one between the Society and the Trust, and this has caused some conflict at times. The Society also promotes itself as the custodian of underwater archaeological sites as well.	
Labour Department - Occupational Health and Safety Section	This department is responsible for standards of occupational health and safety in places of employment and providing inspection of food handling premises.	Employees Occupational Health and Safety Act, No. 10, 1985.

2.1 World Bank Safeguard Policies

World Bank (the Bank) funded projects and activities are governed by Operational Policies (OP), which are designed to ensure that the projects are economically, financially, socially and environmentally sound[1]. The Bank has specific safeguard policies, which include Environmental Assessments and policies designed to prevent unintended adverse effects on third parties and the environment. These specific safeguard policies address natural habitats, pest management, cultural property, involuntary resettlement, indigenous peoples, safety of dams, projects on international waterways and projects in disputed areas[2].

[1] Source: http://www.worldbank.org/opmanual
[2] Source:http://web.worldbank.org/WBSITE/EXTERNAL/PROJECTS/EXTPOLICIES/EXTSAFEPOL/0,,contentMDK:20507440~pagePK:64168427~piPK:64168435~theSitePK:584435,00.html

The World Bank's environmental assessment policy and recommended processing are used to identify, avoid and mitigate the potential negative environmental impacts associated with projects and operations funded by the Bank. The environmental policies are described in the Bank's **Operational Policy (OP)/Bank Procedure (BP) 4.01: Environmental Assessment**. This is considered to be the umbrella policy for the Bank's environmental 'safeguard policies' which among others include: Natural Habitats (OP 4.04), Forests (OP 4.36), Pest Management (OP 4.09), Physical Cultural Resources (OP 4.11), Involuntary Resettlement (OP 4.12), and Safety of Dams (OP 4.37).

Under OP4.01 the Bank undertakes **environmental screening** of a proposed project to determine the appropriate extent and type of EA required. Proposed projects are classified into one of four categories, depending on the type, location, sensitivity, and scale and the nature and magnitude of its potential environmental impacts:

- ***Category A:*** A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works. EA for a Category A project examines the project's potential negative and positive environmental impacts, compares them with those of feasible alternatives (including the "without project" situation), and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. For a Category A project, the borrower is responsible for preparing a report, normally an EIA (or a suitably comprehensive regional or sectoral EA) that includes, as necessary, elements of the other instruments referred to above.
- ***Category B:*** A proposed project is classified as Category B if its potential adverse environmental impacts on human populations or environmentally important areas including wetlands, forests, grasslands, and other natural habitats are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigatory measures can be designed more readily than for Category A projects. The scope of EA for a Category B project may vary from project to project, but it is narrower than that of Category A EA. Like Category A EA, it examines the project's potential negative and positive environmental impacts and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. The findings and results of a Category B EA are described in the project documentation (Project Appraisal Document and Project Information Document).
- ***Category C:*** A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project.

- ***Category FI:*** A proposed project is classified as Category FI if it involves investment of Bank funds through a financial intermediary, in subprojects that may result in adverse environmental impacts[3].

The World Bank Safeguard Policy OP 4.01 for Environmental Assessment (EA) is triggered based on the category of project.

A review of the proposed intake and pipeline rehabilitation project and its components suggest that while there would be environmental impacts, these would not be significant and could be managed with the implementation of the appropriate mitigative management measures, and monitoring efforts. As a result, this Project may be classified as **a Category B project**. This is consistent with the guidelines in the environmental and social impact assessment (ESIA) in accordance with the Environmental Assessment/Environmental Management Framework (March 2016).

Based on the environmental and social assessment scoping conducted, this Project will not involve impacts on any indigenous peoples (SGP OP 4.10), or the relocation of persons, but will involve farmers and landowners and the proposed project activities would likely lead to the acquisition of lands. The policy on involuntary resettlement (SGP OP 4.12) will apply. It must be noted here that the term “resettlement “ would refer to the disturbance to the PAP’s (Project Affected Persons) normal day to day activities, and in this case for some of them that would refer to the daily farming activities. The DVRP’s Resettlement Framework also provides guidance for the project interactions with the affected persons.

The World Bank Safeguard Policies deemed pertinent to this pertaining to natural habitats, forests, involuntary resettlement are highlighted below for reference[4] [5]:

- The Banks’s Policy on Natural Habitats (OP 4.04) seeks to ensure that World Bank supported infrastructure and other development projects take into account the conservation of biodiversity, as well as the numerous environmental services and products which natural habitats provide to human society. The policy strictly limits the circumstances under which any Bank supported project can damage natural habitats (land and water areas where most of the native plant and animal species are still present). This policy was triggered as a precaution to ensure that any affected natural habitats are adequately protected.

[3] Source: http://web.worldbank.org/WBSITE/EXTERNAL/PROJECTS/EXTPOLICIES/EXTOPMANUAL/0,,contentMDK:20064724~menuPK:64701637~pagePK:64709096~piPK:64709108~theSitePK:502184,00.html
[4] Source: http://web.worldbank.org/WBSITE/EXTERNAL/PROJECTS/EXTPOLICIES/EXTSAFEPOL/0,,contentMDK:20543943~menuPK:1286597~pagePK:64168445~piPK:64168309~theSitePK:584435,00.html
[5] Source: https://policies.worldbank.org/sites/ppf3/PPFDocuments/090224b0822f89db.pdf

- The Bank's Forests Policy (OP 4.36) aims to reduce deforestation, enhance the environmental contribution of forested areas, promote afforestation, reduce poverty, and encourage economic development. The objective of this policy is to assist borrowers to harness the potential of forests to reduce poverty in a sustainable manner, integrate forests effectively into sustainable economic development, and protect the vital local and global environmental services and values of forests. Where forest restoration and plantation development are necessary to meet these objectives, the Bank assists borrowers with forest restoration activities that maintain or enhance biodiversity and ecosystem functionality. The Bank also assists borrowers with the establishment and sustainable management of environmentally appropriate, socially beneficial, and economically viable forest plantations to help meet growing demands for forest goods and services. This policy applies to the projects that have or may have impacts on the health and quality of forests, projects that affect the rights and welfare of people and their level of dependence upon or interaction with forests, and projects that aim to bring about changes in the management, protection, or utilization of natural forests.
- The Bank's Involuntary Resettlement Policy (OP 4.12) considers the direct economic and social impacts that result from a Bank funded project and is aimed at the overall objectives of avoiding or minimizing involuntary resettlement and its impacts on affected persons. It encourages inclusion of affected persons within the project process and assisting displaced persons assisted in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher. This policy covers direct economic and social impacts that both result from Bank assisted investment projects, and are caused by (a) the involuntary taking of land resulting in (i) relocation or loss of shelter; (ii) loss of assets or access to assets; or (iii) loss of income sources or means of livelihood, whether or not the affected persons must move to another location; (b) the involuntary restriction of access to legally designated parks and protected areas resulting in adverse impacts on the livelihoods of the displaced persons. The policy outlines the measures to be implemented by the borrowing agency which includes the preparation of a resettlement plan or a resettlement policy framework that included measures to address the situations of the PAPs offering various forms of support to restore their livelihoods and also provided prompt and effective compensation at full replacement cost for losses of assets attributable directly to the project.

These policies are to ensure that adequate steps are taken within a project to ensure protection of the natural habitats as well as minimize impacts on the wider social environment and livelihoods of the project affected communities (PAPs). Identifying potential environmental and social issues early in the project process influences design works and provided the opportunity to address these potential issues in as adequate a manner as possible.

2.2 Permitting

The Physical Planning Department of the Ministry for Agriculture, Fisheries, Physical Planning, Natural Resources and Co-operatives is the department that provides planning approvals for development within the country and is the technical arm or executive secretariat of the Development Control Authority (DCA). The DCA is the Board that reviews and grants approval to applications brought before it for consideration by the Planning Department.

The Physical Planning and Development Act (No. 29, 2001) guides the DCA and the Physical Planning Section providing them with the authority to "… make provision for the development of land, the assessment of the environmental impacts of development, the grant of permission to develop land and for other powers to regulate the use of land, and for related matters."

This legislation also makes provision for some form of environmental management under Section 2(2), Section 2(3), Section 22. These sections in conjunction with the fourth schedule of this Act speaks to the request for an EIA for certain activities under the Fourth Schedule Development Type 9 refers to "Dams and reservoirs", and Type 18 refers to "Development in wetlands, marine parks, national parks, conservation areas, environmental protection areas or other sensitive environmental areas". Both of these apply to the intake and pipeline rehabilitation project as the intake is a form of dam and part of the works is proposed to occur within the national forest reserve which is a conservation and protected area. A copy of the Fourth Schedule is reflected in Appendix 3 of this document.

Upon the submission of an ESIA to the Planning Authority, the report will be circulated to a number of referral agencies which are made up of some of the other agencies and statutory bodies with some responsibility for environmental management and safeguards. These agencies, who usually contribute to the TORs, will review and determine the adequacy of the report, and provide recommendations to the DCA. These recommendations will be provided to the applicant along with the requisite planning approvals that may have been requested as necessary if both are found adequate. It is expected that WASCO will seek and obtain the requisite planning and EIA permits for this development.

The DCA through the Planning Department has the responsibility to monitor approved developments, either singularly, or as part of a monitoring team, in order to evaluate the level of compliance by the developer with the approval granted and the attendant conditions.

3.0 Existing Site and Wider Environmental Conditions

3.1 Site Conditions

3.1.1 Intake and Pipeline

The proposed transmission line and access road would travel along a route from the Junction point (point of connection to the supply from the John Compton Dam) to the Millet Intake. The present location of the Millet Intake is at an elevation of approximately 190 meters above sea level at the upper extent of the Millet River within the Forest Reserve. The site is surrounded by dense natural vegetation characteristic of a tropical forested area. The existing stone and concrete intake structure spans across the active width of the stream forming a low profile dam or weir with a screened intake point on the inflow side of the structure that connects to the raw water pipeline. The raw water pipeline is cast directly into the structure and travels from there within the active stream bed for a short distance and then along the banks of the river to a point approximately 2.3 km downstream where it connects with the raw water line from the John Compton Dam at a point called the Junction. Exposed sections of the pipeline as depicted in the following photographs provide evidence of the significant damage to the existing line as well as the displacement of the pipeline sections.

Figure 2: WASCO Intake structure across the flowing Millet River (2017)

Figure 3: Damaged and displaced steel transmission pipe (2017)

Figure 4: Damaged intake structure (2017)

Figure 5: Sections of exiting damaged transmission pipe line (2017)

3.1.2 Access Route

The approximate 2.3 km proposed access and pipeline route to be utilized from the Junction to the intake will tend to be inland away from the river as much as possible along the Tet Chemin side or along the eastern banks. The access will originate from an existing access road off the Millet Road below Tet Chemin that is used by WASCO to operate the Junction connection and then extend inland. This paved access road travels upwards from the Millet Road to Tet Chemin, over an elevated area, then downslope where it was supposed to end near the Junction connection chamber. This downslope portion of the road is deteriorated and destroyed at a lower point. From the junction point the proposed reserve route would travel south eastward over undulating topography through a number of parcels of land, some farmed, while others vacant and in a state of secondary growth, through forested areas and up to the site of the intake.

The object of the proposed works is to lay the pipeline inland as far away from the river and from potential damage from boulder laden storm flood as much as possible. The photos below give a general idea of the route characteristics.

This re-developed route along the proposed transmission main would also eventually provide access for farmers and landowners to their properties.

Note, this is a good but short motorable section.

Figure 6: An upper section of the road down to Junction (2019)

Note, the vegetation through which the route is to traverse.

Figure 7: Walking the route (2019)

3.1.3 Surrounding Land Use

The surrounding land use at the intake area is largely forested area with natural vegetation. At the Junction point there is agricultural land use with dasheen crop planted. Along the route from the Junction to the Intake there are largely secondary natural vegetation with some cleared areas of subsistence farming. The photos below provide some indication of the type of land use.

Note, stick in centre marks the proposed route centerline.

Figure 8: Secondary vegetative growth along proposed route (2018)

Figure 9: Subsistence farming in the form of tomato patch in close proximity (2018)

3.2 Climate

Saint Lucia has two seasons; a dry season which starts from December and usually ends in May, and a wet season which is from June to November. It is during the wet season that Saint Lucia is very vulnerable to hurricanes and other tropical storm occurrences. This is known as the hurricane season. It has been observed that some changes to what was considered clearly defined seasons have been occurring, and this has been attributed to factors of global climate change.

The island enjoys a relatively pleasant climate with temperatures averaging around 27°C; a maximum temperature is 32°C, with minimum temperature of about 22°C experienced in the mountainous interior during the cool months of November to January. While the island's relative humidity hardly varies, ranging in the high 70% year round, it is highest in the warmer periods of the year. The island is subject to the northeast Trade Winds which generally travel from the east. It has been observed that stronger winds tend to occur during the drier season of the year.

It must be noted that while these conditions had remained relatively consistent, the advent of Global Climate Change is becoming more evident in the changing weather patterns experienced by the island. It is reasonable to anticipate that the project site at Millet will be subject to all of these conditions and the impacts of Climate Change.

3.3 Rainfall

Rainfall in Saint Lucia is characterised by a wet season from June to November and a dry season from December to May. This can result in monthly rainfalls as high as 199 mm and lows of about 64 mm. The influence of topography is also quite significant particularly along the western side of the island and in the interior where at the higher elevations annual volumes can be in the order of 3,420 mm/year compared to 1,265 mm/year in the flat coastal regions.

Although Saint Lucia has experienced drought conditions since 2012, the data analysis shows no significant trend in precipitation relative to the average for the period of 1981 through to 2010. The projection for extreme rainfall events appears to have some conflicting prognostics, from “insufficient daily observational data to identify trends in rainfall extremes” to a somewhat more definite prognosis of a possible increase in rainfall extremes (Validated Design Information Report, Report No. 4).

3.4 Hurricane Activity

Saint Lucia is situated in the Atlantic hurricane belt; however, it is located well to the south of the active core of the belt. Since 1951 there have been five hurricanes over Saint Lucia. Allen in 1980 was a category 4 and Tomas, a category 3 in 2010 which damaged the original Millet Intake and resulted in several deaths and widespread damage. Notwithstanding, Saint Lucia is impacted by a hurricane on average once every 12 years.

Perhaps of greater relevance to the design of this Project is that Saint Lucia is frequently impacted by tropical storms and depressions. A total of 30 tropic storms have passed within 100 km of the Millet Intake between 1950 and 2016; an average of one every two years. This is a determinant factor in establishing the Intensity Duration Frequency (IDF) curves which were applied in the design of the hydraulics for the drainage structures and the works (Validated Design Information Report, Report No. 4). With Climate Change, recent predictions have called for more frequent and intense hurricane events within the region that will obviously affect the proposed intake transmission line and access.

3.5 Temperature

The baseline temperatures in Saint Lucia are determined by the winds off the surrounding ocean. The mean temperatures vary between 25°C in December through March and 30°C between May to September. Maximum temperatures can reach 32.9°C in the warmer months and may also drop to 21.1°C in January and February; with the mountainous topography imparting a significant variation of 2°C to 5°C relative to the areas of low topography.

The relevance in temperature to the design of the works associated with the Millet Intake is the potential impact that it may have on rainfall intensity, duration and frequency due to the increase moisture holding capacity of the atmosphere. Some jurisdictions are proposing an increase (for example 5%) in rainfall intensity per degree of global warming (Validated Design Information Report). Such considerations will be incorporated into the design of the Project.

3.6 Topography

Saint Lucia is mountainous with a south central mountain range rising to Mount Gimie at 950 m (3,117 ft) above sea level and extending to the northeast and southwest in an irregular but pronounced axial ridge of approximately 24 km (15 miles) long with many pronounced gulleys and valleys[6]. The land descends to the coast on both the western and eastern side of the central ridge within deep canyons, to expansive valley areas with perennial streams and rivers, flat alluvial plains, then the sea. The northern, central and eastern parts of the island tend to display a softened, rounded topographic quality reflecting old geologic age, erosion and weathering. Expansive valley areas are incised with main rivers and generally where large agricultural production is undertaken. In the upper reaches the average range elevation is approximately 274 m (900 ft) above sea level but this is also dominated by peaks such as La Sorciere (677 m, 2,221 ft) and Piton Flore (564 m, 1,850 ft).

The west and southwestern edges of the country are geologically newer with more rugged and steeper mountainous terrain and dramatic drops with features such as the Pitons of Soufriere (over 750 m, 2,000 ft) are located in this area and form part of a massive caldera that contains the town of Soufriere and then drops off into Soufriere Bay. The southwestern area stretching from Gros Piton inland to Mount Grand Magazion and down to Vieux Fort and the sea has an extensive flat southern area extending to the sea. This area has deeply cut, narrow, steep-sided gorges as evidence of older geologic activity and time.

The general topography of the Millet area is one of steep slopes with drops in some areas into narrow valley areas. The site itself is within a valleyed area with the Millet River flowing through it until it eventually meets the Roseau River flowing from the John Compton Dam, and then travels through the Roseau valley to the Roseau Bay. The intake itself is at an elevation of 190 meters above mean sea level within the upper reaches of the Millet River within the wider Roseau Watershed.

[6] The Caribbean conservation Association. St.Lucia Country Environmental Profile. St. Michael, Barbados. 1991

Figure 10: Topographic nature of general lands to site (2017)

3.7 Geology

Saint Lucia is part of the wider Antillean Arc of islands that are geologically young, not more than 50 million years old and predominantly volcanic in origin. While the active tectonic processes appear to have ceased in the region, there is still some minor activity as evidenced by the dormant volcano in Soufriere with some near-surface hydrothermal hot spots.

Saint Lucia is almost entirely volcanic with the oldest rocks, largely of rhyolite, andesite and various basalts, dating from the early 'Early Tertiary' period. The rock formations have been grouped into three wide island classes – northern series (early Tertiary [Eocene]), central series (middle Tertiary [Miocene/Pliocene]), and southwestern series (Holocene [mid to late Pleistocene]) series[7].

A geotechnical survey of the Millet Intake site and proposed pipeline routing was undertaken as part of this Project. The area within the vicinity of the Junction Connection indicated soil consisting of grown and grey Loose Silty Sand which appeared to be colluvium material at the upper layer, and moderately weathered rock probably of andesitic origin at the lower levels.

[7] Organization of American States, Saint Lucia Development Atlas. Department of Regional Development, OAS General Secretariat, Washington D.C. USA. 1987

At the intake, the banks of the river are very steep and consist of weathered rock outcrops. The exposed rock could be classified as highly weathered. Downstream of the intake, the rock outcrops appears to be less weathered and could be classified as moderately weathered. The gravel within the intake bottom are classified as poorly graded light brown loose sand also well graded gravel. Such information is used in the final designs and provide guidance for construction of the components of the Project.

3.8 Geohazards

Saint Lucia is vulnerable to a number of natural hazards such as hurricanes, earthquakes, volcanic activity, drought, tsunamis, flooding, and landslides. The effects of these phenomena can be exacerbated by the activities of population such as deforestation, indiscriminate garbage disposal, poor building practices, and unplanned settlements in environmentally sensitive areas. With the increased frequency of more extreme weather events as a result of climate change, the possibility for disasters to occur increases, placing increased strain on the country's ability to respond to such events.

The island has also experienced two periods of drought, in 2002, and again between 2009 and 2010, placing tremendous strain on the limited national water supply. It is critical that Saint Lucia increases its capacity to reduce its vulnerability to these geo hazards and in so doing reduce the potential for loss to life and damage to property.

In 2010 Hurricane Tomas, a category 3 event, impacted Saint Lucia creating a major disaster resulting in landslides, infrastructural damage, loss of property, and life. Several major landslides and debris flows occurred along major roadways and settlements, with several others occurring in forested areas affecting critical water supply infrastructure such as what occurred with the Millet Intake and pipeline. During the scoping exercise for this Project, evidence of land slippage was clearly evident near the intake area and along the route suggesting the need to ensure that proper engineered design considerations and protective measures are incorporated in all works, form design through construction and into operation.

Seismic activity continues to be experienced by the island throughout the year with tremors of varying intensity. According to the University of the West Indies' Seismic Centre, Saint Lucia has an intermediate seismic hazard. The island lies in a transition zone where the rate of seismic activity is climbing. The island's seismic hazard is not as low as neighbouring St. Vincent's to the south, but it is not as high as Martinique's to the north. There have been numerous shallow earthquakes in Saint Lucia over the last 100 years. In December of 2018, the island was one of a number islands in the region who experienced the effects of a magnitude 4 (Richter scale) along with a series of tremors during the subsequent weeks. The potential impact of earthquakes should be considered in all phases of this Millet Project from design to construction, and operation.

Figure 11: Area below intake along eastern high sloped area that has recently experienced land slippage following heavy rainfall (2018)

3.9 Biological Environment

The Millet intake and surrounding wider Millet area falls with the 49.1 km² Roseau River Watershed, which is the largest watershed in Saint Lucia. The biological diversity in Saint Lucia is rich and contains a wide variety of endemic species. Ecosystems on the island range from dry scrub to lush moist tropical rainforest and coral reefs. Due to the small size of the island and fragmented ecosystem distribution, the ecosystems on the island are inherently vulnerable to habitat modification and destruction as a result of human interactions. Invasive species have also become a concern; there are numerous alien species that have been identified on the island (CBD, 2009).

The Forestry Department office at Tet Chemin recently undertook a habitat inventory along the proposed access road and pipeline route back to the intake. The survey conducted 10 m on either side of the route line. This inventory is attached in Appendix 4 for refence. Amongst others, the main flora species found were the Cacolie, mahaut cochon, fern, bwa blanc, silk cotton, bois canoe, citrus, and coconut. The main endemic fauna species were the Saint Lucia Parrot, Saint Lucia Oriole, Saint Lucia Warbler, and Saint Lucia Black Finch. The most common bird species found were the Lesser Antillean fly catcher, banana quit, lesser antillian bull finch, purple and the green throated carib.

3.9.1 Terrestrial

3.9.1.1 Vegetation

There are seventeen vegetation types used to classify the ecosystems in Saint Lucia (Graveson, 2009). Most of the Roseau River Watershed is within what is described as lower montane natural tropical rainforest. The definition of this vegetation category is:

"The canopy height varies from 4 m to more than 45 m; canopy cover is often quite complete on gentler slopes, but broken on steep slopes; ferns, mosses, ground anthuriums, vines, and epiphytes vary from absent to abundant; trees with buttresses and prop roots are present in some areas and absent in others. At ground level, it varies from humid, quite dark and still, to rather breezy and bright." (Graveson, 2009).

The lower montane vegetation community is evergreen with distinct canopy layers. The lower montane forest is easy to walk through although there may be shrub, fern and herbaceous layers (mainly *Anturim*). The understory becomes dense and more difficult to navigate in areas where the canopy has been destroyed (Graveson, 2009).

The vegetation along the proposed Tet Chemin pipeline and service road route to the intake largely consists of a mixture of secondary vegetation, forested areas, and some farming land use.

The following table from an inventory carried out for the Sediment Deposition Area of the John Compton Dam below Tet Chemin reflected the following vegetation:

Table 2: List of Tree Species Present at the SDA and their Dominance

Local Name	Scientific Name	Dominance
Kakoli	*Inga ingoides*	*5*
Bwa kannon	*Cecropia schreberiana*	*5*
Bwa flo	*Ochroma pyramidale*	*5*
Lagli	*Sapium glandulosum*	*4*
Lowyé mabwé	*Ocotea leucoxylon*	*3*
Bwa tan (si)	*Byrsonima spicata*	*3*
Bwa damand	*Hieronyma alchorneoides*	*3*
Bwa blan	*Simarouba amara*	*2*
Savonnèt gwan fey	*Lonchocarpus heptaphyllus*	*2*
Bwa wivyé	*Chimarrhis cymosa*	*1*
Zolivyé	*Symplocos martinicensis*	*1*

Source: Table 1 – List of tree species present at the SDA and their dominance from Haynes,P (2015) Impact of Silt Deposition on Wildlife at the designated Sediment Deposit Area at the John Compton Dam.

