February 20, 2020
File No. 02215014.01

Mr. Daniel Goossen
Chittenden Solid Waste District
1021 Redmond Road
Williston, Vermont 05495

Subject: Compost Design Narrative
CSWD Organics Diversion Facility

Dear Dan:

The Chittenden Solid Waste District (CSWD or District) engaged SCS Engineers (SCS) to design an expansion and improvements to the current composting operation at the Organics Diversion Facility (ODF). Coker Composting & Consulting assisted us with the design. This letter documents our design process and recommendations.

INTRODUCTION

In 2010/2011, CSWD built an aerated static pile (ASP) composting system and facility. Since its grand opening in 2011, the Organics Diversion Facility has seen more than a doubling of incoming food scrap tons. This increase in materials, coupled with the layout and design of the ODF, has led to inefficient processes, requiring excessive material handling, extensive residency times for the compost, and low yields of the finished compost.

When Act 148 (Universal Recycling law) reaches its highest level of diversion in July, CSWD may need to manage 10,000 tons of food scraps or more. CSWD's Board of Commissioners has directed staff to simplify operations by transitioning to a more traditional municipal compost model, where more focus can be given to efficient diversion and quality of process. This has resulted in a reduction of product offerings, from 12 products down to 3.

CSWD applied for a grant from the Department of Environmental Conservation and, in March 2019, was awarded a $500,000 grant. The grant agreement with the State outlines improvements to the composting operation (to compost up to 5,000 tons of food scraps per year on site) as well as construction of additional components required for transfer and/or depackaging and transfer of non-composted, excess organics (food scraps in excess of 5,000 tons per year).

DESIGN CONCEPT

Currently, the District uses a two-phase ASP process, followed by screening and curing. Early-stage screening results in a low yield of fines, but is necessary due to the current configuration of the facility. Curing occurs in large stockpiles.

SCS has experience with ASP systems as well as turned windrow systems. Hybrid systems of ASP and turned windrows can be used for process and cost efficiencies. Relative to the ODF, the existing Phase 1 ASP system can be used for the first phase of processing, when the potential for odors is

the highest. Subsequent to Phase 1 and once the odor potential is minimized, the materials can be processed in open windrows.

With a windrow curing system, the freshly composted feedstocks are formed into long piles (windrows) and periodically turned, based on temperature and time. The turning serves to mix and break up material; aerate the windrow; and, release excess moisture. This hastens the curing process. Windrow turners, instead of front-end loaders or excavators, are specially-designed for aerating and turning the windrows. Front-end loaders may be used to initially form the windrows, but a windrow turner is used to turn and aerate the composted materials, resulting in more thorough and efficient blending and aerating, as compared to a front-end loader or excavator.

In windrows, aeration occurs two ways: by convection, when warm vapors rise through and exit the piles, drawing fresh air in behind; and, by direct exposure, when piles are mechanically turned inside out, clumps are broken apart, and materials are fluffed. Turning windrows also ensures materials are evenly mixed and exposed to high temperatures in the pile's core.

Windrow composting will require more room in comparison to the large curing piles that are currently used. Additionally, the operation of the windrow turner must be done on uniformly-slope pad, which is properly compacted for regular use. Further, the sales area is located in a low lying area of the site that is often muddy, which affects operational efficiency. Grading and surface improvements are required for both the windrow pad and the sales area.

Relative to the site configuration, the curing area (both existing and proposed) is not adjacent to the Phase 1 ASP bays. Worst case, the round-trip travel distance is about 0.5 mile between the ASP bays and the curing area. Currently, front-end loaders, with 3.5 cubic yard buckets, move the material from the ASP area to the curing area. A dump truck, with a capacity of 18 cubic yards is much more efficient versus use of the loaders.

SCS recommends purchase and use of a windrow turner and dump truck, in conjunction with CSWD's existing Phase 1 ASP system, to compost and cure the feedstocks, as it is a versatile system that efficiently produces high-quality material. SCS also recommends grading and surface improvements for both the windrow pad and the sales area to allow year-round use, and processing and sales of materials.

The recommended hybrid system of Phase 1 ASP and turned windrows is designed for 5,000 tons of food scraps per year. This design capacity is intentional to match the inbound carbon (leaf and yard waste) material that is required by the compost recipe. Material in excess of 5,000 tons of incoming food scraps will be exported from the ODF.

MASS/VOLUME BALANCE

CSWD provided historical tonnage reports, including a breakdown of materials received each month from October 2014 through August 2019. Each month has summed values for Food Waste, Yard Waste, Wood Chips, Manure, and Wood Ash. SCS prepared a table of monthly averages over the five-year period, for each category. CSWD also provided estimated sales data for three products, including additives and associated quantities.

Based on the monthly feedstock data and your compost recipe, SCS prepared a process flow diagram and mass balance. SCS calculated the following:

- Feedstock and product stockpile sizes.
- Phase 1 initial volumes and volume reduction.
- Phase 2 (i.e., open windrows) initial volumes and volume reduction.

The process flow diagram is provided on the following page. A summary of the mass/volume balance is provided in Attachment 1.

Design Criteria

Our design criteria and assumptions are detailed below for each unit operation.

