SANBORN | HEAD

Building Trust. Engineering Success.

DRAFT
SOLID WASTE MANAGEMENT FACILITIES STUDY
Town of New London, New Hampshire

Prepared for New London Department of Public Works
File No. 4220.00
November 2017

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

1.0 BACKGROUND AND PURPOSE

1.1 Current Operational Issues and Study Objectives

The New London Transfer Station and Recycling Center, located on Newport Road near exit 12 on Route 89, has served as the Town's trash disposal and household recycling facility since the mid-1980s. When the facility first began operating, recycling was more of a grassroots activity, driven less by regulatory edict or a need to reduce disposal costs and more by individual preference and commitment to the concept of "reduce, reuse, and recycle". For these reasons, the recycling demands on the facility were relatively light in the early years of operation and were met by converting the wooden storage garage into a recycling building. However, over the years the demands placed on the small building have outpaced its ability to accommodate the compounding effect of both the growth in recycling and the overall growth in the Town's population over the past 35 years.

The Town's population has grown by approximately 50% since the mid-1980s (from approximately 3,000 residents to a current population of 4,500). This has not only taxed the capacity of the recycling building to meet growing volume demands, but has taxed the capacity of the 5-acre site to safely and efficiently accommodate the volume of vehicular and pedestrian traffic experienced during high demand periods.

The small size of the site, combined with the minimal space available within the recycling building to store materials, has resulted in the Town relying on multiple sites to meet its solid waste and recycling drop-off and storage needs. The Town's reliance on multiple sites contributes to operational inefficiencies by requiring the Public Works Department (DPW) to handle recyclable materials multiple times in the course of processing, storing and delivering the material to out-of-town recycling markets. These system-wide operational inefficiencies, in combination with the Town's desire to improve the safe and convenient use of the transfer station and recycling center for its residents, prompted the preparation of this Solid Waste Management Facilities Study.

There are two primary objectives associated with the Facilities Study:

1. Optimizing the function and efficiency of the existing transfer station and recycling center on Newport Road; and

2. Identifying an optimal facility layout that will allow all or most of the Town's current solid waste and recycling operations to be consolidated to a single location.

In addition to these two primary objectives, a subordinate objective is to evaluate interest that the Towns of Wilmot and Andover may have in participating in a regional transfer station and recycling facility, as well as presenting an overview of administrative issues associated with regionalization.

1.2 Study Framework

To meet the Study objectives Sanborn Head familiarized itself with the Town's existing solid waste and recycling operations, which included site visits to the various drop-off and storage locations. We then performed a detailed review of the Town's solid waste and recycling tonnages, using this information and both population trends and EPA data to project current (2017) and future (2047) waste and recycling quantities. We then observed and documented traffic conditions at the transfer station site and used this information to assist us in developing the site layout options. A total of three concept options were prepared by Sanborn Head: two for the existing transfer station site and one for a new, hypothetical site. Regionalization issues were then explored and findings summarized. The Study concludes with suggested next steps the Town could take as it moves the planning effort forward.

1.3 Summary of Existing Operations

The Town relies on four sites to support its solid waste and recycling operations:

- *Transfer Station and Recycling Center on Newport Road* – trash and recycling drop-off, where recyclables include glass, metal, plastic and paper;

- *Department of Public Works on South Pleasant Street* – Aluminum bale storage and tin/foil storage (transferred from the transfer station), and residential drop-off of e-waste and used motor oil;

- *Old Landfill Site located on Old Dump Road* – Residential drop-off of brush and scrap metal items (white goods); and

- *Shepherd Pit on Mountain Road* – Glass consolidation (transferred from the transfer station and delivered from other communities in connection with NRRA-brokered recycling) and annual glass crushing.

If one site was to be identified as a "hub" it would be the transfer station and recycling center. It is here that the majority of the Town's recycling activities are performed, including baling of aluminum, plastic and tin, as well as the transfer of glass to Shepherd Pit and the transfer of baled aluminum and loose tin to the Public Works Department. The transfer station operates five days per week (Tuesday, Wednesday, Thursday, Saturday and Sunday) between the hours of 9:00 am and 3:30 pm.

Based on our review and understanding of the Town's existing operations, we have prepared a Material Handling Flow Diagram summarizing the waste and recycling drop-off and processing activities performed at each site in Town. The Flow Diagram, provided as Figure 1, shows how the transfer station and recycling center serves as the primary receiving, processing and distribution hub for the majority of the Town's solid waste and recyclable materials. The Flow Diagram also depicts the extent of material handling performed by the DPW from the moment recyclables are dropped off at the site. For example, tin, aluminum, and plastic is handled as many as seven to eight times in the course of processing, storing and delivering the material to out-of-town recycling markets.

1.4 Existing Conditions Site Plans

The locations of the Town's four drop-off sites are shown on the Locus Plan provided in Figure 2. Schematic layout plans depicting existing conditions at each site are provided in Figures 3 through 6.

2.0 SOLID WASTE & RECYCLING DATA REVIEW & PROJECTIONS

2.1 Review of Existing Data and Calculation of Per Capita Generation Rates

The Town provided Sanborn Head with its annual solid waste (trash) and recycling tonnages for the years 2013 through 2016. These four years of data were obtained from the Recycling and Disposal Report presented on Page 20 of the Town's Annual Report for the Year Ending 2016 (dated March 2017). The data provided in the Annual Report segregated the material into the following categories:

- Trash;
- Newspaper;
- Cardboard;
- Glass;
- Steel/tin cans;
- Aluminum cans;
- PETE (#1) plastic
- HDPE (#2) plastic
- Scrap metal;
- Batteries;
- Electronic waste;
- Used clothing

Sanborn Head sorted and summarized the data, focusing specifically on the trash and household recyclables (consisting of glass, metal and plastic containers; newspaper, which includes mixed paper; and cardboard). The other recyclable streams (scrap metal, e-waste, batteries, and used clothing) were also summarized, but these materials represent only a small percentage of the Town's total trash and recycling stream. As such, these "other" recyclables are considered subordinate to the primary focus on estimating trash and household recycling quantities that would be handled at an expanded or newly constructed facility. The ability to reasonably estimate future quantities of household recyclables has a direct impact on sizing the loose storage requirements for these materials within a new building's bunker bays, as well as anticipated bale storage space needs.

Table 2.1 summarizes Sanborn Head's sorting of the Town's past four years of trash and recycling data. The table totals the trash and household recycling quantities and identifies the percentage of trash and household recyclables as a function of the total of these two streams. As shown in the table, the percentage of trash to household recyclables has been fairly steady over the past four years, with trash representing between 77% and 80% of the combined trash and household recyclables tonnage (household recyclables representing between 20% and 23%).

Table 2.1 also includes the Town's annual population data from 2013 through 2016. The population figures are estimates based upon US Census data for 2010 (population of 4,397) and 2015 population estimates prepared by the New Hampshire Office of Energy and Planning (population estimated at 4,493). The 2010 and 2015 published information was used by Sanborn Head to estimate population growth between these years, where the annual growth rate (approximately 0.433% per year) was projected from 2010 to estimate annual population figures for 2013 through 2016. Using the population data, per-capita waste generation rates

Table 2.1
New London, New Hampshire
Annual Trash and Recycling Tonnages - 2013 to 2016

		Trash and All Recyclables													Trash & Household Recyclables Only		
			Household Recyclables							Other Recyclables							
YEAR	POPULATION	TRASH	GLASS	METAL CONTAINERS		PLASTIC CONTAINERS		PAPER		LIGHT METAL (Scrap Metal)	ELECTRONIC WASTE	BATTERIES	USED CLOTHING	TOTAL	Trash	Household Recyclables	Total
				Steel/Tin	Aluminum	#1 PETE	#2 HDPE	Mixed Paper & Newspaper	Cardboard								
2013	**4,454**	**2,185.00**	**175.73**	**17.73**	**3.23**	**9.28**	**7.43**	**222.41**	**198.53**	**34.95**	**10.96**	**0**	**15.28**	**2,880.53**	**2,185.00**	**634.34**	**2,819.34**
% of Total Tonnage		*75.9%*	*6.10%*	*0.62%*	*0.11%*	*0.32%*	*0.26%*	*7.72%*	*6.89%*	*1.21%*	*0.38%*	*0.00%*	*0.53%*	*100%*	*77.5%*	*22.5%*	*100%*
			6.10%	*0.73%*		*0.58%*		*14.61%*		*2.12%*							
			22.02%														
Per Capita lbs/(person/day)		2.69	0.216	0.022	0.0040	0.0114	0.009	0.274	0.244	0.043	0.013	0.000	0.019	3.54	2.69	0.780	3.47
2014	**4,474**	**2,140.38**	**170.64**	**16.19**	**3.05**	**9.8**	**7.32**	**195.11**	**198.46**	**31.3**	**12.26**	**0.05**	**15.06**	**2,799.62**	**2,140.38**	**600.57**	**2,740.95**
% of Total Tonnage		*76.5%*	*6.10%*	*0.58%*	*0.11%*	*0.35%*	*0.26%*	*6.97%*	*7.09%*	*1.12%*	*0.44%*	*0.002%*	*0.54%*	*100%*	*78.1%*	*21.9%*	*100%*
			6.10%	*0.69%*		*0.61%*		*14.06%*		*2.10%*							
			21.45%														
Per Capita lbs/(person/day)		2.62	0.209	0.020	0.0037	0.0120	0.009	0.239	0.243	0.0383	0.015	0.0001	0.018	3.43	2.62	0.736	3.36
2015	**4,493**	**2,160.10**	**171.26**	**16.51**	**3.25**	**10.39**	**7.71**	**170.96**	**191.39**	**20.19**	**8.77**	**1.5**	**14.4**	**2,776.43**	**2,160.10**	**571.47**	**2,731.57**
% of Total Tonnage		*77.8%*	*6.17%*	*0.59%*	*0.12%*	*0.37%*	*0.28%*	*6.16%*	*6.89%*	*0.73%*	*0.32%*	*0.05%*	*0.52%*	*100%*	*79.1%*	*20.9%*	*100%*
			6.17%	*0.71%*		*0.65%*		*13.05%*		*1.62%*							
			20.58%														
Per Capita lbs/(person/day)		2.63	0.209	0.020	0.0040	0.0127	0.009	0.208	0.233	0.025	0.011	0.0018	0.018	3.39	2.63	0.697	3.33
2016	**4,512**	**2,138.25**	**172.32**	**16.83**	**3.26**	**10.87**	**8.00**	**182.45**	**188.22**	**42.42**	**8.76**	**1.48**	**15.91**	**2,788.77**	**2,138.25**	**581.95**	**2,720.20**
% of Total Tonnage		*76.7%*	*6.18%*	*0.60%*	*0.12%*	*0.39%*	*0.29%*	*6.54%*	*6.75%*	*1.52%*	*0.31%*	*0.05%*	*0.57%*	*100%*	*78.6%*	*21.4%*	*100%*
			6.18%	*0.72%*		*0.68%*		*13.29%*		*2.46%*							
			20.87%														
Per Capita lbs/(person/day)		2.60	0.209	0.020	0.0040	0.0132	0.010	0.222	0.229	0.052	0.011	0.002	0.019	3.386	2.60	0.707	3.30
															Average Annual Trash and Household Recyclables Tonnage from 2013 to 2016:		***2,753.02***

Notes:
1. Population estimates based on US Census data for 2010 (population of 4,397) and 2015 population estimates prepared by the New Hampshire Office of Energy and Planning (population estimated at 4,493). A straight-line annual growth rate was calculated between 2010 and 2015, where this
2. Maximum per capita generation rates for trash and household recyclables are highlighted with gold shading.

(pounds per person per day) were calculated for each material type for the four years of data. Total per-capita generation rates for the aggregate of all materials (trash, household recyclables, and other recyclables) and combined trash and household-recyclables-only were also calculated for each year and are shown in Table 2.1.

The information presented in Table 2.1, combined with a 30-year future Town population projection, served as the basis for projecting future trash and recycling quantities. These future projections were then used to estimate trash and recycling storage requirements appropriate for the facility during its operating life.

2.2 Solid Waste and Recycling Projections

Solid waste and recycling projections were developed using the peak per capita generation rates associated with each material type recorded during the past four years, as highlighted in Table 2.1. For example, as shown in Table 2.1, the peak per capita generation rate for trash was recorded in 2013 (2.69 lbs/person/day), whereas the peak generation rate for #1 and #2 plastics was recorded in 2016 (0.0132 and 0.01 lbs/person/day, respectively). These peak per capita generation rates for each material type were then applied to New London's current population estimate for 2017 (4,532) to estimate current peak tonnages that the Town may experience at the transfer station and recycling facility. The same peak generation rates were also applied to the future population projection for New London in 2047 (7,380). Applying the per-capita generation rates to the population projection for 2047 provides a means of estimating increased volume demands that a new facility should be designed to accommodate over a long-term operating period.

The solid waste and recycling projections for 2017 and 2047, using the previous four-year peak per capita generation rates, are summarized in Table 2.2 (2017) and Table 2.3 (2047).

Table 2.2
Current (2017) Peak Solid Waste and Household Recycling Projections

2017 Estimated Population: 4,532[2]											
	Trash	Household Recyclables							Trash & Household Recyclables		
		GLASS	METAL CONTAINERS		PLASTIC		PAPER		TOTALS	Percentages	
			Steel/ Tin	Alum.	#1 PETE	#2 HDPE	ONP[3]/ Mixed	OCC[4]		Trash	Household Recyclables
Per Capita Gen Rates lbs/(person/ day) →	**2.69**	**0.216**	**0.022**	**0.004**	**0.0132**	**0.01**	**0.274**	**0.244**	**3.47**	**77.4%**	**22.6%**
Tons →	**2,223**	**179**	**18**	**3**	**11**	**8**	**226**	**202**	**2,870**	**2,223**	**647**

1. Per capita generation rates (highlighted in gold) taken from peak rates recorded for each material type for the years 2013 through 2016 (see Table 2.1).
2. Population estimate for 2017 based on US Census data for 2010 (population of 4,397) and 2015 population estimates prepared by the New Hampshire Office of Energy and Planning (population estimated at 4,493). A straight-line annual growth rate was calculated between 2010 and 2015, where this growth rate was used to project from 2015 to estimate the Town's 2017 population.
3. ONP = Newspaper
4. OCC = Cardboard

Table 2.3
Future (2047) Peak Solid Waste and Household Recycling Projections

2047 Estimated Population: 7,380[2]											
	Trash	Household Recyclables							Trash & Household Recyclables		
		GLASS	METAL CONTAINERS		PLASTIC		PAPER		TOTALS	Percentages	
			Steel/ Tin	Alum.	#1 PETE	#2 HDPE	ONP[3]/ Mixed	OCC[4]		Trash	Household Recyclables
Per Capita Gen Rates lbs/(person/ day) →	2.69	0.216	0.022	0.004	0.0132	0.01	0.274	0.244	3.47	77.4%	22.6%
Tons →	3,620	291	29	5	18	13	369	329	4,674	3,620	1,054

1. Per capita generation rates (highlighted in gold) taken from peak rates recorded for each material type for the years 2013 through 2016 (see Table 2.1).
2. Population estimate for 2047 based on population data obtained from the following sources: 1) July 2012 Town of New London Master Plan Executive Summary; 2) US Census data; and 3) 2015 Population Estimates of New Hampshire Cities and Towns, prepared by the New Hampshire Office of Energy and Planning (OEP), July 2016. The New London Master Plan provided population data for 1970, 1980 and 2005, supplemented by US Census data for 2000 and 2010 and the OEP population estimate for 2015. A straight-line annual growth rate was calculated between 1970 and 2015 (annual growth rate of approximately 1.56% per year) and projected to the end of the 30-year facility life cycle, resulting in a projected Town population of 7,380 in 2047.
3. ONP = Newspaper
4. OCC = Cardboard

Based on the information provided in Table 2.2, the projected peak tonnage for trash and household recyclables that could be brought to the facility (existing or new) under current conditions is estimated at approximately 2,900 tons per year. The average tonnage for trash and household recyclables brought to the facility during the past four years is approximately 2,750 tons per year (see Table 2.1), meaning the peak demands estimated in Table 2.1 represent approximately a 6% increase to the average demands placed on the facility over the past four years.

The long-range projections provided in Table 2.3 represent the design basis quantities for a new transfer station and recycling facility. While the future trash and recycling demands will serve as the basis for identifying the optimal size for the facility, the estimated peak tonnages for 2017 will also be carried forward in the facility sizing calculations for the purposes of providing the Town with a comparison of how the size and operation of the facility will vary if it were designed for current tonnages that have been peaked (Table 2.2) versus long-range projected tonnage demands (Table 2.3).

2.3 Estimating Individual Recycling Stream Tonnages

Having generated the trash and household recycling projections, the next step in the waste stream analysis is to estimate the individual material components of the household recycling stream and what a theoretical maximum recovery rate of these materials could be so that this increased recycling rate is accounted for in the evaluation of bunker bay storage requirements for a new recycling facility.

For the purposes of identifying storage volume requirements for source-separated recyclables at a new facility or expansion of the existing facility, the household recycling tonnages provided in Tables 2.2 and 2.3 were divided into the following individual streams:

Table 2.4
Components of Household Recycling Stream Used to Refine Material Storage Requirements at Proposed Facility

Household Recycling Stream	Individual Components of Recycling Stream
Glass	Glass
Metal	Steel & Tin
	Aluminum
Plastic	PETE (#1)
	HDPE (#2)
	#3 – #7
Paper	Newspaper (ONP)
	Mixed Paper
	Cardboard (OCC)

Using national data available from the EPA, Sanborn Head estimated the percentage distribution of the individual components of each recycling stream (for metals, percentage of steel cans and percentage of aluminum cans; for plastic, percentage of PETE, percentage of HDPE, and percentage of #3 - #7, and similar percentages for newspaper, mixed paper and cardboard in the paper stream). The percentages of the individual components of the glass, metal and plastic recycling streams were derived from solid waste data provided in the EPA document titled *Advancing Sustainable Materials Management: 2014 Tables and Figures, Assessing Trends in Material Generation, Recycling, Composting, Combustion with Energy Recovery and Landfilling in the United States, December 2016*.

Sanborn Head compiled data provided in various tables in the EPA document where the data pertains to materials referenced in Table 2.4. The compilation of this data, showing percentages of household recyclables in the solid waste stream, is presented in Table 2.5. As shown in Table 2.5, the theoretical maximum recycling rate for glass, metal, paper and plastic is estimated at approximately 36.5% of the waste stream. Based on actual EPA recycling rates for these materials, the current (2014) national recovery rate is approximately 23%, which is also summarized in Table 2.5.

The theoretical maximum recycling rates for each material type derived and presented in Table 2.5 are used to further refine the individual recycling rates for the individual components of each recycling stream. These component recycling rates for household glass, metal, and plastic materials are calculated and presented in Table 2.6 (Plastic), Table 2.7 (Paper), and Table 2.8 (Metal).

Table 2.5
Percentages of Household Recyclables in the Solid Waste Stream Derived from EPA Data

TOTAL WASTE GENERATION (EPA 2014), Million Tons

These figures are for all waste materials generated, of which some are not routinely recycled. For example, "plastics" includes durable and non-durable goods, as well as containers and packaging. Durable and non-durable plastics account for about half of all plastics generated (the other half being plastics in containers and packaging). Durable plastics include plastics used in cars, electronics and appliances; non-durable plastics include cups and plates - all of which are not readily recyclable. Therefore, the portion of the plastic material generated that could be recovered from a household recycling stream (mostly containers and packaging) was identified and used to estimate the maximum theoretical percentage of plastic material that could be recycled. This same methodology was used to calculate the maximum theoretical percentage of the other recyclable materials shown in Table 2.5.

	TOTAL MSW (EPA Table 1)			Durable Goods (EPA Tables 6, 7 & 8) (Million Tons)	Non-Durable Goods (EPA Table 18) (Million Tons)			Containers & Packaging (EPA Table 22) (Million Tons)			Total Non-Durable and Containers & Packaging (Million Tons)	Theor % of Material that could be Recycled	Theor % of Total Household Waste Stream that could be Recycled	Actual Recycled (EPA Tables 19 & 24)	
	Material	**Million Tons**	**% of Total**		**ONP**	**Books/Mags/ Office Paper**	**Other**	**Steel**	**Aluminum**	**Other**				**Million of Tons**	**Current Recycle Rate**
	Paper	68.6	30.6%	NA	7.62	6.62	NA	NA	NA	39.1	53.34	78%	23.8%	44.4	19.8%
	Yard Waste[2]	0.0	0.0%	NA	NA	NA	NA	NA	NA	NA	0				
EPA Table 8	Plastics	33.3	14.9%	12.15	NA	NA	1.02 α	NA	NA	14.3 β	15.32	46%	6.8%	2.12	0.9%
	Rubber & Leather	8.2	3.7%	NA	NA	NA	NA	NA	NA	NA	0				
	Textiles	16.2	7.2%	NA	NA	NA	NA	NA	NA	NA	0				
EPA Table 7	Metals	23.3	10.4%	19.08	NA	NA	NA	2.17	1.81	NA	3.98	17%	1.8%	2.28	1.0%
	Wood	16.1	7.2%	NA	NA	NA	NA	NA	NA	NA	0				
	Food Waste	38.4	17.1%	NA	NA	NA	NA	NA	NA	NA	0				
EPA Table 6	Glass	11.5	5.1%	2.28	NA	NA	NA	NA	NA	9.2	9.2	80%	4.1%	2.99	1.3%
	Other	8.4	3.8%	NA	NA	NA	NA	NA	NA	0.34	0.34				
	TOTAL	**224.0**	**100.0%**										**36.5%**		**23.1%**

1. EPA tables referenced in Table 2.5 refer to data tables provided in the EPA document entitled *Advancing Sustainable Materials Management: 2014 Tables and Figures - Assessing Trends in Material Generation, Recycling, Composting, Combustion with Energy Recovery and Landfilling in the United States, December 2016.*

2. Yard waste generated in 2014 (34.5 million tons) is not reported in Table 2.5 in order to calibrate the theroretically achievable recycling rates derived from the national figures to the total waste and recycling tonnages associated with New London. Because the total waste and recycling figures summarized for New London in Table 2.1 do not include yard waste tonnages, Table 2.5 should likewise not include yard waste tonnage as part of the total MSW waste stream.

Plastics:
α = Plates and cups (non-durable goods)
β = No. 1 thru 7 container/packaging plastic

Table 2.6
Percent of Plastic in Waste Stream by Type and Theoretical Maximum that can be Recovered

Plastic ID No.	Description	Generation (Mil tons)[1]	% of Total Plastic	Aggregate % Plastic that can be Recovered[2]	% of Total Waste Stream that can be Recovered
1	PETE	3.87	27.0%	6.8%	1.8%
2	HDPE	3.72	26.0%	6.8%	1.8%
3	PVC	0.39	2.7%	6.8%	0.2%
4	LDPE	3.66	25.6%	6.8%	1.7%
5	Polypropylene	1.72	12.0%	6.8%	0.8%
6	Polystyrene	0.56	3.9%	6.8%	0.3%
7	Other	0.4	2.8%	6.8%	0.2%
TOTAL		**14.32**	**100.0%**		**6.8%**

1. Generation tonnage (2014) obtained from Table 8 of EPA's *Advancing Sustainable Materials Management: 2014 Tables and Figures, Assessing Trends in Material Generation, Recycling, Composting, Combustion with Energy Recovery and Landfilling in the United States, December 2016*.
2. Aggregate % plastic that can be recovered from household waste stream is calculated in Table 2.5.

Table 2.7
Percent of Paper in Waste Stream by Type and Theoretical Maximum that can be Recovered

Type	Generation (Mil Tons)[1]	% of Total Paper	Aggregate % Paper that can be Recovered[2]	% of Total Waste Stream that can be Recovered
Newspaper (ONP)	7.62	11.1%	23.8%	2.6%
Books/Magazines/Tissue	21.85	31.9%	23.8%	7.6%
Cardboard (OCC)	30.49	44.4%	23.8%	10.6%
Gable tops	0.59	0.9%	23.8%	0.2%
Folding Cartons	5.41	7.9%	23.8%	1.9%
Bags & Sacks	0.88	1.3%	23.8%	0.3%
Other Paper	1.76	2.5%	23.8%	0.6%
TOTAL	**71.16**	**100.0%**		**23.8%**

1. Generation tonnage (2014) obtained from Table 5 of EPA's *Advancing Sustainable Materials Management: 2014 Tables and Figures, Assessing Trends in Material Generation, Recycling, Composting, Combustion with Energy Recovery and Landfilling in the United States, December 2016*.
2. Aggregate % paper that can be recovered from household waste stream is calculated in Table 2.5.

Table 2.8
Percent of Metal Containers in Waste Stream by Type and Theoretical Maximum that can be Recovered

Type	Generation (Mil Tons)[1]	% of Total Metal Containers	Aggregate % Metal that can be Recovered[2]	% of Total Waste Stream that can be Recovered
Steel Cans	2.17	54.5%	1.8%	1%
Aluminum Cans	1.81	45.5%	1.8%	0.8%
TOTAL	**4.64**	**100.0%**		**1.8%**

1. Generation tonnage (2014) obtained from Table 22 of EPA's *Advancing Sustainable Materials Management: 2014 Tables and Figures, Assessing Trends in Material Generation, Recycling, Composting, Combustion with Energy Recovery and Landfilling in the United States, December 2016*.
2. Aggregate % metal that can be recovered from household waste stream is calculated in Table 2.5.

With the individual recycling percentages estimated in Tables 2.6 through 2.8, these percentages can be used to estimate the tonnages of the source separated material that would be brought to the New London Transfer Station and Recycling Facility under current (2017) and future (2047) conditions. These tonnage distributions for the trash and household recycling streams are presented in Table 2.9 and Table 2.10.