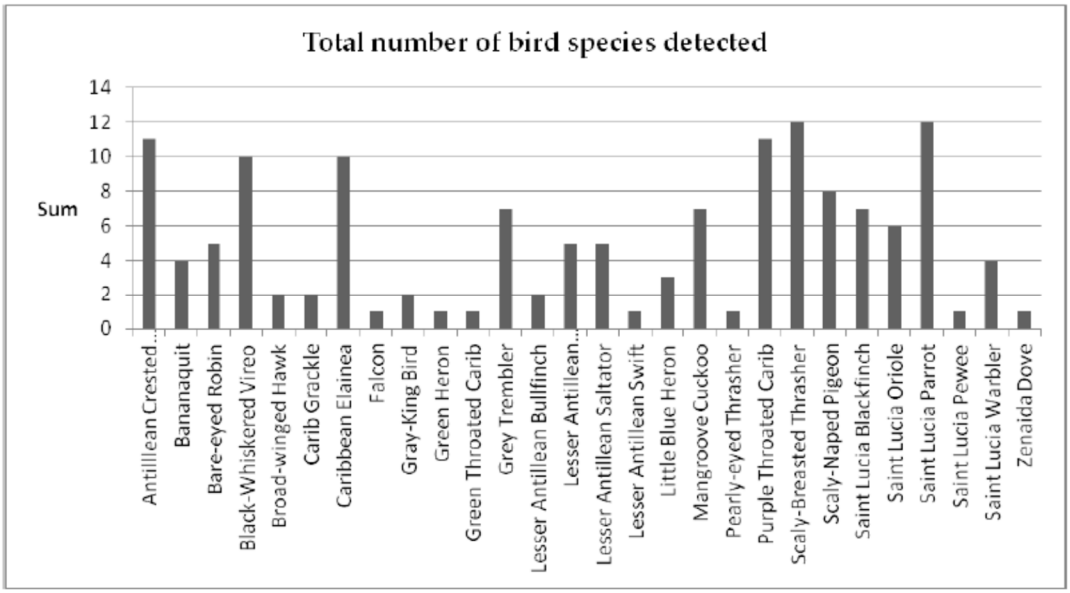
This is generally consistent with the recent survey of the pipeline route to the intake undertaken by the Forestry Department. Within the Millet site the disturbed areas were planted with subsistence crops. The following list represents some of the crops located within these areas:

> *Dasheen, breadfruit, cabbage, tomatoes, sweet potatoes, pineapples, sugar cane, coconuts, plantain, oranges, cocoa, and avocados.*

3.9.1.2 Wildlife

Birds

The forest area is the home to the Saint Lucia National Parrot (*Amazona Versiclor*) and this bird was observed within the site area. The Saint Lucia Amazon, or Saint Lucia Parrot is endemic to Saint Lucia and is designated as Endangered globally. The study for the Sediment Disposal area for the dredging of the John Compton Dam Project identified 28 bird species over the four days over which it was conducted with the Parrot being the most frequently observed along with the Scaly Breasted Thrasher (Figure 12). The table of observations of these birds are reflected below for reference. Some of these birds were also observed in the Project site. It must be noted here that there exists a bird watching program at Tet Chemin.



A list and Sum of the bids detected during the survey period. Note, birds detected in the SDA over a four day, non-contiguous pattern of observation.

Source: Figure 2 from Haynes, P (2015) Impact of Silt Deposition on Wildlife at the designated Sediment Deposit Area at the John Compton Dam

Figure 12: Total Number of Bird Species Detected

The breeding season for the Parrot is from February to August and during this time they tend to habitat within tree cavities, preferably in trees of a large diameter, which are selected and defended from early in the season. Nesting areas can be used for several decades by the same breeding pair. Eggs are laid in March, typically two in a brood (Morton 2009).

Another bird of note is the Saint Lucia Black Finch which was observed within the watershed and is considered Endangered globally due to its small population size, loss of habitat and threat from invasive predators. The Finch is a small dark bird, black for males and brown with a grey head for females and juveniles. It can be distinguished from other similar species by its pink legs and tail bobbing. The Finch is found in all the forest types in Saint Lucia, but prefers secondary growth. They are documented in the Government Forest Reserve. Nests are typically 1 – 3 m from the ground and are used from May to August. Since the nests are in the undergrowth, threats to this species include loss of the understory; timber plantations are a particular concern. Predators such as the mongoose and rats may also prey on eggs and nestlings (Morton, 2009).

Reptiles and Amphibians

Reptiles and amphibians are supposed to be plentiful within the watershed and within the Millet Range, and by extension within the Project site at Tet Chemin. The Saint Lucia Fer-de-Lance (*Bothrops caribbaeus*) and the Saint Lucia Boa (*Boaconstrictor orophias*) are two of the critical snake species within the watershed, and within the site. These are highlighted below.

The Morrison Hershfield study carried out in connection with the John Compton Dam Project states that the Saint Lucia Fer-de-Lance is an endemic species that is recommended to be considered Vulnerable internationally and nationally as per the Critical Species Management report (Morton, 2009). It is a venomous snake, and therefore is subject to animosity among the general public. It is a large snake up to 1.5 m in length and is typically grey to brown with slate-grey to chocolate markings. A dark stripe runs from the eye to the back of the head. Habitat for this species is widely varying including the main forest types on the island including deciduous seasonal, semi-evergreen, and lower montane rainforest. It can also be found in agricultural areas and on the edges of human settlements. Based on the range of habitat used by this species it has suitable habitat within all areas of the Project footprint. It is considered to be common to abundant around the John Compton Dam. This species gives birth to live young; mating occurs in March or April and birth in August and September

Threats to the species include human persecution, habitat loss and predator prey relationships with invasive species. Recommendations for protection of the species include banning killing the Fer-de-Lance in protected areas of the Forest Reserve as well as providing public education to reduce negative interactions (Morton, 2009).

The Saint Lucia Boa is an endemic subspecies of boa constrictor that is endemic to Saint Lucia. This particular subspecies is recommended to be considered Vulnerable Nationally and Internationally and is listed as Appendix II under CITES and protected under the Saint Lucia Wildlife Protection Act 1980. The Saint Lucia Boa is up to 2 m in length and is brown on the top with 23 to 35 darker brown rectangular blotches. The scales of the boa are without keels, unlike the Fer-de-Lance, which gives the boa a smoother appearance. The boa prefers riparian habitat and ravines in dry forest types. Forest gardens and even banana plantations are common habitat for this species. Females give birth to live young, typically in April and May. Threats to this species are predation of young by mongoose, cats and other alien species.

Additionally within the watershed and most likely on the Project site are the endemic Johnstone's Whistling Frog (*Eleutherodactylus johnstonei*) which is considered abundant, cane toad, as well as the Saint Lucia anoles (*Anolis watsii*). WASCO staff and Forestry staff confirm that the site is inhabited by the Fer-de-Lance and the boa snakes and care must be exercised during all works along the route.

3.9.1.3 Marine

The aquatic life within the Millet riverine system, and which also includes the site is supposed to include cray fish, fresh water crabs, tilapia, malay, and zodomay. These are present because of the pristine nature of the waters within the upper Millet River particularly near the intake where there is limited agriculture and the use of agro chemicals by farmers. These are not generally caught with any frequency for any form of food source by residents. This was confirmed by the Social Development Officer and the Agricultural extension officer for the Millet zone.

3.10 Human Settlement

The Millet area falls within the wider Roseau Watershed within the Anse la Ray Region. The population of Anse la Raye is estimated at 6,354 persons. The Millet community comprises a number of smaller communities which are reflected in the table below with a combined population of 1,398 persons:

Table 3: Population of Main Settlements within Millet by Sex

Settlement	Households	Male	Female	Total
Tete Chemen	185	173	189	362
Caico	81	121	107	228
Venus	32	52	46	98
Durandeau	102	149	166	315
Roseau	136	229	166	395
Totals	**536**	**724**	**674**	**1,398**
Source: 2010 Population Census				

Millet/Tet Chemin is the directly affected community with 362 persons of which 173 are male and 189 are female, in 185 households (Government Central Statistical Office, Ministry of Finance, Castries)

The settlement pattern reflects one of a generally linear nature following the main ridges and their slopes with residences on either side of the roadway. The lower valleys and slopes, and some of the upper slopes, are generally utilized for agricultural purposes by residents. This is enhanced by the high rate of rainfall within this area. The main employment generator within the Project area is agriculture, usually undertaken by the mature and older population. The younger persons tend to find employment in other sectors such as tourism, the civil service, teaching, police, and nursing.

The road network branches off from a main Millet arterial road from Roseau into the hinterland to Tet Chemin. As one travels inland, the width of road tends to fluctuate.

In terms of social infrastructure, there is a health centre at Vanard, two schools (one infant and one primary), some preschools, five churches of various denominations, and a six community centres.

Tet Chemin has its own community center and is the location for the Forestry Office in the Millet zone. One of the five churches in the Millet Region, a Seventh Day Adventist church, is located within Tet Chemin. Similar to the wider Millet Community, the agriculture is a mainstay practiced by the more mature of the community, with the younger population employed with the other sectors.

The communities are serviced by water and electricity, but the main concern from residents within the Tet Chemin community where the intake is located is the lack of a consistent water supply from the public system in the area.

4.0 Potential Environmental and Social Impacts

4.1 Project Route and Activities

The physical constraints of the general topography of the area with its steep slopes, drops, and narrowness in some areas, and the actual location of the river has been considered in the final design efforts. Various investigations have been conducted and these have also fed into the design effort. A route has been determined for the service access and realignment of the pipeline along with a design for the actual rehabilitation of the existing intake.

The following are the activities within the various phases of the Project and their status. The anticipated impacts are discussed in more detail in the subsequent sections of this report.

Feasibility Phase

Completed.

Detailed Design Phase

Completed.

Pre Construction and Construction Phase

The pre-construction will involve completing the pre-construction layout surveys, land clearing and grading, and the preparation and mobilization. Construction operations will occur throughout the Project area creating the access road and then rehabilitating the exiting intake. This will result in both direct and indirect impacts. The ESMP discusses the nature of these activities, the potential impacts and the mitigation measures that are to be adopted and formally compiled with through the construction contract.

The ESMP will also document the verification and inspection protocols to ensure that the construction activities are compliant with the requirements of the ESIA.

Operational Phase

The activities associated with the operation and maintenance by WASCO are anticipated to have minor adverse social and environmental impacts. This will warrant that WASCO secure the lands at the intake, the Junction chamber and along the transmission and access road.

4.2 Description of Proposed Project

The proposed alternative to reconstruct and connect the Millet Intake to the John Compton Dam Water Supply System has been developed following a consultative process with the various stakeholders and through the evaluation of the alternatives with due consideration for technical factors, and the corresponding environmental and social impacts. The proposed Project consists of the following components:

1. Reconstruction of the Millet Intake works at the same location and incorporating the existing structures;

2. The proposed works at the Millet Intake include an overflow weir, a bottom raw water capture system consisting of an 8 m wide Coanda type screen, desilting and metering chambers and a connection to the raw water transmission pipeline;

3. Reconstruction of the raw water extends a distance of 2,360 m to the connection with the raw water transmission main from the John Compton Dam;

4. The proposed raw water transmission main is a 450 mm ND (Nominal Diameter) pipeline and will include approximately 18 chambers equipped with combination air release/vacuum breaker valves and 7 blow-offs;

5. While the proposed raw water transmission main follows an alignment that is similar to that of the existing line, the proposed alignment as noted previously, is set at a greater off-set distance away from and to the east of the Millet River;

6. The path of the clearing and excavation for the construction for the proposed raw water transmission main will be upgraded as part of the proposed construction to provide WASCO with an access corridor along the route of the transmission main. The access will consist of a 3 m wide access gravel road for maintenance operations and to provide vehicular access along the pipeline route to the Millet Intake works;

7. The propose connection of the Millet Intake raw water pipeline to the John Compton Dam Water Supply System will be made at a 11.3 x 8.1 x 2.9 m reinforced concrete below grade chamber which will house the connection, metering equipment and associated valves and piping.

The scope and details of the works associated with preferred alternative as listed above are illustrated in Figures 13, 14 and 15; which are reproduced from the detailed design drawings.

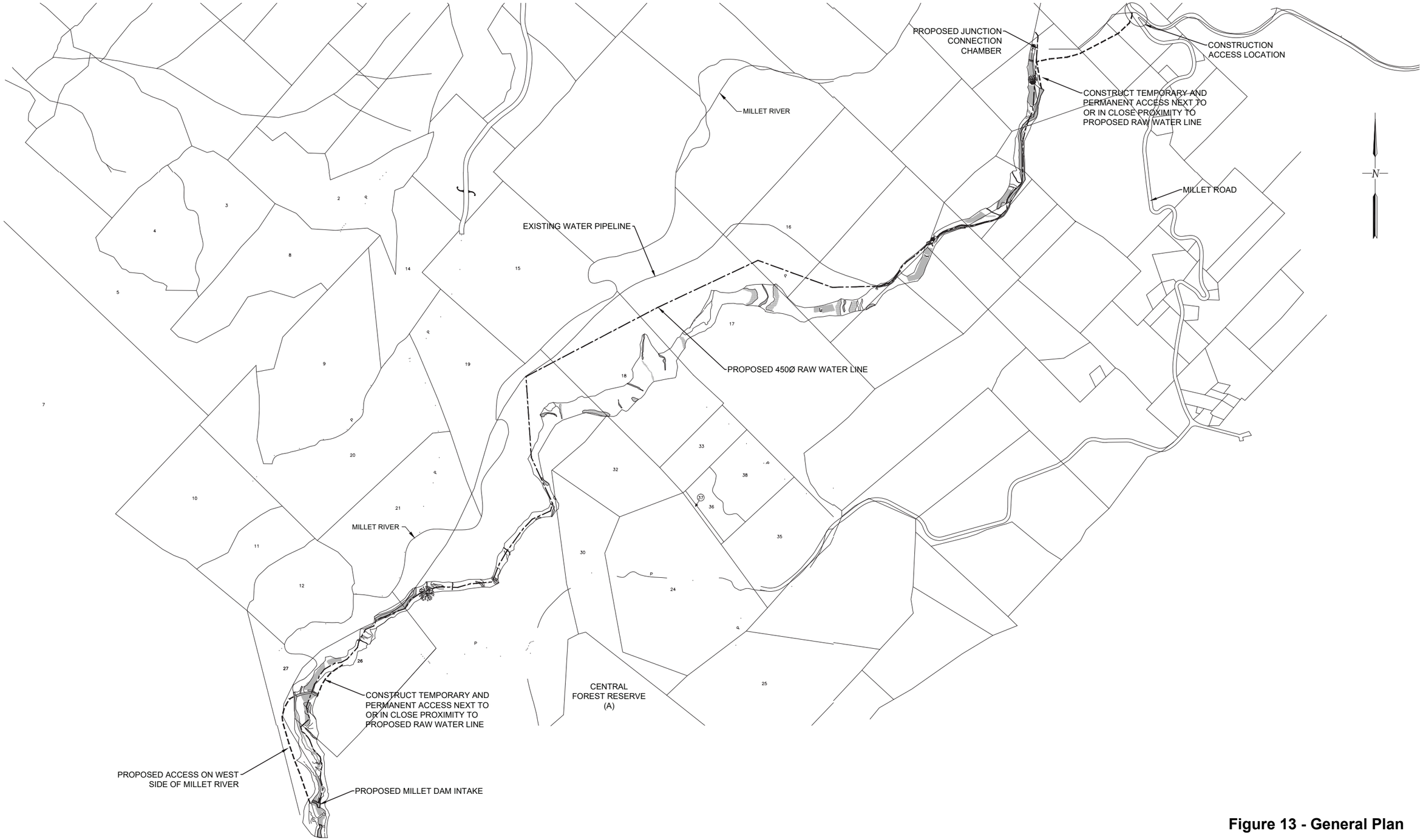


Figure 13 - General Plan

Notes
1. This drawing is the exclusive property of R. J. Burnside International Limited. The reproduction of any part without prior written consent of this office is strictly prohibited.
2. The contractor shall verify all dimensions, levels, and datums on site and report any discrepancies or omissions to this office prior to construction.
3. This drawing is to be read and understood in conjunction with all other plans and documents applicable to this project.

NOT FOR CONSTRUCTION

No.	Issue / Revision	Date	Auth.
0	ISSUED FOR CLIENT REVIEW	19/02/22	RDC
1	ISSUED AS PART OF REPORT No.7	19/03/21	RDC

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West Indies

GOVERNMENT OF SAINT LUCIA

Drawing Title
REDEVELOPMENT OF THE MILLET INTAKE AND RAW WATER PIPELINE WITHIN THE JOHN COMPTON DAM WATER SUPPLY SYSTEM

GENERAL PLAN

Drawn	Checked	Designed	Checked	Date	Drawing No.
CADD	GC	GC	RDC		G001
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Scale					
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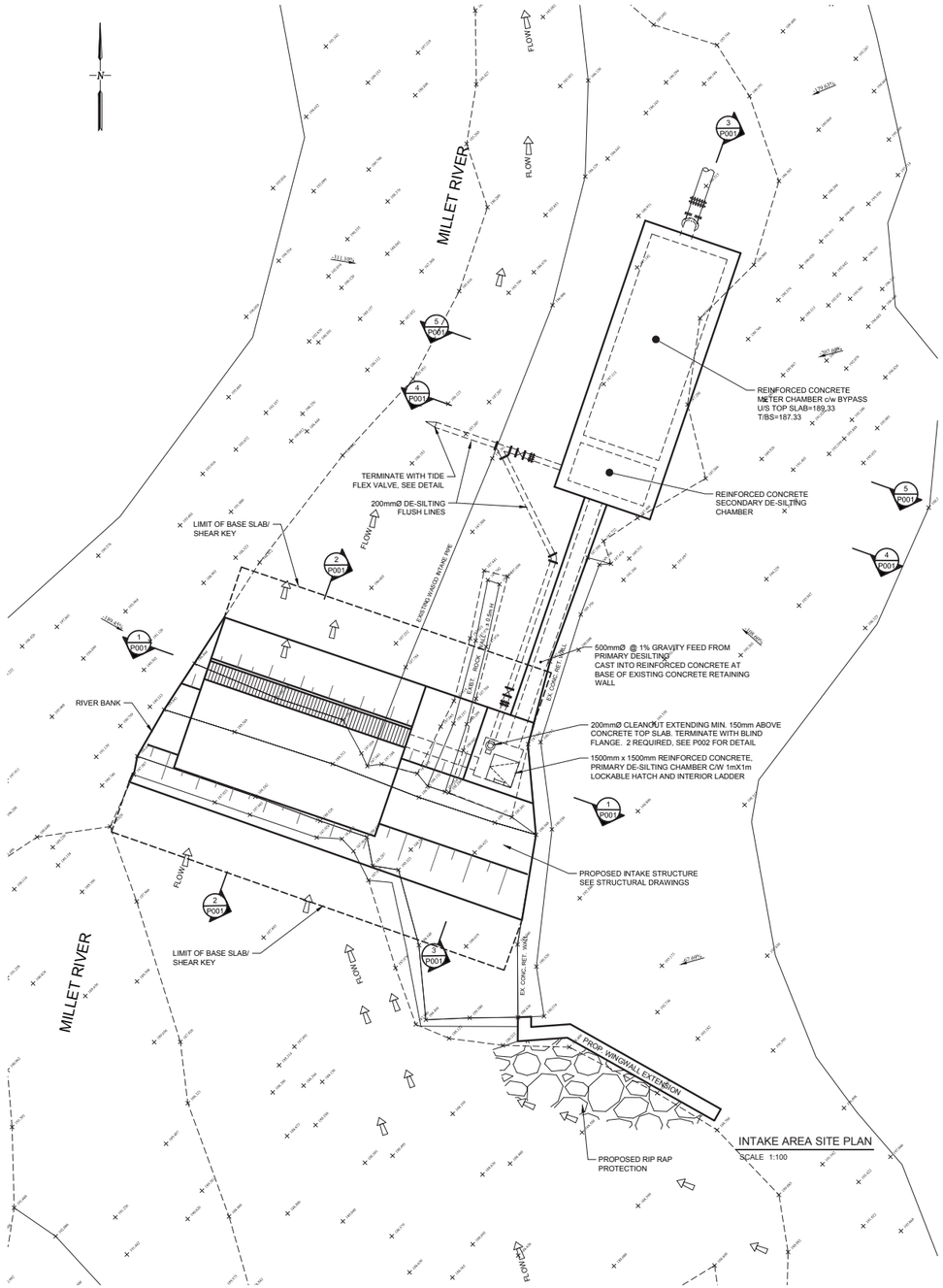

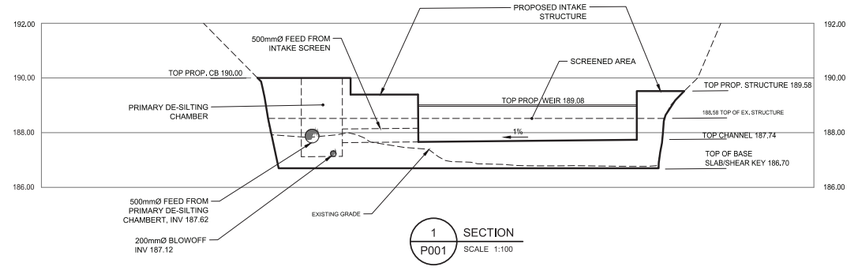

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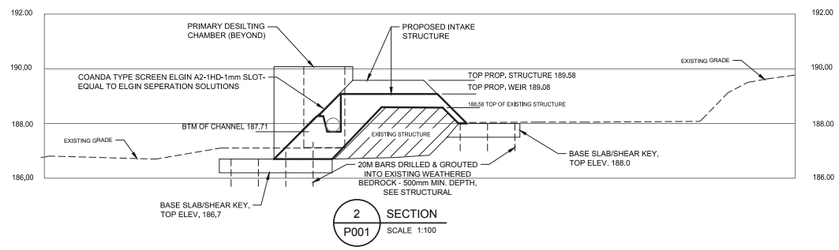

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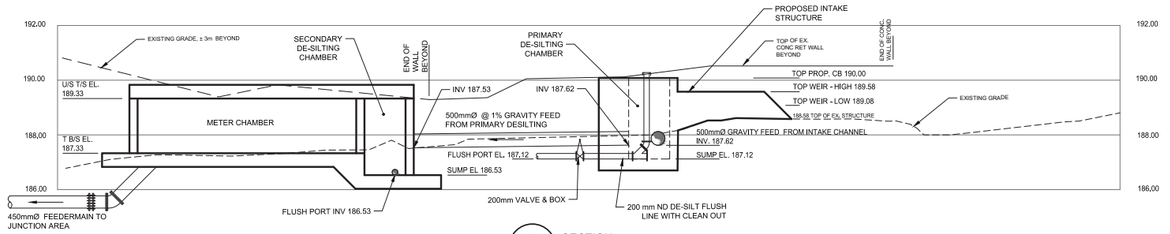

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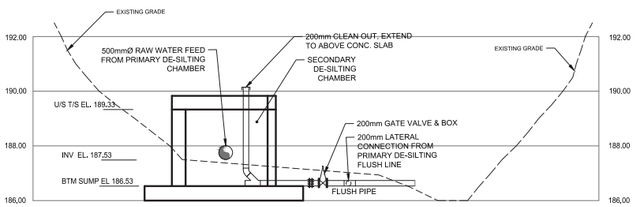

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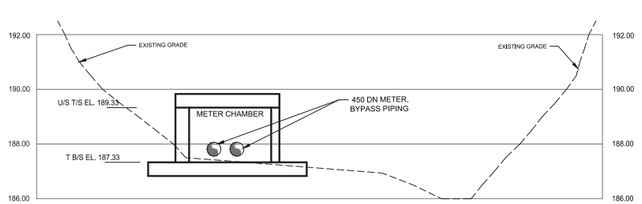

5 / P001 SECTION
SCALE 1:100

Figure 14: Intake Site Plan and Sections

Notes
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2. The contractor shall verify all dimensions, levels, and datums on site and report any discrepancies or omissions to this office prior to construction.
3. This drawing is to be read and understood in conjunction with all other plans and documents applicable to this project.