Phase 1 ASP

The feedstocks are mixed, per CSWD's recipe, and loaded into the Phase 1 ASP bays. The residence time in Phase 1 is 16 days. SCS assumed a volume reduction of 25 percent during the Phase 1 compost process.

Windrow Pad

After Phase 1, the material is unloaded from the bays and moved to the windrow pad. Key design criteria/ assumptions are as follows:

- The residence time on the windrow pad is 4 months. SCS assumed a volume reduction of 25 percent during the windrow turning process.
- The windrows are 18 feet wide by 8 feet high, with an effective cross-sectional area of 72 square feet.
- The aisle between windrows is 3 feet, toe to toe.
- The windrow pad is graded at a slope of 2.5 percent, with run-on and run-off control.
- Perimeter roads at each end to allow windrow turner to turn around, 30 feet at each end.
- Perimeter roads along each side, 25-feet wide.
- Contact water will flow through a compost filter berm on the north end and into storm water management system.

The windrow pad requires more room in comparison to the large curing piles that are currently used so excavation and filling activities are needed to expand the current curing area to the east. Additionally, the operation of the windrow turner must be done on uniformly-slope pad to facilitate movement of the turner. The windrow turner will be used year-round, on a weekly basis, so the pad must be properly compacted and topped with crushed stone for regular use. Stormwater run-on and run-off controls are needed to allow year-round use of the windrow pad.

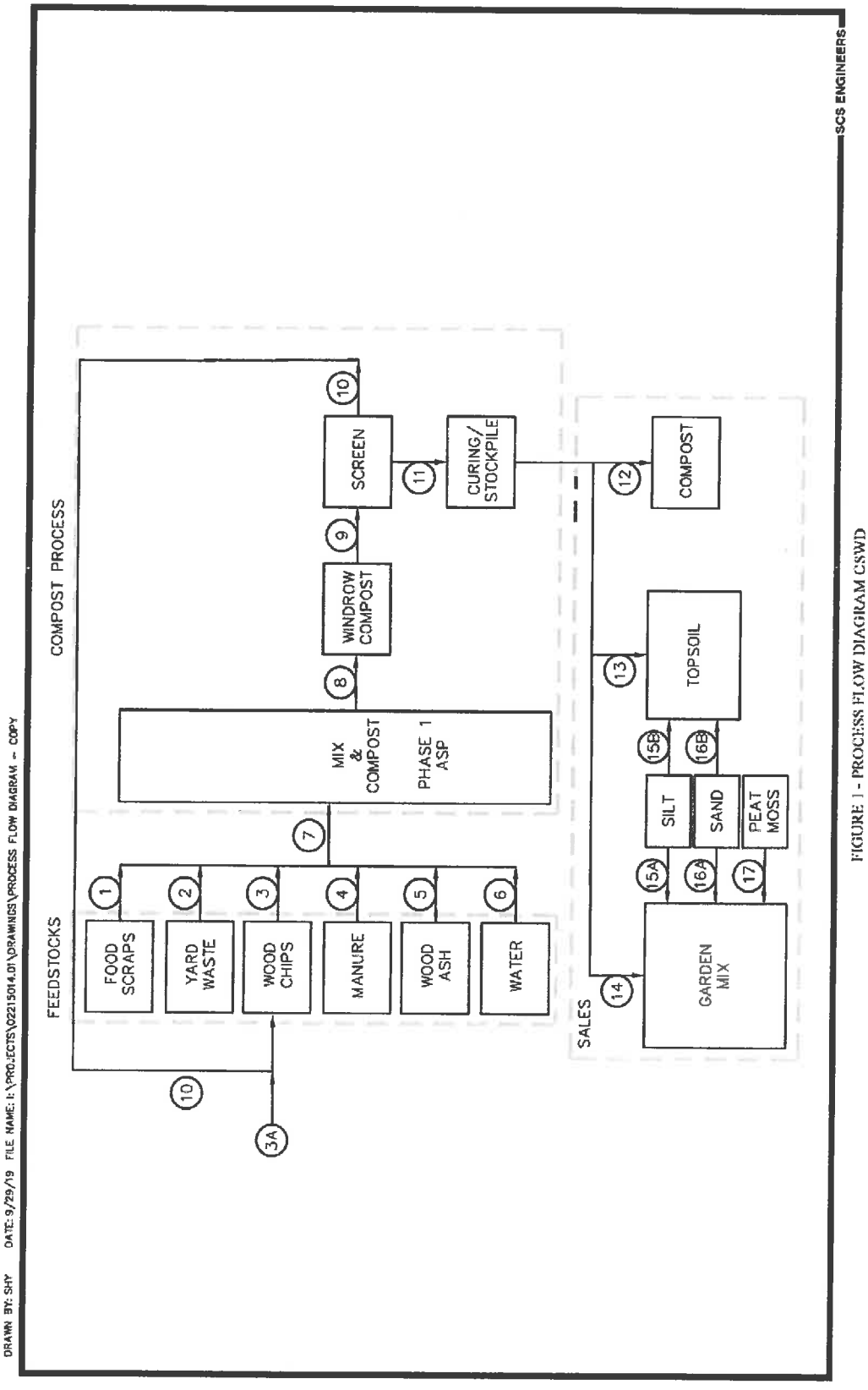


FIGURE 1 - PROCESS FLOW DIAGRAM CSWD

Sales Area

The height of the finished compost stockpiles is dependent on the capability of the front-end loader or the screen discharge conveyor. SCS assumed that CSWD's loader can stack compost to a height of 11 feet.

