

# Solid Waste Management Cost Flows in Washington State

## Technical Data Memorandum

A Beyond Waste Project

2007

Conducted for

Washington State Department of Ecology  
Solid Waste and Financial Assistance Program

Washington State Solid Waste Advisory Committee

Prepared by



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# 1 Introduction and Data Overview

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Ecology's 2004 Beyond Waste Plan for hazardous and solid waste management recommended evaluating the current financing for the solid waste system as the first step in a longer-term effort to examine future funding options and identify stable ways to fund solid waste management efforts, while reducing waste. The 2007 cost estimation project is the first step of that broader effort to help Ecology and the Washington State Solid Waste Advisory Committee (SWAC) evaluate solid waste funding and needs. The primary goal of this project is to provide a **comprehensive estimate of statewide costs of and revenues from solid waste management activities and services in Washington State**, including disposal, recycling, and other activities. A secondary goal is to identify gaps and limitations in existing information regarding revenues and expenditures.

Prior to this project, no comprehensive quantification of solid waste revenues and expenditures had been conducted for Washington State. In 2003, the Solid Waste Policy Forum surveyed county solid waste managers, updating two previous surveys conducted in 1997 and 1999, but these prior studies did not include expenditures by State agencies, cities, or the private sector. The current project focused on capturing the major flows of dollars in a single calendar year – 2005 – while creating a methodology that can be used for future updates and revised to include additional information.

This section briefly describes the approach to tracking revenue inputs to the solid waste management system and expenditures by activity. In light of data and resource constraints, the project team agreed on an input-output approach, rather than the much more intensive effort of trying to track individual dollars as they move throughout the waste system. This section covers which waste flows and sectors of the waste management system were included and excluded. Subsequent sections cover data sources and assumptions, estimation methods, data gaps, and the project's data management tool and analytical spreadsheets.

## 1.1 Input-Output Approach

Dollars can pass through several entities in the waste system; dollars first enter the system as revenues, pass from party to party, and eventually leave the system as final expenditures. For example, local governments received loans from the State government's Public Works Trust Fund (PWTF), which collects revenues from the solid waste collection tax that waste collection companies pay; waste collection companies in turn collect payments for waste services from households and businesses.

To make analysis of this complex system more manageable, this project focused on counting dollars when they first entered the system as revenues and when they exited as expenditures, rather than on "pass-throughs" that circulate within the waste system. In the PWTF example, payments made by households and businesses are inputs included on the revenue side, and expenditures made by local governments to build facilities are outputs included on the final expenditures side. The solid waste tax receipts and PWTF loan are pass-throughs that do not accrue to either total revenues or expenditures for Washington. Where possible, this estimation also attempted to track significant pass-throughs in order to reduce double-counting. The project was unable to quantify some pass-through funds, notably MSW expenditures that local governments pay to waste collection companies, except where local governments identified these cost flows in the data that they provided.

## 1.2 Waste Flows and Sectors

This project focused on gathering data on revenues and expenditures, or cost flows, from key entities for the major waste streams that have publicly available data. In addition, revenues and expenditures were estimated for two major waste streams without publicly available data: construction and demolition debris and recyclables from non-residential sources, referred to as commercial recycling. At the kick-off

meeting, Ecology and the Cascadia team defined the scope of waste streams to target. Ultimately, the project team agreed to include a set of major waste flows and waste systems. State and local governments have some involvement or responsibility for the management of most of these wastes. Waste streams examined in this cost estimation project included:

- Disposed, recycled, and composted municipal solid waste (MSW);
- Moderate risk waste (MRW) handled by governments; and
- Construction and demolition (C&D) debris.

Waste streams that were excluded may increase the total revenues and expenditures for Washington State significantly and could be included in future iterations of this project or as case studies. Waste streams that were not covered in this project included:

- Industrial waste;
- Forestry waste;
- Agricultural waste;
- Hazardous waste and MRW handled by the private sector;
- Nuclear waste;
- Biosolids and septage;
- Petroleum-contaminated soil; and
- Emissions and effluent.

The project focused on gathering data from key entities that have publicly available data, such as government agencies and government-regulated entities. No centralized data source exists for non-regulated private companies, such as commercial recyclers and C&D material handlers; in light of the difficulty of obtaining internal company information on costs and revenues, revenues and expenditures for non-regulated commercial recyclers and C&D debris handlers were modeled. Entities from which data were collected and analyzed included:

- State government;
- Counties;
- Cities;
- Health jurisdictions; and
- WUTC-certificated solid waste collection companies.

### 1.3 Revenue and Expenditure Categories

Data were gathered on revenues and expenditures in the following categories for each sector. See Table 1 for revenue sources and Table 2 for expenditure categories.

**Table 1. Summary of Revenue Sources Included in Data Collection Requests**

Counties, Cities, and Health Jurisdiction Revenue Sources
<p><b>User Fees, Rates, and Taxes:</b>            Solid waste, composting, and recycling tip fees (or related payments)            Fees for planning, permits, advance disposal (ADF), and collection/disposal districts            Fees/revenues from cities            Taxes related to solid waste</p> <p><b>Surcharges for Collection, Recycling, and Disposal</b></p> <p><b>Grants, Loans, and Bond Financing:</b>            Coordinated Prevention Grants (CPG)            Remedial Action Grants            Community Litter Cleanup Program (CLCP) grants            Public Works Trust Fund (PWTF) loans            Bond financing</p> <p><b>Revenues from Sales (e.g., electricity, landfill gas, recyclable materials)</b></p> <p><b>Other Sources of Funds:</b>            Interest income            Enforcement infractions, fines, and penalties            Reserves/fund balance and general funds            Grants, loans, and bond financing</p>
State Revenue Sources
<p><b>Litter tax</b></p> <p><b>MTCA tax on hazardous substances</b></p> <p><b>Solid waste collection tax</b></p> <p><b>WUTC regulatory fees</b></p> <p><b>Fines, penalties, and infractions</b></p> <p><b>Other revenues</b></p>
Hauler Revenue Sources
<p><b>Revenues collected by certificated solid waste collection companies</b></p>

**Table 2. Summary of Expenditure Types Included in Data Collection Requests**

<b>Counties, Cities, Health Jurisdiction Expenditures</b>
<p><b>Municipal Solid Waste Disposal, Recycling, Composting, Waste Reduction, and MRW:</b>            Collection, transfer station, and transportation operations            Education and outreach            Capital improvements            Equipment (purchase and maintenance expenditures)            Operations, monitoring and maintenance of active landfills, recycling facilities, MRW facilities, and other disposal sites            Monitoring, maintenance, and remediation for closed landfills and other disposal sites            Disposal or recycling of MRW</p> <p><b>Litter/illegal dump cleanup</b></p> <p><b>Administration, enforcement, planning, grants, and other activities</b></p> <p><b>Debt service for active and closed facilities</b></p> <p><b>Other expenditures, not specified elsewhere (waste- and non-waste-related)</b></p>
<b>State Expenditures</b>
<p><b>Coordinated Prevention Grants (CPG)</b></p> <p><b>Community Litter Cleanup Program (CLCP) grants</b></p> <p><b>Remedial Action Grants</b></p> <p><b>Public Participation Grants (PPG)</b></p> <p><b>Ecology staff (for solid waste-related activities)</b></p>
<b>Hauler Expenditures</b>
<b>Expenditures by certificated solid waste collection companies</b>

In some revenue and expenditure categories, funds are “passed through” from entity to another for final expenditure and use of funds. This cost estimation project tracked these funds:

- Solid waste collection tax – from solid waste collection companies to the State;
- WUTC fees – from certificated solid waste collection companies to the State;
- Coordinated Prevention Grants (CPG) – from the State to local governments;
- Remedial Action Grants – from the State to local governments;
- Community Litter Cleanup Program (CLCP) – from the State to local governments; and
- Public Works Trust Fund (PWTF) loans – from the State to local governments.

## 2 Data on Local Government Revenues and Expenditures

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Local government revenues and expenditures were estimated using data collection requests distributed to all of Washington's 39 counties, all 35 health jurisdictions, and a stratified sample consisting of 62 of the state's 281 cities. Responses were received from 34 counties, 29 health jurisdictions, and 49 cities. Estimates for non-respondents were extrapolated from data received from respondents, weighted by population. This section describes the methodology used to gather data from counties, cities, and health jurisdictions.

### 2.1 Data Collection Request Design and Review

Requests for data from local governments for this project drew on a previous survey of county solid waste managers conducted by Ecology and the State SWAC in 2003. In consultation with Ecology and the SWAC, revenue and expenditure categories were expanded with subcategories to provide more detail where available. For example, regarding waste reduction and recycling, the questionnaire for the current project requested details on how much of the overall waste reduction and recycling budget was spent on collection operations, transportation operations, education and outreach programs, capital improvements, equipment, and operations and maintenance of recycling facilities. The eight general expenditure categories (and subcategories for disposed and recycled MSW management) for which local government data were requested included:

- **Disposed Municipal Solid Waste Management (MSW);**
- **MSW Recycling, Composting, and Waste Reduction;**
- **Moderate Risk Waste (MRW);**
- **Litter/Illegal Dumping Cleanup;**
- **Capital and Equipment;**
- **Administration, Planning, and Related Activities;**
- **Debt Service; and**
- **Other Expenditures.**

The data requests for cities and health jurisdictions were based on the questionnaire developed for counties. For health jurisdictions, the data request excluded questions such as how much was spent on waste collection. The data request for cities included an initial "short form" that asked who was responsible for major waste activities (such as waste collection) and whether the city collected any solid-waste-related revenue to determine which cities did not need to fill out the longer questionnaire. Copies of city contracts with solid waste collection companies were requested, although few were received.

Each local government data request form was reviewed by Ecology and at least two members of local government who would later be asked to participate in the data collection. Copies of the data collection instruments used for counties, cities, and health jurisdictions are included in Attachments 1, 2, and 3.

## 2.2 Data Request Distribution

The data collection request was distributed by electronic mail to appropriate members of local government based on contact lists provided by Ecology. Ecology distributed the county data collection requests to county solid waste managers. County members of the State SWAC and project team sent supporting follow-up messages. City questionnaires were sent to city employees responsible for solid waste budgets, including public works directors, solid waste managers, solid waste and recycling coordinators, finance directors/officers, and clerk-treasurers. Once the sample of 62 selected cities was developed, Ecology staff contacted the cities to determine the appropriate recipients for the questionnaire. Ecology distributed the city questionnaires via electronic mail. Health jurisdiction questionnaires were sent to environmental health directors on the Department of Health's roster. The data requests for health jurisdictions were distributed via two health directors that lead interagency coordination efforts on the eastern and western sides of Washington State.

Questionnaire recipients received multiple follow-up calls to increase the response rate. When the recipient was not the appropriate contact person, an alternate contact was usually found. To meet the needs of the respondents, some data collection requests were distributed in hard copy by mail or administered over the telephone.

## 2.3 Jurisdictions Contacted and Responding Jurisdictions

All of Washington's 39 counties and 35 health jurisdictions were contacted. Of Washington's 281 cities and towns, all 22 cities with populations larger than 40,000 were contacted, along with a stratified random sample of 40 of the remaining cities and towns. Responses were received from 34 counties, 29 health jurisdictions, and 49 cities. A list of the local government jurisdictions that received and responded to data requests is included in Attachment 4. Of these responding governments, four jurisdictions responded but could not be included in the analysis because their data were either unreadable or not in a readily usable format.

The primary goal of the stratified random sampling approach was to develop a better statewide estimate for revenues and expenditures on solid waste rather than to compare estimates across the different strata. The stratified random sampling approach involved dividing the population of cities into mutually exclusive groups, or "strata," then taking a simple random sample of cities from each group. Stratification provided two advantages for the current project over an unstratified random sample:

- It protected against the possibility of an unusual sample that did not have adequate representation from one or more types of cities (e.g., a sample that had no cities from Eastern Washington).
- It provided a more precise estimate of total revenues and expenditures than would a simple random sample. An estimate based on stratified random sampling is more precise than one based on simple random sampling because stratified random sampling takes advantage of additional information about the cities to be sampled. In this project, cities were stratified using population size and east-west location, which are assumed to influence revenues and expenditures. In contrast, in simple random sampling, a diverse set of cities must be characterized through a single random sample of the entire population.

Table 3 shows how Washington's cities were divided into five strata and the number of responding jurisdictions in each stratum. Attachments 5 and 6 provide more detail on the sampling methods.

**Table 3. City Stratification**

<b>Stratum</b>	<b>Population</b>	<b>Geographic Location</b>	<b>Number of Cities</b>	<b>Sample Size</b>	<b>Number of Responding Cities</b>
1	0 – 5,000	West	67	10	6
2	5,000 – 40,000	West	67	10	8
3	0 – 5,000	East	105	10	9
4	5,000 – 40,000	East	20	10	8
5	40,000 or more	East & West	22	22	18
<b>TOTAL</b>			<b>281</b>	<b>62</b>	<b>49</b>

## 2.4 Extrapolation Method for Missing Data

Because not all local governments provided data, revenues and expenditures for missing jurisdictions were extrapolated from the available data using per-capita figures. Due to stratification, the city extrapolation was more complicated than extrapolation for counties or health jurisdictions and is presented first. After receiving completed data requests from the sampled cities, total revenues and expenditures were estimated as follows:

- For each stratum, per-capita figures for general revenue and expenditure categories (e.g., disposed MSW) were estimated by dividing total spending in the sampled cities by the total sampled population.
- For each stratum, total revenues and expenditures were estimated by multiplying the per-capita figures by the total population of the cities in the stratum, including both sampled and non-sampled cities. For example, if disposed MSW expenditures in Stratum 1 were \$20 on a per-capita basis and 100,000 people lived in all of the cities and towns included in Stratum 1 statewide, the analysis estimated a total of \$2,000,000 in disposed MSW expenditures for Stratum 1 (i.e., \$20 per person multiplied by 100,000 people).
- Statewide revenues and expenditures were estimated by summing the results across all strata and general revenue and expenditure categories.

Total revenues and expenditures for counties and health jurisdictions were estimated using the same general approach as outlined above for cities, simplified because stratification was not used for counties and health jurisdictions. Whereas per-capita figures were estimated by stratum for the city analysis, per-capita figures were estimated for the entire sample of respondents for the county and health jurisdiction analyses.

County and city expenditures for disposed and recycled MSW were broken down into subcategories; however, not all responding jurisdictions were able to provide this level of detail. Subcategory expenditures for those that were able to provide details were converted to percentages and applied to general category totals (by stratum for cities). For example, counties that were able to break down expenditures on recycled MSW reported spending approximately 45% of total recycling expenditures on education and outreach. Thus, the analysis applied 45% to the total estimated spending on recycling and estimated that counties spend \$6.8 million on education and outreach.

## 2.5 Major Assumptions for Local Government Data

Due to data constraints, it was necessary to make several assumptions that may influence the breakdowns of expenditure categories and the final total revenues and expenditures for local government estimates. These assumptions included:

- Local government entities that did not submit data were assumed to have similar revenues and expenditures on a per-capita basis to the averages of reporting entities.
- Local jurisdictions that reported expenditure breakdowns by subcategory were assumed to be similar to jurisdictions that did not break down their costs in such detail. These subcategory breakdowns were applied to total expenditures for the local government category. This assumption affects only the estimates of subcategory amounts, not the aggregated figures.
- Expenditures on collection, transfer, and transportation of disposed MSW reported by local governments are depicted as final expenditures, although a large portion may, in fact, be pass-throughs to private solid waste collection companies. Total expenditures (and thus revenues) for cities and counties are overestimated to the extent that these expenditures are actually pass-through to waste collection companies. Similarly, total expenditures and revenues for waste collection companies may be consequently underestimated, although total solid waste system expenditures would not be affected.
- Grants and loans reported by local governments are typically provided by the State government. In estimating total revenues for the solid waste system, grants and loans reported by local governments were excluded for two reasons. First, local government figures for the total amount of grants and loans disbursed did not always match State government records, which are considered a more reliable source. Second, grants and loans represent a pass-through from State government, rather than an initial revenue input for the solid waste system, so their inclusion would constitute double-counting. For example, Coordinated Prevention Grants are actually funded by MTCA taxes on hazardous waste, so the MTCA tax represents the initial revenue source into the solid waste system.
- This analytic method relies on key data elements collected from local governments. To the extent data collected are inaccurate or otherwise misrepresent actual costs incurred or revenues received, the results generated by the analysis may be skewed. With the resources available, it was not possible to undertake a rigorous review of all the data collected, and therefore not possible to conduct a sensitivity analysis that would provide a clear margin of error for the estimates. Attachment 7 documents several data values that appear to have been incorrectly entered into the data management tool.

Further details and additional assumptions are documented in Attachment 7.

## 3 Data on State Government Revenues and Expenditures

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State government revenues and expenditures were determined from information provided by the Department of Ecology using information on revenues, authorizations, appropriations, and expenditures from Ecology and the Department of Revenue.

### 3.1 Data Sources

Data were collected on revenue collection and disbursements from the following accounts and taxes:

- **Model Toxics Control Act (MTCA)** State and Local accounts, which are funded primarily by taxes on hazardous waste as well as related fees and payments. MTCA revenues provide funding for Coordinated Prevention Grants, Remedial Action grants and loans, Public Participation Grants, other portions of Ecology's budget, hazardous-waste-related activities, and non-solid-waste-related activities of other agencies.
- **Public Works Trust Fund (PWTF)** or Public Works Assistance Account, which is funded by the solid waste collection tax, loan repayments and other non-waste-related sources; it provides loans to local governments for solid waste and non-solid-waste purposes.
- **Waste Reduction, Recycling, and Litter Control** account, which is funded by the State litter tax and provides grants and other funding for the Community Litter Cleanup Program (CLCP) and other activities.
- **Washington Utilities and Transportation Commission (WUTC) regulatory fees**, which are collected from certificated solid waste collection companies and fund WUTC oversight activities.

As noted above, some accounts receive revenues from and provide funding for both solid-waste-related and non-solid-waste-related sources and activities, which complicates the ability to track solid waste dollars and identify non-waste-related revenues and expenditures that enter and exit the system. Cascadia worked extensively with Ecology to identify which revenues and expenditures should be considered solid-waste-related. Data sources included account receipts and outlays, budget provisos from the State Legislature, and communications with Ecology and Revenue staff members. The following expenditures were assigned to solid waste:

- Support for Ecology salaries and benefits, overhead related to solid waste (from MTCA Local Account);
- Administration related to solid waste (from MTCA State Account and Litter tax);
- Toxics cleanup related to solid waste (from MTCA State Account);
- Hazardous Waste and Toxics Reduction Program activities related to solid waste (from MTCA State Account);
- Solid Waste and Financial Assistance Program (from MTCA State Account);
- Public Works Trust Fund administration expenditures (prorated solid waste share);
- Ecology Waste Reduction and Recycling activities (from Litter tax); and
- Cleanup and Prevention activities by Ecology and other State agencies (from Litter tax)

## 3.2 Major Assumptions for State Government Data

Assumptions used in estimating State government revenues and expenditures are as follows:

- Ecology was able to identify all revenues and expenditures related to solid waste.
- Grants and loans to local governments are considered pass-throughs and not included in the State government's contribution to total expenditures in order to avoid double-counting.
- The share of Public Works Trust Fund administrative costs that should be assigned to solid waste was estimated based on the percentage of PWTF loan amounts designated as solid-waste-related.

## 4 Data on Private Sector Revenues and Expenditures

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Private sector revenues and expenditures were estimated using two different methodologies. Revenues and expenditures for solid waste collection companies that are certificated by the Washington Utilities and Transportation Commission (WUTC) were collected from annual reports filed with WUTC. The total costs of commercial recycling activities were estimated by applying per-ton cost estimates to statewide commercial recycling totals provided by the Department of Ecology. This section briefly describes the data sources used to estimate private sector revenues and expenditures, including the data sources and assumptions used to estimate expenditures by companies that collect recyclables from commercial sources.

### 4.1 Certificated Solid Waste Collection Companies

Revenues and expenditures for waste collection companies that are certificated by the Washington Utilities and Transportation Commission (WUTC) were collected from annual reports filed with WUTC. These costs include commercial and residential MSW for disposal and residential MSW for recycling and composting by waste collection companies in Classes A, B, and C.<sup>1</sup> Commercial recycling and composting activities are not regulated by or reported to WUTC.

Private sector expenditures are the sum of all regulated collection company expenditures reported to WUTC in annual filings. They were apportioned among three general expenditure categories (disposed MSW management; recycling, composting, and waste reduction; and other expenditures) based on the categorization of regulated revenues in the WUTC filings and using the following method:

- Regulated revenues associated with garbage collection in WUTC filings represent private disposed MSW management costs;
- Regulated revenues associated with MSW recycling collection and yard waste collection in WUTC filings represent costs associated with recycling, composting, and waste reduction; and
- Regulated revenues from medical waste collection represent other expenditures.

Private sector disposed MSW revenues are the sum of all regulated collection company revenues reported to WUTC in annual filings that the certificated collection companies submit to WUTC. Only regulated revenues earned by waste collection companies are included in the waste management costs incurred by the private sector. Non-regulated revenue data reported by collection companies are excluded to avoid double-counting. This assumption is discussed in more detail in the major assumptions section below.

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<sup>1</sup> According to WAC 480-70-041, Class A and B includes traditional solid waste collection companies with annual gross operating revenues from regulated, intrastate operations of more than \$5 million (Class A) or less than \$5 million (Class B). Class C includes solid waste collection companies that do not provide traditional residential or commercial solid waste operations. Class C companies include specialized carriers generally hauling specific waste products for specific customers or providing only on-call or non-scheduled service. Class C companies submit a different, less detailed annual report form than do Class A and B companies. Class C companies reported expenditures of \$13 million, representing approximately 4% of total expenditures by regulated waste collection companies, while Class A and B companies reported expenditures of approximately \$303 million.

## 4.2 Commercial Recycling

Estimates of the costs and revenues for collection and processing of commercial recyclables were developed by applying per-ton cost estimates to statewide commercial recycling totals. These estimates are known to be coarse approximations and were conducted using limited available data of varying quality. Nevertheless, they provide a straightforward and simple means of estimating an order-of-magnitude estimate of the cost of commercial recycling in Washington. Further analysis and data collection would improve these estimates, but for the purpose of assessing the general overall level of costs of commercial recycling, this coarse approximation was deemed adequate. More specific descriptions are provided in the following section.

### Collection Costs

The costs of operating commercial recycling statewide were estimated by applying per-ton estimates of the cost for companies to operate the collection, as follows:

- (Per-ton recyclables collection cost) \* (Recyclables quantities) = Estimated total recyclables collection cost; and
- (Per-ton compostables collection cost) \* (Recyclables quantities) = Estimated total compostables collection cost.

Per-ton costs were estimated based on the consultant's experience in the field as well as on limited published figures from *Resource Recycling*.<sup>2</sup> Estimates used were \$63/ton for compostables collection and \$126/ton for recyclables collection (assuming that mixed recyclables are, on average, about half as dense as mixed organics).

### Collection Revenues

Revenues to companies for collecting commercial recyclables were also estimated by applying per-ton revenue estimates to collection quantities. Per-ton revenue estimates were estimated by staff of Seattle's Resource Venture program to be approximately \$100 per ton for commingled curbside recycling, \$125 per ton for commercial compostables, and \$0 per ton for large quantities of single materials, such as cardboard or plastic film. Furthermore, it was assumed that half of all commercial recyclables are collected via commingled curbside programs and half are collected as large quantities of single materials.

### Processing Costs

Processing costs were estimated at \$50/ton for recyclables processing and \$40/ton for composting.<sup>3</sup> These per-ton costs were applied to the statewide commercial recycling totals to yield total processing cost estimates.

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<sup>2</sup> Barbara Stevens, "Multifamily Recycling: The Data Are In," *Resource Recycling* (1998).

<sup>3</sup> Chaz Miller, "The Real Price of Processing," *Waste Age* (October 1992); Jeff Gage, Personal communication with Peter Erickson of Cascadia Consulting Group, 2003.

## Processing Revenues

Processors gain revenue from the sale of recyclable materials to end markets. To estimate these revenues, per-ton market prices were applied to commercial recycling totals by material.<sup>4</sup> Materials included in the estimates are containers (glass, metal, and plastic), paper (including cardboard), textiles, white goods, food scraps, and yard waste. Materials that are hazardous, industrial in origin, or from construction and demolition activities were excluded from this estimate.

## Results Summary

Table 4 summarizes the results of the cost and revenue estimations for commercial recycling activities.

**Table 4. Summary of Commercial Recycling Estimates**

	Collection	Processing	Total
<b>Cost</b>	\$140 million	\$60 million	\$200 million
<b>Revenue</b>	\$110 million	\$100 million	\$210 million

Given uncertainty in the estimates, we recommend using a rounded figure of \$200 million for both the cost and revenue for commercial recycling in Washington.

## 4.3 Major Assumptions for Private Sector Data

The following assumptions used in estimating private sector solid waste costs.

- Non-regulated revenue data reported by waste collection companies are excluded because these data largely represent revenues earned through contracts with cities and towns. As such, these city costs are assumed to be reflected in the data that cities reported, and therefore inclusion of the WUTC non-regulated revenue data would lead to double-counting. Consequently, we expect that the estimate for private sector expenditures is conservative and the actual total may be higher. To put the size of the potential error in context: waste collection companies in Class A and B report collecting revenues of \$430 million from non-regulated waste activities. In addition, to the extent that non-regulated revenue reported by WUTC-certificated collection companies reflects waste management activities not captured in any of the other data sources (i.e., city questionnaires) used in this analysis, total solid waste system expenditures may be underestimated.
- Similarly, other expenditures on collection, transfer, and transportation of disposed MSW reported by local governments are depicted as final expenditures, although a large portion may, in fact, be pass-throughs to waste collection companies. Consequently, total expenditures (and thus revenues) for waste collection companies may be underestimated, although total solid waste system expenditures would not be affected.