NOT FOR CONSTRUCTION

No.	Issue / Revision	Date	Auth.
0	ISSUED FOR CLIENT REVIEW	19/02/22	RDC
1	ISSUED AS PART OF REPORT No.7	19/03/21	RDC

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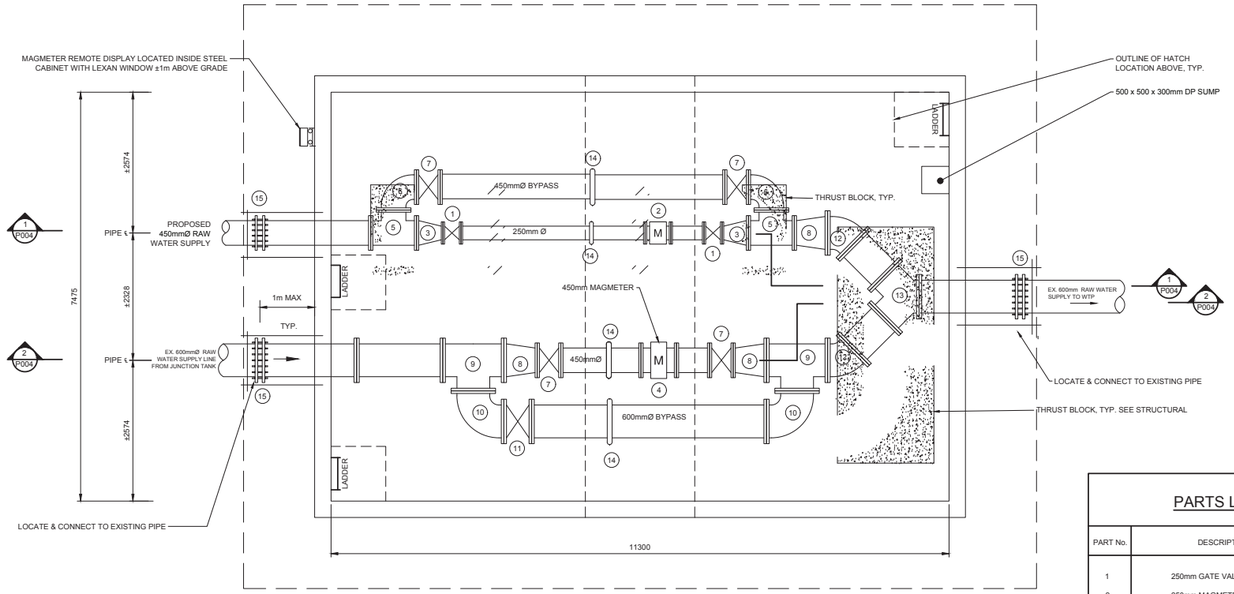
West Indies

GOVERNMENT OF SAINT LUCIA

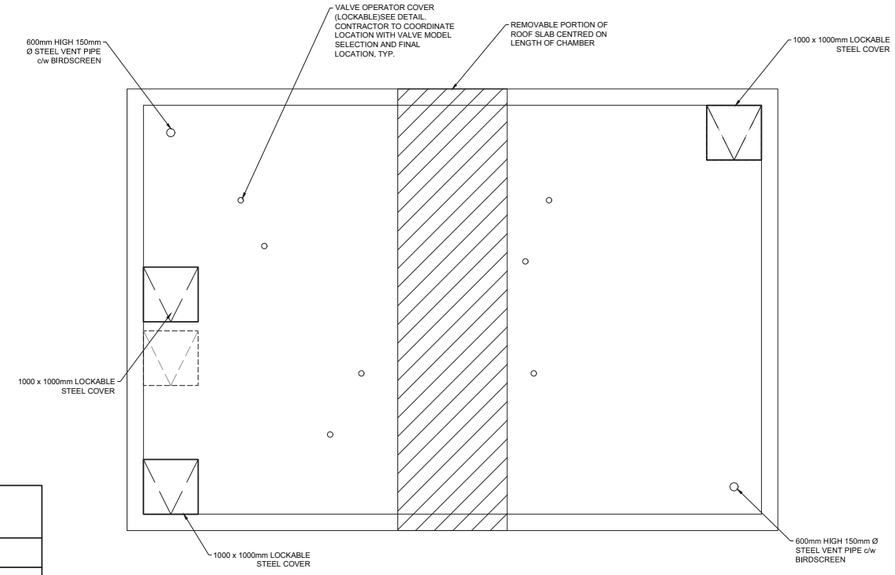
Drawing Title
REDEVELOPMENT OF THE MILLET INTAKE AND RAW WATER PIPELINE WITHIN THE JOHN COMPTON DAM WATER SUPPLY SYSTEM

INTAKE SITE PLAN & SECTIONS

Drawn	Checked	Designed	Checked	Date	Drawing No.
JAD	KRK	KRK	RDC	YY/MM/DD	**P001**
Project No. 300039491.0000		Contract No.		Revision No. 1	
Scale 1:100		0 2.0 4.0 6.0m			



PLAN

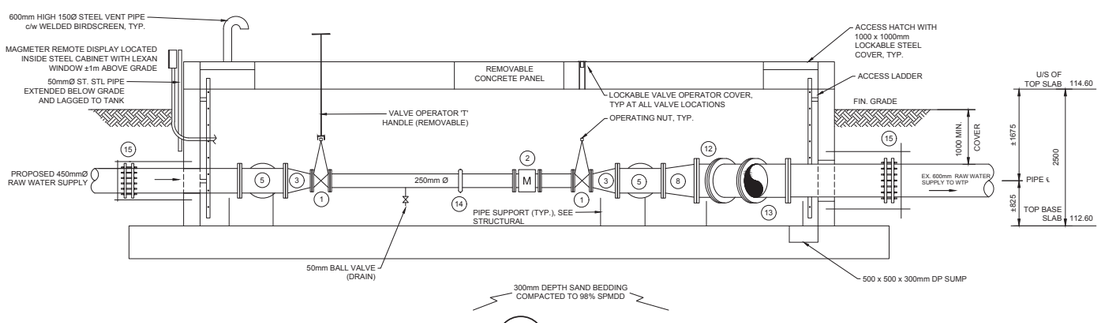


ROOF PLAN

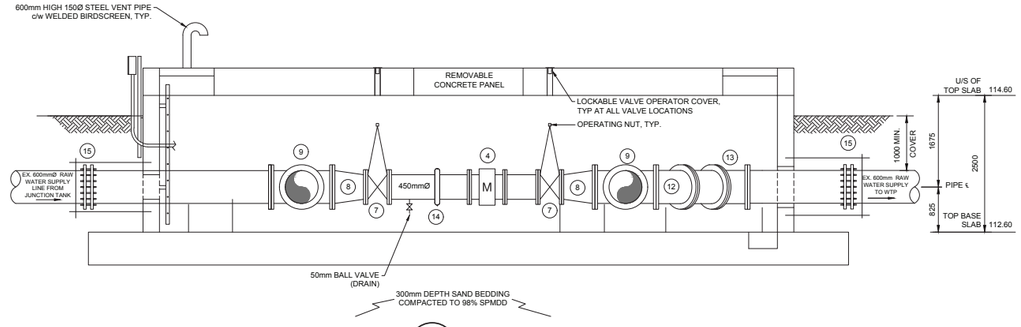
PARTS LIST

PART No.	DESCRIPTION
1	250mm GATE VALVE
2	250mm MAGMETER
3	450 x 250mm REDUCER
4	450mm MAGMETER
5	450mm TEE
6	450mm ELBOW
7	450mm GATE VALVE
8	600 x 450mm REDUCER
9	600mm TEE
10	600mm ELBOW
11	600mm GATE VALVE
12	600mm 45° ELBOW
13	500mm TRUE Y
14	VICTAULIC COUPLING OR APPROVED EQUAL
15	RESTRAINED FLEXIBLE COUPLING

NOTE: ALL GATE VALVES c/w NON-RISING STEM



1 P004 SECTION



2 P004 SECTION

Figure 15: Junction Connection Chamber

Notes
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NOT FOR CONSTRUCTION

No.	Issue / Revision	Date	Auth.
0	ISSUED FOR CLIENT REVIEW	19/02/22	RDC
1	ISSUED AS PART OF REPORT No.7	19/03/21	RDC

NOTES:
1. MAGNETIC FLOW METER TO BE INSTALLED AS PER MANUFACTURER'S RECOMMENDATIONS WITH REQUIRED UPSTREAM AND DOWNSTREAM CLEARANCES
2. ALL PIPING WITHIN CHAMBER TO BE SCHED 40 GALVANIZED STEEL
3. PROVIDE OPENING IN TOP SLAB DIRECTLY ABOVE GATE VALVES
4. SEE STRUCTURAL DWGS FOR VENT PIPE, HATCH & LADDER LOCATIONS
5. SUPPLY AND PLACE SAND BACKFILL 300mm AROUND STRUCTURE SIDES
6. ALL VALVES SHOWN ARE GATE VALVES c/w NON RISING STEM AND OPERATING NUT INDICATED OTHERWISE, REFER TO CONTRACT SPECIFICATIONS MORE MORE INFORMATION. GATE VALVE SIZES ARE TO BE TO MATCH THAT OF PIPE RUN ON WHICH THEY ARE INSTALLED. .

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West Indies

GOVERNMENT OF SAINT LUCIA

Drawing Title
REDEVELOPMENT OF THE MILLET INTAKE AND RAW WATER PIPELINE WITHIN THE JOHN COMPTON DAM WATER SUPPLY SYSTEM

JUNCTION CONNECTION CHAMBER

Drawn	Checked	Designed	Checked	Date	Drawing No.
JAD	KRK	KRK	RDC		**P004**
Project No.		Contract No.		Revision No.	
300039491.0000				1	
Scale					
1:50					

4.3 Potential Project Environmental and Social Impacts

The re-construction of the Millet intake, the transmission main, and required access road will require various levels of pre-construction and construction activities. These activities associated with the various phases of the Project, from preliminary works, through construction, to operation, will have a number of positive and negative impacts on the immediate and wider environment within the short to long term.

The Millet Intake rehabilitation project was one of a number of national projects initially reviewed under the DVRP and is reflected in the DVRP Environmental Assessment and Environmental Management Framework and Social Assessment and Resettlement Policy Framework documents. Within that Environmental Assessment (EA), Table 3 titled "*Impact Matrix of List of Projects Initially Provided by the PCU*" identified the potential impacts associated with this Project. The following is an extraction from that table for reference.

Table 4: Potential Impacts

	Proposed activities	Agency	Possibility of Environ-mental Impact?	Environmental Impact Aspect, positive (+) or negative (-)	Level of Environmental Impact
9	Development of the Millet Intake within the John Compton Dam Raw Water Supply	WASCO	Yes	1. Potential poor construction management practice issues (-). 2. Air pollution from dust and fumes from vehicles/ machinery (-). 3. Solid waste management issues, increased siltation of intakes and water supplies from works (-). 4. Potential resident and worker safety issues (-). 5. Potential disturbance and removal of natural vegetation (-). 6. Potential disturbance and removal of natural vegetation and damage to natural habitat in forest areas (-).	Moderate but has potential to be significant if not properly scoped and works not properly implemented and managed; may require additional assessment to design best environmental management plan.

	Proposed activities	Agency	Possibility of Environ-mental Impact?	Environmental Impact Aspect, positive (+) or negative (-)	Level of Environmental Impact
				7. Impact on fauna via noise impact and presence of human activity (-).	

Source: Extracted from Table 3. Impact Matrix of List of Projects Initially Provided by the PCU DVRP Environmental Assessment and Environmental Management Framework and Social Assessment (2016).

The DVRP EA document does highlight the fact that “the WASCO intake rehabilitation may occur within the natural forest therefore care must be taken during the reconstruction activities. Pertinent environmental management measures must be implemented”.

The potential environmental impacts are consistent with site observations, scoping, and consultation with various stakeholders.

The general potential impacts from the Project activities as anticipated are identified and also depicted in Table 5 – Potential Environmental Impacts related to the activities anticipated for the re-construction of the Millet Intake, Transmission Main and Access Roads below.

Table 5: Potential Environmental & Social Impacts Related to the Works Related to the Preferred Alternative for the Reconstruction of the Millet Intake

Activity Causing Impact	Potential Impact	Impact Category Environmental or Social	Positive/ Negative
Preliminary Phase			
Clearing of vegetation for topographic surveys and for geotechnical investigations for the intake works, the Junction connection chamber and along the route of the transmission pipeline and access corridor	Destruction of habitat Access to privately held lands Impact on the crops of local farmers	Environmental Social	N
Construction Phase			
- Removal of vegetation for the excavations of foundations and trenches for the intake works and transmission pipeline - Construction activities, including use of heavy machinery - Disposal of vegetation cleared for the construction of works - Stripping of topsoil, excavation, stockpiling, grading as may be required for the construction of the proposed works - Clearing and excavations at borrow pits and preparation of staging areas for construction equipment and materials - Levelling and/or terracing along steep slopes to facilitate construction activities - Stockpiling of soils and aggregates	Soil erosion Potential for siltation of riverine water when activities are in the vicinity of the Millet River or of active flowing drainage tributaries Destruction of habitat Access to privately held lands Impact on the crops of local farmers Loss of land used by local farmers	Environmental Social	N
- Grading as necessary for the construction of structures, raw water transmission pipeline, valve chambers and related appurtenances - Creation of stockpiles of excavated and borrow material - Haul roads for materials and equipment - Compaction of soils by heavy vehicles and construction equipment - Use of borrow pits	Changes of the terrain morphology Soil erosion Siltation Destruction of habitat Access to privately held lands Impact on the crops of local farmers Loss of land used by local farmers	Environmental Social	N

Activity Causing Impact	Potential Impact	Impact Category Environmental or Social	Positive/ Negative
- Potential spills of fuel, lubricants and other liquid from vehicles and other construction equipment - Spills from temporary sanitary facilities - Improper management of solid and liquid waste from the working area (domestic effluents, water and soils from vehicles washing, material storage) - Uncontrolled use of fuel and lubricants during the operation of construction vehicles and machinery - Accidental leakage of hydrocarbons and other hazardous products - Waste (garbage) from workers and other construction activities	Contamination and degradation of soil Pollution of surface water	Environmental	N
- Construction activities on days with high rainfall and runoff	Potential soil erosion and inundation Transport of contaminates; increased sedimentation in waterway	Environmental	N
	Pollution of soil, groundwater and surface water	Environmental	N
	Groundwater, soil, and surface water pollution	Environmental	N
	Increase in the noise and vibration levels Creation of resultant dust and particulate material Impact on existing wildlife/fauna and their habitats, potential destabilization of banks and slopes	Environmental and Social Environmental and Social Environmental	N

Activity Causing Impact	Potential Impact	Impact Category Environmental or Social	Positive/ Negative
- Emissions of atmospheric pollutants due to poor maintenance and operation of construction equipment - Unauthorized and uncontrolled burning of waste	Increased emission of smoke and gases (CO, SO2, NOx, particulates and black smokes), Impact on existing wildlife/ fauna and their habitats	Environmental	N
- Increased concentration of airborne dust	Reduced visibility Coating of vegetation, buildings and laundry; occupational health related issues	Environmental and Social	N
	Change in the aesthetic quality of landscape Reduction of forest area Physical loss of habitat Reduction of animal species Land use compatibility in the area Loss of land used by local farmers	Environmental and Social Environmental Environmental Environmental Social Social	N
	Loss of habitat of benthic communities	Environmental	N
	Temporary job and income creation Upliftment of the local communities due to job creation Temporary income generation from support services such as provision of meals and refreshment during project works by commercial establishments in the local communities	Social Social Social	P
	Interference with the local economic and social activities of the population Potential Loss of crops and some agricultural land	Social Social	N

Activity Causing Impact	Potential Impact	Impact Category Environmental or Social	Positive/ Negative
- Transportation of materials and equipment along public roads to the work sites	Disturbance of traffic and accessibility patterns	Social	N
- Movement of construction vehicles and machinery along public roads	Change in the traffic intensity Potential for work related and roadway accidents	Social	N
- Possible rehabilitation of existing roads and access routes used by local farmers	Improved access	Construction and operation phases	P
- Higher concentration of people in the construction area	Potential increase in the incidence of social issues	Social	N
- Construction activities		Social	N
- Exposure to chemical substances - Exposure to dusts, noise and vibrations	Incidence of occupational health related impacts	Environmental and Social	N
- End of construction activities	Loss of jobs with the end of the construction and increase of social vulnerability	Social	N
Operational Phase			
- Improvement of the water supply to the John Compton Water Supply service area	Lifestyle character of the affected communities	Social	P
- The project as a whole	Capacity building for WASCO technical staff through experience sharing with consultants and possible introduction to new approaches and methodologies	Social	P

4.4 Environmental Impacts

The following were determined as the potential environmental impacts of the Project and its related activities. This determined was largely through the various scoping exercises, research, consultation, and particularly the consultations with the community and stakeholder agencies.

4.4.1 Loss of Critical Vegetation Cover

The practice of grubbing and deforesting for exploratory and for construction works can mean the removal of deep rooted vegetation that assist with soil and slope stabilization. Indiscriminate removal of this vegetation also means the removal of canopy cover that protects exposed soils. Such actions can lead to land slippage, erosion, and eventually siltation of the Millet River leading to the loss aquatic communities and contributing to its increased sedimentation. This is especially so on steep slopes as these are frequent along the proposed transmission pipeline route. This loss can also include the now exposed arable lands with the crops that the farmers cultivate for their livelihood. The natural vegetation also plays an important part in maintaining soil moisture content and overall health. The destabilization of slopes and soils by the removal of the vegetative cover is further exacerbated by the vibration and movement of heavy equipment during construction activities. In the forested areas, such deforestation has the potential to lead to the loss of habitat for endemic flora and fauna as well as a loss of biodiversity who depend on the vegetation for food, shelter, and precreation.

Particular care must be exercised to minimize unnecessary removal of vegetation, particularly of mature trees along the proposed route during works.

4.4.2 Loss of Arable Agricultural Lands

The encroachment to create a corridor that will include the proposed raw water transmission main and access road will consume strips of lands dedicated to subsistence farming by the local farmers. The route will impact on a number of landowners, but it is the farmers on some of these parcels whose economic livelihoods will be directly affected. Fertile agricultural soils can be disturbed and left subject to erosion and rainfall causing them to be washed away into the adjacent river. Disturbed soils on sloped areas would also be subject to land slippage as noted previously. This issue was also highlighted during the meeting with landowners, the wider community, and by the various interviewees.

An Organization of Eastern Caribbean States (OECS) Mango planting project was implemented in Tet Chemin in 2017 and involved the planting of mango trees as a natural slope stabilization and erosion control measure in areas prone to erosion. Tet Chemin is one of the demonstration areas. The Forestry's Department has determined that the swarth of the proposed road and transmission line reserve will possibly affect two areas within that project with the possible loss of 20 mango samplings.

4.4.3 Biodiversity/Species Disturbance and Loss

The wider Millet and the Tet Chemin areas have varied, and endemic biodiversity as evidenced by documented reports and the inventory undertaken by the Forestry Department. The Forest Reserve is a protected area and home to the Saint Lucian Parrot, as well as other fauna such as the Fer-de-Lance, and the Boa Constrictor. The natural vegetation, particularly fruit trees serve as food sources, habitats for species rearing, and protection. The river serves a similar function for marine life and as a source of drinking water for terrestrial animals.

The generation of noise from vehicles and any construction activities such as clearing and felling of mature trees can disturb the various fauna species and cause disorientation and movement from what has been a safe and accommodating habitat. This is particularly significant during the nesting and rearing periods of the year and care will need to be exercised in that respect. Similarly, any fumes from any machinery, or the burning of waste material on site will also be disruptive.

Flora may be indiscriminately cut down or trampled, and so lost or damaged. These plants may be medicinal as well as food sources for both human and fauna. Loss of mature trees mean loss of habit, loss of general soil retaining ability, and either potential long grow back period, or a long-term loss. All of this strongly suggest working collaboratively with the Forestry Department and engaging Forestry personnel during the land clearing activities.

4.4.4 Poor Water Quality

There is the potential for the proposed works to negatively impact the existing water quality of the Millet River. This can result from sedimentation generated during the excavation works and general construction. Any loose or disturbed soil as a result of the construction activities if not appropriately managed may end up in the river and contribute to sedimentation. This would include activities associated with site clearing, grubbing of roots, stripping and stockpiling of the topsoil/organic layer, demolition may be necessary at the intake, removal of old embedded as well as loose pipeline sections, loose construction material, excavation, backfilling operations as well as modification to existing slopes and grades to accommodate access and work. Without appropriate

measures during the construction activities, soil disturbance and excavation and demolition works can contribute to sedimentation and siltation.

Construction works at the intake itself might involve some demolition, some digging into the river banks and bed, all of which will generate loose material, dust, and soil which may either will be stirred up into the river. The mixing of materials such as concrete with sand and cement may occur within close proximity and can leach directly into the water system.

The creation of the access and pipeline route will require clearing, grubbing, excavation, backfilling and grading activities that involve the disturbance of soils which can easily wash into the river, especially with any rainfall event.

The indiscriminate disposal of construction waste materials that includes sand, cement, cement bags, or other materials can contribute to pollution of the waterway unless properly contained and managed.

The indiscriminate and improperly managed use and disposal of oils, lubricants, or chemicals used in machinery or for any servicing and construction process can contribute to both soil and surface water pollution. During rainfall events chemicals can mix or be carried with runoff and create liquid wastes that impact both terrestrial and marine environments.

The proper management of wastewater, and in particular human wastes on site is very critical to ensuring a healthy working environment and reduce the risk of faecal contamination of the river. The possible lack of adequate toilet facilities within such a pristine environment is always a concern.

4.4.5 Soil Contamination

The indiscriminate disposal of construction waste materials that includes sand, cement, cement bags, or other materials will contribute to contamination of the soil, especially the arable soil, if not properly managed. The indiscriminate and improperly managed use and disposal of oils, lubricants, or chemicals including fuel spills associated with the operation of machinery or for any servicing and construction process can leach into the soil, especially during rainfall, and contribute to pollution and reducing soil quality. This can impact the regrowth of natural vegetation, but worse, contaminate the soil that farmers and wildlife would also depend on for sustenance.

4.4.6 Increased Noise Levels

Increased noise and vibration levels through construction activities such as the movement of heavy supply trucks into and out of the site, and the operation of machinery such as excavators, dozers and graders can have negative impacts on both the terrestrial and marine environments, particularly within the forested areas. In secluded or forested areas, fauna habitats can be disturbed causing such creatures as the Parrot or the boas to flee their habitat and nesting areas. Similarly, increased noise levels from activities adjacent to or within the communities such as the movement of equipment or large trucks transporting materials, may be deemed as an unnecessary and unwanted nuisance affecting day to day activities of the local residents.

Associated vibrations from the use of heavy equipment such as rollers which may be necessary for soil compaction or heavy truck with construction materials, can negatively impact surrounding communities by causing nuisances through the shaking of households and household items, and possibly affecting the stability of these structures. Similarly, for biological communities, mating seasons may be affected depending of the time of year that the Project activities commence. Care must be taken in the judicious operation of equipment that will cause heavy noise and vibration.

4.4.7 Poor Air Quality

Poor air quality can originate from a number of sources. The vehicles and machinery being utilized can both produces noxious fumes such as carbon monoxide, diesel fumes, as well as burnt oil fumes. There is the increased potential for air pollution to come from the operation of older or improperly service vehicles and machinery. This can directly affect onsite workers over the long term, as well as the community on a shorter term as vehicles travel through that community.

Dust also arises from cleared land that has been exposed to the sun, is dried, and the wind carries this material to nearby residences or communities. Similarly, uncovered fines such as silts, sands or even cement can be light enough to be blown by the wind either when being transported through the community or being stored on site. This is a nuisance to the communities.

The mishandling of particularly noxious chemicals such as solvents or chemical washes, greases, that produce fumes or odours, as well as the burning of solid wastes on the construction site, especially chemical containers, can lead to air pollution and negative resultant health impacts especially for onsite construction workers.

4.4.8 Potential Worker/Occupational Health and Safety Related Impacts

Safety is a critical concern for all workers on this Project. The distant location of the intake site within the Forest Reserve, the poor access route and the distance to the closest medical facility, speaks clearly to the need to ensure proper occupational health and safety conditions and measures are taken. Any mishandling of equipment, improper storage and usage of various chemicals and construction materials, high levels of continuous noise and fumes from generators, excavators, haul vehicles as examples, as well as inadequate safety equipment, poor workplace practices, can contribute to both short and long term adverse health effects, serious injury and down time to the workers also adversely impact the timely completion of the Project. Operating machinery without the proper instruction or safety signage is also a critical issue.

Improper food waste management will tend to increase the potential for vector infestation and possible transference of diseases. The Project area is also an area known as a snake habitat, especially for the poisonous Fer-de-Lance. Snake venom is only available in Castries at the Victoria Hospital.

The management of wastewater, and in particular human wastes generated by the work force on site is very critical to ensure a healthy working environment and reduce the risk of faecal contamination. Possible contamination by human waste due to lack of adequate toilet facilities is always a concern and more so in such a pristine environment.

4.4.9 Public and Community Safety Impacts

There is always the possibility of increased construction-related traffic for such civil works as that involved with the construction of the intake and the clearing and construction of the route and laying of the pipeline. The potential for vehicular/vehicular and pedestrian/vehicular conflict increases as the scale of construction increases if proper traffic management procedures are not implemented. This can lead to very tempered negative response from the nearby residents or the community affected. The matter of safety also becomes a great concern in relation to the speed of the vehicles as well as the alertness of the drivers as they traverse the Millet roads through the communities. Combined with this may be inadequate instruction of these drivers, lack of warning signs, and on ground maneuvering directions during the period of the Project construction. Lack of information within the community on the specific or extra working times can mean the unpreparedness of residents who tend to walk the roads at certain times, especially in the later evenings.

This become particularly hazardous if there are children within the vicinity who may be accustomed to playing on the roads or sidewalk areas.

The breakdown of a large project vehicle causing the blockage of a well-travelled public transportation route, especially during the morning rush hour, can escalate tensions within the community especially if it contributes to loss of travel time to work, school, or returning home. Associated with the movement of vehicles, there is always the potential impacts of dust, fumes, noise, and vibrations on residents as highlighted above.