Table 2.9
Tonnage Estimates for Source Separation of Recyclables into Component Streams
2017 Peak Trash and Recycling Tonnages

Year	Total Projected Tons (Trash & Household Recyclables)[1]	Recyclable Stream		% of Total Waste Stream Based on EPA Numbers[2]	Roll-up - EPA Theoretical Max Recovery	Using EPA %s to Calculate Individual Recycling Components (Tons)	Total Roll-up (Tons)
2017	2,870	Glass	Glass	4.1%	12.7%	117.89	365.2
		Metal	Steel & Tin	1.0%		27.81	
			Aluminum	0.8%		23.19	
		Plastic	HDPE	1.8%		51.00	
			PETE	1.8%		53.05	
			#3 – #7	3.2%		92.26	
		Paper	Newspaper (ONP)	2.6%	23.8%	75.92	683.52
			Mixed Paper	10.6%		303.80	
			Cardboard (OCC)	10.6%		303.80	
Maximum Theoretical Recycling Rate & Tonnage (provides conservative basis for sizing recycling storage needs)				**36.5%**		**1,048**	**36.5%**
Net Trash Tonnage (63.5%)						1,822	63.5%
Until 36.5% recycling rate can be achieved, assume trash tonnage is 80% of total stream (provides conservative basis for evaluating trash storage needs)						**2,296**	**80.0%**

1. Total projected peak rate tonnages for 2017 were obtained from Table 2.2.
2. Waste stream percentages obtained from Tables 2.5 (glass), 2.6 (plastic), 2.7 (paper) and 2.8 (metal).

Table 2.10
Tonnage Estimates for Source Separation of Recyclables into Component Streams
2047 Peak Trash and Recycling Tonnages

Year	Total Projected Tons (Trash & Household Recyclables)[1]	Recyclable Stream		% of Total Waste Stream Based on EPA Numbers[2]	Roll-up - EPA Theoretical Max Recovery	Using EPA %s to Calculate Individual Recycling Components (Tons)	Total Roll-up (Tons)
2047	4,674	Glass	Glass	4.1%	12.7%	191.98	594.71
		Metal	Steel & Tin	1.0%		45.28	
			Aluminum	0.8%		37.77	
		Plastic	HDPE	1.8%		83.05	
			PETE	1.8%		86.39	
			#3 - #7	3.2%		150.24	
		Paper	Newspaper (ONP)	2.6%	23.8%	123.64	1,113.04
			Mixed Paper	10.6%		494.70	
			Cardboard (OCC)	10.6%		494.70	
Maximum Theoretical Recycling Rate & Tonnage (provides conservative basis for sizing recycling storage needs)				**36.5%**		**1708**	**36.5%**
Net Trash Tonnage (63.5%)						2,966	63.5%
Until 36.5% recycling rate can be achieved, assume trash tonnage is 80% of total stream (provides conservative basis for evaluating trash storage needs)						**3,739**	**80.0%**

1. Total projected tonnages for 2047 were obtained from Table 2.3.
2. Waste stream percentages obtained from Tables 2.5 (glass), 2.6 (plastic), 2.7 (paper) and 2.8 (metal).

The information provided in Tables 2.9 and 2.10 summarizes the quantity of household recyclables that could be delivered to the facility under current and future conditions, where the recycling rates represent the estimated maximum recovery of these materials from the waste stream. As shown in Tables 2.9 and 2.10, the maximum estimated peak recycling rate is 36.5%, compared to the Town's current rate, which varies between 20% and 23%. The peak recycling rate provides the specific design basis tonnages for the maximum quantities of glass, metal, and plastic materials that will be processed through a new facility. It would follow that if the peak recycling rate is estimated at 36.5%, then the resulting trash rate would be 63.5%. However, for facility sizing purposes, it is more appropriate to assume that the trash disposal rate will initially be in the 80% range (consistent with the current rate, see Table 2.1) and reduce over time as the recycling rate increases to the peak projected 36.5% rate. For this reason, Table 2.10 identifies the projected trash and recycling tonnages that a new facility would be designed around: 1) 1,708 tons of recyclables representing a maximum anticipated recycling rate of 36.5%; and 2) 3,739 tons of solid waste representing a maximum trash disposal rate of 80%.

It is worth noting that the maximum predicted quantity of glass that could be recycled by the Town under current (2017) conditions, as summarized in Table 2.9, is approximately 117 tons, which is less than the 170 tons per year the Town has achieved since 2013 (see Table 2.1). Since the predicted recycling tonnages shown in Tables 2.9 and 2.10 are intended to provide a conservative basis around which to identify facility sizing needs, it is appropriate to adjust the glass quantity so that the 2017 and 2047 planning numbers properly capture the tonnage the

Town is currently experiencing. To this end, the 2017 glass volume will be set at 170 tons per year plus a 10% peaking factor, for a total projected 2017 peak glass tonnage of 187 tons per year. With respect to the projected glass tonnage estimated for 2047 (192 tons), bunker bay sizing will be based on a 2047 projected glass tonnage of 291 tons, which is the value calculated based on the Town's per-capita generation rate for glass, as shown in Table 2.3.

The information provided in Tables 2.9 and 2.10, together with the adjustments noted for glass as noted above, will be used to estimate the loose volume storage requirements for trash and source-separated recyclables that would be delivered to a new recycling building, as well as the estimated bale production rate and bale storage requirements. This facility sizing methodology is described in Section 3.

3.0 FACILITY SIZING

3.1 Bunker Bay Sizing for Recyclable Materials

Determining bunker bay storage requirements for residential drop-off of trash and recyclables represents one of the primary sizing criteria for a new facility. Using the annual tonnages for each recycling stream provided in Tables 2.9 and 2.10, we can estimate required bunker sizes for these materials using typical loose density volumes associated with each material. This information is presented in Tables 3.1 and 3.2. Table 3.1 depicts criteria relevant to estimating bunker bay storage requirements based on 2017 peak estimated recycling activities (i.e. a 36.5% recycling rate) and Table 3.2 depicts similar criteria used to estimate future (2047) bunker bay storage requirements.

As shown in Tables 3.1 and 3.2, the estimated annual tonnage of each recyclable material is converted into an average daily and weekly tonnage based on a 5-day operating week. These daily and weekly tonnages are then converted into daily and weekly volumes (cubic yards) using the loose volume densities for each material. The bunker bay sizes required to store these volumes can be determined by establishing a standard bay height and bay depth and then calculating the bunker width required to meet the loose volume storage needs.

For this evaluation, all recycling bunker bays are assumed to have an 8-foot storage height and 15-foot length (partition wall length), resulting in a cross-sectional area of 120 square feet for each bay. Accounting for an angle of repose on the stockpiled material (45 degrees), the effective cross-sectional area that can be stored in an 8-foot high by 15-foot long bunker bay reduces to 88 square feet. Using the effective cross-sectional area of 88 square feet for each bay, the bay width may then be calculated. For example, as shown in Table 3.1, the loose storage volume for steel cans was calculated at 1.9 cubic yards per day. This equates to 51.3 cubic feet per day. Based upon a cross-sectional storage area of 88 square feet for an 8-foot high by 15-foot long bay, the required bunker bay width for one day of storage would be:

> 51.3 cubic feet/day ÷ 88 square feet = 0.58 feet for one day of storage
> (rounded to 0.6 in Table 3.1)
>
> One week's worth of storage (5 operating days) for steel cans would be 0.58 x 5 = 2.9 feet.

In this way, the bunker bay dimensions required to store a day's worth and week's worth of each recyclable material was calculated and the results are shown in Tables 3.1 and 3.2. As shown in the tables, some materials can be provided with small bay widths that will provide for a week's worth of storage (steel and metal cans for example), while other materials require notably greater widths to meet a day's worth of storage (cardboard). The final column in Tables 3.1 and 3.2 identifies the theoretical bunker width that would be required (for an 8-foot high by 15-foot long bay) to store one bale's worth of material. These "unit bunker widths" are useful in that they can be used to estimate the equivalent bale storage provided in each bay. For example, the bunker bay width required to store one bale's worth of steel cans in an 8-foot by 15-foot bunker is 5 feet. Therefore, if a bay width of 10 feet was provided for this material, it would, when full, provide sufficient storage to make approximately 2 bales (10 feet wide ÷ 5 feet/bale = 2 bales).

Table 3.1
Recyclable Material Bunker Bay Storage Sizing for 2017 Estimated Peak Demands

Material Characteristics		Typical Bale Characteristics						Peak 2017 Tonnage Rates and Equivalent Loose Storage Volumes					Assumed Fixed Bunker Dimensions (ft): Height 8; Depth (front to back) 15		Effective Cross-Section 88
Material	Loose Density lb/cy	Bale Density lb/cf	Bale Density lb/cy	Bale Volume (cy)	Bale Weight (lbs)	Bale Wt at 90%	Loose Storage Reqd for 1 Bale (cy)	Estimated Current Peak Tonnages Delivered to Facility (36.5% Recycle) Tons/Yr	Tons/Day	Tons/Week	Loose Storage Volume Requirements cy/day	cy/wk	Bunker Width for Projected TPD (ft)	Bunker Width for Projected TPW (ft)	Unit Bunker Width for 1 bale (ft)
Glass	380	---	---	---	---	---	---	187.00	0.7	3.6	3.8	18.9	1.2	5.8	---
Steel Cans	115	44	1188	1.74	2067	1860	16.2	27.81	0.1	0.5	1.9	9.3	0.6	2.9	5.0
Alum. Cans	46	23	621	1.74	1081	972	21.1	23.19	0.1	0.4	3.9	19.4	1.2	6.0	6.5
PETE	32	28	756	1.74	1315	1184	37.0	53.05	0.2	1.0	12.8	63.8	3.9	19.6	11.4
HDPE	32	28	756	1.74	1315	1184	37.0	51.00	0.2	1.0	12.3	61.3	3.8	18.8	11.4
No. 3-7	25	28	756	1.74	1315	1184	47.4	92.26	0.4	1.8	28.4	141.9	8.7	43.6	14.5
OCC	75	30	810	1.74	1409	1268	16.9	303.80	1.2	5.8	31.2	155.8	9.6	47.8	5.2
ONP	360	34	918	1.74	1597	1438	4.0	75.92	0.3	1.5	1.6	8.1	0.5	2.5	1.2
Mixed Paper	245	34	918	1.74	1597	1438	5.9	303.80	1.2	5.8	9.5	47.7	2.9	14.6	1.8
								1117.84	4.3	21.5			32.3	161.5	

1. Loose material densities are based on typical values provided in solid waste literature, including EPA data and data provided by the American Public Works Association (Solid Waste Pocket Guide).
2. Bale density and bale volumes are based on American Baler (formerly Lindemann) RAM II 75 S1 HP dual ram baler.
3. Bale volume assumes bale size of: 30" high x 45" wide x 60" long = approx 47 cf/bale = 1.74 cy/bale.
4. Tons per year obtained from Table 2.9, except for glass (see Note 5).
5. Annual tonnage for glass based on average tonnage currently experienced by the Town (170 TPY) and increased with a 10% peaking factor (187 TPY).

Table 3.2
Recyclable Material Bunker Bay Storage Sizing for Future (2047) Estimated Peak Demands

Material Characteristics		Typical Bale Characteristics[2, 3]						Future Tonnage Rates and Equivalent Loose Storage Volumes					Assumed Fixed Bunker Dimensions (ft): Height 8; Depth (front to back) 15		Effective Cross-Section 88
Material	Loose Density lb/cy[1]	Bale Density lb/cf	Bale Density lb/cy	Bale Volume (cy)[3]	Bale Weight (lbs)	Bale Wt at 90%	Loose Storage Reqd for 1 Bale (cy)	Estimated Future (2047) Tonnages Delivered to Facility (36.5% Recycle) Tons/Yr[4]	Tons/Day	Tons/Week	Loose Storage Volume Requirements cy/day	cy/wk	Bunker Width for Projected TPD (ft)	Bunker Width for Projected TPW (ft)	Unit Bunker Width for 1 bale (ft)
Glass	380	---	---	---	---	---	---	291.00	1.1	5.6	5.9	29.5	1.8	9.0	---
Steel Cans	115	44	1188	1.74	2067	1860	16.2	45.28	0.2	0.9	3.0	15.1	0.9	4.6	5.0
Alum. Cans	46	23	621	1.74	1081	972	21.1	37.77	0.1	0.7	6.3	31.6	1.9	9.7	6.5
PETE	32	28	756	1.74	1315	1184	37.0	86.39	0.3	1.7	20.8	103.8	6.4	31.9	11.4
HDPE	32	28	756	1.74	1315	1184	37.0	83.05	0.3	1.6	20.0	99.8	6.1	30.6	11.4
No. 3-7	25	28	756	1.74	1315	1184	47.4	150.24	0.6	2.9	46.2	231.1	14.2	70.9	14.5
OCC	75	30	810	1.74	1409	1268	16.9	494.70	1.9	9.5	50.7	253.7	15.6	77.8	5.2
ONP	360	34	918	1.74	1597	1438	4.0	123.64	0.5	2.4	2.6	13.2	0.8	4.1	1.2
Mixed Paper	245	34	918	1.74	1597	1438	5.9	494.70	1.9	9.5	15.5	77.7	4.8	23.8	1.8
								1806.78	6.9	34.7			52.5	262.5	

1. Loose material densities are based on typical values provided in solid waste literature, including EPA data and data provided by the American Public Works Association (Solid Waste Pocket Guide).
2. Bale density and bale volumes are based on American Baler (formerly Lindemann) RAM II 75 S1 HP dual ram baler.
3. Bale volume assumes bale size of: 30" high x 45" wide x 60" long = approx 47 cf/bale = 1.74 cy/bale.
4. Tons per year obtained from Table 2.10 except for glass (see Note 5).
5. Annual tonnage for glass based on projected tonnage provided in Table 2.3.

It should be noted that the unit bunker widths to make one bale is a function of the bale densities and volumes that can be achieved with a specific piece of equipment. As noted in Tables 3.1 and 3.2, bale densities and volumes are based on the American Baler 75 horsepower Ram II dual ram baler. Balers that achieve lower bale weights (for equivalent size bales) than those shown in Tables 3.1 and 3.2 will require less loose storage volume to make a bale, however, more bales will be produced to meet an equivalent tonnage throughput.

3.2 Summary of Bunker Sizing and Bale Production Rates

The results of the storage bay sizing for a new recycling building are summarized in Table 3.3, which provides sizing information for both current (2017) and future conditions (2047). The table shows the selected bunker widths for the following nine categories of source separated household recyclables:

1. Glass;
2. Steel containers;
3. Aluminum containers;
4. PETE;
5. HDPE;
6. No. 3 through No. 7 plastics;
7. Cardboard;
8. Newspaper; and
9. Mixed paper.

Table 3.3 is built off of: 1) the bunker widths needed to provide one day's storage for each material type; and 2) the minimum bunker widths needed to make one bale of each material type (aka "unit bunker widths"). Both of these widths are taken from Tables 3.1 and 3.2. The greater of these two widths (one day's storage for the material versus storage required to make one bale) was then selected as the appropriate width for the specific bay under consideration, where widths were rounded up to a minimum dimension of 10-feet, reflecting the minimum recommended width for removing recyclables from the bay using a skid steer loader. The rounded-up width for each bunker bay was then used to calculate bunker storage capacity (in days) and the equivalent number of bales that can be produced from each bay when full. This information was then used to predict the number of bales produced annually under current and future conditions, as well as the estimated number of bale trailer loads that would be hauled from the building annually under current and future conditions.

As shown in Table 3.3, the total clear opening linear footage for the nine recycling bays is estimated at 99 feet for current conditions and 105 feet for 2047 projected tonnages. This indicates the minimal impact to building size when comparing current to future conditions, owing principally to the rounding up of bay sizes to meet the minimum 10-foot width criteria for skid steer access. Accounting for partition walls that separate each bunker (assumed to be 8-inches thick), the total recommended recycling building length is 111 feet – rounded to 115 feet, which would be appropriate to accommodate the recycling bunker bay storage requirements anticipated under future conditions. The 2017 numbers provided in Table 3.3 are provided as a means of comparing the relative size difference in the building if it were designed to meet current peak demands only. For planning purposes, the data associated with the 2047 future projections

Table 3.3
Summary of Recycling Bunker Bay Sizing, Bale Production, and Annual Trailer Load Estimates for Proposed Facility

Year		1 Glass	2 Steel	3 Aluminum	4 PETE	5 HDPE	6 No. 3 thru 7	7 OCC	8 ONP	9 Mixed Paper	Totals[3]	
	"Raw" Bunker Width (ft) Needed to Provide 1 Day's Storage[1]	1.2	0.6	1.2	3.9	3.8	8.7	9.6	0.5	2.9		
	Minimum Bunker Width Needed to Make One Bale[2]	NA	5.0	6.5	11.4	11.4	14.5	5.2	1.2	1.8		
2017	**Round Up Size[3] (ft)**	**10**	**10**	**10**	**12**	**12**	**15**	**10**	**10**	**10**	***99***	***Linear Feet***
	Bunker Storage Capacity (days)	8.6	17.5	8.4	3.1	3.2	1.7	1.0	20.1	3.4		
	Equiv # Bales	NA	2.0	1.5	1.1	1.1	1.0	1.9	8.2	5.6		
	Avg # Bales Made per Year[5]	NA	30	48	90	86	156	479	106	423	1,417	Bales/year
	Est. # Bales per Trailer[6]	NA	21	41	33	33	33	31	28	28		
	Est. # Trailer Loads per Year	NA	1.4	1.2	2.7	2.6	4.7	15.3	3.8	15.3	47	Trailers/year
	"Raw" Bunker Width (ft) Needed to Provide 1 Day's Storage[1]	1.8	0.9	1.9	6.4	6.1	14.2	15.6	0.8	4.8		
	Minimum Bunker Width Needed to Make One Bale[2]	NA	5.0	6.5	11.4	11.4	14.5	5.2	1.2	1.8		
2047	**Round Up Size[3] (ft)**	**10**	**10**	**10**	**12**	**12**	**15**	**16**	**10**	**10**	***105***	***Linear Feet***
	Bunker Storage Capacity (days)	5.5	10.8	5.2	1.9	2.0	1.1	1.0	12.3	2.1		
	Equiv # Bales	NA	2.0	1.5	1.1	1.1	1.0	3.1	8.2	5.6		
	Avg # Bales Made per Year[5]	NA	49	78	146	140	254	780	172	688	2,307	Bales/year
	Est. # Bales per Trailer[6]	NA	21	41	33	33	33	31	28	28		
	Est. # Trailer Loads per Year	NA	2.3	1.9	4.4	4.2	7.6	25.0	6.2	25.0	77	Trailers/year

1. Bunker bay widths for recyclables are based on bay heights of 8 feet and lengths of 15 feet (widths shown are from Tables 3.1 for 2017 and 3.2 for 2047). Widths shown reflect clear dimensions for bunker storage (dimensions do not include bunker wall partition widths - see Note 4 below).
2. Minimum bunker with to make one bale of the specified material is shown in Table 3.1 for 2017 projections and Table 3.2 for 2047 projections.
3. Round-up sizes for bunker widths are based on rounding up the "raw" widths to a minimum of 10 feet, reflecting the minimum recommended width for removing recyclables from the bay by skid-steer loader. Greater widths were selected where calculations showed these were required to store a minumum amount of material to make one bale.
4. Total linear footage calculated for recyclable bay storage does not include partition wall widths. For space planning purposes, it is assumed that the width of each bunker wall partition is 8 inches. Based upon the number of bunker bays (nine), an 8-inch partition for each bunker wall partition would add 6 feet to the clear opening bay widths provided in Table 3.3.
5. Bales made per year based on a 5-day per week, 52 week per year operating schedule.
6. Bale storage on trailers (based on bale weight ranges and a 22 ton trailer load [trailer length approx 48 feet]):

Material	lbs/bale	Tons/bale	Tons/trailer	Estimated bales/trailer
Steel	2067	1.03	22	21
Aluminum	1081	0.54	22	41
PETE	1315	0.66	22	33
HDPE	1315	0.66	22	33
#3-#7	1315	0.66	22	33
OCC	1409	0.70	22	31
ONP	1597	0.80	22	28
Mixed Paper	1597	0.80	22	28

will be used as the preferred data around which to size the proposed facility for nine recycling bays (115 feet).

Sizing the recycling building to accommodate the source separation of recyclables into nine individual bunker bays is a conservative approach that yields a greater building length as compared to designing the facility with fewer bunker bays. Nevertheless, for comparison purposes, and given the tight site constraints at the existing transfer station site, Sanborn Head evaluated building length requirements if the number of bunker bays is reduced from nine to seven. The bay reduction reflects the elimination of source separating No. 3 through No. 7 plastics, which the Town does not currently recycle (these items are disposed of in the trash stream), as well as combining newspaper and other mixed paper (boxboard, office wastepaper, magazines, etc.) into a single bunker bay.

The results of this reduced bunker bay evaluation are summarized in Table 3.4. As shown in the table, the total clear opening linear footage for seven recycling bays is estimated at 74 feet for current conditions and 80 feet for 2047 projected tonnages. The building length is reduced by 25 feet as a result of: 1) eliminating bunker storage for No. 3 through No. 7 plastics (a 15-foot reduction); and 2) combining newspaper and other mixed paper into a single bay (a 10-foot reduction). Accounting for bunker partition widths, the building width would increase to 86 feet, which we have rounded to 90-feet for conceptual planning purposes.

The conceptual layout plans presented in Section 5 include both nine-bay and seven-bay options for the proposed recycling building.

Table 3.4
Summary of Recycling Bunker Bay Sizing, Bale Production, and Annual Trailer Load Estimates for Proposed Facility
(Assumes #3 through #7 Plastic is not Recycled and One Bay Stores All Grades of Paper Except Cardboard)

Year		1 Glass	2 Steel	3 Aluminum	4 PETE	5 HDPE	TRASH No. 3 thru 7	6 OCC	7 ONP & Mixed Paper		Totals[3]	
2017	"Raw" Bunker Width (ft) Needed to Provide 1 Day's Storage[1]	1.2	0.6	1.2	3.9	3.8	0.0	9.6	3.4			
	Minimum Bunker Width Needed to Make One Bale[2]	NA	5.0	6.5	11.4	11.4	0.0	5.2	3.0			
	Round Up Size[3] (ft)	**10**	**10**	**10**	**12**	**12**	**0**	**10**	**10**		***74***	***Linear Feet***
	Bunker Storage Capacity (days)	8.6	17.5	8.4	3.1	3.2	0.0	1.0	2.9			
	Equiv # Bales	NA	2.0	1.5	1.1	1.1	0.0	1.9	3.3			
	Avg # Bales Made per Year[5]	NA	30	48	90	86	0	479	294		1,027	Bales/year
	Est. # Bales per Trailer[6]	NA	21	41	33	33	0	31	28			
	Est. # Trailer Loads per Year	NA	1.4	1.2	2.7	2.6	0.0	15.3	10.7		34	Trailers/year
2047	"Raw" Bunker Width (ft) Needed to Provide 1 Day's Storage[1]	1.8	0.9	1.9	6.4	6.1	0.0	15.6	5.6			
	Minimum Bunker Width Needed to Make One Bale[2]	NA	5.0	6.5	11.4	11.4	0.0	5.2	3.0			
	Round Up Size[3] (ft)	**10**	**10**	**10**	**12**	**12**	**0**	**16**	**10**		***80***	***Linear Feet***
	Bunker Storage Capacity (days)	5.5	10.8	5.2	1.9	2.0	0.0	1.0	1.8			
	Equiv # Bales	NA	2.0	1.5	1.1	1.1	0.0	3.1	3.3			
	Avg # Bales Made per Year[5]	NA	49	78	146	140	0	780	479		1,672	Bales/year
	Est. # Bales per Trailer[6]	NA	21	41	33	33	0	31	28			
	Est. # Trailer Loads per Year	NA	2.3	1.9	4.4	4.2	0.0	25.0	17.4		55	Trailers/year

1. Bunker bay widths for recyclables are based on bay heights of 8 feet and lengths of 15 feet (widths shown are from Tables 3.1 for 2017 and 3.2 for 2047). Widths shown reflect clear dimensions for bunker storage (dimensions do not include bunker wall partition widths - see Note 4 below).
2. Minimum bunker with to make one bale of the specified material is shown in Table 3.1 for 2017 projections and Table 3.2 for 2047 projections.
3. Round-up sizes for bunker widths are based on rounding up the "raw" widths to a minimum of 10 feet, reflecting the minimum recommended width for removing recyclables from the bay by skid-steer loader. Greater widths were selected where calculations showed these were required to store a minumum amount of material to make one bale.
4. Total linear footage calculated for recyclable bay storage does not include partition wall widths. For space planning purposes, it is assumed that the width of each bunker wall partition is 8 inches. Based upon the number of bunker bays (seven), an 8-inch partition for each bunker wall partition would add 5 feet to the clear opening bay widths provided in Table 3.3.
5. Bales made per year based on a 5-day per week, 52 week per year operating schedule.
6. Bale storage on trailers (based on bale weight ranges and a 22 ton trailer load [trailer length approx 48 feet]):

Material	lbs/bale	Tons/bale	Tons/trailer	Estimated bales/trailer
Steel	2067	1.03	22	21
Aluminum	1081	0.54	22	41
PETE	1315	0.66	22	33
HDPE	1315	0.66	22	33
#3-#7	1315	0.66	22	33
OCC	1409	0.70	22	31
ONP	1597	0.80	22	28
Mixed Paper	1597	0.80	22	28

3.3 Baler Area, Interior Bale Storage, and Loading Dock Recommendations

As presented in Section 3.2, the bunker bay storage widths define the length of the recycling building. The width of the building is based upon four primary factors: 1) length of bunker partition walls (in this evaluation, 15 feet); 2) size of the baler and associated components (motor, pit and incline conveyor, wire tier, stairs to the control unit); 3) clearances around the baling equipment; and 4) interior bale storage needs.

For planning purposes, Sanborn Head has assumed a larger footprint for the baling equipment than what would likely be required at facility start-up. Specifically, we have selected a footprint of 30 feet by 55 feet for the baler and components, which will provide sufficient space to upgrade the baling equipment should the Town wish to do so during the life of the facility.