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<sup>4</sup> Washington State Department of Ecology, 2006, *Results from 2005 Recycling Survey: Commercial Recycling Data*, provided to Cascadia Consulting by Gretchen Newman; Barbara Stevens, "Multifamily Recycling: The Data Are In," *Resource Recycling* (1998).

- Fees, penalties, and interest paid to WUTC by certificated solid waste collection companies are considered pass-throughs rather than a primary revenue source for the solid waste system. The primary source for these fees is considered to be payments made to collection companies by households and businesses.
  
- Expenditures by Class C certificated waste collection companies are assumed to follow the same category breakdowns (disposed MSW management, recycling, and other) as Class A and B companies, although Class C companies were not required to report the same information on revenues and costs by category as companies in Class A and B. Class C companies represented only a small fraction (4%) of total expenditures that regulated waste collection companies reported in Washington, so this assumption is not expected to have a significant impact on the resulting cost estimates.

## 5 C&D Debris Data Estimation Method

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Construction and demolition debris (C&D) expenditures were estimated using a cost model that included reported tonnages, distances traveled, and average costs. Both disposed and recycled C&D materials were included. C&D debris quantities reported to the Department of Ecology included construction and demolition materials, inert waste, asbestos, wood waste, landclearing debris, brick and masonry, ceramic materials, asphalt and concrete, and uncontaminated soils. Revenues were not estimated, and expenditures could not be assigned to specific categories.

Total C&D expenditures were estimated based on:

- Ecology's estimate of the total volume of C&D debris generated in Washington (6.1 million tons in 2005, of which 2.4 million were disposed and 3.7 million were recycled.);<sup>5</sup>
- An estimated per-ton cost of disposing of or recycling C&D debris of \$25 per ton, which is a weighted average of the tip fees per ton of disposal and an average figure for source-separated and commingled C&D processing;<sup>6</sup>
- Ecology data on the average distance over which C&D debris is transported, before it is disposed of or recycled, an average of 76 miles for disposal and 18 miles for recycling;<sup>7</sup>
- Estimated unit transport costs of \$0.61 per cubic yard per mile;<sup>8</sup> and
- Estimated C&D debris density of 3.30 tons per cubic yard.<sup>9</sup>

Because of data limitations, it was not possible to determine the distribution of these expenditures among municipalities, the State, and the private sector.

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<sup>5</sup> Tonnage data provided by Cheryl Smith, Washington State Department of Ecology, June 14, 2007.

<sup>6</sup> Tonnage and tip fee data provided by Cheryl Smith, Washington State Department of Ecology, June 14, 2007 and the Department of Ecology solid waste data webpage (<http://www.ecy.wa.gov/programs/swfa/solidwastedata/>), accessed August 2007.

<sup>7</sup> Data provided by Cheryl Smith, Washington State Department of Ecology, June 14, 2007, based on the tons of C&D debris generated by individual counties and disposed/recycled at individual facilities.

<sup>8</sup> Based on an estimate of R.S. Means, *Environmental Remediation Cost Data--Unit Price*, 7th Annual Edition, 2001.

<sup>9</sup> Derived from J.H. Findorff and Son, Inc., "Construction Waste Reduction and Recycling Demonstration Project," Final Grant Report for the Wisconsin Department of Natural Resources, March 2004.

## 6 Data Management Tool and Spreadsheet Analysis

The project team designed and constructed two main tools that Ecology can use in future solid waste cost accounting efforts to facilitate data management and analysis. These tools are:

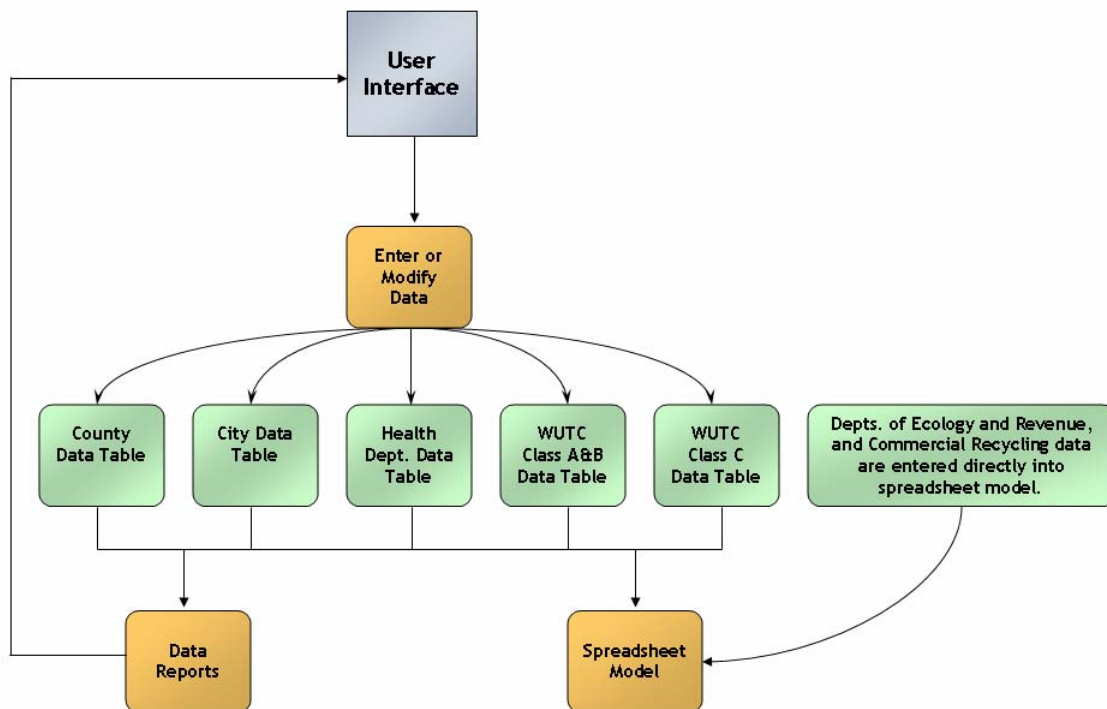
- A **Data Management Tool** to store and maintain data collected by Cascadia and Ecology related to the revenues and expenditures of Washington's current waste management system; and
- An **Analytical Spreadsheet Model** that pulls information from the Data Management Tool to estimate expenditures and associated funding sources for solid waste management activities in Washington.

This section will briefly describe and provide basic instructions on using the data management tool and spreadsheet model. More detail is provided in Attachment 7.

### 6.1 Data Management Tool Overview

The project team designed a Data Management Tool to store and maintain data that the project collected related to the costs and revenues of Washington's current waste management system. This section summarizes the design for this data tool, beginning with a brief outline the structure of the database that underpins the Data Management Tool (see Figure 1) and capabilities of the user interface for the tool (see Table 5). More detail is provided below and in Attachment 7.

Figure 1. Structure of Data Management Tool



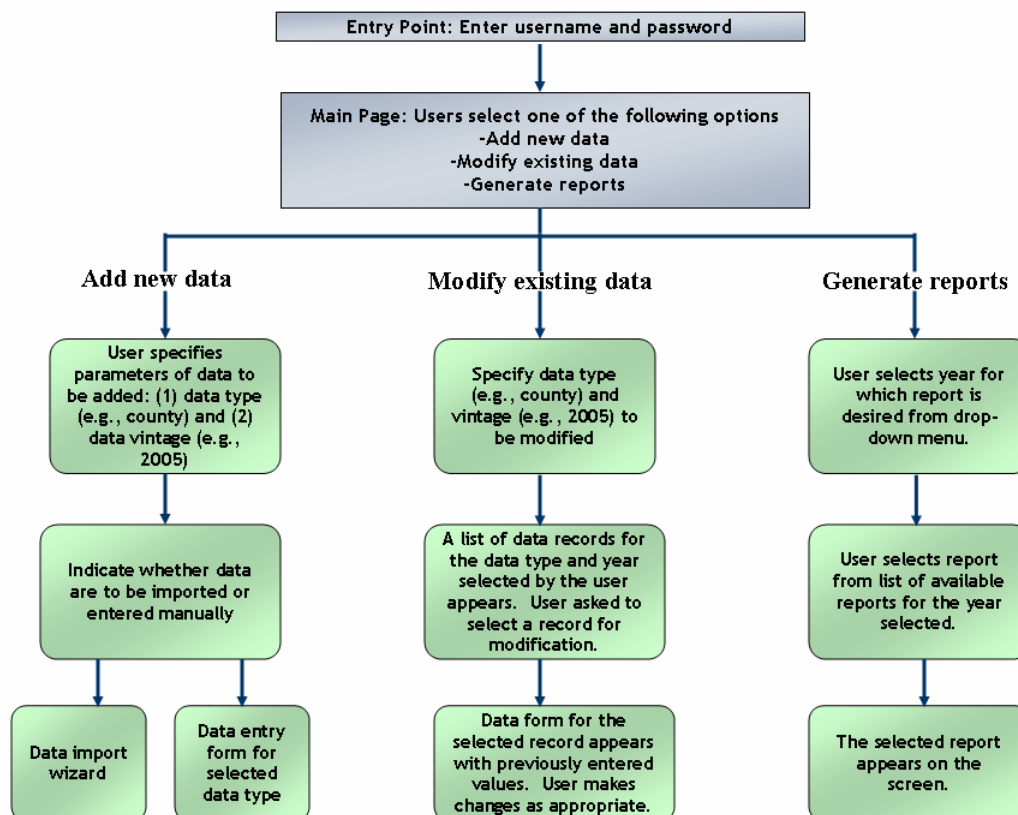
**Table 5. Data Management Tool Capabilities**

<b>Capability</b>	<b>Final Data Management Tool</b>
<b>Data Entry</b>	<ul style="list-style-type: none"> <li>▪ <b>Manual data entry for all data types</b></li> <li>▪ <b>Importation capabilities for cities, counties, and health jurisdictions</b></li> </ul>
<b>Data Editing</b>	<ul style="list-style-type: none"> <li>▪ <b>Web-based data editing for all data types</b></li> </ul>
<b>Reports</b>	<ul style="list-style-type: none"> <li>▪ <b>Four consolidated reports:</b> <ol style="list-style-type: none"> <li>1. Summary of County, Health Jurisdiction, and City Revenue Data</li> <li>2. Summary of County, Health Jurisdiction, and City Expenditure Data</li> <li>3. Summary of WUTC Class A/B Waste Collection Company Data</li> <li>4. Summary of WUTC Class C Waste Collection Company Data</li> </ol> </li> </ul>

## **6.2 Data Management Tool – User Interface**

The Data Management Tool's web-based interface will guide users through the process of adding new data to the tool and also will help users retrieve revenue and expenditure information housed within the tool. Figure 2 illustrates the overall organization of the web-based interface. As indicated in Figure 2, the tool's "welcome" page asks users to enter their username and password for security purposes. Next, users are directed to the tool's main page, where they may select one of the following three options: (1) enter new data, (2) modify data already entered into the data tool, or (3) generate summary reports. The user interface guides the user through data entry and editing. More detail is provided in Attachment 7.

**Figure 2. Illustration of the Data Management Tool's Web-based Interface**



## Enter Data into the Tool

In the tool's main page, users may select one of the following three options: (1) enter new data, (2) modify data already entered into the data tool, or (3) generate summary reports.

If they choose to enter new data, the next steps are as follows:

- Select the data type: County, City/Town, Health Department, WUTC Class A and B, WUTC Class C, Department of Ecology (expenditures), or Department of Revenue (revenues).
- Select the data year (the 2007 cost estimation study used data from calendar year 2005).
- Depending on the data type, users may be asked to name the specific jurisdiction (local government) or entity (solid waste collection company).
- Data for WUTC-certificated solid waste collection companies and the Departments of Ecology and Revenue must be entered manually. Data for local governments can be entered manually or imported from CSV (comma-separated values) files derived from the data collection request forms.

Each time users choose to enter new data, a new record is created, regardless of whether all data elements are completed or whether the data duplicate an earlier record. To avoid duplication, users should choose to “edit/view data entered” when modifying records. Users must then select the data type and record of choice. Data can only be edited manually. If extensive changes are need to local government records, it may be more efficient to delete the existing record and re-import the CSV files.

Data for C&D debris and commercial recycling can be entered directly into the separate analytical spreadsheet model, which is discussed below.

## Gathering and Formatting Questionnaire Data for Importation

Data collection requests were distributed as Microsoft Word forms so that the data could be converted to CSV text files for import into the database using the web interface. An example of what the CSV data should look like is presented in Figure 3. When preparing the files for import, please bear in mind the following tips:

- Each data element must be separated by a comma and contained within parentheses.
- The city short form uses an array of check boxes to ask who provides certain solid waste functions. Word converts a row of check boxes into a single CSV element, which must be separated into its individual data elements by commas and parentheses. For example, Word could generate the following line of text: “010010”. Before importing, the user must edit the text to read as follows: “0”,“1”,“0”,“0”,“1”,“0”.
- Each CSV file must be a single, continuous line of text with no paragraph separations (which respondents occasionally include in note fields and need to be removed prior to importation).
- There must be no tracked changes present in the Word data form at the time of conversion.
- Each CSV file created by converting the Word forms must be divided into three separate tables, as described below, due to file size constraints.

Because the number of data fields included in the county, city, and health jurisdiction data requests well exceeds the Microsoft Access maximum of 255 fields per table, three tables were created for each type of local government (cities, counties, and health jurisdictions). The first table for each local government type includes the beginning of the questionnaire through solid waste-related revenues. The second table includes expenditures up to but not including “Administration, enforcement, planning & other activities” expenditures. The third table includes data from “Administration, enforcement, planning & other activities” expenditures through the end of the questionnaire.

**Figure 3. Example of Local Government CSV data**

```
"COUNTY","unit1","unit1 des","unit2","unit2des","unit3","unit3des","unit4","unit4des","name","title","tel",
,"fax","street","city","110011","email","41.00","R1","41.10","R1.1","41.20","R1.2","41.30","R1.3","41.4
0","R1.4","41.50","R1.5","41.60","R1.6","41.70","R1.7","R1.81S","R1.82S","R1.82S","41.81","41.82","
41.83","R1.81","R1.82","R1.83","R1.91S","R1.92S","R1.93S","R1.94S","R1.95S","41.91","41.92","41.
93","41.94","41.95","R1.91","R1.92","R1.93","R1.94","R1.95"
```

## Viewing Reports

Users can view four summary reports in the database. These reports should be considered preliminary because data are not checked for errors or consistency. The reports are:

- Report 1. Summary of County, Health Jurisdiction, and City Revenue Data
- Report 2. Summary of County, Health Jurisdiction, and City Expenditure Data
- Report 3. Summary of WUTC Class A&B Solid Waste Collection Company Data
- Report 4. Summary of WUTC Class C Solid Waste Collection Company Data

## 6.3 Data Management Database

The user interface feeds data into an Access database with tables for each data type, including three tables each for cities, counties, and health jurisdictions. Each Access table maps to a spreadsheet in the Excel-based analysis model. The table-spreadsheet mapping is presented in Table 6. Additional tables in the Access database provide structure for the web-based data entry interface.

**Table 6. Access Table and Excel Spreadsheet Mapping**

Table in Access Database	Spreadsheet in Excel Analysis Model
tblCityCodes_1	tblCityCodes_1
tblCityCodes_2	tblCityCodes_2
tblCityCodes_3	tblCityCodes_3
tblCountyCodes_1	tblCountyCodes_1
tblCountyCodes_2	tblCountyCodes_2
tblCountyCodes_3	tblCountyCodes_3
tblHealthCodes_1	tblHealthCodes_1
tblHealthCodes_2	tblHealthCodes_2
tblHealthCodes_3	tblHealthCodes_3
tblWUTC_AB	WUTC_AB
tblWUTC_C	WUTC_C
tblRevenue	State_Revenue_Data
tblEcology	State_Expenditure_Data

## 6.4 Analytical Spreadsheet Model Overview

The Analytical Spreadsheet Model is designed to estimate solid waste management revenues and expenditures across different categories. The expenditure categories and subcategories estimated are listed in Table 7. For example, the spreadsheet model estimates city expenditures on municipal solid waste (MSW), county expenditures on debt service, and health jurisdiction expenditures on litter cleanup. The revenue and pass-through categories by funding type (e.g., user fees) and by funding source (e.g., cities) are shown in Table 8.

**Table 7. Summary of Spreadsheet Model Expenditure Outputs**

Sectors	Expenditure Categories
<p><b>State and Other Government</b></p> <p><b>Cities</b></p> <p><b>Counties</b></p> <p><b>Health Jurisdictions</b></p> <p><b>Private Sector</b></p> <p><b>Miscellaneous</b></p>	<ul style="list-style-type: none"> <li>▪ <b>Municipal Solid Waste Management</b> <ul style="list-style-type: none"> <li>- Collection, transport, processing, and disposal</li> <li>- Education and outreach</li> <li>- Equipment purchase and maintenance</li> <li>- Operation, monitoring, and maintenance of active landfills</li> <li>- Monitoring and maintenance of closed landfills</li> <li>- Site clean-up/remediation of closed landfills</li> <li>- Other MSW management</li> </ul> </li> <li>▪ <b>Recycling, Composting, and Waste Reduction</b> <ul style="list-style-type: none"> <li>- Collection and transport operations</li> <li>- Education and outreach</li> <li>- Capital improvements</li> <li>- Equipment purchase and maintenance</li> <li>- Operation and maintenance of recycling facilities</li> <li>- Other recycling, composting, and waste reduction</li> </ul> </li> <li>▪ <b>Moderate Risk Waste (MRW)</b></li> <li>▪ <b>Litter and Illegal Dumping Cleanup</b></li> <li>▪ <b>Capital and Equipment</b></li> <li>▪ <b>Administration, Planning, and Related Activities</b></li> <li>▪ <b>Debt Service</b></li> <li>▪ <b>Other Expenditures</b></li> <li>▪ <b>Construction, Demolition, and Land-clearing Debris</b></li> </ul>

**Table 8. Summary of Spreadsheet Model Revenue Outputs**

Sectors	Revenue Categories
<b>State and Other Government</b>	<ul style="list-style-type: none"> <li>▪ <b>Coordinated Prevention Grants</b> (from the State's Model Toxics Control Accounts)</li> <li>▪ <b>Remedial Action Grants and Loans</b> (from the State's Model Toxics Control Accounts)</li> <li>▪ <b>Community Litter Clean-up Program</b> (from Ecology's Waste Reduction, Recycling, and Litter Control Account)</li> <li>▪ <b>Public Works Trust Funds Grants and Loans</b></li> <li>▪ <b>Other State government funding sources</b></li> </ul>
<b>Local Governments (Cities, Counties, and Health Jurisdictions)</b>	<ul style="list-style-type: none"> <li>▪ <b>User fees, rates, and taxes</b></li> <li>▪ <b>Surcharges</b></li> <li>▪ <b>Issuance of bonds</b></li> <li>▪ <b>Sales related to municipality's solid waste operations</b></li> <li>▪ <b>Other sources</b></li> </ul>
<b>Private Sector</b>	<ul style="list-style-type: none"> <li>▪ <b>Household and business payments to solid waste collection companies for waste management services</b></li> <li>▪ <b>Franchise fees, penalties, and interest from solid waste collection companies</b></li> </ul>
<b>Miscellaneous</b>	<ul style="list-style-type: none"> <li>▪ <b>Fees for the management of construction, demolition, and land-clearing debris. May be paid by several sources, including households, businesses, and government.</b></li> </ul>

To the extent possible, the model's expenditure outputs identify the original source of the funds supporting Washington's solid waste management activities. However, the way in which the data were collected makes it difficult to link individual funding sources with specific solid waste expenditures – for example, it is not possible to estimate the extent to which surcharges collected by cities are used for recycling activities. Nonetheless, on an aggregate level by funding type, the model is designed to track the funding of Washington's solid waste management system and to estimate, where possible, the portion of solid waste management revenues that are used for solid waste management activities statewide.

## 6.5 Analytical Spreadsheet Model Instructions

### Entering Data

To use the Analytical Spreadsheet Model, data must be exported from the Access database into the Excel workbook using the table-spreadsheet mapping presented in Table 6. The tables should be copied and pasted into the appropriate spreadsheet, taking care to include the column headings as row 1 in Excel and to line the data up as was done in the current analysis. The model uses array formulas, lookup functions, and other features that require the user to be fairly comfortable with Excel.

Error-checking and correction of city, county, and health jurisdiction data is required to ensure that responding jurisdictions with summation errors are included appropriately in the model. Error corrections made for 2005 data are listed in Attachment 7. Data for C&D debris and commercial recycling can be entered directly into the spreadsheet model on the spreadsheet tabs for *C&D* and *Comm'l\_Recycling*.

Some adjustments may be necessary to capture new or additional information. Adjustments made to the model in 2005 are described below.

## **Adjustments to the Analysis in 2005**

Several adjustments were made to the analytical model to address the special cases. First, recyclers for commercial businesses are not required to report revenues to WUTC, so their contribution to the waste system was not included in annual reports to WUTC. Cascadia estimated revenues and expenditures for commercial recycling; these estimates were added to the model as a new spreadsheet tab, *Comm'l\_Recycling*.

Second, due to the complexity of State government expenditures and the intermingling of solid waste and non-solid waste revenues and expenditures, the model cannot accurately characterize these expenditures automatically. The project team, in consultation with Ecology, categorized them manually. This review and characterization will also be needed for any future updates.

Third, in 2005, local governments reported expenditures on education and outreach for disposed MSW that were so small that Ecology requested that they be included in "other" expenditures, which was done manually. (Education and outreach expenditures may in fact be higher, but many local governments were unable to break them out as a separate line item from other program expenditures.) This categorization of expenditures was done in the synopsis report and is not incorporated in the spreadsheet model itself.

## **6.6 Using the Tools in the Future**

The tools were designed to accommodate data from the years 2000 through 2015 so that, at a future time, Ecology can add data for future (or previous) years. However, it is important to note that the underlying data tables will be based solely on the data elements included in the current project. To the degree that subsequent years of data include different data elements, these "new" elements will not be reflected in the current tool. The underlying tables can be easily modified, at a future date, to reflect new (or different) data elements, either by adding the new elements to the existing structure or by creating new tables specific to each year.

## 7 Data Gaps and Limitations

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This section briefly discusses the limitations and strengths of the project and its results, including limitations in the types of conclusions that can be drawn from the existing dataset. It also provides some additional suggestions for future efforts that could help fill the existing data gaps.

The cost estimates developed in this project can help Ecology and the SWAC continue their evaluation of future funding needs and sources. This final section briefly discusses options for future updates and refinements as well as issues for Ecology and the SWAC to consider regarding future policy decisions. This project provided not only an estimate for solid waste system costs in 2005, but also an updatable database and a platform for continued future development and analysis. The database in its current form can be updated with data from future years for comparison over time. In addition, the database and its accompanying analytical spreadsheet model can be used as a basis for further refinement and expansion of the covered waste streams, revenues, and costs.

The project currently offers a conservative estimate of revenues and costs associated with key portions of the solid waste system in Washington State. Where data allow, it disaggregates these costs according to sector (e.g., local government) and waste stream (e.g., disposed MSW). The project was not intended to provide an estimate of future system costs, compare the costs of recycling versus disposal, or estimate waste system costs if the Beyond Waste Plan had not been adopted, though Ecology and the SWAC may wish to consider such topics in the future. With more data, such an analysis could provide a more comprehensive and detailed accounting of the waste system, including more detailed breakdowns by activity type. Potential enhancements to the estimates could include:

- Estimating costs for other waste streams (e.g., industrial, agricultural) and sectors (e.g., Tribes);
- Tracking in more detail the pass-through funding and revenue sources by waste stream to follow dollar flows as they move throughout the system;
- Conducting more detailed and broader estimation of costs associated with Moderate Risk Waste;
- Working with local governments to ensure consistent data collection in a manner that necessitates the least burden;
- Including an estimate of the money saved by waste reduction (i.e., how much more would have been spent on disposal without waste reduction, akin to the way that energy utilities may count conservation as a source of additional power generation “capacity”);
- Encouraging WUTC to offer electronic reporting and consider adding several questions relevant to this cost estimation to its annual report form for certificated solid waste collection companies; and
- Developing an estimate of the external costs of solid waste.

The solid waste cost flow data should be updated over time to track how funding sources and needs are changing as Washington makes progress toward its Beyond Waste vision. The data management and analytical tools are already in place, so updating the local government data could be streamlined. The WUTC collection company data and State government expenditures could be updated annually. Given the level of effort that the local government data requests required of both respondents and the project team, updating the city, county, and health jurisdiction data less frequently, such as biennially, may be appropriate. Striking the right balance on the frequency of data updates should help support a high response rate. For example, too-frequent surveys may be burdensome for local governments, while long intervals may mean losing institutional memory about how to fill out the data form as well as generating less useful and timely information. Simplifying the data collection requests could reduce the effort

required and improve the response rate, though the data obtained would be less rich. Some changes are minor (e.g., converting the data collection instruments into Excel forms to facilitate error checking), while others could be more substantial and require corresponding changes to the database (e.g., working with local governments to modify the categories and subcategories or better align them with the existing Budgeting Accounting and Reporting System, or BARS codes). Information collected and lessons learned in 2007 should help pave the way for future updates and continued use of these valuable data on the estimated costs of solid waste management in Washington State.

## **Attachments**

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### **1. County Solid Waste Questionnaire**

Attachment 1 presents the data collection form used to gather information from county governments in Washington State. Similar forms were used to gather data from city governments and health jurisdictions.