4.4.10 Post Construction and Operation

After construction, the operation of the intake and establishment of the access service road and the transmission line is expected to have very minimal negative impacts if any. This would be as a result of the necessary mitigative measures and properly designed and supervised construction of a properly functioning system should have occurred. None of this infrastructure will require manning on a continuous basis. WASCO staff will have to undertake routine visits to ensure that the intake and transmission system are functioning properly, and to undertake repairs and maintenance as necessary.

4.5 Social Impacts

In conducting the social impact assessment, a number of interviews were conducted as part of the consultative process. In conducting this aspect of the study, it was important to understand the implication of the Project on the affected population as their appreciation of and open exchange on its issues, is a key factor in ensuring the Project's immediate, and long term success. Of particular interest were the meetings held with the landowners whose lands in Tet Chemin might be directly affected by the Project at that point in the design phase, and also the wider Millet community to solicit their input. The proceedings of these meetings are highlighted below. Summary details of these meetings along with the list of attendees can be found in Appendices 5, and 6.

A general description of the community has been provided in previous sections, 3.9 and 3.10 of this report. Of note is that the access road and transmission route traverses through private property until it gets to the Forest Reserve which is Crown lands. These properties are largely under secondary vegetative cover with a number of them having part of the land in active subsistence agriculture. There are 93 registered farmers in the Tet Chemin area of which 31 are female and 67 are male. These farmers grow crops that range from bananas to dasheen taking advantage of the high rainfall and moisture laden fertile soils. The matter of the Project's impact on the specific affected farmers and their livelihoods will be addressed later in this report.

In the initial social impact scoping the bird watching programme that exists at Tet Chemin was identified as a possible activity that might have been affected by the Project. After further research it was determined that this activity would not be impacted as it ran much further up in the forest past the Forestry Office and was nowhere near the Project site and of the proposed works.

While the Millet River remained a focal point in the works to be undertaken, it was noted that one of its main uses within Tet Chemin is for irrigation of the agricultural plots. Bathing and other uses are limited due to the presence of a snakes.

Continued communication with the community on the Project and its status remained a major point throughout the process. Compensation for the use or loss of lands and crops remained another key discussion topic. Local knowledge of the Project environment remained a valuable resource in understanding potential design issues and impacts, particularly social impacts.

4.5.1 Meeting with Property Owners

The meeting with the landowners and landowner representatives who might be affected by the pipeline route took place on Sunday, November 4, 2018 at Tet Chemin, Millet. The purpose of the meeting was to inform and engage the landowners in discussions on the forthcoming route identification for the proposed pipeline and access road by the local surveyor to assist Burnside's design efforts. Appendix 5 provides details of the meeting and the list of attendees.

The following were the issues raised and recommendations made.

1. The pipeline should avoid any close proximity to the existing river, especially along its banks as this leads to soil erosion and land slippage into the river. This is based on the experience of the owners and farmers.

2. There is the possibility of the loss of agricultural lands/ prime top soil and crops as a result of the construction works and placement of the new pipeline and access route, and so an assessment must be undertaken, and compensation needs to be provided to farmers/landowners for any such losses.

3. WASCO must be liable for any damage to the properties during the construction and placement of the pipeline and service route.

4. Consideration should be given to the provision of free pipe borne potable water from WASCO for life as part of the compensation consideration to landowners.

5. WASCO must ensure that they contact and have permission from the actual landowners, and not the persons faming the lands as these might be different parties.

7. There must be continued communication with the Tete Chemin community on the Project and the various activities that are to occur so that they are always aware of what is happening.

8. The landowners were pleased that permission was being sought from them for entry through their property and asked that prior to the commencement of any works the surveys and the geotechnical investigations, they should be notified at least 48 hours prior.

4.5.2 Meeting with Millet Community

The meeting with the wider Millet Community took place at the Millet Infant School on Sunday, January 13, 2019. The residents of the wider Millet community included the communities of Tet Chemin (where the Project is to actually occur), Caico, Venus, Durandeau, Morne d'Or and Vanard. The purpose of the meeting was to inform the community of the Project and its works, and to engage the community, soliciting their comments and observations as the wider PAPs and to incorporate these responses and pertinent measures into this final ESIA. Refer to Appendix 6 for list of attendees and a photographic record of this meeting.

The recommendations made by the community were as follows and along with responses offered. The recommendations from the community were accepted.

Table 6: Recommendations Made by the Community and Responses

	Issues and Recommendations	Responses
1.	When will the project works actually commence?	The project works may commence 4 to 5 months from now.
2.	What will the direct benefit to the Millet Community be?	Apart from the improved water supply, there may be local employment with the contractor undertaking the works. There will also be the benefit of improved access for farmers to their farmlands via the proposed new access road that is to be constructed to service the pipeline.
3.	Will residents or people have to be relocated to facilitate the project?	As far as the plan goes, there will be no relocation of persons to facilitate the works.

	Issues and Recommendations	Responses
4.	Will people be compensated if they have to be relocated?	There should be no relocation of any persons. However, if the pipeline passes on private lands, then WASCO will engage in negotiations with these persons.
5.	Will farmers and farm lands be affected?	Yes, there will be some impacts. The geotechnical work has commenced and there may be some clearing and digging that has to be undertaken. This may involve the removal of some crops. WASCO has already engaged the Ministry of Agriculture who has provided an agricultural officer to be present at such works to do a proper evaluation of the crops that may be damaged. The farmers whose lands that are being affected will also be present.
6.	Will there be compensation to farmers or landowners for the use of their lands or damage of their crops by the project?	See above. There will be some damage to crops. As noted, WASCO has engaged the Ministry of Agriculture. Wherever the pipeline is expected to travel over private lands, WASCO will engage in negotiations with those owners.
7.	Will there be interruptions in the water supplies to the communities during the project works?	No. There are no interruptions expected. It is important to ensure the Ti Saut (this a local name for the Millet Intake) is working properly to complement the water coming from the John Compton Dam.
8.	What is the impact of the John Compton Dam (JCD) on the Millet water supply?	Both water supplies meet at a point (the junction), and travel as one flow to the Ciceron Treatment Plant for processing. The initial flows are from two sperate sources.
9.	Will the loan from the World Bank to undertake this project be paid by WASCO or by the Government of Saint Lucia (GOSL)?	The loan will be repaid by the GOSL. The monies will be from the taxes that the GOSL collects annually.
10.	Will there be an increase in the amounts reflected on the monthly water bills received by consumers as a means to pay for this project?	No. There will be no increase in the amounts paid by consumers for their regular water bills.

	Issues and Recommendations	Responses
11.	Is there a possibility of having a treatment plant located at Tet Chemin since all water has to go to Ciceron Treatment plant, and then be pumped back to Tet Chemin, where the original source of the water is?	There have been considerations of what the community was requesting, but over the years, the costs of implementing such a plant were considered by WASCO and found very prohibitive. The decision by WASCO was not to construct an additional treatment plant. This was also considered during the time of the design of the John Compton Dam (JCD).
12.	With the proposed works, will the volume of water from the Ti Saut Intake and the JCD be increased?	WASCO and the consultants have been studying the water supply and have considering the supply levels for the next 30 to 40 years. With the impacts of climate change, it does not appear that there will be any increase in water supply from either Ti Saut or the JCD. That is why it is so important to service and enhance the water supplies from both sources.
13.	Has the flows and intensity of the water supply been studied?	Yes. There is ongoing work by WASCO as well as the Government. The consultants engaged for this project have also undertaken studies to assist in guiding their designs.
14.	Is the project working along with the Forestry Department, and will there be reforestation of any vegetation removed during the project works?	Yes. The Forestry Department is on board and is being consulted. Where necessary, there will be replanting as directed by the Forestry Department.
15.	What arrangement will WASCO now make for the placement of the pipeline over private lands?	Historically, WASCO appears to have had some arrangement with the landowners over whose lands the pipeline traversed. Some of these arrangements are being reviewed. WASCO will be reviewing their records and will get back to the owners in the near future. It is important to state here that the laws of the land must be adhered to in addressing this matter.
16.	Will the final project report that includes the designs and the environmental and social impact assessment be made available to the public?	The Ministry of Finance will attempt to provide a condensed version of the final report on their website as part of the information provided to the community and wider public.

	Issues and Recommendations	Responses
17.	Is there a number at WASCO that someone can call if they have an issue or grievance with this project especially during the construction phase?	This is a very good question. WASCO may need to implement a “grievance number” which residents can call to report any issues during the project.
18.	Will the residents of Millet be offered employment during the project?	It is expected that there will be employment opportunities for Millet residents as they reside with the vicinity of the project works and also have great knowledge of the site.
19.	What is WASCO’s plan for the sections of the damaged pipeline? The damaged pipelines spray jets of water that damage crops and erode lands.	WASCO will investigate this but be aware that the old pipeline was subject to damage because of its location with the river and along its banks. The intention now is to replace the pipeline, but further inland away from the river which may be a more. Ensuring minimal threat to the pipeline over the long period is a major consideration.
20.	If heavy equipment such as an excavator is used in the river, will it be properly supervised as such equipment tends to displace the boulders that protect the river banks and also cause damage in the river.	The contractor will be required to engage in proper supervision of all the equipment used and their activities during the rehabilitation of the intake and pipeline. There will be an Environmental Management Plan coming out of the Environmental and Social Assessment of this project to guide the activities on site during the construction. WASCO will also closely monitor the project construction activities and providing oversight.

With both meetings, and in particular the meeting with the landowners, the matter of compensation for lost crops and also the placement of the service access and pipeline on their properties were raised. While the pipeline presently crossed some private properties, it appeared that there was no formal arrangements between the landowners and the water authority. This matter is presently being reviewed by WASCO towards an arrangement that would not compromise the placement and future operations and maintenance of the pipelines, but also not inconvenience the landowners and farmers.

It must be noted here that while persons may own property, in some cases it was other persons who actually farmed the lands. Compensation is usually paid to the legal owners of property and not occupiers. This is situation is being reviewed by WASCO as previously indicated and would need to be resolved prior to the commencement of any work on the intake and pipeline.

During the discussions, the local the residents of Tet Chemin in particular lamented the fact that there were frequent water shortages in the Millet area despite the presence of the WASCO intake right there in their community. They did however admit that with the recent installation of a new pump, there was a steadier supply, but the situation remained that they were the closest tot eh source, and the last to receive potable water.

4.5.3 Perceived Social Impacts

The following may be considered the main social impacts of the Project on the community, and also on the Client, WASCO.

4.5.3.1 Affected Community

Employment Opportunities

As the Project unfolds and employment opportunities become available to residents, it is anticipated that there would be some temporary income increase for a limited number of households within the community. These opportunities will be associated with the preconstruction phase in terms of bush clearing, and during the construction phase of the Project. However, because of the scale of this Project which is not large and extended over a long period of time, employment opportunities will be of a temporary nature.

Improved Access to Farm Lands

The construction of an access road will provide improved access for farmers with land holdings near the intake and along the transmission main route. This may result in better attention to the crops, improved crop quality and a reduction in post-harvest losses as the farmer may be able to have mobile vehicular access reducing the time to get to, and to extract the crop, and get it to available markets in a timelier manner.

On the negative side, there is a measure of praedial larceny that occurs in the area, and it was opined that the road may facilitate such activities. Improved access could also result in encroachment into the forested area with potential logging and habitat disturbance resulting in negative impact on the forest ecosystem. The possibility also exists that with an open access way, there will arise the opportunity for the construction

of homes, animal pens, agricultural huts and other structures, which could ultimately produce wastes that would adversely affect the water quality in the river.

Impact on Livelihoods

The transmission line and access road route will travers over some private lands before the crown lands and Forest. Construction activities will mean the cutting and preparation of length of land with a width that will require the destruction or removal of planted crops on existing farmland. The existing arable soils will also be impacted by being removed, compacted, or buried under less desirable material. This translates into an economic loss for the farmer who has invested in the crop and expects an economic return, as well as the landowner as they will not be able to use that part of the property for its original use. The farmer's livelihood is negatively impacted, and so is the landowner if he leases to the farmer based on the condition and area of lands. This raises the matter of proper land and crop valuation, appropriate negotiations, and compensation (adequate resettlement arrangements).

However, the alternative side to this will be the fact that with new access road the farmer will now be able to provide better attention to the existing remaining crops, possible lease further lands for other landowners, and with the proper inputs, increase production levels. Better access to transport crops to market may also speak to increase in his livelihood. The matter of ensuring livelihoods is further explored below.

Verification and Reestablishment of Property Boundaries

Some agricultural holdings in the vicinity of the proposed route are not properly demarcated having lost their survey pegs over time. The farmers tend to guess where their properties might extend to. This situation gives rise to potential ownership conflicts and inability for WASCO to confidently approach an owner or famer. Proper surveying exercise that would result from the Project to determine the route and the impacted properties and owners, would assist in the demarcation of the property boundaries of some of the landowners who were not sure of their positions. This would foster confidence in planting efforts as well as allow for proper negotiations and compensation for lands taken by the Project.

General Community Impacts

Please refer to Section 4.4.9 Public and Community Safety Impacts above for a discussion on this impact.

4.5.3.2 WASCO and the Nation

Increased Resiliency and Vulnerability Reduction

The exiting intake and pipeline are exposed and vulnerable to any natural hazard. Hurricane Tomas inflicted heavy damage to this infrastructure. This Project will rehabilitate the intake and the redesigning and relocation of the pipeline to a safer alignment. The overall design is geared at reducing vulnerability and increasing resiliency of the collection and transmission system. This equates to building better for the future and reducing the potential destruction and loss of this critical water supply.

Improved Water Supply

The present system experienced significant damage in the past and in conjunction with climate change factors, this has impacted the water supply. The present intake system is also periodically blocked by debris, reducing its abstraction capacity. These factors have affected the intake's yield over time. A review and engineered redesign of the present intake to account for climate and other factors is geared towards increasing and maintain a more consistent water yield.

This yield in conjunction with that from the John Compton Dam will mean an improved quantity of raw water supply to the Ciceron Treatment plan, and ultimately to the service area possibly reducing, but not eliminating rationing measures.

Institutional Capacity Building

There is the benefit of capacity building for WASCO technical staff through the experience sharing with the consultants on this Project. WASCO staff along with the WRMA were involved throughout the process, including a training session on the water flow data management, hydraulic and hydrologic modelling. This experience and knowledge can now be applied to other WASCO projects within the immediate and long term.

Increased Water Security

Ultimately, the Project is about ensuring water security for the service area. The redesign and rehabilitation of the intake and transmission lines to facilitate improved yield and reduced vulnerability to natural disasters means a more secure system. Climate change factors such as drought has a great impact on water collection and yield. Damaged pipelines also mean the loss of water within the system. The JCD and the Millet Intake system collectively supply raw water to the Ciceron Treatment Plant where this water is treated and distributed to the north of the island. In the event that the JCD is temporarily unable to supply its contribution, the Millet intake must be able to provide a steady supply to the treatment plant that can still maintain a notably volume for treatment

and distribution. On a national scale, the Millet Project, along with improvements in other systems around the island, will equate to increased water security for the nation.

Improved Access for Servicing Infrastructure

The Project is about improving WASCO's ability to service its key infrastructure by improving access. The proposed rout at Tet Chemin is to allow access to the intake facility and to service the new pipeline. The existing access route from upper Tet Chemin and also from the road that accesses the Junction were badly damaged after Hurricane Tomas and have remained in a very poor state of repair. WASCO staff have to monitor and maintain the intake and pipeline by lengthy, time consuming walks. While this has become a routine, this is not an acceptable one for efficient monitoring and response efforts. With the new route, the staff will be better able to service the new pipeline and the intake.

4.6 Affected Livelihoods

4.6.1 Livelihoods

There are a total of 237 farmers in the wider Millet Region registered with the Ministry of Agriculture of which 73 are female. Most of these are subsistence farmers selling their crop at the local market or to the supermarkets. Except for the large farm holding in lower Vanard, most of the farmers are small and non-mechanized operations relaying largely on manual means to toil and harvest the land. Anecdotally from the Agricultural Extension officer from the area, these farmers make an average of $600 to $800 per month depending on the crop, time to maturity, harvesting, and prevailing market price. This does not account for farming inputs such as labour and fertilizers (Agriculture Extension Officer).

There are 93 registered farmers in the Tet Chemin area, the Project location, of which 31 are female and 67 are male. These farmers grow crops such as:

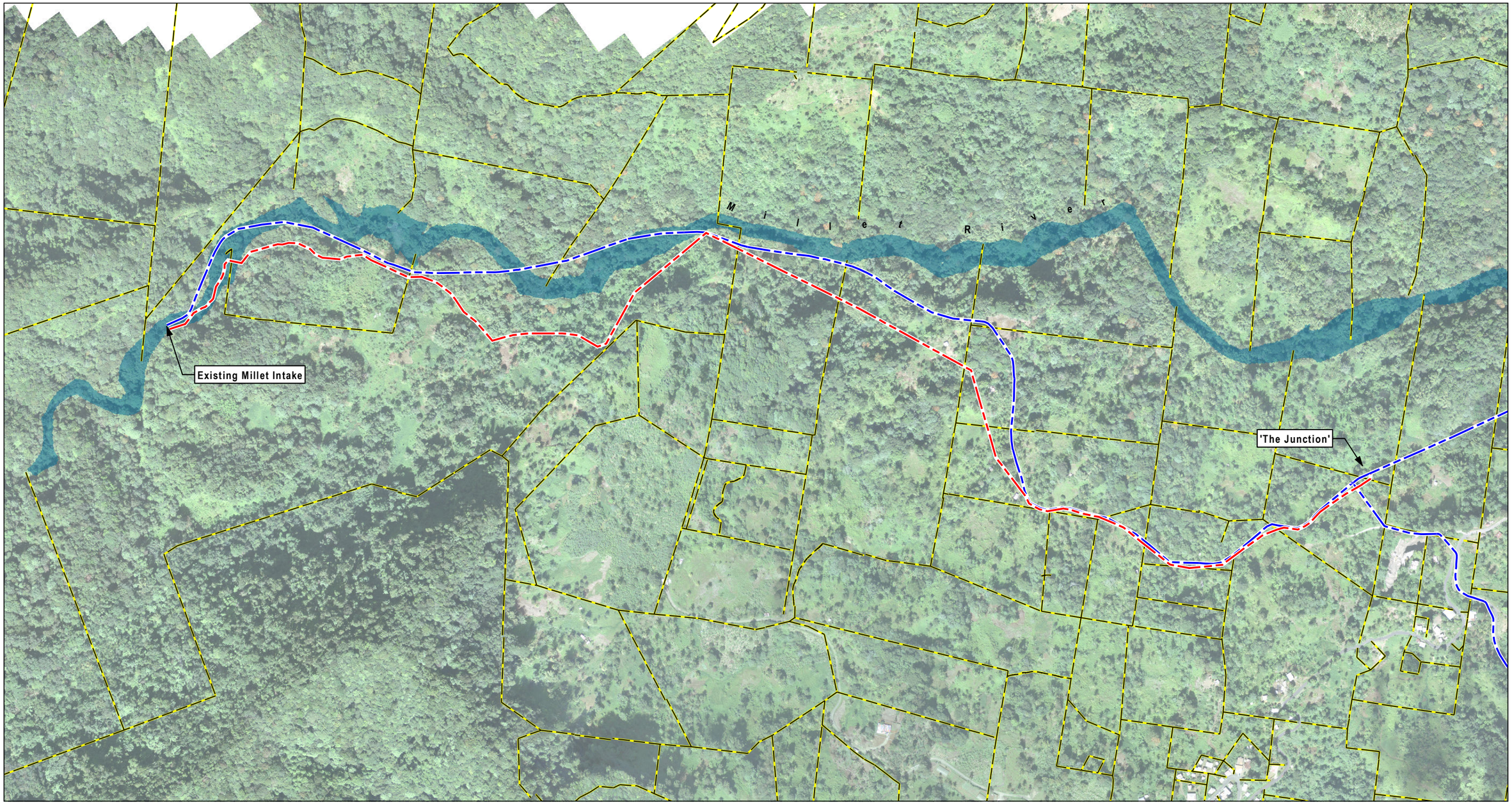
> *Macamboo, green fig, plantain, avocado, coffees, sugar cane, cocoa, cinnamon, pineapple, dasheen, citrus such as sour orange and grapefruit, garden vegetables such as tomato, spring onions, and thyme.*

The presence of active small springs and the high water content with the soils in the lower elevations allows for the cultivation of dasheen, a tuber or root crop, as a predominant crop.

In addition to these crops, there are a number of mango tree saplings planted under an OECS Mango Planting Project under which these samplings were planted from 2017 to late 2018 to assist with slope stabilization and erosion control. The mangos are also being grown with the intention that the fruit will eventually be harvested and sold by local farmers. A survey undertaken by the Tet Chemin office of the Forestry Division determined that there is the possibility that a number (approx. 20) of mango samplings within two areas under the Mango Project may be impacted by the swarth of the proposed road and pipeline corridor. Maintaining the livelihoods of all farmers is very important, especially those that might be affected by the relocation of the pipeline and the new access routing.

The surveying as well as the geotechnical investigation required the removal of vegetation and some damage to crops in executing this work. The damaged crops were assessed for compensation by the extension officer from the regional office of the Extension and Advisory Division of the Ministry of Agriculture at the behest of WASCO and tended to include all of the above listed crops grown, except for citrus, pineapples and the garden vegetables. The list of project affected land parcels, landowners, and the farmers on the farmed parcels are reflected in Appendix 7 of this report.

Based on the initial route survey exercise from the Junction connection to the intake, it would appear that 14 properties or parcels would be impacted. Reference is made here at this point to Figure 16 which shows the proposed route overlaid on the Long Range Transportation Plan (LRTP) Block and Parcel Information for reference. Two of these parcels have farming activities on them (Refer to Appendix 7). One parcel is farmed by one farmer, and the other by two farmers who are also the owners of that property. These farmers are Mr. Errol Felix who is farming on lands belonging to Claudette and Fergus Gilbert (LRTP 0636B 26) close to the river crossing to the intake at Parc Estate, and Messrs. Maurice Charles (aka Gerald Charles) and Theodore Eristhee on their own lands (LRTP 0837B 94) at and along the Junction.



Datum: St Lucia 1955	
Coord. System: St Lucia 1955 British West Indies Grid	
Projection: Transverse Mercator	
Central Meridian: 62°0'0.00"W	
False Easting: 400,000m	False Northing: 0m
Page Orientation: 306°	Scale Factor: 0.99950

True North

0 100 200 300 400 500

Metres

Proposed Pipeline Alignment

Existing Pipeline Alignment

Parcel Boundary

Flood Area

BURNSIDE

Client

WASCO
WATER & SEWERAGE COMPANY, INC.

Figure Title

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN - REPORT NO. 2 (FINAL)

PROPOSED WORKS OVERLAID AGAINST FABRIC OF LAND PARCELS

Drawn	Checked	Date	Figure No.
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File Path: D:\GIS\Project\039491\Map\Env_SIA_SMP\039491 Figure 16 Proposed Works Overlaid Against Fabric of Land Parcels.mxd Print Date: 2019/03/21 Time: 10:42 AM

Messrs. Maurice Charles (aka Gerald Charles) and Theodore Eristhee were also the only owners and farmers affected by the works occurring during the geotechnical investigation. During this exercise all affected crops were assessed and valued for compensation by the regional Agricultural Extension Officer with both farmers present. The attached photos below is a snapshot of that activity (see Figures 17 and 18 below).

Note, Mr. Donovan (in green striped shirt) and farmers/owners of LRTP parcel 0837B 94 Mr. Maurice Charles (aka Gerald Charles), and Mr. Theodore Eristhee observing and assessing crop damage from backhoe facilitating geotechnical investigation – December 19, 2018.

Figure 17: Agricultural Extension Officer on-site

Note, the Agricultural Extension Officer and the affected farmers/owners were present

Figure 18: Crops being damaged and removed to during the Geotechnical Investigation

4.6.2 Ensuring Security of Livelihoods

The World Bank Environmental and Social Safeguards (Policy 2.14) require that the livelihoods of PAP be considered and that projects undertaken do not adversely affect these individuals.

Discussions with WASCO have made it clear that it is not the intention of this Project to intentionally adversely affect the livelihoods of any of the farmers who might be impacted by the proposed route and pipeline works.

Historically, WASCO has compensated farmers along the main dirt access road from the top of Tet Chemin through Parc Estate to the intake whenever there has been some work on that road that has damaged existing crops. The preparation of that road for vehicular traffic to allow access to service the Millet Intake would involve the use of a backhoe or bulldozer with a front end blade that would scarify the path. Ostensibly, this blade would damage any plants in its path. During this ESIA assessment staff of WASCO have indicated that over the past years, while the road way has been cleared to facilitate access by WASCO staff, farmers have tended to return and continue to plant their crops along the edges and within the roadway, even after they have been requested not to do so.