With respect to bale storage requirements, the projections in Table 3.3 indicate that a nine-bay facility, under future conditions, may produce as many as 2,307 bales per year (average of 9 bales per day) and a seven bay facility may produce as many as 1,672 bales per year (average of 6.5 bales per day). For planning purposes, the proposed recycling building will be sized to provide interior storage for one week's worth of bale production (2047 conditions). This equates to 45 bales for the nine-bay facility (which will also serve as the minimum interior storage needs for a seven bay facility). Based on an individual bale size of approximately 4-feet by 5-feet by 30-inches high, up to 60 bales can be stored within a floor area 10 feet wide by 40 feet long stacked to a height of 7.5 feet (bales stacked three courses high). Therefore, an interior bale storage area of 10 feet by 40 feet will be included in the sizing requirements for the proposed recycling building.

As shown in Table 3.3, the number of loads of baled recyclables hauled from the facility is estimated at 77 trailers per year under the nine-bay building scenario. This equates to between one and two trailer hauls per week. Given this low haul rate, one loading dock is deemed sufficient to meet the needs of the proposed facility.

The features that make-up the width of the recycling building are summarized in Table 3.5.

Table 3.5
Components of Recycling Building Width

Length of bunker partition wall	15 feet
Clearance from end of bunker partition wall to baling equipment	25 feet
Width reserved for baling equipment	30 feet
Clearance from baling equipment to interior bale storage area	20 feet
Width of bale storage area	10 feet
Total Building Width	**100 feet**

The design phase for the proposed new facility will present opportunities to refine the width of the proposed recycling building. These refinements may warrant reducing the width of the building to some degree, depending on the specific baling equipment the Town chooses to install.

3.4 Recycling Building Dimensions

Section 3.2 described the methodology for defining the length of the proposed recycling building and Section 3.3 described the methodology for defining its width. The resulting dimensional requirements for the building are summarized in Table 3.6, which highlights the dimensional requirements for a nine bunker bay facility versus a seven bay facility.

Table 3.6
Conceptual Dimensions for New Recycling Building

Number of Bunker Bays for Differing Grades of Source-Separated Recyclables	Dimensions
Nine	115 feet by 100 feet
Seven	90 feet by 100 feet

3.5 Transfer Station Sizing

Identifying the dimensions for the new transfer station is less a function of tonnage delivered to the facility and more dependent on how the facility will operate because variability in tonnage can be addressed by varying the frequency of trailer hauls made from the transfer station. This is particularly true for a direct dump type of transfer station like the existing New London facility, where identifying tipping floor dimensions for waste storage is not an operational component. Given these considerations, it is appropriate to summarize how the existing transfer station operates, since these operations have been identified by the Department of Public Works as meeting the Town's needs and therefore represent a reasonable system to replicate as part of any new transfer station construction.

The existing transfer station is a small direct dump facility where waste drop-off consists of residents and commercial vehicles direct dumping into a compactor hopper, where the compactor cycles the waste into a compaction trailer below, located at a grade approximately 16 feet below the hopper floor elevation. The drop-off portion of the transfer station has dimensions of approximately 32 feet by 16 feet. Approximately half of this area is dedicated to the compactor hopper and the remaining area (16 feet by 16 feet) is interior floor space used by commercial vehicles to direct dump into the compactor hopper. Residents dispose of their waste through a 12-foot wide chute opening in the face of the building located directly above the hopper.

When developing layout concepts for a new transfer station and recycling facility, the size and operational characteristics of the existing transfer station will be used as a model for one of the concepts. The transfer station layout will include provisions for on-site trailer storage, which is estimated by projecting the number of trailer hauls that will be made from the facility. Currently, an average of two trailer hauls per week are made from the transfer station. The Town owns two 106 cubic yard compaction trailers and one 80 cubic yard compaction trailer. The Town hauls their full trailers to the Meredith Transfer Station, where the trailer is then hauled to the Androscoggin Regional Refuse Disposal District Landfill in Berlin, New Hampshire. The New London Transfer Station has space to store one spare transfer trailer. The second trailer on-site is the "live" transfer trailer (trailer being loaded), with the third generally in transit between

New London and Meredith. The goal of the concept planning will be to increase on-site trailer storage capacity at the current site or at a new site. The on-site trailer storage requirements to be included in the conceptual planning effort are summarized in Table 3.7.

Table 3.7
On-Site Transfer Trailer Storage Recommendations

Year	Annual Trash Tonnage[1]	Average Tons Hauled Per Trailer[2]	Average Trailer Hauls Per Week	On-Site Storage Recommendations
2017	2,223	22	1.9	• One (1) bay for empty/full trailer • One (1) spare bay Provides on-site storage capacity for one week's worth of trash disposal (including trailer being loaded)
2047	3,620	22	3.2	• Two (2) bays for empty/full trailers • One (1) spare bay Provides on-site storage capacity for one week's worth of trash disposal (including trailer being loaded)

1. Annual trash tonnages for current (2017) and future (2047) conditions were obtained from Tables 2.2 &2.3.

2. Average tonnage per compaction trailer based on information provided by New London DPW.

As summarized in Table 3.7, on-site trailer storage recommendations are based on providing one week's worth of trash storage within the compaction trailers (which includes the trailer being filled at the transfer station). The conceptual layouts presented in Section 5 will incorporate the trailer storage recommendations associated with future (2047) tonnage projections.

4.0 TRANSFER STATION TRAFFIC OBSERVATIONS

4.1 Overview

On Saturday, August 19, 2017 representatives from Sanborn Head visited the New London Transfer Station and Recycling Center to observe residential drop-off activities. Our observations focused on vehicle queuing, pedestrian and vehicle conflicts, potential interferences to residential drop-off activities, and typical times required to complete the drop-off activities. Observations and data recorded during the site visit are summarized in this section, together with conclusions that served to guide the preparation of the conceptual site plan options presented in Section 5.

4.2 Methodology

4.2.1 Estimating Vehicle Access and Parking

In preparation for the site visit, Sanborn Head reviewed the March 4, 2016 brief video taken by the Northeast Resource Recovery Association (this video is referenced in NRRA's April 4, 2016 Site Review memorandum to the Town). The video review was performed to gain an initial understanding of how residents use the facility, specifically, the manner in which vehicles park and how residents deliver their materials to the various drop-off nodes (transfer station, recycling building, recyclable paper roll-off container, and used clothing donation bin). Based on our review of the video, Sanborn Head prepared a reference sketch depicting approximate parking and queuing locations available within the site and along the access road leading from Newport Road to the site entrance gate. The reference sketch was used by our on-site observers to log the locations occupied by vehicles while we were recording the residents' use of the site. The parking and queuing locations are shown on the Vehicle Access and Parking Plan provided in Figure 7.

As shown on Figure 7, the facility provides capacity for approximately 26 parking spaces, all of which are located inside the entrance gate. These are assumed to represent the maximum number of parking spaces that residents have available to them when dropping off material. The queuing capacity is assumed to be the number of spaces where residents are too far from the transfer station and recycling building to conveniently drop material off and instead they will idle in these spaces until they enter the site and can park. For the purposes of this evaluation, the queuing area is taken as the entrance lane into the site from Newport Road up to the entrance gate. As shown on Figure 7, the queuing area capacity is estimated at 10 vehicles (labeled as Q1 through Q10).

4.2.2 Sanborn Head On-Site Observers

Based on our review of the NRRA video and Sanborn Head's previous visits to the site (April 28, 2017 and July 11, 2017), we determined that two observers would be sufficient to record the residential traffic and drop-off operations at the facility. One observer was focused on the site entrance area and was located near the cottage building where the individual could track the total number of incoming vehicles, queuing outside the gate, as well as observe selected drop-off activities. The second observer was located near the transfer station and was focused on recording parking locations, drop-off activities, and total number of vehicles in the drop-off area at various times during the day. As traffic conditions allowed, each observer would move from their primary location to other locations in an effort to log drop-off activities from differing vantage points. The primary location of each observer is shown on Figure 1 and labeled as OBS-1 and OBS-2.

4.2.3 Video Recording

To provide real-time back-up to our on-site observations and data recording, Sanborn Head employed a video camera to record the day's activities in the drop-off area. Recording was performed for the entirety of the operating day, from 9:00 am to 3:30 pm, with the only interruptions occurring when the camera battery needed to be changed. The camera was mounted to the face of the transfer station building near the office entrance door, which was found to provide the most unobtrusive and complete view of the drop-off area. The camera location is shown on Figure 7. Photograph 1, provided in Appendix A, provides a video camera still-frame image of the drop-off area immediately before the site opened (8:58 am).

4.2.4 Data Recording

Information recorded by Sanborn Head while on-site included the following:

- Total number of vehicles visiting the facility during the day;
- Vehicle type (car, SUV, pick-up, etc.);
- Time entering site;
- Time exiting site;
- Whether vehicles are waiting in a queue and if so, what queue position they are in when they arrive at the site;
- Drop-off parking location (referenced to the numbering system for parking spaces inside the entrance gate, as shown on Figure 7);
- Time when parked in the drop-off area;
- Start and finish time for trash disposal;
- Start and finish time for recyclables drop-off at the recycling building;
- Start and finish time for newspaper (ONP), magazine (OMG), and office wastepaper (OWP) drop-off at the recyclable paper roll-off container; and
- Total number of vehicles parked in the drop-off area at various time intervals.

With the exception of the total number of vehicles visiting the facility, our on-site observers logged the above information onto a Vehicle and Drop-off Area Data Recording Form, a blank copy of which is provided as Figure 8. The estimated total number of vehicles visiting the facility was recorded by the observer located near the site entrance using a handheld tally counter.

Following the site visit, the data recorded on the Vehicle and Drop-off Area Data Recording Forms was compiled into an Excel spreadsheet. The compiled data is provided in Table B-1 of Appendix B.

4.3 Summary of Observations and Data Recording

4.3.1 Total Vehicles Visiting Facility

Sanborn Head counted a total of 505 vehicles visiting the site during the day. We recorded the accumulating total on an hourly basis, as shown in Table 4.1.

Table 4.1
Total Vehicles Visiting Transfer Station and Recycling Center

Period	Approximate Number of Vehicles per Period	Cumulative Number of Vehicles
9:00 am to 10:00 am	100	100
10:00 am to 11:00 am	100	200
11:00 am to Noon	100	300
Noon to 1:00 pm	60	360
1:00 pm to 2:00 pm	50	410
2:00 pm to 3:00 pm	70	480
3:00 pm to 3:30 pm	25	505

As shown in Table 4.1, the hourly rate of vehicles visiting the facility was steady and at its highest between 9:00 am and noon, during which time they were arriving at a rate of approximately 100 vehicles per hour. The next highest arrival rate occurred between 2:00 pm and 3:00 pm, when approximately 70 vehicles visited the site. Overall, the first three hours of operation saw approximately 300 vehicles visiting the site, compared to 205 visiting the site over the final three-and-a-half hours of operation.

Surges in vehicles visiting the site were indirectly recorded by documenting the number of parking spaces occupied within the drop-off area. The higher number of occupied spaces generally indicated periods when peak vehicle arrival rates were occurring. These observations are summarized in Section 4.3.3.

4.3.2 Queuing Observations

As defined in Section 4.2.1, the queuing area is taken as the entrance lane into the site from Newport Road up to the entrance gate. During the August 19 site observations, the only time this area was occupied was immediately prior to the site opening at 9:00 am. At that time, nine vehicles were observed in the queuing area, waiting for the entrance gate to open. These vehicles occupied the nine spaces as labeled on Figure 1 (positions Q1 through Q9).

Transfer station staff informed Sanborn Head that during peak demand days, the queue lane will extend onto Newport Road. This is assumed to occur when all available drop-off spaces are occupied and the facility is receiving an influx of vehicles at a rate greater than the rate at which vehicles are departing the drop-off area.

4.3.3 Parking Spaces Occupied in Drop-off Area

At various times during the day, Sanborn Head recorded the total number of vehicles parked in the drop-off area. When possible, this information was recorded within 15 minute intervals. The objective in capturing this information was to identify general trends related to peak parking demands, when these peak periods occurred, and how quickly they dissipated. This information is recorded in the far right columns of Table B-1 (Appendix B). A total of 58 entries were made regarding total parking observed in the drop-off area. The frequency at which the observations were made varied, largely dictated by the availability of the observer to record parking information while recording other drop-off activities. No fewer than six entries were recorded per hour documenting parking demands in the drop-off area, with as many as 13 readings recorded during the period from 2:00 pm to 3:00 pm. The typical number of parking readings taken per hour ranged from seven to nine.

The parking observations recorded in Table B-1 were plotted and are shown on the bar chart provided in Figure 9. As shown on the chart, the peak number of parking spaces occupied within the drop-off area was 12, where this was documented twice at 9:35 am and 10:24 am. Remaining peak parking demands ranged between 8 and 10 spaces occupied, which occurred predominantly in the morning until approximately 11:45 am. The parking demand then leveled-off between 12:00 pm and 2:15 pm with readings as low as one space occupied to as many as seven occupied, with a typical range of 4 to 5 spaces occupied during this period. A spike was recorded towards the end of the day with a steady demand of more than seven spaces occupied between 2:15 and 3:00 pm. The early morning parking demand and late afternoon parking spike follows the general pattern of the total vehicle traffic count recorded for the day, where the highest traffic volume occurred between 9:00 am and noon, followed by an end-of-day surge between 2:00 pm and 3:00 pm.

4.3.4 Drop-off Times

A total of 117 vehicles were tracked by Sanborn Head for the purposes of recording total time on-site and recording times required to complete drop-off activities at the transfer station, recycling building and other locations. Of the 117 vehicles, 99 were tracked by Sanborn Head to record the time spent by residents to complete drop-off activities at the various drop-off locations. Based on our observations, we found that the time spent dropping off material at any specific location was less telling than the cumulative time required for a resident to complete all drop-off activities. This is because the cumulative time equated, in nearly all cases, to the total time a vehicle occupied a single parking space in the drop-off area (based on observations, residents typically complete all drop-off activities from a single parking space).

Of the 99 vehicles tracked in the drop-off area, the maximum time required for a resident to complete drop-off activities was approximately 17 minutes, where drop-off was limited to trash at the transfer station and recyclables at the recycling building. The minimum time required to complete drop-off activities was just under one minute (50 seconds), where the resident was dropping off trash only. The average time to complete all drop-off activities was approximately four minutes. The maximum, minimum and average time recorded for both total on-site vehicle time and total time spent in the drop-off area is summarized in Table 4.2.

Table 4.2
Typical Times Spent by Residents at the Site

Criteria	Total Time On Site[1]	Total Time in Drop-off Area[2]
Maximum Time	0:18:00	0:17:14
Minimum Time	0:01:00	0:00:50
Average Time	0:04:29	0:04:17

1. Values provided for total on-site time are based upon times recorded for 63 vehicles visiting the facility.

2. Values provided for total time in the Drop-off Area are based upon times recorded for 99 vehicles visiting the facility.

The total on-site times and individual drop-off area times recorded by Sanborn Head are provided in Table B-1. The individual entries reveal the manner in which residents use the facility, which shows that virtually all drop-off activities are completed from a single parking location with multiple trips made by the residents walking back and forth to their vehicles to bring materials to the different drop-off locations. The effect this has on both vehicle and pedestrian traffic patterns, as well as other observations made by Sanborn Head while on site, is presented in Section 4.3.5.

4.3.5 General Observations

Several observations related to facility layout, pedestrian and vehicular interaction, and the manner in which residents perform drop-off activities were noted by Sanborn Head while on-site. These observations are summarized below.

1. The facility consists of four distinct drop-off nodes:
    - Transfer station;
    - Recycling building;
    - Recyclable paper (ONP/OMG/OWP) roll-off container; and
    - Used clothing donation bin.

    The transfer station, recycling building and recyclable paper container are all located within 60 feet of each other, with the used clothing bin located within 110 feet of the other three nodes. Because these nodes are located in such close proximity to each other, configured tightly around the inner and outer edges of the cul-de-sac style drop-off area, the four nodes essentially function as a single node for parking purposes. This is evidenced by the manner in which residents use the facility, where the proximity of each node allows residents to park in a single location and from that location walk with their waste and recyclables to as many nodes as they need to visit. Depending upon where residents park and the amount of material they have with them, a single visit can lead to considerable back-and-forth pedestrian traffic that often will cross and weave around vehicles as the vehicles are entering or leaving the drop-off area.

2. Examples of pedestrian and vehicular interaction are shown in Photographs 2 through 6 of Appendix A. The photographs are still images taken from the video recording performed by Sanborn Head.

3. Sanborn Head observed some instances, during high demand periods, where vehicle and pedestrian conflict was evident. These instances included pedestrians crossing the center drive-through lane, where vehicles were entering or leaving the drop-off area, as well as along the edge of the drive-through area, particularly along the face of the recycling building and transfer station. In these instances, pedestrians appeared more focused on their drop-off activities at the buildings, whereas the vehicles parked in these areas (particularly in parking locations 2, 3, 10 and 11 - see Figure 7), were focused on leaving their parking spaces. This led to some observed quick stops by both pedestrians and vehicles as each were in the same tight quarters with drivers looking to their left to watch for drive-through traffic, while pedestrians were walking around the cars as they were approaching or leaving the buildings.

4. There were some isolated instances where Sanborn Head observed children helping adults with their drop-off activities. In one instance during a high traffic demand period, two children were taking several loads of cardboard to the recycling building, crossing traffic from a parking location near the recyclable paper container (parking location 6). The children tended to run back to their vehicle after each drop-off, contributing to potential conflict points between vehicles and pedestrians.

5. Parallel parking is the predominant method used by residents when in the drop-off area (parking along the edge of the travelled way). On occasion, vehicles with trailer hitches visited the site and when parked in front of the recycling building or transfer station, would occupy two parking spaces, contributing to traffic congestion during high demand periods.

6. Sanborn Head observed some isolated cases where residents left their initial parking space to drive to the used clothing donation bin. The more remote location of the clothing bin demonstrates that when residents perceive a node as being further away than the distance they are prepared to walk, they will drive to the node for convenience sake. Given the limited parking availability near the transfer station and recycling building, having residents move their vehicles from that area to where the used clothing bin is located helps free-up parking in the higher-demand portion of the site.

7. It was common to observe instances where residents who needed to complete drop-off activities at multiple nodes would do so in a random, repetitive node-visiting manner. One example of this was a resident who parked in front of the transfer station and made eight trips to the different drop-off nodes in the following order: 1) recycling building; 2) recyclable paper container; 3) recycling building; 4) transfer station; 5) recycling building (dropping off swap shop items); 6) recyclable paper container; 7) recycling building; and 8) used clothing bin. The total time required to complete these drop-off activities was almost 15 minutes (see line item entries 33 through 38 of Table B-1). This again demonstrates how the facility serves as a single node from a parking perspective and then breaking down into a multi-node facility for a significant amount of pedestrian traffic.

8. The multiple pedestrian visits to different nodes speaks to an inefficiency in how material is disposed of at the existing facility, which is exacerbated by the fact that all locations are accessible from a single parking spot. The inefficiency related to pedestrians walking to the different nodes manifests itself in several ways, including: 1) extending the time residents spend on-site; 2) limiting the number of available parking spaces, particularly during peak demand periods; and 3) increasing the potential for vehicular and pedestrian conflicts.

9. In general, residents were observed spending most of their time at the recycling building. Much of this time is related to dropping-off their source separated recyclables in the building, consisting of aluminum cans, tin cans, cardboard, glass, and plastic containers. This time is often lengthened by the number of trips the residents make back and forth to their vehicles to retrieve the different recyclable materials. Many residents spend additional time in the building dropping off "swap shop" items. Many of these residents will stay in the building to look at and possibly retrieve swap shop items brought by others.

10. Some residents were observed sorting and preparing their materials for drop-off while parked at the site. These activities included organizing items for donation at the swap shop and crushing cardboard boxes. Improvements to the facility layout may not alter this practice, but it could disperse it to locations where it would have a lesser impact on overall parking accessibility.

4.4 Conclusions

As a result of the vehicular data recording and general user observations made during the August 19, 2017 site visit, Sanborn Head has drawn several conclusions that were used to guide the development of the conceptual site plan alternatives presented in Section 5. These conclusions are summarized below.

1. Facility improvements should focus on creating greater separation between the various drop-off nodes such that each node can provide sufficient parking capacity associated with the demands anticipated at that node.

2. The layout should promote organized and efficient traffic flow between nodes, and provide convenient residential access to each node from the node's parking area.

3. Layout modifications should focus on eliminating, to the greatest extent possible, an overlay of vehicular and pedestrian traffic. A fundamental consideration in this regard will be to create parking areas and access points to the drop-off nodes that eliminate pedestrians having to cross vehicular travel lanes.

4. As part of any modified or new facility layout, swap shop activities should be planned as a separate drop-off node. The layout and location of the node should be developed so that it provides sufficient parking for extended stay time and located in an area where it will not interfere with other drop-off operations. Limiting the hours of swap shop operations may also help control demands that can be placed on the node.

5. The maximum number of parking spaces occupied in the drop-off area was 12, as observed by Sanborn Head during the August 19, 2017 site visit. These spaces reflect the number required to support activities at all of the existing drop-off nodes. Therefore, by separating the nodes and creating individual parking areas for each (as recommended under Item 1), it follows that a lesser number of spaces at each node would be appropriate. Nevertheless, for planning purposes, 12 spaces per node (with the transfer station and recycling building serving as a single node) served as the current baseline for parking requirements at a new or modified facility. To account for future growth over a 30-year planning period, considerations for increasing parking space requirements by 60% (minimum of 20 spaces for the transfer station/recycling building node) should be factored into a new or modified facility layout, if possible. The 60% increase reflects the population growth predicted for New London between 2017 and 2047.

6. Queuing capacity for a new or modified layout should remain at a minimum of 10 vehicles, where the queuing area would extend along the access road between the main public roadway and the proposed parking area for the first drop-off node (the transfer station/recycling building node). If possible, the queuing area should be increased to 16 spaces (60% increase over the 10-space minimum) to account for future growth over the 30-year planning period.

5.0 SITE PLAN ALTERNATIVES

5.1 Summary of Concepts Evaluated

Sanborn Head prepared conceptual site plans for three possible development scenarios. Two of the scenarios were focused on site improvements that could be achieved at the existing transfer station site on Newport Road and the third scenario was focused on preparing a conceptual site plan that would consolidate all of the Town's solid waste and recycling activities at a new site that has not yet been identified.

Given the relatively small size of the existing transfer station site (approximately 5 acres), the intent of evaluating two separate development alternatives at the facility was aimed at estimating:

1. The optimal buildout that could theoretically be achieved if wetlands did not serve as a site constraint and if additional property could be obtained from the New Hampshire Department of Transportation (NHDOT) along Newport Road; compared to

2. The optimal buildout that could theoretically be achieved if development was restricted to within the existing property limits and wetland disruption (where wetlands are assumed to be present) is minimized.

The above two scenarios represent Option 1 and Option 2, respectively, for the concept alternatives associated with the existing transfer station site. Option 3 presents a conceptual layout plan for consolidating all recycling and solid waste functions at a new site in Town. Since there is no site location associated with Option 3, there are no specific constraints, such as wetlands, ledge outcroppings, or other site features that need to be accounted for as part of the layout. To this end, Option 3 represents a "consolidated operations concept model" that is useful in identifying the approximate size of a parcel that would need to be obtained to support the proposed development.

The main features associated with each option, as well as their respective limitations and other considerations, are summarized in Sections 5.2 through 5.4. The conceptual site plan for each option is provided in Appendix C and referenced as sheet C-1 through C-3, corresponding to Options 1 through 3.

5.2 Concept Option 1 – Optimize Development at Existing Transfer Station Site through Acquisition of NHDOT Land

The concept layout for Option 1 is shown on Sheet C-1 provided in Appendix C. The main features of this option include:

1. Acquiring approximately 0.55 acres of land from NHDOT located along a portion of Newport Road.
2. Constructing a new recycling building (115 feet by 100 feet – i.e. a nine bunker bay facility) to accept source-separated recyclables;
3. Preserving and continuing to use the existing transfer station;
4. Adding a vehicle weigh scale for weighing outgoing trailers (recyclables and solid waste);

5. Providing an area for yard waste and scrap metal drop-off (allowing these activities to be terminated at the existing site on Old Dump Road); and
6. Providing a dedicated area for a new swap shop.

Sheet C-1 provides additional information on features associated with this option, including specific drop-off functions that are not provided for in the layout due to space limitations. Several limitations and other considerations associated with Option 1 are also outlined on Sheet C-1.

It should be noted that since there is no current mapping of the transfer station site, the extent of wetlands on the property is unknown, although the Town has indicated that there are wetlands in the southern portion of the site. Option 1 was prepared on the assumption that, in the absence of knowing where wetlands are located, the full area could be proposed for development and any wetland replication requirements would need to be addressed at an off-site location, subject to state and local approval of this approach.

With respect to stormwater management, Option 1 does not include stormwater provisions at this early planning stage. Water quality swales, bioretention areas, and other stormwater features will likely be required if this option was to be implemented and those features resulting in the least land area requirements should be prioritized. Stormwater provisions may require some drop-off area relocation from what is shown on Option 1, resulting in the need to develop the northeast corner of the site to accommodate some drop-off operations.

5.3 Concept Option 2 – Optimize Development within Existing Transfer Station Property Limits

The concept layout for Option 2 is shown on Sheet C-2 provided in Appendix C. The main features of this option include:

1. Confining site improvements to within the limits of the existing transfer station property;
2. Constructing a new transfer station/recycling building;
3. The recycling portion of the building (90 feet by 100 feet – i.e. a seven bunker bay facility) will accept source-separated recyclables;
4. The transfer station portion of the building (55 feet by 50 feet) will accommodate an open-top transfer trailer that will be located in a trailer pit within the building where:
    a. residents can direct drop their trash into the trailer via pass-through windows in the building's exterior; and
    b. commercial vehicles can direct dump their waste into the trailer via the tipping floor portion of the building.
5. Adding a vehicle weigh scale for weighing outgoing trailers (recyclables and solid waste);
6. Providing a drop-off area for asphalt shingles, bulky waste (furniture, mattresses, etc.), lumber debris; and concrete debris; and
7. Providing a dedicated area for a new swap shop (with greater parking and a more remote location than Option 1).

Sheet C-2 provides additional information on features associated with this option, including specific drop-off functions that are not provided for in the layout due to space limitations. Several limitations and other considerations associated with Option 2 are also outlined on Sheet C-2.