### **2. City Solid Waste Questionnaire**

Attachment 2 presents the data collection form used to gather information from city governments in Washington State. It includes a “short form” used to determine whether responding cities had solid-waste related revenues and expenditures and needed to fill out the long form to explain their activities.

### **3. Health Jurisdiction Solid Waste Questionnaire**

Attachment 3 presents the data collection form used to gather information from health jurisdictions in Washington State.

### **4. List of Contacted and Responding Local Governments**

Attachment 4 presents the local governments that were contacted and that responded to the data collection requests.

### **5. IEc Sampling Recommendation**

Attachment 5 presents IEc’s sampling recommendation sent to Ecology prior to selecting the sample of cities to contact for data.

### **6. IEc City Sample**

Attachment 6 presents the sample of cities contacted and to the stratum to which each was assigned.

### **7. IEc Spreadsheet Model Documentation**

Attachment 7 presents IEc’s documentation of the spreadsheet model, more details on the data management tool, and adjustments made to the questionnaire data.

## **Attachment 1. County Solid Waste Questionnaire**

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Attachment 1 presents the data collection form used to gather information from county governments in Washington State. Similar forms were used to gather data from city governments and health districts.

# Solid Waste Cost Assessment for Washington State

## *County Revenues & Expenditures for 2005*

### **Section I. Introduction & Instructions**

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Recently, you received an email asking for help from Cullen Stephenson of the Department of Ecology and Steve Wamback of the Washington State Solid Waste Advisory Committee (SWAC) regarding a project to examine the costs of managing solid waste in Washington. We are contacting you now for information on revenues and expenditures related to solid waste in your county for the year 2005. Providing your county's data will likely take about 30-60 minutes of your time. If at all possible, we need your response by **Tuesday, May 22**, as this project is on a fast track due to funding.

**How the information will be used.** The Department of Ecology and the SWAC plan to use this cost accounting information to support a longer-term effort to examine future funding needs for solid waste management and to identify stable ways to fund the system while reducing waste. The overall goal is to help ensure that adequate funding is available in the future. Washington State's Beyond Waste Plan identifies the value of and need for conducting this long-range examination.

**Entering your county information.** We recognize that every county is different and that it is difficult to have a standard form that fits all 39 counties. In some places, the form may ask for more detail than you are able to provide; please fill in as much information as you can, particularly the category totals, even if you cannot provide a more detailed cost breakdown. If a section or line does not apply to your county, mark it "n/a." Similarly, if you have special circumstances regarding solid waste-related revenues and expenditures that are not adequately captured by this form, please add notes to provide further explanation. Please avoid double-counting the same funds in more than one category, or use notes to identify any double-counting that may occur. The forms are intended

to be filled out based on your existing budget information without requiring significant new calculations. Your thorough responses will help us develop a more complete picture of your county's situation. You may either enter exact dollar amounts or round them to the nearest thousand, based on whichever is easier for you, but please use a consistent method throughout the data collection form.

Please include all solid waste revenues and costs for which your county is responsible, even if those activities occur outside of the solid waste department or division. Note that we are also contacting local environmental health jurisdictions, tribal governments, and a sampling of cities, including all cities with populations over 40,000. Accordingly, you do not need to include county revenues and costs associated with the environmental health jurisdiction in your area. Please use the **Notes** fields to explain the roles of your county and other entities in funding solid waste activities. This is a Word form and you should be able to navigate through it using the "tab" or arrow keys or your mouse; gray shading indicates fields for entering your data. If you have any trouble with the file format, please contact Jessica at Cascadia (below) for an alternate version.

**Timeline.** We respectfully ask that you respond with your data at your earliest opportunity. We will share the results with you this summer. We want to thank you in advance for your assistance. Please email your completed forms **by Tuesday, May 22**, to:

**Jessica Branom-Zwick, Cascadia Consulting Group**  
[jessica@cascadiaconsulting.com](mailto:jessica@cascadiaconsulting.com), (206) 343-9759 x126

Please contact Jessica (see above) or Cheryl Smith of Ecology, at (360) 407-6654 or [cstr461@ecy.wa.gov](mailto:cstr461@ecy.wa.gov), with any questions.

## Section II. Identification

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<b>1. County Name</b>	
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<b>2. Departments, divisions, or other offices with responsibility for solid waste in your County government</b>	
<b>Unit of County government</b>	<b>Brief description of solid waste role</b>
a)	
b)	
c)	
d)	

<b>3. Contact person for solid waste cost information (respondent to this form)</b>		
<b>Name</b>		
<b>Title</b>		
<b>Telephone</b>		
<b>Fax</b>		
<b>Street Address</b>		
<b>City</b>		<b>Zipcode</b>
<b>Email Address</b>		

### Section III. Solid Waste Funding – REVENUES for 2005 Calendar Year

4. Please specify how much of your **Calendar Year 2005** solid waste-related **REVENUES** came from each of the following sources. You may either enter exact dollar amounts or round them to the nearest thousand, based on whichever is easier for you, but please use a consistent method throughout the data collection form. Please add notes to explain any special circumstances, including whether the funds are passed through directly to another jurisdiction, such as a city, for actual use and program implementation.

If funds cover more than one year (e.g., a two-year grant), please identify and list the portion of the revenue associated with calendar year 2005. Use the **Notes** field for explanation if needed.

#	Revenue Sources for Calendar Year 2005	Amount	Notes
<b>1</b>	<b>User Fees, Rates, and Taxes</b>	<b>\$</b>	
1.1	- Solid waste tip fees (or related payments)	\$	
1.2	- "Tip" fees to deposit materials at other facilities (e.g., composting, recycling)	\$	
1.3	- Collection/disposal district fees	\$	
1.4	- Planning fees	\$	
1.5	- Fees/revenues from cities	\$	
1.6	- Permit fees	\$	
1.7	- Advance disposal fees (ADFs)	\$	
1.8	- Taxes – <i>specify</i> :		
	a)	a) \$	a)
	b)	b) \$	b)
	c)	c) \$	c)
1.9	- <b>Other</b> fees, rates, taxes, and related – <i>specify</i> :		
	a)	a) \$	a)
	b)	b) \$	b)
	c)	c) \$	c)
	d)	d) \$	d)
	e)	e) \$	e)

#	Revenue Sources for Calendar Year 2005	Amount	Notes
<b>2</b>	<b>Surcharges</b>	\$	<i>Please specify surcharge amount (e.g., \$4/ton) and use of funds.</i>
2.1	- Collection surcharges	\$	
2.2	- Recycling surcharges	\$	
2.3	- Disposal surcharges	\$	
2.4	- Other surcharges – <i>specify:</i> a) b) c) d)	a) \$ b) \$ c) \$ d) \$	a) b) c) d)
<b>3</b>	<b>Grants &amp; Loans (2005 portion only)</b>	\$	<i>Please specify whether the funding was a loan or grant.</i>
3.1	- Coordinated prevention grants (CPG)	\$	
3.2	- Remedial action grants or loans	\$	
3.3	- Community Litter Cleanup Program (CLCP)	\$	
3.4	- Public Works Trust Fund grants or loans	\$	
3.5	- Bond financing	\$	
3.6	- <b>Other</b> grants, loans, and related – <i>specify each:</i> a) b) c) d)	a) \$ b) \$ c) \$ d) \$	a) b) c) d)

#	Revenue Sources for Calendar Year 2005	Amount	Notes
<b>4</b>	<b>Revenues from Sales</b>	<b>\$</b>	
4.1	- Sale of electricity (from waste-to-energy facilities)	\$	
4.2	- Sale or use of landfill gas	\$	
4.3	- Sale of recyclable materials	\$	
4.4	- <b>Other</b> revenues from sales – <i>specify</i> : a) b) c)	a) \$ b) \$ c) \$	a) b) c)
<b>5</b>	<b>Other Sources of Funds</b>	<b>\$</b>	
5.1	- Interest income	\$	
5.2	- Enforcement infractions, fines, penalties	\$	
5.3	- Subsidies – <i>specify</i> :	\$	
5.4	- Reserves/fund balance	\$	
5.5	- General funds	\$	
5.6	- <b>Other funding sources</b> – <i>specify</i> : a) b) c) d)	a) \$ b) \$ c) \$ d) \$	a) b) c) d)
<b>6</b>	<b>Total Solid Waste-related Revenues</b>	<b>\$</b>	

Other notes regarding revenue:

**5. What were the tip fees for disposal or transfer in your county on December 31, 2005?**

(Please note if there are different tip fees for different facilities, loads, or customer types.)

Tip fees at transfer or disposal sites	Units (ton, yard, other)	Facility type (public, private)	Applies to (e.g., facility, waste, customer type)
\$			
\$			
\$			
\$			
\$			
\$			
\$			
\$			

**Other notes regarding tip fees:**

## Section IV. Solid Waste Spending – EXPENDITURES for 2005 Calendar Year

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7. Please specify how much of your county's **actual solid waste expenditures for Calendar Year 2005** were spent in each of the following general areas (see Section VI for Definitions). In all cases, include **all** money spent from the County solid waste budget on that activity in calendar year 2005, regardless of whether the work was done by county staff, consultants, or under contract. (For example, public outreach on HHW performed by a public relations firm under contract to the county should be included under "Moderate Risk Waste.")

We understand that your county's expenditures may not fit precisely into these categories. Accordingly, please use your best estimation of the category breakdowns or provide combined figures (e.g., transportation costs included with transfer station operations), but please use the Notes field to explain what is and is not included in your figures, especially where it differs from the stated definitions.

Please list the **funding sources** (revenues) that pay for each activity type. You may refer to them by line number from the previous table of revenues. You may either enter exact dollar amounts or round them to the nearest thousand, based on whichever is easier for you, but please use a consistent method throughout the data collection form. Please include total costs for the category (e.g., Moderate Risk Waste) even if you cannot provide a more detailed breakdown of the sub-categories (e.g., MRW collection operations). **Please use the attached definitions and examples, even if your county defines these terms differently**; use the **Notes** field for clarification if needed. Please review all of the categories before filling out the form.

Additionally, please use the **Notes** field to identify other entities (e.g., cities, health jurisdictions, private companies) that played a significant role in funding waste-related activities in your county in 2005.

#	County Expenditures for Calendar Year 2005 (Actual)	Amount	Notes (including identification of other responsible entities and roles)	Funding Sources (note line item numbers from Revenue table)
1	<b>Municipal Solid Waste (MSW)</b>	\$		
1.1	- Collection operations	\$		
1.2	- Transfer station operations	\$		
1.3	- Transportation operations	\$		
1.4	- Education & outreach	\$		
1.5	- Capital improvements	\$		
1.6	- Equipment (purchase & maintenance expenditures)	\$		
1.7	- Operations, monitoring & maintenance of <b>active</b> landfills & other disposal sites	\$		
1.8	- Monitoring & maintenance for <b>closed</b> landfills & other disposal sites	\$		
1.9	- Site clean-up/remediation for <b>closed</b> landfills or other disposal sites	\$		
1.10	<b>Other MSW costs – specify:</b> a) b) c) d) e)	a) \$ b) \$ c) \$ d) \$ e) \$	a) b) c) d) e)	a) b) c) d) e)

#	County Expenditures for Calendar Year 2005 (Actual)	Amount	Notes (including identification of other responsible entities and roles)	Funding Sources (note line item numbers from Revenue table)
2	<b>Recycling, Composting &amp; Waste Reduction</b>	\$		
2.1	- Collection operations (incl. events)	\$		
2.2	- Transportation operations	\$		
2.3	- Education & outreach programs	\$		
2.4	- Capital improvements	\$		
2.5	- Equipment (purchase & maintenance expenditures)	\$		
2.6	- Operations & maintenance of recycling facilities	\$		
2.7	<b>Other recycling &amp; related costs – specify:</b> a) b) c) d)	a) \$ b) \$ c) \$ d) \$	a) b) c) d)	a) b) c) d)

#	County Expenditures for Calendar Year 2005 (Actual)	Amount	Notes (including identification of other responsible entities and roles)	Funding Sources (note line item numbers from Revenue table)
<b>3</b>	<b>Moderate Risk Waste</b>	<b>\$</b>		
3.1	- Collection operations (incl. events)	\$		
3.2	- Transportation operations	\$		
3.3	- Education & outreach programs	\$		
3.4	- Capital improvements	\$		
3.5	- Equipment (purchase & maintenance expenditures)	\$		
3.6	- Operations & maintenance of MRW facilities	\$		
3.7	- Disposal or recycling of MRW	\$		
	<b>Other MRW costs – specify:</b>			
3.8	a)	a) \$	a)	a)
	b)	b) \$	b)	b)
	c)	c) \$	c)	c)
	d)	d) \$	d)	d)
<b>4</b>	<b>Litter/illegal dump clean-up</b>	<b>\$</b>		
4.1	- Litter collection/disposal	\$		
4.2	- Illegal dumping programs	\$		
4.3	- Education & outreach programs	\$		
	<b>Other litter/dumping costs – specify:</b>			
4.4	a)	a) \$	a)	a)
	b)	b) \$	b)	b)
	c)	c) \$	c)	c)

#	County Expenditures for Calendar Year 2005 (Actual)	Amount	Notes (including identification of other responsible entities and roles)	Funding Sources (note line item numbers from Revenue table)
<b>5</b>	<b>Any other capital &amp; equipment costs</b>	<b>\$</b>		
5.1	Any <b>other</b> capital improvements (construction & upgrades) – <i>specify</i> : a) b) c)	a) \$ b) \$ c) \$	a) b) c)	a) b) c)
5.2	Any <b>other</b> equipment (purchase & maintenance expenditures) – <i>specify</i> : a) b) c)	a) \$ b) \$ c) \$	a) b) c)	a) b) c)
<b>6</b>	<b>Administration, enforcement, planning &amp; other activities</b>	<b>\$</b>		
6.1	Administration (see definitions)	\$		
6.2	Enforcement/regulatory oversight	\$		
6.3	Solid waste planning	\$		
6.4	Grants to cities or others (see Q.9)	\$		
6.5	Special one-time expenses for 2005 (e.g., moving to new headquarters, landfill closure) – <i>specify</i> : a) b) c)	a) \$ b) \$ c) \$	a) b) c)	a) b) c)
6.6	Contribution to reserves – <i>specify</i> :	\$		

#	County Expenditures for Calendar Year 2005 (Actual)	Amount	Notes (including identification of other responsible entities and roles)	Funding Sources (note line item numbers from Revenue table)
6.7	<b>Other administration &amp; other activities – specify:</b> a) b) c)	a) \$ b) \$ c) \$	a) b) c)	a) b) c)
<b>7</b>	<b>Debt service</b>	<b>\$</b>		
7.1	- <b>active</b> transfer stations, landfills, and WTE plants	\$		
7.2	- <b>active</b> recycling and/or compost facilities	\$		
7.3	- <b>active</b> MRW collection facilities	\$		
7.4	- <b>closed</b> landfills, remediation sites, WTE plants	\$		

#	County Expenditures for Calendar Year 2005 (Actual)	Amount	Notes (including identification of other responsible entities and roles)	Funding Sources (note line item numbers from Revenue table)
8	<b>Other expenditures, not specified elsewhere</b>	\$		
8.1	<b>Other expenditures*</b> : waste-related activities – <i>specify</i> : a) b) c) d) e)	a) \$ b) \$ c) \$ d) \$ d) \$	a) b) c) d) e)	a) b) c) d) e)
8.2	<b>Other expenditures*</b> : <u>non-waste</u> -related activities that are paid for with waste-related funding – <i>specify</i> : a) b) c) d) e)	a) \$ b) \$ c) \$ d) \$ e) \$	a) b) c) d) e)	a) b) c) d) e)
9	<b>Total Solid Waste Expenditures</b>	\$		

\* The two categories of **Other expenditures** include waste-related expenditures not listed elsewhere as well as waste-related funding that is used to fund other purposes. Examples could include:

- **Waste-related**: e.g., disaster debris, junk automobile clean-up
- **Non-waste-related**: e.g., parks, building inspections, inter-fund transfers (these expenditures represent waste-related dollars that are redirected to fund other purposes)

**Other notes regarding expenditures:**





## Section VI. Revenue and Expenditure Categories Defined

Revenue Categories		
Line	Term	Definition
1.1	Solid waste disposal tip fees	Revenues received by the county based on the quantity of waste disposed of at a transfer station or landfill, whether collected by the counties or by a private company. Also includes fees a city or private company has agreed to pay the county for waste it collects in order to pay for county solid waste programs. These fees are based on disposal volumes/weights of solid waste.
1.2	“Tip” fees to deposit materials at non-MSW facilities	Revenues received by the county for disposal or transfer of materials at facilities besides MSW transfer stations and disposal sites, such as compost facilities.
1.3	Collection/disposal district fees	Revenues from a fee levied by a disposal district created by a county under RCW 36.58.100 - 150.
1.4	Planning fee	Revenues from a fee imposed under RCW 36.58.045 to pay for preparation or implementation of a solid waste plan.
1.5	Fees/revenues from cities	Revenues provided to a county from a city or cities within its boundaries (typically), as agreed to by an interlocal or other agreement to help support county solid waste activities. This should <i>not</i> include tip fees for city government waste, or tip fees paid by the city for its residents or businesses.
1.6	Permit fee	Fees collected by the county for solid waste-related permits.
1.7	Advanced Disposal Fees (ADFs)	Fees collected by the county on products or packaging at the time of sale, used to cover a portion of the costs of disposal and/or recycling.
1.8	Taxes	Taxes collected on solid waste activities or for solid waste purposes.
1.9	Other fees, rates, taxes, and related	Please specify (list separately and briefly describe) any other fees, rates, taxes, or related revenues not specified elsewhere in this section.
2.1	Collection surcharges	Surcharges imposed by the county on the collection of municipal solid waste.
2.2	Recycling surcharges	Surcharges imposed by the county on the recovery or recycling of recyclable materials.

## Revenue Categories

Line	Term	Definition
2.3	Disposal Surcharges:	Surcharges imposed by the county on the disposal of municipal solid waste (does not include tip fees).
2.4	Other surcharges	Please specify (list separately and briefly describe) any other surcharges or related revenues not specified elsewhere in this section.
3.1	Coordinated Prevention Grants	Coordinated Prevention Grants (CPG) received from the Department of Ecology (including any funds that your county receives and redistributes to cities or other entities; these should be detailed in Question 9).
3.2	Remedial action grants or loans	Remedial action grants or loans received from the Department of Ecology (including any funds that your county receives and redistributes to cities or other entities; these should be detailed in Question 9).
3.3	Community Litter Cleanup Program funds	Community Litter Cleanup Program (CLCP) funds received from the Department of Ecology (including any funds that your county receives and redistributes to cities or other entities; these should be detailed in Question 9).
3.4	Public Works Trust Fund	Loans, grants, or other funds received from the state Public Works Board to finance capital facilities for solid waste/recycling systems.
3.5	Bond financing	Bonds used to finance capital or operating expenditures for the solid waste/recycling system.
3.6	Other grants, loans, and related	Include all grants and loans used to finance capital or operating expenditures for the solid waste/recycling system except those specified above (CPG, Remedial Action, CLCP, Public Works Trust Fund). Include Referendum 26/39 money. Please list and briefly describe each source separately.
4.1	Sale of electricity	Proceeds from the sale of electricity generated from solid waste.
4.2	Sale or use of landfill gas	Proceeds from the sale or use of landfill gas.
4.3	Sale of recyclable materials	Proceeds from the sale of the county's recyclable materials.
4.4	Other sales revenue and related	Please specify (list separately and briefly describe) any other sales revenues or related revenues not specified elsewhere in this section.

## Revenue Categories

Line	Term	Definition
5.1	Interest income	Interest earned on reserves and various funds and used for solid waste purposes.
5.2	Enforcement	Revenues collected from enforcement of fines and penalties for waste infractions.
5.3	Subsidies	Revenues from other sources that are used to subsidize solid waste activities. Please list any subsidies separately and briefly describe the source of funding and purpose of the subsidy.
5.4	Reserves/fund balance	Revenues drawn from fund balance or reserves, including closure/post-closure reserves, equipment reserves, capital reserves, and rate stabilization funds.
5.5	General Fund	Revenues used to support the solid waste system drawn from the county's General Fund
5.6	Other revenue sources	Please specify (list separately and briefly describe) any other revenue sources not specified elsewhere in this data table.

## Expenditure Categories

Line	Term	Definition
1	Municipal Solid Waste (MSW)	Includes all county expenditures related to the collection, transfer, and disposal of municipal solid waste (MSW) including disposal sites, such as landfills and incinerators. Does <u>not</u> include efforts related to recycling, composting, moderate risk waste, or littering and illegal dumping.
1.1	MSW collection operations	Includes transporting garbage from customers to transfer stations. Does not include collection of recycling or compostable materials.
1.2	MSW transfer station operations	Includes the operations and maintenance of transfer stations for municipal solid waste.
1.3	MSW transportation operations	Includes transporting garbage to landfills or other disposal sites, including hauling leachate & maintenance material. Does not include equipment replacement transfer.
1.4	MSW education & outreach	Education and outreach activities and programs related to proper collection and disposal of municipal solid waste; does not include waste reduction and prevention efforts.

## Expenditure Categories

Line	Term	Definition
1.5	MSW capital improvements	Capital expenditures for construction of and major upgrades (beyond maintenance) to MSW facilities, including transfer stations and disposal sites.
1.6	MSW equipment	Purchase and maintenance of equipment used for MSW collection, transfer stations, and transportation but not already included in operations.
1.7	Operations, monitoring & maintenance of active landfills & other disposal sites	Expenses for operating, monitoring, and maintaining active landfills. This does not include expenses incurred by local health jurisdictions for such expenses, only those paid for by county solid waste funds.
1.8	Monitoring & maintenance for closed landfills & other disposal sites	Expenses for monitoring and maintaining closed landfills. This does not include expenses incurred by local health jurisdictions for such expenses, only those paid for by county solid waste funds.
1.9	Site clean-up/remediation for closed landfills & other disposal sites	Expenses for clean-up and remediation of closed landfills. This does not include expenses incurred by local health jurisdictions for such expenses, only those paid for by county solid waste funds.
1.10	Other MSW costs	Any costs related to MSW collection, transfer, and disposal that is not covered elsewhere in the data table.
2, 2.1- 2.7	Recycling, Composting & Waste Reduction	Staffing and program expenses for both waste reduction and recycling, including composting of yard waste, food waste, and other organics. Includes recycling collection, transportation of recyclables, education & outreach, capital, equipment, and operations of recycling facilities.
3, 3.1- 3.8	Moderate Risk Waste:	Staffing and program expenses for moderate risk waste programs, including collection events and operation of fixed facilities, transportation MRW, education & outreach, capital, equipment, operations & maintenance, and disposal or recycling of MRW.
4, 4.1- 4.4	Litter/illegal dump clean-up:	Staffing and program expenses for litter and illegal dump clean-up programs, including litter collection and disposal, illegal dumping programs, and education programs. <i>[Please use the <b>Notes</b> field to specify any pass-throughs of funding to other jurisdictions.]</i>
5, 5.1- 5.2	Any other capital & equipment costs	Project costs for constructing major facilities <u>not</u> already covered elsewhere. (Transfer stations, landfills, material recovery facilities, and moderate waste treatment facilities are covered in separate sections.)

## Expenditure Categories

Line	Term	Definition
6.1	Administration:	Includes these three categories, combined into a single figure:
	- General Administration	Administrative salaries and benefits, office supplies, telephone, computers, training, office rent, and the like.
	- Overhead	Costs covering entire operation, such as unemployment insurance, workers compensation, insurance, legal work, indirect costs charged by county general fund, and the like.
	- Taxes and fees	B&O taxes, other taxes, surface water fees, and the like.
6.2	Enforcement/regulatory oversight	Expenses for the enforcement or oversight of solid waste regulations.
6.3	Solid waste planning	Expenses of planning the county system, including preparation and maintenance of solid waste plans.
6.4	Grants to cities or others	Grants that the county distributed to cities or other entities. <i>[Please provide the details of these grants in Question 9.]</i>
6.5	Special one-time expenses for 2005	Special one-time expenses, rather than regular costs, incurred in 2005. Examples include moving to a new headquarters building or closing a landfill (particularly unexpected closures).
6.6	Contribution to reserves	Money placed into dedicated reserves as part of annual waste operations, such as landfill closure and post-closure reserves, and equipment replacement reserves.
6.7	Other administration & other activities	Costs of any other related activities not covered elsewhere in this section.
7, 7.1- 7.4	Debt service	Principal and interest payments on solid waste debt, including bonds, Public Works Trust Fund loans, and other types of borrowing. Note that this item is broken into several categories, depending on what type of facility the borrowed money was used for.
8.1	Other expenditures: waste-related	Any other waste-related expenditures not listed elsewhere. Examples could include disaster debris or junk automobile clean-ups.
8.2	Other expenditures: <u>non</u> -waste-related	Expenditures of waste-related funding that is redirected to fund other, non-waste purposes. Examples could include parks, building inspections, or other inter-fund transfers.

## **Attachment 2. City Solid Waste Questionnaire**

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Attachment 2 presents the data collection form used to gather information from city governments in Washington State. It includes a “short form” used to determine whether responding cities had solid-waste related revenues and expenditures and needed to fill out the long form to explain their activities.