For estimating purposes, SCS assumed a finished compost stockpile width of 60 feet. The aisle between stockpiles is 10 feet, toe to toe. An access road width of 25 feet is required around the entire perimeter of the stockpiles.

Material is screened when it is moved from the windrow curing pad to the sales area. SCS assumed that 20 percent of the wood chips in the material mix is screened out and returned to the feedstock stockpile for re-use. SCS also assumed a volume reduction of 5 percent as the material resides in the stockpiles. The sales area is sized for the worst-case month, considering incoming and outgoing materials.

Construction of the windrow pad will result in excess fill material. This excess fill material will be used to elevate the current sales area. Currently, during wet periods, the existing sales area is inaccessible, due to suboptimal stormwater management. Elevation of the sales area and installation of perimeter stormwater controls will allow year-round access and operation of the sales area.

Design Layout

SCS prepared two site plans: one to illustrate the site improvements and the other to illustrate the operations (see Attachment 2). The site improvements plan depicts the following:

- Windrow pad, including grading.
- Sales area, including grading.
- Perimeter roads.
- Stormwater features, including toe drains and conveyance pipes (designed by others)

The operations plan depicts the following:

- Windrows, numbered 1 through 28.
- Sales stockpiles, labelled A, B and C.
- Perimeter roads.
- Summary of operations table, indicating the length of windrows and stockpiles available versus needed, based on steady-state operations.

DESIGN DETAILS

For the windrow pad, SCS assumed 12 inches of crushed stone, placed over geotextile, over a prepared subbase. For the sales area, SCS assumed 6 inches of crushed stone, placed over geotextile, over a prepared subbase.

Excess material excavated from the windrow pad area is used as fill in the sales area, which elevates the sales area above surrounding grade.

FOOD SCRAP TRANSFER OPTION

For food scraps in excess of 5,000 tons per year, one option available to CSWD is direct transfer of the excess tons, with no processing. For this option, SCS recommends use of ½ of an existing Phase 1 bay for short-term storage. For control of odors, a wood chip, compost cover, or other carbon source can be used, as necessary. Material would be loaded into a transfer trailer and transported to an organics management facility (e.g., Exeter Agri-Energy in Exeter, Maine).

DEPACKAGING

For food scraps in excess of 5,000 tons per year, SCS also considered an option involving an on-site depackaging system. Depackaging systems are typically able to process 8 to 30 cubic yards per hour, which equals approximately 5 to 20 tons of organic food waste per hour.

An additional benefit of a depackaging system is that all incoming food scrap material can be processed through the system, including the material that will be composted on site. The depackaging system will homogenize the food scrap material and allow more efficient composting in the Phase 1 ASP bays. Further, the depackaging system will remove some contamination that will result in a better finished product and improved sales.

For estimating purposes, SCS considered a Scott T42 depackaging system, with the following features:

- Stainless steel construction with wet kit and conveyors
- Above-ground, insulated storage tank for slurried material
- Fabric building, about 55 feet by 65 feet; fully-enclosed, minimally-heated

Installation of the depackaging equipment would require mechanical and electrical contractors.

COST ESTIMATES

SCS prepared cost estimates for the proposed site improvements (see Attachment 3), summarized as follows:

- Civil/site work for windrow and sales area: $800,000.
- Transfer option improvements: $10,000.
- Depackaging System: $600,000.

Please call with any questions.

Sincerely,

Stephen Ritman
Staff Engineer
SCS Engineers

Gregory P. McCarron, PE
Project Director
SCS Engineers

GPM

Purpose	The purpose of this workbook is to calculate the Mass and Volume Balance for Chittenden Solid Waste District's (CSWD) compost program in order to estimate site acreage requirements.
General Description of Model	This model uses CSWD's historical monthly feedstock data to create a monthly model of composting requirements. This data, along with some assumptions and inputs based on SCS expertise and conversations with CSWD, is used in a Mass/Volume Balance model to estimate volumes for each step in the process flow. The process is defined by the amount of food waste received and a feedstock recipe provided by CSWD. As such, stockpiles and deficits for each component, besides food, are calculated and presented in separate tabs. Sales stockpiles are also calculated based on projected sales values.