Option 2 was prepared on the assumption that the proposed development in the southern portion of the site (the asphalt shingle, bulky waste, lumber debris and concrete debris drop-off area) can be performed without impacting wetlands that may be located in this general area. In the event wetlands are located within the limit of the proposed drop-off area, it is assumed this area would not be constructed.

As with Option 1, Option 2 does not include stormwater management provisions. Water quality swales, bioretention areas, and other stormwater features will likely be required if this option was to be implemented and those features resulting in the least land area requirements should be prioritized. For Option 2 it is assumed that stormwater management systems would be constructed in the southern-most portion of the site.

5.4 Concept Option 3 – Consolidate Operations at New Site

The concept layout for Option 3 is shown on Sheet C-3 provided in Appendix C. The main features of this option include:

1. Consolidating all of the Town's current solid waste and recycling operations – including yard waste and scrap metal operations currently performed at the Old Dump Road site – to a new, as yet identified, site in Town;
2. Constructing a new transfer station/recycling building;
3. The recycling portion of the building (115 feet by 100 feet – i.e. a nine bunker bay facility) will accept source-separated recyclables;
4. The transfer station portion of the building ("T"-shaped with an area of approximately 1,200 square feet) will function similar to the current transfer station using a compactor and compaction trailers to handle waste, where:
    a. residents can direct drop their trash into the trailer via pass-through windows in the building's exterior;
    b. commercial vehicles can direct dump their waste into a compactor hopper that will feed a closed-top compaction trailer; and
    c. an office space will be suspended above the compaction trailer, similar to the current transfer station office configuration.
5. Providing a 2.3-acre Yard Waste, Scrap Metal & Bulky Waste Drop-off Area with locations for:
    a. leaf, grass, brush, and pine needle drop-off;
    b. composting area for leaves and grass;
    c. finished compost area and sawdust drop-off/pickup area;
    d. scrap metal drop-off, including refrigerators and other white goods, bulky scrap metal, and light metal;
    e. concrete debris drop-off;

   f. bulky waste, lumber debris and asphalt shingle disposal; and
   g. DPW materials including ditching spoils, brush, and street sweepings.
6. Providing a Miscellaneous Materials Drop-off Area for items such as propane tanks, waste oil, electronic waste, fluorescent bulbs, used clothes, used books, and tires;
7. A vehicle weigh scale for weighing outgoing trailers (recyclables and solid waste) with layout flexibility that could accommodate weighing of commercial vehicles visiting the transfer station;
8. Providing a dedicated swap shop area separated from other drop-off operations on-site; and
9. Providing an area of approximately 1 acre for stormwater management, conceptually sized to account for the extent of imperious surface (paved and gravel areas) associated with this option.

Sheet C-3 provides additional information on features associated with this option. For planning purposes, a 50-foot setback was placed around the limit of proposed development (including stormwater area). The setback is intended to provide a buffer around the entirety of the facility and the 50-foot distance was selected to coincide with the property line setback referenced in NHDES regulations for Collection, Storage, and Transfer (C/S/T) facilities.

Based on the proposed limits of development and including the 50-foot setback, the area required for Option 3 is approximately 11 acres. If the setback area was to be reduced, the total area requirements for Option 3 could be reduced accordingly. However, for planning purposes, and given that an actual site is likely to present siting constraints (for example wetlands) that may impact final layout, 11 acres is recommended as a minimum area requirement for the new site development option.

5.5 Opinion of Construction Cost

Sanborn Head has prepared planning level opinions of construction cost for the three concept options. These opinions of cost are intended to be order-of-magnitude estimates to assist the Town in evaluating and comparing the relative costs associated with each option, recognizing that the costs have been prepared with minimal site information for the existing transfer station (no subsurface or topographic information for Options 1 and 2) and in the case of Option 3, prepared as a "concept model" where the layout is not configured to any specific site or site constraints.

In the absence of information that can be used to refine earthwork and other construction costs, and where building and layout at this stage is at the schematic level, it is appropriate to include a conservative estimating contingency to cover the degree of unknowns associated with each option. To this end, the opinions of construction cost for each option include a 30% estimating contingency on site and building costs. A 10% contingency is included on equipment items (truck scale, baler, and compactor). The costs for each option are summarized in Table 5.1.

Table 5.1
Conceptual-Level Construction Costs – Options 1, 2 and 3

Option	Opinion of Construction Cost
1. Optimize Development at Existing Transfer Station Site through Acquisition of NHDOT Land	$5,342,000 See Note 1
2. Optimize Development within Existing Transfer Station Property Limits	$6,173,000 See Note 1
3. Consolidate Operations at New Site	$7,178,000 (Does not include land acquisition cost) See Notes 1 and 2

1. Cost includes pit-style truck scale and 30 horsepower dual ram baler manufactured by International Baler, Model No. TR8-30.
2. Cost includes installation of new WASTEC-rated 6.85 cubic yard stationary compactor manufactured by Wastequip, Model No. 1000HD (same as compactor currently in use at exiting transfer station).
3. Opinions of cost were prepared using unit costs from RS Means construction cost data (2015) and NHDOT weighted average unit prices for projects between April 1, 2016 and March 31, 2017.

An itemized breakdown of the costs for each option is provided in Table D-1 of Appendix D.

6.0 REGIONAL OPPORTUNITIES

6.1 Overview

As New London considers opportunities for improving its solid waste and recycling infrastructure, it has occurred to the Town that issues they are faced with may also be present in their neighboring communities. Small site size combined with limited space to store materials could be creating operational issues for Towns near New London, and if so perhaps a regional solution may be worth pursuing. To this end, one of the objectives of the Solid Waste Management Facilities Study is to identify whether there may be interest among nearby Towns to deliver their waste and recyclables to a regional facility.

The scope of the regionalization inquiry is intended to be limited recognizing that the focus of the Solid Waste Management Facilities Study is aimed at evaluating New London's operations and how best to improve them locally as a Town-only resource. As such, the exploration of a regional alternative at this early planning stage is intended to provide New London with initial feedback on community interest and general administrative considerations associated with the concept.

As coordinated with the Town, the initial inquiry into the regionalization concept was based on the following approach:

1. The facility would be located in New London;
2. Interest in regionalization will be gauged by contacting representatives from Wilmot and Andover who are familiar with their existing solid waste and recycling operations; and
3. Administrative considerations associated with regionalization will be based on the organizational structure of the B.C.E.P. Solid Waste District, comprised of the towns of Barnstead, Chichester, Epsom, and Pittsfield, New Hampshire.

The remainder of this section addresses the results of Sanborn Head's inquiry into regionalization. With respect to soliciting feedback from Wilmot and Andover, it is helpful to know where their transfer stations are located relative to each other and relative to the New London Transfer Station. The locations of the three facilities are shown on Figure 10. The figure also depicts an enlarged aerial view of the Andover and Wilmot facilities, providing an indication of the extent of the operations performed at each site.

6.2 Regionalization Interest

6.2.1 Town of Wilmot

The Town of Wilmot transfer station and recycling center is a small facility located on Route 11 near the Wilmot/Andover town line. The site is open Wednesdays and Saturdays from 8:00 am to 4:00 pm and serves a community of 1,358 residents (2010 Census). The Wilmot Highway Department is responsible for the operation of the transfer station. Sanborn Head contacted the Wilmot road agent to discuss the operation of the existing facility and identify whether there may be interest in being part of a regional transfer station and recycling facility located in New London.

Based on information provided by the road agent, use of the site is limited to residents-only. The site supports drop-off of the following materials: household trash; commingled plastic and metal containers; commingled cardboard and other paper; construction and demolition debris (C&D); glass; scrap metal; and electronic waste. Residents dispose of their trash in an outdoor compactor that discharges to a 50 cubic yard compaction container. Residents drop-off commingled plastic and metal, commingled cardboard and paper, and C&D in at-grade roll-off containers, while glass is deposited in an at-grade bunker bay. Electronic waste is stored in a Conex container, and scrap metal is dropped off in a metal pile.

The road agent stated that their trash container is hauled weekly with an average weight of 8 tons per haul, equating to an annual trash tonnage of approximately 400 tons per year. He was unable to provide the quantity of household recyclables generated by the Town.

Although the drop-off area is fairly small (approximately half-an-acre) the road agent stated that there are no traffic or public safety issues at the site. The only operational improvement the Town is considering is the construction of a pole building or canopy over the open-top roll-off containers to protect them from snow. The agent's overall opinion was that the facility functions well, has no space constraints, and works well for the residents. Given this, he did not see how Wilmot would benefit from being part of a regional facility or what would motivate them to move in that direction. He also did not anticipate much support from the residents, particularly if it meant driving further to visit a regional facility.

6.2.1 Town of Andover

The Town of Andover transfer station and recycling center is a larger facility than Wilmot, although it provides similar drop-off services to the residents. The facility is located at 640 Main Street (Route 11), approximately 1.3 miles from the Wilmot transfer station. The site is open Wednesdays from 7:00 am to 6:00 pm and Saturdays from 7:00 am to 5:00 pm and serves a community of 2,371 residents (2010 Census). Based on information provided on the Town's web page, household recyclables (cardboard, plastic, tin, aluminum, paper, etc.) are commingled into a single container.

The facility is operated under the authority of the Board of Selectman and managed by the Transfer Station Supervisor. Sanborn Head attempted to speak to the Chairman of the Board of Selectmen regarding Town interest in regionalization, however we were unsuccessful in this effort. We also attempted to speak with the Transfer Station Superintendent, and although we were successful in reaching him by telephone, he was reluctant to share any operational information with us. For these reasons, we are unable to comment on Andover's specific operations or level of interest regarding regionalization.

6.3 Administrative Considerations

In the event the Town of New London and other nearby communities were to join together to create a regional facility for solid waste and recyclables management, the administration of the facility would likely be defined in a multilateral inter-municipal agreement between the member communities.

For the purposes of exploring typical administrative issues that New London should be aware of as part of its evaluation of a regional alternative, Sanborn Head has referred to the governance provisions outlined in the inter-municipal Solid Waste District Agreement created by the Towns of Barnstead, Chichester, Epsom, and Pittsfield, New Hampshire. These four communities created the B.C.E.P. Solid Waste District in 1992 and entered into the Solid Waste District

Agreement that year. The provisions of the agreement addressing District management, cost sharing, budgeting, and host community considerations are highlighted below and are intended to serve as a guide for how these issues would be addressed in a similar manner for a regional facility located in New London.

1. ***Provision for Sharing Construction Cost:*** Sanborn Head contacted B.C.E.P. in an effort to confirm how they allocated the cost of constructing the facility amongst the member communities. The District Administrator did not have the history to advise how this was accomplished. For planning purposes, this cost could be allocated similar to how operational costs are allocated: on a pro-rated basis by population of the member communities.

2. ***Operation Costs of Facility:*** Each member community bears the operating, capital, and other costs of the facility prorated upon the basis of their respective populations as indicated by the most recent census by the State of New Hampshire.

3. ***Solid Waste District Committee:*** The District Committee consists of three members appointed from each member community. One member is a current member of the Board of Selectmen and serves a one year term. The other two members from each community must be residents of the community and are appointed for a two-year term.

4. ***Authority of District Committee Members:*** Each member has equal authority and carries one vote, with the exception that only Board of Selectmen members and/or the Treasurer have the authority to sign checks for expenditures by the facility. A quorum shall be defined as at least one representative from each of any three member towns. A simple majority of the members present shall be sufficient for the transaction of business, after a quorum has been obtained. The committee has the authority to manage all aspects of the operation of the Solid Waste District.

5. ***Budget Committee and Adoption of Annual Budget:*** A separate budget committee serves as an advisory group to the District Committee. The budget committee consists of one person from each member community, where these individuals are appointed by the Board of Selectmen in their respective towns. The District Committee, in cooperation with the budget committee, prepares preliminary budget and apportionments for each member community for the upcoming year. A public hearing is then held to receive public comments on the preliminary budget. Following public comment, the District Committee determines its final budget and certifies the apportionment to each member community.

6. ***Administration:*** The District Committee may select an administrator for the facility to serve at the Committee's discretion. The District Administrator is authorized to manage the financial and operational aspects of the District.

7. ***Committee Meetings:*** The District Committee meets a minimum of once monthly.

8. ***Host Community Services Fee:*** The Town of Pittsfield, as the host community, bears responsibility to provide to the District fire, police and other services. In recognition of these services, the District pays Pittsfield an annual fee that increases each year by the

Consumer Price Index. The services fee paid by the District to Pittsfield in 2016 was $10,272.

To help provide additional context regarding operating costs and income for a regional facility, Sanborn Head has summarized the B.C.E.P. budget for 2016, where this information can be interpreted relative to the population of the four communities that form the B.C.E.P. Solid Waste District. The population of the four member communities is 15,788 (2010 Census) and the 2016 operating budget is summarized in Table 6.1.

Table 6.1
B.C.E.P 2016 Operating Budget

Income		
General (disposal fees, etc.)	$250,574	
Recycling	$120,841	
Tax Revenue from Member Communities	$580,195	
Total Income	**$951,610**	**$951,610**
Expenses		
Administrative	$148,063	
Capital (equipment)	$16,875	
Hauling	$267,560	
Maintenance	$54,905	
Operations	$477,527	
Total Expenses	**$964,930**	**$964,930**
Net Operating Expense		**$13,320**

1. Population of the B.C.E.P. member communities is 15,788 (2010 Census).

6.4 Facility Sizing Considerations

If Wilmot and Andover were to be part of a regional district with New London, Option 3 presented in Section 5 would reasonably represent the type of facility that could serve a regional need. To provide an initial interpretation on additional tonnage of trash and recyclables that would be brought to the facility, Sanborn Head used the 2016 per-capita generation rates calculated for New London (see Table 2.1) and applied these rates to the populations of Wilmot and Andover. Their combined estimated tonnage is approximately 80% of the current tonnage associated with New London. The current tonnage estimates for Wilmot and Andover are summarized in Table 6.2.

Table 6.2
2016 Tonnage Estimates for Wilmot and Andover Using New London Generation Rates

Town	Population[1]	Per Capita Generation Rates[2]		Tonnage Estimates	
		Trash	Household Recyclables[3]	Trash	Household Recyclables[3]
Wilmot	1,358	2.6	0.707	644	175
Andover	2,371	2.6	0.707	1,125	306
Totals	**3,729**			**1,769**	**481**
New London (for comparison)	4,512	2.6	0.707	2,138	582

1. Population for Wilmot and Andover is from the 2010 Census. Population for New London is of the B.C.E.P. member communities is 15,788 (2010 Census). New London population reflects 2016 estimate, which is based on 2015 New Hampshire Office of Energy and Planning estimate, increased by an average annual growth rate calculated between 2010 and 2015 and extended one year to estimate the 2016 population.
2. Per capita generations rates (lbs/person/day) are those calculated by Sanborn Head for New London (see Table 2.1) and applied to the populations of Wilmot and Andover.
3. Household recyclables are defined herein as glass, metal containers, plastic containers, and paper.

The tonnage contributions from Wilmot and Andover would not require the proposed recycling building presented in Option 3 to be enlarged because there is sufficient handling and storage capacity provided within the structure (the increased tonnage would only translate to an increased rate of baled material being hauled from the facility). However, what cannot be confirmed at this stage is the impact the added traffic from Wilmot and Andover would have on the facility. Additional traffic count information would need to be collected at both sites to interpret whether additional parking and queuing capacity may need to be factored into the design for a regional facility. This could have an impact on the preferred layout of the transfer station, where increased residential access to the building may be needed (similar to what is provided under the Option 2 concept, where residents can access the full length of a long-haul trash trailer).

7.0 NEXT STEPS

The results of the Study, specifically the facility layout options presented in Section 5, as well as the regionalization considerations presented in Section 6, provide New London with planning-level information that will help the Town chart a path towards implementing long-term improvements to its solid waste and recycling operations. Putting the regionalization concept aside, the fundamental consideration is whether the Town views the existing transfer station site on Newport Road as a preferred location to expand and improve its existing operations, or whether the potential challenges associated with consolidating all or most of the trash and recycling operations to this site makes the identification of a new site a more attractive alternative.

The intent of Option 1 is to show that, with the acquisition of a portion of abutting NHDOT land, the site can support significant facility improvements, including an area for yard waste and scrap metal drop-off. Option 1 assumes that wetlands would not limit the ability to develop the southern portion of the site, and that a sufficient area for stormwater management can be found.

The intent of Option 2 is to show that the existing transfer station site can support significant facility improvements, however, relocating yard waste and scrap metal activities to the site would not be viable, particularly if wetlands are confirmed to be present in the southern portion of the site.

Option 3 has the advantage of accommodating all of the Town's operations at a single site, with the limitation that a site of sufficient size (approximately 11 acres) would need to be identified and its location supported by the residents. Option 3 may also present the best alternative if the Town is interested in pursuing a regional approach to waste and recycling management.

Given the above considerations, Sanborn Head recommends the Town consider taking the next steps to further its evaluation of the options presented:

1. If the Town is interested in further evaluating the development potential at the existing transfer station site, we recommend that an existing conditions topographic survey, including wetland mapping, be performed for the entirety of the parcel. This information can then be used to identify actual site constraints that may impact the extent of improvements that can be achieved at the site.

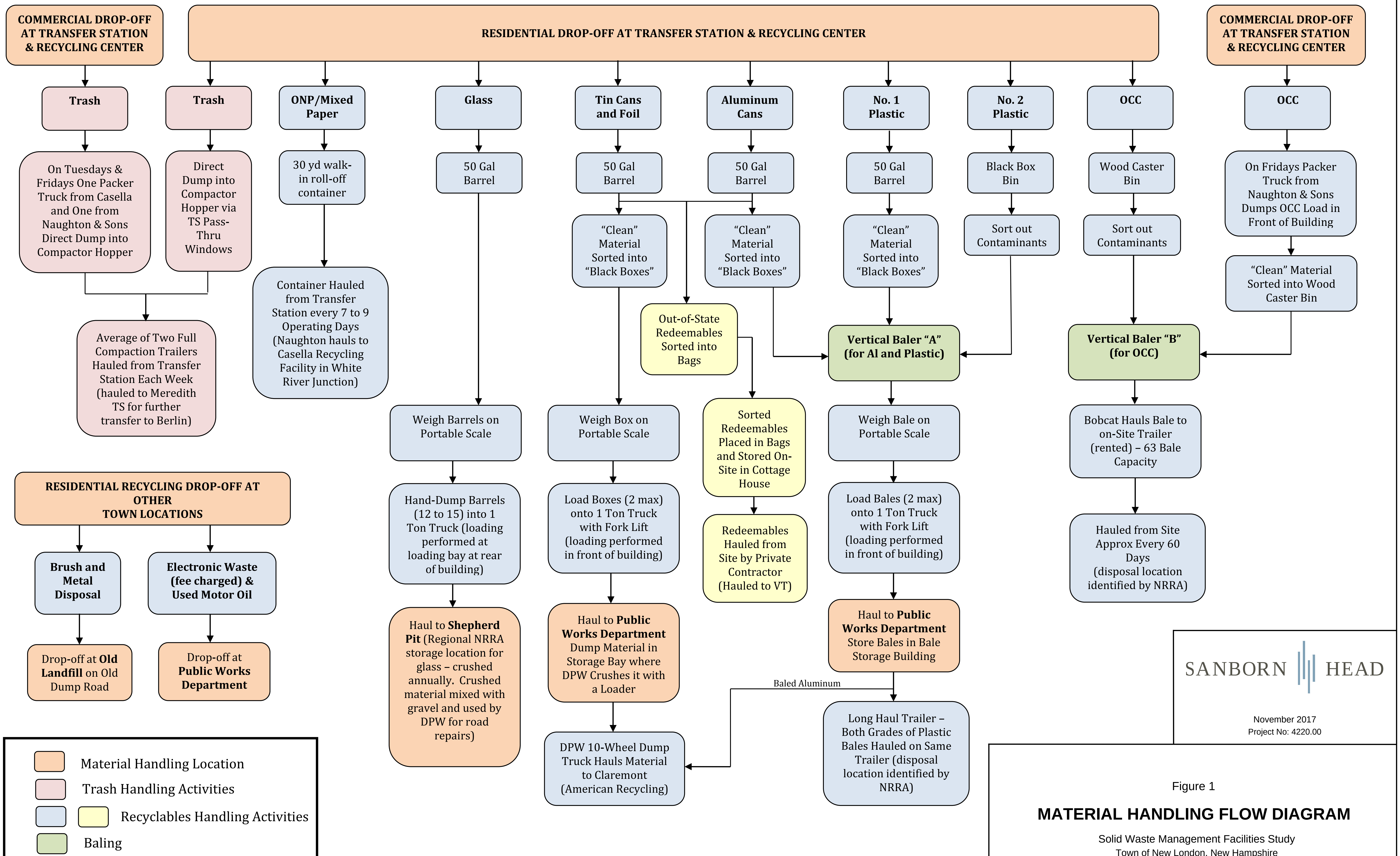
2. If the results of the topographic mapping confirms that wetlands are located in proposed development areas, we recommend the Town meet with representatives from the local conservation commission to discuss the mapping and concepts related to the proposed development. This initial coordination activity at the local level may warrant a follow-up coordination meeting with the New Hampshire Department of Environmental Services to identify strategies that could accomplish the development goals while complying with wetland protection requirements.

3. In connection with Item 1, we recommend discussions be held with representatives from the New Hampshire Department of Transportation to identify whether NHDOT would entertain a transfer of some of its land to the Town and, if so, to confirm the process and timing associated with such a transfer.

4. If the Town is interested in further evaluating a regional alternative, consider broadening the communities it may wish to include in this effort. New London has shown interest in the concept of regionalization because of the issues the Town is currently facing with respect to expanding and improving its existing operations. We recommend the Town identify whether any nearby communities are confronted with similar issues as those in New London. This could establish a common ground that would promote their interest in considering a regional approach. From Sanborn Head's initial inquiry of Wilmot and Andover, these two communities do not appear to be contending with any notable operational issues at their transfer station sites, therefore they do not appear to be viable candidates for regionalization.

P:\4200s\4220.00\Source Files\Report\20171103 Solid Waste Management Facilities Study.docx

FIGURES



SANBORN HEAD

November 2017
Project No: 4220.00

Figure 1

MATERIAL HANDLING FLOW DIAGRAM

Solid Waste Management Facilities Study
Town of New London, New Hampshire

Figure 2

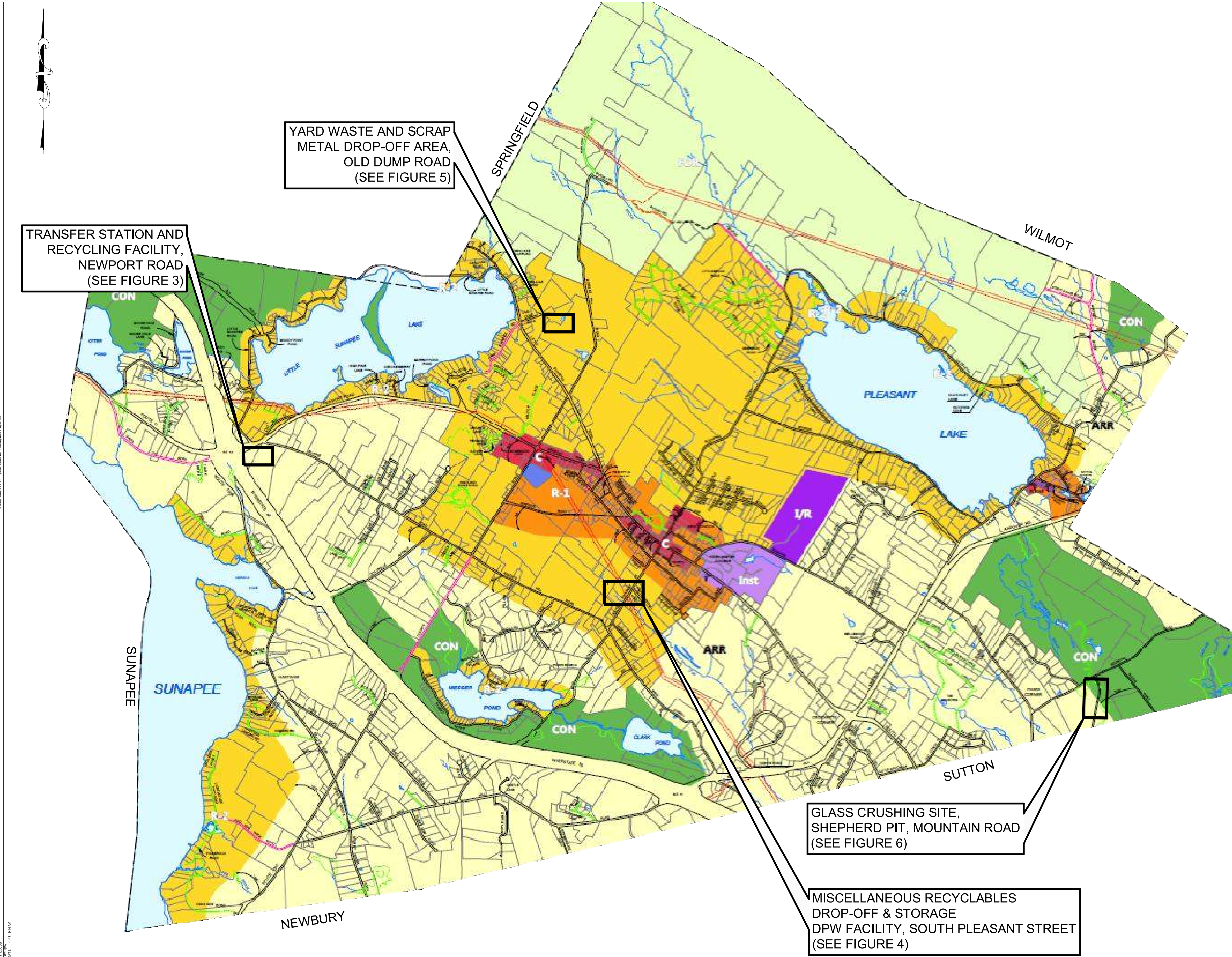
LOCUS PLAN OF TOWN SOLID WASTE & RECYCLING SITES