## Solid Waste Cost Assessment for Washington State *City Revenues & Expenditures for 2005*

### **Section I. Introduction & Instructions**

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Recently, you received an email asking for help from Cullen Stephenson of the Department of Ecology and Steve Wamback of the Washington State Solid Waste Advisory Committee (SWAC) regarding a project to examine the costs of managing solid waste in Washington. We are contacting you now for information on revenues and expenditures related to solid waste in your city for the year 2005. If at all possible, we need your response by **Thursday, June 7**, as this project is on a fast track due to funding constraints. Because we are contacting only a sample of Washington's cities and towns, each response is very important, to ensure that we have statistically significant data for estimating statewide costs.

**How the information will be used.** Ecology and the SWAC plan to use this cost accounting information to support a longer-term effort to examine future funding needs for solid waste management and to identify stable ways to fund the system while reducing waste. The overall goal is to help ensure that adequate funding is available in the future. Washington State's Beyond Waste Plan identifies the need for conducting this long-range examination. Your thorough responses will help us better understand your city's situation.

**Entering your city information.** We understand that the data form may look daunting, but this request is not intended to take a large amount of your time. The forms are intended to be filled out based on your existing budget information without requiring significant new calculations. Every city is different, and it is difficult to have a standard form that fits all of the state's nearly 300 cities and towns. Section II (pp. 2-4) can be used as a "short form" if your city does not have any waste-related revenues or expenditures. The revenue and expenditure tables may ask for more detail than you are able to provide; please fill in as much information as you can, particularly the category totals, even if you cannot provide a more detailed cost

breakdown. If a section or line does not apply to your city, mark it "n/a." Similarly, if you have special circumstances regarding solid waste-related revenues and costs that are not adequately captured by this form, please add notes to provide further explanation. Please avoid double-counting the same funds in more than one category, or use notes to identify any double-counting that may occur. You may either enter exact dollar amounts or round them to the nearest thousand, based on whichever is easier for you, but please use a consistent method throughout the data collection form.

Please include all solid waste revenues and costs for which your city is responsible, even if those activities occur outside of the solid waste department or division. Note that we are also contacting counties, local environmental health jurisdictions, and tribal governments. Please use the **Notes** fields to explain the roles of your city and other entities in funding solid waste activities. This is a Word form, and you should be able to navigate through it using the "tab" or arrow keys or your mouse; gray shading indicates fields for entering your data. If you have any trouble with the file format, please contact Jessica at Cascadia (below) for an alternate version.

**Timeline.** We respectfully ask that you respond with your data at your earliest opportunity. We will share the results with you this summer. We want to thank you in advance for your assistance.

Please email your completed forms by **Thursday, June 7**, to:

**Jessica Branom-Zwick, Cascadia Consulting Group**  
[jessica@cascadiaconsulting.com](mailto:jessica@cascadiaconsulting.com), (206) 343-9759 x126

**Questions?** Please contact Jessica (see above) or Cheryl Smith of Ecology, at (360) 407-6654 or [cstr461@ecy.wa.gov](mailto:cstr461@ecy.wa.gov).

**Section II. Identification & Description of Services**

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<b>1. City Name</b>	
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<b>2. City contact person for solid waste cost information (respondent to this form)</b>		
<b>Name</b>		
<b>Title</b>		
<b>Telephone</b>		
<b>Fax</b>		
<b>Street Address</b>		
<b>City</b>		<b>Zipcode</b>
<b>Email Address</b>		

3. Please note who provides solid waste services in your City.					
Service	City	County	Private hauler(s), <u>not</u> under city contract	Private hauler(s) under city contract*	Comments
a) Solid waste or recycling <u>collection</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Hauler(s):	
b) Solid waste or recycling <u>facilities</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Hauler(s):	
c) Moderate risk waste management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Hauler(s):	
d) Education and outreach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Hauler(s):	
e) Litter / illegal dump clean-up	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Hauler(s):	
f) Solid waste planning, oversight, or administration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Hauler(s):	
g) Other ( <i>specify</i> )	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Hauler(s):	

*\*If you contract for waste services, please provide a copy of your contract(s) with the waste management company to:*

**Fax:** (206) 343-9819,  
Attention: Jessica Branom-Zwick

**Mail:** Jessica Branom-Zwick, Cascadia  
1109 First Avenue, Suite 400  
Seattle, WA 98101

CITIES

4. If a private hauler(s) collects waste in your City, does the City receive a portion of tip fees, franchise fees, or other solid-waste-related revenues?

- From residential customers
- From commercial customers
- From the waste hauler(s)
- Other (*please specify*)

5. Please provide information about any solid waste transfer or disposal, recycling, or composting facilities that serve residents of your City.

Facility Name	Ownership (public or private)	Operations (public or private)	Tip Fees (on 12/31/05)	Units (tons, yards, other)
			\$	
			\$	
			\$	
			\$	
			\$	

Other notes regarding tip fees:

Other comments regarding solid waste collection:

**STOP:** If your City government has no responsibility for solid waste (no checks in the “City” column in Question 3) AND receives no solid-waste-related revenues (Question 4), then you do not need to complete the remainder of this form. Please return it to Jessica Branom-Zwick at [jessica@cascadiaconsulting.com](mailto:jessica@cascadiaconsulting.com).

**Section III. Solid Waste Funding – REVENUES for 2005 Calendar Year**

6. Please specify how much of your **Calendar Year 2005** solid waste-related **REVENUES** came from each of the following sources. (see Section V for **Definitions**). You may either enter exact dollar amounts or round them to the nearest thousand, based on whichever is easier for you, but please use a consistent method throughout the data collection form. Please add notes to explain any special circumstances, including whether the funds are passed through directly to another jurisdiction or entity for actual use and program implementation. If funds cover more than one year (e.g., a two-year grant), please identify and list the portion of the revenue associated with calendar year 2005. Use the **Notes** field for explanation if needed.

#	Revenue Sources for Calendar Year 2005	Amount	Notes
<b>1</b>	<b>TOTAL User Fees, Rates, and Taxes</b>	<b>\$</b>	
1.1	- Solid waste tip fees (or related payments)	\$	
1.2	- "Tip" fees to deposit materials at other facilities (e.g., composting, recycling)	\$	
1.3	- Collection/disposal district fees	\$	
1.4	- Planning fees	\$	
1.5	- Franchise fees or other fees from haulers	\$	
1.6	- Permit fees	\$	
1.7	- Advance disposal fees (ADFs)	\$	
1.8	- Taxes – <i>specify:</i> a) b) c)	a) \$ b) \$ c) \$	a) b) c)
1.9	- <b>Other</b> fees, rates, taxes, and related – <i>specify:</i> a) b) c) d) e)	a) \$ b) \$ c) \$ d) \$ e) \$	a) b) c) d) e)

CITIES

#	Revenue Sources for Calendar Year 2005	Amount	Notes
<b>2</b>	<b>TOTAL Surcharges</b>	<b>\$</b>	<i>Please specify surcharge amount (e.g., \$4/ton) and use of funds.</i>
2.1	- Collection surcharges	\$	
2.2	- Recycling surcharges	\$	
2.3	- Disposal surcharges	\$	
2.4	- Other surcharges – <i>specify:</i> a) b) c) d)	a) \$ b) \$ c) \$ d) \$	a) b) c) d)
<b>3</b>	<b>TOTAL Grants &amp; Loans (2005 portion only)</b>	<b>\$</b>	<i>Please specify whether the funding was a loan or grant.</i>
3.1	- Coordinated prevention grants (CPG)	\$	
3.2	- Remedial action grants or loans	\$	
3.3	- Community Litter Cleanup Program (CLCP)	\$	
3.4	- Public Works Trust Fund grants or loans	\$	
3.5	- Bond financing	\$	
3.6	- <b>Other</b> grants, loans, and related – <i>specify each:</i> a) b) c) d)	a) \$ b) \$ c) \$ d) \$	a) b) c) d)

CITIES

#	Revenue Sources for Calendar Year 2005	Amount	Notes
<b>4</b>	<b>TOTAL Revenues from Sales</b>	<b>\$</b>	
4.1	- Sale of electricity (from waste-to-energy facilities)	\$	
4.2	- Sale or use of landfill gas	\$	
4.3	- Sale of recyclable materials	\$	
4.4	- <b>Other</b> revenues from sales – <i>specify:</i> a) b) c)	a) \$ b) \$ c) \$	a) b) c)
<b>5</b>	<b>Other Sources of Funds – TOTAL</b>	<b>\$</b>	
5.1	- Interest income	\$	
5.2	- Enforcement infractions, fines, penalties	\$	
5.3	- Subsidies – <i>specify:</i>	\$	
5.4	- Reserves/fund balance	\$	
5.5	- General funds	\$	
5.6	- <b>Other funding sources</b> – <i>specify:</i> a) b) c) d)	a) \$ b) \$ c) \$ d) \$	a) b) c) d)
<b>6</b>	<b>TOTAL Solid Waste-related Revenues</b>	<b>\$</b>	

Other notes regarding revenue:

## **Section IV. Solid Waste Spending – EXPENDITURES for 2005 Calendar Year**

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7. Please specify how much of your city's **actual solid waste expenditures for Calendar Year 2005** were spent in each of the following general areas (see Section VI for Definitions). In all cases, include **all** money spent from the City solid waste budget on that activity in calendar year 2005, regardless of whether the work was done by city staff, consultants, or under contract. (For example, public outreach on HHW performed by a public relations firm under contract to the city should be included under "Moderate Risk Waste.")

We understand that your city's expenditures may not fit precisely into these categories. Accordingly, please use your best estimation of the category breakdowns or provide combined figures (e.g., transportation costs included with transfer station operations), but please use the Notes field to explain what is and is not included in your figures, especially where it differs from the stated definitions.

Please list the **funding sources** (revenues) that pay for each activity type. You may refer to them by line number from the previous table of revenues. You may either enter exact dollar amounts or round them to the nearest thousand, based on whichever is easier for you, but please use a consistent method throughout the data collection form. Please include total costs for the category (e.g., Moderate Risk Waste) even if you cannot provide a more detailed breakdown of the sub-categories (e.g., MRW collection operations). **Please use the attached definitions and examples, even if your city defines these terms differently;** use the **Notes** field for clarification if needed. Please review all of the categories before filling out the form.

Additionally, please use the **Notes** field to identify other entities (e.g., county, health jurisdictions, private companies) that played a significant role in funding waste-related activities in your city in 2005.

CITIES

#	City Expenditures for Calendar Year 2005 (Actual)	Amount	Notes (including identification of other responsible entities and roles)	Funding Sources (note line item number from Revenue table)
1	<b>TOTAL Municipal Solid Waste (MSW)</b>	\$		
1.1	- Collection operations	\$		
1.2	- Transfer station operations	\$		
1.3	- Transportation operations	\$		
1.4	- Education & outreach	\$		
1.5	- Capital improvements	\$		
1.6	- Equipment (purchase & maintenance expenditures)	\$		
1.7	- Operations, monitoring & maintenance of <b>active</b> landfills & other disposal sites	\$		
1.8	- Monitoring & maintenance for <b>closed</b> landfills & other disposal sites	\$		
1.9	- Site clean-up/remediation for <b>closed</b> landfills or other disposal sites	\$		
1.10	<b>Other MSW costs – specify:</b> a) b) c) d) e)	a) \$ b) \$ c) \$ d) \$ e) \$	a) b) c) d) e)	a) b) c) d) e)

CITIES

#	City Expenditures for Calendar Year 2005 (Actual)	Amount	Notes (including identification of other responsible entities and roles)	Funding Sources (note line item number from Revenue table)
2	<b>TOTAL Recycling, Composting &amp; Waste Reduction</b>	\$		
2.1	- Collection operations (incl. events)	\$		
2.2	- Transportation operations	\$		
2.3	- Education & outreach programs	\$		
2.4	- Capital improvements	\$		
2.5	- Equipment (purchase & maintenance expenditures)	\$		
2.6	- Operations & maintenance of recycling facilities	\$		
2.7	<b>Other recycling &amp; related costs – specify:</b> a) b) c) d)	a) \$ b) \$ c) \$ d) \$	a) b) c) d)	a) b) c) d)

CITIES

#	City Expenditures for Calendar Year 2005 (Actual)	Amount	Notes (including identification of other responsible entities and roles)	Funding Sources (note line item number from Revenue table)
<b>3</b>	<b>TOTAL Moderate Risk Waste</b>	<b>\$</b>		
3.1	- Collection operations (incl. events)	\$		
3.2	- Transportation operations	\$		
3.3	- Education & outreach programs	\$		
3.4	- Capital improvements	\$		
3.5	- Equipment (purchase & maintenance expenditures)	\$		
3.6	- Operations & maintenance of MRW facilities	\$		
3.7	- Disposal or recycling of MRW	\$		
	<b>Other MRW costs – specify:</b>			
3.8	a)	a) \$	a)	a)
	b)	b) \$	b)	b)
	c)	c) \$	c)	c)
	d)	d) \$	d)	d)
<b>4</b>	<b>TOTAL Litter/illegal dump clean-up</b>	<b>\$</b>		
4.1	- Litter collection/disposal	\$		
4.2	- Illegal dumping programs	\$		
4.3	- Education & outreach programs	\$		
	<b>Other litter/dumping costs – specify:</b>			
4.4	a)	a) \$	a)	a)
	b)	b) \$	b)	b)
	c)	c) \$	c)	c)

CITIES

#	City Expenditures for Calendar Year 2005 (Actual)	Amount	Notes (including identification of other responsible entities and roles)	Funding Sources (note line item number from Revenue table)
<b>5</b>	<b>TOTAL other capital &amp; equipment costs</b>	<b>\$</b>		
5.1	Any <b>other</b> capital improvements (construction & upgrades) – <i>specify</i> : a) b) c)	a) \$ b) \$ c) \$	a) b) c)	a) b) c)
5.2	Any <b>other</b> equipment (purchase & maintenance expenditures) – <i>specify</i> : a) b) c)	a) \$ b) \$ c) \$	a) b) c)	a) b) c)
<b>6</b>	<b>TOTAL Administration, enforcement, planning &amp; other activities</b>	<b>\$</b>		
6.1	Administration (see definitions)	\$		
6.2	Enforcement/regulatory oversight	\$		
6.3	Solid waste planning	\$		
6.4	Grants to cities or others (see Q.9)	\$		
6.5	Special one-time expenses for 2005 (e.g., new HQ, landfill closure) – <i>specify</i> : a) b)	a) \$ b) \$	a) b)	a) b)
6.6	Contribution to reserves – <i>specify</i> :	\$		
6.7	<b>Other</b> admin. & other activities – <i>specify</i> : a) b) c)	a) \$ b) \$ c) \$	a) b) c)	a) b) c)

CITIES

#	City Expenditures for Calendar Year 2005 (Actual)	Amount	Notes (including identification of other responsible entities and roles)	Funding Sources (note line item number from Revenue table)
<b>7</b>	<b>TOTAL Debt service</b>	<b>\$</b>		
7.1	- <b>active</b> transfer stations, landfills, and WTE plants	\$		
7.2	- <b>active</b> recycling and/or compost facilities	\$		
7.3	- <b>active</b> MRW collection facilities	\$		
7.4	- <b>closed</b> landfills, remediation sites, WTE plants	\$		
<b>8</b>	<b>TOTAL Other expenditures, not specified elsewhere</b>	<b>\$</b>		
8.1	<b>Other expenditures*</b> : waste-related activities – <i>specify</i> : a) b) c) d) e)	a) \$ b) \$ c) \$ d) \$ d) \$	a) b) c) d) e)	a) b) c) d) e)
8.2	<b>Other expenditures*</b> : <u>non</u> -waste-related activities that are paid for with waste-related funding – <i>specify</i> : a) b) c) d) e)	a) \$ b) \$ c) \$ d) \$ e) \$	a) b) c) d) e)	a) b) c) d) e)
<b>9</b>	<b>TOTAL Solid Waste Expenditures</b>	<b>\$</b>		

\* The two categories of **Other expenditures** include waste-related costs not listed elsewhere as well as waste-related funding used to fund other purposes. Examples could include:

- **Waste-related**: e.g., disaster debris, junk automobile clean-up
- **Non-waste-related**: e.g., parks, building inspections, inter-fund transfers (these expenditures represent waste-related dollars that are redirected to fund other purposes)

CITIES

**Other notes regarding expenditures:**

**8. Please list waste-related grants and/or other waste-related funds that your city distributed to other entities, such as health jurisdictions, by recipient and total amount for all grants and other funds distributed in 2005.**

Grant Recipient Entity	Waste-related Grants and Other Waste-related Funds Distributed from City in 2005 (\$)

**Other notes regarding grants:**

**Section V. Revenue and Expenditure Categories Defined**

<b>Revenue Categories</b>		
<b>Line</b>	<b>Term</b>	<b>Definition</b>
1.1	Solid waste disposal tip fees	Revenues received by the city based on the quantity of waste disposed of at a transfer station or landfill, whether collected by the counties or by a private company. Also includes fees a city or private company has agreed to pay the city for waste it collects in order to pay for city solid waste programs. These fees are based on disposal volumes/weights of solid waste.
1.2	“Tip” fees to deposit materials at non-MSW facilities	Revenues received by the city for disposal or transfer of materials at facilities besides MSW transfer stations and disposal sites, such as compost facilities.
1.3	Collection/disposal district fees	Revenues from a fee levied by a disposal district created under RCW 36.58.100 - 150.
1.4	Planning fee	Revenues from a fee imposed under RCW 36.58.045 to pay for preparation or implementation of a solid waste plan.
1.5	Franchise fees or other fees from haulers.	Revenues provided from waste or recycling haulers, as agreed to by a contract or franchise agreement. This should <i>not</i> include surcharges or tip fees paid by the hauler.
1.6	Permit fee	Fees collected for solid waste-related permits.
1.7	Advanced Disposal Fees (ADFs)	Fees collected on products or packaging at the time of sale, used to cover a portion of the costs of disposal and/or recycling.
1.8	Taxes	Taxes collected on solid waste activities or for solid waste purposes.
1.9	Other fees, rates, taxes, and related	Please specify (list separately and briefly describe) any other fees, rates, taxes, or related revenues not specified elsewhere in this section.
2.1	Collection surcharges	Surcharges imposed on the collection of municipal solid waste.
2.2	Recycling surcharges	Surcharges imposed on the recovery or recycling of recyclable materials.
2.3	Disposal Surcharges:	Surcharges imposed on the disposal of municipal solid waste (does not include tip fees).
2.4	Other surcharges	Please specify (list separately and briefly describe) any other surcharges or related revenues not specified elsewhere in this section.

<b>Revenue Categories</b>		
<b>Line</b>	<b>Term</b>	<b>Definition</b>
3.1	Coordinated Prevention Grants	Coordinated Prevention Grants (CPG) received from the Department of Ecology (including any funds that your city receives and redistributes to other entities; these should be detailed in Question 9).
3.2	Remedial action grants or loans	Remedial action grants or loans received from the Department of Ecology (including any funds that your city receives and redistributes to other entities; these should be detailed in Question 9).
3.3	Community Litter Cleanup Program funds	Community Litter Cleanup Program (CLCP) funds received from the Department of Ecology (including any funds that your city receives and redistributes to other entities; these should be detailed in Question 9).
3.4	Public Works Trust Fund	Loans, grants, or other funds received from the state Public Works Board to finance capital facilities for solid waste/recycling systems.
3.5	Bond financing	Bonds used to finance capital or operating expenditures for the solid waste/recycling system.
3.6	Other grants, loans, and related	Include all grants and loans used to finance capital or operating expenditures for the solid waste/recycling system except those specified above (CPG, Remedial Action, CLCP, Public Works Trust Fund). Include Referendum 26/39 money. Please list and briefly describe each source separately.
4.1	Sale of electricity	Proceeds from the sale of electricity generated from solid waste.
4.2	Sale or use of landfill gas	Proceeds from the sale or use of landfill gas.
4.3	Sale of recyclable materials	Proceeds from the sale of recyclable materials.
4.4	Other sales revenue and related	Please specify (list separately and briefly describe) any other sales revenues or related revenues not specified elsewhere in this section.
5.1	Interest income	Interest earned on reserves and various funds and used for solid waste purposes.
5.2	Enforcement	Revenues collected from enforcement of fines and penalties for waste infractions.
5.3	Subsidies	Revenues from other sources that are used to subsidize solid waste activities. Please list any subsidies separately and briefly describe the source of funding and purpose of the subsidy.

## Revenue Categories

Line	Term	Definition
5.4	Reserves/fund balance	Revenues drawn from fund balance or reserves, including closure/post-closure reserves, equipment reserves, capital reserves, and rate stabilization funds.
5.5	General Fund	Revenues used to support the solid waste system drawn from the city's General Fund
5.6	Other revenue sources	Please specify (list separately and briefly describe) any other revenue sources not specified elsewhere in this data table.

## Expenditure Categories

Line	Term	Definition
1	Municipal Solid Waste (MSW)	Includes all city expenditures related to the collection, transfer, and disposal of municipal solid waste (MSW) including disposal sites, such as landfills and incinerators. Does <u>not</u> include efforts related to recycling, composting, moderate risk waste, or littering and illegal dumping.
1.1	MSW collection operations	Includes transporting garbage from customers to transfer stations. Does not include collection of recycling or compostable materials.
1.2	MSW transfer station operations	Includes the operations and maintenance of transfer stations for municipal solid waste.
1.3	MSW transportation operations	Includes transporting garbage to landfills or other disposal sites, including hauling leachate & maintenance material. Does not include equipment replacement transfer.
1.4	MSW education & outreach	Education and outreach activities and programs related to proper collection and disposal of municipal solid waste; does not include waste reduction and prevention efforts.
1.5	MSW capital improvements	Capital expenditures for construction of and major upgrades (beyond maintenance) to MSW facilities, including transfer stations and disposal sites.
1.6	MSW equipment	Purchase and maintenance of equipment used for MSW collection, transfer stations, and transportation but not already included in operations.

Expenditure Categories		
Line	Term	Definition
1.7	Operations, monitoring & maintenance of active landfills & other disposal sites	Expenses for operating, monitoring, and maintaining active landfills. This does not include expenses incurred by local health jurisdictions for such expenses, only those paid for by city solid waste funds.
1.8	Monitoring & maintenance for closed landfills & other disposal sites	Expenses for monitoring and maintaining closed landfills. This does not include expenses incurred by local health jurisdictions for such expenses, only those paid for by city solid waste funds.
1.9	Site clean-up/remediation for closed landfills & other disposal sites	Expenses for clean-up and remediation of closed landfills. This does not include expenses incurred by local health jurisdictions for such expenses, only those paid for by city solid waste funds.
1.10	Other MSW costs	Any costs related to MSW collection, transfer, and disposal that is not covered elsewhere in the data table.
2, 2.1- 2.7	Recycling, Composting & Waste Reduction	Staffing and program expenses for both waste reduction and recycling, including composting of yard waste, food waste, and other organics. Includes recycling collection, transportation of recyclables, education & outreach, capital, equipment, and operations of recycling facilities.
3, 3.1- 3.8	Moderate Risk Waste:	Staffing and program expenses for moderate risk waste programs, including collection events and operation of fixed facilities, transportation MRW, education & outreach, capital, equipment, operations & maintenance, and disposal or recycling of MRW.
4, 4.1- 4.4	Litter/illegal dump clean-up:	Staffing and program expenses for litter and illegal dump clean-up programs, including litter collection and disposal, illegal dumping programs, and education programs. <i>[Please use the <b>Notes</b> field to specify any pass-throughs of funding to other jurisdictions.]</i>
5, 5.1- 5.2	Any other capital & equipment costs	Project costs for constructing major facilities <u>not</u> already covered elsewhere. (Transfer stations, landfills, material recovery facilities, and moderate waste treatment facilities are covered in separate sections.)

Expenditure Categories		
Line	Term	Definition
6.1	Administration:	Includes these three categories, combined into a single figure:
	- General Administration	Administrative salaries and benefits, office supplies, telephone, computers, training, office rent, and the like.
	- Overhead	Costs covering entire operation, such as unemployment insurance, workers compensation, insurance, legal work, indirect costs charged by city general fund, and the like.
	- Taxes and fees	B&O taxes, other taxes, surface water fees, and the like.
6.2	Enforcement/regulatory oversight	Expenses for the enforcement or oversight of solid waste regulations.
6.3	Solid waste planning	Expenses of planning the solid waste management system, including preparation and maintenance of solid waste plans.
6.4	Grants to others	Grants that the city distributed to other entities. <i>[Please provide the details of these grants in Question 9.]</i>
6.5	Special one-time expenses for 2005	Special one-time expenses, rather than regular costs, incurred in 2005. Examples include moving to a new headquarters building or closing a landfill (particularly unexpected closures).
6.6	Contribution to reserves	Money placed into dedicated reserves as part of annual waste operations, such as landfill closure and post-closure reserves, and equipment replacement reserves.
6.7	Other administration & other activities	Costs of any other related activities not covered elsewhere in this section.
7, 7.1- 7.4	Debt service	Principal and interest payments on solid waste debt, including bonds, Public Works Trust Fund loans, and other types of borrowing. Note that this item is broken into several categories, depending on what type of facility the borrowed money was used for.
8.1	Other expenditures: waste-related	Any other waste-related expenditures not listed elsewhere. Examples could include disaster debris or junk automobile clean-ups.
8.2	Other expenditures: <u>non</u> -waste-related	Expenditures of waste-related funding that is redirected to fund other, non-waste purposes. Examples could include parks, building inspections, or other inter-fund transfers.

## **Attachment 3. Health Jurisdiction Solid Waste Questionnaire**

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Attachment 3 presents the data collection form used to gather information from health jurisdictions in Washington State.

