Appendix G.
Economic and Fiscal Impacts

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This report analyzes the potential economic and fiscal impacts of the proposed upgrading of the Honouliuli Wastewater Treatment Plant (WWTP), and relocating of non-process related functions and facilities from the Sand Island WWTP and other locations to the Honouliuli WWTP. The analysis estimates the economic impacts of the project, which cover expenditures and sales, employment, and payroll, and the fiscal impacts of the project on revenues of the State of Hawaii. The impacts from the project would occur both in the construction period and on an annual basis during operations.

G.1 Methodology

Construction period impacts are estimated using projected construction costs, and annual operations impacts are estimated using projected operations costs. In this analysis, these costs are transformed into economic and fiscal impacts by multiplying the costs or spending by multipliers from the 2007 Hawaii inter-county input-output (I-O) model updated by the Department of Business, Economic Development, and Tourism (DBEDT) in 2014 (DBEDT, 2014), as well as the 2007 Hawaii state I-O model updated by DBEDT in 2013 (DBEDT, 2013). The Hawaii state I-O model measures how money flows through the state through purchases and sales (inputs and outputs) that businesses and households make. It measures what comes in, through purchases that businesses and households make that come from outside of the state, or imports; and what goes out, through sales and services, or exports. The inter-county I-O model measures how money flows among various economic sectors within each county and between counties.

Economic and fiscal impacts were evaluated for both the initial change in the economy as a result of the project – in other words, the new money spent by the project and the new people employed – as well as the impacts of those changes on the overall economy of the City and County of Honolulu. New spending from project construction and operations would create sales for businesses, new employment (jobs), and earnings (wages). The new spending would ripple through the economy, creating direct (or initial), indirect (or successive), and induced effects. In the context of the project, these are characterized as follows:

- Direct effects measure the volume of economic activity initially produced by constructing and operating the project.
- Indirect effects measure the economic activity produced by the purchases of inputs from local industries necessary to construct and operate the project.
- Induced effects measure the economic activity produced by the construction spending by households that results from changes in earnings through the direct and indirect effects of the project.

I-O model multipliers are used to enable a fairly accurate analysis without difficult and costly survey taking. While the advantages outweigh the disadvantages, it is important to understand the following limitations of using any multipliers:

- One assumption is the accuracy of the data used. To perform the analysis, assumptions are used as a best guess of construction costs and future spending.
- Another assumption is that there are no supply constraints. For example, if operation of the project creates a greater need for energy, the price of energy could go up. However, for the analysis, there is no adjustment for this potential cost increase.
- Use of I-O model multipliers also assumes that all businesses of the same type conduct business the same way, using a certain number of employees and a certain amount of raw materials to produce sales. In reality, some companies may have ways to use fewer employees or raw materials.

- Finally, there is no way of knowing exactly when an effect will occur. If a purchase is made, for example, in 2012 or in 2030, that does not mean that effects would occur in the same year. An effect may not occur for several years or may be spread over several years. In most cases, however, it is reasonable to assume that the greatest effect will occur in the year after money is spent.

G.2 Economic and Fiscal Impacts of Construction

The project would construct process and non-process facilities at the Honouliuli WWTP. The construction expenditures would result in one-time increases in economic output, employment, and earnings, and one-time increases in fiscal revenues of the state. The economic impacts of project construction would include the impact of expenditures on construction materials, and on earnings of construction workers and professional service providers during the construction period. Construction costs were used to estimate economic and fiscal impacts during the construction period.

The project would cost an estimated $760 million to complete, inclusive of the costs of upgrading the Honouliuli WWTP and the costs of constructing facilities at the Honouliuli WWTP required to relocate non-process related functions to the plant. This amount includes both hard and soft costs. Hard costs comprise the construction materials and construction labor, while soft costs comprise engineering, commissioning, legal, and fiscal expenses not directly involved in the construction. Engineering, commissioning, legal, and fiscal costs were estimated to be 20 percent of the hard costs (AECOM, 2014b), or approximately 16.7 percent of the total construction costs. **Table G-1** shows the estimated hard costs, soft costs, and total costs of constructing the project.