Description of Tabs

PFD	Process Flow Diagram. An image of each step of the process along with arrows to show flow, and stream numbers to match the Mass Balance Sheet stream numbers.
Inputs	This tab includes known or estimated values that are used throughout the rest of the workbook. These include component densities, volume reductions for each step, estimated sales, and stockpile and windrow cross sectional areas.
Feedstock	This is a version of data that CSWD provided, which is a breakdown of materials that they received each month since October 2014. At the bottom of the sheet, each month has summed values for Food Waste, Yard Waste, Wood Chips, Manure, and Wood Ash. Note that Manure totals do not include cow manure per our conversations with CSWD. The top of the spreadsheet contains a table of monthly averages over the 5 years of data, for each category.
Mass Balance	This sheet is an overview of how volume changes in each step of the compost process. The inputs are driven by monthly food values and the CSWD recipe, and the sales portion is driven by expected sales. Stockpiles are described in later sheets.
Yard	This sheet estimates the yard waste mass/volume balance throughout the year. Monthly values are split up into how much is needed for composting that month, how much can be stockpiled or drawn down from the stockpile depending on this difference, and how much yard waste is cumulatively stockpiled, along with the area this stockpile will take up.
Wood Chips	This sheet estimates the wood chip mass/volume balance throughout the year. Monthly values are split up into how much is needed for composting that month, how much can be stockpiled or drawn down from the stockpile depending on this difference, and how much of the wood chips is cumulatively stockpiled, along with the area this stockpile will take up. There are also columns for wood chip recycle and wood chips bought, since wood chips can be purchased to meet the recipe's needs
Manure	This sheet estimates the manure mass/volume balance throughout the year. Monthly values are split up into how much is needed for composting that month, how much can be stockpiled or drawn down from the stockpile depending on this difference, and how much manure is cumulatively stockpiled, along with the area this stockpile will take up.
Wood Ash	This sheet estimates the wood ash mass/volume balance throughout the year. Monthly values are split up into how much is needed for composting that month, how much can be stockpiled or drawn down from the stockpile depending on this difference, and how much wood ash is cumulatively stockpiled, along with the area this stockpile will take up.
Sales	This sheet calculates how much compost is needed to meet the expected sales predictions. Additives like silt, sand, and peat moss are also shown. Demand is assumed to vary throughout the year according to the distribution shown. The sales stockpile and the corresponding area are also calculated.

ATTACHMENT 1

Windrows	The windrows sheet estimates how much length is needed for the windrows in each month, given that month's compost volume and assumed composting period
Windrow Stats	This sheet uses the Windrow Length from the previous sheet to look up the number of windrows and associated area required. The areas in this sheet are taken from the AutoCAD drawing. This drawing assumes a windrow width of 18 feet, and includes the perimeter road in its area calculation.
Area Requirements	This sheet summarizes the area requirements for the input stockpiles, windrows, and sales stockpile. It uses maximum and minimum lengths and associated areas based on the input geometry. This sheet should help plan for maximum stockpile areas in planning, and also help see how the areas change over the year, from minimum to maximum piles
CSWD Recipe	This is the recipe provided by CSWD from which we got the density assumptions and ratios of food waste to all other compost inputs
Annual - Not Used	Not directly used in this spreadsheet
Questions	Questions that arise as we are working on the project are placed here

ASSUMPTIONS

Volume Reductions	
Food Stockpile to Phase 1 ASP	0%
Woodchip Stockpile to Phase 1 ASP	0%
Leaf Stockpile to Phase 1 ASP	0%
Manure Stockpile to Phase 1 ASP	0%
Phase 1 ASP to Open Windrows	25%
Open Windrows to Curing Stockpile	25%
Curing Stockpile to Product Stockpile	5%

Densities		
Food Waste	lb/cy	1,400
Yard Waste	lb/cy	550
Wood Chips	lb/cy	550
Manure	lb/cy	750
Wood Ash	lb/cy	250

Woodchips		
Recycling Rate		20%
Wood Chips in ASP	lb/yr	2000

Water		
Density	lb/cy	1,685

Sales		
Compost	CY, annual	4,659
Topsoil	CY, annual	4,025
Garden Mix	CY, annual	4,600
Silt - Topsoil	CY/CY topsoil	0.25
Silt - Garden Mix	CY/CY garden mix	0.20
Sand - Topsoil	CY/CY topsoil	0.21
Sand - Garden Mix	CY/CY garden mix	0.15
Peat Moss	CY/CY garden mix	0.10

Stockpiles			
Yard	Height	ft	13
	Width	ft	50
	Area	ft^2	325
Wood Chips	Height	ft	13
	Width	ft	30
	Area	ft^2	195
Manure	Height	ft	13
	Width	ft	30
	Area	ft^2	195
Wood Ash	Height	ft	13
	Width	ft	30
	Area	ft^2	195
Sales	Height	ft	11
	Width	ft	60
	Area	ft^2	330
Silt & Sand	Height	ft	11
	Cone-Shaped		

Windrows		
Height	ft	8
Width	ft	18
Area	ft^2	72
Turn Rate	CY/hr	3,000
Residence Time	months	4
Full Months	months	4
Partial Month	months	0

FIVE-YEAR HISTORICAL AVERAGES

Stream	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total (tons)	Total (CY)
Food Scraps (tons)	366	386	407	425	423	391	393	428	452	453	388	376	4,887	6,982
Yard Waste (tons)	205	114	61	719	775	427	159	280	302	559	1,164	465	5,230	19,019
Wood Chips (tons)	17	26	174	135	25	44	24	34	41	53	5	58	635	2,309
Manure (tons)	86	103	100	111	110	144	118	122	111	82	58	80	1,225	3,267
Wood Ash (tons)	38	12	12	60	38	4	21	30	20	23	30	19	309	2,471
													12,286	**34,047**