## Solid Waste Cost Assessment for Washington State *Health Jurisdiction Revenues & Expenditures for 2005*

### **Section I. Introduction & Instructions**

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Recently, you received a letter asking for help from Cullen Stephenson of the Department of Ecology and Steve Wamback of the Washington State Solid Waste Advisory Committee (SWAC) regarding a project to examine the costs of managing solid waste in Washington. We are contacting you now for information on revenues and expenditures related to solid waste in your agency for the year 2005. Providing your agency's data will likely take about 30-60 minutes of your time. If at all possible, we need your response by **Tuesday, May 29**, as this project is on a fast track due to funding.

**How the information will be used.** The Department of Ecology and the SWAC plan to use this cost information to support a longer-term effort to examine future funding needs for solid waste management and to identify stable ways to fund the system while reducing waste. The overall goal is to help ensure that adequate funding is available in the future. Washington State's Beyond Waste Plan identifies the value of and need for conducting this long-range examination.

**Entering your agency information.** We recognize that every health jurisdiction is different and that it is difficult to have a standard form that fits all 30+ agencies. In some places, the form may ask for more detail than you are able to provide; please fill in as much information as you can, particularly the category totals, even if you cannot provide a more detailed cost breakdown. If a section or line does not apply to your agency, mark it "n/a." Similarly, if you have special circumstances regarding solid waste-related revenues and expenditures that are not adequately captured by this form, please add notes to provide further explanation. Please avoid double-counting the same funds in more than one category, or use notes to identify any double-counting that may occur. The forms are intended to be filled out based on your existing budget information without

requiring significant new calculations. Your thorough responses will help us develop a more complete picture of your agency's situation. You may either enter exact dollar amounts or round them to the nearest thousand, based on whichever is easier for you, but please use a consistent method throughout the data collection form.

Please include all solid waste-related revenues and costs (including personnel costs) for which your agency is responsible, even if those activities occur outside of the agency's solid waste section. Note that we are also contacting counties, tribal governments, and a sampling of cities, including all cities with populations over 40,000. Accordingly, you do not need to include revenues and costs that are covered by the county(ies) or tribes in your service area. Please use the **Notes** fields to explain the roles of your agency and other entities in funding solid waste activities. This is a Word form and you should be able to navigate through it using the "tab" or arrow keys or your mouse; **gray shading** indicates fields for entering your data. If you have any trouble with the file format, please contact Jessica at Cascadia (see below) for an alternate version.

**Timeline.** We respectfully ask that you respond with your data at your earliest opportunity. We will share the results with you this summer. We want to thank you in advance for your assistance. Please email your completed forms **by Tuesday, May 29**, to:

**Jessica Branom-Zwick, Cascadia Consulting Group**  
[jessica@cascadiaconsulting.com](mailto:jessica@cascadiaconsulting.com), (206) 343-9759 x126

Please contact Jessica (see above) or Cheryl Smith of Ecology, at (360) 407-6654 or [cstr461@ecy.wa.gov](mailto:cstr461@ecy.wa.gov), with any questions.

**Section II. Identification**

<b>1. Health Jurisdiction Name</b>	
Geographic area served (list the county/ies that you serve; please note if there are any areas within those counties that you do not serve.)	

2. Contact person for health jurisdiction's solid waste cost information (respondent to this form)		
<b>Name</b>		
<b>Title</b>		
<b>Telephone</b>		
<b>Fax</b>		
<b>Street Address</b>		
<b>City</b>	<b>Zipcode</b>	
<b>Email Address</b>		

**Section III. Solid Waste Funding – REVENUES for 2005 Calendar Year**

3. Please specify how much of your **Calendar Year 2005** solid waste-related **REVENUES** came from each of the following sources. You may either enter exact dollar amounts or round them to the nearest thousand, based on whichever is easier for you, but please use a consistent method throughout the data collection form. Please add notes to explain any special circumstances, including whether the funds are passed through directly to another jurisdiction, such as a city, for actual use and program implementation.

If funds cover more than one year (e.g., a two-year grant), please identify and list the portion of the revenue associated with calendar year 2005. Use the **Notes** field for explanation if needed.

#	Revenue Sources for Calendar Year 2005	Amount	Notes
<b>1</b>	<b>User Fees, Rates, and Taxes</b>	<b>\$</b>	
1.1	- Solid waste tip fees (or related payments)	\$	
1.2	- "Tip" fees to deposit materials at other facilities (e.g., composting, recycling)	\$	
1.3	- Collection/disposal district fees	\$	
1.4	- Planning fees	\$	
1.5	- Fees/revenues from cities	\$	
1.6	- Permit fees	\$	
1.7	- <b>Other</b> fees, rates, taxes, and related – <i>specify:</i>		
	a)	a) \$	a)
	b)	b) \$	b)
	c)	c) \$	c)
	d)	d) \$	d)
	e)	e) \$	e)

HEALTH JURISDICTIONS

#	Revenue Sources for Calendar Year 2005	Amount	Notes
<b>2</b>	<b>Surcharges</b>	<b>\$</b>	<i>Please specify surcharge amount (e.g., \$4/ton) and use of funds.</i>
2.1	Surcharges – <i>specify</i> : a) b) c) d)	a) \$ b) \$ c) \$ d) \$	a) b) c) d)
<b>3</b>	<b>Grants &amp; Loans</b> (2005 portion only)	<b>\$</b>	<i>Please specify whether the funding was a loan or grant.</i>
3.1	- Coordinated prevention grants (CPG)	\$	
3.2	- Remedial action grants or loans	\$	
3.3	- Community Litter Cleanup Program (CLCP)	\$	
3.4	- Public Works Trust Fund grants or loans	\$	
3.5	- <b>Other</b> grants, loans, and related – <i>specify each</i> : a) b) c) d)	a) \$ b) \$ c) \$ d) \$	a) b) c) d)

HEALTH JURISDICTIONS

#	Revenue Sources for Calendar Year 2005	Amount	Notes
<b>4</b>	<b>Other Sources of Funds</b>	<b>\$</b>	
4.1	- Interest income	\$	
4.2	- Enforcement infractions, fines, penalties	\$	
4.3	- Subsidies – <i>specify</i> :	\$	
4.4	- Reserves/fund balance	\$	
4.5	- General funds	\$	
<b>4.6</b>	<b>Other funding sources – <i>specify</i>:</b>		
	a)	a) \$	a)
	b)	b) \$	b)
	c)	c) \$	c)
	d)	d) \$	d)
<b>5</b>	<b>Total Solid Waste-related Revenues</b>	<b>\$</b>	

Other notes regarding revenue:

## **Section IV. Solid Waste Spending – EXPENDITURES for 2005 Calendar Year**

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4. Please specify how much of your health jurisdiction's **actual solid waste expenditures for Calendar Year 2005** were spent in each of the following general areas (see Section VI for Definitions). In all cases, include **all** money spent from your health jurisdiction's solid waste budget on that activity in calendar year 2005, regardless of whether the work was done by agency staff, consultants, or under contract. (For example, public outreach on HHW performed by a public relations firm under contract to the health jurisdiction should be included under "Moderate Risk Waste.")

We understand that your agency's expenditures may not fit precisely into these categories. Accordingly, please use your best estimation of the category breakdowns or provide combined figures (e.g., transportation costs included with transfer station operations), but please use the Notes field to explain what is and is not included in your figures, especially where it differs from the stated definitions.

Please list the **funding sources** (revenues) that pay for each activity type. You may refer to them by line number from the previous table of revenues. You may either enter exact dollar amounts or round them to the nearest thousand, based on whichever is easier for you, but please use a consistent method throughout the data collection form. Please include total costs for the category (e.g., Moderate Risk Waste) even if you cannot provide a more detailed breakdown of the sub-categories (e.g., MRW collection operations). **Please use the attached definitions and examples, even if your agency defines these terms differently;** use the **Notes** field for clarification if needed. Please review all of the categories before filling out the form.

Additionally, please use the **Notes** field to identify other entities (e.g., counties, cities, private companies) that played a significant role in funding waste-related activities in your health jurisdiction in 2005.

HEALTH JURISDICTIONS

#	Health Jurisdiction Expenditures for Calendar Year 2005 (Actual)	Amount	Notes (including identification of other responsible entities and roles)	Funding Sources (note line item numbers from Revenue table)
1	<b>Municipal Solid Waste (MSW)</b>	\$		
1.1	- Education & outreach	\$		
1.2	- Equipment (purchase & maintenance expenditures)	\$		
1.3	- Operations, monitoring & maintenance of <b>active</b> landfills & other disposal sites	\$		
1.4	- Monitoring & maintenance for <b>closed</b> landfills & other disposal sites	\$		
1.5	- Site clean-up/remediation for <b>closed</b> landfills or other disposal sites	\$		
1.6	<b>Other MSW costs – specify:</b> a) b) c) d) e)	a) \$ b) \$ c) \$ d) \$ e) \$	a) b) c) d) e)	a) b) c) d) e)

HEALTH JURISDICTIONS

#	Health Jurisdiction Expenditures for Calendar Year 2005 (Actual)	Amount	Notes (including identification of other responsible entities and roles)	Funding Sources (note line item numbers from Revenue table)
2	<b>Recycling, Composting &amp; Waste Reduction</b>	\$		
2.1	- Collection operations (incl. events)	\$		
2.2	- Transportation operations	\$		
2.3	- Education & outreach programs	\$		
2.4	- Capital improvements	\$		
2.5	- Equipment (purchase & maintenance expenditures)	\$		
2.6	- Operations & maintenance of recycling facilities	\$		
2.7	<b>Other recycling &amp; related costs – specify:</b> a) b) c) d)	a) \$ b) \$ c) \$ d) \$	a) b) c) d)	a) b) c) d)

HEALTH JURISDICTIONS

#	Health Jurisdiction Expenditures for Calendar Year 2005 (Actual)	Amount	Notes (including identification of other responsible entities and roles)	Funding Sources (note line item numbers from Revenue table)
<b>3</b>	<b>Moderate Risk Waste</b>	<b>\$</b>		
3.1	- Collection operations (incl. events)	\$		
3.2	- Transportation operations	\$		
3.3	- Education & outreach programs	\$		
3.4	- Capital improvements	\$		
3.5	- Equipment (purchase & maintenance expenditures)	\$		
3.6	- Operations & maintenance of MRW facilities	\$		
3.7	- Disposal or recycling of MRW	\$		
3.8	<b>Other MRW costs – specify:</b> a) b) c) d)	a) \$ b) \$ c) \$ d) \$	a) b) c) d)	a) b) c) d)
<b>4</b>	<b>Litter/illegal dump clean-up</b>	<b>\$</b>		
4.1	- Litter collection/disposal	\$		
4.2	- Illegal dumping programs	\$		
4.3	- Education & outreach programs	\$		
4.4	<b>Other litter/dumping costs – specify:</b> a) b) c)	a) \$ b) \$ c) \$	a) b) c)	a) b) c)

HEALTH JURISDICTIONS

#	Health Jurisdiction Expenditures for Calendar Year 2005 (Actual)	Amount	Notes (including identification of other responsible entities and roles)	Funding Sources (note line item numbers from Revenue table)
5	<b>Any other equipment costs</b>	\$		
5.1	Any <b>other</b> equipment (purchase & maintenance expenditures) – <i>specify</i> : a) b) c)	a) \$ b) \$ c) \$	a) b) c)	a) b) c)
6	<b>Administration, enforcement, planning &amp; other activities</b>	\$		
6.1	Administration (see definitions)	\$		
6.2	Enforcement/regulatory oversight	\$		
6.3	Solid waste planning	\$		
6.4	Grants to cities or others (see Q.9)	\$		
6.5	Special one-time expenses for 2005 (e.g., moving to new headquarters, landfill closure) – <i>specify</i> : a) b) c)	a) \$ b) \$ c) \$	a) b) c)	a) b) c)
6.6	Contribution to reserves – <i>specify</i> :	\$		
6.7	<b>Other</b> administration & other activities – <i>specify</i> : a) b) c)	a) \$ b) \$ c) \$	a) b) c)	a) b) c)

HEALTH JURISDICTIONS

#	Health Jurisdiction Expenditures for Calendar Year 2005 (Actual)	Amount	Notes (including identification of other responsible entities and roles)	Funding Sources (note line item numbers from Revenue table)
7	<b>Other expenditures, not specified elsewhere</b>	\$		
7.1	<b>Other expenditures*</b> : waste-related activities – <i>specify</i> : a) b) c) d) e)	a) \$ b) \$ c) \$ d) \$ e) \$	a) b) c) d) e)	a) b) c) d) e)
7.2	<b>Other expenditures*</b> : <u>non-waste</u> -related activities that are paid for with waste-related funding – <i>specify</i> : a) b) c) d) e)	a) \$ b) \$ c) \$ d) \$ e) \$	a) b) c) d) e)	a) b) c) d) e)
8	<b>Total Solid Waste Expenditures</b>	\$		

\* The two categories of **Other expenditures** include waste-related expenditures not listed elsewhere as well as waste-related funding that is used to fund other purposes. Examples could include:

- **Waste-related**: e.g., disaster debris, junk automobile clean-up
- **Non-waste-related**: e.g., parks, building inspections, inter-fund transfers (these expenditures represent waste-related dollars that are redirected to fund other purposes)

**Other notes regarding expenditures:**

**Section V. Other Jurisdictions**

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In this section, please help us avoid double-counting by identifying, if any, the counties, cities, and other entities (including tribes) that received waste-related grant funding or other funding from your health jurisdiction in calendar year 2005. If your agency did not provide any such funding, please write “none.”

5. Please list waste-related grants and/or other waste-related funds that your health jurisdiction distributed to other entities, such as cities, by recipient and total amount for all grants and other funds distributed in 2005.	
City or Other Entity	Waste-related Grants and Other Related Funds Distributed from Health Agency in 2005

**Other notes regarding grants:**

**Section VI. Revenue and Expenditure Categories Defined**

<b>Revenue Categories</b>		
<b>Line</b>	<b>Term</b>	<b>Definition</b>
1.1	Solid waste disposal tip fees	Revenues received by the agency based on the quantity of waste disposed of at a transfer station or landfill, whether collected by the counties or by a private company. Also includes fees a city or private company has agreed to pay the agency for waste it collects in order to pay for agency solid waste programs. These fees are based on disposal volumes/weights of solid waste.
1.2	“Tip” fees to deposit materials at non-MSW facilities	Revenues received by the agency for disposal or transfer of materials at facilities besides MSW transfer stations and disposal sites, such as compost facilities.
1.3	Collection/disposal district fees	Revenues from a fee levied by a disposal district created under RCW 36.58.100 - 150.
1.4	Planning fee	Revenues from a fee imposed under RCW 36.58.045 to pay for preparation or implementation of a solid waste plan.
1.5	Fees/revenues from cities	Revenues provided from a city or cities, as agreed to by an interlocal or other agreement to help support solid waste activities. This should <i>not</i> include tip fees for city government waste, or tip fees paid by the city for its residents or businesses.
1.6	Permit fee	Fees collected by the agency for solid waste-related permits.
1.7	Other fees, rates, taxes, and related	Please specify (list separately and briefly describe) any other fees, rates, taxes, or related revenues not specified elsewhere in this section.
2.1	Surcharges	Please specify (list separately and briefly describe) any surcharges or related revenues collected by your health district.

<b>Revenue Categories</b>		
<b>Line</b>	<b>Term</b>	<b>Definition</b>
3.1	Coordinated Prevention Grants	Coordinated Prevention Grants (CPG) received from the Department of Ecology (including any funds that your agency receives and may redistribute to cities or other entities; these should be detailed in Question 5).
3.2	Remedial action grants or loans	Remedial action grants or loans received from the Department of Ecology (including any funds that your agency receives and may redistribute to cities or other entities; these should be detailed in Question 5).
3.3	Community Litter Cleanup Program funds	Community Litter Cleanup Program (CLCP) funds received from the Department of Ecology (including any funds that your agency receives and may redistribute to cities or other entities; these should be detailed in Question 5).
3.4	Public Works Trust Fund	Loans, grants, or other funds received from the state Public Works Board to finance capital facilities for solid waste/recycling systems.
3.5	Other grants, loans, and related	Include all grants and loans used to finance capital or operating expenditures for the solid waste/recycling system except those specified above (CPG, Remedial Action, CLCP, Public Works Trust Fund). Include Referendum 26/39 money. Please list and briefly describe each source separately.
4.1	Interest income	Interest earned on reserves and various funds and used for solid waste purposes.
4.2	Enforcement	Revenues collected from enforcement of fines and penalties for waste infractions.
4.3	Subsidies	Revenues from other sources that are used to subsidize solid waste activities. Please list any subsidies separately and briefly describe the source of funding and purpose of the subsidy.
4.4	Reserves/fund balance	Revenues drawn from fund balance or reserves, including closure/post-closure reserves, equipment reserves, capital reserves, and rate stabilization funds.
4.5	General Fund	Revenues used to support the solid waste system drawn from the General Fund
4.6	Other revenue sources	Please specify (list separately and briefly describe) any other revenue sources not specified elsewhere in this data table.

<b>Expenditure Categories</b>		
<b>Line</b>	<b>Term</b>	<b>Definition</b>
1	Municipal Solid Waste (MSW)	Includes all agency expenditures related to the collection, transfer, and disposal of municipal solid waste (MSW) including disposal sites, such as landfills and incinerators. Does <u>not</u> include efforts related to recycling, composting, moderate risk waste, or littering and illegal dumping.
1.1	MSW education & outreach	Education and outreach activities and programs related to proper collection and disposal of municipal solid waste; does not include waste reduction and prevention efforts.
1.2	MSW equipment	Purchase and maintenance of equipment used for MSW collection, transfer stations, and transportation but not already included in operations.
1.3	Operations, monitoring & maintenance of active landfills & other disposal sites	Expenses for operating, monitoring, and maintaining active landfills. This does not include expenses incurred by counties for such expenses, only those paid for by local health jurisdiction solid waste funds.
1.4	Monitoring & maintenance for closed landfills & other disposal sites	Expenses for monitoring and maintaining closed landfills. This does not include expenses incurred by counties for such expenses, only those paid for by local health jurisdiction solid waste funds.
1.5	Site clean-up/remediation for closed landfills & other disposal sites	Expenses for clean-up and remediation of closed landfills. This does not include expenses incurred by counties for such expenses, only those paid for by local health jurisdiction solid waste funds.
1.6	Other MSW costs	Any costs related to MSW collection, transfer, and disposal that are not covered elsewhere in the data table.
<b>2,</b> 2.1- 2.7	Recycling, Composting & Waste Reduction	Staffing and program expenses for both waste reduction and recycling, including composting of yard waste, food waste, and other organics. Includes recycling collection, transportation of recyclables, education & outreach, capital, equipment, and operations of recycling facilities.
<b>3,</b> 3.1- 3.8	Moderate Risk Waste:	Staffing and program expenses for moderate risk waste programs, including collection events and operation of fixed facilities, transportation MRW, education & outreach, capital, equipment, operations & maintenance, and disposal or recycling of MRW.

Expenditure Categories		
Line	Term	Definition
4, 4.1- 4.4	Litter/illegal dump clean-up:	Staffing and program expenses for litter and illegal dump clean-up programs, including litter collection and disposal, illegal dumping programs, and education programs. <i>[Please use the Notes field to specify any pass-throughs of funding to other jurisdictions.]</i>
5, 5.1	Any other equipment costs	Project costs for equipment <u>not</u> already covered elsewhere. (Transfer stations, landfills, material recovery facilities, and moderate waste treatment facilities are covered separately.)
6.1	Administration:	Includes these three categories, combined into a single figure:
	- General Administration	Administrative salaries and benefits, office supplies, telephone, computers, training, office rent, and the like.
	- Overhead	Costs covering entire operation, such as unemployment insurance, workers compensation, insurance, legal work, indirect costs, and the like.
	- Taxes and fees	B&O taxes, other taxes, surface water fees, and the like.
6.2	Enforcement/regulatory oversight	Expenses for the enforcement or oversight of solid waste regulations.
6.3	Solid waste planning	Expenses of planning the local waste system, including preparation and maintenance of solid waste plans.
6.4	Grants to cities or others	Grants that the agency distributed to cities or other entities. <i>[Provide details in Question 7.]</i>
6.5	Special one-time expenses for 2005	Special one-time expenses, rather than regular costs, incurred in 2005. Examples include moving to a new headquarters building or closing a landfill (particularly unexpected closures).
6.6	Contribution to reserves	Money placed into dedicated reserves as part of annual waste operations, such as landfill closure and post-closure reserves, and equipment replacement reserves.
6.7	Other administration & other activities	Costs of any other related activities not covered elsewhere in this section.
7.1	Other expenditures: waste-related	Any other waste-related expenditures not listed elsewhere. Examples could include disaster debris or junk automobile clean-ups.
7.2	Other expenditures: <u>non</u> -waste-related	Expenditures of waste-related funding that is redirected to fund other, non-waste purposes. Examples could include parks, building inspections, or other inter-fund transfers.

## **Attachment 4. List of Contacted and Responding Local Governments**

Attachment 4 presents the local governments that were contacted and that responded to the data collection requests.

# List of Responding Local Governments

## Counties

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All counties in Washington were surveyed. The following counties responded to the solid waste cost survey:

- Adams
- Asotin
- Benton
- Chelan
- Clallam
- Clark
- Columbia
- Cowlitz
- Ferry
- Franklin
- Garfield
- Grant
- Grays Harbor
- Island
- Jefferson
- King
- Kitsap
- Kittitas
- Klickitat\*
- Lewis
- Lincoln
- Mason
- Okanogan
- Pacific
- Pend Oreille
- Pierce
- San Juan
- Skagit
- Skamania
- Snohomish
- Spokane
- Stevens
- Thurston
- Wahkiakum
- Walla Walla
- Whatcom
- Whitman
- Yakima

\*Data from Klickitat County were not included in the database because they were not supplied in the survey format.

## Cities

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Washington cities were divided into 5 strata based on size and east-west location. See Attachment #5 IEC City Sample for a complete list of surveyed cities.

- Stratum 1: Western cities with population 5,000 or fewer
- Stratum 2: Western cities with population 5,000 to 40,000
- Stratum 3: Eastern cities with population 5,000 or fewer
- Stratum 4: Eastern cities with population 5,000 to 40,000
- Stratum 5: All cities with population greater than 40,000

The following cities responded to the solid waste cost survey:

### Tier 1

- City of Beaux Arts Village
- City of Bucoda
- City of Hunts Point
- City of La Center
- City of Roy
- City of Yacolt

### Tier 2

- City of Bonney Lake
- City of Centralia
- City of Lacey
- City of Mercer Island
- City of Orting
- City of Pacific
- City of Port Angeles
- City of Sequim

### Tier 3

- City of Asotin
- City of Granger\*
- City of Medical Lake
- City of Newport
- City of Palouse
- City of Republic
- City of Starbuck
- City of Tieton
- City of Warden

### Tier 4

- City of Clarkston
- City of East Wenatchee
- City of Ellensburg
- City of Pullman
- City of Selah
- City of Union Gap
- City of Walla Walla
- City of Wenatchee

### Tier 5

- City of Auburn
- City of Bellevue
- City of Bellingham
- City of Edmonds
- City of Everett
- City of Kent
- City of Kirkland
- City of Lakewood
- City of Olympia
- City of Pasco
- City of Redmond
- City of Richland
- City of Seattle
- City of Spokane\*\*
- City of Spokane Valley
- City of Tacoma
- City of Vancouver
- City of Yakima

\*Data from Granger were not included in the database because key parts of the survey form were not readable.

\*\*The City of Spokane and Spokane County responded together using the county survey form.

## Health Districts

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All health districts in Washington were surveyed. The following health districts responded to the solid waste cost survey:

- Adams County Health District
- Asotin County Health District
- Benton-Franklin Health District
- Chelan-Douglas Health District\*
- Clallam County, Department of Health and Human Services: Department of Community Development
- Clark County Public Health
- Cowlitz County Health Department
- Grant County Health District
- Grays Harbor County Health Department
- Island County Health Department
- Jefferson County Health Department
- King County: Public Health / Seattle & King County
- Kitsap County Health District
- Klickitat County Health Department
- Lewis County Public Health
- Lincoln County Health Department:
- Northeast Tri-County Health District (Ferry, Pend Oreille and Stevens Counties)
- Okanogan County Health District
- Pacific County Department of Community Development\*\*
- Pierce County: Tacoma-Pierce County Health Department
- San Juan County Health & Community Services
- Skagit County Department of Health
- Skamania County Health Department\*\*\*
- Snohomish Health District
- Spokane Regional Health District
- Thurston County Health Department
- Walla Walla County-City Health Department
- Whatcom County Health Department
- Yakima Health District

\*Data from Chelan-Douglas Health District were not included in the database because they were not supplied in the survey format.

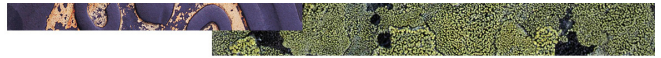
\*\*Pacific County Department of Community Development responded for both the county and health department. The data were included in the county tables in the database.

\*\*\*Skamania County Health Department reported that it has no solid waste function but did not return a survey form.

## **Attachment 5. IEC Sampling Recommendation**

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Attachment 5 presents IEC's sampling recommendation sent to Ecology prior to selecting the sample of cities to contact for data.

**MEMORANDUM | 3 May 2007**

**TO** Christy Shelton  
Cascadia Consulting

**FROM** Chris Leggett and Jason Price  
Industrial Economics, Incorporated

**SUBJECT** Recommended Design for Sampling Washington Municipalities

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In evaluating solid waste spending at the municipal level in Washington, Cascadia has decided to conserve resources by implementing a statistical sampling approach. That is, a random sample of cities will be selected for detailed evaluation rather than the entire population of cities.<sup>1</sup> This memorandum describes our recommended approach to sampling cities. We assume that the goal of the sampling is to estimate a statewide total for some quantity of interest (i.e., total spending on solid waste) using information obtained from each of the sampled municipalities.