Solid Waste Management Facilities Study
Town of New London, New Hampshire

Drawn By: C. Murphy
Designed By: C. Murphy
Reviewed By: S. Wright
Project No: 4220.00
Date: November 2017

Notes

1. Town base map shown on Figure 1 is from the 2017 Town of New London Zoning Map, available online at www.nl-nh.com.



SANBORN | HEAD

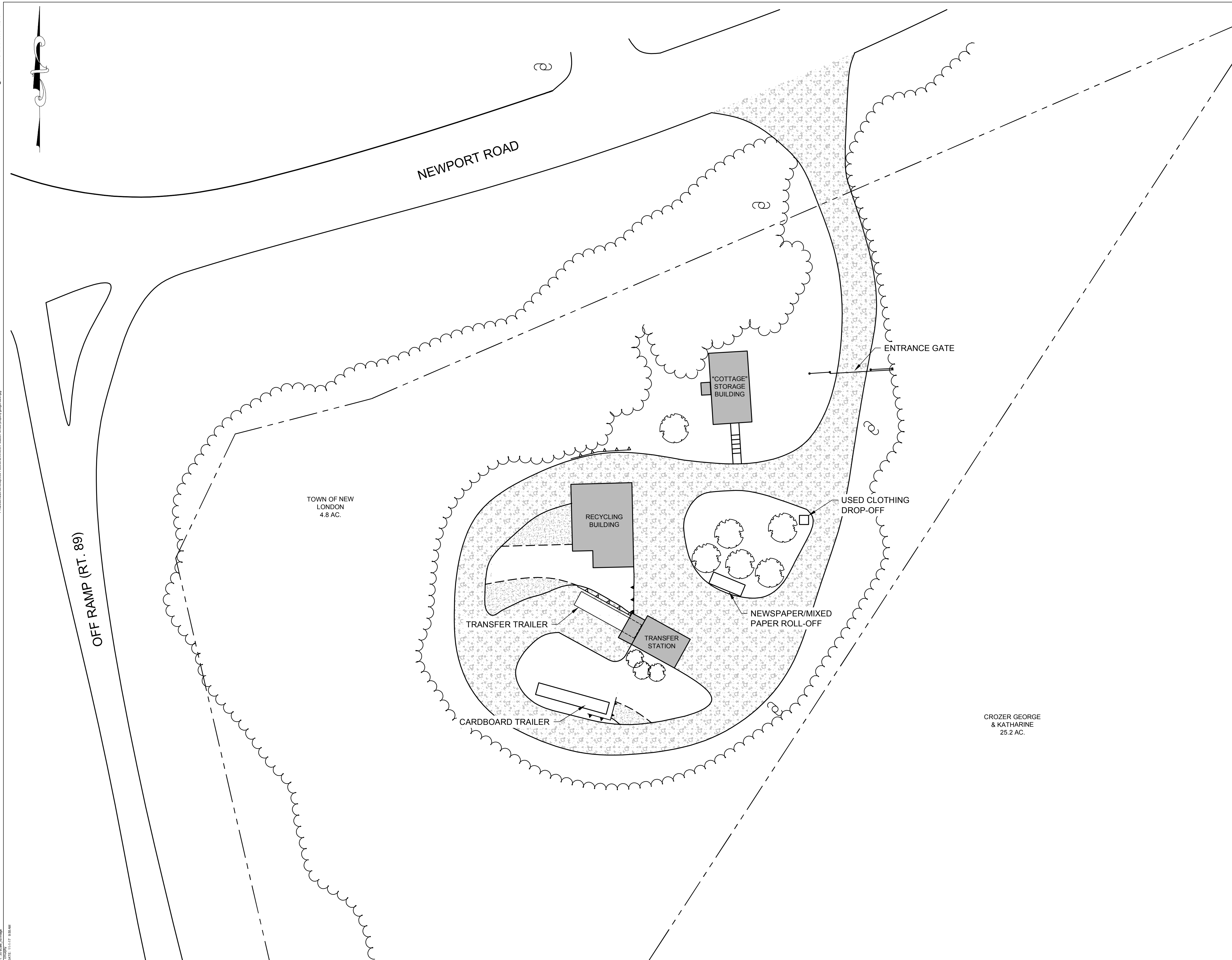


Figure 3

TRANSFER STATION & RECYCLING CENTER, NEWPORT ROAD

Solid Waste Management Facilities Study
Town of New London, New Hampshire

Drawn By: C. Murphy
Designed By: C. Murphy
Reviewed By: S. Wright
Project No: 4220.00
Date: November 2017

Notes

1. Roadway, building, and other site features are based on aerial imagery of site area (Google Earth, April 2011) with field measurement checks of selected features performed by Sanborn Head on July 11, 2017.

2. Property line information, lot acreage, and lot ownership obtained from Town of New London assessors office, online mapping tools, "Tri-Town, NH."

3. All information shown on this figure depicts approximate site conditions and has been compiled by Sanborn Head solely for reference and planning purposes in support of the Solid Waste Management Facilities Study.

Legend

- APPROXIMATE PROPERTY LINE
- BUILDING/STRUCTURE
- EDGE OF PAVED ROADWAY
- ON-SITE PAVEMENT AREA
- TREELINE
- TREE
- GRAVEL AREA
- CONCRETE RETAINING WALL
- STONE RETAINING WALL
- UTILITY POLE

GRAPHICAL SCALE
30' 15' 0' 30' 60'

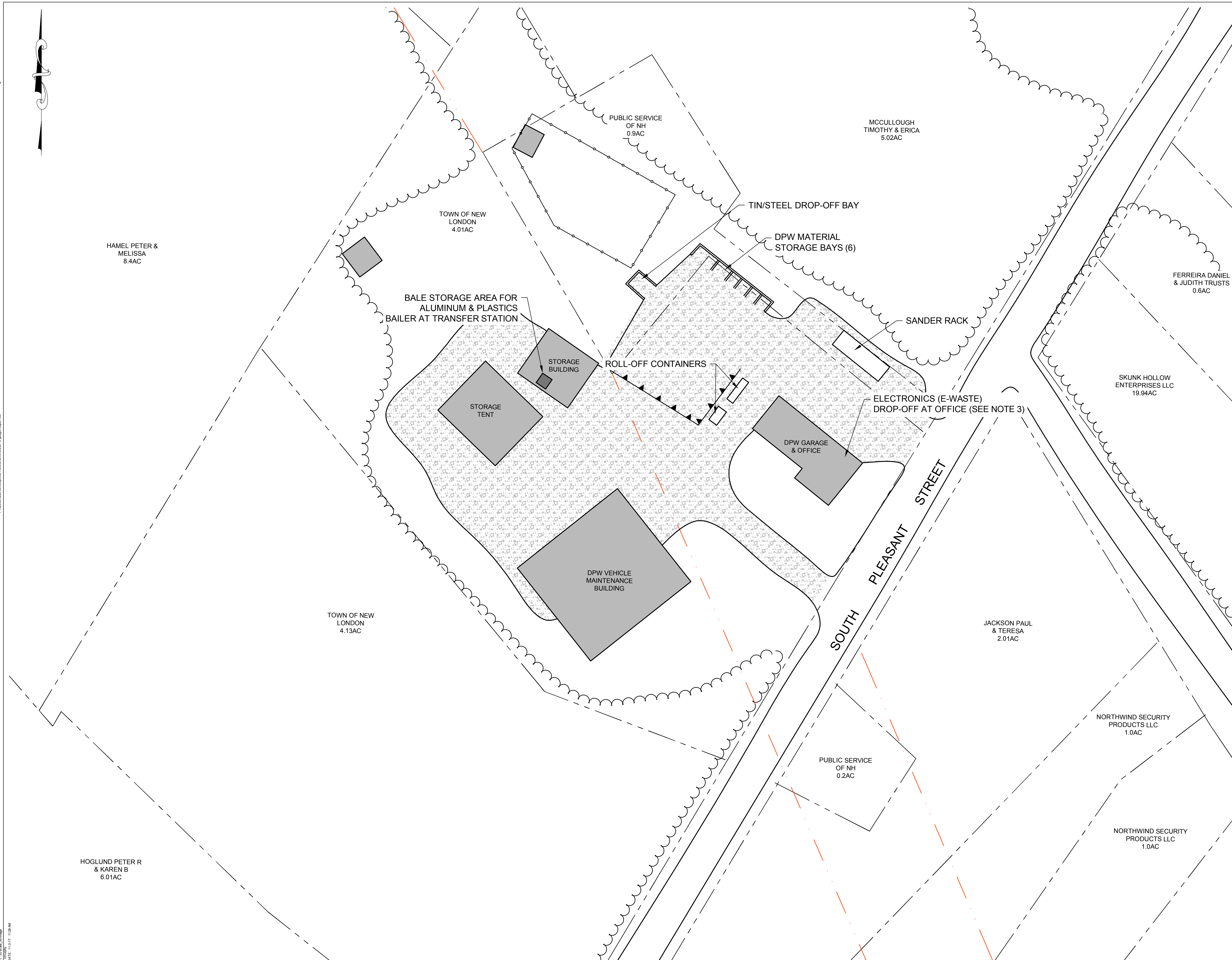
SANBORN HEAD

Figure 4

MISC. RECYCLABLES DROP-OFF & STORAGE DPW FACILITY, SOUTH PLEASANT STREET

Solid Waste Management Facilities Study
Town of New London, New Hampshire

Drawn By: C. Murphy
Designed By: C. Murphy
Reviewed By: S. Wright
Project No: 4220.00
Date: November 2017



Notes

1. Roadway, building, and other site features are based on aerial imagery of site area (Google Maps, 2017) .
2. Property line information, lot acreage, and lot ownership obtained from Town of New London assessors office, online mapping tools, "Tri-Town, NH."
3. Electronics waste drop-off requires residents to pay a fee. E-waste items accepted at DPW consist of computer monitors, televisions, microwaves, CPU's, & printers.

Legend

- APPROXIMATE PROPERTY LINE
- BUILDING/STRUCTURE
- EDGE OF PAVED ROADWAY
- FENCE
- ELECTRICAL UTILITY EASEMENT
- TREELINE
- CONCRETE RETAINING WALL
- ON-SITE PAVEMENT AREA

GRAPHICAL SCALE
40' 20' 0' 40' 80'

SANBORN HEAD

Figure 5

YARD WASTE AND SCRAP METAL DROP-OFF AREA, OLD DUMP ROAD

Solid Waste Management Facilities Study

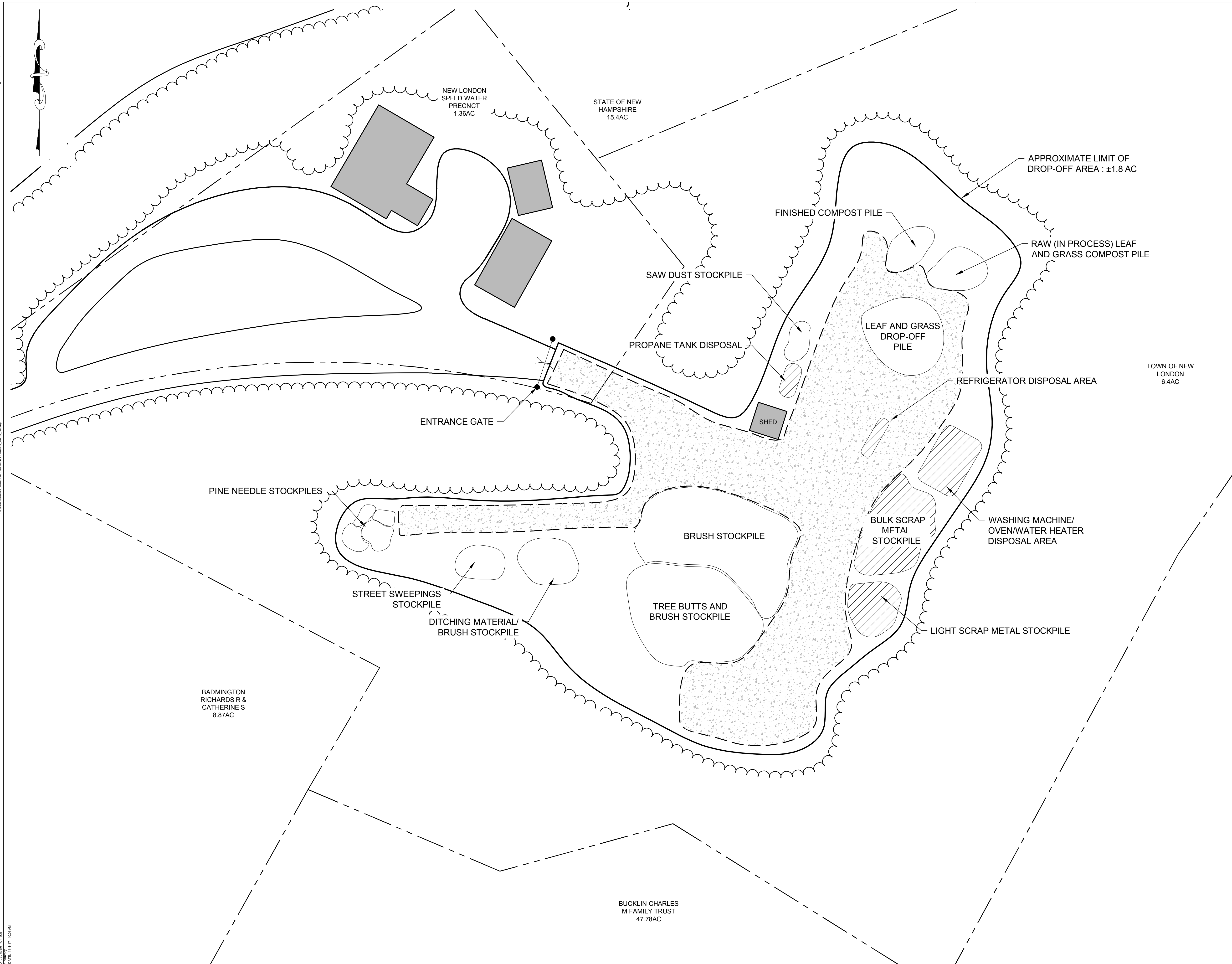
Town of New London, New Hampshire

Drawn By: C. Murphy
Designed By: C. Murphy
Reviewed By: S. Wright
Project No: 4220.00
Date: November 2017

Notes

1. Roadway, building, and other site features are based on aerial imagery of site area (Google Earth, April 2011) with field measurement checks of selected features performed by Sanborn Head on July 11, 2017.

2. All information shown on this figure depicts approximate site conditions and has been compiled by Sanborn Head solely for reference and planning purposes in support of the Solid Waste Management Facilities Study.



Legend

- APPROXIMATE PROPERTY LINE
- BUILDING/STRUCTURE
- EDGE OF PAVED ROADWAY
- GRAVEL AREA
- TREELINE
- METAL DROP-OFF AREAS

GRAPHICAL SCALE

30' 15' 0' 30' 60'

SANBORN HEAD

Figure 6

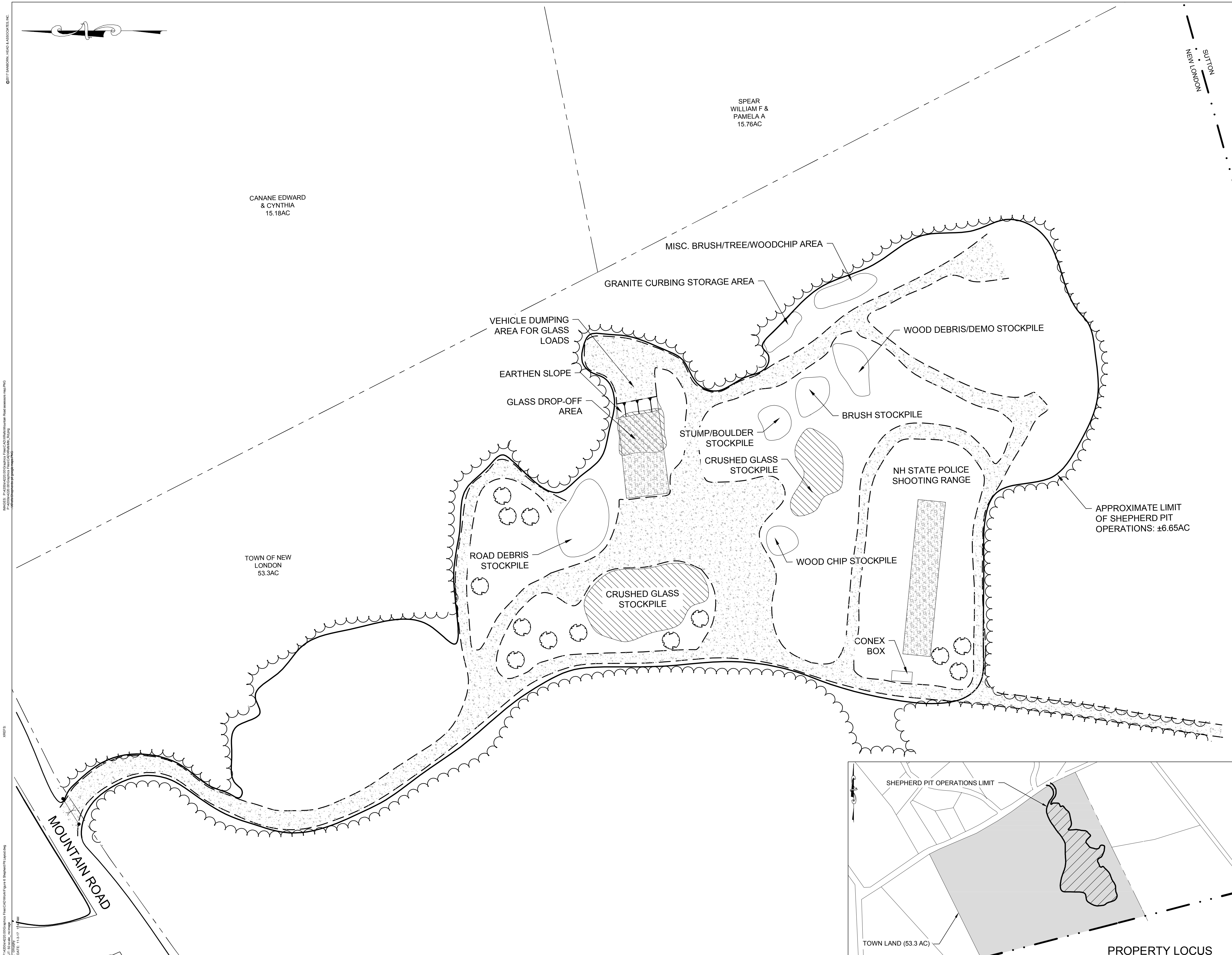
GLASS CRUSHING SITE, SHEPHERD PIT, MOUNTAIN ROAD

Solid Waste Management Facilities Study
Town of New London, New Hampshire

Drawn By: C. Murphy
Designed By: C. Murphy
Reviewed By: S. Wright
Project No: 4220.00
Date: November 2017

Notes

1. Roadway, building, and other site features are based on aerial imagery of site area (Google Earth, April 2011) with field measurement checks of selected features performed by Sanborn Head on July 11, 2017.
2. All information shown on this figure depicts approximate site conditions and has been compiled by Sanborn Head solely for reference and planning purposes in support of the Solid Waste Management Facilities Study.



Legend

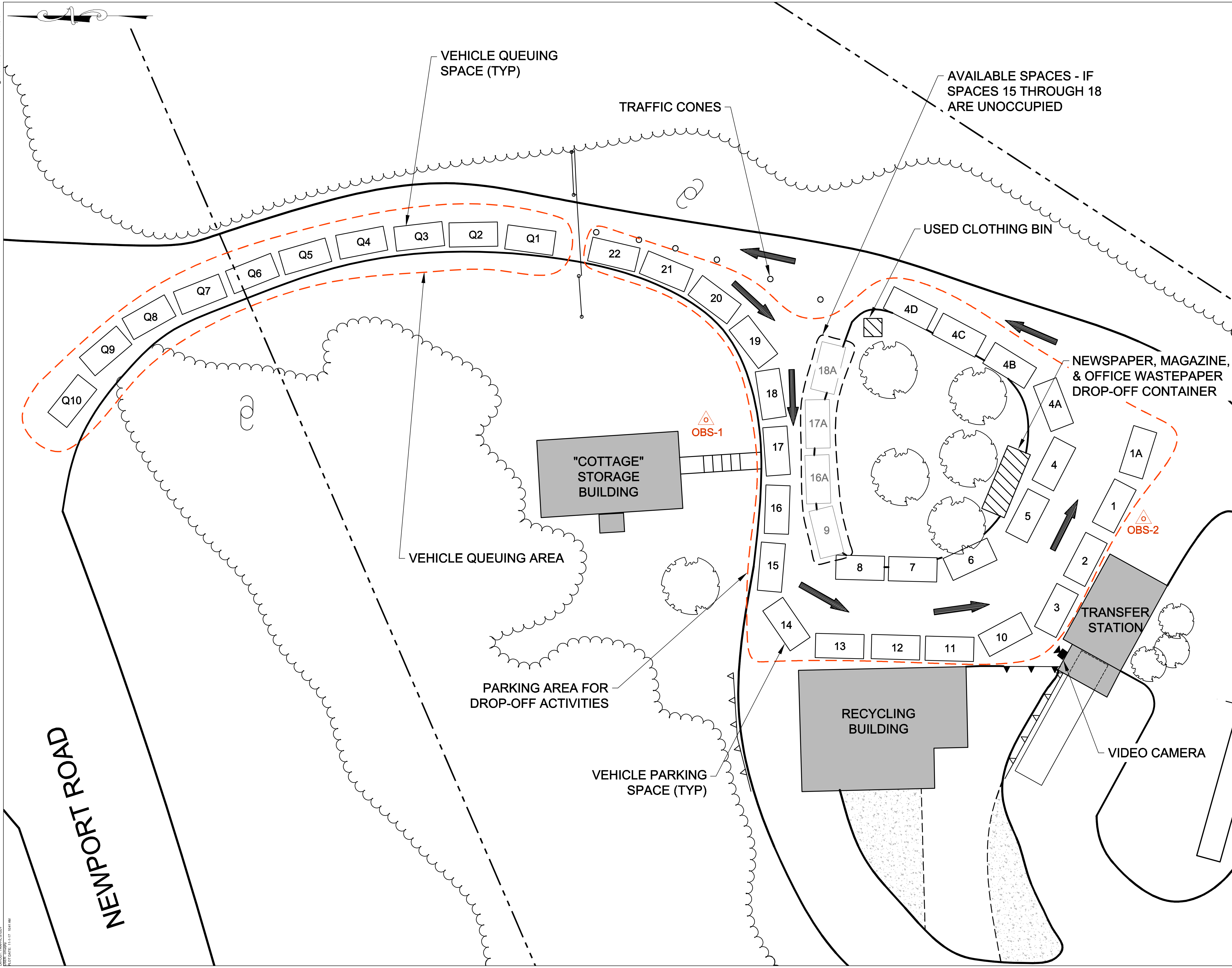
SANBORN HEAD

Figure 7

VEHICLE ACCESS & PARKING PLAN, EXISTING TRANSFER STATION & RECYCLING CENTER

Solid Waste Management Facilities Study
Town of New London, New Hampshire

Drawn By: C. Murphy
Designed By: C. Murphy
Reviewed By: S. Wright
Project No: 4220.00
Date: November 2017



Notes

1. Roadway, building, and other site features are based on aerial imagery of site area (Google Earth, April 2011) with field measurement checks of selected features performed by Sanborn Head on July 11, 2017.
2. Property line information, lot acreage, and lot ownership obtained from Town of New London assessors office, online mapping tools, "Tri-Town, NH."
3. All information shown on this figure depicts approximate site conditions and has been compiled by Sanborn Head solely for reference and planning purposes in support of the Solid Waste Management Facilities Study.