	Feedstocks							Compost Process				Sales		
Stream Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Stream Description	Food Scraps	Yard Waste to ASP	Wood Chips to ASP	Manure	Wood Ash	Water	Total Input to ASP	Windrows	Screen	Wood Chip Recycle	Curing	Compost	Topsoil	Garden Mix
October														
Mass (tons)	453	458	224	104	17	237	1493			41				
Density (lb/CY)	1400	550	550	750	250	1685	843			550				
Volume (CY)	647	1665	814	277	139	281	3542	2,657	1,993	150	1,843	373	174	202
% (by weight)	30%	31%	15%	7%	1%	16%	100%							
% (by volume)	18%	47%	23%	8%	4%	8%	100%							
November														
Mass (tons)	388	392	198	89	15	204	1287			41				
Density (lb/CY)	1400	550	550	750	250	1685	842			550				
Volume (CY)	555	1426	721	238	119	242	3058	2,294	1,720	150	1,571	93	43	51
% (by weight)	30%	30%	15%	7%	1%	16%	100%							
% (by volume)	18%	47%	24%	8%	4%	8%	100%							
December														
Mass (tons)	376	380	193	86	14	198	1248			41				
Density (lb/CY)	1400	550	550	750	250	1685	841			550				
Volume (CY)	537	1381	704	230	115	235	2966	2,225	1,668	150	1,519	47	22	25
% (by weight)	30%	30%	16%	7%	1%	16%	100%							
% (by volume)	18%	47%	24%	8%	4%	8%	100%							
January														
Mass (tons)	366	369	189	84	14	193	1215			41				
Density (lb/CY)	1400	550	550	750	250	1685	841			550				
Volume (CY)	522	1343	689	224	112	229	2891	2,168	1,626	150	1,476	0	0	0
% (by weight)	30%	30%	16%	7%	1%	16%	100%							
% (by volume)	18%	46%	24%	8%	4%	8%	100%							
February														
Mass (tons)	386	390	197	89	15	203	1279			41				
Density (lb/CY)	1400	550	550	750	250	1685	841			550				
Volume (CY)	551	1416	718	236	118	241	3039	2,279	1,709	150	1,560	47	22	25
% (by weight)	30%	30%	15%	7%	1%	16%	100%							
% (by volume)	18%	47%	24%	8%	4%	8%	100%							

	Feedstocks							Compost Process				Sales		
Stream Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Stream Description	Food Scraps	Yard Waste to ASP	Wood Chips to ASP	Manure	Wood Ash	Water	Total Input to ASP	Windrows	Screen	Wood Chip Recycle	Curing	Compost	Topsoil	Garden Mix
March														
Mass (tons)	407	411	206	93	16	214	1347			41				
Density (lb/CY)	1400	550	550	750	250	1685	842			550				
Volume (CY)	582	1496	748	249	125	254	3200	2,400	1,800	150	1,650	233	109	127
% (by weight)	30%	31%	15%	7%	1%	16%	100%							
% (by volume)	18%	47%	23%	8%	4%	8%	100%							
April														
Mass (tons)	425	429	213	98	16	223	1404			-				
Density (lb/CY)	1400	550	550	750	250	1685	842			550				
Volume (CY)	607	1561	774	260	130	264	3333	2,500	1,875	-	1,875	839	391	455
% (by weight)	30%	31%	15%	7%	1%	16%	100%							
% (by volume)	18%	47%	23%	8%	4%	8%	100%							
May														
Mass (tons)	423	428	212	97	16	222	1399			41				
Density (lb/CY)	1400	550	550	750	250	1685	842			550				
Volume (CY)	605	1555	771	259	130	263	3320	2,490	1,868	150	1,718	1351	630	734
% (by weight)	30%	31%	15%	7%	1%	16%	100%							
% (by volume)	18%	47%	23%	8%	4%	8%	100%							
June														
Mass (tons)	391	394	199	90	15	205	1294			41				
Density (lb/CY)	1400	550	550	750	250	1685	842			550				
Volume (CY)	558	1435	725	239	120	244	3076	2,307	1,730	150	1,580	606	283	329
% (by weight)	30%	30%	15%	7%	1%	16%	100%							
% (by volume)	18%	47%	24%	8%	4%	8%	100%							
July														
Mass (tons)	393	397	200	90	15	207	1304			41				
Density (lb/CY)	1400	550	550	750	250	1685	842			550				
Volume (CY)	562	1445	729	241	120	246	3097	2,323	1,742	150	1,593	373	174	202
% (by weight)	30%	30%	15%	7%	1%	16%	100%							
% (by volume)	18%	47%	24%	8%	4%	8%	100%							