We recommend implementing a stratified random sampling approach. This approach involves dividing the population of cities into mutually exclusive and exhaustive groups (or “strata”), then taking a simple random sample of cities from each group. Stratification provides two advantages for the current study:

- It protects against the possibility of an unusual sample that does not have adequate representation from one or more types of cities (e.g., a sample that has no cities from Eastern Washington).
- It provides a more precise estimate of the quantity of interest than would a simple random sample. An estimate based on stratified random sampling is more precise than one based on simple random sampling because stratified random sampling takes advantage of additional information about the cities to be sampled. This information is used to divide cities into relatively similar groups, and the sampling is designed to characterize each of these groups independently. In contrast, in simple random sampling, a diverse set of cities must be characterized through a single random sample of the entire population.

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<sup>1</sup> For simplicity, we refer to both cities and towns as “cities.”

In order to maximize the benefits of stratified random sampling, strata should be designed such that cities in each stratum are as similar as possible (with respect to expected spending on solid waste), while cities in different strata are as different as possible. In statistical terms, the within-stratum variance should be low and the between-stratum variance should be high. As solid waste spending is likely to be related to population, we recommend stratifying cities by population. We also recommend stratifying by East versus West in order to ensure that cities from both regions of the state are represented in the final sample.

While there are no hard-and-fast statistical rules regarding the appropriate *number* of strata, research indicates that the benefits of using more than five or six strata are often minimal. In the present study, using more than six strata would be unadvisable given the relatively small overall sample size anticipated. With a large number of strata, the number of observations from each stratum would be small, and there would be a real risk of having one or more strata with no data (due to survey non-response).

Our recommended stratification approach is illustrated in Exhibit 1. As shown in the exhibit, cities would be divided into five strata based on geographic location (Eastern versus Western Washington) and population (less than 5,000, between 5,000 and 40,000, and greater than 40,000). We combine Eastern and Western Washington cities for the largest population category due to the small number of large cities in Eastern Washington. The largest cities are sampled with certainty (i.e., 100% probability of selection) in order to increase the precision of the final estimate. Ten cities would be sampled from each of the remaining strata. Given the possibility of survey non-response, smaller sample sizes for these strata would be inadvisable.

**EXHIBIT 1: RECOMMENDED STRATIFICATION**

STRATUM	POPULATION	GEOGRAPHIC LOCATION	NUMBER OF CITIES	SAMPLE SIZE	SAMPLING RATE
1	0 - 5,000	West	67	10	15%
2	5,000 - 40,000	West	67	10	15%
3	0 - 5,000	East	105	10	10%
4	5,000 - 40,000	East	20	10	50%
5	40,000 or more	East & West	22	22	100%
<b>TOTAL:</b>			<b>281</b>	<b>62</b>	

After receiving completed surveys from the sampled cities, total spending would be estimated as follows:

1. For each stratum, estimate spending per capita by dividing total spending in the sampled cities by total population.
2. For each stratum, estimate total spending by multiplying the per capita estimate by the total population of the cities in the stratum (including both sampled and non-sampled cities).
3. Estimate statewide spending by summing the results across all strata.

## **Attachment 6. IEC City Sample**

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Attachment 6 presents the sample of cities contacted and to the stratum to which each was assigned.

## MEMORANDUM | 14 May 2007

**TO** Christy Shelton  
 Cascadia Consulting

**FROM** Chris Leggett and Jason Price  
 Industrial Economics, Incorporated (IEc)

**SUBJECT** Stratified Random Sample of Washington Municipalities

This memorandum presents the outcome of the sampling process used to select Washington State municipalities for detailed evaluation of solid waste spending. We described our recommended sampling approach in an earlier memorandum.<sup>1</sup> On May 10, 2007, Cascadia requested that IEc draw a sample of municipalities using that approach

The strata definitions and sample sizes are displayed in Exhibit 1. As shown in the exhibit, cities are divided into five strata based on geographic location (Eastern versus Western Washington) and population (less than 5,000, between 5,000 and 40,000, and greater than 40,000).<sup>2</sup> The largest cities are sampled with certainty (i.e., 100% probability of selection), and ten cities are sampled from each of the remaining strata.

## EXHIBIT 1 STRATA DEFINITIONS AND SAMPLE SIZES

STRATUM	POPULATION	GEOGRAPHIC LOCATION	NUMBER OF CITIES	SAMPLE SIZE	SAMPLING RATE
1	0 - 5,000	West	67	10	15%
2	5,000 - 40,000	West	67	10	15%
3	0 - 5,000	East	105	10	10%
4	5,000 - 40,000	East	20	10	50%
5	40,000 or more	East & West	22	22	100%
<b>TOTAL:</b>			<b>281</b>	<b>62</b>	

<sup>1</sup> See May 3, 2007 memorandum from Chris Leggett and Jason Price (Industrial Economics, Incorporated) to Christy Shelton (Cascadia Consulting).

<sup>2</sup> For convenience, all municipalities are referred to as "cities."

The stratified random sample was drawn using the “sample” command in Stata 9.2 with a seed value of one. Exhibit 2 displays the 62 sampled cities. Although the sampled cities represent only 22 percent of the cities in Washington, nearly 70 percent of the state population resides in these cities.

**EXHIBIT 2      SAMPLED CITIES**

STRATUM	NAME	LOCATION	POPULATION
5	Seattle	West	578,700
5	Spokane	East	201,600
5	Tacoma	West	199,600
5	Vancouver	West	156,600
5	Bellevue	West	117,000
5	Everett	West	101,100
5	Spokane Valley	East	87,000
5	Federal Way	West	86,530
5	Kent	West	85,650
5	Yakima	East	81,710
5	Bellingham	West	73,460
5	Kennewick	East	61,770
5	Lakewood	West	59,000
5	Renton	West	58,360
5	Shoreline	West	52,830
5	Redmond	West	49,890
5	Auburn	West	48,955
5	Pasco	East	47,610
5	Kirkland	West	47,180
5	Richland	East	44,230
5	Olympia	West	43,740
5	Edmonds	West	40,360
4	Walla Walla	East	30,660
4	Wenatchee	East	29,920
4	Pullman	East	27,030
4	Ellensburg	East	17,080
4	East Wenatchee	East	11,420
4	Cheney	East	10,130
4	Clarkston	East	7,275
4	Selah	East	6,840
4	Liberty Lake	East	5,805
4	Union Gap	East	5,685

EXHIBIT 2 SAMPLED CITIES (CONTINUED)

STRATUM	NAME	LOCATION	POPULATION
3	Medical Lake	East	4,510
3	Granger	East	2,880
3	Warden	East	2,575
3	Newport	East	1,985
3	Tieton	East	1,195
3	Asotin	East	1,165
3	Palouse	East	1,015
3	Republic	East	990
3	Winthrop	East	370
3	Starbuck	East	130
2	Lacey	West	34,060
2	Mount Vernon	West	28,710
2	Mercer Island	West	21,860
2	Port Angeles	West	18,970
2	Aberdeen	West	16,470
2	Centralia	West	15,430
2	Bonney Lake	West	15,230
2	Pacific	West	5,940
2	Orting	West	5,560
2	Sequim	West	5,030
1	Woodland	West	4,730
1	Medina	West	2,945
1	La Center	West	2,315
1	Castle Rock	West	2,135
1	Yacolt	West	1,220
1	Roy	West	875
1	Bucoda	West	650
1	Mossyrock	West	485
1	Hunts Point	West	480
1	Beaux Arts Village	West	300

## **Attachment 7. IEC Spreadsheet Model Documentation**

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Attachment 7 presents IEC's documentation of the spreadsheet model, more details on the data management tool, and adjustments made to the questionnaire data.

## MEMORANDUM | 3 August 2007

**TO** Christy Shelton and Marc Daudon, Cascadia Consulting  
**FROM** Jason Price, Malcolm Itter, and Chiara Trabucchi  
**SUBJECT** Cost and Financing Analysis: Washington Department of Ecology Solid Waste Cost Accounting Project

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In November 2004, the Washington State Department of Ecology (Ecology) launched the Beyond Waste initiative, which represents a long-term strategy for reducing the use of toxic substances and eliminating waste within the state's borders. As we understand, the ultimate goal of the program is to "transition to a society where waste is viewed as inefficient, and where most wastes and toxic substances have been eliminated."<sup>1</sup> Given the magnitude of resources necessary to ensure a successful transformation to a Beyond Waste environment, Ecology is considering whether (and if so, how) to alter the financing of its solid waste management system.

As an initial step in the process, Ecology asked Cascadia Consulting and Industrial Economics, Incorporated (IEc) to assess the costs and financing of the state's current waste management services and programs. The results of this analysis will help Ecology to evaluate the financial viability of the current system and could serve as a baseline, against which potential changes to the system can be assessed.

In support of Ecology's effort, Cascadia tasked IEc with designing and constructing:

1. A **Data Management Tool** to store and maintain data collected by Cascadia and Ecology related to the costs and financing of Washington's current waste management system; and<sup>2</sup>
2. A **Spreadsheet Model** that pulls information from the data management tool to estimate expenditures and attendant funding sources for solid waste management activities in Washington.<sup>3</sup>

As indicated in the results section below, we estimate the cost of solid waste management in Washington to be approximately \$1.7 billion during 2005. Management of municipal solid waste accounts for approximately 43 percent of these costs, followed by management of construction, demolition, and land-clearing debris (CDL) at 37 percent.

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<sup>1</sup> Washington State Department of Ecology, Summary of The Washington State Hazardous Waste Management Plan and Solid Waste Management Plan, November 2004.

<sup>2</sup> Appendix A provides a summary of the data management tool's capabilities. IEc will deliver the tool to Cascadia under a separate cover.

<sup>3</sup> This memorandum summarizes the outputs generated by the spreadsheet model and the analytic methods reflected in the model. Although we have not appended images of the Excel worksheets that make up the model, IEc will provide them to Cascadia upon request.

The remainder of this memorandum summarizes the basis for our findings in more detail. Specifically, we begin with a brief summary of the expenditure and financing outputs generated by the spreadsheet model. Next, we summarize our analytic method and results for the year 2005 in detail. We conclude by outlining key limitations to our analysis.

**SPREADSHEET  
MODEL OUTPUTS**

Our original analytic structure presumed less than 50 data elements would be necessary to model the cost of solid waste management in Washington. As project and data collection activities evolved, the number of data elements collected exceeded 1,500 elements across all relevant categories. As a result of this exponential increase in data to be filtered and analyzed, we designed the spreadsheet model so that it estimates solid waste management costs across different expenditure categories. The points of expenditure modeled are listed below in Exhibit 1. For example, the spreadsheet model estimates city municipal solid waste (MSW) expenditures, county expenditures on debt service, and health jurisdiction expenditures on litter cleanup. The model further estimates solid waste management financing by funding type (e.g., user fees) and by funding source (e.g., cities), as shown in Exhibit 2.

**EXHIBIT 1. SUMMARY OF SPREADSHEET MODEL EXPENDITURE OUTPUTS**

POINTS OF EXPENDITURE	EXPENDITURE CATEGORIES
<ul style="list-style-type: none"> <li>• Cities</li> <li>• Counties</li> <li>• Health Jurisdictions</li> <li>• Other Government</li> <li>• Private Sector</li> <li>• Miscellaneous</li> </ul>	<ul style="list-style-type: none"> <li>• Municipal Solid Waste Management               <ul style="list-style-type: none"> <li>- Collection, transport, processing, and disposal</li> <li>- Education &amp; outreach</li> <li>- Equipment purchase and maintenance</li> <li>- Operation, monitoring, and maintenance of active landfills.</li> <li>- Monitoring and maintenance of closed landfills</li> <li>- Site clean-up/remediation of closed landfills</li> <li>- Other</li> </ul> </li> <li>• Recycling, Composting, and Waste Reduction               <ul style="list-style-type: none"> <li>- Collection and transport operations</li> <li>- Education &amp; outreach</li> <li>- Capital improvements</li> <li>- Equipment purchase and maintenance</li> <li>- Operation and maintenance of recycling facilities</li> <li>- Other</li> </ul> </li> <li>• Moderate Risk Waste (MRW)</li> <li>• Litter/Illegal Dumping Cleanup</li> <li>• Capital &amp; Equipment</li> <li>• Administration, Planning, and Related Activities</li> <li>• Debt Service</li> <li>• Other Expenditures</li> <li>• Construction, Demolition, and Land-clearing Debris</li> </ul>

## EXHIBIT 2. SUMMARY OF SPREADSHEET MODEL FINANCING OUTPUTS

FUNDING SOURCES	FUNDING TYPES
STATE GOVERNMENT	<ul style="list-style-type: none"> <li>• Coordinated Prevention Grants (from the state's Model Toxics Control Accounts)</li> <li>• Remedial Action Grants and Loans (from the state's Model Toxics Control Accounts)</li> <li>• Community Litter Clean-up Program (from Ecology's Waste Reduction, Recycling, and Litter Control Account)</li> <li>• Public Works Trust Funds Grants and Loans</li> <li>• Other state government funding sources</li> </ul>
MUNICIPAL GOVERNMENT (e.g., CITIES, COUNTIES, AND HEALTH JURISDICTIONS)	<ul style="list-style-type: none"> <li>• User fees, rates, and taxes</li> <li>• Surcharges</li> <li>• Issuance of bonds</li> <li>• Sales related to municipality's solid waste operations</li> <li>• Other sources</li> </ul>
PRIVATE SECTOR	<ul style="list-style-type: none"> <li>• Household and business payments to haulers for waste management services</li> <li>• Franchise fees, penalties, and interest from haulers</li> </ul>
MISCELLANEOUS	<ul style="list-style-type: none"> <li>• Fees for the management of construction, demolition, and land-clearing debris. May be paid by several sources, including households, businesses, and government.</li> </ul>

To the extent possible, the model's financing outputs identify the original source of the funds supporting Washington's solid waste management activities. However, the way in which the data were collected do not allow us to easily and efficiently link individual funding sources with specific solid waste expenditures – that is, for example, we do not estimate the extent to which surcharges collected by cities are used for recycling activities. Nonetheless, on an aggregate level by funding type, the model is designed to track the financing of Washington's solid waste management system, and also estimate the percentage of Ecology's solid waste management revenues that are re-circulated back into state-wide solid waste management activities.

**ANALYTIC METHOD**

We designed our analytic method to estimate the cost of Washington's solid waste management activities, as well as assess the extent to which different funding sources support these activities. Below, we summarize our method for waste-related expenditures and follow with our approach for funding sources (or financing).<sup>4</sup>

**METHODOLOGY FOR EXPENDITURES**

To estimate the cost of managing solid waste in Washington, we developed a separate approach for each expenditure (cost) node listed in Exhibit 1. Specifically:

<sup>4</sup> This discussion of our analytic method highlights the key assumptions underpinning our analysis. Appendix B provides a more thorough accounting of our assumptions.

### Cities

- We estimate city expenditures for solid waste management activities based on sample data provided to us by Cascadia. As we understand, these data were obtained through the city solid waste management survey developed by Ecology and Cascadia during the late spring and early summer of 2007.
- As discussed in Appendix C, cities surveyed were grouped into a series of five strata, depending on their location and population. We use the sample data for each stratum combined with city/town population data to estimate per capita expenditures, by stratum, for each general category of expenditures listed in Exhibit 1 (e.g., MSW expenditures per capita for Stratum 1, MRW expenditures per capita for Stratum 4, etc.).<sup>5</sup> Next, we use the resulting per capita values, in conjunction with city/town population data, to extrapolate the survey results to the population of all cities and towns within each stratum. For example, if Stratum 1 MSW expenditures on a per capita basis were \$20 and 100,000 people lived in all of the cities and towns included in Stratum 1 statewide, we would estimate \$2,000,000 in MSW expenditures for Stratum 1 (i.e., \$20 per person multiplied by 100,000 people). To estimate statewide costs for each general expenditure category, we sum across strata.
- When estimating expenditures by category, we exclude expenditures that represent a transfer to other categories (e.g., grants). In so doing, we avoid double counting associated with expenditures spanning more than one category. For example, a grant from a county to a city for MSW management would be included in the city's MSW management costs; therefore, we do not count the grant as an expenditure for the county.
- To apportion MSW and Recyclables expenditures across their respective sub-categories, we use city survey data to estimate (by stratum) the distribution of MSW and Recyclables expenditures across each sub-category.<sup>6</sup> We then apply these stratum-specific distributions to our estimates of statewide MSW and Recyclables expenditures for each stratum.

### Counties and Health Jurisdictions

To estimate county and health jurisdiction expenditures, we use the same general approach as outlined above for cities. The exception is that we do not use a stratified approach for county and health jurisdictions. Whereas we estimate per capita expenditures by stratum for the city analysis, we estimate per capita expenditures for the

<sup>5</sup> For the purposes of this document, "general categories of expenditures" includes the nine broad expenditure categories listed in Exhibit 1. We characterize the categories listed under "Municipal Solid Waste Management" and "Recycling, Composting, and Waste Reduction" as expenditure sub-categories. Our approach for parsing MSW and Recycling, Composting, and Waste Reduction expenditures across their respective itemized expenditure categories is described later in this section.

<sup>6</sup> It is important to note that the "Collection, transport, processing, and disposal" sub-category for MSW represents the sum of three more detailed sub-categories included in the city survey (i.e., collection operations, transfer station operations, and transportation operations). Based on the results of Cascadia's survey, it appears that respondents may have characterized expenditures for the latter two subcategories as collection expenditures. Therefore, in consultation with Cascadia, we decided to combine all three. Similarly, we combined the collection operations and transport operations sub-categories for Recyclables into the transport and collection operations sub-category listed in Exhibit 1.

entire sample of survey respondents for the county and health jurisdiction analyses.<sup>7</sup> In our opinion, because the response rates for the county and health jurisdiction surveys were relatively high (i.e., greater than 75 percent), we think it unlikely that stratification would have materially altered our findings either for counties or health jurisdictions.

#### Other Government Expenditures

We estimate other government expenditures based on the solid waste management expenditures of Ecology and other state government agencies, as compiled by Ecology and Cascadia. As we understand, many of these expenditures represent transfers to cities, counties, and health jurisdictions, and therefore are reflected in the data collected from the surveys for each cost category. As a result, our estimate of other government expenditures represents the sum of all waste-related expenditures, as reported in the data provided by Ecology and Cascadia for this category minus expenditures specifically identified as transfers to cities, counties, or health jurisdictions.

#### Private Sector

- Our estimates of private sector costs are based solely on data contained in waste haulers' annual filings to the Washington Utility and Trade Commission (WUTC). Specifically, we assume that regulated revenues earned by waste haulers represent waste management costs incurred by the private sector.<sup>8</sup> We do not use the non-regulated revenue data reported by haulers, because we understand that these data largely represent revenues earned through hauler contracts with cities and towns. As such, we assume that these city costs are reflected in the survey data collected by Cascadia and Ecology, and therefore inclusion of the WUTC non-regulated revenue data would lead to a measure of double counting. To the extent that non-regulated revenue reported by WUTC haulers reflects waste management activities not captured in any of the other data sources used in our analysis, we may underestimate expenditures.
- We apportion private sector costs between MSW management; recycling, composting, and waste reduction; and other expenditures based on the categorization of regulated revenues in the WUTC filings. We assume: (1) regulated revenues associated with garbage collection in the WUTC filings represent private MSW management costs; (2) regulated revenues associated with recycling collection and yard waste collection in the WUTC filings represent costs associated with recycling, composting, and waste reduction; and (3) regulated revenues from medical waste collection represent other expenditures.

<sup>7</sup> To estimate the population of each respondent county and health jurisdiction, we used the U.S. Census Bureau's estimates of each county's population in 2006. Although estimates for 2005 would have been preferable for the current analysis of 2005 expenditures, the Census Bureau did not have county-level estimates for this year.

<sup>8</sup> Although the WUTC Class A/B hauler reports distinguish between regulated and non-regulated revenue, the Class C reports do not make a similar distinction. In the absence of additional information, and based on discussions with Cascadia, we assume that all revenues for Class C haulers are regulated.

### Expenditures from Miscellaneous Sources

For the purposes of this analysis, we assume expenditures from miscellaneous sources represent expenditures related to the management of CDL. To estimate total CDL expenditures, we rely on:

- Ecology's estimate of the total volume of CDL generated in Washington (6.1 million tons in 2005);<sup>9</sup>
- Cascadia's estimate of the per ton cost of disposing of or recycling CDL (\$25 per ton);<sup>10</sup>
- Ecology data on the average distance over which CDL is transported, before it is disposed of or recycled (i.e., average of 76 miles for disposal and 18 miles for recycling);<sup>11</sup>
- Unit transport costs identified by IEc (\$3.04 per cubic yard per 5 miles of transport);<sup>12</sup>

Based on these data we estimate CDL management costs as the total transport and disposal/recycling costs associated with the total tonnage of CDL generated in Washington each year. Because of data limitations, we are unable to determine the distribution of these expenditures between municipalities, the state, and the private sector.

### METHODOLOGY FOR FUNDING SOURCES (OR FINANCING)

Similar to our analysis of solid waste expenditures, our analytic approach for waste management financing varies by funding source, as outlined below.

#### Funding Provided by Municipalities (Counties, Cities, and Health Jurisdictions)

Our approach for estimating waste management funding provided by counties, cities, and health jurisdictions is similar to that described above for expenditures. For cities, we apply the stratification approach outlined above to the city financing categories listed in Exhibit 2.

For counties and health jurisdictions, we estimate funding per capita for the county and health jurisdiction samples, respectively. Next, we extrapolate these values to the entire state. It is important to note that, in estimating the financing provided by counties, cities, and health jurisdictions, we did not use data from survey respondents on the grants and loans received to finance their solid waste management activities. These funds are reflected in our analysis of financing provided by the State of Washington; therefore, including these funds in our analysis of municipal financing would result in double counting.

<sup>9</sup> Data provided by Cheryl Smith, Washington State Department of Ecology, June 14, 2007.

<sup>10</sup> Estimate provided by Christy Shelton, Cascadia Consulting, June 20, 2007.

<sup>11</sup> Data provided by Cheryl Smith, Washington State Department of Ecology, June 14, 2007.

<sup>12</sup> R.S. Means, "Environmental Remediation Cost Data--Unit Price, 7th Annual Edition, 2001."

### **Funding Provided by State Government**

Based on data provided by Ecology on the state's waste-related expenditures, we estimate the level of solid waste funding provided by the state government. These data include estimates of Ecology grants and loans to municipalities and other state agencies, as well as Ecology's funding of its own solid waste programs. We estimate the amount of funding provided by the state by summing across disbursements.

### **Funding Provided by the Private Sector**

We estimate waste management funding provided by the private sector by summing: (1) the regulated hauler revenues reported to the WUTC; and (2) the penalties and interest owed to the WUTC, as indicated in the hauler filings. We assume that all regulated payments to WUTC haulers are made by the private sector.

### **Miscellaneous Financing**

This category represents financing associated with CDL management. Based on readily available data, and discussions with Cascadia, we are unable to identify the extent to which the individual funding sources outlined above finance CDL management activities in Washington.

### **Waste-Related Financial Flows to/from Ecology**

In addition to estimating waste-related financing provided by each of the funding sources described above, we also examine the activities of state accounts that collect funds through the state litter tax, the solid waste collection tax, and the hazardous substances tax. In so doing, we assess the whether solid waste activities are net contributors to, or net recipients of, these funds. To conduct this analysis, we calculate the difference between waste-related contributions to these funds and waste-related disbursements from these funds.

## **SUMMARY OF RESULTS**

Exhibits 3 and 4 on the following pages present the results of our solid waste expenditure and financing analyses for 2005. As indicated in Exhibit 3, we estimate the cost of solid waste management in Washington to be approximately \$1.7 billion during 2005. Management of municipal solid waste accounts for approximately 43 percent of these costs, followed by management of CDL. It is important to note that our estimate of CDL management costs is highly sensitive to data provided by Cascadia and Ecology on the total volume of CDL generated in Washington. To the extent that the CDL data are inaccurate, the CDL cost estimates may be biased.<sup>13</sup>

The expenditure results in Exhibit 3 also indicate that cities, counties, and the private sector each spent between approximately \$315 million and \$363 million on waste management activities during 2005. These findings suggest that expenditures for health jurisdictions relative to the expenditures of other government entities and the private sector appear to be minimal.

<sup>13</sup> The CDL generation estimate of 6.1 million ton provided by Ecology could be as much as double the estimate suggested by data included in Washington State Department of Ecology, "Solid Waste in Washington State: Fifteenth Annual Status Report," December 2006.

EXHIBIT 3. SUMMARY OF EXPENDITURE DATA (ESTIMATES FOR 2005)<sup>14</sup>

EXPENDITURE CATEGORY	CITIES	COUNTIES	HEALTH JURISDICTIONS	PRIVATE SECTOR	OTHER GOVERNMENT	MISCELLANEOUS SOURCES	TOTAL
<b>Total Municipal Solid Waste</b>	<b>\$252,407,277</b>	<b>\$195,995,164</b>	<b>\$1,304,509</b>	<b>\$272,669,639</b>	<b>NA</b>	<b>NA</b>	<b>\$722,376,589</b>
Collection, Transport, Processing, and Disposal	\$160,022,811	\$101,209,436	NA	\$205,321,495	NA	NA	\$466,553,741
Education & Outreach	\$1,628,724	\$675,443	\$40,994	NA	NA	NA	\$2,345,161
Capital Improvements	\$35,890,917	\$12,720,224	NA	NA	NA	NA	\$48,611,141
Equipment Purchase/ Maintenance Expenditures	\$5,554,689	\$16,232,987	\$7	NA	NA	NA	\$21,787,683
Operation, Monitoring, & Maintenance of Active Landfills & Disposal Sites	\$29,386,429	\$23,276,715	\$308,098	NA	NA	NA	\$52,971,242
Monitoring & Maintenance of Closed Landfills & Disposal Sites	\$2,442,877	\$6,991,333	\$120,540	NA	NA	NA	\$9,554,750
Site Cleanup/Remediation of Closed Landfills & Disposal Sites	\$10,051,235	\$960,610	\$0	NA	NA	NA	\$11,011,845
Other	\$7,429,594	\$33,928,416	\$834,871	\$67,348,144	NA	NA	\$109,541,025

<sup>14</sup> These tables are included for reference only but not all numbers reflect the final analysis. Please refer to the synopsis report or the spreadsheet model for final figures.