Legend

- APPROXIMATE PROPERTY LINE
- BUILDING/STRUCTURE
- EDGE OF PAVED ROADWAY
- TREELINE
- TREE
- GRAVEL AREA
- CONCRETE RETAINING WALL
- STONE RETAINING WALL
- UTILITY POLE
- TRAFFIC CONE
- OBS-1 PRIMARY TRAFFIC OBSERVATION LOCATIONS (SANBORN HEAD OBSERVER LOCATION)
- DRIVE-THROUGH LANE
- VIDEO CAMERA
- Q1/13 VEHICLE PARKING OR QUEUING SPACE

GRAPHICAL SCALE
15' 8' 0' 15' 30'

SANBORN HEAD

NEW LONDON TRANSFER STATION AND RECYCLING FACILITY
Vehicle and Drop-off Area Data Recording Form
Saturday, August 19, 2017

	Vehicle Information		Selected Site Entrance & Exit Observations			Selected Tash & Recycling Drop-Off Area Observations									
	Vehicle Designation (1) (C / HT / RO / PU / V / PK)	Color	Time when Entering Site	Waiting in Queue? (Y/N) if Yes note vehicle location and approx cars in queue	Time when Exiting Site	Parking Location & Time when Parked		Trash Disposal Time		Recycling Bldg Drop-off Time		ONP, OMG, OWP (2) Roll-Off Container Drop-off Time		Total Number of Vehicles Parked in Drop-Off Area (record number observed at frequent (15 min) intervals)	
						Location	Time when Parked	Start Time	Finish Time	Start Time	Finish Time	Start Time	Finish Time	Number of Vehicles	Time of Observ.
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

P:\4200s\4220.00\Source Files\Traffic\Traffic Observation Tables.xlsx

1. Vehicle designation C = car/sedan; HT = heavy truck (panel truck or stake truck); RO = roll-off truck; PU = pickup truck, V= Van; PK = packer truck;
2. Paper grades abbreviated as follows:
   ONP = Old Newspapers
   OMG = Old Magazines
   OWP = Office Wastepaper

SANBORN | HEAD

November 2017
Project No: 4220.00

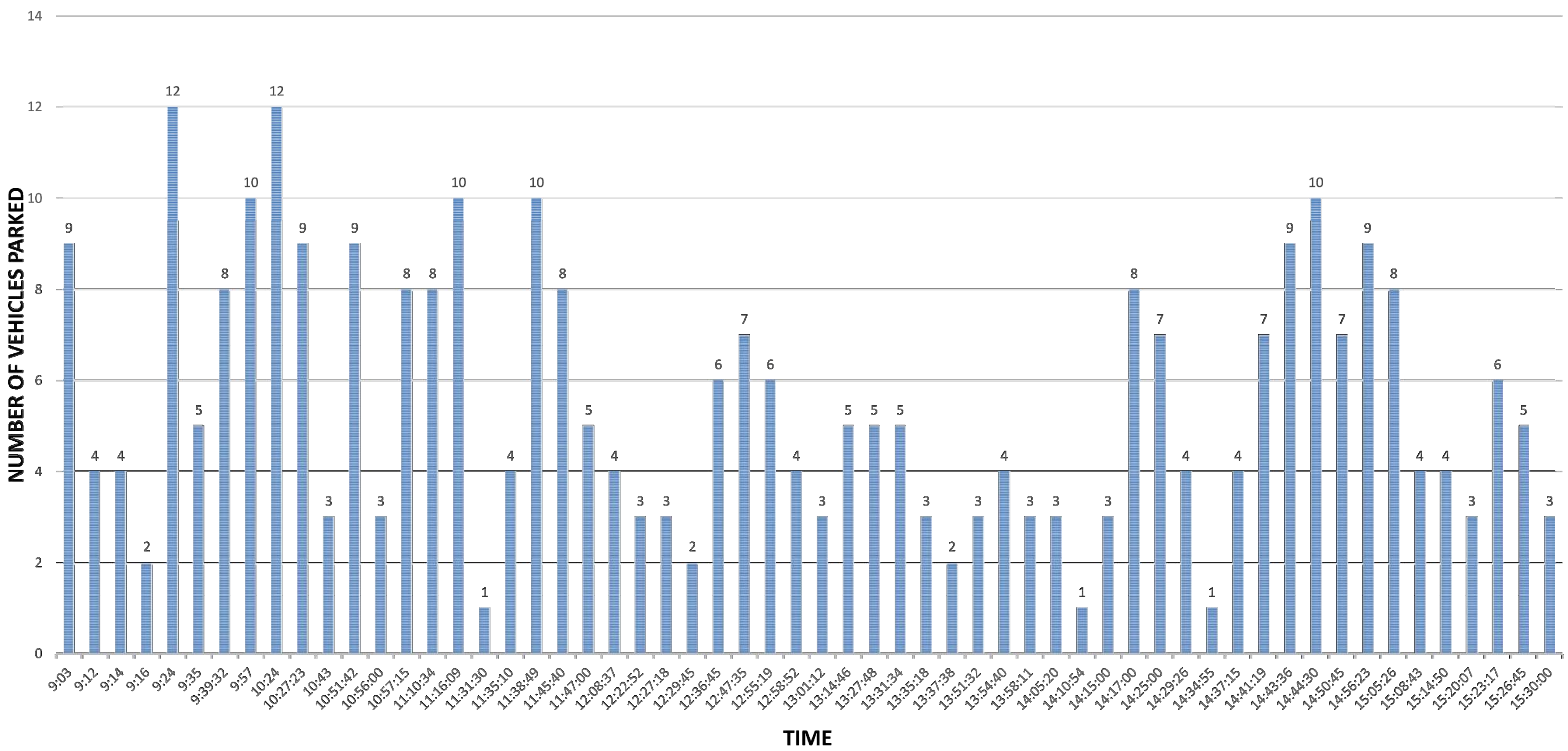
Figure 8

VEHICLE AND DROP-OFF AREA DATA RECORDING FORM

Solid Waste Management Facilities Study
Town of New London, New Hampshire

FILE: P:\4200s\4220.00\Graphics Files\CAD\Work\Transfer Station Drawings\Traffic Study Figure 2-3.dwg
LAYOUT: Figure 2
USER: cmurphy
PLOT DATE: 11-1-17 10:43 AM

NUMBER OF VEHICLES PARKED IN DROP-OFF AREA
NEW LONDON TRANSFER STATION & RECYCLING CENTER
AUGUST 19, 2017



SANBORN HEAD

November 2017
Project No: 4220.00

Figure 9

PARKING DEMAND CHART
TRANSFER STATION & RECYCLING CENTER
DROP-OFF AREA

Solid Waste Management Facilities Study
Town of New London, New Hampshire

Figure 10

LOCUS PLAN OF WILMOT AND ANDOVER TRANSFER STATIONS

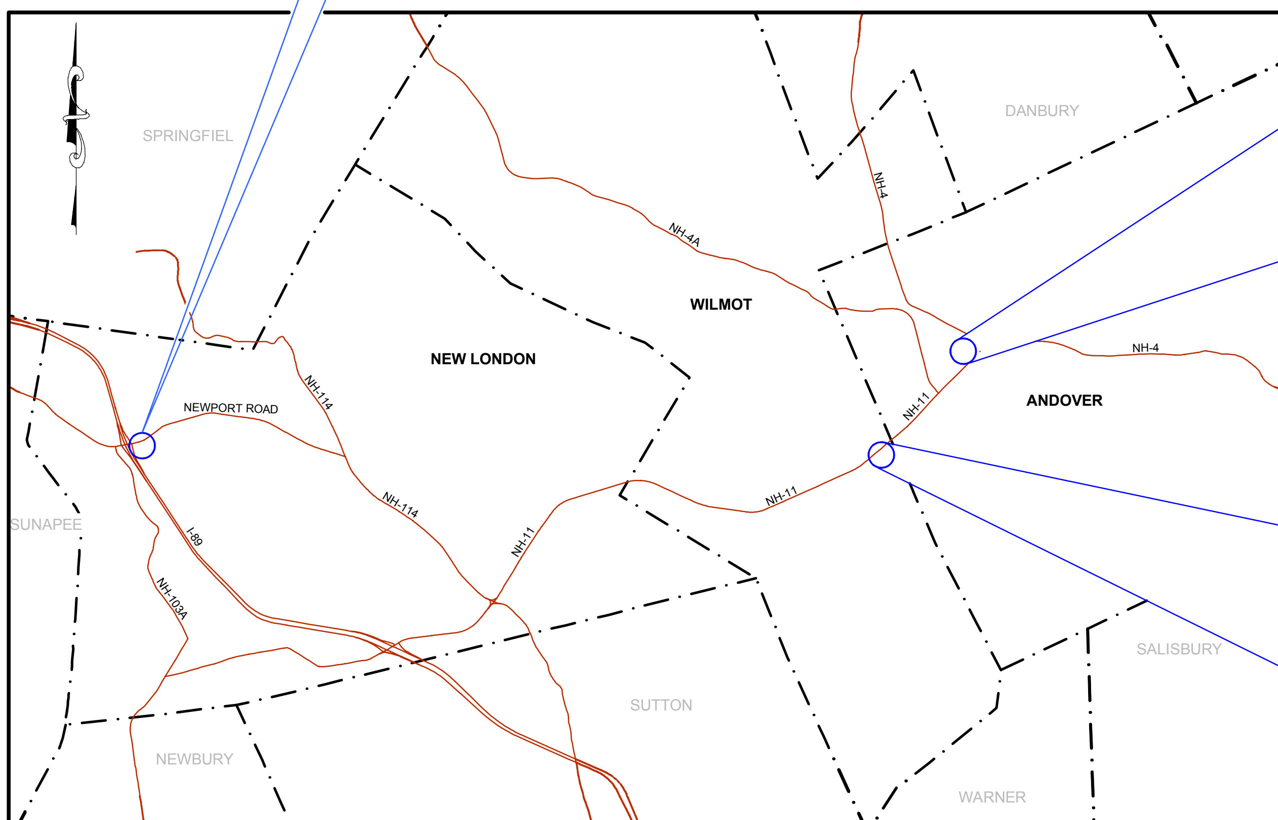
Solid Waste Management Facilities Study
Town of New London, New Hampshire

Drawn By: C. Murphy
Designed By: C. Murphy
Reviewed By: S. Wright
Project No: 4220.00
Date: November 2017

Notes

1. The aerial images of both the Andover and Wilmot Transfer Stations were taken as screenshots from Google Earth.
2. The Town property lines, highway, and road layouts were taken from the Road Inventory section at NH Dept. of Transportation, Bureau of Planning.

NEW LONDON TRANSFER STATION



TOWN LOCUS PLAN

GRAPHICAL SCALE

1 mi 0.5 mi 0 1 mi 2 mi

ANDOVER TRANSFER STATION

WILMOT TRANSFER STATION

SANBORN | HEAD

APPENDIX A

TRAFFIC OBSERVATION PHOTOGRAPHS

PHOTOGRAPH 1
New London, NH Transfer Station & Recycling Center
Solid Waste Management Facilities Study

SANBORN HEAD

PHOTOGRAPH 2
New London, NH Transfer Station & Recycling Center
Solid Waste Management Facilities Study

SANBORN HEAD

PHOTOGRAPH 3
New London, NH Transfer Station & Recycling Center
Solid Waste Management Facilities Study

SANBORN | HEAD

PHOTOGRAPH 4
New London, NH Transfer Station & Recycling Center
Solid Waste Management Facilities Study

SANBORN | HEAD

PHOTOGRAPH 5
New London, NH Transfer Station & Recycling Center
Solid Waste Management Facilities Study

SANBORN HEAD

PHOTOGRAPH 6
New London, NH Transfer Station & Recycling Center
Solid Waste Management Facilities Study

SANBORN HEAD

APPENDIX B

VEHICLE AND DROP-OFF AREA SITE OBSERVATION DATA

TABLE B-1
Vehicle and Drop-off Area Site Observation Data
Recorded Saturday August 19, 2017

	Vehicle Information		Selected Site Entrance & Exit Observations				Selected Tash & Recycling Drop-Off Area Observations										
	Vehicle Designation (1) (C / HT / RO / PU / V / PK)	Color	Time when Entering Site	Waiting in Queue? (Y/N) if Yes note vehicle location and approx cars in queue	Time when Exiting Site	Total Time On Site	Parking Location & Time when Parked		Trash Disposal Time		Recycling Bldg Drop-off Time		ONP, OMG, OWP (2) Roll-Off Container Drop-off Time		Total Time in Drop-off Area	Total Number of Vehicles Parked in Drop-Off Area (record number observed at frequent intervals)	
							Location	Time when Parked	Start Time	Finish Time	Start Time	Finish Time	Start Time	Finish Time		Number of Vehicles	Time of Observ.
1	Audi SUV	Black	9:00	Q1	9:07:00	0:07:00	2	9:00	9:00	9:02	9:02	9:06	DNV	DNV	0:06	9	9:03
2																	
3	Truck	Red	9:00	Q2	9:03:00	0:03:00											
4	Car	Blue	9:00	Q3	9:06:00	0:06:00											
5	Car	Silver	9:00	Q4	9:02:00	0:02:00											
6	Car	Silver	9:00	Q5	9:06:00	0:06:00											
7	Car	Red	9:00	Q6	9:03:00	0:03:00	7	9:00	9:01	9:02	9:02	9:03			0:03		
8	Car	Black	9:00	Q7	9:01:00	0:01:00											
9	Car	Silver	9:00	Q8	9:05:00	0:05:00	8	9:00	9:01	9:02	9:02	9:05			0:05		
10	Car	White	9:00	Q9	9:05:00	0:05:00											
11	Truck	Silver	9:01		9:06:00	0:05:00											
12	Car	White	9:01		9:03:00	0:02:00											
13	Truck	Red	9:03														
14	Car	Blue	9:04		9:09:00	0:05:00	3	9:04	9:04	9:05	9:05	9:07	9:07	9:07	0:03		
15																	
16	Subaru	Blue					1	9:07			9:07	9:08					
17									9:09	9:09:47							
18													9:09:47	9:10:40			
19											9:10:40	9:11			0:04		
20																	
21	Truck	Green	9:08		9:11:00	0:03:00	6	9:08									
22	Car	Blue	9:09		9:14:00	0:05:00	3	9:09	9:10:00	9:10	9:11	9:14	9:10	9:10	0:05		
23																	
24	Pickup	Black					1	9:12	9:12:30	9:13	DNV	DNV	DNV	DNV	0:01	4	9:12

Weather - overcast in the early morning and then clearing around 10:00 am. Mostly sunny from 10:00 am until about 12:30, then clouds for the remainder of the afternoon.

SANBORN HEAD

TABLE B-1
Vehicle and Drop-off Area Site Observation Data
Recorded Saturday August 19, 2017

	Vehicle Information		Selected Site Entrance & Exit Observations				Selected Tash & Recycling Drop-Off Area Observations										
	Vehicle Designation (1) (C / HT / RO / PU / V / PK)	Color	Time when Entering Site	Waiting in Queue? (Y/N) if Yes note vehicle location and approx cars in queue	Time when Exiting Site	Total Time On Site	Parking Location & Time when Parked		Trash Disposal Time		Recycling Bldg Drop-off Time		ONP, OMG, OWP (2) Roll-Off Container Drop-off Time		Total Time in Drop-off Area	Total Number of Vehicles Parked in Drop-Off Area (record number observed at frequent intervals)	
							Location	Time when Parked	Start Time	Finish Time	Start Time	Finish Time	Start Time	Finish Time		Number of Vehicles	Time of Observ.
25																	
26	Lexus SUV	Silver					2	9:15:20	9:15:20	9:16:12			DNV	DNV		4	9:14
27											9:16:12	9:17:45			0:02:25		
28																	
29	Truck	White	9:15		9:16:00	0:01:00	3	9:15	9:15	9:16					0:01		
30	Car	White	9:15		9:20:00	0:05:00											
31	Car	Silver	9:15				7	9:16	9:23		9:17	9:22	9:17	9:17	0:07		
32																	
33	Honda Minivan	Grey					2	9:18:40			9:19	9:19:50	9:19:50	9:21		2	9:16
34											9:21:20	9:21:55					
35									9:21:55	9:22:49	9:22:49	9:26:14	9:26:14	9:26:33		12	9:24
36											9:26:33	9:31:55					
37												To Clothes Bin; Done at:					
38												9:33:16			0:14:36		
39																	
40	Car	White	9:20		9:25:00	0:05:00	6		9:23	9:25	9:21		9:21	9:21	0:05		
41	Truck	Red	9:25		9:30:00	0:05:00	3	9:25	9:26				9:27	9:28	0:03		
42	Car	Blue	9:28														
43	Van	White	9:28														
44	Audi Car	Silver	9:31		9:35:00	0:04:00	6	9:31	9:33	9:33	9:31	9:34			0:03		
45	Van	White	9:35		9:40:00	0:05:00	8	9:36	9:37	9:37	9:38	9:40			0:04		
46																	
47	VW SUV	Silver					2	9:36:07	9:36:07	9:36:40	9:41	9:42:30	9:40:16	9:41		5	9:35
48												Left area at:					

TABLE B-1
Vehicle and Drop-off Area Site Observation Data
Recorded Saturday August 19, 2017

	Vehicle Information		Selected Site Entrance & Exit Observations				Selected Tash & Recycling Drop-Off Area Observations										
	Vehicle Designation (1) (C / HT / RO / PU / V / PK)	Color	Time when Entering Site	Waiting in Queue? (Y/N) if Yes note vehicle location and approx cars in queue	Time when Exiting Site	Total Time On Site	Parking Location & Time when Parked		Trash Disposal Time		Recycling Bldg Drop-off Time		ONP, OMG, OWP (2) Roll-Off Container Drop-off Time		Total Time in Drop-off Area	Total Number of Vehicles Parked in Drop-Off Area (record number observed at frequent intervals)	
							Location	Time when Parked	Start Time	Finish Time	Start Time	Finish Time	Start Time	Finish Time		Number of Vehicles	Time of Observ.
49												9:43:00			0:06:53	8	9:39:32
50	Car	Blue	9:42		9:48	0:06:00											
51	Truck	Silver	9:42		9:49	0:07:00	14	9:42	9:45	9:48	9:42	9:48:00			0:06:00		
52																	
53	Subaru w/trlr hitch	Metalic Blue					7	9:44	9:44:36	9:47:23	9:47:51	9:49:30					
54									9:49:50	9:50:30	9:50:30	9:55:25	DNV	DNV	0:11:25		
55																	
56	Truck	Red	9:45		9:50	0:05:00	6	9:45	9:46	9:48	9:48	9:50			0:05:00		
57	Car	White	9:52		9:53	0:01:00	2	9:53	9:53	9:53							
58	Scion Car	Silver	9:55		10:05	0:10:00	3	9:56	9:56		9:57	10:04	9:57		0:08:00		
59																	
60	Subaru Outback	Silver					8	9:59	DNV	DNV	9:59:31	10:01:50	DNV	DNV	0:02:50	10	9:57
61																	
62	Truck	Black	10:00		10:05	0:05:00	11	10:00									
63	Truck	Black	10:00				6	10:00									
64	Truck	Blue	10:00				4	10:01									
65																	
66	F150 Pickup						5	10:00	10:04	10:17:14	10:03	10:17:14	DNV	DNV	0:17:14		
67										Father takes trash to TS		kids take OCC to recycle bldg					
68																	
69	Honda Car	Silver	10:02		10:06	0:04:00	7		10:05	10:06	10:03	10:05			0:04:00		
70	Honda Car	Blue	10:17		10:25	0:08:00	6	10:18	10:18	10:18	10:19	10:25	10:18	10:18	0:07:00		
71	Audi	Silver	10:20		10:24	0:04:00	5	10:20	10:20	10:20	10:21	10:24			0:04:00		
72																	

TABLE B-1
Vehicle and Drop-off Area Site Observation Data
Recorded Saturday August 19, 2017

	Vehicle Information		Selected Site Entrance & Exit Observations				Selected Tash & Recycling Drop-Off Area Observations										
	Vehicle Designation (1) (C / HT / RO / PU / V / PK)	Color	Time when Entering Site	Waiting in Queue? (Y/N) if Yes note vehicle location and approx cars in queue	Time when Exiting Site	Total Time On Site	Parking Location & Time when Parked		Trash Disposal Time		Recycling Bldg Drop-off Time		ONP, OMG, OWP (2) Roll-Off Container Drop-off Time		Total Time in Drop-off Area	Total Number of Vehicles Parked in Drop-Off Area (record number observed at frequent intervals)	
							Location	Time when Parked	Start Time	Finish Time	Start Time	Finish Time	Start Time	Finish Time		Number of Vehicles	Time of Observ.
73	Subaru	Grey					2	10:23:30	10:23:30	10:24:22			10:24:22	10:24:50			
74									10:24:50	10:25:43	10:25:43	10:26:25			0:02:55		
75																	
76	VW Car	Silver	10:24		10:27	0:03:00	2	10:25	10:25	10:27	10:26	10:27	10:26	10:27	0:02:00	12	10:24
77																	
78	Yukon SUV	Silver					1	10:27:44	10:28:00	10:28:50			10:28:50	10:30			
79									10:30:18	10:32:28	10:32:28	10:36:00			0:08:16	9	10:27:23
80												Left area					
81																	
82	Toyota Truck	Green	10:29		10:32	0:03:00	15	10:29	10:29	10:30	10:30	10:31			0:02:00		
83	Car	Green	10:33		10:34	0:01:00	7	10:33	10:33	10:34	10:34	10:34			0:01:00		
84	Car	Red	10:35				2										
85	Car	Red	10:35				7										
86	Car	Blue	10:35				6										
87	Car	Silver	10:35				10										
88	Truck	Silver	10:36		10:41	0:05:00	4										
89	Car	Red	10:38		10:44	0:06:00	11	10:38	10:42	10:43	10:39	10:42			0:05:00		
90																	
91	Volvo	Silver					1	10:39:58	10:39:58	10:40:35	10:40:35	10:41:10					
92												Left area at:					
93												10:42:42			0:02:44	3	10:43
94																	
95	Truck	Black	10:40		10:45	0:05:00		10:41	10:41	10:45					0:04:00		
96																	
97	Volvo Wagon	Silver					5	10:44:00	10:44:00	10:45	10:45	10:47:13					

SANBORN HEAD

TABLE B-1
Vehicle and Drop-off Area Site Observation Data
Recorded Saturday August 19, 2017

	Vehicle Information		Selected Site Entrance & Exit Observations				Selected Tash & Recycling Drop-Off Area Observations										
	Vehicle Designation (1) (C / HT / RO / PU / V / PK)	Color	Time when Entering Site	Waiting in Queue? (Y/N) if Yes note vehicle location and approx cars in queue	Time when Exiting Site	Total Time On Site	Parking Location & Time when Parked		Trash Disposal Time		Recycling Bldg Drop-off Time		ONP, OMG, OWP (2) Roll-Off Container Drop-off Time		Total Time in Drop-off Area	Total Number of Vehicles Parked in Drop-Off Area (record number observed at frequent intervals)	
							Location	Time when Parked	Start Time	Finish Time	Start Time	Finish Time	Start Time	Finish Time		Number of Vehicles	Time of Observ.
98												Ledt area at:					
99												10:47:57			0:03:57		
100																	
101	Truck	Blue	10:46		10:47	0:01:00	3	10:46	10:46	10:47	10:46	10:47:00			0:01:00		
102																	
103	Ford SUV	Tan					3	10:48:38	10:48:38	10:49:30	DNV	DNV	DNV	DNV	0:00:52		
104																	
105	Honda Car	White	10:49		10:54	0:05:00	10	10:49	10:51	10:52					0:03:00		
106																	
107	Toyota Corolla	Red					1	10:51:50			10:52:00	10:52:53	DNV	DNV			
108									10:52:53	10:53:20						9	10:51:42
109											10:53:20	10:54:19			0:02:29		
110																	
111	Car	Black	10:52		10:58	0:06:00	11	10:52	10:53	10:53	10:53	10:58:00	10:53	10:53	0:06:00		
112																	
113	Honda CRV						2	10:55:14	10:55:14	10:55:35	10:55:35	10:57:54	DNV	DNV	0:02:40	3	10:56:00
114																8	10:57:15
115	Jeep	Blue	10:57		10:59	0:02:00	6	10:57	10:57	10:59					0:02:00		
116	Car	Silver	11:01		11:06	0:05:00	5	11:01	11:04	11:05	11:02	11:04:00			0:04:00		
117	Car	Green	11:01				12										
118																	
119	Honda SUV						12	11:01:44			11:01:44	11:04:55					
120									11:04:55	11:05:42	11:05:42	11:05:46	DNV	DNV	0:04:02	8	11:10:34
121																	
122	Car	Maroon	11:02		11:11	0:09:00	10										

SANBORN HEAD

TABLE B-1
Vehicle and Drop-off Area Site Observation Data
Recorded Saturday August 19, 2017

	Vehicle Information		Selected Site Entrance & Exit Observations				Selected Tash & Recycling Drop-Off Area Observations										
	Vehicle Designation (1) (C / HT / RO / PU / V / PK)	Color	Time when Entering Site	Waiting in Queue? (Y/N) if Yes note vehicle location and approx cars in queue	Time when Exiting Site	Total Time On Site	Parking Location & Time when Parked		Trash Disposal Time		Recycling Bldg Drop-off Time		ONP, OMG, OWP (2) Roll-Off Container Drop-off Time		Total Time in Drop-off Area	Total Number of Vehicles Parked in Drop-Off Area (record number observed at frequent intervals)	
							Location	Time when Parked	Start Time	Finish Time	Start Time	Finish Time	Start Time	Finish Time		Number of Vehicles	Time of Observ.
123	Car	White	11:03		11:06	0:03:00	2										
124	Truck	Blue	11:07		11:09	0:02:00	2										
125	Truck	Red	11:11		11:14	0:03:00	6	11:11	11:12	11:13			11:13	11:14	0:03:00		
126																	
127	Toyota RAV 4	Silver					3 & 4D	11:11:28	11:11:28	11:15:39						10	11:16:09
128										To Clothes Bin; Done at:							
129										11:19:34	11:19:34						
130										Left clothes bin at:							
131										11:22:43					0:11:15		
132																	
133	Car	Blue	11:14		11:17	0:03:00											
134	Car	Red	11:14		11:18	0:04:00											
135	Truck	Red	11:15		11:17	0:02:00											
136	Car	White	11:15		11:20	0:05:00	14/13		11:16	11:17	11:17	11:19:00			0:04:00		
137	Car	Purple	11:19		11:24	0:05:00	10	11:19	11:19	11:20	11:20	11:23:00			0:04:00		
138	Car	Green	11:21				11										
139	Truck	White	11:21				12										
140																	
141	VW Wagon	Black					4A	11:24:00	11:24:00	11:24:34			11:24:50	11:25:15			
142											11:25:15	11:26:19			0:02:19		
143																	
144	Mazda SUV	Silver					6	11:33:12					11:33:12	11:33:36		1	11:31:30
145											11:33:36	11:33:53					
146									11:33:53	11:34:21					0:01:09	4	11:35:10

TABLE B-1
Vehicle and Drop-off Area Site Observation Data
Recorded Saturday August 19, 2017

	Vehicle Information		Selected Site Entrance & Exit Observations				Selected Tash & Recycling Drop-Off Area Observations										
	Vehicle Designation (1) (C / HT / RO / PU / V / PK)	Color	Time when Entering Site	Waiting in Queue? (Y/N) if Yes note vehicle location and approx cars in queue	Time when Exiting Site	Total Time On Site	Parking Location & Time when Parked		Trash Disposal Time		Recycling Bldg Drop-off Time		ONP, OMG, OWP (2) Roll-Off Container Drop-off Time		Total Time in Drop-off Area	Total Number of Vehicles Parked in Drop-Off Area (record number observed at frequent intervals)	
							Location	Time when Parked	Start Time	Finish Time	Start Time	Finish Time	Start Time	Finish Time		Number of Vehicles	Time of Observ.
147																	
148	Van	Gray	11:35		11:53	0:18:00	11	11:35	11:46	11:52	11:39	11:46:00	11:36	11:39	0:17:00		
149																	
150	Subaru car	Grey					10	11:37:46			11:37:46	11:39:00	DNV	DNV			
151									11:39:00	11:40:00						10	11:38:49
152											11:40:48						
153									11:41:22	11:41:44					0:03:58		
154																	
155	Tacoma Pickup	Dk Green					5	11:42:30	11:42:54	11:43:20	DNV	DNV	DNV	DNV	0:00:50	8	11:45:40
156																5	11:47:00
157	Truck	Green	11:43		11:46	0:03:00	2	11:43	11:43	11:44	11:44	11:46:00			0:03:00		
158	Car	Blue	11:49				3	11:49									
159	Truck	Green	11:49		11:52	0:03:00	5	11:49									
160																	
161	Dodge Ram Pickup	Grey					8	11:50:52			11:51:24	11:52:20					
162									11:52:45	11:53:35							
163													11:53:35	11:54:13			
164														Left area at:			
165														11:54:52	0:04:00		
166																	
167	Car	Green	11:55		11:58	0:03:00											
168	Car	Blue	11:55		11:58	0:03:00	8	11:55					11:55	11:57:00	0:02:00		
169																	
170	?	?					8	11:55:44			11:55:44	11:57:08	DNV	DNV			
171									11:57:08	11:57:36					0:01:52		

