



USAID
FROM THE AMERICAN PEOPLE

TAGBILARAN CITY SLAUGHTERHOUSE COMPREHENSIVE STUDY

Strengthening Urban Resilience for Growth with
Equity (SURGE) Project

CONTRACT NO. AID-492-H-15-00001

FEBRUARY 28, 2017

This report is made possible by the support of the American people through the United States Agency for International Development (USAID). The contents of this report are the sole responsibility of the International City/County Management Association (ICMA) and do not necessarily reflect the view of USAID or the United States Government.

TAGBILARAN CITY SLAUGHTERHOUSE COMPREHENSIVE STUDY

**Strengthening Urban Resilience for Growth with
Equity (SURGE) Project**

CONTRACT NO. AID-492-H-15-00001

Program Title: USAID/SURGE
Sponsoring USAID Office: USAID/Philippines
Contract Number: AID-492-H-15-00001
**Contractor: International City/County Management Association
(ICMA)**
Date of Publication: February 28, 2017

Contents

Executive Summary	6
I. Introduction	13
II. Study Area	14
A. Profile of Tagbilaran City	14
B. Significance of Tagbilaran to the Province of Bohol	16
III. The Tagbilaran City Slaughterhouse	18
A. Establishment and Operation	18
B. Environmental Compliance	18
C. Current State of the Slaughterhouse	18
IV. The Project Site	19
A. Location of the Slaughterhouse Building	19
B. Land Use and Zoning	19
C. Existing Site Conditions	19
V. City Demand and Supply of Meat	21
A. Demand Study	21
B. Supply Study	25
VI. Tagbilaran City Slaughterhouse Assessment	29
A. Infrastructure and Facilities	29
B. Operating Capacity	30
C. Capital/Investment Requirements	31
D. Financial Analysis	31
E. Simulations and Sensitivity Analysis	34
F. Environmental Impact Assessment	36
VII. Recommendations	39
A. Highlights of the Financial Analysis and Simulations on the Four Scenarios	39
B. Options and Possible Alternatives	40
C. Overall Recommendations	44
D. Technical Recommendations	45
E. Environmental Recommendations	47

Tables

Table 1. Tourist Arrivals (Province of Bohol)	17
Table 2. Projected Population and Demand for Catchment Area	23
Table 3. Projected Passenger Arrivals (In '000)	25
Table 4. Livestock and Sufficiency Level in Bohol	26
Table 5. Livestock Volume of Production, Province of Bohol (Metric Tons)	26
Table 6. Current Operating Level of Private Slaughterhouses	27
Table 8. Estimated Cost of Rehabilitation	31
Table 9. Scenarios, Catchment Areas and Demand Assumptions	34
Table 10. Sensitivity Analysis on the Four Scenarios	35

Figures

Figure 1. Location Map of Tagbilaran City	14
Figure 2. Project Site Location	20
Figure 3. Slaughterhouse Catchment Area	22
Figure 4. Slaughterhouse Buffer Demand	24
Figure 5. Tagbilaran City Slaughterhouse Work Area	30

Annexes

Annex A. Report on the Pre-Feasibility Study for the Upgrading of the Tagbilaran City Slaughterhouse	50
Annex B. Proposed Floor Plan	51
Annex C. Statement of Receipts and Expenditures	52
Annex D. Financial Statements	53

Acronyms

APGR	Annual population growth rate
BOD	Biochemical oxygen demand
BQ	Bohol quality
CDI	Cities Development Initiative
CLUP	Comprehensive Land Use Plan
DENR	Department of Environment and Natural Resources
DOT	Department of Tourism
ECC	Environmental Compliance Certificate
EMB	Environmental Management Bureau
EMT	Electrical metallic tubing
ECC	Environmental Compliance Certificate
HLURB	Housing and Land Use Regulatory Board
ICMA	International City/County Management Association
IRR	Internal rate of return
LGU	Local government unit
NEDA	National Economic Development Authority
NMIS	National Meat Inspection Service
NPV	Net present value
PCCP	Philippine Cold Chain Project
PFG	Partnership for Growth
PPDO	Provincial Planning and Development Office
PPE	Personal protective equipment
PPP	Public-private partnership
PVC	Polyvinyl chloride
PSA	Philippine Statistics Authority
ROE	Return on equity
SURGE	Strengthening Urban Resilience for Growth with Equity
USAID	United States Agency for International Development

Executive Summary

Tagbilaran is a third class component city in Bohol Province, and serves an important role as the center of education, seat of political power and the primary hub of trade and commerce. Located 630 kilometers southeast of Manila and 72 kilometers south of Cebu City, the city is composed of 15 barangays with a total land area of 32.7 square kilometers. Its 2015 population is 105,051 and projected to increase to 106,685 by 2017 and 115,967 by 2023.

Livestock production is limited to the backyard level and the city relies on adjoining areas for its supply of meat. At the provincial level, however, there is an overproduction of livestock based on data for both sufficiency level and the actual production volume.

As a major economic driver of Bohol, tourism fuels the economy of Tagbilaran City. Tourist arrivals, according to the Department of Tourism, registered a 74 percent increase from 2008 to 2015. With the increase of number of tourists in the city, the demand for food, services and facilities consequently increased.

The Tagbilaran City Slaughterhouse is located on a 1.9-hectare lot, which is part of an agri-industrial zone in Purok I, *Barangay* Tiptip. A private operator managed the slaughterhouse since its establishment in 2002, which generated revenues from monthly rental fees. In 1997, the slaughterhouse received its Environmental Compliance Certificate (ECC) from the Environmental Management Bureau (EMB). In 2004, the National Meat Inspection Service (NMIS) granted the facility with an “AA” accreditation¹.

The city government assumed management of the facility after the 10-year contract with the private operator expired in 2012. The facility has deteriorated over time and has lost its “AA” accreditation. Thus, there is a need to rehabilitate the slaughterhouse and help it to regain its “AA” standard to ensure a sustainable supply of safe and good quality meat products for the increasing number of residents and tourists. The proposed rehabilitation will involve upgrading existing facilities and equipment, streamlining operations, and implementing environmental management measures.

The Tagbilaran City Government requested the Strengthening Urban Resilience for Growth with Equity (SURGE) Project for the conduct of a project study to assess the financial and technical feasibility of upgrading the existing slaughterhouse. In response to the city government’s request, the Project undertook a pre-feasibility study to review the current and projected meat supply-demand situation and to conduct an analysis of the facility’s estimated costs and returns.

The pre-feasibility study of the Tagbilaran City Slaughterhouse is a preliminary document and partially covers output 3.3.1.3.1 of SURGE Project’s year 1 approved work plan, i.e. Comprehensive Analysis of Tagbilaran City’s Slaughterhouse. The report includes the economic and financial analysis of rehabilitating the slaughterhouse, taking into account various demand scenarios and risks that may arise from deviations in some cost and consumption projections. Refer to *Annex A* for the full report of the slaughterhouse pre-feasibility study.

¹ Based on the NMIS classification and accreditation of slaughterhouses, “AA” standard pertains to “those with facilities and operational procedures sufficiently adequate that the livestock and fowls for sale in any market, within the country.” NMIS. Executive Order No. 137 in pursuant with the Local Government Code of the Philippines. 1993.

The SURGE Project, in partnership with Winrock International of the U.S. Department of Agriculture-supported Philippine Cold Chain Project (PCCP), also evaluated existing slaughterhouse facilities and recommended appropriate upgrading measures. The project also performed an environmental screening to identify critical environmental issues that may result from the operations of the slaughterhouse and to recommend appropriate mitigating measures to address the negative impact on the environment.

Demand Study

The demand study determines the possible number of livestock that the facility can slaughter. The catchment area is primarily Tagbilaran City and includes the municipalities of Cortes, Maribojoc, Antequera, Corella, Loboc and Loay, which are within a 30-minute commute to the city.

The study used the population projections of the Bohol Provincial Planning and Development Office (PPDO) instead of the Philippine Statistics Authority's (PSA) since the former is conservative at 0.097 percent growth rate compared to 2.3 percent of the latter. However, the study used the national per capita meat consumption of 5.68 kilos pork, 0.52 beef and 0.15 kilos carabeef (carabao meat) in the absence of local estimates.

Based on the projected population, the total consumption of livestock will increase from the 2010 level of 1,843,297 kilograms to an estimated 4,754,130 kilograms in 2043. The projections also identified a buffer demand involving the nearby municipalities of Loon, Balilihan, Sevilla, Lila, Dimiao, Calape and Bilar.

The study also considered other factors to forecast additional demand aside from projected local meat consumption. These demand factors include a segment of the tourists visiting Bohol Province, buffer demand from neighboring towns and a portion of imported meat volumes imported by high-end outlets from Cebu City or Manila. The demand projection also did not account for occasional increases in meat consumption during *fiestas* and other celebrations like Christmas holidays and graduation rites.

Supply Study

Data on livestock sufficiency level shows that Bohol Province has had sufficient supply of pork and beef for the last three years. Livestock production also increased during the last five years (2010-2015), with overproduction of livestock at the provincial level. Imported meats mainly from Cebu City cater to high-end resorts and restaurants.

Demand increases during peak season, particularly between January and April. There are two private operators of AA-certified slaughterhouses within the catchment area: Alturas Group of Companies in Dauis and the Bohol Quality Slaughterhouse in Corella. Both facilities cater to their supermarket stores in Tagbilaran City and Cebu City.

The municipal governments of Maribojoc, Antequera and Loboc also operate some public slaughterhouses which are not classified as "AA". These slaughterhouses supply meat to other municipalities, which is a violation of NMIS regulations. The regulation states that only meat from "AA" slaughterhouses can cross municipal borders and be supplied to other areas.

Tagbilaran City Slaughterhouse Assessment

While there are no structural integrity issues, the slaughterhouse badly needs repair and rehabilitation of both the building and the equipment. The renovation and upgrading will involve physical works and repair and replacement or upgrading of equipment with a total estimated cost of Php3,985,219.84.

On average, the facility processes 60 heads of swine and one head of cattle a day. Human resources consist of 55 personnel with a production head-to-staff ratio of 1:1, which is less efficient when compared to the privately operated slaughterhouses at 3:1.

Financial Analysis

The study involved the identification and analysis of options for the city government to consider in rehabilitating and operating the slaughterhouse:

- A. Status Quo.** Efficiency and viability of the Tagbilaran City Slaughterhouse can be achieved if the LGU improves the slaughterhouse through its own capital outlay and streamlines and manages the operations;
- B. Consolidation and LGU Operation.** Efficiency and viability of the slaughterhouse can be achieved if the three public slaughterhouses in the neighboring towns of Maribojoc, Antequera and Loboc will be consolidated as part of the primary catchment area. The city government will improve the slaughterhouse through its own funds and streamline and manage the operations;
- C. Public Private Partnership Limited to Operation and Management.** Efficiency and viability of the Tagbilaran City Slaughterhouse can be achieved if the three public slaughterhouses will be consolidated as part of the primary catchment area. The city government will improve the slaughterhouse through its own funds, but a private operator will streamline and manage the operations; or
- D. Full Public Private Partnership (PPP).** Efficiency and viability of the slaughterhouse can be achieved if the three public slaughterhouses will be consolidated as part of the primary catchment area. The slaughterhouse will be upgraded using private funds and will be managed by a private operator.

Options B, C, and D involve a crucial precondition requiring the city government to secure an agreement with the Bohol Provincial Government for the exclusive catering of the catchment area including points of delivery to maximize operating potential. Otherwise, assumptions will not apply.

Simulations Using Four Scenarios

The financial analysis involved simulations using four scenarios to compute the internal rate of return (IRR) and the net present value (NPV). Each scenario considered different catchment areas and projected demand levels. The four scenarios and the corresponding results are the following:

- **Scenario 1:** Catchment area will be limited to Tagbilaran City and will not include acquisition and maintenance costs of van and fuel. Simulation resulted in a 10-percent

IRR and a positive NPV of Php6,794,550.59. The opportunity cost of the project is 2 percent using the latest T-bill rate. This means that the project is feasible from the viewpoint of the city government.

- **Scenario 2:** Catchment area includes Tagbilaran and the three other adjacent towns. Simulation resulted in a 13-percent IRR and a positive NPV of Php482,090.48. This means that the project is feasible at current assumptions from the point of view of a private investor.
- **Scenario 3:** Catchment area includes Tagbilaran, the three other adjacent towns and the status quo passenger arrival using the old airport. Simulation resulted in an 18-percent IRR and a positive NPV of Php2,820,157.00. This means that the project is feasible at current assumptions from the point of view of a private investor.
- **Scenario 4:** Catchment area includes Tagbilaran, the three other adjacent towns and the completion of the new airport resulting in increased passenger arrivals. Simulation resulted in a 25-percent IRR and a positive NPV of Php7,496,290.06. This means that the project is feasible at current assumptions from the point of view of a private investor.

Sensitivity Analysis

The study subjected the four scenarios to sensitivity analysis to determine which risk areas would cause financial distress in operating and managing the slaughterhouse. The analysis tested the sensitivity of the scenarios to the following parameters:

- a. An increase in project/rehabilitation cost up to 20 percent;
- b. A decrease in consumption up to 20 percent;
- c. Simultaneous 20 percent increase in cost and 20 percent decrease in consumption; and
- d. Operational efficiency decreased from 3 heads per staff (3:1) to 2 heads per staff (2:1).

The analysis generated the following results:

- Scenarios 1 and 2 are sensitive to an increase in cost and decrease in consumption and in decrease in staff efficiency.
- Scenarios 3 and 4 are sensitive to a simultaneous increase in cost and decrease in consumption and to a decrease in staff efficiency.
- In the four simulations, the project is sensitive to a decrease in production efficiency from 3:1 to 2:1. The project needs to maintain operating efficiency at three swine heads per staff at any given time.
- If the project can capture 15 percent of the passenger arrivals as part of the catchment population for the slaughterhouse facility, the project is highly feasible.

Overall, **the biggest risk is the decrease in efficiency** (hiring more personnel than needed) for all scenarios, followed by the decrease in consumption pattern and increase in project cost.

Recommendations

The simulations and sensitivity analysis reveal valuable insights, which can be the basis for an informed decision on the option that can best serve the interest of the city government in its effort to regain the “AA” accreditation of the slaughterhouse and ensure the supply of safe meat to both tourists and residents.

The following are key considerations for Tagbilaran City Government:

Option A. If the city decides to maintain the status quo and operate the slaughterhouse, then improvements in the management systems particularly on staffing, financial management and accounting are crucial. Accounts should be ring-fenced and all expenses accounted for to reflect the actual financial status of operations.

The management should ensure staff efficiency by right sizing the organization considering that the biggest risk identified by the sensitivity analysis is a decrease in staff efficiency. Strict enforcement of laws is a requirement to ensure that the facility will capture all slaughtering services. The city will also need to allocate the required funds to rehabilitate the slaughterhouse.

This option will enable the city to have full control of the operations with the potential for increased revenues if operated efficiently to meet increasing demand. However, the city will also face the challenge and rigors of managing the facility and ensuring its viability as an enterprise. It will have to deal with constraints associated with government bureaucracy, which may hinder the timely procurement of goods and services. There is also a risk of limited demand from the catchment area if laws on slaughtering are not strictly enforced and backyard slaughtering will continue.

Option B. If the city will be able to consolidate the operations of the three public slaughterhouses into the Tagbilaran slaughterhouse and still operate the facility, there is a need to improve management systems to ensure that accounts are ring-fenced, the organization is right-sized and to ensure efficiency and capacity development.

A crucial precondition is for the city government to secure an institutional arrangement and long-term formal agreement with the provincial government and concerned municipalities to ensure that the Tagbilaran City Slaughterhouse will handle all slaughtering services.

Similar with Option A, this option will enable the city government to have full control of the facility but will have the additional advantage of having a bigger and more secure market that can redound to increased revenues. In the longer term, assuming efficient management is in place, the operations can be expanded to capitalize on the surplus production of livestock at the provincial level and maximize the “AA” classification to export meat outside the province. However, this option is heavily dependent on an institutional arrangement with other local government units to consolidate slaughterhouse operations. It will also require the closure of the three other public slaughterhouses, which may have negative consequences to the municipalities concerned. Unfavorable conditions arising from possible political transitions will also adversely affect the operations of the facility.

Option C. A limited PPP will enable the city to engage the private sector in a potentially productive partnership that will relieve the local government from the task of managing the facility under government bureaucracy. This would entail the consolidation of the three other public slaughterhouses and improvement of the Tagbilaran Slaughterhouse using the city’s funds.

This option will allow for a more streamlined and efficient operations as it will not be subject to government bureaucracy; hence, it will allow for flexibility in operations and enable the management to make timely adjustments as needed. The city government will earn revenue from rental fees and minimize its expenditures since the private operator will shoulder maintenance costs. On the other hand, this option will result to the city having no direct control of the facility and revenues will be on a fixed term basis.

Financial analysis on scenarios 3 and 4 indicate that the project is feasible from the point of view of the private investor. As with Option B, however, there should be an institutional arrangement with other local government units to consolidate the operations. There is also a risk of possible disruptions in service delivery in case of operational and administrative problems (i.e., workers' strike) encountered by the private operator.

Option D. A full PPP will enable the city government to engage in a potentially productive partnership with the private sector without spending government funds to rehabilitate and operate the slaughterhouse. This option is based on the most ideal scenario that can maximize the demand for the slaughterhouse because of the consolidation of the three other slaughterhouses and the completion of the new airport that will result in increased passenger arrivals.

Assuming favorable conditions, this option opens the possibilities for expansion that can result to high quality products and cater to the demands of the high-end markets in Bohol or even those outside the province.

Technical Recommendations

Rehabilitation of the facility will require physical works to repair and renovate the building structure. The entire roof needs to be replaced while the floors need to be chipped, re-plastered and finished.

A concrete wall needs to be constructed to serve as a physical separator for the slaughtering and offal areas. Wooden braces in windows and ventilation openings need to be replaced with steel, and screens need to be installed to keep out insects, birds and vermin. The walls need repainting, preferably using liquid tile materials to ensure durability.

The existing office space and dressing room for the butchers should be repaired while the comfort rooms need to be rehabilitated and made fully functional.

Water supply systems should be improved with the installation of an elevated water tank and outlets fitted with high-pressure water sprayers. The drainage and wastewater management systems should be improved to ensure the disposal of liquid wastes.

The entire electrical system should be improved by engaging the services of an electrical engineer to assess the status of the installations and supervise the installations. There is a need to repair the existing equipment and to re-orient the layout for efficiency.

Environmental Recommendations

Measures can be taken to reduce the potentially adverse impacts on the environment, particularly on land resources, water and air quality and on human health. Recommendations for land-related

impacts include reviewing the existing land use classification of the slaughterhouse compound and the surrounding area, implementation of a solid waste management system, preventing soil erosion and planting trees as buffer from residential area.

To minimize negative impact on water, recommendations include establishment of efficient wastewater treatment, regular monitoring of water quality of effluent, maintenance of catch basins, implementing standards based on the Sanitation Code of the Philippines, water conservation measures, and proper storage of oil, diesel and grease used for equipment.

Recommendations to mitigate negative air impacts include planting a thick strip of vegetation as buffer to nuisance odor, providing noise suppressors to machinery and equipment, employing the use of an electric stunner during early morning slaughterhouse operations, periodic wetting of exposed cleared site to reduce dust, and providing air pollution control devices.

Implementing good housekeeping and proper sanitation measures, proper waste disposal, securing the area with a perimeter fence, establishing personnel space and washrooms, addressing potential traffic congestion and prioritizing hiring local residents are some of the measures to reduce potentially effects on people in the worksite and surrounding areas.

In the immediate term, the local government should comply with existing conditions of its ECC by providing regular monitoring reports to concerned regulatory agencies such as the Environmental Management Bureau (EMB).

Overall Recommendations

While the financial analysis showed that the project is viable using private sector's opportunity cost of capital, the management should address risks such as a possible decrease in consumption and the non-realization of the new airport or projected number of swine slaughtered at the facility.

As presented in Options B, C and D, the consolidation of the three other slaughterhouses is a crucial precondition, which the city government can address by securing a long-term institutional agreement enacted by all local governments concerned.

The provincial government and the NMIS should also launch an advocacy campaign to ensure safe meat and on the provisions of government regulations pertaining to slaughtering and transport of meat products. The advocacy campaign should be rolled-out together with strict enforcement of laws to eliminate or at least minimize backyard slaughtering.

I. Introduction

The Strengthening Urban Resilience for Growth with Equity (SURGE) Project is an award of the Philippines Mission of the U.S. Agency for International Development (USAID) to the International City/County Management Association (ICMA). The period of performance is five years from July 27, 2015 to July 26, 2020. The SURGE Project is an activity in support of USAID/Philippines' Cities Development Initiative (CDI). The CDI is a crucial component of the broader Partnership for Growth (PFG), a White House initiated "whole-of-government" partnership between the U.S. Government and the Government of the Philippines. The PFG aims to shift the Philippines to a sustained and more inclusive growth trajectory at par with other high-performing emerging economies.