## EXHIBIT 3. SUMMARY OF EXPENDITURE DATA (ESTIMATES FOR 2005), CONTINUED

EXPENDITURE CATEGORY	CITIES	COUNTIES	HEALTH JURISDICTIONS	PRIVATE SECTOR	OTHER GOVERNMENT	MISCELLANEOUS SOURCES	TOTAL
<b>Total Recycling, Composting, Waste Reduction</b>	<b>\$17,790,827</b>	<b>\$15,057,255</b>	<b>\$29,752</b>	<b>\$42,501,222</b>	NA	NA	<b>\$75,379,057</b>
Collection and Transport Operations	\$9,392,765	\$5,939,577	\$0	\$32,003,616	NA	NA	\$47,335,958
Education & Outreach	\$1,739,551	\$6,794,626	\$2,103	NA	NA	NA	\$8,536,280
Capital Improvements	\$1,506,967	\$785,727	\$0	NA	NA	NA	\$2,292,695
Equipment Purchase/Maintenance Expenditures	\$3,383,510	\$60,320	\$0	NA	NA	NA	\$3,443,830
Operation & Maintenance of Recycling Facilities	\$252,285	\$1,373,207	\$0	NA	NA	NA	\$1,625,492
Other	\$1,515,749	\$103,798	\$27,649	\$10,497,606	NA	NA	\$12,144,802
<b>Total MRW</b>	<b>\$4,609,980</b>	<b>\$21,291,084</b>	<b>\$1,173,819</b>	NA	NA	NA	<b>\$27,074,883</b>
<b>Total Litter/Illegal Dump Cleanup</b>	<b>\$4,821,711</b>	<b>\$2,743,840</b>	<b>\$1,267,841</b>	NA	NA	NA	<b>\$8,833,393</b>
<b>Total Capital &amp; Equipment</b>	<b>\$13,776,383</b>	<b>\$9,760,083</b>	<b>\$33,616</b>	NA	NA	NA	<b>\$23,570,082</b>
<b>Total Admin, Enforcement, Planning, Other Activities</b>	<b>\$36,312,541</b>	<b>\$63,123,991</b>	<b>\$2,501,287</b>	NA	NA	NA	<b>\$101,937,820</b>
<b>Total Debt Service</b>	<b>\$15,496,735</b>	<b>\$36,318,205</b>	NA	NA	NA	NA	<b>\$51,814,940</b>
<b>Total Other Expenditures</b>	<b>\$17,286,191</b>	<b>\$1,660,168</b>	<b>\$212,887</b>	<b>\$609,784</b>	<b>\$11,787,319</b>	NA	<b>\$31,556,349</b>
CDL	NA	NA	NA	NA	NA	\$618,099,379	\$618,099,379
<b>TOTALS</b>	<b>\$362,501,645</b>	<b>\$345,949,790</b>	<b>\$6,523,712</b>	<b>\$315,780,645</b>	<b>\$11,787,319</b>	<b>\$618,099,379</b>	<b>\$1,660,642,491</b>

Note: Totals may not add due to rounding.

Source: Estimates derived from the following data sources: (1) city, county, and health jurisdiction surveys administered by Ecology, (2) WUTC hauler filings, (3) state government expenditure data provided by Ecology, (4) CDL generation and transportation data provided by Cascadia and Ecology.

EXHIBIT 4. SUMMARY OF FINANCING SOURCES (ESTIMATES FOR 2005) <sup>15</sup>

FUNDING PROVIDED BY STATE GOVERNMENT				TOTAL
Coordinated Prevention Grants (Funded by MTCA)		\$8,368,790		
Remedial Action Grants and Loans (Funded by MTCA)		\$953,187		
Community Litter Cleanup Program (Funded by Waste Reduction, Recycling, and Litter Control Account)		\$1,479,853		
Public Works Trust Fund Grants & Loans (Funded by PWAA)		\$2,615,763		
Other (Funded by various sources)		\$11,444,666		
<b>Subtotal</b>		<b>\$24,862,258</b>		
FUNDING PROVIDED BY MUNICIPAL GOVERNMENT				
FUNDING SOURCE	CITIES	COUNTIES	HEALTH JURISDICTIONS	
User Fees, Rates, and Taxes	\$278,750,504	\$277,712,353	\$4,291,909	
Surcharges	\$1,600,481	\$4,939,116	\$0	
Bond Financing	\$7,694,051	\$0	NA	
Sales from solid waste operations	\$2,601,285	\$15,279,523	NA	
Other Funds	\$63,729,935	\$41,623,405	\$843,405	
<b>Subtotal</b>	<b>\$354,376,256</b>	<b>\$339,554,396</b>	<b>\$5,135,314</b>	
FUNDING FROM THE PRIVATE SECTOR				
Household and Business Payments to Haulers for MSW Mgt.		\$315,780,645		
Haulers		\$436,909		
<b>Subtotal</b>		<b>\$316,217,554</b>		
FUNDING OTHERWISE NOT CLASSIFIED				
Financing for CDL Mgt., Subtotal				<b>\$618,099,379</b>
<b>TOTAL</b>				<b>\$1,658,245,158</b>
Percentage of solid waste-related revenues funding the Waste Reduction, Recycling, and Litter Control Account; MTCA; and PWAA that are re-directed to solid waste management activities				66%
Percentage of solid and hazardous waste-related revenues funding the Waste Reduction, Recycling, and Litter Control Account; MTCA; and PWAA that are re-directed to solid waste management activities				18%
<p>Note: Totals may not add due to rounding.</p> <p>Source: Estimates derived from the following data sources: (1) city, county, and health jurisdiction surveys administered by Ecology, (2) WUTC hauler filings, (3) state government financing data provided by Ecology, (4) CDL generation and transportation data provided by Cascadia and Ecology.</p>				

15 These tables are included for reference only but not all numbers reflect the final analysis. Please refer to the synopsis report or the spreadsheet model for final figures.

As shown in Exhibit 4, our findings suggest that the estimated total solid waste financing for 2005 is approximately 0.14 percent less than estimated total waste-related expenditures. In our opinion, this difference is not material and likely represents rounding and measurement error.

Comparable to the findings of our expenditures analysis, our analysis of waste management financing suggests that cities, counties, and the private sector each provide between \$316 million and \$355 million for the state's solid waste management activities. In the case of cities and counties, much of the financing revenue is raised through user fees, rates, and taxes, whereas private sector financing takes the form of household and business payments to haulers. Our analysis of waste management finances indicates that nearly two-thirds of the revenues collected by Ecology through solid waste activities are used for waste-related programs. This figure drops to 18 percent if we integrate revenues earned through hazardous waste management activities.

**KEY LIMITATIONS** Our findings, and attendant estimates represent a reasonable approximation of waste-related expenditures and financing in Washington. However, it is important to note several key analytic limitations with respect to the spreadsheet model and the data collected in support of this project.

- As previously discussed, our analytic method relies on key data elements collected by Cascadia and maintained in the data management tool developed for this project. To the extent data collected are inaccurate or otherwise misrepresent actual costs incurred or revenues received, the results generated by our analysis may be skewed. With the resources provided, we are unable to undertake a rigorous review of the more than 1,500 data elements maintained in the tool, and therefore are unable to conduct a sensitivity analysis that would provide a clear margin of error for our estimates. In Appendix D, based on a cursory review of the data, we identify several data values that appear to have been incorrectly entered into the data management tool. Based on discussions with Cascadia, we changed these values in the spreadsheet model, but will rely on Cascadia to make comparable changes in the data management tool.
- Based on technical direction from Ecology and Cascadia, we used a stratified sampling approach to analyze city expenditures and financing between: (1) urban and rural areas; and (2) Eastern and Western Washington. As we understand, Ecology and Cascadia conducted a census of counties and health jurisdictions to provide us with comparable data. However, as we understand, the census did not yield a 100 percent response rate. As a result, based on technical direction from Cascadia, we base our estimates of county and health jurisdiction data on statewide per capita cost and revenue values, and not on values specific to individual strata. However, because the response rate for counties and health jurisdiction was relatively high, we do not believe that the application of a stratified approach would significantly change our results.
- Because of limitations in the available CDL data, we are unable to disaggregate CDL management costs by subsectors; that is, across cities, counties, health jurisdictions, other government agencies, and the private sector.

- Because our analysis of private sector costs relies exclusively on WUTC data, we likely do not capture costs associated with private sector waste management activities that do not involve WUTC haulers. The omission of data for haulers that do not submit WUTC filings may result in the underestimation of expenditures.
- As indicated above, to avoid double counting, our analysis of private sector waste management costs relies on the WUTC data for regulated hauler revenues. We do not use data for non-regulated revenues, because we understand these data are reflected in the survey data collected by Ecology and Cascadia. However, to the extent these revenues are not reflected in the survey data, we likely underestimate costs.
- Some of the state expenditure line items identified by Ecology and Cascadia for the purposes of this project represent a combination of solid waste management and other activities. For example, Ecology overhead expenditures funded by the state litter tax support Ecology's waste-related programs as well as several other programs. For this and similar line items, we deferred to Cascadia's judgment about their potential inclusion in our analysis. Decisions about the inclusion and exclusion of individual line items could potentially bias our results, but the magnitude and direction of this bias is unclear.

## APPENDIX A: DATA MANAGEMENT TOOL

For ease of review, we append our June 11, 2007 memorandum summarizing the structure and design of the data management tool.<sup>16</sup> However, given shifts in resources and the magnitude of data elements captured by the tool, and based on technical direction from Cascadia, we amended aspects of the data management tool. Exhibit A-1 summarizes what IEc proposed in its June memorandum and the final capabilities of the data management tool.

EXHIBIT A-1. SUMMARY OF DATA MANAGEMENT TOOL CAPABILITIES

CAPABILITY	ORIGINAL PROPOSAL	FINAL DATA MANAGEMENT TOOL
DATA ENTRY	<ul style="list-style-type: none"> <li>Manual data entry</li> <li>Importation capabilities for all data types.</li> </ul>	<ul style="list-style-type: none"> <li>Manual data entry for all data types</li> <li>Importation capabilities for cities, counties, and health jurisdictions.</li> </ul>
DATA EDITING	<ul style="list-style-type: none"> <li>Web-based data editing for all data types.</li> </ul>	<ul style="list-style-type: none"> <li>Web-based data editing for all data types.</li> </ul>
REPORTS	<ul style="list-style-type: none"> <li>Reports for counties, cities, health jurisdictions, and WUTC filings.</li> </ul>	<p>Four consolidated reports.</p> <ul style="list-style-type: none"> <li>Summary of County, Health Jurisdiction, and City Revenue Data</li> <li>Summary of County, Health Jurisdiction, and City Expenditure Data</li> <li>Summary of WUTC Class A/B Hauler Data</li> <li>Summary of WUTC Class C Hauler Data</li> </ul>

<sup>16</sup> In the following memo, Cascadia has deleted two paragraphs and several minor references, and appropriately altered two graphics to reflect these shifts in project design.

## MEMORANDUM | 11 June 2007

**TO** Christy Shelton, Cascadia Consulting

**FROM** Jason Price and Chiara Trabucchi

**SUBJECT** Design Framework for Washington Department of Ecology Solid Waste Cost Accounting Data Management Tool

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In November 2004, the Washington State Department of Ecology (Ecology) launched the Beyond Waste initiative, a long-term strategy for reducing the generation of waste and use of toxic substances within the state's borders. As we understand, the ultimate goal of the program is to "transition to a society where waste is viewed as inefficient, and where most wastes and toxic substances have been eliminated."<sup>17</sup> Given the magnitude of resources necessary to ensure a successful transformation to a Beyond Waste environment, Washington is considering whether (and if so, how) to alter the financing of its solid waste management system.

As an initial step in the process, Ecology has asked Cascadia Consulting and Industrial Economics, Incorporated (IEc) to assess the costs and financing of the state's current waste management services and programs. This information will help Ecology evaluate the financial viability of the current system and will serve as a baseline for future analyses of potential changes to the system. In support of this effort, Cascadia tasked IEC with designing a data management tool to store and maintain data collected by Cascadia and Ecology related to the costs and financing of Washington's current waste management system. The purpose of this memorandum is to summarize our proposed design for this tool. We begin with a brief summary of the data elements to be included in the tool. Following this discussion, we outline the structure of the database that will underpin the data management tool and describe our proposed user interface for the tool.<sup>18</sup>

**CONTENT AND  
STRUCTURE OF THE  
DATA MANAGEMENT TOOL**

The data management tool's structure and user interface will depend largely on the data elements to be included in the tool. The data elements will be drawn from six sources:

1. ***County Revenue and Expenditure Survey:*** To support our assessment of the costs and funding of Washington's solid waste management system, Ecology surveyed waste management officials from all 39 Washington counties to obtain information on the revenue sources and expenditures associated with each county's waste management activities.

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<sup>17</sup> Washington State Department of Ecology, Summary of The Washington State Hazardous Waste Management Plan and Solid Waste Management Plan, November 2004.

<sup>18</sup> Prior to June 29, IEC will migrate the data management tool to Cascadia's server, where it will be housed before its eventual transfer to Ecology. We presume that Cascadia will be responsible for this transfer.

2. ***Health Jurisdiction Revenue and Expenditure Survey:*** In addition to the county survey, Ecology conducted a survey of the state's 35 health jurisdictions for information related to their waste management-related expenditures and revenue sources.
3. ***City Revenue and Expenditure Survey:*** Ecology also surveyed a limited number of cities and towns for information on the costs and financing associated with their waste management activities.
4. ***Washington Utility and Trade Commission Waste Hauler Filings:*** Firms that have been granted franchises for waste collection within the state of Washington are required to submit annual filings to the Washington Utility and Trade Commission (WUTC) detailing the revenues that they have earned from waste collection within the state as well as other key attributes of their waste management operations.
5. ***Department of Ecology Data:*** For the purposes of this analysis, Ecology will provide the project team with information on the Department's expenditures on waste management programs.
6. ***Department of Revenue Data:*** The Washington State Department of Revenue will provide the project team with information on revenues earned by the State through its solid waste management system.

Exhibit 1 lists the data elements that will be included in the data management tool from each of the data sources outlined above. As indicated in Exhibit 1, we will design the tool to accommodate all of the data elements included in the county, health jurisdiction, and city surveys. Similarly, we intend to design the tool to house information on all of the expenditures and revenue sources included in the data provided by Ecology and the State Department of Revenue. However, we require additional information about the precise content and structure of the data, before we can design the tool to integrate these elements. As discussed with Cascadia, for WUTC filings, the data management tool will contain only those data elements directly related to the costs and revenues associated with Washington's solid waste management system.

As we understand, for the purposes of the current initiative, Ecology plans to input 2005 revenue and cost information into the data management tool. Therefore, the data elements listed in Exhibit 1 reflect the structure of the data sources as of 2005. The design of the tool will be sufficiently flexible to accommodate changes to the data sources under future efforts. For example, if Ecology decides to add post-2005 data to the tool, IEc can modify the design of the tool at that time to accommodate separate data element groupings for each year (e.g., data elements for 2006 data, data elements for 2007 data, etc.). Given current resource and time constraints, IEc is designing the current tool to reflect data elements only as of 2005.

## EXHIBIT 1. DATA ELEMENTS INCLUDED IN THE DATA MANAGEMENT TOOL BY DATA SOURCE

DATA SOURCE	DATA ELEMENTS				
COUNTY SURVEY	All data elements included in the survey. See Appendix A.				
HEALTH JURISDICTION SURVEY	All data elements included in the survey. See Appendix B.				
CITY SURVEY	All data elements included in the survey. See Appendix C.				
WUTC FILINGS*	<table border="1"> <thead> <tr> <th>Filings for Class A &amp; B Haulers:</th> <th>Filings for Class C Haulers:</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> <li>• Full and exact name of hauler</li> <li>• Garbage certificate number</li> <li>• Alternate names</li> <li>• Stockholders</li> <li>• Lines 1 through 16 of the income statement provided in Schedule 5 of each filing (see Appendix D)</li> <li>• All of the revenue information included in Schedule 6A (see Appendix D)</li> <li>• All of the customer information included in Schedule 6B (see Appendix D)</li> <li>• Total regulatory fees owed, as indicated in the Regulatory Fee Calculation Schedule</li> <li>• Total penalties and interest owed, as indicated in the Regulatory Fee Calculation Schedule</li> </ul> </td> <td> <ul style="list-style-type: none"> <li>• Company name</li> <li>• Garbage certificate number</li> <li>• Alternate name</li> <li>• Owners/stockholders</li> <li>• Lines 1 through 15 of the income statement in Schedule 2 of each filing (see Appendix E)</li> <li>• All of the revenue information in Schedule 3 of each filing (see Appendix E)</li> <li>• Total gross intrastate operating revenue, as indicated in the Regulatory Fee Calculation Schedule.</li> <li>• Non-fee paying revenue, as indicated in the Regulatory Fee Calculation Schedule</li> <li>• Balance-adjusted gross intrastate operating revenue, as indicated in the Regulatory Fee Calculation Schedule</li> <li>• Total regulatory fees owed, as indicated in the Regulatory Fee Calculation Schedule</li> <li>• Total penalties and interest owed, as listed on the Regulatory Fee Calculation Schedule</li> </ul> </td> </tr> </tbody> </table>	Filings for Class A & B Haulers:	Filings for Class C Haulers:	<ul style="list-style-type: none"> <li>• Full and exact name of hauler</li> <li>• Garbage certificate number</li> <li>• Alternate names</li> <li>• Stockholders</li> <li>• Lines 1 through 16 of the income statement provided in Schedule 5 of each filing (see Appendix D)</li> <li>• All of the revenue information included in Schedule 6A (see Appendix D)</li> <li>• All of the customer information included in Schedule 6B (see Appendix D)</li> <li>• Total regulatory fees owed, as indicated in the Regulatory Fee Calculation Schedule</li> <li>• Total penalties and interest owed, as indicated in the Regulatory Fee Calculation Schedule</li> </ul>	<ul style="list-style-type: none"> <li>• Company name</li> <li>• Garbage certificate number</li> <li>• Alternate name</li> <li>• Owners/stockholders</li> <li>• Lines 1 through 15 of the income statement in Schedule 2 of each filing (see Appendix E)</li> <li>• All of the revenue information in Schedule 3 of each filing (see Appendix E)</li> <li>• Total gross intrastate operating revenue, as indicated in the Regulatory Fee Calculation Schedule.</li> <li>• Non-fee paying revenue, as indicated in the Regulatory Fee Calculation Schedule</li> <li>• Balance-adjusted gross intrastate operating revenue, as indicated in the Regulatory Fee Calculation Schedule</li> <li>• Total regulatory fees owed, as indicated in the Regulatory Fee Calculation Schedule</li> <li>• Total penalties and interest owed, as listed on the Regulatory Fee Calculation Schedule</li> </ul>
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ECOLOGY DATA	<p><i>[Structure of data associated with the items listed below are to be determined in consultation with Cascadia.]</i></p> <ul style="list-style-type: none"> <li>• Community Litter Cleanup Program</li> <li>• Coordinated Prevention Grants</li> <li>• Remedial Action Grants</li> <li>• Public Participation Grants</li> <li>• Ecology labor costs related to waste management programs</li> </ul>				
DEPT. OF REVENUE DATA	<p><i>[DOR data have not yet been provided, but are likely to include the following.]</i></p> <ul style="list-style-type: none"> <li>• Revenues collected through the state Litter Tax</li> <li>• Revenues collected through Model Toxics Control Act taxes on hazardous substances</li> <li>• Revenues collected through the state tax on disposal fees</li> </ul>				
Notes: * WUTC reporting requirements are different for specialized haulers (i.e., Class C haulers) than for non-specialized haulers (i.e., Class A and B haulers).					

## DATA STORAGE SYSTEM

The data management tool will store all data collected from the sources described above in a Microsoft Access database, the structure of which is illustrated in Exhibit 2. As Exhibit 2 indicates, we plan to create separate data tables for each major data source (e.g., city survey results) included in the database. The data fields included in each table will correspond to the data elements listed in Exhibit 1. By organizing the data by major data source, we are able to reduce the level of effort necessary for quality control checks of the database. In addition, users will be better able to identify the specific data sources and variables represented in the database, thereby enhancing the tool's transparency.

Also as shown in Exhibit 2, we intend to create two separate data tables for WUTC filings: (1) for Class A and B waste haulers, and (2) for Class C haulers. Ideally, we would create a single table for all WUTC filings, but the less detailed Class C filings combine some of the data elements included in the Class A and B filings. For example, Class A and B haulers are required to report revenues from garbage collection separately from revenues associated with recycling, whereas Class C haulers combine the two. As a result of these and other inconsistencies between the Class A and B, and Class C filings, we intend to use separate data tables.

As discussed in the previous section, the tool will accommodate Ecology's decision to include year 2005 data. We appreciate that, at a future time, Ecology may wish to amend the tool to add data for subsequent years. To accommodate this decision, we will design each table illustrated in Exhibit 2 to house multiple years' worth of data. However, it is important to note, that the underlying data tables will be based solely on the data elements included in Exhibit 1. To the degree subsequent years of data include different data elements, these "new" elements will not be reflected in the current tool. The underlying tables can be easily modified, at a future date, to reflect new (or different) data elements, either by adding the new elements to the existing structure or by creating new tables specific to each year.

#### **USER INTERFACE**

The data management tool's web-based interface will guide users through the process of adding new data to the tool and also will help users retrieve cost and revenue information housed within the tool. Exhibit 3 illustrates the overall organization of the web-based interface. As indicated in Exhibit 3, the tool's "welcome" page asks users to enter their username and password for security purposes. Next, users are directed to the tool's main page, where they may select one of the following three options: (1) enter new data, (2) modify data already entered into the data tool, or (3) generate summary reports. In the following sections, we outline each of these options.