Clearing of the roadway forces the removal of these crops. Similarly, with the laying of new pipe or any repair work, any crop loss or damage becomes a point of conflict between the farmers and WASCO. The farmers demand compensation for the damaged or lost crops and a valuation has to be undertaken by an Agricultural Extension Officer from the regional office of the Extension and Advisory Division of the Ministry of Agriculture. WASCO is presented with a costing and, over the years, has had to compensate the farmers for their loss.

Discussion with both WASCO staff and the Ministry of Agriculture valuation officer suggested that following the track cut by the surveyor for the gathering of topographic data to assist in the identification of the most optimal routing for this exercise, it only appeared at this moment that three farmers on two parcels of lands at this point would be affected as the remaining lands towards the intake tended to be uncultivated and in secondary growth. In such an instance, if that uncultivated area remains so during the execution of the Project, it may stand to reason that it is the landowner who would need to be compensated for the use or traversing of their lands.

Similarly, when the geotechnical investigation was being conducted last year in December, a backhoe had to be utilized to conduct the excavation of the test pits at various locations. While on site, in both travelling to the pit locations and actually digging them, a number of crops on existing plots were damaged. As indicated above in an earlier section, the farmers of these crops were present along with the Agricultural Extension Officer to take an account of the impacted crop.

In order to reduce the impacts on farmers' livelihoods, it is important that anytime any work is to be undertaken, that the farmers be informed and they or their representative be present during the works. An Agricultural Valuation Officer should also be present to note the existence of the crop, the damage or loss incurred, and to determine in a fair a manner as possible, the monetary amount of the crop loss so that adequate compensation can be provided to the farmer.

There should also be a clear record, video or photographic, of the area to be worked and the crops present prior to any works, and then after the execution of the works to assist in the assessment. Consultation with the Chief Extension Officer at the Ministry of Agriculture indicated that involving the extension services from the beginning before any clearing is undertaken to undertake a base assessment of what exists, and then during and after the works, as WASCO has begun to practice and intends to continue through the Project, is considered the preferred approach. The valuation of the crops are based on values prescribed in the Ministry's Crop Valuation Guidelines which defines monetary value of the crop (fruit and tree) from seedling to production and harvesting stage over time. Additionally, the wider extension and valuation efforts are guided under the Sale of

Produce Act no 4 of 1945 and amendment of 2001 along with the Banana Plants Protocol of 1958 (Chief Agricultural Extension Officer).

The long term strategy presently being explored by WASCO and the designers is that the area of land to be occupied by the road and pipeline as a wide reserve would be acquired to secure the access route and allow for unencumbered access for monitoring and servicing of the new pipeline. This would mean that WASCO would not require permission to enter and traverse private lands or compensate farmers for damaged crops that may be planted within that area without WASCO's permission. However, consideration would be given to maintaining good neighbourly relations and supporting farmer livelihoods and so even after establishing ownership, it would be understood that the landowners and farmers could also utilize this road as an access route to their site and crops. The abutting area of unpaved land that still forms part of the road and pipeline reserve could be planted by farmers with shallow root crops only. However, as this is within the service reserve, no compensation will be paid for damage to any planting located within it. This must be clearly explained to the farmers and landowners prior to construction and this must be properly understood and agreed by all parties. This arrangement between the now adjacent property owners, farmers, and WASCO, with all its applicable conditions, would no doubt have to be properly enshrined within a legally binding agreement.

In this manner, the farmers would be able to maintain their livelihoods by not only having access to lands to still grow their crops (shallow rooted in the road reserve and other crops within the other established lands beyond), but also by benefiting from an access road that would facilitate easier transportation of their goods out of the lands and to the main road for further transportation to the markets.

Consultation with all potentially affected parties during which such a proposal is clearly explained and all comments received and further guide any revision or tweaking is critical to understanding and ensuring any success for this approach as proposed. What is important is that this process is well thought out, fair and transparent.

Importantly, the process and actual acquisition of the route and pipeline reserve must occur first before any project works commence in order that the Project is not jeopardized. Any issues that may have arisen between the famers, landowners, and WASCO pertaining to the lands that would comprise the route reserve must be fully ventilated and addressed. The acquisition process must be completed in its entirety with all necessary survey, valuation, payments, and legal arrangements between all parties understood and finalized.

4.7 Land Acquisition Process

4.7.1 Compulsory Acquisition of Key Lands for The Project

As noted previously, institutionally, WASCO falls under the Ministry of Agriculture, Fisheries, Physical Planning, Natural Resources and Cooperatives and so does the Planning Department who prepares the memorandum to the Cabinet of Ministers providing the request for the acquisition of lands. With such an institutional linkage, there is the possibility that the required memos to Cabinet can be more readily and speedily facilitated. The General Manager of WASCO would contact the Permanent Secretary (PS) Agriculture, and the pertinent information would be provided from that PS to the PS of Planning who would then have a memo prepared and sent to Cabinet. The process of compulsory acquisition by the Government occurs when there is an overriding national need or that there are many heirs, or owners who may not be fully willing to sell.

The formal compulsory acquisition process for the lands to required strip of lands to accommodate the service access and transmission pipeline would have to be guided by the Land Acquisition Act No.12 of 1945 Amended by Act 11 of 2000. The Authorized Officer to execute the surveying and acquisition of the required properties is the Chief Surveyor of the Survey and Mapping Department of the Department of Physical Planning in the Ministry of Agriculture.

Generally, the formal compulsory acquisition process would involve the following process:

1. The approach by an agency or department to the relevant Minister or to write directly to the Minister responsible for Physical Planning and make a request along with justification for the acquisition of a particular area of land for a particular use that they want to use it for.

2. The agency’s Minister can choose to prepare a memo to the Cabinet of Ministers or the Minister of Physical Planning can do so and submit to the Cabinet.

3. If land in question is being dismembered, when it goes to Cabinet the memo will be for notification of the intent to acquire. This notification must be presented in two consecutive issues of Gazette.

4. After second publication of notification the Chief Surveyor or the authorized officer will commence the survey. After the survey is done block and parcel numbers will be issued and the survey properly lodged. Land registers will be produced

5. Another memo will be produced for cabinet on the declaration of the accusation. This will be published in another two issues of the Gazette. The property will now belong to the Crown and be designated for use or management by a specific ministry or agency.

6. After that the Chief Surveyor and the landowners will meet to negotiate the compensation for the acquired property.

7. Once compensation arrangements are successful the agency of interest will now be able to access the property and carry out the Project.

8. The full compensation may not necessarily occur before the land is owned by the Crown and the Project commences. However, it must be noted that under the World Bank policies compensations must be completed before the Project commences or any further disbursement from the World Band on the Project.

9. The timeline for compulsory acquisitions can vary depending on the length of time of the survey or Cabinet response. Sometimes, two to three months can be occupied by the survey and another three to four months can follow with negotiations and agreements before the process can be completed.

WASCO can opt to deal directly with landowners if required and negotiate if the landowner agrees to sell. Compulsory acquisition would occur if landowners do not wish to sell or if there are a number of heirs. Because WASCO falls under the Ministry of Agriculture which also includes Planning and so it is easy for the Permanent Secretary in the Ministry of Agriculture to communicate with the Permanent Secretary in Planning. If funding for this process was not a part of the initial proposal to the World Bank and a request was made, once the World Bank has been informed that payment has been made then funds may be provided as reimbursements. If the acquisitions have already been identified as part of the project cost, then that funding will be available for drawing down.

4.7.2 The World Bank Approach to the Land Acquisition

Consultation with the Social Safeguards Staff at the PCU indicated clearly that the World Bank is of the opinion that the most complex resettlement issues on any of their projects can be adequately resolved if the particular issues or situations are identified early in the project preparation stages and addressed early and expeditiously with the affected parties. The World Bank, consistent with Policy, 4.12 Involuntary Resettlement, and the DVRP's Resettlement Policy Framework, tends to favour a more communicative and negotiative approach to the acquisition of any required land rather than compulsory acquisition which suggests a heavier handed approach. As indicated earlier, while there is no relocation of persons or residences, in this case the term "resettlement " would

refer to the disturbance to the PAP's normal day to day activities such as the farming of the plots of land.

Negotiations with affected landowners identified by WASCO based on the project and confirmed by the PCU, may be facilitated through the PCU and its Social Safeguard's Section under the DVRP. Institutionally, the PCU resides under the Ministry of Economic Development, Housing, Urban Renewal, Transport, and Civil Aviation. The Chief Economist in this Ministry along with the PCU would take the lead role and with WASCO present. The PCU's Social Safeguard's section must ensure that the World Bank's Social Safeguards are incorporated and complied with in throughout all aspects of the Project.

The property owners of the land must be identified and compensated for any lands to be acquired. Similarly, farmers whose crops have been damaged or will be damaged, must also be identified and have their crops properly assessed by the Ministry of Agriculture, and compensated. This must all be done prior to the project commencing on ground.

It is important that a proper assessment of the damage to crops and land is made and that the correct landowners are identified and not just the farmers. The correct LRTP block and parcels must be identified so that the location of owner's lands and the farmer's plots can be correctly identified.

There must be an element of transparency within this whole process and any disclosure procedures that are implemented must be in keeping with Bank's Policy 4.12 and the PCU's DVRP Resettlement Policy Framework.

The process guided by the Resettlement Framework which the PCU through the Ministry of Economic Development would facilitate is as follows.

The landowners and farmers affected by the Project would be identified by WASCO and confirmed by the PCU. The PCU and WASCO would engage the farmers and property owners (PAPs) to ensure that they clearly understood the project and the intention for which the particular portions of their property is being sought is going to be used for. The crops that would be affected would have to be assessed and valued. After discussions between WASCO and the PCU with the landowners, and a request would be forwarded from the PCU to the Permanent Secretary of the Ministry of Economic Development to begin the process of acquisition.

The Permanent Secretary would then write to the Permanent Secretary of the Department of Physical Planning in the Ministry of Agriculture, indicating the rationale for the request and the intent to acquire. The Permanent Secretary of Physical Planning would prepare a memo to the Cabinet of Ministers through the Cabinet Secretary with all supporting documentation to have a Declaration of Intent to Acquire prepared. Once this

has been approved by the Cabinet, the declaration is published in two notices of the Gazette. If there are not contentious objections, the Permanent Secretary of Physical Planning directs the Authorized Officer or Chief Surveyor to commence surveys of the properties and determine the cost of the lands to be acquired for compensation. The PCU with its Social Safeguards section would call a meeting with all affected landowners and would negotiate with them. This negotiation process would be led by the Chief Economist or their representatives of the Economic Development Ministry with PCU and WASCO in attendance. This process is to be guided by the principle of fairness and respect for all parties.

Upon acceptance of the compensatory amount by the PAP, a formal contract would be prepared which included the agreed price and also the cost for any lost crops with the assessment from the Ministry of Agriculture. Under the DVRP after acceptance by the PAPs, a formal letter documenting that agreement along with a copy of the compensation agreement is sent to the Accounts Section of the Ministry of economic Development with a requisition order. Compensation is based on Full Replacement Cost as per the Bank Policy and the DVRP's Resettlement Policy. Unlike the formal process under the Compensation Act which allows for the accumulation of interest on the compensation because of the length of time that can transpire before a PAP receives payment, the World Bank requires that settlement be done immediately upon the formalization of the agreement of compensation between the parties involved.

It must be noted that once information has been obtained on persons who might be affected by the Project a Resettlement Action Plan (RAP) is prepared by the Social Safeguards Section of the PCU and continually updated as the process continues. The RAP will include the information on the PAPs (land owners and farmers), the full consultation and discussions with the PAPs, the publications in the Gazette, details of the settlement, and any special conditions. The completed plan after compensation is finalized, is sent to the Bank for approval, and after approval, the final document is published for public consumption. Apart from fulfilling due diligence requirements, making the RAP available to the public ensures transparency in the process.

In the event that any PAP has any issue at any point in the process, there are Grievance Redress Mechanisms outlined in the DVRP's Resettlement Framework (section 15) following the Banks's Resettlement Policy to allow any PAP to voice their concerns on any aspect of the project process that affects them, and to receive some form of redress. This process is facilitated by the PCU Social Safeguards officer and would ensure that the grievance is reported and recorded, there is a designated person responsible for responding to it, and that a firm timeline is specified to address the issue. There would also be a monitoring mechanism to ensure the effectiveness of the response and the affected party's satisfaction.

4.8 Recommendations

The following are recommendations based on the attention to ensuring the livelihoods of the affected farmers.

1. Implement the procedures under the World Bank and DVRP Resettlement policy to ensure fair resolution of any issues, compensation, and acquisition of the required properties to facilitate the Project.

2. A social safeguards monitoring officer is to monitor the Project from beginning to end.

3. The PCU is to ensure that all affected parties are aware of the redress mechanism.

4.9 Summary Potential Environmental and Social Impacts Table

During the preparation of this study, a number of potential environmental and social issues that may occur during the execution of the works within the Project site at Tet Chemin were determined and documented in Table 5 presented in a previous section. The following sections address the mitigative measures to be considered and adopted during the implementation of the Project.

5.0 Mitigative Measures

Mitigative measures address the potential impacts of the Project works and to reduce or avoid any negative impact on the environment over the short to long term. The major potential impacts for the intake and pipeline project is expected to occur during construction phase when there is continuous activity. While these impacts are not expected to be major, the careful implementation of mitigative measures will allow for the reduction or avoidance of any adverse effects.

A number of general impacts have been identified previously under Table 5. A list of the potential mitigative measures is presented under Table 7. The measures are presented in a manner that makes them easily incorporated into an ESMP and, with appropriate wording, can become contract clauses for the contractor who will undertake the civil works. This also allows for ease of monitoring to ensure compliance.

Additional mitigative measures would be derived from any conditions imposed by any statutory agency such as the Planning Department who may provide recommendations or conditionalities upon approval. These could also be incorporated into contract clauses as necessary.

The following Table 7 presents the potential impact areas and the proposed mitigative measures.

Table 7: Impact Areas and Mitigative Measures

	Impact Area	Mitigative Measures
1	Traffic impacts	(a) A traffic management plan to be developed and implemented by contractor. (b) Alternative routes to be identified in the instance of extended road works or road blockages. (c) The public to be notified of all disturbance to their normal routes. (d) Signposting, warning signs, barriers and traffic diversions must be clearly visible and the public warned of all potential hazards. (e) Provision must be made for the safe passages and crossings for all pedestrians where construction traffic interferes with their normal route.

	Impact Area	Mitigative Measures
		(f) There must be active traffic management by trained and visible staff at the site or along roadways as required to ensure safe and convenient passage for the vehicular and pedestrian public. (g) Adjustment of working hours to local traffic patterns, e.g., avoiding major transport activities during rush hours, the start and dismissal of school children, or times of livestock movement.
2	Noise	(a) Construction / work activities will occur within specified daylight hours e.g. 8:00 am to 4:00pm. (b) Community / public to be informed in advance of any work activities to occur outside of normal working hours or on weekends. (c) Sites should be hoarded wherever possible. (d) During operations, the engine covers of generators, air compressors and other powered mechanical equipment shall be closed, and equipment placed as far away from residential areas as possible and appropriately secured. (e) There will be no excessive (unnecessary) idling of construction vehicles at sites. (f) Noise suppression equipment or systems supplied by manufacture will be utilized. (g) Ensure all vehicles and equipment are properly serviced. (h) The contractor must develop and implement a public notification and noise management plan.
3	Land Clearing and Deforestation	(a) Any works to be undertaken in a protected forest area must be done under the supervision of a representative of the Forestry Department (b) There must be no unnecessary clearing of natural vegetation. (c) Avoid the use of herbicides or other chemicals. (d) Consideration must be given to the mating and nesting periods for all critical species.

	Impact Area	Mitigative Measures
		(e) The contractor must ensure that any work undertaken in the Forest Reserve must be done by manual means insofar as this may be practical. (f) There must be minimal impact to flora and fauna in the forest area. (g) All recognized natural habitats, wetlands and protected areas in the immediate vicinity of the activity must not be damaged or exploited. (h) The contractor must ensure that all staff will be strictly prohibited from hunting, foraging, logging or other damaging activities. (i) A survey and an inventory shall be made of large trees in the vicinity of the construction activity, large trees shall be marked and cordoned off with fencing, their root system protected, and any damage to the trees avoided. (j) There will be no unlicensed borrow pits, quarries or waste dumps in protected areas. (k) Upon completion, all wastes must be immediately removed out of the forested area and disposed in a compliant manner.
4	Soil Erosion and Slippage	(a) The contractor must ensure that appropriate erosion control measures such as silt fences are installed. (b) Proper site drainage must be implemented (c) Any drain clogged by construction material or sediment must be unclogged as soon as possible to prevent overflow and flooding. (d) The use of retaining structures and planting with deep rooted grasses to retain soil during and after works must be considered. (e) The use of bio-engineering methods must be considered as a measure to reduce erosion and land slippage. (f) Keep angle of slopes within limits of soil type. (g) Balance cut and fill to limit steepness of slopes.

	Impact Area	Mitigative Measures
		(h) All slopes and excavated areas must be monitored for movement.
5	Poor Air Quality	(a) Construction materials such as sand, cement, or other fines should be kept properly covered. (b) Cement should be kept stored within a shed or container. (c) The sand and fines can be moistened with sprays of water to control dust. (d) Unpaved, dusty construction roads should compacted and then wet periodically for dust control. (e) During interior demolition debris-chutes shall be used above the first floor. (f) Demolition debris shall be kept in controlled area and sprayed with water mist to reduce debris dust. (g) During pneumatic drilling/wall destruction dust shall be suppressed by ongoing water spraying and/or installing dust screen enclosures at site (h) The surrounding environment (sidewalks, roads) shall be kept free of debris to minimize dust. (i) There will be no open burning of construction / waste material at the site. (j) There will be no excessive and unnecessary idling of construction vehicles at sites. (k) The bins of all haulage vehicles transporting aggregate or building materials must be covered on all public roads.
6	Solid and Liquid Waste Management (general)	(a) Contractor to develop and implement waste management plan. (b) Contractor to abide by all pertinent waste management and public health laws. (c) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (d) Construction and demolition wastes will be stored in appropriate bins.

	Impact Area	Mitigative Measures
		(e) Liquid and chemical wastes will be stored in appropriate containers separated from the general refuse. (f) All waste will be collected and disposed of properly in approved landfills by licensed collectors. (g) The records of waste disposal will be maintained as proof for proper management as designed. (h) Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos). (i) Construction related liquid wastes must not be allowed to accumulate on or off the site, or to flow over or from the site in an uncontrolled manner or to cause a nuisance or health risk due to its contents.
7	Solid and Liquid Waste Management (hazardous)	(a) Contractor must provide temporary storage on site of all hazardous or toxic substances in safe containers labeled with details of composition, properties and handling information. (b) The containers of hazardous substances shall be placed in an leak-proof container to prevent spillage and leaching. (c) The wastes shall be transported by specially licensed carriers and disposed in a licensed facility. (d) Paints with toxic ingredients or solvents or lead-based paints will not be used. (e) Banned chemicals will not be used on any project. (f) Any project activity which involves the purchase or use of significant amounts of pesticides (other than as described in (g) below) will be excluded during the screening process. (g) If termite treatment is to be utilized, appropriate chemical management measures will be implemented to prevent contamination of surrounding areas and use only licensed and registered pest control professionals with training and knowledge of proper application methods and techniques.

	Impact Area	Mitigative Measures
8	Terrestrial and Riverine Marine Pollution	(a) The contractor must implement all necessary waste management plans and measures. (b) All construction materials, including chemicals, must be properly stored. (c) The contractor will establish appropriate erosion and sediment control measures such as hay bales, sedimentation basins, and / or silt fences and traps to prevent sediment from moving off site and causing excessive turbidity in nearby streams, rivers, wetlands, and coastal waters. (d) If works are long coastal marine areas or near major streams and rivers, water quality monitoring must be done before construction, and at regular intervals to determine turbidity levels and other quality parameters. (e) See soil erosion and slippage mitigative measures below. (f) Construction vehicles and machinery will be washed only in designated areas where runoff will not pollute natural surface water bodies.
9	Occupational Health and Safety Issues	(a) The contractor must ensure that an Occupational Health and Safety Plan is in place to guide work activities, and provide a safe environment for workers. (b) The contractor must ensure that all workers operate within a safe environment. (c) All relevant Labour and Occupational Health and Safety regulations must be adhered to ensure worker safety. (d) Workers must be provided with necessary equipment as well as protective gear as per their specific tasks such as hard hats, overalls, gloves, goggles, boots, etc. (e) Sanitary facilities must be provided for all workers on site. (f) The contractor must ensure that there are basic medical facilities on site and that there are staff trained in basic first aid. (g) Appropriate posting of information within the site must be done to inform workers of key rules and regulations to follow.

6.0 Environmental and Social Management Plan

Environmental and social impacts of the proposed Project were determined in the wider ESIA. This section of the report describes the link between the predicted impacts, the needed mitigation measures identified during the screening and assessment process, provisions for budgeting the costs of such measures, and the roles of those responsible for ensuring that the mitigation measures are carried out.

6.1 Environmental and Social Impacts

The potential environmental and social impacts determined from the study were identified as the following:

Environmental Impacts

- Loss of critical vegetation cover;
- Loss of arable agricultural lands;
- Biodiversity/species disturbance and loss;
- Poor water quality;
- Poor soil quality;
- Increased noise levels;
- Poor air quality;
- Potential worker/occupational health and safety related impacts; and
- Public and community safety impacts.

Social Impacts

Affected Community:

- Employment opportunities;
- Improved access to farm lands;
- Impact on livelihoods;
- Verification and reestablishment of property boundaries; and
- General community impacts.

WASCO & the Nation:

- Increased resiliency and vulnerability reduction;
- Improved water supply;
- Institutional capacity building;
- Increased water security; and
- Improved access for servicing infrastructure.

The contractor is to be cognitive of these and the ESMP is to ensure that his actions do not adversely increase any negative social or environmental impacts.

6.2 Mitigative Measures

The mitigative measures are based on best management practice and industry standards and responses from the communities and stakeholders. These are the mitigation measures which are expected of the contractors who will be undertaking the Project works and represent the minimum standard of execution for environmental protection during the execution of such works.

Table 8 below lists the measures, which have been described more fully in Table 7 under Mitigative Measures and need not be repeated here. The generic environmental clauses in Appendix 8 of this report will feed into the specific contract clauses for these types of works. The following Table 8 provides the elements of the standardized ESMP for such works and includes monitoring responsibilities and timeframes.

Table 8: Standard Minimum Elements of the Environmental Social Management Plan (ESMP)

Category of Project	Impact Area	Mitigative Measures	Mitigation Responsibility	Monitoring	Frequency
Water Intake Rehabilitation and pipeline Works	Traffic conflict issues	As per mitigative measures (a) to (g)	Contractor	WASCO, PCU, MIPEL	Weekly daily for contractor and staff
	Noise	As per mitigative measures (a) to (h)	Contractor	WASCO, PCU, Forestry	Weekly daily for contractor and staff
	Land clearing and deforestation	As per mitigative measures (a) to (k)	Contractor	WASCO, PCU, Forestry	Weekly daily for contractor and staff
	Soil erosion and slippage	As per mitigative measures (a) to (h)	Contractor	WASCO, PCU, Forestry	Weekly daily for contractor and staff
	Poor air quality	As per mitigative measures (a) to (k)	Contractor	WASCO, PCU, Forestry	Weekly daily for contractor and staff
	Solid and liquid waste	As per mitigative	Contractor	WASCO, PCU, Forestry	Weekly

Category of Project	Impact Area	Mitigative Measures	Mitigation Responsibility	Monitoring	Frequency
	Management (general)	measures (a) to (i)			daily for contractor and staff
	Solid and liquid waste management (hazardous)	As per mitigative measures (a) to (g)	Contractor	Forestry, PCU	Weekly daily for contractor and staff
	Terrestrial and riverine marine pollution	As per mitigative measures (a) to (f)	Contractor	WASCO, PCU, Forestry Fisheries	Weekly daily for contractor and staff
	Occupational health and safety issues	As per mitigative measures (a) to (g)	Contractor	WASCO, PCU, Forestry Labour Dept	Weekly daily for contractor and staff

If Development Control Authority (DCA) approval has been sought and granted, then the generic minimum mitigative measures and monitoring conditions in Table 8 above should be amended to include the conditions and recommendations of DCA, as well as those of any other statutory agency who was part of the permitting.

6.3 Key Recommendations

The following key recommendations are made to assist in ensuring the ESMP conditions are implemented to acceptable levels by the contractor.

1. WASCO must employ an environmental monitoring officer to monitor the implementation of the ESMP actions to ensure the contractor is implementing and abiding by all the requisite environmental safety and management plans and procedures.

2. The PCU Social Safeguards Monitoring Officer is to monitor the Project from beginning to end and ensure the implement the procedures under the World Bank and DVRP Resettlement policy to ensure fair resolution of any issues, compensation, and acquisition of the required properties to facilitate the Project. The Officer through the PCU is also to ensure that all affected parties are aware of the redress mechanism.