The SURGE Project's development hypothesis is that secondary cities serve as agents of growth and contribute to the improved welfare of both urban and rural populations. USAID aims to promote more balanced and resilient urban growth, reduce economic disparities and improve socio-economic conditions for highly urbanized secondary cities and their surrounding areas. SURGE assists cities and adjacent areas plan effectively, guarantee basic public services, reduce business transaction costs, promote competitiveness, support sustainable development and reduce disaster risks while ensuring inclusive and sustainable growth.

In expanding economic access and connectivity between rural and urban areas, the SURGE Project has adopted the development and strengthening of promising value chains/supply chains as one of its strategies. On April 2016, the City Government of Tagbilaran requested for the assistance of the SURGE Project in conducting a comprehensive study to assess the feasibility of upgrading the Tagbilaran City Slaughterhouse's current National Meat Inspection Service (NMIS) classification back to its former "AA" standard. Initially managed by a private operator and then by the current administration, the city's slaughterhouse has deteriorated over time.

Given the potential of the slaughterhouse and Tagbilaran City to be the hub of meat inspection and distribution, the project provided technical assistance for the requested assessment. Representatives from Winrock International/ Philippine Cold Chain Project and SURGE technical staff, along with key stakeholders involved in the slaughterhouse operations, conducted a reconnaissance survey of the Tagbilaran City Slaughterhouse in June 2016. The survey, which is part of the overall comprehensive study, involved a physical inspection of the slaughterhouse and an examination of the status of its facilities, equipment and operations.

The comprehensive study on the Tagbilaran City Slaughterhouse is a document that covers Output 2-3.3.09: Comprehensive Study of the Tagbilaran City Slaughterhouse with Environmental Sustainability Component.

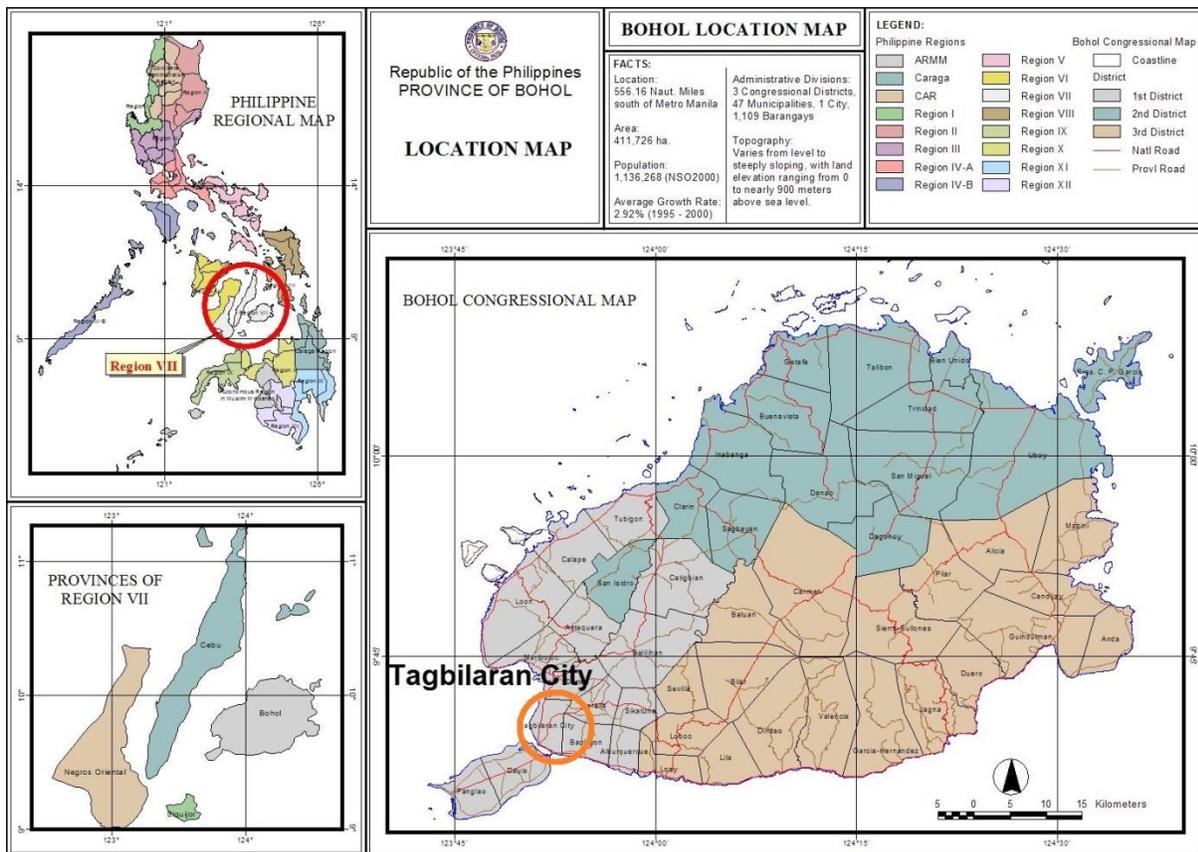
II. Study Area

A. Profile of Tagbilaran City

1. Location

Tagbilaran City is located 630 kilometers southeast of Manila and 72 kilometers south of Cebu City, the regional capital of the Central Visayas Region. The city lies on the southwestern part of the island of Bohol and is bounded on the north by the towns of Cortes and Corella; on the east by the towns of Baclayon and Corella; on the south by the Tagbilaran Strait; and on the west by the Maribojoc Bay (see *Figure 1*).²

Figure 1. Location Map of Tagbilaran City



Source: Tagbilaran City CLUP, 2016

2. Land Area and Physical Characteristics³

Tagbilaran City has a total land area of 32.7 square kilometers covering 15 barangays and approximately 13 kilometers of coastline. Only three barangays are rural – Cabawan, Taloto and Tiptip – while the remaining 12 are categorized as urban.

² This data was based on Tagbilaran City's Comprehensive Land Use Plan. 2016.

³ Footnote 2

The city's topography is generally moderately rolling with prevailing slopes ranging 3-6 percent along the coastlines to generally flat and level land. Ridges with an average altitude of 30 meters run almost parallel to the shoreline and two peaks rise on both ends of the ridge, Elley Hill (100-meters) on the north and Banat-i (145-meters) on the south.

The city sits on a generally flat limestone formation with a relatively thin soil cover. The shallow superficial and unconsolidated soils are derived from the residual weathering of underlying coralline limestone. Due to the thin soil cover, bedrocks crop out even in low-lying portions, including shore areas. The hills (Elley and Banat-i) and the ridges are practically without soil cover due to the rapid surface water run-off.

Tagbilaran practically sits on a cave network. The occurrence of the numerous underground caverns can be attributed to the absence of rivers and natural water channel ways in the area. The action of the surface waters infiltrating the normal fissures and joints of the substrata produced the enlargement and widening of cavities, which ultimately formed into caverns.

3. Demographics

Based on the 2015 census, the city's population was around 105,051, which constitutes approximately 8 percent of the provincial population of Bohol.⁴ It is among the top 10 most populous cities/municipalities in Region VII (excluding Cebu City, Mandaue City and Lapulapu City).⁵ The top five most populous barangays among the city's 15 barangays in 2010 were the barangays of Cogon, Booy, Dampas, Dao and Manga.⁶

The city's population increased from 77,700 in 2000 to 96,792 in 2010, registering a growth rate of 2.22 percent, while the recent 2015 census recorded an annual population growth rate of 2 percent for 2010-2015. Based on the 1990-2010 annual population growth rate of 2.74 percent, the estimated population in 2017 is 106,685 and projected to grow to 115,967⁷ in 2023.

Tagbilaran City, together with the municipalities of Ubay (5.4 percent), and Talibon (4.8 percent) registered the highest population growth rates and made up the top three most populated areas in the province for three consecutive censuses (2007, 2000 and 1990). The towns along the periphery of the city registered population increases with Dausi having the biggest increase at 38 percent.⁸

4. Livestock and Poultry Industry

While livestock raising is among the sources of income of Tagbilaran City residents, it is limited to small-scale or backyard level operations. Annual livestock production in 2013 was recorded at 2,600 hogs, 210 cows and 15 carabaos. On the other hand, a few existing commercial level poultry growers were able to produce 120,000 chickens.⁹

⁴ Data was based on the Census of Population, Philippine Statistics Authority, Bohol Province. 2015.

⁵ Footnote 4

⁶ Data generated from the National Statistics Office. 2010.

⁷ The data on the annual population growth rate and projections was generated from the Tagbilaran City Socio-Economic Profile. 2010.

⁸ This data was based from the Bohol Provincial Development and Physical Framework Plan (PDPFP). 2010-2015.

⁹ Data on the annual livestock production in Tagbilaran City. Tagbilaran City Socio-Economic Profile. 2016.

At the provincial level, however, there is overproduction of livestock as indicated by the high sufficiency level for the last three years (2013-2015). Cattle (beef) sufficiency was at 428 percent, carabao at 688 percent and pork at 390 percent for 2015.¹⁰

As a predominantly urban area with limited agricultural production, Tagbilaran City depends on external supply sources of livestock and poultry. This is to address the growing demand fueled by the commercial activities arising from the tourism industry. Considering the livestock production in the entire province of Bohol, there is sufficient supply to meet the demand of meat in the city.

B. Significance of Tagbilaran City to the Province of Bohol

Tagbilaran City is a third class component city and serves an important role in the province as the center of education, seat of political power and the hub of trade and commerce. It is also the primary provider of services and facilities for the booming tourism industry of the city. Based on historical accounts, Tagbilaran City was once part of the town of Baclayon and was only created as a separate town in 1742. It became a chartered city in 1966 by virtue of Republic Act 4660.¹¹

Being the primary gateway and service center, Tagbilaran City's significant role in the tourism industry is underpinned by the presence of business establishments and transport infrastructure that cater both to the residents of Bohol Province and to the increasing number of tourists. The Port of Tagbilaran City accommodates vessels servicing various routes connecting Bohol Province to other areas in the Visayas such as the island province of Siquijor and the cities of Cebu, Cagayan de Oro and Dumaguete. The port also caters to vessels with direct trips to and from Manila.

An indicator of the province's growth as a tourism destination is the increasing volume of passengers and cargo passing through the Port of Tagbilaran. In 2013, the average number of ship calls was at 19 per day with 1,596,337 passengers disembarking and embarking or an average of 4,434 passengers daily. In 2015, the total number of inbound and outbound passengers reached 5,033 daily. Similarly, there is a significant increase (50 percent) in the volume of cargo passing through the port for the 2009-2013 period¹² The Tagbilaran City airport accommodated 3,189 carrier flights including General Aviation and Military, ferried 517,308 passengers (incoming and outgoing) and 3,514,109 kilograms of cargo in 2013.¹³

Tourism, as a major economic driver of the province of Bohol, fuels the economy of Tagbilaran City. Data from the DOT Region VII Office in Cebu City showed that tourist arrivals to Bohol Province increased from 282,498 in 2008 to 490,545 in 2015, indicating a 74 percent increase for that period (*Table 1*). This, in turn, increases the demand for services, facilities and food products in the various establishments in the city.

¹⁰ Over-production of livestock in Bohol Province. Provincial Veterinary Office of Bohol. 2015.

¹¹ Historical data was generated from the Tagbilaran City Comprehensive Land Use Plan. 2016.

¹² The port of tagbilaran is the city's main seaport and is located on the northern edge of the city. Tagbilaran City Socio-Economic Profile. 2016

¹³ Footnote 12

Table 1. Tourist Arrivals, Province of Bohol

	2015	2014	2013	2012	2011	2010	2009	2008
Foreign	169,431	158,502	108,608	105,949	106,124	102,650	99,031	82,888
Domestic	321,114	296,653	281,159	250,421	231,889	231,282	216,211	199,610
Total	490,545	455,155	389,767	356,370	338,013	333,932	315,242	282,498

Source: Department of Tourism Region VII

About 70 accommodation facilities are operating in Tagbilaran City with 1,117 rooms. These establishments generated about 4,189 jobs. In addition, there are 44 ancillary tourism establishments that serve as restaurants and bars, souvenir shops and tour operators, which offer tour packages.¹⁴

¹⁴ Footnote 12

III. The Tagbilaran City Slaughterhouse

A. Establishment and Operation

The construction of the Tagbilaran City Slaughterhouse started in 1997 to replace the old slaughterhouse located in Cogon District.¹⁵ Operations, however, only began in 2003 when it was leased to a private entity (A.V.M. Bernardo Engineering) due to lack of government funds. The contract between the city government and the private entity stipulated the terms and conditions on tenure, rental, facilities and structures and management systems.

Among the salient provisions in the contract is the monthly rental of Php35,000 to the city government for the first year and an increase of Php10,000 starting on the third year, and every two years thereafter. The contract is effective for 10 years and is renewable subject to full review. The contract price also states that, in accordance with the contracting firm's qualifying bid, the investment shall be Php3,440,400.00.¹⁶

On September 28, 2005, the National Meat Inspection Commission (NMIC, now known as NMIS) awarded the privately operated slaughterhouse with a Certificate of Accreditation (SH-684-"AA") as Class "AA," which allowed it to slaughter hogs and large animals for domestic trade.¹⁷ With the certification, the operator could supply meats from the facility to other areas in the country.

B. Environmental Compliance

On July 23, 1997, the Department of Environment and Natural Resources (DENR) Region VII issued the Tagbilaran City Slaughterhouse with an Environmental Compliance Certificate (ECC-97G-07BO-109).¹⁸ The ECC stipulates the slaughterhouse's rated capacity of 114 hogs and 28 cattle for slaughter per day.

C. Current State of the Slaughterhouse

The slaughterhouse has deteriorated since the city government took over the operations of the facility, thereby losing its "AA" accreditation. While there are no visible issues in terms of structural integrity, the building is already dilapidated and requires significant repair, renovation or upgrading to bring it back to "AA" standard status.

The overall functionality of the facility is constrained due to the deterioration of major components such as drainage, wastewater management, potable water supply and the electrical system. Some equipment no longer functions which further constrains its operations. A re-orientation is needed on the process of slaughtering to comply with the standard procedures and processes (from the initial stage of reception/lairage to evisceration and the final stage of delivery). A more detailed description of the current state of the slaughterhouse is discussed in the assessment section of the report.

¹⁵ Based on the Management Contract between Tagbilaran City Government and A.V.M. Bernardo Engineering

¹⁶ Footnote 15

¹⁷ The data was based on Executive Order No. 137 in pursuant with the Local Government Code of the Philippines. NMIS.1993.

¹⁸ The ECC was issued by DENR Regional Technical Director Julian Amador.

IV. The Project Site

A. Location of the Slaughterhouse Building

The slaughterhouse building and ancillary structures were constructed on a 1.9-hectare lot owned by the city government located in Purok I, Barangay Tiptip. It is near the northern boundary of the city with the Municipality of Cortes (*Figure 2*) and approximately 6 kilometers from the city proper. It is accessible via a city road that connects to the Casa Road and Manga-Tiptip-Cabawan Road.¹⁹

The City Veterinarian's Office is located about 100 meters east. Some residential buildings are located within the 100-meter radius of the slaughterhouse, the closest of which is less than 50 meters.

B. Land Use and Zoning

Under the current Comprehensive Land Use Plan (CLUP), the location of the slaughterhouse is within an agri-industrial zone. The adjacent area south of the slaughterhouse is residential while toward west is an area zoned as light industrial.²⁰ Based on the CLUP, the facility's location is compliant within the agri-industrial zone despite its proximity to residential areas.

C. Existing Site Conditions

The area within the 100-meter radius of the slaughterhouse building is sparsely vegetated with shrubs, grasses and a few trees. Beyond the 100-meter radius, vegetation is denser with indications of reforestation efforts.

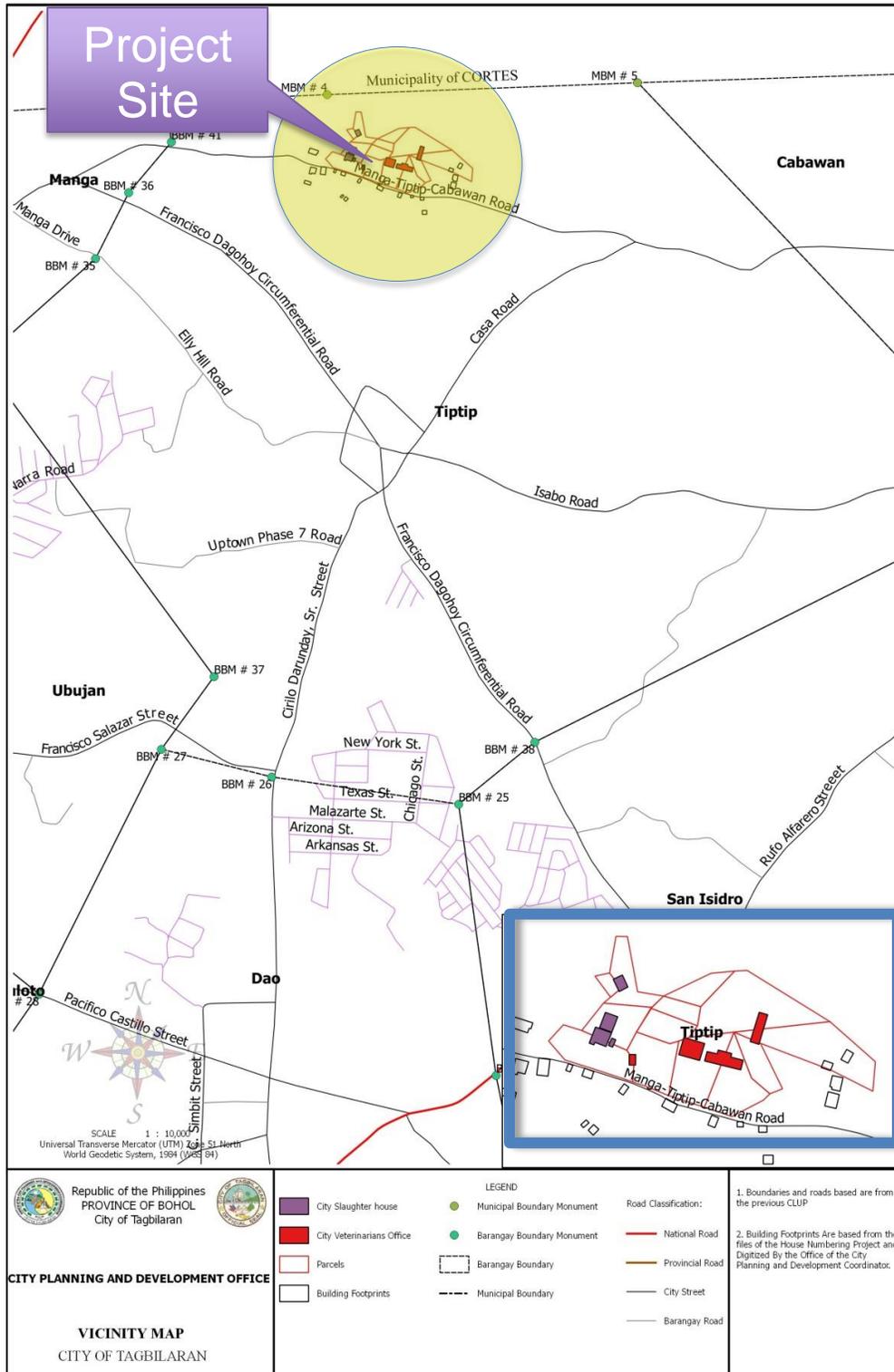
One of the ECC provisions is the establishment of a buffer strip of trees around the periphery of the plant 60 days after completion of the project to minimize nuisance generated by the plant.²¹ However, the buffer strip was not adequately established, particularly at the entrance to the property, which is incidentally close to residential buildings across the road.

¹⁹ Discussions on the Tagbilaran City Slaughter house was also mentioned in the Tagbilaran City CLUP. 2016.

²⁰ Footnote 19.

²¹ This pertains to the ECC issued by the Regional Technical Director-DENR-Region VII.

Figure 2. Project Site Location



Source: CLUP 2016. Province of Bohol

V. City Demand and Supply of Meat

A. Demand Study

1. Assumptions

The primary objective of the demand study is to ascertain the possible number of swine, cattle and carabao that the Tagbilaran Slaughterhouse may slaughter. The assumptions used were based on secondary data and information from key informant interviews. Generally, the assumptions were always on the conservative side for the revenue streams and optimistic side for the cost streams.

2. Catchment Area

Aside from Tagbilaran City, which is the primary catchment area of the slaughterhouse, the delineation for the catchment areas also includes the immediate and adjoining municipalities. These are Cortes, Maribojoc, Antequera, Corella, Loboc, Loay, Albuquerque, Sikatuna, Panglao, Daus and Baclayon (*Figure 3*). These municipalities are within a 30-minute commute going to the city.

The roads leading to Tagbilaran City from these municipalities are paved and in good condition. Based on interviews with market goers, most of the respondents in these municipalities travel to Tagbilaran City to buy household requirements.