TABLE B-1
Vehicle and Drop-off Area Site Observation Data
Recorded Saturday August 19, 2017

	Vehicle Information		Selected Site Entrance & Exit Observations				Selected Tash & Recycling Drop-Off Area Observations										
	Vehicle Designation (1) (C / HT / RO / PU / V / PK)	Color	Time when Entering Site	Waiting in Queue? (Y/N) if Yes note vehicle location and approx cars in queue	Time when Exiting Site	Total Time On Site	Parking Location & Time when Parked: Location	Parking Location & Time when Parked: Time when Parked	Trash Disposal Time: Start Time	Trash Disposal Time: Finish Time	Recycling Bldg Drop-off Time: Start Time	Recycling Bldg Drop-off Time: Finish Time	ONP, OMG, OWP (2) Roll-Off Container Drop-off Time: Start Time	ONP, OMG, OWP (2) Roll-Off Container Drop-off Time: Finish Time	Total Time in Drop-off Area	Total Number of Vehicles Parked in Drop-Off Area (record number observed at frequent intervals): Number of Vehicles	Total Number of Vehicles Parked in Drop-Off Area (record number observed at frequent intervals): Time of Observ.
172																	
173	Audi	Blue	11:58		12:02	0:04:00	5	11:59	12:01	12:01	11:59	12:01:00			0:02:00		
174																	
175	Subaru SUV	Blue					5	11:59:13			11:59:23	12:01:11	DNV	DNV			
176									12:01:29	12:01:49							
177										Left area at:							
178										12:02:08					0:02:55		
179																	
180	Toyota Car	Red	12:03		12:07	0:04:00	6	12:03	12:05	12:06	12:04	12:05:00			0:03:00		
181																	
182	Minivan	White					6	12:03:05					12:03:05	12:03:45			
183									12:03:57	12:04:25							
184													12:04:25	12:04:41			
185											12:04:50	12:06:46					
186												Left area at:					
187												12:07:15			0:04:10		
188																4	12:08:37
189	Toyota Car	Red	12:14		12:20	0:06:00	12	12:14	12:15	12:19	12:16	12:20:00			0:06:00		
190																	
191	Volvo SUV	Black					2	12:24:56	12:24:49	12:25:00						3	12:22:52
192											12:25:20	12:25:49					
193													12:26:00	12:26:15			
194														Left area at:			
195														12:26:31	0:01:35		
196																3	12:27:18

SANBORN HEAD

TABLE B-1
Vehicle and Drop-off Area Site Observation Data
Recorded Saturday August 19, 2017

	Vehicle Information		Selected Site Entrance & Exit Observations				Selected Tash & Recycling Drop-Off Area Observations										
	Vehicle Designation (1) (C / HT / RO / PU / V / PK)	Color	Time when Entering Site	Waiting in Queue? (Y/N) if Yes note vehicle location and approx cars in queue	Time when Exiting Site	Total Time On Site	Parking Location & Time when Parked		Trash Disposal Time		Recycling Bldg Drop-off Time		ONP, OMG, OWP (2) Roll-Off Container Drop-off Time		Total Time in Drop-off Area	Total Number of Vehicles Parked in Drop-Off Area (record number observed at frequent intervals)	
							Location	Time when Parked	Start Time	Finish Time	Start Time	Finish Time	Start Time	Finish Time		Number of Vehicles	Time of Observ.
197	VW Golf	Green					5	12:33:52	12:34:18	12:34:40			DNV	DNV		2	12:29:45
198											12:34:58	12:35:38					
199												Left area at:					
200												12:35:54			0:02:02		
201																6	12:36:45
202	Truck	White	12:36		12:42	0:06:00	6	12:36	12:39	12:41	12:37	12:39:00	12:40	12:40	0:05:00		
203																	
204	Honda Ridgeline	Grey					13	12:39:40	12:40:27	12:43:00			DNV	DNV			
205											12:43:17	12:44:42					
206												Left area at:					
207												12:45:03			0:05:23		
208																	
209	Honda SUV	Grey					2	12:53:57	12:54:00	12:54:20			DNV	DNV		7	12:47:35
210											12:55:30	12:55:44				6	12:55:19
211											12:58:29	12:59:01				4	12:58:52
212												Walking to clothes bin					
213												12:59:30					
214												Left area at:					
215												13:00:55			0:06:58	3	13:01:12
216																5	13:14:46
217	Nissan Car	Gray	12:54		12:58	0:04:00	6		12:55	12:55	12:55	12:58:00			0:03:00		
218																	
219	Toyota Highlander SUV	Maroon	13:30		13:34:37	0:04:37	2	13:30:44	13:30:55	13:31:11			DNV	DNV		5	13:27:48
220											13:31:20	13:33:46				5	13:31:34

TABLE B-1
Vehicle and Drop-off Area Site Observation Data
Recorded Saturday August 19, 2017

	Vehicle Information		Selected Site Entrance & Exit Observations				Selected Tash & Recycling Drop-Off Area Observations										
	Vehicle Designation (1) (C / HT / RO / PU / V / PK)	Color	Time when Entering Site	Waiting in Queue? (Y/N) if Yes note vehicle location and approx cars in queue	Time when Exiting Site	Total Time On Site	Parking Location & Time when Parked		Trash Disposal Time		Recycling Bldg Drop-off Time		ONP, OMG, OWP (2) Roll-Off Container Drop-off Time		Total Time in Drop-off Area	Total Number of Vehicles Parked in Drop-Off Area (record number observed at frequent intervals)	
							Location	Time when Parked	Start Time	Finish Time	Start Time	Finish Time	Start Time	Finish Time		Number of Vehicles	Time of Observ.
221												Left area at:					
222												13:34:15			0:03:31	3	13:35:18
223																	
224	Honda Element	---					4	13:36:21	13:36:48	13:37:00			DNV	DNV			
225											13:37:09	13:39:04				2	13:37:38
226												Left area at:					
227												13:40:00			0:03:39		
228																	
229	Toyota RAV 4	---					6	13:48:13	13:48:35	13:49:28	DNV	DNV	DNV	DNV			
230										Left area at:							
231										13:49:45					0:01:32		
232																	
233																	
234	Subaru Forester	Silver					8	14:05:43			14:06:42	14:09:15	DNV	DNV		3	13:51:32
235								Spouse to Clothes bin; done at:			14:07:20	14:08:35				4	13:54:40
236								14:07:20 PM				Left area at:				3	13:58:11
237												14:10:40			0:04:57	3	14:05:20
238																1	14:10:54
239	Minivan	Grey					11	14:14:05			14:14:12	14:15:00	DNV	DNV		3	14:15:00
240									14:15:19	14:15:30						8	14:17:00
241										Left area at:							
242										14:16:03					0:01:58		
243																	
244	Car	Red	14:14:30		14:19	0:04:30	3	14:14:52	14:15:20	14:16					0:01:08		

TABLE B-1
Vehicle and Drop-off Area Site Observation Data
Recorded Saturday August 19, 2017

	Vehicle Information		Selected Site Entrance & Exit Observations				Selected Tash & Recycling Drop-Off Area Observations										
	Vehicle Designation (1) (C / HT / RO / PU / V / PK)	Color	Time when Entering Site	Waiting in Queue? (Y/N) if Yes note vehicle location and approx cars in queue	Time when Exiting Site	Total Time On Site	Parking Location & Time when Parked		Trash Disposal Time		Recycling Bldg Drop-off Time		ONP, OMG, OWP (2) Roll-Off Container Drop-off Time		Total Time in Drop-off Area	Total Number of Vehicles Parked in Drop-Off Area (record number observed at frequent intervals)	
							Location	Time when Parked	Start Time	Finish Time	Start Time	Finish Time	Start Time	Finish Time		Number of Vehicles	Time of Observ.
245																	
246	Chevy Cruz	Black					10	14:22:04	14:22:45		14:25:36	14:27:45	DNV	DNV		7	14:25:00
247												Left area at:					
248												14:28:40			0:06:36	4	14:29:26
249																	
250	Audi	Black	14:22		14:26	0:04:00	11	14:23	14:23	14:23	14:23	14:26:00	14:23	14:23	0:03:00		
251																	
252	F150 Pickup	Red					10	14:31:39	14:32:00	14:32:30							
253											14:32:48	14:33:20					
254													14:33:20	14:33:34			
255														Left area at:			
256														14:34:05	0:02:26	1	14:34:55
257																4	14:37:15
258	Subaru Forester	Silver					2	14:41:54	14:41:57	14:42:00						7	14:41:19
259											14:42:00	14:43:05				9	14:43:36
260												Drove to Clothes Bin; left clothes bin at:					
261												14:44:46			0:02:52	10	14:44:30
262																7	14:50:45
263	Hummer H2 w/Trailer hitch	Red					11	14:52:33	14:53:00	14:53:31			DNV	DNV			
264											14:53:31	14:58:01				9	14:56:23
265												Left area at:					
266												14:58:16			0:05:43		
267																	
268																	

TABLE B-1
Vehicle and Drop-off Area Site Observation Data
Recorded Saturday August 19, 2017

	Vehicle Information		Selected Site Entrance & Exit Observations				Selected Tash & Recycling Drop-Off Area Observations										
	Vehicle Designation (1) (C / HT / RO / PU / V / PK)	Color	Time when Entering Site	Waiting in Queue? (Y/N) if Yes note vehicle location and approx cars in queue	Time when Exiting Site	Total Time On Site	Parking Location & Time when Parked		Trash Disposal Time		Recycling Bldg Drop-off Time		ONP, OMG, OWP (2) Roll-Off Container Drop-off Time		Total Time in Drop-off Area	Total Number of Vehicles Parked in Drop-Off Area (record number observed at frequent intervals)	
							Location	Time when Parked	Start Time	Finish Time	Start Time	Finish Time	Start Time	Finish Time		Number of Vehicles	Time of Observ.
269	Ford Car	Red	14:52:38		14:57:20	0:04:42	7	14:53:08	14:53:30	14:54	14:54:36	14:56:32	14:54	14:54:30	0:03:24		
270																	
271	Honda Civic	Silver					5	15:04:01	15:04:45	15:04:55			DNV	DNV		8	15:05:26
272											15:05:05	15:10:04			0:06:03		
273																4	15:08:43
274																	
275	Hyandai Wagon	Silver					1	15:12:07	15:13:10	15:13:22			DNV	DNV		4	15:14:50
276											15:13:22	15:13:50					
277												Left area at:					
278												15:14:31			0:02:24		
279																	
280	Honda CRV	Black					2	15:21:24	15:21:50	15:22:11						3	15:20:07
281													15:22:16	15:22:28		6	15:23:17
282											15:22:50	15:25:50			0:04:26	5	15:26:45
283																3	15:30:00
284																	
285																	
286																	

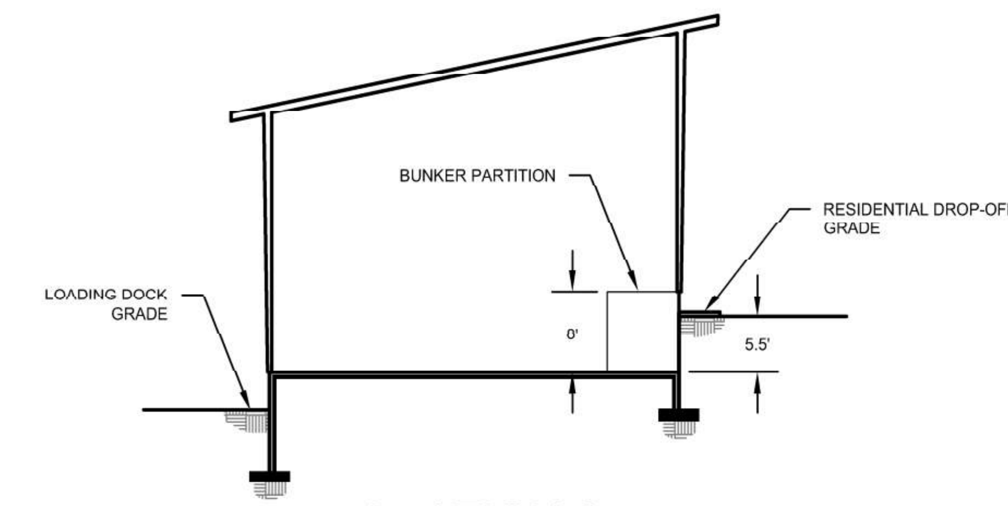
P:\4200s\4220.00\Source Files\Traffic\Traffic Observation Tables.xlsx

1. Vehicle designation C = car/sedan; HT = heavy truck (panel truck or stake truck); RO = roll-off truck; PU = pickup truck, V= Van; PK = packer truck;
2. Paper grades abbreviated as follows:
   - ONP = Old Newspapers
   - OMG = Old Magazines
   - OWP = Office Wastepaper

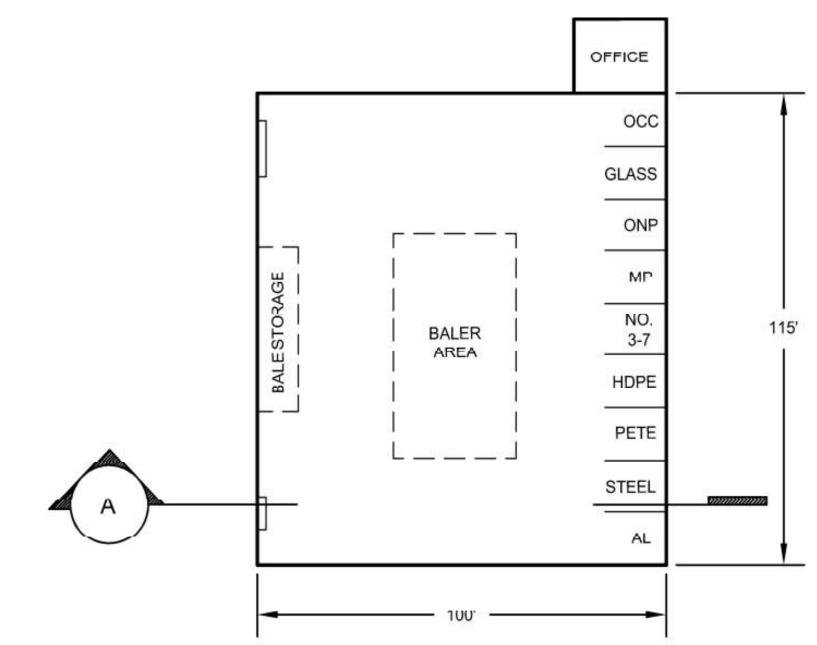
DNV = Did Not Visit

APPENDIX C

CONCEPTUAL SITE PLANS



SECTION A



FLOOR PLAN

RECYCLING BUILDING PLAN AND SECTION

LEGEND

- APPROXIMATE PROPERTY LINE
- PROPOSED EDGE OF PAVED ROADWAY
- PROPOSED EDGE OF GRAVEL AREA
- EXISTING TREELINE
- PROPOSED CONCRETE RETAINING WALL
- EXISTING CONCRETE RETAINING WALL
- EXISTING STONE RETAINING WALL
- EXISTING UTILITY POLE
- GRAVEL WEARING SURFACE

FEATURES:

1. RECYCLING BUILDING SIZED TO SEPARATE RECYCLABLES INTO NINE CATEGORIES:

   a. GLASS
   b. STEEL
   c. ALUMINUM
   d. NO.1 PLASTIC (PETE)
   e. NO. 2 PLASTIC (HDPE)
   f. NO. 3 THROUGH 7 PLASTIC
   g. CARDBOARD (OCC)
   h. NEWSPAPER (ONP)
   i. MIXED PAPER (MP)

   IF 3-7 PLASTICS ARE NOT RECYCLED AND NEWPAPER AND MIXED PAPER ARE COMMINGLED IN A SINGLE BUNKER, BUILDING COULD REDUCE FROM 115 FEET WIDE TO 90 FEET WIDE.

2. BUILDING SIZED FOR DUAL RAM BALER AND MINIMUM BALE STORAGE CAPACITY OF 48 BALES.
3. PROPOSED LAYOUT INCLUDES DROP-OFF LOCATIONS FOR THE FOLLOWING:

   a. DEDICATED SWAP SHOP SHED
   b. YARD WASTE (BRUSH, TREE BUTTS, RAW LEAVES AND GRASS, IN-PROCESS LEAVES AND GRASS, FINISHED COMPOST, PINE NEEDLES)
   c. SCRAP METAL (LIGHT IRON, BULK SCRAP, WHITE GOODS)
   d. REFRIGERATORS
   e. PROPANE TANKS
   f. CONCRETE DEBRIS
   g. FLUORESCENT BULBS
   h. WASTE OIL
   i. ELECTRONICS (TVs, COMPUTER MONITORS, MICROWAVES, OTHER ELECTRONICS)
   j. USED CLOTHING
   k. USED BOOKS

4. DUE TO SPACE LIMITATIONS, LAYOUT DOES NOT INCLUDE DROP-OFF FOR THE FOLLOWING:

   a. STREET SWEEPINGS AND DITCHING MATERIAL (MATERIAL FROM DPW OPERATIONS)
   b. BULKY WASTE DISPOSAL FOR FURNITURE OR OTHER WOOD/LUMBER DEBRIS
   c. ASPHALT SHINGLES
   d. TIRES

LIMITATIONS/CONSIDERATIONS:

1. OPTION IS BASED ON ACQUIRING APPROXIMATELY 0.55 ACRES FROM NHDOT TO EXTEND LAYOUT TOWARDS NEWPORT ROAD.
2. THERE IS NO CURRENT TOPOGRAPHIC INFORMATION FOR THE SITE ALTHOUGH THERE IS WHAT APPEARS TO BE DATED TOPOGRAPHY FROM ESRI (IT DOES NOT REFLECT TOPOGRAPHY EXPECTED IN THE VICINITY OF ROUTE 89). SANBORN HEAD PREPARED AN APPROXIMATE CONTOURING PLAN FOCUSING PRINCIPALLY ON THE AREA NEAR THE EXISTING RECYCLING BUILDING AND TRANSFER STATION. THE APPROXIMATE CONTOURS ARE RELATIVE TO AN ASSUMED ELEVATION 0.0 AT THE TRANSFER STATION TRAILER PIT.
3. BECAUSE THERE IS ONLY AN APPROXIMATE UNDERSTANDING OF SITE TOPOGRAPHY, THE EXTENT OF GRADING REQUIRED TO TIE PROPOSED GRADES INTO EXISTING GRADES IS UNKNOWN.
4. SINCE THERE IS NO CURRENT MAPPING OF THE SITE, EXTENT OF WETLANDS ON THE PROPERTY IS UNKNOWN. THE TOWN HAS INDICATED THAT THERE ARE WETLANDS IN THE SOUTHERN PORTION OF THE SITE. OPTION 1 WAS PREPARED ON THE ASSUMPTION THAT - IN THE ABSENCE OF KNOWING WHERE WETLANDS ARE LOCATED - THE FULL AREA COULD BE PROPOSED FOR DEVELOPMENT AND ANY WETLAND REPLICATION REQUIREMENTS WOULD NEED TO BE ADDRESSED AT AN OFF-SITE LOCATION, SUBJECT TO STATE AND LOCAL APPROVAL OF THIS APPROACH.
5. PARCEL SIZE FROM THE TOWN'S ONLINE ASSESSORS DATABASE INDICATES THAT THE TRANSFER STATION SITE IS 4.8 ACRES IN SIZE. SANBORN HEAD DIGITIZED THE PROPERTY LINE INFORMATION INTO A CAD FILE. THE AREA OF THE PARCEL GENERATED IN CAD SUGGESTS THAT THE PROPERTY IS 5.4 ACRES IN SIZE.
6. NHDES REGULATIONS FOR COLLECTION, STORAGE, AND TRANSFER (C/S/T) FACILITIES STATES THAT THESE FACILITIES SHALL BE SITED NO LESS THAN 50 FEET FROM ANY PROPERTY LINE (ENV SW 403.02). THE PROPOSED RECYCLING BUILDING LOCATION SHOWN IN THIS OPTION WOULD COMPLY WITH THE 50-FT PROPERTY LINE SETBACK, ASSUMING LAND IS ACQUIRED FROM NHDOT. A WAIVER MAY BE REQUIRED FROM NHDES FOR SCRAP METAL AND OTHER SOLID WASTE STORAGE PROPOSED WITHIN THE 50-FT SETBACK.
7. THE CONCEPTUAL LAYOUT DOES NOT INCLUDE STORMWATER PROVISIONS. WATER QUALITY SWALES, BIORETENTION AREAS, AND OTHER STORMWATER FEATURES WILL LIKELY BE REQUIRED AND THOSE RESULTING IN THE LEAST LAND AREA REQUIREMENTS SHOULD BE PRIORITIZED. STORMWATER PROVISIONS MAY REQUIRE SOME DROP-OFF AREA RELOCATION, RESULTING IN THE NEED TO DEVELOP THE NORTHEAST CORNER OF THE SITE TO ACCOMMODATE SOME DROP-OFF OPERATIONS.

SANBORN HEAD

GRAPHICAL SCALE: 40' 20' 0' 40' 80'

DRAFT

NO.	DATE	DESCRIPTION	BY

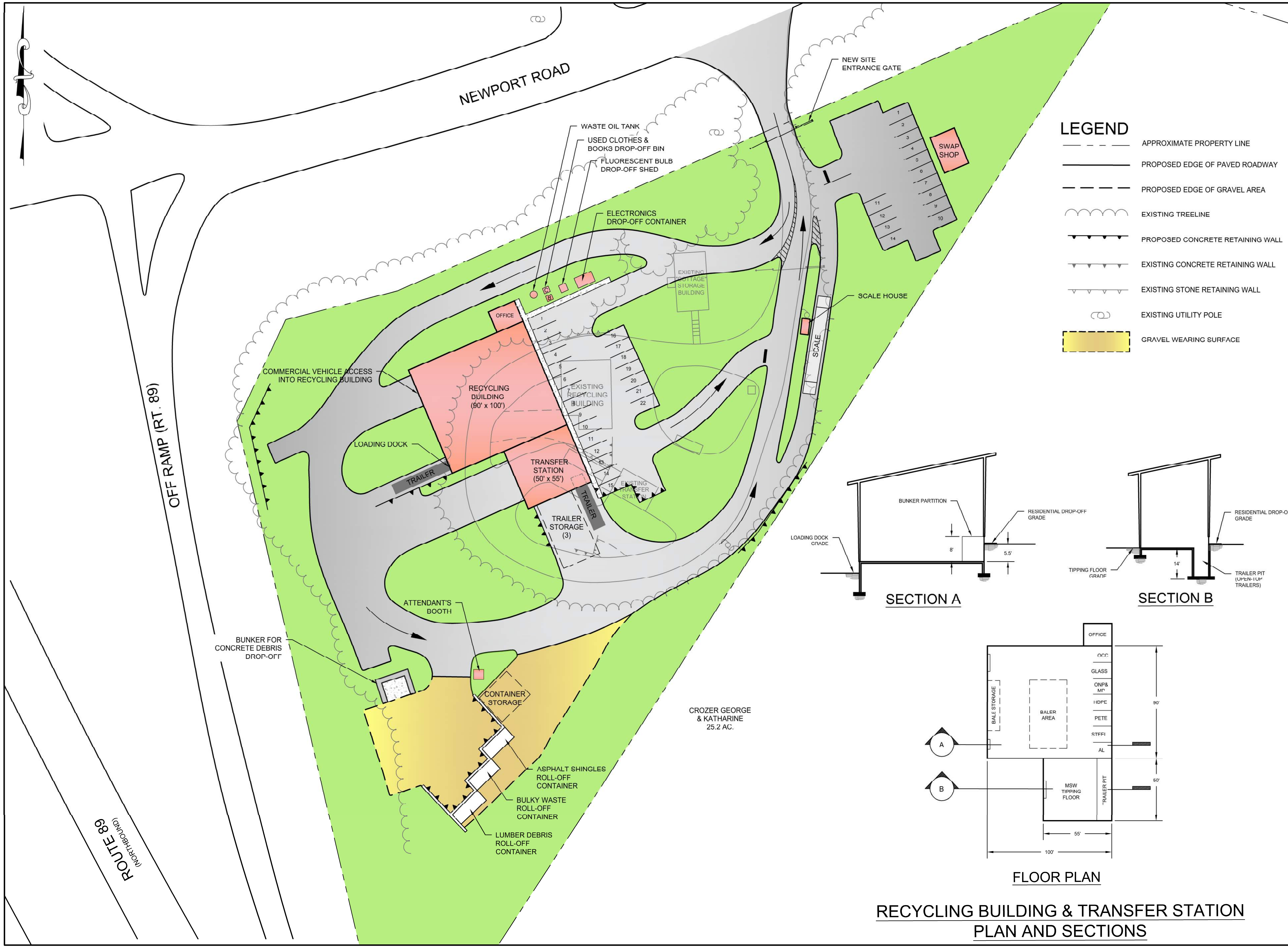
DRAWN BY: C. MURPHY
DESIGNED BY: S. WRIGHT
REVIEWED BY: S. WRIGHT
DATE: NOVEMBER 2017