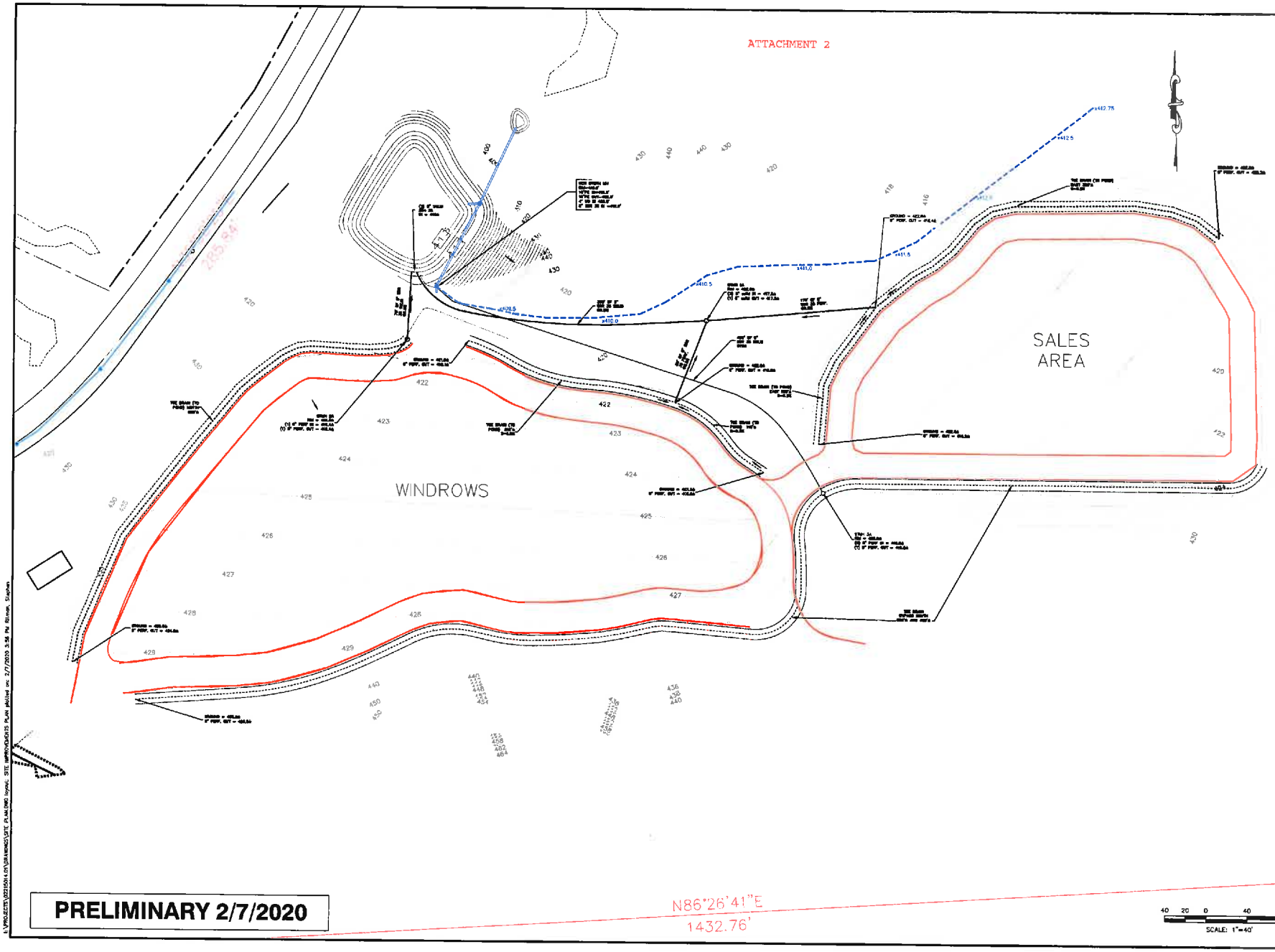
	Feedstocks							Compost Process				Sales		
Stream Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Stream Description	Food Scraps	Yard Waste to ASP	Wood Chips to ASP	Manure	Wood Ash	Water	Total Input to ASP	Windrows	Screen	Wood Chip Recycle	Curing	Compost	Topsoil	Garden Mix
August														
Mass (tons)	428	432	214	98	16	224	1412			41				
Density (lb/CY)	1400	550	550	750	250	1685	843			550				
Volume (CY)	611	1571	777	262	131	266	3351	2,514	1,885	150	1,735	326	152	177
% (by weight)	30%	31%	15%	7%	1%	16%	100%							
% (by volume)	18%	47%	23%	8%	4%	8%	100%							
September														
Mass (tons)	452	456	223	104	17	236	1489			41				
Density (lb/CY)	1400	550	550	750	250	1685	843			550				
Volume (CY)	645	1660	812	277	138	280	3532	2,649	1,987	150	1,837	373	174	202
% (by weight)	30%	31%	15%	7%	1%	16%	100%							
% (by volume)	18%	47%	23%	8%	4%	8%	100%							