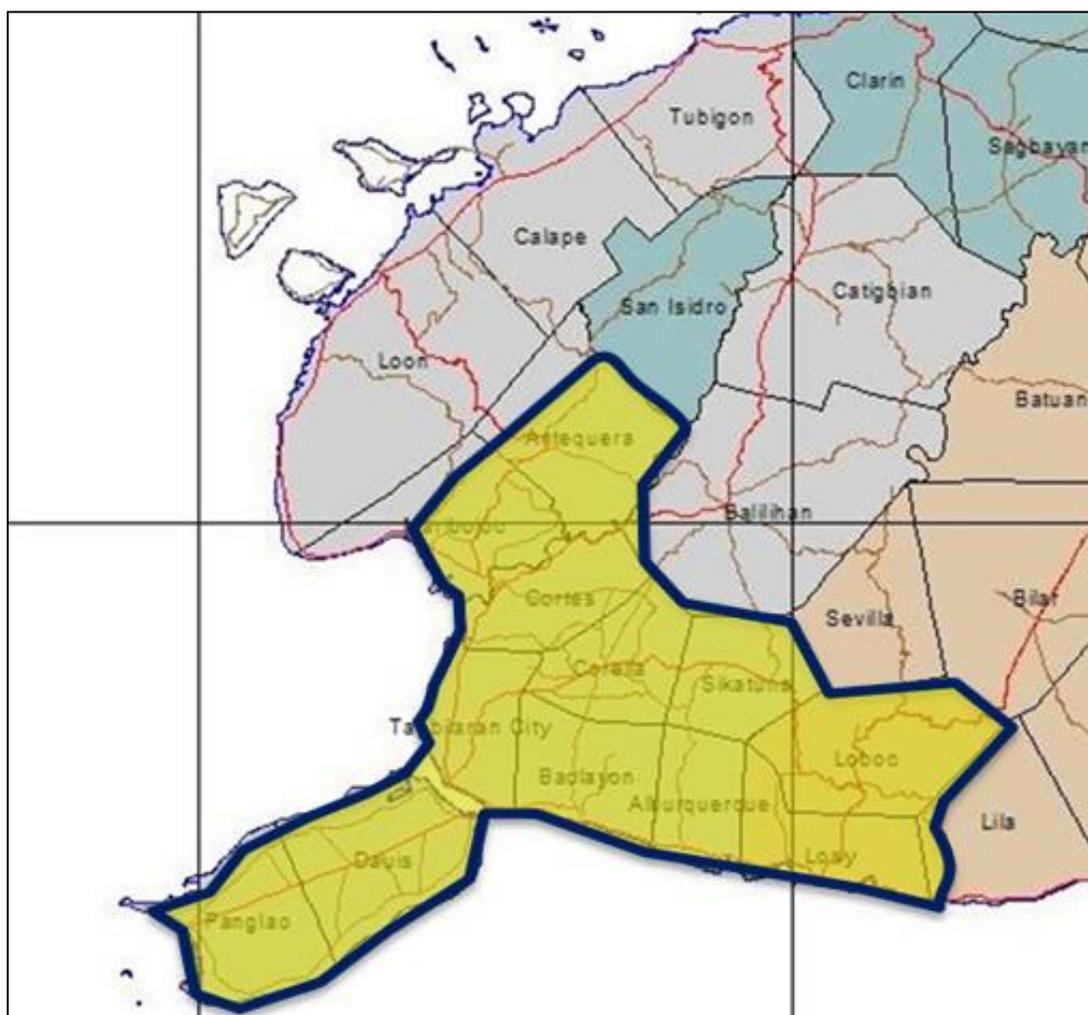
These municipalities are among those that registered significant increases in population based on three previous censuses (1990, 2000 and 2007) with Daus having the biggest increase (38 percent).

Each of the municipalities has its individual market that is also used for trading *tabo-an* day, the day when local producers sell their farm produce at the site. Trading or *Tabo-an* is held twice a week in Maribojoc and once a week in the rest of the catchment municipalities.

During usual days, the market opens at 6 a.m. and ends at 10 a.m. Only Maribojoc resumes market operation around 3 p.m. or until 5 p.m. The rest are assumed to conduct market at Tagbilaran City since it provides more options and variety.

Tagbilaran City has two public markets, the Central Public and Cogon Markets, and five supermarkets which are Island City Mall, Alturas Mall, Plaza Marcela, BQ Superstore, and Shopper's Mart.

Figure 3. Slaughterhouse Catchment Area



Source: map generated by Evan Arias, Feasibility Study writer SURGE Project

3. Population Projections and Estimated Demand for Meat

The study considered two population projections – data from the Philippine Statistics Authority (PSA) and the Provincial Planning and Development Office (PPDO) of Bohol Province. The study used the PPDO population projection since it is conservative in nature at .097 percent growth rate compared to the PSA projection of 2.3 percent.

The national per capita meat consumption figures 5.68 kilos pork, 0.52 beef and 0.15 kilos carabeef (carabao meat) were used since there are no local or provincial estimates of meat consumption according to the Provincial Veterinarian Office.

Using projected population for 2043, the total consumption for pork, beef and carabao were computed at 4,754,130 kilograms (*Table 2*).

Table 2. Projected Population and Demand for Catchment Area

Catchment Area	Population (Based on Projection)					
	2010	2016	2020	2025	2030	2043
Tagbilaran	96,792	99,097	102,998	108,092	113,437	128,604
Cortes	15,294	15,514	16,125	16,922	17,759	20,133
Maribojoc	20,491	18,938	19,683	20,657	21,678	24,577
Corella	7,699	8,109	8,428	8,845	9,282	10,523
Antequera	14,481	14,875	15,469	16,225	17,027	19,304
Loboc	16,312	16,853	17,516	18,383	19,292	10,523
Loay	16,261	16,696	17,354	18,212	19,112	21,871
Alburquerque	9,921	10,156	10,555	11,077	11,625	21,668
Panglao	28,603	2,880	30,017	31,502	33,060	37,480
Dauis	39,448	39,831	41,399	43,446	45,594	51,691
Baclayon	18,630	19,402	20,166	21,163	22,210	25,180
Total Population	283,932	262,351	299,710	314,524	330,076	748,682
	Estimated Consumption (kg)					
Pork	1,613,585	1,490,940	1,703,252	1,787,440	1,875,822	4,254,759
Beef	148,213	136,947	156,449	164,182	172,300	390,812
Carabao Beef	41,170	38,041	43,458	45,606	47,861	108,559
Total Estimated Consumption (kg)	1,802,968	1,665,929	1,903,158	1,997,227	2,095,982	4,754,130

Source: PSA, PPDO and Provincial Veterinarian Office

Buffer Demand

Other nearby municipalities such as Loon, Balilihan, Sevilla, Lila, Dimiao, Calape and Bilar (see *Figure 4*), which are within the 30-45-minute radius of commuting access, were not included in the catchment area but assumed as part of the buffer demand. These areas have access to Tagbilaran City by other modes of transportation (i.e., jeepney, minibus, van, and private car) and their locals conduct market activity in Tagbilaran City.

Assumptions on Demand from Tourism

The study also considered the status quo scenario on tourist arrivals in case the New Bohol International airport would not push through, as well as the scenario where the development of the airport in the island of Panglao materializes.

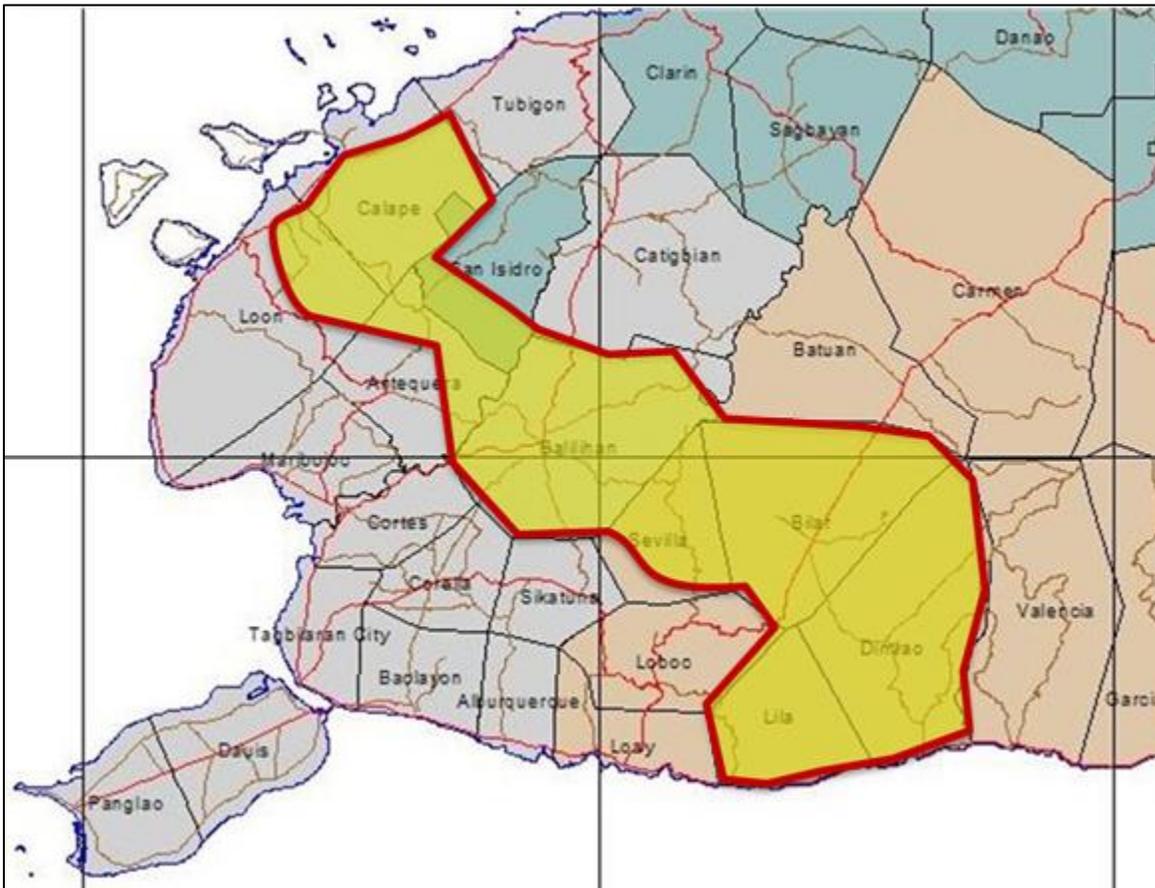
As stated in the New Bohol International Airport Feasibility Study,²² the current passenger arrivals at the old airport will triple if the project is completed by 2020 (*Table 3*). The limited circulation airport study prepared three passenger arrival scenarios – low, medium and high.

²² JICA Study Team for New Bohol International Airport Draft Final Report

A low 15 percent of the medium scenario was taken into consideration in this study. It is assumed that this passenger segment is composed of economy travelers, usually not billeted at three-star accommodations, and will end up staying within the Tagbilaran City Slaughterhouse catchment areas.²³ Hence, this is accounted as additional consumption within the catchment area.

The remaining 85 percent of the passenger arrivals is assumed to be composed of travelling local residents of Bohol Province, and buffer additional demand for meat and tourist population served by the imported meat from Cebu City and Manila.

Figure 4. Slaughterhouse Buffer Demand



Source: map generated by Evan Arias, Feasibility Study writer SURGE Project

Further, the demand did not account for occasional increases in meat demand during fiestas and other celebrations within the catchment areas. During the interviews with the public slaughterhouse operators, it was noted that surges in slaughtering requirement happen during fiestas (depending on the patron saint of the town), Christmas season (December and January) and graduation ceremonies (usually March).

²³ Luxury accommodations and restaurants use imported meats in their kitchens and menus.

Collection fee data from slaughterhouse operations from these towns are not available, since these slaughterhouse fees are usually combined with the collections from the market and other local economic enterprises.

Table 3. Projected Passenger Arrivals (In '000)

Case	CY	Air Passenger Demand									
		Domestic (*1)		International Passengers (*2)						Grand Total	
		Pass.	G/R (%)	Sched	G/R (%)	Non-Sched.	G/R (%)	Total	G/R (%)	Pass.	G/R (%)
Actual	2010	572	0.0		0.0		0.0		0.0	572	0.0
Low Case	2015	898	9.4	0		2		2		900	9.5
	2020	1,125	4.6	0		6	19.0	6	19.0	1,131	4.7
	2025	1,295	2.8	41		10	10.5	50	53.4	1,345	3.5
	2030	1,343	0.7	125	25.1	12	4.1	137	22.0	1,479	1.9
	2035	1,414	1.0	149	3.7	15	5.1	164	3.8	1,579	1.3
	2040	1,469	0.8	171	2.8	18	2.8	189	2.8	1,658	1.0
	2045	1,508	0.5	190	2.1	20	2.2	209	2.1	1,718	0.7
Medium Case	2015	1,037	12.6	0		3		3		1,040	12.7
	2020	1,393	6.1	34		8	23.2	43	71.0	1,436	6.7
	2025	1,566	2.4	124	29.3	12	7.4	136	26.1	1,702	3.5
	2030	1,773	2.5	167	6.1	17	7.7	185	6.3	1,958	2.8
	2035	1,937	1.8	246	8.0	21	4.6	268	7.7	2,205	2.4
	2040	2,117	1.8	298	3.9	26	4.0	324	3.9	2,441	2.1
	2045	2,285	1.5	349	3.2	31	3.3	380	3.2	2,666	1.8
High Case	2015	1,185	15.7	0		3		3		1,188	15.7
	2020	1,615	6.4	40		10	23.5	50	71.4	1,665	7.0
	2025	1,908	3.4	153	30.7	16	10.0	169	27.6	2,077	4.5
	2030	2,231	3.2	252	10.4	22	7.0	274	10.1	2,505	3.8
	2035	2,590	3.0	333	5.8	29	5.9	362	5.8	2,952	3.3
	2040	2,960	2.7	422	4.8	37	4.9	459	4.8	3,419	3.0
	2045	3,342	2.5	518	4.2	45	4.2	563	4.2	3,905	2.7

(*1) including some new route between Bohol and other islands (*2) 4 new routes (BHL-SHA, BHL-HKG, BHL-TPE & BHL-SEL) and charter flights to/from many Asian countries (*3) excluding international cargoes and domestic cargoes of new domestic routes
Source: JICA Study Team for New Bohol International Airport Draft Final Report

B. Supply Study

1. Livestock Production

Tagbilaran City is not a major producer of livestock and agricultural areas are limited to only 10 percent of the city's total land area. Owing to its limitations on agricultural production, it has to rely on the other areas of the province for the supply of livestock.²⁴ Table 4 presents the livestock and sufficiency level in Bohol Province in the past three years. The livestock sufficiency level shows that the province of Bohol had sufficient supply of pork and beef for the last three years.

²⁴ Tagbilaran City Comprehensive Land Use Plan (2016)

Using PSA data on production volume per province, the livestock volume of production in the province of Bohol increased for all animal types in the last six years (2010-2015) as shown in Table 5. Hog production in 2015 was 43,928 metric tons. Assuming a weight of hogs at 90 kilograms per head, production in 2015 would be approximately 488,000 heads.

Table 4. Livestock and Sufficiency Level in Bohol

Commodity	2013 (%)	2014 (%)	2015 (%)
Carabao Beef	654	677	688
Chicken Meat	239	270	284
Cattle Beef	438	449	428
Pork	371	380	390
Goat Chevon	661	716	760
Chicken Egg	73	85	94
Duck Meat	129	141	113
Duck Egg	40	44	53

Source: Provincial Veterinary Office, Bohol

For cattle, assuming an average weight of 400 kilograms, the production would be approximately 15,500 heads while for carabaos, using 500 kilograms as average weight, would translate to 5,538 heads. The production data coincides with the sufficiency level and a clear indication of surplus production of livestock at the provincial level.

Table 5. Livestock Volume of Production, Province of Bohol (Metric Tons)

Commodity	2010	2011	2012	2013	2014	2015
Carabao	2,243	2,327	2,394	2,575	2,666	2,769
Cattle	5,950	6,314	6,248	6,210	6,372	6,200
Hog	41,142	41,256	42,107	40,833	41,868	43,928
Total	49,335	49,897	50,749	49,618	50,906	52,897

Source: Philippine Statistics Authority, 2016

2. Imported Meats

Frozen pork and beef are imported to Bohol Province from either Manila or mainly from Cebu City. Imported meats, however, are usually intended for Class A resorts and high-end restaurants catering to predominantly foreign tourists. Imported meats are characterized by special and uniform cuts of pork, beef, and lamb needed for a variety of dishes in resorts and restaurants.

Data on imported meats are inadequate and the only available data provided was for 2015 wherein the Veterinary Quarantine Services tracked and recorded a shipment of 71,862 kilos of pork. The peak occurs during the summer months, between January and April, and the recorded supply has already reached a total of 60,271 kilos in 2016.²⁵

An indication of substantial supply coming from outside of Bohol Province can be gleaned from the volume of meats imported by one distributor who stated that its office in Cebu imports pork and beef from the United States and New Zealand in a 40-foot container. The weekly supply to

²⁵ Interviews with Dr. Estela Lapiz (Provincial Veterinarian), Dr. Victoria Limbaga (Tagbilaran City Veterinarian), and Dr. Eduardo Seroje of the National Meat Inspection Service (NMIS)

Bohol Province is transported through a 3-5-tonner refrigerated truck, which increases to twice a week during peak season.²⁶

3. Private and Public Slaughterhouses

There are two private operators of AA-certified slaughterhouse facilities within the city reach or catchment area - the Alturas Group of Companies in Dauis and the Bohol Quality Slaughterhouse (BQ) in Corella. Both facilities cater to their supermarket stores in Tagbilaran and Cebu City. *Table 6* presents their operating capacities.

Table 6. Current Operating Level of Private Slaughterhouses

Name of Facility	Swine Heads per day	Cattle Heads per day	Number of Personnel
Alturas Group of Companies	60	None	20
Bohol Quality	20	1	Undisclosed

Their facilities are strictly for company use and representatives did not provide much data during the visits. The BQ Slaughterhouse is more systematic and has a bigger operating capacity than Alturas due to a bigger floor space, but only Alturas has a cold storage facility.

The staffing in Alturas consists of one manager, five butchers, six security guards, and eight support staff – or a production to staff ratio of approximately 3 heads: 1 staff.

Meat prices of the two private slaughterhouse are higher by Php10.00 to Php20.00 per kilo when sold to the supermarket compared to the prices at the public market. Almost half of the meats from Alturas slaughterhouse are shipped to Cebu for their own supermarkets.

The local government units (LGUs) of Maribojoc, Antequera and Loboc operate public slaughterhouses classified as non-double A. LGUs heavily subsidize these slaughterhouses since revenues cannot cover operating costs (maximum slaughter cannot even reach 2 heads per day).

To maximize efficiency of staff, they are also utilized for the market operations, which explain the non-availability of disaggregated data on market and slaughterhouse collection fees. Neither of the receipts generated from the slaughter fee nor the market stalls are enough to pay the two salaried personnel plus water, electricity, and office supplies. All of the three public slaughterhouse facilities need improvement, repair and maintenance.

These slaughterhouses supply meat to other municipalities without slaughterhouses even if their facilities are not AA-certified. As per NMIS, only meat from AA-certified slaughterhouse facilities can cross municipal borders and be sold to other markets.

Findings from the interviews with the City and Provincial Veterinarians presented that the LGUs permit backyard slaughtering by imposing a fee of P50 for each head of swine slaughtered at the backyard or distant areas from public slaughterhouses.

²⁶ Interview with the branch manager of Belcris Foods, Inc.

One notable strategy of enforcing swine slaughtering at the municipal slaughterhouse was found at Antequera, wherein the meat vendor's butcher handles the pick-up, drop off and butchering of swine. Meat vendors recover fees on a per-kilo-of-meat basis. Antequera meat vendors, however, peddle meat to Maribojoc and Cortes, which is prohibited since only meat from AA-certified slaughterhouse facilities can be sold to other municipalities.

VI. Tagbilaran City Slaughterhouse Assessment

A. Infrastructure and Facilities

1. Overall Assessment

The Tagbilaran City Slaughterhouse is within a fenced compound along a city road that connects to the Casa Road and Manga-Tiptip-Cabawan Road. The presence of residential buildings within the 100-meter radius of the slaughterhouse building is concerning since the locational standards of the Housing and Land Use Regulatory Board (HLURB) requires slaughterhouses to be at least 200 meters away from built-up or residential areas.

Moreover, much have changed since the project 1997, when there had been neither residential houses nor agriculture activities near the site. With growth of population and influx of migrants, a number of residents might be directly and/or indirectly be affected by the operation of the project.

While there are no visible structural integrity issues in the slaughterhouse facility, it badly needs repair and rehabilitation on its aesthetics, functionality and other important components such as drainage, water supply, wastewater system, electrical wire networks, etc.