3. WASCO and the contractor must engage and work collaboratively with the Forestry Department of the Ministry of Agriculture from the preconstruction stage during all land clearing to ensure that there is no adverse impact on any endemic flora or fauna.

4. WASCO must work with the contractor to engage the Forestry Department to provide a training session for all workers on how to safely manage encounters with snakes, especially the Fer-de-Lance.

6.4 Environmental Performance Clauses for Works Contracts

Standard environmental related clauses were developed and are to be appended to or incorporated into the work contract. These also form part of the environmental management plan and the mitigative measure presented there. These clauses must be modified to conform with applicable Saint Lucian laws and contract procedures for such works and shall remain in force throughout the contract period.

The generic contract clauses are provided in Appendix 8 for reference and listed here:

- Permits and Approvals;
- Site Security;
- Discovery of Antiquities;
- Worker Occupational Health and Safety;
- Noise Control;
- Use and Management of Hazardous Materials, fuels, solvents and petroleum products;
- Use and Management of Pesticides;
- Use of Preservatives and Paint Substances;
- Site Stabilization and Erosion Control;
- Air Quality;
- Traffic Management;
- Management of Standing Water;
- Management of Solid Wastes - trash and construction debris;
- Management of Liquid Wastes;
- Water Pipeline Installation; and
- Works in designated Forest Reserves.

It is expected that these generic clauses will be incorporated into all contracts, as applicable. In addition, specific project-related recommendations may also be forthcoming from statutory permitting agencies such as the DCA or the Ministry of Health, and these can be reformatted in to contract clauses or referred to as appropriate. Finally, if an EIA has been conducted for a particular sub-project due to its environmentally sensitive or complex nature, then the specific recommendations for mitigative measures in that EIA should also be included as contract clauses.

For purposes of cost estimation and budgeting, the contractors should be aware of the existence of the environmental mitigation measures and associated ESMP requirements and include cost items for such purposes in their bids.

6.5 Supervision, Monitoring, and Reporting

A unified and integrated approach must be adopted in reviewing and monitoring the projects from pre-construction to operations in to respond to any issue that may arise. The purpose of the ESMP and its conditions reflected in the construction and operational contract are to ensure accepted good practices are employed and maintained in order to mitigate any adverse environmental impacts.

The person or entity responsible for on-ground implementation, monitoring, and abiding by the contract clauses, recommendations, and mitigative measures will be the contractor. The frequency of monitoring will be determined by the requesting agencies but will be at such a frequency so as to allow them to determine site changes, the environmental conditions, and the adequacy of the mitigative measures, and the overall ability of the contractor to execute the works in the specified and sustainable manner. The main agency will be the Forestry Department. Additional agencies such as the Ministry of Health or the Ministry of Infrastructure, or labour Department or the Fisheries Department may monitor as well as part of their routine or be called in for a specific occurrence.

WASCO is the implementing agency, but the with the responsibility to supervise and monitor the Project. However, the PCU can also share such responsibility and have the ability to co-opt other technical departments and ministries to assist in executing this duty especially where it comes to monitoring and reporting on the technical aspects of the works as necessary, especially where it pertained to the requirements or conditions of the World Bank. The DCA will also be an agency that may monitor to ensure conditions are being met especially following approval.

Reference Project Specific Documents

Feasibility Study and Detailed Designs for the Development of the Millet Intake within the John Compton Dam Raw Water Supply System:

- Data Evaluation and Assumptions Report, Rev. 1 – January 26, 2018;
- Inception Report, Report No. 1, Rev. 1 – January 26, 2018;
- Preliminary Environmental and Social Impact Assessment and Environmental and Social Management Plan, Report No. 2, Rev. 2 – February 22, 2019 (included as a component of Report No. 6);
- Environmental and Social Impact Assessment and Environmental and Social Management Plan, Report No. 2, Final – March 22, 2019;
- Design Criterion Report, Report No. 3, Rev. 1 – May 18, 2018;
- Validated Design Information Report, Report No. 4, Rev. 1 – August 3, 2018;
- Design Options Review Report, Report No. 5, Rev. 1 – August 15, 2018;
- Draft Design Report, Report No. 6, Rev. 0 – February 22, 2019; and
- Design Report, Report No. 7, Rev. 0 – March 22, 2019.

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BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix 1

Terms of Reference

Government of Saint Lucia

Department of Economic Development, Transport and Civil Aviation

Disaster Vulnerability Reduction Project
(DVRP)

TERMS OF REFERENCE

FOR CONSULTING SERVICES

Feasibility Study and Detailed Designs
for the Development of the Millet Intake within the John Compton Dam Raw Water Supply

May 13, 2016
July 12, 2016 (no-obj)
February 12, 2017 (rev)
March 2nd 2017

Terms of Reference
Feasibility study and Detailed Designs
for the
Development of the Millet Intake
within the John Compton Dam Raw Water Supply System

1. BACKGROUND

Saint Lucia is exposed to a range of natural hazards, particularly weather-related phenomena such as hurricanes, winds, storm surges, and heavy rainfalls which leads to flooding and landslides. In addition, climate change related impacts are expected to intensify precipitation patterns, thereby generating more extreme storms, hurricanes, floods and rises in sea- level. These extreme natural events can cause considerable destruction to the island's infrastructure, social and economic sectors as they typically devastate costal and low lying areas, which are the areas where the majority of the island's population and main

commercial activities are situated. Such disasters can impose exorbitant costs on the country's fragile economy and thus exacerbate poverty levels.

The Government of Saint Lucia (GOSL) has obtained assistance from the World Bank towards the financing of the Disaster Vulnerability Reduction Project (DVRP). The DVRP is being implemented by the Department of Economic Development, Transport and Civil Aviation through the Project Coordination Unit (PCU) while the Water and Sewerage Company Limited shall be the technical Implementation Agency responsible for coordinating and managing the proposed contract.

The Disaster Vulnerability Reduction Project aims to measurably reduce the Country's vulnerability to natural hazards and climate change impacts, and includes various activities related to institutional strengthening and training as well as the execution of various civil works to improve the resilience, preparedness, and response capacity of Saint Lucia to natural hazards. To this end, the Rebuilding of Millet Intake has been identified as a priority by the Water and Sewerage Company Inc. (WASCO). As a precursor to this activity the WASCO seeks to undertake a Feasibility Study and detailed designs for the Development of the Millet Intake within the John Compton Dam Raw Water Supply.

Consequently, WASCO seeks to engage consultancy services undertake a Feasibility Study and detailed designs for the Development of the Millet Intake within the John Compton Dam Raw Water Supply.

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The Consultancy services will be financed under the Disaster Vulnerability Reduction Project and the contracts for consultancy services will be administered by WASCO.

2. Background - John Compton Dam and the Millet Intake

The "Northern" section of the island, consisting of Gros Islet, Castries and environs, receives a potable water supply from raw water collected from the John Compton Dam and the Millet Intake, both located in Millet within the Roseau watershed. Approximately 32,000m^3 [7 million imperial gallons] of raw water is pumped from the John Compton Dam per day for potable water production. The raw water is pumped to a tank, also located within Millet; from there the water flows to the T R Theobalds Water Treatment Plant by gravity through a transmission line installed within the Millet River. An average of 3,428,057 kilowatt hours is consumed by the pumps at the Dam transporting raw water for potable water production. WASCO, in partnership with Hamburg Wasser, has undertaken a pumping system energy audit which revealed average efficiencies exceeding 75%.

The Millet Intake is a diversion dam constructed on an elevated tributary of the Millet River. The intake diverts water through the same transmission line to the same treatment plant via gravity. There is no raw water storage and the yield from the Millet Intake fluctuates tremendously depending on the, wet or dry, season of the year. Over the years, the yield from the intake has varied from approximately 27,277m^3 [6,000,000 imperial gallons] to approximately 4,546m^3 [1,000,000 imperial gallons] per day. While the catchment properties have remained the same, damage to the intake caused by Hurricane Tomas and siltation are the main causes for this variation/shortfall.

The objective of the project is to re-establish the Millet Intake as the primary source of raw water with the John Compton Dam providing the secondary source to meet the shortfall. This will build in adequate redundancy into the system which is critical for reducing the risk to disasters. This project will be critical for the John Compton Dam Rehabilitation Project and in particular the de-silting component. . Also, with the Millet Intake as the primary supply there will be a significant reduction in the power consumption at the John Compton Dam because of the reduced volume of water to be pumped.

3. Objectives of the Assignment

The overall objective of the consultancy is to:

1. Undertake a feasibility study for the re-construction of the Millet Intake and the associated raw water line;

2. Prepare engineering options for the re-design and detail designs for construction of the option approved by the Client.

3. Prepare detailed designs consistent and based on the options accepted by the Client

4. Scope of Services

In general, the scope of works includes a) conducting hydrological modeling and hydraulic analysis and assessment of the select watershed (See Appendix A – Watersheds) b) develop solutions that will include development of engineered options for the intake and the associated pipeline to convey the maximum allowable flow from the intake to the raw water line from the John Compton Dam and c) preparation of detailed designs consistent with the options accepted by the Client.

The assessment involves literature review, assessing information available at relevant agencies, field reconnaissance, measurements and use of GIS and remote sensing tools.

Task 1 − Prepare a Work Plan, Inception Meeting Report and Data Needs Assessment

i. Convene an inception meeting with the Client, WASCO, the PCU, and other relevant stakeholders to (a) review the process for conducting all activities within the study; (b) determine roles and responsibilities; (c) discuss the basis on which this work will be implemented, and (d) finalise the work plan and timetable. A final work plan and report on the outcome of the inception meeting will be prepared by the Consulting Team, and submitted to the client no later than two (2) weeks from commencement of the consultancy.

ii. Conduct a data and information needs assessment through the review of available data to include past studies, inventories and maps, available topographic and survey data. The Consultant shall engage the following stakeholders as part of the review process; Water Resources Management Agency (WRMA), Forestry Department, Saint Lucia meteorological services, Environmental Health Department of the Ministry of Health Wellness, Human Services and Gender Relations, and external agencies such as Caribbean Public Health Agency (CarPHA)

Task 2 – Hydrological Modelling, Hydraulic Analysis and Assessments (including Catchment)

The **Consulting Team** will:

i. Undertake an environmental and social impact assessment (ESIA) in accordance with the Environmental Assessment / Environmental Management Framework (March 2016) Appendix 9 (Sample Terms-of-Reference (TOR) for a Subproject EIS).

ii. Develop an Environmental and Social Management Plan (ESMP) as part of the ESIA. The ESMP must at minimum address potential impacts outlined in the DVRP Environmental Assessment and Environmental Management Framework and Social Assessment and Resettlement Policy Framework and (EMF Table 3) standard mitigation measures (EMF Table 6) and special provision for work in Forest Reserve (EMF Annex 10 item 19). (The EA/EMF document for the DVRP project can be found on the following website: http:

www.finance.gov.lc/resources/index/34). The area of influence should include the diversion point(s), pipeline route, water treatment facility, and any access routes, as well as any effects on downstream water users or ecosystems affected by the diversions, or offsite areas required for resettlement or compensatory tracts (in the case of any impacts related to private land acquisition, resettlement or economic displacement). Any relevant permit requirements should also be included in the ESIA.

iii. Collect field data to develop a hydrologic model of the catchment area to assess the effects of rainfall intensity and duration on discharge and sediment transfer rates;

   a. The model should be created on a software package which will be handed over to the Client at the end of the consultancy.

   b. The Client should be trained on using the software package and at the end of the consultancy be able to adjust the model if necessary.

iv. Determine the maximum amount of water available for potable water production and the possible effects of climate change on the resource in the catchment;

v. Assess the possible effects of climate variability and propose mitigative and/or adaptation measures for consideration;

vi. Develop a hydraulic model of the entire system, including the John Compton Dam system and the Millet Intake. The hydraulic model should be used to assess the existing location or select and justify a more appropriate location for the proposed intake

   a. The model should also include key discharge volumes corresponding to a volume represented by the number of pumps operating at the Dam to meet the shortfall from the intake; this will provide an indication of the power consumption to the total volume of water received from the entire Dam & Millet system

   b. The maximum and minimum discharges from the proposed options for the Millet Intake using historical information. (Available rainfall data (millimeters) from January 2000 to December 2016 and flow rate data (million gallons) from June 2008 to October 2010).

vii. Undertake comparisons using plausible discharge scenarios utilizing the Millet Intake as the primary source of raw water supply and the John Compton Dam as secondary. This must include operational and maintenance cost for both structures

viii. Undertake an assessment of the proposed Millet Intake raw water line to convey the maximum allowable flow from the proposed intake to the T R Theobalds Water Treatment Plant under different pumping configurations from the Dam [the existing line is approximately 450 millimeters [18 inches] and 2 kilometers long]. (The Consultant responsibility in reference to the water treatment plant stops at ensuring the design provided facilitates the rated treatment capacity of the plant within an agreed quality)

The results of the analysis and assessments will have to be included in the final report for (i) use by the Client in immediate and long term planning, (ii) inform options and preliminary engineering design (iii) inform details based on selection of the option (iv) inform performance specifications with drawings/maps for the proposed works, (iv) inform the time schedule.

Task 3 –Preliminary Engineering Design Options Report

The Consulting Team will produce preliminary designs for various workable options of intake location and flow out of the intake and frequency pumping and volume pumped from the dam. Each scenario shall be accompanied with the necessary operations and maintenance requirements and the frequency of pumping from the Dam which should be included in the overall operation and maintenance of the system.

i. Develop design options for the proposed Millet Intake and raw water line and the pumping control system options for consideration and approval by the Client;

ii. Make recommendations towards the establishment of a remote hydrologic monitoring system for the purposes of monitoring river flows and water abstraction.

Prepare a report containing the relevant assessments and preliminary designs complete with data, figures, assumptions, calculations and models to support the design options. The options should be complimented with rough order magnitude itemized cost for works, supplies and operations and maintenance in order to facilitate a decision on the final design based on life cycle cost.

It should be noted that the Client reserves the right select from the options presented.

Task 4 –Final Design Report complete with Specifications

Taking the Client comments into consideration the Consulting Team will provide the following to include:

i. A detailed final design of the intake and raw water pipeline complete specifications, including but not limited to performance and environmental specifications;

ii. The Environmental and Social Management Plan;

iii. The communication, education and public awareness plan; and

iv. Budgetary cost for the construction of intake and the procurement installation and commissioning of associated appurtenances and pipe.

v. The cost for operating the entire system indicating savings compared to current operations. This should include, but not limited to, the following:

    a. The cost for pumping from the John Compton Dam at key discharges from the Intake;

b. Estimated time periods for desilting

vi. Produce cost estimates for re-establishing the Millet automatic weather station to monitor rainfall, temperature, solar radiation and wind speed. (estimates should include costing of works and procurement of equipment inclusive of CIF, inland transportation and installation and overheads)

vii. Produce final designs, operational performance specifications and estimated cost of construction (estimates should include costing of works and procurement of equipment inclusive of CIF, inland transportation and installation and overheads). The design will take into account findings and recommendations from the ESIA

5. REPORTING REQUIREMENTS AND DELIVERABLES

The **Consulting Team** shall provide the following deliverables in accordance with the timelines, on the basis of which the instalment schedule is defined.

Task #1

Inception report and Work Plan

The Consulting Team will report to the Managing Director of the Water and Sewerage Company (WASCO) Inc., or designated representative. Within two (2) weeks of contract signature the Consultants shall submit the Inception Report and a detailed Work Plan. (Updated work plan and report on the outcome of the inception meeting will be prepared by the Consulting Team)

Comments in response by WASCO, should reach the Consultants no later than ten (10) days after receipt of Report #1 – Inception Report and Work Plan.

Data Evaluation and Assumptions Report

Deliver a power point presentation of the data and information needs and availability assessment exercise conducted. A summary of the assessment should be presented including data and information availability and/or deficiencies

Report on the ESIA and ESMP

The consultant will submit Report #2 within six weeks of signing the contract. This report will be on the ESIA and will include an Environmental and Social Management Plan.

Comments in response by PCU Social and Environmental Safeguards Officers should reach the Consultants no later than ten (10) days after receipt of Report #2 – ESIA and ESMP.

Task #2

Data Evaluation and Assumptions Report - To be submitted within one (1) month of the inception report.

Deliver a power point presentation of the data and information needs and availability assessment exercise conducted. A summary of the assessment should be presented including data and information availability

and/or deficiencies. The Consulting Team should indicate additional data requirements and the process for generating required information and in the event of a lack of data, the Consultant should provide a plan for collecting primary data and/or recommendations on alternate data sets and/or assumptions which may be needed and justification for the assumptions and possible repercussions.
Comments in response by WASCO, should reach the Consulting Team no later than ten (10) days after receipt of the presentation and report of action points.

Within five (5) months of contract signature the Consulting Team shall submit Report #3 – **Design Criterion** – which should contain the information for undertaking designs generated from data collected.

Comments in response by WASCO should reach the Consulting Team no later than ten (10) days after receipt of Report #3.

Task #3

Presentation of information collected from the desk reviews and surveys and evaluation results. The results should include, Extreme Weather Management Plan (EWMP) and Source Water Protection Plan (SWPP), the watershed analysis and model, hydraulic analysis, ESIA and preliminary intake Design Options and ESMP.

Within six (6) months of contract signature the Consulting Team shall submit Report #4 –**Validated Design Information**.

Comments in response by WASCO should reach the Consulting Team no later than ten (10) days after receipt of Report #4.

Task #4

Presentation of Design options for selection of the most appropriate option by the Client. This should include design options with associated preliminary cost estimates (estimates should include costing of works and procurement of equipment inclusive of CIF, inland transportation and installation and overheads) and sufficient information for the Client to undertake an informed review. Please note **the Client reserves the right to create an option from a combination of options provided.** Approval on an option will be communicated in formal correspondence to the Consulting Team. The consultant will recommend an appropriate form of tender based on the options provided.

Within ten (10) months of contract signature the Consulting Team shall submit Report #5 – **Design Options Review**.

Comments in response by WASCO should reach the Consulting Team no later than ten (10) days after receipt of Report #5.

Task #5

A Draft Design Report [Report #6] – to be submitted within eleven (11) months after contract signing and shall include the following:

a. Detailed final technical civil works designs and other relevant designs, including , but not limited to, pump control and data acquisition systems;

b. Environmental and Performance specifications for construction and operating the intake and associated system(s)

Task #6

Final Design Report [Report #7] – to be submitted within twelve (12) months after contract signing and should contained the final designs which reflects and incorporates comments provided by the Client.

The final submission should also include tender documents

The Reports are to be submitted to the Managing Director of WASCO, or designated representative, who will be in charge of the study oversight, and deliverables.

WASCO together with relevant stakeholders and the Project Coordinating Unit (PCU), will review and return comments to the **Consulting Team** within two (2) weeks after the submission of the Options Report.

The **Consulting Team** will be required to submit an electronic copy of the final in addition to six (6) hard copies.

Note: Client comments must be taken into account and addressed before final submission of each deliverable.

- ***All reports shall be submitted in English.***

- ***All reports and documents relevant to the Consultant's services, computer programmers, etc. shall become the property of the Government of Saint Lucia.***
- All information, models and/or derivatives used for this feasibility study including the development of options and final design for construction shall become the property of the Client on completion of the assignment.

Appendix 2

List of Interviews and Meetings

Fact Gathering Interviews and Meetings

Agency	Person Interviewed/ meetings	Date
WASCO	Mr. Peter Norville, Strategic Planning Manager Mr. Joachim Hyacinth, Date Supervisor	2017 to 2019 (Various dates)
MEIGSD (DSD)	Ms. Shanna Emmanuel, Sustainable Development Officer Ms. Lavina Alexander, Sustainable Development Officer Ms. Teisha JnBaptiste, Sustainable Development Officer Ms. Jasmin Jude, Sustainable Development Officer Ms. Jannel Gabriel, Sustainable Development Officer	24 Jan 2018
PCU	Eng. Kingsly Promise, Environmental Safeguards officer Eng. Nicholas Johnny, Project Engineer Ms. Deborah Hippolyte, Social Safeguards Officer	26 Jan 2018
PCU	Ms. Deborah Hippolyte, Social Safeguards Officer	2018 to 2019 (various dates)
MESEYSCLG	Mr. Jim Xavier, Deputy Director	28 Jan 2018
CARPHA/ CEHI	Mr. Lyndon Forbes-Robertson, Head Environmental Health and Sustainability Mrs. Shermaine Clauzel, Environmental Officer	29 Jan 2018
MIPEL	Eng. Natalie Popovic, Engineer	31 Jan 2018
MAFPPNRC (Fisheries)	Ms. Allana Joseph, Fisheries Officer	1 Feb 2018
MHW	Mr. Parker Ragnanan, Chief Environmental Health Officer Mr. Arthur Antoine, Environmental Health Officer	1 Feb 2018
WRMA	Eng. Rupert Lay, Director Mr. Junior Mathurin, Water Resources Officer Mr. Dalcius Kenny Pierre, Water Resources Officer Ms. Cantarra Cooper, Water resources Officer	1 Feb 2018
SLSWMA	Mr. Justine Sealy, General Manager Mr. Laurie Les Floris, Deputy General Manager	2 Feb 2018
LD	Mr. Ray Narsisse, Labour Commissioner Mr. Andres Griffith, Senior Health and Safety officer	5 Feb 2018
MAFPPNRC (Forestry)	Mr. Aloysius Charles, Forest Officer - Wildlife Unit Mr. Donatian Gustave, Research Officer - Watershed Unit	9 Feb 2018
WASCO	Mr. Jim King, Water Services Manager - WASCO Mr. Kelvin Emilien, Head Design & Construction – WASCO Mr. Raphael Eudovic, Senior Operations Manager - WASCO Mr. Hamish Josep, GIS Technician – WASCO Mr. Joachim Hyacinth, Data Supervisor - WASCO	14 Feb 2018
PCU	Eng. Nicholas Johnny, Project Engineer	31 Feb 2018
MAFPPNRC (Forestry)	Ms. Charmaine Augustine, Forestry Officer - Millet Region	2018 to 2019 Various dates
MAFPPNRC (Phy Planning)/ DCA	Ms. Karen Augustin, Chief Physical Planner/ Executive Secretary	2 March 2018
WASCO	Mr. Norville, Mrs. Benjamin, Legal Officer	24 April 2018

Agency	Person Interviewed/ meetings	Date
WASCO	Mr. Norville-WASCO Strategic Manager, Mr. Joachim Hyacinth-Date Supervisor WASCO, Mr. Raphael Eudovic - WASCO (Ciceron Treatment Plant), Mr. Hamish Joseph, GIS - WASCO, Mr. Ale Anthony - WASCO Operations Manager, Mr. Hamilton-WASCO Supervisor (JCD), Mr. Rupert Lay- WRMA, Mr. Junior Mathurin - WRMA, Mr. Mike Fuller - Baird International	25 April 2018
MAFPPNRC (Forestry)	Mr. Alwin Dornelly, Deputy Chief Forestry	13 June 2018
MAFPPNRC_Agric Engineering	Mr. Faustinus Monero, Director - Engineering Department	13 June 2018
World Bank	Mr. Mike Darr, Environmental Specialist Mr. Norman Russle Howard Taylor, Social Specialist	13 Dec 2018
MESEYSCLG	Mrs. Lucia Yard, Community Development Officer - Millet/ Anse la Raye	Mar 2019
MDC	Mr. Aaron Donovan, President	2018 to 2019 (Various dates)
MAFPPNRC (Extension & Advisory Services)	Mr. Kemuel Jn Baptiste, Chief Agricultural Extension Officer	6 Mar 2019
MAFPPNRC (Extension & Advisory Services)	Mr. Aaron Donovan, Regional Agricultural Extension Officer - Millet Region	2018 to 2019 (various dates)
MAFPPNRC (Survey & Mapping Dept)	Mr. John Labadee, Chief Surveyor	10 Mar 2019

Key for Abbreviations

CARPHA/ CEHI	---	Caribbean Public Health Authority/ Caribbean Environmental Health Institute
DCA	---	Development Control Authority
DSD	---	Department of Sustainable Development
DVRP	---	Disaster Vulnerability Reduction Project
LD	---	_Labour Department
MAFPPNRC	---	Ministry of Agriculture, Fisheries, Physical Planning, Natural resources and Cooperatives
MDC	---	Millet Development Committee
MEIGSD	---	Ministry of Education, Innovation, Gender Relations, and Sustainable Development
MESEYSCLG	---	Ministry of Equity, Social Justice, Empowerment, Youth Development, Sports, Culture, and Local Government
MIPEL	---	Ministry of Infrastructure, Ports, Energy, and Labour
MHW	---	Ministry of Health and Wellness
PCU	---	Project Coordinating Unit

PPS	---	Physical Planning Section
SLSWMA	---	Saint Lucia Solid Waste Management Authority
WASCO	---	Water and Sewerage Company Inc
WRMA	---	Water Resource Management Unit/ Water Management Authority

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Appendix 3

Fourth Schedule of the Planning Act

Schedule 4 of the Physical Planning and Development Act of 2001
Projects requiring an EIA

SCHEDULE 4 **(section 22)**

MATTERS FOR WHICH ENVIRONMENTAL IMPACT ASSESSMENT IS ORDINARILY REQUIRED

1. Hotels of more than the number of rooms specified in the Regulations;
2. Sub-divisions of more than the number of plots specified in the Regulations;
3. Residential development of more than the number of units specified in the Regulations;
4. Any industrial plant which in the opinion of the Head of the Physical Planning and Development Division is likely to cause significant adverse impact on the environment;
5. Quarrying and other mining activities;
6. Marinas;
7. Land reclamation, dredging and filling of ponds;
8. Ports;
9. Dams and reservoirs;
10. Hydro-electric projects and power plants;
11. Desalination plants;
12. Water purification plants;
13. Sanitary land fill operations, solid waste disposal sites, toxic waste disposal sites and other similar sited;
14. Gas pipeline installations;
15. Any development projects generating or potentially generating emissions, aqueous effluent, solid waste, noise, vibration or radioactive discharges;
16. Any development involving the storage and use of hazardous materials;
17. Coastal zone developments;
18. Development in wetlands, marine parks, national parks, conservation areas, environmental protection areas or other sensitive environmental areas.