Table G-1. Construction Costs

		Cost	
		%	$
Hard Costs	Heavy and Civil Engineering Construction	83.3	633,333,333
Soft Costs	Architectural and Engineering Services	16.7	126,666,667
Total Construction Costs		**100.0**	**760,000,000**

Source: AECOM, 2014c.

Multipliers for heavy and civil engineering construction were applied to hard costs; whereas, multipliers for architectural and engineering services were applied to the soft costs. **Table G-2** shows the resulting economic and fiscal impacts. On a one-time basis, project construction would have an estimated total economic impact of $1.6 billion in output, supporting a total of approximately 13,430 jobs, earnings of $520 million, and fiscal revenues of $70 million. The state taxes in the 2007 I-O model predominantly comprise general excise and use tax, and individual income tax, which together account for about 79 percent of total state taxes, as well as 11 other categories of taxes that represent lesser portions of the tax revenues of the state.

Table G-2. One-Time Economic and Fiscal Impacts of Construction

	Output	Earnings	Employment	State Tax
	Million $	Million $	Jobs	Million $
Direct/Indirect Impact				
Hard Construction Costs	975	298	8,487	32
Soft Construction Costs	151	82	975	11
Total Direct/Indirect Impact	1,126	380	9,462	43
Induced Impact				
Hard Construction Costs	386	108	3,103	19
Soft Construction Costs	106	29	861	6
Total Induced Impact	493	137	3,965	25
Total Impact				
Hard Construction Costs	1,362	405	11,590	51
Soft Construction Costs	257	111	1,837	18
Total Impact	1,619	517	13,427	68

The estimated construction period is 9 years (AECOM 2014a). Although construction expenditures and therefore the resulting effects actually would vary from year to year, the estimated total economic impact translates to an average annual economic impact of about $180 million, which would support approximately 1,490 jobs, earnings of $60 million, and fiscal revenues of $7.6 million per year. Providing each job or employee represents one household and assuming the current average household size of 2.98 people in Honolulu County (United States Census Bureau [USCB], 2014), direct, indirect, and induced jobs provided by project construction would support approximately 4,450 residents on average during project construction.

G.3 Economic and Fiscal Impacts of Operations

Annual expenditures from operations of the project would result in ongoing increases in economic output, employment, and earnings, and ongoing increases in fiscal revenues. Operations costs were used to estimate economic and fiscal impacts during the operation of the upgraded Honouliuli WWTP, exclusive of the non-process related functions and facilities relocated from the Sand Island WWTP and other locations to the Honouliuli WWTP. Whereas the economic and fiscal impacts of construction evaluated above cover both upgrading the Honouliuli WWTP and constructing non-process related facilities at the plant, the ongoing impacts of operating the non-process related facilities are not evaluated here, as those operating costs are undetermined at the time of writing. The annual operating expenditures for the WWTP upgrades are estimated to be approximately $19.8 million (AECOM, 2014b). This spending comprises expenditures in the utilities industry, inclusive of sewer treatment facilities, and the applicable multipliers were used. **Table G-3** shows the resulting economic and fiscal impacts.

Table G-3. Ongoing Economic and Fiscal Impacts of Operations

	Output	Earnings	Employment	State Tax
	Million $	Million $	Jobs	$
Direct/Indirect Impact	24.9	2.8	59	792,000
Induced Impact	3.6	1.0	30	198,000
Total Annual Impact	28.5	3.8	89	990,000

On an ongoing basis, plant operation related to the upgrading of the Honouliuli WWTP would result in an estimated annual impact of $28.5 million in output, supporting about 90 jobs, earnings of $3.8 million, and fiscal revenues of $990,000. Providing each job represents one household and assuming the current average household size of 2.98 people in Honolulu County (USCB, 2014), direct, indirect, and induced jobs provided by these operations would support approximately 270 residents on average.

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