2. Detailed Assessment of Facility

Table 7 shows the composite team's assessments on the physical aspects of the slaughterhouse:

Table 7. Physical Aspect Assessment of the Slaughterhouse

Aspect	Assessment
Water Supply	It presently has no efficient water supply system. Water outlets are not strategically placed in the working area.
Drainage	Drain canals and floor gradient are heavily worn and are no longer efficient, causing retention of water over the floor of the work area and presence of water puddles.
Wastewater System	The wastewater pond no longer functions effectively. Consequently, the wastewater being released to the disposal area at the lower portion of the compound does not go through the required process of aerobic treatment.
Electrical	Electrical wires that are channeled towards the main panel board are chaotically connected. Moreover, the wires are not encased in standard electrical conduits. Circuit breakers and panel boards are unnecessarily exposed and the facility is not well lighted owing to insufficient light bulbs and lamps in the working area.
Ventilation, Doors and Windows	Ventilation openings are not provided with standard insect screens. Most of the doors and windows are either missing or already dilapidated. The windows also lack appropriate screens.
Physical Separator	There is no physical separation, such as a concrete wall, between the slaughtering area and the offal area.
Roofing	Majority of the roof sheets are already heavily dilapidated with several large holes all over it. Some of the roof frames also need repair or replacement.
Flooring	The floor badly needs repairs. The termination between the wall and the floor is a sharp corner angle and not curved (see Figure 5).
Walls	The walls need to be repainted.
Personnel space	Dressing, washing and comfort rooms for the personnel are not functional.

Aspect	Assessment
Equipment	Scalding tank and dehairing machine are both in running condition but may need some upgrade, retooling and repair. The rest of the equipment such as the offal table, tool dip and gambrel are already heavily dented and need to be replaced.
Process Flow	The process flow of the slaughtering process needs to be improved to achieve efficiency. The handling of carcass needs to be corrected to ensure that off-floor slaughtering is observed unlike the current practice of dragging the carcass over the floor from one point to another which is a major violation of meat handling regulations.

The picture in *Figure 5* shows the current state of the work area with its dilapidated walls, floors and other components. With the current condition of the facility, the non-observance of off-floor slaughtering increases the possibility of meat contamination since the carcass is dragged across the floor. The absence of an efficient water supply system further constrains the sanitation and hygiene in the facility.

Figure 5. Tagbilaran City Slaughterhouse Work Area



B. Operating Capacity

The Tagbilaran City Slaughterhouse currently processes, on the average, 60 heads of swine and one head of cattle per day. At present, the facility is managed by a former barangay captain, 15 butchers, 32 support staff, three meat inspectors and four security guards (total: 55). The daily production to staff ratio is 1 head: 1 staff which is less efficient compared to the privately-operated slaughterhouses at 3 heads: 1 staff.

C. Capital/Investment Requirements

Considering the current state of the slaughterhouse, renovation and upgrading will involve physical works and repair, replacement or upgrading of equipment. The summary of estimated costs of rehabilitation including equipment is presented below in *Table 8*. The detailed estimates and proposed floor plan are attached as *Annex B* and *Annex C* of the report.

Table 8. Estimated Cost of Rehabilitation

Direct Cost	Amount
Infrastructure Rehabilitation Cost	1,383,736.00
Slaughterhouse Equipment Cost	1,579,000.00
Labor Cost	595,496.00
Contingency Cost	426,987.84
Total Direct Cost	Php 3,985,219.84

The estimates were computed based on the current situation and the prevailing costs of materials and labor. It is possible that there will be an increase in estimated costs if the city government will decide to push through with the construction works and equipment upgrading at a later date. A detailed survey of the area and engineering design might also result to a different plan and corresponding higher cost estimates.

D. Financial Analysis

1. Options or Hypotheses Explored and Analyzed

The Local Government Code of 1991 mandates local governments to effectively provide basic services and facilities that include slaughterhouses.²⁷ Based on this premise, the city government of Tagbilaran should continue operating the City Slaughterhouse to cater to the general public consumption within the catchment area.

In order to fulfill such a mandate however, the existing facility needs to operate effectively and efficiently; hence, the need for physical and organizational improvements in terms of physical layout, staffing and overall operations and management.

Considering the prevailing circumstances, the study identified, explored and analyzed four possible options to determine the slaughterhouse's viability and provide the basis for decision-making. Each option has its own set of preconditions or requirements in order for the corresponding assumptions or scenarios to happen.

The following are the options evaluated in this study:

- A. Status Quo.** Efficiency and viability of the Tagbilaran City Slaughterhouse can be achieved if the LGU improves the slaughterhouse through its own capital outlay and the operation will still be streamlined and managed by the city.

²⁷ RA 7160 (Local Government Code of 1991), Book 1, Title 1, Chapter 1, Section 17. Basic Services and Facilities

B. Consolidation and LGU Operation. Efficiency and viability of the City Slaughterhouse can be achieved if the three public slaughterhouses will be consolidated as part of the primary catchment area. The City Slaughterhouse will be improved by Tagbilaran City through its own capital outlay and the operation will still be streamlined and managed by the city.

C. Public Private Partnership Limited to Operation and Management. Efficiency and viability of the City Slaughterhouse can be achieved if the three public slaughterhouses will be consolidated as part of the primary catchment area. The City Slaughterhouse will be improved by Tagbilaran City through its own capital outlay and the operation will be streamlined and managed by the private sector.

D. Full Public Private Partnership (PPP). Efficiency and viability of the City Slaughterhouse can be achieved if the three public slaughterhouses will be consolidated as part of the primary catchment area. The City Slaughterhouse will be improved using private sector funds and managed by a private sector operator.

A crucial precondition for options B, C and D is for the city government of Tagbilaran City to secure an agreement with the provincial government so that the city slaughterhouse can exclusively cater to the catchment area, including points of delivery, to maximize operating potential.

2. Assumptions

As a general rule and similar to the demand and supply section, the assumptions used were based on the secondary data and key informant interviews. All revenue streams are always on the conservative side and the cost streams are on the optimistic side, which means the higher projected amounts are used.

The data on projected population and per capita consumption presented in the demand-supply section of the report were used to determine the number of swine and cattle/carabao heads that the slaughterhouse may opt to slaughter.

3. Assumptions on Receipts

The receipts for the slaughterhouse facility would come from the following fees:

- Corral (Php5.00 per head per day)
- Holding (Php5.00 per head)
- Slaughter (Php2.75 per kilo)
- Ante and post mortem (Php0.25 per kilo) fees

The existing fees based on current operations were increased by 10 percent every five years starting in 2019. The revenue from ante and post mortem fees were also reduced by 25 percent, which will be remitted as shares to the NMIS.

There is a potential to sell biogas produced from the collected waste at the facility, but these have not been quantified as there was no resource person who could specify the construction dates of the biogas tank, the volume of the industrial plastic tank and the rate at which the chambers are filled with biogas materials.

Another possible source of income that could help recover costs is the levy of delivery charge per head of swine. However, this could not be ascertained yet due to pending consultations with towns having operational slaughterhouses.

4. Cost Assumptions

The costs were derived from the assumption that the facility would be operated based on an AA classification standard with lean staffing and operations as a private enterprise. All cost prices were applied with a five-year average rolling inflation based on 2010-2015 historical data.²⁸ It is assumed that the inflation factor would cover salary increases.

The capital outlay was based on the engineering design estimated at around Php4 million, which include civil work, equipment purchase, labor, and contingencies. The rehabilitation cost was assumed to cut across two fiscal years. The value of the current structure was not included in the financial analysis.

The capital outlay would also include the purchase of delivery vans for options that would require such. Since the building is already over 12 years old and would only be rehabilitated, a maintenance cost was allocated every four years and van repurchase was programmed every six years. On the other hand, vehicle maintenance was allocated every year.

Staffing was based on the assumption that the average swine to staff ratio is 3:1 at an average salary of Php12,000 per month including overtime pay for night differentials, holidays, Saturdays, and Sundays. The operation would begin with 18 staff, which would gradually increase to 23 within the 25-year study period. The regular operating period would start at 10 p.m. and end at 5 a.m. the following day. As an environmental mitigating measure, however, an electric stunner must be used in actual slaughtering of animals especially during early morning.

Utilities were based on the number of heads that would be processed at the facility: water at 0.5 cubic meter and electricity at 0.5 kilowatt-hour per head. Fuel, on the other hand, was based on a daily route of 200 kilometers to service all the towns that the facility would cover. Office supplies were also accounted for at approximately Php5,000 per month. To cover for unforeseen costs, a 10 percent contingency of all the costs was included in the projection.

5. Feasibility Parameters

The parameters used for determining the financial feasibility of pursuing the slaughterhouse rehabilitation and managing its operations were the complementary indicators internal rate of return (IRR) and the net present value (NPV), which are being used by the National Economic and Development Authority (NEDA) for public infrastructure projects.

The IRR is the discount rate used in capital budgeting that makes the NPV of all cash flows from a particular project equal to zero. In general, the higher a project's IRR compared to other investment options, the more desirable and favorable it is to undertake the project. As such, the IRR can be used to rank several prospective projects.

²⁸ Bangko Sentral ng Pilipinas. (n.d.). Economic and financial statistics. Retrieved from http://www.bsp.gov.ph/statistics/efs_prices.asp

IRRs can also be compared against prevailing rates of returns that the LGU can invest on. On the other hand, the resulting IRR can also be compared to the usual investment option of local governments, which is time deposit (usually at 1.25 percent for Landbank of the Philippines/Government Financial Institution) or the latest T-bill rate (at 1.723 percent as of first quarter of 2016).

Since the T-bill rate was higher at the time of the study, it would be used as the cost of capital for the LGU. However, two of the four options necessitate looking into private sector involvement, for which the hurdle rate of 12 percent could be used for the analysis. This could increase if the risk was too high or if there were other viable projects available for investment.

The NPV is the difference between the present value of the cash inflows and the present value of the cash outflows. It compares the value of the peso today with the value of that same peso in the future taking into account inflation and returns. Therefore, if the NPV is zero or positive, then it indicates that the project is favorable.

6. Current Financial Records Need Thorough Review

While financial records of the slaughterhouse operations showed a net positive cash flow over five years (*see Annex D*), there were expense items that were not consistently recorded such as water, fuel, oil, office supplies, and salaries. It would be impossible to run the facility without costs incurred under these items.

It appears that in Tagbilaran City, similar with other local governments' declared local economic enterprises, salaries are all lumped into the "other maintenance and operating expense" and, therefore, the management hire almost, if not all, of the salaried personnel as job orders or casual. In addition, financial records do not capture other costs such as supervision and/or permanent staff working for the slaughterhouse. This is because the account for the slaughterhouse is not ring-fenced and treated as a true economic enterprise.

Therefore, the financial report submitted cannot be used to represent the true financial condition of the facility. While there was an effort to restructure the report to account for the salaries, the complete financial picture of the slaughterhouse could not be accurately re-constructed.

E. Simulations and Sensitivity Analysis

1. Simulations on Scenarios

The financial analysis involved simulations using four scenarios to compute the IRR and the NPV. Each scenario considered different catchment areas and projected demand levels. *Table 9* presents the results of the simulations.

Table 9. Scenarios, Catchment Areas and Demand Assumptions

Scenario	Catchment Area and Demand Assumptions	IRR	NPV (Php)	Indication
1	Catchment area will be limited to Tagbilaran City. This scenario do not include	10%	6,794,550.59	Opportunity Cost of 2% using the latest T-bill rate. The project is feasible from the viewpoint of the city government.

Scenario	Catchment Area and Demand Assumptions	IRR	NPV (Php)	Indication
	acquisition and maintenance costs of van and fuel			
2	Catchment area includes Tagbilaran and the other adjacent towns	13%	482,090.4	The project is feasible at current assumptions from the point of view of the private investor. However, given the low results of the financial indicator, there is a need to test the project to major risks affecting its viability.
3	Catchment area includes Tagbilaran, the other adjacent towns and the status quo passenger arrival using the old airport	18%	2,820,157.00	The project is feasible at current assumptions from the point of view of the private investor. However, given the low results of the financial indicator, there is a need to test the project to major risks affecting its viability.
4	Catchment area includes Tagbilaran, the other adjacent towns and the completion of the new airport resulting to increased passenger arrivals	25%	7,496,290.06	The project is feasible at current assumptions from the point of view of the private investor. However, given the low results of the financial indicator, there is a need to test the project to major risks affecting its viability.

2. Sensitivity Analysis of Scenarios

The four scenarios were subjected to sensitivity analysis to determine which risk areas would cause financial distress in operating and managing the slaughterhouse.

The sensitivity parameters used are:

- An increase in project/rehabilitation cost up to 20 percent
- A decrease in consumption up to 20 percent
- Simultaneous 20 percent increase in cost and 20 percent decrease in consumption
- Operational efficiency decreased from 3 heads per swine per staff (3:1) to 2 heads per swine per staff (2:1)

Operational efficiency focused on the number of swine per staff since salaries comprise the biggest cost of operating the slaughterhouse. The researcher largely hinged the financial model on the number of swine to be slaughtered and the number of staff needed to carry out the task. The results of the sensitivity analysis are summarized in *Table 10*.

Table 10. Sensitivity Analysis on the Four Scenarios

Parameters		Scenario 1	Scenario 2	Scenario 3	Scenario 4
Opportunity cost of Money		2%	12%	12%	12%
IRR		10%	13%	18%	25%
NPV		P6,794,550.59	P482,090.48	P2,820,157.00	P7,496,290.06
a. 20% increase in cost	IRR	8%	11%	15%	22%
	NPV	-P1,394,570.56	-P480,539.02	P1,857,528.04	P6,533,660.56
b. 20% decrease in consumption	IRR	7%	8%	14%	22%
	NPV	-P1,398,526.79	-P1,509,797.99	P828,269.07	P5,504,401.59
c. Simultaneous 20% increase in Cost and 20% decrease in consumption	IRR	6%	N/A	N/A	N/A
	NPV	-P2,072,049.28	-P19,685,712.54	-P22,121,437.17	-P26,992,885.02

d. Decrease in efficiency from 3:1 to 2:1 (increase in staff by 1)	IRR	#NUM!	N/A	N/A	N/A
	NPV	-P7,851,182.91	-P21,005,428.48	-P23,417,883.22	-P28,289,331.08

Scenarios 1 and 2 are sensitive to parameters: (a) increase in cost, (b) decrease in consumption, and (d) decrease in staff efficiency.

Scenarios 3 and 4 are sensitive to parameters (c) simultaneous increase in cost and decrease in consumption and (d) in decrease in staff efficiency.

In the four simulations, the project is sensitive to decrease in production efficiency from 3 heads: 1 staff to 2 heads: 1 staff. The project needs to maintain operating efficiency at three swine heads per staff at any given time.

If the project can capture 15 percent of the passenger arrival as part of the catchment population for the slaughterhouse facility, the project is highly feasible.

Overall, **the biggest risk is the decrease in efficiency** (hiring more personnel than what is needed) for all scenarios followed by the decrease in consumption pattern and increase in project cost.

3. Other Viability Risks

Aside from the risks in the scenarios identified in the financial analysis, the following risks will affect the viability of the project:

- If the two private slaughterhouse owners would open up their slaughtering operations to all interested users or clients and not just limited to their own requirements;
- Failure to forge an agreement with the province and three municipalities concerned on granting Tagbilaran City full access to the proposed catchment area;
- Continuous operation of the existing municipal slaughterhouses despite an agreement with the province;
- Weak or ineffective enforcement of regulations and dissemination of information, education and implementation of communication strategies on safe meat; and
- Using the slaughterhouse (account) as a source of employment for locals despite the lack of financial viability as a local economic enterprise (see the Department of Budget and Management through circular 100 dated 01 October 2012).

F. Environmental Impact Assessment

The Project has engaged the services of an Environmental Specialist to conduct an environmental screening of the proposed Tagbilaran Slaughterhouse Upgrading Project and draft an Environmental Performance Report and Management Plan (EPRMP) in preparation for the project’s application for an environmental compliance certificate once fully implemented. The EPRMP, to be submitted in a separate report, assessed the potential impact of the proposed upgrading project on the environment and proposed corresponding mitigating measures to minimize the project’s negative effects. The following paragraphs discuss some of the important environmental issues related to the project.

1. Impact Assessment on Land

Changing Land-use. Under the current CLUP, the slaughterhouse compound is zoned as agri-industrial, while the adjacent area south is residential and the neighboring community to the west is classified as light industrial. Much have changed since 1997, when there had been neither residential houses nor agriculture activities near the site. With the growth and influx of migrants over time, a number of residents might be directly and/or indirectly be affected by the operation of the project which might give rise to some land use issues in the future.

Generation of Solid Wastes. The project may produce a considerable amount of solid waste during repair and rehabilitation phase (e.g., construction debris, residuals, domestic waste) and upon full operation of the expanded facility. At present, the project generates two sacks of approximately 100-kilogram solid waste mostly composed of residuals (e.g. offal, hairs, nails, etc.) and does not practice waste segregation.

Workers treat residual wastes produced in slaughtering like ordinary domestic waste and there is no temporary waste storage facility. The wastes are in placed sacks, which are then disposed of for the City Garbage collection system to collect and deposit in an open dumpsite in Barangay Dampas as its final disposal facility.

Soil Erosion. Although the project site is relatively flat except on the back portion where it is sloping downward towards the intermittent creek and into the tributaries leading to Manga River, soil erosion is unavoidable during heavy downpour especially during the rehabilitation phase when soil excavations may to be undertaken.

Vegetation Loss and Wildlife Disturbance. So far, there is no threatened or endangered animals or plants in the area. Hence, there would not be any impact on wildlife disturbance or substantial vegetation loss.

During rehabilitation, workers may remove some vegetation, which they can replace by planting trees and ornamentals around the periphery of the property. Environmental regulations require the planting of thick strip of trees to act as buffer from nearby residential areas and other establishments.

2. Impact Assessment on Water

Water Pollution. With the operation of the project, surface run-off and untreated effluent may affect the water quality of Manga River if these reach the said river. Solid wastes in the catch basins and some effluent from washings might result to incidence of diseases if left untreated.

Groundwater Contamination. Groundwater contamination from surface pollutants is possible if drainage system is not efficient and wastewater system is not functioning effectively.

Increase in Water Demand. Once the project becomes operational, it will increase the water demand for slaughter, facility maintenance and hygienic purposes. To avoid conflict with residents on water use, the slaughterhouse will draw the water requirement from a deep well as an additional source to ensure adequate water supply. Other measures include water recycling, water conservation and regular maintenance of the water system.

Generation of Oil and Grease. The use of diesel-fueled generator in boiling operations and as standby power supply will generate oil and grease.

3. Impact Assessment on Air

Generation of nuisance odor. Without proper housekeeping and sanitation, a slaughterhouse can release objectionable odor because of high biochemical oxygen demand (BOD) loading.

Generation of noise. Noise level may increase during the rehabilitation phase due to construction activities.

Generation of dust and particulate matters. Strict implementation of dust control is necessary since the unobstructed air space characteristic of a flat landscape, such as the project site, is favorable for dust transport.

Generation of smoke and emissions from delivery trucks, heavy equipment and generator. The main source of air pollutants is the heavy equipment during the rehabilitation stage and delivery trucks during slaughterhouse operations. The scalds vat furnaces, powered by a diesel generator, will also produce emissions.

4. Impact Assessment on People

Threat to Health and Sanitation. Rehabilitation will cause temporary nuisance to the local population (i.e., noise, dust, exhaust fumes, accessibility) due to construction-related activities. Nuisance odor during operations can cause discomfort to nearby residents and negative effects to the workers if contact is prolonged.

Increase Exposure from Contaminants. Security measures are weak in the project. The absence of a gated enclosure and lack of perimeter fence around the property allows access of people and stray animals within the premises. In the main building, there are no doors to prevent the entry of animals like stray dogs during slaughtering. This might pose hazards and cause contamination to the quality of meat.

Implementation of Personal Conduct. The proponent strictly implements the prohibition of smoking in controlled areas. It has designated smoking sheds where smoking is permitted.

Increase Traffic situation in the area. At present, traffic seems a minor issue since few vehicles ply along the barangay road. The impact on the traffic situation occurs only in the early morning during delivery of meat to the market.

If full operation starts with the projected increase in production, however, there could be traffic congestion since the facility is along the barangay road, a main thoroughfare in the vicinity where establishments and residential communities are situated. Traffic situation can peak during delivery of animals and meat products back and forth the site.

VII. Recommendations

The financial analysis generated valuable information that can provide the basis in determining the viability of the slaughterhouse project. The four scenarios presented the feasibility of the project from the viewpoints of the city government and the private sector while the sensitivity analysis further provided insights on what risks can adversely affect the project's viability.

In terms of technical or engineering aspect, the assessment emphasized the need for significant improvements in order to upgrade the facility to "AA" status. This would require substantial investments for the renovation and upgrading of the physical components.

This section of the report presents the four options for consideration by the city government in regaining the "AA" status through improvements in physical as well as management aspects of the slaughterhouse.