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Appendix 4

Flora and Fauna Inventory

DATE	LOCATION	GPS	OBSERVERS	POINT #	START TIM	END TIME	WAYPOIN	SPECIES	SPECIES NAME	NUMBER	EVIDENCE	STATE	PRECIP.	CLOUD	WIND	REMARKS
22/01/19	Millet intake road	N: 13.90878	Damas and Randal		8:50 AM			Bird	Green Heron	1	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road	W: 060.99735	Damas and Randal					Bird	Lesser Antillean Saltator	1	Heard	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	Purple Throated Carib	2	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	Lesser Antillean Bullfinch	5	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	Green Throated Carib	1	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	Bananaquit	3	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	Scaly-Breasted Thrasher	1	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	Zenaida Dove	1	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	Gray-King Bird	3	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	Mangroove Cuckoo	1	Heard					
	Millet intake road		Damas and Randal					Bird	Carib Grackle	2	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	Broad-winged Hawk	1	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Reptile	agouti	1	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road	N:13.90574	Damas and Randal					Bird	Antilllean Crested Hummingt	2	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road	W: 060.99778	Damas and Randal					Bird	St.Lucia Blackfinch	2	Heard/See	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	Caribbean Elainea	1	Heard/see	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	Bananaquit	5	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	Purple Throated Carib	2	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	Broad-winged Hawk	2	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	Scaly-Breasted Thrasher	1	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	St. Lucia Oreole	2	Heard	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	St.Lucia Warbler	3	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road	N: 13.90366	Damas and Randal					Bird	Purple Throated Carib	1	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road	W: 060.99968	Damas and Randal					Bird	Antilllean Crested Hummingt	2	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	Grey Trembler	1	Heard/see	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	Lesser Antillean Saltator	1	Heard/see	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Reptile	St. Lucia Anole	2	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	St.Lucia Oriole	1	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	Mangroove Cuckoo	2	Heard/sser	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	Bananaquit	4	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Reptile	Agouti	1	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road	N:13.90319	Damas and Randal					Bird	lesser Antillean Soltator	2	Seen	Dead	Dry	Light cloud	Light breeze	
	Millet intake road	W:061.00278	Damas and Randal					Bird	Lesser Antillean Flycatcher	1	Heard	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	Bananaquit	3	seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	Black-Whiskered Vireo	1	Heard/see	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	St.Lucia Warbler	1	Heard/see	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	Caribbean Elainea	1	Heard	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	Mangroove Cuckoo	1	Heard	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	Purple Throated Carib	1	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	Bare-eyed Robin	1	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	board-winged Hawk	1	Seen	Dead	Dry	Light cloud	Light breeze	

DATE	LOCATION	GPS	OBSERVERS	POINT #	START TIM	END TIME	WAYPOIN	SPECIES	SPECIES NAME	NUMBER	EVIDENCE	STATE	PRECIP.	CLOUD	WIND	REMARKS
	Millet intake road		Damas and Randal					Bird	St.Lucia Blackfinch	2	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	Scaly-Breasted Thrasher	2	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	St. Lucia Parrot	3	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road	N:13.90090	Damas and Randal	start of mango project				Bird	St.Lucia Blackfinch	2	Heard/see	Alive	Dry	Light cloud	Light breeze	
	Millet intake road	W:061.00583	Damas and Randal					Bird	St.Lucia Parrot	4	Heard/see	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	Grey Trembler	1	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	Antilllean Crested Hummingb	3	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	Gray-King Bird	2	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	Purple Throated Carib	2	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	St. Lucia Warbler	2	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	Lesser Antillean Soltator	1	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	St. Lucia Oreole	1	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Reptile	St.Lucia Anole	1	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road	N:13.89900	Damas and Randal	end of mango project.				Bird	St. Lucia Parrot	3	seen/Hear	Alive	Dry	Light cloud	Still	
	Millet intake road	W:061.00637	Damas and Randal					Bird	Caribbean Elainea	1	Heard	Alive	Dry	Light cloud	Still	
	Millet intake road		Damas and Randal					Bird	Scaly-Breasted Thrasher	2	Seen	Alive	Dry	Light cloud	Still	
	Millet intake road		Damas and Randal					Bird	Antilllean Crested Hummingb	1	Seen	Alive	Dry	Light cloud	Still	
	Millet intake road		Damas and Randal					Bird	St.Lucia Warbler	1	Heard	Alive	Dry	Light cloud	Still	
	Millet intake road		Damas and Randal					Bird	Lesser Antillean Flycatcher	1	seen	Alive	Dry	Light cloud	Still	
	Millet intake road		Damas and Randal					Bird	Caribbean Elainea	1	Heard	Alive	Dry	Light cloud	Still	
	Millet intake road		Damas and Randal					Reptile	agouti	1	seen	Alive	Dry	Light cloud	Still	
	Millet intake road		Damas and Randal					Reptile	St.Lucia Anole	1	Seen	Alive	Dry	Light cloud	Still	
	Millet intake road		Damas and Randal					Bird	Scaly-Breasted Thrasher	1	Seen	Alive	Dry	Light cloud	Light Breeze	
	Millet intake road		Damas and Randal					Bird	Purple Throated Carib	1	Seen	Alive	Dry	Light cloud	Light Breeze	
	Millet intake road		Damas and Randal					Bird	Mangroove Cuckoo	1	Seen	Alive	Dry	Light cloud	Light Breeze	
	Millet intake road		Damas and Randal					Bird	Lesser Antillean Bullfinch	3	Seen	Alive	Dry	Light cloud	Light Breeze	
	Millet intake road		Damas and Randal					Bird	LesserAntillean soltator.	1	Heard	Alive	Dry	Light cloud	Light Breeze	
	Millet intake road	N:13.89843	Damas and Randal					Bird	St.Lucia Parrot	2	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road	W:061.00784	Damas and Randal					Reptile	St.Lucia Anole	2	Seen	Alive	Dry	Light cloud	Light breeze	
	Millet intake road		Damas and Randal					Bird	scaly naped Pigeon	2	Seen	Alive	Dry	Overcast	Light breeze	
	Millet intake road		Damas and Randal					Bird	Lesser Antillean Saltator	2	Heard	Alive	Dry	Overcast	Light breeze	
	Millet intake road		Damas and Randal					Bird	Gray-King Bird	3	Heard	Alive	Dry	Overcast	Light breeze	
	Millet intake road		Damas and Randal					Bird	Lesser Antillean Flycatcher	2	Seen	Alive	Dry	Overcast	Light breeze	
	Millet intake road		Damas and Randal					Bird	Mangroove Cuckoo	1	Seen	Alive	Dry	Overcast	Light breeze	
	Millet intake road		Damas and Randal					Bird	Pearly-eyed Thrasher	1	Heard	Alive	Dry	Overcast	Light breeze	
	Millet intake road		Damas and Randal					Bird	Caribbean Elainea	1	Seen	Alive	Dry	Overcast	Light breeze	
	Millet intake road		Damas and Randal					Bird	Green Throated Carib	3	Seen	Alive	Dry	Overcast	Light breeze	
	Millet intake road		Damas and Randal					Reptile	St.Lucia Finch	2	Seen	Alive	Dry	Overcast	Light breeze	
	Millet intake road		Damas and Randal					Bird	St.Lucia Warbler	3	Seen	Alive	Dry	Overcast	Light breeze	
	Millet intake road		Damas and Randal					Bird	Scaly-Breasted Thrasher	1	Seen	Alive	Dry	Overcast	Light breeze	
	Millet intake road		Damas and Randal					Bird	Bananaquit	1	Seen	Alive	Dry	Overcast	Light breeze	
	Millet intake road		Damas and Randal					Bird	Bare-eyed Robin	1	Heard	Alive	Dry	Overcast	Light breeze	

DATE	LOCATION	GPS	OBSERVERS	POINT #	START TIM	END TIME	WAYPOIN	SPECIES	SPECIES NAME	NUMBER	EVIDENCE	STATE	PRECIP.	CLOUD	WIND	REMARKS
	Millet intake road	N:13.89497	Damas and Randal					Bird	Purple Throated Carib	1	Seen	Alive	Dry	Overcast	Light breeze	
	Millet intake road	W:061.00965	Damas and Randal					Bird	St.Lucia Parrot	2	Seen	Alive	Dry	Overcast	Light breeze	
	Millet intake road		Damas and Randal					Bird	Antilllean Crested Hummingt	1	Seen	Alive	Dry	Overcast	Light breeze	
	Millet intake road		Damas and Randal					Bird	osprey	2	Seen	Alive	Dry	Overcast	Light breeze	
	Millet intake road		Damas and Randal					Bird	Caribbean Elainea	1	Seen	Alive	Dry	Overcast	Light breeze	
	Millet intake road		Damas and Randal					Bird	Black-Whiskered Vireo	1	Seen	Alive	Dry	Overcast	Light breeze	
	Millet intake road		Damas and Randal					Bird	Scaly-Naped Pigeon	1	Heard/See	Alive	Dry	Overcast	Light breeze	
	Millet intake road		Damas and Randal					Bird	Bare-eyed Robin	1	Heard	Alive	Dry	Overcast	Light breeze	
	Millet intake road		Damas and Randal					Bird	St. Lucia Warbler	1	Seen	Alive	Dry	Overcast	Light breeze	
	Millet intake road		Damas and Randal					Bird	Scaly-Breasted Thrasher	1	Heard/See	Alive	Dry	Overcast	Light breeze	
	Millet intake road		Damas and Randal					Bird	St. Lucia finch	6	Seen	Alive	Dry	Overcast	Light breeze	
	Millet intake road		Damas and Randal					Bird	Lesser Antillean Saltator	1	Seen	Alive	Dry	Overcast	Light breeze	
	Millet intake road		Damas and Randal					Bird	Bananaquit	1	Heard	Alive	Dry	Overcast	Light breeze	

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Appendix 5

Meeting with Landowners - October 16, 2018

APPENDIX 5 - List of Affected Land Owners and LRTP Parcels

WASCO

Water and Sewerage Company Inc.

Strategic Planning Department

~~Revised 12th Sept 2018~~

Revised 16th Oct 2018

Map Ref#	Proposed Route From intake	Registered Land Owner	Contact
1	0635B 3	Crown	Removed for Confidentiality
2	0636B 26	Claudette Gilbert	
3	0635B 3	Crown	
4	0636B 18	Bibianne Hilton, Constauce Marie Jn Francois	
5	0636B 17	Henry, Marie, Georgina Lubin, Antoinette, Irina Lubin	
6	**0836B 1**	**Thomas & Gilbert Francois, John Laurencin, Marguarite Joseph**	
7	**0836B 32**	**Julian & Simonia Jean Phillip**	
8	**0836B 31**	**Winster L. Frederick**	
9	**0836B 77**	**Epiphane Modest**	
10	**0836B 85**	**Henry Charles**	
11	**0837B 52**	**Garnet, Daniel, Leonard, Albert Stanislaus, Petre Mathurin**	
12	**0837B 94**	**Maurice Charles**	

List of Persons who attended meeting on 16 October 2018

WATER AND SEWERAGE COMPANY INC. (WASCO)

Meeting with Landowners in Tete Chemin – Millet, to Discuss Topographic Surveys and Geotechnical Investigations for Feasibility Study on Development of Millet Intake

Tete Chemin Community Centre; Sunday November 04, 2018; 3:00 pm

NAME	CONTACT INFORMATION (Address, Tel, Email)	BLOCK + PARCEL NUMBER	NOTES*
PASCAL JOSEPH		0536B 82	REPRESENTING JULIAN & SIMONIA JOHN PHILLIP
JOHN LAURENCIN		0836B 1	
NICK LUBIN		0636B 17	REPRESENTING THEODORA LUBIN
GERALD CHARLES		0837B 94	MAURICE GEORGE CHARLES / THEODORA ERASTUS
CLAUDETTE GILBERT		0636B 26	OWNER 0636B 89 MOTHER 0636B400
CYPRIAN GERALD		0636B 26	FARMER
EPIPHANE MODEST		0836B 77	
MARC PHILLIS			NOT DIRECTLY AFFECTED

*Notes could include other relevant information, including whether attendee is representing a landowner, or information on other persons in joint ownership of property.

WASCO Millet Intake and pipeline rehabilitation project
Meeting with landowners
Tete Chemin, Millet, Anse la Raye
Sunday 4th November, 2018

The following is a summary of the comments and concerns raised by the land owners and landowner representatives who attended the meeting on Sunday 4th November, facilitated by WASCO. The purpose of the meeting was to inform and engage the land owners in discussions on the forthcoming route identification for the proposed pipeline and access road by the local surveyor to assist RJ Burnside's design efforts.

1. The pipeline should avoid being located in close proximity to the existing river, especially along its banks as this leads to soil erosion and land slippage into the river. This is based on the experience of the owners and farmers.
2. There is the possibility of the loss of agricultural lands/ top soil and crops as a result of the construction works and placement of the new pipeline and access route, and so an assessment must be undertaken after the proposed route is determined, and compensation needs to be provided to farmers/ land owners for any such losses.
3. WASCO must be liable for any damage to the properties during the construction and placement of the pipeline and service route.
4. Consideration should be given to the provision of free pipe borne water from WASCO for life as part of the compensation consideration to land owners.
5. WASCO must ensure that they contact and have permission from the actual land owners, and not the persons faming the lands as these might be different parties.
6. Additional information on the method of how the test pits are to be done.
7. There must be continued communication with the Tete Chemin community on the project and the various activities that are to occur so that they are always aware of what is happening.
8. The landowners were pleased that permission was being sought from them for entry through their property and asked that prior to the commencement of the surveys and geotechnical investigation, they should be notified at least 48 hours prior.

Photos of the Community meeting session

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Appendix 6

Community Meeting, Millet - Sunday, January 13, 2019

WASCO Millet Intake and Pipeline Rehabilitation Project

Millet Community Meeting
Sunday January 13th, 2019

1.0 Introduction

The meeting with the wider Millet Community as part of the Environmental and Social Impact Assessment (ESIA) for the WASCO Millet intake and pipeline rehabilitation project took place at the Millet Infant School on Sunday 13th January, 2019. The purpose of the meeting was to inform the community of the project and its works, and to engage the community, soliciting their comments and observations as the wider project affected persons (PAPs) and to incorporate these responses and pertinent measures into a final ESIA report. This community engagement formed part of the Social Impact Assessment.

The residents of the wider Millet community which included the communities of **Tet Chemin (where the project is to actually occur), Caico, Venus, Durandeau, Morne d'Or and Vanard,** were informed of the meeting via announcements at church services in five (5) churches within the community, and through town crier announcements. The town crier drove through each community after working hours (approximately between 5:00pm and 7:00pm) when many residents are expected to be at home. A member of WASCO staff served as the town crier who used a loud speaker mounted on a WASCO vehicle driving through the community to deliver the announcement in both English and Kweyol (local Saint Lucian patois dialect). This was done daily from the Wednesday to the Friday prior to the meeting date.

The Millet Development Committee (the local development group) worked collaboratively with WASCO and RJ Burnside in planning and implementing this meeting.

Transportation to the meeting venue was provided by local buses so as to provide residents without access to transportation, with the opportunity to attend and contribute.

2.0 Agenda

The agenda that guided the engagement can be found in Appendix 1 to this report.

3.0 Officials at the Meeting

The following lists the persons and their designations who met with the community residents and facilitated their input.

Mr. Peter Norville	Strategic Planning Manager	Water and Sewerage Company (WASCO)
Mr. Joachim N Hyacinth	Data Processing Supervisor	Water and Sewerage Company (WASCO)
Mrs. CherryAnne Williams	Communications Officer	Water and Sewerage Company (WASCO)

Mr. Aaron Donovan	President	Millet Development Committee
Mr. Daune Heholt	Environmental & Social Safeguards Specialist	RJ Burnside
Mr. Naim Jn Pierre	Engineering Specialist	Amarna Consult/ RJ Burnside
Mrs. Antonia Jagroop	Regional Head	Extension Division, Ministry of Agriculture
Ms. Deborah Hippolyte	Social Safeguard, Monitoring, and Reporting Officer	Disaster Vulnerability Project - Project Coordinating Unit, Ministry of Economic Development
Mr. Lucius Doxerie	Communications Officer	Disaster Vulnerability Project - Project Coordinating Unit, Ministry of Economic Development

4.0 Meeting

The meeting commenced at 3:15 pm and ended at 4:40 pm. While a headcount indicated 70 persons in attendance, only 63 signed the register sheets as attending. A copy of the sign in sheets is presented Appendix 2 of this report.

The meeting was conducted in both English and Kweyol as a means of ensuring effective communication.

All issues and questions raised by the residents, along with the recommendations that they offered, were recorded. Depending on the issue or question posed, responses were provided by the relevant persons from the head table.

Photographs of the meeting are presented for record in Appendix 3 of this report.

4.1 Issues and Questions

The following were the **issues and questions** raised by the Community members at the meeting:

1. When will the project works actually commence?
2. What will the direct benefit to the Millet Community be?
3. Will residents or people have to be relocated to facilitate the project?
4. Will people be compensated if they have to be relocated?
5. Will farmers and farm lands be affected?
6. Will there be compensation to farmers or land owners for the use of their lands or damage of their crops by the project?

7. Will there be interruptions in the water supplies to the communities during the project works?

8. What is the impact of the John Compton Dam (JCD) on the Millet water supply?

9. Will the loan by the World Bank to undertake this project be paid by WASCO or by the GOSL?

10. Will there be an increase in the amounts reflected on the monthly water bills received by consumers as a means to pay for this project?

11. Is there a possibility of having a treatment plant located at Tet Chemin since all water has to go to Ciceron Treatment plant, and then be pumped back to Tet Chemin, where the original source of the water is?

12. With the proposed works, will the volume of water from the Ti Saut Intake (this a local name for the Millet Intake) and the JCD be increased?

13. Has the flows and intensity of the water supply been studied?

14. Is the project working along with the Forestry Department, and will there be reforestation of any vegetation removed during the project works?

15. What arrangement will WASCO make for the placement of the pipeline over private lands?

16. Will the final project report that includes the designs and the environmental and social impact assessment be made available to the public?

17. Is there a number at WASCO that someone can call if they have an issue or grievance?

18. Will the residents of Millet be offered employment during the project?

19. What is WASCO's plan for the sections of the damaged pipeline? The damaged pipelines spray jets of water that damage crops and erode lands.

20. If heavy equipment such as an excavator is used in the river, will it be properly supervised as such equipment tends to displace the boulders that protect the river banks and also cause damage in the river.

4.2 Recommendations

The following were the **recommendations** made by the community:

1. The roads over which any heavy equipment travels and damages must be completely repaired soon after the work is done. Temporary repairs will be allowed while works are ongoing.

2. Another meeting should be held just before the works are about to commence to inform the community of what is about to occur, and to also receive any further suggestions or recommendations that the community may wish to make.

3. Ensure that there is minimal disturbance of the forest during the proposed works.

4. Ensure appropriate compensation measures are in place for farmers who are affected by the works and the placement of the pipeline.

5. Ensure that there is a hotline that can be called in the event of any issue on the project for reporting and seeking remedial measures.

6. In the engineering and construction study try to maintain the river banks. Particularly try to ensure that the boulders along the banks are maintained as they assist in protecting the banks and lands behind them. The river generates a great flow and force especially after heavy rainfall.

7. WASCO should maintain constant communication with the community.

4.3 Responses to Issues Raised and Recommendations

The recommendations made by the community were accepted. In respect to the issues or concerns raised, the following was offered as responses.

1. When will the project works actually commence?

- The project works may commence 4 to 5 months from now.

2. What will the direct benefit to the Millet Community be?

– Apart from the improved water supply, there may be local employment with the contractor undertaking the works. There will also be the benefit of improved access for farmers to their farmlands via the proposed new access road that is to be constructed to service the pipeline.

3. Will residents or people have to be relocated to facilitate the project?

– As far as the plan goes, there will be no relocation of persons to facilitate the works

4. Will people be compensated if they have to be relocated?

– there should be no relocation of any persons. However, if the pipeline passes on private lands, then WASCO will engage in negotiations with these persons.

5. Will farmers and farm lands be affected?

– yes, there will be some impacts. The geotechnical work has commenced and there may be some clearing and digging that has to be undertaken. This may involve the removal of some crops. WASCO has engaged the Ministry of Agriculture already who has provided an agricultural officer work to be present at such works to do a proper evaluation of the crops that may be damaged. The farmers who lands that are being affected, are also present during that time as well.

6. Will there be compensation to farmers or land owners for the use of their lands or damage of their crops by the project?

– See above. There will be some damage to crops. WASCO has engaged the Ministry of Agriculture already who has provided an agricultural officer work to be present at such works to do a proper evaluation of the crops that may be damaged. The farmers who lands that are being affected, are also present during that time as well. Where ever the pipeline is expected to travel over private lands, WASCO will engage in negotiations with those owners.

7. Will there be interruptions in the water supplies to the communities during the project works?

- No. There are no interruptions expected. It is important to ensure the Ti Saut (this a local name for the Millet Intake) is working properly to complement the water coming from the John Compton Dam.

8. What is the impact of the John Compton Dam (JCD) on the Millet water supply?

– There will be major impact. Both water supplies meet at a point (the junction), and travel as one flow to the Ciceron Treatment Plant for processing. The initial flows are from sperate sources.

9. Will the loan from the World Bank to undertake this project be paid by WASCO or by the Government of Saint Lucia (GOSL)?

– the loan will be repaid by the GOSL. The monies will be from the taxes that the GOSL collects annually.

10. Will there be an increase in the amounts reflected on the monthly water bills received by consumers as a means to pay for this project?

– No. There will be no increase in the amounts paid by consumers for their regular water bills.

11. Is there a possibility of having a treatment plant located at Tet Chemin since all water has to go to Ciceron Treatment plant, and then be pumped back to Tet Chemin, where the original source of the water is?

– There have been considerations of what the community was requesting, but over the years, the costs of implementing such a plant were considered by WASCO and found very prohibitive. The decision by WASCO was not to construct an additional treatment plant. This was also considered during the time of the design of the John Compton Dam as well.

12. With the proposed works, will the volume of water from the Ti Saut Intake and the JCD be increased?

– WASCO and the consultants have been studying the water supply and have considering the supply levels for the next 30 to 40 years. With the impacts of climate change, it does not appear that there will be any increase in water supply from either Ti Saut or the JCD. That is why it is so important to service and enhance the water supplies from both sources.

13. Has the flows and intensity of the water supply been studied?

– Yes. There is ongoing work by WASCO as well as the Government. The consultants engaged for this project has also undertaken studies as well to assist in guiding their designs.

14. Is the project working along with the Forestry Department, and will there be reforestation of any vegetation removed during the project works?

– Yes. The Forestry Department is on board and is being consulted. Where necessary, there will be replanting as directed by the Forestry Department.

15. What arrangement will WASCO now make for the placement of the pipeline over private lands?

– Historically, WASCO appears to have had some arrangement with the land owners over whose lands the pipeline traversed. Some of these arrangements are being reviewed. WASCO will be reviewing their records and will get back to the owners in the near future. It is important to state here that the laws of the land must be adhered to in addressing this matter.

16. Will the final project report that includes the designs and the environmental and social impact assessment be made available to the public?

– The Ministry of Finance will attempt to provide a condensed version of the final report on their website as part of the information provided to the community and wider public.

17. Is there a number at WASCO that someone can call if they have an issue or grievance with this project especially during the construction phase?

– This is a very good question. WASCO may need to implement a “grievance number” which residents can call to report any issues during the project.