Stream			12		13		14	15A	15B	16A	16B	17				
	Total Cured	Demand	Compost Sales	Topsoil Sold	Compost in Topsoil	Garden Mix Sold	Compost in Garden Mix	Silt Needed Garden Mix	Silt Needed Topsoil	Sand Needed Garden Mix	Sand Needed Topsoil	Peat Moss Needed	Compost Added to Stockpile	Stockpile Drawdown	Cumulative Stockpile	Sales Stockpile Length (ft)
October	1,501	8%	373	322	174	368	202	74	81	55	68	37	752	-	752	62
November	1,513	2%	93	81	43	92	51	18	20	14	17	9	1,326	-	2,078	170
December	1,649	1%	47	40	22	46	25	9	10	7	8	5	1,555	-	3,633	297
January	1,745	0%	-	-	-	-	-	-	-	-	-	-	1,745	-	5,378	440
February	1,751	1%	47	40	22	46	25	9	10	7	8	5	1,657	-	7,035	576
March	1,492	5%	233	201	109	230	127	46	50	35	42	23	1,024	-	8,059	659
April	1,443	18%	839	725	391	828	455	166	181	124	152	83	-	242	7,817	640
May	1,402	29%	1,351	1,167	630	1,334	734	267	292	200	245	133	-	1,313	6,504	532
June	1,482	13%	606	523	283	598	329	120	131	90	110	60	265	-	6,769	554
July	1,568	8%	373	322	174	368	202	74	81	55	68	37	819	-	7,587	621
August	1,781	7%	326	282	152	322	177	64	70	48	59	32	1,126	-	8,713	713
September	1,632	8%	373	322	174	368	202	74	81	55	68	37	883	-	9,596	785
Annual	18,959	100%	4,659	4,025	2,174	4,600	2,530	920	1,006	690	845	460				
Totals			9,363					1,926		1,535		460	-	-	-	785
Grand Total			13,284													

Windrow Analysis

Month	Volume Added	Length Added	Total Length
October	2,657	996	3,803
November	2,294	860	3,792
December	2,225	834	3,684
January	2,168	813	3,504
February	2,279	855	3,362
March	2,400	900	3,402
April	2,500	937	3,505
May	2,490	934	3,626
June	2,307	865	3,636
July	2,323	871	3,607
August	2,514	943	3,613
September	2,649	993	3,672
Peak			3,803

ATTACHMENT 2



PRELIMINARY 2/7/2020

NO.	REVISION	DATE

SHEET TITLE: SITE IMPROVEMENTS PLAN

PROJECT TITLE: CSWD COMPOST FACILITY
WILLISTON, VERMONT

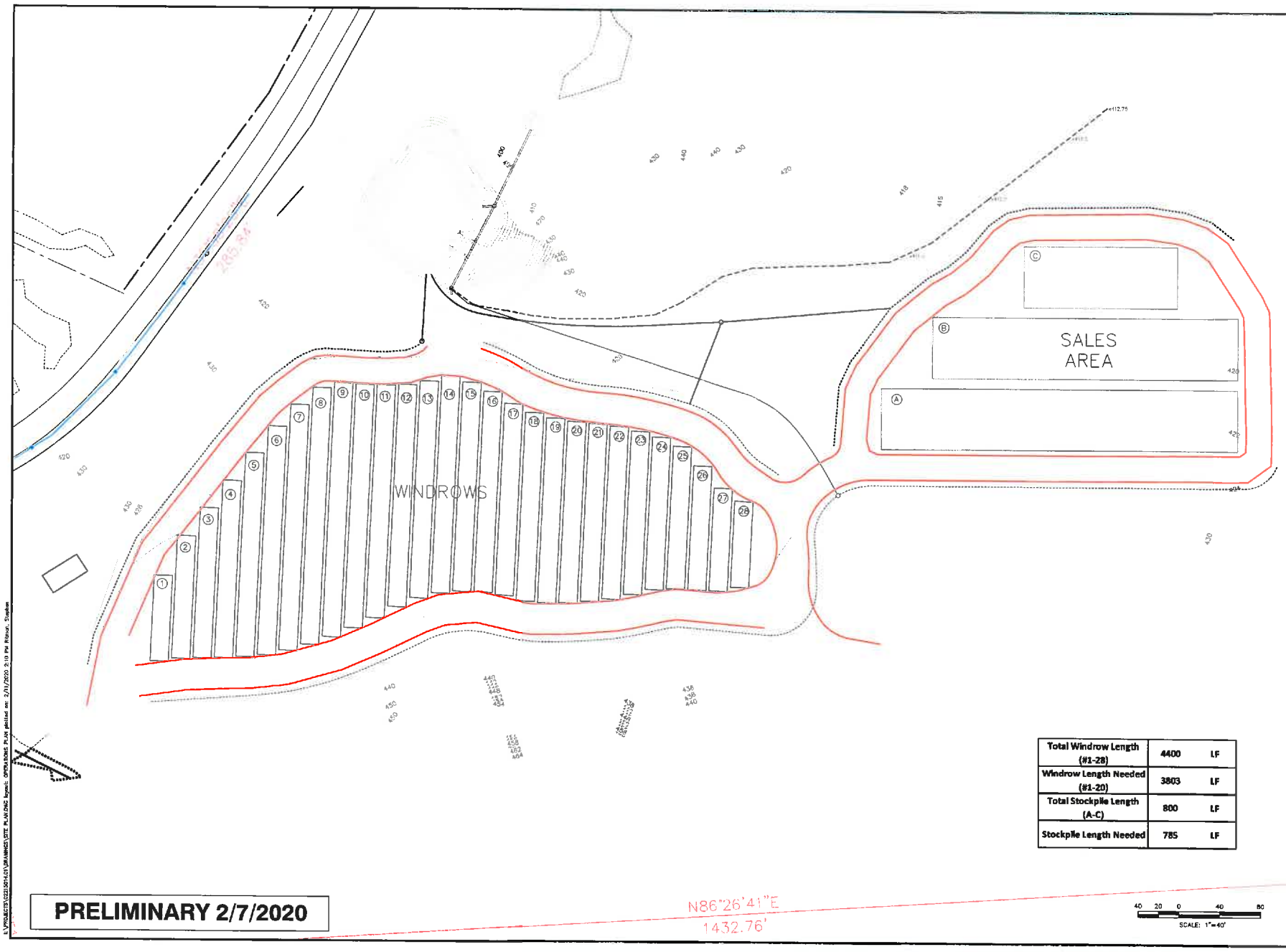
CLIENT: CSWD
CHITTENDEN SOLID WASTE DISTRICT
1021 REDMOND ROAD
WILLISTON VERMONT 05495