A. Highlights of the Financial Analysis and Simulations on the Four Scenarios

The four scenarios were generated to present simulations that can provide insights on the viability of the project considering several factors. The analysis and simulations resulted to the following:

Scenario 1 which considers Tagbilaran City as the only catchment area and does not include acquisition and maintenance costs of van and fuel resulted to 10-percent IRR, a positive NPV of Php6,794,550.59 with an opportunity cost of 2 percent using the latest T-bill rate. This means that the project is feasible from the viewpoint of the city government but it is sensitive to increase in cost and decrease in consumption and in decrease in staff efficiency.

Scenario 2 which considers Tagbilaran City and the other adjacent towns as catchment area resulted to 13-percent IRR and a positive NPV of Php482,090.48. This means that the project is feasible at current assumptions from the point of view of the private investor. This scenario is sensitive to increase in cost and decrease in consumption and in decrease in staff efficiency.

Scenario 3 which considers Tagbilaran City and the other adjacent towns as catchment area and also involves the assumption of a status quo passenger arrival using the old airport resulted to 18-percent IRR and a positive NPV of Php2,820,157.00. This means that the project is feasible at current assumptions from the point of view of the private investor but sensitive to a) a simultaneous increase in cost and decrease in consumption or b) a decrease in staff efficiency.

Scenario 4 which considers Tagbilaran City and the other adjacent towns as catchment area and involves the assumption that the completion of the new airport will result to increased passenger arrivals yielded a 25-percent IRR and a positive NPV of Php7,496,290.06. This means that the project is feasible at current assumptions from the point of view of the private investor but is also sensitive to a) a simultaneous increase in cost and decrease in consumption or b) a decrease in staff efficiency.

The slaughterhouse project is feasible from the viewpoints of the city and the private sector based on the financial analysis and simulations of the four scenarios (assuming that preconditions are met). However, risks that need to be considered are an increase in costs, decrease in consumption, and a combination thereof which are particularly applicable to scenarios 1 and 2. A combination of simultaneous increase in costs and decrease in consumption will affect Scenarios

3 and 4. The **biggest risk revealed by the analysis and simulation is the decrease in staff efficiency**, which will negatively affect all four scenarios.

B. Options and Possible Alternatives

Option A: Status Quo

Improvement of the slaughterhouse will be undertaken using city government funds and operations will be managed by the city. The proposed project of rehabilitating the slaughterhouse is a viable full undertaking for the city given the low opportunity cost of capital.

If the city desires to operate the facility as it is now, the slaughterhouse management should be improved by ensuring ring-fencing of receipts or accounts, accounting for all expenses and providing capacity development interventions. The biggest risk identified by the sensitivity analysis is a decrease in staff efficiency.

The key aspect to ensure viability under this option is on operating the facility as an economic enterprise anchored on corporate principles to ensure efficiency.

Key Considerations

In order to ensure viability, this option necessitates the strict enforcement of laws to eliminate or minimize backyard slaughtering and ensure that the slaughterhouse will capture all slaughtering services in the city and in the catchment area.

Advantages

- The city government has direct control of the facility and will have the opportunity of operating a viable economic enterprise that ensures the adequate supply of safe meat for both residents and tourists;
- If operated as an economic enterprise, the city can avoid increasing its personal services (PS) budget and will not deal with concerns arising from the rules on PS limitations per existing guidelines from the Department of Budget and Management (DBM);
- If operated efficiently and effectively, there is a potential of progressively generating revenues due to projected increase in demand; and
- In the long term and beyond the status quo, this option has a potential of generating more revenues if the city can achieve the conditions under Scenarios 2, 3 and 4 by securing institutional arrangements with the provincial government and other municipalities which would expand the catchment area and significantly increase the demand.

Disadvantages

- The city government will have the additional task of effectively managing the facility and maintaining its viability as an economic enterprise which the city has not been able to do in the recent past;

- Catchment area is limited and if laws on slaughtering are not strictly enforced, there is possibility that the slaughterhouse will not be able to capture all slaughtering services in the city;
- Operations will be subject to government bureaucracy particularly the regulations on procurement which could result to difficulty in ensuring availability of essential supplies and materials for both operations and maintenance as well as timely delivery of vital services;
- Will add more burden to the city's accounting and treasury departments as it would require a separate account with ring fenced receipts and other accounting procedures.

Option B: Consolidation and LGU Operation

The three public slaughterhouses will be consolidated as part of the primary catchment area, improvement of the slaughterhouse using the city government funds will be undertaken and operations will be managed by the city.

Similar to Option 1, this option capitalizes on the low cost of capital indicating the viability of the project from the point of view of the city. It would likewise require improving the facility's management by ensuring that the slaughterhouse receipts/account are ring fenced, all expenses are accounted for, managed efficiently by right-sizing the organization, and capacity development interventions are provided.

Key Considerations

This option requires the city government of Tagbilaran City to secure an agreement with the Provincial Government of Bohol and the adjacent municipalities that the city slaughterhouse will exclusively cater to the catchment area, including points of delivery, to maximize operating potential. This would require the closure of the three public slaughterhouses in the adjoining municipalities. The city and the adjacent municipalities must conclude a long-term formal agreement for the consolidation of slaughterhouse operations in Tagbilaran City with corresponding legislative mechanisms agreed upon and enacted by the LGUs.

Advantages

- The city will have direct control, avoid increasing PS if operated as an economic enterprise and will have the opportunity of operating a viable economic enterprise with potential increase in revenues;
- In addition, the consolidation of the three public slaughterhouses in the catchment area will result to much bigger and more secure market for the City Slaughterhouse thereby increasing revenues; and
- In the longer term, assuming all conditions are adequately met, there is a potential of expanding operations to capitalize on the overproduction of livestock at the provincial level and maximize the facility's double A classification to export meat outside the province.

Disadvantages

- This option hinges on a crucial requirement which is an institutional arrangement with the provincial government and the municipalities included as catchment area which may take time to realize and will be dependent upon the receptiveness of the other local governments concerned;
- There is a risk that the institutional arrangement with the provincial government will be affected by political transition process especially upon the assumption of new local chief executives;
- There is a risk that the other public slaughterhouses in the catchment area will continue to operate despite the agreement;
- Closure of the other public slaughterhouses might have negative implications on the municipalities concerned; and
- The travel time between the slaughterhouse and the catchment areas outside the city might be a factor that will discourage other municipalities from agreeing to consolidate the operations of the other public slaughterhouses.

Option C: Public Private Partnership limited to Operation and Management

The three public slaughterhouses will be consolidated as part of the primary catchment area, improvement of the slaughterhouse using the city government funds will be undertaken and operations will be managed by the private sector.

Financial analysis on scenarios 2, 3 and 4 indicate that the project is feasible from the point of view of the private investor. However, there are key considerations in ensuring the viability of this option. By financing the improvement of the slaughterhouse the city government will fulfill its mandate of providing services to its constituents and at the same will still generate revenue.

Key Considerations

As with Option B, this option requires that the city government of Tagbilaran City will secure an agreement with the Provincial Government of Bohol and the adjacent municipalities that the city slaughterhouse will exclusively cater to the catchment area, including points of delivery, to maximize operating potential. This would require the closure of the three public slaughterhouses in the adjoining municipalities.

Advantages

- The city will not be burdened by the challenges of managing the facility and ensuring its viability as an economic enterprise;
- Management by the private operator will not involve government bureaucracy and thus delays in procurement will be avoided and timeliness in the provision of essential supplies and materials as well as services will be ensured;

- There will be flexibility in operations and the slaughterhouse management can immediately respond to changes in the business environment and market forces by making timely adjustments or rectifications if needed;
- There will be an assured revenue stream in the form of rental fee and possible other benefits that can be derived from the management contract with the private sector; and
- Limited annual expenditures on the part of the city as operating and maintenance costs will be shouldered by the private operator.

Disadvantages

- The city has no direct control over the operations of the slaughterhouse;
- Revenues to be derived by the city will be on a fixed term basis in the form of rental fees as stipulated in the contract even if there will be accrued revenues later on as a result of increased operations by the private sector;
- The factors identified in Option 2 also applies as this option relies heavily on the consolidation of the three other public slaughterhouses in the catchment area which, if not realized or fully observed, viability will be jeopardized; and
- Possible disruptions in delivery of services in case of operational and administrative problems (i.e., workers' strike) encountered by private operator.

Option D: Full Public Private Partnership

The three public slaughterhouses will be consolidated as part of the primary catchment area, the City Slaughterhouse will be improved using private sector funds and managed by the private sector.

This option will enable the city government to engage in a potentially productive partnership with the private sector. Considering that the private partner will take charge of both improvement and operations, the needed capacity in terms of knowledge and skills of the city government departments tasked to manage the contract will now be on contract management and effective monitoring and evaluation of the private partner's performance.

Key Considerations

This option is anchored on the most ideal scenario that can maximize the demand for the slaughterhouse; catchment area that includes Tagbilaran City and the other adjacent municipalities, consolidation of the three other slaughterhouses and the completion of the new airport that will result to increased passenger arrivals.

In case the new Bohol International Airport does not push through, the project is still viable but is very sensitive to variables such as increase in costs, decrease in consumption or a combination thereof and on staff efficiency.

Advantages

- Full PPP arrangement will enable the city government to upgrade the slaughterhouse into AA category using private sector funds and avoid spending scarce government resources but still able to fulfil its mandate of providing slaughtering services;
- Full PPP will also enable the management to adopt corporate principles to streamline the various aspects of operations and improve the competitiveness of the enterprise;
- Considering that a private entity or PPP operator will undertake the improvement or upgrading there is a greater possibility of lower construction and equipment costs;
- Assuming that all preconditions are met, this option will have the potential to increase and expand operations to include export of meat to other provinces or regions; and
- Assuming favorable conditions, the addition of a cold storage facility can further boost the operations and coupled with good quality livestock, there is a potential of catering to the high end market.

Disadvantages

- Considering that the projected completion of the new airport will come after the intended rehabilitation of the slaughterhouse, the private sector might find it risky to fully assume the rehabilitation costs and there is a possibility that there will be no takers;
- Like Options B and C, this option is highly dependent on the institutional arrangement with the provincial government of Bohol and the other municipalities for the consolidation of operations and will require the closure of the three public slaughterhouses. Thus, risks arising from possible political transition may have to be considered;
- The city government will have no direct control over the improvement and operations of the slaughterhouse to be undertaken by the PPP operator;
- There are risks associated with possible termination of contract as a result of unfavorable conditions especially if financial and/or market assumptions will not happen; and
- Possible disruption in delivery of service in case of labor, administrative or financial problems encountered by PPP operator.

C. Overall Recommendations

1. Addressing the Risks

While the project is also viable using private sector's opportunity cost of capital and the issue on operational efficiency ensured if undertaken through a PPP arrangement, risks remain, such as the possible decrease in consumption and the non-realization of the new airport.

The completion of the new international airport will have a significant positive effect on the viability of the project. Nonetheless, considering that the projected completion of the new airport will come after the intended rehabilitation of the slaughterhouse, the private sector might still find it risky to fully assume the rehabilitation costs.

This can, however, be mitigated by ensuring the completion of the new international airport by 2020 and securing an inter-municipal agreement through the Provincial Government that existing public slaughterhouses within the proposed catchment area will cease to operate to capture the catchment area considered in this comprehensive study.

In case the new Bohol International Airport does not push through, the slaughterhouse project is still viable but is very sensitive to variables as to increase in costs, decrease in consumption or a combination of both and decrease in staff efficiency.

2. Metropolitan Arrangement for Rural-Urban Linkages

While Tagbilaran City is performing a key role as service center to the whole province of Bohol, it is also dependent on surrounding areas for the supply of raw materials such as livestock and other agricultural and fishery products. Consequently, the city will have to deal with the surrounding municipalities and even rural areas farther out where products are produced.

The Tagbilaran slaughterhouse is a manifestation of the need for an effective mechanism to facilitate rural-urban linkages that can maximize the potential and mutually benefit the city and adjacent local governments. A metropolitan arrangement can be explored with Tagbilaran City as the urban core and with the municipal governments assuming functional roles to promote complementation and cooperation.

3. Advocacy and Law Enforcement

The NMIS and the province will have to lead a massive campaign on minimizing backyard slaughtering and information/education campaign on the benefits of securing clean meat. Regulations such as transport of meat need strict implementation.

4. Alternative Option

With these remaining risks, the City of Tagbilaran may offer to finance the rehabilitation of the slaughterhouse to a maximum of Php6 million and for the private sector to bid for the rental on the use of the slaughterhouse. The bid should also include delivery services of clean meat and the repair and maintenance of the slaughterhouse while on lease.

Finally, the city will still have to evaluate the pricing of slaughterhouse fees to maintain acceptable and competitive meat prices and to enact the necessary enabling ordinances.

D. Technical Recommendations

If the City Government of Tagbilaran decides to proceed with rehabilitating the slaughterhouse, the following list provides recommendations for various components of the facility. The proposed floor plan for the rehabilitated slaughterhouse is also included as *Annex D* of the report.

1. **Water Supply** – An overhead water supply system with outlets fitted with water sprayer must be installed. It is best to introduce an air pressure tank to ensure that enough water pressure is generated during the slaughtering process and during the standard cleaning of the area. Water outlets must always be provided in every work station to ensure efficiency all throughout the process.

2. **Drainage Canal** – The canals and the steel grating covers must be repaired. If possible, tiles must be installed over the length of the canal for easy clean-up. The canal must have a slope of 1-1.5 percent with its flow coming from the clean area towards the dirty zone.
3. **Wastewater System** – The water lagoon must be de-silted and rehabilitated to regain its original function and efficiency. Canal must be drained towards the wastewater pond and must be cleaned-up and repaired regularly to ensure that wastewater will truly reach the lagoon. It is also helpful to establish catch basin along the canal towards the lagoon so that majority of the solids are already intercepted early on before it reaches the wastewater pond.
4. **Electrical** – A power and electrical control rooms must be set up where breakers and panel boards are specifically confined. Appropriate electrical conduits such as polyvinyl chloride (PVC) or electrical metallic tubing (EMT) pipes must be used. Flexible wires shall never be utilized as conduits. Moreover, the assistance and expertise of an electrical engineer must be engaged to ensure the safe and organized connection and placement of wire with appropriate tags in the panel boards. Industrial light bulbs and lamps, with cover, must be utilized and placed strategically to ensure and achieve the required luminance in the working area.
5. **Ventilation, Doors and Windows** – All openings, doors and windows must be braced with steel. Wood must no longer be used whether as principal material or braces. Also, to ensure that no insects or birds will have access inside the slaughterhouse, appropriate screens or plastic curtains must be installed.
6. **Physical Separator** – A concrete wall must be built to serve as a physical barrier to separate the offal area from the main work area of the slaughterhouse. The entry of the offal area must also be installed exclusively.
7. **Roofing** – The entire roof must be replaced with new and durable roof sheets. Epoxy pastes must be used to cover the gap and the screw area to prevent water from dripping from it. A couple of skylight roofing materials may also be used to allow natural light.
8. **Flooring** – Chip and re-plaster the floor and have it finished smoothly that makes clean-up a lot easier. The corners between floor and wall must not remain sharp but curved smoothly. Epoxy paint instead of tiles should be installed for safety reasons.
9. **Wall** – Walls should be repainted with white. If possible, ordinary latex paint should not be used as it fades easily. Use solvent based paints, such as liquid tile, to ensure durability.
10. **Personnel Space** – Office space and dressing room should be provided for the butchers by repairing the existing ones. Existing comfort rooms need to be rehabilitated.
11. **Equipment** – Scalding tank needs to be re-oriented. The scalding tank may also be moved to the side wall if the intention to use alternative solid fuel will be pursued. All the missing rubber flaps in the dehairing machine should be replaced or repaired. All the heavily dented equipment such as the staking table, platform and inspection tables should be repaired. Overhead rail should be de-rusted and repainted.

12. **Process flow** – Process flow of the slaughtering procedure needs to be reworked by directing its traffic towards ease, convenience and efficiency. Observance of off-floor slaughtering should be ensured.

Assuming that the management will adopt these recommendations, improved efficiency of the method and process of slaughtering will enable the facility to accommodate higher volumes of hogs and cattle per day. Faster slaughtering process will result in less operating time for the boiler translating to lower diesel fuel consumption.

A highly efficient facility only needs a minimum number of workers to run the entire operation resulting in higher net income for the LGU arising from increased revenue and lower operating costs. Moreover, the slaughterhouse will build a positive image as a facility that runs in accordance with good manufacturing processes which ensures clean and safe meat.

E. Environmental Recommendations

1. Impact Mitigation on Land

Changing Land-use. Under the current CLUP, the slaughterhouse compound is zoned as agri-industrial, while the adjacent area south is residential and neighboring area towards the west is light industrial. To avoid possible land use issues in the future, the city government should review the existing zoning classifications of the slaughterhouse compound and its neighboring areas and make possible amendments, if necessary.

Generation of Solid Wastes. The slaughterhouse must implement waste minimization, reuse and recycling, segregation, establish a temporary storage area and formulate a solid waste management system. In particular, the management should provide special containers with labels for residuals such as animal hairs, nails, etc. to avoid contamination or outbreak of disease. The City Government of Tagbilaran should negotiate with the municipality of Albuquerque for the use of the sanitary landfill to dispose of residual waste.

Soil Erosion. To minimize soil erosion, the management and contractor should establish structural erosion and sediment control measures to divert storm water from the exposed areas and reduce the erosive forces of the runoff water.

Vegetation Loss and Wildlife Disturbance. During rehabilitation, some vegetation may have to be removed, but this could be replaced by planting trees and ornamentals around the periphery of the property. ECC condition requires the planting of thick strip of trees to act as buffer from nearby residents and other establishments.

2. Impact Mitigation on Water

Water Pollution. To prevent or abate any water pollution problems, the proponent shall introduce various wastewater control techniques, including (1) establishment of an effective wastewater treatment plant; (2) repair and maintenance of three-chambered lagoon for aerobic and anaerobic treatment of effluent; (3) regular monitoring of water quality of effluent; (4) channeling drainage system from the main building, the holding pens and other ancillary facilities and structures towards the slaughterhouse to prevent spillage and leakage; and (5) regular removal of grey, sewage and silts in catch basins.

For domestic wastewater generated, toilet and washroom facilities in the slaughterhouse should be provided with a two-chambered septic tank in compliance with PD No. 856, otherwise known as the Sanitation Code of the Philippines.

Groundwater Contamination. To prevent groundwater contamination, drainage system from the main building, the holding pens and other ancillary facilities and structures must be channeled towards the slaughterhouse to prevent spillage and leakage. To oversee possible changes on the quality of groundwater extracted, the City Waterworks System should perform continuous monitoring of groundwater of the pumping stations in Barangay Tiptip for total coliform, fecal coliform, alkalinity, Ca, K, Na, HCO₃, etc.

Increase in Water Demand. To avoid water competition with residents, the slaughterhouse will draw most of its water requirement from a deep well and the combined daily capacity of the water supply to ensure adequate water supply. Other measures include water recycling, water conservation and regular maintenance of the water system.

Generation of Oil and Grease. To reduce hazards from diesel-fueled generators, the staff should properly maintain the equipment to avoid any leakage. The used oil, diesel fuel and grease should be properly stored in a designated area.

3. Impact Mitigation on Air

Generation of Nuisance Odor. To mitigate nuisance odor, appropriate control measures should be undertaken such as regular cleaning and housekeeping; proper handling and disposal of waste; and planting a thick strip of vegetation as buffer to minimize nuisance odor to the nearby community.

Generation of Noise. The contractor or management should provide mufflers or noise suppressors to heavy equipment or machinery during construction phase and limit construction activities during daytime. The property should also be enclosed to keep noise within the compound.

Generation of Dust and Particulate Matters. Controlled and periodic wetting of exposed cleared areas within the project site is recommended to reduce dust and particle dispersion.

Generation of Smoke and Emissions from Delivery Trucks, Heavy Equipment and Generator. The contractors should be required to conduct appropriate maintenance activities on their equipment prior to the start of the rehabilitation and regularly thereafter to minimize air pollutants. Air pollution control devices are needed for the standby generator.

4. Impact Mitigation on People

Threat to Health and Sanitation. To mitigate threats to health and sanitation, the slaughterhouse operator will implement efficient housekeeping and proper sanitation by cleaning the facilities immediately after each slaughter operation; regularly spraying of environment-friendly deodorizer/sanitizer; providing workers with personal protective equipment (PPE); regularly conducting health check-ups among workers; and properly medicating workers if sickness occurs.

Good Housekeeping and Hygiene. Overall, the project area must be kept clean and tidy at all times. The operator shall ensure that the working area is cleaned at the end of each workday; wastes are properly disposed; and workers observe good personal hygiene. Comfort and washing rooms, sanitation room and personal space should be established as part of the facility upgrading.

Increase Exposure from Contaminants. To prevent contamination of meat, the project should prevent the entry of stray animals from the area; enclose the building to ensure quality meat fit for human consumption; construct separate access gates for clean and dirty areas; impose sanitation and hygiene measures for workers (including wearing PPE); construct personnel space for changing and dressing; refurbish washing rooms; construct sanitation room with sanitizer and hygienic products; and require foot baths.