EXHIBIT 2. STRUCTURE OF THE DATA MANAGEMENT TOOL

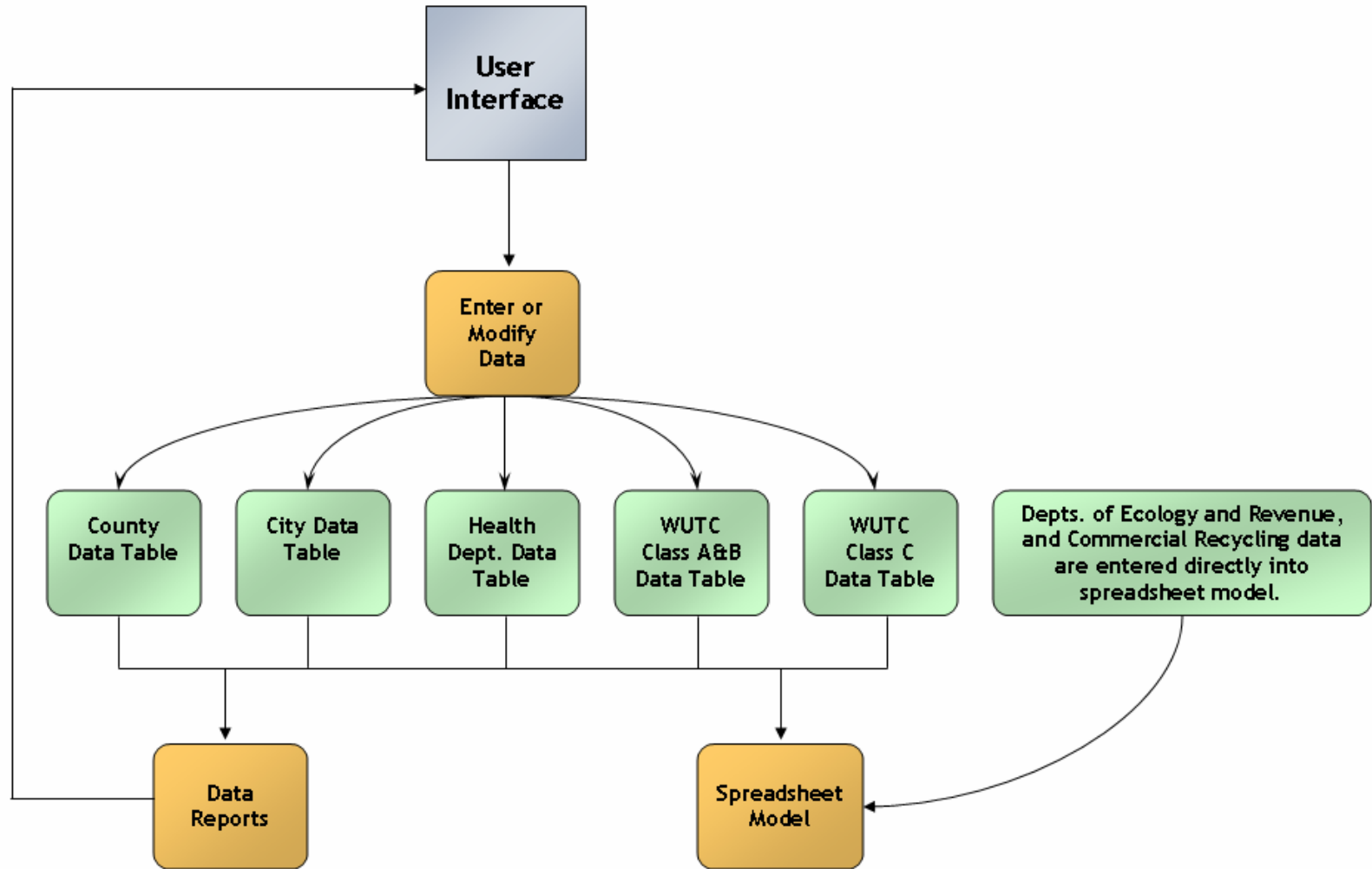
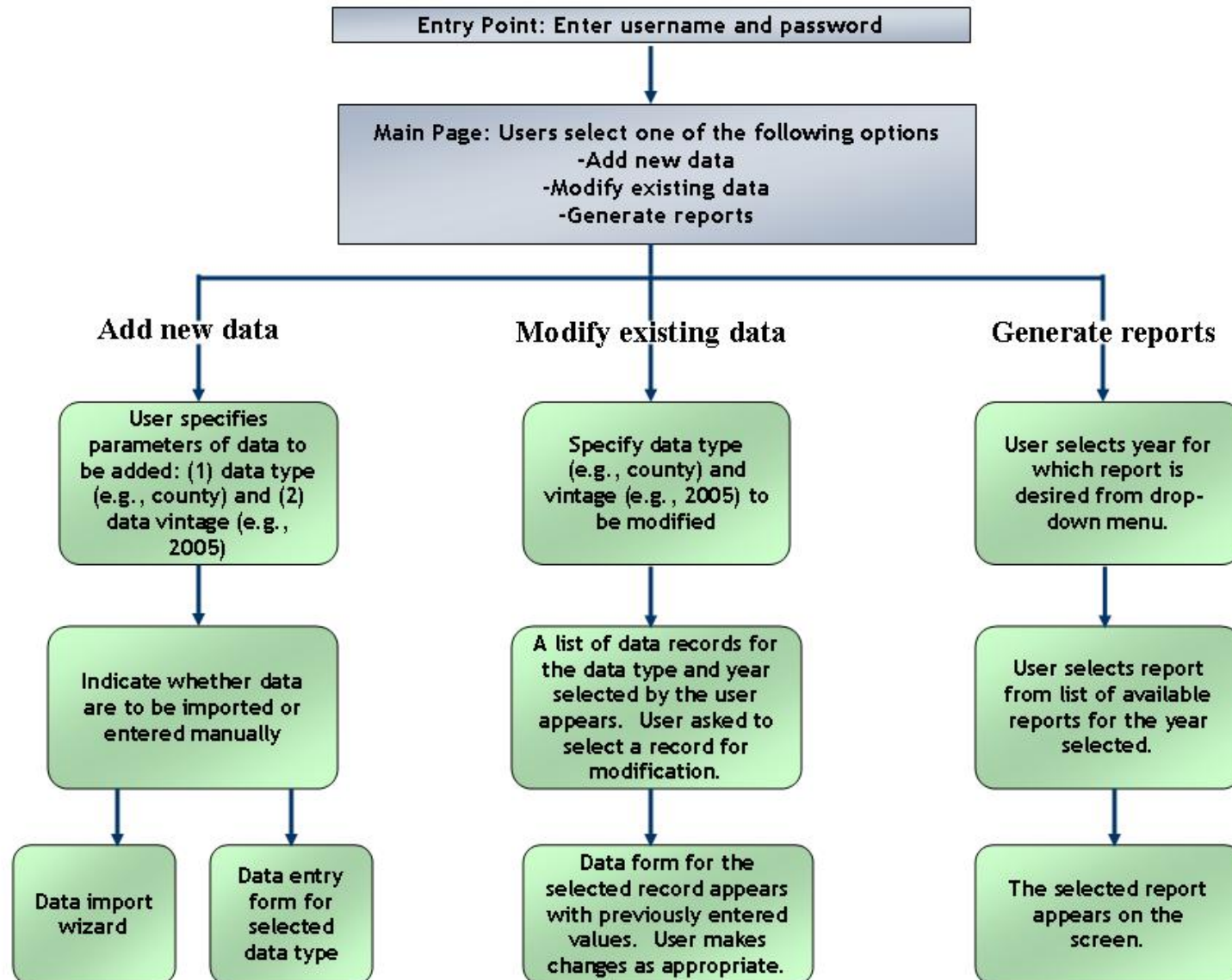


EXHIBIT 3. ILLUSTRATION OF THE DATA MANAGEMENT TOOL'S WEB-BASED INTERFACE



**OPTION 1. ENTER NEW DATA**

When users select the data entry option from the tool's main page, the tool will guide them through the data entry process depicted in Exhibit 3. As Exhibit 3 indicates, the tool first asks users to specify the type of data that they wish to enter (e.g., county survey data, WUTC Class A&B filings, etc.) and the year of the data. Based on the type of data selected, the tool will assign the user's data entry to the appropriate data table illustrated in Exhibit 2. Depending on the year identified for the data, the tool will assign the data record to the corresponding year. The latter feature is particularly important, if Ecology decides to use the tool to manage data spanning several years.

Following this initial step, users must specify how they would prefer to enter their data -- manually or through an automated data importation process.

- **Manual Data Entry.** If users choose to enter data manually, the tool will guide them through an electronic data entry form tailored to the specific type of data (e.g., county survey data) identified by the user in the step above. To the extent practicable, we will design each data entry form in a tabular format and will divide each form across several screens. After users enter all of the information requested on a given screen, they will click a button labeled "Next" to advance to the following screen. Once users have completed the data entry form, the tool will direct them back to the main page.
- **Automated Data Importation.** If users opt to upload their data, instead of manually entering data, the tool will guide them through the data importation process. To begin, the tool will ask the user to confirm that the data to be uploaded are in a comma-delimited format. This data format is consistent with the sample data files that IEc received from Cascadia on May 31, 2007, and June 1, 2007. Second, users will be asked to provide the file path and file name from which data are to be uploaded to the data tool. Next, the data tool will import the data into the data table that corresponds with the data type previously specified by the user. Users can verify that data have been imported correctly by going back to the main page and choosing "Edit/View Data Entered," as described below.

As suggested by our description of the data importation process, the success of the process hinges on users appropriately formatting their data *prior to import*. All data must be comma-delimited, and within each de-limited file, users must arrange all data elements in the appropriate order. In addition, each imported file should contain data for no more than one record.

**OPTION 2. MODIFY EXISTING DATA**

After a record has been added to the data management tool, users may use the tool's data editing capabilities to modify the record. To take advantage of these capabilities, users must select the data modification option from the tool's main page. After having done so, users must indicate the type and year of the data that they would like to modify. After making these selections, a list of records matching the data type and year selected will appear on the screen. The tool will direct users to click on the record that they would like to change. For example, if users indicate that they would like to modify WUTC Class A&B data for 2005, a list of all records corresponding to 2005 WUTC Class A&B filings will appear on the screen, and the tool will ask users to select the record that they would like to change. After users select a record, the tool will guide them to a data entry form populated with the data previously entered for that record. Then, users can modify the values in each data field, as appropriate.

**OPTION 3. GENERATE REPORTS**

The data management tool's report generation capabilities will allow users to view summaries of the revenue and cost information entered into the tool. To access individual reports, users must select the report generation option from the main page of the data management tool, as indicated in Exhibit 3. Next, the tool will direct users to select the year for which they would like to generate a report. After users make this selection, a list of reports summarizing data for the year selected will appear on the screen. Users can click on each report to view its contents. Exhibit 4 summarizes the standardized reports that we plan to include in the data management tool.

## EXHIBIT 4. SUMMARY OF REPORTS INCLUDED IN THE DATA MANAGEMENT TOOL

REPORT	CONTENTS OF REPORT
County, city, and health jurisdiction revenue sources for waste management activities	<ul style="list-style-type: none"> <li>• Total user fees, rates, and taxes collected</li> <li>• Surcharges collected</li> <li>• Grants &amp; loans received</li> <li>• Revenues from sales (e.g., revenues earned from selling landfill gas)</li> <li>• Other funds received</li> <li>• Total solid waste-related revenues</li> </ul>
County, city, and health jurisdiction expenditures on waste management activities	<ul style="list-style-type: none"> <li>• MSW management expenditures</li> <li>• Recycling, composting, and waste reduction expenditures</li> <li>• Expenditures associated with the management of moderate risk waste</li> <li>• Litter/illegal dumping clean-up expenditures</li> <li>• Other capital and equipment costs</li> <li>• Expenditures associated with administration, enforcement, planning, and other activities</li> <li>• Debt service</li> <li>• Other expenditures</li> <li>• Total waste-related expenditures</li> </ul>
Revenues reported in WUTC Class A&B filings <sup>3</sup>	<ul style="list-style-type: none"> <li>• Regulated revenues earned through garbage collection</li> <li>• Regulated revenues earned through collection of recyclables, yard waste, and medical waste</li> <li>• Other regulated revenues</li> <li>• Total regulated revenues</li> <li>• Non-regulated revenues earned through garbage collection</li> <li>• Non-regulated revenues earned through collection of recyclables, yard waste, and medical waste</li> <li>• Other non-regulated revenues</li> <li>• Total non-regulated revenues</li> <li>• Regulatory fees owed</li> <li>• Penalties and interest owed</li> </ul>
Revenues reported in WUTC Class C filings <sup>3</sup>	<ul style="list-style-type: none"> <li>• Revenues collected from residential customers</li> <li>• Revenues collected from commercial customers</li> <li>• Revenues earned through drop boxes/compactors</li> <li>• Other revenues</li> <li>• Total revenues</li> <li>• Regulatory fees owed</li> <li>• Penalties and interest owed</li> </ul>
<p>Notes:</p> <ol style="list-style-type: none"> <li>1. The health jurisdiction survey does not include a separate line item for revenues earned from sales.</li> <li>2. The health jurisdiction survey does not include a separate line item for debt service.</li> <li>3. WUTC reporting requirements are different for specialized haulers (i.e., Class C haulers) than for non-specialized haulers (i.e., Class A and B haulers).</li> </ol>	

**ADDITIONAL  
CAPABILITIES**

As we move forward with our analyses of the data to be housed in the data management tool, we may refine the tool's capabilities. We will keep Cascadia apprised, if and when we develop additional capabilities

## APPENDIX B: ASSUMPTIONS

1. Not every city, county, and health jurisdiction provided sub-itemized expenditure values (e.g., they did not break down MSW expenditures into collection operations, transfer station operations, transportation operations, etc.). We assume that the cities/counties/health jurisdictions that provided sub-itemized expenditures represent an unbiased sample of all cities, counties, or health jurisdictions. We use the sample values to generate sub-itemized cost estimates for the state.
2. We assume that all contributions to reserves reported under Administration, Enforcement, Planning, and Other Activities expenditures are contributions to solid-waste-related reserves. Thus, all reserve contributions are counted as solid waste expenditures.
3. We assume that all grants reported are for solid waste activities. Further, we assume that all solid-waste-related grants will be used for solid-waste-related activities. Thus, no grants are counted as solid waste expenditures, because the grant funding will be accounted for when it is used for a specific solid waste activity.
4. In the case where grant expenditures are listed at the end of a survey as opposed to as part of Administration, Enforcement, Planning, and Other Activities expenditures category, we assume that the grant values listed are counted as an Administration, Enforcement, Planning, and Other Activities expenditure.
5. In the case where grant expenditures are reported within the Administration, Enforcement, Planning, and Other Activities expenditures category and at the end of the city, county, or health jurisdiction survey, we assume that the larger reported value (if the values are not equal) represents the grant expenditures counted as part of Administration, Enforcement, Planning, and Other Activities expenditures.
6. If no grant data are reported, either within the Administration, Enforcement, Planning, and Other Activities expenditures category or at the end of the city, county, or health jurisdiction survey, we assume there are no grant expenditures.
7. We assume that medical waste collected by WUTC regulated haulers falls into the Other Solid Waste category.
8. Due to the lack of itemized revenue data for WUTC Class C haulers, we assume that Class C haulers collect revenues for MSW; Recycling, Composting, and Waste Reduction; and Other Solid Waste in the same proportion of total revenues as Class A and B haulers (i.e., the distribution of total revenues within the three categories is approximately the same).
9. Whenever a respondent includes sub-categorized expenditures or revenues for a general expenditure or revenue category, we assume that all the expenditures/

revenues for the general category are provided in the sub-categories. That is, we assume that the sub-categorized values sum to the value reported for the general category.

10. The WUTC Class C revenue data do not distinguish between regulated revenues and non-regulated revenues. In our opinion, although the distribution of regulated and non-regulated revenues can be estimated using the WUTC class A and B data, the distribution of regulated and non-regulated revenues for Class A and B haulers differs significantly from the distribution for Class C haulers. Thus, we assume that all revenues reported for Class C haulers are regulated revenues. As a result, all solid-waste-related revenues for Class C haulers are counted in the current analysis.

**APPENDIX C: DOCUMENTATION OF STRATIFICATION APPROACH****MEMORANDUM | 3 May 2007**

**TO** Christy Shelton  
Cascadia Consulting

**FROM** Chris Leggett and Jason Price  
Industrial Economics, Incorporated

**SUBJECT** Recommended Design for Sampling Washington Municipalities

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In evaluating solid waste spending at the municipal level in Washington, Cascadia has decided to conserve resources by implementing a statistical sampling approach. That is, a random sample of cities will be selected for detailed evaluation rather than the entire population of cities.<sup>19</sup> This memorandum describes our recommended approach to sampling cities. We assume that the goal of the sampling is to estimate a statewide total for some quantity of interest (i.e., total spending on solid waste) using information obtained from each of the sampled municipalities.

We recommend implementing a stratified random sampling approach. This approach involves dividing the population of cities into mutually exclusive and exhaustive groups (or “strata”), then taking a simple random sample of cities from each group. Stratification provides two advantages for the current study:

- It protects against the possibility of an unusual sample that does not have adequate representation from one or more types of cities (e.g., a sample that has no cities from Eastern Washington).
- It provides a more precise estimate of the quantity of interest than would a simple random sample. An estimate based on stratified random sampling is more precise than one based on simple random sampling because stratified random sampling takes advantage of additional information about the cities to be sampled. This information is used to divide cities into relatively similar groups, and the sampling is designed to characterize each of these groups independently. In contrast, in simple random sampling, a diverse set of cities must be characterized through a single random sample of the entire population.

In order to maximize the benefits of stratified random sampling, strata should be designed such that cities in each stratum are as similar as possible (with respect to expected spending on solid waste), while cities in different strata are as different as possible. In

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<sup>19</sup> For simplicity, we refer to both cities and towns as “cities.”

statistical terms, the within-stratum variance should be low and the between-stratum variance should be high. As solid waste spending is likely to be related to population, we recommend stratifying cities by population. We also recommend stratifying by East versus West in order to ensure that cities from both regions of the state are represented in the final sample.

While there are no hard-and-fast statistical rules regarding the appropriate *number* of strata, research indicates that the benefits of using more than five or six strata are often minimal. In the present study, using more than six strata would be unadvisable given the relatively small overall sample size anticipated. With a large number of strata, the number of observations from each stratum would be small, and there would be a real risk of having one or more strata with no data (due to survey non-response).

Our recommended stratification approach is illustrated in Exhibit 1. As shown in the exhibit, cities would be divided into five strata based on geographic location (Eastern versus Western Washington) and population (less than 5,000, between 5,000 and 40,000, and greater than 40,000). We combine Eastern and Western Washington cities for the largest population category due to the small number of large cities in Eastern Washington. The largest cities are sampled with certainty (i.e., 100% probability of selection) in order to increase the precision of the final estimate. Ten cities would be sampled from each of the remaining strata. Given the possibility of survey non-response, smaller sample sizes for these strata would be inadvisable.

#### EXHIBIT 1: RECOMMENDED STRATIFICATION

STRATUM	POPULATION	GEOGRAPHIC LOCATION	NUMBER OF CITIES	SAMPLE SIZE	SAMPLING RATE
1	0 - 5,000	West	67	10	15%
2	5,000 - 40,000	West	67	10	15%
3	0 - 5,000	East	105	10	10%
4	5,000 - 40,000	East	20	10	50%
5	40,000 or more	East & West	22	22	100%
<b>TOTAL:</b>			<b>281</b>	<b>62</b>	

After receiving completed surveys from the sampled cities, total spending would be estimated as follows:

1. For each stratum, estimate spending per capita by dividing total spending in the sampled cities by total population.
2. For each stratum, estimate total spending by multiplying the per capita estimate by the total population of the cities in the stratum (including both sampled and non-sampled cities).
3. Estimate statewide spending by summing the results across all strata.

## APPENDIX D: DATA CHANGES MADE BY IEC IN THE SPREADSHEET MODEL

Below, we summarize data changes that IEC made in the spreadsheet model due to respondent reporting errors and inconsistencies. As we understand, Cascadia will make comparable changes in the data management tool.

### City Data

1. Beaux Arts, Hunts Point, Lacey, Pullman, Redmond, and Sequim all claim that they are responsible for at least one solid waste activity. That is, they checked one of the boxes in the city column of survey question three. However, none of these cities reports any solid waste expenditures.
2. Bellevue: Respondent did not sum the sub-itemized user fee, rate, and tax revenues correctly. The sum of the sub-itemized revenues is equal to \$533,599, however the respondent reports a value of \$510,485.
3. Seattle: Respondent did not sum the sub-itemized user fee, rate, and tax revenues correctly. The sum of the sub-itemized revenues is equal to \$110,355,000, however the respondent reports a value of \$110,255,000.
4. Tacoma: a.) Respondent did not sum the sub-itemized user fee, rate, and tax revenues correctly. The sum of the sub-itemized revenues is equal to \$47,588,237, however the respondent reported a value of \$47,558,237. b.) Respondent did not sum the sub-itemized recycling, composting, and waste reduction expenditures correctly. The sum of the sub-itemized expenditures is equal to \$6,103,776, however the respondent reports a value of \$6,103,777.
5. Vancouver: Respondent did not sum the sub-itemized user fee, rate, and tax revenues correctly. The sum of the sub-itemized revenues is equal to \$3,277,500, however the respondent reports a value of \$3,278,000. The difference may be due to the respondent rounding the summation result when calculating the total user fee, rate, and tax revenue value.
6. Clarkston: Respondent did not sum the sub-itemized user fee, rate, and tax revenues correctly. The sum of the sub-itemized revenues is equal to \$881,976, however the respondent reports a value of \$835,566. The difference is due to the respondent failing to include tax revenues and other revenues in their calculation of total user fee, rate, and tax revenues.
7. Richland: Respondent did not sum the sub-itemized user fee, rate, and tax revenues correctly. The sum of the sub-itemized revenues is equal to \$5,384,000, however the respondent reports a value of \$6,028,000. Difference may be due to the respondent failing to report a sub-itemized revenue source.

8. Walla Walla: Respondent did not sum the sub-itemized other funding source values correctly. The sum of the sub-itemized revenues is equal to \$252,096, however the respondent reports a value of \$252,095.
9. Warden: Respondent did not sum the general revenue categories correctly. The sum of the general categories is equal to \$22,623, however the respondent reports a value of \$307,134. It is possible that the respondent meant \$284,000 when they report a value of \$284 for collection and disposal fees. However, if this assumption is made the sum of the general categories is \$306,339 not \$307,134.
10. Yakima: Respondent did not sum the sub-itemized other funding source values correctly. The sum of the sub-itemized revenues is equal to \$101,349, however the respondent reports a value of \$1,000. Difference is due to the respondent failing to include their beginning balance in their calculation of total other funding source revenues.
11. Everett: Respondent did not sum the sub-itemized MSW expenditures correctly. The sum of the sub-items is equal to \$660,000, however the respondent reports a value of \$301,000.
12. Port Angeles: a.) The respondent did not sum the sub-itemized MSW expenditures correctly. The sum of the sub-items is equal to \$8,520,000, however the respondent reports a value of \$4,500,000. b.) The respondent did not sum the sub-itemized recycling, composting, and waste reduction expenditures correctly. The sum of the sub-items is equal to \$110,000, however the respondent reports a value of \$500,000.

### County Data

1. Spokane County: Respondent failed to count contributions to reserves as part of their total Administration, Enforcement, Planning, and Other Activities costs. Thus, the respondent calculates a total Administration, Enforcement, Planning, and Other Activities cost equal to \$12,170,000, rather than the correct \$13,493,000.
2. King County: a.) Respondent miscalculated the total Administration, Enforcement, Planning, and Other Activities costs. The sum of the sub-itemized expenditures is equal to \$24,329,000, but the respondent reports a total expenditure value of \$24,408,182. b.) The respondent did not sum the sub-itemized other fund source values correctly. The sum of the sub-items is equal to \$6,946,171, however the respondent reports a value of \$6,947,971. c.) (Second King County Entry – “King County Local Hazardous Waste”) The respondent did not sum the sub-itemized other fund source values correctly. The sum of the

sub-items is equal to \$1,399,356, however the respondent reports a value of \$1,399,553.

3. Cowlitz County: Respondent miscalculated the total MRW costs. The sum of the sub-itemized expenditures is equal to \$87,238, but the respondent reports a total expenditure value of \$87,239.
4. Garfield County: Respondent did not sum the general expenditure categories correctly. The total solid waste expenditures should be equal to \$81,472, however the respondent reports a value of \$76,854.
5. Kitsap County: Respondent miscalculated the total Administration, Enforcement, Planning, and Other Activities costs. The sum of the sub-itemized expenditures is equal to \$2,339,912, however the respondent reports a total expenditure value of \$1,325,971. Difference caused by the respondent failing to include Other Administration costs in the calculation of the total Administration, Enforcement, Planning, and Other Activities costs.
6. Mason County: Respondent did not sum the general expenditure categories correctly. The total solid waste expenditures should equal \$2,315,600, however the respondent reports a value of \$2,255,600.
7. Stevens County: a.) Respondent dropped a figure when adding sub-itemized costs for total Debt Service. The total Debt Service expenditures should be equal to \$230,000, but the respondent reports a value of \$23,000. b.) The respondent did not sum the sub-itemized other fund source values correctly. The sum of the sub-items is equal to \$435,655, however the respondent reports a value of \$121,602. The difference is due to the respondent failing to include reserves/fund balances in their calculation of “total other sources of funds” revenues.
8. Island County: a.) Respondent miscalculated the total MSW expenditures. The sum of the sub-itemized costs is equal to \$4,871,092, however the respondent reports an expenditure value of \$4,871,119. Additionally, the respondent placed Other Waste-Related Expenditures in the box reserved for total Other Expenditures. Thus, the total Other Expenditures does not include Non-Waste-Related Expenditures, which are equal to \$289,944. b.) The respondent did not sum the sub-itemized other fund source values correctly. The sum of the sub-items is equal to \$715,429, however the respondent reports a value of \$71,511. Additionally, the respondent reports a negative revenue value of \$2,517 under the “other funding sources” sub-category.
9. Skamania County: Respondent did not sum the general expenditure categories correctly. The total solid waste expenditure should equal \$747,000, however the respondent reports a value of \$748,000.

10. Yakima County: The respondent did not sum the sub-itemized other fund source values correctly. The sum of the sub-items is equal to \$3,690,790, however the respondent reports a value of \$521,260.

### Health Jurisdictions

1. Within the respondent health jurisdictions, several health jurisdictions are counted twice. Specifically, the health jurisdictions for Adams County, Clark County, Cowlitz County, and Clallam County are counted twice in the first two data tables. In the third data table, one of the Clark County entries is removed however additional entries for the Pacific County and King County health jurisdictions are added.
2. Adams County: Respondent reports no itemized expenditures for Other Equipment costs but reports a total expenditure value of \$87,000 for Other Equipment costs. Under Administration, Enforcement, Planning, and Other Activities, the itemized expenditures reported by the respondent sum to \$87,000, but the respondent lists no total expenditure value for the category. I think the \$87,000 was reported in the wrong box. It should be reported as the total Administration, Enforcement, Planning, and Other Activities expenditure.
3. Snohomish County: a.) The respondent did not sum the sub-itemized MRW expenditures correctly. The total should be equal to \$82,000, however the respondent reports a value of \$80,000. b.) The respondent did not sum the sub-itemized user fee, rate, and tax revenues correctly. The sum of the sub-items is equal to \$556,000, however the respondent reports a value of \$586,000.
4. Grays Harbor County: a.) The respondent did not sum the sub-itemized MSW expenditures correctly. The total should be equal to \$67,766.41, however the respondent reports a value of \$67,768. b.) The respondent did not sum the sub-itemized grant and loan revenues correctly. The sum of the sub-items is equal to \$31,757, however the respondent reports a value of \$31,758.
5. Pierce County: The respondent did not sum the sub-itemized MRW expenditures correctly. The total should be equal to \$154,000, however the respondent reports a value of \$155,000.
6. San Juan County: The respondent does not sum the general expenditure categories correctly. The total expenditure value should equal \$39,429, however the respondent reports a value of \$39,430.
7. Spokane County: The respondent does not sum the general expenditure categories correctly. The total expenditure value should equal \$95,958, however the respondent reports a value of \$95,959.

11. Kitsap County: The respondent did not sum the sub-itemized other fund source values correctly. The sum of the sub-items is equal to \$315,150, however the respondent reports a value of \$51,957.
12. Northeast Tri-County: The respondent did not sum the general revenue categories correctly. The sum of the general categories is equal to \$24,440, however the respondent reports a value of \$22,570.