18. Will the residents of Millet be offered employment during the project?

– It is expected that there will be employment opportunities for Millet residents as they reside with the vicinity of the project works and also have great knowledge of the site.

19. What is WASCO’s plan for the sections of the damaged pipeline? The damaged pipelines spray jets of water that damage crops and erode lands.

- WASCO will investigate this but be aware that the old pipeline was subject to damage because of its location with the river and along its banks. The intention now is to replace the pipeline, but further inland away from the river which may be a more secure option. Ensuring minimal threat to the pipeline over the long period is a major consideration.

20. If heavy equipment such as an excavator is used in the river, will it be properly supervised as such equipment tends to displace the boulders that protect the river banks and also cause damage in the river.

– The contractor will be required to engage in proper supervision of all the equipment used and their activities during the rehabilitation of the intake and pipeline. There will be an Environmental Management Plan coming out of the Environmental and Social Assessment of this project to guide the activities on site during the construction. WASCO will also closely be monitoring the project construction activities and providing oversight.

5.0 Next Steps

The comments and recommendations made by the residents and to be reviewed and addressed. These comments will contribute to guiding the project works design and implementation phases. They will also be reflected in the guidelines of the Environmental and Social Management Plan.

Appendix 1

Agenda for the Millet Community Meeting - Sunday 13th January, 2019

Agenda

1. **Opening Prayers**_Millet Development Committee (A. Donovan)
2. **Welcome and Introductions**_WASCO (P. Norville)
3. **Background and Project overview_** WASCO (P. Norville)
4. **ESIA process and Environmental & Social Considerations**_ RJ Burnside (D. Heholt)
5. **Intake rehabilitation and pipeline engineering works**_Amarna / RJ Burnside (N. JnPiere)
6. **Opening of floor to Community** for comments_ ((facilitators WASCO/ RJ Burnside))
7. **Response to Community**_ WASCO, RJ Burnside, Amarna, Millet Community Development Committee (facilitator WASCO/ RJ Burnside)
8. **Closing Remarks**_WASCO (P. Norville & A. Donovan)

Appendix 2

List of Registered Attendees_ Sunday 13th January 2019

Millet Intake Upgrade: Community Meeting: 13th Jan 2018

	NAME	COMMUNITY	
1	Jennifer Alexis	Durandeau	F
2	Irina Augustin	Venus	F
3	Albina Dulice	Morne D'or	F
4	Anna Lendor	Durandeau	F
5	Theresa Donovan	Caico	F
6	Florita Alexis Raymond	Venus	F
7	Agnes Sanson	Morne D'or	F
8	Francisca St Marie	Tete Chemin	F
9	Norma Matthew	Vanard	F
10	Priscilla Augustin	Vanard	F
11	Edith Modeste	Venus	F
12	Rosanna Charles	Vanard	F
13	Juliana M Reg°	Morn'dor	F
14	Dawn Regis	Venus	M
15	Terrence Charles	Millet	M
16	Philomene Regis	Venus	F
17	Veronica Henry	Millet	F
18	Pascal Joseph	Tete Chemin	M
19	Francis George	MILLET	M
20	Georgianna Hippolyte	Venus	F
21	Veronica Rene	Millet Millet	F
22	Jimmy Wilson	Vanard	F
23	Juita Charleye	Vanard	F
24	Jules Wilson	Tete Chemin	M
25	Francis Joseph	MILLET	M
26	Chanderna Wills	millet	M
27	Darlene St Marie	MILLET	M
28	Valence George		M
29	Renee prophet	Morne D'or	M
30	Pro Fruit	Mordor	M
31	Marie Ange Joseph	morne dor	F
32	C M	Caico	M
33	Fixroy Ismael	Caico	M
34	Veronique Jewel	Caico	F
35	Thomas Raymond	Venus	M
36	Reginald Charles	Tete Chemin	M
37	Jonal Rene	Venus	M
38	Terrance Charlemagne	Venus	M
39			F
40	Bartholomew Donovan	Tete Chemin	M
41	Suzanna Regis	Venus	F
42	Sheila Jean	Tete Chemin	F

~~55 female~~

Millet Intake Upgrade: Community Meeting: 13th Jan 2018

	NAME	COMMUNITY	
43	Daniel George	Tete Chemin	M
44	Noelita Gabriel	Millet Venus	F
45	Nadia Gabriel	Millet venus	F
46	Albert Jean Louisy	Millet	M
47	Gerald Charles	Tet Chemin	M
48	Eustace Isidore	Venus	M
49	Nathaniel James	Millet Caico	M
50	Solomon Donnovan	Tet Chemin	M
51	Markite Lovence	Caico	M
52	Cyril Lovigny	Venus	M
53	Charmain Augustin ✓	Tete Chemin	F
54	Nesia Augustin	Tete Chemin	F
55	Gena Stanislaus ✓	Caico	F
56	Calvin Stanislaus	Caico	M
57	Naim Stanislaus	Caico	M
58	Albertha Hippolyte ✓	Millet	F
59	Celine Joseph	millet	F
60	Sherelle St. Clair	Millet	F
61	Delicia Gabriel	millet Venus	F
62	Lucia Regis-Lonsde	Social Transformation Office	F
63	Christopher Stanislaus ✓	Anse-la-Raye/Canaries Millet	M

Appendix 3

Photographs of the Community Meeting_ Sunday 13th January 2019

Photo 1. Preparation for the meeting at the Millet Infant School. Map of pipeline route displayed for reference.

Photo 2. Members of the Millet Community arriving to attend the meeting.

Photo 3. Community residents attending the meeting.

Photo 4. Team members preparing to address the community

Photo 5. Community residents listening attentively before posing questions and raising issues

Photo 6. Community member posing a question

Photo 7. Resident making a point

Photo 8. Engaging the community in discussion

Photo 8. Engaging the community in discussion

Photo 9. Enjoying some refreshments after the meeting

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Appendix 7

List of Affected Landowners and Farmers - March 2019

WASCO

Water and Sewerage Company Inc.

Strategic Planning Department

~~Revised 13th Sept 2018 Revised 16th Oct 2018 Revised 20th Nov 2018~~ 6th Mar 2019

Map Ref#	Proposed Route From intake	Registered Land Owner	Farmers on Property	AREA of Parcel (Hectares)	Contact
	0635B 3	Crown		33	
	0636B 26	Claudette Gilbert Fergus Gilbert 7137006 / 4529795	Errol Felix	4.47	
	0635B 3	Crown		33	
	0636B 18	Bibianne Hilton, Constauce Marie Jn Francois		5.12	
	0636B 17	Henry, Marie, Georgina Lubin, Antoinette, Irina Lubin		10.12	
	0836B 1	Thomas & Gilbert Francois, John Laurencin, Marguarite Joseph		3.74	
	0826B 17	Andrew Frederick &		4.92	
	0836B 32	Julian & Simonia Jean Phillip		2.33	
	0836B 31	Winster L. Frederick		1.09	
	0836B 77	Epiphane Modest		1.4	
	0836B 85	Henry Charles		1.11	
		Derick D Kenson		0.81	
	0837B 52	Garnet, Daniel, Leonard, Albert Stanislaus, Petre Mathurin		5.88	
	0837B 94	Maurice Charles (aka Gerald Charles) Theodore Eristhee	Maurice Charles (aka Gerald Charles) Theodore Eristhee	2.66	

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Appendix 8

Environmental Contract Clauses Examples

Environmental Contract Clauses Examples

The following are standard environmental related clauses that may be appended to or incorporated into the contracts for the civil works involved with the Millet Intake and pipeline rehabilitation works. These mitigation measures are the core of a generic, standardized EMP (Environmental Management Plan) for this type of works and typical associated impacts. Best industry practice and responsible environmental management are expected. These clauses are general and are to be modified to conform with applicable Saint Lucian laws and contract procedures for such works and shall remain in force throughout the contract period. The mitigative measures are to address the expected environmental management issues and are based on best management practice and industry standards.

It must be noted that specific project related recommendations may also be forthcoming from statutory permitting agencies such as the DCA or the Ministry of Health, and these can be reformatted in to contract clauses as well. The specific recommendations for mitigative measures in the ESIA should also be included as contract clauses.

These clauses are consistent with those outlined in the DVRP Environmental Assessment and Environmental Management Framework and Social Assessment and Resettlement Policy Framework and (EMF Table 3) standard mitigation measures (EMF Table 6) and special provision for work in Forest Reserve (EMF Annex 10 item 19).

1. Permits and Approvals

The contractor shall be responsible for ensuring that he or she has all relevant legal approvals and permits required to commence works.

2. Site Security

The contractor shall be responsible for maintaining security over the construction site including the protection of stored materials and equipment. In the event of severe weather, the contractor shall secure the construction site and associated equipment in such a manner as to protect the site and adjacent areas from consequential damages. This includes the management of onsite, construction materials, construction and sanitary wastes, additional strengthening of erosion control and soil stabilization systems, and other conditions resulting from contractor activities which may increase the potential for damages.

3. Discovery of Antiquities

If, during the execution of the activities contained in this contract, any material is discovered onsite which may be considered of historical or cultural interest, such as evidence of prior settlements, native or historical activities, evidence of any existence on a site which may be of cultural significance, all work shall stop and the supervising contracting officer shall be notified immediately. The area in which the material was discovered shall be secured, cordoned off, marked, and the evidence preserved for examination by the local archaeological or cultural authority[1]. No item believed to be an artifact must be

[1] The local authority in this case is the Archaeological and Historical Society. The Saint Lucia National Trust would also be involved only after discussion and agreement with the Archaeological and Historical Society.

removed or disturbed by any of the workers. Work may resume, without penalty of prejudice to the contractor upon permission from the contracting officer with any restrictions offered to protect the site.

4. Worker Occupational Health and Safety

The contractor shall ensure that all workers operate within a safe environment. Sanitation facilities shall be provided for all site workers. All sanitary wastes generated as a result of project activities shall be managed in a manner approved by the contracting officer and the local authority responsible for public health[2]. The contractor shall ensure that there are basic medical facilities on site and that there are staff trained in basic first aid. Workers must be provided with the necessary protective gear as per their specific tasks such as hard hats, overalls, gloves, goggles, boots, etc. The contractor shall provide the contracting officer with an occupational health and safety plan for approval by the local health authority prior to the commencement of site activities.

The contractor must ensure that all workers operate within a safe environment. All relevant Labour and Occupational Health and Safety regulations must be adhered to ensure worker safety. Sanitary facilities must be provided for all workers on site. Appropriate posting of information within the site must be done to inform workers of key rules and regulations to follow.

5. Noise Control

The contractor shall control noise emissions generated as a result of contracting activities to the extent possible. In the case of site locations where noise disturbance will be a concern, the contractor shall ensure that the equipment is in good working order with manufacturer supplied noise suppression (mufflers etc.) systems functioning and in good repair. Where noise management is a concern, the contractor shall make reasonable efforts to schedule activities during normal working hours (between 8 am and 5 pm). Where noise is likely to pose a risk to the surrounding community either by normal works or working outside of normal working hours or on weekends, the contractor shall inform the contracting officer and shall develop a public notification and noise management plan for approval by the contracting officer.

Specific elements of the noise control activities by the contractor shall include: construction / work activities will occur within specified daylight hours e.g. 8:00 am to 4:00pm; community / public to be informed in advance of any work activities to occur outside of normal working hours or on weekends; sites should be hoarded wherever possible; during operations, the engine covers of generators, air compressors and other powered mechanical equipment shall be closed, and equipment placed as far away from residential areas as possible; there will be no excessive idling of construction vehicles at sites; noise suppression equipment or systems supplied by manufacture will be utilized; ensure all vehicles and equipment are properly serviced; the contractor must develop and implement a public notification and noise management plan.

[2] The Ministry of Health , Wellness, Human Services, and Gender Relations, in particular the Environmental Health Department is the agency responsible for public and environmental health matters, and the issuing of the relevant health permits. They also review Occupational Health and Safety plans as part of their project review.

6. Use and Management of Hazardous Materials, fuels, solvents and petroleum products

The use of any hazardous materials including oils, fuels and petroleum products shall conform to the proper use recommendations of the product. Waste hazardous materials and their containers shall be disposed of in a manner approved by the contracting officer. A site management plan will be developed by the contractor if the operation involves the use of these materials to include estimated quantities to be consumed in the process, storage plans, spill control plans, and waste disposal practices to be followed. This plan and the manner of management are subject to the approval of local authority responsible for safety, and waste management, and the contracting officer[3].

Elements of the hazardous materials management shall include: contractor must provide temporary storage on site of all hazardous or toxic substances in safe containers labeled with details of composition, properties and handling information; the containers of hazardous substances shall be placed in an leak-proof container to prevent spillage and leaching; the wastes shall be transported by specially licensed carriers and disposed in a licensed facility; paints with toxic ingredients or solvents or lead-based paints will not be used; banned chemicals will not be used on any project.

7. Use and Management of Pesticides

The project will not fund activities that involve the purchase or use of significant quantities of pesticides. For incidental, minor use of pesticides, the use of pesticides shall be approved by the contracting officer and shall conform to the manufacturers' recommendations for use and application. Any person using pesticides shall demonstrate that they have read and understood these requirements and are capable of complying with the usage recommendations to the satisfaction of the contracting officer. All pesticides to be used shall conform to the list of acceptable pesticides that are not banned by the relevant local authority. The contractor and client must ensure that appropriate chemical management measures are implemented to prevent contamination of surrounding areas and will use only licensed and registered pest control professionals with training and knowledge of proper application methods and techniques if the case requires.

8. Use of Preservatives and Paint Substances

All paints and preservatives which includes paints for marking, shall only be used with the approval of the contracting officer. Information shall be provided to the contracting officer which describes the essential components of the materials to be used so that an informed determination can be made as to the potential for environmental effects and suitability can be made. Storage, use, and disposal of excess paints and preservatives shall be managed in conformance with the manufacturers' recommendations and as approved by the contracting officer. The contractor shall provide the contracting officer with a list of materials and estimated quantities to be used, storage, spill control and waste disposal plans to be observed during the execution of the contract. This plan is subject to the approval of the contracting officer.

9. Use of Explosives

No explosives in any form will be utilized on this project.

[3] The local Authorities here are the St. Lucia Fire and Emergency Services, The St. Lucia Solid Waste management Authority, and the Ministry of Health.

10. Site Stabilization and Erosion Control

The Contractor shall implement measures at the site of operations to manage all soil erosion through minimization of excavated area and time of exposure of excavated areas, preservation of existing ground cover to the extent possible, provision of approved ground cover. Where excavations are made, contractor shall implement appropriate stabilizing techniques to prevent cave-in or landslide. Measures shall be approved by the contracting officer.

The contractor must ensure that appropriate erosion control measures such as silt fences are installed. Proper site drainage must be implemented. Any drain clogged by construction material or sediment must be unclogged as soon as possible to prevent overflow and flooding. The use of retaining structures and planting with deep rooted grasses to retain soil during and after works must be considered. The use of bio-engineering methods must be considered as a measure to reduce erosion and land slippage. Keep angle of slopes within limits of soil type. Balance cut and fill to limit steepness of slopes. All slopes and excavated areas must be monitored for movement.

All construction materials, including chemicals, must be properly stored. The contractor will establish appropriate erosion and sediment control measures such as hay bales, sedimentation basins, and / or silt fences and traps to prevent sediment from moving off site and causing excessive turbidity in nearby streams, rivers, wetlands, and coastal waters.

An erosion management plan will be required where the potential exists for significant sediment quantities to accumulate in wetlands, lakes, rivers and nearshore marine systems. This plan shall include a description of the potential threat, mitigation measures to be applied, and consideration for the effects of severe weather and an emergency response plan.

With all work along the river, water quality testing and monitoring must be done before construction, and at regular intervals during the works, and then after the works are completed in order to determine turbidity levels and other quality parameters.

Construction vehicles and machinery must not be washed in or near the river, but only in designated areas outside of the site where runoff will not pollute natural surface water bodies.

11. Air Quality

The following conditions apply to work sites for the control of air quality including dust control:

- Construction materials such as sand, cement, or other fines should be kept properly covered.
- Cement should be kept stored within a shed or container.
- The sand and fines can be moistened with sprays of water.
- Unpaved, dusty construction roads should be compacted and then wet periodically.
- During interior demolition debris-chutes shall be used above the first floor.
- Demolition debris shall be kept in controlled area and sprayed with water mist to reduce debris dust.

- During pneumatic drilling/wall destruction dust shall be suppressed by ongoing water spraying and/or installing dust screen enclosures at site
- The surrounding environment (sidewalks, roads) shall be kept free of debris to minimize dust.
- There will be no open burning of construction / waste material at the site.
- There will be no excessive idling of construction vehicles at sites.
- The bins of all haulage vehicles transporting aggregate or building materials must be covered on all public roads.

12. Traffic Management

In the event that contractor / construction activities will result in the disruption of area transportation services, including temporary loss of roadways, blockages due to deliveries and site related activities, the contractor shall provide the contracting officer with a traffic management plan including a description of the anticipated service disruptions, community information plan, and traffic control strategy to be implemented so as to minimize the impact to the surrounding community. This plan shall consider time of day for planned disruptions, and shall include consideration for alternative access routes, access to essential services such as medical, disaster evacuation, and other critical services. The plan shall be approved by relevant local authority[4] and the contracting officer.

Elements of the traffic management plan to be developed and implemented by contractor shall include: alternative routes to be identified in the instance of extended road works or road blockages; the public to be notified of all disturbance to their normal routes; signposting, warning signs, barriers and traffic diversions must be clearly visible and the public warned of all potential hazards; provision must be made for the safe passages and crossings for all pedestrians where construction traffic interferes with their normal route; there must be active traffic management by trained and visible staff at the site or along roadways as required to ensure safe and convenient passage for the vehicular and pedestrian public; Adjustment of working hours to local traffic patterns, e.g. avoiding major transport activities during rush hours or times of livestock movement .

13. Management of Standing Water

Under no circumstances shall the contractor permit the collection of standing water as a consequence of contractor activities without the approval of the contracting officer and consultation with the relevant local environmental health authority. Recommendations from that local authority on how to manage and treat the standing water must be implemented. The condition of the standing water must be monitored by the contractor to ensure that it does not present itself as a breeding ground for any pests such as mosquitoes.

[4] The Transport Division of the Ministry Infrastructure, Ports, Energy, and Labour, with the assistance of the Chief Engineer's Office in that Ministry is the authority responsible for reviewing and approving traffic management plans.

14. Management of Solid Wastes -trash and construction debris

The contractor shall provide the contracting officer with a solid waste management plan as part of a site waste management plan that conforms to the solid waste management policies and regulations of the relevant St. Lucian authority[5]. Under no circumstances shall the contractor allow construction wastes to accumulate so as to cause a nuisance or health risk due to the propagation of pests and disease vectors. The site waste management plan shall include a description of how wastes will be stored, collected and disposed of in accordance with current law. Additionally, the contractor shall provide for the regular removal and disposal of all site wastes and provide the contracting officer with a schedule for such removal.

15. Management of Liquid Wastes

The contractor shall provide the contracting officer with a liquid waste management plan as part of a site waste management plan that conforms to the waste management policies and regulations of the relevant St. Lucian authority[6]. Under no circumstances shall the contractor allow construction related liquid wastes to accumulate on or off the site, or to flow over or from the site in an uncontrolled manner or to cause a nuisance or health risk due to its content. The site waste management plan shall include a description of how these wastes will be stored, collected and disposed of in accordance with current law. Additionally, the contractor shall provide for the regular removal and disposal of all site wastes and provide the contracting officer with a schedule for such removal.

Specific elements of the contractor's liquid waste management plan shall include: contractor to abide by all pertinent waste management and public health laws; waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities; construction and demolition wastes will be stored in appropriate bins; liquid and chemical wastes will be stored in appropriate containers separated from the general refuse; all waste will be collected and disposed of properly in approved landfills by licensed collectors; the records of waste disposal will be maintained as proof for proper management as designed; whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos); construction related liquid wastes must not be allowed to accumulate on or off the site, or to flow over or from the site in an uncontrolled manner or to cause a nuisance or health risk due to its contents.

16. Special conditions - Water Pipeline Installation

The Contractor shall utilize the following measures to mitigate potential environmental, health and safety impacts during the construction and installation of the water pipeline:

- Trenching. Soil stockpiling will be done in designated areas alongside the trench using piles no higher than 2 meters, convex in shape, and located so as to minimize disturbance and hazard to passers-by or traffic. The contractor shall ensure that stockpiles do not cause damming of water or runoff, or that such stockpiles are themselves not washed away.

[5] The St. Lucia Solid Waste Management Authority is the responsible agency. The Environmental Health Department of the Ministry of Health have requested such plans as part of their permitting process as well.
[6] As per 31 above.

- Dewatering. Removal of water from trenches shall be done in such a manner to prevent the discharge of mud or sediment into any water body, or the creation of standing water bodies on lands outside the work area.

- Dust Control. During dry periods when dust is a nuisance it shall be mitigated by spraying of water onto work surfaces along the pipeline work area. Dust shall not be allowed to travel outside of the work zone.

- Traffic Control. For all works alongside roadways, appropriate safety signage and barriers shall be used to ensure the safety of any foot traffic or vehicular traffic. If the trench is exposed to foot or vehicle traffic appropriate restrictive barriers, taping, and warning signage shall be used. Traffic shall be controlled and stopped as necessary on public thoroughfares in accordance with good safety practice and national requirements. Trenches or equipment exposed to public access must be clearly demarcated and restricted to public access. Mud and sand brought onto paved public access roads shall be washed and cleared daily.

- Safety Plan. The Contactor will prepare a Health and Safety Plan which shall include emergency response and first aid procedures, awareness training suitable to the tasks being conducted, vehicle and equipment safety provisions, and personal protective equipment information. The contractor will provide hard hats, work boots, protective eyewear and gloves to workers and will ensure that they are used by workers on the job.

- Vegetation and Topsoil Clearing. If any vegetation or brush is cleared, or topsoil removed, it shall be done in such a way as to avoid disturbance or effects outside the established work area. Herbicides or burning may not be used to dispose of any cleared vegetation, rather such vegetation must be chipped, shredded, and dispersed in approved areas or hauled to an approved landfill. Should fauna be encountered, work will cease until such fauna have been safely relocated. If any agricultural land is crossed, topsoil shall be stored separately and replaced by spreading on the land surface upon completion of work.

- Access Roads. No new access roads will be opened, only existing roadways will be used for all the entry and exit of materials and equipment to and from the work zone.

- Work Areas. Contractor will delineate approved work areas for all activities including excavation, stockpiling, access, equipment placement during excavation, and materials storage. Such work areas are subject to approval by the contract manager and/or supervising engineer, and Contractor may use only those lands for which approval and access has been provided by the contracting officer and/or supervising engineer. Any rental, use or acquisition of lands from private parties is not permitted without previous notification to and express written approval by the PCU through application of relevant World Bank Policy.

- Vehicle and Equipment Fueling and Maintenance. All gasoline and diesel filling, oil changing, and maintenance of vehicles and equipment will be done outside of the project area at established facilities. If fuel trucks are used they will have adequate safety equipment and fire extinguishers, be free of leaks and be fitted with appropriate dispensers and have spill kits and absorbent materials ready to retrieve any leaked or spilled fuels. No fuel, new oil or waste oil

will be stored on the work site, and vehicles will not be washed on the work site or in adjacent areas.

17. Special conditions – works in Forest Reserves

For any work in a designated Forest Reserve, the following will apply:

- The Forestry Department must be engaged prior to, and during all works within Forest area.
- There must be no unnecessary clearing of natural vegetation.
- Avoid the use of herbicides or other chemicals.
- Any works to be undertaken in a protected forest area must be done under the supervision of a representative of the Forestry Department.
- The contractor must ensure that any work undertaken in the forest reserve must be done by manual means.
- There must be minimal impact to flora and fauna in the forest area.
- All recognized natural habitats, wetlands and protected areas in the immediate vicinity of the activity must not be damaged or exploited.
- The contractor must ensure that all staff will be strictly prohibited from hunting, foraging, logging or other damaging activities.
- A survey and an inventory shall be made of large trees in the vicinity of the construction activity, large trees shall be marked and cordoned off with fencing, their root system protected, and any damage to the trees avoided.
- There will be no unlicensed borrow pits, quarries or waste dumps in protected areas.
- Upon completion, all wastes must be immediately removed out of the forested area.

18. Communications with the Community

The contractor must develop a communications plan for review and approval by the client. This plan must outline the measures to be undertaken to engage and maintain open communication with community. The plan must also include measures to address any complaints from the community in a fair and speedy manner towards resolution of the particular issue or issues that may be raised. This plan must also include public meetings with the community prior to, during, and upon completion of the project works in order to ensure that the affected communities are aware of the status of the project and that they may also have the opportunity to express their opinions, concerns, or guidance.

R.J. Burnside International Limited