Increase Traffic Situation in the Area. To address potential traffic congestion, the slaughterhouse operator should assign a traffic officer in coordination with the barangay; to manage vehicular traffic. Improper parking of vehicles along the barangay road shall also be disallowed and appropriate traffic signage should also be installed for smoother traffic flow.

Enhancing Socio-Economic Benefits (Increase Local Benefits). The project is expected to increase the tax base of the city government, generate local employment and stimulate additional economic activities in the community. These positive impacts can be further enhanced by requiring the slaughterhouse operator to prioritize the hiring of local residents especially for non-skilled positions.

Regular and timely payment of taxes will also be encouraged to increase the capabilities of the LGU to provide adequate and timely social services to its constituents.

Overall, the economic benefits from the project are increased employment opportunities, increase in income, better health and sanitation and improved general welfare of the consumers by providing the market with safe and quality meat products.

The project will strictly comply with relevant local and national laws such as NMIS Guidelines, Sanitation Code of the Philippines and other environmental rules and regulations to ensure effective and compliant operations.

Annexes

Annex A. Report on the Pre-Feasibility Study for the Upgrading of the Tagbilaran City Slaughterhouse



USAID
FROM THE AMERICAN PEOPLE

Annex A

PRE-FEASIBILITY STUDY FOR THE UPGRADING OF THE TAGBILARAN CITY SLAUGHTERHOUSE

Strengthening Urban Resilience for Growth with
Equity (SURGE) Project

CONTRACT NO. AID-492-H-15-00001

JANUARY 27, 2017

This report is made possible by the support of the American people through the United States Agency for International Development (USAID). The contents of this report are the sole responsibility of the International City/County Management Association (ICMA) and do not necessarily reflect the view of USAID or the United States Agency for International Development.

PRE-FEASIBILITY STUDY FOR THE UPGRADING OF THE TAGBILARAN CITY SLAUGHTERHOUSE

Strengthening Urban Resilience for Growth with
Equity (SURGE) Project

CONTRACT NO. AID-492-H-15-00001

Program Title:	USAID/SURGE
Sponsoring USAID Office:	USAID/Philippines
Contract Number:	AID-492-H-15-00001
Contractor:	International City/County Management Association (ICMA)
Date of Publication:	January 27, 2017

Contents

I.	Introduction	4
II.	Current Condition of the Tagbilaran City Slaughterhouse	5
	A.Catchment Area of the Slaughterhouse	5
	B.Assessment of the Slaughterhouse's Infrastructure Condition	5
	C.Operating Capacity	6
III.	Demand and Supply Analysis	7
	A.Demand Analysis	7
	B.Supply Analysis	9
IV.	Financial Analysis	12
	A.Options	12
	B.Assumptions	12
	C.Results	14
V.	Recommendations	19
	A.Options Prior to the Conduct of a Full-blown Feasibility Study	19
	B.Economic Analysis	19
	C.Technical Recommendations	20
	D.Next Steps	21

Tables

Table 1. Projected Demand for Various Types of Meats in the Targeted Catchment of the Tagbilaran Slaughterhouse	8
Table 2. Projected Passenger Arrivals (In Thousand)	9
Table 3. Livestock Sufficiency Level in Bohol, 2013-2015 (In %)	10
Table 4. Current Operating Level of Private Slaughterhouses	10
Table 5. Base Scenario and Scenario 1: Catchment Area includes Tagbilaran City and 11 Municipalities	15
Table 6. Scenario 2: Catchment Area includes Tagbilaran, 11 Municipalities and Passenger Arrivals at the Old Bohol Airport	16
Table 7. Scenario 3: Catchment Area includes Tagbilaran, 11 Municipalities and Passenger Arrivals at the New Bohol International Airport	16

Acronyms

BQ	Bohol quality slaughterhouse
CDI	Cities Development Initiative
EIA	Environmental impact assessment
EMT	Electrical metallic tubing
ICMA	International City/County Management Association
IRR	Internal rate of return
LGU	Local government unit
NEDA	National Economic and Development Authority
NMIS	National Meat Inspection Service
NPV	Net present value
PPDO	Provincial Planning and Development Office
PPP	Public-private partnership
PVC	Polyvinyl chloride
PSA	Philippine Statistics Authority
ROE	Return on equity
SURGE	Strengthening Urban Resilience for Growth with Equity
USAID	United States Agency for International Development

I. Introduction

The Strengthening Urban Resilience for Growth with Equity (SURGE) Project is an award of the Philippines Mission of the U.S. Agency for International Development (USAID) to the International City/County Management Association (ICMA). The period of performance is five years from July 27, 2015 to July 26, 2020. The SURGE Project is an activity in support of USAID/Philippines' Cities Development Initiative (CDI). The CDI is a crucial component of the broader Partnership for Growth, a White House initiated "whole-of-government" partnership between the U.S. Government and the Government of the Philippines.

The SURGE Project's development hypothesis is that secondary cities serve as agents of growth and contribute to the improved welfare of both urban and rural populations. To realize this objective, USAID approved the project's first year work plan with three components: (1) improving local capacity in inclusive and resilient urban development; (2) promotion of low emission local economic development strategies; and (3) expanding economic connectivity and access between urban and rural areas.

To increase access and connectivity between rural and urban areas, the SURGE Project aims to strengthen supply chains as one of its strategies. In April 2016, Tagbilaran City requested the assistance of SURGE Project conduct feasibility study of upgrading Tagbilaran City Slaughterhouse's current National Meat Inspection Service (NMIS) back to its former Double A ("AA") classification standard. The deteriorating slaughterhouse was initially managed by the private sector and then passed on to the present administration.

Given the potential of the slaughterhouse and Tagbilaran City to be the hub of meat inspection and distribution, the project provided technical assistance in preparing a pre-feasibility study for the upgrading of the city's slaughterhouse, in partnership with Winrock International/Philippine Cold Chain Project. The project conducted a reconnaissance survey in June 2016, which involved an ocular inspection of the state of the slaughterhouse's facilities, equipment, and operation procedures.

The pre-feasibility study of the Tagbilaran City Slaughterhouse is a preliminary document and partially covers output 3.3.1.3.1 of SURGE Project's year 1 approved work plan, i.e. Comprehensive Analysis of Tagbilaran City's Slaughterhouse. The report includes the economic and financial analysis of rehabilitating the slaughterhouse, taking into account various demand scenarios and risks that may arise from deviations in some cost and consumption projections. It is a consolidation of reports and documents prepared by SURGE Project's Batangas City Program Coordinator (Dondon Almonacid) and Winrock International/ Philippine Cold Chain Project. The pre-feasibility study, however, was constrained by lack of data on public slaughterhouses near Tagbilaran City and the limitations of the financial records of the city's slaughterhouse.

II. Current Condition of the Tagbilaran City Slaughterhouse

A. Catchment Area of the Slaughterhouse

The catchment area of the Tagbilaran Slaughterhouse is delineated within the immediate and adjoining municipalities of the city, which are within a 30-minute commute. These are Tagbilaran, Cortes, Maribojoc, Antiquera, Loboc, Loay, Albuquerque, Panglao, Daus and Baclayon. The roads leading to Tagbilaran City from these municipalities are paved and in good condition. Based on interviews with market goers, most of the respondents in these municipalities travel to the city to buy their household requirements.

Each of these municipalities has its individual market that is also used for *tabo-an (trading)* day, the day when local producers sell their farm products in the site. *Tabo-an* is held twice a week in Maribojoc and once a week in the rest of the municipalities. On ordinary days, market operations start at 6 a.m. and ends at 10 a.m. Only Maribojoc resumes market operation around 3 p.m. to 5 p.m. The Central Public Market and Cogon Market, including five supermarkets (Island City Mall, Alturas Mall, Plaza Marcela, BQ Superstore and Shopper's Mart) in Tagbilaran City operate throughout the day.

The nearby municipalities such as Loon, Balilihan, Sevilla, Lila, Dimiao, Calape, and Bilar have access to Tagbilaran City by other modes of transportation (i.e., jeepney, minibus, van, and private car) and also conduct market activities in Tagbilaran City. These areas can be accessed within 30 to 45 minutes.

B. Assessment of the Slaughterhouse's Infrastructure Condition

The Tagbilaran City Slaughterhouse is situated in a separate but spacious fenced area from the residential areas. The structure shows integrity without strain, cracks or reinforcement problems. It, however, urgently needs repair and rehabilitation on its aesthetics, functionality and other significant components such as drainage, water supply, waste water system, electrical wire networks. Listed below are the assessment of its infrastructure facilities:

- **Water Supply** – The water supply system is inefficient. Water outlets are not strategically placed in the working area.
- **Drainage** – Improper water drainage and heavily worn-out flooring causes water spills and water leakage to the working area.
- **Wastewater System** – The wastewater pond is no longer functioning, hence, the wastewater being released does not pass through the required process of aerobic treatment.
- **Electrical** – There is no proper electrical wire connections as the wires are not encased in standard electrical conduits. Breakers and panel boards are exposed. Lighting is also poor, particularly in the working area.
- **Ventilation, Doors and Windows** – Ventilation openings are not provided with standard insect screens. Most of the doors and windows are either missing or already dilapidated. The windows also lack appropriate screens.
- **Physical Separator** – There is no physical separator, such as a concrete wall, between the butchering area and the offal area.

- **Roofing** – Most of the roof sheets are heavily dilapidated. Some of the roof frames also need repair or replacement.
- **Flooring** – The floor badly needs repairs. The termination between the wall and the floor has a sharp corner angle and not curved.
- **Walls** – Repainting is needed.
- **Personnel space** – There is no room designated for the staff to change, rest or wash. Toilets for staff use must be made available.
- **Equipment** – Although in running condition, the scalding tank and de-hairing machine need to be upgraded. The rest of the equipment such as the offal table, tool dip and gambrel are heavily dented and need to be replaced.
- **Process Flow** – There must be an efficient way in the slaughtering process.

C. Operating Capacity

The Tagbilaran City Slaughterhouse butchers about 60 swine and a cattle every day. Presently, the facility, which has 55 staff managed by a former barangay captain, has the following manpower complement: 15 butchers, 32 support staff, three meat inspectors and four security guards. The daily production to staff ratio is 1 head: 1 staff, which is less efficient compared to the privately operated slaughterhouses at 3 heads: 1 staff.

III. Demand and Supply Analysis

The economic analysis for the proposed project was conducted initially by assessing the demand and supply conditions for meat that will be processed in the slaughterhouse.

A. Demand Analysis

The demand study aims to determine the number of swine, cattle and carabao that can be butchered as part of the proposed rehabilitation of the Tagbilaran Slaughterhouse. In estimating the demand, the project considered the following: population projections, estimates of meat consumption and sources of demand. As a general rule, the assumptions used were based on the secondary data and key informant interviews. The project adopted conservative estimates of the revenue streams but used relatively higher assumptions for cost.

- *Population projections.* The study used the assumed population growth rate of the Provincial Planning and Development Office (PPDO) of Bohol Province of 0.097 percent growth. This is lower than the 2.3 percent assumption of the Philippine Statistics Authority (PSA) for the province.
- *Meat consumption.* Since there are no estimates of meat consumption for the province, the national per capita meat consumption figures of 5.68 kilos pork, 0.52 beef and 0.15 kilos carabeef (carabao meat) were used in the analysis.
- *Sources of Meat Demand.* There are three possible sources of demand for meat that used in the analysis.
 - (1) The catchment area, which includes the municipalities of Tagbilaran, Cortes, Maribojoc, Antequera, Loboc, Loay, Alburquerque, Panglao, Corella, Dauis and Baclayon, is assumed to be the major source of demand for the services of the slaughterhouse. A demand projection was established using the estimated population of these towns and the national per capita consumption for various types of meet (*Table 1*).
 - (2) Other nearby municipalities such as Loon, Balilihan, Sevilla, Lila, Dimiao, Calape, and Bilar, which have access to Tagbilaran City, were not included in the catchment area but assumed to be part of the buffer demand.
 - (3) Tourists in Tagbilaran City are another source of demand for meat. Two scenarios were considered:
 - A status quo scenario on tourist arrivals in case the New Bohol International airport will not push through.
 - A scenario that assumes the operations of the new Bohol International Airport in the island of Panglao.

Table 1. Projected Demand for Various Types of Meats in the Targeted Catchment of the Tagbilaran Slaughterhouse

Towns Considered as Catchment Area	2010 Population	Projected Population (2043)
Tagbilaran	96,792	128,604
Cortes	15,294	20,133
Maribojoc	20,491	24,577
Corella	7,699	10,523
Antequera	14,481	19,304
Loboc	16,312	10,523
Loay	16,261	21,871
Alburquerque	9,921	21,668
Panglao	28,603	37,480
Dausis	39,448	51,691
Baclayon	18,630	25,180
Total Population	283,932	371,554
Estimated Consumption (kg)		
Pork	1,613,585	2,110,426.72
Beef	148,213	193,208.08
Carabao	41,170	55,733.10
Total Estimated Consumption (kg)	1,802,968	2,359,368

In the feasibility study of the New Bohol International Airport, it is projected that the current passenger arrivals at the old airport triples if the project is completed by 2020. The limited circulation airport study prepared three passenger arrival scenarios - low, medium and high (*Table 2*). A low 15 percent of the medium scenario was taken into consideration in this pre-feasibility study. It is assumed that this passenger segment, which is composed of economy travelers who are usually not billeted at three-star accommodations, will end up staying within the catchment areas to be served by the Tagbilaran City slaughterhouse. Hence, this is accounted as additional consumption within the catchment area.

The demand did not account for the occasional surge in meat demand during festivals and other celebrations within the catchment areas. During the interviews with the public slaughterhouse operators, they noted that surges in slaughtering requirements happen during festivals or town fiestas, Christmas season (from December to January) and during graduation ceremonies (usually in March).

Table 2. Projected Passenger Arrivals (In Thousand)

Case	CY	Air Passenger Demand									
		Domestic (*1)		International (*2)						Grand Total	
		Number	G/R (%)	Scheduled	G/R (%)	Non-Scheduled	G/R (%)	Total	G/R (%)	Number	G/R (%)
Actual	2010	572	0.0		0.0		0.0		0.0	572	0.0
Low Case	2015	898	9.4	0		2		2		900	9.5
	2020	1,125	4.6	0		6	19.0	6	19.0	1,131	4.7
	2025	1,295	2.8	41		10	10.5	50	53.4	1,345	3.5
	2030	1,343	0.7	125	25.1	12	4.1	137	22.0	1,479	1.9
	2035	1,414	1.0	149	3.7	15	5.1	164	3.8	1,579	1.3
	2040	1,469	0.8	171	2.8	18	2.8	189	2.8	1,658	1.0
Medium Case	2015	1,037	12.6	0		3		3		1,040	12.7
	2020	1,393	6.1	34		8	23.2	43	71.0	1,436	6.7
	2025	1,566	2.4	124	29.3	12	7.4	136	26.1	1,702	3.5
	2030	1,773	2.5	167	6.1	17	7.7	185	6.3	1,958	2.8
	2035	1,937	1.8	246	8.0	21	4.6	268	7.7	2,205	2.4
	2040	2,117	1.8	298	3.9	26	4.0	324	3.9	2,441	2.1
High Case	2015	1,185	15.7	0		3		3		1,188	15.7
	2020	1,615	6.4	40		10	23.5	50	71.4	1,665	7.0
	2025	1,908	3.4	153	30.7	16	10.0	169	27.6	2,077	4.5
	2030	2,231	3.2	252	10.4	22	7.0	274	10.1	2,505	3.8
	2035	2,590	3.0	333	5.8	29	5.9	362	5.8	2,952	3.3
	2040	2,960	2.7	422	4.8	37	4.9	459	4.8	3,419	3.0
	2045	3,342	2.5	518	4.2	45	4.2	563	4.2	3,905	2.7

Notes: (*1) including some new route between Bohol and other islands; (*2) 4 new routes (Bohol-Shanghai, Bohol-Hongkong, Bohol-Taipei & Bohol-Seoul) and charter flights to/from many Asian countries; (*3) excluding international cargoes and domestic cargoes of new domestic routes

G/R – refers to growth rate

Source: JICA Study Team for New Bohol International Airport Draft Final Report

B. Supply Analysis

The supply of meat in Tagbilaran City comes from locally grown livestock from the nearby areas and frozen meat shipped from outside the city like Cebu and Manila.

1. Livestock Sector in Tagbilaran City

Based on data from the Provincial Veterinary Office of Bohol, the province is self-sufficient in most of the meat-related commodities from the livestock sector. Except for cattle beef, the sufficiency level has been increasing from 2013-2015 indicating a possible uptick in the number of livestock in the province (Table 3).

Table 3. Livestock Sufficiency Level in Bohol, 2013-2015 (in %)

Commodity	2013	2014	2015
Carabao Beef	654	677	688
Chicken Meat	239	270	284
Cattle Beef	438	449	428
Pork	371	380	390
Goat Chevron	661	716	760
Chicken Egg	73	85	94
Duck Meat	129	141	113
Duck Egg	40	44	53

Source: Provincial Veterinary Office, Bohol

2. Other Slaughterhouses

Private Sector Slaughterhouses

Two private AA-certified slaughterhouse facilities operate within the catchment area - the Alturas Group of Companies in Daus and the Bohol Quality Slaughterhouse (BQ) in Corella. Both cater to their supermarkets in Tagbilaran City and Cebu City. Their facilities and operations are strictly for company use. Based on observation, the facility of BQ has a bigger operating capacity than Alturas, given its larger floor area, and appears to be more systematic. However, it has no cold storage facility compared to Alturas.

Based on interviews, the Alturas Group of companies' current capacity is thrice as much in swine head slaughtered per day at 60 heads than BQ's 20 heads (*Table 4*). A manager, five butchers, six security guards, and eight support staff operates Alturas' slaughterhouse.

Table 4. Current Operating Level of Private Slaughterhouses

Name of Facility	Swine Heads per day	Cattle Heads per day	Number of Personnel
Alturas Group of Companies	60	none	20
Bohol Quality Slaughterhouse	20	1	Undisclosed

Alturas' meat products sold at supermarkets are priced higher by Php10 to Php20 a kilo compared to those at public markets. About half of the meat produced from the Alturas slaughterhouse is shipped to Alturas' supermarkets in Cebu.

Public Sector Slaughterhouses

The municipalities of Maribojoc, Antequera and Loboc in Bohol operate their respective public slaughterhouses that are classified as non-double A. These local governments heavily subsidize the operations of the slaughterhouses since not enough revenues can be generated to cover operating costs. For instance, the maximum slaughter in these slaughterhouses cannot even reach two swine heads per day. The revenues generated from the slaughter fees and the market stalls are not enough to even pay the two salaried personnel employed to operate the

slaughterhouses and other operating expenses such as water, electricity and supplies. Slaughterhouse staff is also employed for market operations to maximize efficiency.

The three public slaughterhouse facilities need improvement, repair and maintenance. Based on interviews, these public slaughterhouses supply meat to other municipalities, violating NMIS regulations, which specifies that only meat from AA-certified slaughterhouse facilities can cross municipal borders and be sold to other markets.

During interviews with the City and Provincial Veterinarians, most local governments also permit backyard slaughtering for meat to be used by the family use or at areas far from public slaughterhouses, with Php50 levy imposed for each head of swine slaughtered at the backyard.

Antequera is enforcing a different strategy for swine slaughtering wherein the pick-up, drop-off and butchering of swine are entrusted to the meat vendor's butchers. Meat vendors then recover fees on a per-kilo-of-meat basis. Antequera meat vendors, however, sell meat to Maribojoc and Cortes.

3. Meat from other Areas

Based on the interview with Dr. Estela Lapiz (Provincial Veterinarian), Dr. Victoria Limbaga (Tagbilaran City Veterinarian), and Mr. Eduardo Seroje of the Provincial NMIS, frozen pork and beef in the province are also sourced primarily from Cebu City or Manila and are usually intended for Class A resorts and high-end restaurants catering to foreign tourists. These meats are characterized by special and uniform cuts of pork, beef and lamb needed for a variety of dishes in resorts and restaurants. There are no frozen meat distributors in the province. In 2015, the Veterinary Quarantine Services recorded a shipment of about 71,862 kilos of pork, which went down to 60,271 kilos in 2016. The peak for frozen meat shipments from other areas occurs between the summer months of January and April.

IV. Financial Analysis

A. Options

Tagbilaran City's Slaughterhouse must continue to operate with efficient and optimum sanitation standards that will benefit the general public. Hence, the study considered the following options for improving the efficiency and viability slaughterhouse:

- 1. Status Quo.** The city government improves the slaughterhouse infrastructure using its own capital outlay. The city also streamlines the slaughterhouse operations. The management and operations of the slaughterhouse, however, will remain with the city government.
- 2. Consolidation and Local Government Unit (LGU) operation.** The three public slaughterhouses (in Maribojoc, Antequera and Loboc) will be consolidated as part of the primary catchment area for the Tagbilaran City Slaughterhouse. The Tagbilaran City government will improve the slaughterhouse using its capital outlay and also oversee its management and operation.
- 3. Public Private Partnership limited to operation and management.** Similar to option 2, the three public slaughterhouses will be consolidated as part of the primary catchment area with the Tagbilaran City government improving the slaughterhouse through its capital outlay. Operation of the slaughterhouse however will be managed by the private sector.
- 4. Full Public-Private Partnership (PPP).** The three public slaughterhouses will be consolidated as part of the primary catchment area with the Tabilaran City Slaughterhouse to be improved and managed by the private sector.