SOLID WASTE MANAGEMENT FACILITIES STUDY
TOWN OF NEW LONDON, NEW HAMPSHIRE

OPTION 1 - OPTIMIZE DEVELOPMENT AT EXISTING TRANSFER STATION SITE THROUGH ACQUISITION OF NHDOT LAND

PROJECT NUMBER: 4220.00

SHEET NUMBER: C-1



FEATURES:

1. RECYCLING BUILDING SIZED TO SEPARATE RECYCLABLES INTO SEVEN CATEGORIES:
   a. GLASS
   b. STEEL
   c. ALUMINUM
   d. NO.1 PLASTIC (PETE)
   e. NO. 2 PLASTIC (HDPE)
   f. CARDBOARD (OCC)
   g. NEWSPAPER/MIXED PAPER (ONP/MP)

   RECYCLING BUILDING WIDTH OF 90 FEET REQUIRED FOR THE ABOVE SEVEN BUNKER BAYS.
2. RECYCLING PORTION OF BUILDING SIZED FOR DUAL RAM BALER AND MINIMUM BALE STORAGE CAPACITY OF 48 BALES.
3. NEW TRANSFER STATION ASSUMED TO CONSIST OF OPEN-TOP TRAILER LOADING (NOT COMPACTION TRAILERS, AS CURRENTLY USED).
4. PROPOSED LAYOUT INCLUDES DROP-OFF LOCATIONS FOR THE FOLLOWING:
   a. DEDICATED SWAP SHOP SHED
   b. CONCRETE DEBRIS
   c. BULKY WASTE DISPOSAL FOR FURNITURE OR OTHER WOOD/LUMBER DEBRIS
   d. ASPHALT SHINGLES
   e. FLUORESCENT BULBS
   f. WASTE OIL
   g. ELECTRONICS (TVs, COMPUTER MONITORS, MICROWAVES, OTHER ELECTRONICS)
   h. USED CLOTHING
   i. USED BOOKS
5. DUE TO SPACE LIMITATIONS, LAYOUT DOES NOT INCLUDE DROP OFF FOR THE FOLLOWING:
   a. STREET SWEEPINGS AND DITCHING MATERIAL (MATERIAL FROM DPW OPERATIONS)
   b. YARD WASTE (BRUSH, TREE BUTTS, RAW LEAVES AND GRASS, IN-PROCESS LEAVES AND GRASS, FINISHED COMPOST, PINE NEEDLES)
   c. SCRAP METAL (LIGHT IRON, BULK SCRAP, WHITE GOODS)
   d. REFRIGERATORS
   e. PROPANE TANKS
   f. TIRES

LIMITATIONS/CONSIDERATIONS:

6. CONFINING DEVELOPMENT TO WITHIN THE EXISTING PROPERTY BOUNDARIES AND COMPLYING WITH NHDES 50-FT PROPERTY LINE SETBACK REQUIREMENTS (SEE ITEM 6 BELOW) FOR THE PROPOSED BUILDING RESULTS IN A BUILDING LOCATION THAT WOULD MAKE CONTINUED OPERATION OF THE EXISTING TRANSFER STATION IMPOSSIBLE DURING CONSTRUCTION OF THE NEW BUILDING. THEREFORE, PROVISIONS WOULD NEED TO BE MADE TO ALLOW TEMPORARY TRANSFER STATION OPERATIONS TO BE CONDUCTED ELSEWHERE ON SITE WHILE THE NEW BUILDING IS BEING CONSTRUCTED (FOR RESIDENTS, THE TEMPORARY LOCATION COULD BE IN THE PROPOSED BULKY WASTE DISPOSAL AREA; FOR COMMERCIAL WASTE FURTHER COORDINATION WOULD BE REQUIRED TO DETERMINE WHETHER THIS COULD BE CONTINUED AT THE SITE WHILE THE NEW FACILITY IS BEING CONSTRUCTED).
7. THERE IS NO CURRENT TOPOGRAPHIC INFORMATION FOR THE SITE ALTHOUGH THERE IS WHAT APPEARS TO BE DATED TOPOGRAPHY FROM ESRI (IT DOES NOT RELFECT TOPOGRAPHY EXPECTED IN THE VICINITY OF ROUTE 89). SANBORN HEAD PREPARED AN APPROXIMATE CONTOURING PLAN FOCUSING PRINCIPALLY ON THE AREA NEAR THE EXISTING RECYCLING BUILDING AND TRANSFER STATION. THE APPROXIMATE CONTOURS ARE RELATIVE TO AN ASSUMED ELEVATION 0.0 AT THE EXISTING TRANSFER STATION TRAILER PIT.
8. BECAUSE THERE IS ONLY AN APPROXIMATE UNDERSTANDING OF SITE TOPOGRAPHY, THE EXTENT OF GRADING REQUIRED TO TIE PROPOSED GRADES INTO EXISTING GRADES IS UNKNOWN.
9. SINCE THERE IS NO CURRENT MAPPING OF THE SITE, EXTENT OF WETLANDS ON THE PROPERTY IS UNKNOWN. THE TOWN HAS INDICATED THAT THERE ARE WETLANDS IN THE SOUTHERN PORTION OF THE SITE. OPTION 2 WAS PREPARED ON THE ASSUMPTION THAT - IN THE ABSENCE OF KNOWING WHERE WETLANDS ARE LOCATED - THE AMOUNT OF WETLAND DISRUPTION COULD BE LIMITED BY REDUCING DEVELOPMENT IN THE SOUTHERN PORTION OF THE SITE AND ANY REPLICATION OF DISTURBED AREAS COULD BE ACCOMMODATED ON-SITE (OR, IF NECESSARY, AT AN OFF-SITE LOCATION, SUBJECT TO STATE AND LOCAL APPROVAL OF THIS APPROACH).
10. PARCEL SIZE FROM THE TOWN'S ONLINE ASSESSORS DATABASE INDICATES THAT THE TRANSFER STATION SITE IS 4.8 ACRES IN SIZE. SANBORN HEAD DIGITIZED THE PROPERTY LINE INFORMATION INTO A CAD FILE. THE AREA OF THE PARCEL GENERATED IN CAD SUGGEST THAT THE PROPERTY IS 5.4 ACRES IN SIZE.
11. NHDES REGULATIONS FOR COLLECTION, STORAGE, AND TRANSFER (C/S/T) FACILITIES STATES THAT THESE FACILITIES SHALL BE SITED NO LESS THAN 50 FEET FROM ANY PROPERTY LINE (ENV SW 403.02). THE PROPOSED TRANSFER STATION/RECYCLING BUILDING LOCATION SHOWN IN THIS OPTION WOULD COMPLY WITH THE 50-FT PROPERTY LINE SETBACK. A WAIVER MAY BE REQUIRED FROM NHDES FOR ANY SOLID WASTE STORAGE PROPOSED WITHIN THE 50-FT SETBACK (THIS OPTION DOES NOT HAVE SOLID WASTE STORAGE WITHIN THE 50-FT PROPERTY LINE SETBACK).
12. THE CONCEPTUAL LAYOUT DOES NOT INCLUDE STORMWATER PROVISIONS. WATER QUALITY SWALES, BIORETENTION AREAS, AND OTHER STORMWATER FEATURES WILL LIKELY BE REQUIRED AND THOSE RESULTING IN THE LEAST LAND AREA REQUIREMENTS SHOULD BE PRIORITIZED. STORMWATER PROVISIONS MAY REQUIRE SOME LAYOUT MODIFICATIONS TO ACCOMMODATE STORMWATER MANAGEMENT, WHICH IS ASSUMED TO BE LOCATED PREDOMINANTLY IN THE SOUTHERN PORTION OF THE SITE.

SANBORN HEAD

GRAPHICAL SCALE: 40' 20' 0' 40' 80'

DRAFT

NO.	DATE	DESCRIPTION	BY

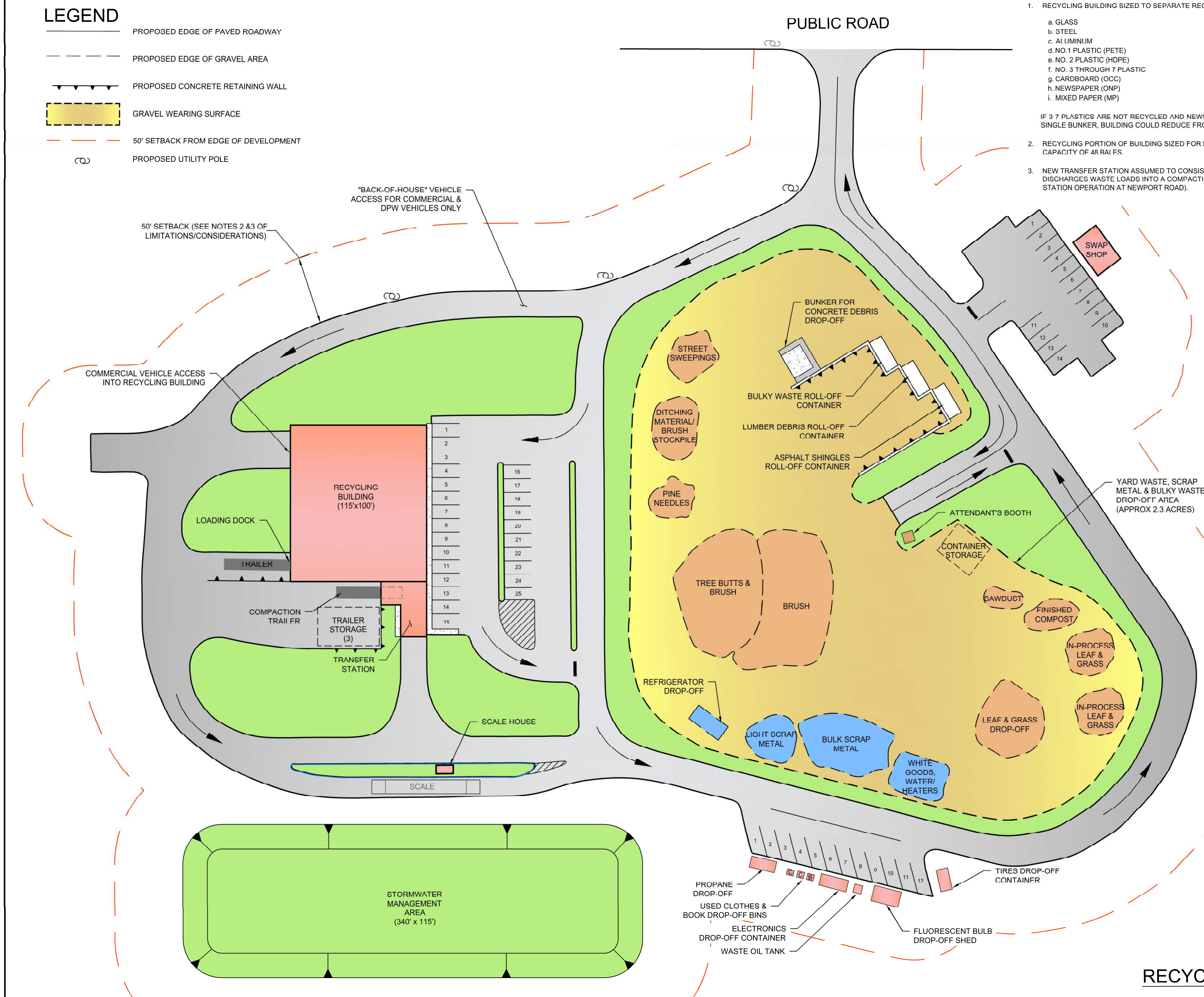
DRAWN BY: C. MURPHY
DESIGNED BY: S. WRIGHT
REVIEWED BY: S. WRIGHT
DATE: NOVEMBER 2017

SOLID WASTE MANAGEMENT FACILITIES STUDY
TOWN OF NEW LONDON, NEW HAMPSHIRE

OPTION 2 - OPTIMIZE DEVELOPMENT WITHIN EXISTING TRANSFER STATION PROPERTY LIMITS

PROJECT NUMBER: 4220.00

SHEET NUMBER: C-2



FEATURES:

1. RECYCLING BUILDING SIZED TO SEPARATE RECYCLABLES INTO NINE CATEGORIES:
   a. GLASS
   b. STEEL
   c. ALUMINUM
   d. NO.1 PLASTIC (PETE)
   e. NO. 2 PLASTIC (HDPE)
   f. NO. 3 THROUGH 7 PLASTIC
   g. CARDBOARD (OCC)
   h. NEWSPAPER (ONP)
   i. MIXED PAPER (MP)

   IF 3 7 PLASTICS ARE NOT RECYCLED AND NEWSPAPER AND MIXED PAPER ARE COMMINGLED IN A SINGLE BUNKER, BUILDING COULD REDUCE FROM 115 FEET WIDE TO 90 FEET WIDE.

2. RECYCLING PORTION OF BUILDING SIZED FOR DUAL RAM BALER AND MINIMUM BALE STORAGE CAPACITY OF 48 BALES.

3. NEW TRANSFER STATION ASSUMED TO CONSIST OF A HOPPER-FED COMPACTOR THAT DISCHARGES WASTE LOADS INTO A COMPACTION TRAILER (SIMILAR TO THE CURRENT TRANSFER STATION OPERATION AT NEWPORT ROAD).

4. IN ADDITION TO THE RECYCLING BUILDING AND TRANSFER STATION, THE PROPOSED LAYOUT INCLUDES THE FOLLOWING DROP-OFF NODES:
   a. SWAP SHOP WITH DEDICATED PARKING
   b. MISCELLANEOUS MATERIAL DROP-OFF AREA WITH DEDICATED PARKING, ACCEPTING:
      i. FLUORESCENT BULBS
      ii. WASTE OIL
      iii. ELECTRONICS (TVs, COMPUTER MONITORS, MICROWAVES, OTHER ELECTRONICS)
      iv. PROPANE TANKS
      v. TIRES
      vi. USED CLOTHING
      vii. USED BOOKS

   i. YARD WASTE, SCRAP METAL, AND OTHER BULK ITEM DISPOSAL AREA, ACCEPTING:
      i. YARD WASTE (BRUSH, TREE BUTTS, RAW LEAVES AND GRASS, IN-PROCESS LEAVES AND GRASS,FINISHED COMPOST, PINE NEEDLES)
      ii. SCRAP METAL (LIGHT IRON, BULK SCRAP, WHITE GOODS)
      iii. REFRIGERATORS
      iv. CONCRETE DEBRIS
      v. BULKY WASTE DISPOSAL FOR FURNITURE OR OTHER WOOD/LUMBER DEBRIS
      vi. ASPHALT SHINGLES
      vii. STREET SWEEPINGS AND DITCHING MATERIAL (MATERIAL FROM DPW OPERATIONS)

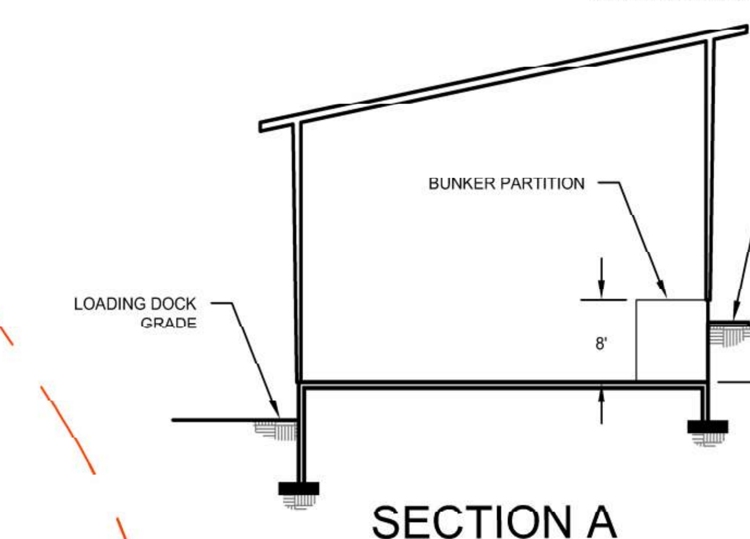
LIMITATIONS/CONSIDERATIONS:

1. THIS OPTION EXPLORES CONSOLIDATING ALL RECYCLING, TRANSFER STATION, YARD WASTE AND OTHER DROP-OFF ACTIVITIES AT A NEW SITE WHERE THE SITE HAS NOT YET BEEN IDENTIFIED. THE PRIMARY GOAL OF THIS OPTION IS TO DEPICT THE AREA NEEDED TO CONSOLIDATE ALL OF THE TOWN'S SOLID WASTE AND RECYCLING OPERATIONS AT A SINGLE SITE. BECAUSE THERE IS NO SPECIFIC SITE AROUND WHICH THE CONCEPTUAL LAYOUT HAS BEEN PREPARED, THERE ARE NO EXISTING SITE CONDITIONS (FOR EXAMPLE, WETLANDS, TOPOGRAPHY, LEDGE, OR OTHER SITE CONSTRAINTS) THAT WOULD LIMIT DEVELOPMENT AS SHOWN.

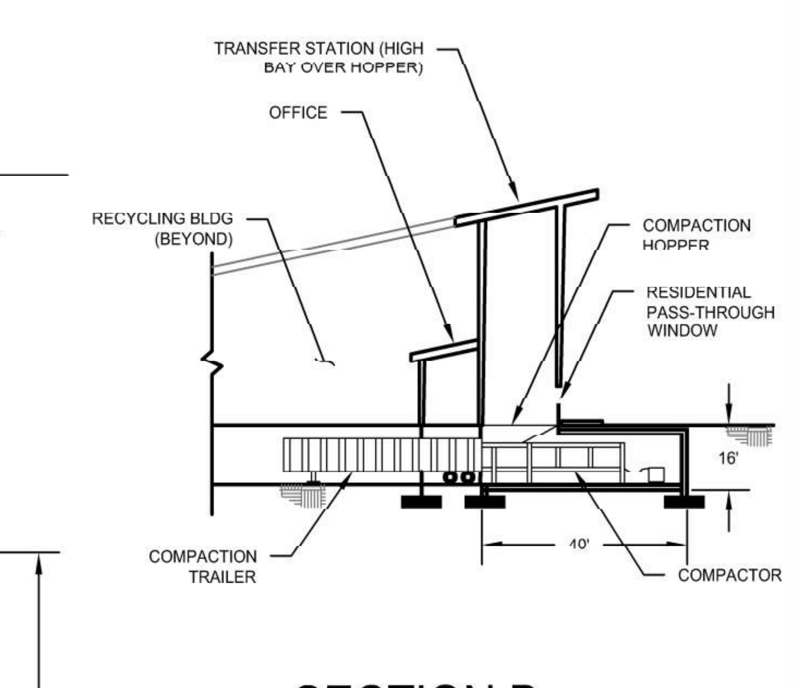
2. FOR PLANNING PURPOSES, A 50-FOOT SETBACK FROM THE LIMITS OF PROPOSED DEVELOPMENT HAS BEEN INCORPORATED INTO THE AREA REQUIREMENTS FOR THIS OPTION. THIS OFFSET IS INTENDED TO PROVIDE A BUFFER AROUND THE LIMITS OF THE FACILITY OPERATIONS, WHERE THE 50-FOOT DISTANCE WAS SELECTED TO COINCIDE WITH THE PROPERTY LINE SETBACK REFERENCED IN NHDES REGULATIONS FOR COLLECTION, STORAGE, AND TRANSFER (C/S/T) FACILITIES. THE REGULATIONS STATE THAT THESE FACILITIES SHALL BE SITED NO LESS THAN 50 FEET FROM ANY PROPERTY LINE (ENV SW 403.02).

3. THE AREA REQUIREMENTS FOR THE CONSOLIDATED LAYOUT AS SHOWN IS APPROXIMATELY 11 ACRES, WHICH INCLUDES THE 50-FOOT SETBACK FROM THE PROPOSED EDGE OF DEVELOPMENT. FOR COMPARISON. THE DEVELOPMENT AREA WITHOUT 50-FOOT SETBACK IS APPROXIMATELY 7 ACRES IN SIZE.

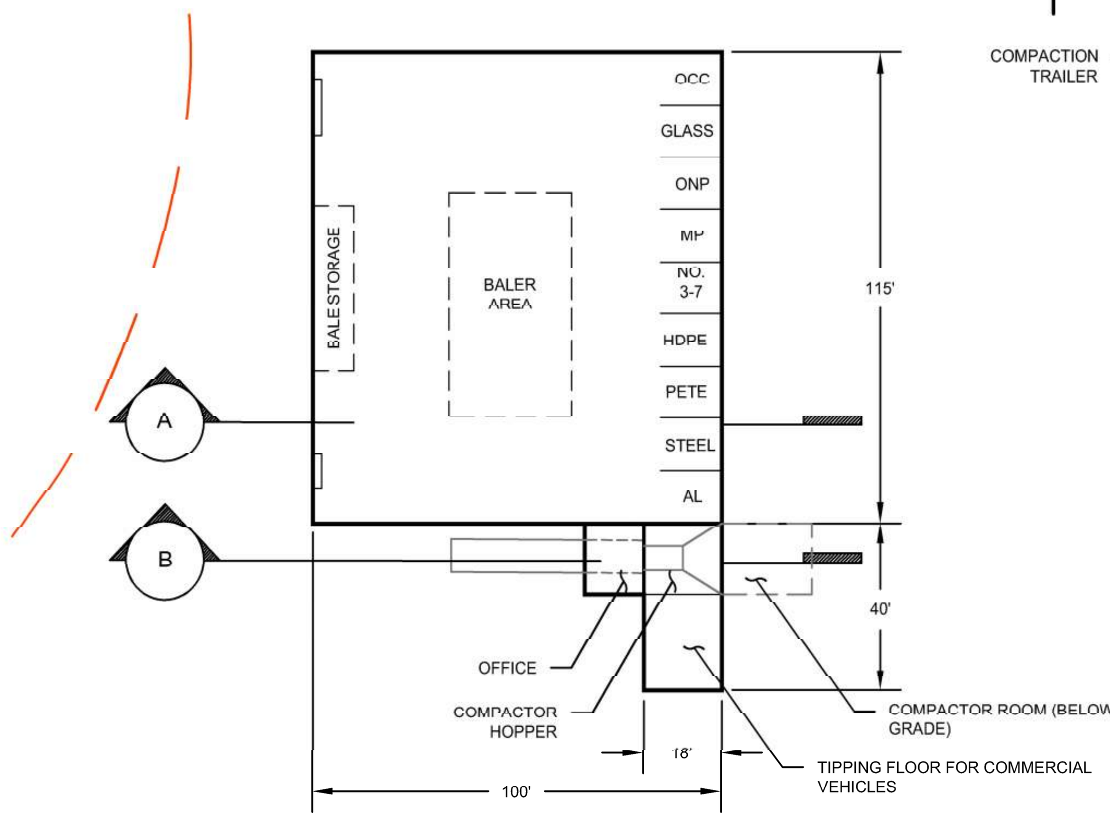
4. THE STORMWATER MANAGEMENT FOR THE PROPOSED DEVELOPMENT IS ESTIMATED TO REQUIRE A BASIN AREA OF APPROXIMATELY 1 ACRE. THE BASIN SIZE IS INTENDED TO BE CONSERVATIVE FOR CONCEPTUAL PLANNING PURPOSES. TYPE C SOIL CONDITIONS AND NO OFF-SITE RUN-ON WAS ASSUMED WHEN ESTIMATING BASIN SIZE REQUIREMENTS.



SECTION A



SECTION B



FLOOR PLAN

RECYCLING BUILDING & TRANSFER STATION PLAN AND SECTIONS

SANBORN HEAD

GRAPHICAL SCALE
40' 20' 0' 40' 80'

DRAFT

09/02/2016

09/02/2016

NO.	DATE	DESCRIPTION	BY

DRAWN BY: C. MURPHY
DESIGNED BY: S. WRIGHT
REVIEWED BY: S. WRIGHT
DATE: NOVEMBER 2017

SOLID WASTE MANAGEMENT FACILITIES STUDY
TOWN OF NEW LONDON, NEW HAMPSHIRE

OPTION 3 - CONSOLIDATE OPERATIONS AT NEW SITE

PROJECT NUMBER: 4220.00

SHEET NUMBER: C-3

APPENDIX D

OPINION OF CONSTRUCTION COST - CONCEPT PLANNING PHASE

TABLE D-1
Opinion of Construction Cost - Concept Planning Phase
Solid Waste Managment Facilities Study
Town of New London, New Hampshire

Item No.	Item Description	Conceptual-Level Opinion of Construction Cost[1]		
		Option 1 Optimize Development at Existing Transfer Station Site Through Acquisition of NHDOT Land	**Option 2** Optimize Development Within Existing Transfer Station Property Limits	**Option 3** Consolidate Operations at New Site
1	General Conditions	$264,000	$307,000	$348,000
2	Earthwork	$440,000	$873,000	$983,000
3	Demolition	$57,000	$80,000	$0
4	Stormwater Management	$348,000	$269,000	$574,000
5	Concrete (Building and Site)	$379,000	$516,000	$512,000
6	Recycling Building & Transfer Station[2]	$2,032,000	$2,065,000	$2,144,000
7	Pavement and Markings	$251,000	$320,000	$494,000
8	Swap Shop	$25,000	$25,000	$25,000
9	Scale House	$15,000	$15,000	$15,000
10	Landscaping Buffer	$20,000	$0	$0
Subtotal Buildings & Site	Subtotal	$3,831,000	$4,470,000	$5,095,000
	30% Contingency	$1,149,000	$1,341,000	$1,529,000
	Subtotal with Contingency	**$4,980,000**	**$5,811,000**	**$6,624,000**
11	Equipment Costs			
	a. Daul Ram Baler/Conveyor/Incidentals	$235,000	$235,000	$235,000
	b. Scale/Scale Foundation/Incidentals	$94,000	$94,000	$94,000
	c. Compactor & Hopper	$0	$0	$175,000
Subtotal Equipment	Subtotal	$329,000	$329,000	$504,000
	10% Contingency	$33,000	$33,000	$50,000
	Subtotal with Contingency	**$362,000**	**$362,000**	**$554,000**
	Total	**$5,342,000**	**$6,173,000**	**$7,178,000**

1. Cost estimates were prepared using unit costs from RS Means construction cost data (2015) and NHDOT weighted average unit prices for projects between April 1,2016 and March 31,2017.
2. Option 1 assumes continued use of existing transfer station.