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS, INC.
PH. (603) 357-1616 FAX: (603) 357-1649

PROJ. NO. 02215014.01
DES. BY: DPM
DRN. BY: SWS
CHK. BY:
APP. BY:

CADD FILE: Site Plan
DATE: 2/7/2020
SCALE: 1" = 40'
DRAWING NO. 1 of 2

L:\PROJECTS\02215014.01\DRAWINGS\SITE PLAN\DWG topoLC SITE IMPROVEMENTS PLAN plotted on: 2/7/2020 3:56 PM Richard Stephen



Total Windrow Length (#1-28)	4400	LF
Windrow Length Needed (#1-20)	3803	LF
Total Stockpile Length (A-C)	800	LF
Stockpile Length Needed	785	LF

PRELIMINARY 2/7/2020

NO. | REVISION | DATE

SHEET TITLE: OPERATIONS PLAN

PROJECT TITLE: CSWD COMPOST FACILITY WILLISTON, VERMONT

CLIENT: CSWD CHITTENDEN SOLID WASTE DISTRICT 1021 REDMOND ROAD WILLISTON VERMONT 05495

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS, INC.
4 EXECUTIVE BLVD, SUITE 201, SUFFERN, NY 10901
PH: (845) 357-1930 FAX: (845) 357-1965

CADD FILE: Site Plan
DATE: 2/7/2020
SCALE: 1" = 40'
DRAWING NO. 2 of 2

L:\PROJECTS\02250014.01\DRAWINGS\SITE PLAN.DWG ltgsel: OPERATIONS PLAN plotted on: 2/7/2020 2:10 PM Ritner, Stephen

SITE IMPROVEMENTS
ODF, CSWD

Payment Item (PI)#	Description of Work	Quantity	Unit	Engineer's Estimate (SCS) 1/3/2020 Unit Price ($)	Total Cost ($)	Cost Comments
	Mobilization/ Demobilization					
1	a. Mobilization/Demobilization	1	Lump Sum	$ 27,364	$ 27,364	4% of total estimate (less PI1)
2	b. As-built Drawings	1	Lump Sum	$ 2,000	$ 2,000	estimate
	Subgrade preparation					
3	a. Clearing and Grubbing	2	AC	$ 5,000	$ 10,000	estimate
4	b. Cut and fill to excavation grades; fill sales area	18,300	CY	$ 10	$ 183,000	Net cut; $7-10/cy per SD Ireland
	Final Grading and Surfaces					
5	a. Windrow pad, filter fabric	19,000	SY	$ 1.00	$ 19,000	estimate
6	b. Windrow pad, 5A stone, 12" thick	7,500	CY	$ 27	$ 202,500	includes 20% extra; $27/cy per SD Ireland
7	c. Sales area, filter fabric	15,000	SY	$ 1.00	$ 15,000	estimate
8	d. Sales area, 5A stone, 6" thick	3,000	CY	$ 27	$ 81,000	includes 20% extra; $27/cy per SD Ireland
	Erosion Control Material					
9	a. Erosion Control Material	3,300	SY	$ 2.00	$ 6,600	SCS Estimate
	Seeding					
10	a. Seed, mulch	30	MSF	$ 1,500.00	$ 45,000	Means estimate
	Stormwater Management					
11	Toe Drain (Bypass Collection)	1300	LF	$ 30	$ 39,000	O'Leary & Burke
12	Toe Drain (Drains to Pond)	1540	LF	$ 30	$ 46,200	O'Leary & Burke
13	8" SDR 35 PVC Solid Trench	770	CY	$ 25	$ 19,250	O'Leary & Burke
14	Storm Structures	3	EA	$ 2,500	$ 7,500	O'Leary & Burke
15	Miscellaneous	1	LS	$ 8,050	$ 8,050	O'Leary & Burke
		Payment Items Subtotal:			$ 711,464	
			Contingency	15%	$ 106,720	
			TOTAL OF ALL BID ITEMS:		**$ 818,000**	

ATTACHMENT 3