Tagbilaran City and the Provincial Government of Bohol may need to deliberate on the best option for the catchment area that the city slaughterhouse will exclusively serve to maximize its operating potential. These options will be tested using the preliminary financial analysis in the succeeding sections. Option 4 will be subject to additional tests, e.g. return on equity (ROE), to determine if there will be sufficient returns for potential investors, which would then imply additional capitalization for the project.

B. Assumptions

As a general rule and similar to the demand and supply section, the assumptions used were based on secondary data and key informant interviews. All revenue streams are always on the conservative side and the cost streams are on the optimistic side.

Based on the population data and per capita consumption, the number of swine and cattle/carabaos being processed through the City Slaughterhouse can be determined. Using the four options, the Slaughterhouse Project was subjected to a financial analysis testing each of the project approaches to determine the most efficient way of running the slaughterhouse.

For the first option, only the residents of Tagbilaran City would be the catchment for the City Slaughterhouse. The cost of using delivery vans, however, was not considered.

1. Receipts

The receipts for the slaughterhouse facility would come from the following fees: corral (Php5 per head per day), holding (Php5 per head), slaughter (Php2.75 per kilo), and ante and post mortem (Php0.25 per kilo) fees. The existing fees based on current practices were increased by 10 percent every five years starting 2019. The ante and post-mortem fees were also reduced by 25 percent.²⁹

2. Cost

The costs were derived from the assumption that the facility would be operated based on an AA classification standard with lean staffing and its operations are going to be run similar to a private enterprise. All costs were applied with a five-year average rolling inflation based on 2010-2015 historical data.³⁰ It was assumed that the inflation factor would cover salary increases.

Specific assumptions on different cost categories are explained below.

- **Capital Outlay.** The pre-feasibility engineering design for the slaughterhouse was estimated at around Php4 million, which includes civil work, equipment purchase, labor, and contingencies. The rehabilitation cost will be incurred for two fiscal years. The value of the current structure was not included in the financial analysis.

The capital outlay would also include the purchase of delivery vans for options that would require such. An amount for vehicle maintenance was allocated every year. The van repurchase was programmed every six years.

Since the building is already old and would only be rehabilitated, a maintenance cost was allocated every four years.

- **Personnel Cost.** Staffing was based on the assumption that the average swine to staff ratio is 3:1 at an average salary of Php12,000 per month including overtime pay for night differentials, holidays, Saturdays and Sundays. The operation would start at 18 staff, which would gradually increase to 23 within the 25-year study period. The regular operating period would start at 10 p.m. and end at 5 a.m. the following day.
- **Utilities and Supplies.** Utilities were based on the number of heads that would be processed at the facility: water at 0.5 cubic meter and electricity at 0.5 kilowatt-hour per head. Fuel cost, on the other hand, was based on a daily route of 200 kilometers to service all the towns that the facility would cover. Office supplies were also accounted for at approximately Php5,000 per month.
- **Contingency.** To cover for unforeseen costs, a 10-percent contingency of all the costs was included in the projection.

²⁹ Two other possible sources of income for the slaughterhouse are (1) selling the biogas produced from the collected waste at the facility; and (2) imposing a delivery charge per head of swine. However, these were not considered due to lack of information.

³⁰ Bangko Sentral ng Pilipinas. (n.d.). Economic and financial statistics. Retrieved from http://www.bsp.gov.ph/statistics/efs_prices.asp

3. Feasibility Parameters

The financial feasibility of pursuing the slaughterhouse rehabilitation and managing its operations were determined using two complementary indicators - internal rate of return (IRR) and the net present value (NPV). The National Economic and Development Authority (NEDA) is currently using these indicators for public infrastructure projects.

The IRR is the discount rate used in capital budgeting that makes the NPV of all cash flows from a particular project equal to zero. In general, the higher a project's IRR compared to other investment options, the more desirable and favorable it is to undertake the project. As such, the IRR can be used to rank several prospective projects. IRRs can also be compared against prevailing rates of returns that the LGU can invest in. The resulting IRR, on the other hand, can also be compared to the usual investment option of local governments which is time deposit (usually at 1.25 percent for Landbank of the Philippines/Government Financial Institution) or the latest T-bill rate (at 1.723 percent as of first quarter of 2016).

Since the T-bill rate was higher at the time when the pre-feasibility study had been developed, it would be used as the cost of capital for the LGU. Two of the four options, however, necessitate the need to look at private sector involvement, for which the hurdle rate of 12 percent could be used for the analysis. This could increase if the risk was too high or if there were other viable projects available for investment.

The NPV is the difference between the present value of the cash inflows and the present value of the cash outflows. It compares the value of the peso today with the value of that same peso in the future taking into account inflation and returns. Therefore, if the NPV is zero or positive, then it indicates that the project is favorable.

4. Current Financial Records of the Slaughterhouse

In the slaughterhouse's financial record provided by the City Accountant's Office (see *Annex C*), it was noted that while there had been a net cash flow over five years, there had been expense items that were not consistently recorded such as water, fuel, oil, office supplies, and salaries. It would be impossible to run the facility without costs incurred under these items.

It appears that in Tagbilaran City, similar with other local governments' declared local economic enterprises, salaries are all lumped into the "other maintenance and operating expense" and, therefore, most of the salaried personnel are hired as job orders or casual.

C. Results

1. Case studies/ Scenarios

The base case analysis covered four cases assuming different demand assumptions; (1) Case 1 - the catchment area will be limited to Tagbilaran City; (2) Case 2 - the catchment area will be expanded to other adjacent towns; (3) Case 3 - the catchment area will be expanded to other municipalities and the status quo on passenger arrivals in the old airport; and (4) Case 4 - the catchment area will be expanded to other municipalities and additional passenger arrivals arising from the completion of the new airport.

Base Scenario. The base case scenario, wherein the catchment area will be limited to Tagbilaran City, resulted in a 10 percent IRR and a positive NPV of Php6.8 million (*Table 5*). This scenario

did not include the cost of a van, maintenance of the van and fuel. The opportunity cost of the project is 2 percent using the latest T-bill rate. Hence, the project is feasible from the viewpoint of the city.

Table 5. Base Scenario and Scenario 1: Catchment Area Includes Tagbilaran City and 11 Municipalities

Scenarios	Internal Rate of Return (%)	Net Present Value (Php)
Catchment area is limited to Tagbilaran City	10	6,794,550.59
Catchment area is beyond Tagbilaran City	13	482,090.48
10% increase in cost	12	12,410.67
20% increase in cost	11	- 480,539.02
10% decrease in consumption	11	- 502,218.81
20% decrease in consumption	8	- 1,509,797.99
Decrease in efficiency at 2:1	(n/a)	- 21,005,428.48
Simultaneous scenario of 10% increase in cost 10% decrease in consumption	10	- 995,168.50
Simultaneous scenario of 10% increase in cost 10% decrease in consumption Decrease in efficiency at 2:1	(n/a)	- 20,333,935.57
Simultaneous scenario of 10% increase in cost 20% decrease in consumption Decrease in efficiency at 2:1	(n/a)	- 19,192,726.85
Simultaneous scenario of 20% increase in cost 20% decrease in consumption Decrease in efficiency at 2:1	(n/a)	- 19,685,712.54

Scenario 1. The scenario wherein the catchment area will be expanded to other adjacent towns, resulted to a 13 percent IRR and a positive NPV of Php482,090 (*Table 5*). This means that the project is feasible at current assumption from the point of view of the private investor. However, given the low results of the financial indicator, there is a need to test the project to major risks affecting the viability.

Scenario 2. The case scenario wherein the catchment area will be expanded to other adjacent towns and the status quo passenger arrival using the old airport resulted to an 18 percent IRR and a positive NPV of Php2.8 million (*Table 6*). This means that the project is feasible at current assumption from the point of view of the private investor. However, given the low results of the financial indicator, there is a need to test the project against major risks affecting the viability.

Table 6. Scenario 2: Catchment Area includes Tagbilaran, 11 Municipalities and Passenger Arrivals at the Old Bohol Airport

Scenario	Internal Rate of Return (%)	Net Present Value (Php)
Catchment area is beyond Tagbilaran City + 15% of Passenger Arrival (medium scenario)	18	2,820,157.00
10% increase in cost	17	2,350,437.73
20% increase in cost	15	1,857,528.04
10% decrease in consumption	16	1,835,848.24
20% decrease in consumption	14	804,999.18
Decrease in efficiency at 2:1	(n/a)	- 23,441,153.11
Simultaneous scenario of 10% increase in cost 10% decrease in consumption	16	1,812,578.35
Simultaneous scenario of 10% increase in cost 10% decrease in consumption Decrease in efficiency at 2:1	(n/a)	- 22,299,980.39
Simultaneous scenario of 10% increase in cost 20% decrease in consumption Decrease in efficiency at 2:1	(n/a)	- 21,158,807.67
Simultaneous scenario of 20% increase in cost 20% decrease in consumption Decrease in efficiency at 2:1	(n/a)	- 21,158,807.67

Scenario 3. The scenario wherein the catchment area will be expanded to other adjacent towns and the completion of the new airport resulting to increased passenger arrivals resulted to a 25 percent IRR and a positive NPV of Php7.5 million (*Table 7*). The project is feasible at current assumption from the point of view of the private investor. However, given the low results of the financial indicator, there is a need to test the project versus major risks affecting the viability.

Table 7. Scenario 3: Catchment Area includes Tagbilaran, 11 Municipalities and Passenger Arrivals at the New Bohol International Airport

Scenario	Internal Rate of Return (%)	Net Present Value (Php)
Catchment area is beyond Tagbilaran City + 15% of Passenger Arrival (medium scenario)	25	P 7,496,290.06
10% increase in cost	24	P 7,026,610.25
20% increase in cost	22	P 6,533,660.56
10% decrease in consumption	23	P 6,511,980.77
20% decrease in consumption	22	P 5,504,401.59

Scenario	Internal Rate of Return (%)	Net Present Value (Php)
Decrease in efficiency at 2:1	(n/a)	- P 28,289,331.08
Simultaneous scenario of 10% increase in cost 10% decrease in consumption	22	P 6,019,031.08
Simultaneous scenario of 10% increase in cost 10% decrease in consumption Decrease in efficiency at 2:1	(n/a)	- P 27,641,108.05
Simultaneous scenario of 10% increase in cost 20% decrease in consumption Decrease in efficiency at 2:1	(n/a)	- P 26,030,255.53
Simultaneous scenario of 20% increase in cost 20% decrease in consumption Decrease in efficiency at 2:1	(n/a)	- P 26,992,885.02

2. Sensitivity Analysis

The three scenarios above were tested in the sensitivity analysis, where consumption is based on: (1) current catchment area (Tagbilaran City and 11 Municipalities); (2) catchment area including existing passenger arrivals; and (3) catchment area including passenger arrivals due to the intended completion of the New Bohol International Airport in 2020.

These scenarios were subjected to a sensitivity analysis to determine which risk areas would cause financial distress in operating and managing the slaughterhouse. These include an increase in project/rehabilitation cost up to 20 percent, a decrease in revenues up to 20 percent, operational efficiency decreased to two heads per swine per staff, and any or all of the combinations of these three.

Operational efficiency was focused on the number of swine per staff since the biggest cost component of operating the slaughterhouse is salaries. The financial model was largely hinged on the number of swine to be slaughtered and the number of staff needed to carry out the task.

Tables 5-7 show the results of the sensitivity analyses using whole of project scenario. In the three simulations, the project is sensitive to a decrease in production efficiency from 3 heads: 1 staff to 2 heads: 1 staff. The project must maintain operating efficiency at 3 heads: 1 staff at any given time. If the project is to capture 15 percent of the passenger arrival as part of the catchment population for the slaughterhouse facility, the project is highly feasible.

Overall, the biggest risk to the project is decrease in efficiency (i.e. hiring more personnel than needed) for both scenarios followed by the decrease in consumption pattern and increase in project cost.

3. Other Viability Risks

Aside from the scenarios identified above, the following risks need to be addressed to support the viability of the project:

- If the two private slaughterhouse owners would open operations to the needs to the public – vigilant monitoring and clarify in the inter-municipal agreement.
- If the province would not agree on institutionalizing Tagbilaran City full access to the proposed catchment area – encourage the province to agree on the basis of general welfare of the catchment area through provision of clean meat.
- If the existing slaughterhouses in the three catchment areas continue to operate despite agreement by province – remind the municipalities of the agreements.
- If enforcement of information, education, and communication strategies and safe meat is weak – develop a mechanism where enforcement activities and campaign are actually conducted and can be monitored.
- If the account/slaughterhouse continues to be source of employment – the Department of Budget and Management through Circular 100 dated 01 October 2012 specified that local economic enterprises should show viability, the city need to adjust the size of its slaughterhouse operation to prove that the facility is earning.

V. Recommendations

A. Options Prior to the Conduct of a Full-blown Feasibility Study

The proposed project of rehabilitating the slaughterhouse is a viable full undertaking for the city given the low opportunity cost of capital. If the city desires to operate the facility as it is now, it can improve slaughterhouse management by ensuring that the slaughterhouse receipts or accounts are ring fenced, accounting for all expenses, managing efficiently by right-sizing the organization and providing capacity development interventions.

The project is considered viable using the private sector's opportunity cost of capital and on the assumption that existing operational efficiency is enhanced and can be viably undertaken through PPP arrangement. However, the biggest risks to this PPP scheme are the possible decrease in meat consumption and the non-implementation of the new airport.

The completion of the new international airport will significantly affect the viability of the project. But since the projected completion of the new airport will come after the intended rehabilitation of the slaughterhouse, private sector participation might still find it risky to fully assume the rehabilitation costs of the slaughterhouse. This can be mitigated, however, by working on completing the new international airport by 2020 and securing an inter-municipal agreement through the provincial government that existing public slaughterhouses within the proposed catchment area will cease to operate to capture the catchment area used in this pre-feasibility study. In case the new Bohol International Airport does not push through, the project remains viable but is very sensitive to increases in cost, decrease in consumption, or a combination thereof. Further, the NMIS and the province will have to lead a massive campaign to minimize backyard slaughtering and to spread the benefits of clean meat.

With these remaining risks, the city government of Tagbilaran may offer to finance the rehabilitation of the slaughterhouse to a maximum of Php6 million and for the private sector to bid for the rental of the slaughterhouse. The bid should also include delivery services of clean meat and the repair and maintenance of the slaughterhouse while on lease. Finally, the city will still have to look at pricing of slaughterhouse fees to maintain acceptable and competitive meat prices and issuance of the necessary enabling ordinances.

B. Economic Analysis

Economic analysis is carried out to determine the economic costs and benefits beyond the realm of the financial model. For projects that do not meet the financial viability tests, the economic analysis provides the bigger scope of project impact by estimating all project-related social and environmental costs. If the economic analysis still yields poor viability indicators using the Economic IRR and NPV, then the project can be dropped or deprioritized.

All the inflationary factors in the financial analysis are reversed to get the current price. It also includes quantification of benefits from having clean meat resulting to avoidance of diseases, hospitalization costs, and unproductive days. It will also include quantification of environmental costs, if any. An Environmental Impact Assessment (EIA) is recommended to determine the overall effect of the slaughterhouse rehabilitation on the environment, but it is best to proceed only after the city has decided on the options it will pursue.

C. Technical Recommendations

The rehabilitation of the slaughterhouse will require various infrastructure-related modifications in the current structure of the building. A proposed floor plan for the rehabilitated slaughterhouse is presented in *Annex B*. Some of the proposed technical changes needed are listed below:

13. **Water Supply** – Install an overhead water supply system with its outlets fitted with water sprayer. It is best to introduce an air pressure tank to ensure that enough water pressure is generated during the slaughtering process and during the standard cleaning of the area. Water outlets must always be provided in every workstation to ensure efficiency.
14. **Drainage canal** – Repair the canals and the steel grating covers. If possible, install tiles over the length of the canal for easy clean-up. Make sure that the canal has a slope of 1 percent to 1.5 percent with its flow coming from the clean area towards the dirty zone.
15. **Waste Water System** – De-silt and rehabilitated the water lagoon to regain its original function and efficiency; drain the canal towards the wastewater pond which must be cleaned-up and repaired to ensure that wastewater will truly reach the lagoon. It is also helpful to establish a catch basin along the canal towards the lagoon so that majority of the solids are already intercepted early on before it reaches the wastewater pond.
16. **Electrical** – Set-up a power and electrical control rooms where breakers and panel boards are specifically confined; make sure to use appropriate electrical conduits such as polyvinyl chloride (PVC) or electrical metallic tubing (EMT) pipes. Flexible wires shall never be utilized as conduits. Moreover, engage the services of an electrical engineer to ensure the safe and organized connection and placement of wire with appropriate tags in the panel boards. Industrial light bulbs and lamps, with cover, must be utilized and placed strategically to ensure and achieve the required luminance in the working area.
17. **Ventilation, doors and windows** – Brace with steel all openings, doors and windows. Wood must no longer be used whether as principal material or braces. Placing appropriate screens or plastic curtains can help keep insects and birds from entering the slaughterhouse.
18. **Physical Separator** – Build a concrete wall that physically separates the offal area from the main work area of the slaughterhouse. The offal area must also have a separate and exclusive entrance area.
19. **Roofing** – Replace the entire roof with new and durable roof sheets. Make sure to cover with epoxy pastes the gap and the screw area to prevent water from dripping from it. You may use just a couple of skylight roofing materials to allow natural light.
20. **Flooring** – Chip and re-plaster the floor and have it finished smoothly that makes clean-up a lot easier. The corner between the floor and the wall must be smooth. Avoid installing floor tiles as it may pose safety risks. Epoxy paint must be used for flooring.
21. **Wall** – Repaint the walls with white and, if possible, avoid using ordinary latex paint as it worn-out easily. Use solvent based paints instead to ensure durability.
22. **Personnel space** – Provide office space and repair the existing dressing room for the staff. Toilets must also be rehabilitated.
23. **Equipment** – Re-orient the scalding tank. The scalding tank may also be moved to the side wall in cases where alternative solid fuel is used. Replace or repair all the missing rubber flap in the de-hairing machine. Replace all the heavily dented equipment such as the staking table, platform and inspection tables. De-rust and repaint the overhead rail.

24. **Process flow** – Review the slaughtering process to ensure efficiency.

Following stringent sanitation regulations, employing staffing and upgrading of Tagbilaran City's Slaughterhouse will make the slaughtering process efficient, allowing larger volumes of hogs to be processed daily.

The systematic slaughtering of by-products leads to shorter operating time of the boiler, making it more fuel-efficient. A highly efficient facility requires a small team of workers. Hence, it will increase the city's net income through increased revenue and lower operational cost. The facility should be seen as an ideal slaughterhouse that is operated efficiently, adhering to strict sanitation regulations and safety.

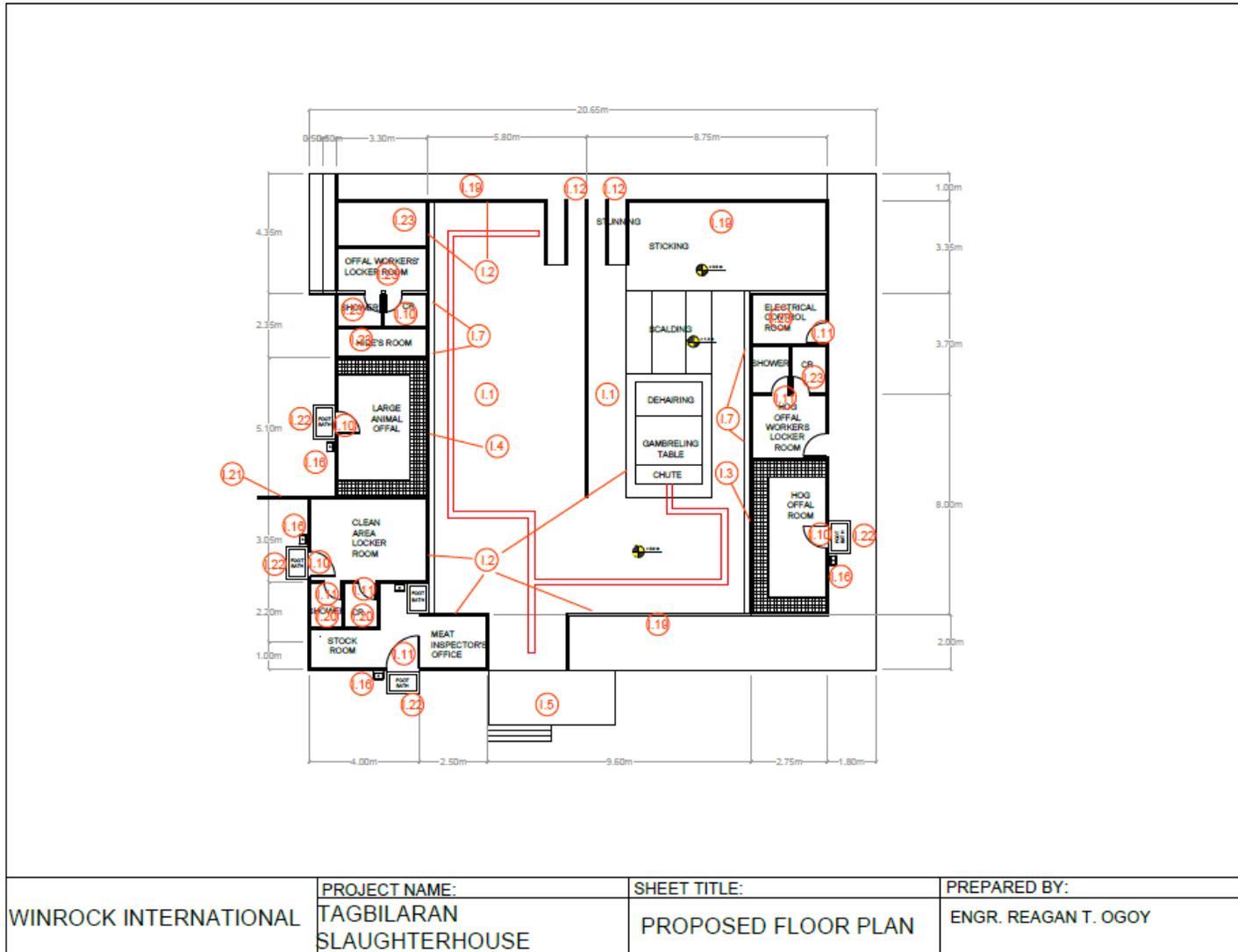
D. Next Steps

The pre-feasibility study which includes the technical assessment and financial analysis provides the city government important information on the existing status of the Tagbilaran City Slaughterhouse, the required improvements in facilities and equipment and preliminary investment cost estimates. It also presents an analysis of the planned project's financial viability (*refer to Annex D*), its risks factors and an initial set of options for project implementation.

To follow through on this study and prepare for project implementation, the following steps need to be undertaken by the city government:

- Consolidate the technical and pre-feasibility studies into one comprehensive project study which can be used to support budgetary request from the city government or presented to private sector groups for consideration. The SURGE Project may be able to provide technical assistance in consolidating and/or packaging existing studies into one comprehensive project study;
- Review all costings or financial data related to current slaughterhouse operations to help validate financial projections made in the pre-feasibility study;
- Review the proposed technical recommendations particularly the required improvements in building structure, facilities and equipment and develop in-house cost estimates as a comparison to the preliminary cost estimates prepared by the SURGE Project and Winrock International;
- Initiate exploratory discussions with the provincial government and the three adjacent municipal governments regarding the proposed joint and integrated slaughterhouse operations for the city and the three towns;
- Gather information on environmental regulations and requirements in preparation for the Environmental Impact Assessment (EIA) needed in project implementation. The SURGE Project may provide technical assistance in the preparation of the EIA subject to USAID approval;
- Collect and consolidate all relevant information such as building plans, costings, personnel, inventory of equipment and facilities, etc. which may be needed in packaging the project study, validate costs or for possible use in the pre-implementation phase of the project (EIA, MOU with other LGUs, etc.)

Annex B. Proposed Floor Plan



Annex C. Statement of Receipts and Expenditures

CITY GOVERNMENT OF TAGBILARAN
STATEMENT OF RECEIPTS AND EXPENDITURES
Slaughterhouse Operation
For C.Y 2011-2015

	<u>2015</u>	<u>2014</u>	<u>2013</u>	<u>2012</u>	<u>2011</u>
II. RECEIPTS					
A. Local Sources					
Business and Service Income					
Income from Slaughterhouses	3,019,850.50	3,132,648.82	1,976,352.66	2,402,491.44	2,668,709.23
Prior Year - Income from Slaughterhouses	69,061.00	158,949.00	266,019.50	56,253.00	81,517.74
Fines and Penalties - Business Income	1.00	55.30	7.00	38.00	-
Total Receipts	3,088,912.50	3,291,653.12	2,242,379.16	2,458,782.44	2,750,226.97
II. EXPENDITURES					
Maintenance and Operating Expense					
Supplies and Material Expenses					
Office Supplies Expense	-	-	-	43,089.55	59,592.25
Gasoline, Oil and Lubricants Expenses	-	-	-	51,240.00	141,076.27
Other Supplies Expense	78,735.00	482,192.80	504,092.00	475,807.50	397,380.00
Utility Expenses					
Water Expenses	-	8,021.98	4,648.56		
Electricity Expenses	50,791.17	228,443.64	76,260.79	54,601.96	23,049.28
Cooking Gas Expenses	34,450.00	-	-	-	22,785.00
Repairs and Maintenance					
Repairs and Maintenance - Markets and Slaughterhouses	106,575.00	13,800.00	583,912.00	244,237.50	97,500.00
Repairs and Maintenance - Office Equipment	-	3,600.00			
Taxes, Insurance Premiums and Other Fees					
Insurance Expense	-	47,080.00	39,320.00	52,760.00	52,760.00
Other Maintenance and Operating Expense	1,504,681.25	1,535,450.42	767,200.00	914,325.00	997,205.00
Total Expenditures	1,775,232.42	2,318,588.84	1,975,433.35	1,836,061.51	1,791,347.80

Certified correct:


 ELEAZAR B. BENIGA
 OIC - City Accountants Office

Annex D. Financial Statements

WINROCK INTERNATIONAL -PCCP					
Project:	Slaughterhouse in Tagbilaran				
Owner:	City of Tagbilaran				
Location:	Tagbilaran, Bohol				
Item	Description	Qty	Unit	Unit Cost	Amount
I.	INFRASTRUCTURE				
I.1	STRIPPING AND RE-PLASTERING OF SLAUGHTERHOUSE FLOOR	372.73	m²		
	Materials				
	Cement	187	bags	250.00	46,750.00
	Sand	7	m ³	350.00	2,450.00
I.2	STRIPPING AND RE-PLASTERING OF SLAUGHTERHOUSE WALL	309.84	m²		
	Materials				
	Cement	155	bags	250.00	38,750.00
	Sand	6	m ³	350.00	2,100.00
I.3	CONSTRUCTION OF SEPARATION WALL FOR HOG OFFAL	35.20	m²		
	Materials				
	4" CHB	438	pcs	12.00	5,496.00
	40kg Portland cement	50	bags	250.00	12,500.00
	10mmØ x 6m RSB	30	pcs	216.00	6,480.00
	1/2" coarse aggregate (G1 gravel)	1	m ³	480.00	480.00
	Sand	1	m ³	350.00	350.00
	Tie Wire Ga. #16	5	kgs	35.00	175.00
I.4	CONSTRUCTION OF SEPARATION WALL FOR LARGE ANIMAL OFFAL	23.30	m²		
	Materials				
	4" CHB walls	350	pcs	12.00	4,200.00
	40kg Portland cement	40	bags	250.00	10,000.00
	10mmØ x 6m RSB	18	pcs	216.00	3,888.00
	1/2" coarse aggregate (G1 gravel)	1	m ³	480.00	480.00
	Sand	1	m ³	350.00	350.00
	Tie Wire Ga. #16	5	kgs	35.00	175.00
I.5	EXTENSION OF DISPATCH AREA				
	Materials				
	4" CHB	91	pcs	12.00	1,092.00
	40kg Portland cement	3	bags	250.00	750.00
	10mmØ x 6m RSB	5	lengths	216.00	1,080.00
	1/2" coarse aggregate (G1 gravel)	1	m ³	480.00	480.00

WINROCK INTERNATIONAL -PCCP					
Project:	Slaughterhouse in Tagbilaran				
Owner:	City of Tagbilaran				
Location:	Tagbilaran, Bohol				
Item	Description	Qty	Unit	Unit Cost	Amount
	Sand	1	m ³	350.00	350.00
	Tie Wire Ga. #16	2	kgs	35.00	70.00
I.6	STRIPPING AND REPLACEMENT OF ROOFS				
	Materials				
	Painted corrugated roof sheets (10.4m L x 1.2m W x 0.4mm)	40	lengths	4,100.00	164,000.00
	3/8" φ x 55mm Tek Screw	1000	pcs	1.00	1,000.00
	3/8" φ x 65mm Tek Screw adaptor	5	pcs	5.00	25.00
	Ridge Roll (8 feet x 0.3mm thick off-white coil)	8	lengths	376.00	3,008.00
	Gutter (8 feet X Fabricated 0.3mm coil)	16	lengths	674.00	10,784.00
	1/8" φ Blind rivets	2	boxes	350.00	700.00
	Vulcaseal	2	gals	1,500.00	3,000.00
	Insulation Foam (50 Mtrs / Roll)	4	rolls	2,150.00	8,600.00
	Insulation Tape	10	pcs	184.00	1,840.00
	2"x3"x3m C-purlins	90	pcs	800.00	72,000.00
I.7	DRAINAGE				
	Materials				
	Cement	34	bags	250.00	8,500.00
	1/2" coarse aggregate (G1 gravel)	3	m ³	480.00	1,440.00
	Sand	2	m ³	350.00	700.00
	2"x2"x 1/4" x 6m angle bar	30	lengths	635.00	19,050.00
	8mm solid round bar	80	lengths	190.00	15,200.00
	welding rod	10	kg	100.00	1,000.00
I.8	ELECTRICAL WORKS				
	Materials				
	3.5mm ² THHN Copper Wire (black/ White)	2	Box	3,300.00	6,600.00
	30mm ² THHN Copper wire	50	mtrs	330.00	16,500.00
	15mm PVC Electrical Pipe	10	pcs.	145.00	1,450.00
	2- 10 Watts LED tube with cover	10	pcs.	700.00	7,000.00
	7 watt LED pinlight	8	pcs.	450.00	3,600.00
	Receptacle 4" White	5	pcs.	60.00	300.00
	Junction Box 4x4 PVC/with cover	4	pcs.	30.00	120.00
	Pull Box 6"x 6"	1	pcs.	350.00	350.00
	Utility Box Metal 2"x 4"	4	pcs.	70.00	280.00
	Cable Tie 1/2 by 10"	20	pcs.	5.00	100.00
	2 Gang Switches	6	pcs.	86.00	516.00
	2 Gang Industrial Weatherproof Outlet	2	pcs.	420.00	840.00
	Panel Board 60 amps Main Breaker 1-Phase with 6 Branches Bolt-on Type	1	unit	3,500.00	3,500.00
	Terminal Lug 3.5mm	6	pcs.	5.00	30.00

WINROCK INTERNATIONAL -PCCP					
Project:	Slaughterhouse in Tagbilaran				
Owner:	City of Tagbilaran				
Location:	Tagbilaran, Bohol				
Item	Description	Qty	Unit	Unit Cost	Amount
	15AT CB 2P 1P, 250V Bolt-On	1	pcs.	450.00	450.00
	30AT CB 2P 1P, 250V Bolt-On	4	pcs.	450.00	1,800.00
I.9	OVERHEAD WATER SUPPLY				
	Materials				
	82 L capacity pressure tank	1	pcs	14,000.00	14,000.00
	3/4" Ø x 6m G.I pipe sch. 40	3	lengths	395.00	1,185.00
	3/4" Ø G.I elbow	5	pcs	28.00	140.00
	1" teflon tape	10	rolls	150.00	1,500.00
	3/4" x 1/2" Ø G.I. Tee reducer	4	pcs	30.00	120.00
	3/4" x 1/2" Ø G.I. coupling reducer	4	pcs	30.00	120.00
	3/4" Ø G.I 90° elbow	4	pcs	38.00	152.00
	3/4" G.I. male plug	2	pcs	24.00	48.00
	3/4" Ø gate valve	5	pcs	340.00	1,700.00
	1/2" Ø x 6m G.I. pipe	30	pcs	315.00	9,450.00
	1/2" Ø x 8" G.I. nipple	22	pcs	31.00	682.00
	1/2" Ø G.I. tee	22	pcs	50.00	1,100.00
	1/2" Ø G.I. ball valve	22	pcs	280.00	6,160.00
	1/2" Ø G.I. faucet	8	pcs	175.00	1,400.00
	1/2" Ø G.I 90° elbow	12	pcs	28.00	336.00
	1/2" G.I. male plug	10	pcs	18.00	180.00
	1/2" Ø hose adaptor	22	pcs	35.00	770.00
	quart size vulcaseal	4	cans	370.00	1,480.00
	garden hose (30 m)	3	roll	1,450.00	4,350.00
	garden hose spray nozzle	22	pcs	165.00	3,630.00
	Hose clip	20	pcs	15.00	300.00
I.10	CONSTRUCTION AND TRANSFER OF DOOR OPENINGS				
	Materials				
	4" CHB	250	pcs	12.00	3,000.00
	Rebars 10mmφ x 6m, grade 40	15	pcs	216.00	3,240.00
	Cement (40 kg/bag)	28	bags	250.00	7,000.00
	Sand	2	m ³	350.00	700.00
	3/4" gravel	3	m ³	480.00	1,440.00
I.11	DOORS & WINDOWS				
	Materials				
	1.1mx1.2m fixed & sliding glass window with steel pipe or aluminum frame with aluminum screen and insect screen	8	sets	6000.00	48,000.00
	0.6m x 2.1m PVC door with door closer	6	sets	5500.00	33,000.00
	0.75m x 2.1m PVC door with door closer	8	set	6500.00	52,000.00

WINROCK INTERNATIONAL -PCCP					
Project:		Slaughterhouse in Tagbilaran			
Owner:		City of Tagbilaran			
Location:		Tagbilaran, Bohol			
Item	Description	Qty	Unit	Unit Cost	Amount
	2m x 2.1m roll-up door	1	set	20000.00	20,000.00
	Door knobs	14	pcs	1200.00	16,800.00
	door hinges	24	sets	120.00	2,880.00
	Plastic curtain	5	sets	1500.00	7,500.00
I.12	REPAIR AND REPLASTERING OF CHUTE				
	Materials				
	Cement	20	bags	250.00	5,000.00
	Sand	1	m ³	350.00	350.00
I.13	STRIPPING AND RE-TILING OF OFFAL ROOMS				
	Materials				
	20cm x 20cm tiles	500	pcs	80.00	40,000.00
	Tile Adhesive (5kg/gal)	5	gals	300.00	1,500.00
	Tile Grout	2	gals	50.00	100.00
I.14	WASTE WATER SYSTEM (RIP-RAPPED LAGOON)				
	Materials				
	4" Ø boulders	1	lot	85,000.00	85,000.00
	Rebars 10mmφ x 6m, grade 40	50	pcs	216.00	10,800.00
	Cement (40 kg/bag)	60	bags	250.00	15,000.00
	Sand	7	m ³	350.00	2,450.00
I.15	REPAIR OF CANAL TOWARDS WASTE WATER LAGOON				
	Materials				
	4" CHB walls	468	pcs	12.00	5,616.00
	Rebars 10mmφ x 6m, grade 40	25	pcs	216.00	5,400.00
	Cement (40 kg/bag)	43	bags	250.00	10,750.00
	Sand	3	m ³	350.00	1,050.00
	3/4" coarse aggregate (G1 gravel)	5	m ³	480.00	2,400.00
	20cm Ø culvert pipe	20	pcs	2000.00	40,000.00
I.16	CONSTRUCTION OF SEPARATE GATEWAY AND ROAD ACCESS FOR CLEAN AND DIRTY AREA	20.00	m ³		
	Materials				
	Cement (40 kg/bag)	190	bags	250.00	47,500.00
	3/4" coarse aggregate (G1 gravel)	20	m ³	480.00	9,600.00
	Sand	15	m ³	350.00	5,250.00

WINROCK INTERNATIONAL -PCCP					
Project:		Slaughterhouse in Tagbilaran			
Owner:		City of Tagbilaran			
Location:		Tagbilaran, Bohol			
Item	Description	Qty	Unit	Unit Cost	Amount
I.17	PROVISION OF HAND SANITATION FACILITY				
	Materials				
	Lavatory	6	pcs	2000.00	12,000.00
	Hand Soap Dispenser	6	pcs	900.00	5,400.00
	Hand drier	6	pcs	2800.00	16,800.00
I.18	PAINTING WORKS	608	m ²		
	Materials				
	Davies Liquid Tile Undercoat Primer	55	gals	900.00	49,500.00
	Davies Liquid Tile Paint (White)	40	gals	1200.00	48,000.00
	Skim Coat	25	bags	350.00	8,750.00
	Davies Liquid Tile Putty Filler	10	gals	700.00	7,000.00
	Roller 4" cotton	6	pcs	70.00	420.00
	Cotton roller re-fill 4"	10	pcs	50.00	500.00
	Paint toller pan	10	pcs	70.00	700.00
	Paint Brush 2"	5	pcs	60.00	300.00
	Paint Brush 4"	5	pcs	50.00	250.00
	Masking tape 1"	10	roll	45.00	450.00
I.19	VENTILATION				
	Materials				
	20"Ø cooling exhaust fans with screen	3	sets	17500.00	52,500.00
I.20	REPAIR OF COMFORT ROOMS	1	lot	45000.00	45,000.00
I.21	CONSTRUCTION AND EXTENSION OF FENCE	20	m ²		
	Materials				
	4" CHB	260	pcs	12.00	3,120.00
	Rebars 10mmφ x 6m, grade 40	15	pcs	216.00	3,240.00
	Cement (40 kg/bag)	30	bags	250.00	7,500.00
	Sand	2	m ³	350.00	700.00
	3/4" gravel	3	m ³	480.00	1,440.00
I.22	CONSTRUCTION & PROVISION OF BOOT WASH, BOOT DIP				
	Materials				

WINROCK INTERNATIONAL -PCCP					
Project:		Slaughterhouse in Tagbilaran			
Owner:		City of Tagbilaran			
Location:		Tagbilaran, Bohol			
Item	Description	Qty	Unit	Unit Cost	Amount
	4" CHB	400	CHB	12.00	
	Rebars 10mmφ x 6m, grade 40	18	pcs	216.00	3,888.00
	Cement (40 kg/bag)	15	bags	250.00	3,750.00
	Sand	2	m ³	350.00	700.00
	3/4" gravel	3	m ³	480.00	1,440.00
I.23	CONSTRUCTION ADDITIONAL ROOMS FOR C.R, LOCKER ROOM AND ELECTRICAL ROOM				
	Materials				
	4" CHB	2100	CHB	12.00	25,200.00
	Rebars 10mmφ x 6m, grade 40	100	pcs	216.00	21,600.00
	Cement (40 kg/bag)	135	bags	250.00	33,750.00
	Sand	6	m ³	350.00	2,100.00
	3/4" gravel	6	m ³	480.00	2,880.00
II. SLAUGHTERHOUSE EQUIPMENT					
	Hog Trolley	50	units	2,200.00	110,000.00
	Gambrel	50	units	800.00	40,000.00
	Electric Hog Stunner	1	unit	54,000.00	54,000.00
	Scalding Tank with dislodger	1	unit	250,000.00	250,000.00
	Dehairing Machine	1	unit	650,000.00	650,000.00
	Hand and Tool dip tub	4	unit	24,000.00	96,000.00
	Viscera Inspection Table (Offal Collector)	1	unit	24,000.00	24,000.00
	Staking table	1	unit	45,000.00	45,000.00
	Hog Restrainer	1	unit	60,000.00	60,000.00
	Evisceration Platform	1	unit	18,000.00	18,000.00
	Trolley Storage Truck	2	unit	16,000.00	32,000.00
	Rehab and repainting of overhead railing	1	lot	200,000.00	200,000.00
III. LABOR					
	Engineer	720	mh	105.00	75,600.00
	Foreman	720	mh	62.50	45,000.00
	Carpenter/Mason	4320	mh	50.00	216,000.00
	Construction Laborer	4320	mh	37.50	162,000.00
	Welder	768	mh	56.00	43,008.00
	Tacker	768	mh	37.50	28,800.00
	Equipment servicemen & installers	448	mh	56.00	25,088.00

WINROCK INTERNATIONAL -PCCP					
Project:	Slaughterhouse in Tagbilaran				
Owner:	City of Tagbilaran				
Location:	Tagbilaran, Bohol				
Item	Description	Qty	Unit	Unit Cost	Amount
DIRECT COST:					
<i>Infrastructure Rehab Cost</i>					1,383,736.00
<i>Slaughterhouse Equipment Cost</i>					1,579,000.00
<i>Labor Cost</i>					595,496.00
<i>Contingency Cost</i>					426,987.84
TOTAL DIRECT COST					3,985,219.84

PREPARED BY:


REAGAN OGOY
 Project Engineer
 Winrock International-PCCP

NOTED BY:

JIM ORPRECIO
 Deputy-Chief-of-Party